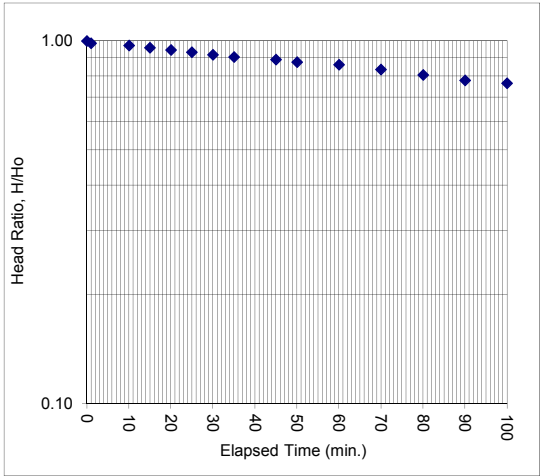


Appendix E

Slug Test Hydraulic Conductivity Calculations

VARIABLE HEAD PERMEABILITY TEST				PZ-01-2010	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	PZ-01-2010
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	668.44

Hvorslev Case G (1951)



WELL DETAILS
 d Casing diameter, inches: 2.00

D Effective diameter, inches: 8.50

TEST INTERVAL DETAILS
 dt Depth to top of screen interval, feet
 (below ground surface): 16.0
 db Depth to bottom of screen interval, feet
 (below ground surface): 27.0

L Length, feet: 11.00

Hs Static Water Level
 (feet above troll or well bot): 8.54

DTW feet below top of riser: --

m Estimate: 1
 (Ratio Kh/Kv)

LITHOLOGY: fractured bedrock
 TEST: slug out

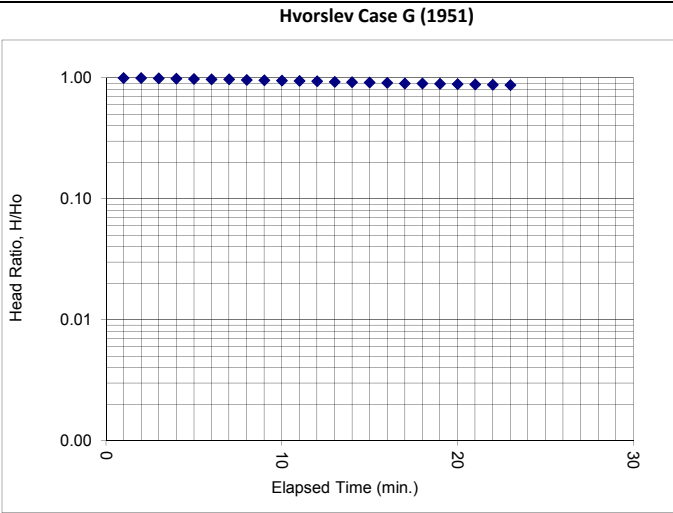
t ELAPSED TIME (min)	MEASURED HEAD (feet above troll or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	7.32	1.22	1			
1.00	7.34	1.20	0.986	1.5E-05	0.02	7.9E-06
10.00	7.36	1.19	0.972	1.7E-06	0.00	8.7E-07
15.00	7.37	1.17	0.958	3.1E-06	0.00	1.6E-06
20.00	7.39	1.15	0.944	3.2E-06	0.00	1.6E-06
25.00	7.41	1.14	0.930	3.2E-06	0.00	1.6E-06
30.00	7.42	1.12	0.916	3.3E-06	0.00	1.7E-06
35.00	7.44	1.10	0.902	3.3E-06	0.00	1.7E-06
45.00	7.46	1.08	0.889	1.7E-06	0.00	8.6E-07
50.00	7.48	1.07	0.875	3.4E-06	0.00	1.7E-06
60.00	7.49	1.05	0.861	1.7E-06	0.00	8.8E-07
70.00	7.53	1.02	0.834	3.5E-06	0.00	1.8E-06
80.00	7.56	0.98	0.806	3.7E-06	0.01	1.9E-06
90.00	7.59	0.95	0.778	3.8E-06	0.01	1.9E-06
100.00	7.61	0.93	0.764	2.0E-06	0.00	1.0E-06
110.00	7.64	0.90	0.736	4.0E-06	0.01	2.0E-06
120.00	7.66	0.88	0.722	2.1E-06	0.00	1.1E-06
130.00	7.70	0.85	0.694	4.3E-06	0.01	2.2E-06
140.00	7.71	0.83	0.680	2.2E-06	0.00	1.1E-06
150.00	7.75	0.80	0.652	4.5E-06	0.01	2.3E-06

Represent slope using 2 points.

		Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.02	1.22			
	20.00	1.15	3.1E-06	0.004	1.6E-06
Lower Portion	25.00	1.14			
	80.00	0.983	2.8E-06	0.004	1.4E-06

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				PZ-3 (2006)	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	PZ-3 (2006)
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/02/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	679.30



WELL DETAILS

d Casing diameter, inches: 1.00

D Effective diameter, inches: 2.50

TEST INTERVAL DETAILS

dt Depth to top of screen interval, feet
(below ground surface): 19.6

db Depth to bottom of screen interval, feet
(below ground surface): 31.6

L Length, feet: 12.00

Hs Static Water Level
(feet above troll or well bot): 11.97

DTW feet below top of riser: 12.82

m Estimate: 1
(Ratio Kh/Kv)

LITHOLOGY: fractured bedrock
TEST: slug in

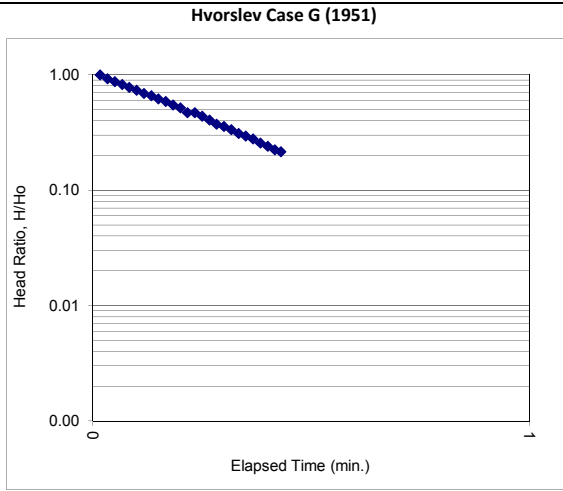
t ELAPSED TIME (min)	MEASURED HEAD (feet above troll or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	15.59	3.62	1			
0.07	15.58	3.61	0.995	3.2E-05	0.05	1.6E-05
0.22	15.56	3.59	0.991	1.1E-05	0.02	5.5E-06
0.37	15.54	3.57	0.986	1.1E-05	0.02	5.5E-06
0.60	15.53	3.56	0.981	7.0E-06	0.01	3.6E-06
1.10	15.51	3.54	0.977	3.3E-06	0.00	1.7E-06
1.30	15.49	3.52	0.972	7.8E-06	0.01	4.0E-06
1.60	15.46	3.49	0.963	1.1E-05	0.02	5.6E-06
2.00	15.44	3.47	0.958	4.2E-06	0.01	2.1E-06
3.00	15.41	3.44	0.949	3.4E-06	0.00	1.7E-06
5.00	15.39	3.42	0.944	8.5E-07	0.00	4.3E-07
7.00	15.37	3.40	0.939	8.6E-07	0.00	4.3E-07
10.00	15.34	3.37	0.930	1.1E-06	0.00	5.8E-07
12.00	15.31	3.34	0.921	1.7E-06	0.00	8.8E-07
15.00	15.29	3.32	0.916	5.8E-07	0.00	3.0E-07
17.00	15.27	3.30	0.911	8.8E-07	0.00	4.5E-07
19.00	15.24	3.27	0.902	1.8E-06	0.00	9.0E-07
21.00	15.24	3.27	0.902	--	--	--
23.00	15.20	3.23	0.892	1.8E-06	0.00	9.1E-07
25.20	15.19	3.22	0.888	8.2E-07	0.00	4.2E-07
28.20	15.17	3.20	0.883	6.1E-07	0.00	3.1E-07
30.20	15.15	3.18	0.879	8.6E-07	0.00	4.4E-07
38.53	15.14	3.17	0.874	2.2E-07	0.00	1.1E-07
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Represent slope using 2 points.

		Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.07	3.61			
	1.30	3.57	2.6E-06	0.004	1.3E-06
Lower Portion	3.00	3.54			
	12.00	3.488	5.4E-07	0.001	2.8E-07

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				PZ-SEA-1Z	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	PZ-SEA-1Z
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	672.81



WELL DETAILS

d Casing diameter, inches: 2.00

D Effective diameter, inches: 5.88

TEST INTERVAL DETAILS

dt Depth to top of screen interval, feet
(below ground surface): 55.0

db Depth to bottom of screen interval, feet
(below ground surface): 67.0

L Length, feet: 12.00

Hs Static Water Level
(feet above troll or well bot): 12.6

DTW feet below top of riser: 15.98

m Estimate: 1
(Ratio Kh/Kv)

LITHOLOGY: Fractured bedrock

TEST: slug out

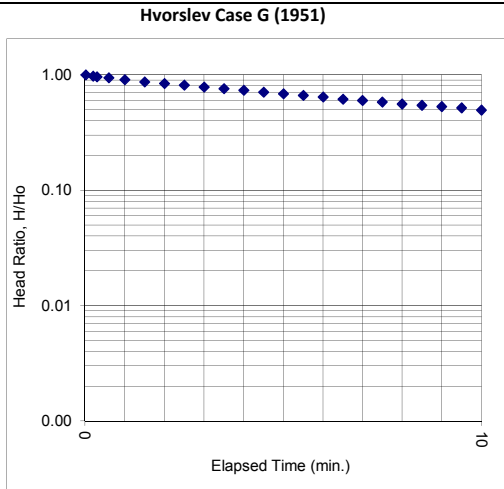
t ELAPSED TIME (min)	MEASURED HEAD (feet above troll or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	10.46	2.14	1			
0.03	10.61	1.99	0.929	5.0E-03	7.16	2.5E-03
0.05	10.73	1.87	0.873	4.2E-03	6.00	2.1E-03
0.07	10.83	1.77	0.826	3.8E-03	5.45	1.9E-03
0.08	10.93	1.67	0.779	4.0E-03	5.72	2.0E-03
0.10	11.02	1.58	0.739	3.5E-03	5.09	1.8E-03
0.12	11.12	1.48	0.691	4.5E-03	6.48	2.3E-03
0.13	11.19	1.41	0.660	3.1E-03	4.50	1.6E-03
0.15	11.27	1.33	0.620	4.2E-03	6.03	2.1E-03
0.17	11.34	1.26	0.589	3.5E-03	5.11	1.8E-03
0.18	11.42	1.18	0.549	4.7E-03	6.79	2.4E-03
0.20	11.49	1.11	0.517	4.0E-03	5.80	2.0E-03
0.22	11.59	1.01	0.470	6.5E-03	9.30	3.3E-03
0.23	11.59	1.01	0.470	--	--	--
0.25	11.66	0.94	0.438	4.7E-03	6.80	2.4E-03
0.27	11.73	0.87	0.407	5.1E-03	7.31	2.6E-03
0.28	11.80	0.80	0.375	5.5E-03	7.91	2.8E-03
0.30	11.83	0.77	0.359	2.9E-03	4.21	1.5E-03
0.32	11.88	0.72	0.336	4.5E-03	6.54	2.3E-03
0.33	11.93	0.67	0.312	5.0E-03	7.16	2.5E-03
0.35	11.97	0.63	0.296	3.5E-03	5.08	1.8E-03
0.37	12.00	0.60	0.280	3.7E-03	5.36	1.9E-03
0.38	12.05	0.55	0.256	6.0E-03	8.64	3.0E-03
0.40	12.09	0.51	0.240	4.3E-03	6.22	2.2E-03
0.42	12.12	0.48	0.225	4.6E-03	6.65	2.3E-03
0.43	12.14	0.46	0.217	3.0E-03	4.38	1.5E-03

Represent slope using 2 points.

		Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.03	1.99			
	0.07	1.77	4.0E-03	5.73	2.0E-03
Lower Portion	0.10	1.58			
	0.13	1.414	3.8E-03	5.49	1.9E-03

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				PZ-SEA-3Z	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	PZ-SEA-3Z
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	668.37



WELL DETAILS

d Casing diameter, inches: 2.00

D Effective diameter, inches: 5.88

TEST INTERVAL DETAILS

dt Depth to top of screen interval, feet
(below ground surface): 7.5

db Depth to bottom of screen interval, feet
(below ground surface): 19.5

L Length, feet: 12.00

Hs Static Water Level
(feet above troll or well bot): 19.10

DTW feet below top of riser: 15.32

m Estimate: 1
(Ratio Kh/Kv)

LITHOLOGY: fractured bedrock

TEST: slug out

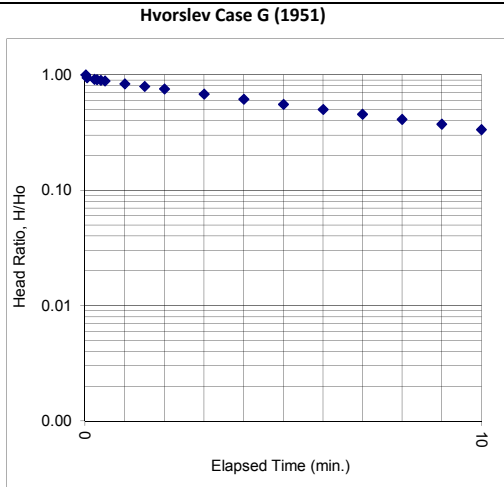
t ELAPSED TIME (min)	MEASURED HEAD (feet above troll or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	16.71	2.39	1			
0.20	16.76	2.34	0.979	1.3E-04	0.19	6.7E-05
0.30	16.80	2.30	0.964	1.7E-04	0.24	8.4E-05
0.60	16.85	2.25	0.943	8.2E-05	0.12	4.2E-05
1.00	16.93	2.17	0.908	1.1E-04	0.16	5.5E-05
1.50	17.02	2.08	0.872	9.0E-05	0.13	4.6E-05
2.00	17.09	2.02	0.844	7.5E-05	0.11	3.8E-05
2.50	17.15	1.95	0.815	7.7E-05	0.11	3.9E-05
3.00	17.22	1.88	0.787	7.9E-05	0.11	4.0E-05
3.50	17.29	1.81	0.759	8.3E-05	0.12	4.2E-05
4.00	17.34	1.76	0.737	6.4E-05	0.09	3.3E-05
4.50	17.41	1.69	0.709	8.9E-05	0.13	4.5E-05
5.00	17.46	1.64	0.688	6.9E-05	0.10	3.5E-05
5.50	17.51	1.59	0.667	7.0E-05	0.10	3.5E-05
6.00	17.56	1.54	0.645	7.3E-05	0.11	3.7E-05
6.50	17.63	1.47	0.617	1.0E-04	0.15	5.2E-05
7.00	17.66	1.44	0.603	5.3E-05	0.08	2.7E-05
7.50	17.71	1.39	0.581	8.1E-05	0.12	4.1E-05
8.00	17.76	1.34	0.560	8.4E-05	0.12	4.3E-05
8.50	17.80	1.30	0.546	5.8E-05	0.08	2.9E-05
9.00	17.83	1.27	0.531	6.0E-05	0.09	3.0E-05
9.50	17.86	1.24	0.518	5.9E-05	0.09	3.0E-05
10.00	17.92	1.19	0.496	9.5E-05	0.14	4.8E-05
11.00	17.98	1.12	0.468	6.7E-05	0.10	3.4E-05
12.00	18.05	1.05	0.439	7.1E-05	0.10	3.6E-05
13.00	18.10	1.00	0.418	5.6E-05	0.08	2.9E-05

Represent slope using 2 points.

	Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.20	2.34		
	0.60	2.25	1.0E-04	5.2E-05
Lower Portion	4.00	1.76		
	6.00	1.541	7.5E-05	3.8E-05

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				PZ-SEA-5Z	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	PZ-SEA-5Z
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	659.04



WELL DETAILS

d Casing diameter, inches: 2.00

D Effective diameter, inches: 5.88

TEST INTERVAL DETAILS

dt Depth to top of screen interval, feet
(below ground surface): 42.4

db Depth to bottom of screen interval, feet
(below ground surface): 54.4

L Length, feet: 12.00

Hs Static Water Level
(feet above trol or well bot): 8.10

DTW feet below top of riser: 10.65

m Estimate: 1
(Ratio Kh/Kv)

LITHOLOGY: fractured bedrock
TEST: slug out

t ELAPSED TIME (min)	MEASURED HEAD (feet above trol or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	3.661	4.44	1			
0.05	3.898	4.20	0.947	1.9E-03	2.67	9.4E-04
0.23	4.034	4.07	0.916	2.0E-04	0.29	1.0E-04
0.30	4.068	4.03	0.908	1.4E-04	0.20	7.2E-05
0.40	4.119	3.98	0.897	1.4E-04	0.21	7.3E-05
0.50	4.153	3.95	0.889	9.7E-05	0.14	4.9E-05
1.00	4.373	3.73	0.840	1.3E-04	0.19	6.6E-05
1.50	4.559	3.54	0.798	1.2E-04	0.17	5.9E-05
2.00	4.746	3.35	0.756	1.2E-04	0.18	6.2E-05
3.00	5.068	3.03	0.683	1.1E-04	0.16	5.8E-05
4.00	5.356	2.74	0.618	1.1E-04	0.16	5.7E-05
5.00	5.627	2.47	0.557	1.2E-04	0.17	5.9E-05
6.00	5.864	2.24	0.504	1.1E-04	0.16	5.8E-05
7.00	6.068	2.03	0.458	1.1E-04	0.16	5.5E-05
8.00	6.271	1.83	0.412	1.2E-04	0.17	6.0E-05
9.00	6.441	1.66	0.374	1.1E-04	0.16	5.6E-05
10.00	6.61	1.49	0.336	1.2E-04	0.17	6.1E-05
11.00	6.746	1.35	0.305	1.1E-04	0.16	5.5E-05
12.00	6.881	1.22	0.275	1.2E-04	0.17	6.0E-05
13.00	6.983	1.12	0.252	9.8E-05	0.14	5.0E-05
14.00	7.085	1.02	0.229	1.1E-04	0.16	5.5E-05
15.00	7.186	0.91	0.206	1.2E-04	0.17	6.0E-05
16.00	7.271	0.83	0.187	1.1E-04	0.16	5.6E-05
18.00	7.407	0.69	0.156	1.0E-04	0.15	5.1E-05
20.00	7.508	0.59	0.133	8.9E-05	0.13	4.5E-05
22.00	7.593	0.51	0.114	8.7E-05	0.13	4.4E-05

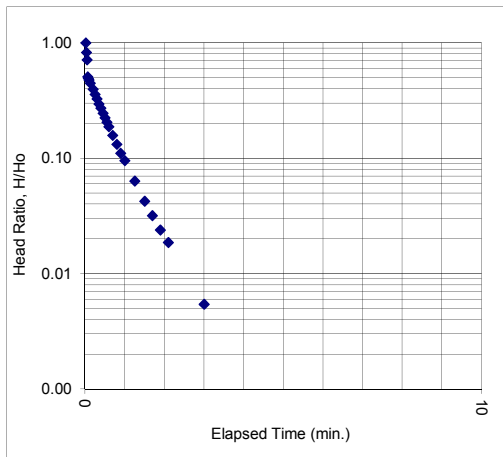
Represent slope using 2 points.

	Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.05	4.20		
	0.30	4.03	1.9E-04	9.4E-05
Lower Portion	1.50	3.54		
	3.00	3.032	1.2E-04	5.9E-05

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				PZ-SEA-6Z	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	PZ-SEA-6Z
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	671.27

Hvorslev Case G (1951)



WELL DETAILS

d Casing diameter, inches:	<u>2.00</u>
D Effective diameter, inches:	<u>5.88</u>
TEST INTERVAL DETAILS	
dt Depth to top of screen interval, feet (below ground surface):	<u>59.9</u>
db Depth to bottom of screen interval, feet (below ground surface):	<u>71.9</u>
L Length, feet:	<u>12.00</u>
Hs Static Water Level	
(feet above troll or well bot):	<u>17.12</u>
DTW feet below top of riser	<u>17.11</u>
m Estimate:	<u>1</u>
(Ratio Kh/Kv)	

LITHOLOGY: fractured bedrock

TEST: slug out

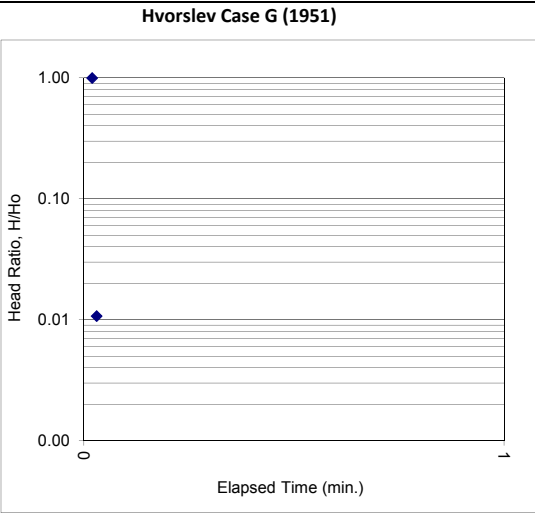
t ELAPSED TIME (min)	MEASURED HEAD (feet above troll or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	10.695	6.43	1			
0.03	11.797	5.32	0.828	1.3E-02	18.31	6.5E-03
0.05	12.525	4.60	0.715	9.9E-03	14.31	5.0E-03
0.07	13.847	3.27	0.509	2.3E-02	33.01	1.2E-02
0.08	13.949	3.17	0.494	2.1E-03	3.08	1.1E-03
0.10	14.051	3.07	0.478	2.2E-03	3.18	1.1E-03
0.13	14.237	2.88	0.449	2.1E-03	3.04	1.1E-03
0.20	14.576	2.54	0.396	2.1E-03	3.04	1.1E-03
0.25	14.814	2.31	0.359	2.2E-03	3.19	1.1E-03
0.30	15.017	2.10	0.327	2.1E-03	2.99	1.1E-03
0.35	15.22	1.90	0.296	2.3E-03	3.29	1.2E-03
0.40	15.373	1.75	0.272	1.9E-03	2.72	9.6E-04
0.45	15.542	1.58	0.246	2.3E-03	3.30	1.2E-03
0.50	15.678	1.44	0.224	2.0E-03	2.92	1.0E-03
0.55	15.797	1.32	0.206	1.9E-03	2.79	9.9E-04
0.60	15.915	1.21	0.188	2.1E-03	3.03	1.1E-03
0.70	16.102	1.02	0.158	1.9E-03	2.73	9.6E-04
0.80	16.271	0.85	0.132	2.0E-03	2.94	1.0E-03
0.90	16.407	0.71	0.111	2.0E-03	2.83	1.0E-03
1.00	16.508	0.61	0.095	1.7E-03	2.48	8.7E-04
1.25	16.712	0.41	0.064	1.8E-03	2.63	9.3E-04
1.50	16.847	0.27	0.042	1.8E-03	2.61	9.2E-04
1.70	16.915	0.21	0.032	1.6E-03	2.32	8.2E-04
1.90	16.966	0.15	0.024	1.6E-03	2.32	8.2E-04
2.10	17	0.12	0.019	1.4E-03	2.02	7.1E-04
3.00	17.085	0.04	0.005	1.5E-03	2.22	7.8E-04

Represent slope using 2 points.

	Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.07	3.27		
	0.13	2.88	2.1E-03	3.09
Lower Portion	0.30	2.10		
	0.50	1.442	2.1E-03	3.06

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				MW-SEA-1A	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	MW-SEA-1A
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	673.06



WELL DETAILS

d Casing diameter, inches: 2.00

D Effective diameter, inches: 5.88

TEST INTERVAL DETAILS

dt Depth to top of screen interval, feet
(below ground surface): 10.1

db Depth to bottom of screen interval, feet
(below ground surface): 22.1

L Length, feet: 12.00

Hs Static Water Level
(feet above troll or well bot): 14.56

DTW feet below top of riser: 16.28

m Estimate: 1
(Ratio Kh/Kv)

LITHOLOGY: fractured bedrock
TEST: slug in

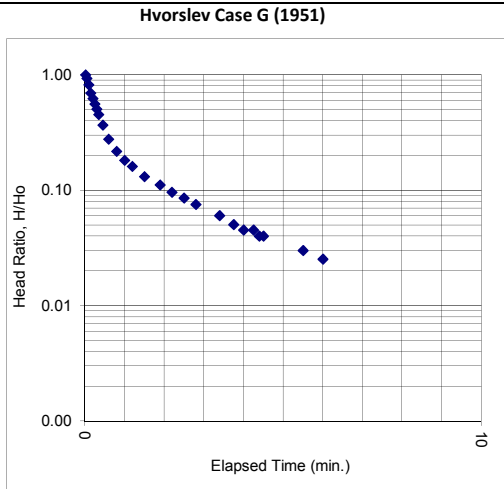
t ELAPSED TIME (min)	MEASURED HEAD (feet above troll or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	15.49	0.93	1			
0.03	14.57	0.01	0.011	5.1E-01	734.92	2.6E-01
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Represent slope using 2 points.

		Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.02	0.93			
	0.03	0.01	5.1E-01	734.92	2.6E-01
Lower Portion	0.00	0.00			
	0.00	0.000			

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				MW-SEA-1B	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	MW-SEA-1B
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	673.22



WELL DETAILS

d Casing diameter, inches: 2.00

D Effective diameter, inches: 5.88

TEST INTERVAL DETAILS

dt Depth to top of screen interval, feet
(below ground surface): 10.1

db Depth to bottom of screen interval, feet
(below ground surface): 22.1

L Length, feet: 12.00

Hs Static Water Level
(feet above trol or well bot): 5.93

DTW feet below top of riser: 16.19

m Estimate: 1
(Ratio Kh/Kv)

LITHOLOGY: fractured bedrock
TEST: slug out

t ELAPSED TIME (min)	MEASURED HEAD (feet above trol or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	2.58	3.36	1			
0.05	2.80	3.14	0.934	2.3E-03	3.31	1.2E-03
0.10	3.17	2.76	0.823	2.8E-03	4.10	1.4E-03
0.15	3.59	2.34	0.697	3.8E-03	5.40	1.9E-03
0.20	3.83	2.10	0.626	2.4E-03	3.48	1.2E-03
0.25	4.05	1.88	0.560	2.5E-03	3.59	1.3E-03
0.30	4.24	1.70	0.505	2.3E-03	3.38	1.2E-03
0.35	4.41	1.53	0.454	2.4E-03	3.43	1.2E-03
0.45	4.70	1.24	0.369	2.4E-03	3.39	1.2E-03
0.60	5.00	0.93	0.278	2.1E-03	3.06	1.1E-03
0.80	5.20	0.73	0.217	1.4E-03	1.99	7.0E-04
1.00	5.32	0.61	0.182	1.0E-03	1.44	5.1E-04
1.20	5.39	0.54	0.162	6.7E-04	0.96	3.4E-04
1.50	5.49	0.44	0.131	7.8E-04	1.13	4.0E-04
1.90	5.56	0.37	0.111	4.7E-04	0.67	2.4E-04
2.20	5.61	0.32	0.096	5.5E-04	0.79	2.8E-04
2.50	5.64	0.29	0.086	4.2E-04	0.60	2.1E-04
2.80	5.68	0.25	0.076	4.7E-04	0.68	2.4E-04
3.40	5.73	0.20	0.060	4.2E-04	0.61	2.1E-04
3.75	5.76	0.17	0.050	5.9E-04	0.85	3.0E-04
4.00	5.78	0.15	0.045	4.8E-04	0.69	2.4E-04
4.25	5.78	0.15	0.045	--	--	--
4.40	5.80	0.14	0.040	8.9E-04	1.28	4.5E-04
4.50	5.80	0.14	0.040	--	--	--
5.50	5.83	0.10	0.030	3.3E-04	0.47	1.7E-04
6.00	5.85	0.09	0.025	3.9E-04	0.56	2.0E-04

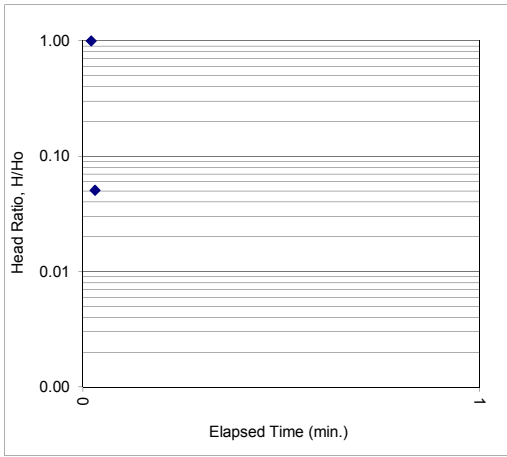
Represent slope using 2 points.

	Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.05	3.14		
	0.15	2.34	3.3E-03	4.75
Lower Portion	0.25	1.88		1.7E-03
	0.35	1.525	2.4E-03	3.40
				1.2E-03

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				MW-SEA-2A	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	MW-SEA-2A
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	668.62

Hvorslev Case G (1951)



WELL DETAILS

d Casing diameter, inches: 2.00

D Effective diameter, inches: 5.88

TEST INTERVAL DETAILS

dt Depth to top of screen interval, feet
(below ground surface): 27.5

db Depth to bottom of screen interval, feet
(below ground surface): 52.5

L Length, feet: 25.00

Hs Static Water Level
(feet above troll or well bot): 12.97

DTW feet below top of riser: 12.82

m Estimate: 1

(Ratio Kh/Kv)

LITHOLOGY: fractured bedrock

TEST: slug out

t ELAPSED TIME (min)	MEASURED HEAD (feet above troll or well bot.)	Drawdown H Relative Head (feet above/below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	7.25	5.72	1			
0.03	12.68	0.29	0.051	1.9E-01	275.84	9.7E-02

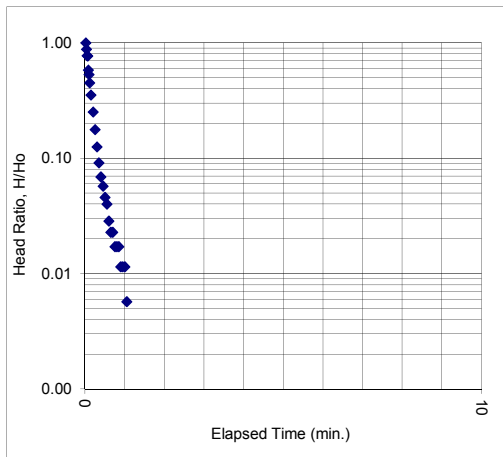
Represent slope using 2 points.

	t	Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.02	5.72			
	0.03	0.29	1.9E-01	275.84	9.7E-02
Lower Portion	0.00	0.00			
	0.00	0.000			

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				MW-SEA-2B	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	MW-SEA-2B
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	669.09

Hvorslev Case G (1951)



WELL DETAILS

d Casing diameter, inches:	<u>2.00</u>
D Effective diameter, inches:	<u>5.88</u>
TEST INTERVAL DETAILS	
dt Depth to top of screen interval, feet (below ground surface):	<u>9.2</u>
db Depth to bottom of screen interval, feet (below ground surface):	<u>21.2</u>
L Length, feet:	<u>12.00</u>
Hs Static Water Level (feet above trol or well bot): <u>8.05</u>	
DTW feet below top of riser	<u>13.17</u>
m Estimate:	<u>1</u>
(Ratio Kh/Kv)	

LITHOLOGY: fractured bedrock

TEST: slug out

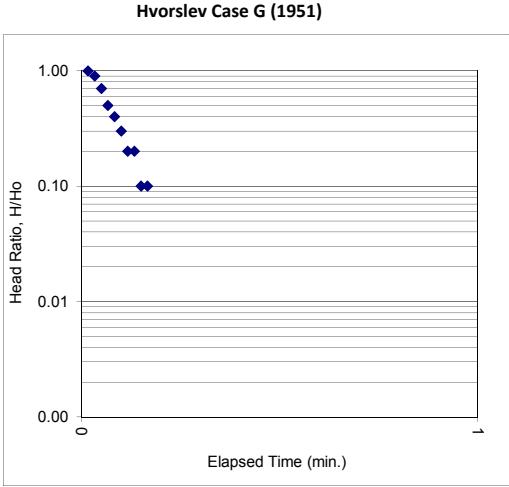
t ELAPSED TIME (min)	MEASURED HEAD (feet above trol or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	5.09	2.97	1			
0.03	5.44	2.61	0.880	8.6E-03	12.44	4.4E-03
0.05	5.75	2.31	0.777	8.4E-03	12.09	4.3E-03
0.07	5.76	2.29	0.771	5.0E-04	0.72	2.6E-04
0.08	6.32	1.73	0.583	1.9E-02	27.25	9.6E-03
0.10	6.48	1.58	0.531	6.3E-03	9.01	3.2E-03
0.12	6.71	1.34	0.451	1.1E-02	15.85	5.6E-03
0.15	7.00	1.05	0.354	8.2E-03	11.78	4.2E-03
0.20	7.31	0.75	0.252	7.7E-03	11.12	3.9E-03
0.25	7.53	0.53	0.177	7.9E-03	11.33	4.0E-03
0.30	7.68	0.37	0.126	7.7E-03	11.15	3.9E-03
0.35	7.78	0.27	0.091	7.2E-03	10.36	3.7E-03
0.40	7.85	0.20	0.069	6.4E-03	9.21	3.2E-03
0.45	7.88	0.17	0.057	4.1E-03	5.91	2.1E-03
0.50	7.92	0.14	0.046	5.0E-03	7.24	2.6E-03
0.55	7.93	0.12	0.040	3.0E-03	4.33	1.5E-03
0.60	7.97	0.09	0.029	7.6E-03	10.91	3.8E-03
0.65	7.98	0.07	0.023	5.0E-03	7.24	2.6E-03
0.70	7.98	0.07	0.023	--	--	--
0.75	8.00	0.05	0.017	6.5E-03	9.33	3.3E-03
0.80	8.00	0.05	0.017	--	--	--
0.85	8.00	0.05	0.017	--	--	--
0.90	8.02	0.03	0.011	9.1E-03	13.15	4.6E-03
0.95	8.02	0.03	0.011	--	--	--
1.00	8.02	0.03	0.011	--	--	--
1.05	8.03	0.02	0.006	1.6E-02	22.48	7.9E-03

Represent slope using 2 points.

	Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.03	2.61		
	0.07	2.29	4.4E-03	6.40
Lower Portion	0.15	1.05		2.3E-03
	0.25	0.526	7.8E-03	11.22
				4.0E-03

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				MW-SEA-3A	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	MW-SEA-3A
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	669.01



WELL DETAILS

d Casing diameter, inches: 2.00

D Effective diameter, inches: 5.88

TEST INTERVAL DETAILS

dt Depth to top of screen interval, feet
(below ground surface): 30.7

db Depth to bottom of screen interval, feet
(below ground surface): 47.7

L Length, feet: 17.00

Hs Static Water Level
(feet above troll or well bot): 17.00

DTW feet below top of riser 14.35

m Estimate: 1
(Ratio Kh/Kv)

LITHOLOGY: fractured bedrock

TEST: slug out

t ELAPSED TIME (min)	MEASURED HEAD (feet above troll or well bot.)	Drawdown H Relative Head (feet above/below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	16.83	0.17	1			
0.03	16.85	0.15	0.905	5.2E-03	7.44	2.6E-03
0.05	16.88	0.12	0.704	1.3E-02	18.80	6.6E-03
0.07	16.92	0.09	0.503	1.7E-02	25.17	8.9E-03
0.08	16.93	0.07	0.402	1.2E-02	16.70	5.9E-03
0.10	16.95	0.05	0.302	1.5E-02	21.52	7.6E-03
0.12	16.97	0.03	0.201	2.1E-02	30.34	1.1E-02
0.13	16.97	0.03	0.201	--	--	--
0.15	16.98	0.02	0.101	3.6E-02	51.86	1.8E-02
0.17	16.98	0.02	0.101	--	--	--

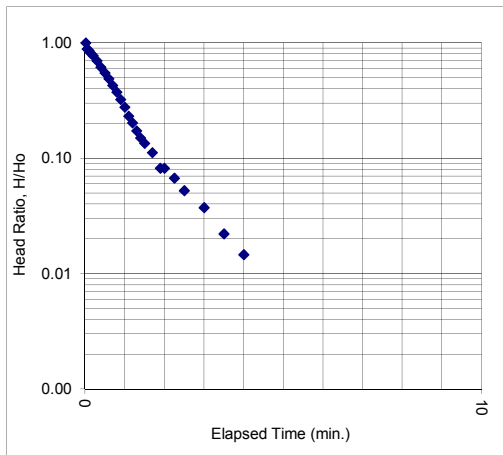
Represent slope using 2 points.

	Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.03	0.15		
	0.07	0.09	1.5E-02	21.99
Lower Portion	0.07	0.09		7.8E-03
	0.17	0.017	1.4E-02	20.07
				7.1E-03

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				MW-SEA-3B	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	MW-SEA-3B
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	668.64

Hvorslev Case G (1951)



WELL DETAILS

d Casing diameter, inches:	<u>2.00</u>
D Effective diameter, inches:	<u>5.88</u>
TEST INTERVAL DETAILS	
dt Depth to top of screen interval, feet (below ground surface):	<u>7.5</u>
db Depth to bottom of screen interval, feet (below ground surface):	<u>19.5</u>
L Length, feet:	<u>12.00</u>
Hs Static Water Level (feet above troll or well bot): <u>8.66</u>	
DTW feet below top of riser	<u>10.8</u>
m Estimate:	<u>1</u>
(Ratio Kh/Kv)	

LITHOLOGY: fractured bedrock

TEST: slug out

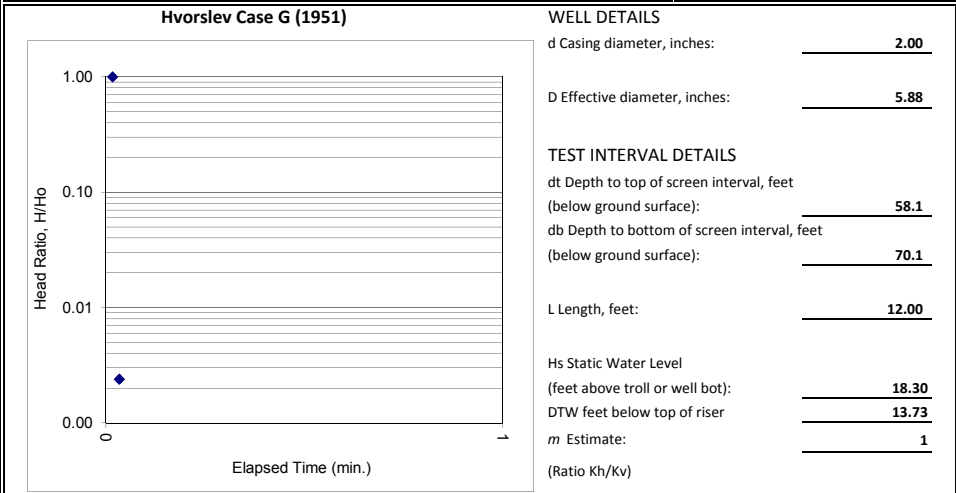
t ELAPSED TIME (min)	MEASURED HEAD (feet above troll or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	6.407	2.25	1			
0.05	6.661	2.00	0.887	4.0E-03	5.82	2.1E-03
0.1	6.729	1.93	0.857	7.8E-04	1.12	4.0E-04
0.15	6.831	1.83	0.812	1.2E-03	1.76	6.2E-04
0.2	6.915	1.75	0.775	1.1E-03	1.52	5.4E-04
0.3	7.085	1.58	0.699	1.2E-03	1.66	5.9E-04
0.4	7.271	1.39	0.617	1.4E-03	2.04	7.2E-04
0.5	7.424	1.24	0.549	1.3E-03	1.89	6.7E-04
0.6	7.559	1.10	0.489	1.3E-03	1.88	6.6E-04
0.7	7.695	0.97	0.428	1.5E-03	2.14	7.5E-04
0.8	7.814	0.85	0.375	1.5E-03	2.13	7.5E-04
0.9	7.932	0.73	0.323	1.7E-03	2.44	8.6E-04
1	8.034	0.63	0.278	1.7E-03	2.45	8.6E-04
1.1	8.136	0.52	0.233	2.0E-03	2.88	1.0E-03
1.2	8.203	0.46	0.203	1.5E-03	2.22	7.8E-04
1.3	8.271	0.39	0.173	1.8E-03	2.61	9.2E-04
1.4	8.322	0.34	0.150	1.6E-03	2.28	8.0E-04
1.5	8.356	0.30	0.135	1.2E-03	1.72	6.1E-04
1.7	8.407	0.25	0.112	1.0E-03	1.49	5.3E-04
1.9	8.475	0.19	0.082	1.8E-03	2.54	9.0E-04
2	8.475	0.19	0.082	--	--	--
2.25	8.508	0.15	0.067	8.8E-04	1.27	4.5E-04
2.5	8.542	0.12	0.052	1.1E-03	1.64	5.8E-04
3	8.576	0.08	0.037	7.7E-04	1.10	3.9E-04
3.5	8.61	0.05	0.022	1.2E-03	1.68	5.9E-04
4	8.627	0.03	0.015	9.4E-04	1.35	4.8E-04

Represent slope using 2 points.

	Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.05	2.00		
	0.15	1.83	1.0E-03	1.44
Lower Portion	0.50	1.24		5.1E-04
	0.70	0.965	1.4E-03	2.01
				7.1E-04

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				MW-SEA-3Z	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	MW-SEA-3Z
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	668.37



LITHOLOGY: fractured bedrock
TEST: slug out

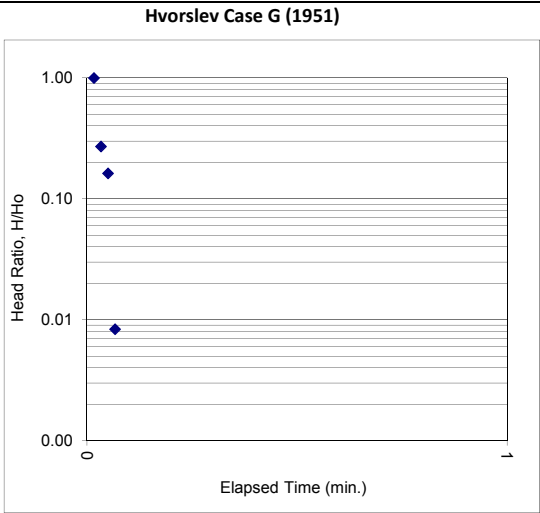
t ELAPSED TIME (min)	MEASURED HEAD (feet above troll or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	14.14	4.16	1			
0.03	18.29	0.01	0.002	4.1E-01	586.70	2.1E-01

Represent slope using 2 points.

		Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.02	4.16			
	0.03	0.01	4.1E-01	586.70	2.1E-01
Lower Portion	0.00	0.00			
	0.00	0.000			

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				MW-SEA-4A	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	MW-SEA-4A
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	677.35



WELL DETAILS

d Casing diameter, inches: 2.00

D Effective diameter, inches: 5.88

TEST INTERVAL DETAILS

dt Depth to top of screen interval, feet
(below ground surface): 40.1

db Depth to bottom of screen interval, feet
(below ground surface): 62.1

L Length, feet: 22.00

Hs Static Water Level
(feet above trol or well bot): 11.36

DTW feet below top of riser: 24.21

m Estimate: 1
(Ratio Kh/Kv)

LITHOLOGY: fractured bedrock
TEST: slug out

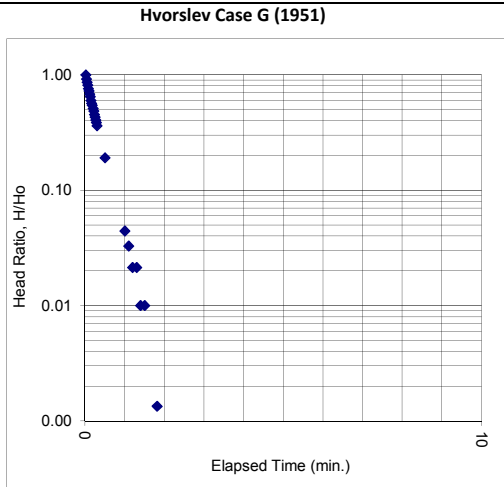
t ELAPSED TIME (min)	MEASURED HEAD (feet above trol or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	7.78	3.58	1			
0.03	10.39	0.97	0.271	5.6E-02	80.09	2.8E-02
0.05	10.78	0.58	0.162	2.2E-02	31.54	1.1E-02
0.07	11.39	0.03	0.008	1.3E-01	181.65	6.4E-02

Represent slope using 2 points.

	Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.02	3.58		
	0.03	0.97	5.6E-02	80.09
Lower Portion	0.05	0.58		
	0.07	0.030	1.3E-01	181.65
				6.4E-02

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				MW-SEA-4B	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	MW-SEA-4B
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	677.82



WELL DETAILS

d Casing diameter, inches: 2.00

D Effective diameter, inches: 8.50

TEST INTERVAL DETAILS

dt Depth to top of screen interval, feet
(below ground surface): 26.0

db Depth to bottom of screen interval, feet
(below ground surface): 38.0

L Length, feet: 12.00

Hs Static Water Level
(feet above trol or well bot): 13.10

DTW feet below top of riser: --

m Estimate: 1

(Ratio Kh/Kv)

LITHOLOGY: fractured bedrock

TEST: slug out

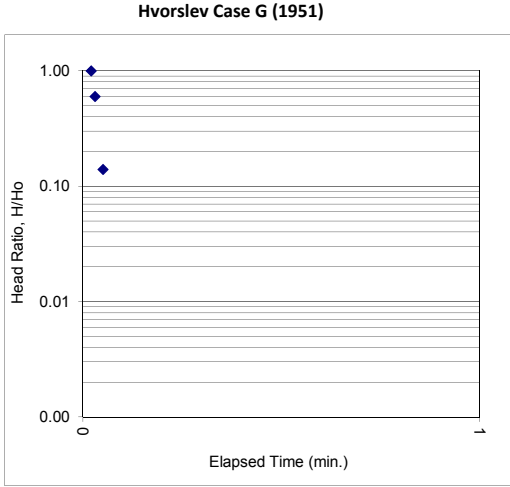
t ELAPSED TIME (min)	MEASURED HEAD (feet above trol or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	11.6	1.49	1			
0.03	11.7	1.37	0.920	5.1E-03	7.33	2.6E-03
0.05	11.8	1.29	0.863	3.9E-03	5.64	2.0E-03
0.07	11.9	1.22	0.818	3.3E-03	4.71	1.7E-03
0.08	12.0	1.13	0.761	4.4E-03	6.37	2.2E-03
0.10	12.0	1.08	0.727	2.8E-03	4.05	1.4E-03
0.12	12.1	1.02	0.681	4.0E-03	5.71	2.0E-03
0.13	12.1	0.96	0.647	3.2E-03	4.54	1.6E-03
0.15	12.2	0.90	0.602	4.4E-03	6.34	2.2E-03
0.17	12.3	0.85	0.568	3.6E-03	5.16	1.8E-03
0.18	12.3	0.81	0.545	2.5E-03	3.61	1.3E-03
0.20	12.3	0.76	0.511	4.0E-03	5.71	2.0E-03
0.22	12.4	0.73	0.488	2.8E-03	4.03	1.4E-03
0.23	12.4	0.68	0.454	4.4E-03	6.41	2.3E-03
0.25	12.5	0.64	0.431	3.2E-03	4.54	1.6E-03
0.27	12.5	0.61	0.408	3.3E-03	4.79	1.7E-03
0.28	12.5	0.57	0.386	3.4E-03	4.91	1.7E-03
0.30	12.6	0.54	0.363	3.7E-03	5.37	1.9E-03
0.50	12.8	0.29	0.192	3.2E-03	4.68	1.7E-03
1.00	13.0	0.07	0.044	3.0E-03	4.30	1.5E-03
1.10	13.1	0.05	0.033	3.0E-03	4.37	1.5E-03
1.20	13.1	0.03	0.021	4.3E-03	6.25	2.2E-03
1.30	13.1	0.03	0.021	--	--	--
1.40	13.1	0.01	0.010	7.7E-03	11.12	3.9E-03
1.50	13.1	0.01	0.010	--	--	--
1.82	13.1	0.00	0.001	6.5E-03	9.34	3.3E-03

Represent slope using 2 points.

	Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.03	1.37		
	0.07	1.22	3.6E-03	5.17
Lower Portion	0.13	0.96		1.8E-03
	0.17	0.846	4.0E-03	5.75
				2.0E-03

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				MW-SEA-5A	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	MW-SEA-5A
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	659.29



WELL DETAILS

d Casing diameter, inches: 2.00

D Effective diameter, inches: 5.88

TEST INTERVAL DETAILS

dt Depth to top of screen interval, feet
(below ground surface): 24.0

db Depth to bottom of screen interval, feet
(below ground surface): 41.0

L Length, feet: 17.00

Hs Static Water Level
(feet above troll or well bot): 14.46

DTW feet below top of riser: 10.55

m Estimate: 1
(Ratio Kh/Kv)

LITHOLOGY: fractured bedrock
TEST: slug out

t ELAPSED TIME (min)	MEASURED HEAD (feet above troll or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	10.97	3.49	1			
0.03	12.37	2.09	0.599	4.4E-02	63.94	2.3E-02
0.05	14.949	0.49	0.140	6.3E-02	90.57	3.2E-02
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Represent slope using 2 points.

	Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.02	3.49		
	0.05	0.49	5.7E-02	81.69
Lower Portion	0.00	0.00		2.9E-02
	0.00	0.000		

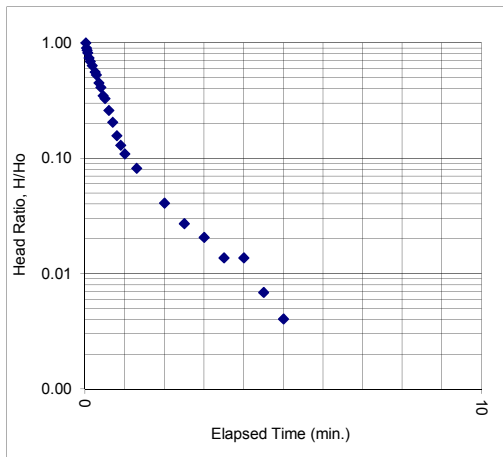
Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.

VARIABLE HEAD PERMEABILITY TEST				MW-SEA-5B		
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1	
LOCATION:	Bergen, NY			BORING :	MW-SEA-5B	
CLIENT:	Waste Management			PROJ NO.:	1328270	
PERFORMED:	M. Cummings	DATE:	10/01/13	TEST NO.:	1	
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER		
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	659.44	
Hvorslev Case G (1951)				WELL DETAILS		
				d Casing diameter, inches:	2.00	
				D Effective diameter, inches:	5.88	
				TEST INTERVAL DETAILS		
				dt Depth to top of screen interval, feet (below ground surface):	11.5	
				db Depth to bottom of screen interval, feet (below ground surface):	23.5	
				L Length, feet:	12.00	
				Hs Static Water Level (feet above troll or well bot):	10.28	
				DTW feet below top of riser	9.55	
				m Estimate:	1	
				(Ratio Kh/Kv)		
LITHOLOGY: fractured bedrock TEST: slug in						
t ELAPSED TIME (min)	MEASURED HEAD (feet above troll or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	13.54	3.26	1			
1.00	13.51	3.23	0.990	1.2E-05	0.02	6.1E-06
2.00	13.46	3.18	0.974	1.8E-05	0.03	8.9E-06
5.00	13.25	2.97	0.912	2.5E-05	0.04	1.3E-05
7.00	13.12	2.84	0.870	2.6E-05	0.04	1.3E-05
10.00	12.95	2.67	0.818	2.3E-05	0.03	1.2E-05
12.00	12.86	2.58	0.792	1.8E-05	0.03	9.3E-06
15.00	12.76	2.48	0.761	1.5E-05	0.02	7.6E-06
17.00	12.71	2.43	0.746	1.2E-05	0.02	5.9E-06
20.00	12.64	2.36	0.725	1.1E-05	0.02	5.4E-06
23.00	12.59	2.31	0.709	8.2E-06	0.01	4.2E-06
25.00	12.54	2.26	0.693	1.3E-05	0.02	6.4E-06
27.00	12.51	2.23	0.683	8.5E-06	0.01	4.3E-06
30.00	12.46	2.18	0.668	8.5E-06	0.01	4.3E-06
32.00	12.42	2.14	0.657	8.9E-06	0.01	4.5E-06
35.00	12.39	2.11	0.647	6.0E-06	0.01	3.0E-06
40.00	12.32	2.04	0.626	7.4E-06	0.01	3.7E-06
45.00	12.25	1.97	0.605	7.6E-06	0.01	3.9E-06
50.00	12.19	1.91	0.584	7.9E-06	0.01	4.0E-06
55.00	12.12	1.84	0.564	8.1E-06	0.01	4.1E-06
60.00	12.10	1.82	0.559	2.1E-06	0.00	1.1E-06
65.00	12.07	1.79	0.548	4.2E-06	0.01	2.2E-06
70.00	12.03	1.75	0.538	4.3E-06	0.01	2.2E-06
75.00	12.00	1.72	0.527	4.4E-06	0.01	2.2E-06
80.00	11.97	1.69	0.517	4.5E-06	0.01	2.3E-06
88.70	11.92	1.64	0.501	4.0E-06	0.01	2.0E-06
Represent slope using 2 points.						
		Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)	
Upper Portion	1.00	3.23				
	10.00	2.97	1.0E-05	0.015	5.2E-06	
Lower Portion	20.00	2.67				
	30.00	2.483	8.1E-06	0.012	4.1E-06	
Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.						

VARIABLE HEAD PERMEABILITY TEST				MW-SEA-6A			
PROJECT: Mill Seat LF Expansion		LOCATION: Bergen, NY		CLIENT: Waste Management		PAGE: 1 of 1	
PERFORMED: M. Cummings	DATE: 10/02/13	CALCULATED: M. Cummings		DATE: 10/03/13	BORING : MW-SEA-6A		
CHECKED: R. Frappa	DATE: 10/07/13	TEST NO.: 1		PROJ NO.: 1328270		TEST NO.: 1	
				TOP RISER		ELEV.: 672.27	
Hvorslev Case G (1951)			WELL DETAILS				
			d Casing diameter, inches: <u>2.00</u>				
			D Effective diameter, inches: <u>5.88</u>				
			TEST INTERVAL DETAILS				
			dt Depth to top of screen interval, feet (below ground surface): <u>33.7</u>				
				db Depth to bottom of screen interval, feet (below ground surface): <u>50.7</u>			
				L Length, feet: <u>17.00</u>			
				Hs Static Water Level (feet above trol or well bot): <u>16.27</u>			
				DTW feet below top of riser: <u>18.1</u>			
				m Estimate: <u>1</u>			
				(Ratio Kh/Kv)			
LITHOLOGY: fractured bedrock							
TEST: slug out							
t ELAPSED TIME (min)	MEASURED HEAD (feet above trol or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)	
0.02	13.85	2.42	1				
0.03	15.36	0.91	0.376	8.5E-02	121.96	4.3E-02	
Represent slope using 2 points.							
		Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)		
Upper Portion	0.02	2.42					
	0.03	0.91	8.5E-02	121.96	4.3E-02		
Lower Portion	0.00	0.00					
	0.00	0.000					
Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.							

VARIABLE HEAD PERMEABILITY TEST				MW-SEA-6B	
PROJECT:	Mill Seat LF Expansion			PAGE:	1 of 1
LOCATION:	Bergen, NY			BORING :	MW-SEA-6B
CLIENT:	Waste Management			PROJ NO.:	1328270
PERFORMED:	M. Cummings	DATE:	10/02/13	TEST NO.:	1
CALCULATED:	M. Cummings	DATE:	10/03/13	TOP RISER	
CHECKED:	R. Frappa	DATE:	10/07/13	ELEV.:	672.22

Hvorslev Case G (1951)



WELL DETAILS

d Casing diameter, inches: 2.00

D Effective diameter, inches: 5.88

TEST INTERVAL DETAILS

dt Depth to top of screen interval, feet
(below ground surface): 10.3

db Depth to bottom of screen interval, feet
(below ground surface): 22.3

L Length, feet: 12.00

Hs Static Water Level
(feet above troll or well bot): 4.22

DTW feet below top of riser: 17.61

m Estimate: 1

(Ratio Kh/Kv)

LITHOLOGY: fractured bedrock

TEST: slug out

t ELAPSED TIME (min)	MEASURED HEAD (feet above troll or well bot.)	Drawdown H Relative Head (feet above/ below static)	H/Ho HEAD RATIO	K (feet/min)	K (feet/day)	K (cm/sec)
0.02	1.746	2.47	1			
0.03	1.983	2.24	0.904	6.8E-03	9.80	3.5E-03
0.05	2.085	2.14	0.863	3.2E-03	4.54	1.6E-03
0.07	2.186	2.03	0.822	3.3E-03	4.71	1.7E-03
0.10	2.39	1.83	0.740	3.6E-03	5.14	1.8E-03
0.13	2.508	1.71	0.692	2.3E-03	3.24	1.1E-03
0.18	2.644	1.58	0.637	1.9E-03	2.68	9.5E-04
0.25	2.831	1.39	0.561	2.1E-03	3.07	1.1E-03
0.28	2.915	1.31	0.527	2.1E-03	3.03	1.1E-03
0.35	3.102	1.12	0.452	2.6E-03	3.76	1.3E-03
0.40	3.203	1.02	0.411	2.1E-03	3.07	1.1E-03
0.45	3.356	0.86	0.349	3.7E-03	5.29	1.9E-03
0.50	3.407	0.81	0.329	1.4E-03	1.97	7.0E-04
0.60	3.576	0.64	0.260	2.6E-03	3.78	1.3E-03
0.70	3.712	0.51	0.205	2.7E-03	3.85	1.4E-03
0.80	3.831	0.39	0.157	3.0E-03	4.33	1.5E-03
0.90	3.898	0.32	0.130	2.1E-03	3.06	1.1E-03
1.00	3.949	0.27	0.110	1.9E-03	2.80	9.9E-04
1.30	4.017	0.20	0.082	1.1E-03	1.56	5.5E-04
2.00	4.119	0.10	0.041	1.1E-03	1.62	5.7E-04
2.50	4.153	0.07	0.027	9.2E-04	1.33	4.7E-04
3.00	4.169	0.05	0.021	6.1E-04	0.88	3.1E-04
3.50	4.186	0.03	0.014	9.1E-04	1.31	4.6E-04
4.00	4.186	0.03	0.014	--	--	--
4.50	4.203	0.02	0.007	1.6E-03	2.25	7.9E-04
5.00	4.21	0.01	0.004	1.2E-03	1.72	6.1E-04

Represent slope using 2 points.

	Rel. Head (ft)	K(ft/min)	K (ft/day)	K (cm/s)
Upper Portion	0.03	2.24		
	0.18	1.58	2.6E-03	3.79
Lower Portion	0.35	1.12		1.3E-03
	0.60	0.644	2.5E-03	3.58
				1.3E-03

Reference: Hvorslev, M.J., Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, U.S. Army Corps of Engineers, April 1951.