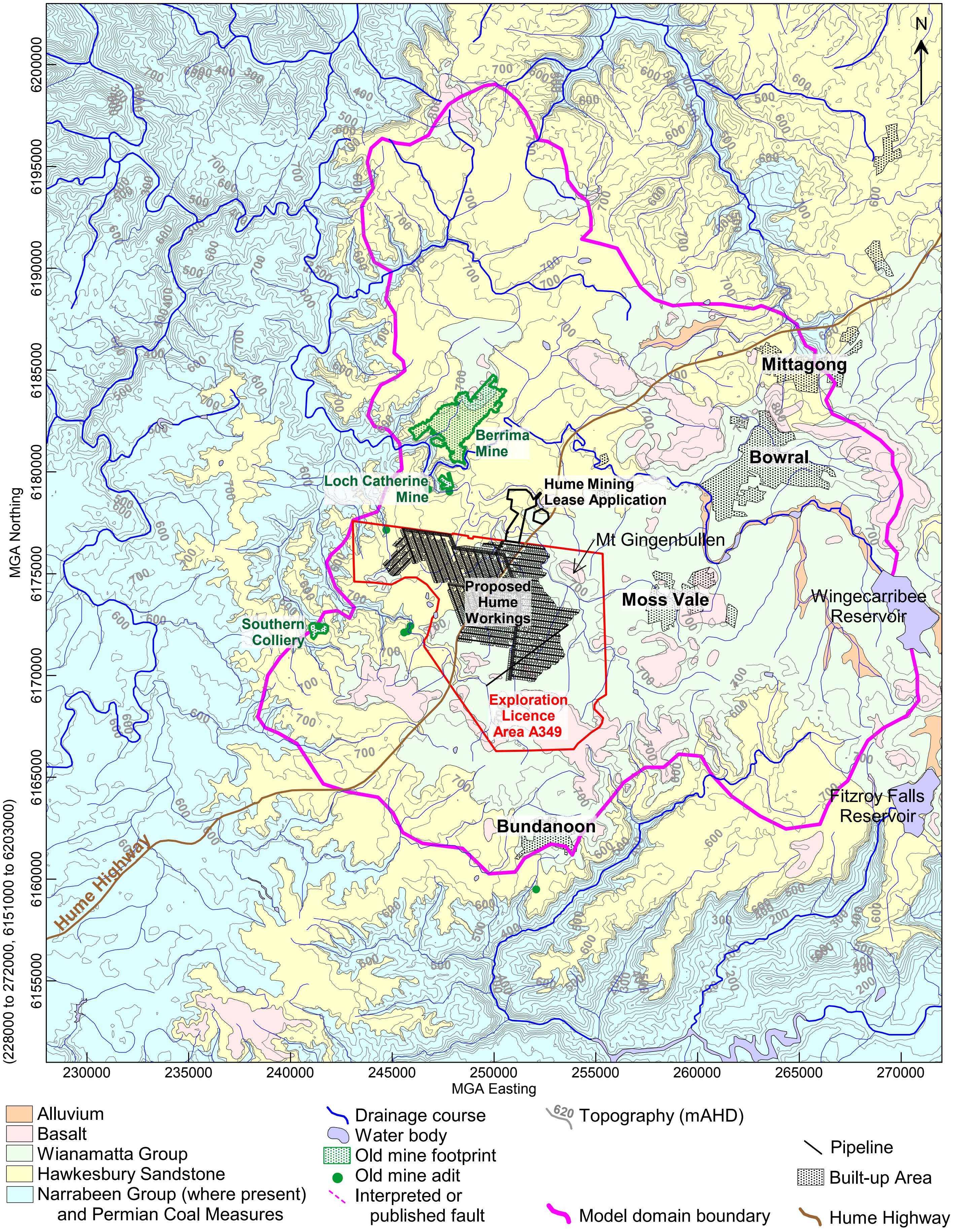
Drawings



drawn	PT	client:	Hume Coal Pty Limited
approved	RJB	project:	Hume Coal Project Groundwater Assessment
date	30 Jun 2016		
scale	1:250,000	title:	**Regional Locality Plan**
original size	A4	project no: GEOTLCOV25281AB	figure no: **Drawing 1**

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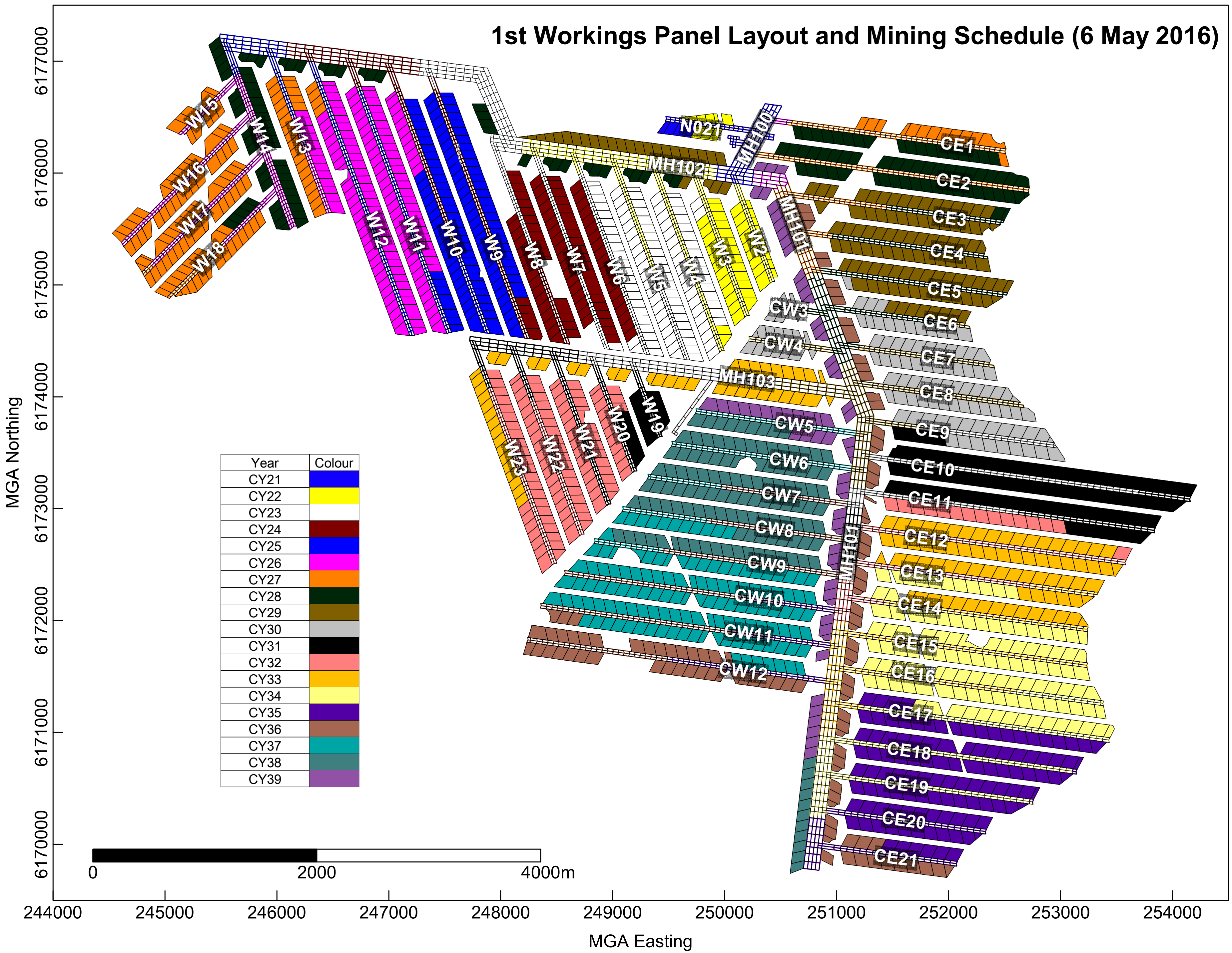
Appendix A - Hume Mining Schedule and Mining Heights

Production Volume by Panel / Heading

Panel or Heading	Start Date	Finish Date	Development (m^3)	Web Panel (m^3)	Total Void Volume (m^3)
N021	30/08/21	03/02/22	53000	112324	165324
CE001	11/12/26	17/04/28	141270	406099	547370
CE002	16/01/27	22/12/28	166886	574940	741826
CE003	11/09/27	09/07/29	128338	436958	565296
CE004	28/11/27	13/11/29	109862	414865	524727
CE005	15/02/28	13/01/30	112990	425862	538852
CE006	23/08/28	27/03/30	81445	300909	382355
CE007	18/12/28	29/05/30	87838	317630	405468
CE008	05/05/29	29/08/30	97408	359660	457068
CE009	02/11/29	30/01/31	99444	345500	444944
CE010	06/03/30	29/11/31	180104	640784	820888
CE011	15/07/30	27/03/32	169478	589618	759096
CE012	04/02/32	15/08/33	155942	538008	693950
CE013	19/06/32	08/03/34	141506	467821	609327
CE014	20/11/32	28/04/34	138995	460634	599629
CE015	13/03/33	20/09/34	140950	453273	594223
CE016	25/06/33	03/12/34	152838	507858	660696
CE017	30/11/33	25/05/35	155053	522297	677349
CE018	12/04/34	16/12/35	130759	443055	573814
CE019	22/05/34	03/07/35	100516	353978	454495
CE020	06/01/35	23/11/35	81320	271559	352879
CE021	15/04/35	21/03/36	65624	216580	282205
CW003	17/09/28	20/06/30	27115	44653	71767
CW004	29/01/29	25/08/30	50238	148636	198875
CW005	26/03/37	11/04/39	96382	335596	431978
CW006	20/03/37	07/11/38	108869	366418	475287
CW007	07/08/36	30/10/38	121112	446080	567191
CW008	26/07/36	04/06/38	133357	498474	631831
CW009	11/06/36	23/04/38	148291	513884	662175
CW010	17/09/35	25/10/37	162578	597347	759926
CW011	07/09/35	07/09/37	167544	609570	777114
CW012	01/07/35	11/02/37	154509	501831	656340
W002	11/01/22	22/07/22	64320	154808	219128
W003	04/03/22	16/01/23	90592	326586	417178
W004	14/05/22	05/07/23	117990	438896	556886
W005	16/08/22	04/12/23	128534	526146	654680
W006	18/12/22	17/04/24	128639	526733	655373
W007	24/04/23	26/07/24	123296	480552	603848
W008	05/08/23	27/09/24	126240	379480	505720
W009	23/12/23	28/10/25	176565	764067	940632
W010	03/05/24	24/02/26	162667	702219	864886
W011	01/12/24	20/10/26	160779	708405	869184
W012	03/01/25	23/01/27	153907	660482	814389
W013	12/10/25	02/05/27	91723	387584	479307
W014	18/11/25	09/08/28	144976	384351	529327
W015	21/03/26	21/03/27	47509	131872	179381
W016	10/05/26	03/09/27	102408	361532	463939
W017	20/06/26	13/10/27	86833	343298	430130
W018	29/09/26	29/01/28	73288	273653	346941
W019	26/02/31	14/07/31	43205	121872	165077
W020	21/03/31	17/03/32	65875	232148	298024
W021	20/05/31	08/08/32	91166	324085	415251
W022	03/11/31	22/12/32	108283	409721	518003
W023	11/11/31	23/03/33	109939	405264	515204
MH100	21/04/21	13/10/21	86773		86773
MH101	03/04/27	05/08/39	787191	1106498	1893689
MH102	13/10/21	31/08/39	701852	659579	1361431
MH102ext	05/03/23	30/06/23	14888		14888
MH103	09/06/29	06/10/33	311013	425330	736343
Shaft	19/08/21	29/08/21	5697		5697
Shaft2	29/05/30	15/07/30	25139		25139
Sump	19/09/21	22/10/21	15082		15082
TOTAL			8207931	24457865	32665796

Annual Production Mass and Volumes

Calendar Year	Mining Year	Total Run-Of-Mine Coal (Mt)	Total Void Volume (m^3)
2021	1	0.381	247980
2022	2	1.693	1102692
2023	3	2.819	1839725
2024	4	2.537	1665325
2025	5	2.824	1841464
2026	6	3.084	1994056
2027	7	3.147	2045160
2028	8	3.161	2040342
2029	9	3.314	2154903
2030	10	2.871	1888687
2031	11	2.726	1772364
2032	12	2.950	1915615
2033	13	3.282	2132458
2034	14	3.289	2102426
2035	15	3.041	1853594
2036	16	2.593	1671060
2037	17	3.081	2013607
2038	18	2.546	1640445
2039	19	1.141	743896
TOTAL		50.5	32665796



1st Workings Panel Layout and Mining Schedule (6 May 2016)
MGA Northing
MGA Easting
6170000
6171000
6172000
6173000
6174000
6175000
6176000
6177000
244000
245000
246000
247000
248000
249000
250000
251000
252000
253000
254000
0
2000
4000m
W15
W14
W13
W16
W17
W18
W12
W11
W10
W9
W8
W7
W6
W5
W4
W3
W2
N021
MH100
MH102
MH101
CE1
CE2
CE3
CE4
CE5
CE6
CE7
CE8
CE9
CE10
CE11
CE12
CE13
CE14
CE15
CE16
CE17
CE18
CE19
CE20
CE21
CW3
CW4
CW5
CW6
CW7
CW8
CW9
CW10
CW11
CW12
MH103
MH104
W19
W20
W21
W22
W23
Year
Colour
CY21
CY22
CY23
CY24
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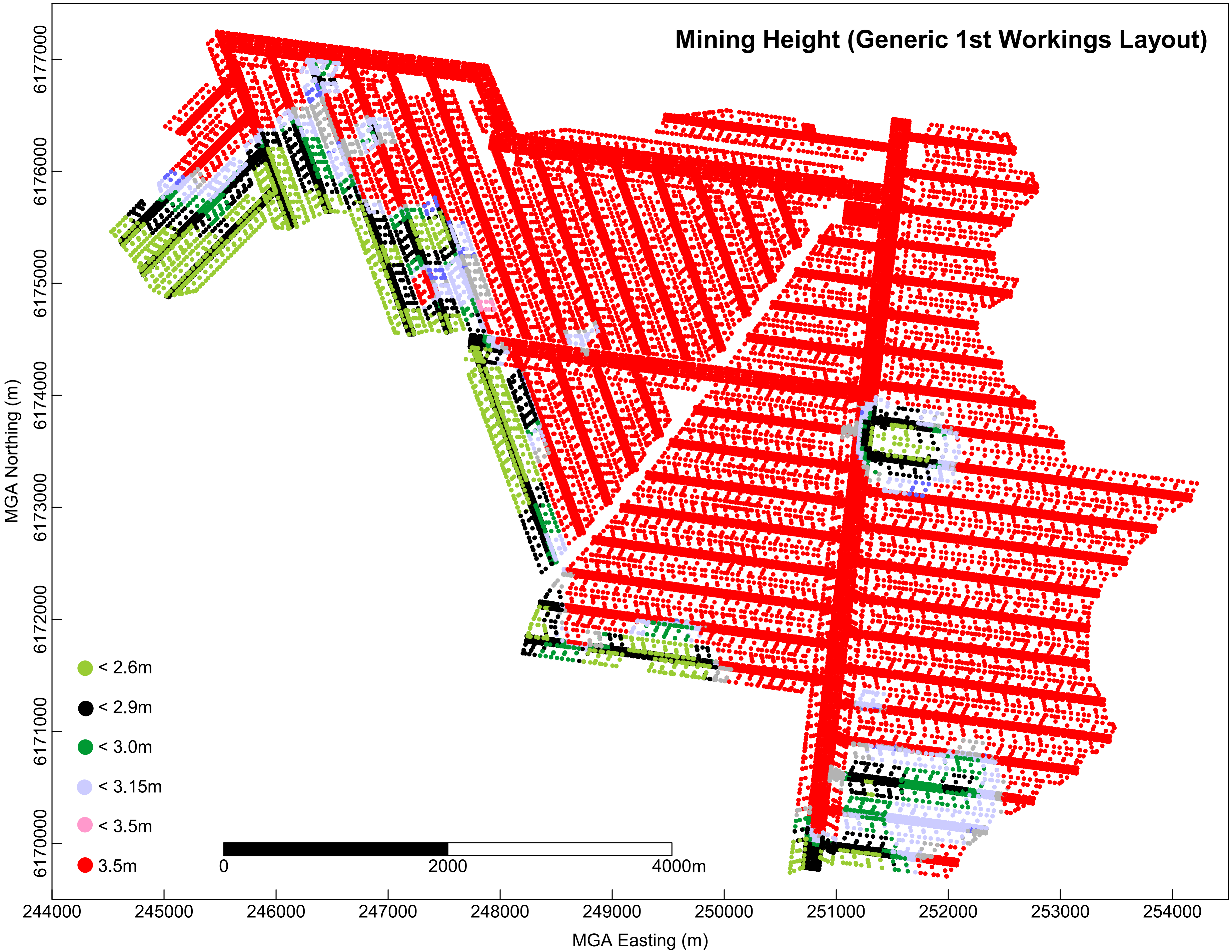
CY35
CY36
CY37
CY38
CY39


Mining Height (Generic 1st Workings Layout)
MGA Northing (m)
6177000
6176000
6175000
6174000
6173000
6172000
6171000
6170000
MGA Easting (m)
244000
245000
246000
247000
248000
249000
250000
251000
252000
253000
254000
< 2.6m
< 2.9m
< 3.0m
< 3.15m
< 3.5m
3.5m
0
2000
4000m

Appendix B - Hydraulic Head Targets and Calibrated Hydrographs

Table B1. Piezometers Used for Calibration Targets

Monitoring Network	Piezometer	Easting (MGA)	Northing (MGA)	RL Ground (mAHD)	RL Casing (mAHD)	Drilled Depth (mbgl)	Screen (mbgl) From	Screen (mbgl) To	Sandpack (mbgl) From	Sandpack (mbgl) To	Screened Stratum	L (m)
Hume	H18A	246696	6174166	691.74	691.67	108	96	99	95	99	WW	4
	H18B	246695	6174159	691.97	691.89	114	75	88	73	88	HAW	15
	H19A	243557	6174381	720.65	720.55	108	100	103	100	103	WW	3
	H19B	243562	6174379	720.46	720.36	88	70	81	69	81	HAW	12
	H20B	244255	6176930	703.67	703.59	114	80	86	78	86	WW	8
	H35A	250523	6172486	681.43	682.16	152	53	77	50	78	HAW	28
	H35B	250531	6172487	680.84	681.52	35	15	34	14	35	WG	21
	H37A	246551	6167440	703.79	703.70	111	101	105	101	107	ICM	6
	H37B	246546	6167438	703.77	703.69	90	72	87	70	90	HAW	20
	H38A	248783	6175453	658.53	657.67	117	105	108	103	110	WW	7
	H38B	248788	6175452	658.44	658.33	78	74	77	72	78	HAW	6
	H38C	248793	6175452	658.31	658.17	63	55	62	52	63	HAW	11
	H42A	250988	6166688	702.50	702.43	173	156	159	153	161	WW	8
	H42C	250985	6166678	702.00	701.92	150	142	150	135	150	HAW	15
	H43XA	247147	6178127	692.04	691.96	111	95	101	93	103	WW	10
	H43XB	247152	6178133	691.77	691.69	87	77	86	75	87	HAW	12
	H44XA	242285	6164084	641.94	641.92	12	8	11	7	12	WW	5
	H44XB	242281	6164077	647.00	646.96	5	4	5	3.5	5	HAW	2
	H56XB	245225	6169198	735.45		140	132	140	130	140	HAW	10
	H72A	252074	6177157	640.12	640.05	129	124	128	121	129	WW	8
	H72B	252083	6177169	640.43	640.36	99	92	98	88	98	HAW	10
	H72C	252091	6177180	640.85	640.77	46	39	45	35	46	HAW	11
	H73A	251015	6172718	656.46	657.00	172	151	169	149	172	CM Lower	23
	H73B	251029	6172717	655.78	656.35	124	119	123	117	124	WW	7
	H73C	251035	6172717	655.50	656.13	86	79	85	77	86	HAW	9
	H88A	253059	6173144	655.44	655.37	156	143	146	141	148	WW	7
	H88B	253059	6173144	655.33	655.26	150	121	126	119	128	HAW	9
	H96A	246489	6177025	699.21	699.14	147	111	120	108	120	CM Lower	12
	H96B	246491	6177029	699.10	699.00	101	92	98	91	101	WW	10
	H96C	246494	6177045	683.00	682.94	89	69	87	67	89	HAW	22
	H129A	253042	6171301	679.10	679.04	177	166	170	165	171	WW	6
	H129B	253044	6171306	679.20	679.11	177	146	153	146	153	HAW	7
	H136A	254521	6166894	718.49	718.36	216	199	203	196	203	WW	7
	H136B	254517	6166890	718.52	718.40	168	157	168	155	168	HAW	13
	H142A(&H23A)*	250769	6169622	680.47	680.38	140	135	138	135	138	WW	3
	H142B(&H23B)*	250763	6169620	680.63	680.55	132	118	130	116	130	HAW	14
	H142C(&H23C)*	250755	6169617	680.76	680.69	100	84	97	82	97	HAW	15
	H143A(&H133A)*	249685	6176683	648.15	647.98	141	119	126	115	127	CM Lower	12
	H143B(&H133B)*	249688	6176688	648.17	648.04	113	108	113	108	113	WW	5
	H143C(&H133C)*	249690	6176694	648.03	647.94	84	80	83	77	84	HAW	7
Berrima	DeBeaujeu^	250915	6185343	678.00	678.00	50	7	50	Open hole		HAW	42
	Belbin^	249914	6183996		691.40	186	132	186	Open hole		ICM Lower	54
	Culpepper P^	250100	6185126		693.00	41		41	Open hole		HAW	< 41
	B62_Upper	249411	6184243	727.00	727.00	181	58	58	VWP	VWP	HAW	Point
	B62_Lower	249411	6184243	727.00	727.00	181	126	126	VWP	VWP	HAW	Point
	B62_WW	249411	6184243	727.00	727.00	181	170	170	VWP	VWP	WW	Point
	B63_Upper	249907	6184861	738.00	738.00	185	85	85	VWP	VWP	HAW	Point
	B63_Lower	249907	6184861	738.00	738.00	185	133	133	VWP	VWP	HAW	Point
	B63_WW	249907	6184861	738.00	738.00	185	177	177	VWP	VWP	WW	Point

HAW: Hawkesbury Sandstone. WW: Wongawilli Seam. WG: Wianamatta Group.

ICM: Illawarra Coal Measures. SS: Sandstone. Sh: Shale.

* Piezometer in brackets replaced with first one. Coords and completions are for replaced piezometer.

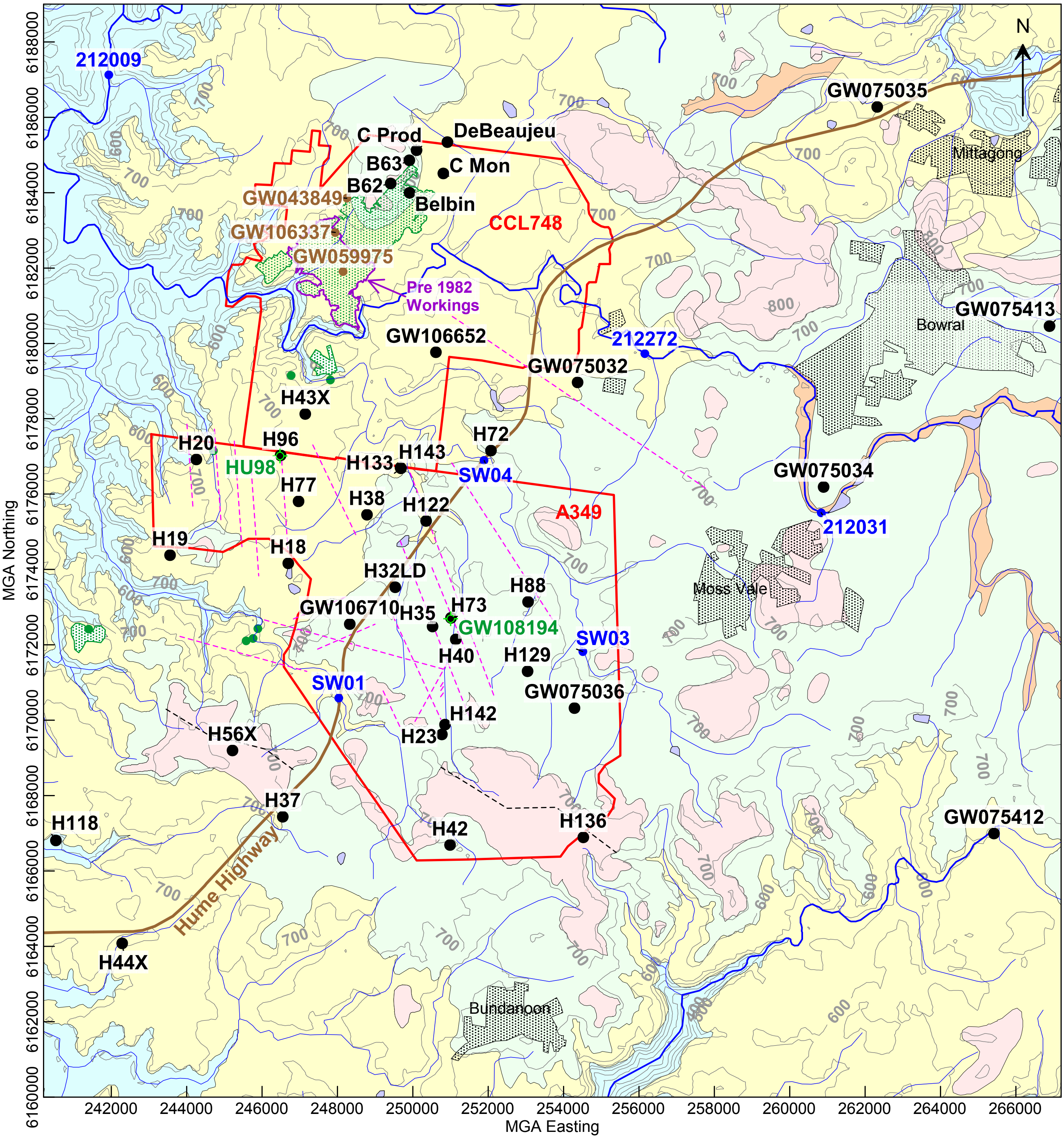
Strongly affected by subvertical barriers.

^ Registration Numbers: DeBeaujeu: GW028373; Belbin: GW106150; Culpepper P: GW101581.

Table B2. Piezometers Not Used for Calibration Targets

Monitoring Network	Piezometer	Easting (MGA)	Northing (MGA)	RL Ground (mAHD)	RL Casing (mAHD)	Drilled Depth (mbgl)	Screen (mbgl)		Sandpack (mbgl)		Screened Stratum	L (m)	Reason for Exclusion.
							From	To	From	To			
Hume	H20A	244258	6176920	703.25	703.18	80	71	77	71	77	HAW	6	Always dry.
	H32LDA	249532	6173533	646.60	646.78	152	108	114	106	117	WW	11	A and B in same hole, and
	H32LDB	249532	6173533	646.60	646.73	152	57	88	54	89	HAW	35	long hydraulic interval.
	H42B	250990	6166681	702.70		141	134	141	132	141	HAW	9	Collapsed (no data).
	H56XA	245214	6169199	735.38		150	143	144	141	146	WW	5	Unusable (no data).
	H56XC	245234	6169198	735.51		26	19	25	17	26	Basalt	9	Basalt not simulated.
	H118	240529	6166811	612.50		15	7	13	5	15	HAW	10	Appears to have failed.
	H136C	254513	6166887	718.51	718.40	60	52	59	50	60	Basalt	10	Basalt not simulated.
	H40_1	251140	6172143	656.51	656.51	129	120	120	VWP	VWP	WW	Point	Low resolution and accuracy.
	H40_2	251140	6172143	656.51	656.51	129	107	107	VWP	VWP	HAW	Point	
	H40_3	251140	6172143	656.51	656.51	129	81	81	VWP	VWP	HAW	Point	
	H40_4	251140	6172143	656.51	656.51	129	39	39	VWP	VWP	HAW	Point	
	H77_1	246966	6175811	689.74	689.74	98	87	87	VWP	VWP	WW	Point	Low resolution and accuracy.
	H77_2	246966	6175811	689.74	689.74	98	72	72	VWP	VWP	HAW	Point	
	H77_3	246966	6175811	689.74	689.74	98	58	58	VWP	VWP	HAW	Point	
	H122_1	250352	6175286	634.50	634.50	120	112	112	VWP	VWP	WW	Point	Low resolution and accuracy.
	H122_2	250352	6175286	634.50	634.50	120	86	86	VWP	VWP	HAW	Point	
	H122_3	250352	6175286	634.50	634.50	120	45	45	VWP	VWP	HAW	Point	
	H122_4	250352	6175286	634.50	634.50	120	15	15	VWP	VWP	HAW	Point	
	GW106652	250614	6179763	652.32	652.85	120	25	120	Open hole		HAW	95	Long hydraulic interval.
	GW106710	248326	6172551	672.39	672.70	115	64	108	Open hole		HAW	44	Long hydraulic interval.
Berrima	Culpepper M (B28)	250809	6184507		677.90	143		143	Open hole		HAW	> 100	Long hydraulic interval.
Government	G75032_1	254374	6178962	678.23	678.75	91	24	29	1	31	HAW	30	Long hydraulic intervals.
	G75032_2	254374	6178962	678.23	678.65	91	73	88	2	91	HAW	90	
	G75033_1	273474	6170523	692.96	693.58	101	30	35	1	36	SS	35	Long hydraulic intervals.
	G75033_2	273474	6170523	692.96	693.04	101	89	99	50	101	SS/Sh	51	
	G75034	260898	6176191	660.01	660.73	101	90	100	50	101	WG	51	Long hydraulic interval.
	G75035	262322	6186276	648.25	648.17	91	74	89	1	91	HAW	90	Long hydraulic interval.
	G75036	254286	6170323	660.24	660.87	100	73	84	2	85	SS	84	Long hydraulic interval.
	G75412	265421	6166998	650.07		70	52	64	44	70	SS	26	Far to southeast.
	G75413	266895	6180460	710.69		151	108	151	Open hole		WG	43	Open hole.

HAW: Hawkesbury Sandstone. WW: Wongawilli Seam. WG: Wianamatta Group.
ICM: Illawarra Coal Measures. SS: Sandstone. Sh: Shale.



Subsurface flow barrier emplaced during model calibration.

Alluvium
Basalt
Wianamatta Group
Hawkesbury Sandstone
Narrabeen Group (where present) and Permian Coal Measures

Drainage course
Water body
Old mine footprint
Old mine adit
Interpreted or published fault

GW106337 Hume pumping test bore
620 Topography (mAHD)
H72 Groundwater monitoring piezometer / well
GW106337 Private bore over workings

SW01 Flow gauge
Pipeline
Built-up Area
Hume Highway

drawn	PT	client:	Hume Coal Pty Limited
approved	RJB	project:	Hume Coal Project Groundwater Assessment
date	29 Jul 2016		
scale	1:150,000	title:	**Monitoring Piezometer and Well Locations**
original size	A4	project no: GEOTLCOV25281AB	figure no: **Figure B1**

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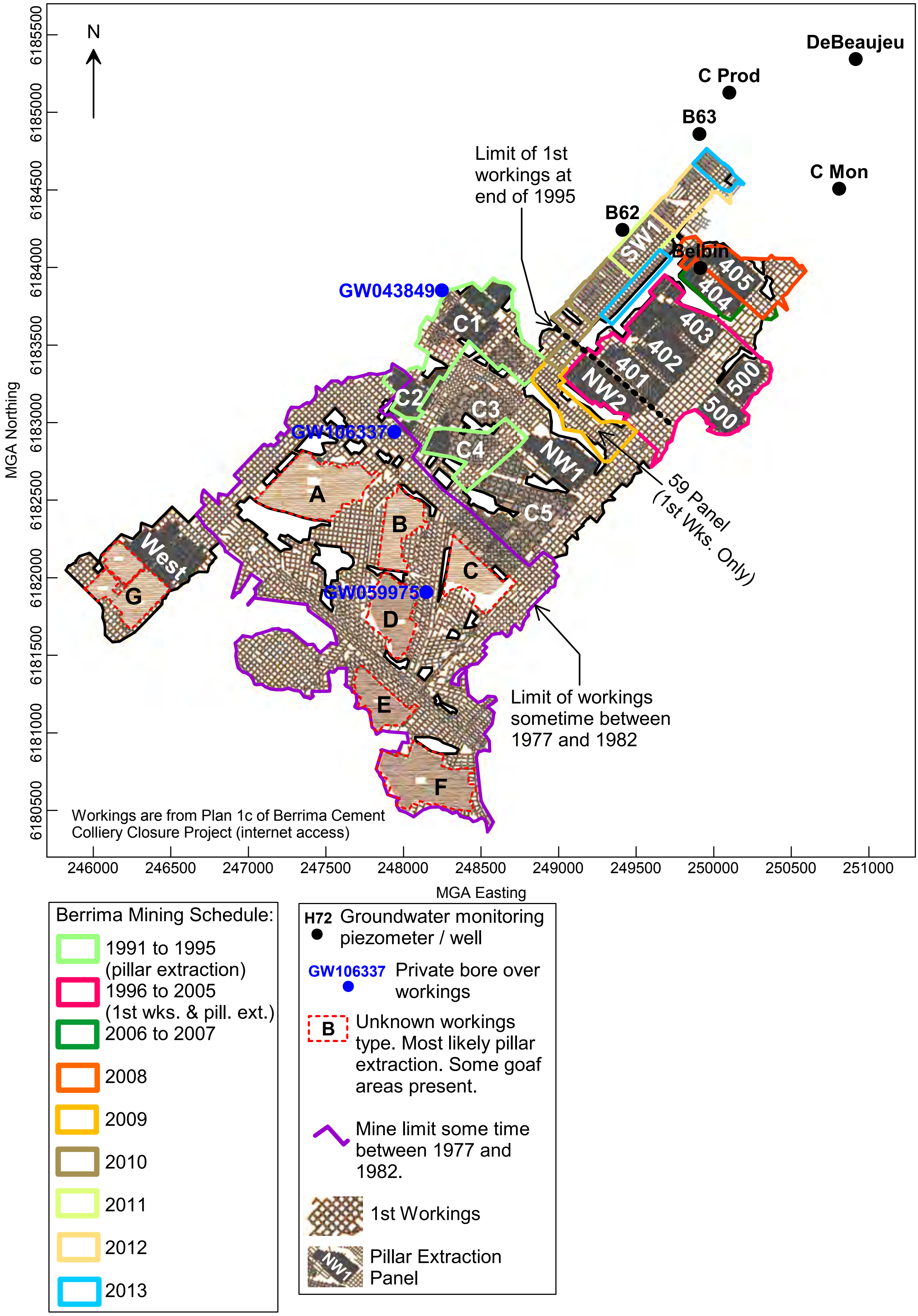

drawn	PT	client:	Hume Coal Pty Limited
approved	RJB	project:	Hume Coal Project Groundwater Assessment
date	6 Jun 2016	title:	**Monitoring Piezometers/Wells (Berrima Mine)**
scale	1:35,000	project no:	GEOTLCOV25281AB
original size	A4	figure no:	**Figure B2**

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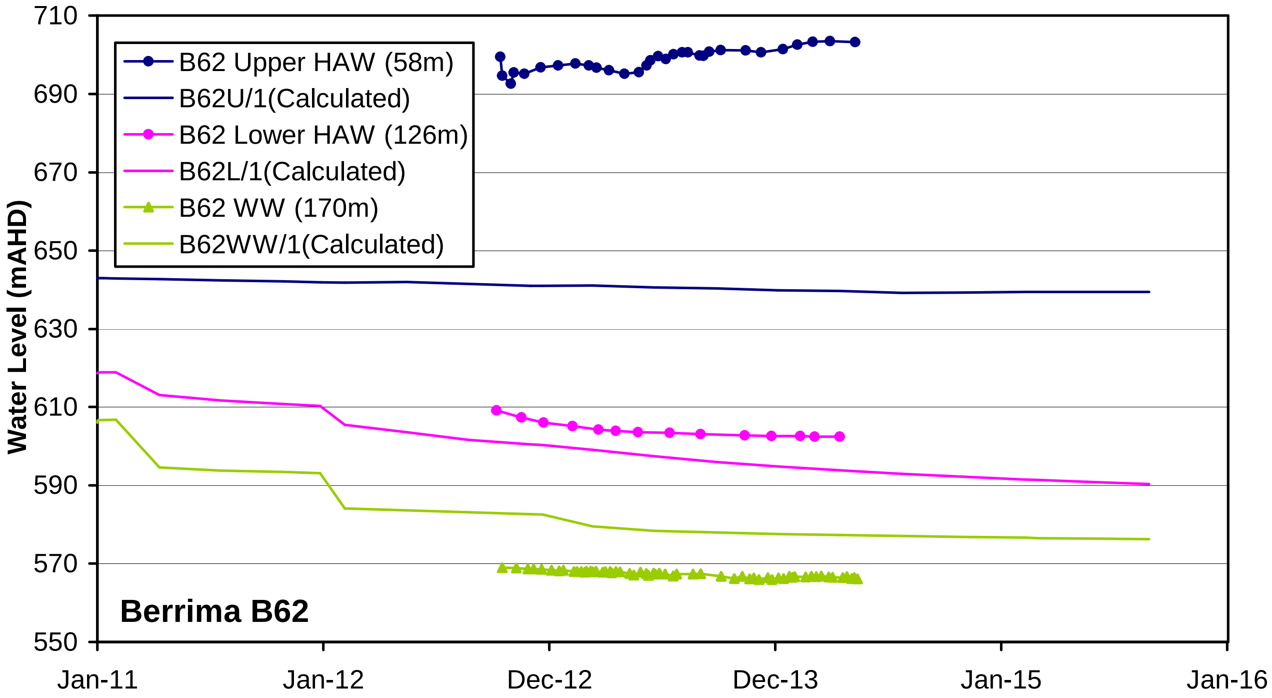
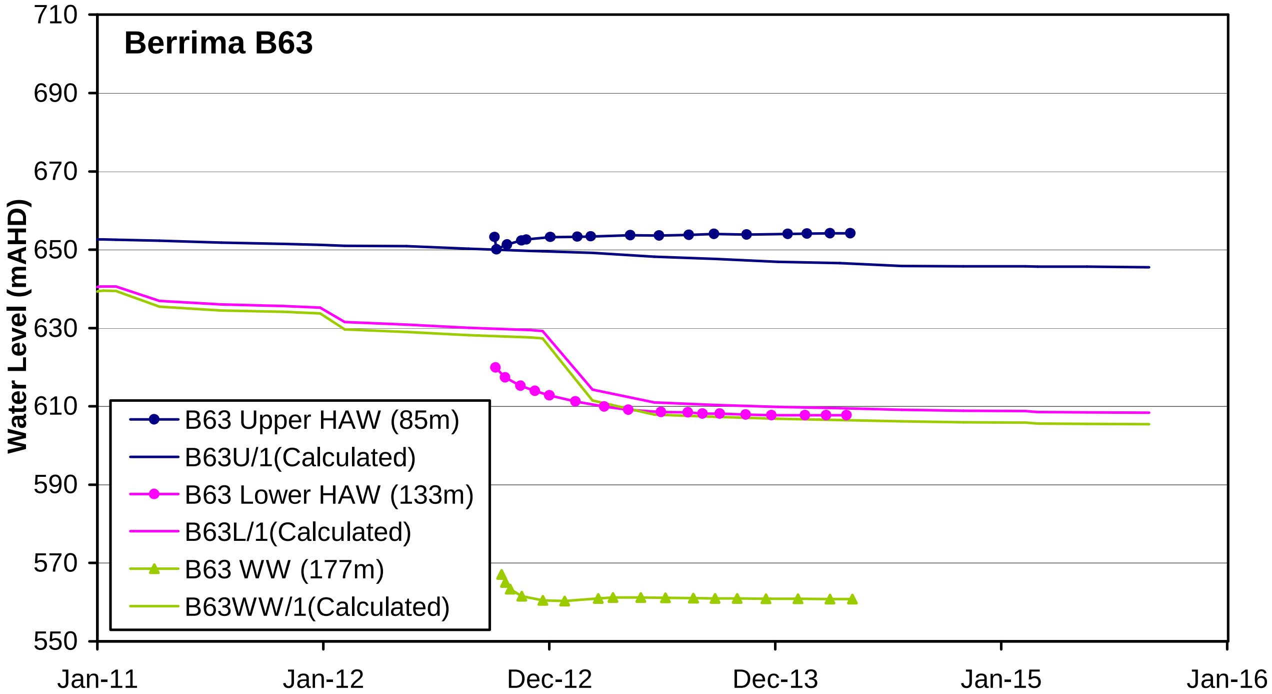
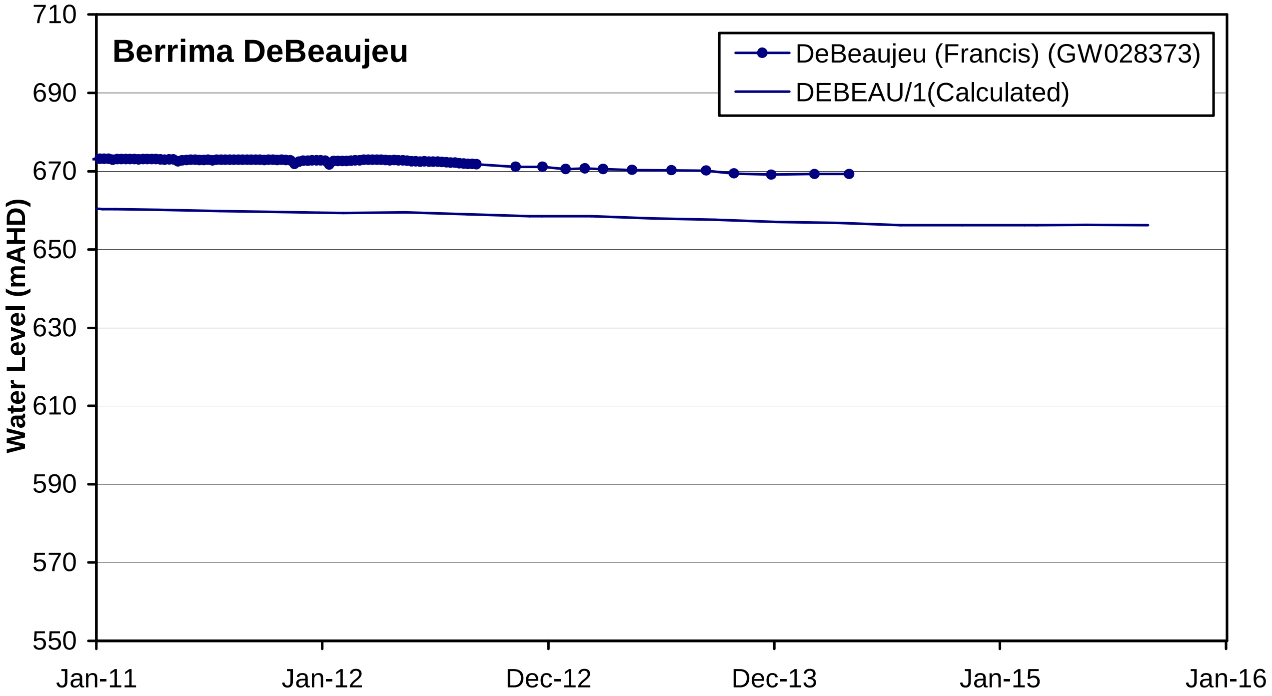
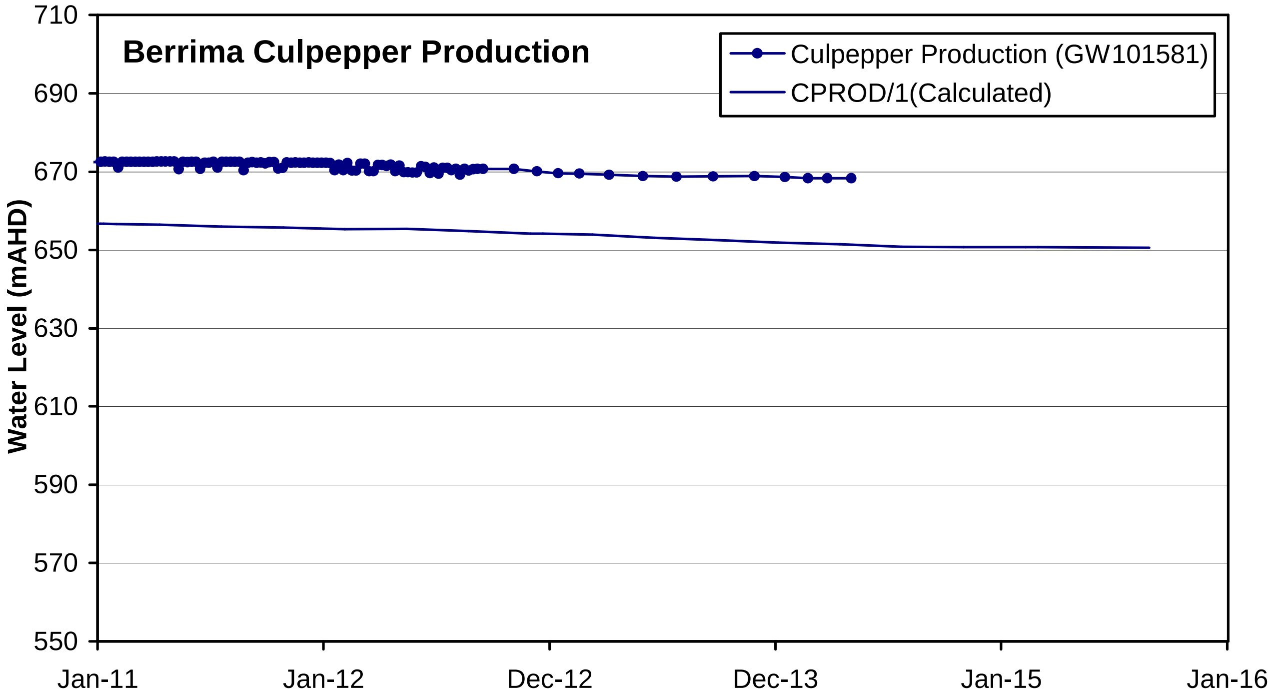
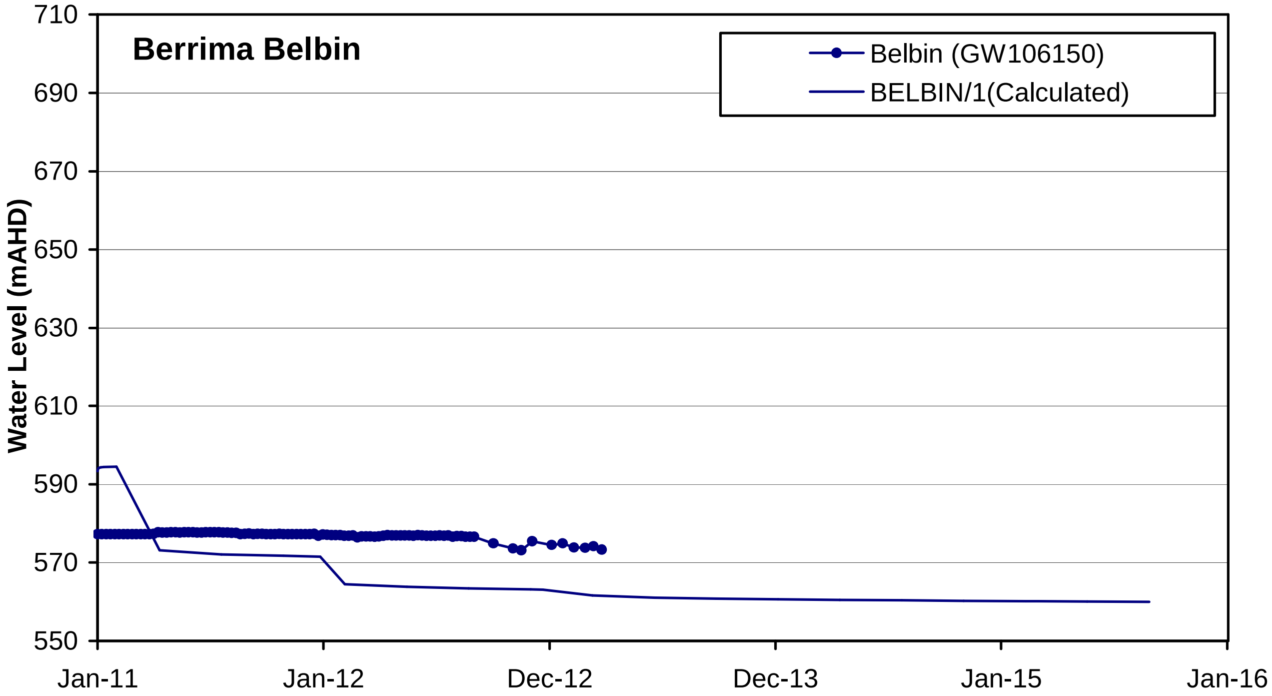
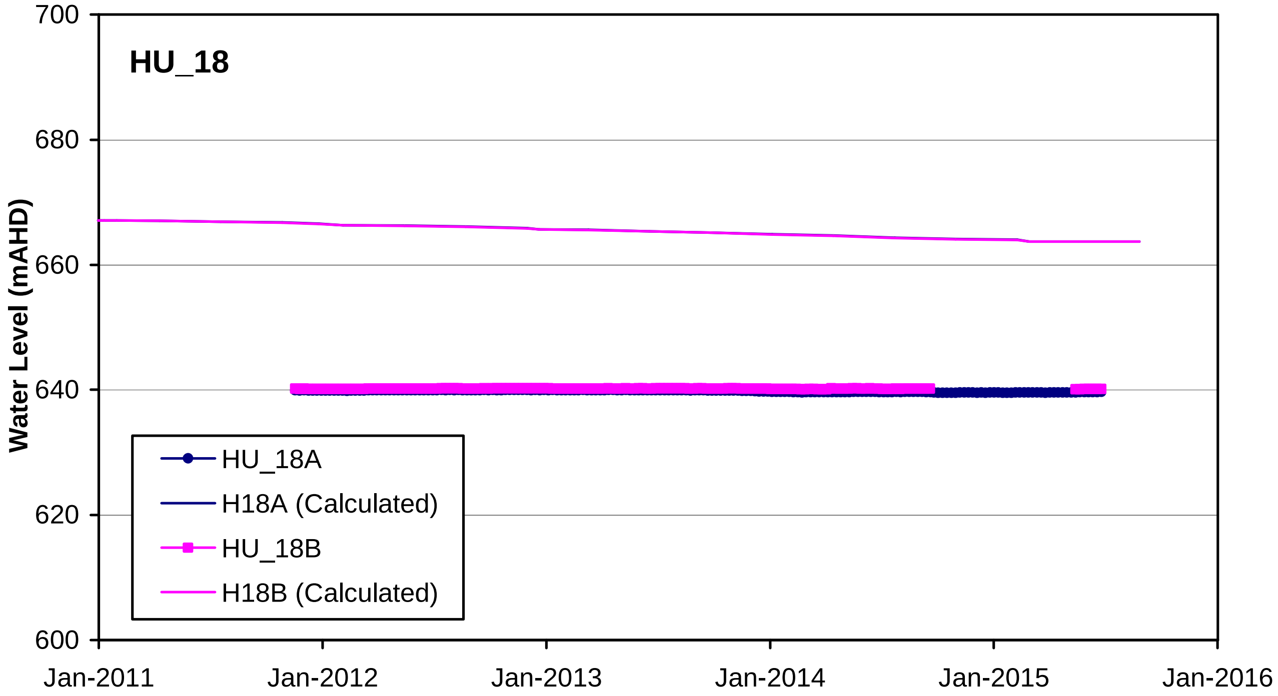

Berrima B62
B62 Upper HAW (58m)
B62U/1(Calculated)
B62 Lower HAW (126m)
B62L/1(Calculated)
B62 WW (170m)
B62WW/1(Calculated)
Water Level (mAHD)
710
690
670
650
630
610
590
570
550
Jan-11
Jan-12
Dec-12
Dec-13
Jan-15
Jan-16

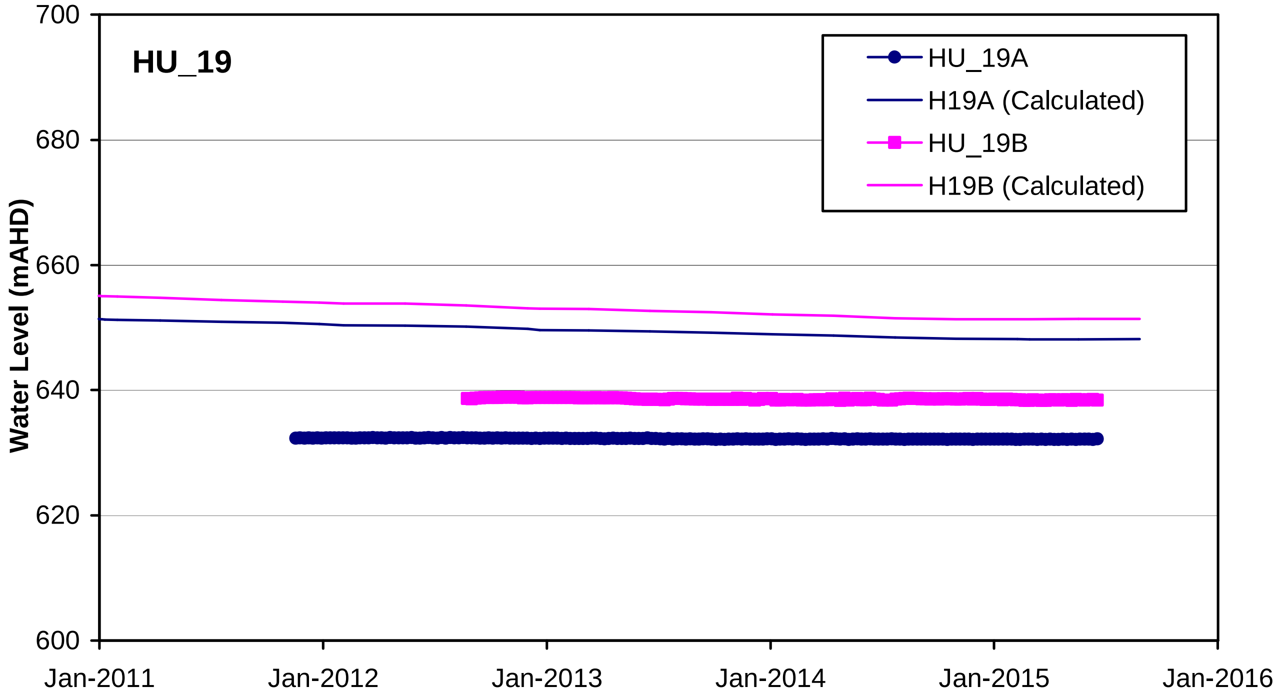

Berrima B63
B63 Upper HAW (85m)
B63U/1(Calculated)
B63 Lower HAW (133m)
B63L/1(Calculated)
B63 WW (177m)
B63WW/1(Calculated)
Water Level (mAHD)
710
690
670
650
630
610
590
570
550
Jan-11
Jan-12
Dec-12
Dec-13
Jan-15
Jan-16

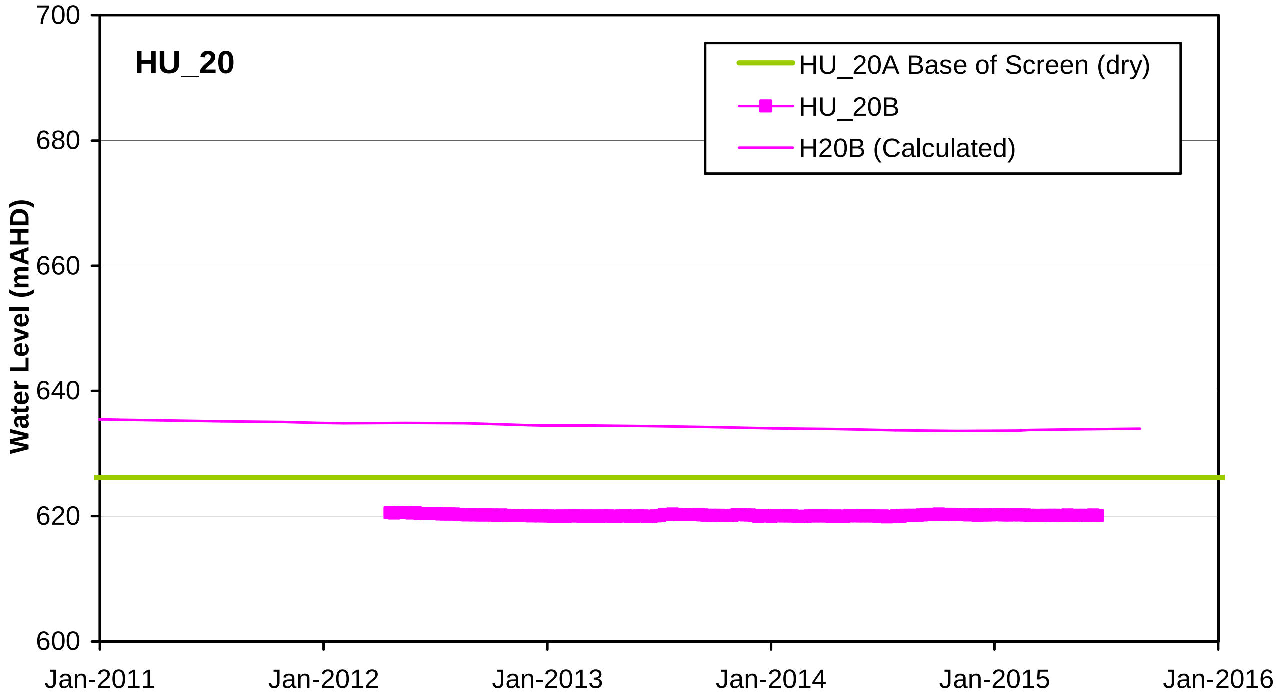

Berrima DeBeaujeu
DeBeaujeu (Francis) (GW028373)
DEBEAU/1(Calculated)
Water Level (mAHD)
710
690
670
650
630
610
590
570
550
Jan-11
Jan-12
Dec-12
Dec-13
Jan-15
Jan-16

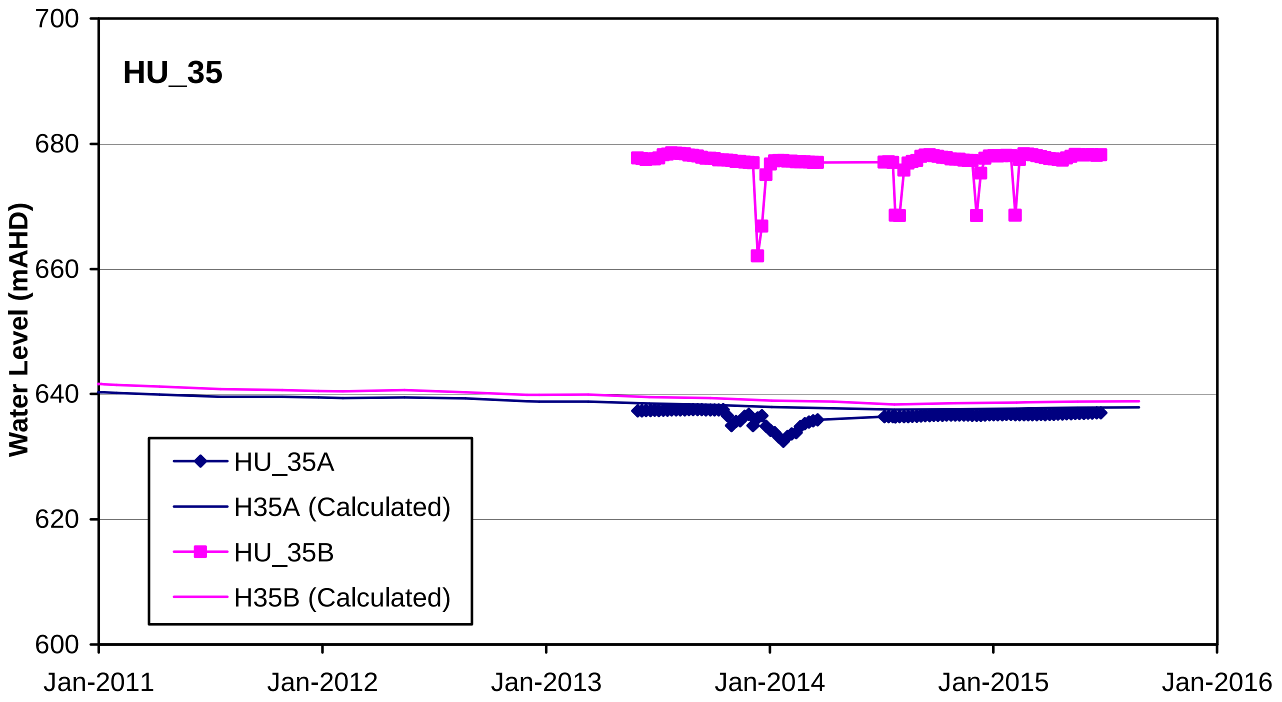

Berrima Culpepper Production
Culpepper Production (GW101581)
CPROD/1(Calculated)
Water Level (mAHD)
710
690
670
650
630
610
590
570
550
Jan-11
Jan-12
Dec-12
Dec-13
Jan-15
Jan-16

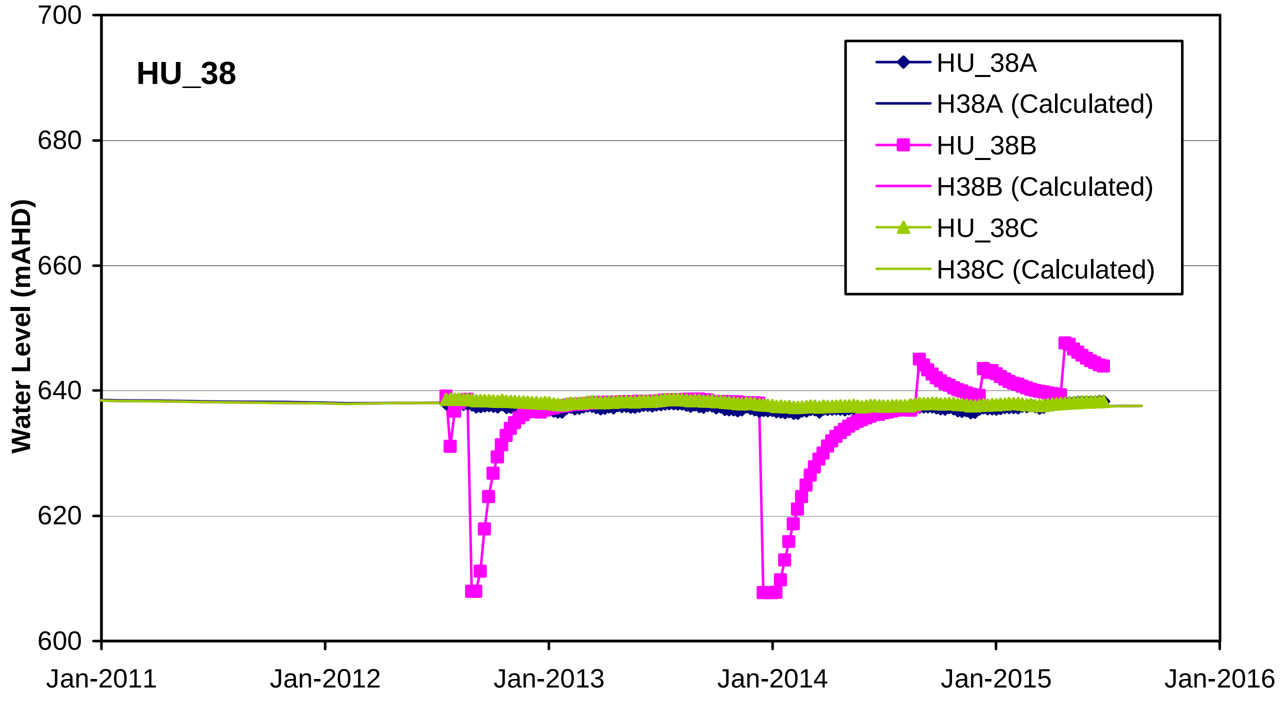

Berrima Belbin
Belbin (GW106150)
BELBIN/1(Calculated)
Water Level (mAHD)
710
690
670
650
630
610
590
570
550
Jan-11
Jan-12
Dec-12
Dec-13
Jan-15
Jan-16

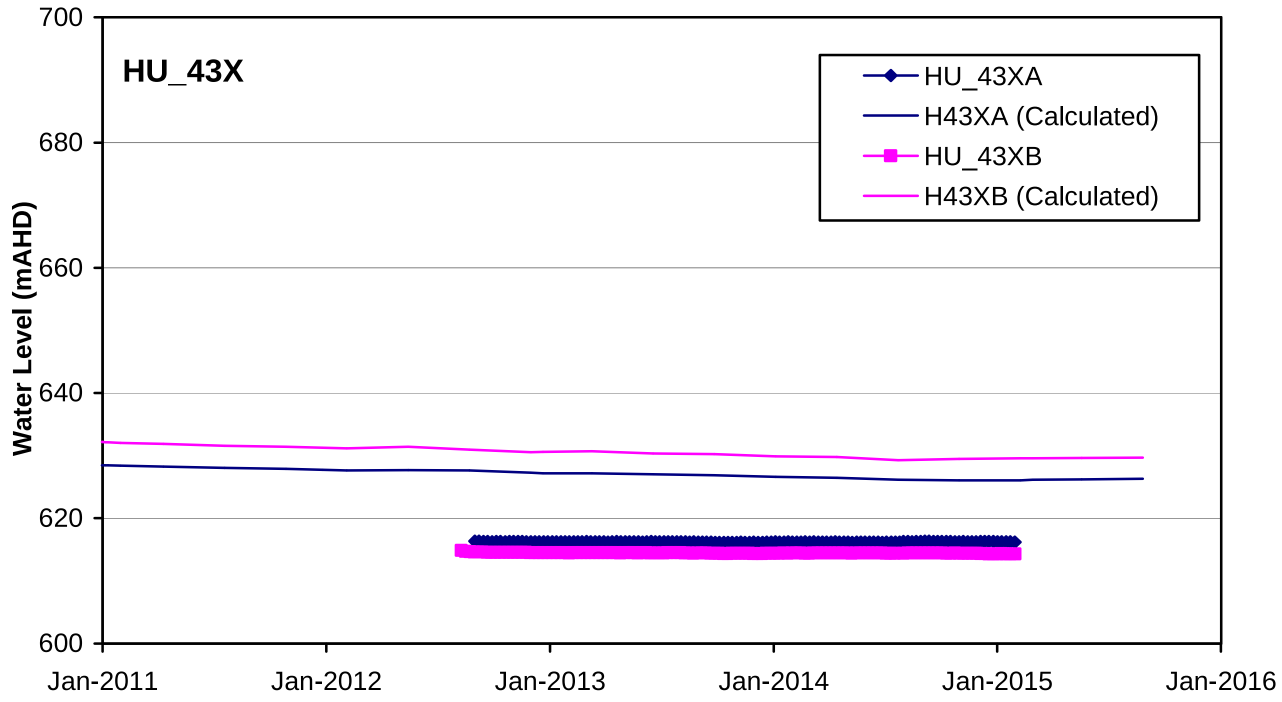

HU_18
Water Level (mAHD)
700
680
660
640
620
600
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
HU_18A
H18A (Calculated)
HU_18B
H18B (Calculated)

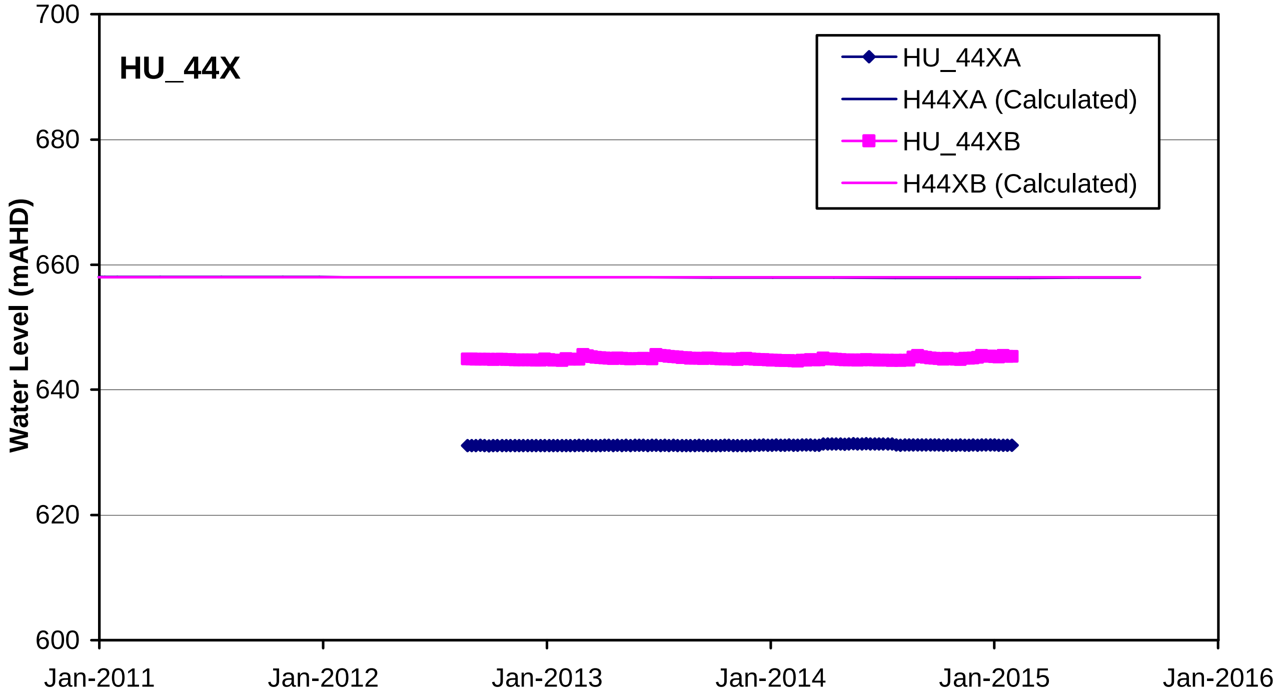

HU_19
Water Level (mAHD)
700
680
660
640
620
600
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
HU_19A
H19A (Calculated)
HU_19B
H19B (Calculated)

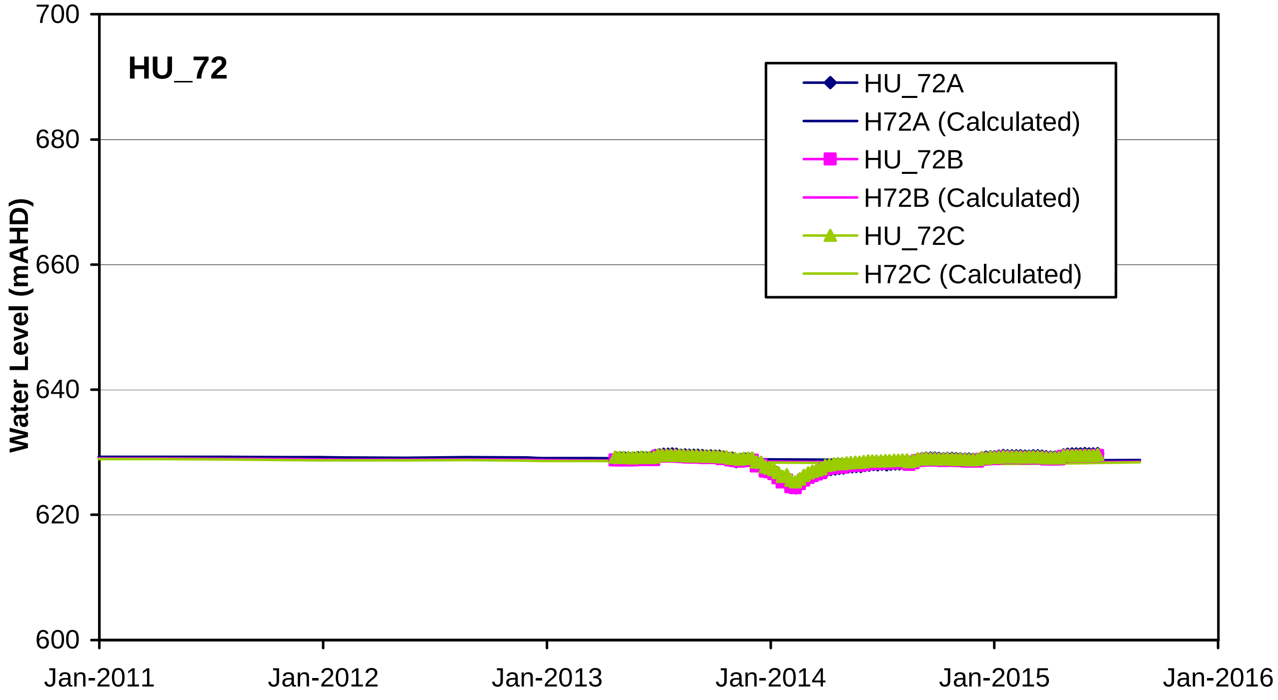

HU_20
Water Level (mAHD)
700
680
660
640
620
600
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
HU_20A Base of Screen (dry)
HU_20B
H20B (Calculated)

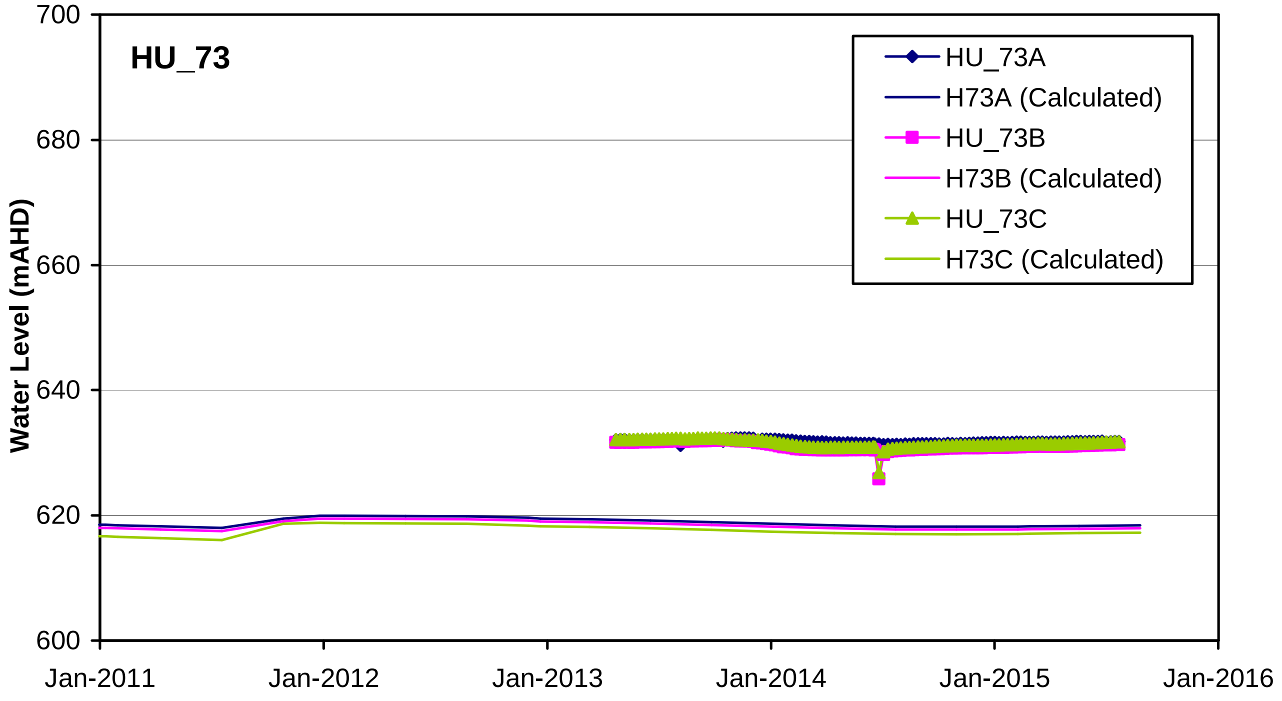

HU_35
Water Level (mAHD)
700
680
660
640
620
600
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
HU_35A
H35A (Calculated)
HU_35B
H35B (Calculated)

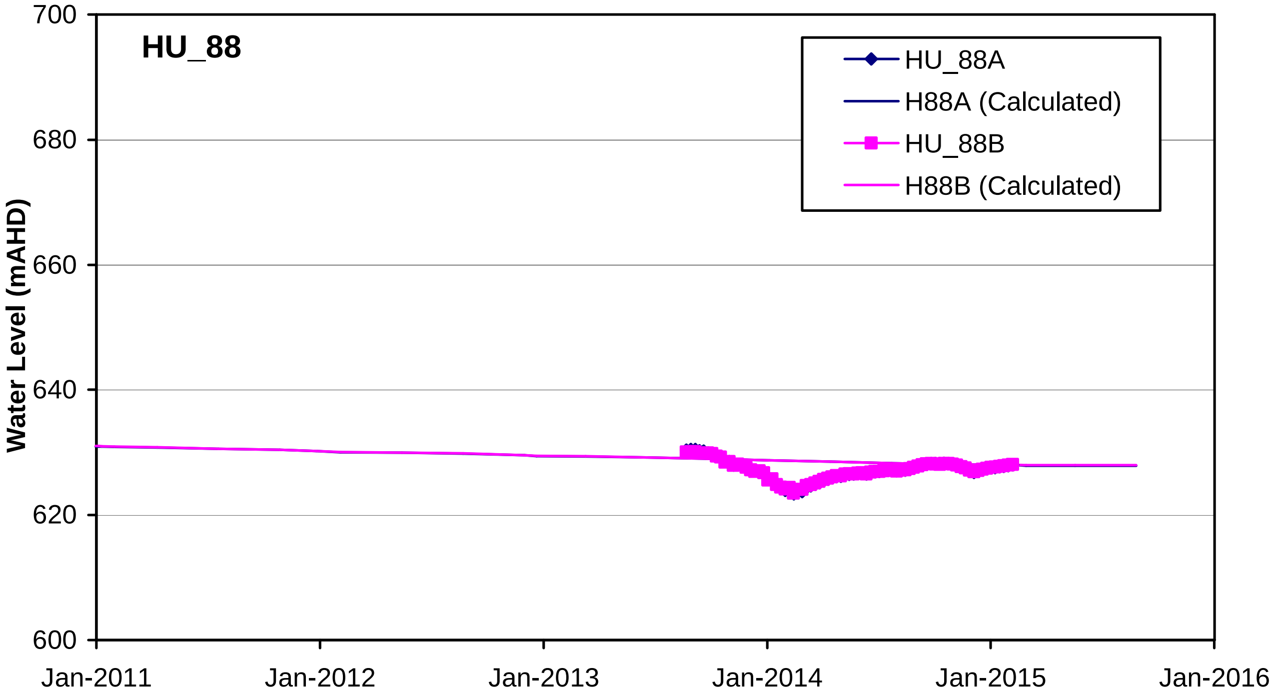

HU_38
Water Level (mAHD)
700
680
660
640
620
600
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
HU_38A
H38A (Calculated)
HU_38B
H38B (Calculated)
HU_38C
H38C (Calculated)

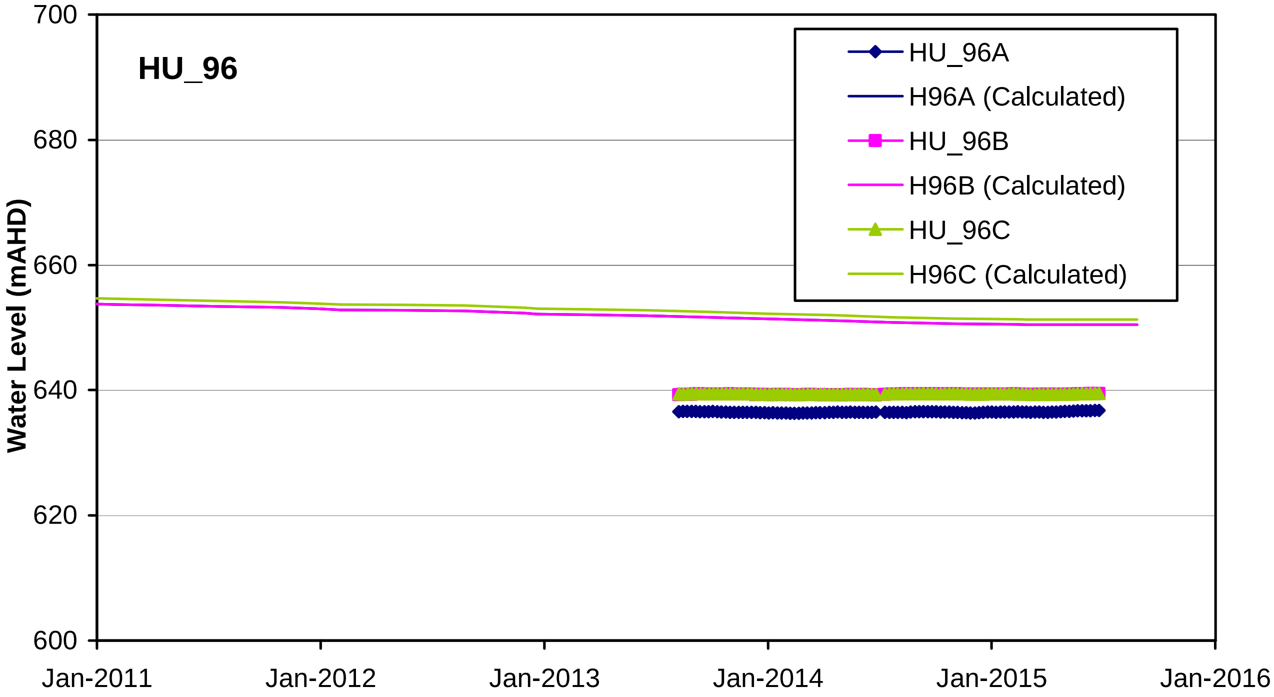

HU_43X
Water Level (mAHD)
700
680
660
640
620
600
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
HU_43XA
H43XA (Calculated)
HU_43XB
H43XB (Calculated)

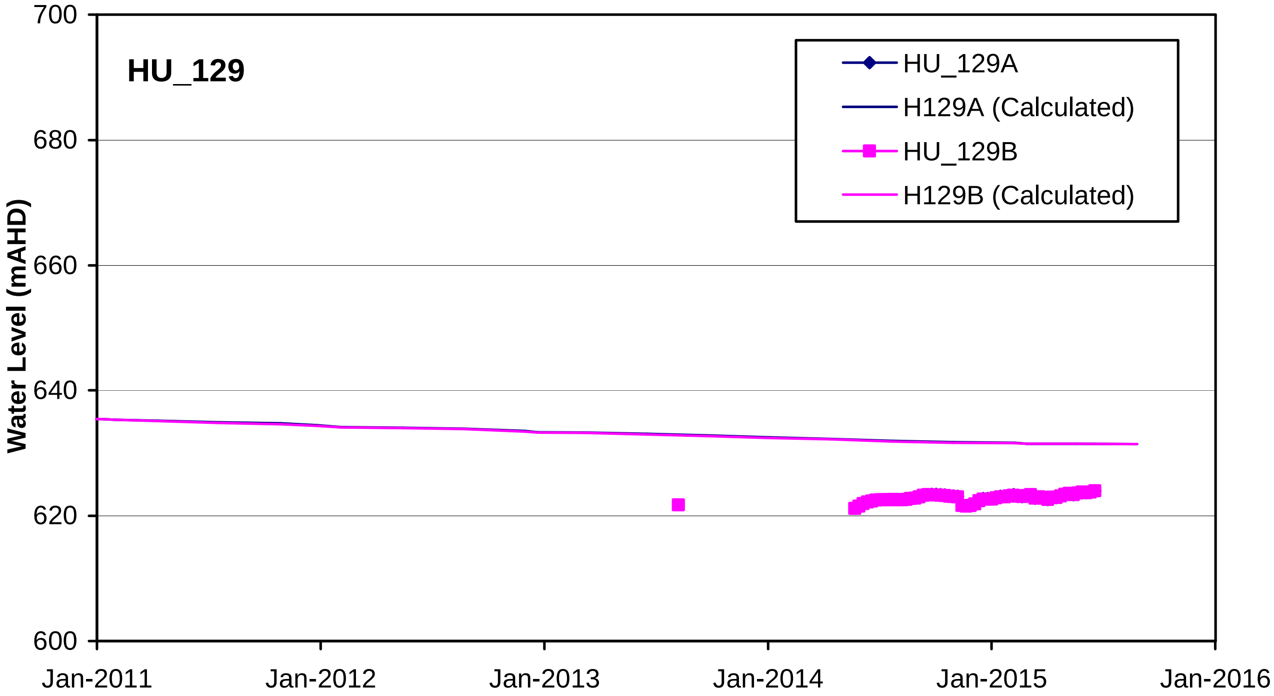

HU_44X
HU_44XA
H44XA (Calculated)
HU_44XB
H44XB (Calculated)
Water Level (mAHD)
700
680
660
640
620
600
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016

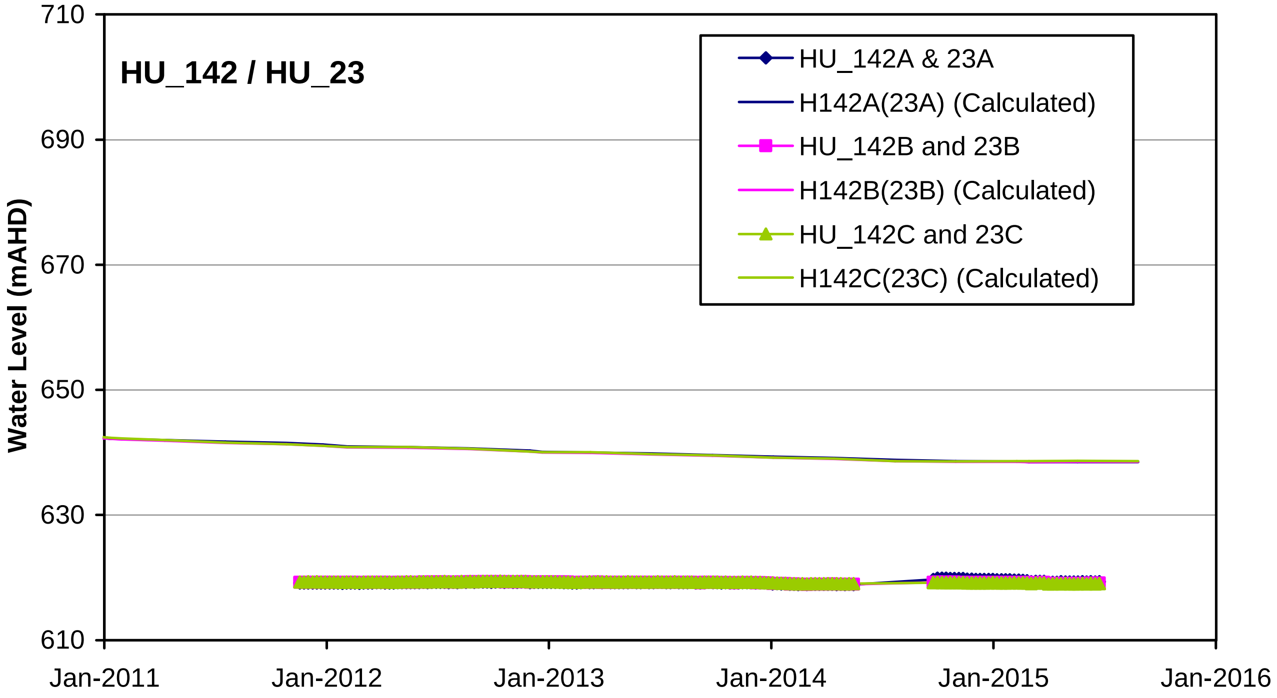

HU_72
HU_72A
H72A (Calculated)
HU_72B
H72B (Calculated)
HU_72C
H72C (Calculated)
Water Level (mAHD)
700
680
660
640
620
600
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016


HU_73
HU_73A
H73A (Calculated)
HU_73B
H73B (Calculated)
HU_73C
H73C (Calculated)
Water Level (mAHD)
700
680
660
640
620
600
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016

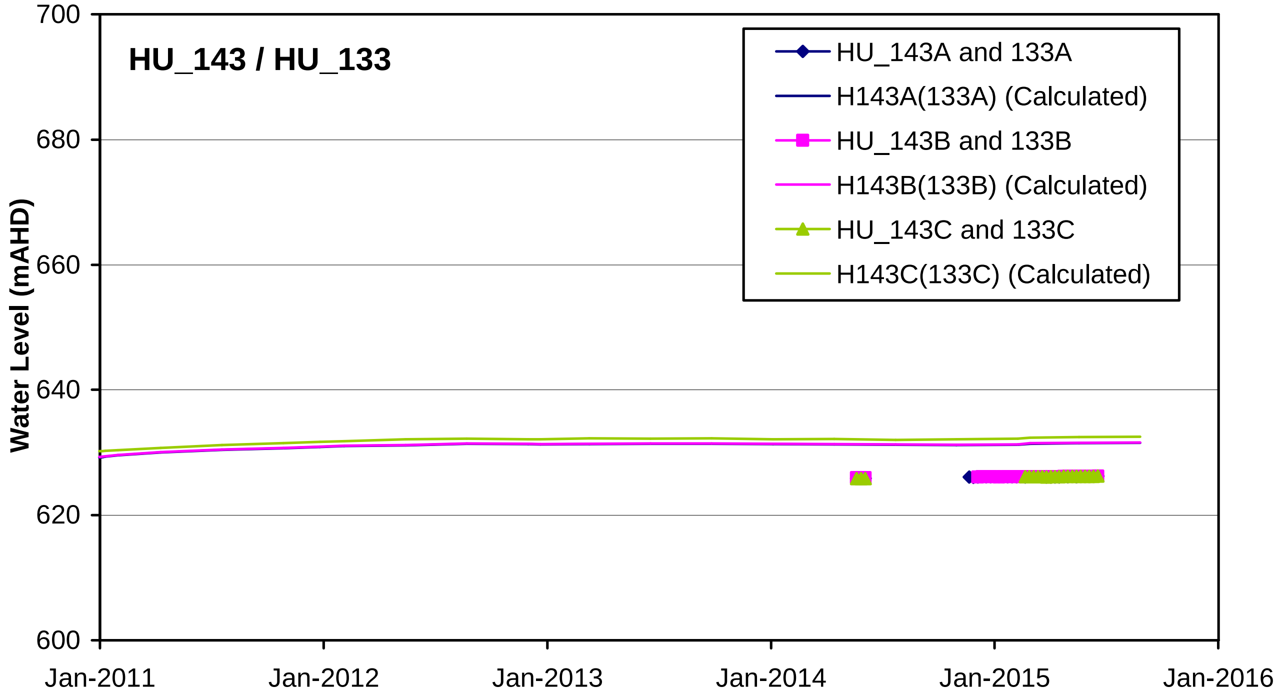

HU_88
HU_88A
H88A (Calculated)
HU_88B
H88B (Calculated)
Water Level (mAHD)
700
680
660
640
620
600
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016


HU_96
HU_96A
H96A (Calculated)
HU_96B
H96B (Calculated)
HU_96C
H96C (Calculated)
Water Level (mAHD)
700
680
660
640
620
600
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016

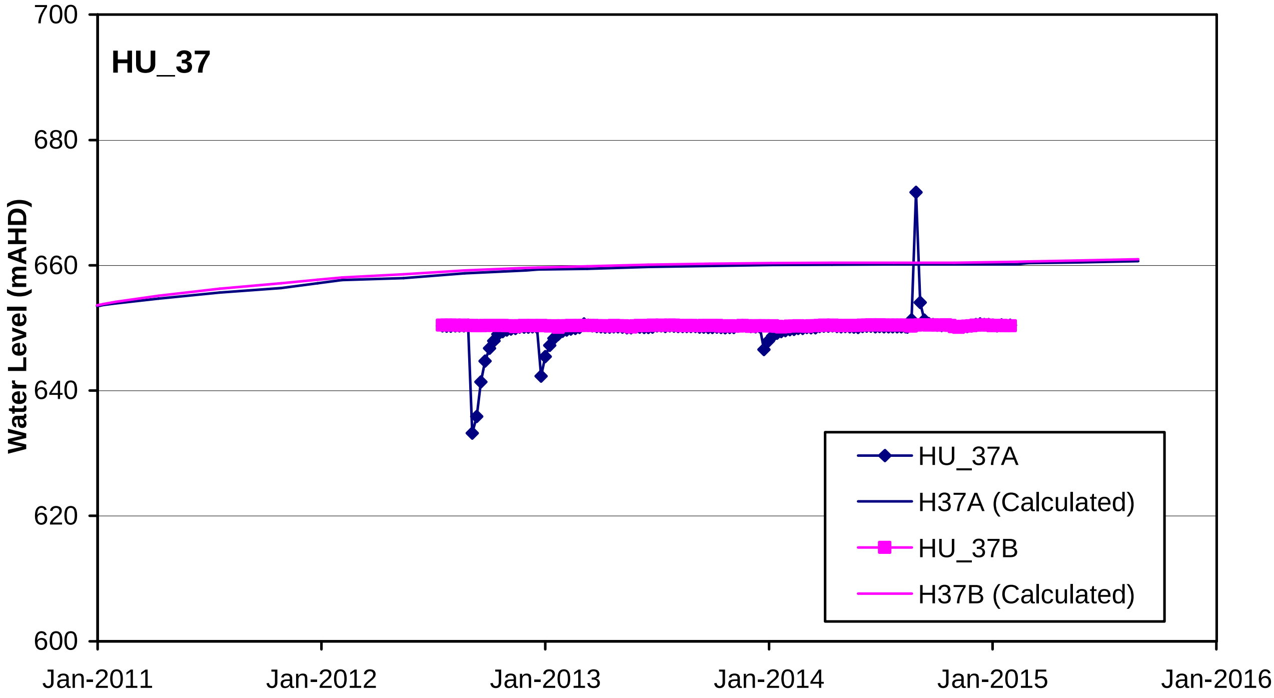

HU_129
HU_129A
H129A (Calculated)
HU_129B
H129B (Calculated)
Water Level (mAHD)
700
680
660
640
620
600
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016

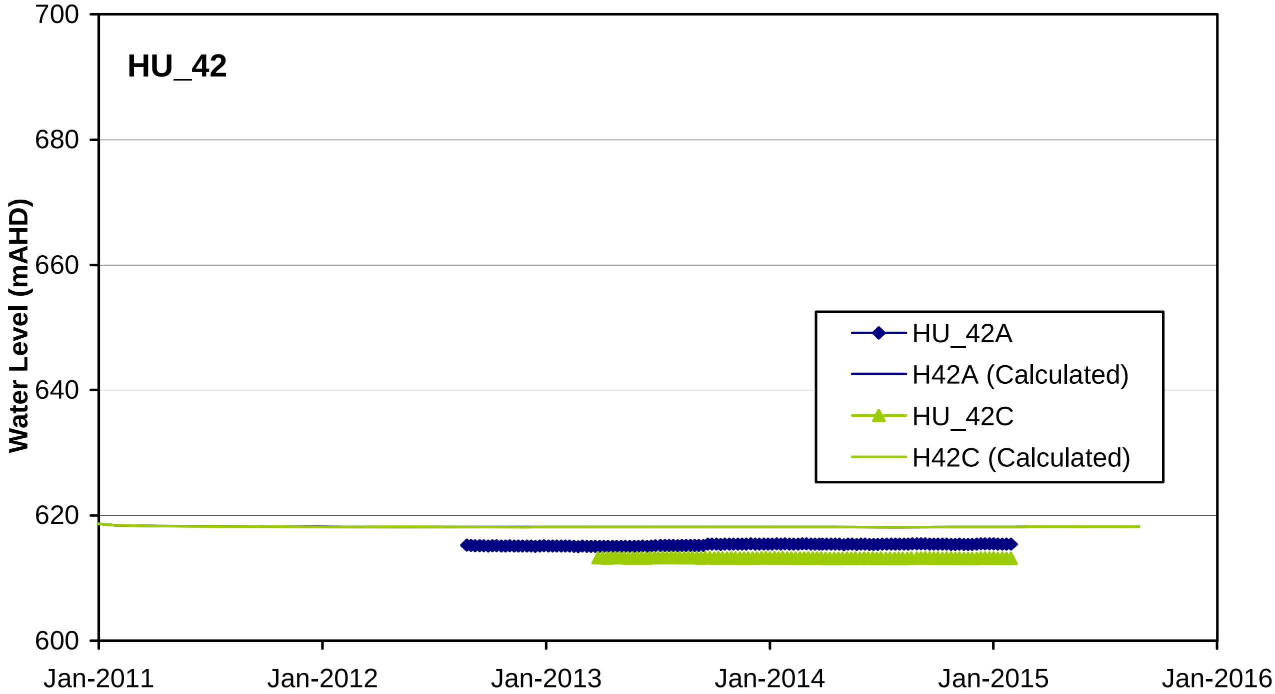


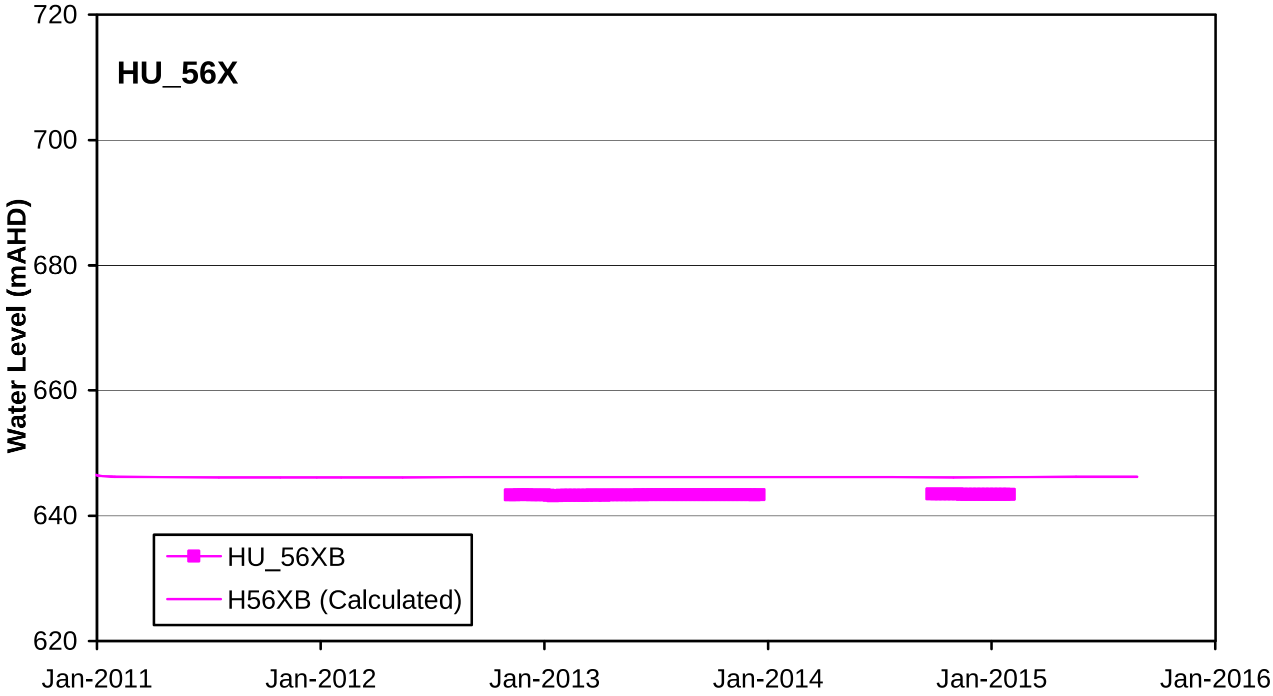
HU_142 / HU_23
Water Level (mAHD)
710
690
670
650
630
610
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
HU_142A & 23A
H142A(23A) (Calculated)
HU_142B and 23B
H142B(23B) (Calculated)
HU_142C and 23C
H142C(23C) (Calculated)

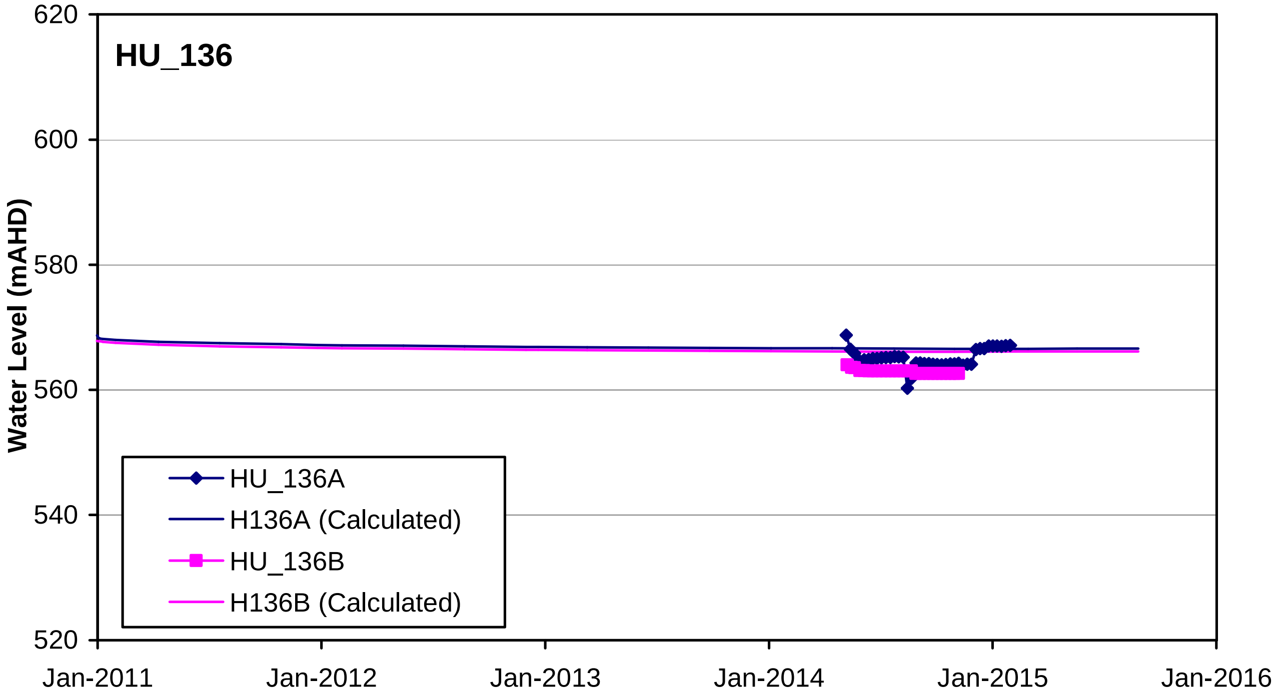


HU_143 / HU_133
Water Level (mAHD)
700
680
660
640
620
600
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
HU_143A and 133A
H143A(133A) (Calculated)
HU_143B and 133B
H143B(133B) (Calculated)
HU_143C and 133C
H143C(133C) (Calculated)


HU_37
Water Level (mAHD)
700
680
660
640
620
600
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
HU_37A
H37A (Calculated)
HU_37B
H37B (Calculated)


HU_42
Water Level (mAHD)
700
680
660
640
620
600
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
HU_42A
H42A (Calculated)
HU_42C
H42C (Calculated)

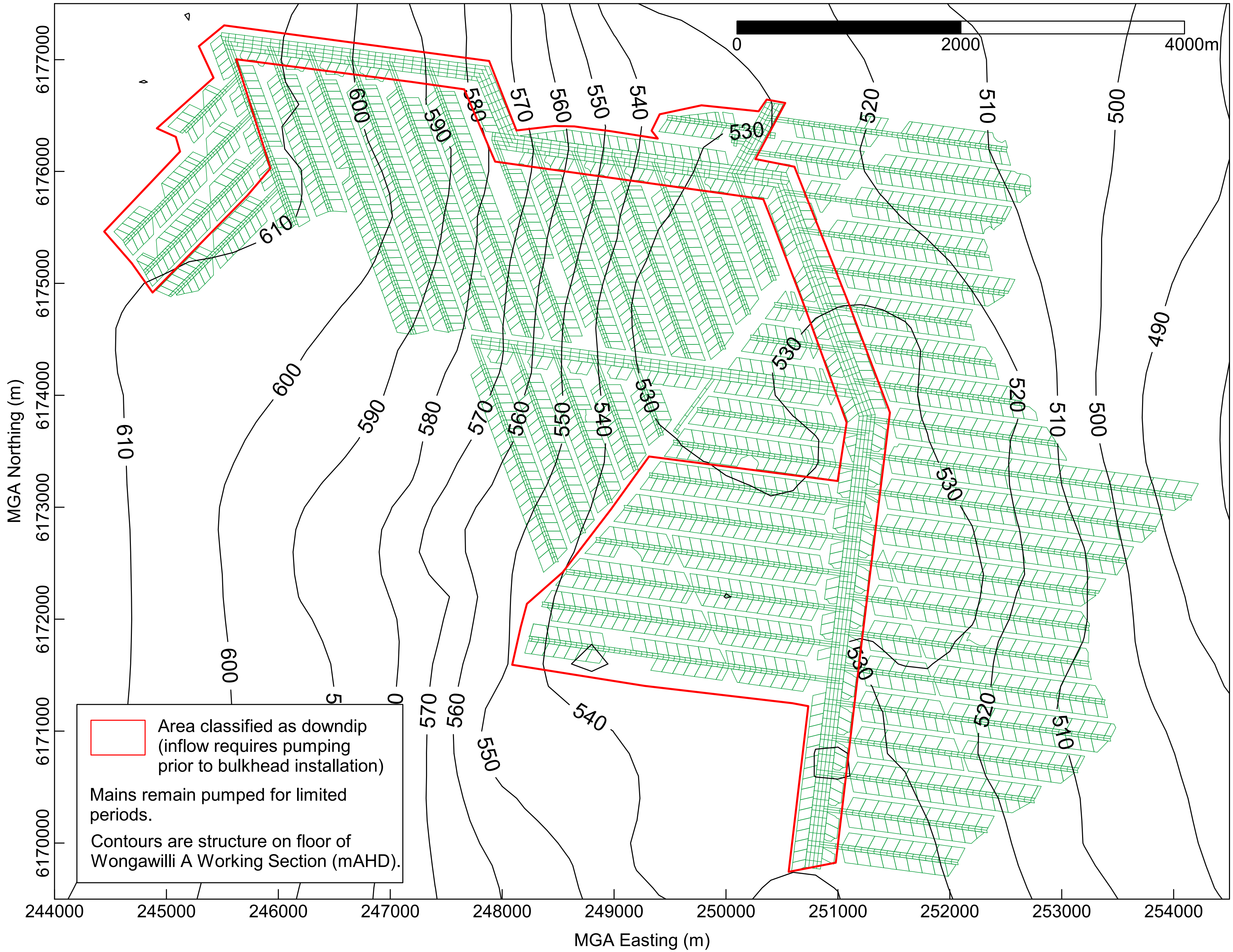

HU_56X
Water Level (mAHD)
720
700
680
660
640
620
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
HU_56XB
H56XB (Calculated)



HU_136
Water Level (mAHD)
620
600
580
560
540
520
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
HU_136A
H136A (Calculated)
HU_136B
H136B (Calculated)

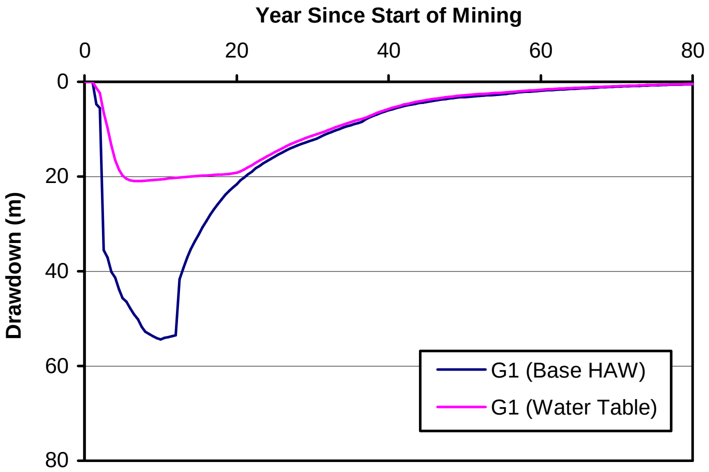
Appendix C - Downdip and Updip Panel Areas

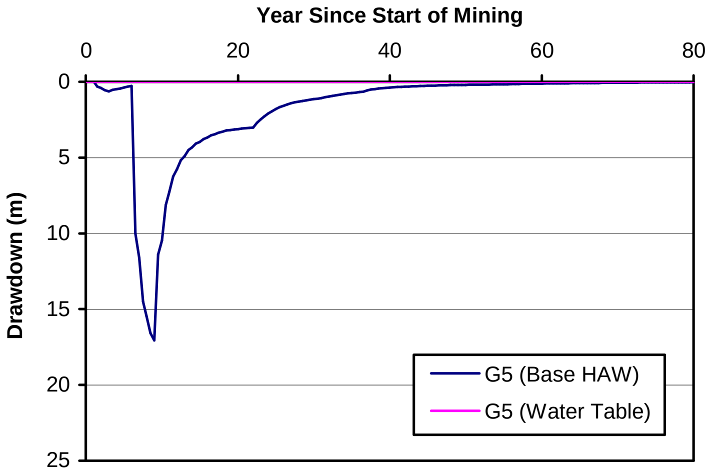
Downdip and Updip Panel Areas (1st Workings Layout 06.05.2016)

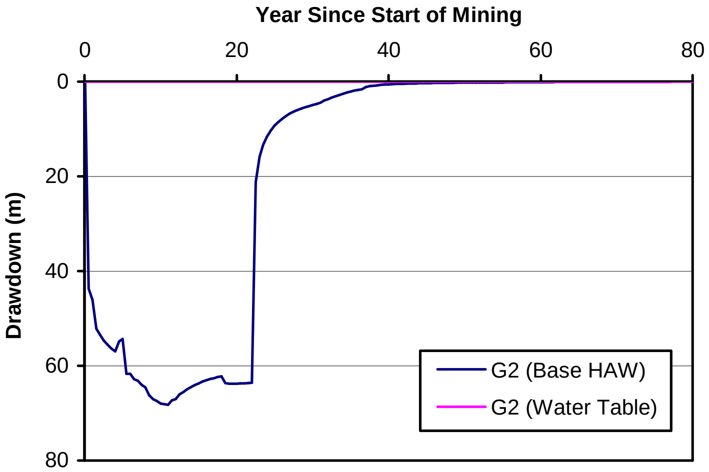


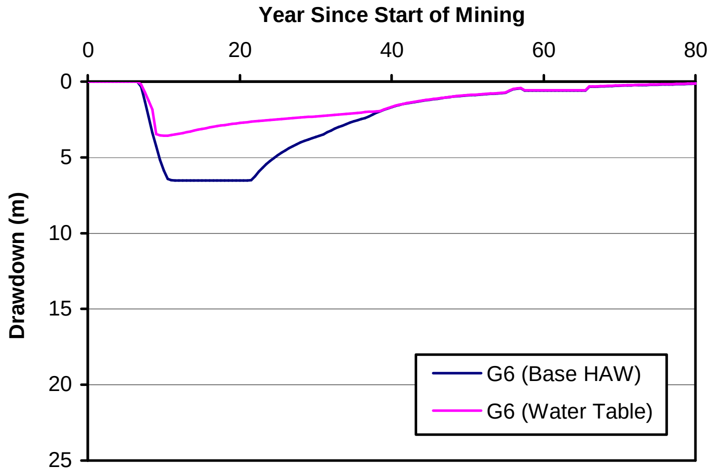
Appendix D - Total and Differential Drawdown of the Water Table and at the Base of the Hawkesbury Sandstone at Virtual Piezometers

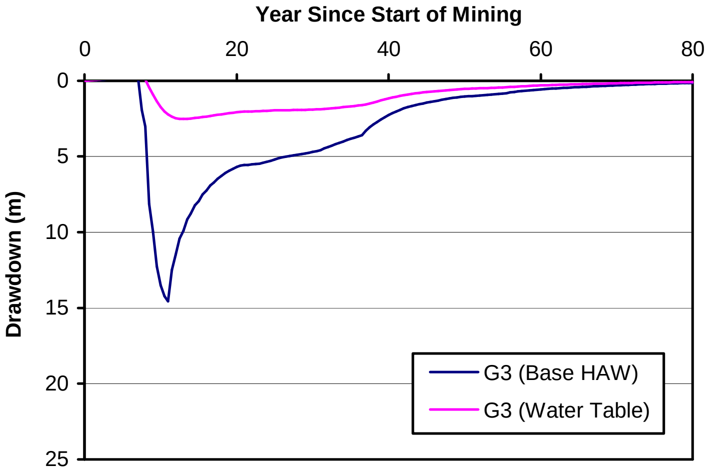
DIFFERENTIAL DRAWDOWN

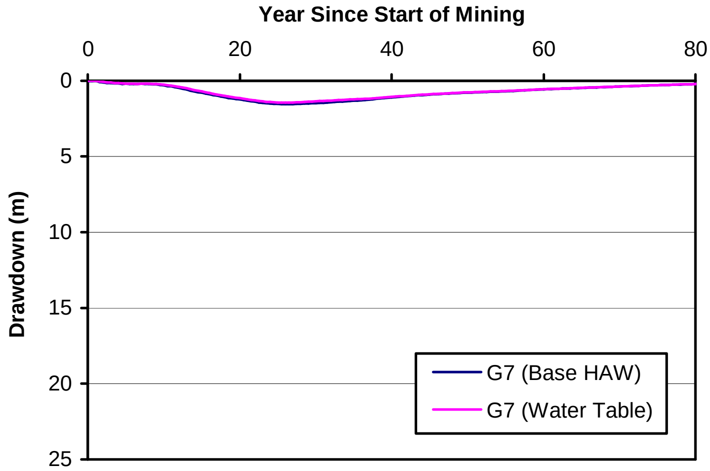


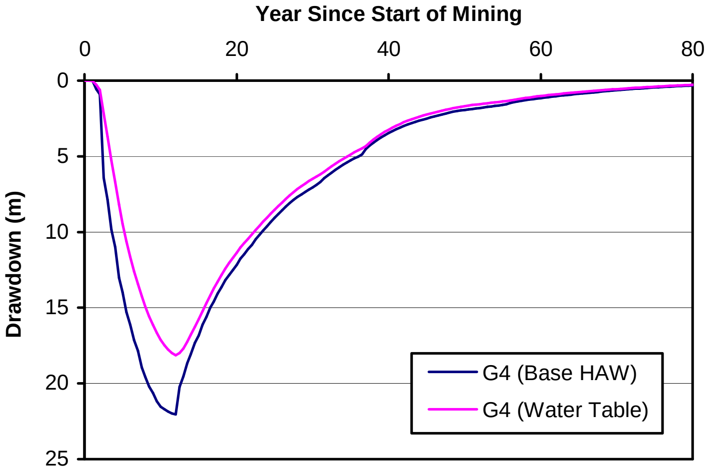


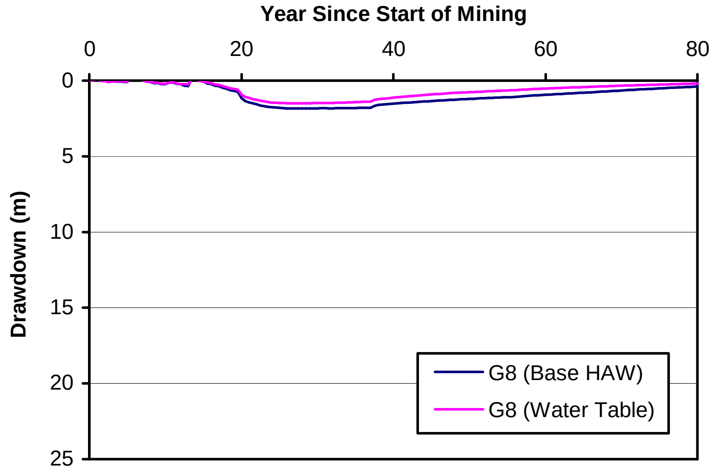




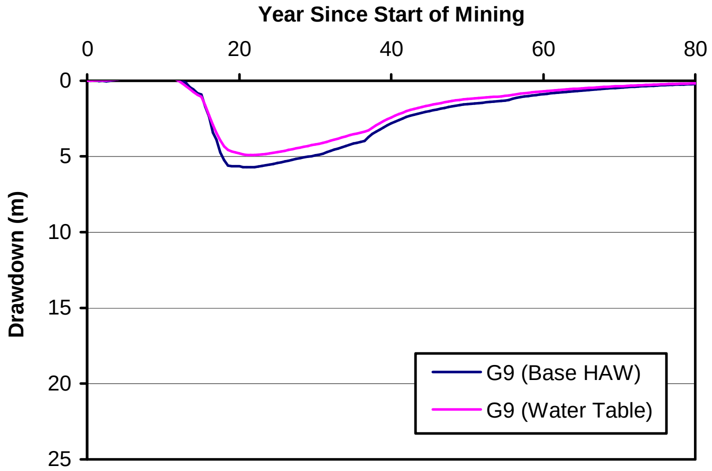


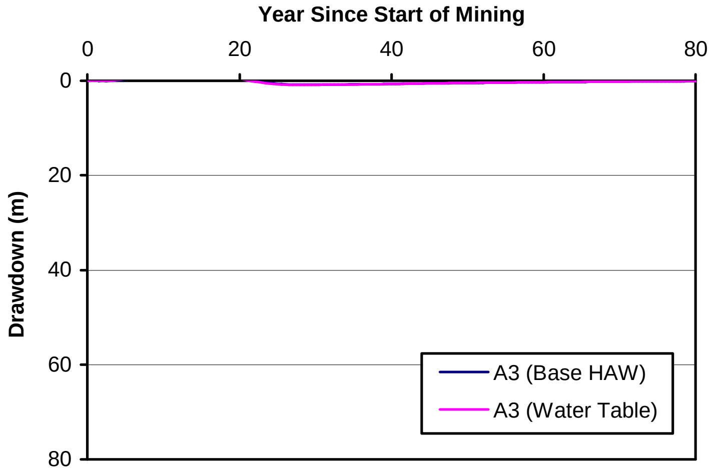




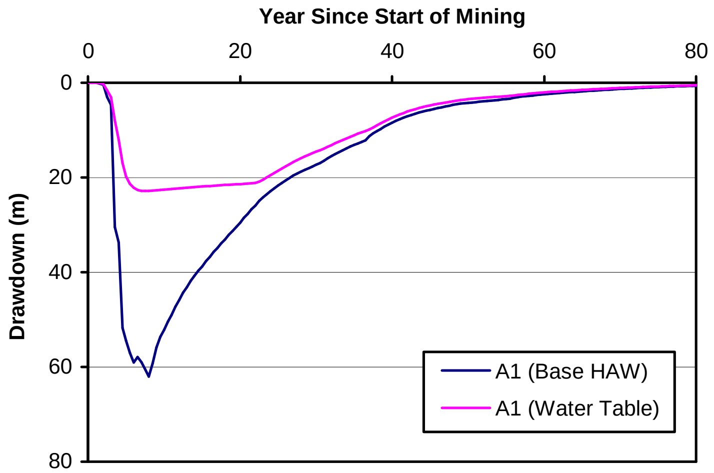


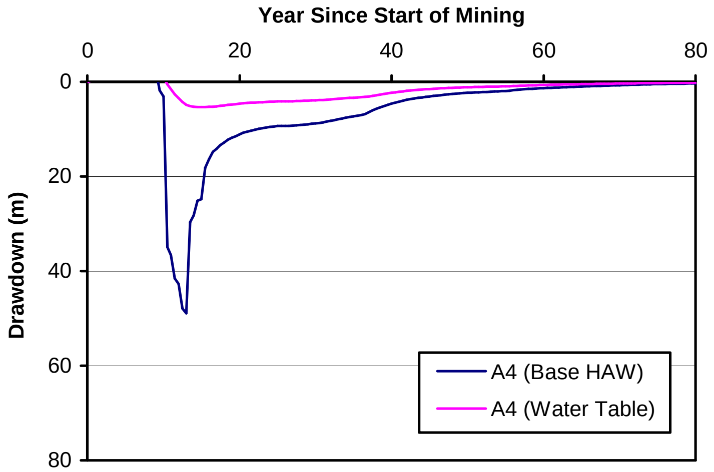
DIFFERENTIAL DRAWDOWN

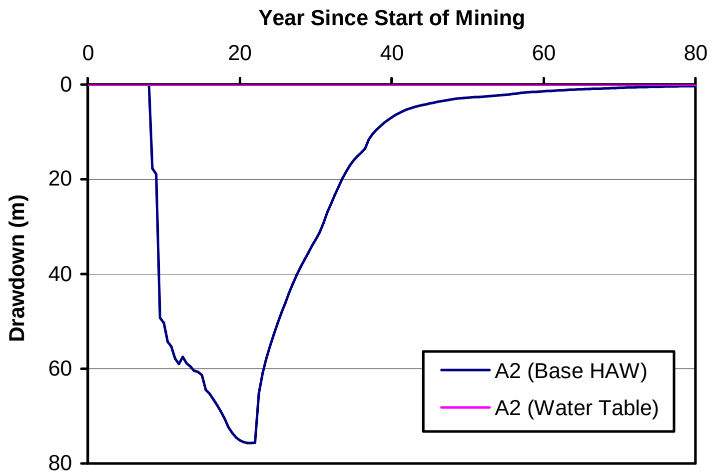


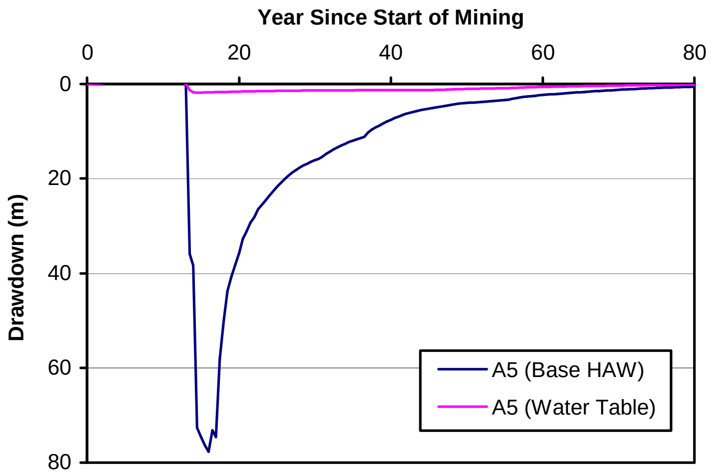


Nil drawdown calculated at G10 and G11

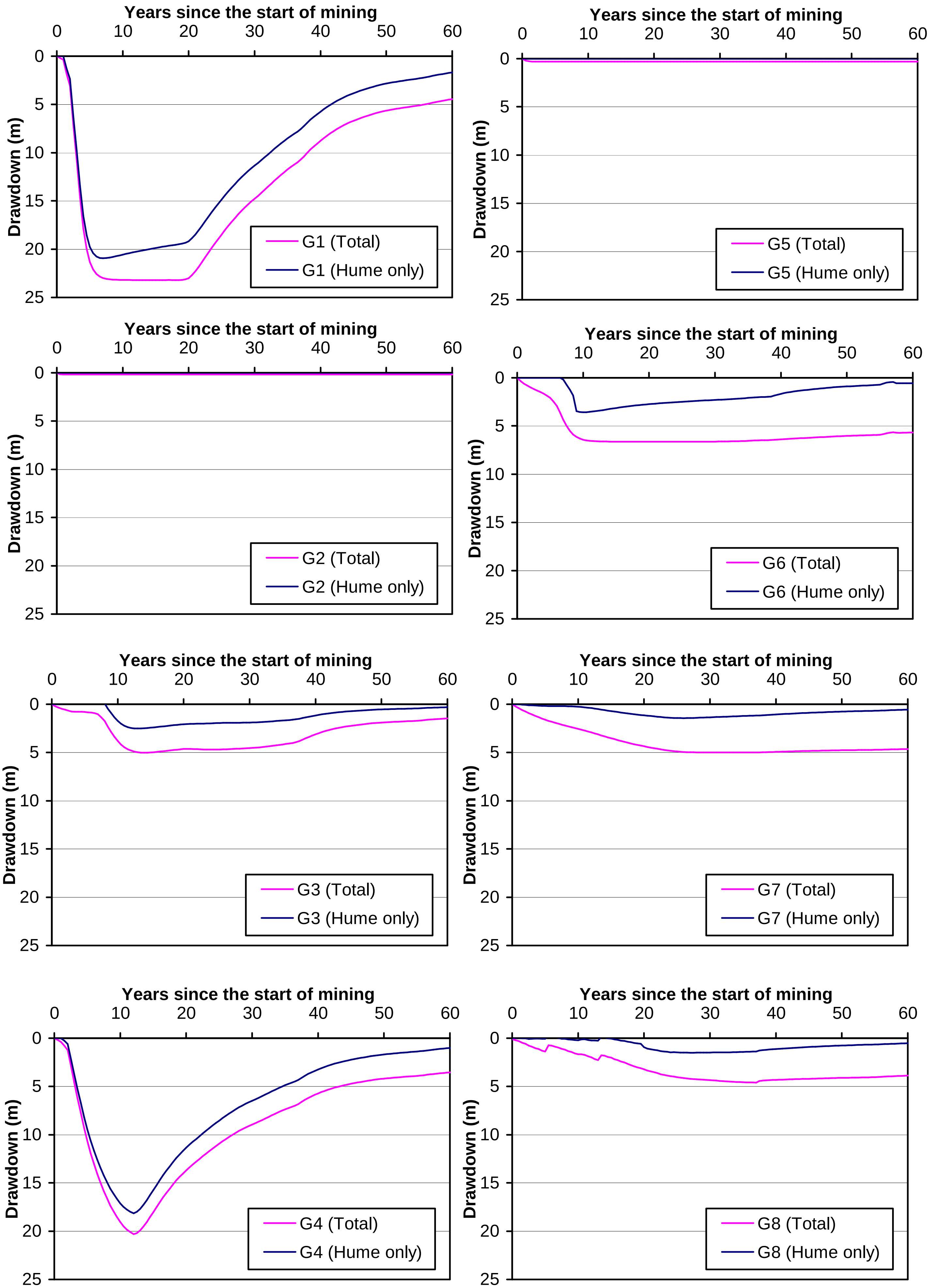




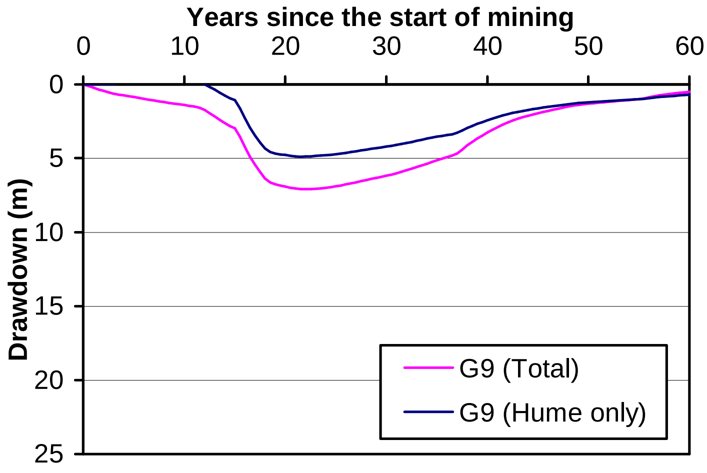


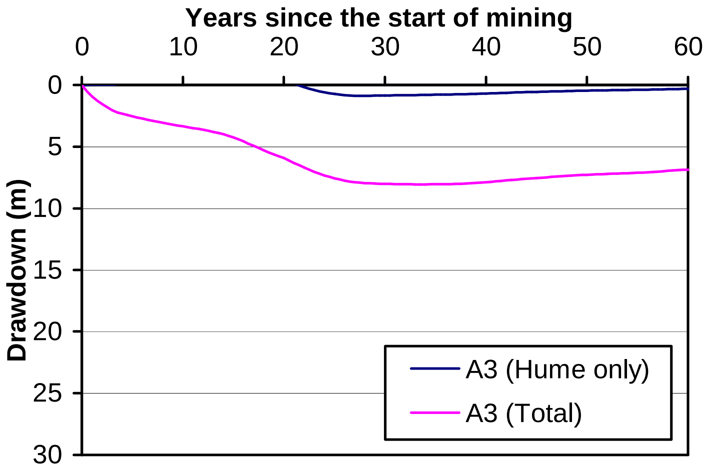


TOTAL AND DIFFERENTIAL DRAWDOWN (WATER TABLE)

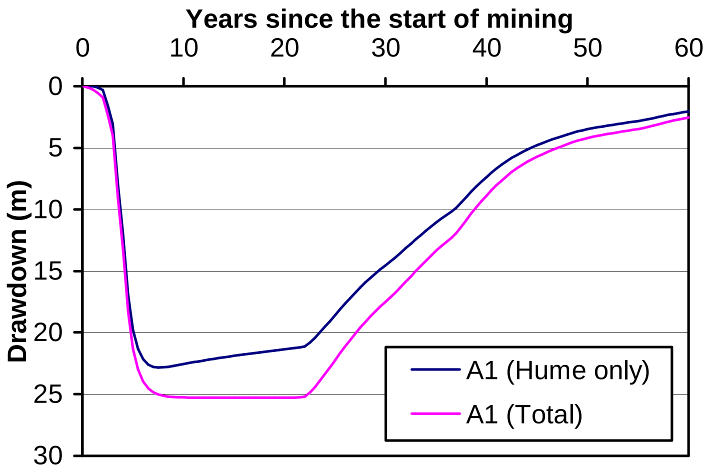


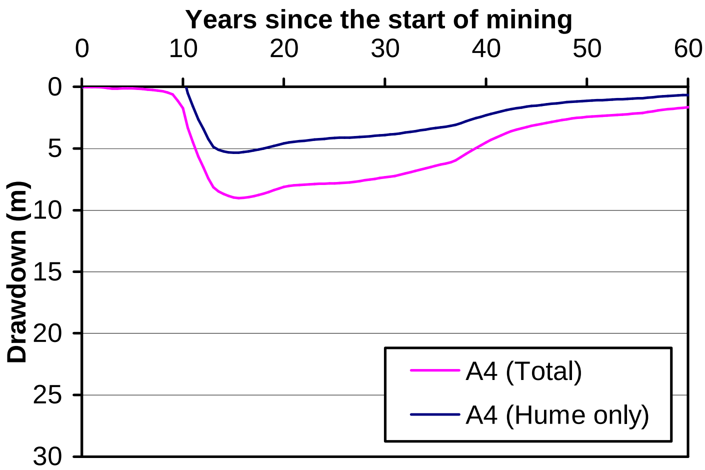
TOTAL AND DIFFERENTIAL DRAWDOWN (WATER TABLE)

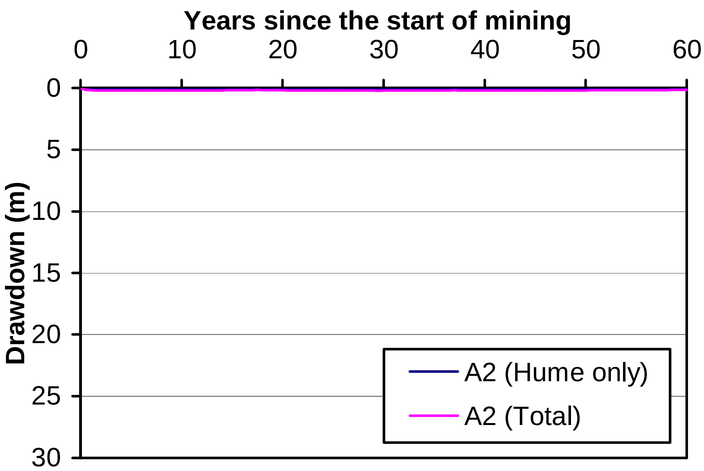


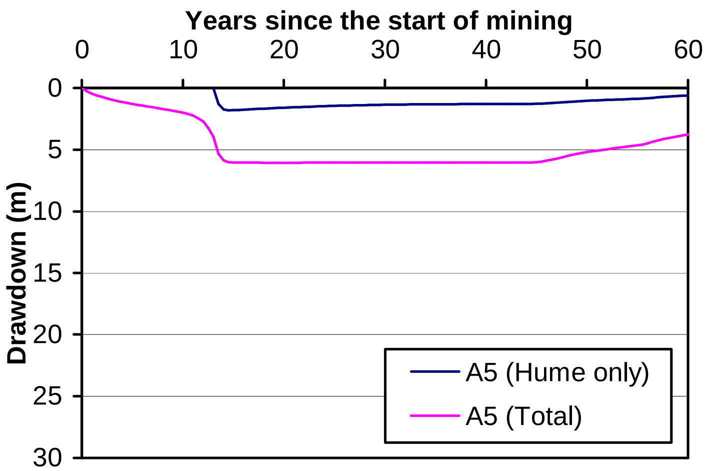


Nil Drawdown calculated at G10 and G11



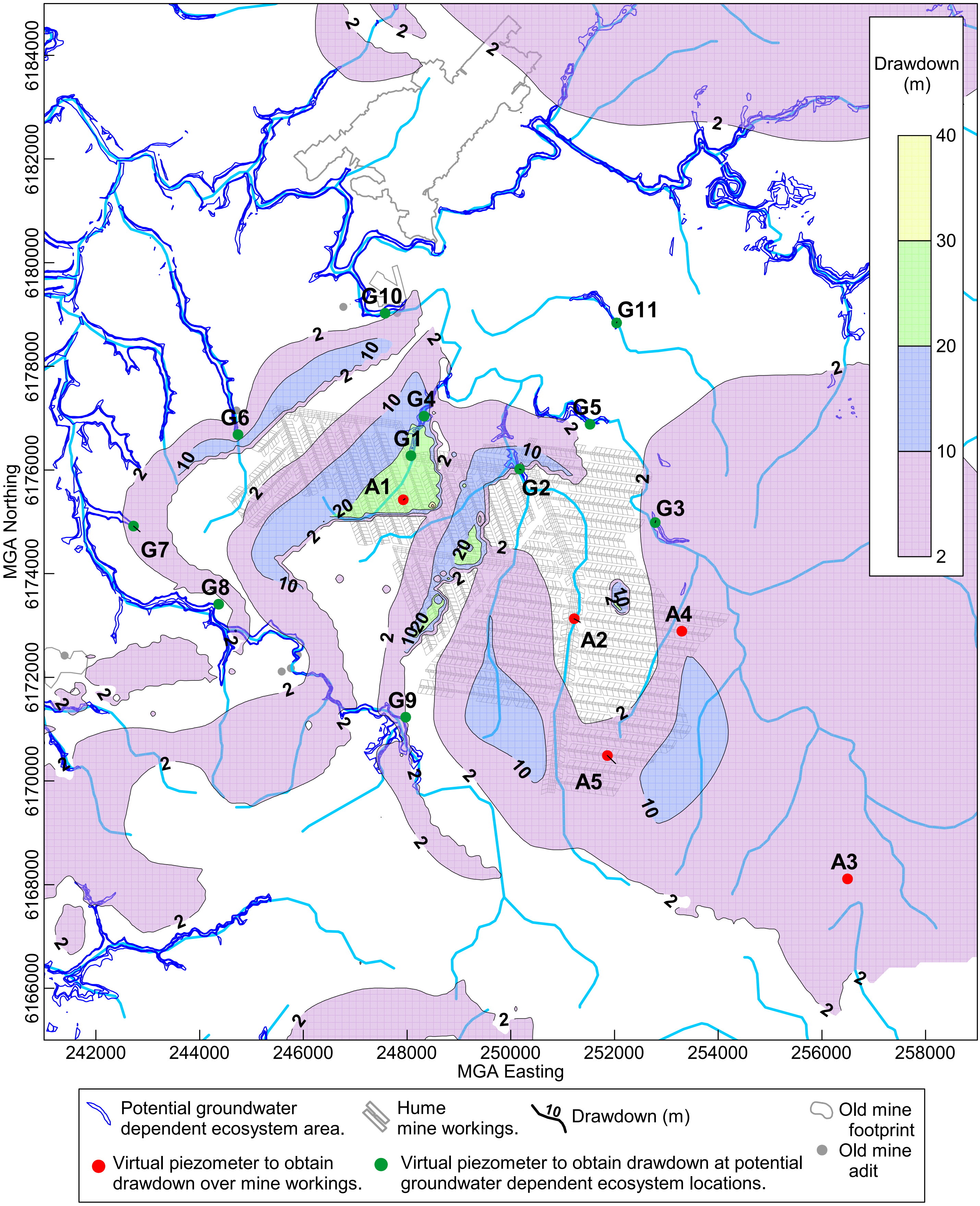




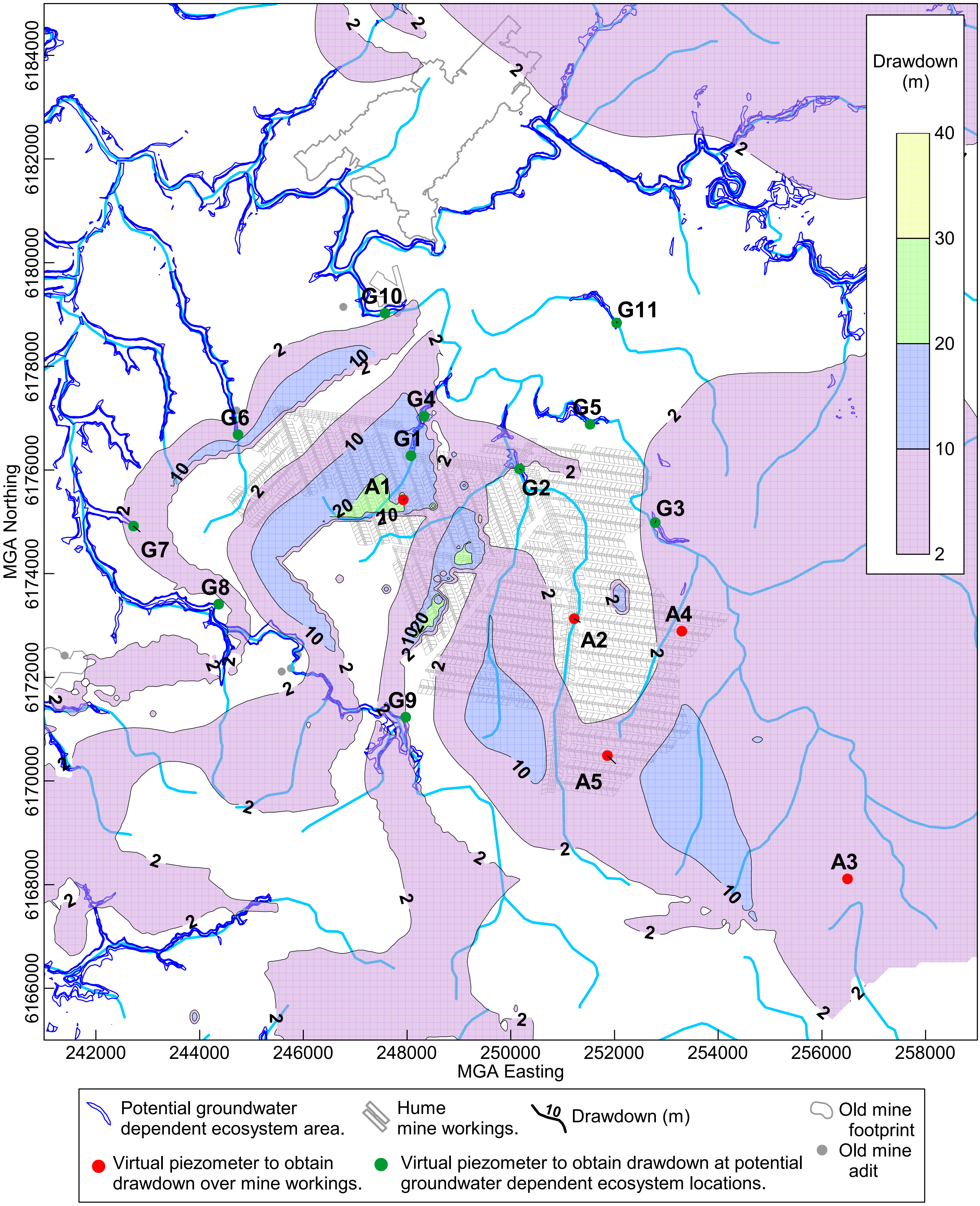


Appendix E - Total Drawdown of the Water Table at 17 and 30 Years Since the Start of Mining

TOTAL DRAWDOWN AT WATER TABLE AT 17 YEARS



TOTAL DRAWDOWN AT WATER TABLE AT 30 YEARS



Appendix F - Six-Monthly Accounts for Intercepted Baseflow to Surface Water Sources and Induced Release from Groundwater Storage in Groundwater Sources

Table 1. Modelled Intercepted Baseflow induced by Hume Operations

Years since the start of mining	Lower Wingecarribee R. (ML/day)	Longacre Ck. (ML/day)	Medway Rivulet (ML/day)	Oldbury Ck. (ML/day)	Belanglo Ck. (ML/day)	Wells Ck. (ML/day)	Wells Ck. Tributary (ML/day)	Lower Wollondilly R. (ML/day)	Bundanoon Ck. (ML/day)
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.5	0.018	0.000	0.035	0.000	0.000	0.011	0.013	0.000	0.000
1	0.177	0.000	0.057	0.000	0.000	0.021	0.020	0.000	0.000
1.5	0.177	0.000	0.088	0.000	0.001	0.075	0.033	0.000	0.000
2	0.000	0.000	0.143	0.000	0.002	0.072	0.033	0.000	0.000
2.5	0.090	0.000	0.177	0.000	0.004	0.070	0.032	0.000	0.000
3	0.314	0.000	0.248	0.000	0.006	0.068	0.031	0.000	0.000
3.5	0.475	0.000	0.243	0.000	0.008	0.065	0.031	0.000	0.000
4	0.654	0.000	0.242	0.000	0.009	0.063	0.030	0.000	0.000
4.5	0.486	0.000	0.236	0.000	0.011	0.061	0.030	0.004	0.000
5	0.575	0.000	0.224	0.000	0.012	0.059	0.029	0.027	0.000
5.5	0.653	0.000	0.215	0.000	0.013	0.057	0.029	0.005	0.000
6	0.518	0.000	0.206	0.000	0.014	0.055	0.029	0.000	0.000
6.5	0.493	0.000	0.354	0.000	0.014	0.054	0.028	0.000	0.000
7	0.231	0.000	0.418	0.000	0.015	0.052	0.028	0.000	0.000
7.5	0.311	0.000	0.703	0.000	0.015	0.050	0.027	0.000	0.000
8	0.331	0.000	0.756	0.000	0.016	0.048	0.027	0.000	0.000
8.5	0.321	0.000	0.799	0.000	0.016	0.047	0.026	0.000	0.000
9	0.323	0.054	0.820	0.000	0.016	0.045	0.026	0.000	0.000
9.5	0.232	0.062	0.753	0.000	0.017	0.044	0.026	0.000	0.000
10	0.762	0.054	0.811	0.001	0.017	0.043	0.025	0.000	0.000
10.5	0.601	0.142	0.804	0.002	0.017	0.042	0.025	0.000	0.000
11	0.580	0.106	0.841	0.002	0.017	0.041	0.025	0.000	0.000
11.5	0.510	0.052	0.784	0.002	0.017	0.041	0.025	0.000	0.000
12	0.442	0.224	0.790	0.002	0.017	0.040	0.025	0.000	0.000
12.5	0.453	0.292	0.754	0.002	0.017	0.040	0.025	0.000	0.000
13	0.538	0.311	0.721	0.002	0.017	0.039	0.025	0.000	0.000
13.5	0.491	0.307	0.645	0.001	0.017	0.039	0.025	0.000	0.000
14	0.357	0.290	0.601	0.000	0.016	0.039	0.024	0.000	0.000
14.5	0.230	0.249	0.460	0.000	0.016	0.039	0.024	0.000	0.000
15	0.586	0.176	0.537	0.000	0.016	0.039	0.024	0.000	0.000
15.5	0.583	0.111	0.510	0.000	0.015	0.039	0.024	0.000	0.000
16	0.632	0.046	0.477	0.000	0.015	0.040	0.024	0.041	0.000
16.5	0.721	0.015	0.376	0.000	0.015	0.040	0.024	0.046	0.000

Nil Loss in baseflow for:

Upper Wingecarribee R.
Black Bobs C.
Nattai R.

Table 1. Modelled Intercepted Baseflow induced by Hume Operations

Years since the start of mining	Lower Wingecarribee R. (ML/day)	Longacre Ck. (ML/day)	Medway Rivulet (ML/day)	Oldbury Ck. (ML/day)	Belanglo Ck. (ML/day)	Wells Ck. (ML/day)	Wells Ck. Tributary (ML/day)	Lower Wollondilly R. (ML/day)	Bundanoon Ck. (ML/day)
17	0.800	0.000	0.296	0.000	0.014	0.040	0.023	0.031	0.000
17.5	0.000	0.000	0.000	0.000	0.014	0.040	0.023	0.009	0.000
18	0.000	0.000	0.000	0.000	0.014	0.040	0.023	0.011	0.000
18.5	0.000	0.065	0.000	0.000	0.013	0.039	0.023	0.012	0.000
19	0.000	0.073	0.000	0.000	0.013	0.039	0.023	0.012	0.000
19.5	0.000	0.065	0.000	0.000	0.013	0.038	0.023	0.016	0.000
20	0.000	0.056	0.000	0.000	0.013	0.038	0.022	0.012	0.000
20.5	0.000	0.046	0.000	0.000	0.012	0.037	0.022	0.012	0.000
21	0.000	0.037	0.000	0.000	0.012	0.037	0.022	0.012	0.000
21.5	0.000	0.027	0.000	0.000	0.012	0.037	0.022	0.013	0.000
22	0.000	0.000	0.000	0.000	0.012	0.036	0.022	0.014	0.000
22.5	0.000	0.000	0.000	0.000	0.011	0.036	0.022	0.014	0.000
23	0.000	0.000	0.000	0.000	0.011	0.035	0.022	0.014	0.001
23.5	0.000	0.000	0.000	0.000	0.011	0.035	0.021	0.014	0.005
24	0.000	0.000	0.000	0.000	0.010	0.034	0.021	0.014	0.008
24.5	0.000	0.000	0.000	0.000	0.010	0.034	0.021	0.014	0.011
25	0.000	0.000	0.000	0.000	0.010	0.034	0.021	0.014	0.014
25.5	0.000	0.000	0.000	0.000	0.010	0.033	0.021	0.047	0.016
26	0.000	0.000	0.000	0.000	0.009	0.033	0.021	0.050	0.019
26.5	0.000	0.000	0.000	0.000	0.009	0.033	0.021	0.049	0.021
27	0.000	0.000	0.000	0.000	0.009	0.035	0.020	0.048	0.022
27.5	0.000	0.000	0.000	0.000	0.009	0.034	0.020	0.046	0.023
28	0.000	0.000	0.000	0.000	0.008	0.033	0.020	0.043	0.024
28.5	0.000	0.000	0.000	0.000	0.008	0.033	0.020	0.041	0.024
29	0.000	0.000	0.000	0.000	0.008	0.032	0.020	0.039	0.024
29.5	0.000	0.000	0.000	0.000	0.008	0.032	0.020	0.037	0.024
30	0.000	0.000	0.000	0.000	0.008	0.032	0.020	0.035	0.024
30.5	0.000	0.000	0.000	0.000	0.007	0.032	0.020	0.034	0.024
31	0.000	0.000	0.000	0.000	0.007	0.032	0.020	0.000	0.023
31.5	0.000	0.000	0.000	0.000	0.007	0.031	0.020	0.000	0.023
32	0.000	0.000	0.000	0.000	0.007	0.031	0.020	0.000	0.023
32.5	0.000	0.000	0.000	0.000	0.007	0.031	0.020	0.000	0.022
33	0.000	0.000	0.000	0.000	0.006	0.031	0.020	0.000	0.022
33.5	0.000	0.000	0.000	0.000	0.005	0.031	0.020	0.000	0.021

Table 1. Modelled Intercepted Baseflow induced by Hume Operations

Years since the start of mining	Lower Wingecarribee R. (ML/day)	Longacre Ck. (ML/day)	Medway Rivulet (ML/day)	Oldbury Ck. (ML/day)	Belanglo Ck. (ML/day)	Wells Ck. (ML/day)	Wells Ck. Tributary (ML/day)	Lower Wollondilly R. (ML/day)	Bundanoon Ck. (ML/day)
34	0.000	0.000	0.000	0.000	0.002	0.031	0.020	0.000	0.021
34.5	0.000	0.000	0.000	0.000	0.000	0.031	0.020	0.000	0.020
35	0.000	0.000	0.000	0.000	0.000	0.031	0.019	0.000	0.019
35.5	0.000	0.000	0.000	0.000	0.000	0.031	0.019	0.000	0.019
36	0.000	0.000	0.000	0.000	0.000	0.030	0.000	0.000	0.018
36.5	0.000	0.000	0.000	0.000	0.000	0.030	0.016	0.000	0.017
37	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.017
37.5	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.016
38	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015
38.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014
39	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013
39.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012
40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011
40.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010
41	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
41.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007
42	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
42.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
43	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
43.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
44	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
44.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
46	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
46.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
47	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
47.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
48	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
48.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
49	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
49.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 2. Modelled Release from Groundwater Storage induced by Hume Operations

Years since the start of mining	Nepean Management Zone 2 (ML/day)	Sydney Basin South (ML/day)	Nepean Management Zone 1 (ML/day)
0	0.000	0.001	0.000
0.5	0.000	0.000	0.274
1	0.001	0.000	0.079
1.5	0.002	0.000	1.005
2	0.003	0.000	1.087
2.5	0.003	0.000	2.185
3	0.003	0.000	1.796
3.5	0.002	0.000	2.545
4	0.001	0.000	2.233
4.5	0.000	0.000	2.682
5	0.000	0.000	2.369
5.5	0.000	0.000	2.317
6	0.000	0.000	2.200
6.5	0.000	0.000	2.792
7	0.000	0.000	2.759
7.5	0.000	0.000	3.503
8	0.000	0.000	3.154
8.5	0.000	0.000	3.986
9	0.000	0.000	3.669
9.5	0.000	0.000	4.740
10	0.000	0.000	3.630
10.5	0.000	0.000	4.210
11	0.000	0.000	4.053
11.5	0.000	0.000	4.476
12	0.000	0.000	4.167
12.5	0.000	0.000	4.336
13	0.000	0.000	4.046
13.5	0.000	0.000	4.605
14	0.000	0.000	4.566
14.5	0.000	0.000	5.206
15	0.000	0.000	4.616
15.5	0.000	0.000	4.824
16	0.000	0.000	4.625
16.5	0.000	0.000	4.106
17	0.000	0.000	3.922
17.5	0.000	0.000	4.426
18	0.000	0.000	4.168
18.5	0.000	0.000	3.276
19	0.000	0.000	3.061
19.5	0.000	0.000	2.891
20	0.000	0.000	2.741
20.5	0.000	0.010	1.797
21	0.000	0.014	1.728
21.5	0.000	0.021	1.143
22	0.000	0.026	1.153
22.5	0.000	0.035	0.500
23	0.000	0.040	0.100
23.5	0.000	0.040	0.000
24	0.000	0.041	0.000
24.5	0.000	0.041	0.000
25	0.000	0.042	0.000

Table 2. Modelled Release from Groundwater Storage induced by Hume Operations

Years since the start of mining	Nepean Management Zone 2 (ML/day)	Sydney Basin South (ML/day)	Nepean Management Zone 1 (ML/day)
25.5	0.000	0.042	0.000
26	0.000	0.040	0.000
26.5	0.000	0.038	0.000
27	0.000	0.035	0.000
27.5	0.000	0.032	0.000
28	0.000	0.028	0.000
28.5	0.000	0.025	0.000
29	0.000	0.022	0.000
29.5	0.000	0.019	0.000
30	0.000	0.017	0.000
30.5	0.000	0.015	0.000
31	0.000	0.014	0.000
31.5	0.000	0.014	0.000
32	0.000	0.013	0.000
32.5	0.000	0.013	0.000
33	0.000	0.012	0.000
33.5	0.000	0.011	0.000
34	0.000	0.010	0.000
34.5	0.000	0.009	0.000
35	0.000	0.008	0.000
35.5	0.000	0.006	0.000
36	0.000	0.005	0.000
36.5	0.000	0.004	0.000
37	0.000	0.005	0.000
37.5	0.000	0.005	0.000
38	0.000	0.004	0.000
38.5	0.000	0.002	0.000
39	0.000	0.000	0.000
39.5	0.000	-0.002	0.000
40	0.000	-0.005	0.000
40.5	0.000	0.000	0.000
41	0.000	0.000	0.000
41.5	0.000	0.000	0.000
42	0.000	0.000	0.000
42.5	0.000	0.000	0.000
43	0.000	0.000	0.000
43.5	0.000	0.000	0.000
44	0.000	0.000	0.000
44.5	0.000	0.000	0.000
45	0.000	0.000	0.000
45.5	0.000	0.000	0.000
46	0.000	0.000	0.000
46.5	0.000	0.000	0.000
47	0.000	0.000	0.000
47.5	0.000	0.000	0.000
48	0.000	0.000	0.000
48.5	0.000	0.000	0.000
49	0.000	0.000	0.000
49.5	0.000	0.000	0.000
50	0.000	0.000	0.000

Appendix G - Private Water Bore Register, Locations, Results, and Drawdown Hydrographs

Table 1. PRIVATE BORE DETAILS

Bore	Easting (mMGA)	Northing (mMGA)	Water Level (mbgl)*	Hydraulic Interval (mbgl		Water Column# (m)	Intersected Strata^	Screened Model Layers											
				From	To														
GW011227	252755	6175769	0	12	40	40	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW017295	256273	6172008	3	58	76	73	WG	$\boxed{1}$	2	3	4	5	6	7	8	9	10	11	12
GW021817	245756	6174939	55	6	93	38	HAW	1	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	6	7	8	9	10	11	12
GW023322	248882	6173630	8	7	45	37	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW024688	249722	6174670	2	12	75	74	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW025808	250587	6169081	14	17	128	114	WG/HAW	$\boxed{1}$	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW026136	250554	6174076	20	20	53	33	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW026805	246680	6173940	23	3	83	60	HAW	1	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW028687	252433	6175391	3	8	52	49	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW028832	253958	6173704	8	40	132	124	HAW	1	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW031527	252625	6176814	2	6	40	38	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW032319	251374	6175856	12	19	38	26	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW035590	247831	6171936	26	2	34	8	WG/HAW	$\boxed{1}$	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW037851	248939	6176253	27	2	79	51	HAW	1	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW042642	255687	6172949	18	18	69	51	WG	$\boxed{1}$	2	3	4	5	6	7	8	9	10	11	12
GW047076	254720	6170814	8	6	90	82	WG/HAW	$\boxed{1}$	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW047117	251827	6177040	6	5	34	28	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW047157	248506	6175285	12	6	67	55	HAW	1	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW047443	249131	6169165	13	24	67	54	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW048345	251887	6174821	9	25	38	29	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW049172	249209	6175705	10	16	70	60	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW052538	244625	6175333	38	7	88	50	HAW/ICM	1	2	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	$\boxed{6}$	$\boxed{7}$	$\boxed{8}$	$\boxed{9}$	$\boxed{10}$	$\boxed{11}$	$\boxed{12}$
GW053331	251462	6177338	18	6	92	74	HAW	1	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW053793	247553	6173717	22	20	92	70	HAW	1	2	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW053801	247583	6171683	27	30	99	72	HAW/ICM	1	2	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	$\boxed{6}$	$\boxed{7}$	$\boxed{8}$	$\boxed{9}$	$\boxed{10}$	$\boxed{11}$	12
GW054137	251672	6177128	13	6	46	33	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW057683	252063	6176799	9	6	61	52	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW057906	250456	6174875	6	6	61	55	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW057908	250955	6176276	21	6	84	63	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW057943	252428	6169840	11	20	26	15	WG	$\boxed{1}$	2	3	4	5	6	7	8	9	10	11	12
GW060067	254057	6169020	37	6	76	39	WG	$\boxed{1}$	2	3	4	5	6	7	8	9	10	11	12
GW060125	252618	6175525	7	7	107	100	HAW	1	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW060199	253094	6174514	1	12	37	36	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW062326	250784	6169333	43	14	95	51	WG/HAW	$\boxed{1}$	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW064613	249108	6175671	14	7	43	29	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW066775	253213	6170077	50	50	86	36	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW066798	251660	6175678	10	10	32	22	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW066800	253274	6170634	14	14	81	67	WG/HAW	$\boxed{1}$	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW067303	247661	6171654	25	90	100	75	HAW/ICM	1	2	3	4	$\boxed{5}$	$\boxed{6}$	$\boxed{7}$	$\boxed{8}$	$\boxed{9}$	$\boxed{10}$	11	12
GW067305	250965	6174950	12	6	15	3	WG	$\boxed{1}$	2	3	4	5	6	7	8	9	10	11	12
GW067319	251579	6175830	10	10	31	21	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW068965	251659	6175774	14	8	37	23	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW069072	254350	6169571	60	99	120	60	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW071741	248620	6171839	25	12	85	60	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW072207	256328	6171699	33	91	109	76	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW072320	256462	6171059	33	91	109	76	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW072672	251924	6174305	24	12	122	98	HAW/ICM	1	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	$\boxed{6}$	$\boxed{7}$	$\boxed{8}$	$\boxed{9}$	$\boxed{10}$	$\boxed{11}$	12
GW100147	253307	6172269	20	20	80	60	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW100153	253247	6172606	20	20	85	65	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW102309	254109	6170271	45	45	67	22	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW102516	256418	6171364	11	14	91	80	WG/HAW	$\boxed{1}$	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW102588	244853	6174954	56	42	88	32	HAW/ICM	1	2	3	$\boxed{4}$	$\boxed{5}$	$\boxed{6}$	$\boxed{7}$	$\boxed{8}$	$\boxed{9}$	$\boxed{10}$	11	12
GW102689	252658	6172598	24	36	84	60	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW102694	253410	6168417	89	96	169	80	HAW	1	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	6	7	8	9	10	11	12
GW102705	246987	6171111	32	60	150	118	HAW/ICM	1	2	3	4	$\boxed{5}$	$\boxed{6}$	$\boxed{7}$	$\boxed{8}$	$\boxed{9}$	$\boxed{10}$	$\boxed{11}$	$\boxed{12}$
GW102713	251032	6175292	10	12	60	50	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12

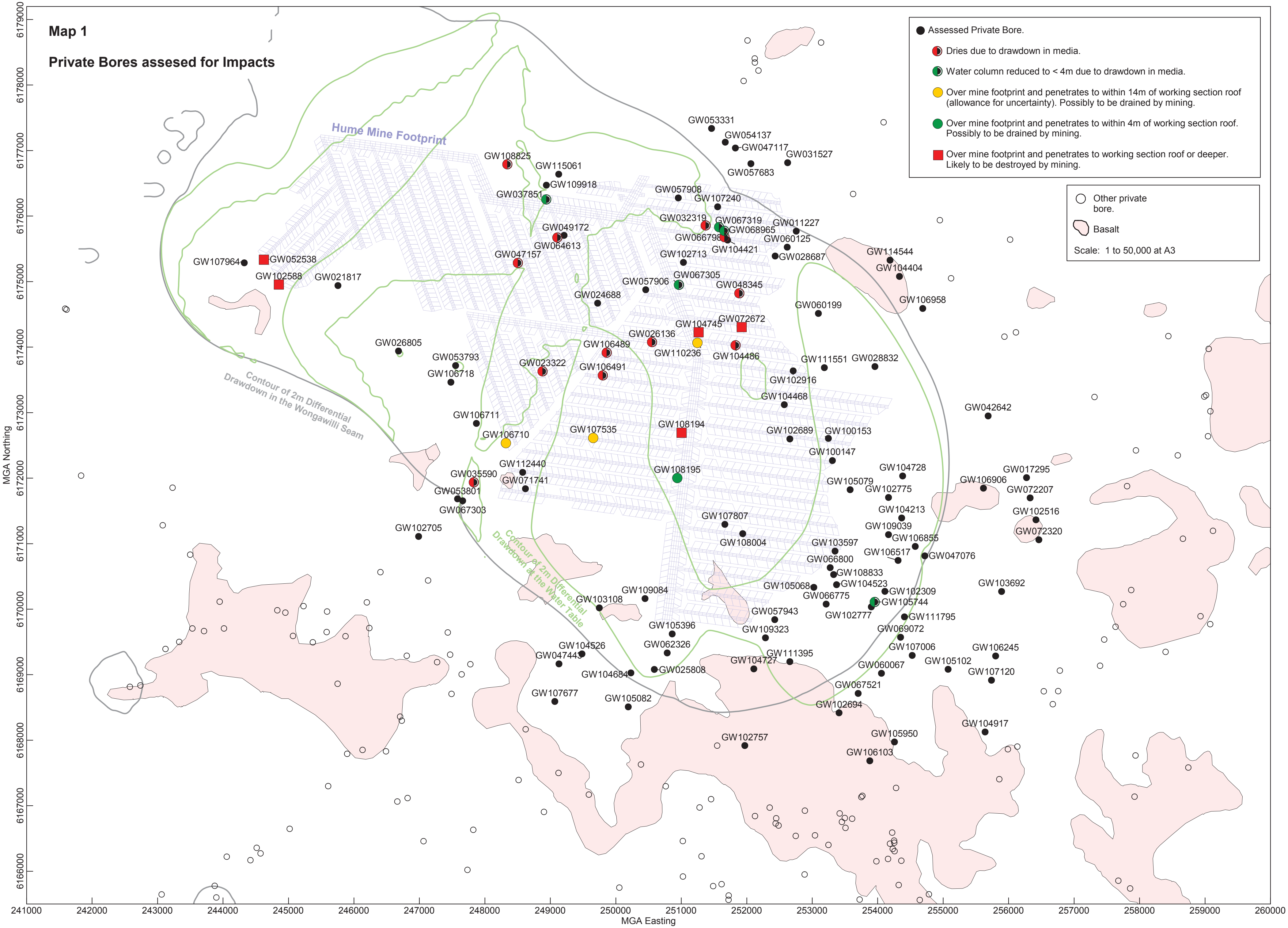
Table 1. PRIVATE BORE DETAILS

Bore	Easting (mMGA)	Northing (mMGA)	Water Level (mbgl)*	Hydraulic Interval (mbgl)		Water Column[#] (m)	Intersected Strata^	Screened Model Layers											
				From	To														
GW102757	251971	6167918	99	19	210	111	WG/HAW/ICM	$\boxed{1}$	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	$\boxed{6}$	$\boxed{7}$	$\boxed{8}$	$\boxed{9}$	$\boxed{10}$	$\boxed{11}$	$\boxed{12}$
GW102775	254164	6171706	52	59	116	64	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW102777	253902	6170034	44	59	103	59	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW102916	252708	6173638	42	48	108	66	HAW	1	2	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW103108	249748	6170021	35	60	114	79	HAW	1	2	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW103597	253347	6170885	50	6	90	40	WG/HAW	$\boxed{1}$	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW103692	255893	6170270	13	79	152	139	HAW	1	2	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW104213	254367	6171392	34	84	144	110	HAW	1	2	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW104404	254332	6175078	74	126	159	85	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW104421	251708	6175634	15	30	42	27	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW104468	252574	6173120	43	73	103	60	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW104486	251831	6174027	19	26	43	25	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW104523	253372	6170373	42	66	91	49	HAW	1	2	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW104526	249484	6169317	33	40	61	28	HAW	1	2	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW104684	250231	6169027	57	66	156	99	HAW/ICM	1	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	$\boxed{6}$	$\boxed{7}$	$\boxed{8}$	$\boxed{9}$	$\boxed{10}$	$\boxed{11}$	12
GW104727	252108	6169089	101	101	175	74	HAW	1	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	6	7	8	9	10	11	12
GW104728	254382	6172032	13	67	79	66	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW104745	251266	6174225	80	80	130	50	HAW	1	2	3	$\boxed{4}$	$\boxed{5}$	$\boxed{6}$	7	8	9	10	11	12
GW104917	255641	6168126	65	101	156	91	HAW	1	2	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW105068	253025	6170333	40	67	91	51	HAW	1	2	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW105079	253578	6171823	18	54	114	96	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW105082	250190	6168508	38	38	102	64	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW105102	255075	6169083	52	85	151	99	HAW	1	2	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW105396	250860	6169623	60	79	96	36	HAW	1	2	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW105744	253955	6170109	52	55	67	15	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW105950	254257	6167973	72	80	168	96	HAW/ICM	1	2	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	$\boxed{6}$	$\boxed{7}$	$\boxed{8}$	$\boxed{9}$	$\boxed{10}$	$\boxed{11}$	12
GW106245	255801	6169286	70	102	139	69	HAW	1	2	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW106489	249862	6173914	5	30	55	50	HAW	1	2	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW106491	249802	6173568	5	36	60	55	HAW	1	2	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW106517	254312	6170743	56	88	144	88	HAW	1	2	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW106710	248321	6172535	35	64	115	80	HAW	1	2	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW106711	247871	6172835	59	60	145	86	HAW/ICM	1	2	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	$\boxed{6}$	$\boxed{7}$	$\boxed{8}$	$\boxed{9}$	$\boxed{10}$	$\boxed{11}$	$\boxed{12}$
GW106718	247480	6173463	35	35	93	58	HAW	1	2	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW106855	254574	6170957	39	59	146	107	HAW	1	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	6	7	8	9	10	11	12
GW106906	255615	6171846	0	72	150	150	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW106958	254688	6174591	82	138	168	86	HAW	1	2	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW107006	254526	6169294	64	90	175	111	HAW/ICM	1	2	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	$\boxed{6}$	$\boxed{7}$	$\boxed{8}$	$\boxed{9}$	$\boxed{10}$	$\boxed{11}$	12
GW107120	255737	6168916	0	85	132	132	HAW	1	2	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW107240	251555	6176142	10	14	42	32	HAW	1	$\boxed{2}$	3	4	5	6	7	8	9	10	11	12
GW107535	249655	6172612	13	13	114	101	HAW	1	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	$\boxed{6}$	7	8	9	10	11	12
GW107677	249069	6168592	44	44	66	22	HAW	1	2	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW107807	251666	6171294	31	113	121	90	HAW	1	2	3	$\boxed{4}$	5	6	7	8	9	10	11	12
GW107964	244325	6175286	60	63	96	36	HAW/ICM	1	2	3	$\boxed{4}$	$\boxed{5}$	$\boxed{6}$	$\boxed{7}$	$\boxed{8}$	$\boxed{9}$	$\boxed{10}$	$\boxed{11}$	$\boxed{12}$
GW108004	251939	6171152	21	113	121	100	HAW	1	2	3	4	$\boxed{5}$	6	7	8	9	10	11	12
GW108194	251005	6172692	24	36	122	98	HAW/ICM	1	2	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	$\boxed{6}$	$\boxed{7}$	$\boxed{8}$	$\boxed{9}$	$\boxed{10}$	11	12
GW108195	250939	6172001	28	36	126	98	HAW/ICM	1	2	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	$\boxed{6}$	$\boxed{7}$	$\boxed{8}$	$\boxed{9}$	$\boxed{10}$	11	12
GW108825	248345	6176790	52	52	79	27	HAW/ICM	1	2	3	4	$\boxed{5}$	$\boxed{6}$	$\boxed{7}$	$\boxed{8}$	$\boxed{9}$	10	11	12
GW108833	253326	6170528	48	66	85	37	HAW	1	2	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW109039	254164	6171137	44	44	120	76	HAW	1	$\boxed{2}$	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW109084	250446	6170161	20	20	139	119	HAW	1	$\boxed{2}$	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	6	7	8	9	10	11	12
GW109323	252286	6169562	68	72	132	64	HAW	1	2	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12
GW109918	248938	6176472	27	27	102	75	HAW	1	2	$\boxed{3}$	$\boxed{4}$	$\boxed{5}$	$\boxed{6}$	7	8	9	10	11	12
GW110236	251246	6174064	17	54	108	91	HAW	1	2	3	$\boxed{4}$	$\boxed{5}$	6	7	8	9	10	11	12
GW111395	252658	6169198	54	90	121	67	HAW	1	2	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW111551	253185	6173686	23	60	78	55	HAW	1	2	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW111795	254408	6169883	98	102	156	58	HAW	1	2	$\boxed{3}$	$\boxed{4}$	5	6	7	8	9	10	11	12

Table 1. PRIVATE BORE DETAILS

Bore	Easting (mMGA)	Northing (mMGA)	Water Level (mbgl)*	Hydraulic Interval (mbgl) From	Hydraulic Interval (mbgl) To	Water Column[#] (m)	Intersected Strata^	Screened Model Layers											
GW112440	248577	6172089	0	66	91	91	HAW	1	2	$\boxed{3}$	4	5	6	7	8	9	10	11	12
GW114544	254189	6175327	20	20	36	16	WG	$\boxed{1}$	2	3	4	5	6	7	8	9	10	11	12
GW115061	249128	6176639	23	114	129	106	ICM	1	2	3	4	5	6	7	8	9	10	11	$\boxed{12}$
GW067521	253702	6168715	18	21	33	15	WG	$\boxed{1}$	2	3	4	5	6	7	8	9	10	11	12
GW106103[%]	253879	6167685	27	27	66	39	Basalt	$\boxed{1}$	(separate model)										

No information for top of hydraulic interval, therefore set to recorded bore water level.
No information for top of hydraulic interval, therefore set to surrogate SWL (pre-mining water level from model).
Surrogate SWL (pre-mining water level from model).
^ HAW denotes Hawkesbury Sandstone, WG denotes Wianamatta Group, and ICM denotes Illawarra Coal Measures.
* Denotes metres below ground level.
[%] Drilled to 156m (into WG and HAW) but appears to have been backfilled.
[#] The distance between the base of the bore and the pre-mining bore water level.



Map 1
Private Bores assesed for Impacts
Assessed Private Bore.
Dries due to drawdown in media.
Water column reduced to < 4m due to drawdown in media.
Over mine footprint and penetrates to within 14m of working section roof (allowance for uncertainty). Possibly to be drained by mining.
Over mine footprint and penetrates to within 4m of working section roof. Possibly to be drained by mining.
Over mine footprint and penetrates to working section roof or deeper. Likely to be destroyed by mining.
Other private bore.
Basalt
Scale: 1 to 50,000 at A3
Hume Mine Footprint
Contour of 2m Differential Drawdown in the Wongawilli Seam
Contour of 2m Differential Drawdown at the Water Table
MGA Northing
MGA Easting
6179000
6178000
6177000
6176000
6175000
6174000
6173000
6172000
6171000
6170000
6169000
6168000
6167000
6166000
241000
242000
243000
244000
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253000
254000
255000
256000
257000
258000
259000
260000
GW053331
GW054137
GW047117
GW031527
GW057683
GW108825
GW115061
GW109918
GW037851
GW057908
GW107240
GW032319
GW067319
GW011227
GW068965
GW049172
GW066798
GW060125
GW064613
GW104421
GW047157
GW102713
GW028687
GW114544
GW104404
GW107964
GW052538
GW102588
GW021817
GW057906
GW067305
GW048345
GW024688
GW106958
GW060199
GW104745
GW072672
GW026136
GW026805
GW106489
GW110236
GW104486
GW053793
GW023322
GW111551
GW028832
GW106718
GW106491
GW102916
GW104468
GW042642
GW106711
GW108194
GW106710
GW107535
GW102689
GW100153
GW100147
GW112440
GW035590
GW108195
GW104728
GW017295
GW071741
GW105079
GW106906
GW053801
GW102775
GW072207
GW067303
GW104213
GW102516
GW107807
GW109039
GW072320
GW102705
GW108004
GW103597
GW106855
GW106517
GW047076
GW066800
GW108833
GW104523
GW103692
GW105068
GW102309
GW066775
GW105744
GW109084
GW103108
GW057943
GW102777
GW111795
GW105396
GW109323
GW069072
GW104526
GW062326
GW107006
GW106245
GW047443
GW111395
GW104727
GW105102
GW104684
GW025808
GW060067
GW107120
GW107677
GW067521
GW105082
GW102694
GW104917
GW102757
GW105950
GW106103

Table 2. MODELLED IMPACTS ON PRIVATE BORES

Bore	Total Drawdown		Differential Drawdown				Proportion of max. total drawdown caused by Hume operations	Comment	
	Maximum (m)	Time to Maximum (Years)	Maximum (m)	Time to Maximum (Years)	Time to 2m drawdown (Years)	Time to 2m recovery (Years)		Drawdown (model)	Structural
GW011227	6.1	10.0	4.7	10.0	8.3	18.9	0.77		
GW017295	7.4	26.0	1.1	26.0	N/A *	N/A *	0.14		
GW021817	23.1	20.5	15.2	19.0	6.3	71.6	0.66		
GW023322	40.1	14.5	39.7	14.5	3.4	4.5	0.99	Goes dry	
GW024688	33.0	16.0	31.4	16.0	1.2	45.3	0.95		
GW025808	6.1	22.5	3.1	19.5	15.6	43.8	0.50		
GW026136	47.8	22.0	44.9	22.0	2.7	47.8	0.94	Goes dry	
GW026805	14.8	26.5	8.6	24.0	8.3	66.4	0.58		
GW028687	12.1	11.0	10.7	11.0	7.9	38.0	0.88		
GW028832	6.5	26.0	3.2	13.0	11.8	37.3	0.49		
GW031527	2.2	10.0	1.1	10.0	N/A *	N/A *	0.50		
GW032319	33.4	10.0	32.8	10.0	3.5	35.1	0.98	Goes dry	
GW035590	11.9	20.5	8.4	20.5	13.7	48.1	0.70	Goes dry	
GW037851	47.5	11.0	46.2	11.0	1.0	41.1	0.97	Water column reduces to < 4m	
GW042642	6.8	26.5	1.2	26.0	N/A *	N/A *	0.18		
GW047076	10.2	25.0	3.5	25.0	16.6	37.2	0.34		
GW047117	3.3	9.0	2.6	9.0	8.4	11.7	0.79		
GW047157	63.9	6.0	62.6	6.0	2.0	53.2	0.98	Goes dry	
GW047443	8.2	26.0	5.1	25.5	18.2	47.1	0.63		
GW048345	37.8	11.0	36.2	11.0	7.1	41.8	0.96	Goes dry	
GW049172	40.2	5.5	39.6	5.5	1.1	38.9	0.98		
GW052538	27.5	18.0	21.3	18.0	6.0	67.3	0.77		Over mine footprint and penetrates to working section roof or below. Likely to be intersected by mining
GW053331	2.4	3.0	2.0	3.0	2.9	3.0	0.83		
GW053793	24.2	16.5	20.1	16.0	8.0	58.2	0.83		
GW053801	8.1	22.5	5.0	21.5	20.1	44.7	0.62		
GW054137	3.1	9.5	2.4	9.5	8.6	11.3	0.77		
GW057683	3.5	9.0	2.9	9.0	8.1	11.8	0.83		
GW057906	40.9	12.0	39.8	12.0	1.1	43.1	0.97		
GW057908	14.9	10.0	14.5	10.0	6.7	28.0	0.97		
GW057943	9.2	17.0	4.2	15.5	14.2	48.3	0.46		
GW060067	11.4	26.0	4.6	25.5	17.4	46.4	0.40		
GW060125	9.5	10.0	8.0	10.0	7.7	36.8	0.85		
GW060199	9.2	13.0	6.6	12.5	9.4	40.2	0.71		
GW062326	13.9	22.0	10.5	22.0	14.7	54.8	0.76		
GW064613	52.1	5.0	51.5	5.0	1.1	41.0	0.99	Goes dry	
GW066775	15.2	17.5	9.9	17.5	14.1	55.5	0.65		

Table 2. MODELLED IMPACTS ON PRIVATE BORES

Bore	Total Drawdown		Differential Drawdown				Proportion of max. total drawdown caused by Hume operations	Comment	
	Maximum (m)	Time to Maximum (Years)	Maximum (m)	Time to Maximum (Years)	Time to 2m drawdown (Years)	Time to 2m recovery (Years)		Drawdown (model)	Structural
GW066798	34.7	10.0	34.0	10.0	6.0	36.9	0.98	Goes dry	
GW066800	14.5	17.0	9.1	17.0	13.6	53.0	0.63		
GW067303	8.7	22.0	5.7	21.5	16.3	46.4	0.65		
GW067305	0.3	7.5	0.0	7.5	N/A *	N/A *	0.01	Water column reduces to < 4m	
GW067319	20.6	10.0	19.9	10.0	5.1	34.9	0.97	Water column reduces to < 4m	
GW068965	19.9	10.0	19.2	10.0	6.1	34.9	0.96	Water column reduces to < 4m	
GW069072	9.4	25.5	4.2	25.5	17.0	43.2	0.44		
GW071741	22.3	18.5	18.9	18.5	12.7	55.7	0.85		
GW072207	7.4	26.0	1.2	25.5	N/A *	N/A *	0.16		
GW072320	7.6	26.0	1.1	25.5	N/A *	N/A *	0.14		
GW072672	48.6	12.0	46.3	12.0	7.8	45.2	0.95		Over mine footprint and penetrates to working section roof or below. Likely to be intersected by mining
GW100147	16.4	15.0	12.3	15.0	11.4	48.1	0.75		
GW100153	16.0	15.0	12.0	15.0	10.7	46.9	0.75		
GW102309	11.3	25.5	4.8	23.0	15.2	43.3	0.42		
GW102516	7.7	26.0	1.0	25.5	N/A *	N/A *	0.13		
GW102588	22.8	18.0	20.3	18.0	6.2	69.5	0.89		Over mine footprint and penetrates to working section roof or below. Likely to be intersected by mining
GW102689	17.8	15.0	11.9	15.0	12.2	43.7	0.67		
GW102694	12.3	28.5	0.0	2.5	N/A *	N/A *	0.00		
GW102705	4.4	32.0	1.8	27.0	N/A *	N/A *	0.41		
GW102713	45.8	11.5	45.0	11.5	2.2	38.8	0.98		
GW102757	4.0	31.0	2.4	28.5	23.0	37.5	0.61		
GW102775	10.6	16.5	5.9	16.0	13.1	42.8	0.56		
GW102777	11.8	25.5	5.5	22.5	15.0	46.4	0.46		
GW102916	39.6	12.0	36.6	12.0	9.1	50.3	0.92		
GW103108	13.1	23.5	9.8	23.0	15.6	56.2	0.75		
GW103597	14.7	17.0	9.4	17.0	13.4	52.0	0.64		
GW103692	8.4	26.0	1.6	25.5	N/A *	N/A *	0.19		
GW104213	10.2	17.0	5.2	16.5	13.8	42.2	0.51		
GW104404	5.0	27.5	1.6	13.5	N/A *	N/A *	0.31		
GW104421	20.6	10.0	19.9	10.0	6.1	36.7	0.96		
GW104468	22.2	13.0	18.5	13.0	9.9	49.0	0.84		
GW104486	44.1	12.5	41.5	12.5	8.1	46.3	0.94	Goes dry	

Table 2. MODELLED IMPACTS ON PRIVATE BORES

Bore	Total Drawdown		Differential Drawdown				Proportion of max. total drawdown caused by Hume operations	Comment	
	Maximum (m)	Time to Maximum (Years)	Maximum (m)	Time to Maximum (Years)	Time to 2m drawdown (Years)	Time to 2m recovery (Years)		Drawdown (model)	Structural
GW104523	17.1	17.0	11.9	17.0	13.5	55.8	0.70		
GW104526	8.9	25.0	5.9	24.5	16.9	48.1	0.66		
GW104684	9.7	23.5	6.7	23.0	15.9	48.7	0.69		
GW104727	15.1	23.5	9.8	22.5	15.1	57.2	0.65		
GW104728	9.2	17.0	4.7	16.5	13.0	40.6	0.52		
GW104745	44.7	13.0	42.6	13.0	7.1	43.9	0.95		Over mine footprint and penetrates to working section roof or below. Likely to be intersected by mining
GW104917	8.4	31.0	1.4	27.0	N/A *	N/A *	0.17		
GW105068	21.9	17.0	16.8	17.0	13.3	57.8	0.77		
GW105079	15.1	16.0	10.6	16.0	12.2	48.4	0.70		
GW105082	6.1	25.5	3.8	25.0	18.2	42.0	0.62		
GW105102	8.6	26.0	2.5	25.5	22.4	35.0	0.29		
GW105396	19.1	21.0	15.4	21.0	14.1	56.8	0.81		
GW105744	11.5	25.5	5.1	22.5	15.1	45.1	0.45	Water column reduces to < 4m	
GW105950	10.0	32.5	2.9	28.5	23.1	42.9	0.29		
GW106245	8.5	26.5	1.5	26.0	N/A *	N/A *	0.18		
GW106489	56.6	21.0	54.2	21.0	2.1	53.6	0.96	Goes dry	
GW106491	72.7	21.0	70.0	21.0	3.0	55.9	0.96	Goes dry	
GW106517	10.8	25.5	4.4	22.5	16.1	41.4	0.41		
GW106710	35.4	14.0	32.3	14.0	11.1	55.3	0.91		Over mine footprint and penetrates to within 14m of working section roof (allowance for uncertainty). Possibly to be drained by mining.
GW106711	13.8	20.0	9.7	20.0	12.3	45.9	0.71		
GW106718	20.6	21.0	15.4	21.0	11.7	59.5	0.75		
GW106855	10.4	25.5	3.8	23.0	15.1	38.7	0.37		
GW106906	7.7	25.5	1.6	25.5	N/A *	N/A *	0.21		
GW106958	5.4	28.0	1.4	14.5	N/A *	N/A *	0.26		
GW107006	6.7	26.0	3.7	25.5	20.5	42.1	0.54		
GW107120	8.6	27.0	1.7	26.0	N/A *	N/A *	0.19		
GW107240	15.4	10.0	14.8	10.0	6.1	31.5	0.96		
GW107535	62.0	20.0	58.6	20.0	13.5	52.9	0.95		Over mine footprint and penetrates to within 14m of working section roof (allowance for uncertainty). Possibly to be drained by mining.
GW107677	4.9	28.5	2.6	27.0	22.0	38.9	0.52		
GW107807	64.0	17.0	59.7	17.0	12.1	60.3	0.93		
GW107964	18.6	20.5	12.5	20.5	6.5	64.0	0.67		
GW108004	84.2	16.0	80.0	16.0	12.2	61.5	0.95		

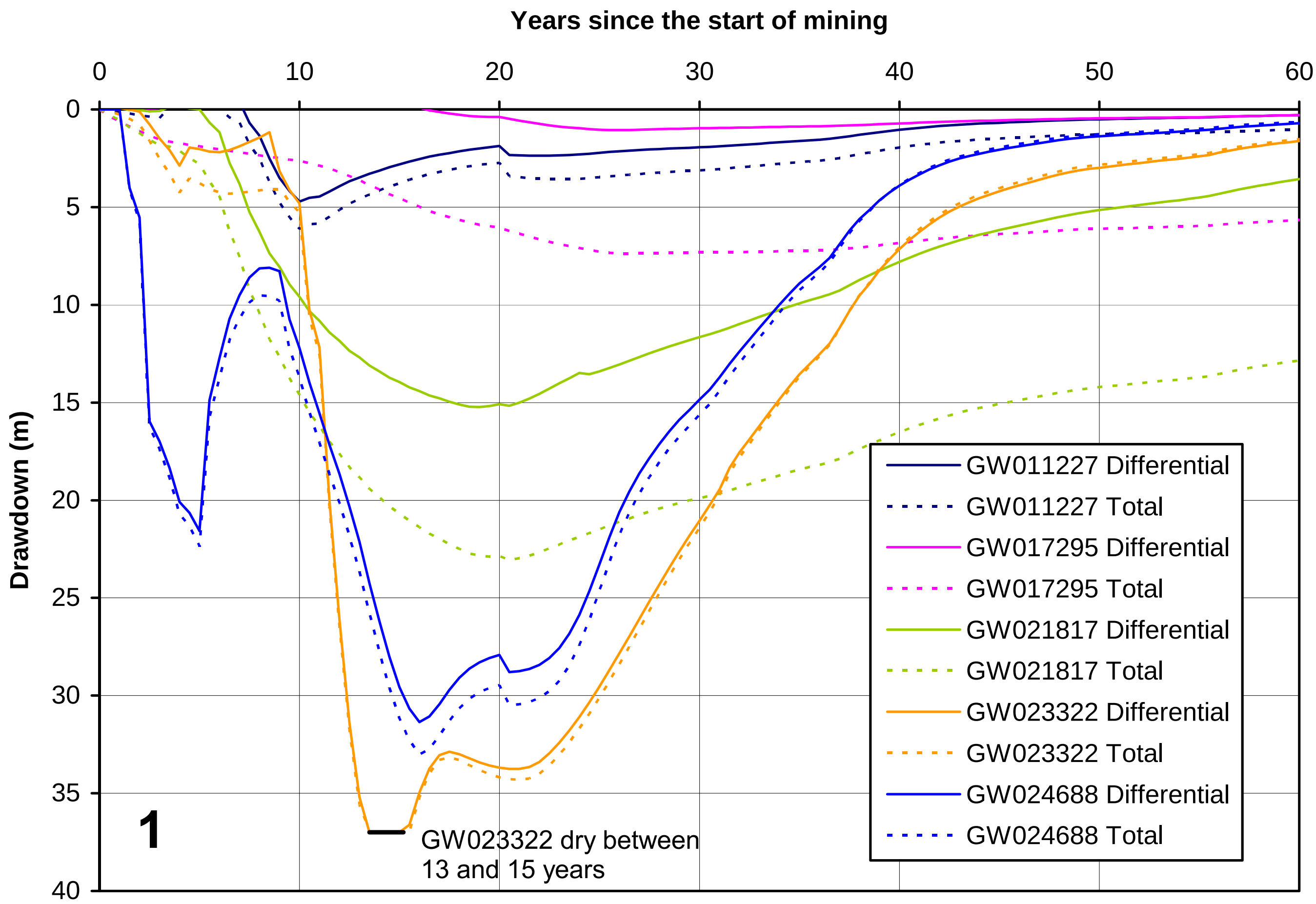
Table 2. MODELLED IMPACTS ON PRIVATE BORES

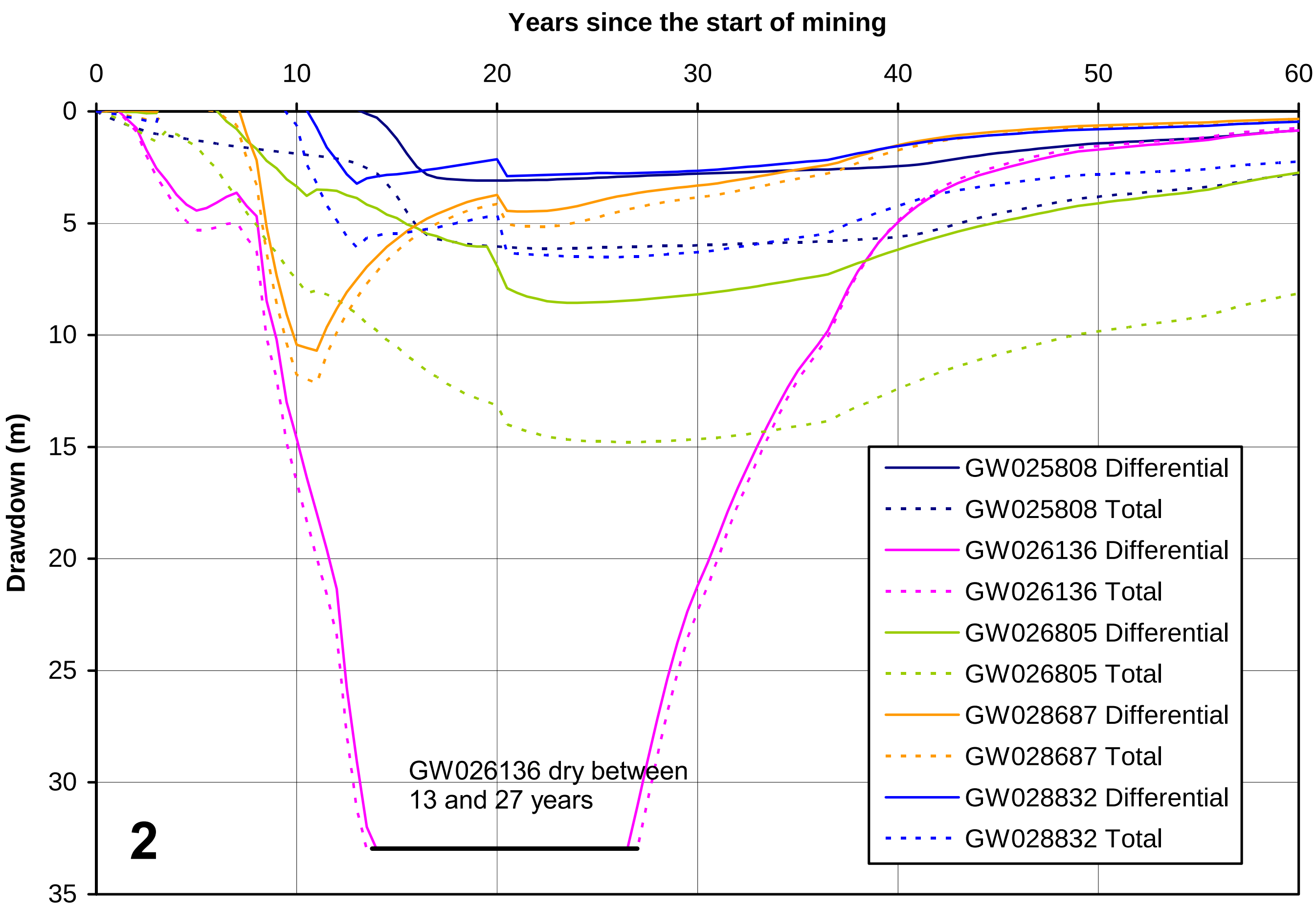
Bore	Total Drawdown		Differential Drawdown				Proportion of max. total drawdown caused by Hume operations	Comment	
	Maximum (m)	Time to Maximum (Years)	Maximum (m)	Time to Maximum (Years)	Time to 2m drawdown (Years)	Time to 2m recovery (Years)		Drawdown (model)	Structural
GW108194	48.8	22.0	44.6	22.0	14.5	48.0	0.91		Over mine footprint and penetrates to working section roof or below. Likely to be intersected by mining
GW108195	49.4	21.5	45.0	21.5	15.1	49.5	0.91		Over mine footprint and penetrates to within 4m of working section roof. Possibly to be drained by mining
GW108825	29.6	12.0	27.4	11.5	2.0	52.7	0.92	Goes dry	
GW108833	19.4	17.0	14.3	17.0	13.3	56.4	0.74		
GW109039	11.0	17.0	5.8	17.0	13.8	43.5	0.53		
GW109084	20.3	21.0	16.6	21.0	13.9	56.7	0.82		
GW109323	20.1	20.5	14.8	20.5	14.5	59.0	0.74		
GW109918	28.5	11.0	27.3	11.0	1.1	39.3	0.96		
GW110236	57.5	15.5	55.1	15.5	8.0	44.3	0.96		Over mine footprint and penetrates to within 14m of working section roof (allowance for uncertainty). Possibly to be drained by mining.
GW111395	14.7	24.0	8.8	22.5	15.1	56.5	0.60		
GW111551	15.6	12.0	12.7	12.0	9.4	45.1	0.82		
GW111795	9.3	25.5	3.8	25.5	17.5	41.3	0.41		
GW112440	33.0	18.0	29.6	18.0	11.8	56.9	0.90		
GW114544	5.0	28.0	1.3	14.5	N/A *	N/A *	0.26		
GW115061	22.1	11.0	21.1	11.0	1.1	37.1	0.96		
GW067521	9.3	18.5	5.0	18.0	13.4	31.5	0.54		
GW106103	0.14	20.7	0.07	20.0	N/A *	N/A *	0.52		

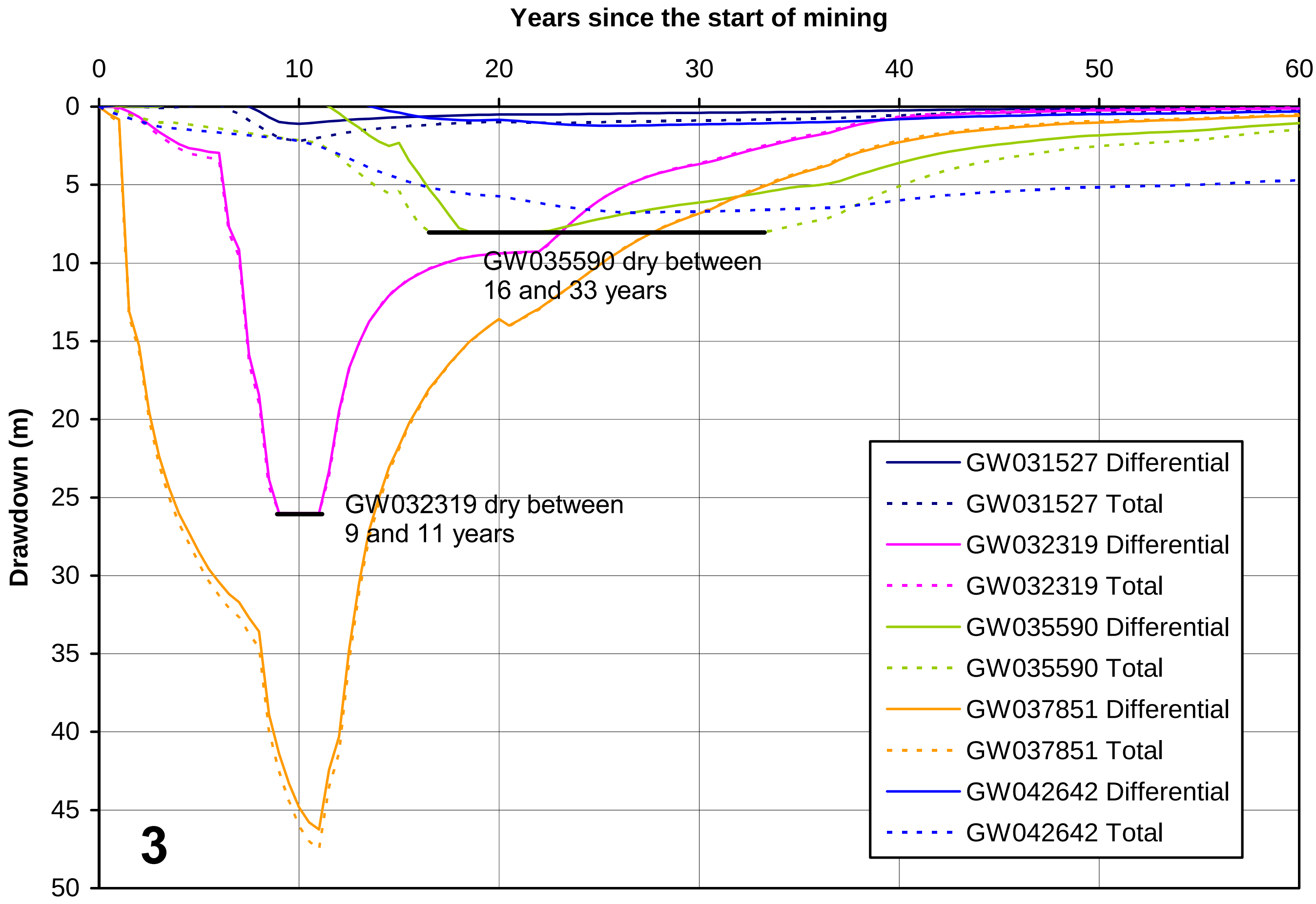
* Differential drawdown is less than 2m.

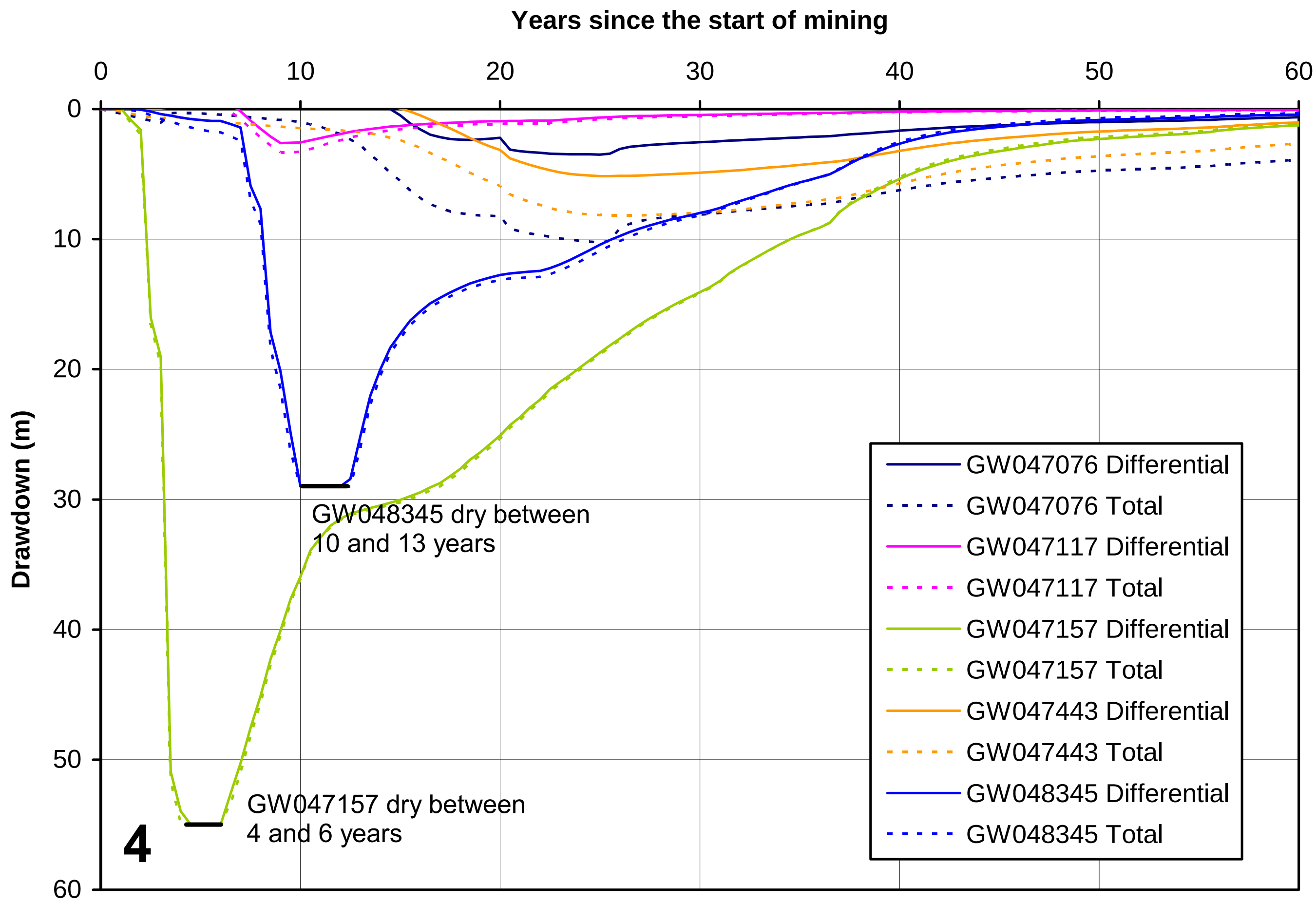
PRIVATE BORE CHART REGISTER

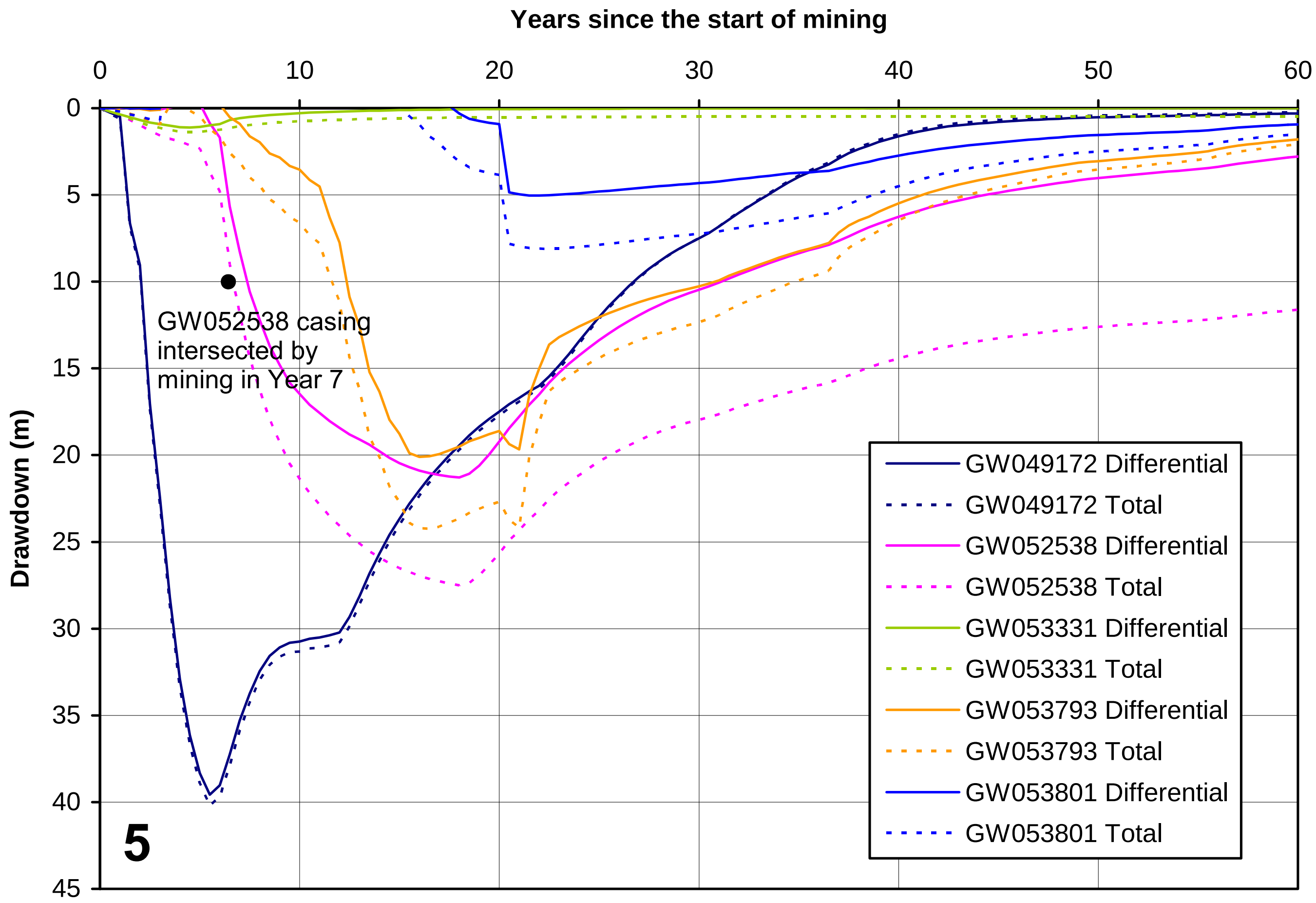
Bore	Chart	Bore	Chart	Bore	Chart
GW011227	1	GW072320	10	GW106906	19
GW017295		GW072672		GW106958	
GW021817		GW100147		GW107006	
GW023322		GW100153		GW107120	
GW024688		GW102309		GW107240	
GW025808	2	GW102516	11	GW107535	20
GW026136		GW102588		GW107677	
GW026805		GW102689		GW107807	
GW028687		GW102694		GW107964	
GW028832		GW102705		GW108004	
GW031527	3	GW102713	12	GW108194	21
GW032319		GW102757		GW108195	
GW035590		GW102775		GW108825	
GW037851		GW102777		GW108833	
GW042642		GW102916		GW109039	
GW047076	4	GW103108	13	GW109084	22
GW047117		GW103597		GW109323	
GW047157		GW103692		GW109918	
GW047443		GW104213		GW110236	
GW048345		GW104404		GW111395	
GW049172	5	GW104421	14	GW111551	23
GW052538		GW104468		GW111795	
GW053331		GW104486		GW112440	
GW053793		GW104523		GW114544	
GW053801		GW104526		GW115061	
GW054137	6	GW104684	15	GW102694	24
GW057683		GW104727		GW106103	
GW057906		GW104728			
GW057908		GW104745			
GW057943		GW104917			
GW060067	7	GW105068	16		
GW060125		GW105079			
GW060199		GW105082			
GW062326		GW105102			
GW064613		GW105396			
GW066775	8	GW105744	17		
GW066798		GW105950			
GW066800		GW106245			
GW067303		GW106489			
GW067305		GW106491			
GW067319	9	GW106517	18		
GW068965		GW106710			
GW069072		GW106711			
GW071741		GW106718			
GW072207		GW106855			

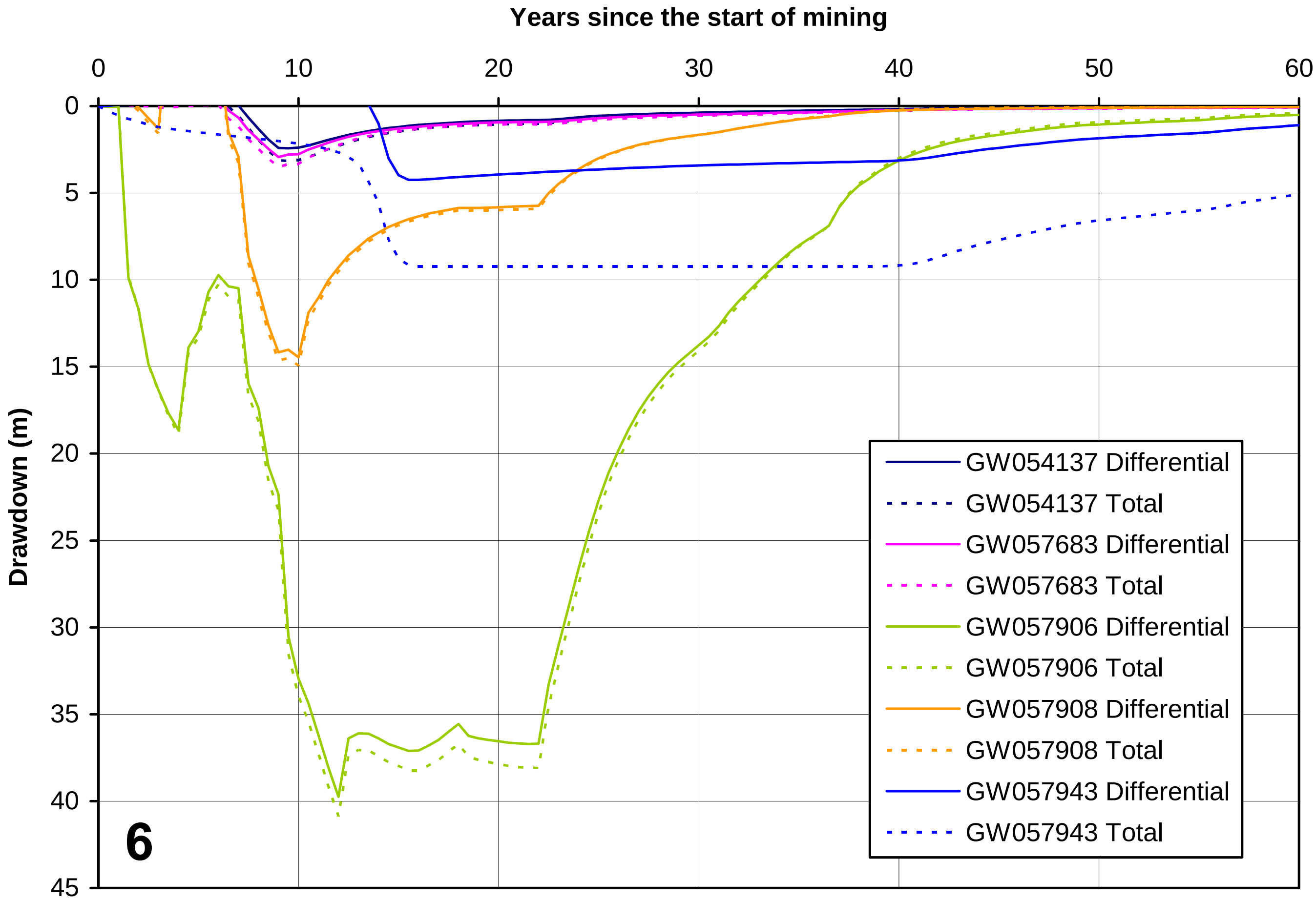

Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
5
10
15
20
25
30
35
40
GW011227 Differential
GW011227 Total
GW017295 Differential
GW017295 Total
GW021817 Differential
GW021817 Total
GW023322 Differential
GW023322 Total
GW024688 Differential
GW024688 Total
GW023322 dry between
13 and 15 years
1

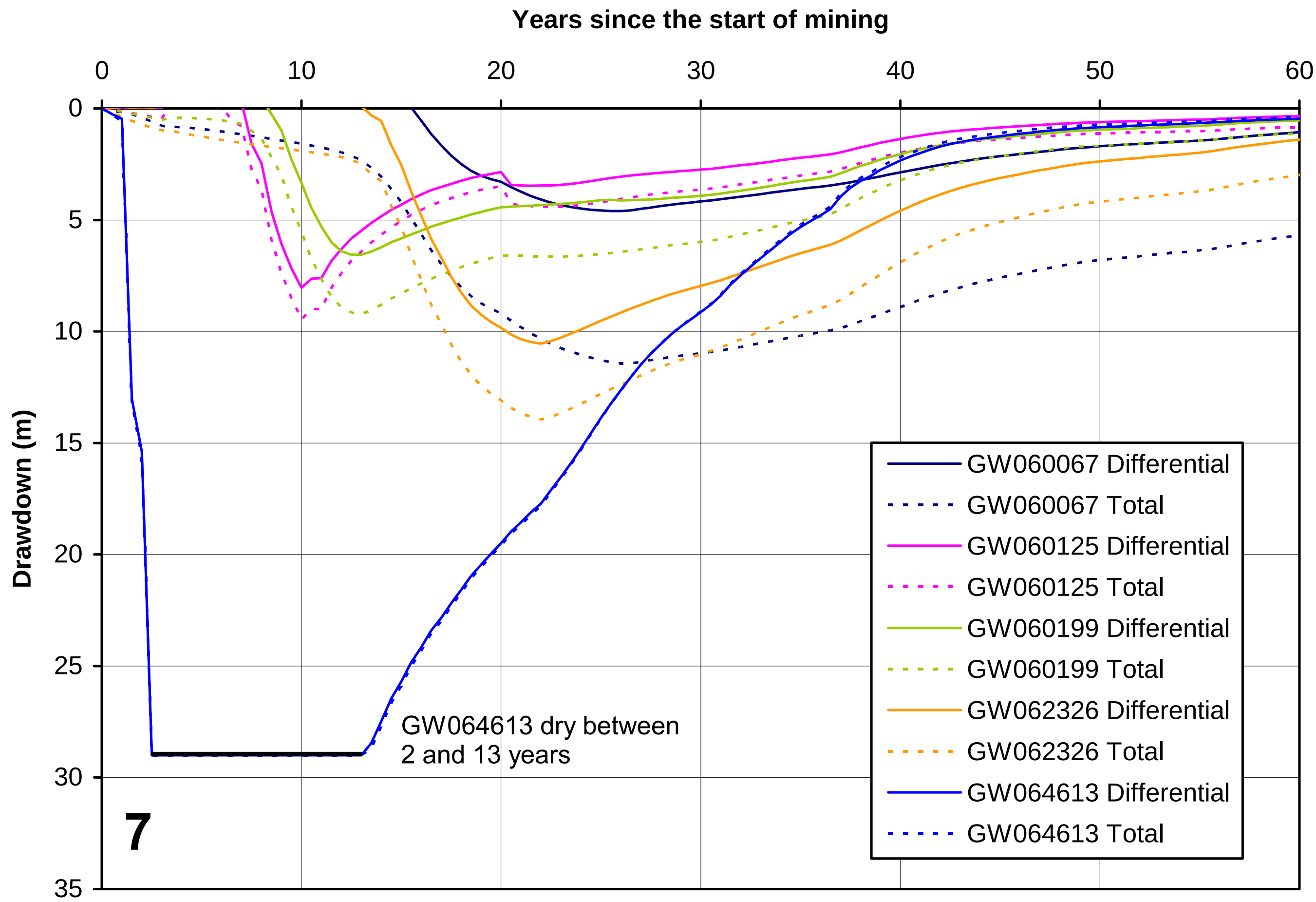

Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
5
10
15
20
25
30
35
GW025808 Differential
GW025808 Total
GW026136 Differential
GW026136 Total
GW026805 Differential
GW026805 Total
GW028687 Differential
GW028687 Total
GW028832 Differential
GW028832 Total
GW026136 dry between
13 and 27 years
2


Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
5
10
15
20
25
30
35
40
45
50
GW035590 dry between
16 and 33 years
GW032319 dry between
9 and 11 years
3
GW031527 Differential
GW031527 Total
GW032319 Differential
GW032319 Total
GW035590 Differential
GW035590 Total
GW037851 Differential
GW037851 Total
GW042642 Differential
GW042642 Total

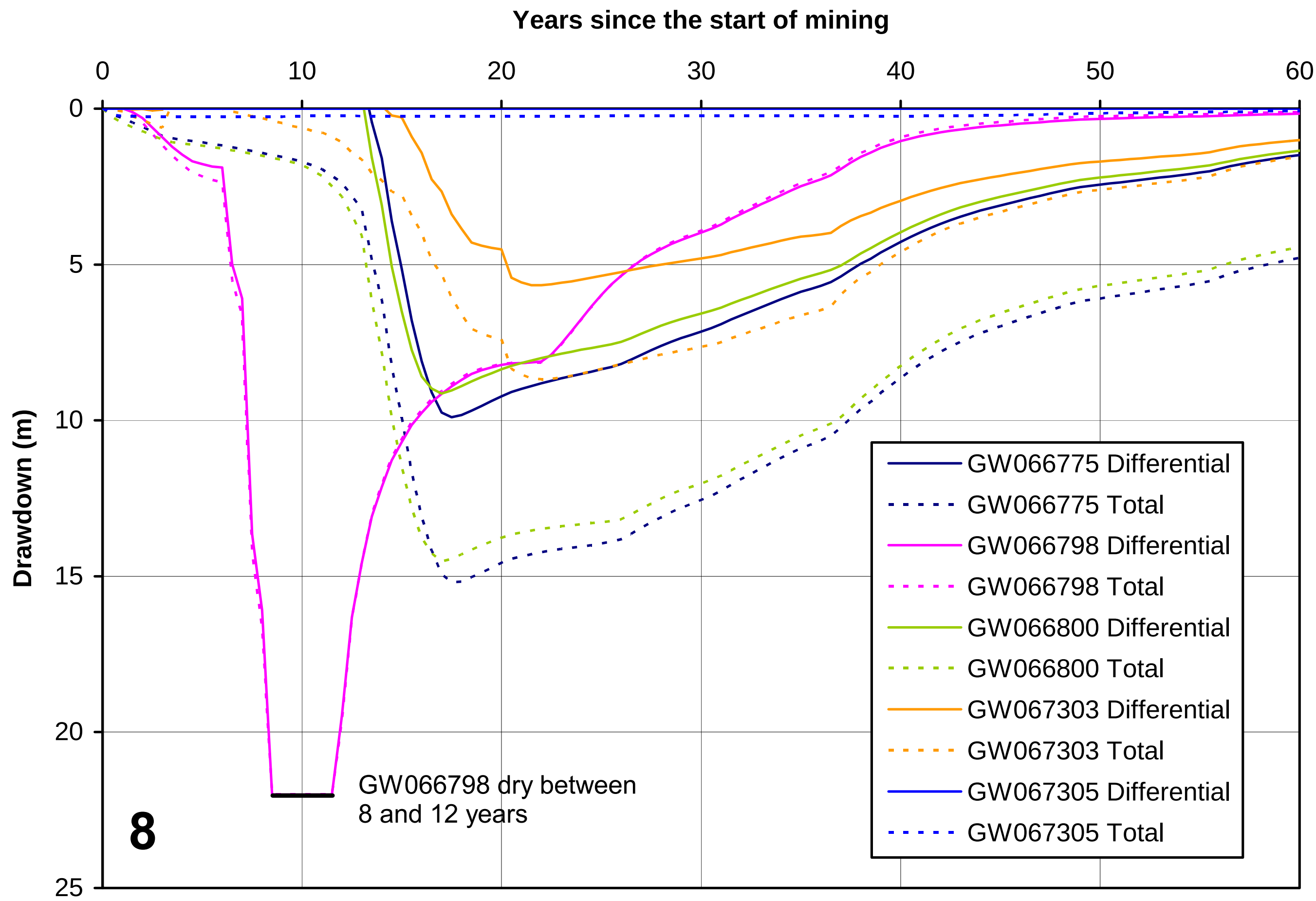

Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
10
20
30
40
50
60
GW048345 dry between
10 and 13 years
GW047157 dry between
4 and 6 years
4
GW047076 Differential
GW047076 Total
GW047117 Differential
GW047117 Total
GW047157 Differential
GW047157 Total
GW047443 Differential
GW047443 Total
GW048345 Differential
GW048345 Total


Years since the start of mining
0
10
20
30
40
50
60
0
5
10
15
20
25
30
35
40
45
Drawdown (m)
GW052538 casing intersected by mining in Year 7
5
GW049172 Differential
GW049172 Total
GW052538 Differential
GW052538 Total
GW053331 Differential
GW053331 Total
GW053793 Differential
GW053793 Total
GW053801 Differential
GW053801 Total

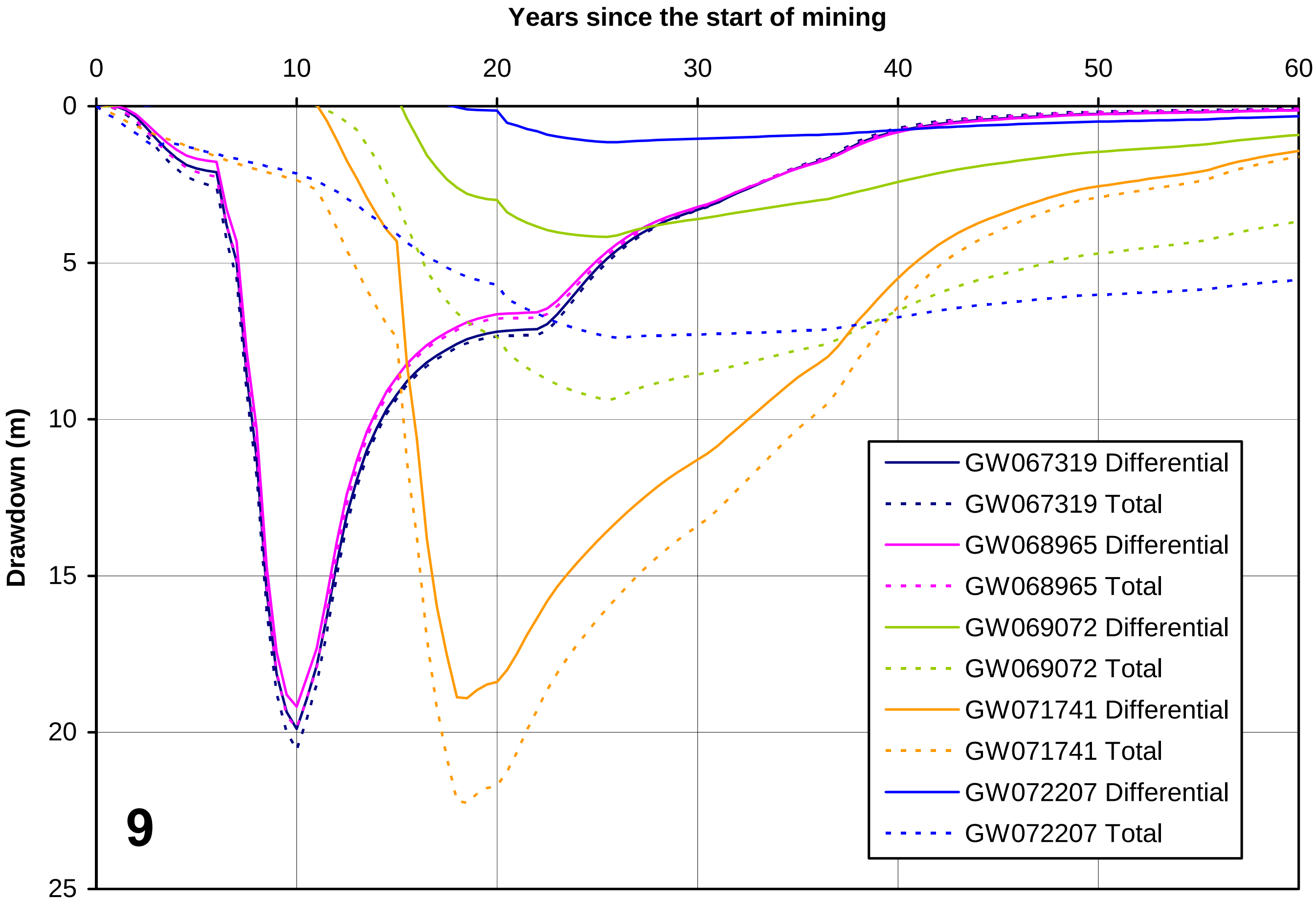

Years since the start of mining
0
10
20
30
40
50
60
0
5
10
15
20
25
30
35
40
45
Drawdown (m)
6
GW054137 Differential
GW054137 Total
GW057683 Differential
GW057683 Total
GW057906 Differential
GW057906 Total
GW057908 Differential
GW057908 Total
GW057943 Differential
GW057943 Total

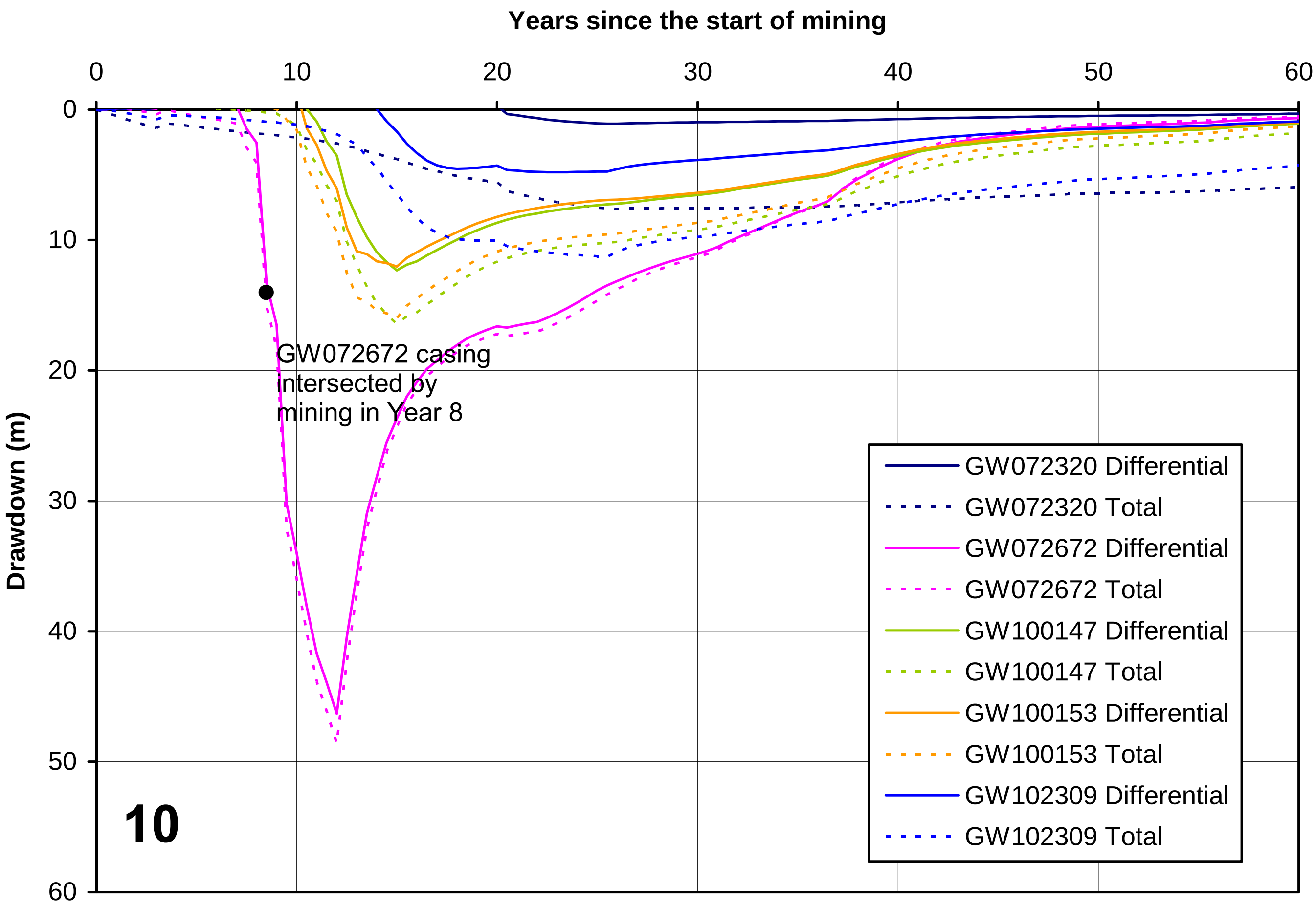


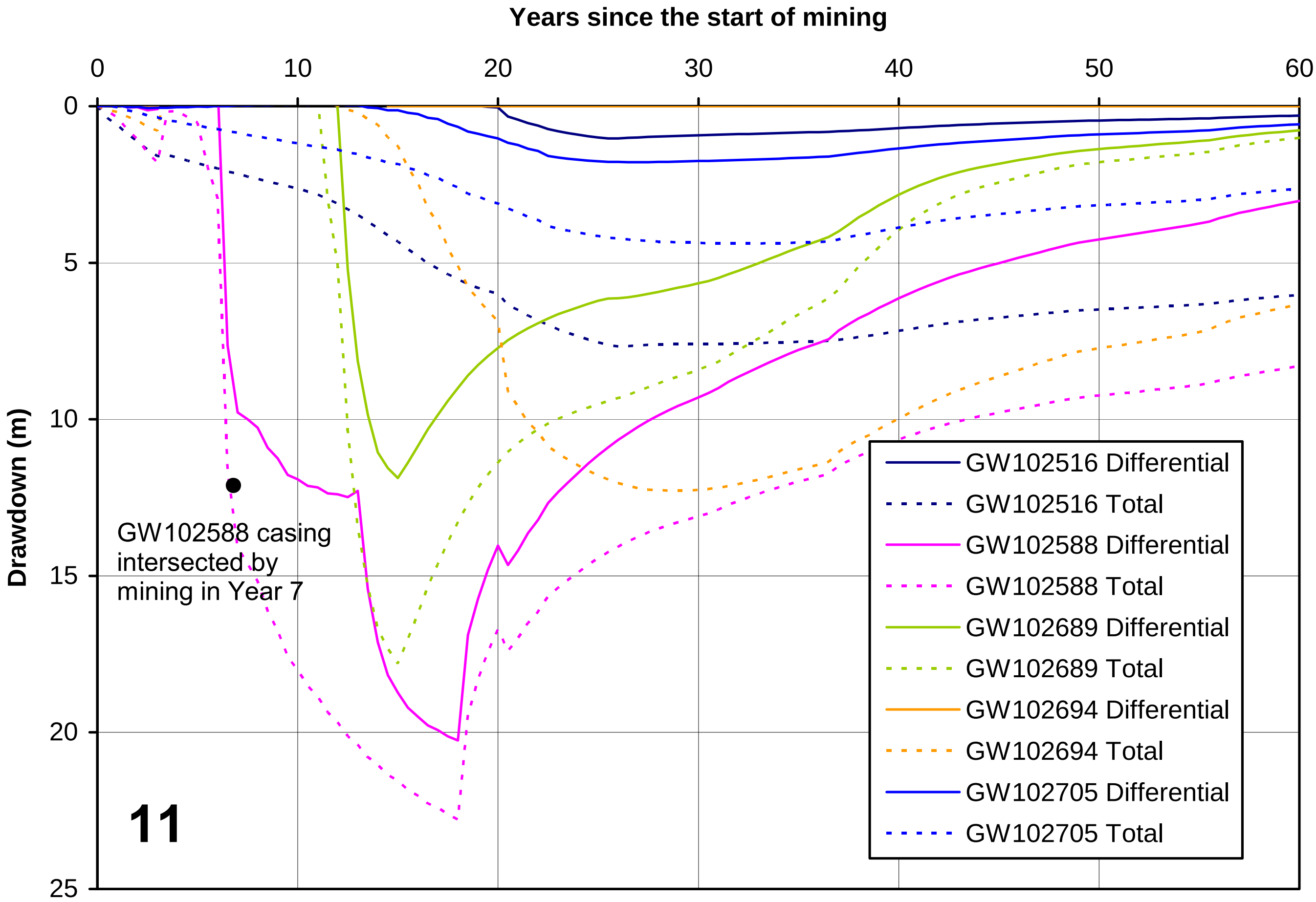
Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
5
10
15
20
25
30
35
GW060067 Differential
GW060067 Total
GW060125 Differential
GW060125 Total
GW060199 Differential
GW060199 Total
GW062326 Differential
GW062326 Total
GW064613 Differential
GW064613 Total
GW064613 dry between
2 and 13 years
7

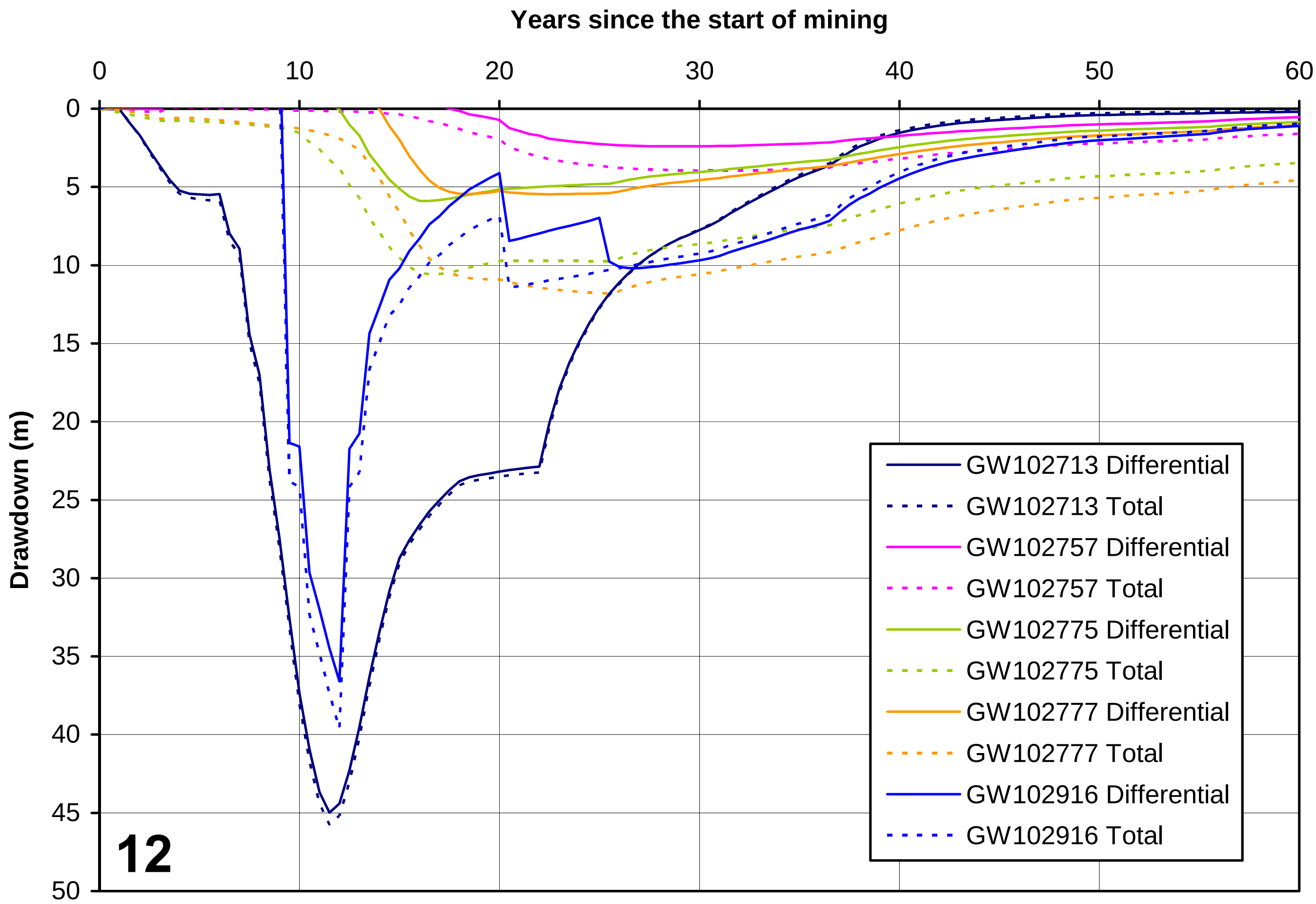


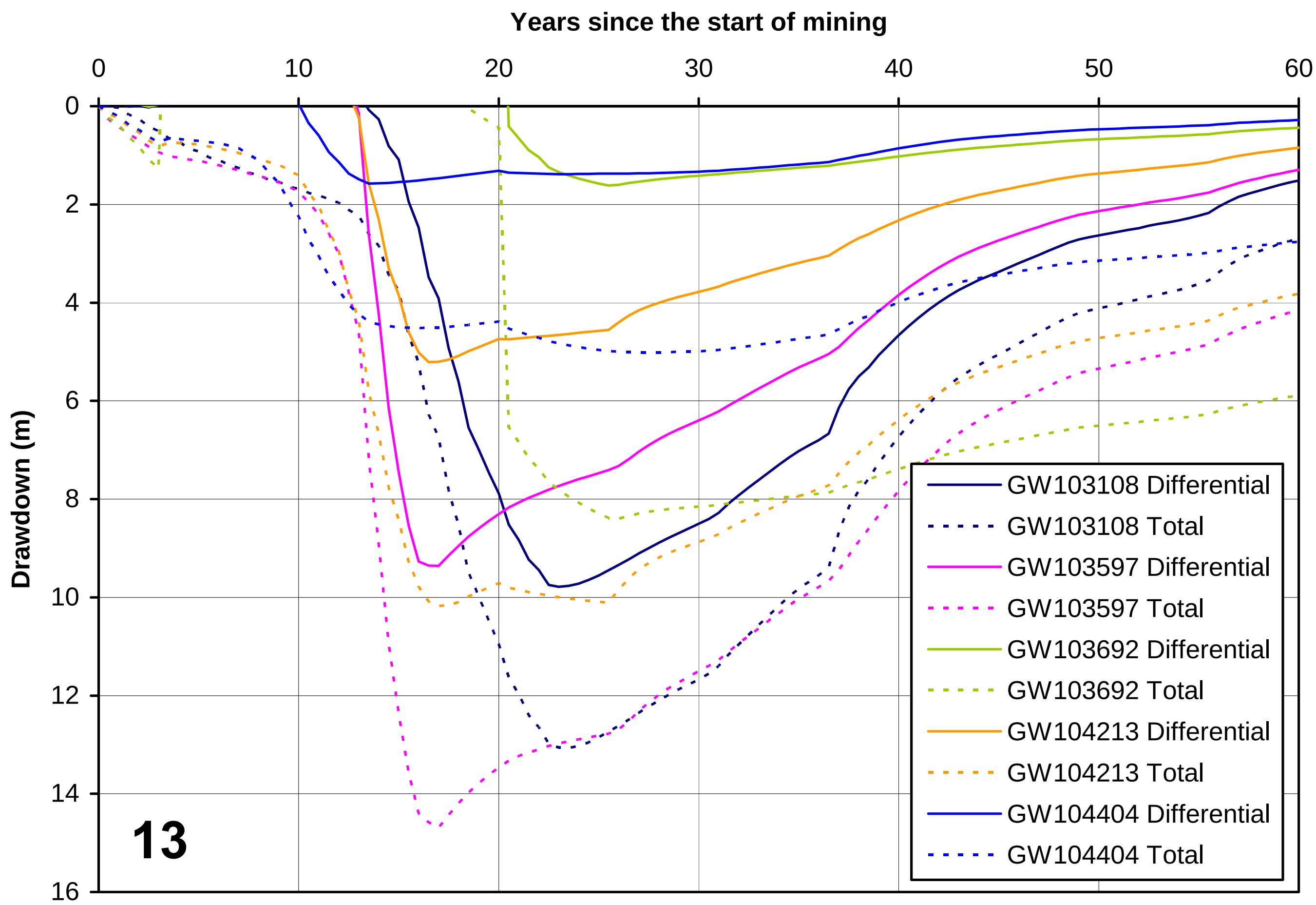
Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
5
10
15
20
25
GW066775 Differential
GW066775 Total
GW066798 Differential
GW066798 Total
GW066800 Differential
GW066800 Total
GW067303 Differential
GW067303 Total
GW067305 Differential
GW067305 Total
GW066798 dry between
8 and 12 years
8

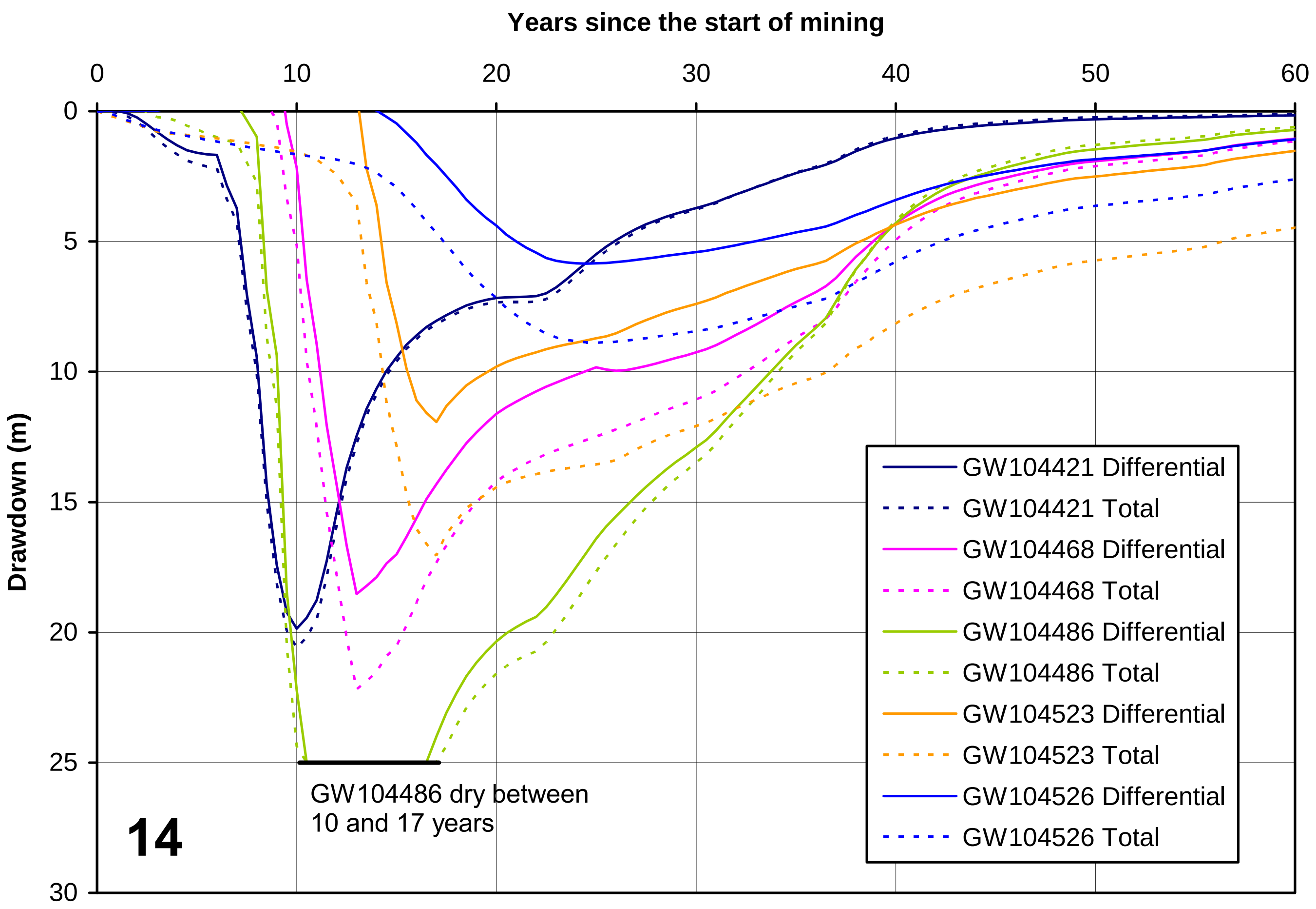

Years since the start of mining
0
10
20
30
40
50
60
0
5
10
15
20
25
Drawdown (m)
9
GW067319 Differential
GW067319 Total
GW068965 Differential
GW068965 Total
GW069072 Differential
GW069072 Total
GW071741 Differential
GW071741 Total
GW072207 Differential
GW072207 Total

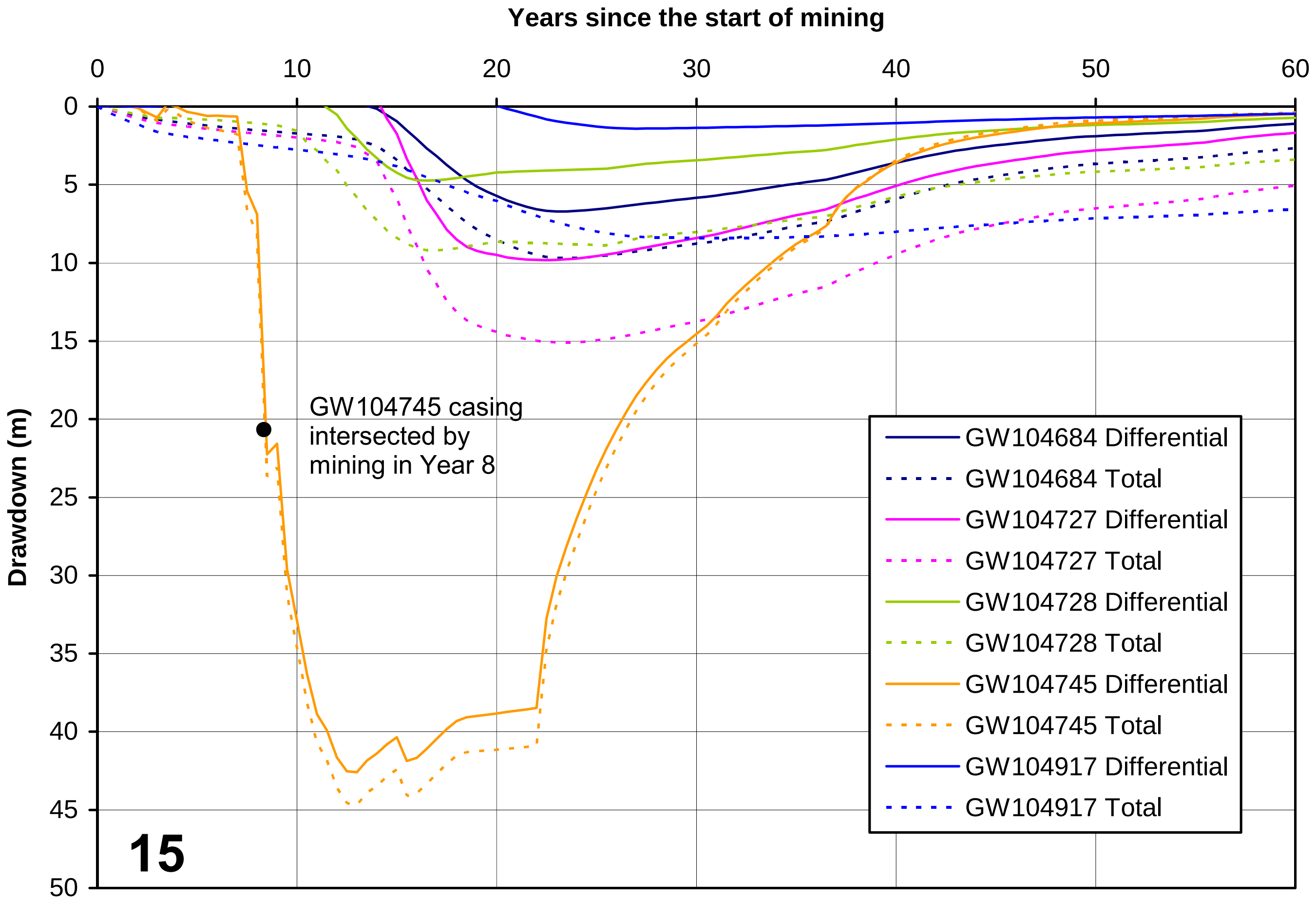

Years since the start of mining
0
10
20
30
40
50
60
0
10
20
30
40
50
60
Drawdown (m)
GW072672 casing
intersected by
mining in Year 8
10
GW072320 Differential
GW072320 Total
GW072672 Differential
GW072672 Total
GW100147 Differential
GW100147 Total
GW100153 Differential
GW100153 Total
GW102309 Differential
GW102309 Total


Years since the start of mining
0
10
20
30
40
50
60
0
5
10
15
20
25
Drawdown (m)
GW102588 casing
intersected by
mining in Year 7
11
GW102516 Differential
GW102516 Total
GW102588 Differential
GW102588 Total
GW102689 Differential
GW102689 Total
GW102694 Differential
GW102694 Total
GW102705 Differential
GW102705 Total

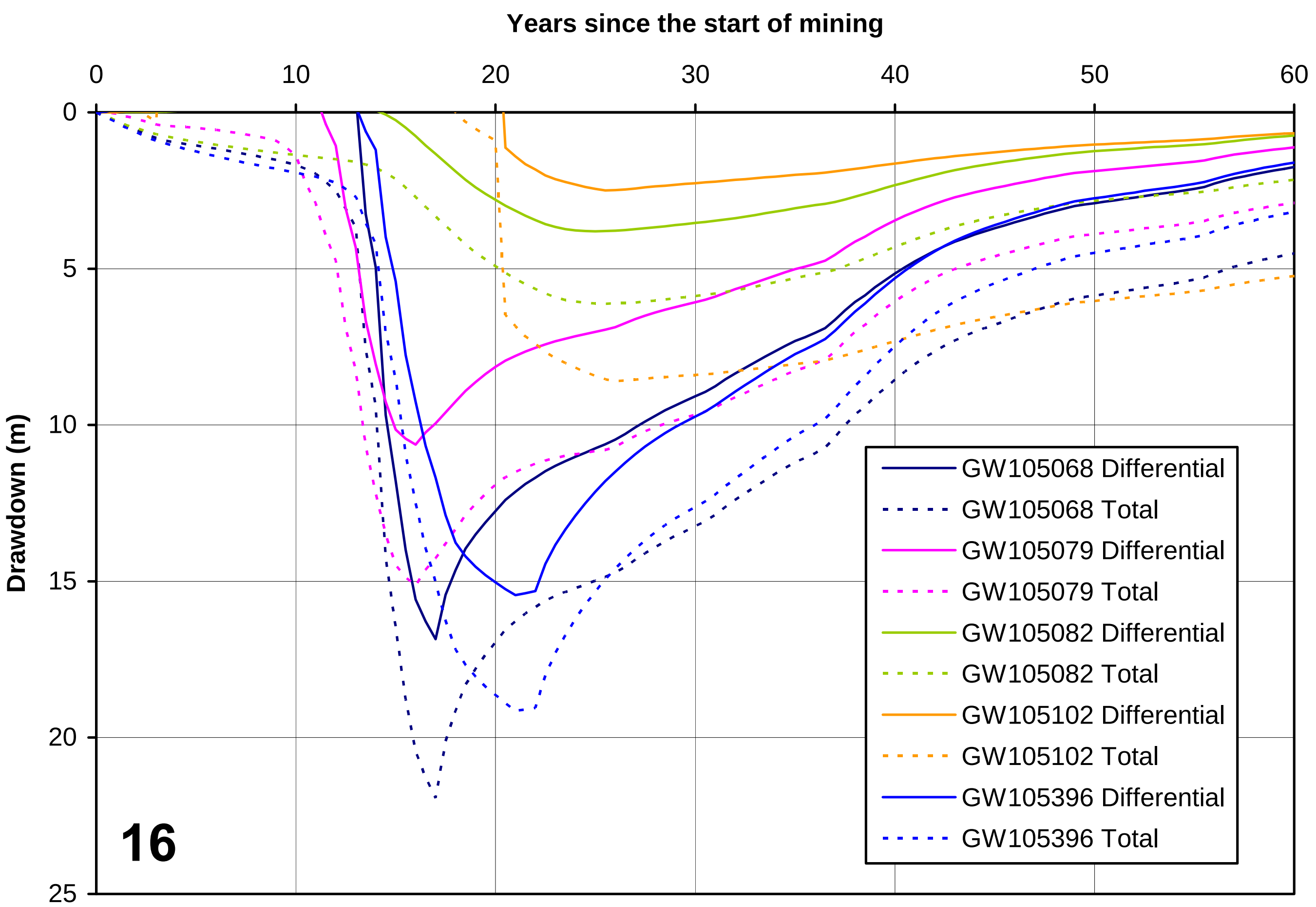

Years since the start of mining
0
10
20
30
40
50
60
0
5
10
15
20
25
30
35
40
45
50
Drawdown (m)
12
GW102713 Differential
GW102713 Total
GW102757 Differential
GW102757 Total
GW102775 Differential
GW102775 Total
GW102777 Differential
GW102777 Total
GW102916 Differential
GW102916 Total


Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
2
4
6
8
10
12
14
16
13
GW103108 Differential
GW103108 Total
GW103597 Differential
GW103597 Total
GW103692 Differential
GW103692 Total
GW104213 Differential
GW104213 Total
GW104404 Differential
GW104404 Total

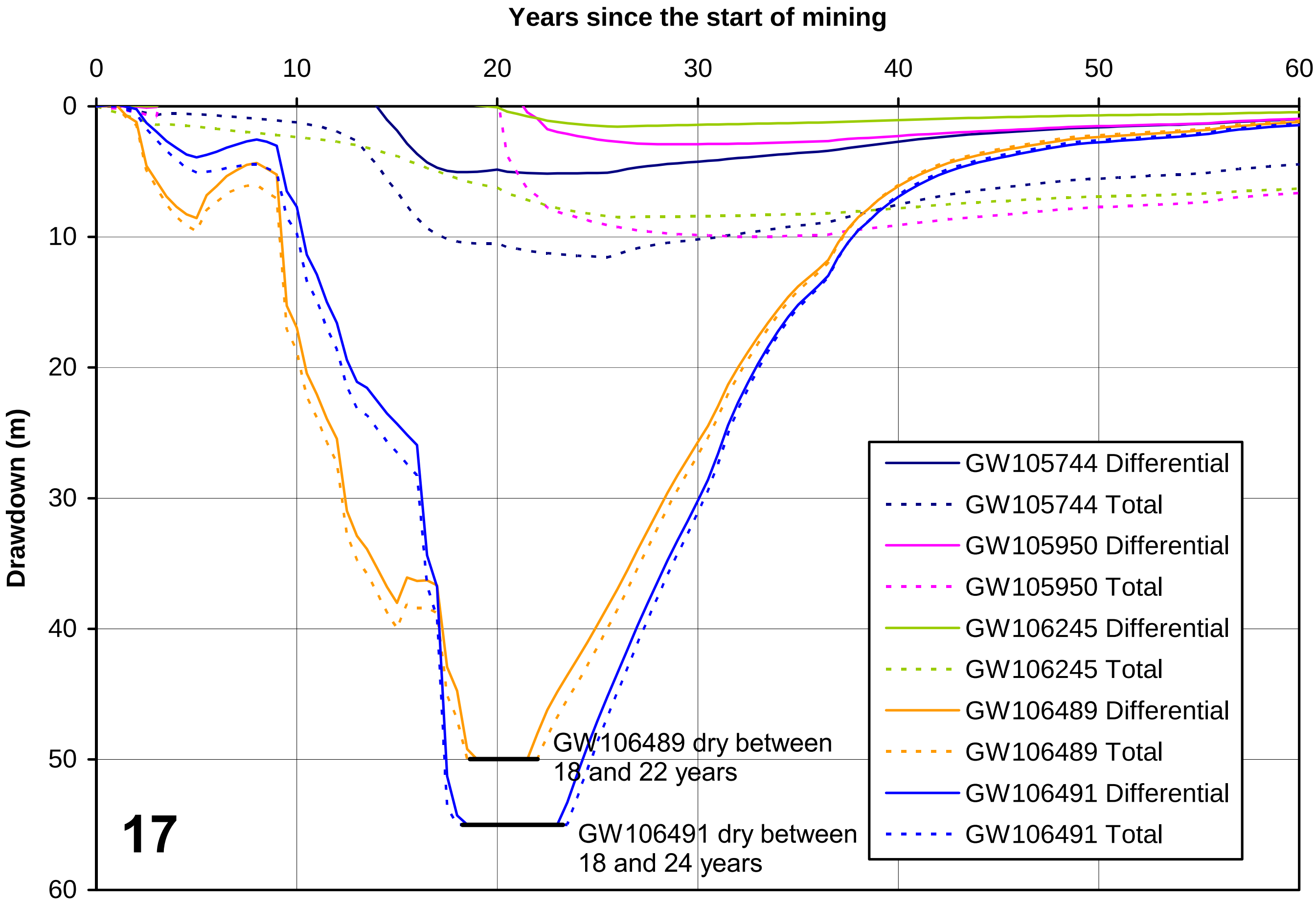

Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
5
10
15
20
25
30
14
GW104486 dry between
10 and 17 years
GW104421 Differential
GW104421 Total
GW104468 Differential
GW104468 Total
GW104486 Differential
GW104486 Total
GW104523 Differential
GW104523 Total
GW104526 Differential
GW104526 Total



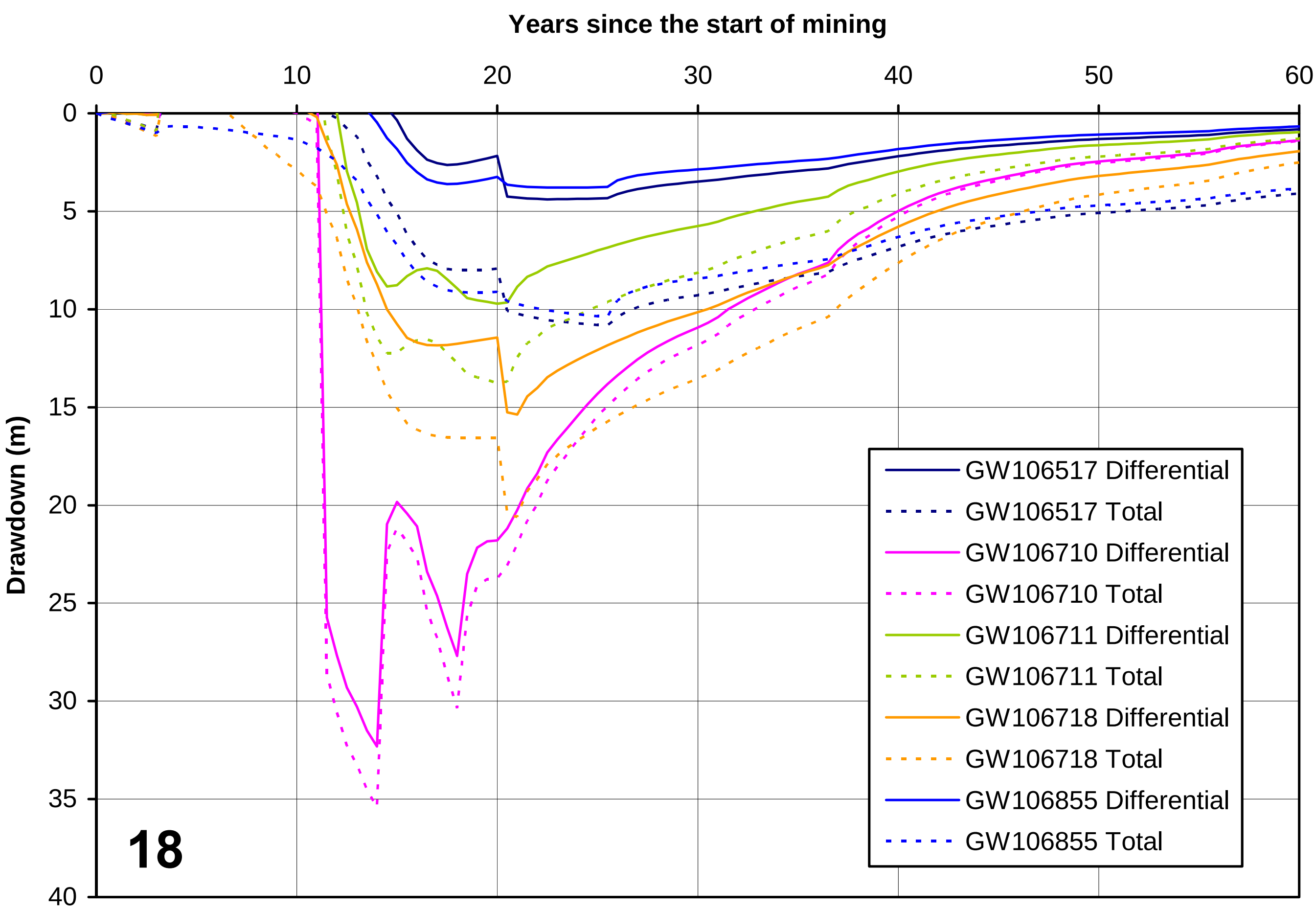
Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
5
10
15
20
25
30
35
40
45
50
GW104745 casing
intersected by
mining in Year 8
GW104684 Differential
GW104684 Total
GW104727 Differential
GW104727 Total
GW104728 Differential
GW104728 Total
GW104745 Differential
GW104745 Total
GW104917 Differential
GW104917 Total
15



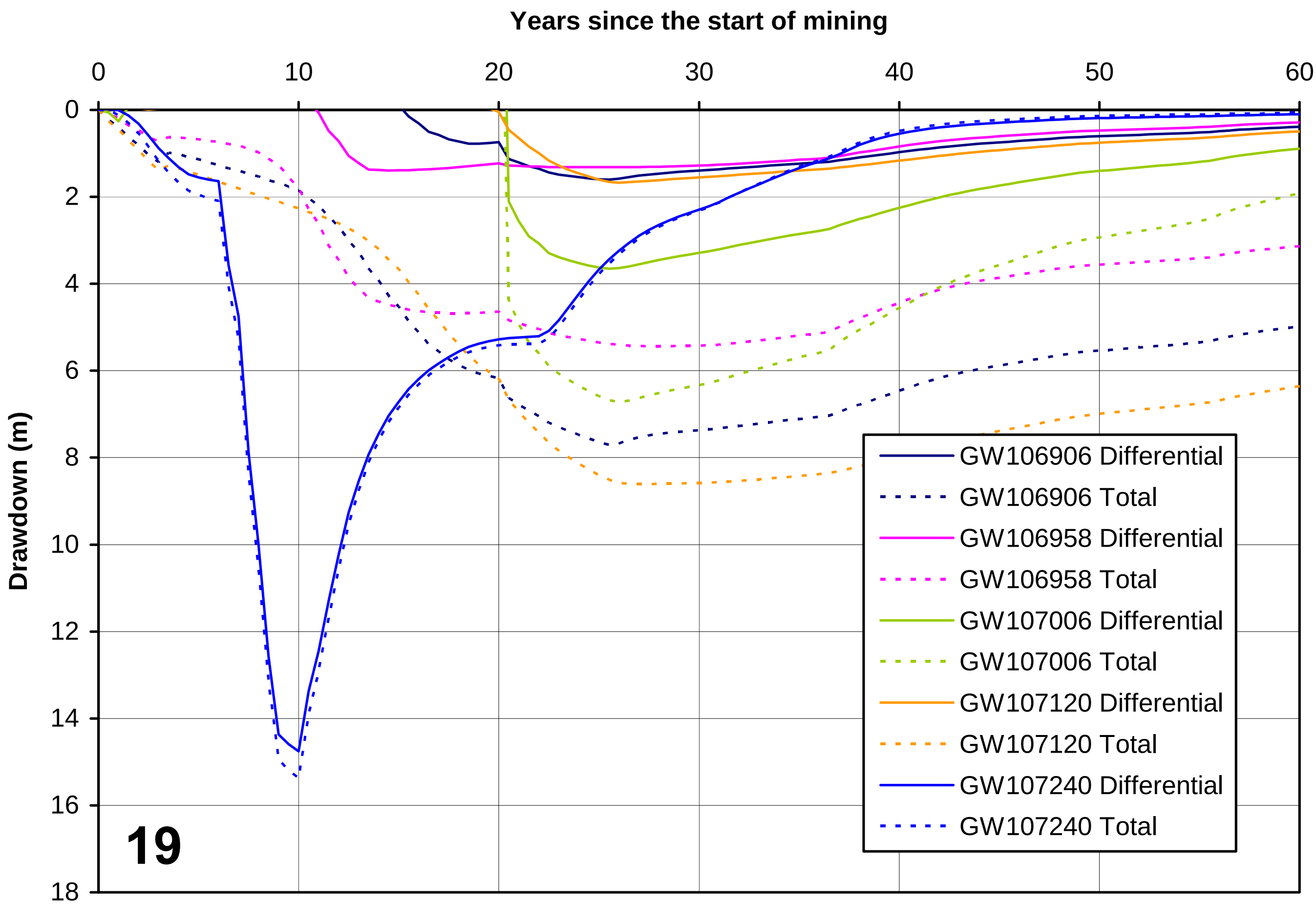
Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
5
10
15
20
25
GW105068 Differential
GW105068 Total
GW105079 Differential
GW105079 Total
GW105082 Differential
GW105082 Total
GW105102 Differential
GW105102 Total
GW105396 Differential
GW105396 Total
16

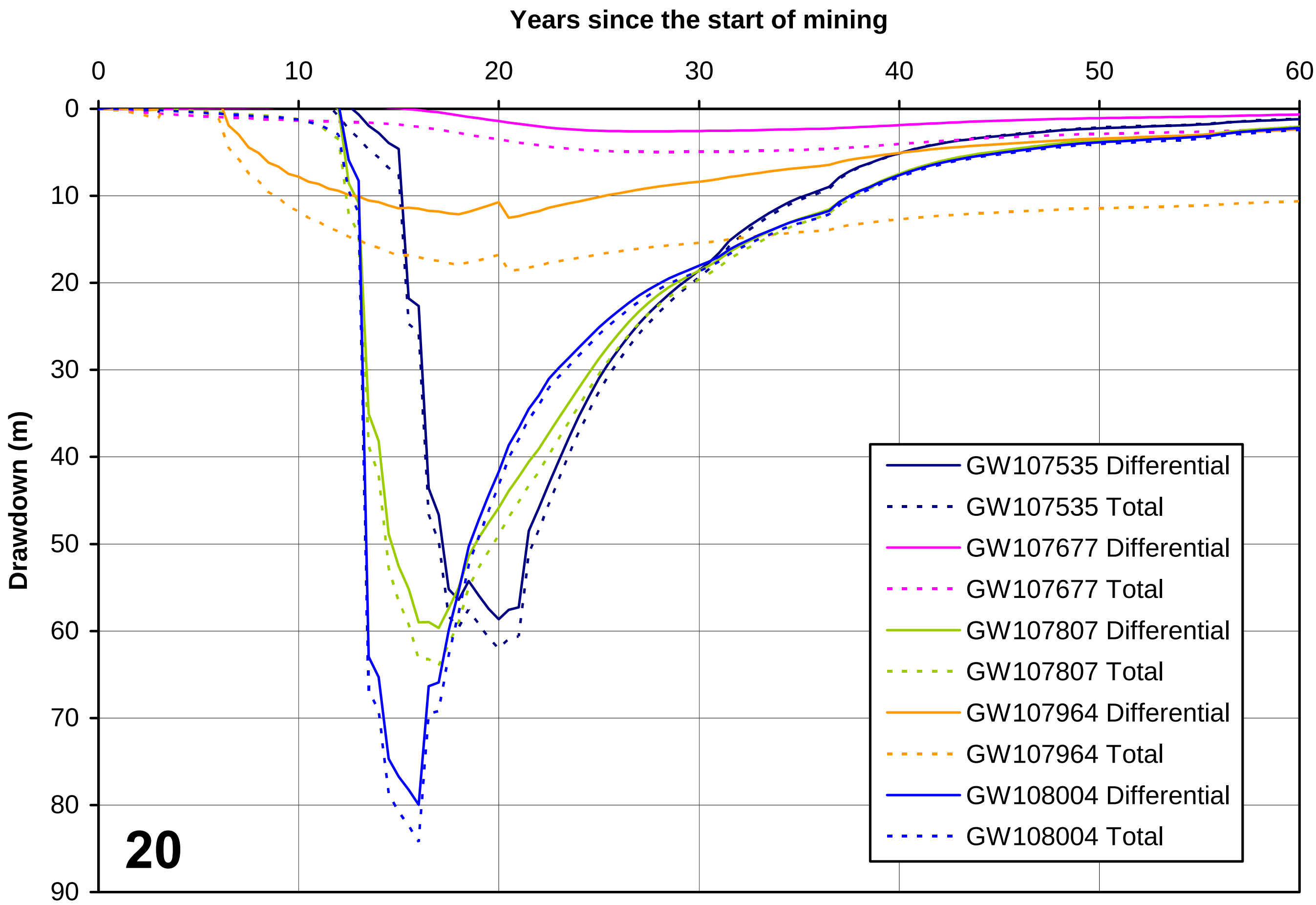


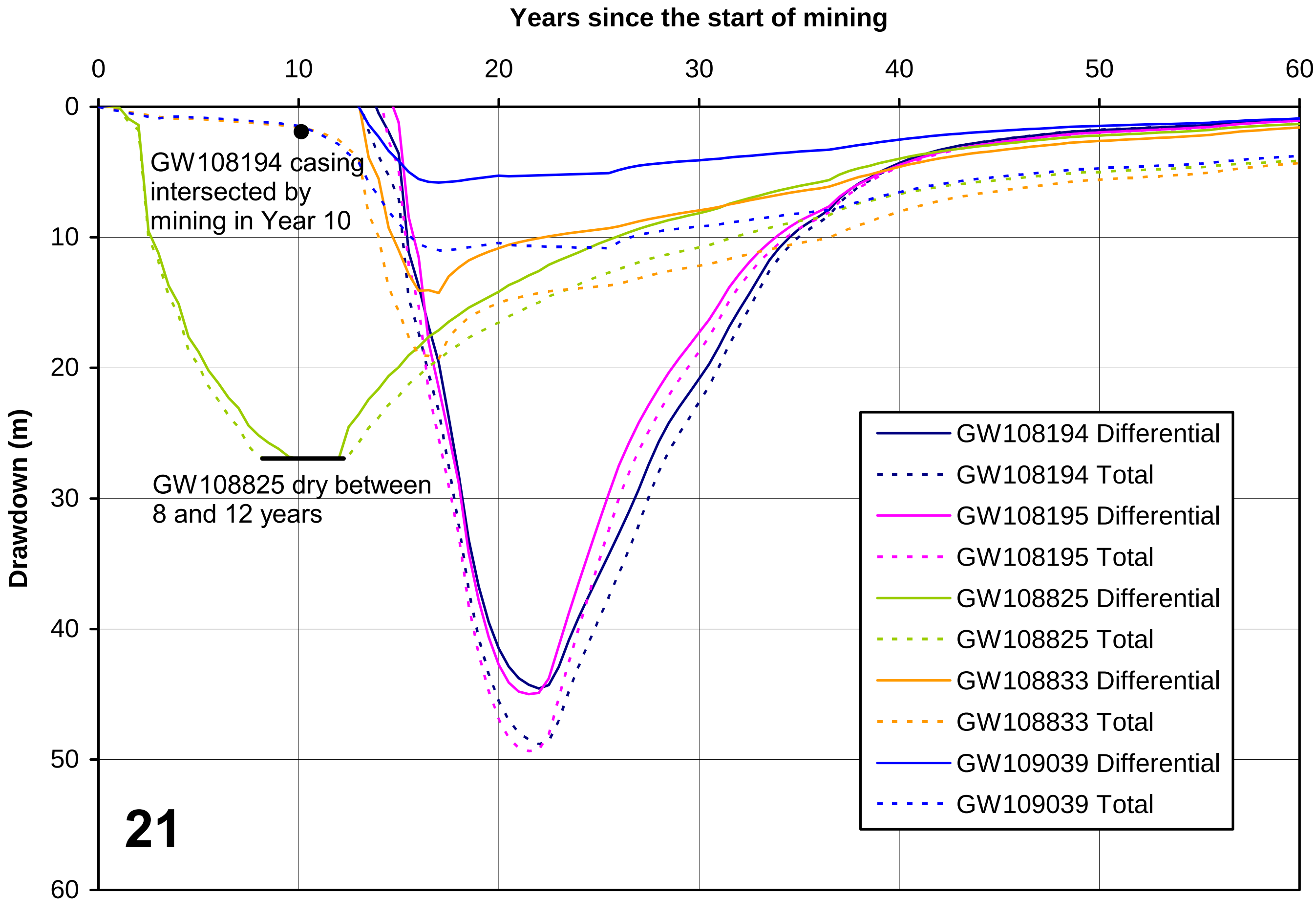
Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
10
20
30
40
50
60
GW106489 dry between
18 and 22 years
GW106491 dry between
18 and 24 years
17
GW105744 Differential
GW105744 Total
GW105950 Differential
GW105950 Total
GW106245 Differential
GW106245 Total
GW106489 Differential
GW106489 Total
GW106491 Differential
GW106491 Total



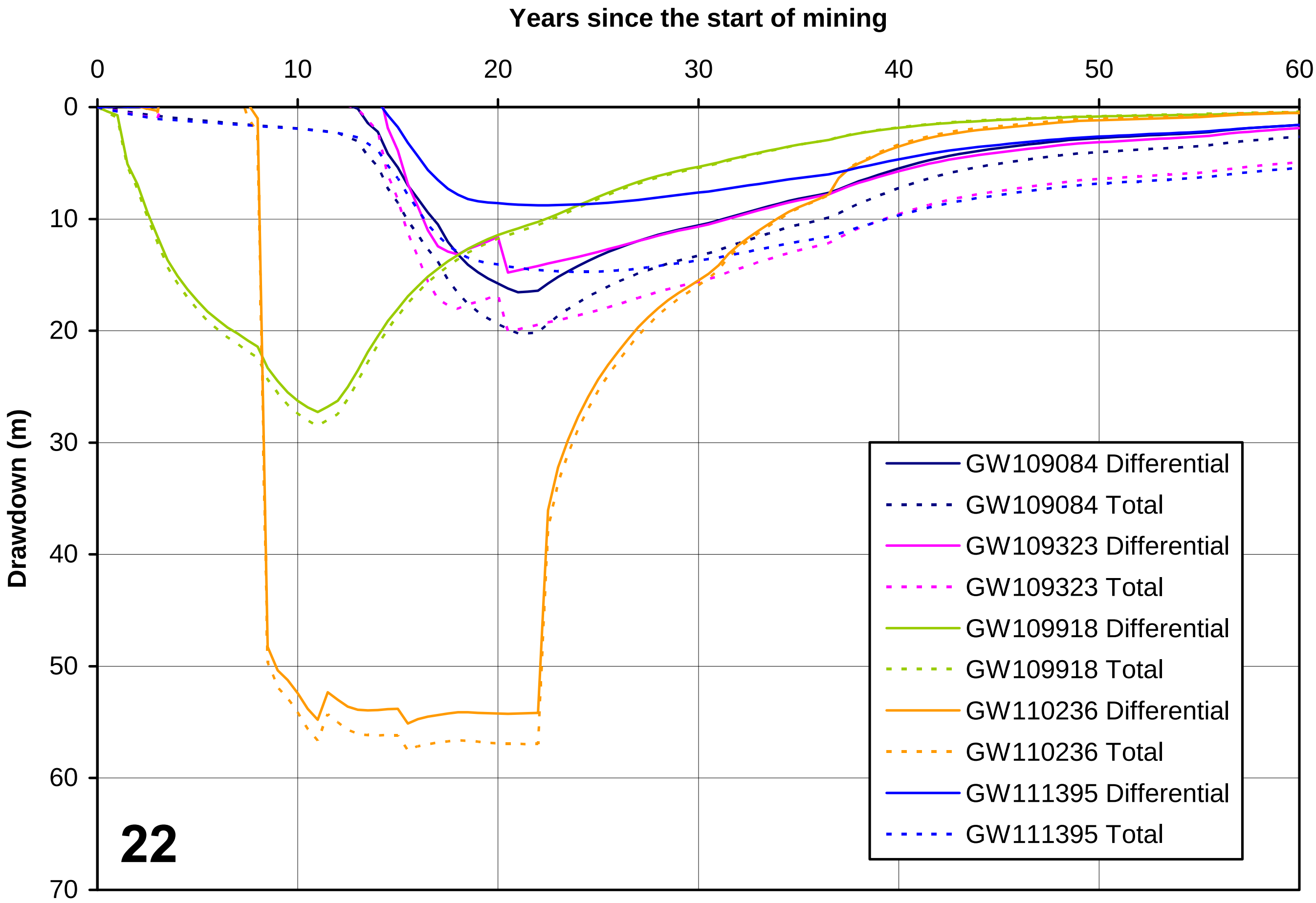
Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
5
10
15
20
25
30
35
40
18
GW106517 Differential
GW106517 Total
GW106710 Differential
GW106710 Total
GW106711 Differential
GW106711 Total
GW106718 Differential
GW106718 Total
GW106855 Differential
GW106855 Total


Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
2
4
6
8
10
12
14
16
18
19
GW106906 Differential
GW106906 Total
GW106958 Differential
GW106958 Total
GW107006 Differential
GW107006 Total
GW107120 Differential
GW107120 Total
GW107240 Differential
GW107240 Total

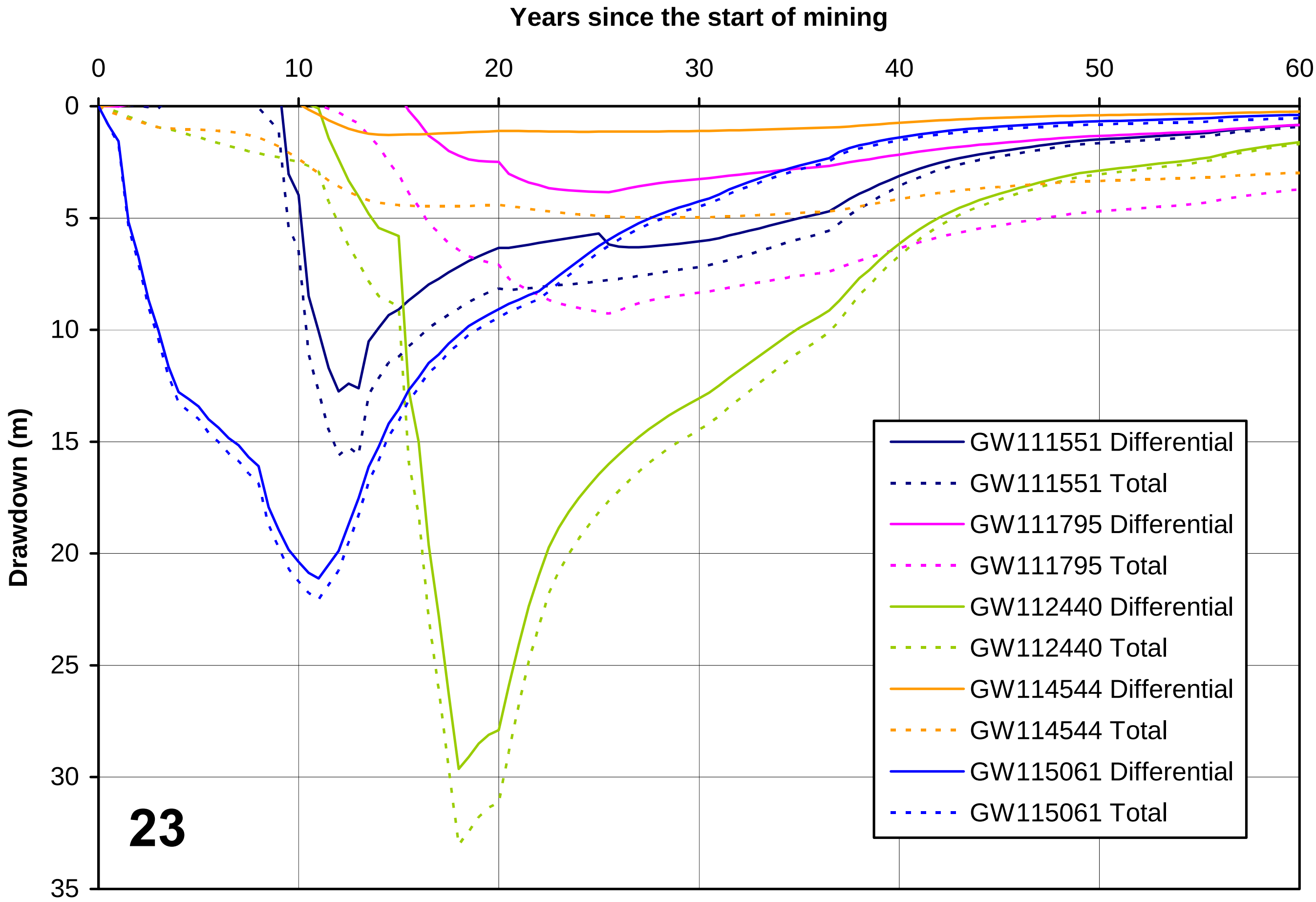

Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
10
20
30
40
50
60
70
80
90
20
GW107535 Differential
GW107535 Total
GW107677 Differential
GW107677 Total
GW107807 Differential
GW107807 Total
GW107964 Differential
GW107964 Total
GW108004 Differential
GW108004 Total

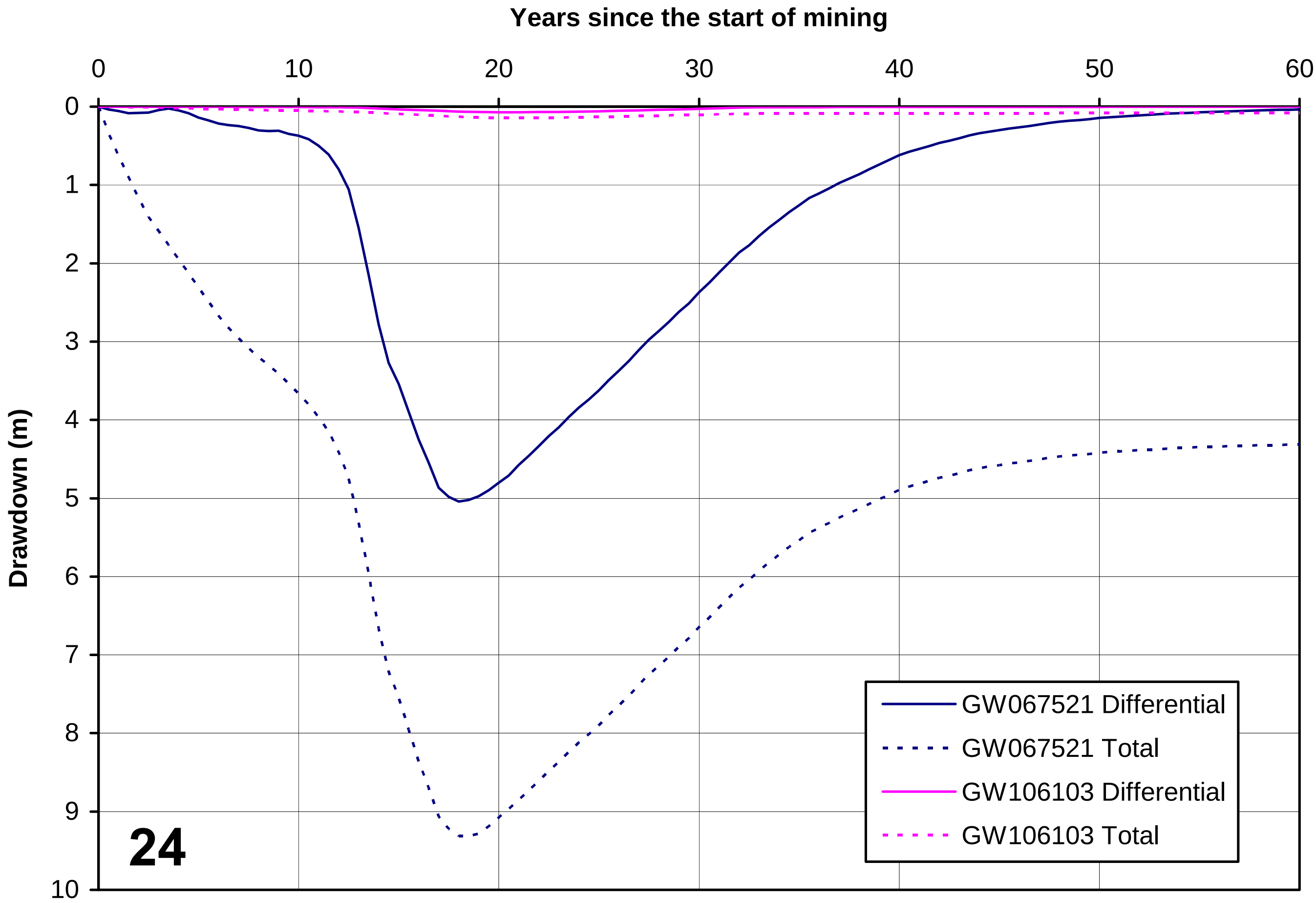


Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
GW108194 casing intersected by mining in Year 10
GW108825 dry between 8 and 12 years
GW108194 Differential
GW108194 Total
GW108195 Differential
GW108195 Total
GW108825 Differential
GW108825 Total
GW108833 Differential
GW108833 Total
GW109039 Differential
GW109039 Total
21



Years since the start of mining
0
10
20
30
40
50
60
70
Drawdown (m)
GW109084 Differential
GW109084 Total
GW109323 Differential
GW109323 Total
GW109918 Differential
GW109918 Total
GW110236 Differential
GW110236 Total
GW111395 Differential
GW111395 Total
22


Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
5
10
15
20
25
30
35
GW111551 Differential
GW111551 Total
GW111795 Differential
GW111795 Total
GW112440 Differential
GW112440 Total
GW114544 Differential
GW114544 Total
GW115061 Differential
GW115061 Total
23


Years since the start of mining
0
10
20
30
40
50
60
Drawdown (m)
0
1
2
3
4
5
6
7
8
9
10
GW067521 Differential
GW067521 Total
GW106103 Differential
GW106103 Total
24

Appendix H - Basalt Model used to Assess Drawdown in Private Bore GW106103

1. Basalt Model

The basalt model was developed to calculate drawdown in bore GW106103 due to underground mining in the Hume lease. The model was developed using MODFLOW-SURFACT Version 3, distributed by Hydrogeologic, Inc. (Virginia, USA). It is an advanced version of the standard USGS MODFLOW algorithm and is able to simulate variably saturated flow. The software can accommodate unsaturated zones at depth. MODFLOW-SURFACT is operated within the Visual Modflow (Version 2009) pre- and post-processing environment, developed by Schlumberger Water Services.

The active model area (the model domain) is shown in Figure 1. It covers 15 km^2. Its boundary follows the limit of the southeastern basalt body that intersects the 2m differential drawdown contour in the Wongawilli Seam at 17 years since the start of mining (the highest drawdowns developed in any layer at any time in the main model). GW106103 is situated within this body (see Map 1 in Appendix G).

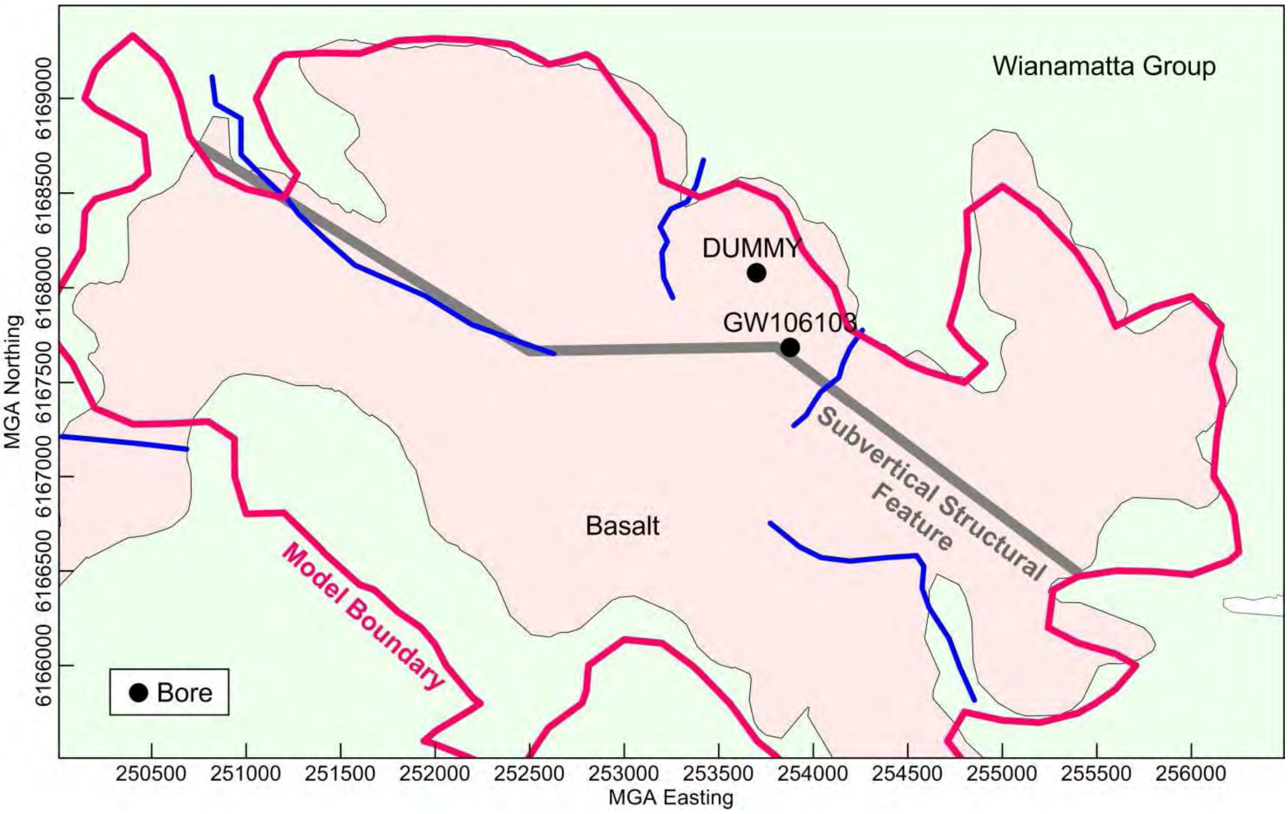


Figure 1. Map showing basalt model limits.

The model grid comprises 2 layers with 100 columns and 40 rows. Cell dimensions are 100 m x 100 m. Layer 1 represents the Robertson Basalt and Layer 2 represents a notional layer underlying the basalt that retards drainage to the underlying Wianamatta Group. The basalt thickness is based on structure contours developed from government records for bores in this body.

1.1. Calibration Targets

Calibration was undertaken in steady state simulation. Calibration targets comprised the following:

- Single hydraulic head measurements obtained from government records for 25 private bores located in the southeastern basalt body, obtained mostly between 1991 and 2006. These are listed in Table 1. All bores appear to be located in basalt.

Table 1. Hydraulic Head Calibration Targets.

Bore	Easting (mMGA)	Northing (mMGA)	Date Constructed	Depth (mbgl)*	Water Level (mbgl)	Bore Hydraulic Interval (mbgl)	
						From	To
GW011262	252352	6166970	1-Dec-55	9	4	4	9
GW014121	252487	6166696	1-Dec-56	24	8	20	24
GW014491	253454	6166753	1-Nov-56	23	9	9	23
GW066761	253508	6166662	16-Oct-92	18	4	12	18
GW066764	254253	6166435		24	14	14	24
GW066769	254252	6166466		24	7	7	24
GW066770	254362	6166160		33	10	18	33
GW069007	254188	6166419	4-Nov-91	36	10	10	36
GW069118	253610	6166800	25-Feb-91	30	18	18	30
GW072154	253249	6166401	17-Jan-94	27	10	13	27
GW072273	253044	6166546	31-Jan-92	18	4	12	18
GW072416	252451	6166806	24-Nov-94	18	7	11	18
GW100256	254259	6166306	10-Aug-93	30	8	8	30
GW100257	254231	6166339	12-Aug-93	36	11	12	36
GW101324	254223	6166588	26-Sep-95	15	7	7	15
GW101421	254321	6165789	13-Mar-96	37	9	13	37
GW102401	254158	6166186	20-Dec-96	78	14	25	78
GW102621	254577	6166721	11-Dec-98	25	13	17	25
GW102622	254626	6166784	13-Nov-98	42	13	23	42
GW102623	254576	6166752	15-Nov-98	27	11	20	27
GW102624	254548	6166844	18-Nov-99	21	11	15	21
GW102964	253499	6166812	1-Jan-56	23	15	15	23
GW104198	252443	6166728	5-Feb-02	36	11	12	36
GW107625	252749	6166539	15-Nov-05	31	7	11	31
GW108271	254281	6167270	26-Aug-06	66	15	57	66

* Denotes metres below ground level.

- Hydraulic conductivity estimated from measurements made at several locations in Australia and worldwide (shown in Figure 2). These mainly comprise 24-hour pumping tests.
- Estimates of rainfall recharge to the basalt (10% of annual rainfall), with 80% reporting to streams and springs, and 20% draining vertically to the underlying WG. The latter is considered conservatively high and favours increased drainage to the WG from the basalt, for a given drawdown in the WG. The rainfall recharge estimate represents the recharge that has acceded to the groundwater system following consumption in the unsaturated zone and consumption by mega flora. These estimates are based on baseflow analysis discussed in Coffey (2016).

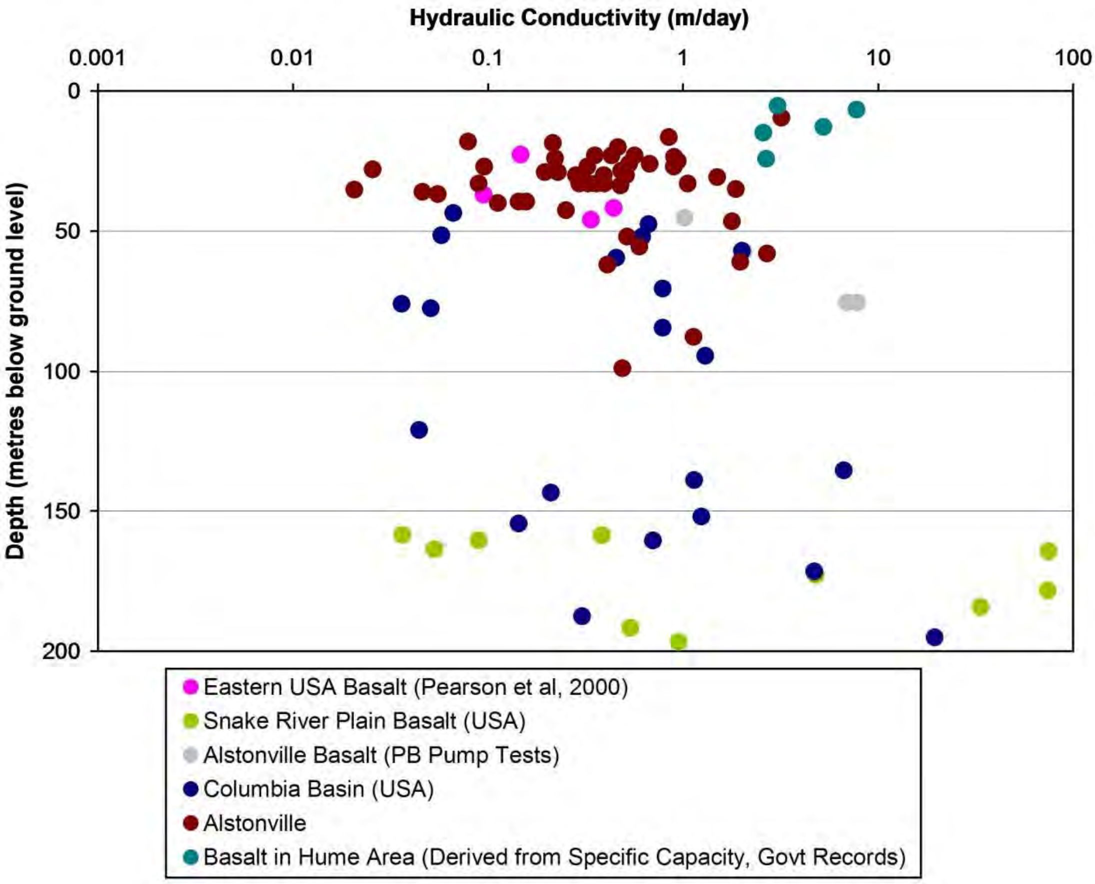


Figure 2. Measured hydraulic conductivity of basalt in the Hume area and around the world.

1.2. Boundary Conditions

Both layers were designated as variable type layers (a layer that will allow both unconfined and confined behaviour).

Layer 1 (basalt) hosts drains that represent streams and springs. Layer 2 is the notional retarding layer that represents altered WG. It hosts a general head boundary (GHB) with the external head comprising hydraulic head obtained at a dummy piezometer (see Figure 1) in Layer 1 of the main model, for the null and active mining predictive scenarios. These heads are shown in Figure 3. They contain the drawdown induced by Hume operations, and are discretised into yearly periods. There are two GHB zones, one on either side of the interpreted horizontal flow barrier. The external GHB head south of the barrier remains at null case values while the external GHB head north of the barrier varies according to the null or main scenarios. The location of the dummy piezometer provides heads intermediate between those underlying the northern boundary of the basalt and those underlying the basalt at the barrier. Drawdown in the main model south of the barrier is negligible.

The conductance term for the northern GHB zone is the main calibration parameter, and is a measure of the capability of the barrier underlying the basalt to retard vertical drainage.

Drainage channels and springs were simulated using the Drain package. Drain conductance was set to a high value of 1000 m^2/day, allowing the media hydraulic properties to control leakage to the channels. Elevations for the inverts of these features are based on digital elevation information available from the Australian Government, checked against LiDAR topographic survey data for the Hume Lease.

Given the length of time over which hydraulic measurements were made, rainfall was applied as a constant percentage of average rainfall for the area. The recharge used in the model is the component of rainfall that reports to drainage channels or springs, or that drains vertically to the underlying WG.

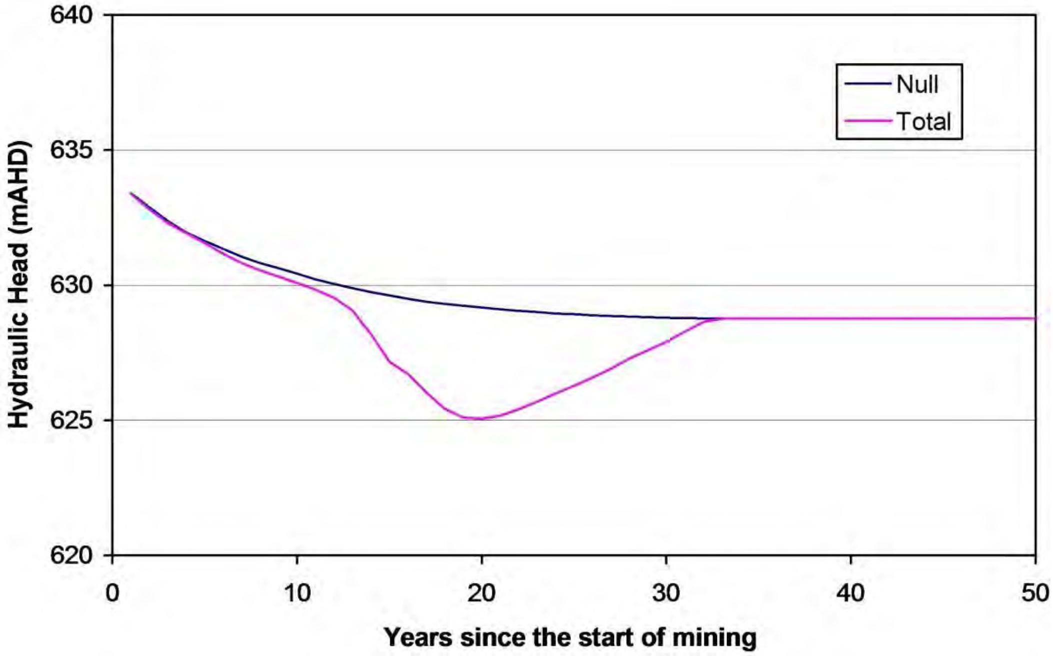


Figure 3. The external hydraulic head assigned for the GHB boundary condition.

1.3. Calibration Results

Figure 4 shows modelled and observed hydraulic heads for steady state calibration. The normalised root-mean-squared (NRMS) error is 20% and considered reasonable, given the length of time over which observations have been made, the uncertainty in water levels reported in government records, and the small total head difference of the target dataset. Residuals are reasonably normally distributed.

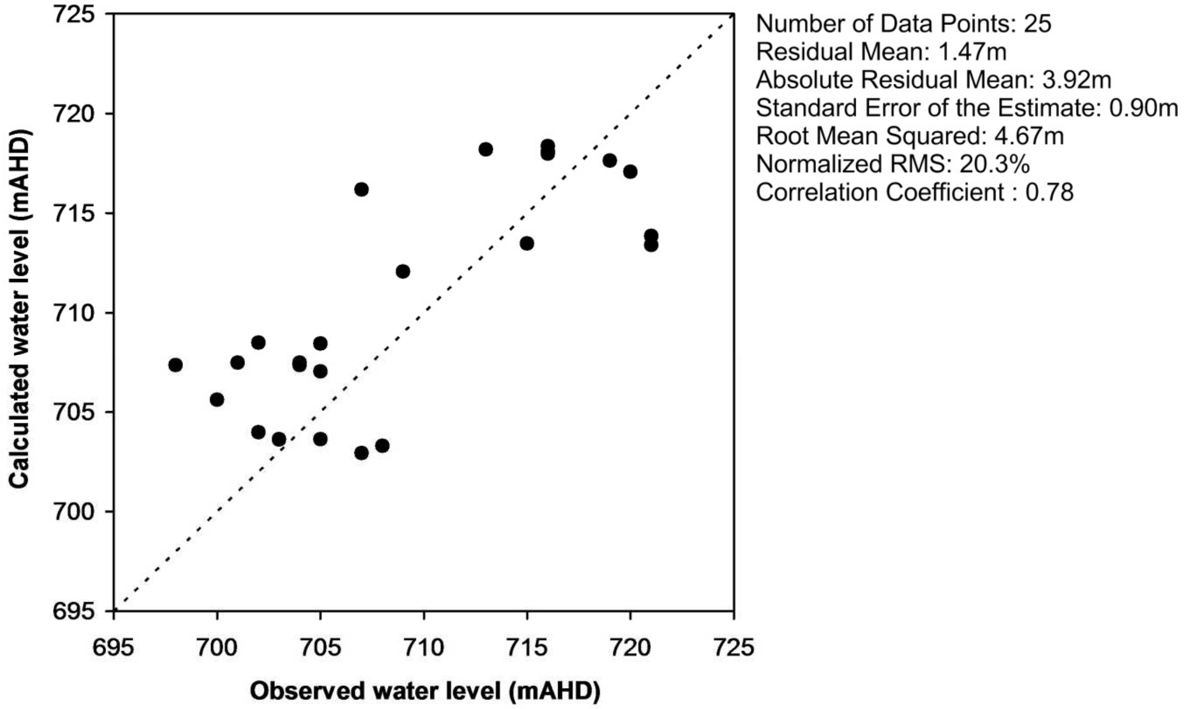


Figure 4. Observed and calculated steady state water levels.

The modelled steady state flow budget is listed in Table 2. The flow budget discrepancy is less than 0.005% and is considered reasonable. Drainage to the underlying WG comprises 20% of the recharge to the basalt, with the remainder discharging at streams and springs. The calibrated K for the basalt is 0.8m/day, considered reasonable based on observations in Figure 2.

Table 2. Modelled steady state flow budget.

IN (ML/day)		OUT (ML/day)	
Rainfall Recharge	2.73	Discharge to streams and springs	2.20
		Drainage to underlying WG	0.53
TOTAL	2.73	TOTAL	2.73
Discrepancy: +0.00 ML/day (+0.0 %)			

The calibrated GHB conductance is 0.03m^2/day which equates to a vertical hydraulic conductivity of the lateral retarding layer under the basalt of about 0.0003 m/day.

1.4. Predictive Simulation and Results

The calibrated model was run in transient mode for predictive simulations over a period of 100 years, using a specific yield of 4% for the basalt.

Figure 5 shows the modelled total and differential drawdown at bore GW106103. The total and differential drawdowns achieve maximums of 0.14m and 0.07m respectively.

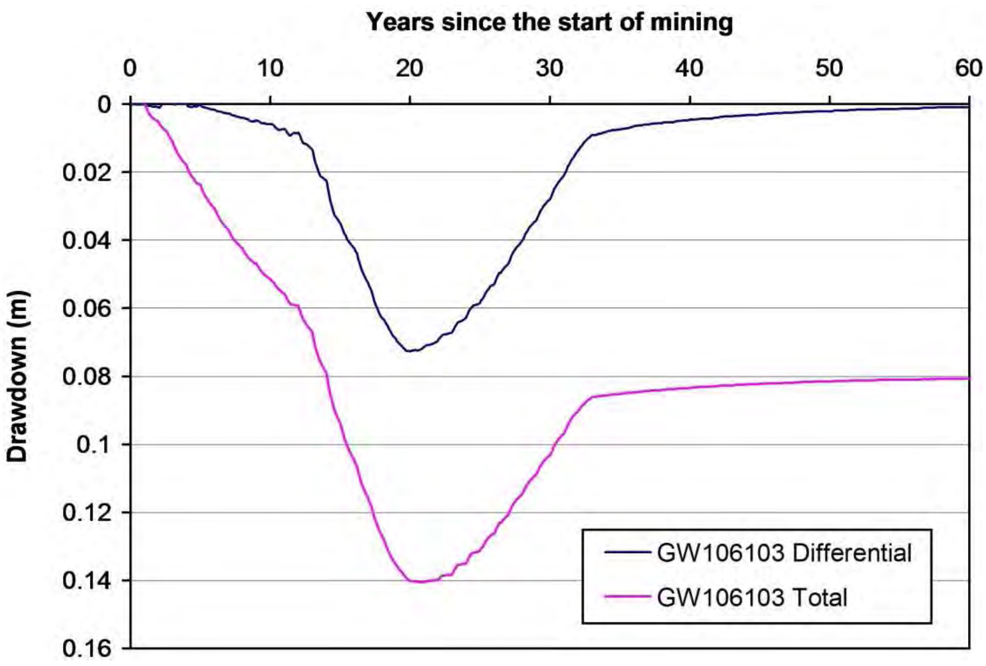


Figure 5. Modelled hydrographs for private basalt bore GW106103.