AECOM

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April 19, 2010

Richard Goding P.E.
City Engineer/Deputy Director of Public Works
City of Fond du Lac
160 South Macy Street
Fond du Lac, WI 54935

Subject: **Preconstruction Hydraulic Conductivity Testing**
Rueping-Macy Stormwater Quality Pond
Fond du Lac, Wisconsin
AECOM Project No. 60130644 (formerly 103003)

Dear Rick,

This letter presents the results of preconstruction hydraulic conductivity testing performed at the Rueping-Macy site. The testing was conducted to provide information that can be used by construction contractors to estimate likely rates of groundwater recharge that may be encountered during potential excavation dewatering operations in the southern and southwest portions of the site. The test results may also be used to assist construction contractors in evaluating and selecting appropriate methods for excavation dewatering.

On October 30, 2009, AECOM personnel performed a slug test at Monitoring Well OMW3 and pump/recovery tests at Monitoring Wells OMW1 and OMW2. Water levels were recorded using a data logger. Static depths to groundwater were 6.9 feet below ground surface (bgs) in OMW1 (Groundwater Elev. 749.16 feet), 8.7 feet bgs in OMW2 (Groundwater Elev. 748.27 feet), and 9.6 feet bgs in OMW3 (Groundwater Elev. 747.21 feet). All tests were analyzed utilizing the Bouwer-Rice Method for hydraulic conductivity analysis. Monitoring Wells OMW1, OMW2, and OMW3 are depicted on the enclosed Figure 1.

The slug used in the OMW3 test displaced approximately 0.3 gallons of water. A rising-head test was run when the submerged slug was removed from the well. Monitoring Wells OMW1 and OMW2 were dewatered using a 12-volt submersible pump that was removed from the wells at the start of each test. Two rising-head tests were run at OMW1 and one test was run at OMW2.

Test calculation results indicated that the average hydraulic conductivity in the vicinity of Monitoring Wells OMW1, OMW2, and OMW3 ranged from 1.2×10^{-3} centimeters per second (cm/sec) to 1.4×10^{-4} cm/sec. Hydraulic conductivity test results are summarized in the enclosed Table 1. Graphic test results and calculations are also enclosed.

If you have any questions regarding the hydraulic conductivity tests or results, please contact me at (715) 342-3037.

Sincerely,

Phil Eagan
Hydrogeologist
phil.eagan@aecom.com

Enclosures: As Noted

c/enc: Jennifer Easterly, WDNR Oshkosh
Caroline Burger, AECOM
David Senfelds, AECOM

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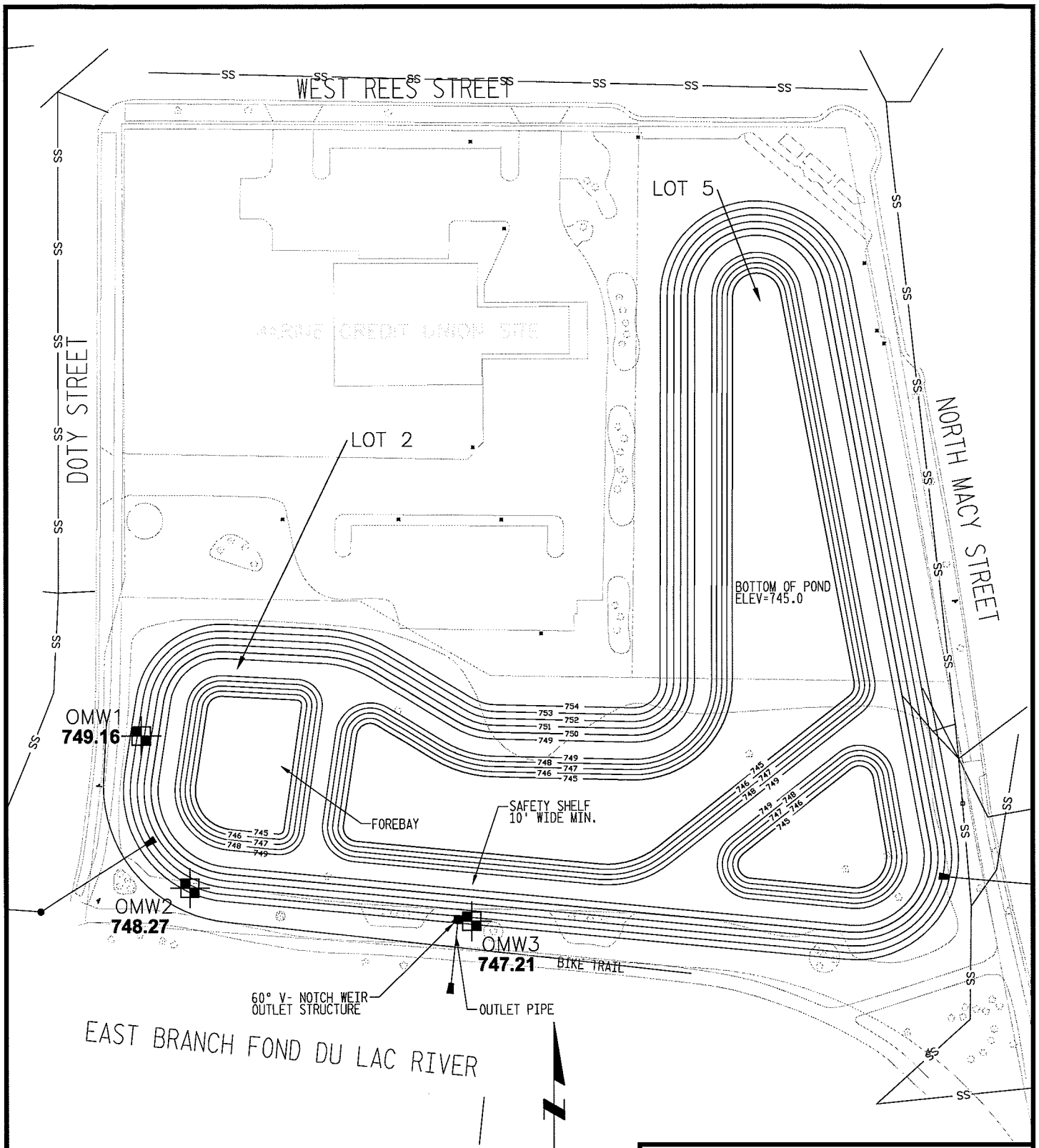

LEGEND

OMW1 MONITORING WELL/TEST LOCATION

749.16 GROUNDWATER ELEVATION ON OCTOBER 30, 2009

AECOM

FIGURE 1

HYDRAULIC CONDUCTIVITY TEST LOCATIONS
RUEPING-MACY SITE
FOND DU LAC, WISCONSIN

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
fig2-3.dwg	DMA	000000	03/2010	1

Plotted By: mittelsteadtk
Layout-Sheet Name: FIGURE 1
Plot File Date Created: Mar/24/2010 4:27 PM

Filename: L:\WORK\PROJECTS\103003\GRA\FIG2-3.DWG

TABLE 1
ESTIMATED HYDRAULIC CONDUCTIVITIES
FORMER RUEPING LEATHER SITE
FOND DU LAC, WISCONSIN

Well	Test Type	Estimated Hydraulic Conductivity	Duration	Method
OMW-3	Slug Test - Rising Head	**1.4×10^{-3} cm/sec**	26 minutes	Bouwer Rice Unconfined Model
OMW-2	Rate of Recovery Test	Early Response 1.4×10^{-5} cm/sec Late Response 4.0×10^{-4} cm/sec **Average Response 7.1×10^{-4} cm/sec**	64 minutes	Bouwer Rice Unconfined Model
OMW-1	Rate of Recovery Test # 1	Early Response 2.5×10^{-3} cm/sec Middle Response 1.7×10^{-4} cm/sec Late Response 5.0×10^{-4} cm/sec **Average Response 1.2×10^{-3} cm/sec**	30 minutes	Bouwer Rice Unconfined Model
OMW-1	Rate of Recovery Test # 2	Early Response 1.5×10^{-3} cm/sec Late Response 2.3×10^{-4} cm/sec **Average Response 8.5×10^{-4} cm/sec**	28 minutes	Bouwer Rice Unconfined Model

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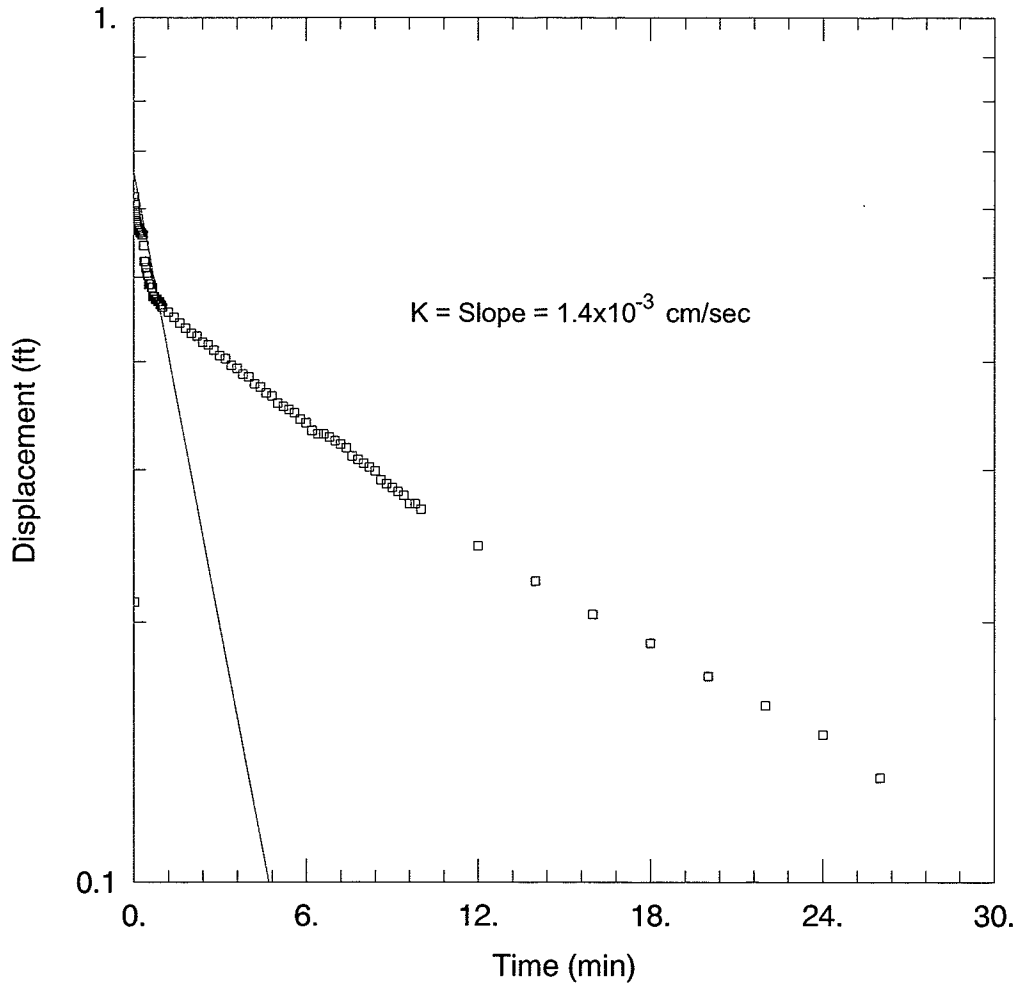


RISING HEAD TEST OMW-3

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW3ris.aqt
Date: 04/06/10 Time: 13:32:33

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Well: OMW3
Test Date: 10-30-2009

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OMW3)

Initial Displacement: 0.62 ft
Total Well Penetration Depth: 4.82 ft
Casing Radius: 0.083 ft
Static Water Column Height: 4.82 ft
Screen Length: 10. ft
Wellbore Radius: 0.33 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.001409 ft/min
y0 = 0.6623 ft

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW3ris.aqt
Title: Rising Head Test OMW-3
Date: 04/06/10
Time: 13:33:06

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Date: 10-30-2009
Test Well: OMW3

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : OMW3

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 0.62 ft
Static Water Column Height: 4.82 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.33 ft
Well Skin Radius: 0.33 ft
Screen Length: 10. ft
Total Well Penetration Depth: 4.82 ft
Corrected Casing Radius (Bouwer-Rice Method): 0.1936 ft
Gravel Pack Porosity: 0.3

No. of Observations: 133

Observation Data

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.0083	0.	0.8	0.472
0.0166	0.053	0.8166	0.472
0.025	0.211	0.8333	0.469
0.0333	0.62	0.85	0.469
0.0416	0.61	0.8666	0.469
0.05	0.607	0.8833	0.469
0.0583	0.594	0.9	0.469
0.0666	0.591	0.9166	0.465
0.075	0.588	0.9333	0.465
0.0833	0.585	0.95	0.465
0.0916	0.582	0.9666	0.465
0.1	0.579	0.9833	0.462
0.1083	0.579	1.	0.462
0.1166	0.576	1.2	0.456
0.125	0.576	1.4	0.45
0.1333	0.576	1.6	0.443
0.1416	0.572	1.8	0.437
0.15	0.572	2.	0.431
0.1583	0.569	2.2	0.428
0.1666	0.569	2.4	0.421
0.175	0.569	2.6	0.418
0.1833	0.569	2.8	0.412
0.1916	0.566	3.	0.406
0.2	0.566	3.2	0.403
0.2083	0.566	3.4	0.396
0.2166	0.566	3.6	0.393
0.225	0.563	3.8	0.387
0.2333	0.563	4.	0.384

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.2416	0.563	4.2	0.377
0.25	0.563	4.4	0.374
0.2583	0.563	4.6	0.368
0.2666	0.563	4.8	0.365
0.275	0.563	5.	0.358
0.2833	0.56	5.2	0.355
0.2916	0.56	5.4	0.352
0.3	0.56	5.6	0.349
0.3083	0.56	5.8	0.343
0.3166	0.56	6.	0.34
0.325	0.56	6.2	0.333
0.3333	0.56	6.4	0.33
0.35	0.544	6.6	0.33
0.3666	0.522	6.8	0.327
0.3833	0.522	7.	0.324
0.4	0.522	7.2	0.321
0.4166	0.513	7.4	0.318
0.4333	0.513	7.6	0.311
0.45	0.506	7.8	0.308
0.4666	0.506	8.	0.305
0.4833	0.503	8.2	0.302
0.5	0.503	8.4	0.299
0.5166	0.491	8.6	0.292
0.5333	0.491	8.8	0.289
0.55	0.491	9.	0.286
0.5666	0.491	9.2	0.283
0.5833	0.491	9.4	0.28
0.6	0.491	9.6	0.274
0.6166	0.487	9.8	0.274
0.6333	0.487	10.	0.27
0.65	0.487	12.	0.245
0.6666	0.475	14.	0.223
0.6833	0.475	16.	0.204
0.7	0.475	18.	0.189
0.7166	0.475	20.	0.173
0.7333	0.475	22.	0.16
0.75	0.472	24.	0.148
0.7666	0.472	26.	0.132
0.7833	0.472		

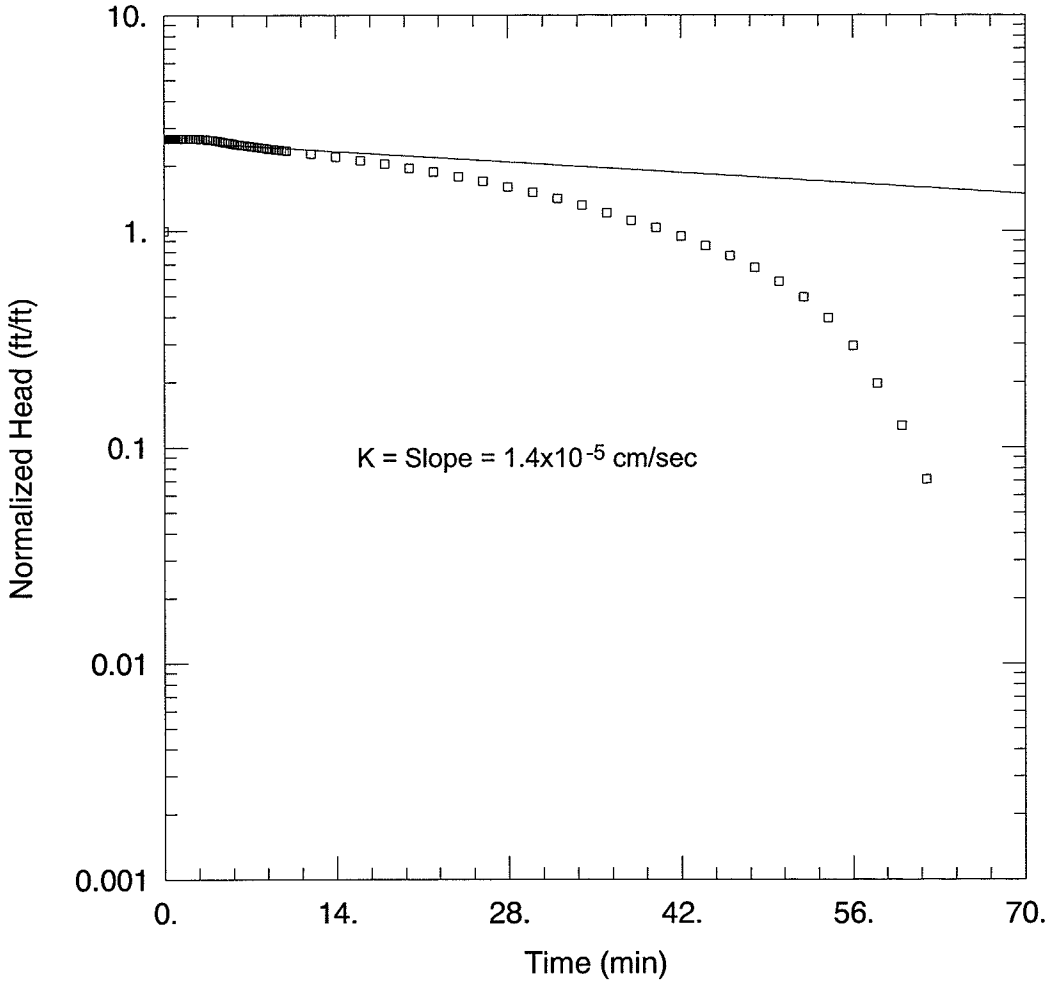
SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
Shape Factor: 1.864

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.001409	ft/min
y0	0.6623	ft



RISING HEAD TEST OMW-2 - RECOVERY TEST - EARLY RESPONSE

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW2recearly.aqt
Date: 04/06/10 Time: 16:05:15

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Well: OMW2
Test Date: 10-30-2009

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OMW2)

Initial Displacement: 0.62 ft
Total Well Penetration Depth: 4.82 ft
Casing Radius: 0.083 ft
Static Water Column Height: 4.82 ft
Screen Length: 10. ft
Wellbore Radius: 0.33 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 1.431E-5 cm/sec
y0 = 1.617 ft

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW2recearlydata.aqt
Title: Rising Head Test OMW-2 - Recovery Test - Early Response
Date: 04/06/10
Time: 16:06:25

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Date: 10-30-2009
Test Well: OMW2

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : OMW2

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 0.62 ft
Static Water Column Height: 4.82 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.33 ft
Well Skin Radius: 0.33 ft
Screen Length: 10. ft
Total Well Penetration Depth: 4.82 ft
Corrected Casing Radius (Bouwer-Rice Method): 0.1936 ft
Gravel Pack Porosity: 0.3

No. of Observations: 152

Observation Data

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.0083	1.655	0.95	1.651
0.0166	1.655	0.9666	1.651
0.025	1.655	0.9833	1.651
0.0333	1.655	1.	1.651
0.0416	1.655	1.2	1.651
0.05	1.655	1.4	1.651
0.0583	1.655	1.6	1.651
0.0666	1.655	1.8	1.651
0.075	1.655	2.	1.655
0.0833	1.655	2.2	1.651
0.0916	1.655	2.4	1.651
0.1	1.655	2.6	1.651
0.1083	1.655	2.8	1.651
0.1166	1.651	3.	1.648
0.125	1.651	3.2	1.648
0.1333	1.655	3.4	1.645
0.1416	1.655	3.6	1.639
0.15	1.655	3.8	1.636
0.1583	1.655	4.	1.63
0.1666	1.651	4.2	1.623
0.175	1.655	4.4	1.617
0.1833	1.655	4.6	1.611
0.1916	1.655	4.8	1.601
0.2	1.655	5.	1.595
0.2083	1.655	5.2	1.589
0.2166	1.655	5.4	1.579
0.225	1.655	5.6	1.57
0.2333	1.655	5.8	1.56

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.2416	1.655	6.	1.557
0.25	1.655	6.2	1.551
0.2583	1.655	6.4	1.545
0.2666	1.651	6.6	1.542
0.275	1.651	6.8	1.532
0.2833	1.655	7.	1.529
0.2916	1.655	7.2	1.523
0.3	1.655	7.4	1.517
0.3083	1.655	7.6	1.51
0.3166	1.655	7.8	1.507
0.325	1.655	8.	1.501
0.3333	1.655	8.2	1.495
0.35	1.655	8.4	1.488
0.3666	1.651	8.6	1.482
0.3833	1.655	8.8	1.479
0.4	1.655	9.	1.476
0.4166	1.655	9.2	1.469
0.4333	1.655	9.4	1.466
0.45	1.655	9.6	1.46
0.4666	1.655	9.8	1.457
0.4833	1.651	10.	1.454
0.5	1.655	12.	1.407
0.5166	1.655	14.	1.36
0.5333	1.655	16.	1.312
0.55	1.651	18.	1.262
0.5666	1.655	20.	1.209
0.5833	1.655	22.	1.159
0.6	1.655	24.	1.102
0.6166	1.655	26.	1.049
0.6333	1.655	28.	0.989
0.65	1.655	30.	0.933
0.6666	1.655	32.	0.873
0.6833	1.655	34.	0.813
0.7	1.651	36.	0.75
0.7166	1.655	38.	0.691
0.7333	1.655	40.	0.641
0.75	1.655	42.	0.584
0.7666	1.651	44.	0.528
0.7833	1.655	46.	0.474
0.8	1.655	48.	0.418
0.8166	1.651	50.	0.361
0.8333	1.655	52.	0.305
0.85	1.651	54.	0.245
0.8666	1.655	56.	0.182
0.8833	1.651	58.	0.122
0.9	1.651	60.	0.078
0.9166	1.655	62.	0.044
0.9333	1.651	64.	0.

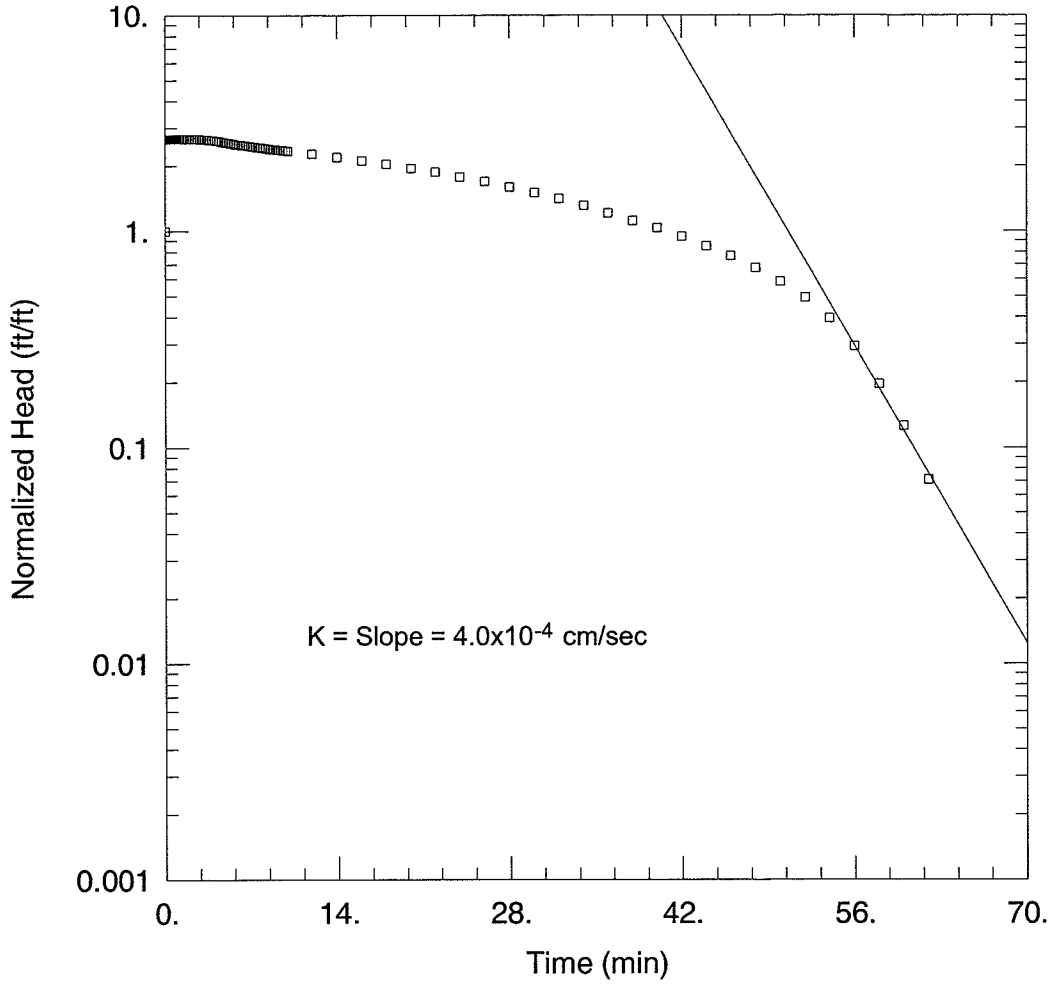
SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
Shape Factor: 1.864

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	1.431E-5	cm/sec
y0	1.617	ft



RISING HEAD TEST OMW-2 - RECOVERY TEST - LATE RESPONSE

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW2reclate.aqt
Date: 04/06/10 Time: 15:58:10

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Well: OMW2
Test Date: 10-30-2009

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OMW2)

Initial Displacement: 0.62 ft
Total Well Penetration Depth: 4.82 ft
Casing Radius: 0.083 ft
Static Water Column Height: 4.82 ft
Screen Length: 10. ft
Wellbore Radius: 0.33 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0004015 cm/sec
y0 = 5.78E+4 ft

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW2reclate.aqt
Title: Rising Head Test OMW-2 - Recovery Test - Late Response
Date: 04/06/10
Time: 15:59:13

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Date: 10-30-2009
Test Well: OMW2

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : OMW2

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 0.62 ft
Static Water Column Height: 4.82 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.33 ft
Well Skin Radius: 0.33 ft
Screen Length: 10. ft
Total Well Penetration Depth: 4.82 ft
Corrected Casing Radius (Bouwer-Rice Method): 0.1936 ft
Gravel Pack Porosity: 0.3

No. of Observations: 152

Observation Data

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.0083	1.655	0.95	1.651
0.0166	1.655	0.9666	1.651
0.025	1.655	0.9833	1.651
0.0333	1.655	1.	1.651
0.0416	1.655	1.2	1.651
0.05	1.655	1.4	1.651
0.0583	1.655	1.6	1.651
0.0666	1.655	1.8	1.651
0.075	1.655	2.	1.655
0.0833	1.655	2.2	1.651
0.0916	1.655	2.4	1.651
0.1	1.655	2.6	1.651
0.1083	1.655	2.8	1.651
0.1166	1.651	3.	1.648
0.125	1.651	3.2	1.648
0.1333	1.655	3.4	1.645
0.1416	1.655	3.6	1.639
0.15	1.655	3.8	1.636
0.1583	1.655	4.	1.63
0.1666	1.651	4.2	1.623
0.175	1.655	4.4	1.617
0.1833	1.655	4.6	1.611
0.1916	1.655	4.8	1.601
0.2	1.655	5.	1.595
0.2083	1.655	5.2	1.589
0.2166	1.655	5.4	1.579
0.225	1.655	5.6	1.57
0.2333	1.655	5.8	1.56

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.2416	1.655	6.	1.557
0.25	1.655	6.2	1.551
0.2583	1.655	6.4	1.545
0.2666	1.651	6.6	1.542
0.275	1.651	6.8	1.532
0.2833	1.655	7.	1.529
0.2916	1.655	7.2	1.523
0.3	1.655	7.4	1.517
0.3083	1.655	7.6	1.51
0.3166	1.655	7.8	1.507
0.325	1.655	8.	1.501
0.3333	1.655	8.2	1.495
0.35	1.655	8.4	1.488
0.3666	1.651	8.6	1.482
0.3833	1.655	8.8	1.479
0.4	1.655	9.	1.476
0.4166	1.655	9.2	1.469
0.4333	1.655	9.4	1.466
0.45	1.655	9.6	1.46
0.4666	1.655	9.8	1.457
0.4833	1.651	10.	1.454
0.5	1.655	12.	1.407
0.5166	1.655	14.	1.36
0.5333	1.655	16.	1.312
0.55	1.651	18.	1.262
0.5666	1.655	20.	1.209
0.5833	1.655	22.	1.159
0.6	1.655	24.	1.102
0.6166	1.655	26.	1.049
0.6333	1.655	28.	0.989
0.65	1.655	30.	0.933
0.6666	1.655	32.	0.873
0.6833	1.655	34.	0.813
0.7	1.651	36.	0.75
0.7166	1.655	38.	0.691
0.7333	1.655	40.	0.641
0.75	1.655	42.	0.584
0.7666	1.651	44.	0.528
0.7833	1.655	46.	0.474
0.8	1.655	48.	0.418
0.8166	1.651	50.	0.361
0.8333	1.655	52.	0.305
0.85	1.651	54.	0.245
0.8666	1.655	56.	0.182
0.8833	1.651	58.	0.122
0.9	1.651	60.	0.078
0.9166	1.655	62.	0.044
0.9333	1.651	64.	0.

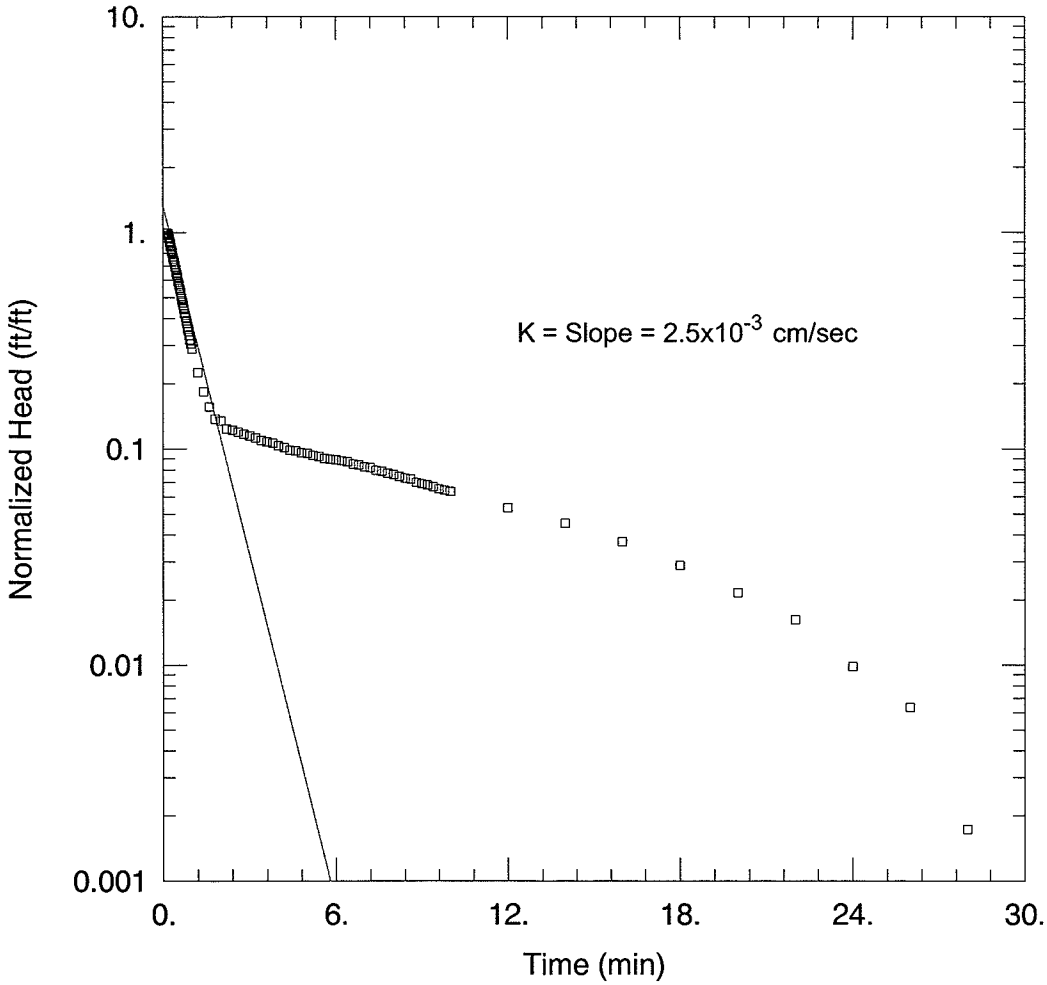
SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
Shape Factor: 1.864

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0004015	cm/sec
y0	5.78E+4	ft



RISING HEAD TEST OMW-1- RECOVERY TEST 1-EARLY RESPONSE

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW1recearly.aqt
Date: 04/06/10 Time: 11:20:59

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Well: OMW1
Test Date: 10-30-2009

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OMW1)

Initial Displacement: 3.47 ft
Total Well Penetration Depth: 7.9 ft
Casing Radius: 0.083 ft
Static Water Column Height: 5.21 ft
Screen Length: 10. ft
Wellbore Radius: 0.33 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.002528 cm/sec
y0 = 4.623 ft

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW1recearly.aqt
Title: Rising Head Test OMW-1- Recovery Test 1-Early Response
Date: 04/06/10
Time: 11:21:56

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Date: 10-30-2009
Test Well: OMW1

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : OMW1

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 3.47 ft
Static Water Column Height: 5.21 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.33 ft
Well Skin Radius: 0.33 ft
Screen Length: 10. ft
Total Well Penetration Depth: 7.9 ft
Corrected Casing Radius (Bouwer-Rice Method): 0.1936 ft
Gravel Pack Porosity: 0.3

No. of Observations: 135

Observation Data

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.0083	3.468	0.8166	1.354
0.0166	3.468	0.8333	1.316
0.025	3.468	0.85	1.276
0.0333	3.464	0.8666	1.238
0.0416	3.461	0.8833	1.213
0.05	3.461	0.9	1.159
0.0583	3.458	0.9166	1.159
0.0666	3.458	0.9333	1.106
0.075	3.455	0.95	1.109
0.0833	3.455	0.9666	1.059
0.0916	3.452	0.9833	1.059
0.1	3.449	1.	1.005
0.1083	3.449	1.2	0.782
0.1166	3.446	1.4	0.638
0.125	3.446	1.6	0.544
0.1333	3.442	1.8	0.478
0.1416	3.442	2.	0.468
0.15	3.439	2.2	0.43
0.1583	3.436	2.4	0.424
0.1666	3.436	2.6	0.415
0.175	3.433	2.8	0.405
0.1833	3.433	3.	0.399
0.1916	3.364	3.2	0.39
0.2	3.276	3.4	0.38
0.2083	3.289	3.6	0.374
0.2166	3.238	3.8	0.368
0.225	3.163	4.	0.358
0.2333	3.172	4.2	0.352

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.2416	3.119	4.4	0.342
0.25	3.122	4.6	0.339
0.2583	3.081	4.8	0.333
0.2666	3.019	5.	0.33
0.275	2.984	5.2	0.324
0.2833	2.956	5.4	0.32
0.2916	2.887	5.6	0.314
0.3	2.896	5.8	0.311
0.3083	2.833	6.	0.308
0.3166	2.837	6.2	0.305
0.325	2.777	6.4	0.302
0.3333	2.78	6.6	0.295
0.35	2.664	6.8	0.292
0.3666	2.61	7.	0.286
0.3833	2.567	7.2	0.283
0.4	2.51	7.4	0.276
0.4166	2.457	7.6	0.273
0.4333	2.4	7.8	0.267
0.45	2.34	8.	0.264
0.4666	2.259	8.2	0.258
0.4833	2.205	8.4	0.254
0.5	2.165	8.6	0.251
0.5166	2.117	8.8	0.242
0.5333	2.051	9.	0.239
0.55	2.004	9.2	0.236
0.5666	1.957	9.4	0.232
0.5833	1.91	9.6	0.226
0.6	1.866	9.8	0.223
0.6166	1.822	10.	0.22
0.6333	1.766	12.	0.185
0.65	1.719	14.	0.157
0.6666	1.681	16.	0.129
0.6833	1.64	18.	0.1
0.7	1.599	20.	0.075
0.7166	1.561	22.	0.056
0.7333	1.533	24.	0.034
0.75	1.461	26.	0.022
0.7666	1.461	28.	0.006
0.7833	1.408	30.	0.
0.8	1.351		

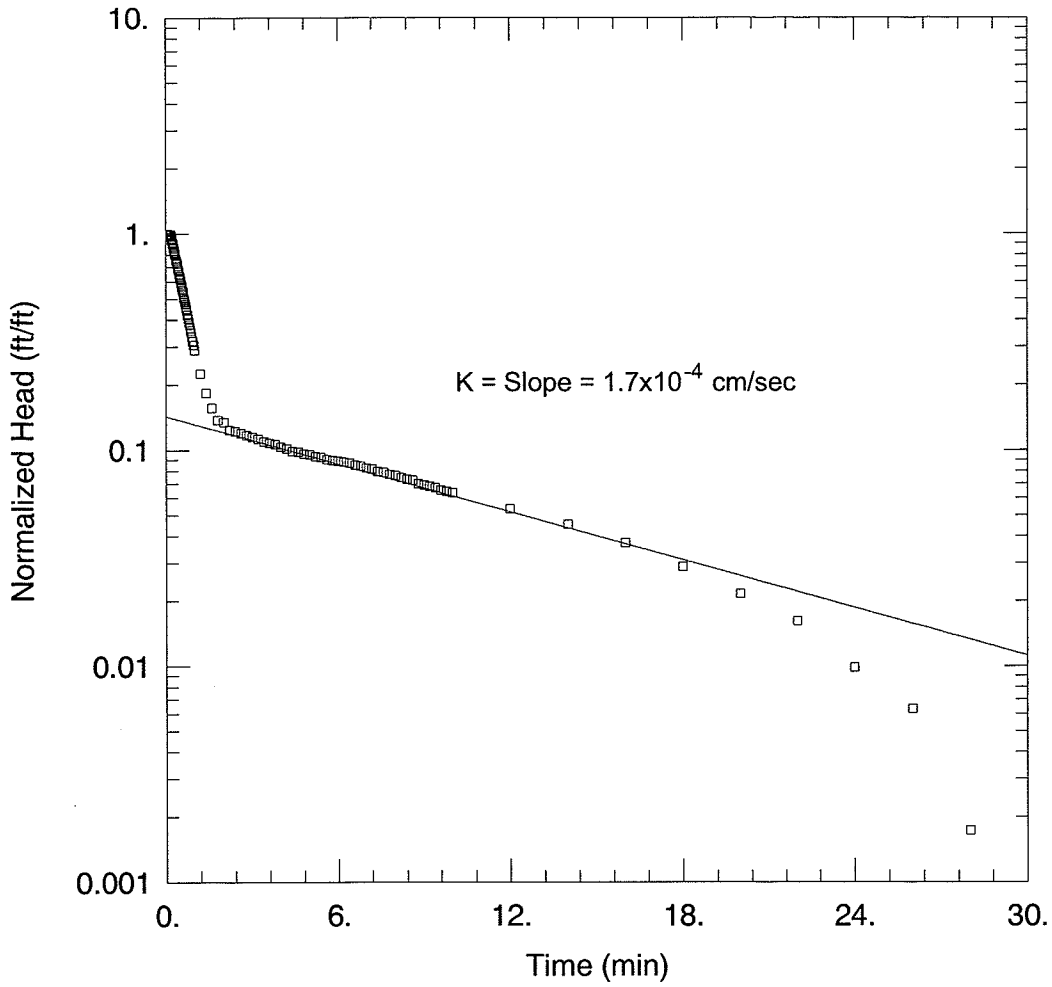
SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
Shape Factor: 2.138

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.002528	cm/sec
y0	4.623	ft



RISING HEAD TEST OMW-1- RECOVERY TEST 1-MIDDLE RESPONSE

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW1recmid.aqt
Date: 04/06/10 Time: 11:17:44

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Well: OMW1
Test Date: 10-30-2009

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OMW1)

Initial Displacement: 3.47 ft
Total Well Penetration Depth: 7.9 ft
Casing Radius: 0.083 ft
Static Water Column Height: 5.21 ft
Screen Length: 10. ft
Wellbore Radius: 0.33 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0001729 cm/sec
y0 = 0.497 ft

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW1recmid.aqt
Title: Rising Head Test OMW-1- Recovery Test 1-Middle Response
Date: 04/06/10
Time: 11:16:55

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Date: 10-30-2009
Test Well: OMW1

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : OMW1

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 3.47 ft
Static Water Column Height: 5.21 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.33 ft
Well Skin Radius: 0.33 ft
Screen Length: 10. ft
Total Well Penetration Depth: 7.9 ft
Corrected Casing Radius (Bouwer-Rice Method): 0.1936 ft
Gravel Pack Porosity: 0.3

No. of Observations: 135

Observation Data

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.0083	3.468	0.8166	1.354
0.0166	3.468	0.8333	1.316
0.025	3.468	0.85	1.276
0.0333	3.464	0.8666	1.238
0.0416	3.461	0.8833	1.213
0.05	3.461	0.9	1.159
0.0583	3.458	0.9166	1.159
0.0666	3.458	0.9333	1.106
0.075	3.455	0.95	1.109
0.0833	3.455	0.9666	1.059
0.0916	3.452	0.9833	1.059
0.1	3.449	1.	1.005
0.1083	3.449	1.2	0.782
0.1166	3.446	1.4	0.638
0.125	3.446	1.6	0.544
0.1333	3.442	1.8	0.478
0.1416	3.442	2.	0.468
0.15	3.439	2.2	0.43
0.1583	3.436	2.4	0.424
0.1666	3.436	2.6	0.415
0.175	3.433	2.8	0.405
0.1833	3.433	3.	0.399
0.1916	3.364	3.2	0.39
0.2	3.276	3.4	0.38
0.2083	3.289	3.6	0.374
0.2166	3.238	3.8	0.368
0.225	3.163	4.	0.358
0.2333	3.172	4.2	0.352

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.2416	3.119	4.4	0.342
0.25	3.122	4.6	0.339
0.2583	3.081	4.8	0.333
0.2666	3.019	5.	0.33
0.275	2.984	5.2	0.324
0.2833	2.956	5.4	0.32
0.2916	2.887	5.6	0.314
0.3	2.896	5.8	0.311
0.3083	2.833	6.	0.308
0.3166	2.837	6.2	0.305
0.325	2.777	6.4	0.302
0.3333	2.78	6.6	0.295
0.35	2.664	6.8	0.292
0.3666	2.61	7.	0.286
0.3833	2.567	7.2	0.283
0.4	2.51	7.4	0.276
0.4166	2.457	7.6	0.273
0.4333	2.4	7.8	0.267
0.45	2.34	8.	0.264
0.4666	2.259	8.2	0.258
0.4833	2.205	8.4	0.254
0.5	2.165	8.6	0.251
0.5166	2.117	8.8	0.242
0.5333	2.051	9.	0.239
0.55	2.004	9.2	0.236
0.5666	1.957	9.4	0.232
0.5833	1.91	9.6	0.226
0.6	1.866	9.8	0.223
0.6166	1.822	10.	0.22
0.6333	1.766	12.	0.185
0.65	1.719	14.	0.157
0.6666	1.681	16.	0.129
0.6833	1.64	18.	0.1
0.7	1.599	20.	0.075
0.7166	1.561	22.	0.056
0.7333	1.533	24.	0.034
0.75	1.461	26.	0.022
0.7666	1.461	28.	0.006
0.7833	1.408	30.	0.
0.8	1.351		

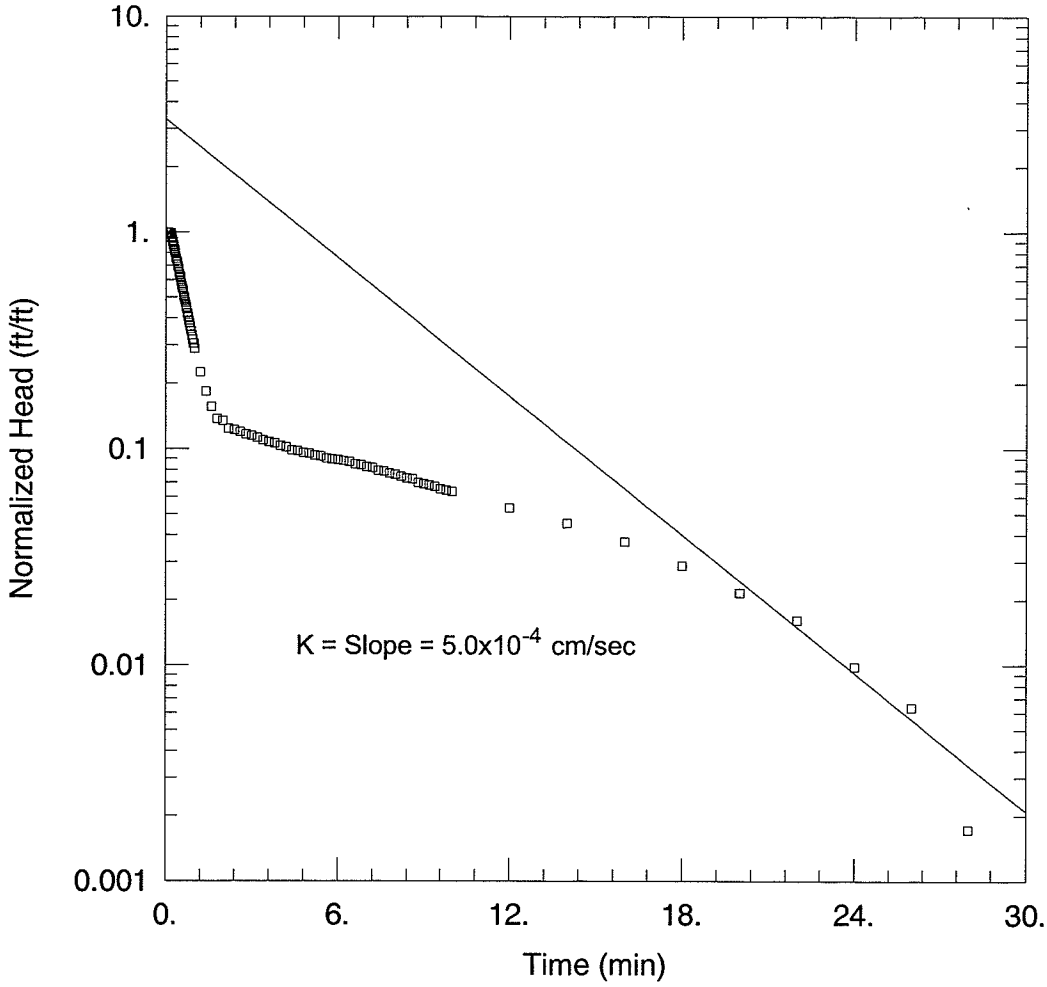
SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
Shape Factor: 2.138

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0001729	cm/sec
y0	0.497	ft



RISING HEAD TEST OMW-1- RECOVERY TEST 1-LATE RESPONSE

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW1reclate.aqt
Date: 04/06/10 Time: 13:26:35

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Well: OMW1
Test Date: 10-30-2009

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OMW1)

Initial Displacement: 3.47 ft
Total Well Penetration Depth: 7.9 ft
Casing Radius: 0.083 ft
Static Water Column Height: 5.21 ft
Screen Length: 10. ft
Wellbore Radius: 0.33 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0005001 cm/sec
y0 = 11.56 ft

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW1reclate.aqt
Title: Rising Head Test OMW-1- Recovery Test 1-Late Response
Date: 04/06/10
Time: 13:29:01

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Date: 10-30-2009
Test Well: OMW1

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : OMW1

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 3.47 ft
Static Water Column Height: 5.21 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.33 ft
Well Skin Radius: 0.33 ft
Screen Length: 10. ft
Total Well Penetration Depth: 7.9 ft
Corrected Casing Radius (Bouwer-Rice Method): 0.1936 ft
Gravel Pack Porosity: 0.3

No. of Observations: 135

Observation Data

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.0083	3.468	0.8166	1.354
0.0166	3.468	0.8333	1.316
0.025	3.468	0.85	1.276
0.0333	3.464	0.8666	1.238
0.0416	3.461	0.8833	1.213
0.05	3.461	0.9	1.159
0.0583	3.458	0.9166	1.159
0.0666	3.458	0.9333	1.106
0.075	3.455	0.95	1.109
0.0833	3.455	0.9666	1.059
0.0916	3.452	0.9833	1.059
0.1	3.449	1.	1.005
0.1083	3.449	1.2	0.782
0.1166	3.446	1.4	0.638
0.125	3.446	1.6	0.544
0.1333	3.442	1.8	0.478
0.1416	3.442	2.	0.468
0.15	3.439	2.2	0.43
0.1583	3.436	2.4	0.424
0.1666	3.436	2.6	0.415
0.175	3.433	2.8	0.405
0.1833	3.433	3.	0.399
0.1916	3.364	3.2	0.39
0.2	3.276	3.4	0.38
0.2083	3.289	3.6	0.374
0.2166	3.238	3.8	0.368
0.225	3.163	4.	0.358
0.2333	3.172	4.2	0.352

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.2416	3.119	4.4	0.342
0.25	3.122	4.6	0.339
0.2583	3.081	4.8	0.333
0.2666	3.019	5.	0.33
0.275	2.984	5.2	0.324
0.2833	2.956	5.4	0.32
0.2916	2.887	5.6	0.314
0.3	2.896	5.8	0.311
0.3083	2.833	6.	0.308
0.3166	2.837	6.2	0.305
0.325	2.777	6.4	0.302
0.3333	2.78	6.6	0.295
0.35	2.664	6.8	0.292
0.3666	2.61	7.	0.286
0.3833	2.567	7.2	0.283
0.4	2.51	7.4	0.276
0.4166	2.457	7.6	0.273
0.4333	2.4	7.8	0.267
0.45	2.34	8.	0.264
0.4666	2.259	8.2	0.258
0.4833	2.205	8.4	0.254
0.5	2.165	8.6	0.251
0.5166	2.117	8.8	0.242
0.5333	2.051	9.	0.239
0.55	2.004	9.2	0.236
0.5666	1.957	9.4	0.232
0.5833	1.91	9.6	0.226
0.6	1.866	9.8	0.223
0.6166	1.822	10.	0.22
0.6333	1.766	12.	0.185
0.65	1.719	14.	0.157
0.6666	1.681	16.	0.129
0.6833	1.64	18.	0.1
0.7	1.599	20.	0.075
0.7166	1.561	22.	0.056
0.7333	1.533	24.	0.034
0.75	1.461	26.	0.022
0.7666	1.461	28.	0.006
0.7833	1.408	30.	0.
0.8	1.351		

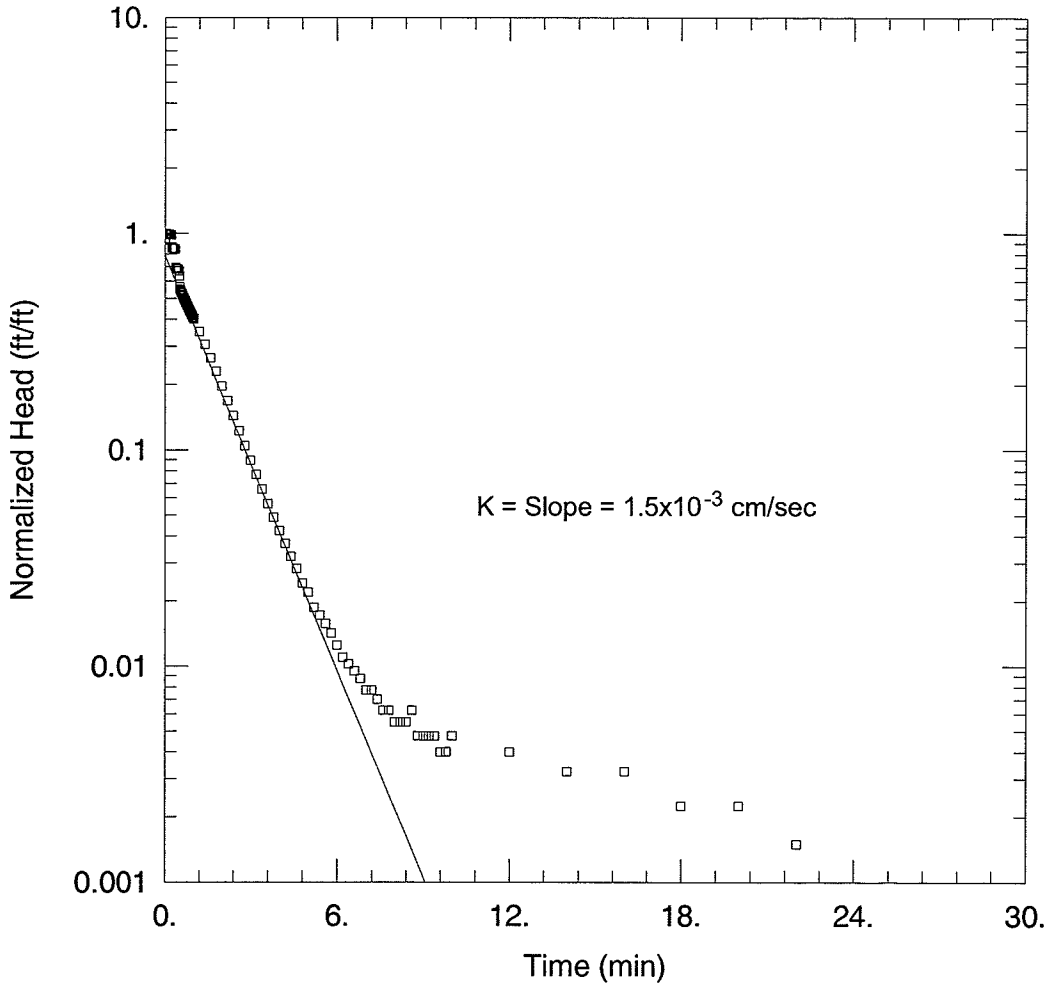
SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
Shape Factor: 2.138

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0005001	cm/sec
y0	11.56	ft



RISING HEAD TEST OMW-1- RECOVERY TEST 2 - EARLY RESPONSE

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW1rec2learly.aqt
Date: 04/06/10 Time: 15:39:23

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Well: OMW1
Test Date: 10-30-2009

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OMW1)

Initial Displacement: 4.004 ft
Total Well Penetration Depth: 7.9 ft
Casing Radius: 0.083 ft
Static Water Column Height: 5.21 ft
Screen Length: 10. ft
Wellbore Radius: 0.33 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.001496 cm/sec
y0 = 3.146 ft

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW1rec2learly.aqt
Title: Rising Head Test OMW-1- Recovery Test 2 - Early Response
Date: 04/06/10
Time: 15:40:24

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Date: 10-30-2009
Test Well: OMW1

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : OMW1

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 4.004 ft
Static Water Column Height: 5.21 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.33 ft
Well Skin Radius: 0.33 ft
Screen Length: 10. ft
Total Well Penetration Depth: 7.9 ft
Corrected Casing Radius (Bouwer-Rice Method): 0.1936 ft
Gravel Pack Porosity: 0.3

No. of Observations: 134

Observation Data

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.0083	3.719	0.8	1.832
0.0166	3.782	0.8166	1.81
0.025	4.004	0.8333	1.791
0.0333	3.995	0.85	1.772
0.0416	3.989	0.8666	1.753
0.05	3.982	0.8833	1.734
0.0583	3.979	0.9	1.716
0.0666	3.976	0.9166	1.7
0.075	3.97	0.9333	1.678
0.0833	3.967	0.95	1.662
0.0916	3.967	0.9666	1.643
0.1	3.964	0.9833	1.628
0.1083	3.964	1.	1.609
0.1166	3.96	1.2	1.408
0.125	3.957	1.4	1.229
0.1333	3.957	1.6	1.065
0.1416	3.954	1.8	0.921
0.15	3.951	2.	0.789
0.1583	3.951	2.2	0.676
0.1666	3.948	2.4	0.575
0.175	3.948	2.6	0.49
0.1833	3.945	2.8	0.418
0.1916	3.942	3.	0.358
0.2	3.942	3.2	0.308
0.2083	3.942	3.4	0.264
0.2166	3.939	3.6	0.226
0.225	3.935	3.8	0.195
0.2333	3.935	4.	0.17

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.2416	3.414	4.2	0.148
0.25	3.405	4.4	0.129
0.2583	3.408	4.6	0.113
0.2666	3.405	4.8	0.097
0.275	3.405	5.	0.088
0.2833	3.405	5.2	0.075
0.2916	3.402	5.4	0.069
0.3	3.402	5.6	0.063
0.3083	3.402	5.8	0.057
0.3166	3.399	6.	0.05
0.325	3.399	6.2	0.044
0.3333	3.396	6.4	0.041
0.35	3.392	6.6	0.038
0.3666	3.386	6.8	0.035
0.3833	2.774	7.	0.031
0.4	2.736	7.2	0.031
0.4166	2.733	7.4	0.028
0.4333	2.733	7.6	0.025
0.45	2.73	7.8	0.025
0.4666	2.727	8.	0.022
0.4833	2.683	8.2	0.022
0.5	2.542	8.4	0.022
0.5166	2.265	8.6	0.025
0.5333	2.202	8.8	0.019
0.55	2.174	9.	0.019
0.5666	2.143	9.2	0.019
0.5833	2.118	9.4	0.019
0.6	2.092	9.6	0.016
0.6166	2.067	9.8	0.016
0.6333	2.045	10.	0.019
0.65	2.02	12.	0.016
0.6666	1.998	14.	0.013
0.6833	1.976	16.	0.013
0.7	1.954	18.	0.009
0.7166	1.932	20.	0.009
0.7333	1.913	22.	0.006
0.75	1.891	24.	0.003
0.7666	1.869	26.	0.003
0.7833	1.851	28.	0.

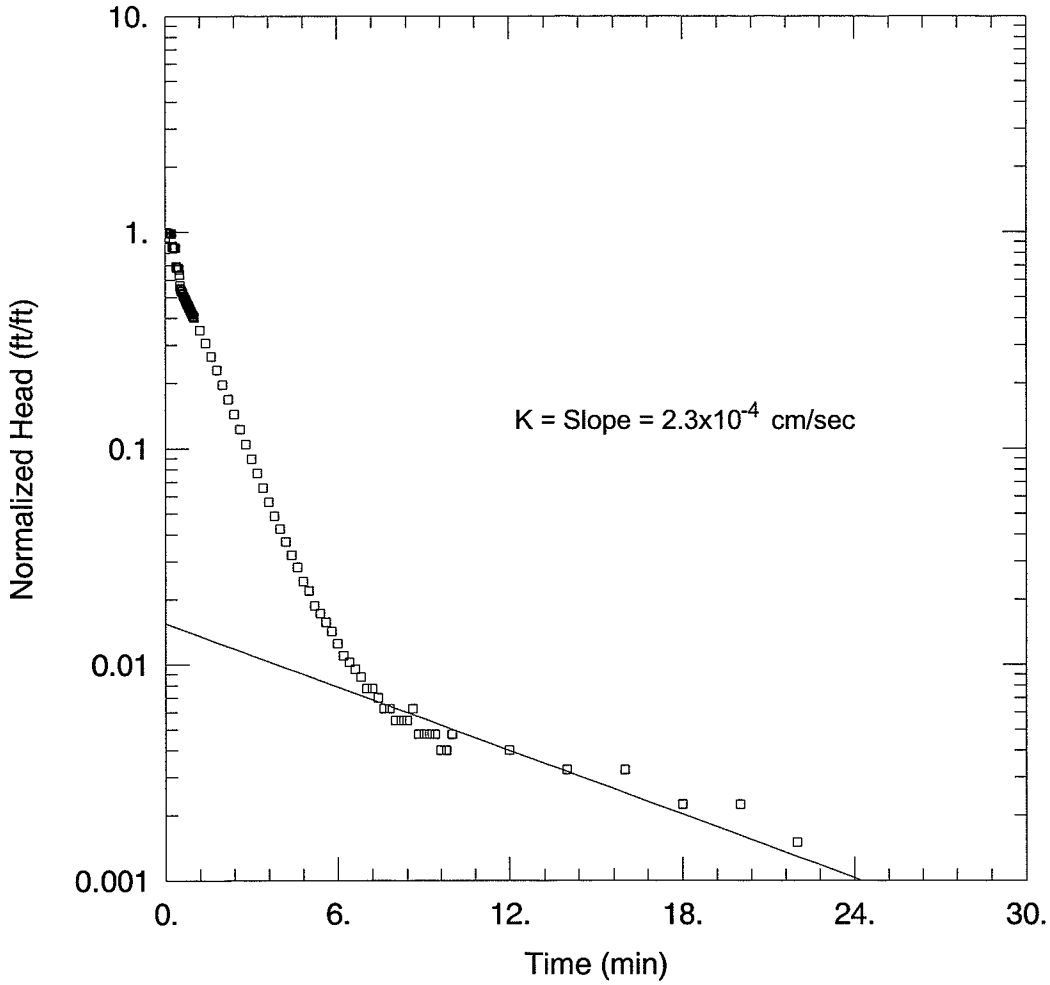
SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
Shape Factor: 2.138

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.001496	cm/sec
y0	3.146	ft



RISING HEAD TEST OMW-1- RECOVERY TEST 2

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW1rec2late.aqt
Date: 04/06/10 Time: 15:35:19

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Well: OMW1
Test Date: 10-30-2009

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OMW1)

Initial Displacement: 4.004 ft
Total Well Penetration Depth: 7.9 ft
Casing Radius: 0.083 ft
Static Water Column Height: 5.21 ft
Screen Length: 10. ft
Wellbore Radius: 0.33 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0002299 cm/sec
y0 = 0.06196 ft

Data Set: C:\Documents and Settings\greg.brooks\My Documents\OMW1rec2late.aqt
Title: Rising Head Test OMW-1- Recovery Test 2
Date: 04/06/10
Time: 15:36:19

PROJECT INFORMATION

Company: AECOM
Client: Rueping Leather Site
Project: 103003
Location: Fond du Lac
Test Date: 10-30-2009
Test Well: OMW1

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : OMW1

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 4.004 ft
Static Water Column Height: 5.21 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.33 ft
Well Skin Radius: 0.33 ft
Screen Length: 10. ft
Total Well Penetration Depth: 7.9 ft
Corrected Casing Radius (Bouwer-Rice Method): 0.1936 ft
Gravel Pack Porosity: 0.3

No. of Observations: 134

Observation Data

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.0083	3.719	0.8	1.832
0.0166	3.782	0.8166	1.81
0.025	4.004	0.8333	1.791
0.0333	3.995	0.85	1.772
0.0416	3.989	0.8666	1.753
0.05	3.982	0.8833	1.734
0.0583	3.979	0.9	1.716
0.0666	3.976	0.9166	1.7
0.075	3.97	0.9333	1.678
0.0833	3.967	0.95	1.662
0.0916	3.967	0.9666	1.643
0.1	3.964	0.9833	1.628
0.1083	3.964	1.	1.609
0.1166	3.96	1.2	1.408
0.125	3.957	1.4	1.229
0.1333	3.957	1.6	1.065
0.1416	3.954	1.8	0.921
0.15	3.951	2.	0.789
0.1583	3.951	2.2	0.676
0.1666	3.948	2.4	0.575
0.175	3.948	2.6	0.49
0.1833	3.945	2.8	0.418
0.1916	3.942	3.	0.358
0.2	3.942	3.2	0.308
0.2083	3.942	3.4	0.264
0.2166	3.939	3.6	0.226
0.225	3.935	3.8	0.195
0.2333	3.935	4.	0.17

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.2416	3.414	4.2	0.148
0.25	3.405	4.4	0.129
0.2583	3.408	4.6	0.113
0.2666	3.405	4.8	0.097
0.275	3.405	5.	0.088
0.2833	3.405	5.2	0.075
0.2916	3.402	5.4	0.069
0.3	3.402	5.6	0.063
0.3083	3.402	5.8	0.057
0.3166	3.399	6.	0.05
0.325	3.399	6.2	0.044
0.3333	3.396	6.4	0.041
0.35	3.392	6.6	0.038
0.3666	3.386	6.8	0.035
0.3833	2.774	7.	0.031
0.4	2.736	7.2	0.031
0.4166	2.733	7.4	0.028
0.4333	2.733	7.6	0.025
0.45	2.73	7.8	0.025
0.4666	2.727	8.	0.022
0.4833	2.683	8.2	0.022
0.5	2.542	8.4	0.022
0.5166	2.265	8.6	0.025
0.5333	2.202	8.8	0.019
0.55	2.174	9.	0.019
0.5666	2.143	9.2	0.019
0.5833	2.118	9.4	0.019
0.6	2.092	9.6	0.016
0.6166	2.067	9.8	0.016
0.6333	2.045	10.	0.019
0.65	2.02	12.	0.016
0.6666	1.998	14.	0.013
0.6833	1.976	16.	0.013
0.7	1.954	18.	0.009
0.7166	1.932	20.	0.009
0.7333	1.913	22.	0.006
0.75	1.891	24.	0.003
0.7666	1.869	26.	0.003
0.7833	1.851	28.	0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
Shape Factor: 2.138

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0002299	cm/sec
y0	0.06196	ft