

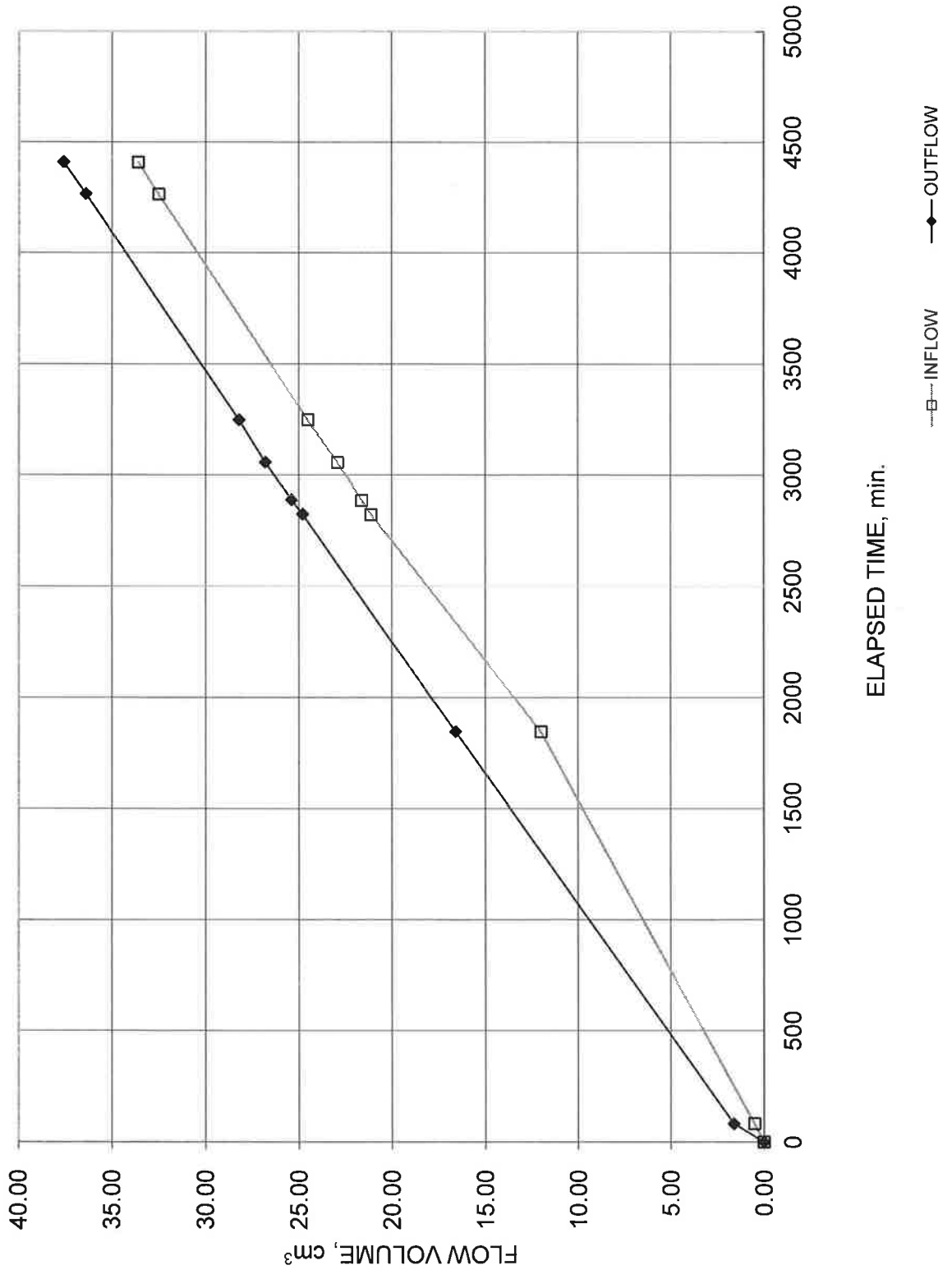


APPENDIX N

Laboratory and In-Situ Hydraulic Conductivity Testing Results

HYDRAULIC CONDUCTIVITY TEST

BH 12-03-03 Sample 1



HYDRAULIC CONDUCTIVITY TEST

ASTM D 5084 (CONSTANT HEAD)

SAMPLE IDENTIFICATION

PROJECT NUMBER	12-1125-0045	SAMPLE	3
PROJECT TITLE		SAMPLE DEPTH, m	11.43-12.00
BOREHOLE NUMBER	12-02-03	DATE	03/01/2013

SPECIMEN PROPERTIES AND DIMENSIONS (INITIAL)

SAMPLE HEIGHT, cm	7.48	UNIT WEIGHT, kN/m ³	16.07
SAMPLE DIAMETER, cm	6.92	DRY UNIT WEIGHT, kN/m ³	9.94
SAMPLE AREA, cm ²	37.61	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm ³	281.32	VOLUME OF SOLIDS, cm ³	105.57
TOTAL MASS, g	460.90	VOLUME OF VOIDS, cm ³	175.75
DRY MASS, g	285.03	VOID RATIO	1.66
WATER CONTENT, %	61.7		

SATURATION STAGE

CELL PRESSURE, kPa	350	EFFECTIVE CONFINING STRESS, kPa	5
HEAD PRESSURE, kPa	345	DURATION, min	4,140
BACK PRESSURE, kPa	345	B COEFFICIENT	0.96

CONSOLIDATION STAGE

CELL PRESSURE, kPa	416	EFFECTIVE CONFINING STRESS, kPa	71
HEAD PRESSURE, kPa	345	DURATION, min	1,485
BACK PRESSURE, kPa	345	VOLUME CHANGE, cm ³	5.5
		DRAINAGE	Top and Bottom

SPECIMEN PROPERTIES AND DIMENSIONS (AFTER CONSOLIDATION)

SAMPLE HEIGHT, cm	7.43	SAMPLE AREA, cm ²	37.12
SAMPLE DIAMETER, cm	6.87	SAMPLE VOLUME, cm ³	275.85

HYDRAULIC CONDUCTIVITY STAGE

CELL PRESSURE, kPa	431	EFFECTIVE CONFINING STRESS, kPa	71
HEAD PRESSURE, kPa	360	DURATION, min	4223.0
BACK PRESSURE, kPa	345	HYDRAULIC GRADIENT, \dot{u}	21

SPECIMEN PROPERTIES AND DIMENSIONS (FINAL)

SAMPLE HEIGHT, cm	7.43	UNIT WEIGHT, kN/m ³	16.27
SAMPLE DIAMETER, cm	6.87	DRY UNIT WEIGHT, kN/m ³	10.13
SAMPLE AREA, cm ²	37.12	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm ³	275.85	VOLUME OF SOLIDS, cm ³	105.57
TOTAL MASS, g	457.60	VOLUME OF VOIDS, cm ³	170.28
DRY MASS, g	285.03	VOID RATIO	1.61
WATER CONTENT, %	60.5		

TEST RESULTS

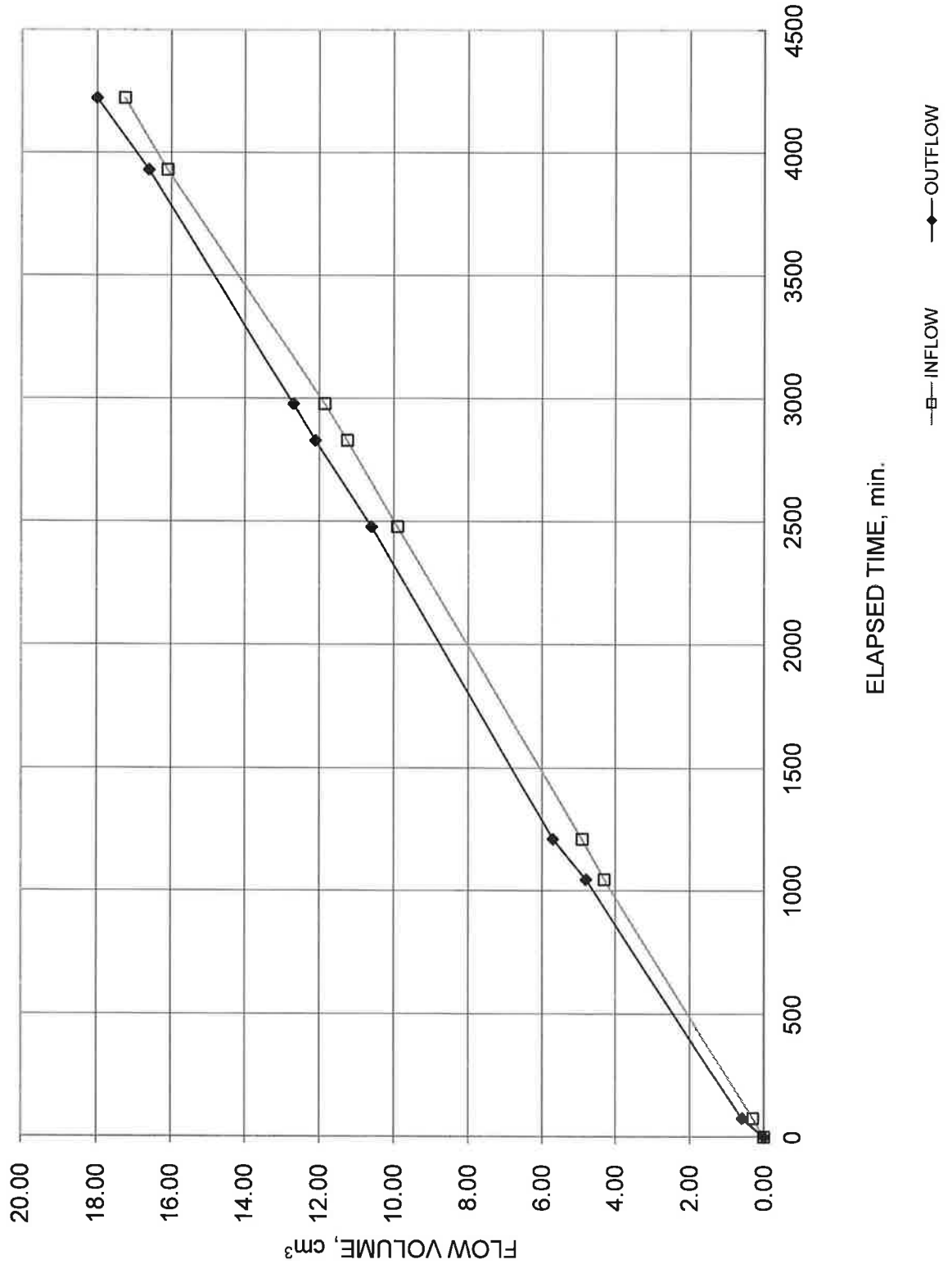
ELAPSED TIME TO STEADY STATE FLOW (min)		0.0
DURATION OF STEADY STATE FLOW (min)		4223.0
INFLOW VOLUME UNDER STEADY STATE FLOW (cm ³)		17.3
OUTFLOW VOLUME UNDER STEADY STATE FLOW (cm ³)		18.0
HYDRAULIC CONDUCTIVITY (INFLOW) (cm/s)		8.91E-08
HYDRAULIC CONDUCTIVITY (OUTFLOW) (cm/s)		9.30E-08
HYDRAULIC CONDUCTIVITY, K, cm/s		9.10E-08

NOTES:

PERMEANT FLUID Deaired tap water

HYDRAULIC CONDUCTIVITY TEST

BH 12-02-03 Sample 3



HYDRAULIC CONDUCTIVITY TEST

ASTM D 5084 (CONSTANT HEAD)

SAMPLE IDENTIFICATION

PROJECT NUMBER	12-1125-0045	SAMPLE	6
PROJECT TITLE		SAMPLE DEPTH, m	21.26-21.82
BOREHOLE NUMBER	12-01-03	DATE	03/01/2013

SPECIMEN PROPERTIES AND DIMENSIONS (INITIAL)

SAMPLE HEIGHT, cm	6.98	UNIT WEIGHT, kN/m ³	15.53
SAMPLE DIAMETER, cm	6.94	DRY UNIT WEIGHT, kN/m ³	9.13
SAMPLE AREA, cm ²	37.84	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm ³	264.26	VOLUME OF SOLIDS, cm ³	91.17
TOTAL MASS, g	418.60	VOLUME OF VOIDS, cm ³	173.09
DRY MASS, g	246.16	VOID RATIO	1.90
WATER CONTENT, %	70.1		

SATURATION STAGE

CELL PRESSURE, kPa	210	EFFECTIVE CONFINING STRESS, kPa	5
HEAD PRESSURE, kPa	205	DURATION, min	2,520
BACK PRESSURE, kPa	205	B COEFFICIENT	0.99

CONSOLIDATION STAGE

CELL PRESSURE, kPa	322	EFFECTIVE CONFINING STRESS, kPa	117
HEAD PRESSURE, kPa	205	DURATION, min	2,250
BACK PRESSURE, kPa	205	VOLUME CHANGE, cm ³	11.5
		DRAINAGE	Top and Bottom

SPECIMEN PROPERTIES AND DIMENSIONS (AFTER CONSOLIDATION)

SAMPLE HEIGHT, cm	6.88	SAMPLE AREA, cm ²	36.74
SAMPLE DIAMETER, cm	6.84	SAMPLE VOLUME, cm ³	252.87

HYDRAULIC CONDUCTIVITY STAGE

CELL PRESSURE, kPa	336	EFFECTIVE CONFINING STRESS, kPa	117
HEAD PRESSURE, kPa	219	DURATION, min	3333.0
BACK PRESSURE, kPa	205	HYDRAULIC GRADIENT, i	21

SPECIMEN PROPERTIES AND DIMENSIONS (FINAL)

SAMPLE HEIGHT, cm	6.88	UNIT WEIGHT, kN/m ³	16.08
SAMPLE DIAMETER, cm	6.84	DRY UNIT WEIGHT, kN/m ³	9.55
SAMPLE AREA, cm ²	36.74	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm ³	252.87	VOLUME OF SOLIDS, cm ³	91.17
TOTAL MASS, g	414.66	VOLUME OF VOIDS, cm ³	161.70
DRY MASS, g	246.16	VOID RATIO	1.77
WATER CONTENT, %	68.5		

TEST RESULTS

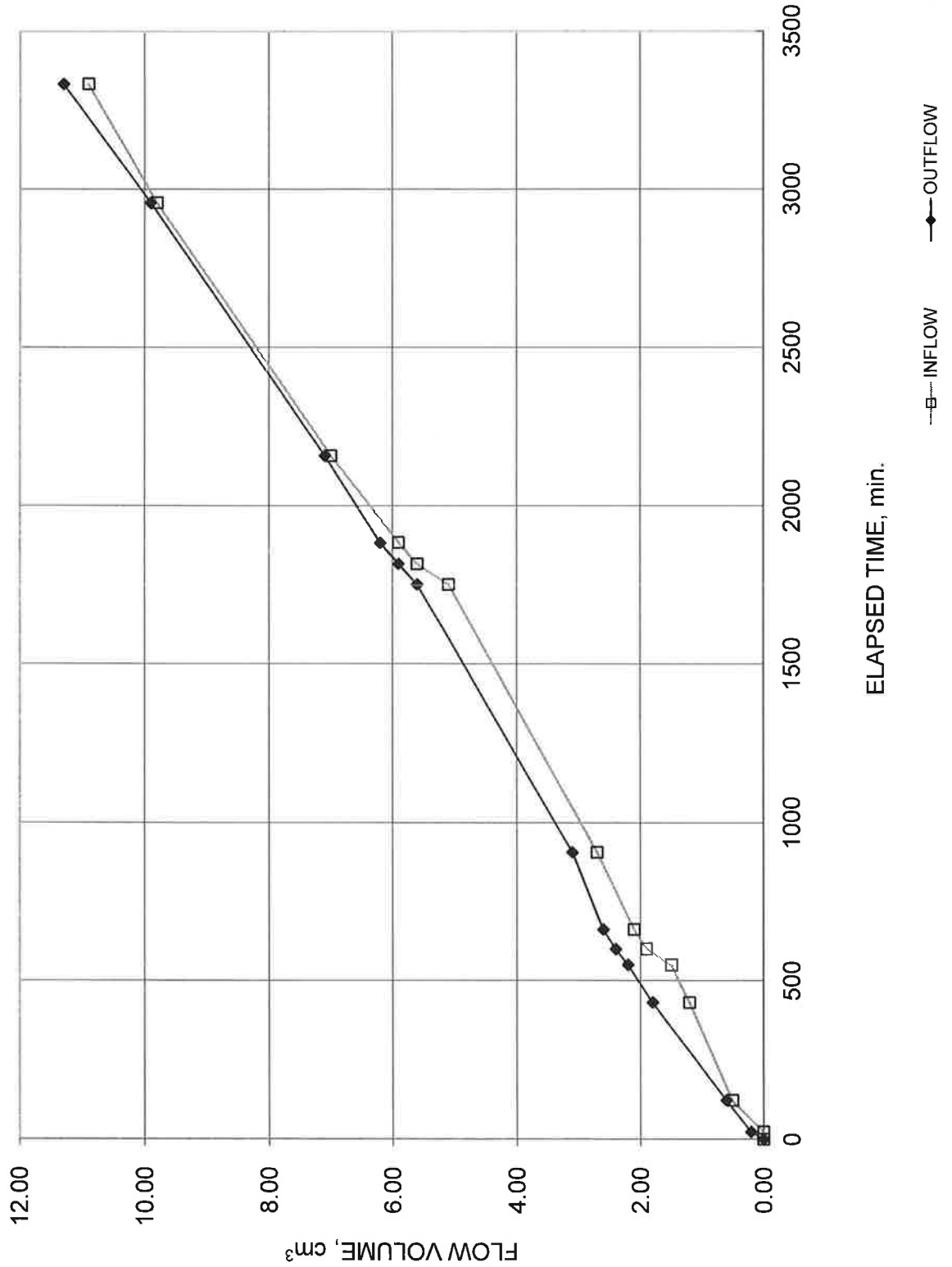
ELAPSED TIME TO STEADY STATE FLOW (min)	0.0
DURATION OF STEADY STATE FLOW (min)	3333.0
INFLOW VOLUME UNDER STEADY STATE FLOW (cm ³)	10.9
OUTFLOW VOLUME UNDER STEADY STATE FLOW (cm ³)	11.3
HYDRAULIC CONDUCTIVITY (INFLOW) (cm/s)	7.15E-08
HYDRAULIC CONDUCTIVITY (OUTFLOW) (cm/s)	7.42E-08
HYDRAULIC CONDUCTIVITY, K, cm/s	7.28E-08

NOTES:

PERMEANT FLUID Deaired tap water

HYDRAULIC CONDUCTIVITY TEST

BH 12-01-03 Sample 6



**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 12-1-3-1**

INTERVAL (metres below ground surface)

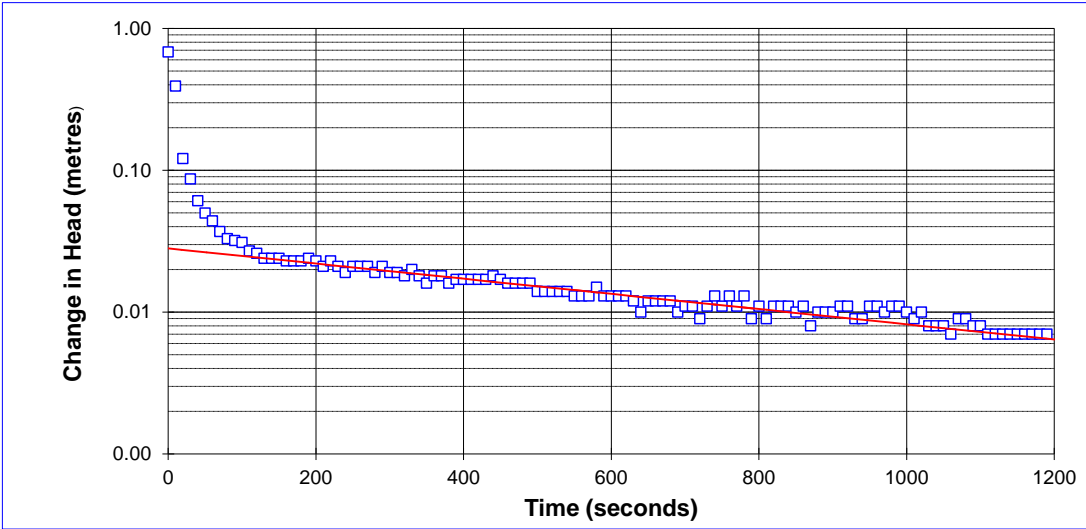
Top of Interval = 40.1
Bottom of Interval = 45.4

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K=\text{m/sec}$$

where:

r_c = casing radius (metres); r_w = radial distance to undisturbed aquifer (metres)
 R_e = effective radius (metres); y_0 = initial drawdown (metres)
 L_e = length of screened interval (metres); y_t = drawdown (metres) at time t (seconds)

INPUT PARAMETERS	RESULTS
$r_c = 0.03$	$K = 2\text{E-}07 \text{ m/sec}$ $K = 2\text{E-}05 \text{ cm/sec}$
$r_w = 0.05$	
$L_e = 5.27$	
$\ln(R_e/r_w) = 3.10$	
$y_0 = 0.02$	
$y_t = 0.01$	
$t = 600.0$	



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1125-0045
 Test Date: 01/14/13

Analysis By: DH
 Checked By: BH
 Analysis Date: 1/15/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 12-1-4A**

INTERVAL (metres below ground surface)

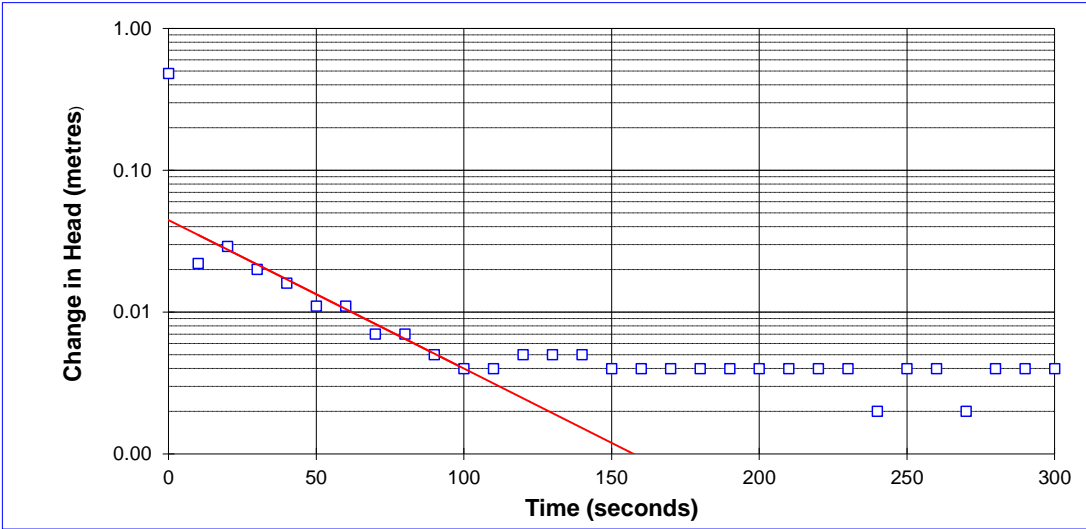
Top of Interval = 36.0
Bottom of Interval = 39.5

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K=\text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS
$r_c = 0.02$	$K = 3\text{E-}06 \text{ m/sec}$ $K = 3\text{E-}04 \text{ cm/sec}$
$r_w = 0.06$	
$L_e = 3.50$	
$\ln(R_e/r_w) = 2.92$	
$y_0 = 0.04$	
$y_t = 0.00$	
$t = 90.0$	



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1125-0045
 Test Date: 01/14/13

Analysis By: DH
 Checked By: CHM
 Analysis Date: 1/15/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 12-1-5B**

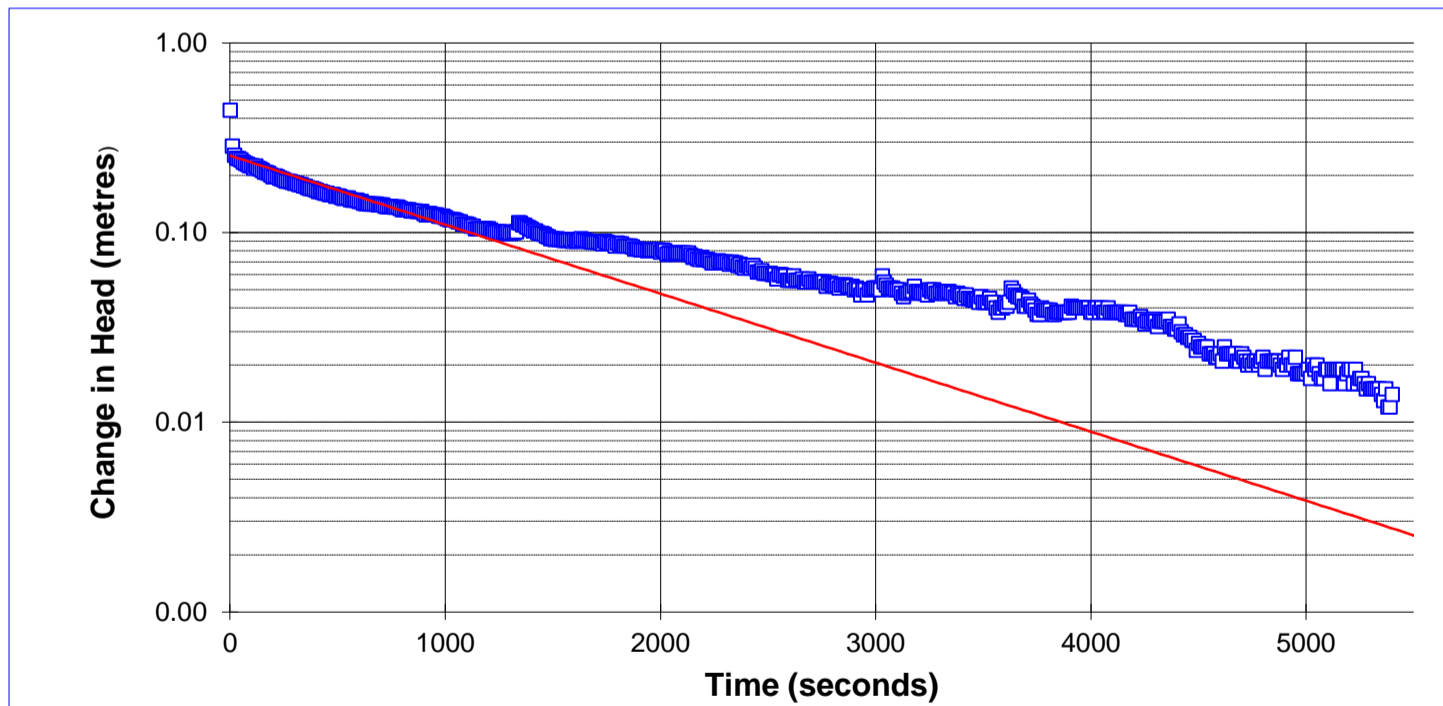
INTERVAL (metres below ground surface)	
Top of Interval =	4.8
Bottom of Interval =	5.0

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|--|---|
| <p>r_c = casing radius (metres);</p> <p>R_e = effective radius (metres);</p> <p>L_e = length of screened interval (metres);</p> | <p>r_w = radial distance to undisturbed aquifer (metres)</p> <p>y_0 = initial drawdown (metres)</p> <p>y_t = drawdown (metres) at time t (seconds)</p> |
|--|---|

INPUT PARAMETERS	RESULTS				
$r_c = 0.02$	<table style="width: 100%; border: none;"> <tr> <td style="padding: 5px;">$K = 5E-07$</td> <td style="padding: 5px;">m/sec</td> </tr> <tr> <td style="padding: 5px;">$K = 5E-05$</td> <td style="padding: 5px;">cm/sec</td> </tr> </table>	$K = 5E-07$	m/sec	$K = 5E-05$	cm/sec
$K = 5E-07$		m/sec			
$K = 5E-05$		cm/sec			
$r_w = 0.10$					
$L_e = 0.24$					
$\ln(R_e/r_w) = 1.03$					
$y_0 = 0.25$					
$y_t = 0.11$					
$t = 980.0$					



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1125-0045
 Test Date: 01/14/13

Analysis By: DH
 Checked By: CHM
 Analysis Date: 1/15/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 12-1-6**

INTERVAL (metres below ground surface)

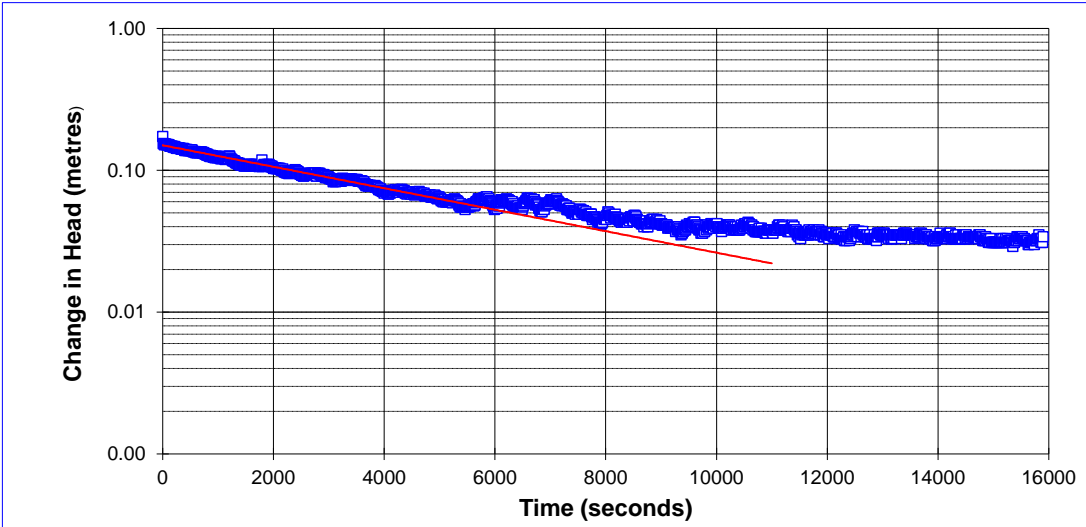
Top of Interval = 0.3
Bottom of Interval = 1.5

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K=\text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.03$	<table border="1"> <tr> <td>K=</td> <td>9E-08</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>9E-06</td> <td>cm/sec</td> </tr> </table>	K=	9E-08	m/sec	K=	9E-06	cm/sec
K=		9E-08	m/sec				
K=		9E-06	cm/sec				
$r_w = 0.10$							
$L_e = 1.20$							
$\ln(R_e/r_w) = 1.84$							
$y_0 = 0.15$							
$y_t = 0.13$							
$t = 1000.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
Project No.: 12-1125-0045
Test Date: 01/14/13

Analysis By: DH
Checked By: CHM
Analysis Date: 1/15/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 12-2-3**

INTERVAL (metres below ground surface)

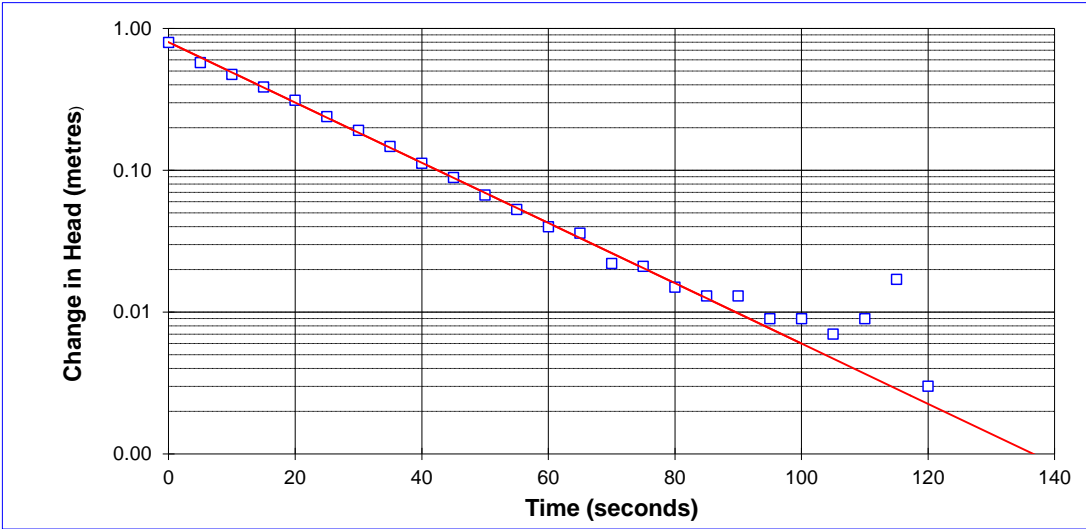
Top of Interval = 37.0
Bottom of Interval = 42.0

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.03$	<table border="1"> <tr> <td>K=</td> <td>2E-05</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>2E-03</td> <td>cm/sec</td> </tr> </table>	K=	2E-05	m/sec	K=	2E-03	cm/sec
K=		2E-05	m/sec				
K=		2E-03	cm/sec				
$r_w = 0.05$							
$L_e = 4.95$							
$\ln(R_e/r_w) = 3.05$							
$y_0 = 0.80$							
$y_t = 0.01$							
$t = 100.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
Project No.: 12-1125-0045
Test Date: 01/22/13

Analysis By: DH
Checked By: CHM
Analysis Date: 1/22/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST BH12-2-5B**

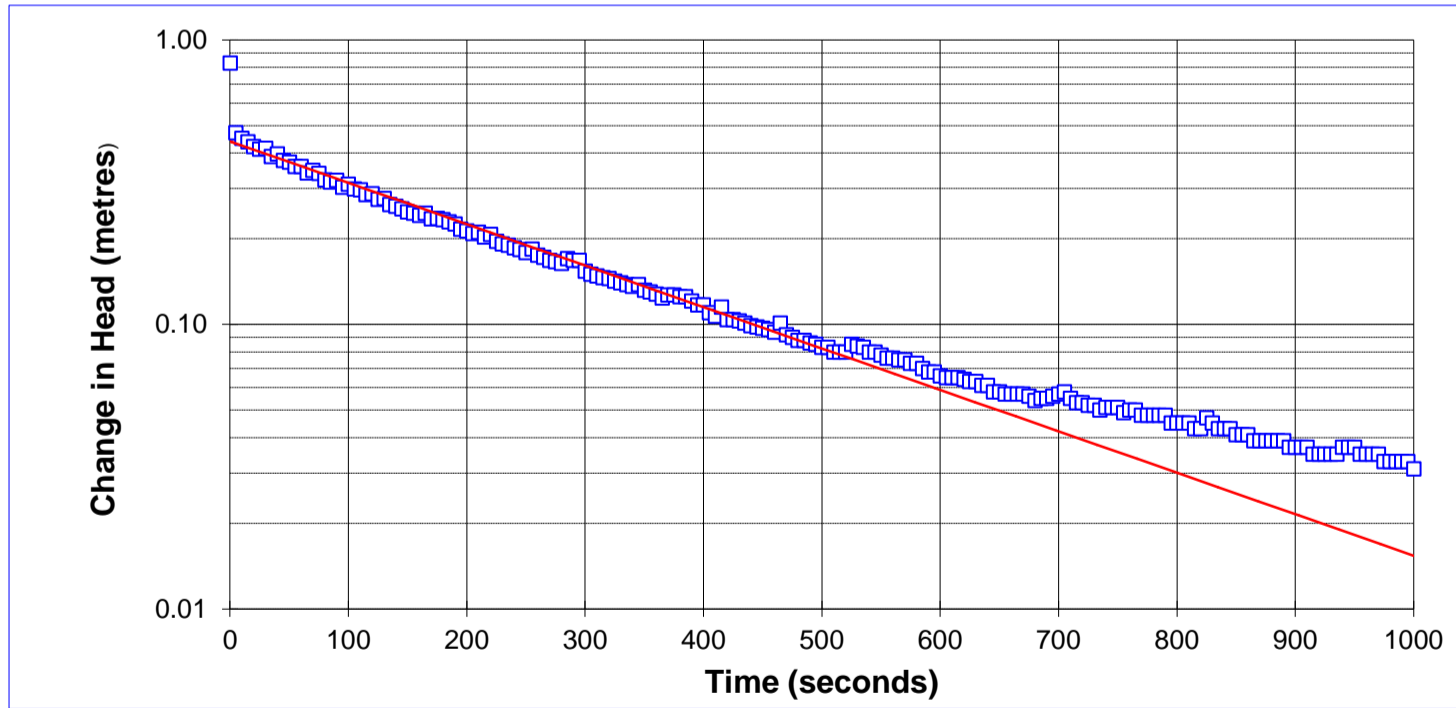
INTERVAL (metres below ground surface)	
Top of Interval =	6.3
Bottom of Interval =	6.6

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|--|---|
| <p>r_c = casing radius (metres);</p> <p>R_e = effective radius (metres);</p> <p>L_e = length of screened interval (metres);</p> | <p>r_w = radial distance to undisturbed aquifer (metres)</p> <p>y_0 = initial drawdown (metres)</p> <p>y_t = drawdown (metres) at time t (seconds)</p> |
|--|---|

INPUT PARAMETERS	RESULTS						
$r_c = 0.02$	<table style="width: 100%; border: none;"> <tr> <td style="padding: 5px;">K=</td> <td style="padding: 5px;">2E-06</td> <td style="padding: 5px;">m/sec</td> </tr> <tr> <td style="padding: 5px;">K=</td> <td style="padding: 5px;">2E-04</td> <td style="padding: 5px;">cm/sec</td> </tr> </table>	K=	2E-06	m/sec	K=	2E-04	cm/sec
K=		2E-06	m/sec				
K=		2E-04	cm/sec				
$r_w = 0.06$							
$L_e = 0.30$							
$\ln(R_e/r_w) = 1.13$							
$y_0 = 0.44$							
$y_t = 0.23$							
$t = 200.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1125-0045
 Test Date: 01/22/13

Analysis By: DH
 Checked By: CHM
 Analysis Date: 1/22/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 12-2-6**

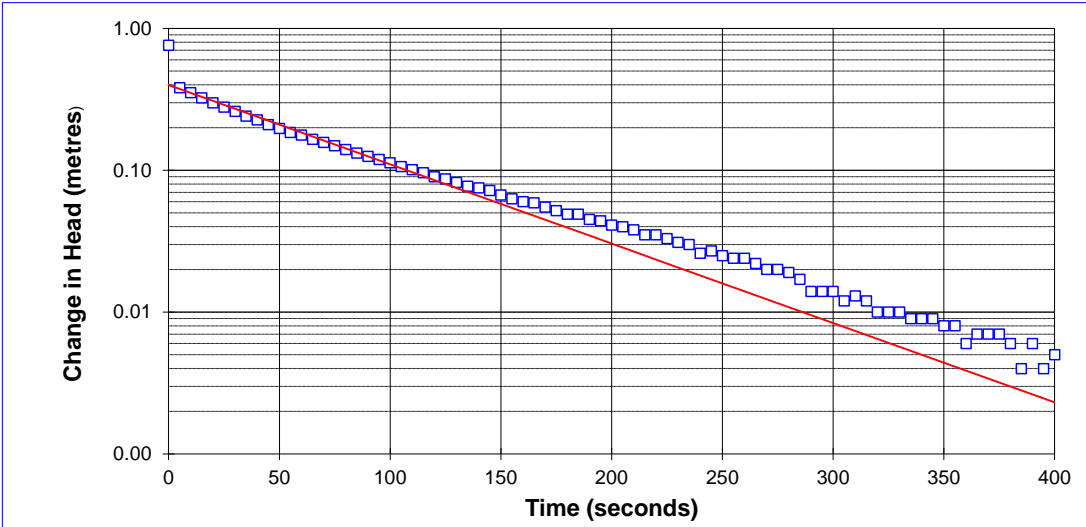
INTERVAL (metres below ground surface)	
Top of Interval =	0.4
Bottom of Interval =	2.3

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS
$r_c = 0.06$	$K = 2\text{E-}05 \text{ m/sec}$ $K = 2\text{E-}03 \text{ cm/sec}$
$r_w = 0.10$	
$L_e = 1.81$	
$\ln(R_e/r_w) = 1.78$	
$y_0 = 0.40$	
$y_t = 0.21$	
$t = 50.0$	



Project Name: **CRRRC/EA Eastern ON/Boundary Rd**
 Project No.: **12-1125-0045**
 Test Date: **01/22/13**

Analysis By: **DH**
 Checked By: **CHM**
 Analysis Date: **1/22/2013**

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 12-3-3**

INTERVAL (metres below ground surface)

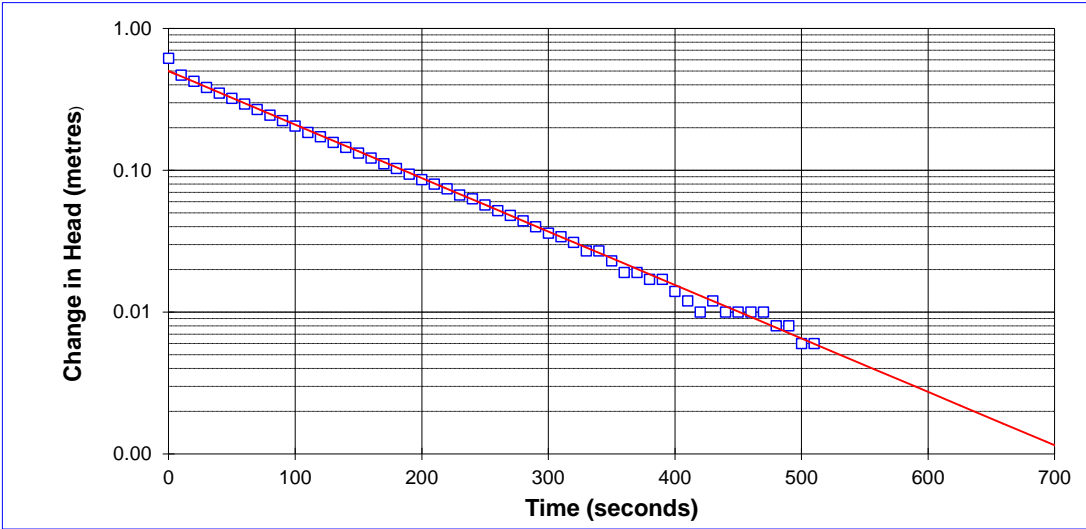
Top of Interval = 40.1
Bottom of Interval = 45.4

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K=\text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS
$r_c = 0.03$	$K = 3E-06 \text{ m/sec}$ $K = 3E-04 \text{ cm/sec}$
$r_w = 0.05$	
$L_e = 5.30$	
$\ln(R_e/r_w) = 3.08$	
$y_0 = 0.50$	
$y_t = 0.04$	
$t = 300.0$	



Project Name: CRRRC/EA Eastern ON/Boundary Rd
Project No.: 12-1125-0045
Test Date: 01/14/13

Analysis By: DH
Checked By: CHM
Analysis Date: 1/15/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 12-3-4A**

INTERVAL (metres below ground surface)

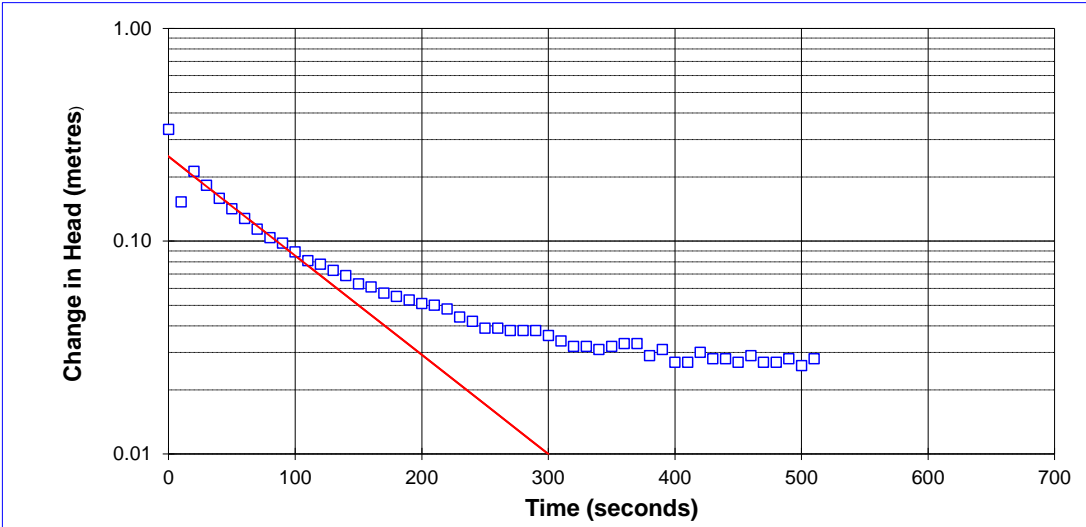
Top of Interval = 35.1
Bottom of Interval = 38.7

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS
$r_c = 0.02$	$K = 2\text{E-}06 \text{ m/sec}$ $K = 2\text{E-}04 \text{ cm/sec}$
$r_w = 0.06$	
$L_e = 3.60$	
$\ln(R_e/r_w) = 3.39$	
$y_0 = 0.25$	
$y_t = 0.01$	
$t = 300.0$	



Project Name: CRRRC/EA Eastern ON/Boundary Rd
Project No.: 12-1125-0045
Test Date: 01/14/13

Analysis By: DH
Checked By: CHM
Analysis Date: 1/16/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 12-3-5B**

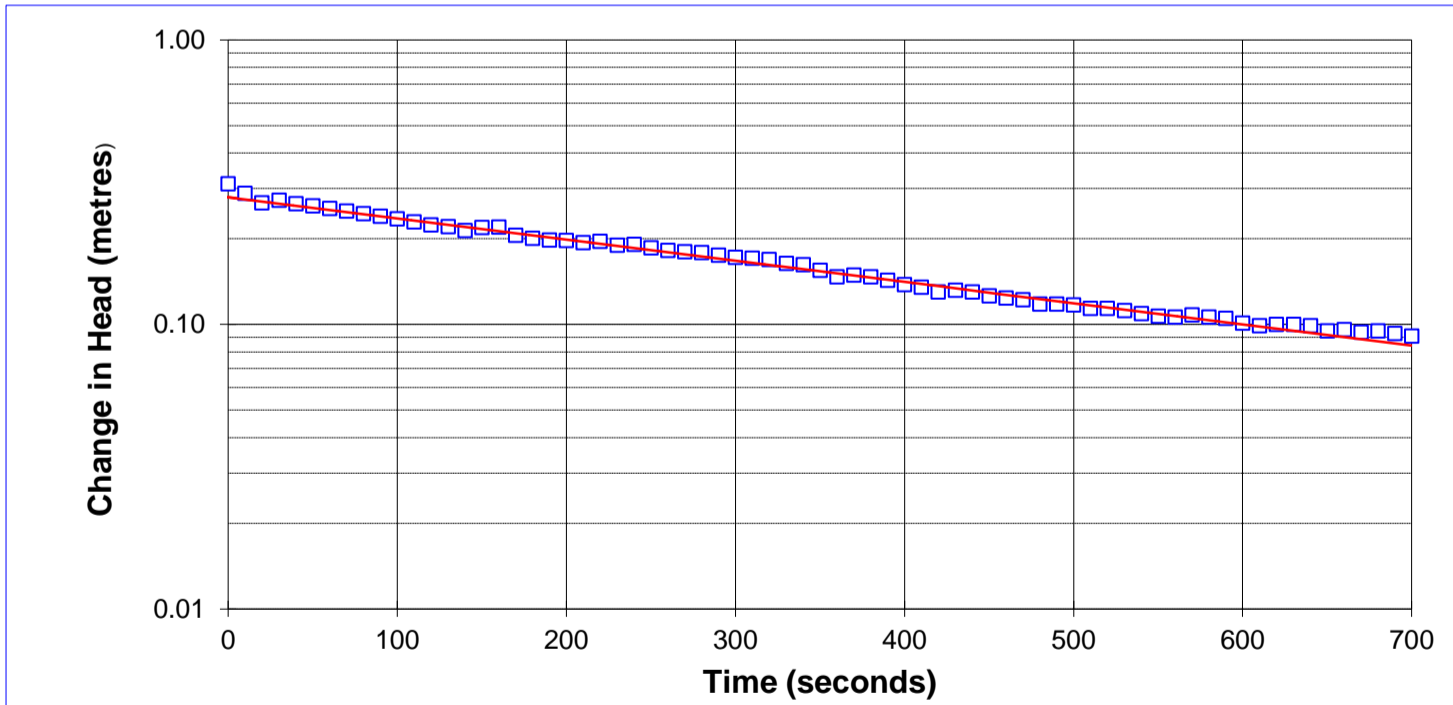
INTERVAL (metres below ground surface)	
Top of Interval =	4.6
Bottom of Interval =	4.9

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.02$	<table style="width: 100%;"> <tr> <td>K=</td> <td>7E-07</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>7E-05</td> <td>cm/sec</td> </tr> </table>	K=	7E-07	m/sec	K=	7E-05	cm/sec
K=		7E-07	m/sec				
K=		7E-05	cm/sec				
$r_w = 0.10$							
$L_e = 0.30$							
$\ln(R_e/r_w) = 1.00$							
$y_0 = 0.28$							
$y_t = 0.10$							
$t = 600.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1125-0045
 Test Date: 01/14/13

Analysis By: DH
 Checked By: CHM
 Analysis Date: 1/15/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 12-3-6**

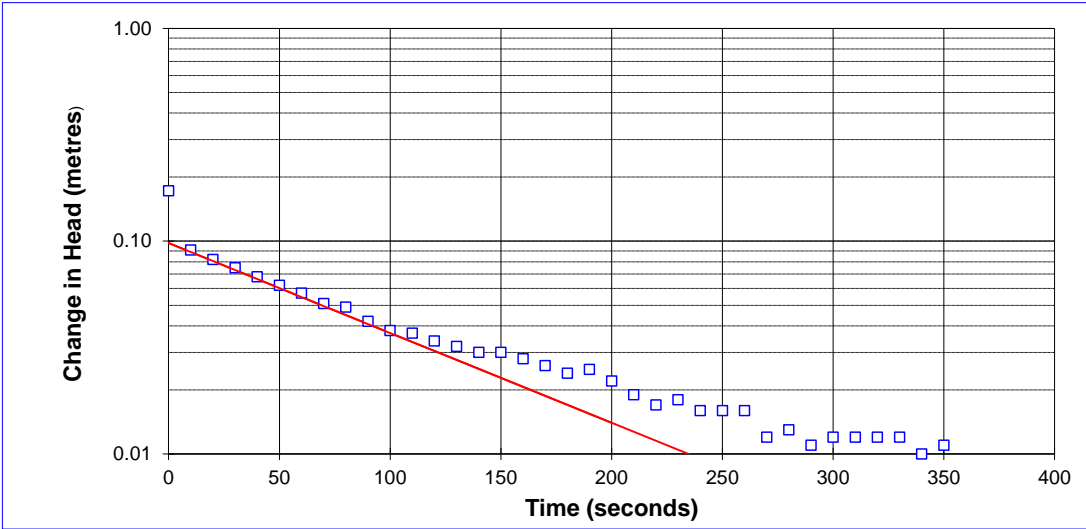
INTERVAL (metres below ground surface)	
Top of Interval =	0.3
Bottom of Interval =	1.5

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.03$	<table style="width: 100%;"> <tr> <td>K=</td> <td>5E-06</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>5E-04</td> <td>cm/sec</td> </tr> </table>	K=	5E-06	m/sec	K=	5E-04	cm/sec
K=		5E-06	m/sec				
K=		5E-04	cm/sec				
$r_w = 0.10$							
$L_e = 1.20$							
$\ln(R_e/r_w) = 1.87$							
$y_0 = 0.10$							
$y_t = 0.01$							
$t = 200.0$							



Project Name: **CRRRC/EA Eastern ON/Boundary Rd**
 Project No.: **12-1125-0045**
 Test Date: **01/14/13**

Analysis By: **DH**
 Checked By: **CHM**
 Analysis Date: **1/15/2013**

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 12-4-3**

INTERVAL (metres below ground surface)

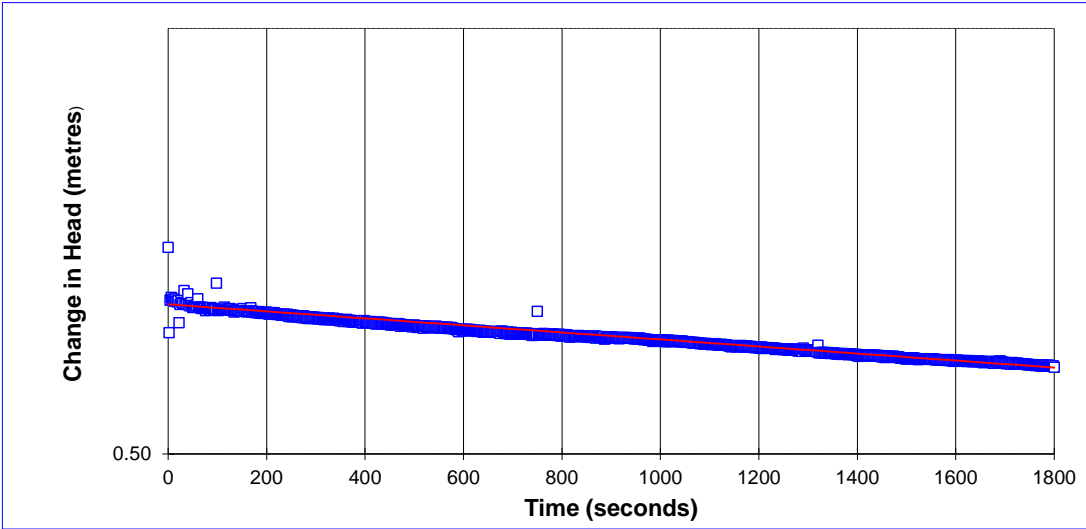
Top of Interval = 38.5
Bottom of Interval = 43.6

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K=\text{m/sec}$$

where:

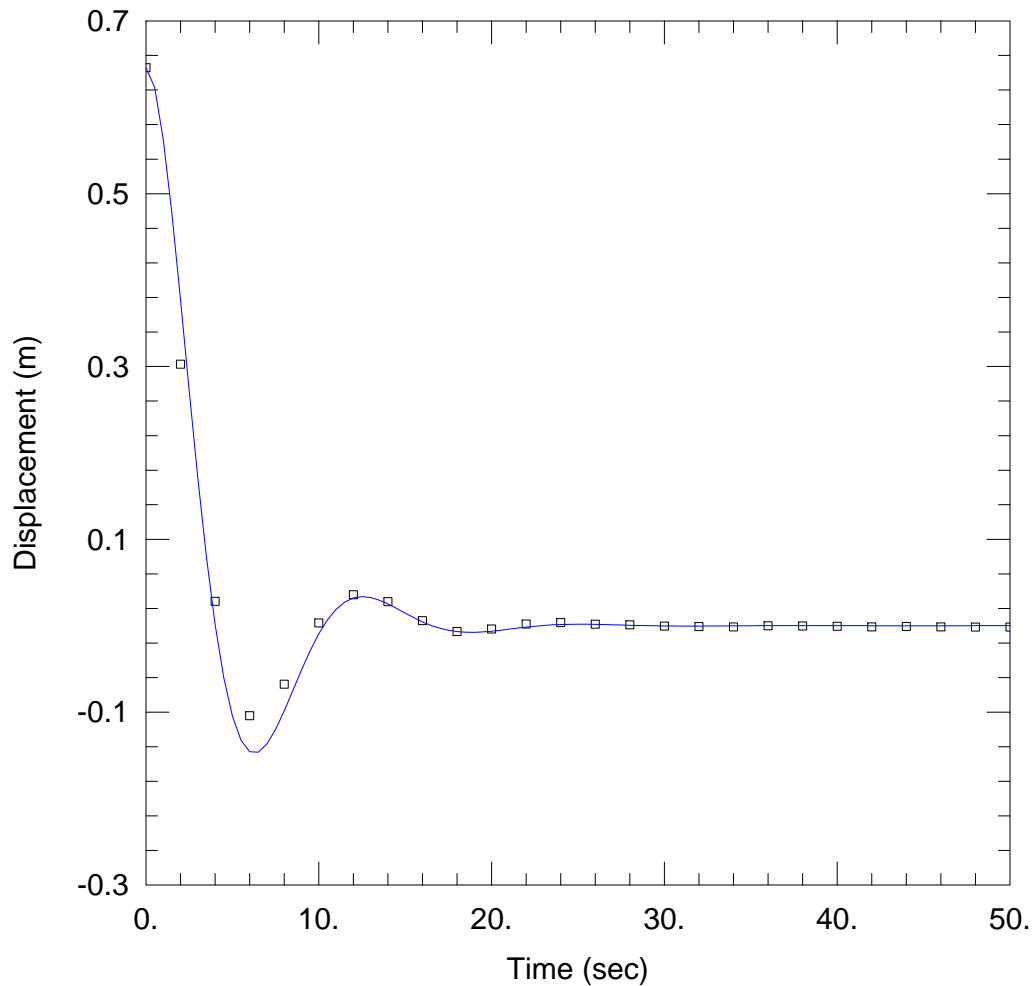
- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS
$r_c = 0.03$	$K = 2\text{E-}08 \text{ m/sec}$ $K = 2\text{E-}06 \text{ cm/sec}$
$r_w = 0.05$	
$L_e = 5.10$	
$\ln(R_e/r_w) = 4.13$	
$y_0 = 0.64$	
$y_t = 0.62$	
$t = 500.0$	



Project Name: CRRRC/EA Eastern ON/Boundary Rd
Project No.: 12-1127-00125/1000/0120
Test Date: 04/18/13

Analysis By: DH
Checked By: BH
Analysis Date: 5/2/2013



WELL TEST ANALYSIS

Data Set: \...\BH12-4-4A RHT-1_BH.aqt
 Date: 12/05/13

Time: 16:41:56

PROJECT INFORMATION

Company: Golder Associate Ltd.
 Client: CRRRC/Eastern EA ON/Boundary R
 Project: 12-1125-0045/1000/0120
 Test Well: 12-4-4A
 Test Date: 4/18/2013

AQUIFER DATA

Saturated Thickness: 4.36 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (12-4-4A)

Initial Displacement: 0.6458 m
 Total Well Penetration Depth: 2.89 m
 Casing Radius: 0.016 m

Static Water Column Height: 35.28 m
 Screen Length: 1.85 m
 Well Radius: 0.05 m

SOLUTION

Aquifer Model: Confined
 K = 0.0001774 m/sec

Solution Method: Butler
 Le = 31.97 m

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 12-4-5B**

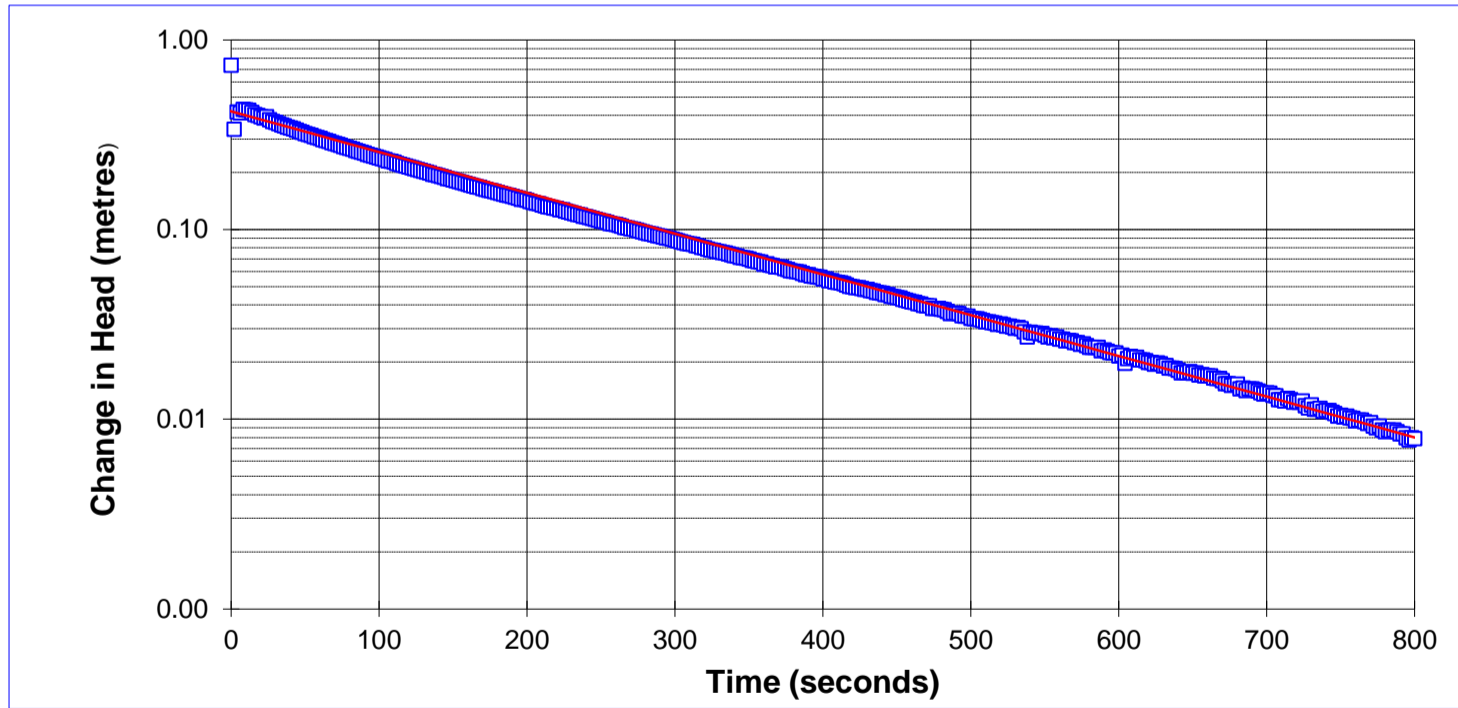
INTERVAL (metres below ground surface)	
Top of Interval =	4.7
Bottom of Interval =	5.0

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.02$	<table style="width: 100%;"> <tr> <td>K=</td> <td>3E-06</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>3E-04</td> <td>cm/sec</td> </tr> </table>	K=	3E-06	m/sec	K=	3E-04	cm/sec
K=		3E-06	m/sec				
K=		3E-04	cm/sec				
$r_w = 0.06$							
$L_e = 0.23$							
$\ln(R_e/r_w) = 1.06$							
$y_0 = 0.42$							
$y_t = 0.06$							
$t = 400.0$							



Project Name: **CRRRC/EA Eastern ON/Boundary Rd**
 Project No.: **12-1127-00125/1000/0120**
 Test Date: **04/18/13**

Analysis By: **DH**
 Checked By: **BH**
 Analysis Date: **5/2/2013**

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 12-4-6**

INTERVAL (metres below ground surface)

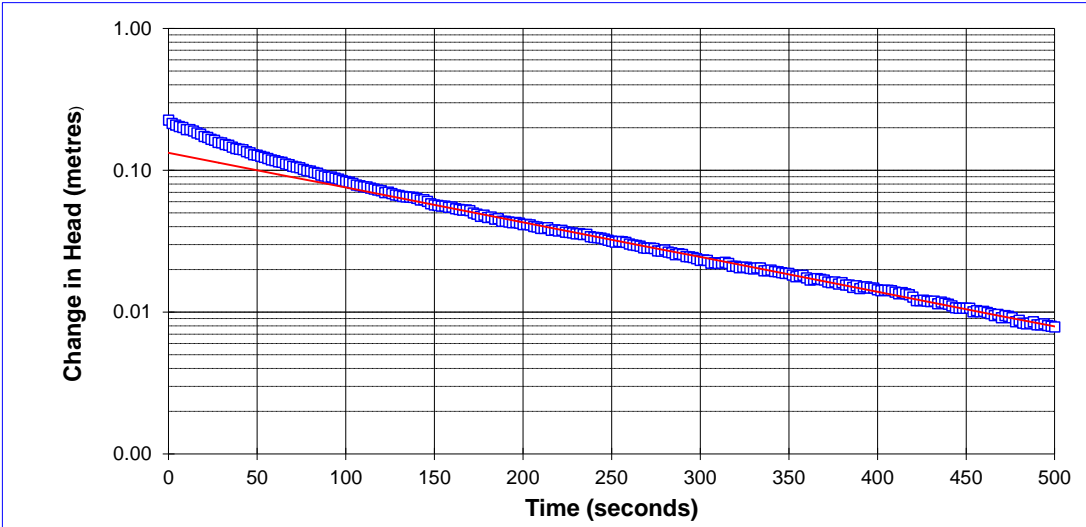
Top of Interval = 0.3
Bottom of Interval = 1.6

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K=\text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS
$r_c = 0.03$	$K = 3E-06 \text{ m/sec}$ $K = 3E-04 \text{ cm/sec}$
$r_w = 0.06$	
$L_e = 1.30$	
$\ln(R_e/r_w) = 2.05$	
$y_0 = 0.06$	
$y_t = 0.01$	
$t = 300.0$	



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1127-00125/1000/0120
 Test Date: 04/24/13

Analysis By: DH
 Checked By: BH
 Analysis Date: 5/7/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 13-10-2**

INTERVAL (metres below ground surface)

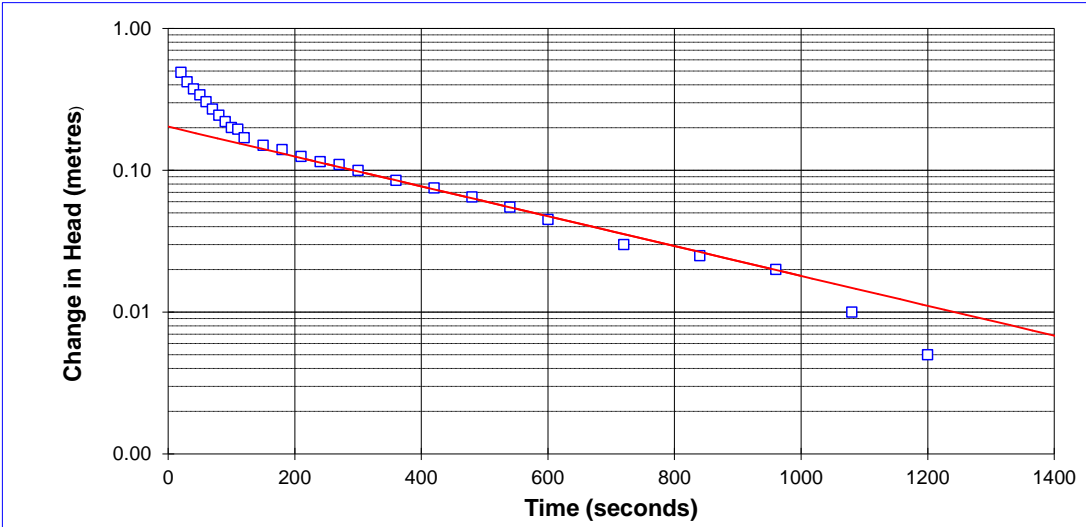
Top of Interval = 0.3
Bottom of Interval = 1.5

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K=\text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS
$r_c = 0.03$	$K = 2\text{E-}06 \text{ m/sec}$ $K = 2\text{E-}04 \text{ cm/sec}$
$r_w = 0.06$	
$L_e = 1.13$	
$\ln(R_e/r_w) = 1.92$	
$y_0 = 0.13$	
$y_t = 0.02$	
$t = 800.0$	



Project Name: **CRRRC/EA Eastern ON/Boundary Rd**
 Project No.: **12-1127-00125/1000/0120**
 Test Date: **04/22/13**

Analysis By: **DH**
 Checked By: **BH**
 Analysis Date: **5/6/2013**

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 13-10-3**

INTERVAL (metres below ground surface)

Top of Interval = 5.87
Bottom of Interval = 6.15

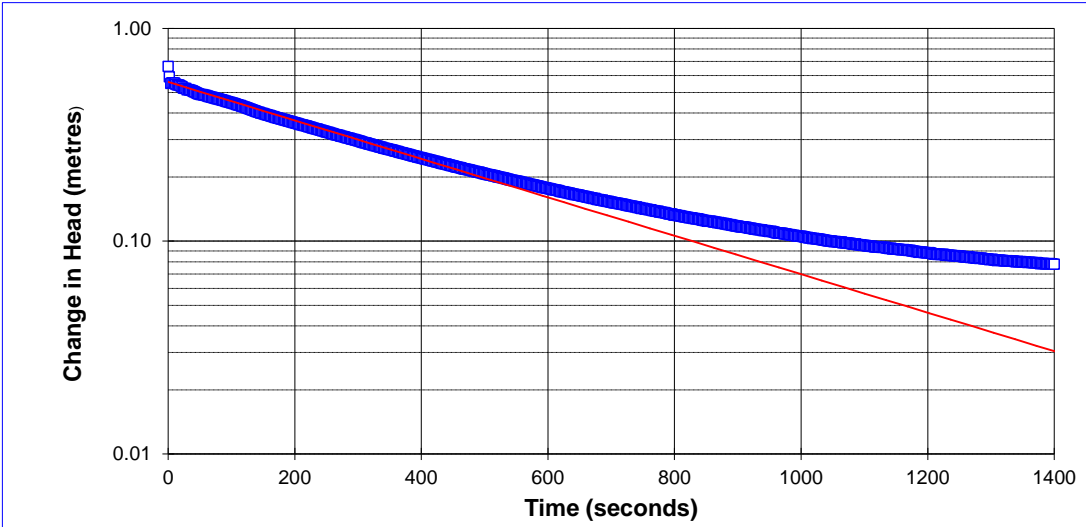
$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t}$$

where K=m/sec

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.02$	<table border="0"> <tr> <td>K=</td> <td>1E-06</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>1E-04</td> <td>cm/sec</td> </tr> </table>	K=	1E-06	m/sec	K=	1E-04	cm/sec
K=		1E-06	m/sec				
K=		1E-04	cm/sec				
$r_w = 0.06$							
$L_e = 0.28$							
$\ln(R_e/r_w) = 1.15$							
$y_0 = 0.56$							
$y_t = 0.30$							
$t = 300.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
Project No.: 12-1127-00125/1000/0120
Test Date: 04/18/13

Analysis By: DH
Checked By: BH
Analysis Date: 7/23/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 13-12-2**

INTERVAL (metres below ground surface)

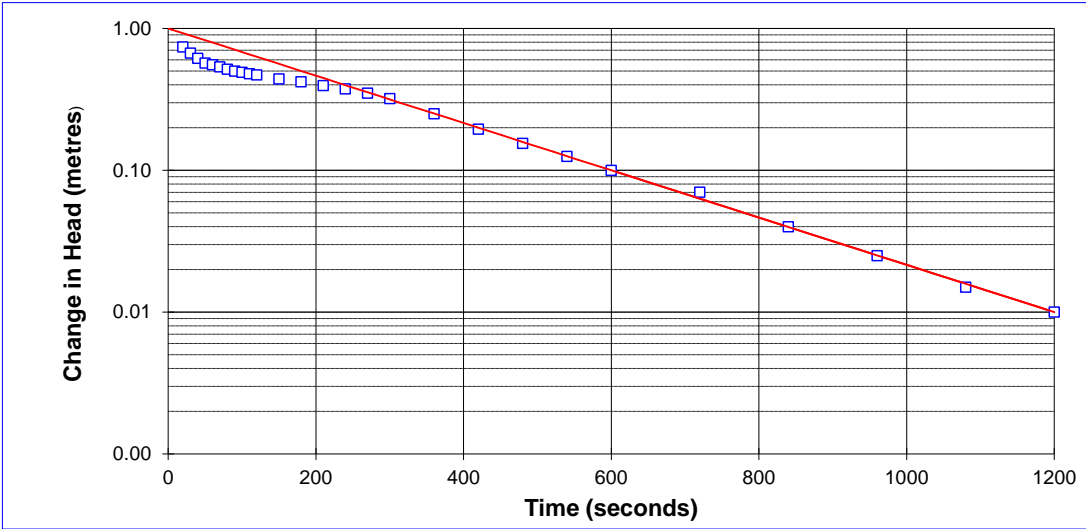
Top of Interval = 0.3
Bottom of Interval = 1.5

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K=\text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.03$	<table border="1"> <tr> <td>K=</td> <td>4E-06</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>4E-04</td> <td>cm/sec</td> </tr> </table>	K=	4E-06	m/sec	K=	4E-04	cm/sec
K=		4E-06	m/sec				
K=		4E-04	cm/sec				
$r_w = 0.06$							
$L_e = 1.22$							
$\ln(R_e/r_w) = 2.43$							
$y_0 = 0.10$							
$y_t = 0.01$							
$t = 600.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
Project No.: 12-1127-00125/1000/0120
Test Date: 04/24/13

Analysis By: DH
Checked By: BH
Analysis Date: 5/6/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 13-12-3**

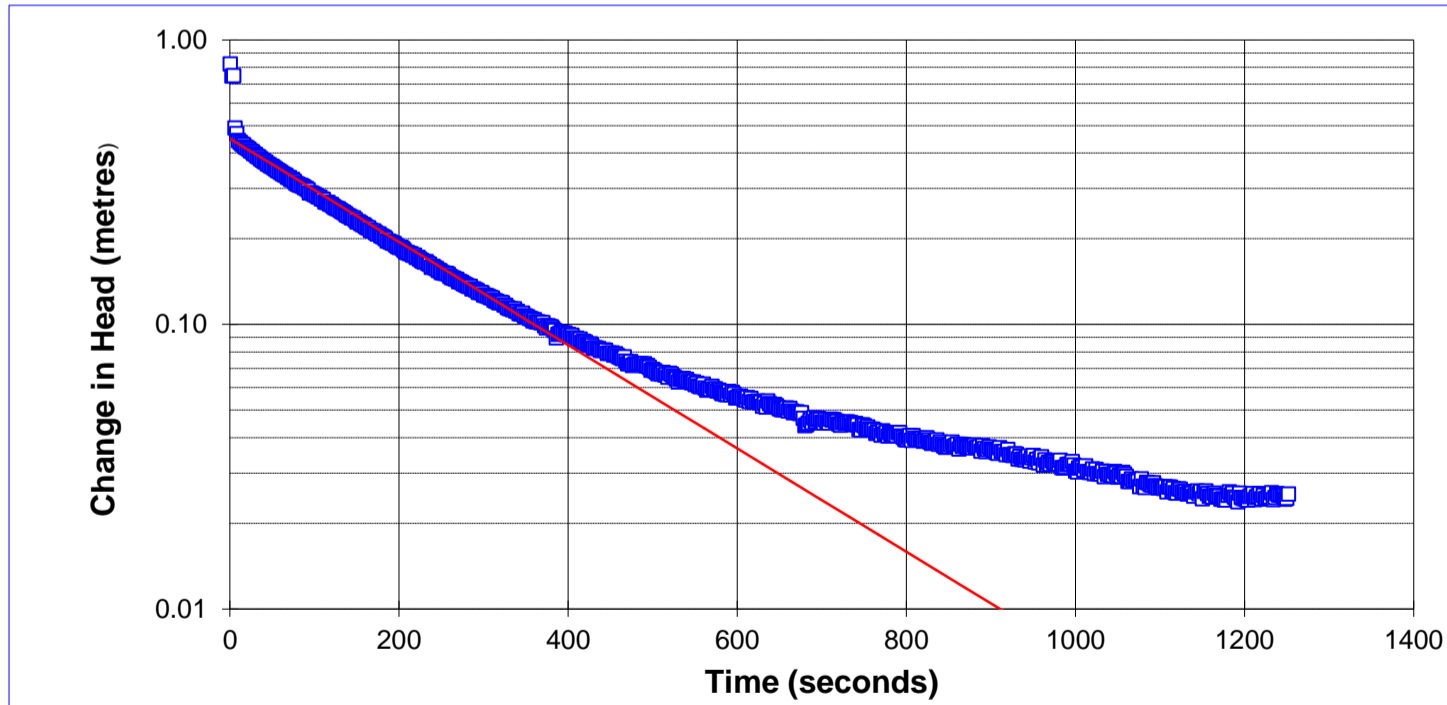
INTERVAL (metres below ground surface)	
Top of Interval =	4.8
Bottom of Interval =	5.4

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.02$	<table style="width: 100%;"> <tr> <td>K=</td> <td>1E-06</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>1E-04</td> <td>cm/sec</td> </tr> </table>	K=	1E-06	m/sec	K=	1E-04	cm/sec
K=		1E-06	m/sec				
K=		1E-04	cm/sec				
$r_w = 0.06$							
$L_e = 0.61$							
$\ln(R_e/r_w) = 1.71$							
$y_0 = 0.45$							
$y_t = 0.20$							
$t = 200.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1127-00125/1000/0120
 Test Date: 04/18/13

Analysis By: DH
 Checked By: BH
 Analysis Date: 5/9/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 13-17-2**

INTERVAL (metres below ground surface)

Top of Interval = 0.3
Bottom of Interval = 1.5

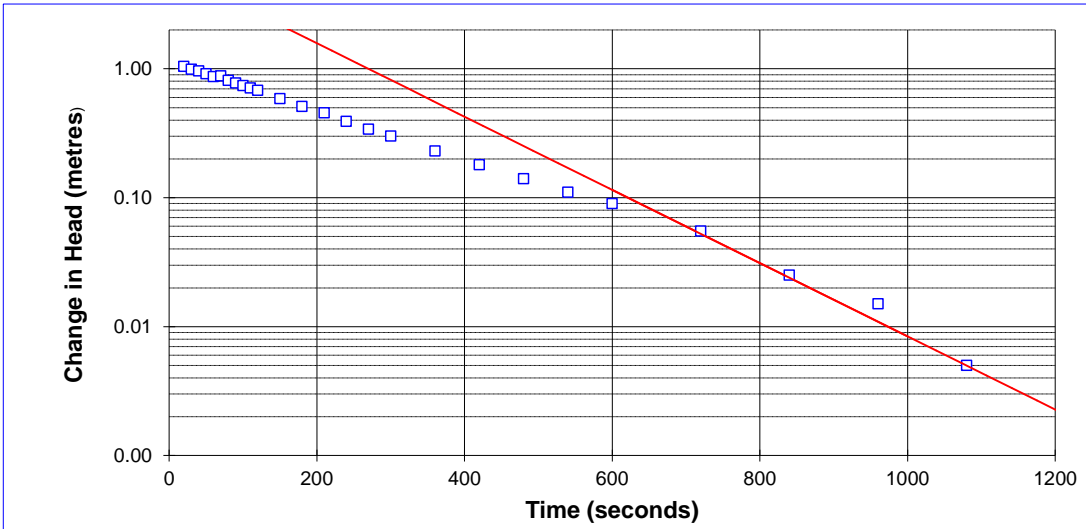
$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t}$$

where K=m/sec

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.02$	<table border="1"> <tr> <td>K=</td> <td>1E-06</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>1E-04</td> <td>cm/sec</td> </tr> </table>	K=	1E-06	m/sec	K=	1E-04	cm/sec
K=		1E-06	m/sec				
K=		1E-04	cm/sec				
$r_w = 0.06$							
$L_e = 1.22$							
$\ln(R_e/r_w) = 2.16$							
$y_0 = 0.12$							
$y_t = 0.01$							
$t = 400.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
Project No.: 12-1127-00125/1000/0120
Test Date: 04/24/13

Analysis By: DH
Checked By: BH
Analysis Date: 5/7/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 13-17-3**

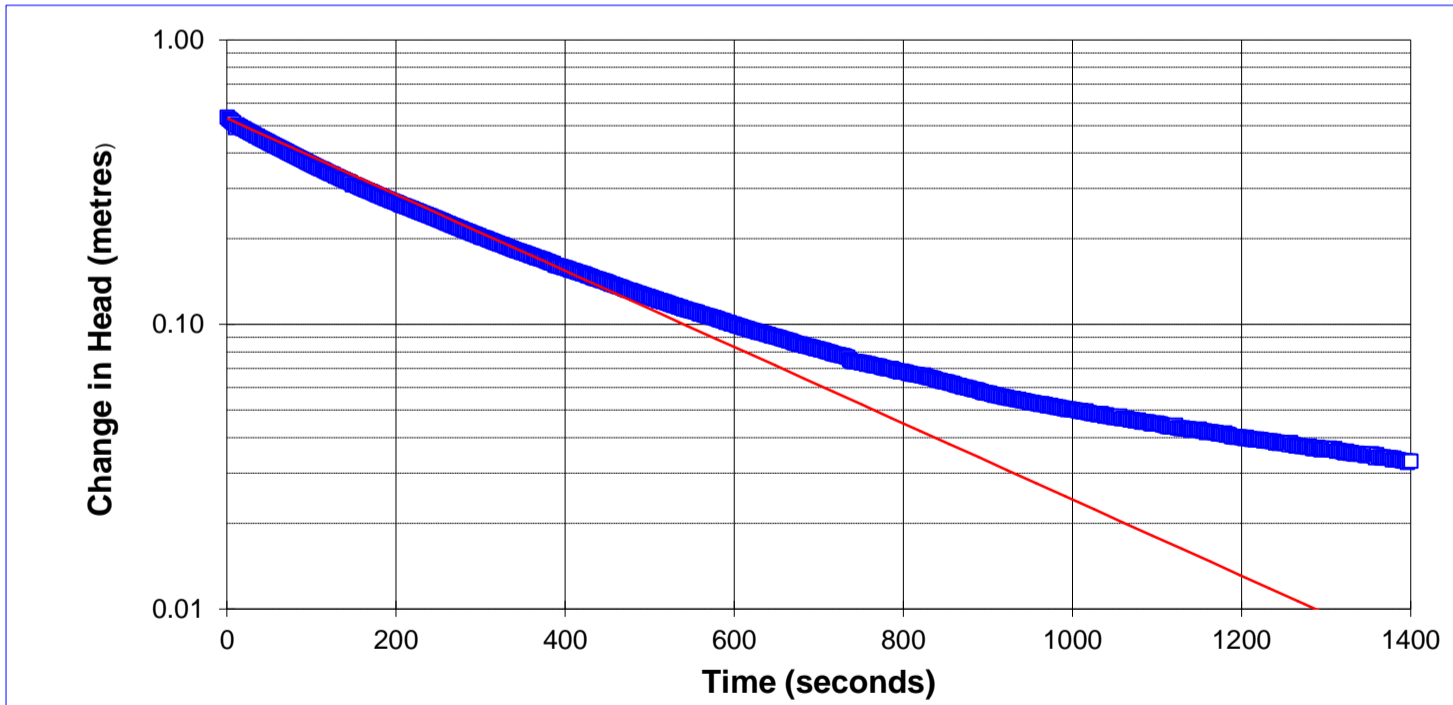
INTERVAL (metres below ground surface)	
Top of Interval =	4.4
Bottom of Interval =	5.0

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.02$	<table style="width: 100%;"> <tr> <td>K=</td> <td>1E-06</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>1E-04</td> <td>cm/sec</td> </tr> </table>	K=	1E-06	m/sec	K=	1E-04	cm/sec
K=		1E-06	m/sec				
K=		1E-04	cm/sec				
$r_w = 0.06$							
$L_e = 0.58$							
$\ln(R_e/r_w) = 1.67$							
$y_0 = 0.53$							
$y_t = 0.21$							
$t = 300.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1127-00125/1000/0120
 Test Date: 04/17/13

Analysis By: DH
 Checked By: BH
 Analysis Date: 5/2/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 13-18-2**

INTERVAL (metres below ground surface)

Top of Interval = 0.3
Bottom of Interval = 1.5

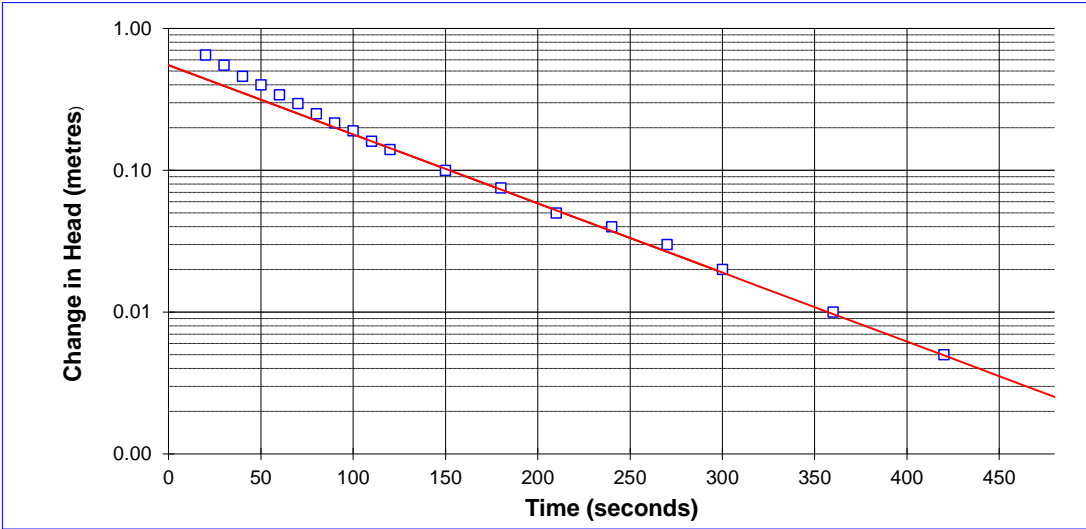
$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t}$$

where K=m/sec

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.03$	<table border="0"> <tr> <td>K=</td> <td>1E-05</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>1E-03</td> <td>cm/sec</td> </tr> </table>	K=	1E-05	m/sec	K=	1E-03	cm/sec
K=		1E-05	m/sec				
K=		1E-03	cm/sec				
$r_w = 0.06$							
$L_e = 1.22$							
$\ln(R_e/r_w) = 2.16$							
$y_0 = 0.55$							
$y_t = 0.02$							
$t = 300.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
Project No.: 12-1127-00125/1000/0120
Test Date: 04/22/13

Analysis By: DH
Checked By: BH
Analysis Date: 5/6/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 13-18-3**

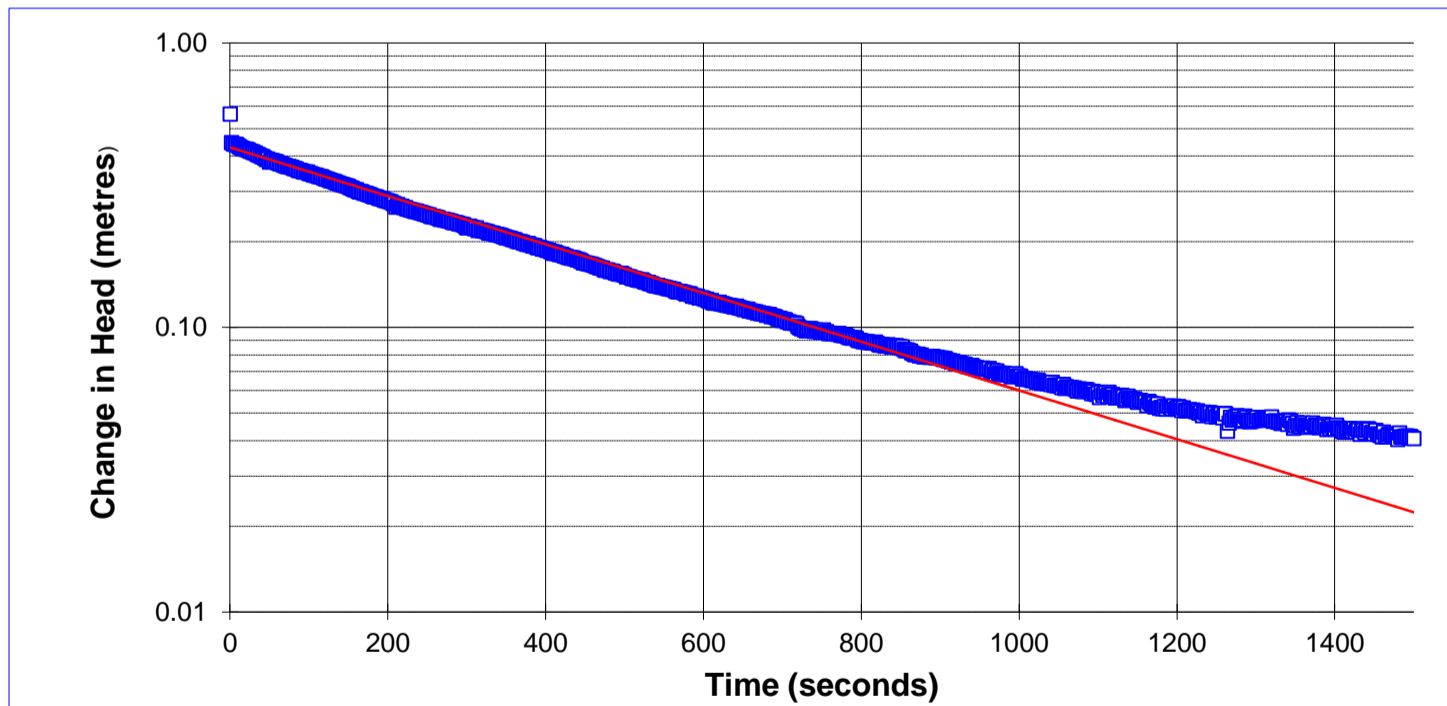
INTERVAL (metres below ground surface)	
Top of Interval =	5.7
Bottom of Interval =	6.2

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.02$	<table style="width: 100%;"> <tr> <td>K=</td> <td>8E-07</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>8E-05</td> <td>cm/sec</td> </tr> </table>	K=	8E-07	m/sec	K=	8E-05	cm/sec
K=		8E-07	m/sec				
K=		8E-05	cm/sec				
$r_w = 0.06$							
$L_e = 0.43$							
$\ln(R_e/r_w) = 1.43$							
$y_0 = 0.43$							
$y_t = 0.06$							
$t = 1000.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1127-00125/1000/0120
 Test Date: 04/22/13

Analysis By: DH
 Checked By: BH
 Analysis Date: 5/6/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 13-21-2**

INTERVAL (metres below ground surface)

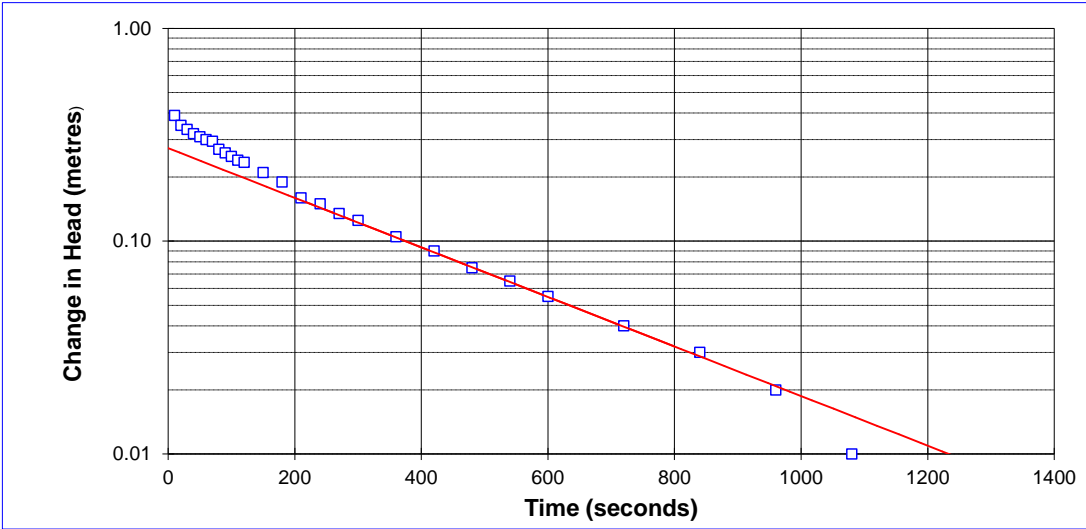
Top of Interval = 0.3
Bottom of Interval = 1.5

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS
$r_c = 0.03$	$K = 3E-06 \text{ m/sec}$ $K = 3E-04 \text{ cm/sec}$
$r_w = 0.06$	
$L_e = 0.94$	
$\ln(R_e/r_w) = 1.77$	
$y_0 = 0.16$	
$y_t = 0.03$	
$t = 600.0$	



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1127-00125/1000/0120
 Test Date: 04/22/13

Analysis By: DH
 Checked By: BH
 Analysis Date: 5/3/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 13-24-2**

INTERVAL (metres below ground surface)

Top of Interval = 0.3
Bottom of Interval = 1.5

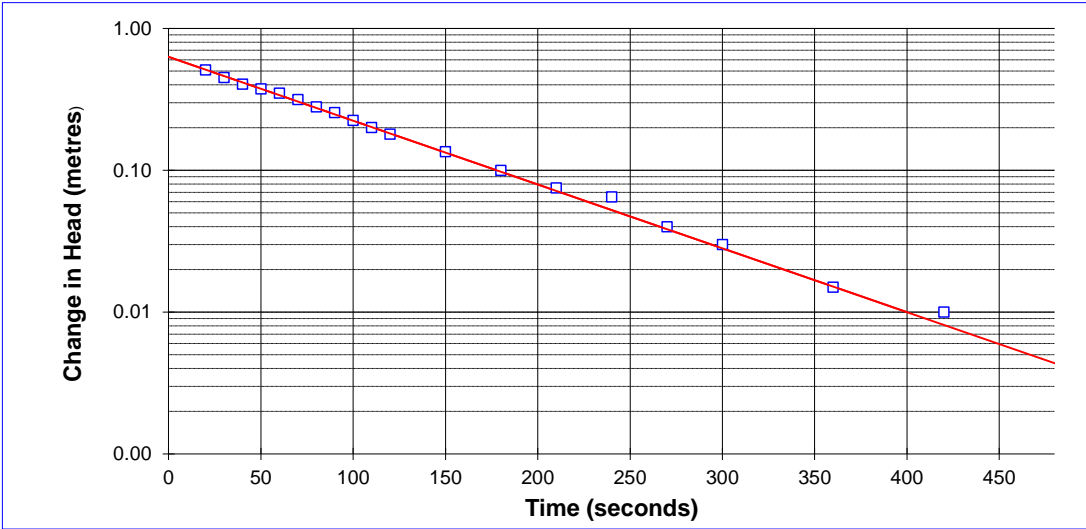
$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t}$$

where K=m/sec

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.02$	<table border="1"> <tr> <td>K=</td> <td>2E-06</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>2E-04</td> <td>cm/sec</td> </tr> </table>	K=	2E-06	m/sec	K=	2E-04	cm/sec
K=		2E-06	m/sec				
K=		2E-04	cm/sec				
$r_w = 0.06$							
$L_e = 1.22$							
$\ln(R_e/r_w) = 2.14$							
$y_0 = 0.63$							
$y_t = 0.01$							
$t = 400.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
Project No.: 12-1127-00125/1000/0120
Test Date: 04/22/13

Analysis By: DH
Checked By: BH
Analysis Date: 5/6/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 13-5-3**

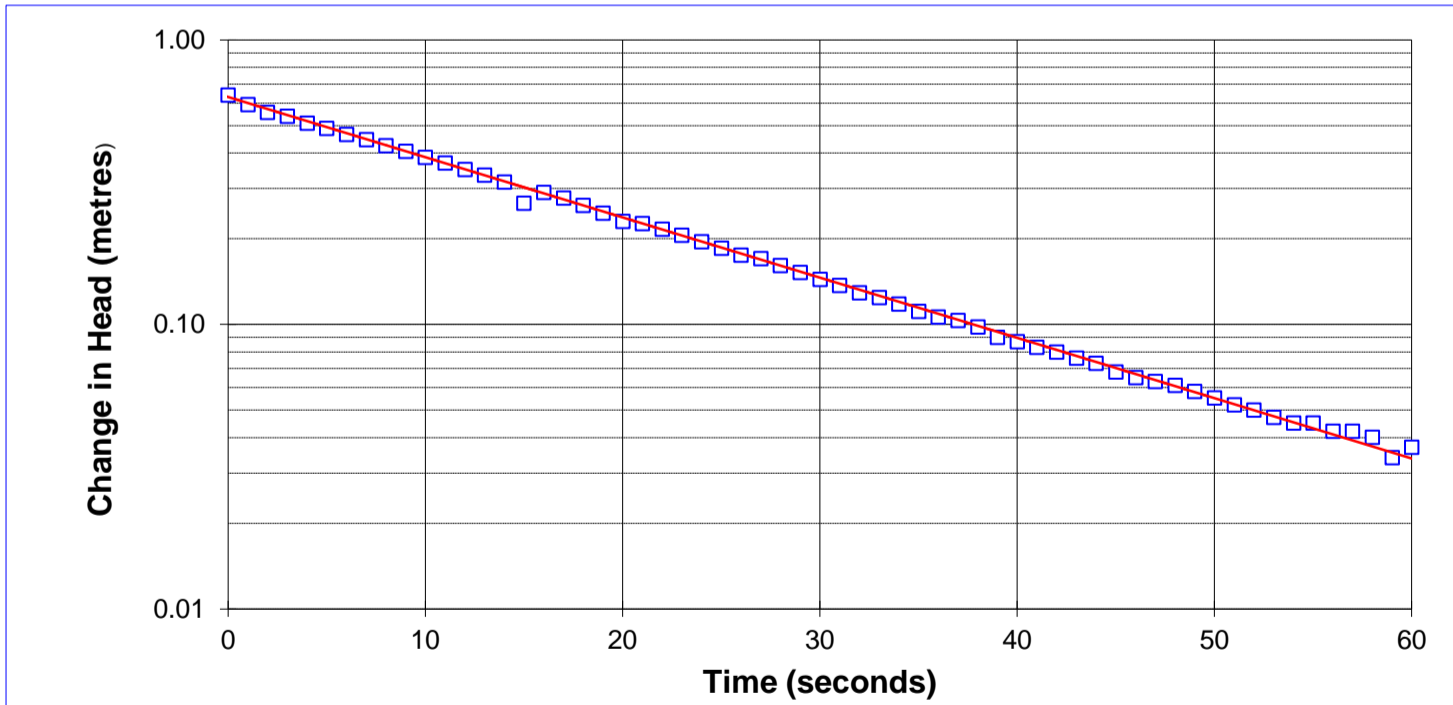
INTERVAL (metres below ground surface)	
Top of Interval =	35.3
Bottom of Interval =	40.3

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.02$	<table style="width: 100%; border: none;"> <tr> <td style="padding: 5px;">$K =$</td> <td style="padding: 5px;">5E-06</td> <td style="padding: 5px;">m/sec</td> </tr> <tr> <td style="padding: 5px;">$K =$</td> <td style="padding: 5px;">5E-04</td> <td style="padding: 5px;">cm/sec</td> </tr> </table>	$K =$	5E-06	m/sec	$K =$	5E-04	cm/sec
$K =$		5E-06	m/sec				
$K =$		5E-04	cm/sec				
$r_w = 0.04$							
$L_e = 5.08$							
$\ln(R_e/r_w) = 4.24$							
$y_0 = 0.63$							
$y_t = 0.06$							
$t = 50.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1127-00125/1000/0120
 Test Date: 07/09/13

Analysis By: DH
 Checked By: BH
 Analysis Date: 7/12/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 13-5-4A**

INTERVAL (metres below ground surface)

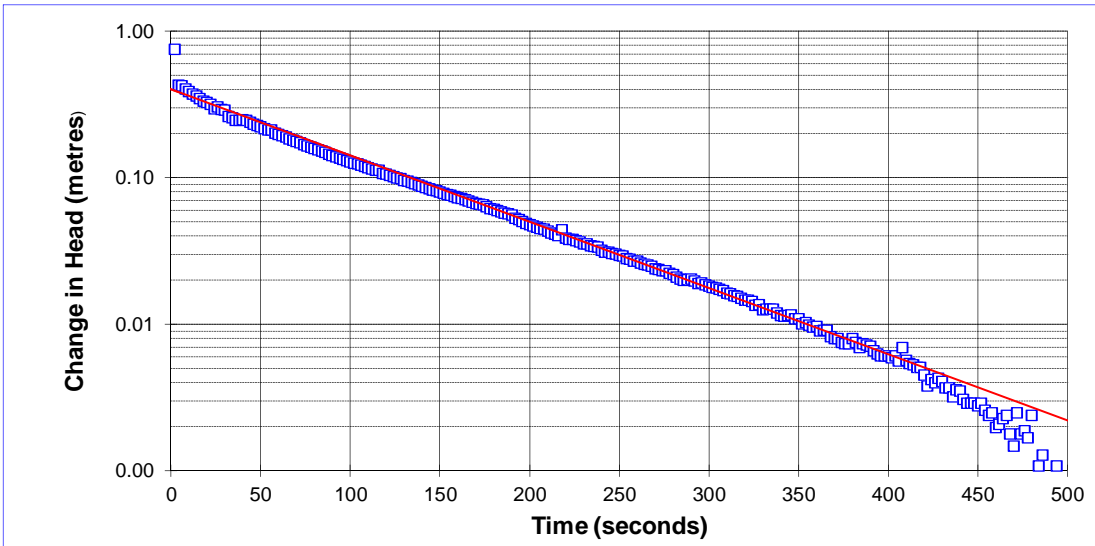
Top of Interval = 28.7
Bottom of Interval = 31.1

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

r_c = casing radius (metres); r_w = radial distance to undisturbed aquifer (metres)
 R_e = effective radius (metres); y_0 = initial drawdown (metres)
 L_e = length of screened interval (metres); y_t = drawdown (metres) at time t (seconds)

INPUT PARAMETERS	RESULTS						
$r_c = 0.02$	<table border="1"> <tr> <td>K=</td> <td>2E-06</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>2E-04</td> <td>cm/sec</td> </tr> </table>	K=	2E-06	m/sec	K=	2E-04	cm/sec
K=		2E-06	m/sec				
K=		2E-04	cm/sec				
$r_w = 0.06$							
$L_e = 2.44$							
$\ln(R_e/r_w) = 2.65$							
$y_0 = 0.40$							
$y_t = 0.05$							
$t = 200.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1127-00125/1000/0120
 Test Date: 04/25/13

Analysis By: DH
 Checked By: BH
 Analysis Date: 5/7/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 13-5-5**

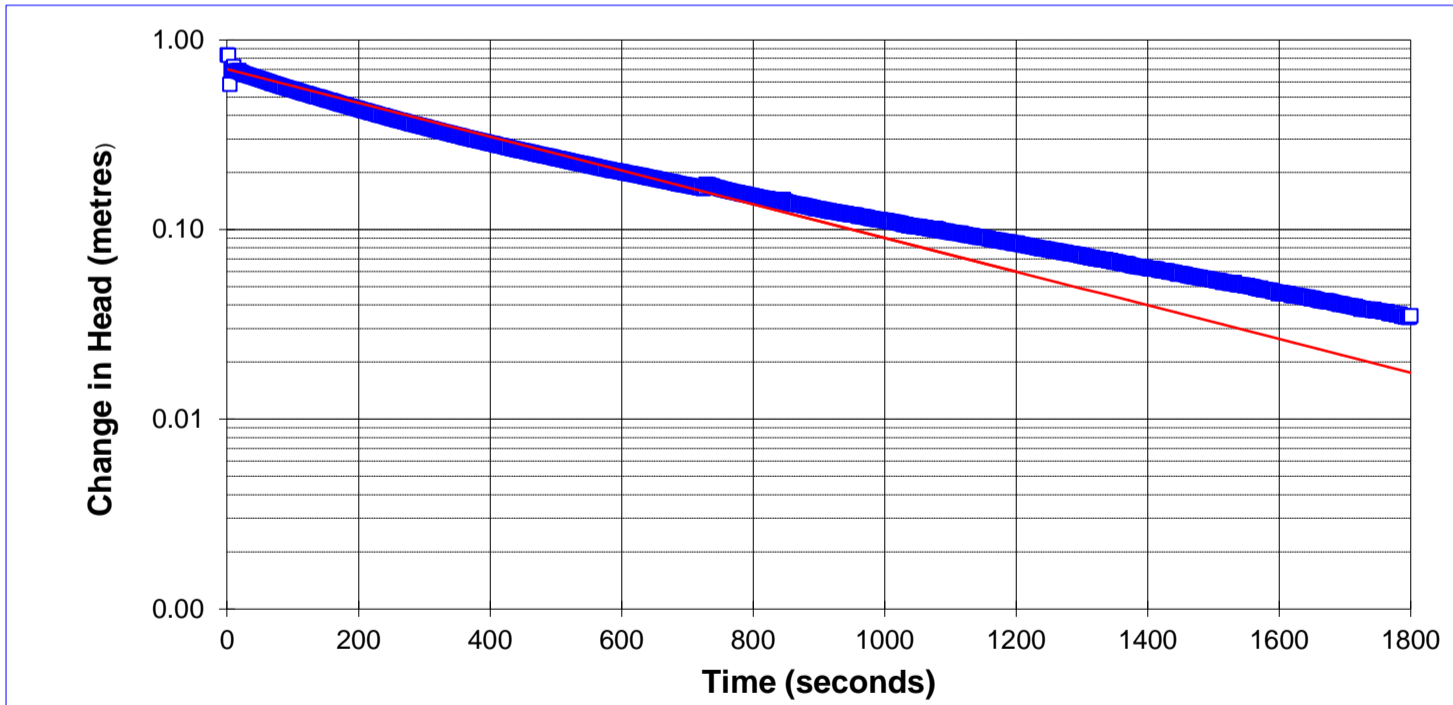
INTERVAL (metres below ground surface)	
Top of Interval =	4.3
Bottom of Interval =	4.9

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|--|---|
| <p>r_c = casing radius (metres);</p> <p>R_e = effective radius (metres);</p> <p>L_e = length of screened interval (metres);</p> | <p>r_w = radial distance to undisturbed aquifer (metres)</p> <p>y_0 = initial drawdown (metres)</p> <p>y_t = drawdown (metres) at time t (seconds)</p> |
|--|---|

INPUT PARAMETERS	RESULTS						
$r_c = 0.03$	<table style="width: 100%; border: none;"> <tr> <td style="padding: 5px;">$K =$</td> <td style="padding: 5px;">1E-06</td> <td style="padding: 5px;">m/sec</td> </tr> <tr> <td style="padding: 5px;">$K =$</td> <td style="padding: 5px;">1E-04</td> <td style="padding: 5px;">cm/sec</td> </tr> </table>	$K =$	1E-06	m/sec	$K =$	1E-04	cm/sec
$K =$		1E-06	m/sec				
$K =$		1E-04	cm/sec				
$r_w = 0.10$							
$L_e = 0.60$							
$\ln(R_e/r_w) = 1.23$							
$y_0 = 0.70$							
$y_t = 0.06$							
$t = 1200.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1127-00125/1000/0120
 Test Date: 04/24/13

Analysis By: DH
 Checked By: BH
 Analysis Date: 5/7/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 13-5-6**

INTERVAL (metres below ground surface)

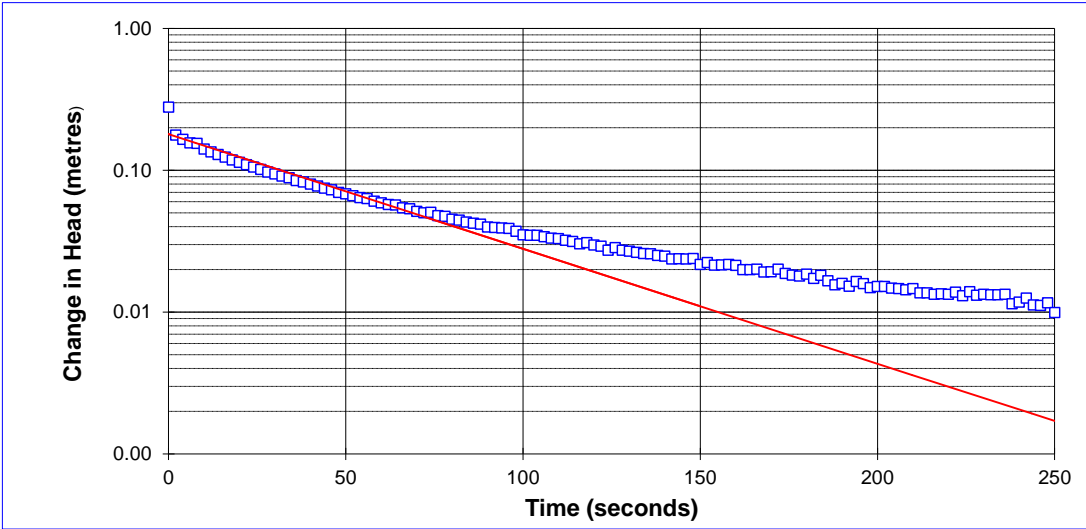
Top of Interval = 0.3
Bottom of Interval = 1.5

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.03$	<table border="1"> <tr> <td>K=</td> <td>9E-06</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>9E-04</td> <td>cm/sec</td> </tr> </table>	K=	9E-06	m/sec	K=	9E-04	cm/sec
K=		9E-06	m/sec				
K=		9E-04	cm/sec				
$r_w = 0.10$							
$L_e = 1.22$							
$\ln(R_e/r_w) = 1.81$							
$y_0 = 0.18$							
$y_t = 0.01$							
$t = 150.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
Project No.: 12-1127-00125/1000/0120
Test Date: 04/25/13

Analysis By: DH
Checked By: BH
Analysis Date: 5/7/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 13-6-3**

INTERVAL (metres below ground surface)

Top of Interval = 41.4
Bottom of Interval = 44.7

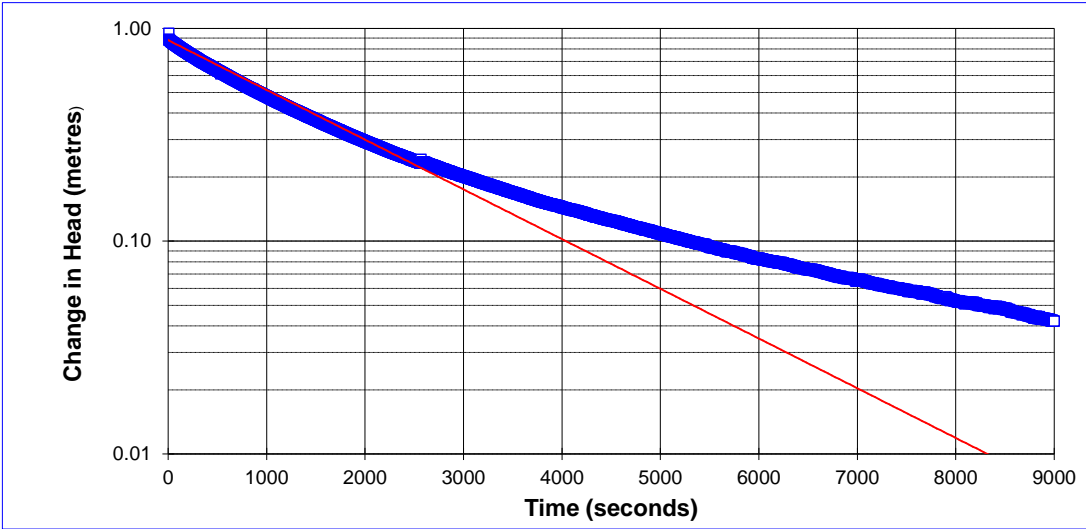
$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t}$$

where K=m/sec

where:

r_c = casing radius (metres); r_w = radial distance to undisturbed aquifer (metres)
 R_e = effective radius (metres); y_0 = initial drawdown (metres)
 L_e = length of screened interval (metres); y_t = drawdown (metres) at time t (seconds)

INPUT PARAMETERS	RESULTS
$r_c = 0.03$	$K = 2E-07$ m/sec $K = 2E-05$ cm/sec
$r_w = 0.05$	
$L_e = 3.34$	
$\ln(R_e/r_w) = 3.15$	
$y_0 = 0.88$	
$y_t = 0.30$	
$t = 2000.0$	



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1127-00125/1000/0120
 Test Date: 04/22/13

Analysis By: DH
 Checked By: BH
 Analysis Date: 5/3/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 13-6-4A**

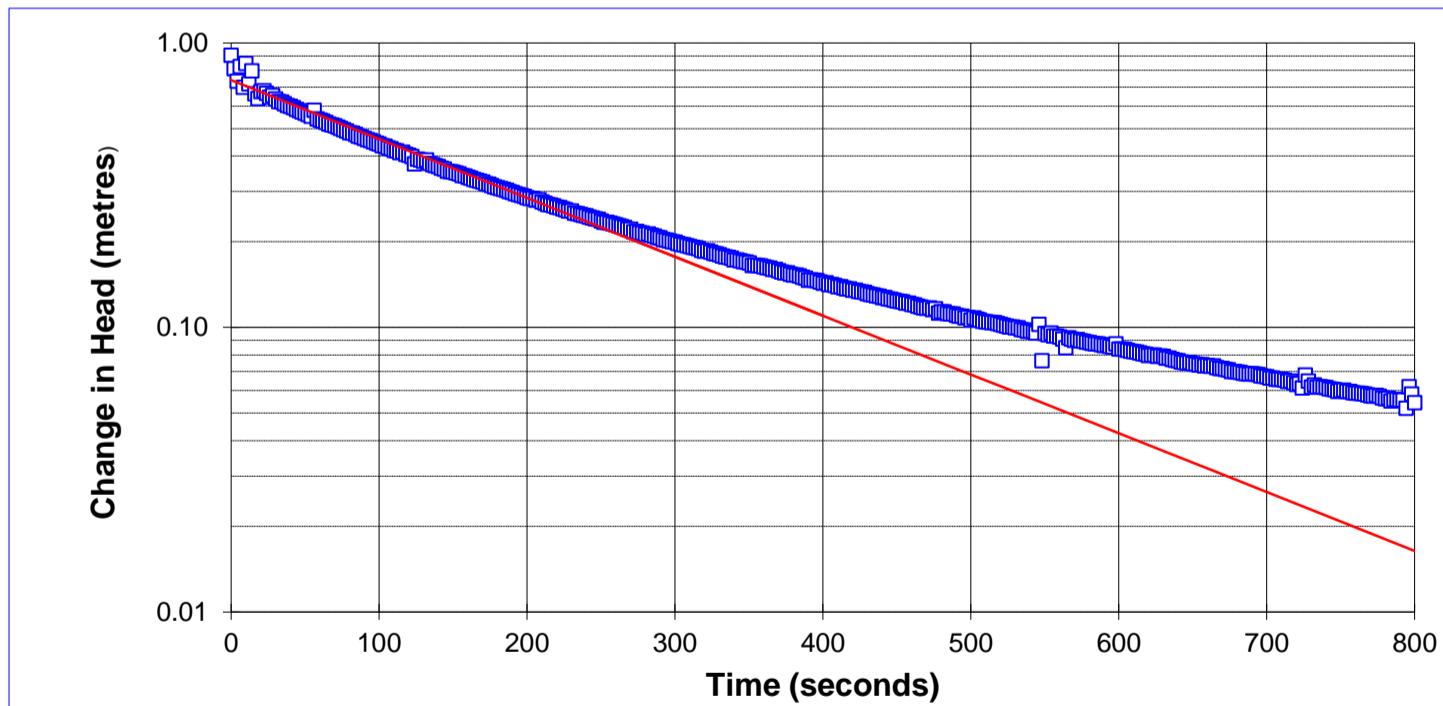
INTERVAL (metres below ground surface)	
Top of Interval =	33.0
Bottom of Interval =	35.6

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|--|---|
| <p>r_c = casing radius (metres);</p> <p>R_e = effective radius (metres);</p> <p>L_e = length of screened interval (metres);</p> | <p>r_w = radial distance to undisturbed aquifer (metres)</p> <p>y_0 = initial drawdown (metres)</p> <p>y_t = drawdown (metres) at time t (seconds)</p> |
|--|---|

INPUT PARAMETERS	RESULTS				
$r_c = 0.02$	<table style="width: 100%; border: none;"> <tr> <td style="padding: 5px;">$K = 6E-07$</td> <td style="padding: 5px;">m/sec</td> </tr> <tr> <td style="padding: 5px;">$K = 6E-05$</td> <td style="padding: 5px;">cm/sec</td> </tr> </table>	$K = 6E-07$	m/sec	$K = 6E-05$	cm/sec
$K = 6E-07$		m/sec			
$K = 6E-05$		cm/sec			
$r_w = 0.06$					
$L_e = 2.58$					
$\ln(R_e/r_w) = 2.69$					
$y_0 = 0.74$					
$y_t = 0.11$					
$t = 400.0$					



Project Name: **CRRRC/EA Eastern ON/Boundary Rd**
 Project No.: **12-1127-00125/1000/0120**
 Test Date: **04/17/13**

Analysis By: **DH**
 Checked By: **BH**
 Analysis Date: **5/3/2013**

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 13-6-5B**

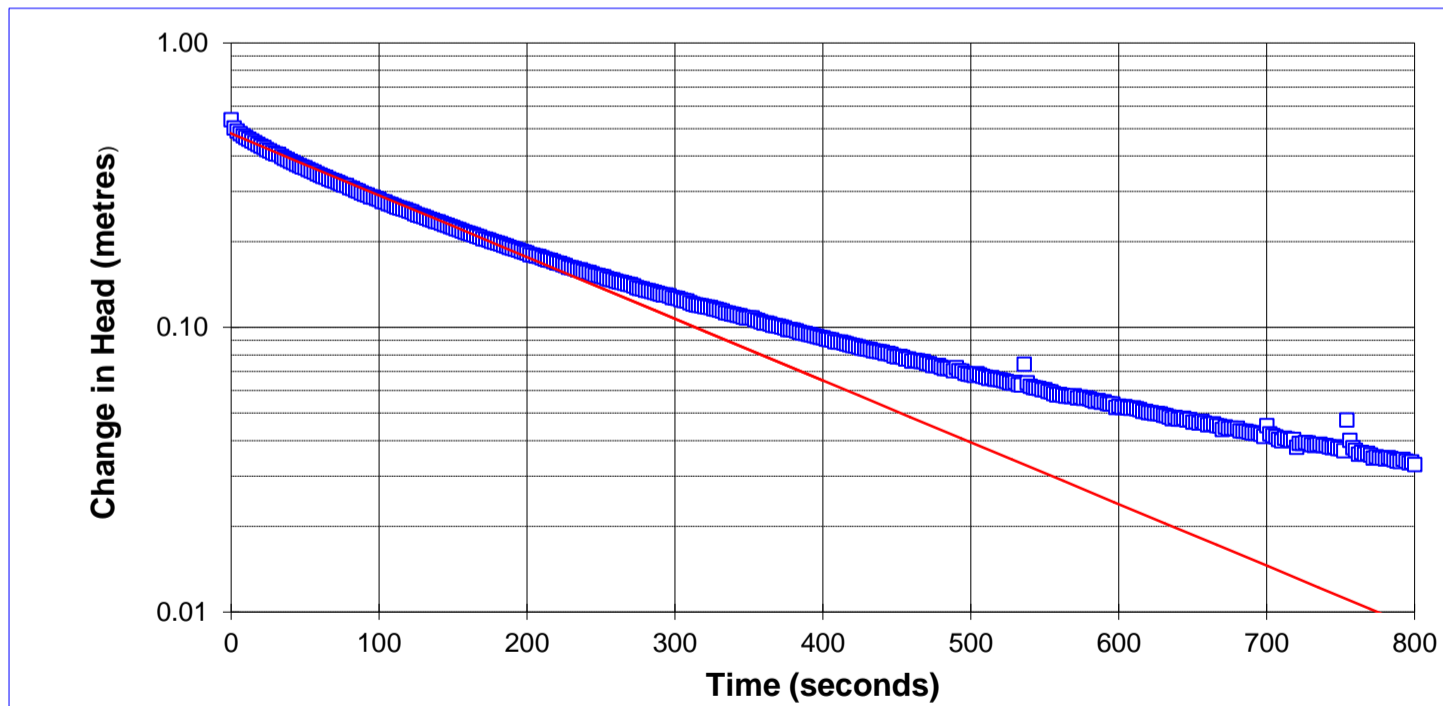
INTERVAL (metres below ground surface)	
Top of Interval =	5.2
Bottom of Interval =	5.6

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|--|---|
| <p>r_c = casing radius (metres);</p> <p>R_e = effective radius (metres);</p> <p>L_e = length of screened interval (metres);</p> | <p>r_w = radial distance to undisturbed aquifer (metres)</p> <p>y_0 = initial drawdown (metres)</p> <p>y_t = drawdown (metres) at time t (seconds)</p> |
|--|---|

INPUT PARAMETERS	RESULTS				
$r_c = 0.02$	<table style="width: 100%; border: none;"> <tr> <td style="padding: 5px;">$K = 2\text{E-}06$</td> <td style="padding: 5px;">m/sec</td> </tr> <tr> <td style="padding: 5px;">$K = 2\text{E-}04$</td> <td style="padding: 5px;">cm/sec</td> </tr> </table>	$K = 2\text{E-}06$	m/sec	$K = 2\text{E-}04$	cm/sec
$K = 2\text{E-}06$		m/sec			
$K = 2\text{E-}04$		cm/sec			
$r_w = 0.06$					
$L_e = 0.38$					
$\ln(R_e/r_w) = 1.34$					
$y_0 = 0.48$					
$y_t = 0.07$					
$t = 400.0$					



Project Name: **CRRRC/EA Eastern ON/Boundary Rd**
 Project No.: **12-1127-00125/1000/0120**
 Test Date: **04/17/13**

Analysis By: **DH**
 Checked By: **BH**
 Analysis Date: **5/3/2013**

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 13-6-6**

INTERVAL (metres below ground surface)

Top of Interval = 0.6
Bottom of Interval = 1.6

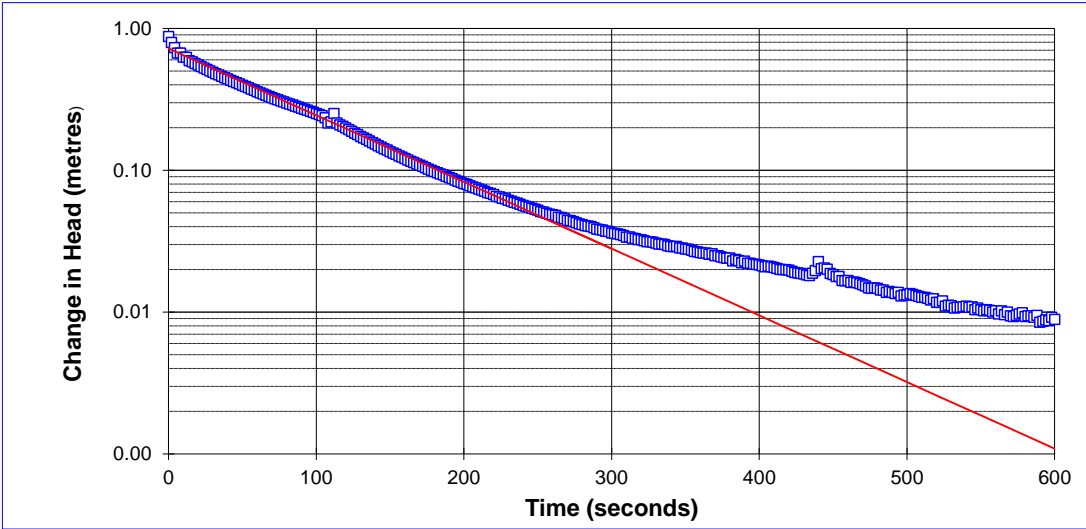
$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t}$$

where K=m/sec

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS
$r_c = 0.03$	$K = 8E-06$ m/sec $K = 8E-04$ cm/sec
$r_w = 0.06$	
$L_e = 1.00$	
$\ln(R_e/r_w) = 2.16$	
$y_0 = 0.72$	
$y_t = 0.03$	
$t = 300.0$	



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1127-00125/1000/0120
 Test Date: 04/17/13

Analysis By: DH
 Checked By: BH
 Analysis Date: 4/22/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 13-7-2**

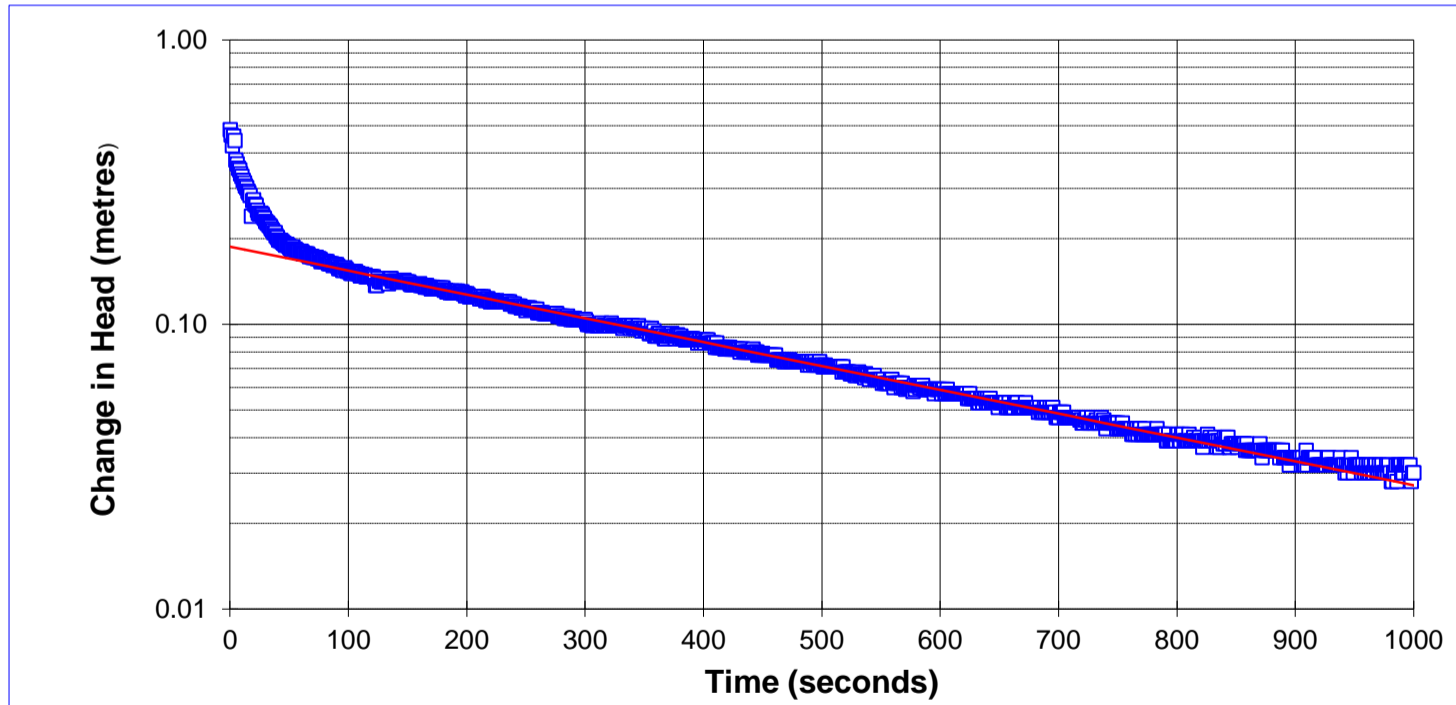
INTERVAL (metres below ground surface)	
Top of Interval =	34.6
Bottom of Interval =	39.5

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS				
$r_c = 0.02$	<table style="width: 100%; border: none;"> <tr> <td style="padding: 5px;">$K = 2E-07$</td> <td style="padding: 5px;">m/sec</td> </tr> <tr> <td style="padding: 5px;">$K = 2E-05$</td> <td style="padding: 5px;">cm/sec</td> </tr> </table>	$K = 2E-07$	m/sec	$K = 2E-05$	cm/sec
$K = 2E-07$		m/sec			
$K = 2E-05$		cm/sec			
$r_w = 0.04$					
$L_e = 4.87$					
$\ln(R_e/r_w) = 4.21$					
$y_0 = 0.11$					
$y_t = 0.04$					
$t = 500.0$					



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1127-00125/1000/0120
 Test Date: 07/09/13

Analysis By: DH
 Checked By: BH
 Analysis Date: 7/9/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 13-7-3**

INTERVAL (metres below ground surface)

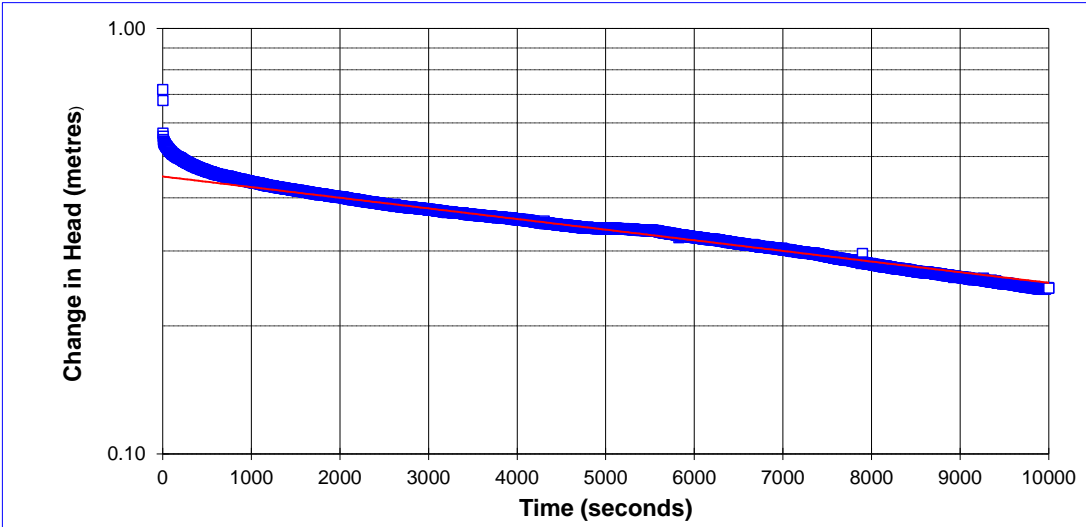
Top of Interval = 28.0
Bottom of Interval = 30.3

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K=\text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS
$r_c = 0.02$	$K = 8E-09 \text{ m/sec}$ $K = 8E-07 \text{ cm/sec}$
$r_w = 0.06$	
$L_e = 2.27$	
$\ln(R_e/r_w) = 2.62$	
$y_0 = 0.40$	
$y_t = 0.30$	
$t = 5000.0$	



Project Name: CRRRC/EA Eastern ON/Boundary Rd
Project No.: 12-1127-00125/1000/0120
Test Date: 04/25/13

Analysis By: DH
Checked By: BH
Analysis Date: 5/7/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 13-7-4-2**

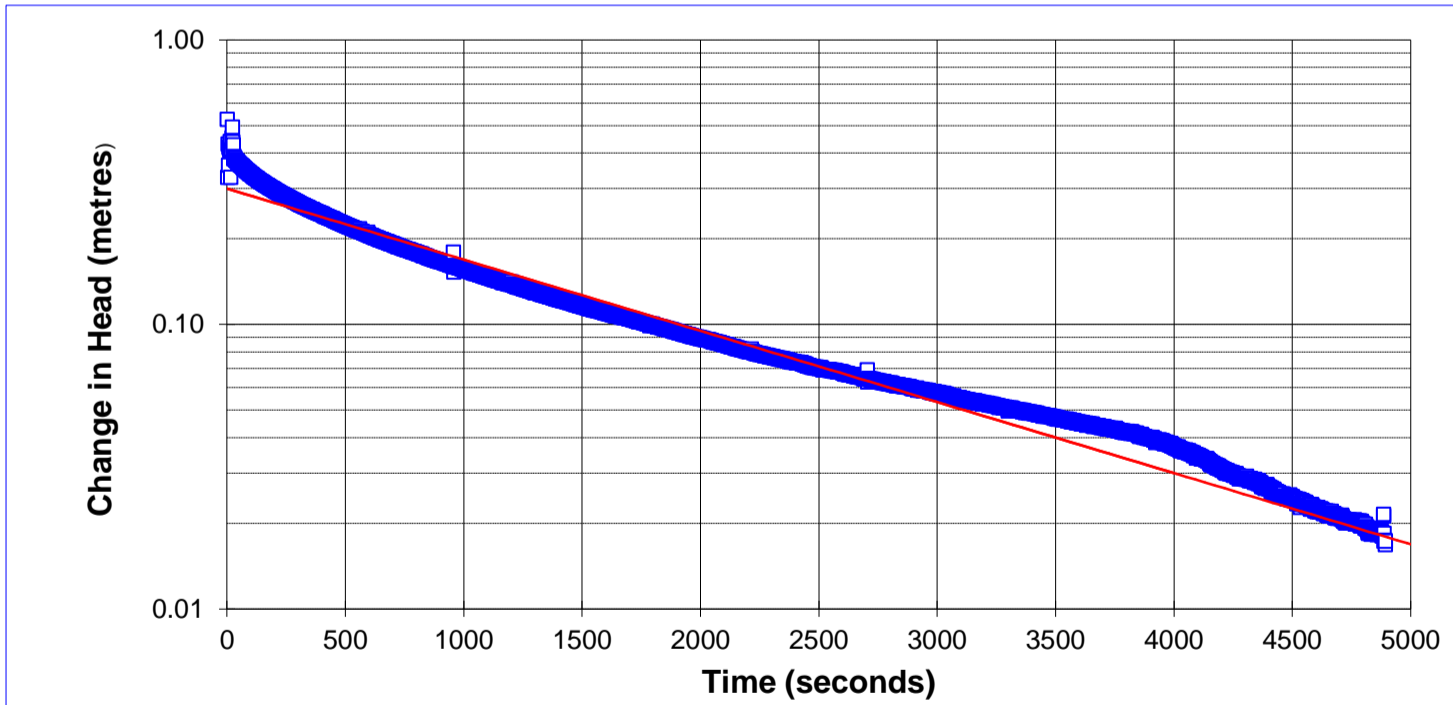
INTERVAL (metres below ground surface)	
Top of Interval =	5.8
Bottom of Interval =	5.9

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|--|---|
| <p>r_c = casing radius (metres);</p> <p>R_e = effective radius (metres);</p> <p>L_e = length of screened interval (metres);</p> | <p>r_w = radial distance to undisturbed aquifer (metres)</p> <p>y_0 = initial drawdown (metres)</p> <p>y_t = drawdown (metres) at time t (seconds)</p> |
|--|---|

INPUT PARAMETERS	RESULTS				
$r_c = 0.02$	<table style="width: 100%; border: none;"> <tr> <td style="padding: 5px;">$K = 7E-07$</td> <td style="padding: 5px;">m/sec</td> </tr> <tr> <td style="padding: 5px;">$K = 7E-05$</td> <td style="padding: 5px;">cm/sec</td> </tr> </table>	$K = 7E-07$	m/sec	$K = 7E-05$	cm/sec
$K = 7E-07$		m/sec			
$K = 7E-05$		cm/sec			
$r_w = 0.10$					
$L_e = 0.15$					
$\ln(R_e/r_w) = 1.36$					
$y_0 = 0.30$					
$y_t = 0.03$					
$t = 4000.0$					



Project Name: **CRRRC/EA Eastern ON/Boundary Rd**
 Project No.: **12-1127-00125/1000/0120**
 Test Date: **04/25/13**

Analysis By: **DH**
 Checked By: **BH**
 Analysis Date: **5/8/2013**

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 13-7-5**

INTERVAL (metres below ground surface)

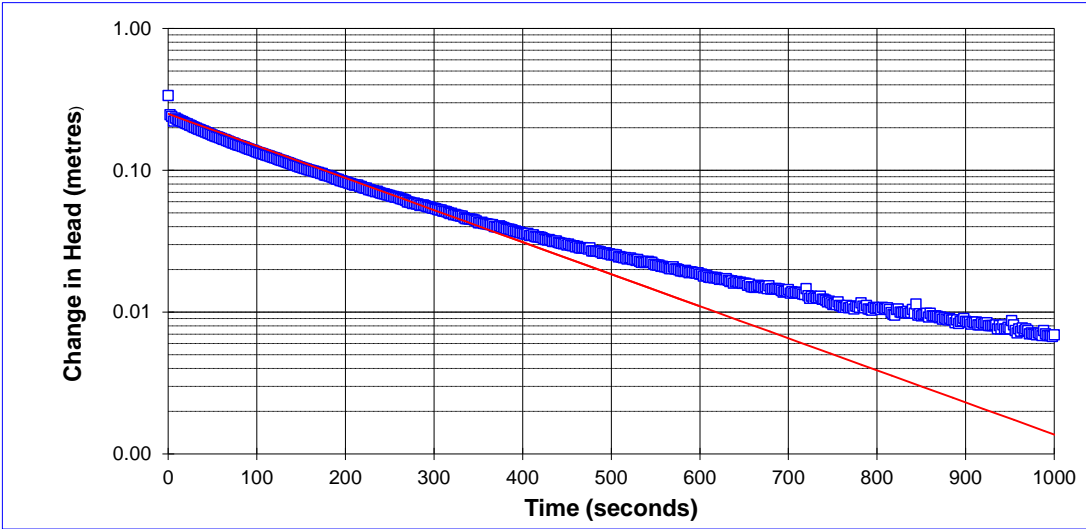
Top of Interval = 0.5
Bottom of Interval = 1.7

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K=\text{m/sec}$$

where:

r_c = casing radius (metres); r_w = radial distance to undisturbed aquifer (metres)
 R_e = effective radius (metres); y_0 = initial drawdown (metres)
 L_e = length of screened interval (metres); y_t = drawdown (metres) at time t (seconds)

INPUT PARAMETERS	RESULTS						
$r_c = 0.03$	<table border="1"> <tr> <td>K=</td> <td>2E-06</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>2E-04</td> <td>cm/sec</td> </tr> </table>	K=	2E-06	m/sec	K=	2E-04	cm/sec
K=		2E-06	m/sec				
K=		2E-04	cm/sec				
$r_w = 0.10$							
$L_e = 1.18$							
$\ln(R_e/r_w) = 1.46$							
$y_0 = 0.25$							
$y_t = 0.01$							
$t = 600.0$							



Project Name: CRRRC/EA Eastern ON/Boundary Rd
 Project No.: 12-1127-00125/1000/0120
 Test Date: 04/25/13

Analysis By: DH
 Checked By: BH
 Analysis Date: 5/7/2013

**BOUWER AND RICE SLUG TEST ANALYSIS
RISING HEAD TEST 13-8-2**

INTERVAL (metres below ground surface)

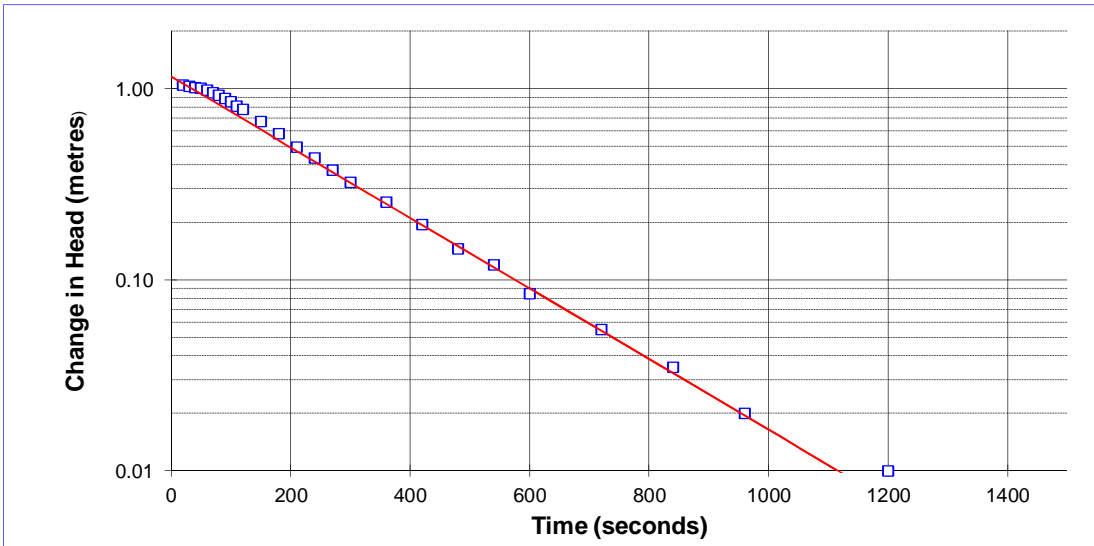
Top of Interval = 0.3
Bottom of Interval = 1.5

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

- | | |
|---|---|
| r_c = casing radius (metres); | r_w = radial distance to undisturbed aquifer (metres) |
| R_e = effective radius (metres); | y_0 = initial drawdown (metres) |
| L_e = length of screened interval (metres); | y_t = drawdown (metres) at time t (seconds) |

INPUT PARAMETERS	RESULTS						
$r_c = 0.02$	<table border="1"> <tr> <td>K=</td> <td>1E-06</td> <td>m/sec</td> </tr> <tr> <td>K=</td> <td>1E-04</td> <td>cm/sec</td> </tr> </table>	K=	1E-06	m/sec	K=	1E-04	cm/sec
K=		1E-06	m/sec				
K=		1E-04	cm/sec				
$r_w = 0.06$							
$L_e = 1.22$							
$\ln(R_e/r_w) = 2.31$							
$y_0 = 0.09$							
$y_t = 0.01$							
$t = 600.0$							



Project Name: **CRRRC/EA Eastern ON/Boundary Rd**
 Project No.: **12-1127-00125/1000/0120**
 Test Date: **04/24/13**

Analysis By: **DH**
 Checked By: **BH**
 Analysis Date: **5/7/2013**

**BOUWER AND RICE SLUG TEST ANALYSIS
FALLING HEAD TEST 13-8-3**

INTERVAL (metres below ground surface)

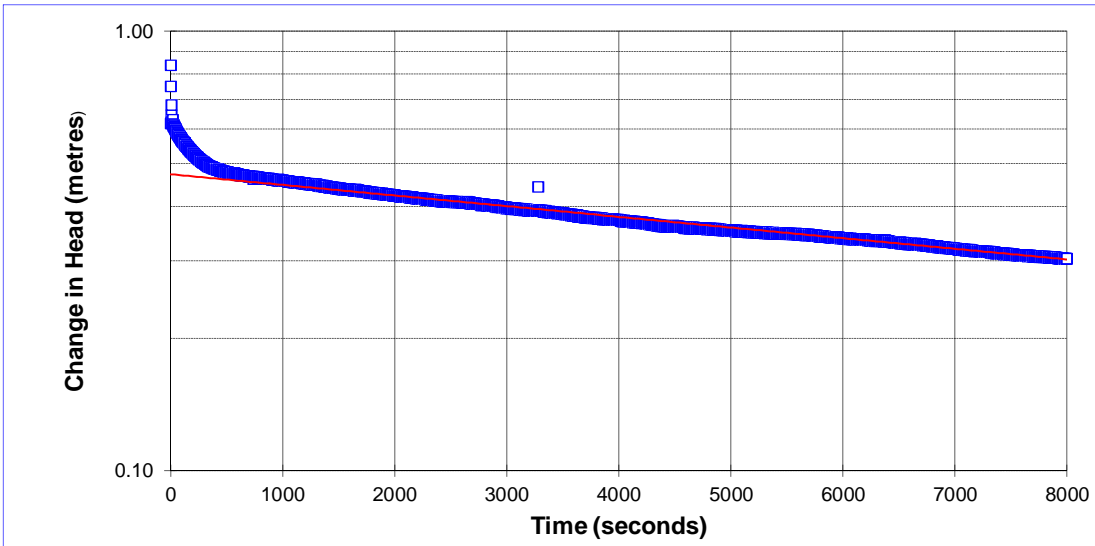
Top of Interval = 4.4
Bottom of Interval = 4.7

$$K = \frac{r_c^2 \ln\left(\frac{R_e}{r_w}\right)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \quad \text{where } K = \text{m/sec}$$

where:

r_c = casing radius (metres); r_w = radial distance to undisturbed aquifer (metres)
 R_e = effective radius (metres); y_0 = initial drawdown (metres)
 L_e = length of screened interval (metres); y_t = drawdown (metres) at time t (seconds)

INPUT PARAMETERS	RESULTS
$r_c = 0.02$	$K = 3E-08 \text{ m/sec}$ $K = 3E-06 \text{ cm/sec}$
$r_w = 0.06$	
$L_e = 0.30$	
$\ln(R_e/r_w) = 1.19$	
$y_0 = 0.40$	
$y_t = 0.32$	
$t = 4000.0$	



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