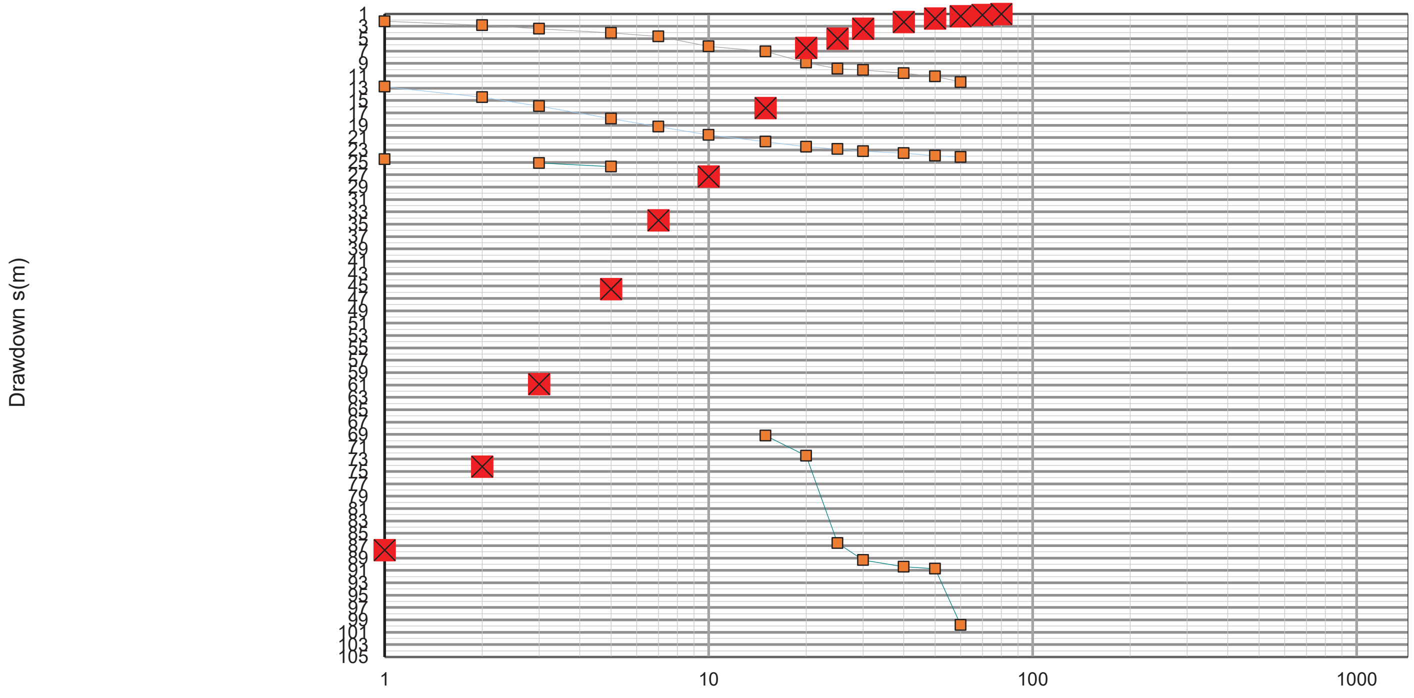
Appendices

Appendix A: Hydrocensus Water Level Data

BH I.D	Use	General Area Description	Easting	Northing	Collar Elevation (mamsl)	Collar Height (magl)	Borehole Depth (mbgl)	Water Level	
								mbgl	mamsl
DEW04	Dewatering Borehole	Kinsevere Hill	563506	8743210	1 220	0.52	121	47	1 172
DEW07	Dewatering Borehole	Kinsevere Hill open pit area	563304	8743432	1 222	0.49	121	52	1 170
DEW08	Dewatering Borehole	Northeast side Mashi Pit	561921	8745031	1 191	0.65	139	12	1 178
DEW25	Dewatering Borehole	In Central Pit	562104	8744452	1 204	0.40	250	8	1 196
DEW26	Dewatering Borehole	West side of Central Pit	561947	8743956	1 208	0.40	250	7	1 201
DEW33	Dewatering Borehole	North side of Mashi	561897	8744830	1 161	0.50	140	19	1 142
GWT07	Groundwater Supply Borehole	West side of dirty pond (Junction roads)	561129	8743746	1 218	0.68	68	33	1 184
GWT09	Groundwater Supply Borehole	Wash bay area	560880	8744292	1 213	0.42	70	28	1 185
GWT10B	Groundwater Supply Borehole	NB mining area	560869	8744622	1 208	0.50	100	27	1 181
GWT12	Groundwater Supply Borehole	Kinsevere Hill open pit area	562674	8743784	1 219	0.42	120	49	1 170
MON03	Monitoring Borehole	Kinsevere Hill open pit area	563812	8744477	1 211	0.59	81	36	1 174
MON04	Monitoring Borehole	East side of TSF 2	564095	8742098	1 238	0.43	81	53	1 185
MON09	Monitoring Borehole	Water Borehole at Kalilanda Village	561439	8746527	1 185	0.51	50	1	1 183
MON10	Monitoring Borehole	Water Borehole at Mpundu Village	562378	8746861	1 187	0.29	51	86	1 101
MON11	Monitoring Borehole	Water Borehole at Ernest Village	563669	8747317	1 189	0.30	50	3	1 186
MON24	Monitoring Borehole	South side of Central Pit	562315	8743790	1 213	0.45		27	1 185
MON41	Monitoring Borehole	Northeast of Kinsevere concession	563628	8745484	1 203	0.50	103	26	1 177
MON42	Monitoring Borehole	Southeast of Kinsevere concession	564094	8742970	1 214	0.57	88	37	1 176
MON43	Monitoring Borehole	South of TSF	562223	8741740	1 237	0.91	120	58	1 178
MON44	Monitoring Borehole	North of TSF	562837	8742978	1 224	0.75	103	49	1 174
MON45	Monitoring Borehole	Northeast of Mashi Pit	562060	8745095	1 204	0.70	99	25	1 178
MON46	Monitoring Borehole	Northwest of Mashi Pit	561663	8744839	1 203	0.55	101	42	1 160
MON47	Monitoring Borehole	Southeast of Central Pit	562559	8743777	1 218	0.61	101	48	1 169
MON52	Monitoring Borehole	South of TSF01 Area	563581	8744115	1 215			32	1 183
TSFMON01	Monitoring Borehole	South of TSF01 Area	563038	8741614	1 236	0.91	80	56	1 179
TSFMON02	Monitoring Borehole	South of Kinsevere Hill Towards EAF and New SX/EW TSF	563396	8743096	1 221	1.00	81	17	1 203
TSFMON03	Monitoring Borehole	Near Magazine Explosive Storage Yard	562391	8743224	1 217	0.95	80	23	1 193
TSFMON04	Monitoring Borehole	Kinsevere Hill	564082	8742010	1 243	0.49	80	63	1 180
TSFMON05	Monitoring Borehole	Tailings Storage Facility	563113	8741617	1 259	0.95	80	83	1 175
TSFMON07	Monitoring Borehole	Pundu Village	563150	8746101	1 195	0.95	86	4	1 190
TSFMON08	Monitoring Borehole	Kinsevere Hill	563734	8743879	1 214	0.71	80	37	1 176
HTH1	Multi-level Pressure Piezometer	North side of the Central Pit	562635	8744539	1 214	Pore Pressure Measurements			
HTH2	Multi-level Pressure Piezometer	East side of the Central Pit	562709	8744123	1 219	Pore Pressure Measurements			
HTH3	Multi-level Pressure Piezometer	West side of the Central Pit	562061	8831347	1 206	Pore Pressure Measurements			
HTH4	Multi-level Pressure Piezometer	North west side of the Central Pit	561976	8744653	1 205	Pore Pressure Measurements			
HTH5	Multi-level Pressure Piezometer	North side of the Mashi Pit	561938	8745022	1 203	Pore Pressure Measurements			
HTH6	Multi-level Pressure Piezometer	South side of the Central Pit	562030	8743850	1 203	Pore Pressure Measurements			

Appendix B: Pumping Test Data



STEP DRAWDOWN TEST DATA PLOT

= Drawdown data.

X = Recovery data.

BH DEW08

DATE TESTED

From 21/08/2017

To 21/08/2017

DISCHARGE RATES (Q)

Q1 =	**5.06**	l/s
Q2 =	**10.15**	l/s
Q3 =	**20.19**	l/s
Q4 =	**0.00**	l/s
Q5 =	**0.00**	l/s
Q6 =	**0.00**	

STEPPED DISCHARGE TEST & RECOVERY

CONSULTANT :					**CONSULTANT ONSITE :**	MOSH
PUMP TESTING CONTRACTOR :					**PUMP TESTING SUPERVISOR :**	SAKHI
PROJECT NUMBER :					**PROJECT NAME :**	KINSEVERE GW
COORDINATES :	S-11.35209		E27.56749		**BOREHOLE I.D**	DEW08
AQUIFER TESTING DATES :	FROM :	21/08/2017	TO :	21/08/2017	**PROVINCE :**	KATANGA

BOREHOLE DETAILS	**CASING HEIGHT (magl) :**	0.6
	BOREHOLE DEPTH (mbgl) :	125
	STATIC WATER LEVEL (mbgl)	12.75
	PUMP INSTALLATION DEPTH (mbgl)	120
	AVAILABLE DRAWDOWN (m)	107.25

STEPPED DISCHARGE TEST & RECOVERY

STEP 1

TIME (MIN)	DRAW DOWN (M)		YIELD (L/S)	TIME (MIN)	RECOVERY (M)
1	2.18		5.06	1	
2	2.85			2	
3	3.40			3	
5	4.06		5.01	5	
7	4.62		5.05	7	
10	6.24			10	
15	7.05			15	
20	8.88			20	
25	9.84		5.11	25	
30	10.06			30	
40	10.61		5.04	40	
50	11.12			50	
60	12.01			60	
Average (l/s)			5.06		
Average (m3/d)			436.88		
pH					
TEMP			°C		
EC			μS/cm		

STEP 2

TIME (MIN)	DRAW DOWN (M)	YIELD (L/S)	TIME (MIN)	RECOVERY (M)
1	12.78	10.15	1	
2	14.49		2	
3	15.90	10.40	3	
5	17.95		5	
7	19.24		7	
10	20.58		10	
15	21.66	10.13	15	
20	22.47		20	
25	22.87		25	
30	23.19	10.09	30	
40	23.51		40	
50	23.93	9.98	50	
60	24.15		60	
		10.15		
		877.13		
pH				
TEMP		°C		
EC		μS/cm		

STEP 3

TIME (MIN)	DRAW DOWN (M)	YIELD (L/S)	TIME (MIN)	RECOVERY (M)
1	24.50	20.19	1	
2			2	Issue with dip meter
3	25.10		3	
5	25.70		5	
7			7	Issue with dip meter
10			10	Issue with dip meter
15	69.18	20.11	15	
20	72.47	20.21	20	
25	86.60		30	
30	89.30	20.28	40	
40	90.43	20.15	50	
50	90.70		60	
60	99.84		70	
		20.19		
		1744.20		
pH				
TEMP		°C		
EC		μS/cm		

STEP 4

TIME (MIN)	DRAW DOWN (M)		YIELD (L/S)	TIME (MIN)	RECOVERY (M)
1				1	87.71
2				2	74.20
3				3	60.88
5				5	45.52
7				7	34.36
10				10	27.30
15				15	16.24
20				20	6.50
25				25	5.00
30				30	3.40
40				40	2.30
50				50	1.74
60				60	1.38
				70	1.17
				80	1.02
				90	0.92
				100	0.84
				120	
				150	
				180	
				210	
				240	
TEMP			°C		0.07
EC			μS/cm		0.06

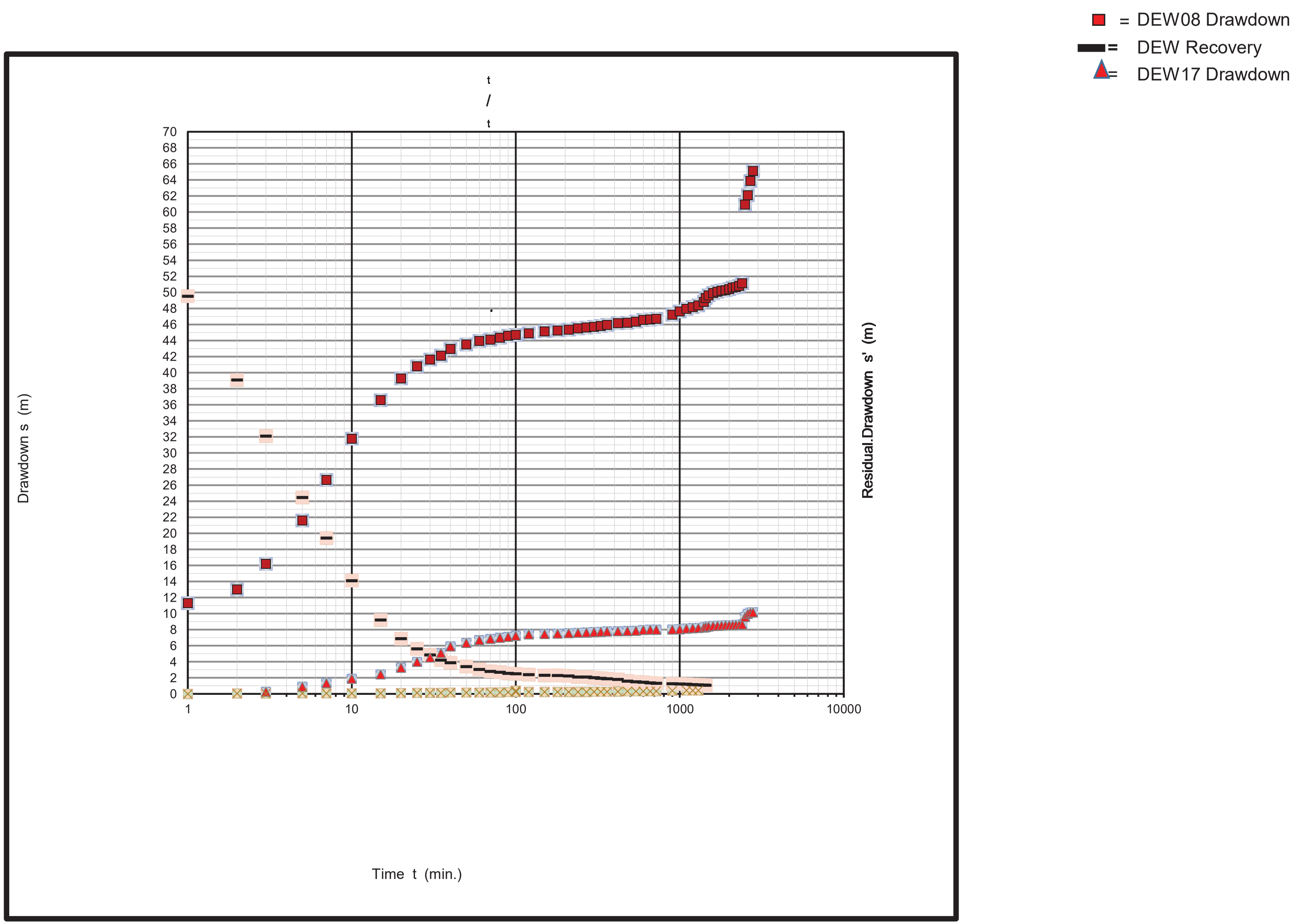
STEP 5

TIME (MIN)	DRAW DOWN (M)	YIELD (L/S)	TIME (MIN)	RECOVERY (M)
1			1	
2			2	
3			3	
5			5	
7			7	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	
TEMP		°C		
EC		μS/cm		

STEP 6

TIME (MIN)	DRAW DOWN (M)	YIELD (L/S)	TIME (MIN)	RECOVERY (M)
1			1	
2			2	
3			3	
5			5	
7			7	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	
TEMP		°C		
EC		μS/cm		

CONSTANT DISCHARGE TEST DATA PLOT



CONSULTANT :			**CONSULTANT ONSITE :**	MOSH	
PUMP TESTING CONTRACTOR :			**PUMP TESTING SUPERVISOR :**	SAKHI	
PROJECT NUMBER :			**PROJECT NAME :**	KINSEVERE GW	
COORDINATES :	S-11.35209	E27.56749	**BOREHOLE I.D**	DEW08	
AQUIFER TESTING DATES :	FROM : 22/08/2017	TO :	**PROVINCE :**	KATANGA	
BOREHOLE DETAILS	**CASING HEIGHT (magl) :**	0.6			
	BOREHOLE DEPTH (mbgl) :	125			
	STATIC WATER LEVEL (mbgl)	15.55			
	PUMP INSTALLATION DEPTH (mbgl)	120			
	AVAILABLE DRAWDOWN (m)	104.45			

DISCHARGE BOREHOLE						OBSERVATION HOLE 1		DEW17	OBSERVATION HOLE SRK06			OBSERVATION HOLE 3		OBSERVATION HOLE 4	
						Distance(m);	15		Distance(m);			Distance(m);		Distance(m);	
TIME (MIN)	CDT DRAWDOWN (M)		YIELD (L/S)	TIME MIN	CDT RECOVE (M)	TIME: (min)	Drawdown m	Recovery (m)	TIME: (min)	Drawdown (m)	Recovery	TIME: (min)	Drawdown (m)	TIME: (min)	Drawdown (m)
0.5	10.1	109.9			56.29	0.5		10.15							
1	11.31			1	49.50	1		10.13	1	0.00		1		1	
2	13.00			2	39.07	2		9.94	2	0.05		2		2	
3	16.20			3	32.10	3	0.26	9.52	3	0.05		3		3	
5	21.58			5	24.46	5	0.87	9.07	5	0.06		5		5	
7	26.64			7	19.40	7	1.34	8.19	7	0.06		7		7	
10	31.76			10	14.07	10	1.89	7.60	10	0.08		10		10	
15	36.58			15	9.20	15	2.41	5.02	15	0.08		15		15	
20	39.26			20	6.87	20	3.25	3.82	20	0.10		20		20	
25	40.78			25	5.60	25	3.97	2.83	25	0.11		25		25	
30	41.61			30	4.85	30	4.53	1.97	30	0.12		30		30	
35	42.10			35	4.21	35	5.08	0.80	35	0.13		35		35	
40	42.94			40	3.87	40	5.90	0.44	40	0.14		40		40	
50	43.50			50	3.40	50	6.33		50	0.15		50		50	
60	43.93			60	3.03	60	6.67		60	0.16		60		60	
70	44.10			70	2.80	70	6.85		70	0.17		70		70	
80	44.35			80	2.68	80	6.98		80	0.18		80		80	
90	44.58			90	2.56	90	7.10		90	0.21		90		90	
100	44.70			100	2.50	100	7.22		100	0.22		100		100	
120	44.90			120	2.38	120	7.40		120	0.22		120		120	
150	45.12			150	2.32	150	7.45		150	0.22		150		150	
180	45.23			180	2.27	180	7.50		180	0.22		180		180	
210	45.35			210	2.24	210	7.55		210	0.22		210		210	
240	45.50			240	2.10	240	7.59		240	0.23		240		240	
270	45.62			270	2.08	270	7.62		270	0.24		270		270	
300	45.71			300	2.02	300	7.67		300	0.25		300		300	
330	45.82			330	1.94	330	7.70		330	0.26		330		330	
360	45.94			360	1.88	360	7.75		360	0.27		360		360	
420	46.15			420	1.80	420	7.79		420	0.29		420		420	
480	46.20			480	1.58	480	7.82		480	0.30		480		480	
540	46.35			540	1.49	540	7.85		540	0.31		540		540	
600	46.57			600	1.44	600	7.95		600	0.31		600		600	
660	46.62			660	1.37	660	7.97		660	0.32		660		660	
720	46.70			720	1.30	720	7.99		720	0.33		720		720	
900	47.21			900	1.26	900	8.01		900	0.39		900		900	
1000	47.62			1000	1.24	1000	8.02		100	0.40		100		100	
1100	47.93			1100	1.19	1100	8.11		1100	0.41		1100		1100	
1200	48.15			1200	1.15	1200	8.16		1200	0.42		1200		1200	
1300	48.36			1300	1.11	1300	8.19		1300	0.42		1300		1300	
1400	48.81			1400	1.09	1400	8.25		1400			1400		1400	
1440	49.29			1440	1.08	1440	8.31		1440			1440		1440	
1500	49.61			1500		1500	8.38		1500			1500		1500	
1600	49.90			1600		1600	8.43		1600			1600		1600	
1700	50.07			1700		1700	8.47		1700			1700		1700	
1800	50.20			1800		1800	8.50		1800			1800		1800	
1900	50.27			1900		1900	8.52		1900			1900		1900	
2000	50.40			2000		2000	8.54		2000			2000		2000	
2100	50.58			2100		2100	8.55		2100			2100		2100	
2200	50.64			2200		2200	8.56		2200			2200		2200	
2300	50.81			2300		2300	8.58		2300			2300		2300	
2400	51.13			2400		2400	8.62		2400			2400		2400	
2500	60.92			2500		2500	9.56		2500			2500		2500	
2600	62.10			2600		2600	9.94		2600			2600		2600	
2700	63.88			2700		2700	10.11		2700			2700		2700	
2800	65.11			2800		2800	10.14		2800			2800		2800	
2900				2900		2900			2900			2900		2900	
3000				3000		3000			3000			3000		3000	

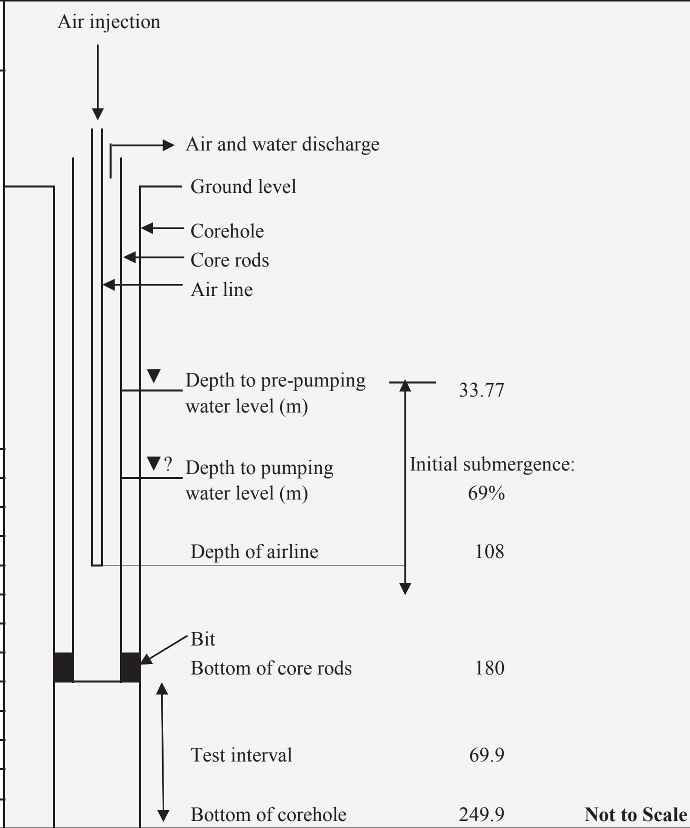
Appendix C: Airlift Testing Data

Analysis of DEW31 Airlift Pumping and Recovery Data

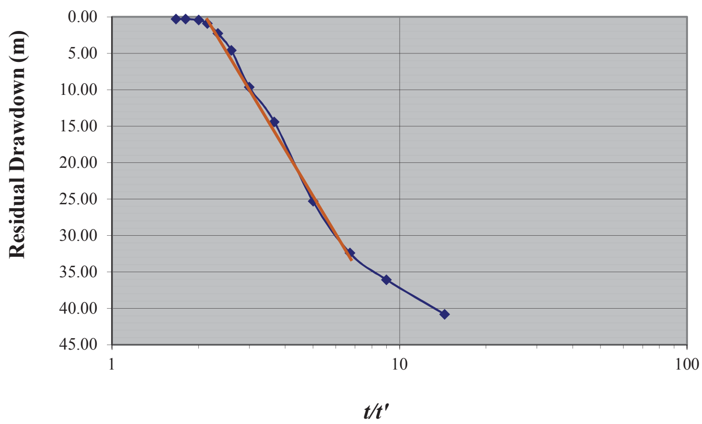
Corehole Depth (m):	**249.9**	**Pre-Pumping WL (m):**	**33.8**
Core Rod Depth (m):	**180.0**	**Depth of Airline (m):**	**107.6**

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			2.1		
	5			2.1		
	7			2.1		
	10			2.1		
	15			2.1		
	20			2.1		
	25			2.1		
	30			2.1		
	35			2.1		
	40			2.1		
	50			2.1		
	60			2.1		
			Q_{ave}	2.1		
Recovery	43	3	14.3		74.57	40.80
	45	5	9.0		69.84	36.07
	47	7	6.7		66.18	32.41
	50	10	5.0		59.08	25.31
	55	15	3.7		48.18	14.41
	60	20	3.0		43.42	9.65
	65	25	2.6		38.38	4.61
	70	30	2.3		36.05	2.28
	75	35	2.1		34.69	0.92
	80	40	2.0		34.20	0.43
	90	50	1.8		34.06	0.29
	100	60	1.7		34.06	0.29

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

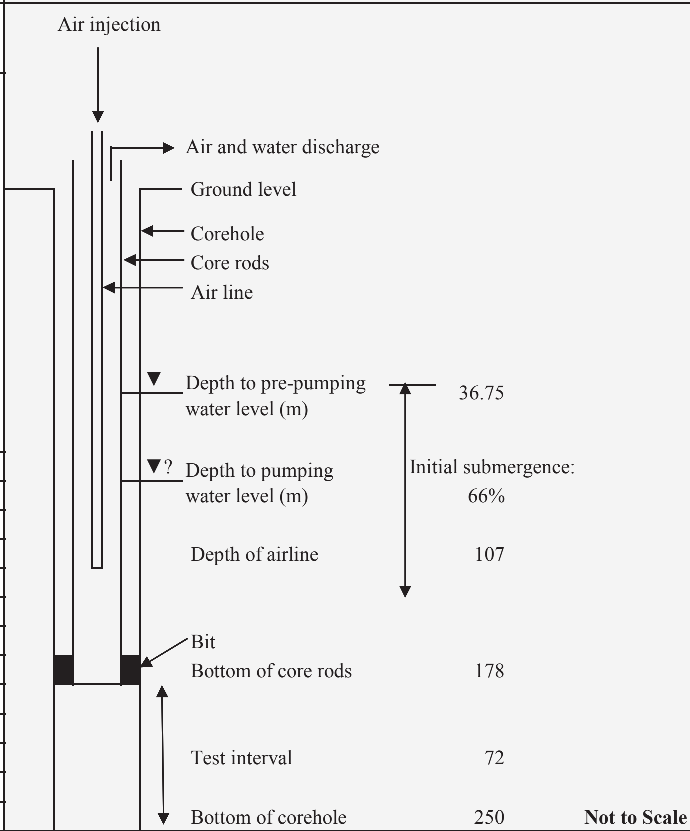
Q_{ave}	50.9	Discharge (m^3/d)
Δs	30.13	Drawdown (m)
T	3.1E-01	m^2/d
b	69.9	Test zone thickness (m)
K	4.4E-03	m/d

Analysis of DEW30 Airlift Pumping and Recovery Data

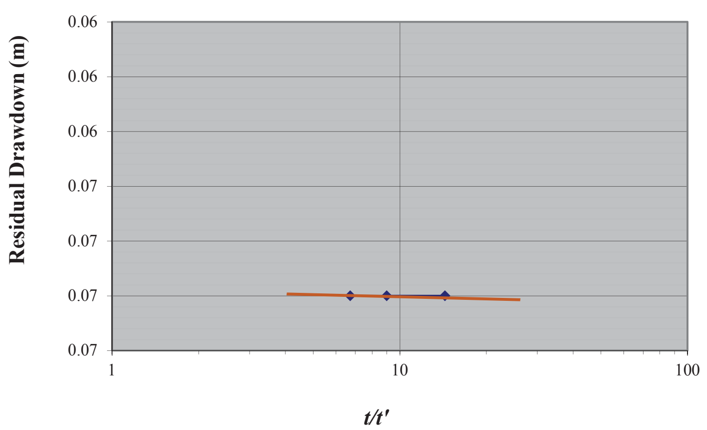
Corehole Depth (m):	250.0	Pre-Pumping WL (m):	36.8
Core Rod Depth (m):	178.0	Depth of Airline (m):	107.0

Data	t (mins)	t' (mins)	t/t'	Q (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			23.0		
	5			25.9		
	7			29.1		
	10			25.9		
	15			25.9		
	20			25.9		
	25			25.9		
	30			25.9		
	35			29.1		
	40			29.1		
	50			29.1		
	60			29.1		
			Q_{ave}	27.0		
Recovery	43	3	14.3		36.82	0.07
	45	5	9.0		36.82	0.07
	47	7	6.7		36.82	0.07
	50	10	5.0			
	55	15	3.7			
	60	20	3.0			
	65	25	2.6			
	70	30	2.3			
	75	35	2.1			
	80	40	2.0			
	90	50	1.8			
	100	60	1.7			

Schematic Diagram of Airlift Pumping System



Recovery vs. t/t' Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

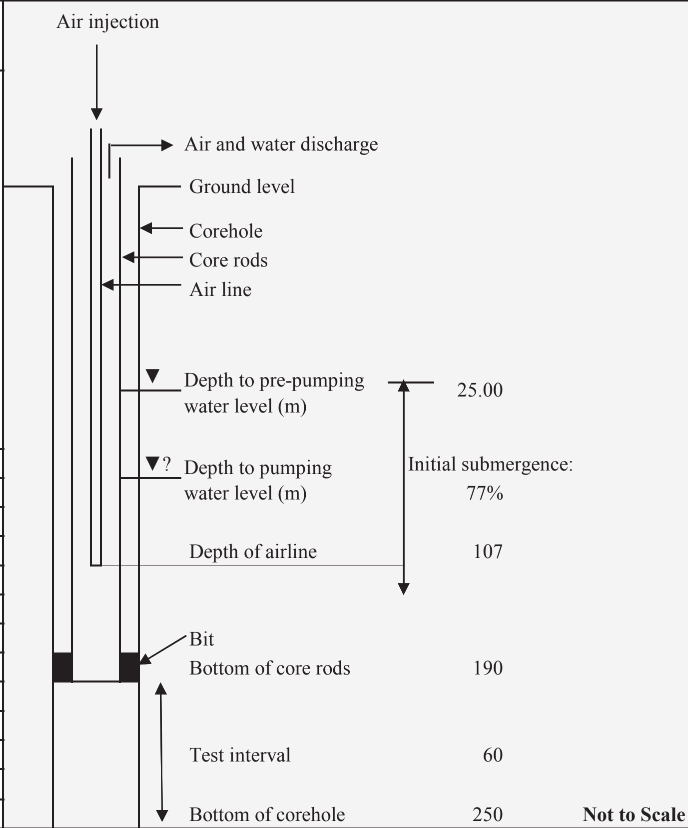
Q_{ave}	647.7	Discharge (m^3/d)
Δs	0.01	Drawdown (m)
T	1.2E+04	m^2/d
b	72.0	Test zone thickness (m)
K	1.6E+02	m/d

Analysis of DEW29 Airlift Pumping and Recovery Data

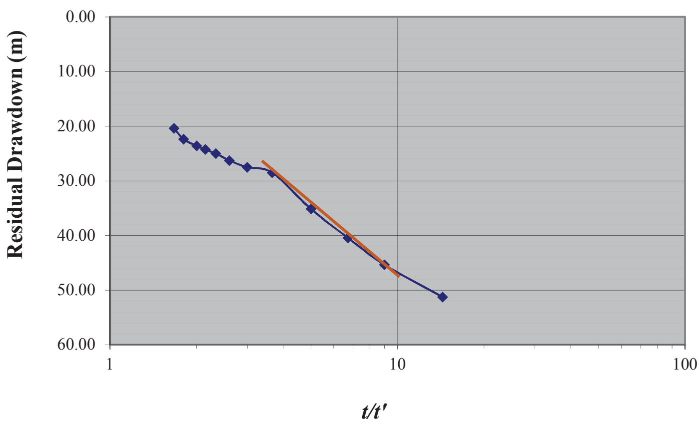
Corehole Depth (m):	250.0	Pre-Pumping WL (m):	25.0
Core Rod Depth (m):	190.0	Depth of Airline (m):	107.0

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			8.5		
	5			8.5		
	7			3.6		
	10			3.1		
	15			2.1		
	20			3.1		
	25			3.1		
	30			3.1		
	35			3.1		
	40			2.1		
	50					
	60					
			Q_{ave}	4.0		
Recovery	43	3	14.3		76.26	51.26
	45	5	9.0		70.34	45.34
	47	7	6.7		65.42	40.42
	50	10	5.0		60.15	35.15
	55	15	3.7		53.52	28.52
	60	20	3.0		52.51	27.51
	65	25	2.6		51.28	26.28
	70	30	2.3		49.98	24.98
	75	35	2.1		49.27	24.27
	80	40	2.0		48.60	23.60
	90	50	1.8		47.35	22.35
	100	60	1.7		45.36	20.36

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

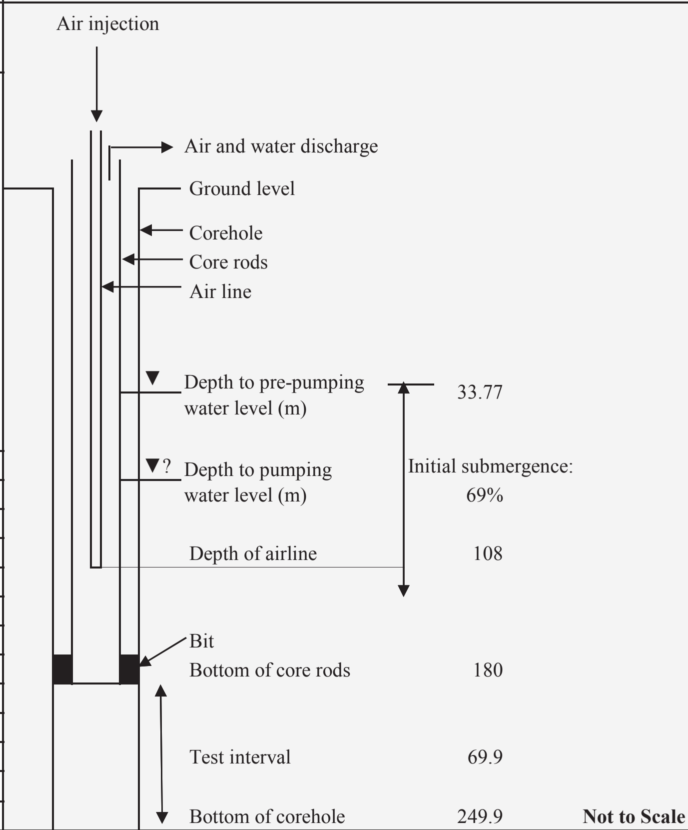
Q_{ave}	96.1	Discharge (m^3/d)
Δs	16.82	Drawdown (m)
T	1.0E+00	m^2/d
b	60.0	Test zone thickness (m)
K	1.7E-02	m/d

Analysis of DEW28 Airlift Pumping and Recovery Data

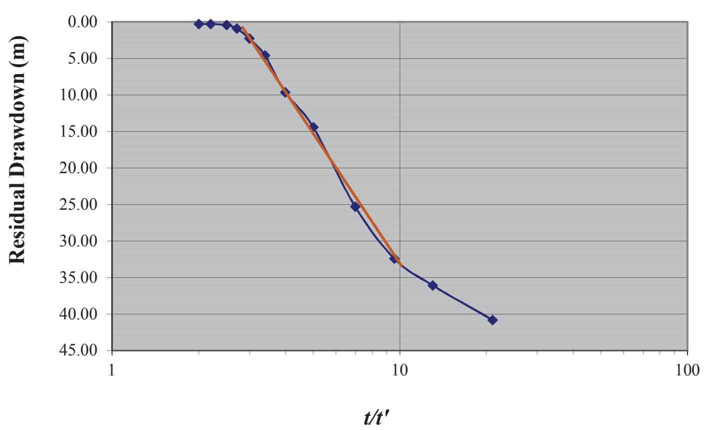
Corehole Depth (m):	**249.9**	**Pre-Pumping WL (m):**	**33.8**
Core Rod Depth (m):	**180.0**	**Depth of Airline (m):**	**107.6**

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			2.1		
	5			2.1		
	7			2.1		
	10			2.1		
	15			2.1		
	20			2.1		
	25			2.1		
	30			2.1		
	35			2.1		
	40			2.1		
	50			2.1		
	60			2.1		
			Q_{ave}	2.1		
Recovery	63	3	21.0		74.57	40.80
	65	5	13.0		69.84	36.07
	67	7	9.6		66.18	32.41
	70	10	7.0		59.08	25.31
	75	15	5.0		48.18	14.41
	80	20	4.0		43.42	9.65
	85	25	3.4		38.38	4.61
	90	30	3.0		36.05	2.28
	95	35	2.7		34.69	0.92
	100	40	2.5		34.20	0.43
	110	50	2.2		34.06	0.29
	120	60	2.0		34.06	0.29

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

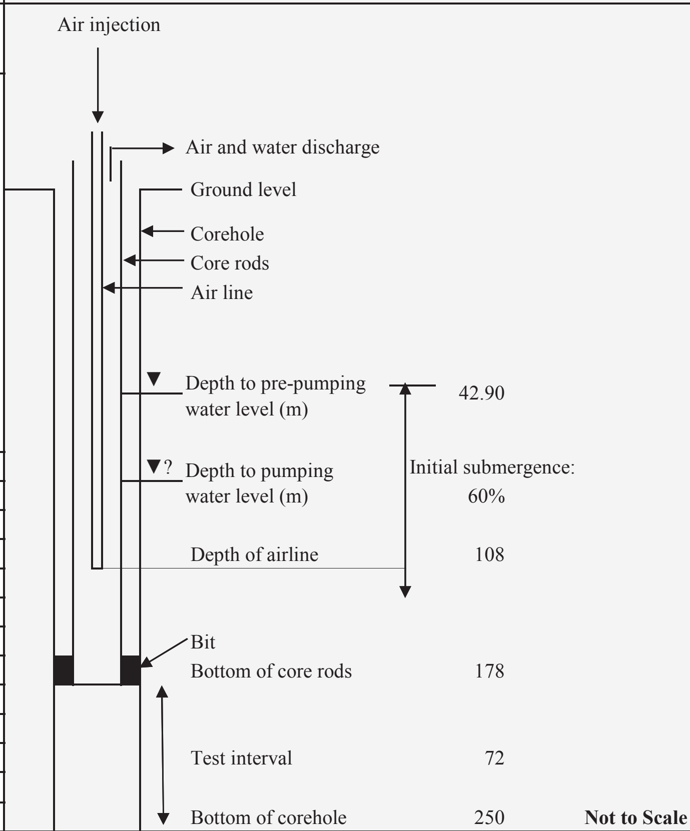
Q_{ave}	50.9	Discharge (m^3/d)
Δs	31.49	Drawdown (m)
T	3.0E-01	m^2/d
b	69.9	Test zone thickness (m)
K	4.2E-03	m/d

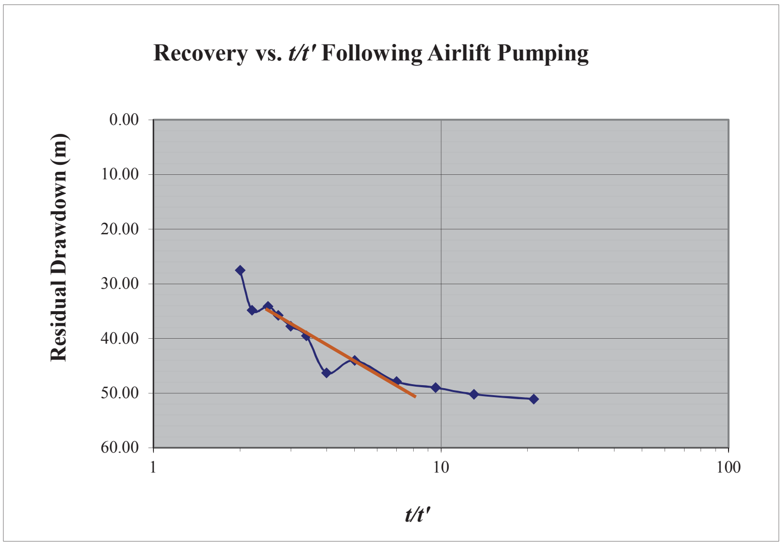
Analysis of DEW27 Airlift Pumping and Recovery Data

Corehole Depth (m):	**250.0**	**Pre-Pumping WL (m):**	**42.9**
Core Rod Depth (m):	**178.0**	**Depth of Airline (m):**	**107.7**

Data	***t* (mins)**	***t'* (mins)**	***t/t'***	***Q* (m³/hr)**	**Depth to Water (m)**	**Residual Drawdown (m)**
Pumping	--			--		
	3			6.9		
	5			6.1		
	7			9.3		
	10			6.9		
	15			6.1		
	20			6.9		
	25			6.1		
	30			4.8		
	35			3.6		
	40			4.8		
	50					
	60					
			Q_{ave}	6.1		
Recovery	63	3	21.0		94.00	51.10
	65	5	13.0		93.10	50.20
	67	7	9.6		91.90	49.00
	70	10	7.0		90.80	47.90
	75	15	5.0		86.90	44.00
	80	20	4.0		89.20	46.30
	85	25	3.4		82.42	39.52
	90	30	3.0		80.68	37.78
	95	35	2.7		78.67	35.77
	100	40	2.5		77.02	34.12
	110	50	2.2		77.72	34.82
	120	60	2.0		70.42	27.52

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

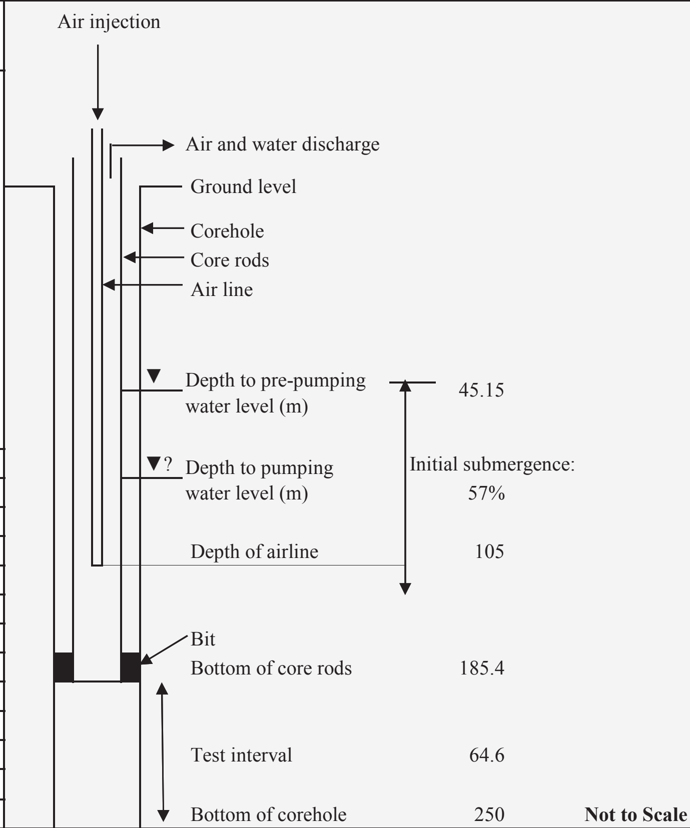
Q_{ave}	147.3	Discharge (m³/d)
Δs	12.13	Drawdown (m)
T	2.2E+00	m²/d
b	72.0	Test zone thickness (m)
K	3.1E-02	m/d

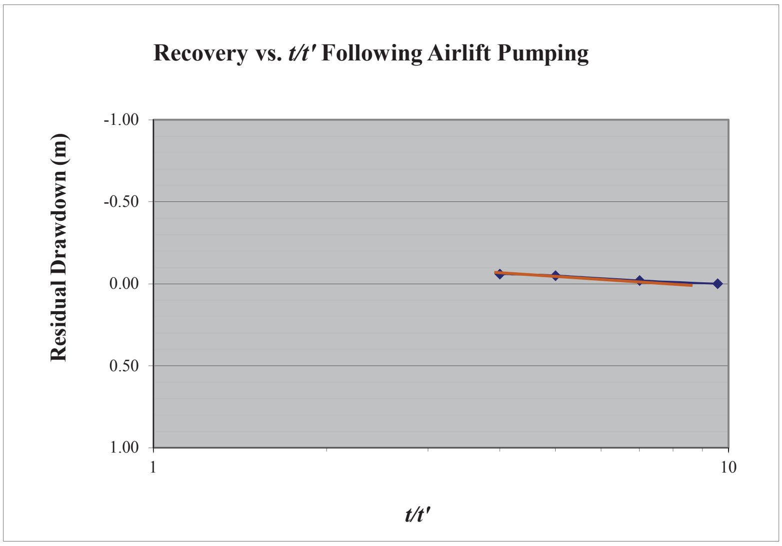
Analysis of DEW26 Airlift Pumping and Recovery Data

Corehole Depth (m):	250.0	Pre-Pumping WL (m):	45.2
Core Rod Depth (m):	185.4	Depth of Airline (m):	104.5

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			3.6		
	5			3.6		
	7			3.6		
	10			4.8		
	15			4.8		
	20			4.8		
	25			4.2		
	30			4.8		
	35			4.8		
	40			4.8		
	50			3.6		
	60			4.8		
			Q_{ave}	4.3		
Recovery	67	7	9.6		45.15	0.00
	70	10	7.0		45.13	-0.02
	75	15	5.0		45.10	-0.05
	80	20	4.0		45.09	-0.06
	85	25	3.4			
	90	30	3.0			
	95	35	2.7			
	100	40	2.5			

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

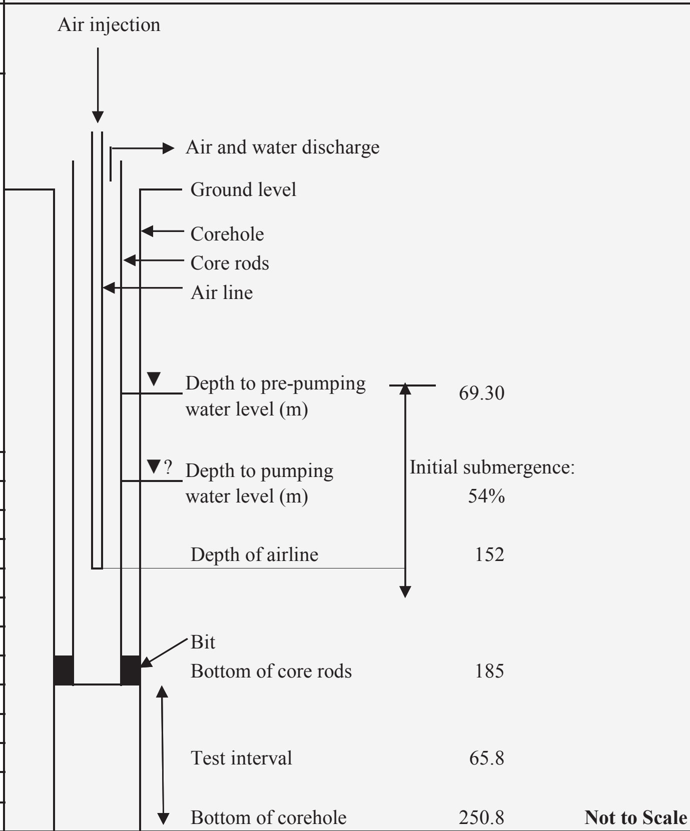
Q_{ave}	103.8	Discharge (m^3/d)
Δs	0.04	Drawdown (m)
T	4.7E+02	m^2/d
b	64.6	Test zone thickness (m)
K	7.4E+00	m/d

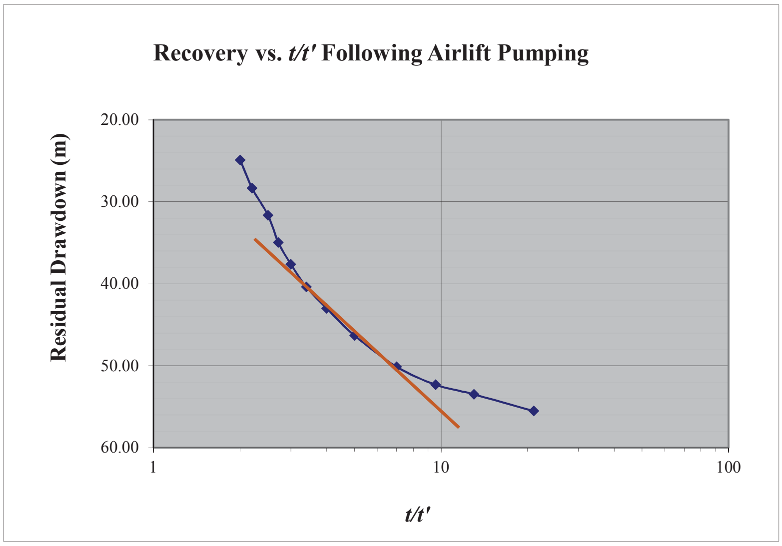
Analysis of DEW25 Airlift Pumping and Recovery Data

Corehole Depth (m):	250.8	Pre-Pumping WL (m):	69.3
Core Rod Depth (m):	185.0	Depth of Airline (m):	151.9

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			2.1		
	5			2.1		
	7			2.1		
	10			2.1		
	15			2.1		
	20			2.1		
	25			2.1		
	30			2.1		
	35			2.1		
	40			2.1		
	50			2.1		
	60			2.1		
			Q_{ave}	2.1		
Recovery	63	3	21.0		124.82	55.52
	65	5	13.0		122.78	53.48
	67	7	9.6		121.60	52.30
	70	10	7.0		119.41	50.11
	75	15	5.0		115.61	46.31
	80	20	4.0		112.28	42.98
	85	25	3.4		109.68	40.38
	90	30	3.0		106.89	37.59
	95	35	2.7		104.24	34.94
	100	40	2.5		100.94	31.64
	110	50	2.2		97.62	28.32
	120	60	2.0		94.21	24.91

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

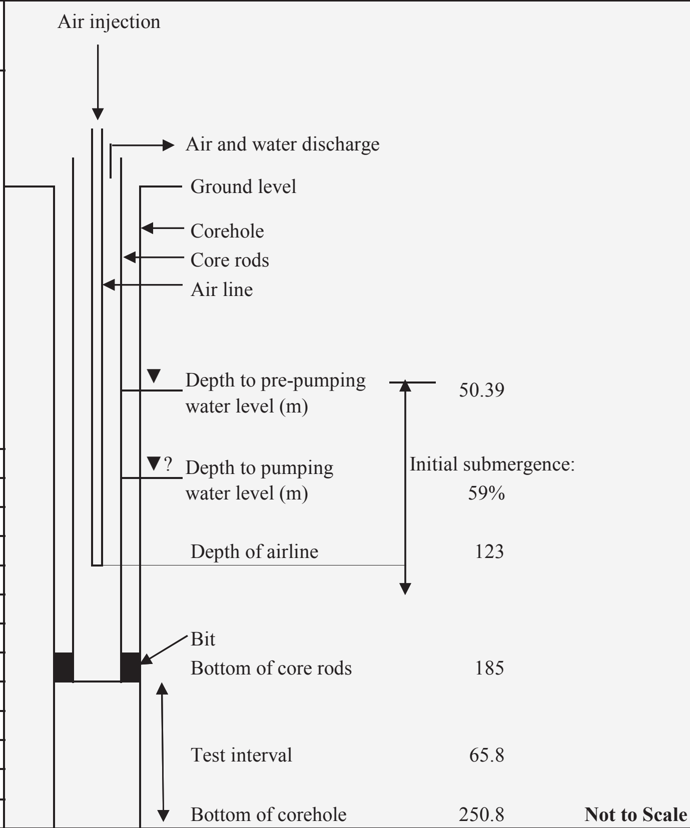
Q_{ave}	50.9	Discharge (m^3/d)
Δs	9.73	Drawdown (m)
T	9.6E-01	m^2/d
b	65.8	Test zone thickness (m)
K	1.5E-02	m/d

Analysis of DEW24 Airlift Pumping and Recovery Data

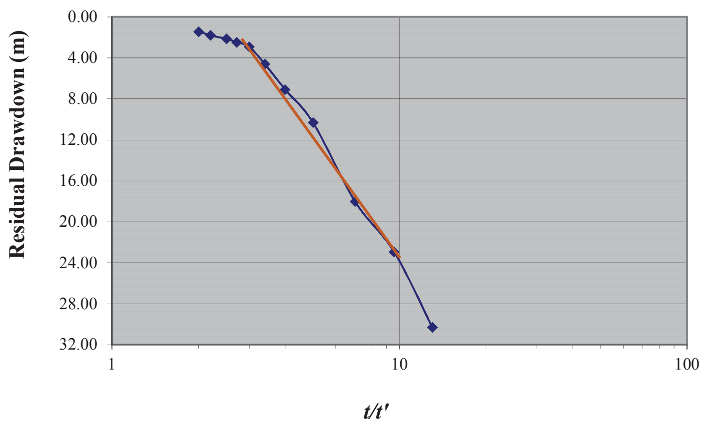
Corehole Depth (m):	**250.8**	**Pre-Pumping WL (m):**	**50.4**
Core Rod Depth (m):	**185.0**	**Depth of Airline (m):**	**122.8**

Data	***t*** **(mins)**	***t'*** **(mins)**	***t/t'***	***Q*** **(m^3/hr)**	**Depth to Water (m)**	**Residual Drawdown (m)**
Pumping	--			--		
	3			2.1		
	5			2.1		
	7			2.1		
	10			2.1		
	15			2.1		
	20			2.1		
	25			2.1		
	30			2.1		
	35			2.1		
	40			2.1		
	50			2.1		
	60			2.1		
			Q_{ave}	2.1		
Recovery	63	3	21.0			
	65	5	13.0		80.70	30.31
	67	7	9.6		73.32	22.93
	70	10	7.0		68.40	18.01
	75	15	5.0		60.70	10.31
	80	20	4.0		57.48	7.09
	85	25	3.4		55.00	4.61
	90	30	3.0		53.32	2.93
	95	35	2.7		52.86	2.47
	100	40	2.5		52.54	2.15
	110	50	2.2		52.18	1.79
	120	60	2.0		51.83	1.44

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

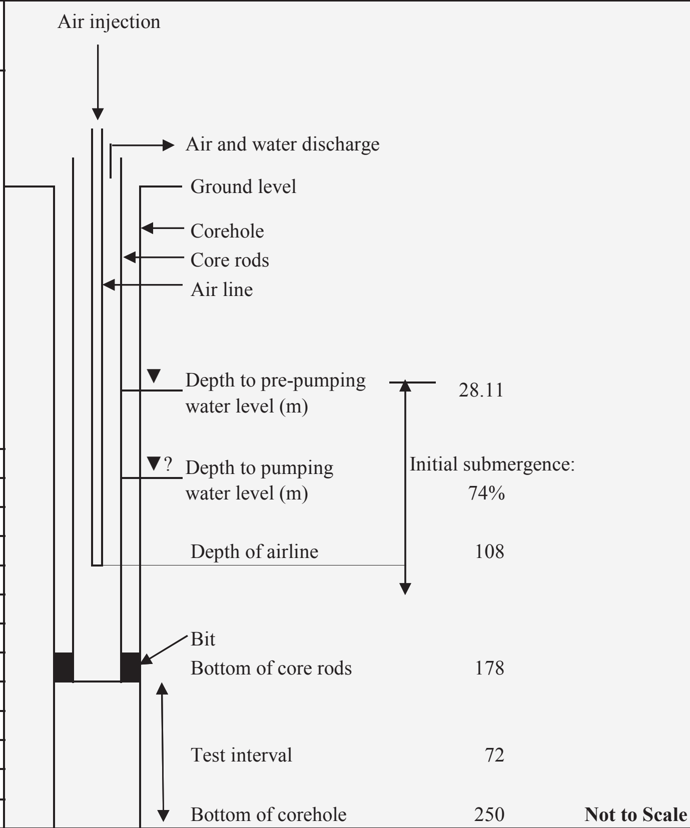
Q_{ave}	50.9	Discharge (m^3/d)
Δs	20.00	Drawdown (m)
T	4.7E-01	m^2/d
b	65.8	Test zone thickness (m)
K	7.1E-03	m/d

Analysis of DEW23 Airlift Pumping and Recovery Data

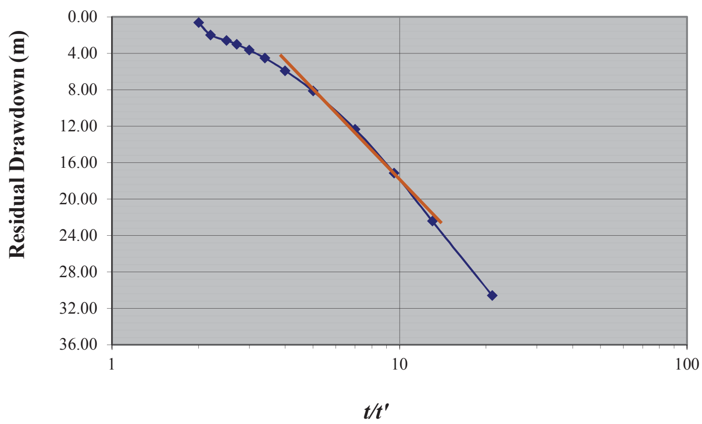
Corehole Depth (m):	**250.0**	**Pre-Pumping WL (m):**	**28.1**
Core Rod Depth (m):	**178.0**	**Depth of Airline (m):**	**108.0**

Data	t (mins)	t' (mins)	t/t'	Q (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			4.8		
	5			4.8		
	7			4.8		
	10			1.7		
	15			1.3		
	20			1.0		
	25			1.0		
	30			1.0		
	35			1.0		
	40			1.0		
	50			1.0		
	60			1.0		
			Q_{ave}	2.0		
Recovery	63	3	21.0		58.70	30.59
	65	5	13.0		50.53	22.42
	67	7	9.6		45.24	17.13
	70	10	7.0		40.44	12.33
	75	15	5.0		36.25	8.14
	80	20	4.0		34.01	5.90
	85	25	3.4		32.64	4.53
	90	30	3.0		31.76	3.65
	95	35	2.7		31.12	3.01
	100	40	2.5		30.70	2.59
	110	50	2.2		30.08	1.97
	120	60	2.0		28.72	0.61

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

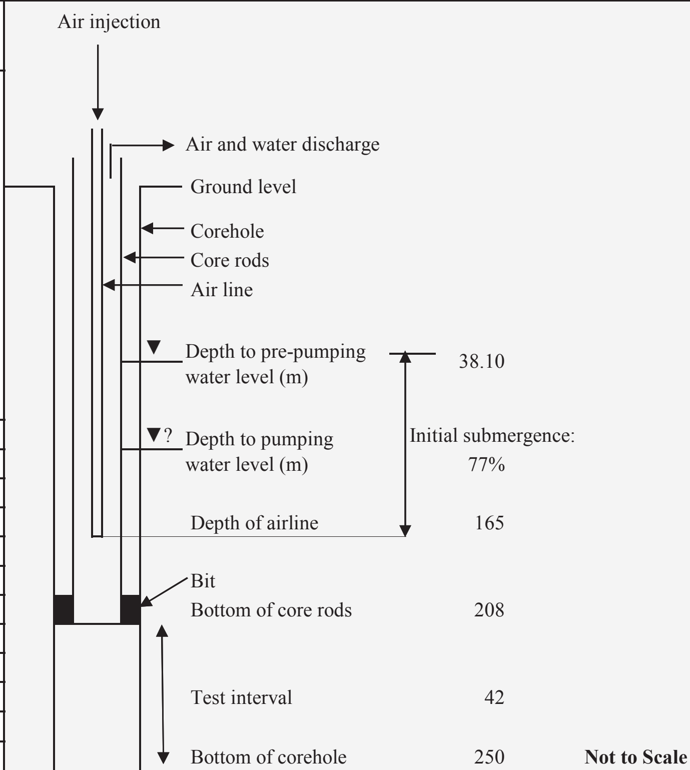
Q_{ave}	48.7	Discharge (m^3/d)
Δs	16.52	Drawdown (m)
T	5.4E-01	m^2/d
b	72.0	Test zone thickness (m)
K	7.5E-03	m/d

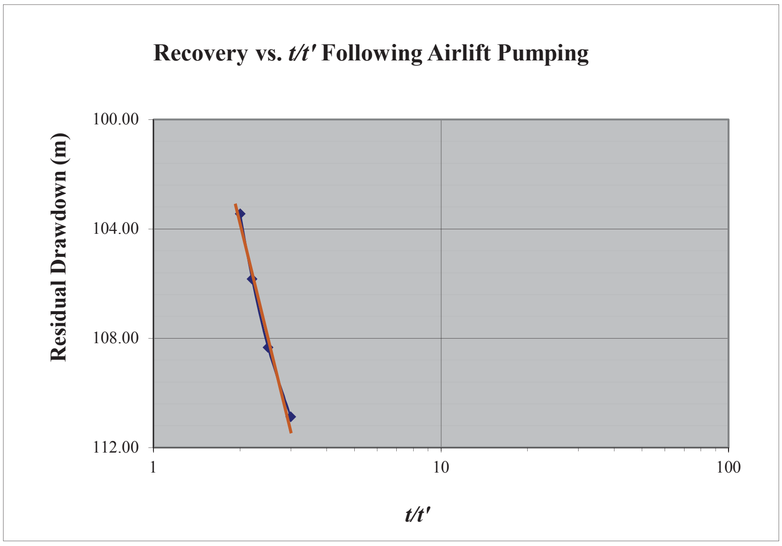
Analysis of HTH06 (Test 3) Airlift Pumping and Recovery Data

Corehole Depth (m):	250.0	Pre-Pumping WL (m):	38.1
Core Rod Depth (m):	208.0	Depth of Airline (m):	165.0

Data	t (mins)	t' (mins)	t/t'	Q (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			2.1		
	5					
	7					
	10					
	15					
	20					
	25					
	30					
	40					
	50					
	60					
			Q_{ave}	2.1		
Recovery	63	3	21.0			
	65	5	13.0			
	67	7	9.6			
	70	10	7.0			
	75	15	5.0			
	80	20	4.0			
	85	25	3.4			
	90	30	3.0		148.97	110.87
	100	40	2.5		146.44	108.34
	110	50	2.2		143.93	105.83
	120	60	2.0		141.55	103.45

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

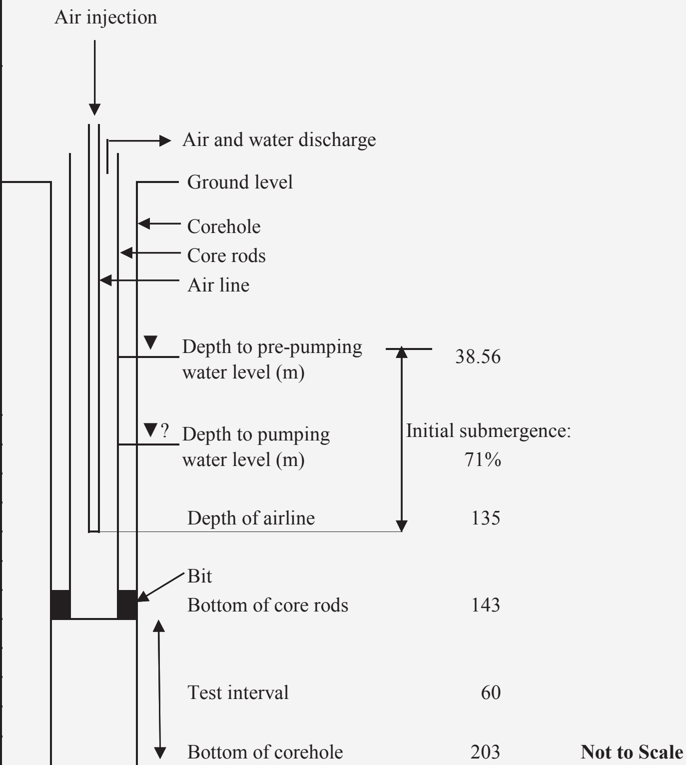
Q_{ave}	50.9	Discharge (m^3/d)
Δs	7.42	Drawdown (m)
T	1.3E+00	m^2/d
b	42.0	Test zone thickness (m)
K	3.0E-02	m/d

Analysis of HTH06 (Test 2) Airlift Pumping and Recovery Data

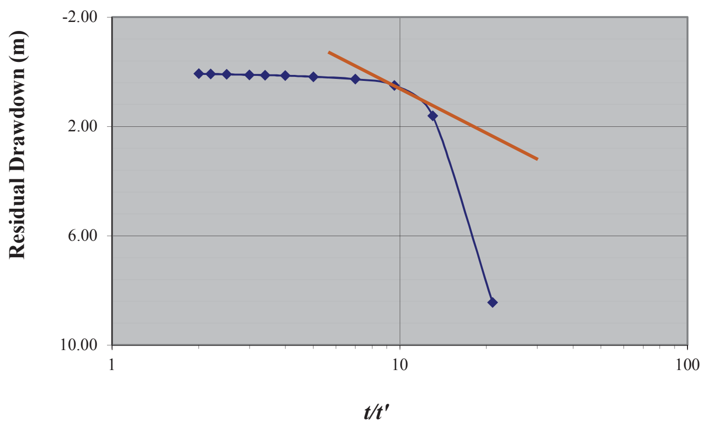
Corehole Depth (m):	**203.0**		**Pre-Pumping WL (m):**	**38.6**		
Core Rod Depth (m):	**143.0**		**Depth of Airline (m):**	**135.0**		

Data	***t*** **(mins)**	***t'*** **(mins)**	***t/t'***	***Q*** **(m^3/hr)**	**Depth to Water (m)**	**Residual Drawdown (m)**
Pumping	--			--		
	3			10.3		
	5			12.2		
	7			10.3		
	10			10.3		
	15			10.3		
	20			8.5		
	25			8.5		
	30			8.5		
	40			8.5		
	50			8.5		
	60			8.5		
			Q_{ave}	9.5		
Recovery	63	3	21.0		47.00	8.44
	65	5	13.0		40.17	1.61
	67	7	9.6		39.06	0.50
	70	10	7.0		38.83	0.27
	75	15	5.0		38.74	0.18
	80	20	4.0		38.70	0.14
	85	25	3.4		38.68	0.12
	90	30	3.0		38.67	0.11
	100	40	2.5		38.65	0.09
	110	50	2.2		38.64	0.08
	120	60	2.0		38.63	0.07

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

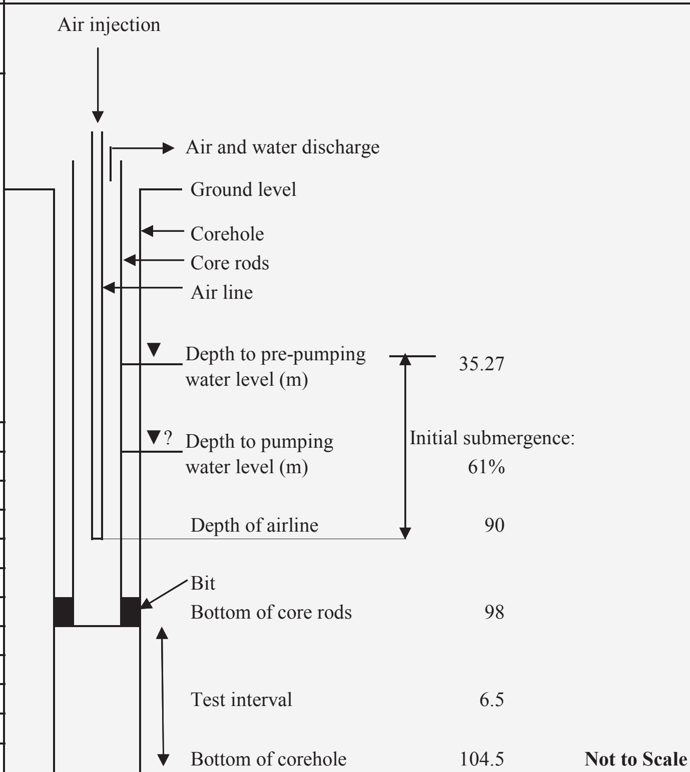
Q_{ave}	227.1	Discharge (m^3/d)
Δs	1.11	Drawdown (m)
T	3.7E+01	m^2/d
b	60.0	Test zone thickness (m)
K	6.2E-01	m/d

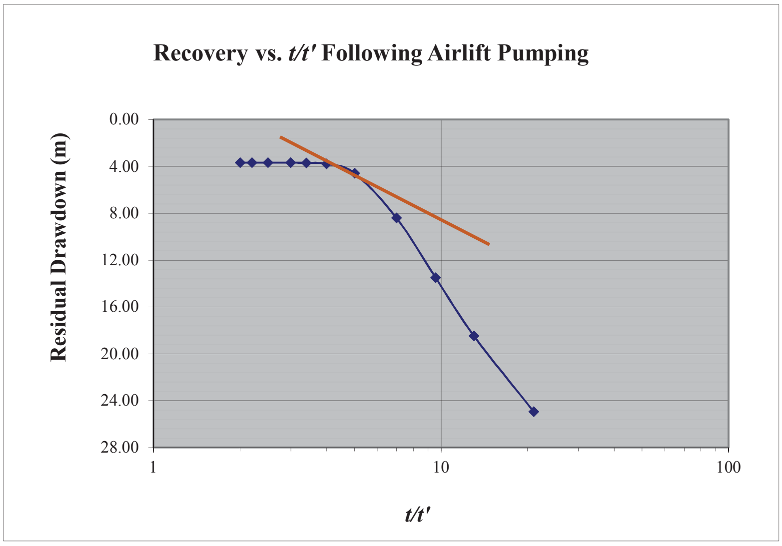
Analysis of HTH06 (Test 1) Airlift Pumping and Recovery Data

Corehole Depth (m):	104.5	Pre-Pumping WL (m):	35.3
Core Rod Depth (m):	98.0	Depth of Airline (m):	90.0

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			2.1		
	5			2.1		
	7			2.1		
	10			2.1		
	15			2.1		
	20			2.1		
	25			2.1		
	30			2.1		
	40			2.1		
	50			2.1		
	60			2.1		
			Q_{ave}	2.1		
Recovery	63	3	21.0		60.21	24.94
	65	5	13.0		53.73	18.46
	67	7	9.6		48.76	13.49
	70	10	7.0		43.67	8.40
	75	15	5.0		39.85	4.58
	80	20	4.0		39.05	3.78
	85	25	3.4		38.97	3.70
	90	30	3.0		38.95	3.68
	100	40	2.5		38.95	3.68
	110	50	2.2		38.95	3.68
	120	60	2.0		38.95	3.68

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

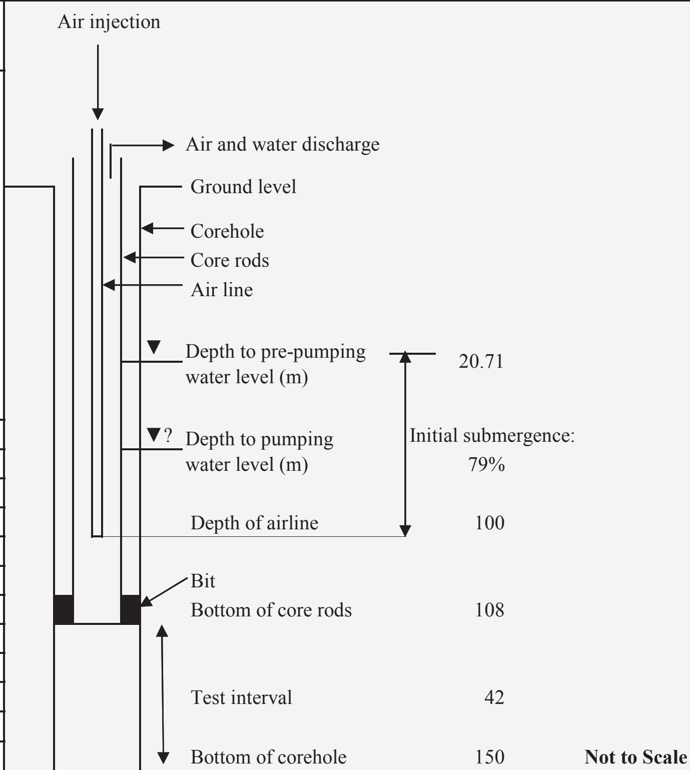
Q_{ave}	50.4	Discharge (m^3/d)
Δs	0.80	Drawdown (m)
T	1.2E+01	m^2/d
b	6.5	Test zone thickness (m)
K	1.8E+00	m/d

Analysis of HTH05 (Test 2) Airlift Pumping and Recovery Data

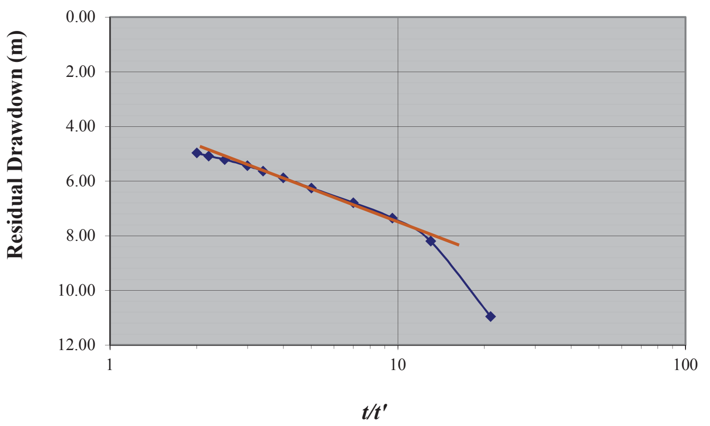
Corehole Depth (m):	150.0	Pre-Pumping WL (m):	20.7
Core Rod Depth (m):	108.0	Depth of Airline (m):	100.0

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			2.1		
	5			2.1		
	7			2.1		
	10			2.1		
	15			2.1		
	20			2.1		
	25			2.1		
	30			2.1		
	40			2.1		
	50			2.1		
	60			2.1		
			Q_{ave}	2.1		
Recovery	63	3	21.0		31.66	10.95
	65	5	13.0		28.91	8.20
	67	7	9.6		28.06	7.35
	70	10	7.0		27.50	6.79
	75	15	5.0		26.96	6.25
	80	20	4.0		26.59	5.88
	85	25	3.4		26.34	5.63
	90	30	3.0		26.15	5.44
	100	40	2.5		25.92	5.21
	110	50	2.2		25.79	5.08
	120	60	2.0		25.68	4.97

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

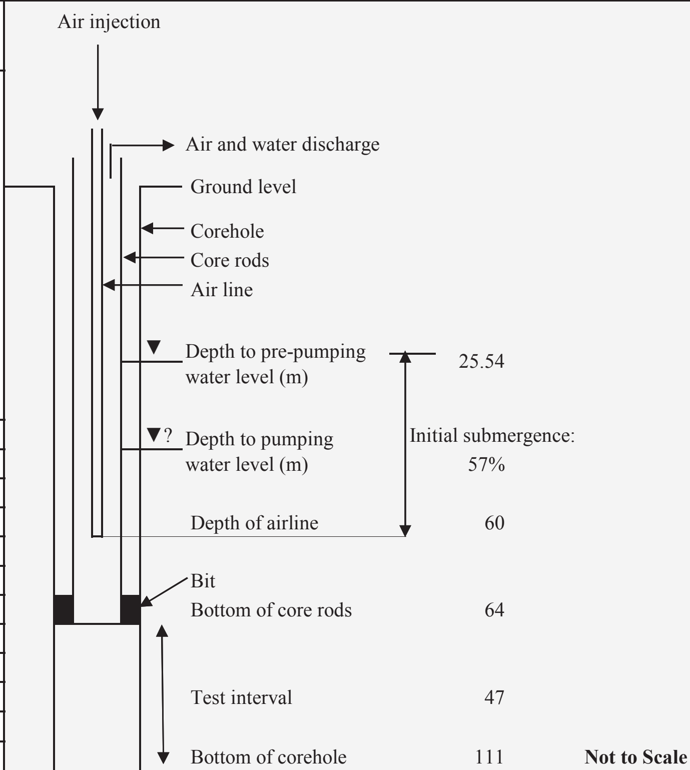
Q_{ave}	50.4	Discharge (m^3/d)
Δs	2.27	Drawdown (m)
T	4.1E+00	m^2/d
b	42.0	Test zone thickness (m)
K	9.7E-02	m/d

Analysis of HTH05 (Test 1) Airlift Pumping and Recovery Data

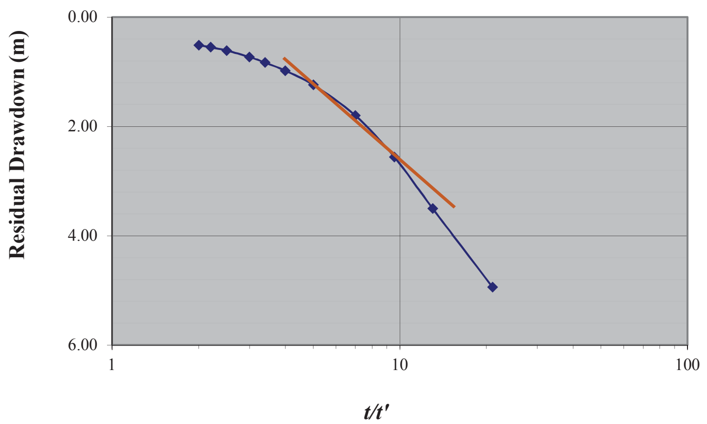
Corehole Depth (m):	111.0	Pre-Pumping WL (m):	25.5
Core Rod Depth (m):	64.0	Depth of Airline (m):	60.0

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			2.1		
	5			2.1		
	7			2.1		
	10			2.1		
	15			2.1		
	20			2.1		
	25			2.1		
	30			2.1		
	40			2.1		
	50			2.1		
	60			2.1		
			Q_{ave}	2.1		
Recovery	63	3	21.0		30.48	4.94
	65	5	13.0		29.04	3.50
	67	7	9.6		28.10	2.56
	70	10	7.0		27.34	1.80
	75	15	5.0		26.78	1.24
	80	20	4.0		26.52	0.98
	85	25	3.4		26.37	0.83
	90	30	3.0		26.27	0.73
	100	40	2.5		26.15	0.61
	110	50	2.2		26.09	0.55
	120	60	2.0		26.05	0.51

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

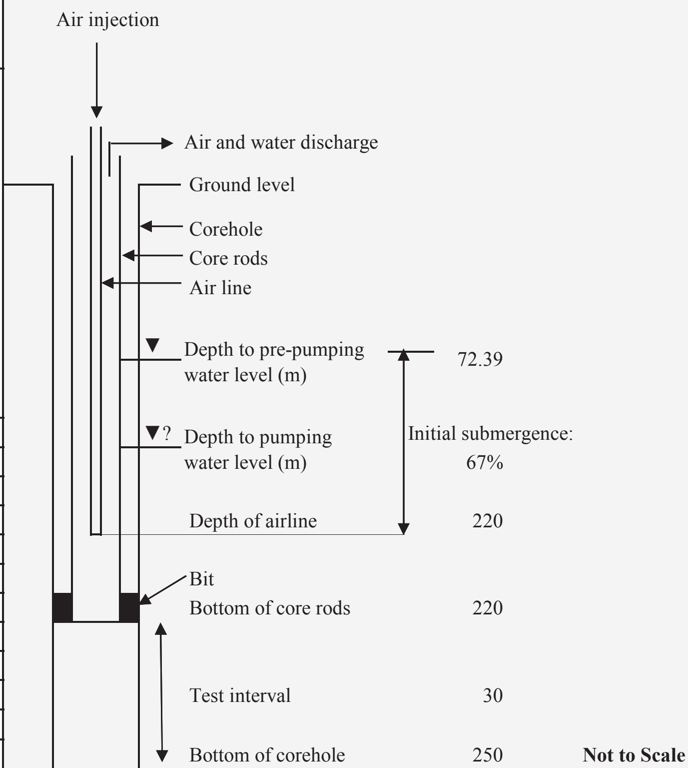
Q_{ave}	50.4	Discharge (m^3/d)
Δs	1.32	Drawdown (m)
T	7.0E+00	m^2/d
b	47.0	Test zone thickness (m)
K	1.5E-01	m/d

Analysis of HTH04 (Test 3) Airlift Pumping and Recovery Data

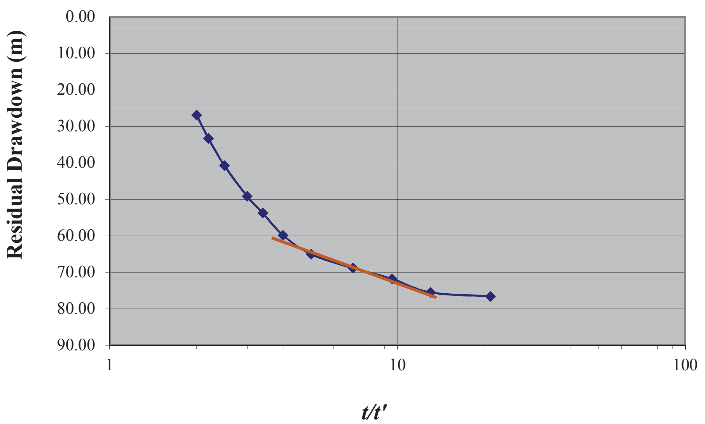
Corehole Depth (m):	250.0	Pre-Pumping WL (m):	72.4
Core Rod Depth (m):	220.0	Depth of Airline (m):	220.0

Data	t (mins)	t' (mins)	t/t'	Q (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			1.1		
	5			1.1		
	7			1.1		
	10			1.1		
	15			1.1		
	20			1.1		
	25			1.1		
	30			1.1		
	40			1.1		
	50			1.1		
	60			1.1		
			Q_{ave}	1.1		
Recovery	63	3	21.0		149.00	76.61
	65	5	13.0		147.92	75.53
	67	7	9.6		144.21	71.82
	70	10	7.0		141.26	68.87
	75	15	5.0		137.46	65.07
	80	20	4.0		132.27	59.88
	85	25	3.4		126.16	53.77
	90	30	3.0		121.61	49.22
	100	40	2.5		113.12	40.73
	110	50	2.2		105.69	33.30
	120	60	2.0		99.25	26.86

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

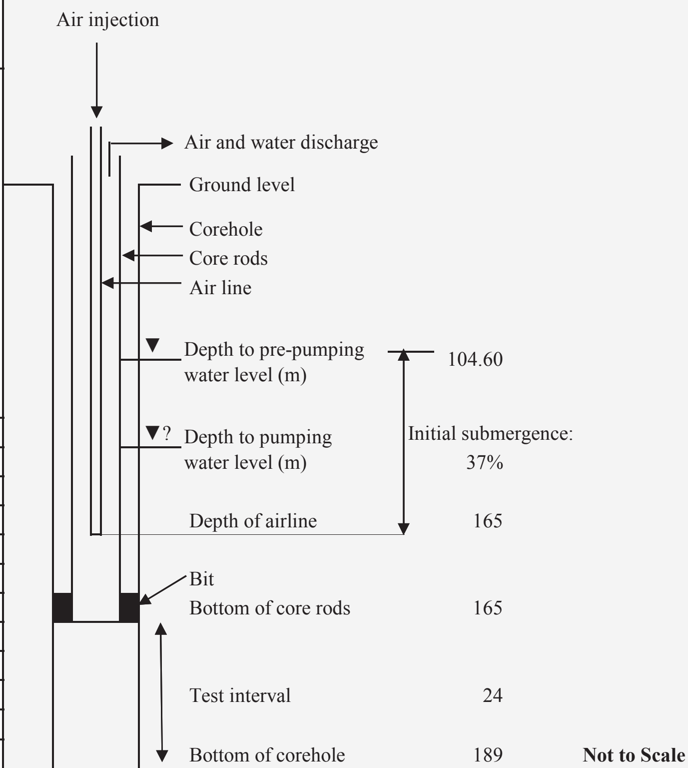
Q_{ave}	26.4	Discharge (m^3/d)
Δs	19.65	Drawdown (m)
T	2.5E-01	m^2/d
b	30.0	Test zone thickness (m)
K	8.2E-03	m/d

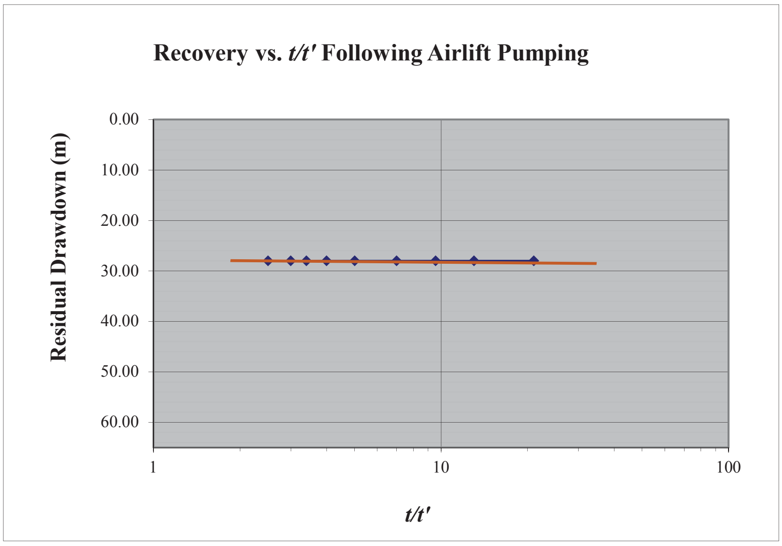
Analysis of HTH04 (Test 2) Airlift Pumping and Recovery Data

Corehole Depth (m):	189.0	Pre-Pumping WL (m):	104.6
Core Rod Depth (m):	165.0	Depth of Airline (m):	165.0

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			1.1		
	5			1.1		
	7			1.1		
	10			1.1		
	15			1.1		
	20			1.1		
	25			1.1		
	30			1.1		
	40					
	50					
	60					
			Q_{ave}	1.1		
Recovery	63	3	21.0		132.60	28.00
	65	5	13.0		132.60	28.00
	67	7	9.6		132.60	28.00
	70	10	7.0		132.60	28.00
	75	15	5.0		132.59	27.99
	80	20	4.0		132.59	27.99
	85	25	3.4		132.59	27.99
	90	30	3.0		132.59	27.99
	100	40	2.5		132.59	27.99
	110	50	2.2			
	120	60	2.0			

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

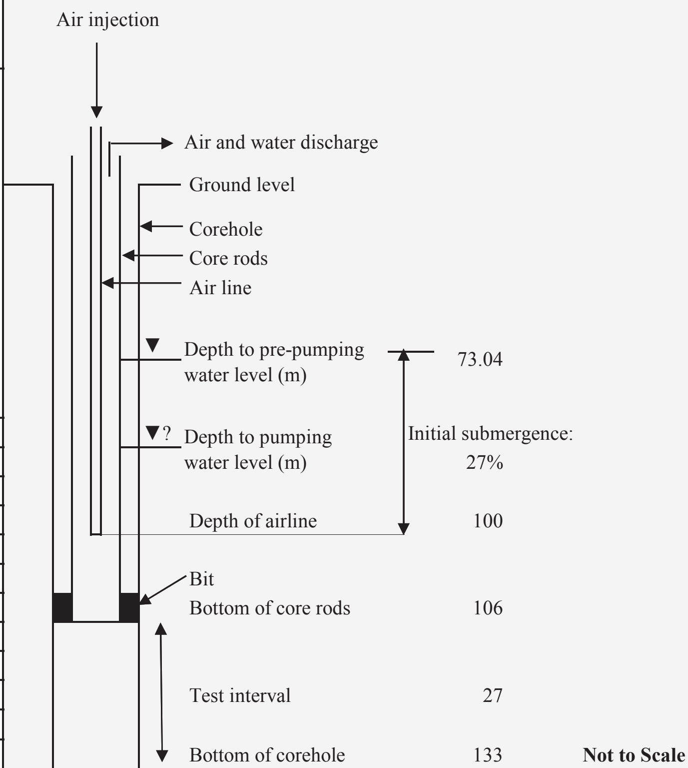
Q_{ave}	26.4	Discharge (m^3/d)
Δs	0.01	Drawdown (m)
T	4.8E+02	m^2/d
b	24.0	Test zone thickness (m)
K	2.0E+01	m/d

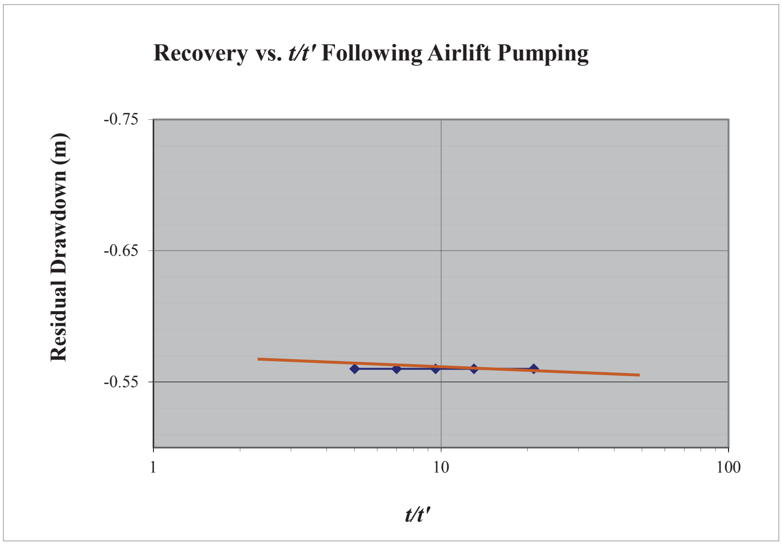
Analysis of HTH04 (Test 1) Airlift Pumping and Recovery Data

Corehole Depth (m):	133.0	Pre-Pumping WL (m):	73.0
Core Rod Depth (m):	106.0	Depth of Airline (m):	100.0

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			3.1		
	5			3.1		
	7			3.1		
	10			3.1		
	15			3.1		
	20			3.1		
	25			3.1		
	30			3.1		
	40			3.1		
	50			3.1		
	60			3.1		
			Q_{ave}	3.1		
Recovery	63	3	21.0		72.48	-0.56
	65	5	13.0		72.48	-0.56
	67	7	9.6		72.48	-0.56
	70	10	7.0		72.48	-0.56
	75	15	5.0		72.48	-0.56
	80	20	4.0			
	85	25	3.4			
	90	30	3.0			
	100	40	2.5			
	110	50	2.2			
	120	60	2.0			

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

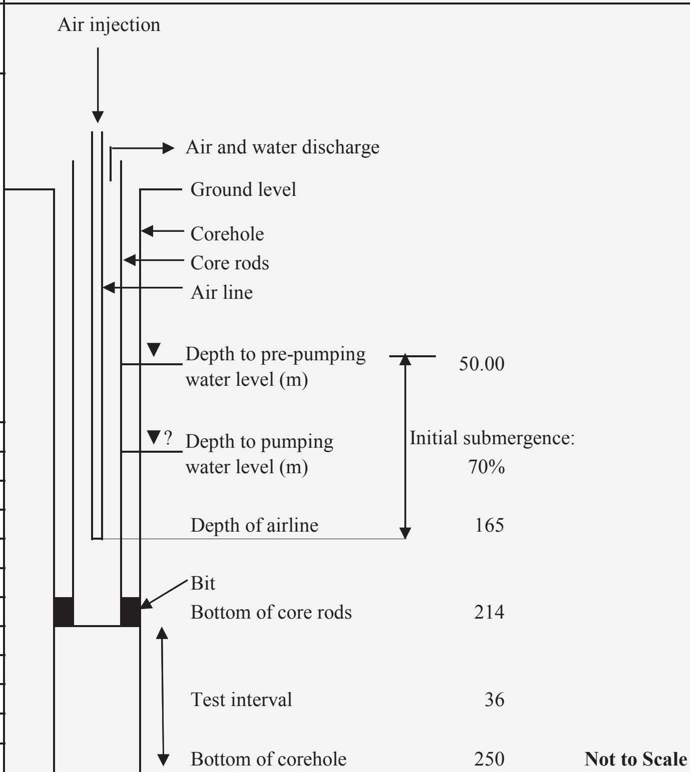
Q_{ave}	74.9	Discharge (m^3/d)
Δs	0.01	Drawdown (m)
T	1.4E+03	m^2/d
b	27.0	Test zone thickness (m)
K	5.1E+01	m/d

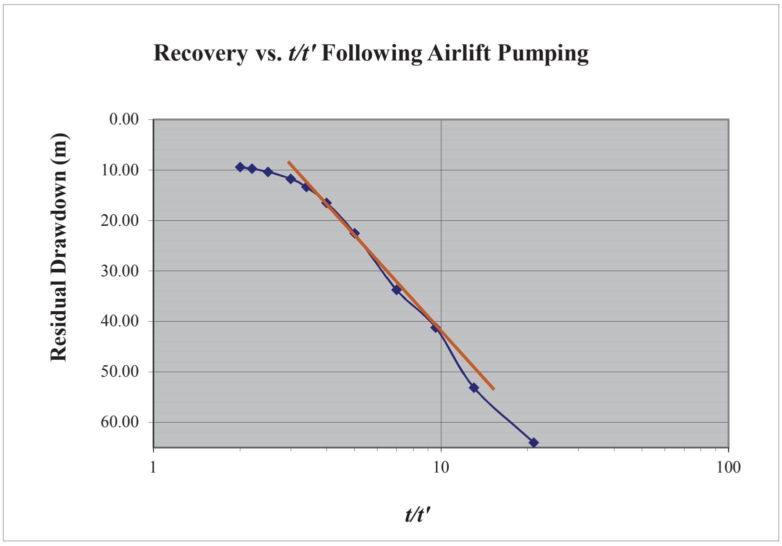
Analysis of HTH03 (Test 4) Airlift Pumping and Recovery Data

Corehole Depth (m):	**250.0**	**Pre-Pumping WL (m):**	**50.0**
Core Rod Depth (m):	**214.0**	**Depth of Airline (m):**	**165.0**

Data	***t* (mins)**	***t'* (mins)**	***t/t'***	***Q* (m^3/hr)**	**Depth to Water (m)**	**Residual Drawdown (m)**
Pumping	--			--		
	3			2.1		
	5			2.1		
	7			1.3		
	10			0.8		
	15			0.8		
	20			0.8		
	25			0.8		
	30			0.8		
	40			0.8		
	50			0.8		
	60			0.8		
			***Q** ave*	1.1		
Recovery	63	3	21.0		114.00	64.00
	65	5	13.0		103.11	53.11
	67	7	9.6		91.19	41.19
	70	10	7.0		83.75	33.75
	75	15	5.0		72.54	22.54
	80	20	4.0		66.50	16.50
	85	25	3.4		63.37	13.37
	90	30	3.0		61.73	11.73
	100	40	2.5		60.36	10.36
	110	50	2.2		59.76	9.76
	120	60	2.0		59.41	9.41

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

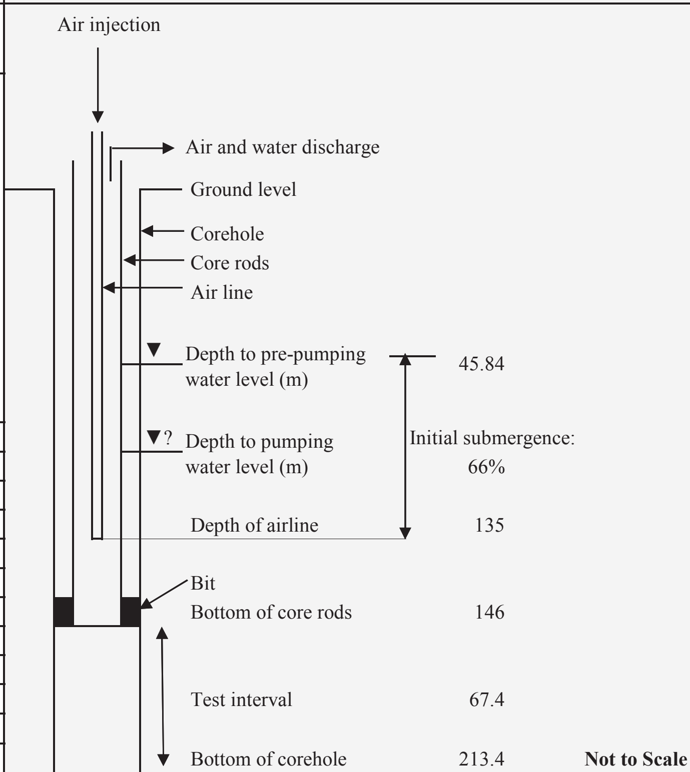
Q_{ave}	25.4	Discharge (m^3/d)
Δs	24.69	Drawdown (m)
T	1.9E-01	m^2/d
b	36.0	Test zone thickness (m)
K	5.2E-03	m/d

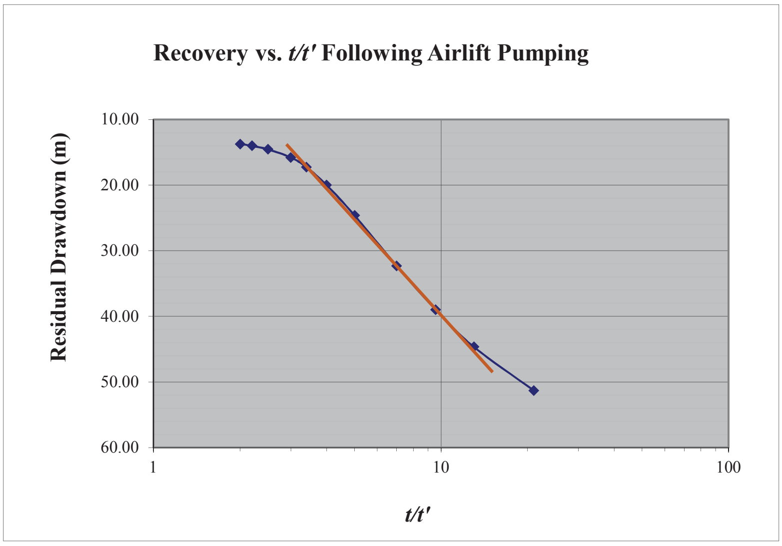
Analysis of HTH03 (Test 3) Airlift Pumping and Recovery Data

Corehole Depth (m): 213.4	**Pre-Pumping WL (m):** 45.8
Core Rod Depth (m): 146.0	**Depth of Airline (m):** 135.0

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			2.1		
	5			2.1		
	7			2.1		
	10			2.1		
	15			2.1		
	20			2.1		
	25			2.1		
	30			2.1		
	40			2.1		
	50			2.1		
	60			2.1		
			Q_{ave}	2.1		
Recovery	63	3	21.0		97.14	51.30
	65	5	13.0		90.49	44.65
	67	7	9.6		84.81	38.97
	70	10	7.0		78.12	32.28
	75	15	5.0		70.45	24.61
	80	20	4.0		65.83	19.99
	85	25	3.4		63.07	17.23
	90	30	3.0		61.62	15.78
	100	40	2.5		60.37	14.53
	110	50	2.2		59.84	14.00
	120	60	2.0		59.55	13.71

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

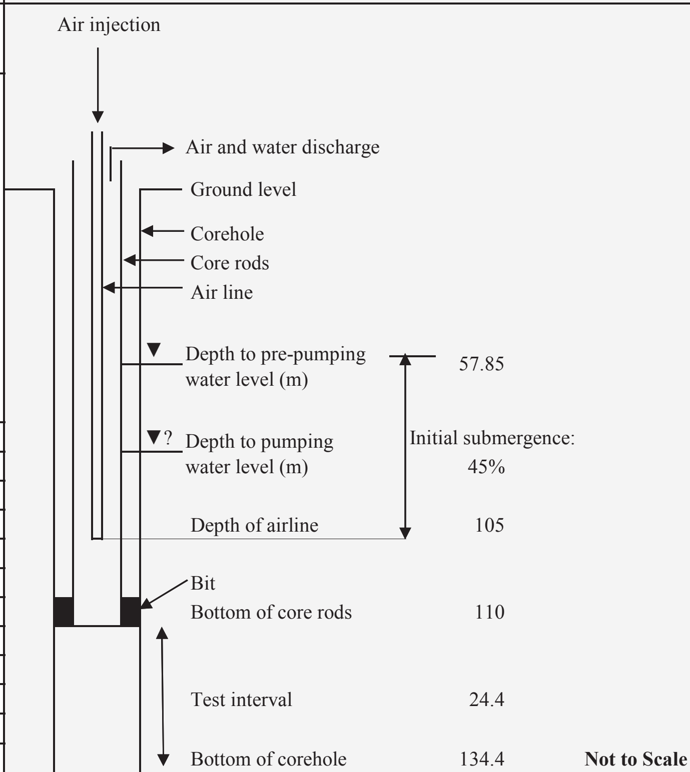
Q_{ave}	50.4	Discharge (m^3/d)
Δs	21.74	Drawdown (m)
T	4.2E-01	m^2/d
b	67.4	Test zone thickness (m)
K	6.3E-03	m/d

Analysis of HTH03 (Test 2) Airlift Pumping and Recovery Data

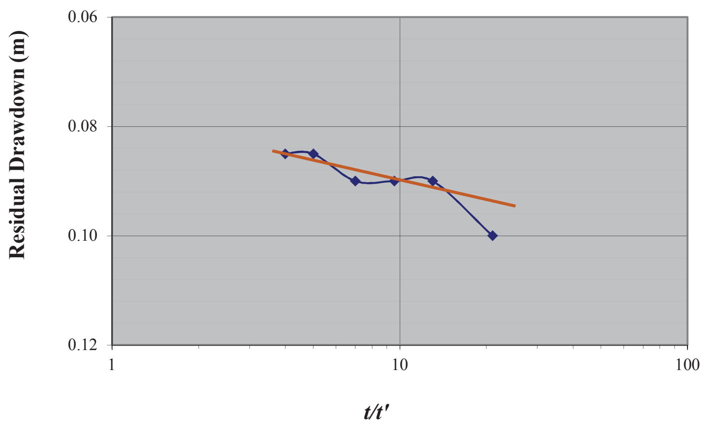
Corehole Depth (m):	134.4	Pre-Pumping WL (m):	57.9
Core Rod Depth (m):	110.0	Depth of Airline (m):	105.0

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			8.5		
	5			10.3		
	7			10.3		
	10			10.3		
	15			10.3		
	20			10.3		
	25			10.3		
	30			10.3		
	40			10.3		
	50			10.3		
	60			10.3		
			Q_{ave}	10.1		
Recovery	63	3	21.0		57.95	0.10
	65	5	13.0		57.94	0.09
	67	7	9.6		57.94	0.09
	70	10	7.0		57.94	0.09
	75	15	5.0		57.94	0.09
	80	20	4.0		57.94	0.09
	85	25	3.4			
	90	30	3.0			
	100	40	2.5			
	110	50	2.2			
	120	60	2.0			

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

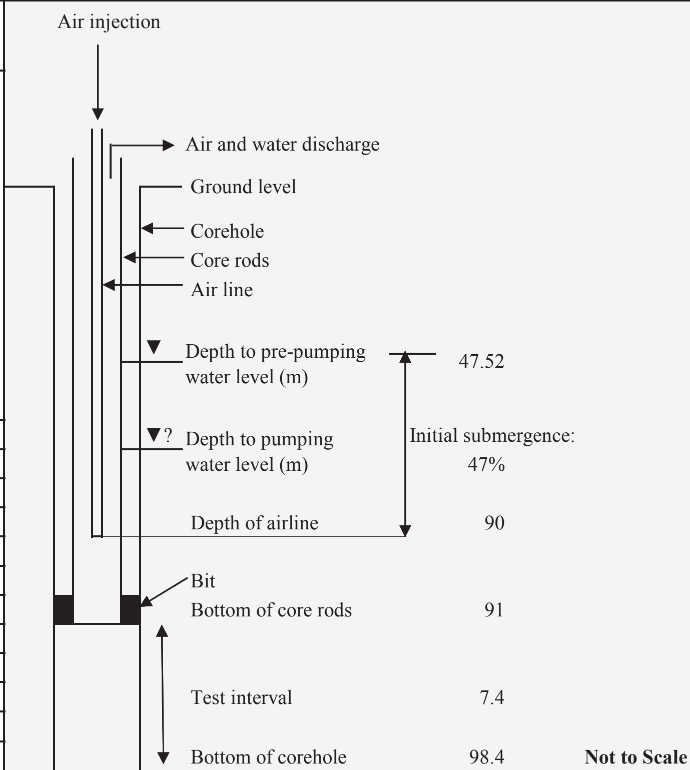
Q_{ave}	242.1	Discharge (m^3/d)
Δs	0.02	Drawdown (m)
T	3.0E+03	m^2/d
b	24.4	Test zone thickness (m)
K	1.2E+02	m/d

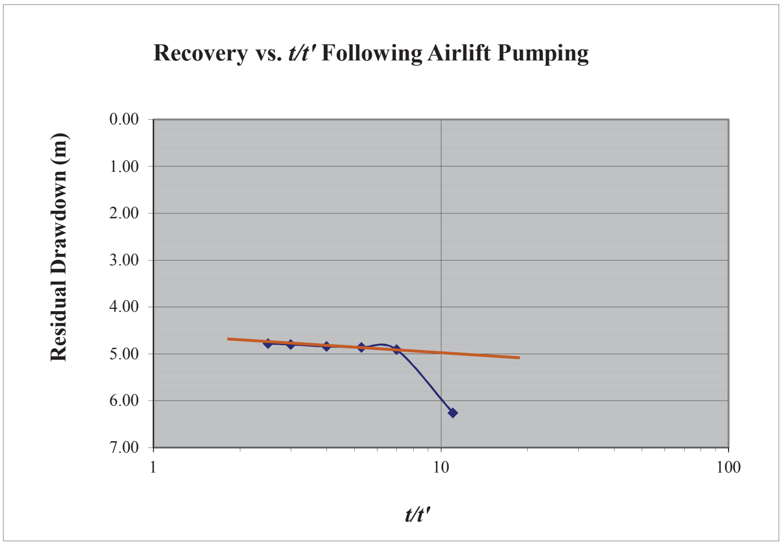
Analysis of HTH03 (Test 1) Airlift Pumping and Recovery Data

Corehole Depth (m):	98.4	Pre-Pumping WL (m):	47.5
Core Rod Depth (m):	91.0	Depth of Airline (m):	90.0

Data	t (mins)	t' (mins)	t/t'	Q (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			5.4		
	5			6.9		
	7			6.9		
	10			6.9		
	15			6.9		
	20			6.9		
	25			6.9		
	30			6.9		
			Q_{ave}	6.7		
Recovery	33	3	11.0		53.78	6.26
	35	5	7.0		52.43	4.91
	37	7	5.3		52.38	4.86
	40	10	4.0		52.36	4.84
	45	15	3.0		52.32	4.80
	50	20	2.5		52.30	4.78
	55	25	2.2			
	60	30	2.0			

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

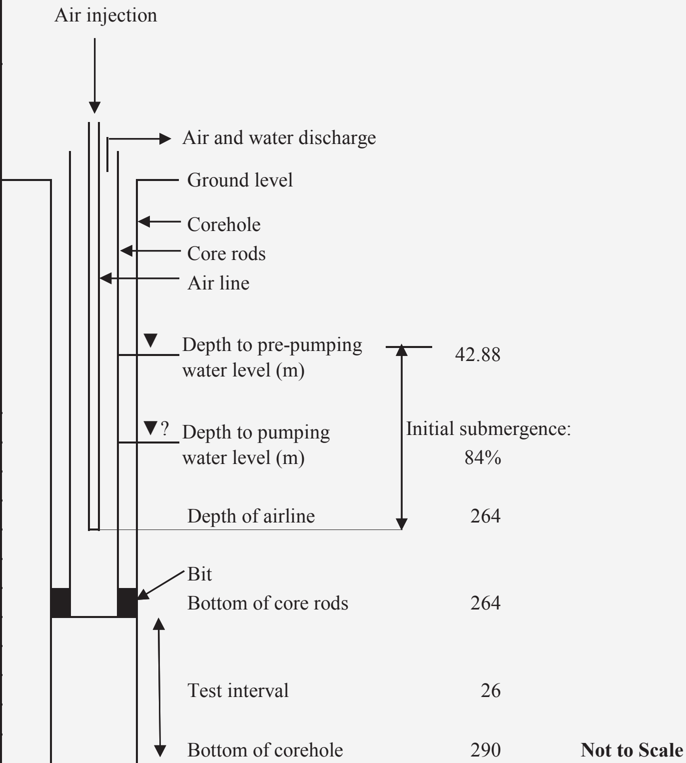
Q_{ave}	160.4	Discharge (m^3/d)
Δs	0.13	Drawdown (m)
T	2.3E+02	m^2/d
b	7.4	Test zone thickness (m)
K	3.1E+01	m/d

Analysis of HTH02 (Test 3) Airlift Pumping and Recovery Data

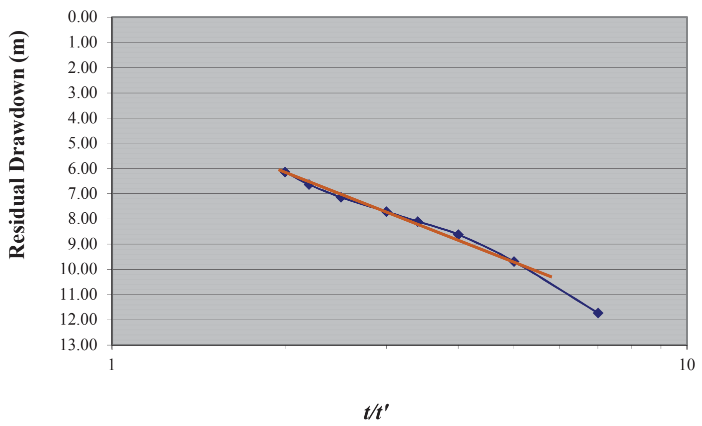
Corehole Depth (m):	**290.0**	**Pre-Pumping WL (m):**	**42.9**
Core Rod Depth (m):	**264.0**	**Depth of Airline (m):**	**264.0**

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			5.4		
	5			19.1		
	7			19.1		
	10			19.1		
	15			24.6		
	20			24.6		
	25			24.6		
	30			24.6		
	40			21.7		
	50			21.7		
	60			21.7		
			Q_{ave}	20.5		
Recovery	63	3	21.0		62.32	19.44
	65	5	13.0		59.71	16.83
	67	7	9.6		56.89	14.01
	70	10	7.0		54.61	11.73
	75	15	5.0		52.57	9.69
	80	20	4.0		51.50	8.62
	85	25	3.4		50.98	8.10
	90	30	3.0		50.59	7.71
	100	40	2.5		50.02	7.14
	110	50	2.2		49.51	6.63
	120	60	2.0		49.02	6.14

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

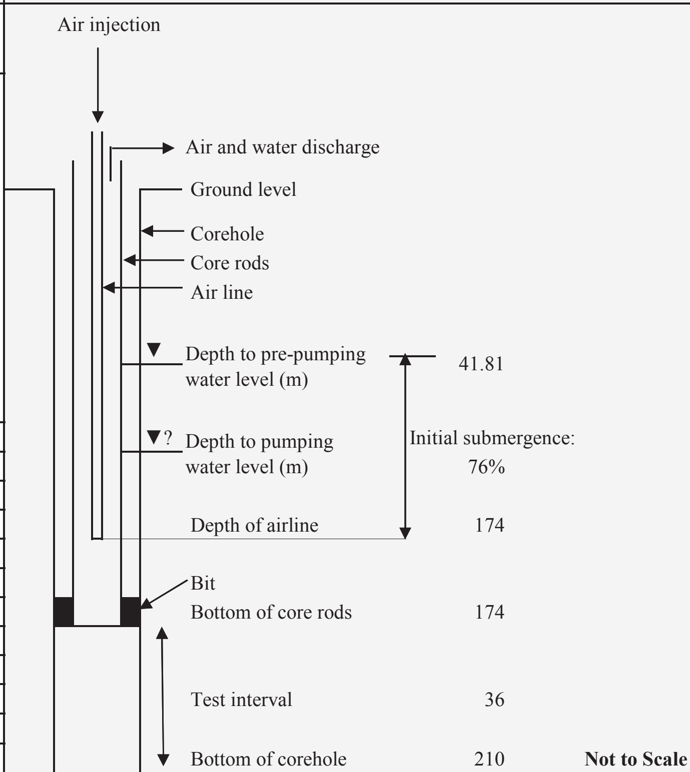
Q_{ave}	492.8	Discharge (m^3/d)
Δs	12.81	Drawdown (m)
T	7.0E+00	m^2/d
b	26.0	Test zone thickness (m)
K	2.7E-01	m/d

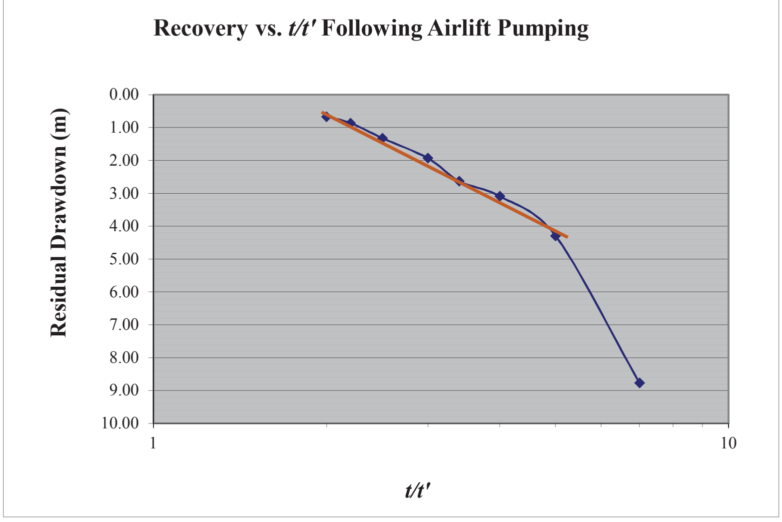
Analysis of HTH02 (Test 2) Airlift Pumping and Recovery Data

Corehole Depth (m):	210.0	Pre-Pumping WL (m):	41.8
Core Rod Depth (m):	174.0	Depth of Airline (m):	174.0

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			4.2		
	5			4.2		
	7			51.0		
	10			19.1		
	15			8.5		
	20			8.5		
	25			6.9		
	30			6.9		
	40			6.9		
	50			6.9		
	60			6.9		
			Q_{ave}	11.8		
Recovery	63	3	21.0			
	65	5	13.0		71.09	29.28
	67	7	9.6		58.06	16.25
	70	10	7.0		50.58	8.77
	75	15	5.0		46.10	4.29
	80	20	4.0		44.90	3.09
	85	25	3.4		44.44	2.63
	90	30	3.0		43.74	1.93
	100	40	2.5		43.13	1.32
	110	50	2.2		42.67	0.86
	120	60	2.0		42.48	0.67

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

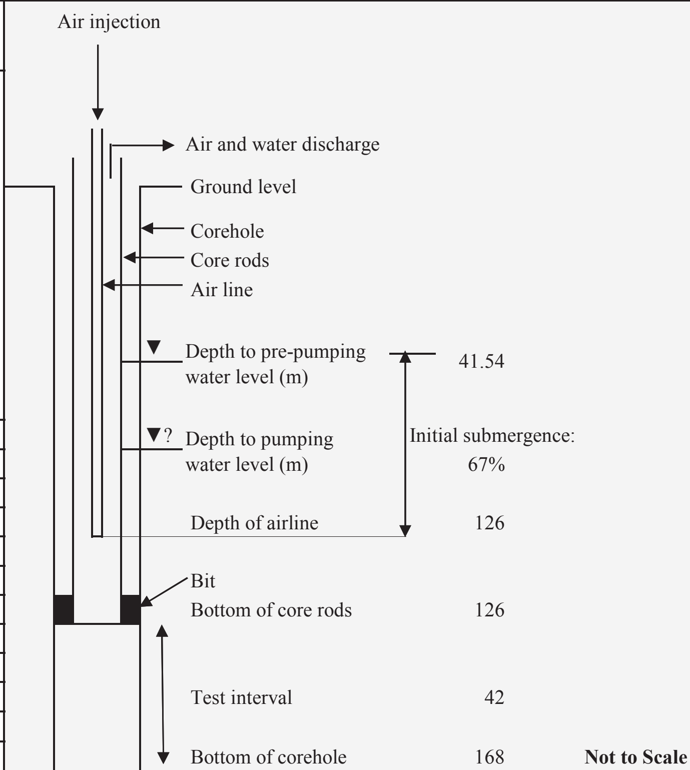
Q_{ave}	282.8	Discharge (m^3/d)
Δs	3.62	Drawdown (m)
T	1.4E+01	m^2/d
b	36.0	Test zone thickness (m)
K	4.0E-01	m/d

Analysis of HTH02 (Test 1) Airlift Pumping and Recovery Data

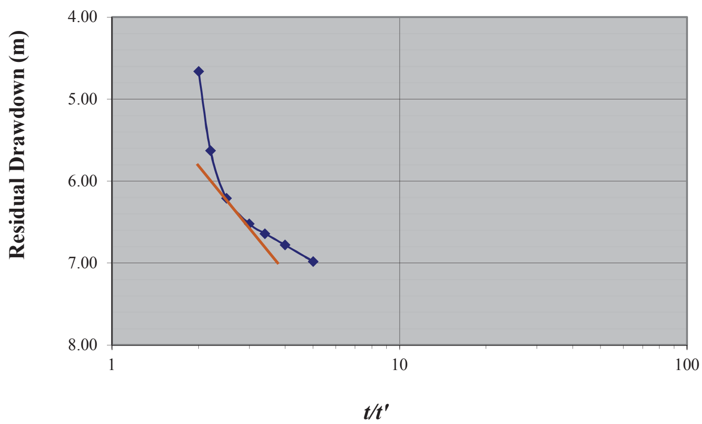
Corehole Depth (m):	168.0	Pre-Pumping WL (m):	41.5
Core Rod Depth (m):	126.0	Depth of Airline (m):	126.0

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			1.0		
	5			1.0		
	7			1.0		
	10			1.0		
	15			1.0		
	20			1.0		
	25			1.0		
	30			1.0		
	40			1.0		
	50			1.0		
	60			1.0		
			Q ave	1.0		
Recovery	63	3	21.0			
	65	5	13.0			
	67	7	9.6			
	70	10	7.0			
	75	15	5.0		48.52	6.98
	80	20	4.0		48.32	6.78
	85	25	3.4		48.18	6.64
	90	30	3.0		48.06	6.52
	100	40	2.5		47.75	6.21
	110	50	2.2		47.17	5.63
	120	60	2.0		46.20	4.66

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

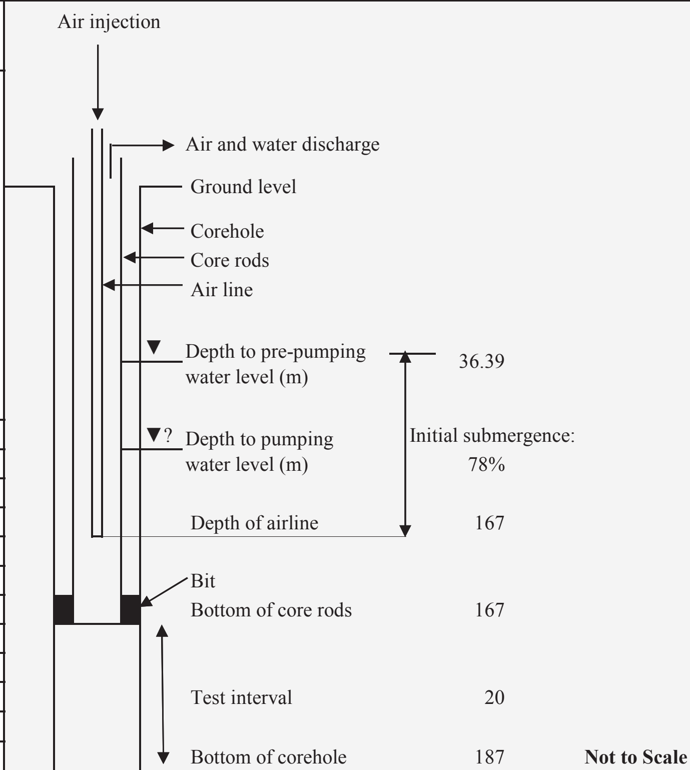
Q_{ave}	25.0	Discharge (m^3/d)
Δs	0.31	Drawdown (m)
T	1.5E+01	m^2/d
b	42.0	Test zone thickness (m)
K	3.5E-01	m/d

Analysis of HTH01 (Test 2) Airlift Pumping and Recovery Data

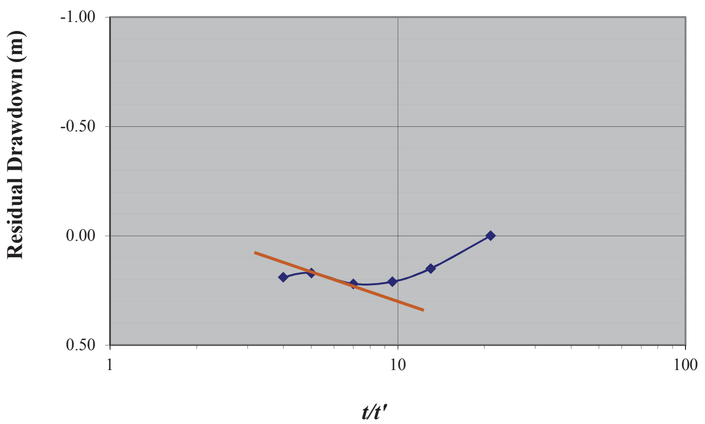
Corehole Depth (m):	**187.0**	**Pre-Pumping WL (m):**	**36.4**
Core Rod Depth (m):	**167.0**	**Depth of Airline (m):**	**167.0**

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			6.9		
	5			6.9		
	7			6.9		
	10			8.5		
	15			8.5		
	20			8.5		
	25			8.5		
	30			8.5		
	40			9.3		
	50			9.3		
	60			10.3		
			Q_{ave}	8.4		
Recovery	63	3	21.0		36.39	0.00
	65	5	13.0		36.54	0.15
	67	7	9.6		36.60	0.21
	70	10	7.0		36.61	0.22
	75	15	5.0		36.56	0.17
	80	20	4.0		36.58	0.19
	85	25	3.4			
	90	30	3.0			
	100	40	2.5			
	110	50	2.2			
	120	60	2.0			

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

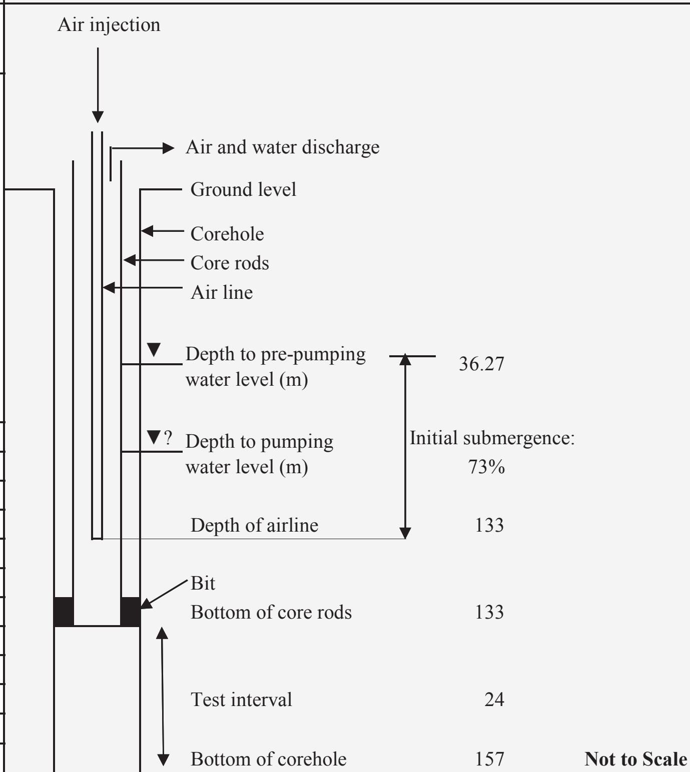
Q_{ave}	200.5	Discharge (m^3/d)
Δs	0.05	Drawdown (m)
T	7.3E+02	m^2/d
b	20.0	Test zone thickness (m)
K	3.7E+01	m/d

Analysis of HTH01 (Test 1) Airlift Pumping and Recovery Data

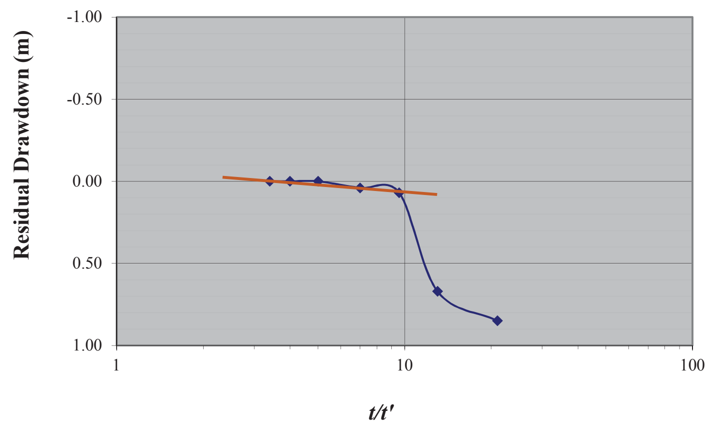
Corehole Depth (m):	157.0	Pre-Pumping WL (m):	36.3
Core Rod Depth (m):	133.0	Depth of Airline (m):	133.0

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			21.7		
	5			21.7		
	7			21.7		
	10			21.7		
	15			19.1		
	20			19.1		
	25			20.4		
	30			20.4		
	40			21.7		
	50			20.4		
	60			20.4		
			Q_{ave}	20.7		
Recovery	63	3	21.0		37.12	0.85
	65	5	13.0		36.94	0.67
	67	7	9.6		36.34	0.07
	70	10	7.0		36.31	0.04
	75	15	5.0		36.27	0.00
	80	20	4.0		36.27	0.00
	85	25	3.4		36.27	0.00
	90	30	3.0			
	100	40	2.5			
	110	50	2.2			
	120	60	2.0			

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

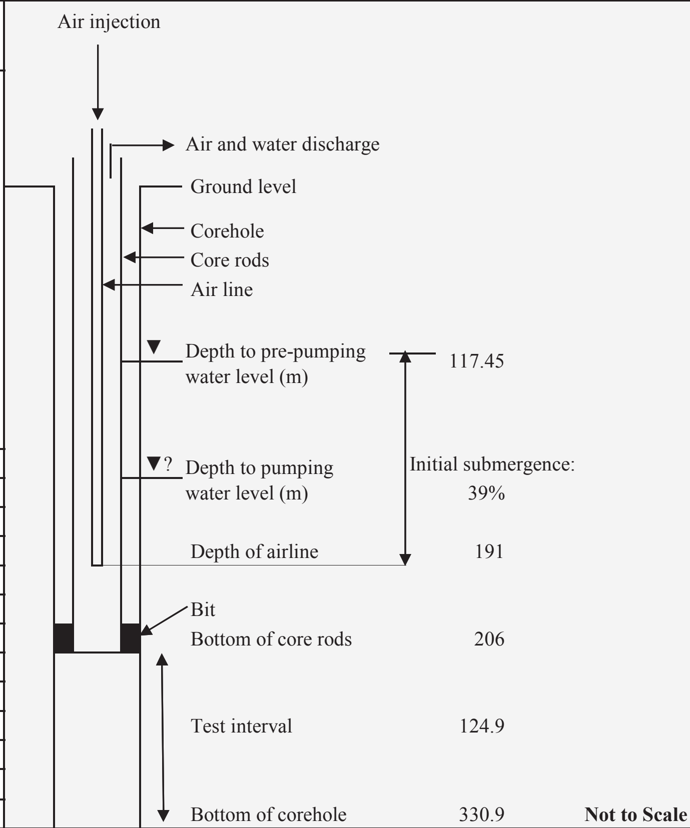
Q_{ave}	497.4	Discharge (m^3/d)
Δs	0.07	Drawdown (m)
T	1.3E+03	m^2/d
b	24.0	Test zone thickness (m)
K	5.4E+01	m/d

Analysis of KSV17004 Airlift Pumping and Recovery Data

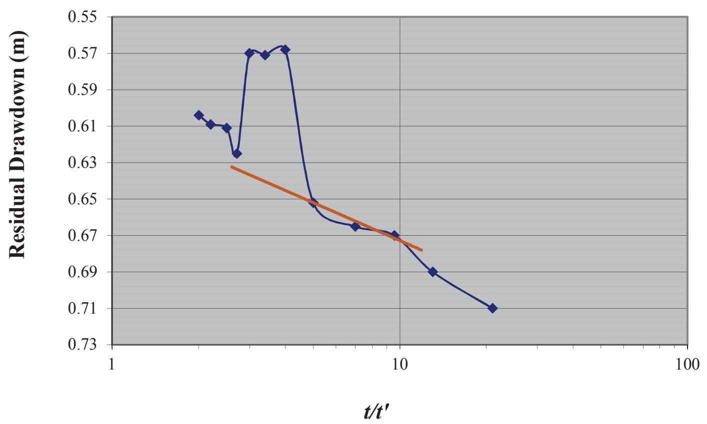
Corehole Depth (m):	330.9	Pre-Pumping WL (m):	117.5
Core Rod Depth (m):	206.0	Depth of Airline (m):	191.0

Data	*t* (mins)	*t′* (mins)	*t/t′*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			0.5		
	5			0.5		
	7			0.5		
	10			0.5		
	15			0.5		
	20			0.5		
	25			0.5		
	30			0.5		
	35			0.5		
	40			0.5		
	50			0.5		
	60			0.5		
			Q_{ave}	0.5		
Recovery	63	3	21.0		118.16	0.71
	65	5	13.0		118.14	0.69
	67	7	9.6		118.12	0.67
	70	10	7.0		118.12	0.66
	75	15	5.0		118.10	0.65
	80	20	4.0		118.02	0.57
	85	25	3.4		118.02	0.57
	90	30	3.0		118.02	0.57
	95	35	2.7		118.08	0.63
	100	40	2.5		118.06	0.61
	110	50	2.2		118.06	0.61
	120	60	2.0		118.05	0.60

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t′* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

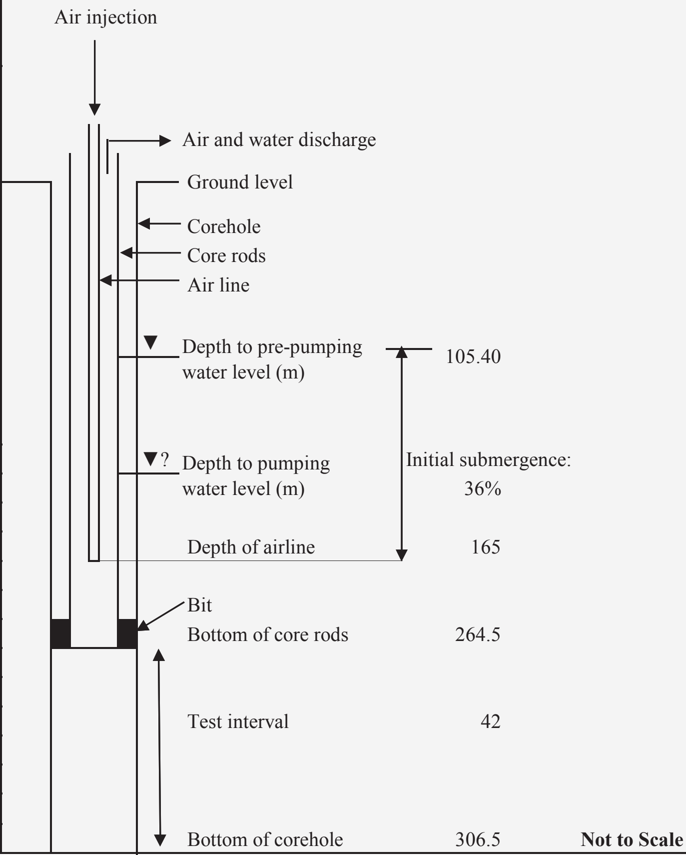
Q_{ave}	12.2	Discharge (m^3/d)
Δs	0.02	Drawdown (m)
T	1.1E+02	m^2/d
b	124.9	Test zone thickness (m)
K	9.0E-01	m/d

Analysis of KSV17005 (Test2) Airlift Pumping and Recovery Data

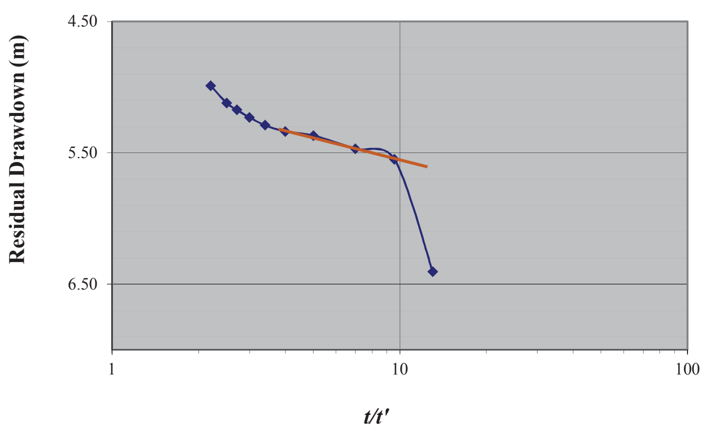
Corehole Depth (m):	**306.5**	**Pre-Pumping WL (m):**	**105.4**
Core Rod Depth (m):	**264.5**	**Depth of Airline (m):**	**165.0**

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			0.5		
	5			0.5		
	7			0.5		
	10			0.5		
	15			0.5		
	20			0.5		
	25			0.5		
	30			0.5		
	35			0.5		
	40			0.5		
	50			0.5		
	60			0.5		
			Q_{ave}	0.5		
Recovery	63	3	21.0			
	65	5	13.0		111.81	6.40
	67	7	9.6		110.95	5.55
	70	10	7.0		110.87	5.47
	75	15	5.0		110.77	5.37
	80	20	4.0		110.74	5.34
	85	25	3.4		110.69	5.29
	90	30	3.0		110.63	5.23
	95	35	2.7		110.57	5.17
	100	40	2.5		110.52	5.12
	110	50	2.2		110.39	4.99
	120	60	2.0		110.90	5.49

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

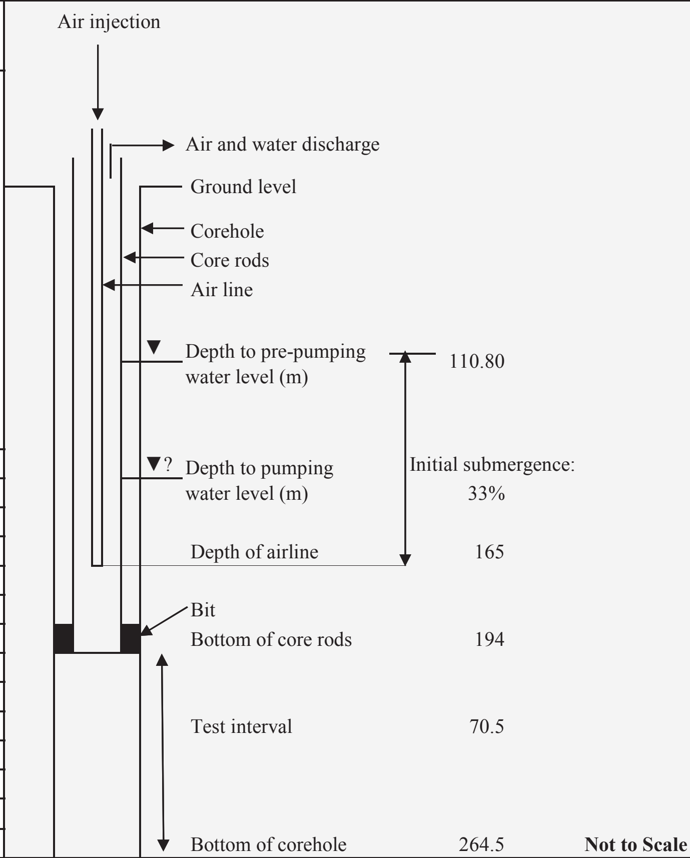
Q_{ave}	12.2	Discharge (m^3/d)
Δs	0.26	Drawdown (m)
T	8.6E+00	m^2/d
b	42.0	Test zone thickness (m)
K	2.1E-01	m/d

Analysis of KSV17005 (Test1) Airlift Pumping and Recovery Data

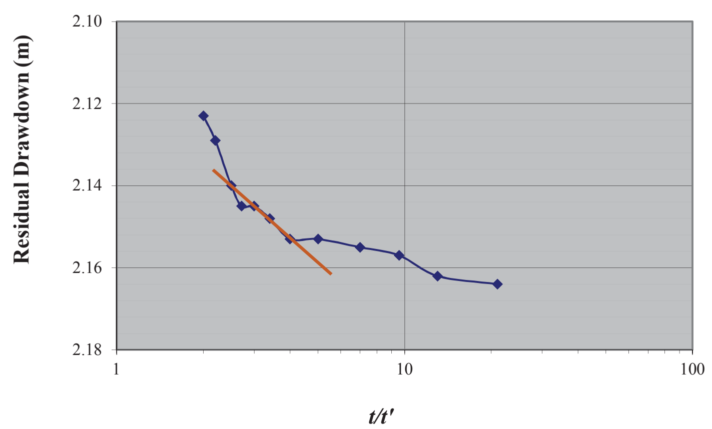
Corehole Depth (m):	264.5	Pre-Pumping WL (m):	110.8
Core Rod Depth (m):	194.0	Depth of Airline (m):	165.0

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			0.5		
	5			0.5		
	7			0.5		
	10			0.5		
	15			0.5		
	20			0.5		
	25			0.5		
	30			0.5		
	35					
	40					
	50					
	60					
			Q ave	0.5		
Recovery	63	3	21.0		112.97	2.16
	65	5	13.0		112.96	2.16
	67	7	9.6		112.96	2.16
	70	10	7.0		112.96	2.15
	75	15	5.0		112.96	2.15
	80	20	4.0		112.96	2.15
	85	25	3.4		112.95	2.15
	90	30	3.0		112.95	2.15
	95	35	2.7		112.95	2.15
	100	40	2.5		112.94	2.14
	110	50	2.2		112.93	2.13
	120	60	2.0		112.93	2.12

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t'* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

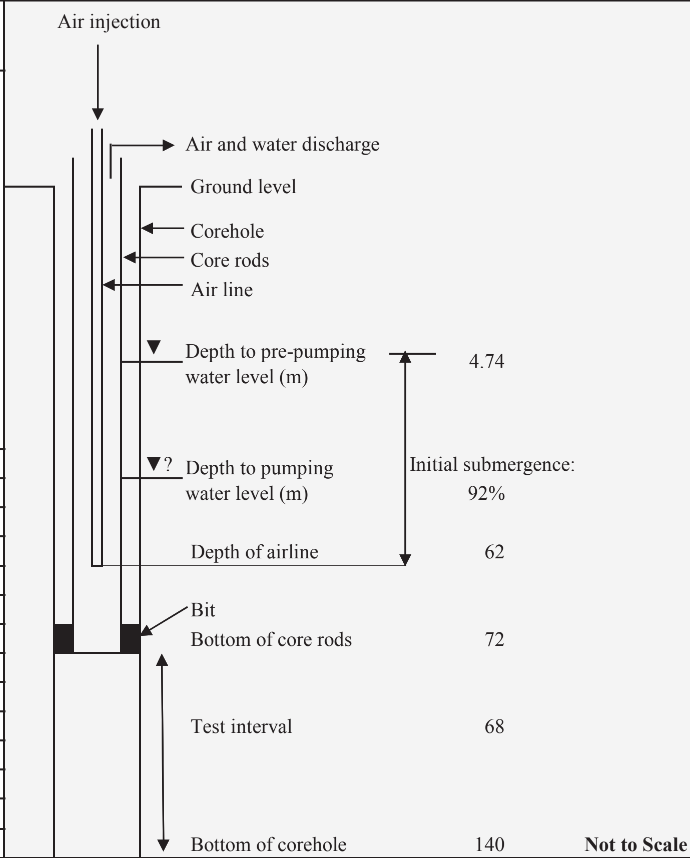
Q_{ave}	12.2	Discharge (m^3/d)
Δs	0.01	Drawdown (m)
T	1.7E+02	m^2/d
b	70.5	Test zone thickness (m)
K	2.4E+00	m/d

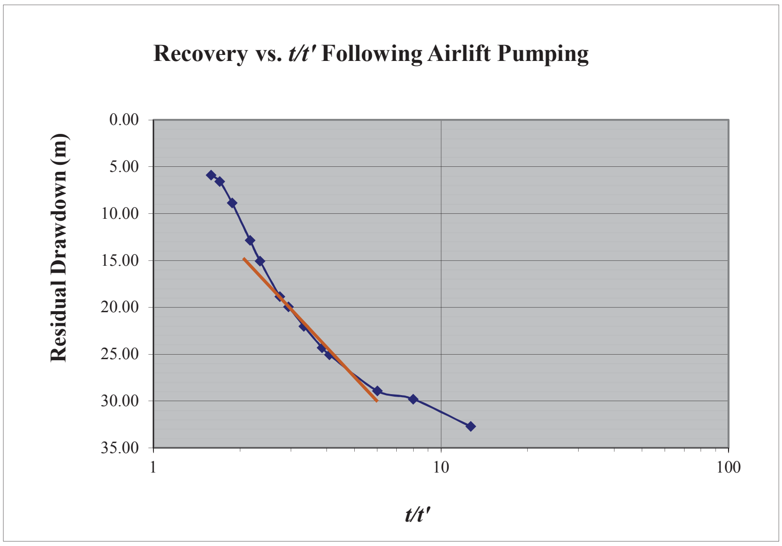
Analysis of KSVSS51 Airlift Pumping and Recovery Data

Corehole Depth (m):	140.0	Pre-Pumping WL (m):	4.7
Core Rod Depth (m):	72.0	Depth of Airline (m):	62.0

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	5			0.5		
	7			0.5		
	10			0.5		
	15			0.5		
	20			0.5		
	25			0.5		
	30			0.5		
	35			0.5		
			Q_{ave}	0.5		
Recovery	38	3	12.7		37.45	32.71
	40	5	8.0		34.53	29.79
	42	7	6.0		33.65	28.91
	46	11	4.1		29.80	25.06
	47	12	3.9		29.06	24.32
	50	15	3.3		26.76	22.02
	53	18	2.9		24.67	19.93
	55	20	2.7		23.59	18.85
	61	26	2.3		19.79	15.05
	65	30	2.2		17.60	12.86
	75	40	1.9		13.60	8.86
	85	50	1.7		11.30	6.56
	95	60	1.6		10.62	5.88

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

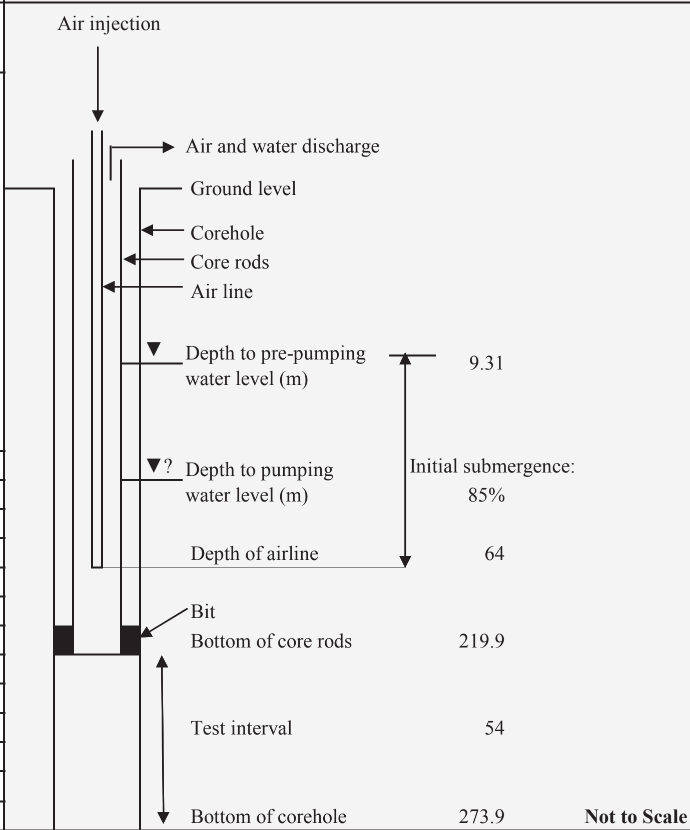
Q_{ave}	12.2	Discharge (m^3/d)
Δs	10.06	Drawdown (m)
T	2.2E-01	m^2/d
b	68.0	Test zone thickness (m)
K	3.3E-03	m/d

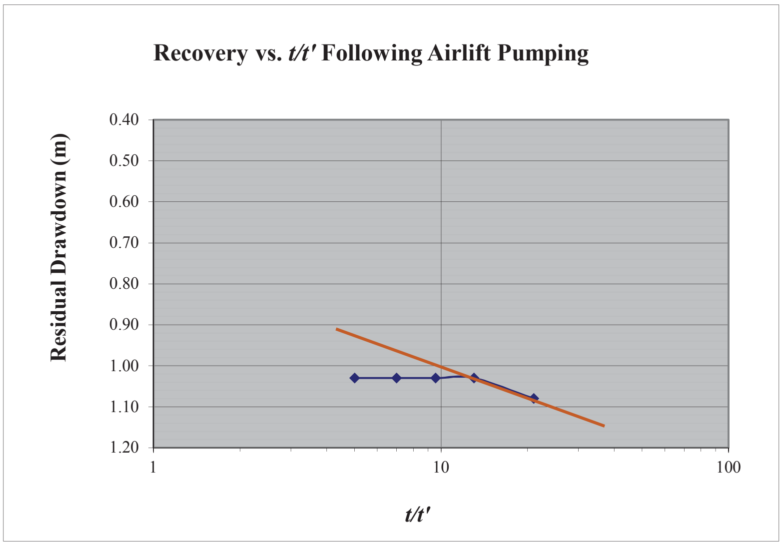
Analysis of KTCSS320 (Test 2) Airlift Pumping and Recovery Data

Corehole Depth (m):	273.9	Pre-Pumping WL (m):	9.3
Core Rod Depth (m):	219.9	Depth of Airline (m):	64.0

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			2.1		
	5			2.1		
	7			2.1		
	10			2.1		
	15			2.1		
	20			2.1		
	25			2.1		
	30			2.1		
	35			2.1		
	40			2.1		
	50			2.1		
	60			3.7		
			Q_{ave}	2.3		
Recovery	63	3	21.0		10.39	1.08
	65	5	13.0		10.34	1.03
	67	7	9.6		10.34	1.03
	70	10	7.0		10.34	1.03
	75	15	5.0		10.34	1.03
	80	20	4.0			
	85	25	3.4			
	90	30	3.0			
	95	35	2.7			
	100	40	2.5			
	110	50	2.2			
	120	60	2.0			

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

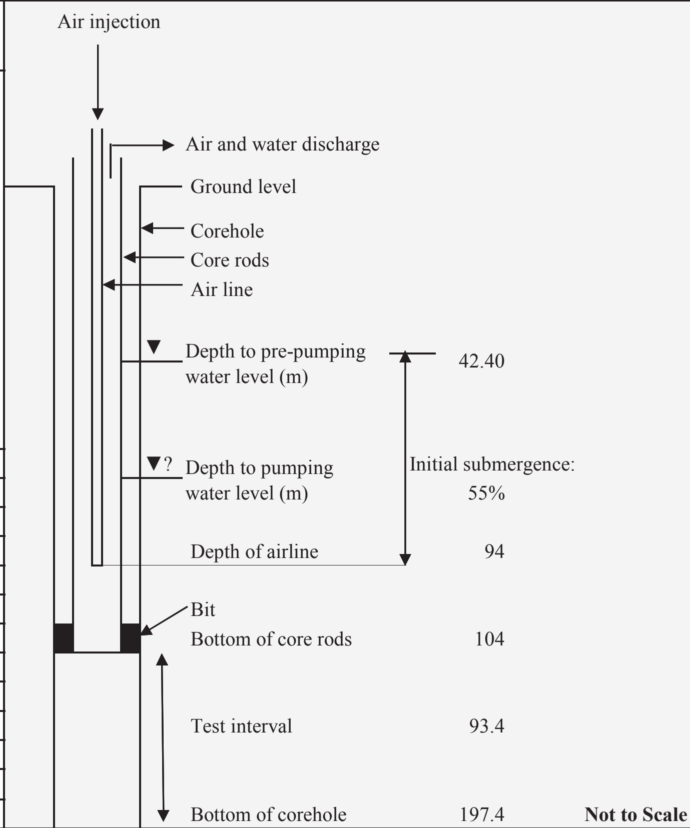
Q_{ave}	54.1	Discharge (m^3/d)
Δs	0.05	Drawdown (m)
T	2.0E+02	m^2/d
b	54.0	Test zone thickness (m)
K	3.7E+00	m/d

Analysis of KTCSS320 (Test 1) Airlift Pumping and Recovery Data

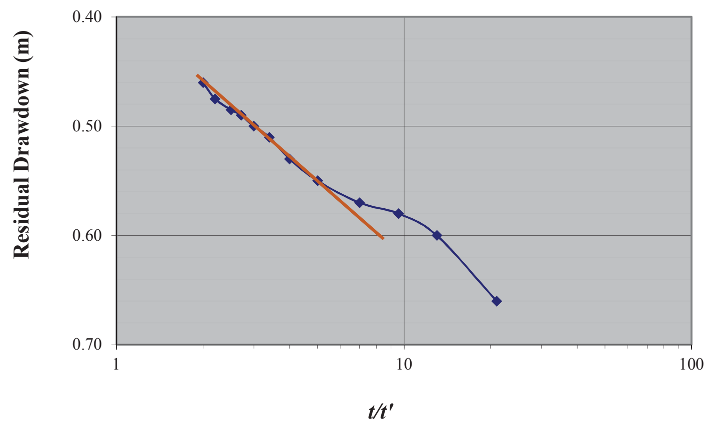
Corehole Depth (m):	197.4	Pre-Pumping WL (m):	42.4
Core Rod Depth (m):	104.0	Depth of Airline (m):	94.0

Data	*t* (mins)	*t′* (mins)	*t/t′*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			4.6		
	5			3.7		
	7			3.7		
	10			3.7		
	15			3.7		
	20			3.7		
	25			3.7		
	30			3.7		
	35			3.7		
	40			3.7		
	50			3.7		
	60			3.7		
			Q_{ave}	3.8		
Recovery	63	3	21.0		43.06	0.66
	65	5	13.0		43.00	0.60
	67	7	9.6		42.98	0.58
	70	10	7.0		42.97	0.57
	75	15	5.0		42.95	0.55
	80	20	4.0		42.93	0.53
	85	25	3.4		42.91	0.51
	90	30	3.0		42.90	0.50
	95	35	2.7		42.89	0.49
	100	40	2.5		42.89	0.48
	110	50	2.2		42.88	0.48
	120	60	2.0		42.86	0.46

Schematic Diagram of Airlift Pumping System



Recovery vs. *t/t′* Following Airlift Pumping



Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

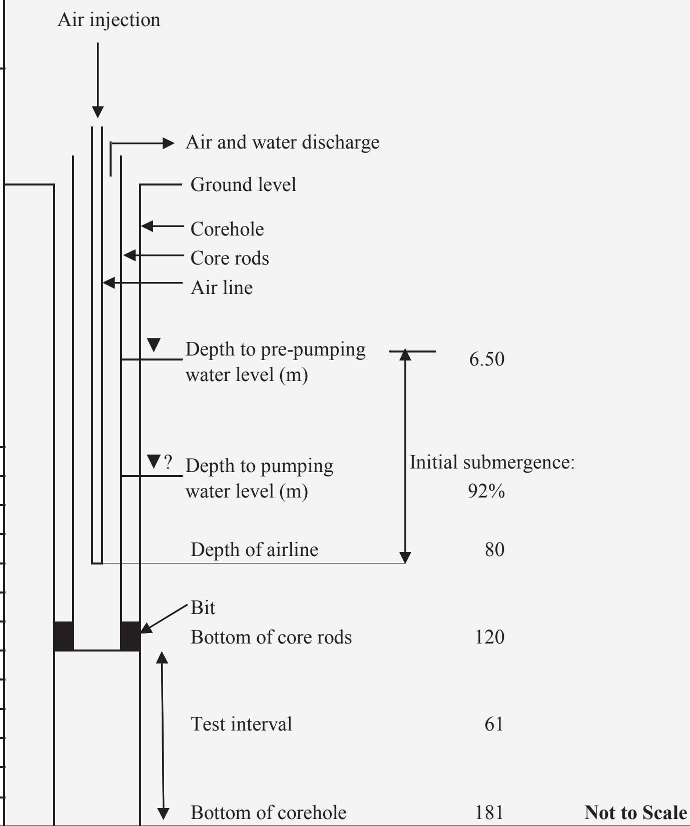
Q_{ave}	91.4	Discharge (m^3/d)
Δs	0.05	Drawdown (m)
T	3.3E+02	m^2/d
b	93.4	Test zone thickness (m)
K	3.6E+00	m/d

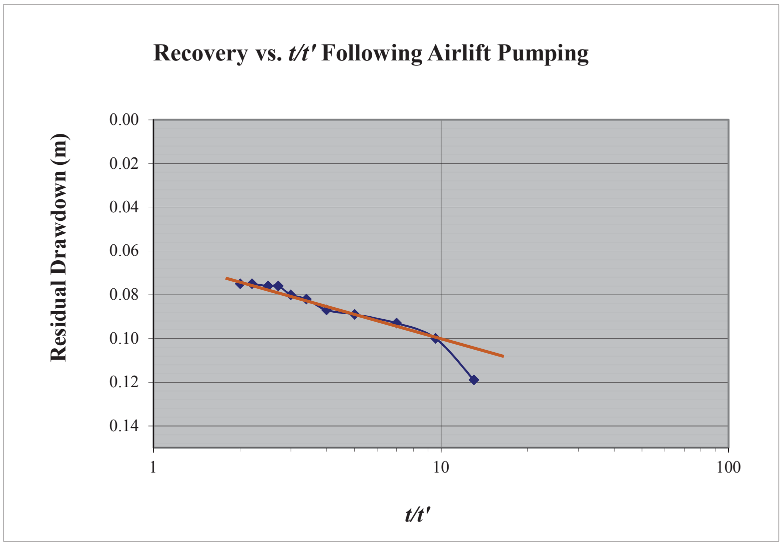
Analysis of KSV17002 (Test 1) Airlift Pumping and Recovery Data

Corehole Depth (m):	181.0	Pre-Pumping WL (m):	6.5
Core Rod Depth (m):	120.0	Depth of Airline (m):	80.0

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			6.6		
	5			6.6		
	7			5.2		
	10			5.2		
	15			5.2		
	20			5.2		
	25			5.2		
	30			4.6		
	35			4.6		
	40			5.2		
	50			4.0		
	60			5.2		
			Q_{ave}	5.3		
Recovery	63	3	21.0			
	65	5	13.0		6.62	0.12
	67	7	9.6		6.60	0.10
	70	10	7.0		6.60	0.09
	75	15	5.0		6.59	0.09
	80	20	4.0		6.59	0.09
	85	25	3.4		6.58	0.08
	90	30	3.0		6.58	0.08
	95	35	2.7		6.58	0.08
	100	40	2.5		6.58	0.08
	110	50	2.2		6.58	0.08
	120	60	2.0		6.58	0.08

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

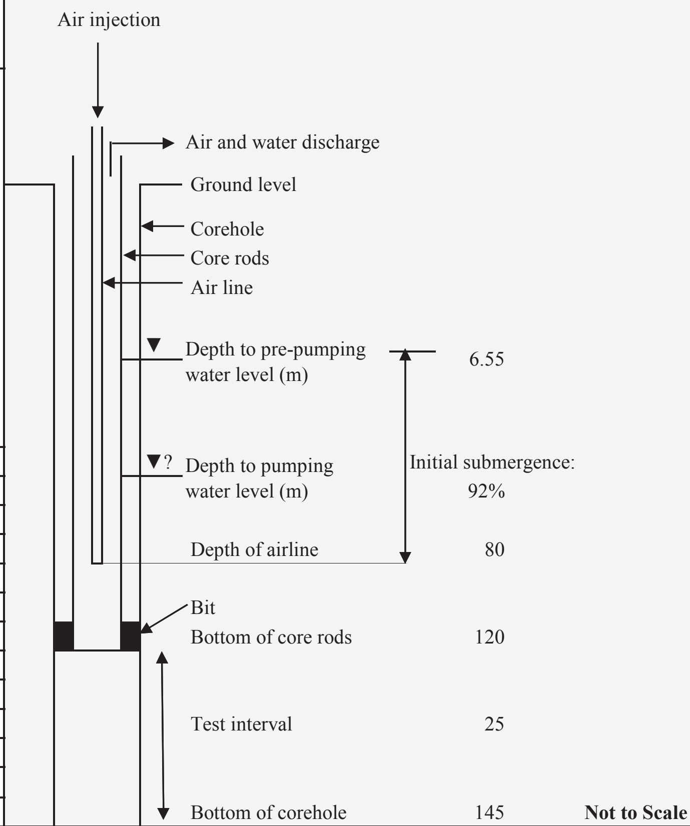
$$T = \frac{0.183Q}{\Delta s}$$

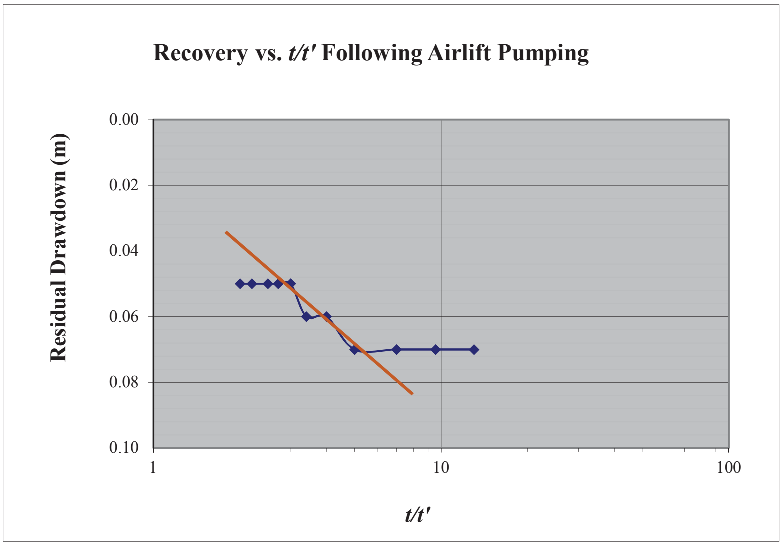
Q_{ave}	126.1	Discharge (m^3/d)
Δs	0.03	Drawdown (m)
T	9.2E+02	m^2/d
b	61.0	Test zone thickness (m)
K	1.5E+01	m/d

Analysis of KSV17003 (Test 1) Airlift Pumping and Recovery Data

Corehole Depth (m):	145			Pre-Pumping WL (m):	6.6		
Core Rod Depth (m):	120			Depth of Airline (m):	80.0		
Data	***t*** **(mins)**	***t'*** **(mins)**	***t/t'***	***Q*** **(m^3/hr)**	**Depth to Water (m)**	**Residual Drawdown (m)**	
Pumping	--			--			
	3			4.6			
	5			6.3			
	7			6.3			
	10			7.4			
	15			6.6			
	20			7.4			
	25			7.4			
	30			8.2			
	35			8.2			
	40			8.2			
	50			7.4			
	60			6.6			
			Q_{ave}	7.0			
Recovery	63	3	21.0				
	65	5	13.0		6.62	0.07	
	67	7	9.6		6.62	0.07	
	70	10	7.0		6.62	0.07	
	75	15	5.0		6.62	0.07	
	80	20	4.0		6.61	0.06	
	85	25	3.4		6.61	0.06	
	90	30	3.0		6.60	0.05	
	95	35	2.7		6.60	0.05	
	100	40	2.5		6.60	0.05	
	110	50	2.2		6.60	0.05	
	120	60	2.0		6.60	0.05	

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

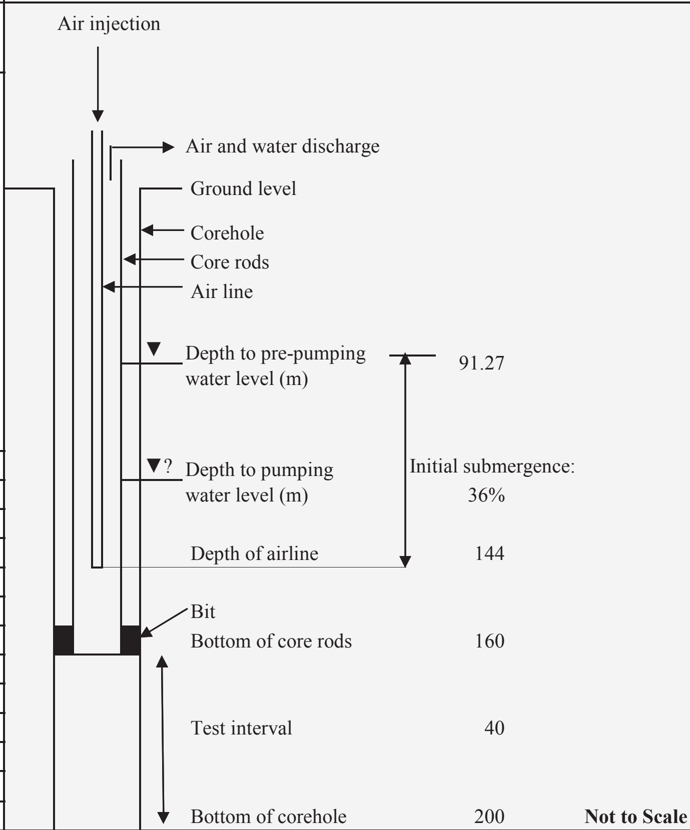
Q_{ave}	168.9	Discharge (m^3/d)
Δs	0.02	Drawdown (m)
T	1.5E+03	m^2/d
b	25.0	Test zone thickness (m)
K	6.2E+01	m/d

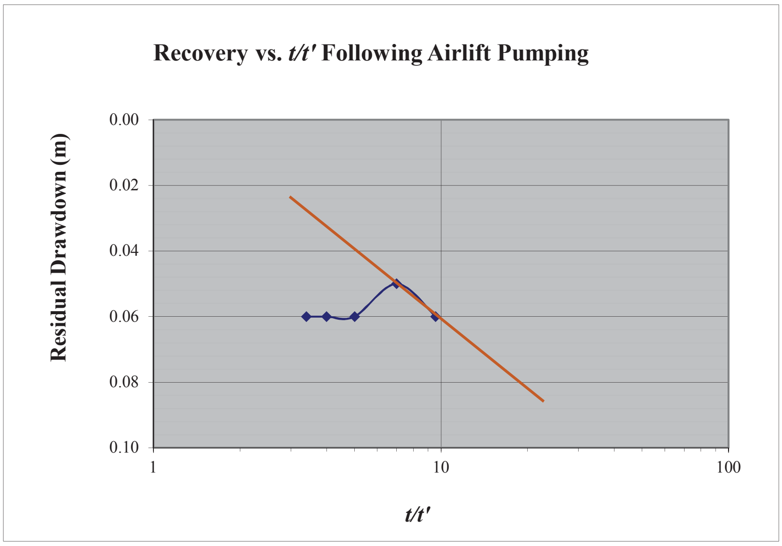
Analysis of DEW18-1 Airlift Pumping and Recovery Data

Corehole Depth (m):	200.0	Pre-Pumping WL (m):	91.3
Core Rod Depth (m):	160.0	Depth of Airline (m):	143.7

Data	t (mins)	t' (mins)	t/t'	Q (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			1.0		
	5			1.8		
	7			1.8		
	10			1.8		
	15			1.0		
	20			1.0		
	25			1.5		
	30			1.0		
	35			1.0		
	40			1.5		
	50			1.0		
	60			1.5		
			Q_{ave}	1.3		
Recovery	63	3	21.0			
	65	5	13.0			
	67	7	9.6		91.33	0.06
	70	10	7.0		91.32	0.05
	75	15	5.0		91.33	0.06
	80	20	4.0		91.33	0.06
	85	25	3.4		91.33	0.06
	90	30	3.0			
	95	35	2.7			
	100	40	2.5			
	110	50	2.2			
	120	60	2.0			

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

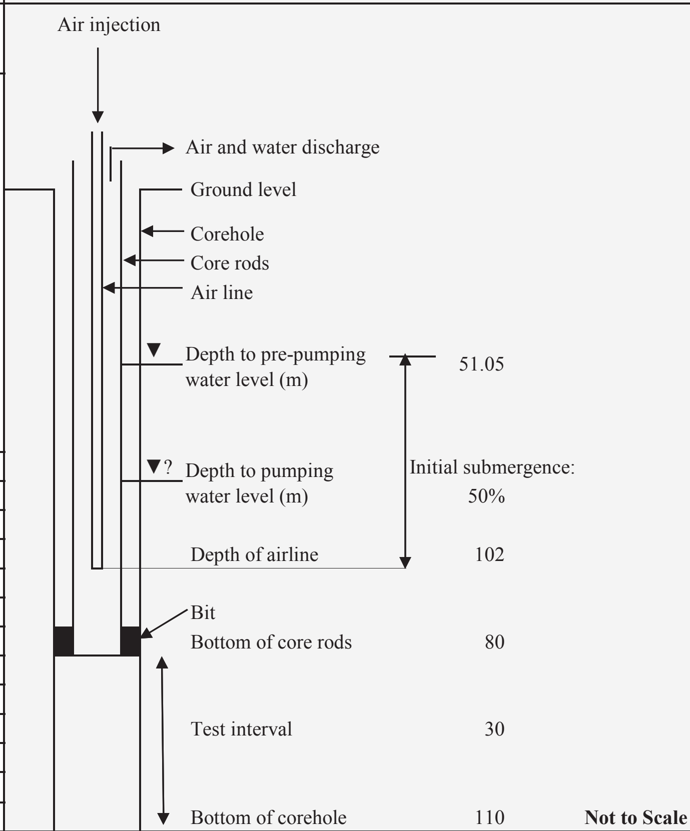
Q_{ave}	32.0	Discharge (m^3/d)
Δs	0.01	Drawdown (m)
T	5.9E+02	m^2/d
b	40.0	Test zone thickness (m)
K	1.5E+01	m/d

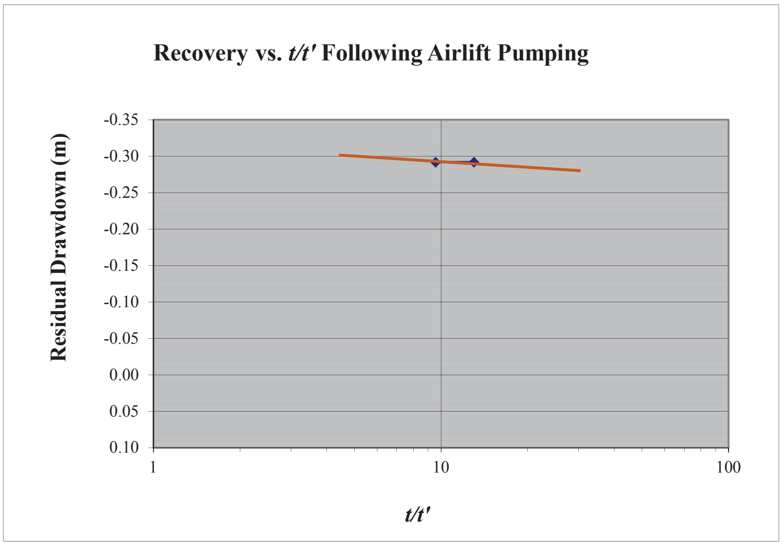
Analysis of KH01 (Test1) Airlift Pumping and Recovery Data

Corehole Depth (m):	**110.0**	**Pre-Pumping WL (m):**	**51.0**
Core Rod Depth (m):	**80.0**	**Depth of Airline (m):**	**102.0**

Data	***t*** **(mins)**	***t′*** **(mins)**	***t/t′***	***Q*** **(m^3/hr)**	**Depth to Water (m)**	**Residual Drawdown (m)**
Pumping	--			--		
	3			3.0		
	5			3.4		
	7			3.0		
	10			4.2		
	15			4.2		
	20			4.2		
	25			4.2		
	30			4.2		
	35			2.3		
	40					
	50					
	60					
			Q_{ave}	3.6		
Recovery	63	3	21.0			
	65	5	13.0		50.76	-0.29
	67	7	9.6		50.76	-0.29
	70	10	7.0			
	75	15	5.0			
	80	20	4.0			
	85	25	3.4			
	90	30	3.0			
	95	35	2.7			
	100	40	2.5			
	110	50	2.2			
	120	60	2.0			

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

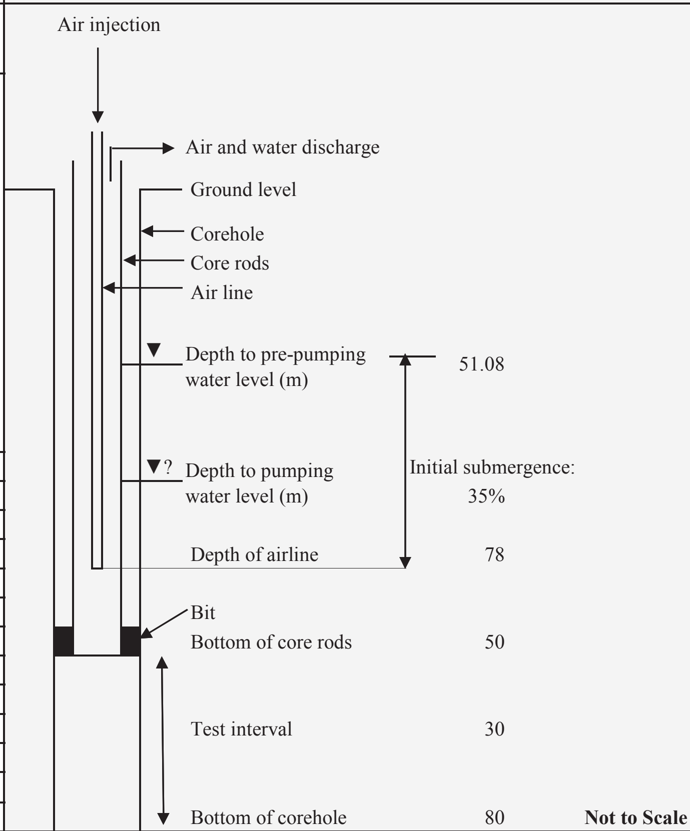
Q_{ave}	86.7	Discharge (m^3/d)
Δs	0.01	Drawdown (m)
T	1.6E+03	m^2/d
b	30.0	Test zone thickness (m)
K	5.3E+01	m/d

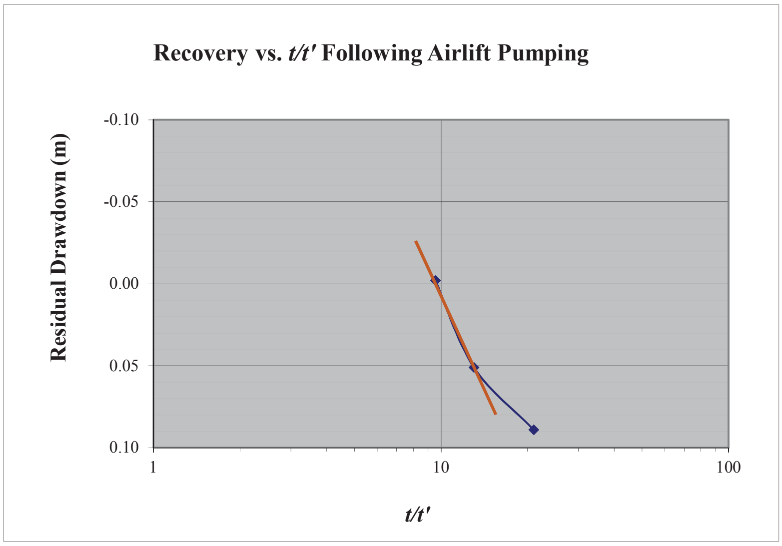
Analysis of KH01 (Test2) Airlift Pumping and Recovery Data

Corehole Depth (m):	80.0	Pre-Pumping WL (m):	51.1
Core Rod Depth (m):	50.0	Depth of Airline (m):	78.0

Data	t (mins)	t' (mins)	t/t'	Q (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			1.8		
	5			2.3		
	7			2.3		
	10			2.3		
	15			2.3		
	20			2.3		
	25			2.3		
	30			2.3		
	35			2.3		
	40			2.3		
	50			2.3		
	60			2.3		
			Q_{ave}	2.3		
Recovery	63	3	21.0		51.17	0.09
	65	5	13.0		51.13	0.05
	67	7	9.6		51.08	0.00
	70	10	7.0			
	75	15	5.0			
	80	20	4.0			
	85	25	3.4			
	90	30	3.0			
	95	35	2.7			
	100	40	2.5			
	110	50	2.2			
	120	60	2.0			

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

$$T = \frac{0.183Q}{\Delta s}$$

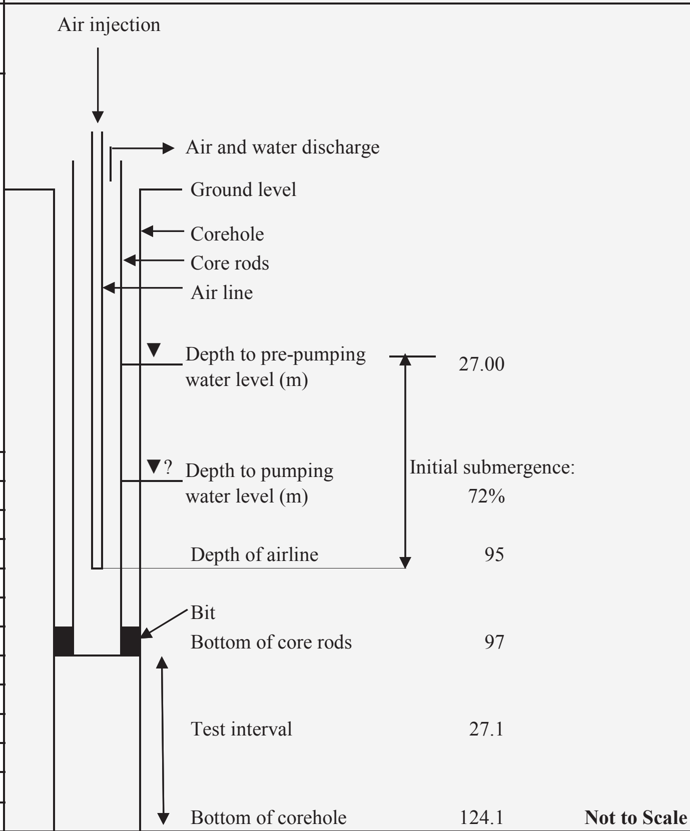
Q_{ave}	54.9	Discharge (m^3/d)
Δs	0.05	Drawdown (m)
T	1.9E+02	m^2/d
b	30.0	Test zone thickness (m)
K	6.3E+00	m/d

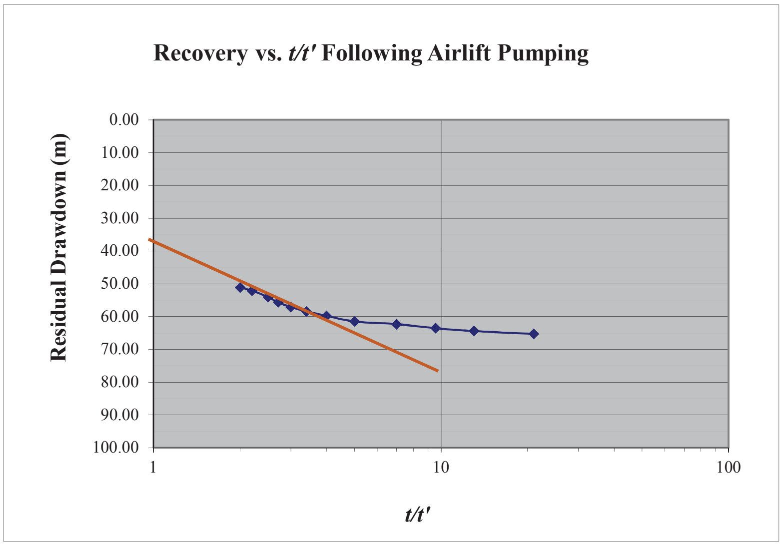
Analysis of DEW33 Airlift Pumping and Recovery Data

Corehole Depth (m):	124.1	Pre-Pumping WL (m):	27
Core Rod Depth (m):	97.0	Depth of Airline (m):	95

Data	*t* (mins)	*t'* (mins)	*t/t'*	*Q* (m^3/hr)	Depth to Water (m)	Residual Drawdown (m)
Pumping	--			--		
	3			1.0		
	5			1.0		
	7			1.0		
	10			1.0		
	15			1.0		
	20			1.0		
	25			1.0		
	30			1.0		
	35			1.0		
	40					
	50					
	60					
			Q_{ave}	1.0		
Recovery	63	3	21.0		92.30	65.30
	65	5	13.0		91.40	64.40
	67	7	9.6		90.54	63.54
	70	10	7.0		89.30	62.30
	75	15	5.0		88.48	61.48
	80	20	4.0		86.78	59.78
	85	25	3.4		85.42	58.42
	90	30	3.0		84.05	57.05
	95	35	2.7		82.65	55.65
	100	40	2.5		81.02	54.02
	110	50	2.2		79.11	52.11
	120	60	2.0		78.11	51.11

Schematic Diagram of Airlift Pumping System





Theis (1935) Recovery Method

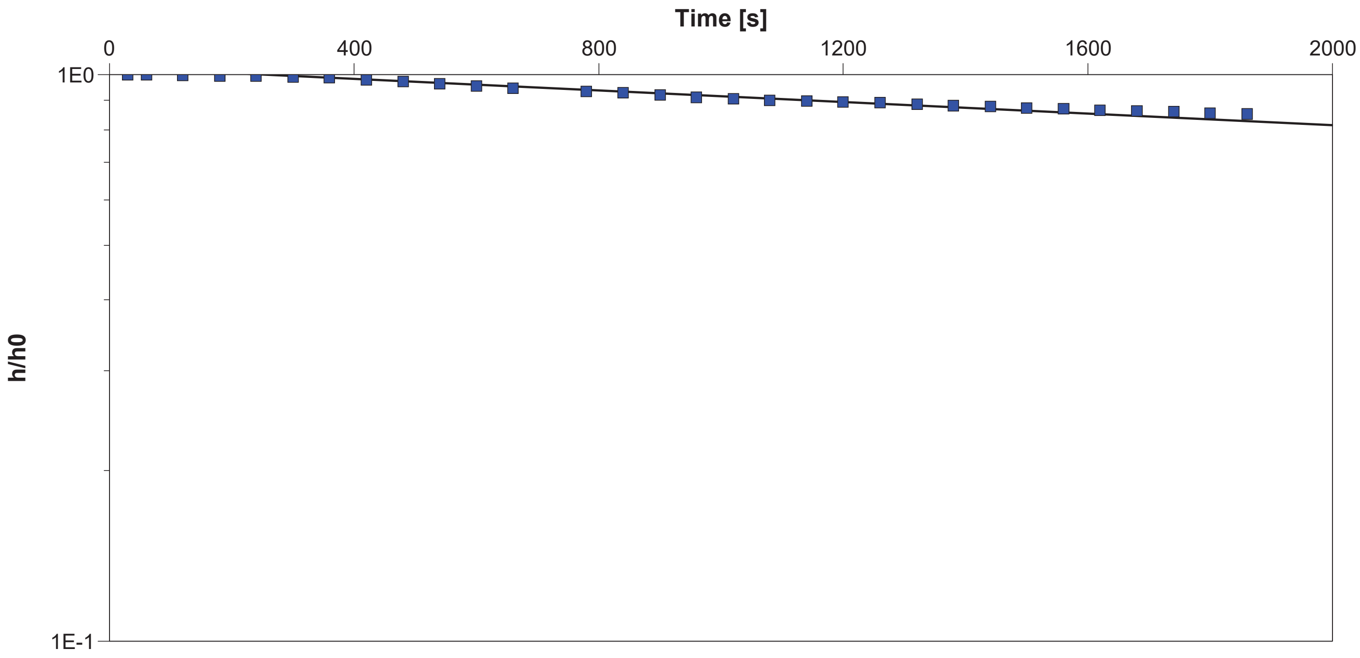
$$T = \frac{0.183Q}{\Delta s}$$

Q_{ave}	25.0	Discharge (m^3/d)
Δs	7.67	Drawdown (m)
T	6.0E-01	m^2/d
b	27.1	Test zone thickness (m)
K	2.2E-02	m/d

Appendix D: Slug Test Data

Contact Info **Address** **Company Name** **City, State/Province**	**Slug Test Analysis Report** Project: Hydraulic Charcterisation of KNS Geology Number: 1099612 Client: MMG

Location: Kinsevere	Slug Test: SRC0670	Test Well: SRC070
Test Conducted by: Hamilton		Test Date: 04/12/2018
Analysis Performed by: Hamilton	SRC070	Analysis Date: 08/01/2019
Aquifer Thickness: 8.80 m		

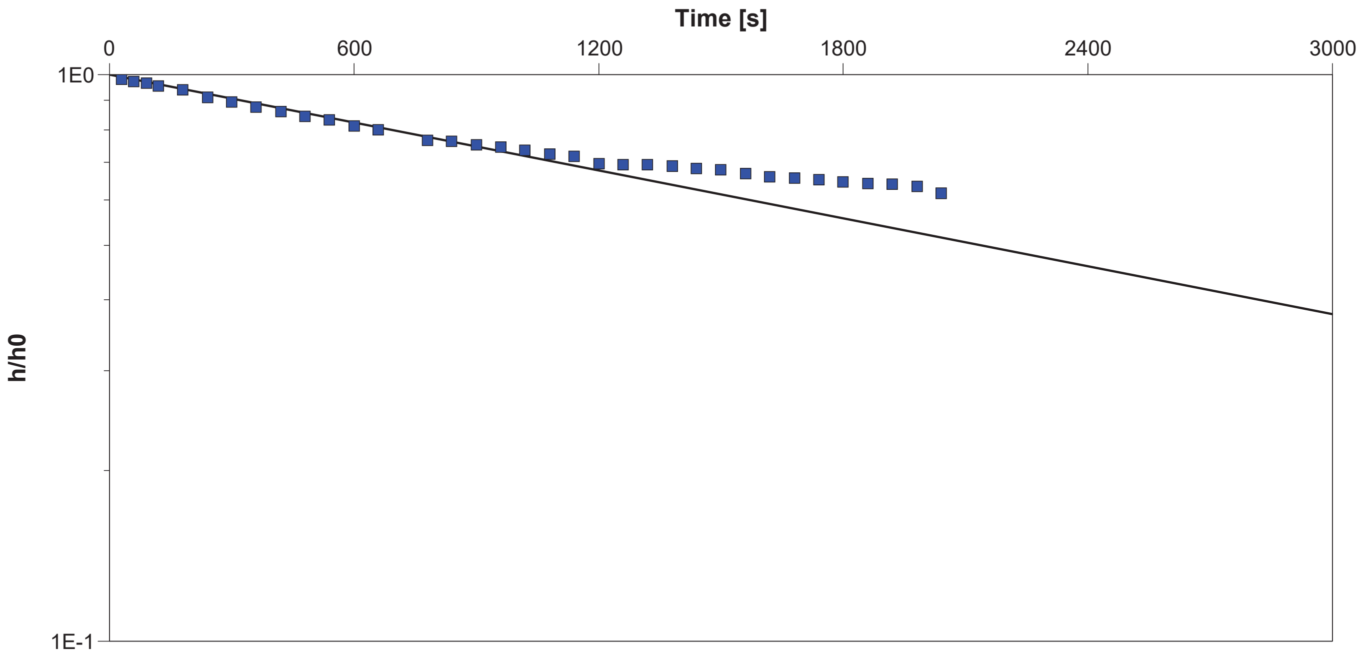


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/d]	
SRC070	8.04×10^{-3}	

Contact Info Address Company Name City, State/Province	**Slug Test Analysis Report**
	Project: Hydraulic Charcterisation of KNS Geology
	Number: 1099612
	Client: MMG

Location: Kinsevere	Slug Test: SRC069	Test Well: SRC069
Test Conducted by: Hamilton		Test Date: 04/12/2018
Analysis Performed by: Hamilton	SRC069	Analysis Date: 08/01/2019
Aquifer Thickness: 20.70 m		

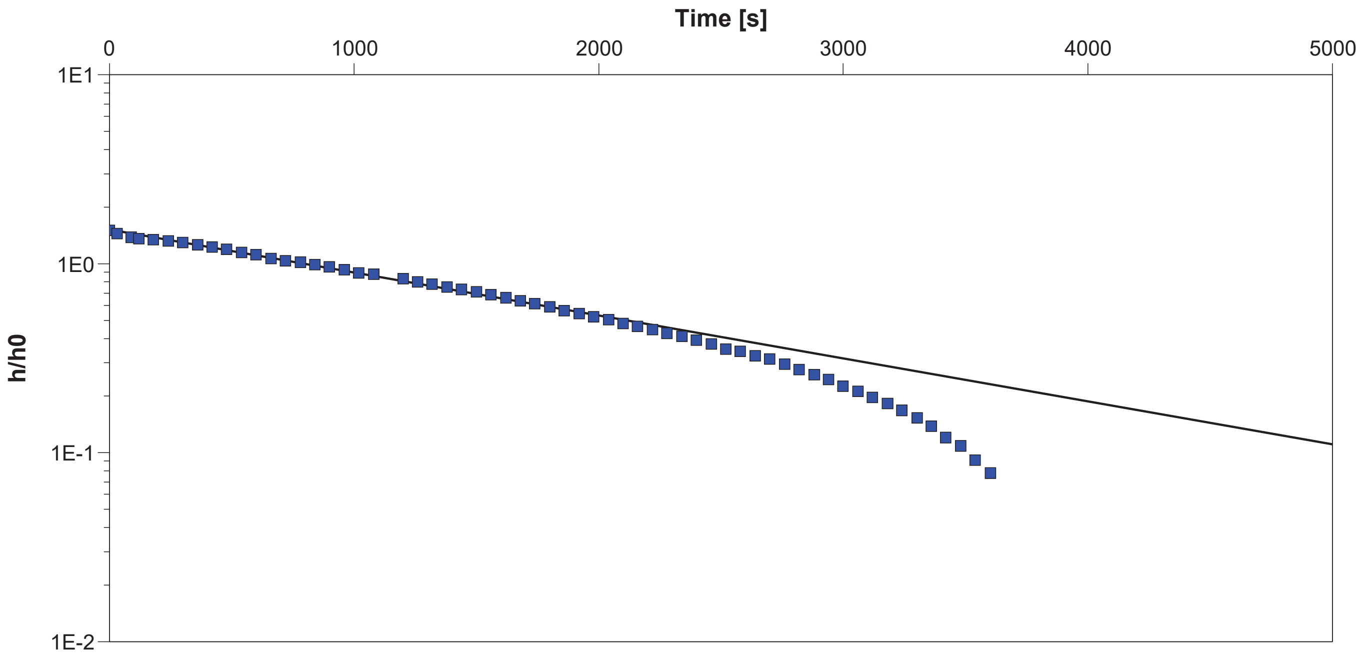


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/d]	
SRC069	1.14×10^{-2}	

Schlumberger Water Services — **Contact Info** **Address** **Company Name** **City, State/Province**	**Slug Test Analysis Report** Project: Hydraulic Charcterisation of KNS Geology Number: 1099612 Client: MMG

Location: Kinsevere	Slug Test: SRC066	Test Well: SRC066
Test Conducted by: Hamilton		Test Date: 04/12/2018
Analysis Performed by: Hamilton	SRC066	Analysis Date: 08/01/2019
Aquifer Thickness: 13.60 m		

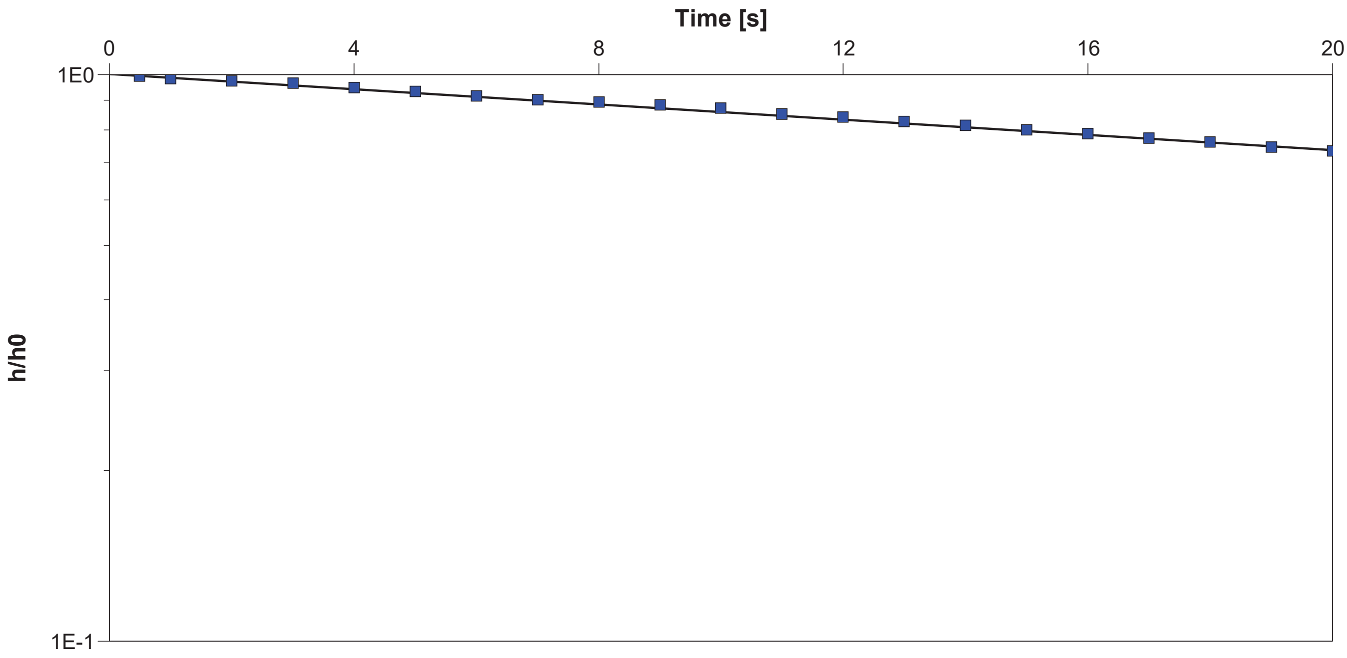


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/d]	
SRC066	2.55×10^{-2}	

Contact Info Address Company Name City, State/Province	**Slug Test Analysis Report**
	Project: Hydraulic Charcterisation of KNS Geology
	Number: 1099612
	Client: MMG

Location: Kinsevere	Slug Test: SRC059	Test Well: SRC059
Test Conducted by: Hamilton		Test Date: 04/12/2018
Analysis Performed by: Hamilton	SRC051	Analysis Date: 08/01/2019
Aquifer Thickness: 22.35 m		

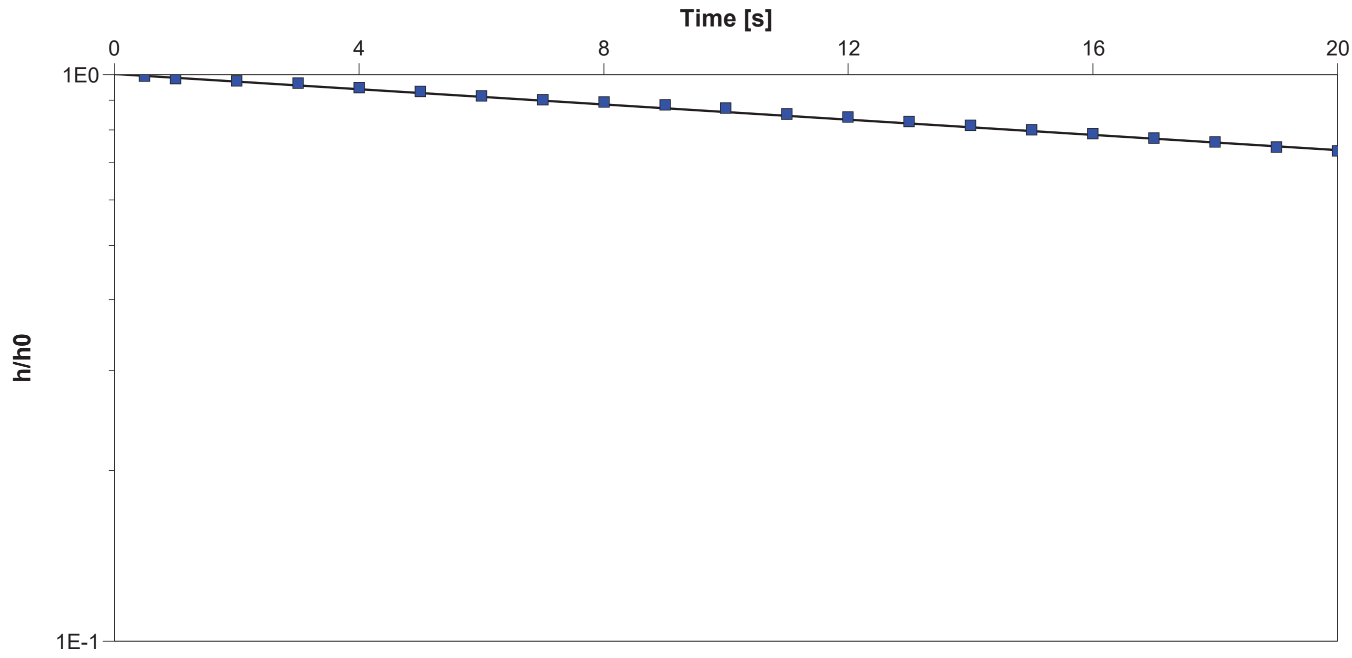


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/d]	
SRC059	5.10×10^{-1}	

Contact Info **Address** **Company Name** **City, State/Province**	**Slug Test Analysis Report**
	Project: Hydraulic Charcterisation of KNS Geology
	Number: 1099612
	Client: MMG

Location: Kinsevere	Slug Test: SRC059	Test Well: SRC059
Test Conducted by: Hamilton		Test Date: 04/12/2018
Analysis Performed by: Hamilton	SRC051	Analysis Date: 08/01/2019
Aquifer Thickness: 22.35 m		

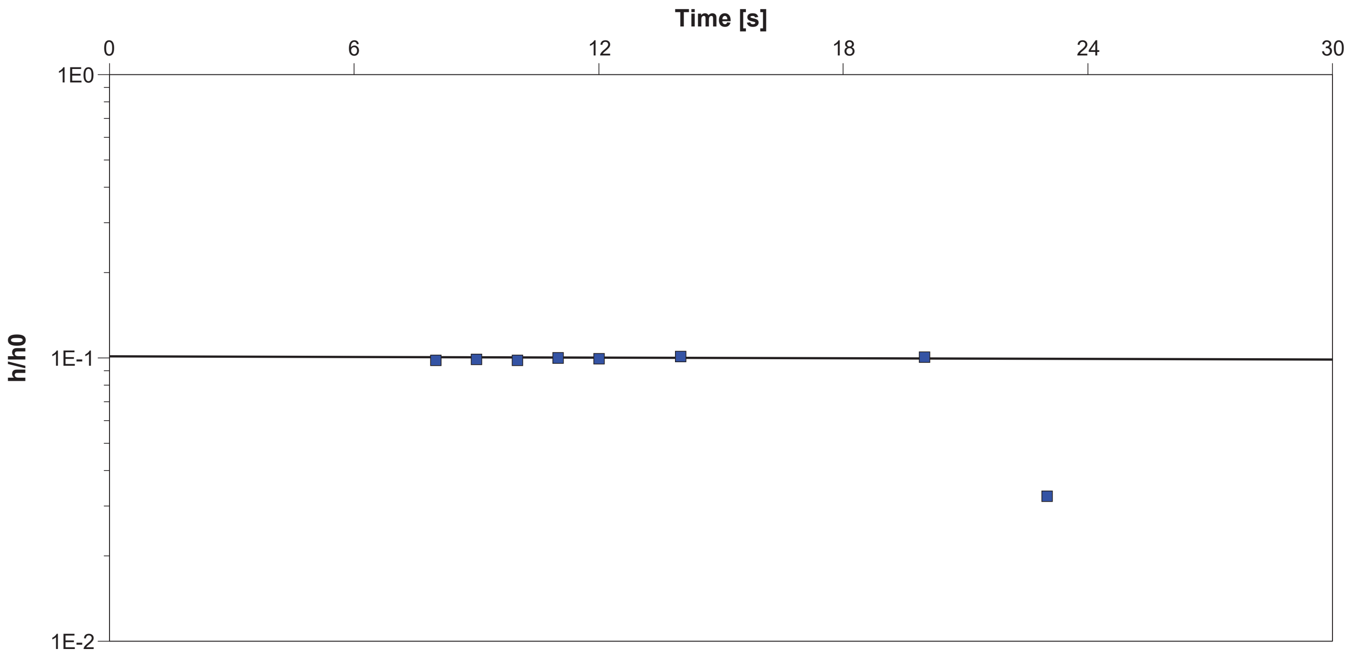


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/d]	
SRC059	5.10×10^{-1}	

Contact Info **Address** **Company Name** **City, State/Province**	**Slug Test Analysis Report** Project: Hydraulic Charcterisation of KNS Geology Number: 1099612 Client: MMG

Location: Kinsevere	Slug Test: SRC048	Test Well: SRC048
Test Conducted by: Hamilton		Test Date: 04/12/2018
Analysis Performed by: Hamilton	SRC048	Analysis Date: 08/01/2019
Aquifer Thickness: 2.79 m		

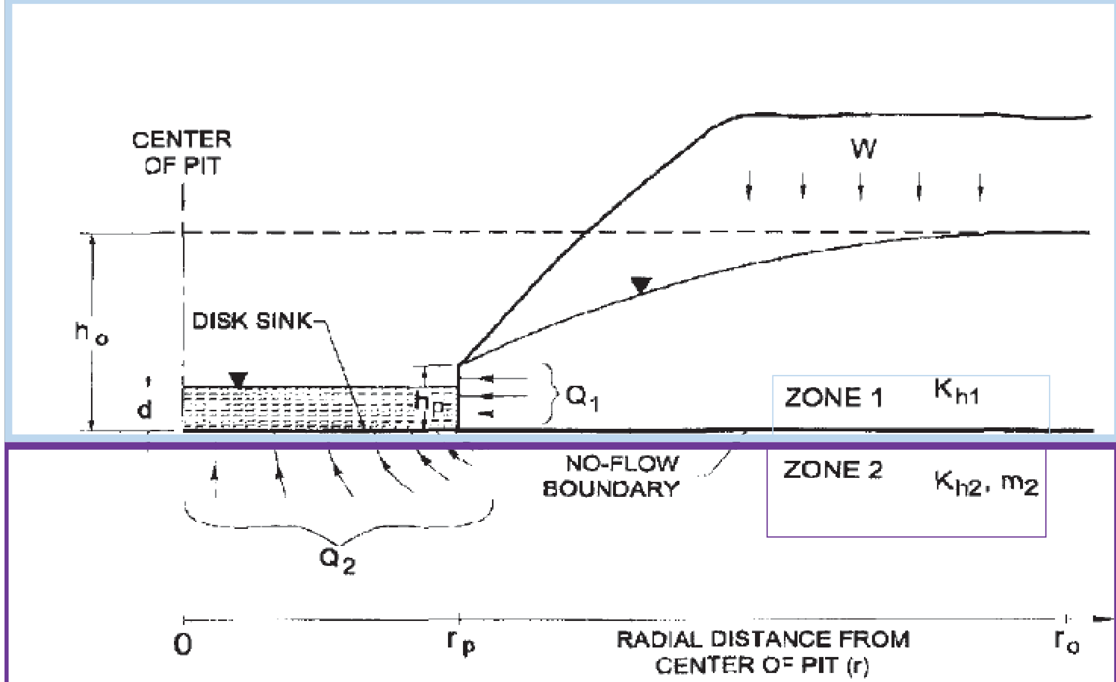


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/d]	
SRC048	1.60×10^{-1}	

Appendix E: Groundwater Inflow Calculations

Projected Gundwater Inflow Determination for Mashi Pit



Zone 1 Analytical Solution

The analytical solution for Zone 1 considers steady-state, unconfined, horizontal radial flow, with uniformly distributed recharge at the water table. Additional assumptions of this solution are as follows:

- The pit walls are approximated as a right circular cylinder.
- Ground water flow is horizontal. The Dupuit-Forchheimer approximation (McWhorter and Sunada 1977) is used to account for changes in saturated thickness due to depression of the water table.
- The static (premining) water table is approximately horizontal.
- Uniform distributed recharge occurs across the site as a result of surface infiltration. All recharge within the radius of influence (cone of depression) of the pit is assumed to be captured by the pit.
- Ground water flow toward the pit is axially symmetric.

As derived in the Appendix, the following equation applies for these conditions:

$$(1)\ h_o = \sqrt{h_p^2 + \frac{W}{K_{h1}}\left[r_o^2 \ln\left(\frac{r_o}{r_p}\right) - \frac{(r_o^2 - r_p^2)}{2}\right]}$$

$$(2)\ Q_1 = W \pi (r_o^2 - r_p^2)$$

ho	=	105	Initial Saturated Thickness (m)
hp	=	85	Saturated Thickness (m)
W	=	8.32E-04	Distributed Recharge Flux (m/d)
Kh1	=	1.32E+00	Horizontal Hydraulic Conductivity (m/d)
r0	=	2100	Radius of Influence **(use for reiteration) (m)**
rp	=	335	Effective Pit Radius (m)
		Input	

Values have to match

Reiteration

ho	=	105

Change r0 so the ho values can match

Zone 1 Inflow			
Q1	=	11227	m3/d
		130	L/s

Zone 2 Analytical Solution

The analytical solution for Zone 2 is based on steady-state flow to one side of a circular disk sink of constant and uniform drawdown. The sink represents the bottom of the pit. This solution is based on the following assumptions:

- Hydraulic head is initially uniform (hydrostatic) throughout Zone 2. Initial head is equal to the elevation of the initial water table in Zone 1.
- The disk sink has a constant hydraulic head equal to the elevation of the pit lake water surface. If the pit is completely dewatered, the disk sink head is equal to elevation of the pit bottom.
- Flow to the disk sink is three-dimensional and axially symmetric.
- Materials within Zone 2 are anisotropic, and the principal coordinate directions for hydraulic conductivity are horizontal and vertical.

The steady-state inflow rate to one side of the disk sink is given by the following equations:

$$Q_2 = 4\, r_p \left(\frac{K_{h2}}{m_2}\right)(h_o - d)$$

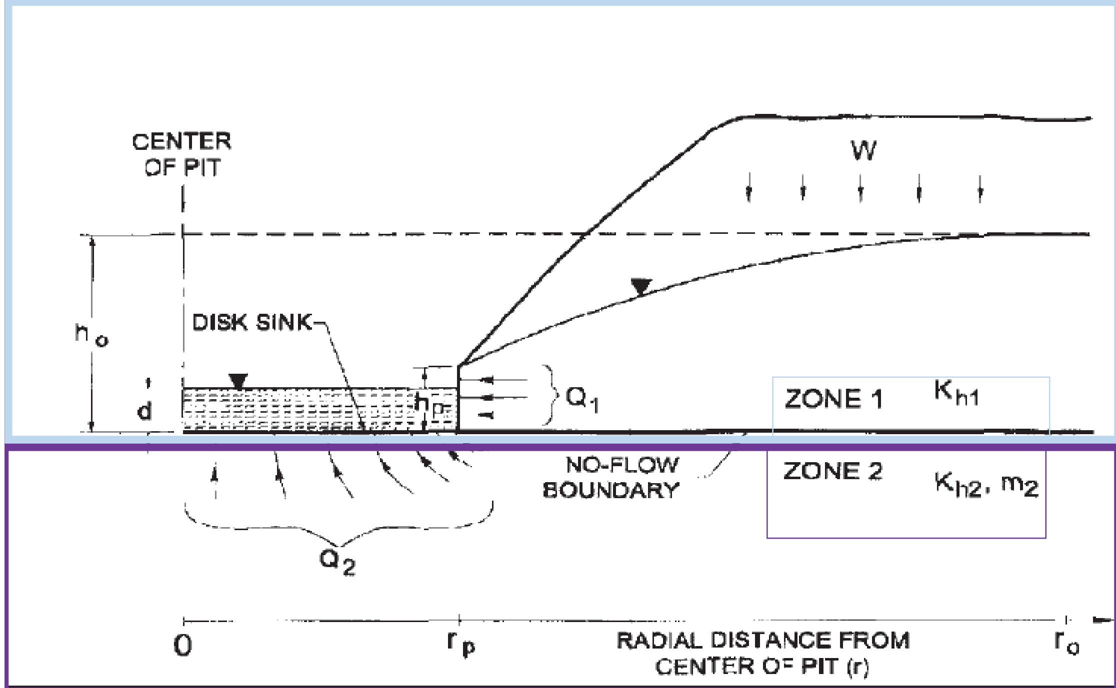
$$m_2 = \sqrt{\frac{K_{h2}}{K_{v2}}}$$

rp	=	335	Effective Pit Radius (same as above)
Kh2	=	1.32E+00	Horizontal Hydraulic Conductivity
Kv2	=	1.32E-02	Vertical Hydraulic Conductivity
m2	=	10	Anisotropy Parameter **(Do not edit)**
ho	=	105	Initial Saturated Thickness
d	=	85	Depth of the Pit Lake
		Input	

Zone 2 Inflow			
Q2	=	3538	m3/d
		41	L/s

Q1=	130	L/s
Q2=	41	L/s
Q1+Q2=	171	L/s

Gundwater Inflow Determination for Mashi Pit



Zone 1 Analytical Solution

The analytical solution for Zone 1 considers steady-state, unconfined, horizontal radial flow, with uniformly distributed recharge at the water table. Additional assumptions of this solution are as follows:

- The pit walls are approximated as a right circular cylinder.
- Ground water flow is horizontal. The Dupuit-Forchheimer approximation (McWhorter and Sunada 1977) is used to account for changes in saturated thickness due to depression of the water table.
- The static (premining) water table is approximately horizontal.
- Uniform distributed recharge occurs across the site as a result of surface infiltration. All recharge within the radius of influence (cone of depression) of the pit is assumed to be captured by the pit.
- Ground water flow toward the pit is axially symmetric.

As derived in the Appendix, the following equation applies for these conditions:

$$(1)\ h_o = \sqrt{h_p^2 + \frac{W}{K_{h1}}\left[r_o^2 \ln\left(\frac{r_o}{r_p}\right) - \frac{(r_o^2 - r_p^2)}{2}\right]}$$

$$(2)\ Q_1 = W\,\pi\,(r_o^2 - r_p^2)$$

ho	=	30	Initial Saturated Thickness (m)
hp	=	10	Saturated Thickness (m)
W	=	8.32E-04	Distributed Recharge Flux (m/d)
Kh1	=	1.32E+00	Horizontal Hydraulic Conductivity (m/d)
r0	=	1225	Radius of Influence **(use for reiteration) (m)**
rp	=	335	Effective Pit Radius (m)
		Input	

Values have to match

Reiteration		
ho	=	30

Change r0 so the ho values can match

Zone 1 Inflow			
Q1	=	3627	m3/d
		42	L/s

Zone 2 Analytical Solution

The analytical solution for Zone 2 is based on steady-state flow to one side of a circular disk sink of constant and uniform drawdown. The sink represents the bottom of the pit. This solution is based on the following assumptions:

- Hydraulic head is initially uniform (hydrostatic) throughout Zone 2. Initial head is equal to the elevation of the initial water table in Zone 1.
- The disk sink has a constant hydraulic head equal to the elevation of the pit lake water surface. If the pit is completely dewatered, the disk sink head is equal to elevation of the pit bottom.
- Flow to the disk sink is three-dimensional and axially symmetric.
- Materials within Zone 2 are anisotropic, and the principal coordinate directions for hydraulic conductivity are horizontal and vertical.

The steady-state inflow rate to one side of the disk sink is given by the following equations:

$$Q_2 = 4\,r_p\left(\frac{K_{h2}}{m_2}\right)(h_o - d)$$

$$m_2 = \sqrt{\frac{K_{h2}}{K_{v2}}}$$

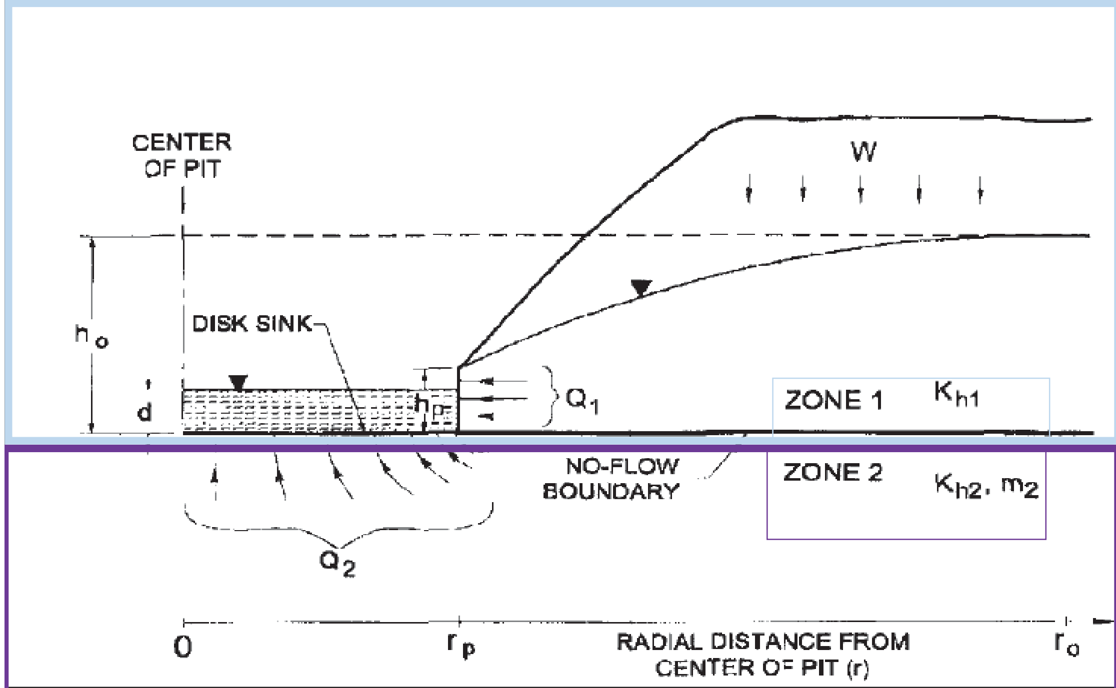
rp	=	335	Effective Pit Radius (same as above)
Kh2	=	1.32E+00	Horizontal Hydraulic Conductivity
Kv2	=	1.32E-02	Vertical Hydraulic Conductivity
m2	=	10	Anisotropy Parameter **(Do not edit)**
ho	=	30	Initial Saturated Thickness
d	=	10	Depth of the Pit Lake
		Input	

Zone 2 Inflow			
Q2	=	3538	m3/d
		41	L/s

Q1=	42	L/s
Q2=	41	L/s
Q1+Q2=	83	L/s

Dupuit-Forchheimer

Projected Gundwater Inflow Determination for Kinsevere Hill South Pit



Zone 1 Analytical Solution

The analytical solution for Zone 1 considers steady-state, unconfined, horizontal radial flow, with uniformly distributed recharge at the water table. Additional assumptions of this solution are as follows:

- The pit walls are approximated as a right circular cylinder.
- Ground water flow is horizontal. The Dupuit-Forchheimer approximation (McWhorter and Sunada 1977) is used to account for changes in saturated thickness due to depression of the water table.
- The static (premining) water table is approximately horizontal.
- Uniform distributed recharge occurs across the site as a result of surface infiltration. All recharge within the radius of influence (cone of depression) of the pit is assumed to be captured by the pit.
- Ground water flow toward the pit is axially symmetric.

As derived in the Appendix, the following equation applies for these conditions:

$$(1)\ h_o = \sqrt{h_p^2 + \frac{W}{K_{h1}}\left[r_o^2 \ln\left(\frac{r_o}{r_p}\right) - \frac{(r_o^2 - r_p^2)}{2}\right]}$$

$$(2)\ Q_1 = W\,\pi\,(r_o^2 - r_p^2)$$

ho	=	55	Initial Saturated Thickness (m)
hp	=	0	Saturated Thickness (m)
W	=	8.32E-04	Distributed Recharge Flux (m/d)
Kh1	=	1.32E+00	Horizontal Hydraulic Conductivity (m/d)
r0	=	1625	Radius of Influence **(use for reiteration)** (m)
rp	=	166	Effective Pit Radius (m)
		Input	

Reiteration		
ho	=	55

Values have to match

Change r0 so the ho values can match

Zone 1 Inflow			
Q1	=	6826	m3/d
		79	L/s

Zone 2 Analytical Solution

The analytical solution for Zone 2 is based on steady-state flow to one side of a circular disk sink of constant and uniform drawdown. The sink represents the bottom of the pit. This solution is based on the following assumptions:

- Hydraulic head is initially uniform (hydrostatic) throughout Zone 2. Initial head is equal to the elevation of the initial water table in Zone 1.
- The disk sink has a constant hydraulic head equal to the elevation of the pit lake water surface. If the pit is completely dewatered, the disk sink head is equal to elevation of the pit bottom.
- Flow to the disk sink is three-dimensional and axially symmetric.
- Materials within Zone 2 are anisotropic, and the principal coordinate directions for hydraulic conductivity are horizontal and vertical.

The steady-state inflow rate to one side of the disk sink is given by the following equations:

$$Q_2 = 4\,r_p\left(\frac{K_{h2}}{m_2}\right)(h_o - d)$$

$$m_2 = \sqrt{\frac{K_{h2}}{K_{v2}}}$$

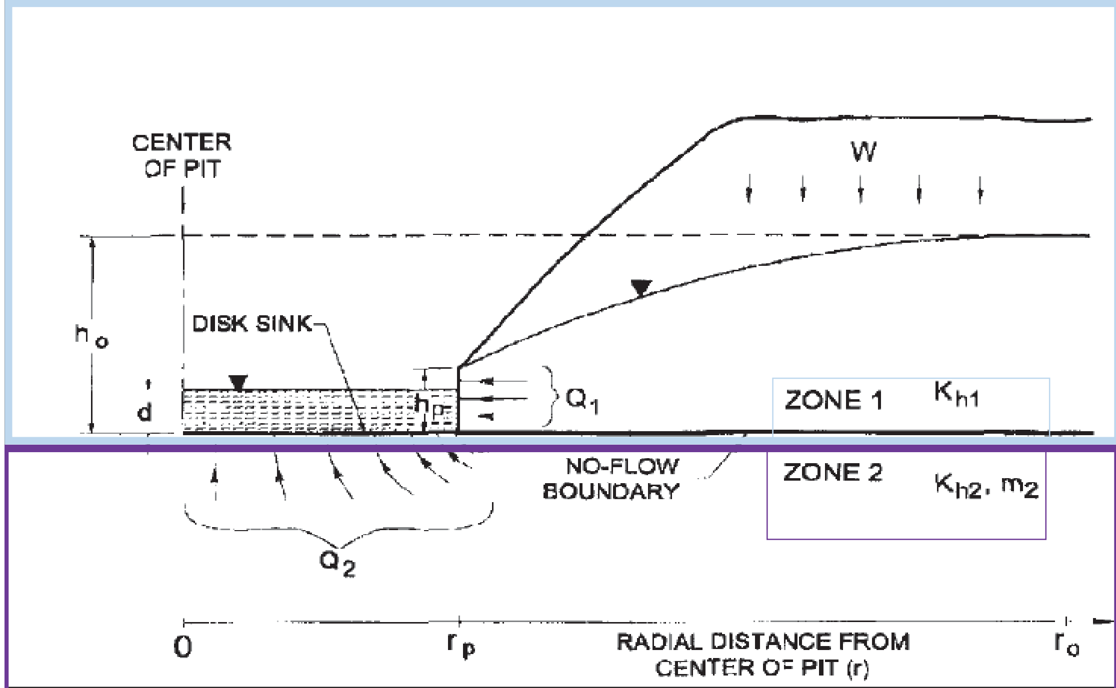
rp	=	166	Effective Pit Radius (same as above)
Kh2	=	1.32E+00	Horizontal Hydraulic Conductivity
Kv2	=	1.32E-02	Vertical Hydraulic Conductivity
m2	=	10	Anisotropy Parameter **(Do not edit)**
ho	=	55	Initial Saturated Thickness
d	=	0	Depth of the Pit Lake
		Input	

Zone 2 Inflow			
Q2	=	4821	m3/d
		56	L/s

Q1=	79	L/s
Q2=	56	L/s
Q1+Q2=	135	L/s

Dupuit-Forchheimer

Projected Gundwater Inflow Determination for Kinsevere Hill North Pit



Zone 1 Analytical Solution

The analytical solution for Zone 1 considers steady-state, unconfined, horizontal radial flow, with uniformly distributed recharge at the water table. Additional assumptions of this solution are as follows:

- The pit walls are approximated as a right circular cylinder.
- Ground water flow is horizontal. The Dupuit-Forchheimer approximation (McWhorter and Sunada 1977) is used to account for changes in saturated thickness due to depression of the water table.
- The static (premining) water table is approximately horizontal.
- Uniform distributed recharge occurs across the site as a result of surface infiltration. All recharge within the radius of influence (cone of depression) of the pit is assumed to be captured by the pit.
- Ground water flow toward the pit is axially symmetric.

As derived in the Appendix, the following equation applies for these conditions:

$$(1)\ h_o = \sqrt{h_p^2 + \frac{W}{K_{h1}}\left[r_o^2 \ln\left(\frac{r_o}{r_p}\right) - \frac{(r_o^2 - r_p^2)}{2}\right]}$$

$$(2)\ Q_1 = W\,\pi\,(r_o^2 - r_p^2)$$

ho	=	10	Initial Saturated Thickness (m)
hp	=	0	Saturated Thickness (m)
W	=	8.32E-04	Distributed Recharge Flux (m/d)
Kh1	=	1.32E+00	Horizontal Hydraulic Conductivity (m/d)
r0	=	625	Radius of Influence **(use for reiteration)** (m)
rp	=	271	Effective Pit Radius (m)
		Input	

Reiteration

ho	=	10	

Values have to match

Change r0 so the ho values can match

Zone 1 Inflow			
Q1	=	829	m3/d
		10	L/s

Zone 2 Analytical Solution

The analytical solution for Zone 2 is based on steady-state flow to one side of a circular disk sink of constant and uniform drawdown. The sink represents the bottom of the pit. This solution is based on the following assumptions:

- Hydraulic head is initially uniform (hydrostatic) throughout Zone 2. Initial head is equal to the elevation of the initial water table in Zone 1.
- The disk sink has a constant hydraulic head equal to the elevation of the pit lake water surface. If the pit is completely dewatered, the disk sink head is equal to elevation of the pit bottom.
- Flow to the disk sink is three-dimensional and axially symmetric.
- Materials within Zone 2 are anisotropic, and the principal coordinate directions for hydraulic conductivity are horizontal and vertical.

The steady-state inflow rate to one side of the disk sink is given by the following equations:

$$Q_2 = 4\,r_p\left(\frac{K_{h2}}{m_2}\right)(h_o - d)$$

$$m_2 = \sqrt{\frac{K_{h2}}{K_{v2}}}$$

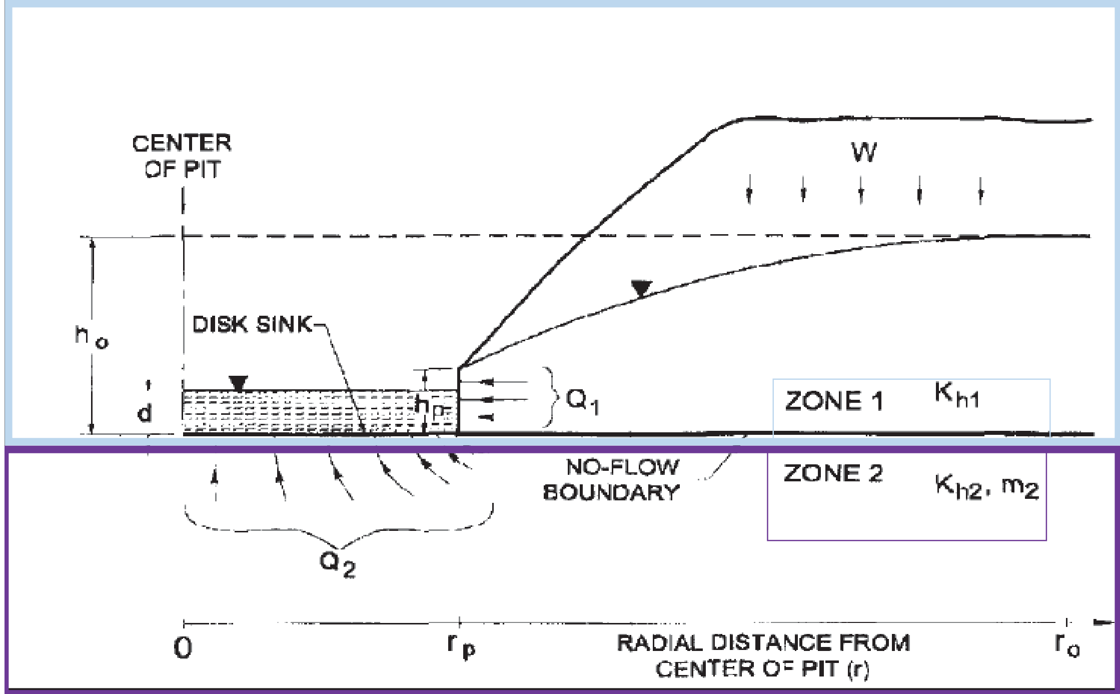
rp	=	271	Effective Pit Radius (same as above)
Kh2	=	1.32E+00	Horizontal Hydraulic Conductivity
Kv2	=	1.32E-02	Vertical Hydraulic Conductivity
m2	=	10	Anisotropy Parameter **(Do not edit)**
ho	=	10	Initial Saturated Thickness
d	=	0	Depth of the Pit Lake
		Input	

Zone 2 Inflow			
Q2	=	1431	m3/d
		17	L/s

Q1=	10	L/s
Q2=	17	L/s
Q1+Q2=	26	L/s

Dupuit-Forchheimer

Gundwater Inflow Determination for Central Pit



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$$(2)\ Q_1 = W\pi\,(r_o^2 - r_p^2)$$

ho	=	110	Initial Saturated Thickness (m)
hp	=	25	Saturated Thickness (m)
W	=	8.32E-04	Distributed Recharge Flux (m/d)
Kh1	=	1.32E+00	Horizontal Hydraulic Conductivity (m/d)
r0	=	3350	Radius of Influence **(use for reiteration) (m)**
rp	=	405	Effective Pit Radius (m)
		Input	

Reiteration

ho	=	110

Values have to match

Change r0 so the ho values can match

Zone 1 Inflow

Q1	=	28887	m3/d
		334	L/s

Zone 2 Analytical Solution

The analytical solution for Zone 2 is based on steady-state flow to one side of a circular disk sink of constant and uniform drawdown. The sink represents the bottom of the pit. This solution is based on the following assumptions:

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$$m_2 = \sqrt{\frac{K_{h2}}{K_{v2}}}$$

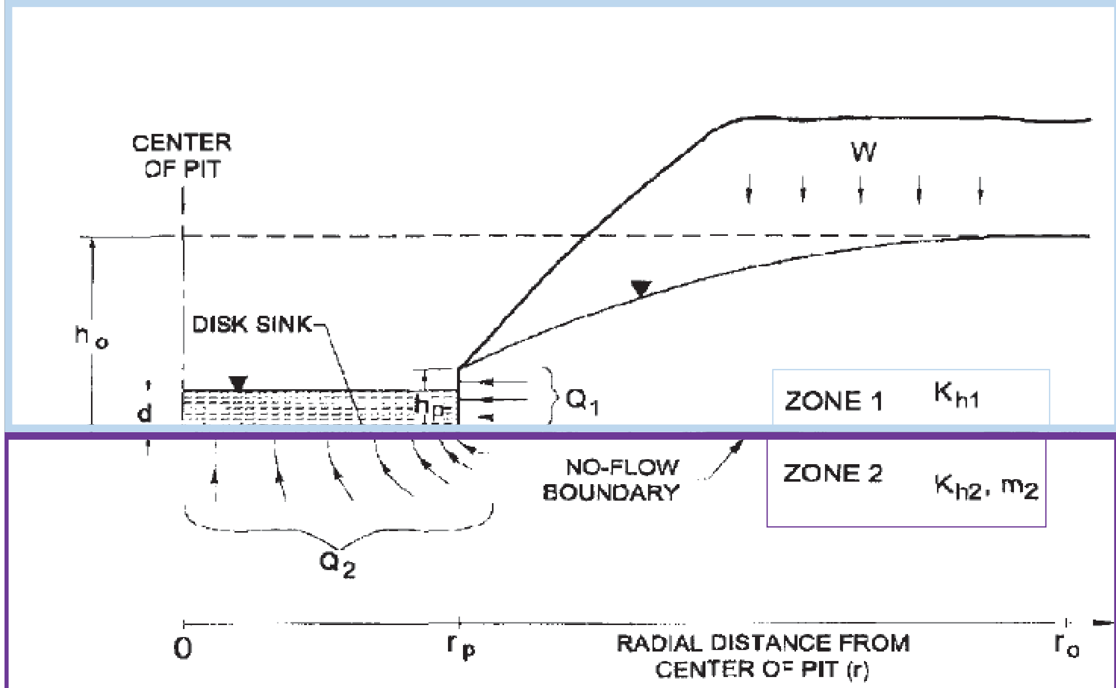
rp	=	405	Effective Pit Radius (same as above)
Kh2	=	1.32E+00	Horizontal Hydraulic Conductivity
Kv2	=	1.32E-02	Vertical Hydraulic Conductivity
m2	=	10	Anisotropy Parameter **(Do not edit)**
ho	=	110	Initial Saturated Thickness
d	=	25	Depth of the Pit Lake
		Input	

Zone 2 Inflow

Q2	=	18176	m3/d
		210	L/s

Q1=	334	L/s
Q2=	210	L/s
Q1+Q2=	545	L/s

Projected Gundwater Inflow Determination for Central Pit



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$$(2)\; Q_1 = W\pi\,(r_o^2 - r_p^2)$$

ho	=	275	Initial Saturated Thickness (m)
hp	=	190	Saturated Thickness (m)
W	=	8.32E-04	Distributed Recharge Flux (m/d)
Kh1	=	1.32E+00	Horizontal Hydraulic Conductivity (m/d)
r0	=	5450	Radius of Influence **(use for reiteration) (m)**
rp	=	405	Effective Pit Radius (m)
		Input	

Reiteration		
ho	=	275

Values have to match

Change r0 so the ho values can match

Zone 1 Inflow			
Q1	=	77161	m3/d
		893	L/s

Zone 2 Analytical Solution

The analytical solution for Zone 2 is based on steady-state flow to one side of a circular disk sink of constant and uniform drawdown. The sink represents the bottom of the pit. This solution is based on the following assumptions:

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$$m_2 = \sqrt{\frac{K_{h2}}{K_{v2}}}$$

rp	=	405	Effective Pit Radius (same as above)
Kh2	=	1.32E+00	Horizontal Hydraulic Conductivity
Kv2	=	1.32E-02	Vertical Hydraulic Conductivity
m2	=	10	Anisotropy Parameter **(Do not edit)**
ho	=	275	Initial Saturated Thickness
d	=	190	Depth of the Pit Lake
		Input	

Zone 2 Inflow			
Q2	=	18176	m3/d
		210	L/s

Q1=	893	L/s
Q2=	210	L/s
Q1+Q2=	1103	L/s