

Appendix H

Investigation-Derived Waste Management

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: *NA*
 2. Page 1 of: *1*
 3. Emergency Response Phone: *800-899-4672*
 4. Waste Tracking Number: *109704 Load #4*

5. Generator's Name and Mailing Address: *The BNSF Railway*
605 Payallup Ave
Tacomah, WA.
 Generator's Phone: *253-591-2567*
 Generator's Site Address (if different than mailing address): *1 Railway Ave*
Wishram, WA.

6. Transporter 1 Company Name: *NRC Environmental Services, Inc.* U.S. EPA ID Number: *CAR 0000 30114*
 7. Transporter 2 Company Name: U.S. EPA ID Number:

8. Designated Facility Name and Site Address: *Wasco County Landfill*
2550 State Road
The Dalles, OR 97058 U.S. EPA ID Number: *NA.*
 Facility's Phone: *541-296-4082*

9. Waste Shipping Name and Description	10. Containers		11. Total Quantity	12. Unit
	No.	Type		
1. <i>Material not regulated by DOT (ball bearings)</i>	<i>014</i>	<i>DM</i>	<i>1,000</i>	<i>A</i>
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information:
NRC Project # 109704
Waste Connection Approval # 2042-16-223
NRC Track # 1331

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offoror's Printed/Typed Name: *Perry L. Stayton For BNSF RR* Signature: *Perry L. Stayton* Month: *02* Day: *27* Year: *17*

15. International Shipments: Import to U.S. Export from U.S. Port of entry/exit: Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: *Jaren Rhein* Signature: *Jaren Rhein* Month: *02* Day: *27* Year: *17*

Transporter 2 Printed/Typed Name: Signature: Month: Day: Year:

17. Discrepancy
 17a. Discrepancy Indication Space: Quantity Type Residue Partial Rejection Full Rejection

17b. Alternate Facility (or Generator): Manifest Reference Number: U.S. EPA ID Number:

Facility's Phone: 17c. Signature of Alternate Facility (or Generator): Month: Day: Year:

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: *Marian Krueger* Signature: *Marian Krueger* Month: *02* Day: *27* Year: *17*

NON-HAZARDOUS WASTE MANIFEST		1. Generator ID Number <i>NA</i>	2. Page 1 of <i>1</i>	3. Emergency Response Phone <i>800-899-4673</i>	4. Waste Tracking Number <i>109704 Load #3</i>	
5. Generator's Name and Mailing Address <i>The BNSF Railway 605 Puyallup Ave Tacoma WA</i>			Generator's Site Address (if different than mailing address) <i>1 Railroad Ave Wishram, WA</i>			
Generator's Phone: <i>253-591-2567</i>						
6. Transporter 1 Company Name <i>NRC Environmental Services, Inc.</i>				U.S. EPA ID Number <i>CR000030114</i>		
7. Transporter 2 Company Name				U.S. EPA ID Number		
8. Designated Facility Name and Site Address <i>Wasco County Land Fill 2550 Steele Road The Dalles, OR 97058</i>				U.S. EPA ID Number <i>NA</i>		
Facility's Phone: <i>541-296-4083</i>						
9. Waste Shipping Name and Description	10. Containers		11. Total Quantity	12. Unit Wt./Vol.		
	No.	Type				
1. <i>Material Not Regulated by DOT (soil borings)</i>	<i>04</i>	<i>DM</i>	<i>1,000</i>	<i>D</i>		
2.						
3.						
4.						
13. Special Handling Instructions and Additional Information <i>NRC Project #109704 Waste Connections Approval # 2042-16-223 NRC Truck #1291</i>						
14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.						
Generator's/Offeror's Printed/Typed Name <i>Perry L. Stanton For BNSF RR</i>				Signature <i>Perry L. Stanton</i>		Month Day Year <i>02 27 17</i>
15. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. (Port of entry/exit: _____ Date leaving U.S.: _____)						
16. Transporter Acknowledgment of Receipt of Materials						
Transporter 1 Printed/Typed Name <i>Derek Holmes</i>				Signature <i>[Signature]</i>		Month Day Year <i>02 27 17</i>
Transporter 2 Printed/Typed Name				Signature		Month Day Year
17. Discrepancy						
17a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection						
17b. Alternate Facility (or Generator) Manifest Reference Number: _____ U.S. EPA ID Number _____						
Facility's Phone: _____						
17c. Signature of Alternate Facility (or Generator) _____ Month Day Year _____						
18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a						
Printed/Typed Name <i>Marian Krueger</i>				Signature <i>[Signature]</i>		Month Day Year <i>02 27 17</i>

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: **NA** 2. Page 1 of **1** 3. Emergency Response Phone: **800-899-4672** 4. Waste Tracking Number: **109704 hood #2**

5. Generator's Name and Mailing Address: **The BNSF Railway, 605 Fryallup Ave, Tacoma, WA.** Generator's Site Address (if different than mailing address): **1 Railroad Ave, Wishram, WA.**
 Generator's Phone: **253-591-2567**

6. Transporter 1 Company Name: **NRC Environmental Services, Inc.** U.S. EPA ID Number: **CAE000030114**

7. Transporter 2 Company Name: _____ U.S. EPA ID Number: _____

8. Designated Facility Name and Site Address: **Wasco County Landfill, 2550 Steele Road, The Dalles, OR 97058** U.S. EPA ID Number: **NA**
 Facility's Phone: **541-296-4082**

9. Waste Shipping Name and Description	10. Containers		11. Total Quantity	12. Unit Wt./Vol.
	No.	Type		
1. Material Not Regulated by DOT (soil borings)	014	DM	10,000	P
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information:
NRC Project # 109704
Waste Connections Approval # 2042-16-223
NRC Truck # 1331.

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Officer's Printed/Typed Name: **Perry H. Stanton for BNSF RR** Signature: *[Signature]* Month: **02** Day: **27** Year: **17**

15. International Shipments: Import to U.S. Export from U.S. Port of entry/exit: _____ Date leaving U.S.: _____

16. Transporter Acknowledgment of Receipt of Materials
 Transporter 1 Printed/Typed Name: **Jaren Rhee** Signature: *[Signature]* Month: **02** Day: **27** Year: **17**
 Transporter 2 Printed/Typed Name: _____ Signature: _____ Month: _____ Day: _____ Year: _____

17. Discrepancy: _____
 17a. Discrepancy Indication Space: Quantity Type Residue Partial Rejection Full Rejection

17b. Alternate Facility (for Generator): _____ Manifest Reference Number: _____ U.S. EPA ID Number: _____

Facility's Phone: _____

17c. Signature of Alternate Facility (or Generator): _____ Month: _____ Day: _____ Year: _____

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: **Marian Kueger** Signature: *[Signature]* Month: **20** Day: **17** Year: **17**

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: **NA**
 2. Page 1 of: **1**
 3. Emergency Response Phone: **800-899-4672**
 4. Waste Tracking Number: **109704 Load #1**

5. Generator's Name and Mailing Address: **The BNSF Railway, 605 Puyallup Ave., Tacoma, WA**
 Generator's Site Address (if different than mailing address): **1 Railroad Avenue, Wishram, WA**
 Generator's Phone: **253-591-2567**

6. Transporter 1 Company Name: **NRC Environmental Services, Inc.** U.S. EPA ID Number: **CR000030114**

7. Transporter 2 Company Name: U.S. EPA ID Number:

8. Designated Facility Name and Site Address: **Wasco County Landfill, 2550 Steele Road, The Dalles, OR 97058** U.S. EPA ID Number: **NA**
 Facility's Phone: **541-296-4083**

9. Waste Shipping Name and Description	10. Containers		11. Total Quantity	12. Unit Wt./Vol.
	No.	Type		
1. Material Not Regulated by DOT (soil borings)	014	BM	10,000	P
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information:
NRC Project #109704
Waste Connections Approval #204246-223
NRC Truck #1291.

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Officer's Printed/Typed Name: **Kerry L. Stayton For BNSF RR** Signature: **Kerry L. Stayton** Month: **02** Day: **27** Year: **17**

15. International Shipments: Import to U.S. Export from U.S. Port of entry/exit: Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
 Transporter 1 Printed/Typed Name: **Deeak Holmes** Signature: **[Signature]** Month: **02** Day: **27** Year: **17**
 Transporter 2 Printed/Typed Name: Signature: Month: Day: Year:

17. Discrepancy
 17a. Discrepancy Indication Space: Quantity Type Residue Partial Rejection Full Rejection

17b. Alternate Facility (or Generator): Manifest Reference Number: U.S. EPA ID Number:

Facility's Phone: 17c. Signature of Alternate Facility (or Generator): Month: Day: Year:

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
 Printed Name: **Marian Kroger** Signature: **[Signature]** Month: **02** Day: **27** Year: **17**

GENERATOR
INTL
TRANSPORTER
DESIGNATED FACILITY



WASTE MATERIAL PROFILE SHEET

Profile No. 405184

A. GENERAL INFORMATION

GENERATOR EPA ID #/REGISTRATION # **CESQG** GENERATOR NAME: **Bnsf**
 GENERATOR CODE (Assigned by Clean Harbors) **BN06363** CITY **Wishram** STATE/PROVINCE **WA** ZIP/POSTAL CODE **98673**
 ADDRESS **510 W Bridgeway Rd** PHONE: (509) 748-3203
 CUSTOMER CODE (Assigned by Clean Harbors) **BN06309** CUSTOMER NAME: **BNSF Sea Jennifer Wiener**
 ADDRESS **2454 Occidental Av South #A** CITY **Seattle** STATE/PROVINCE **WA** ZIP/POSTAL CODE **98134**

B. WASTE DESCRIPTION

WASTE DESCRIPTION: **Oily waste water**

PROCESS GENERATING WASTE: **Waste water impacted with petroleum hydrocarbons**

IS THIS WASTE CONTAINED IN SMALL PACKAGING CONTAINED WITHIN A LARGER SHIPPING CONTAINER? **No**

C. PHYSICAL PROPERTIES (at 25C or 77F)

PHYSICAL STATE <input type="checkbox"/> SOLID WITHOUT FREE LIQUID POWDER <input checked="" type="checkbox"/> MONOLITHIC SOLID <input checked="" type="checkbox"/> LIQUID WITH NO SOLIDS <input type="checkbox"/> LIQUID/SOLID MIXTURE % FREE LIQUID % SETTLED SOLID % TOTAL SUSPENDED SOLID SLUDGE GAS/AEROSOL	NUMBER OF PHASES/LAYERS <input checked="" type="checkbox"/> 1 2 3 TOP 0.00 % BY VOLUME (Approx.) MIDDLE 0.00 BOTTOM 0.00			VISCOSITY (if liquid present) <input checked="" type="checkbox"/> 1 - 100 (e.g. Water) 101 - 500 (e.g. Motor Oil) 501 - 10,000 (e.g. Molasses) > 10,000		COLOR <i>clear-brown</i>
	ODOR <input checked="" type="checkbox"/> NONE MILD STRONG Describe:	BOILING POINT °F (°C) <= 95 (<=35) 95 - 100 (35-38) 101 - 129 (38-54) <input checked="" type="checkbox"/> >= 130 (>54)		MELTING POINT °F (°C) < 140 (<60) 140-200 (60-93) > 200 (>93)			TOTAL ORGANIC CARBON ☒ <= 1% 1-9% >= 10%
FLASH POINT °F (°C) < 73 (<23) 73 - 100 (23-38) 101 - 140 (38-60) 141 - 200 (60-93) <input checked="" type="checkbox"/> > 200 (>93)	pH <= 2 2.1 - 6.9 <input checked="" type="checkbox"/> 7 (Neutral) 7.1 - 12.4 >= 12.5	SPECIFIC GRAVITY < 0.8 (e.g. Gasoline) 0.8-1.0 (e.g. Ethanol) <input checked="" type="checkbox"/> 1.0 (e.g. Water) 1.0-1.2 (e.g. Antifreeze) > 1.2 (e.g. Methylene Chloride)	ASH < 0.1 > 20 0.1 - 1.0 <input checked="" type="checkbox"/> Unknown 1.1 - 5.0 5.1 - 20.0		BTU/LB (MJ/kg) <input checked="" type="checkbox"/> < 2,000 (<4.6) 2,000-5,000 (4.6-11.6) 5,000-10,000 (11.6-23.2) > 10,000 (>23.2) Actual:	

D. COMPOSITION (List the complete composition of the waste, include any inert components and/or debris. Ranges for individual components are acceptable. If a trade name is used, please supply an MSDS. Please do not use abbreviations.)

CHEMICAL	MIN	MAX	UOM
OIL	0.0000000	1.0000000	%
WATER	100.0000000	100.0000000	%

DOES THIS WASTE CONTAIN ANY HEAVY GAUGE METAL DEBRIS OR OTHER LARGE OBJECTS (EX., METAL PLATE OR PIPING >1/4" THICK OR >12" LONG, METAL REINFORCED HOSE >12" LONG, METAL WIRE >12" LONG, METAL VALVES, PIPE FITTINGS, CONCRETE REINFORCING BAR OR PIECES OF CONCRETE >3")? YES NO

If yes, describe, including dimensions:

DOES THIS WASTE CONTAIN ANY METALS IN POWDERED OR OTHER FINELY DIVIDED FORM? YES NO

DOES THIS WASTE CONTAIN OR HAS IT CONTACTED ANY OF THE FOLLOWING; ANIMAL WASTES, HUMAN BLOOD, BLOOD PRODUCTS, BODY FLUIDS, MICROBIOLOGICAL WASTE, PATHOLOGICAL WASTE, HUMAN OR ANIMAL DERIVED SERUMS OR PROTEINS OR ANY OTHER POTENTIALLY INFECTIOUS MATERIAL? YES NO

I acknowledge that this waste material is neither infectious nor does it contain any organism known to be a threat to human health. This certification is based on my knowledge of the material. Select the answer below that applies:

The waste was never exposed to potentially infectious material. YES NO

Chemical disinfection or some other form of sterilization has been applied to the waste. YES NO

I ACKNOWLEDGE THAT THIS PROFILE MEETS THE CLEAN HARBORS BATTERY PACKAGING REQUIREMENTS. YES NO

I ACKNOWLEDGE THAT MY FRIABLE ASBESTOS WASTE IS DOUBLE BAGGED AND WETTED. YES NO

SPECIFY THE SOURCE CODE ASSOCIATED WITH THE WASTE.

G15

SPECIFY THE FORM CODE ASSOCIATED WITH THE WASTE. **W219**

E. CONSTITUENTS

Are these values based on testing or knowledge? Knowledge Testing

If based on knowledge, please describe in detail, the rationale applied to identify and characterize the waste material. Please include reference to Material Safety Data Sheets (MSDS) when applicable. Include the chemical or trade-name represented by the MSDS, and or detailed process or operating procedures which generate the waste.

Waste water from drilling monitoring wells.

Please indicate which constituents below apply. Concentrations must be entered when applicable to assist in accurate review and expedited approval of your waste profile. Please note that the total regulated metals and other constituents sections require answers.

RCRA	REGULATED METALS	REGULATORY LEVEL (mg/l)	TCLP mg/l	TOTAL	UOM	NOT APPLICABLE
D004	ARSENIC	5.0				<input checked="" type="checkbox"/>
D005	BARIUM	100.0				<input checked="" type="checkbox"/>
D006	CADMIUM	1.0				<input checked="" type="checkbox"/>
D007	CHROMIUM	5.0				<input checked="" type="checkbox"/>
D008	LEAD	5.0				<input checked="" type="checkbox"/>
D009	MERCURY	0.2				<input checked="" type="checkbox"/>
D010	SELENIUM	1.0				<input checked="" type="checkbox"/>
D011	SILVER	5.0				<input checked="" type="checkbox"/>
VOLATILE COMPOUNDS						
D018	BENZENE	0.5				<input checked="" type="checkbox"/>
D019	CARBON TETRACHLORIDE	0.5				<input checked="" type="checkbox"/>
D021	CHLOROGENZENE	100.0				<input checked="" type="checkbox"/>
D022	CHLOROFORM	6.0				<input checked="" type="checkbox"/>
D028	1,2-DICHLOROETHANE	0.5				<input checked="" type="checkbox"/>
D029	1,1-DICHLOROETHYLENE	0.7				<input checked="" type="checkbox"/>
D035	METHYL ETHYL KETONE	200.0				<input checked="" type="checkbox"/>
D039	TETRACHLOROETHYLENE	0.7				<input checked="" type="checkbox"/>
D040	TRICHLOROETHYLENE	0.5				<input checked="" type="checkbox"/>
D043	VINYL CHLORIDE	0.2				<input checked="" type="checkbox"/>
SEMI-VOLATILE COMPOUNDS						
D023	o-CRESOL	200.0				<input checked="" type="checkbox"/>
D024	m-CRESOL	200.0				<input checked="" type="checkbox"/>
D025	p-CRESOL	200.0				<input checked="" type="checkbox"/>
D026	CRESOL (TOTAL)	200.0				<input checked="" type="checkbox"/>
D027	1,4-DICHLOROGENZENE	7.5				<input checked="" type="checkbox"/>
D030	2,4-DINITROTOLUENE	0.13				<input checked="" type="checkbox"/>
D032	HEXACHLOROGENZENE	0.13				<input checked="" type="checkbox"/>
D033	HEXACHLOROBUTADIENE	0.5				<input checked="" type="checkbox"/>
D034	HEXACHLOROETHANE	3.0				<input checked="" type="checkbox"/>
D036	NITROGENZENE	2.0				<input checked="" type="checkbox"/>
D037	PENTACHLOROPHENOL	100.0				<input checked="" type="checkbox"/>
D038	PYRIDINE	5.0				<input checked="" type="checkbox"/>
D041	2,4,5-TRICHLOROPHENOL	400.0				<input checked="" type="checkbox"/>
D042	2,4,6-TRICHLOROPHENOL	2.0				<input checked="" type="checkbox"/>
PESTICIDES AND HERBICIDES						
D012	ENDRIN	0.02				<input checked="" type="checkbox"/>
D013	LINDANE	0.4				<input checked="" type="checkbox"/>
D014	METHOXYCHLOR	10.0				<input checked="" type="checkbox"/>
D015	TOXAPHENE	0.5				<input checked="" type="checkbox"/>
D016	2,4-D	10.0				<input checked="" type="checkbox"/>
D017	2,4,5-TP (SILVEX)	1.0				<input checked="" type="checkbox"/>
D020	CHLORDANE	0.03				<input checked="" type="checkbox"/>
D031	HEPTACHLOR (AND ITS EPOXIDE)	0.008				<input checked="" type="checkbox"/>

OTHER CONSTITUENTS	MAX	UOM	NOT APPLICABLE
BROMINE			<input checked="" type="checkbox"/>
CHLORINE			<input checked="" type="checkbox"/>
FLUORINE			<input checked="" type="checkbox"/>
IODINE			<input checked="" type="checkbox"/>
SULFUR			<input checked="" type="checkbox"/>
POTASSIUM			<input checked="" type="checkbox"/>
SODIUM			<input checked="" type="checkbox"/>
AMMONIA			<input checked="" type="checkbox"/>
CYANIDE AMENABLE			<input checked="" type="checkbox"/>
CYANIDE REACTIVE			<input checked="" type="checkbox"/>
CYANIDE TOTAL			<input checked="" type="checkbox"/>
SULFIDE REACTIVE			<input checked="" type="checkbox"/>

HOCs	PCBs
<input checked="" type="checkbox"/> NONE	<input checked="" type="checkbox"/> NONE
<input type="checkbox"/> < 1000 PPM	<input type="checkbox"/> < 50 PPM
<input type="checkbox"/> >= 1000 PPM	<input type="checkbox"/> >= 50 PPM
IF PCBs ARE PRESENT, IS THE WASTE REGULATED BY TSCA 40 CFR 761?	
YES	<input checked="" type="checkbox"/> NO

ADDITIONAL HAZARDS

DOES THIS WASTE HAVE ANY UNDISCLOSED HAZARDS OR PRIOR INCIDENTS ASSOCIATED WITH IT, WHICH COULD AFFECT THE WAY IT SHOULD BE HANDLED?

YES NO (If yes, explain)

CHOOSE ALL THAT APPLY

- | | | | |
|--------------------------|-------------|-------------------|---|
| DEA REGULATED SUBSTANCES | EXPLOSIVE | FUMING | OSHA REGULATED CARCINOGENS |
| POLYMERIZABLE | RADIOACTIVE | REACTIVE MATERIAL | <input checked="" type="checkbox"/> NONE OF THE ABOVE |



Profile No. 405184

F. REGULATORY STATUS

YES NO USEPA HAZARDOUS WASTE?

YES NO DO ANY STATE WASTE CODES APPLY?
 Texas Waste Code **OUTS8091**

YES NO DO ANY CANADIAN PROVINCIAL WASTE CODES APPLY?

YES NO IS THIS WASTE PROHIBITED FROM LAND DISPOSAL WITHOUT FURTHER TREATMENT PER 40 CFR PART 268?
 LDR CATEGORY: **Not subject to LDR**
 VARIANCE INFO:

YES NO IS THIS A UNIVERSAL WASTE?

YES NO IS THE GENERATOR OF THE WASTE CLASSIFIED AS CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR (CESQG)?

YES NO IS THIS MATERIAL GOING TO BE MANAGED AS A RCRA EXEMPT COMMERCIAL PRODUCT, WHICH IS FUEL (40 CFR 261.2 (C)(2)(II))?

YES NO DOES TREATMENT OF THIS WASTE GENERATE A F006 OR F019 SLUDGE?

YES NO IS THIS WASTE STREAM SUBJECT TO THE INORGANIC METAL BEARING WASTE PROHIBITION FOUND AT 40 CFR 268.3(C)?

YES NO DOES THIS WASTE CONTAIN VOC'S IN CONCENTRATIONS >=500 PPM?

YES NO DOES THE WASTE CONTAIN GREATER THAN 20% OF ORGANIC CONSTITUENTS WITH A VAPOR PRESSURE >= .3KPA (.044 PSIA)?

YES NO DOES THIS WASTE CONTAIN AN ORGANIC CONSTITUENT WHICH IN ITS PURE FORM HAS A VAPOR PRESSURE > 77 KPA (11.2 PSIA)?

YES NO IS THIS CERCLA REGULATED (SUPERFUND) WASTE ?

YES NO IS THE WASTE SUBJECT TO ONE OF THE FOLLOWING NESHAP RULES?
 Hazardous Organic NESHAP (HON) rule (subpart G) Pharmaceuticals production (subpart GGG)

YES NO IF THIS IS A US EPA HAZARDOUS WASTE, DOES THIS WASTE STREAM CONTAIN BENZENE?
 YES NO Does the waste stream come from a facility with one of the SIC codes listed under benzene NESHAP or is this waste regulated under the benzene NESHAP rules because the original source of the waste is from a chemical manufacturing, coke by-product recovery, or petroleum refinery process?
 YES NO Is the generating source of this waste stream a facility with Total Annual Benzene (TAB) >10 Mg/year?
 What is the TAB quantity for your facility? _____ Megagram/year (1 Mg = 2,200 lbs)
 The basis for this determination is: Knowledge of the Waste Or Test Data Knowledge Testing
 Describe the knowledge: _____

G. DOT/TDG INFORMATION

DOT/TDG PROPER SHIPPING NAME:
NON DOT REGULATED MATERIAL, (OILY WASTE WATER)

H. TRANSPORTATION REQUIREMENTS

ESTIMATED SHIPMENT FREQUENCY ONE TIME WEEKLY MONTHLY QUARTERLY YEARLY OTHER

<input checked="" type="checkbox"/> CONTAINERIZED		BULK LIQUID		BULK SOLID		
1-1 CONTAINERS/SHIPMENT		GALLONS/SHIPMENT: 0 Min - 0 Max		GAL.	SHIPMENT UOM:	TON YARD
STORAGE CAPACITY: 1					TONS/YARDS/SHIPMENT: 0 Min - 0 Max	
CONTAINER TYPE:						
PORTABLE TOTE TANK	BOX|CARTON|CASE					
CUBIC YARD BOX	<input checked="" type="checkbox"/> DRUM					
OTHER.	DRUM SIZE: 55					

I. SPECIAL REQUEST

COMMENTS OR REQUESTS:

GENERATOR'S CERTIFICATION

I certify that I am authorized to execute this document as an authorized agent. I hereby certify that all information submitted in this and attached documents is correct to the best of my knowledge. I also certify that any samples submitted are representative of the actual waste. If Clean Harbors discovers a discrepancy during the approval process, Generator grants Clean Harbors the authority to amend the profile, as Clean Harbors deems necessary, to reflect the discrepancy.

AUTHORIZED SIGNATURE	NAME (PRINT)	TITLE	DATE
	Ryan Hultgren of Kennedy/Jenks Consultants signing on behalf of BNSF Railway Company	Project Engineer	5/3/2017

FOR SERVICE CALL	BRANCH MANAGER	DOC. EXP.	SCHEDULED SERVICE WEEK	SCHEDULED TERRITORY	REFERENCE NUMBER
503-788-4612	Johnny Smith				73731752
CREDIT CODE	PREVIOUS BALANCE				BAL. OVER 60 DAYS
CUSTOMER SEGMENT	CHAIN	OUTER COUNTY	SVC. P/C	PROD. P/C	
LOCATION			TAX EXEMPTION NO.		

B N O G 3 G 3

BNSF

B
I
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L

SERVICE DATE	SALES REP NO.	CUSTOMER P.O. NUMBER	CUSTOMER PHONE #	TAX CODE	DATE EQPT/PROD ORDERED	SERVICE TAX	C.O.M.S. TAX	PRODUCT TAX
5-5-17	054831							

DEPT	SERVICE/PRODUCT	REMARKS/UNIT PRICE	QUAN.	CHARGE	SALES TAX	TOTAL CHARGE	WASTE MIN.	SOLVENT/DRUMS			CC	SERVICE TERM	CHANGE SERVICE TERM (WEEKS)(INITIAL)	CHANGE SCH. DATE (YY WW)	INV. CODE	PROMO NO.	MSDS GIVEN
								CLEAN	SPENT	# OF CONT.							
1	875480 (NOS Drum)	#257-	32														<input type="checkbox"/>
2																	<input type="checkbox"/>
3																	<input type="checkbox"/>
4																	<input type="checkbox"/>
5																	<input type="checkbox"/>
6																	<input type="checkbox"/>
7																	<input type="checkbox"/>
8																	<input type="checkbox"/>
9																	<input type="checkbox"/>
10																	<input type="checkbox"/>
11																	<input type="checkbox"/>
12																	<input type="checkbox"/>

TOTAL-SERVICE/PRODUCTS				CHECK APPROPRIATE BOXES	MACHINE CONDITION & CLEANLINESS	GOOD <input type="checkbox"/>	POOR <input type="checkbox"/>	DECALS IN PLACE AND LEGIBLE	YES <input type="checkbox"/>	NO <input type="checkbox"/>	MACHINE PROPERLY GROUNDED	YES <input type="checkbox"/>	NO <input type="checkbox"/>
USEPA TRANSPORTER 1 ID NO.	USEPA TRANSPORTER 2 ID NO.	GENERATOR USEPA ID NO.	GENERATOR STATE ID NO.	LAMP ASSEMBLY CONDITION		<input type="checkbox"/>	<input type="checkbox"/>	FUSIBLE LINK INSTALLED	<input type="checkbox"/>	<input type="checkbox"/>	LOCAL PHONE NO. STICKER AFFIXED TO MACHINE	<input type="checkbox"/>	<input type="checkbox"/>
				EMERGENCY CLOSING OF LID UNOBSTRUCTED		<input type="checkbox"/>	<input type="checkbox"/>	SPENT SOLVENT MEETS ACCEPTANCE CRITERIA	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

11. US DOT DESCRIPTION (INCLUDING PROPER SHIPPING NAME, HAZARD CLASS, AND ID.)	12. CONTAINERS NO.	13. TOTAL QUANTITY	14. UNIT WT/VOL	SK DOT NUMBER	I CERTIFY THAT MY TOTAL WASTE STREAMS ARE WITHIN ONE OF THE FOLLOWING CATEGORIES.
A. Non DOT Regulated (Oil/Wastewater)					0 TO 220 LBS./MONTH INITIALS _____
B.					220 LBS. TO 2,200 LBS./MONTH INITIALS _____
C.					GREATER THAN 2,200 LBS./MONTH INITIALS _____
D.					

DESIGNATED FACILITY NAME AND ADDRESS	I CERTIFY THAT NO MATERIAL CHANGE HAS OCCURRED EITHER IN THE CHARACTERISTICS OF THE WASTE MATERIALS OR IN THE PROCESS GENERATING THE WASTE MATERIALS.	USA EPA ID NO.	STATE ID NO.
--------------------------------------	---	----------------	--------------

PAYMENT RECEIVED SECTION	CASH <input type="checkbox"/>	TOTAL RECEIVED	APPLY PAYMENT TO:	
	CHECK NUMBER		<input type="checkbox"/> TODAY'S SERVICE/SALE	<input type="checkbox"/> PREVIOUS BALANCE AS FOLLOWS
PREVIOUS CREDIT CARD NO.	INVOICE #	AMOUNT \$	INVOICE #	AMOUNT \$

MANIFEST NO.	
LDR MESSAGE	
MANIFEST CODE	SEQ #

I AGREE TO PAY THE ABOVE CHARGES AND TO BE BOUND BY THE TERMS AND CONDITIONS SET FORTH ABOVE AND ON THE REVERSE SIDE OF THIS DOCUMENT. PLEASE CHARGE MY ACCOUNT FOR THIS TRANSACTION UNLESS OTHERWISE INDICATED IN THE PAYMENT RECEIVED SECTION. THE INDIVIDUAL SIGNING THIS DOCUMENT IS DULY AUTHORIZED TO SIGN AND BIND CUSTOMER TO ITS TERMS.

This is to certify that the above-named materials are properly classified, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Derek Holmes
Print Customer Name

By: [Signature]
Customer's Authorized Representative

TOTAL CHARGE (FROM ABOVE)	
WASTE MIN. (FROM ABOVE)	
TOTAL DUE	

DO NOT WRITE IN THE AREA BELOW

CREDIT CARD NO.	AMEX VISA MC	EXP. DATE
CUSTOMER REFERENCE INFORMATION		

IN THE EVENT OF AN EMERGENCY CALL
 1-800-468-1760 (24 hours)

THIS AGREEMENT CONTINUES ON THE REVERSE SIDE

SERVICE AND SALES ACKNOWLEDGMENT
 PART 1366 (Rev. 11/12)



Waste Management, Inc.
 3780 W. Mineral Road
 Littleton, CO, 80120
 Tel. (303) 441-9000

Division
 Ticket # 18-028

BNSF Wishram RIWP Addendum Soil and Water IDW

Customer Name: BNSF WISHRAM RAILROAD
 Service Date: 08/26/2019
 Facility Name: BNSF WISHRAM
 Material: Soil
 Sample Method: Other
 Sample Fee: \$0
 Container: 55 Gallon Drum
 Material: 100% Soil
 Generator: BNSF WISHRAM RAILROAD, WEST 26th STREET, WASH STATE

Item	Unit	Description	Quantity	Unit Price	Total Price
Soil	Yard	100% Soil	14	4.23	59.22

For more information, we want to know, please call.

Item	Description	Quantity	Unit Price	Total Price
1	Soil	14	4.23	59.22

Wishram Soil
 Hoquiam
 1 Hoquiam
 14 Wishram

Total Tax
 Total Ticket

59.29





Waste Management
 3,755 SE Minter Bridge
 Milwaukie, OR, 97122
 Phone: (503)-640-9427

Customer:
 Ticket# 1512502

Customer Name CLEARWATER/CLEARWATER ENVIRONMENTAL
 Ticket Date 12/10/2010
 Payment Type Credit Account
 Service Ticket#
 Hauling Ticket#
 Route
 Waste Waste Code
 Manifest #
 Destination
 City
 Profile 11294100 FLAOT - Fuel Oil Impacted Soil/Debris
 Generator OR-BMSF WISHRAM BMSF 5601 WEST 36 WISHRAM WA 98675
 Carrier clear water enviro
 Vehicle# 18
 Container
 Driver RYAN
 Check#
 Pulling # 0001006
 Gen EPA ID
 6-40

Time	Weight	Scale	Director	Inbound	Gross	Weight
10:15 AM	12,100 lbs	Impound #	STANLEY		Tare	12,100 lbs
10:45 AM	12,100 lbs	Outbound	jprime		Net	12,100 lbs
					Tare	12,100 lbs

Comments:

Customer Comments? We want to know. Please call.

Invoice #	Line	Qty	Unit	Rate	Tax	Amount	Description
1	Special Rate Earn - 100	18	Each	50.46		908.28	Special
2	17.5% FGR 17.5% Fe 100		%	17.50		158.95	

[Handwritten Signature]

Wishram water
 Wenatchee/Devere

2 of 18 Wenatchee

16 Wishram

Total Tax
 Total Ticket

908.28
 ÷ 18
 50.46



Date: 12/11/2018 Project #: 5573 Site Work Description: Wishram, WA IDW Water

Purchase Order # _____

Contact: Shane Degross Company: BNSF

_____	PM	Ian Tally
_____	Super	_____
_____	Oper	_____
_____	Tech	_____

- Safety Meeting
- Facility Set up / Daily Inspection
- Safety Equipment Check
- Construction Work Inspection

0600 Loadout

0730 Head to Wishram, WA

0900 Onsite, loadup 8 55gal DM IDW Water

1015 Drive yard to check for missing water DM

1030 Head back to office

1200 Lunch

1330 End of day

EMPLOYEE NAME	START TIME	END TIME	LUNCH HOURS	STRAIGHT TIME	OVER TIME	TOTAL HOURS
Ian Tally	600	1330	0.5			7
Ari Andrade	630	1330	0.5			6.5
Total Labor Hours						13.5

Date: 12.12.18 Project #: 5573 Site Work Description: IDW Water

Purchase Order # _____

Contact: ~~Ryan Hibbs~~ *Scott McDonald* Company: BNSF Wishram

_____	PM	_____
_____	Super	_____
_____	Oper	_____
_____	Tech	_____
_____	_____	_____

- Safety Meeting
- Facility Set up / Daily Inspection
- Safety Equipment Check
- Construction Work Inspection

0600 loaded up from shop, pre trip inspection, fuel and left to wishram

0900 arrived to wishram, started loading 13 drums of soil, 1 ppe, 1 water in soft ground

1400 left wishram

1600 arrived back to shop

EMPLOYEE NAME	START TIME	END TIME	LUNCH HOURS	DRIVE TIME	OVER TIME	TOTAL HOURS
Ari Andrade	600	1600	0.5	4		9.5
Ryan Munson	700	1600	0.5	4		8.5
Total Labor Hours						18

Date:	12/17/2018	Project #:	5573	Site Work Description:	Wishram, WA IDW Water Solidification
Purchase Order #					
Contact:	Scott McDonald	Company:	BNSF		

	PM	Ian Tally
	Super	
	Oper	
	Tech	

- | | |
|------------------------------------|-------------------------------------|
| Safety Meeting | <input checked="" type="checkbox"/> |
| Facility Set up / Daily Inspection | <input checked="" type="checkbox"/> |
| Safety Equipment Check | <input checked="" type="checkbox"/> |
| Construction Work Inspection | <input checked="" type="checkbox"/> |

0600 Start solidification of Wishram IDW Water DMs

4 DMs solidified by end of day

1430 End of day

EMPLOYEE NAME	START TIME	END TIME	LUNCH HOURS	STRAIGHT TIME	OVER TIME	TOTAL HOURS
Ian Tally	600	1200	0.5			5.5
Ari Andrade	600	1430	0.5			8
Drake Repp	600	1430	0.5			8
Ryan Munson	1200	1430	0			2.5
Total Labor Hours						24

Date: 12.18.18	Project #: 5573	Site Work Description: idw water solidification
Purchase Order # _____		
tact: scott alexander <i>McDonald</i>		Company: BNSF Wishram

	PM	
	Super	
	Oper	
	Tech	

- Safety Meeting
- Facility Set up / Daily Inspection
- Safety Equipment Check
- Construction Work Inspection

0930 started solidification process

1100 made dump run to hillsboro

1300 returned from landfill

EMPLOYEE NAME	START TIME	END TIME	LUNCH HOURS	STRAIGHT TIME	OVER TIME	TOTAL HOURS
Ari Andrade	930	1530	0.5			5.5
Ryan Munson	930	1500	0.5			5
Ian Tally	1030	1430	0.5			3.5
Drake Repp	1030	1500	0.5			4
Total Labor Hours						



Requested Facility: Chemical Waste Management (Hazardous Waste Facility) Unsure Profile Number: OR342506
 Multiple Generator Locations (Attach Locations) Request Certificate of Disposal Renewal? Original Profile Number: _____

A. GENERATOR INFORMATION (MATERIAL ORIGIN)

- 1. Generator Name: BNSF Railway
- 2. Site Address: 1 Railroad Avenue
(City, State, ZIP) Wishram WA 98673
- 3. County: Klickitat
- 4. Contact Name: Shane DeGross
- 5. Email: Shane.Degross@BNSF.com
- 6. Phone: (253) 591-2567 7. Fax: _____
- 8. Generator EPA ID: _____ N/A
- 9. State ID: _____ N/A

C. MATERIAL INFORMATION

- 1. Common Name: STAB01 - LNAPL Remediation Waste
Describe Process Generating Material: See Attached

Vacuum removal of diesel and oil range petroleum hydrocarbons (LNAPL) from three onsite monitoring wells.
- 2. Material Composition and Contaminants: See Attached

1. Diesel and Oil Range Petroleum Hydrocarbon	95-100 %
2. Groundwater	0-5 %
3.	
4.	
Total comp. must be equal to or greater than 100% ≥100%	
- 3. State Waste Codes: _____ N/A
- 4. Color: Various
- 5. Physical State at 70°F: Solid Liquid Other: _____
- 6. Free Liquid Range Percentage: 99 to 100 N/A
- 7. pH: _____ to _____ N/A
- 8. Strong Odor: Yes No Describe: petroleum hydrocarbon
- 9. Flash Point: <140°F 140°-199°F ≥200° N/A

E. ANALYTICAL AND OTHER REPRESENTATIVE INFORMATION

- 1. Analytical attached Yes
Please identify applicable samples and/or lab reports:

All samples in the analytical report are representative of the LNAPL waste.
- 2. Other information attached (such as MSDS)? Yes

G. GENERATOR CERTIFICATION (PLEASE READ AND CERTIFY BY SIGNATURE)

By signing this EZ Profile™ form, I hereby certify that all information submitted in this and all attached documents contain true and accurate descriptions of this material, and that all relevant information necessary for proper material characterization and to identify known and suspected hazards has been provided. Any analytical data attached was derived from a sample that is representative as defined in 40 CFR 261 - Appendix 1 or by using an equivalent method. All changes occurring in the character of the material (i.e., changes in the process or new analytical) will be identified by the Generator and be disclosed to Waste Management prior to providing the material to Waste Management.

If I am an agent signing on behalf of the Generator, I have confirmed with the Generator that information contained in this Profile is accurate and complete.

Name (Print): SHANE DEGROSS Date: 07/10/2019
Title: Manager Environmental Remediation
Company: BNSF Railway

B. BILLING INFORMATION

SAME AS GENERATOR

- 1. Billing Name: BNSF Railway
- 2. Billing Address: 605 Puyallup Avenue
(City, State, ZIP) Tacoma WA 98421
- 3. Contact Name: Shane DeGross
- 4. Email: Shane.Degross@BNSF.com
- 5. Phone: (253) 591-2567 6. Fax: _____
- 7. WM Hauled? Yes No
- 8. P.O. Number: _____
- 9. Payment Method: Credit Account Cash Credit Card

D. REGULATORY INFORMATION

- 1. EPA Hazardous Waste? Yes* No
Code: _____
- 2. State Hazardous Waste? Yes No
Code: X004
- 3. Is this material non-hazardous due to Treatment, Delisting, or an Exclusion? Yes* No
- 4. Contains Underlying Hazardous Constituents? Yes* No
- 5. From an industry regulated under Benzene NESHAP? Yes* No
- 6. Facility remediation subject to 40 CFR 63 GGGGG? Yes* No
- 7. CERCLA or State-mandated clean-up? Yes* No
- 8. NRC or State-regulated radioactive or NORM waste? Yes* No
- *If Yes, see Addendum (page 2) for additional questions and space.**
- 9. Contains PCBs? → If Yes, answer a, b and c. Yes No
 - a. Regulated by 40 CFR 761? Yes No
 - b. Remediation under 40 CFR 761.61 (a)? Yes No
 - c. Were PCB imported into the US? Yes No
- 10. Regulated and/or Untreated Medical/Infectious Waste? Yes No
- 11. Contains Asbestos? Yes No
→ If Yes: Non-Friable Non-Friable - Regulated Friable

F. SHIPPING AND DOT INFORMATION

- 1. One-Time Event Repeat Event/Ongoing Business
- 2. Estimated Quantity/Unit of Measure: 1000
 Tons Yards Drums Gallons Other: _____
- 3. Container Type and Size: Tanker Truck
- 4. USDOT Proper Shipping Name: _____ N/A

Certification Signature

00601c1324...



Only complete this Addendum if prompted by responses on EZ Profile™ (page 1) or to provide additional information. Sections and question numbers correspond to EZ Profile™.

Profile Number: OR342506

C. MATERIAL INFORMATION

Describe Process Generating Material (Continued from page 1): If more space is needed, please attach additional pages.

Empty text box for describing the process generating material.

Material Composition and Contaminants (Continued from page 1): If more space is needed, please attach additional pages.

Table with 2 columns for material composition and contaminants, rows 5-9, and a total composition row at the bottom.

D. REGULATORY INFORMATION

Only questions with a "Yes" response in Section D on the EZ Profile™ form (page 1) need to be answered here.

- 1. EPA Hazardous Waste
a. Please list all USEPA listed and characteristic waste code numbers:
b. Is the material subject to the Alternative Debris standards (40 CFR 268.45)?
c. Is the material subject to the Alternative Soil standards (40 CFR 268.49)?
d. Is the material exempt from Subpart CC Controls (40 CFR 264.1083)?
2. State Hazardous Waste
3. For material that is Treated, Delisted, or Excluded
4. Underlying Hazardous Constituents
5. Industries regulated under Benzene NESHAP include petroleum refineries, chemical manufacturing plants, coke by-product recovery plants, and TSDFs.
6. 40 CFR 63 GGGGG
7. CERCLA or State-Mandated clean up
8. NRC or state regulated radioactive or NORM Waste



Hazardous WAM Approval

Requested Management Facility: Chemical Waste Management (Hazardous Waste Facility)

Profile Number: OR342506 Waste Approval Expiration Date: 07/17/2020

APPROVAL DETAILS

Hazardous Classification: State Hazardous Profile Renewal: Yes No

Management Method: Solidification/Liquifix

Generator Name: BNSF Railway

Material Name: STAB01 - INAPL Remediation Waste

Management Facility Precautions, Special Handling Procedures or Limitation on approval:

Generator Conditions

- An EPA form 8700-22 must be used for all hazardous shipments and may be ordered from an authorized vendor or your TSC.
- Approval number must accompany shipment.
- Drummed waste must be marked with profile number on top & side of the containers & bear only the appropriate labeling under RCRA and/or DOT provisions
- Chemical Waste Management has all the necessary permits and licenses for the waste that has been characterized and identified by this approved profile.
- Must meet applicable OSHA, DOT packaging, labeling, shipping and manifesting requirements per 49 CFR.
- The WM decision is based on specific parameters defined within this waste profile. Waste received that is non-conforming in any way will need to be re-evaluated and managed in accordance with all RCRA and State regulations. If alternative treatment is not available and the waste cannot be managed it will be rejected back to the generator.
- OR - Section 13 of the manifest will require Oregon state code.
Must be scheduled. Please contact Bob Mulholland (rmulholl@wm.com) or Tina Weiser (tweiser@wm.com).

WM Authorization Name: Leslie Fichera Title: Waste Approval Manager

WM Authorization Signature: Leslie Fichera Date: 07/17/2019

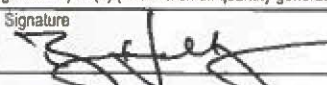
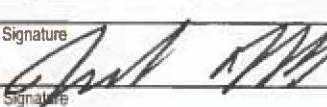

Agency Authorization (if Required): _____ Date: _____

2138

471524

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator ID Number <i>Exempted</i>		2. Page 1 of <i>1</i>		3. Emergency Response Phone <i>800-899-4672</i>		4. Manifest Tracking Number <i>010520724 JJK</i>							
5. Generator's Name and Mailing Address <i>BNSF Railway 605 Puget Ave Tucuma WA 99421 Generator's Phone: 253-591-2567</i>						Generator's Site Address (if different than mailing address) <i>1 Railroad Ave Wishram WA 98673</i>									
6. Transporter 1 Company Name <i>NRC Environmental Services</i>								U.S. EPA ID Number <i>CA2 0000 30114</i>							
7. Transporter 2 Company Name								U.S. EPA ID Number							
8. Designated Facility Name and Site Address <i>Chemical Waste Management 17629 Cedar Springs Lane Astington OR 97812 Facility's Phone: 541-454-2030</i>						U.S. EPA ID Number <i>OR008945 2353</i>									
GENERATOR	9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))				10. Containers		11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes					
		<i>1 Diesel and Oil Range Petroleum Hydrocarbon</i>				No.	Type								
						<i>01</i>	<i>TT</i>	<i>80</i>	<i>G</i>	<i>x004</i>					
		<i>2</i>													
		<i>3</i>													
	<i>4</i>														
14. Special Handling Instructions and Additional Information <i>Truck # 2138 State Hazardous Waste x004 84G Profile # OR342506</i>															
15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.															
Generator's/Offoror's Printed/Typed Name <i>Ryan Hultgren ON BEHALF OF BNSF RAILWAY COMPANY</i>								Signature 		Month <i>7</i>		Day <i>23</i>		Year <i>19</i>	
INT'L	16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: _____ Date leaving U.S.: _____														
	Transporter signature (for exports only): _____														
TRANSPORTER	17. Transporter Acknowledgment of Receipt of Materials														
	Transporter 1 Printed/Typed Name <i>John Nikirk</i>								Signature 		Month <i>07</i>		Day <i>23</i>		Year <i>19</i>
Transporter 2 Printed/Typed Name								Signature		Month		Day		Year	
DESIGNATED FACILITY	18. Discrepancy														
	18a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input checked="" type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection														
	<i>9.1 Sludge is bunker oil. Approved to process as one-time anomaly per Shane DeGross/Manager/BNSF Railway. KR 7-24-19</i>														
	Manifest Reference Number: _____ U.S. EPA ID Number														
18b. Alternate Facility (or Generator) U.S. EPA ID Number															
Facility's Phone															
18c. Signature of Alternate Facility (or Generator) Month Day Year															
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)															
1. <i>H100</i>			2.			3.			4.						
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a															
Printed/Typed Name <i>Dawn Dunlap</i>								Signature 		Month <i>7</i>		Day <i>24</i>		Year <i>19</i>	

gm

Washington State-Only Toxicity Designation Tool



DEPARTMENT OF
ECOLOGY
State of Washington

This table is included in the full designation tool. Use this if you are only interested in the WA state-only toxicity designation of your waste. Only enter text in **yellow** fields.

WISHRAM - LNAPL

← Start Here

Applicable State-Only Toxicity Waste Codes

Chemical	CAS No.	Concentration Weight %	Reference	Fish <i>LC₅₀</i> mg/L	Rat <i>Oral LD₅₀</i> mg/kg	Rat <i>Inhalation LC₅₀</i> mg/L	Rabbit <i>Dermal LD₅₀</i> mg/kg	Toxic Category	Halogenated Organic Compound (HOC)?
Double check to make sure your CAS #'s are input correctly with dashes. If the NO DATA error is still in the Chemical column, contact your regional Ecology designation contact.	Input CAS number must include dashes, e.g., 108-88-3	Input as a percent. Include the % sign, e.g., 15.5%. To convert mg/kg to percentage, divide mg/kg by 10,000 (input with % sign).	Toxicity database information is from, e.g., RTECS or EcoTox	< 0.01	< 0.5	< 0.02	< 2	X	
				0.01 - < 0.1	0.5 - < 5	0.02 - < 0.2	2 - < 20	A	
				0.1 - < 1	5 - < 50	0.2 - < 2	20 - < 200	B	
				1 - < 10	50 - < 500	2 - < 20	200 - < 2,000	C	
				10 - 100	500 - 5,000	20 - 200	2,000 - 20,000	D	
Copper	7440-50-8	0.000101%	RTECS and Ecotox	0.02				A	
Nickel	7440-02-0	0.000153%	RTECS and Ecotox	0.05				A	
Mercury	7439-97-6	0.000001%	RTECS and Ecotox	0.01				X	D,F,P,U,WP,
n-butylbenzene	104-51-8	0.001070%	RTECS, HSDB, Ecotox					NO DATA	
Benzene, ethyl-	100-41-4	0.000010%	RTECS and Ecotox	14.00	3,500.0		5,000.00	D	D,F,P,U,WP,
Cumene	98-82-8	0.001250%	RTECS and Ecotox	6.32	1,400.0		10,627.20	C	D,F,P,U,WP,
p-Cymene	99-87-6	0.000528%	RTECS and Ecotox		3,200.0		10,545.00	D	
Naphthalene	91-20-3	0.001070%	RTECS and Ecotox	6.14	490.0		20,000.00	C	D,F,P,U,WP,
Benzene, propyl-	103-65-1	0.001590%	RTECS		6,040.0			--	
1,2,4-Trimethylbenzene	95-63-6	0.002250%	RTECS and Ecotox	7.72	5,000.0	18.00		C	
1,2,3-Trimethylbenzene	NO DATA	526-73-8	0.003090%						
Xylene	1330-20-7	0.000204%	RTECS and Ecotox	3.30	1,300.0	21.71	1,700.00	C	D,F,P,U,WP,
o-Xylene	95-47-6	0.000068%	RTECS and Ecotox	16.40	3,567.0			D	
Sec-Butylbenzene	135-98-8	0.001290%	RTECS, HSDB, Ecotox		1,933.1		13,808.00	D	
tert-butylbenzene	98-06-6	0.000165%	RTECS, HSDB, Ecotox	65.00	3,045.0			D	

Equivalent Concentration	
$\frac{0.00\%}{1}$	X
+ $\frac{0.00\%}{10}$	A
+ $\frac{0.00\%}{100}$	B
+ $\frac{0.00\%}{1,000}$	C
+ $\frac{0.00\%}{10,000}$	D

0.0000%
Waste Code: NA
Designation: Non-toxic

Waste Code	Designation	Min %
WT01	EHW	1%
WT02	DW	0.01%
WT02	DW or Special Waste	0.001%

Laboratory Results notes:
 - No reference data for 1,2,3-trimethylbenzene
 - Mercury was detected in the method blank for LNAPL samples. Results were qualified as non-detect, U, at the reporting limit. Value of 1/2 the reporting limit included in this tool.

Appendix I

Bank Monitoring Inspection Data

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	1/22/2016
Start Time	1105
End Time	1250
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	70 F Wind 5 mph from W Partly cloudy
Water Conditions (calm, small riffles, choppy, etc.)	Calm
Pool Elevation (NOAA TDAO3)	159.21
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	2/12/2016
Start Time	9:00
End Time	9:40
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	70 F Wind 0 mph Overcast/misty
Water Conditions (calm, small riffles, choppy, etc.)	Calm
Pool Elevation (NOAA TDAO3)	158.96
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	3/30/2016
Start Time	11:45
End Time	12:05
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	70 F Wind 0-5 mph Clear
Water Conditions (calm, small riffles, choppy, etc.)	Calm
Pool Elevation (NOAA TDAO3)	158.91
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	4/29/2016
Start Time	12:50
End Time	13:30
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	60 F Wind 20-30 mph Overcast
Water Conditions (calm, small riffles, choppy, etc.)	Very choppy
Pool Elevation (NOAA TDAO3)	159.14
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	5/31/2016
Start Time	16:45
End Time	17:05
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	90 F Wind up to 10 mph Clear
Water Conditions (calm, small riffles, choppy, etc.)	Calm
Pool Elevation (NOAA TDAO3)	158.61
Other Observations	Sunken fishing boat present in river adjacent to site

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	6/30/2016
Start Time	10:55
End Time	11:10
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	90 F Wind up to 20-25 mph Clear
Water Conditions (calm, small riffles, choppy, etc.)	Choppy
Pool Elevation (NOAA TDAO3)	158.67
Other Observations	Sunken fishing boat present in river adjacent to site

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	JS
Date	8/1/2016 - 8/12/2016
Start Time	Daily during drilling activities
End Time	Daily during drilling activities
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	Yes. Sheen and oil droplets observed on 4 August 2016, sample of oil droplets was collected and submitted for analysis. Subsequent bank monitoring was performed from August 5th through August 12th. No additional oil droplet sheen was identified through 12 August 2016.
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	Average daily temperatures between 67 - 80 F Clear
Water Conditions (calm, small riffles, choppy, etc.)	Calm
Pool Elevation (NOAA TDAO3)	158.68-159.15
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	9/16/2016
Start Time	16:30
End Time	16:50
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	90 F Clear
Water Conditions (calm, small riffles, choppy, etc.)	Calm
Pool Elevation (NOAA TDAO3)	158.95
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	JS
Date	10/10/2016 - 10/25/2016
Start Time	Daily during RI field activities
End Time	Daily during RI field activities
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	Yes. Oil droplet sheen was observed on the surface of the river on 13 and 14 October 2016. Sample of the oil droplets were collected and submitted for analysis. Sheen was not observed during subsequent inspections between 17 and 20 October 2016. Sheen was observed on 21 October 2016. No sample was collected. Sheen was not observed during subsequent inspections.
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	Average daily temperatures between 49 and 56 F Clear
Water Conditions (calm, small riffles, choppy, etc.)	
Pool Elevation (NOAA TDAO3)	157.97 - 158.97
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	JS/AR
Date	11/1/2016 - 11/18/2016
Start Time	Daily during RI field activities
End Time	Daily during RI field activities
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	Average temperature 42 F 0 inches precipitation
Water Conditions (calm, small riffles, choppy, etc.)	
Pool Elevation (NOAA TDAO3)	158.77
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	JS
Date	12/12/2016 - 12/13/2016
Start Time	Daily during RI field activities
End Time	Daily during RI field activities
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	Average temperature 36 F 0.04 inches precipitation
Water Conditions (calm, small riffles, choppy, etc.)	
Pool Elevation (NOAA TDAO3)	159.11
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	1/27/2017
Start Time	13:40
End Time	13:55
Start Location	Concrete Pad
End Location	WWTP Outfall
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	34 F No wind Clear
Water Conditions (calm, small riffles, choppy, etc.)	Calm
Pool Elevation (NOAA TDAO3)	158.90
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	2/24/2017
Start Time	14:15
End Time	
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	45 F No wind Clear
Water Conditions (calm, small riffles, choppy, etc.)	Calm
Pool Elevation (NOAA TDAO3)	158.70
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	3/16/2017
Start Time	12:40
End Time	
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	50 F Wind 10 mph from W Clear
Water Conditions (calm, small riffles, choppy, etc.)	Calm
Pool Elevation (NOAA TDAO3)	156.20
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	4/18/2017
Start Time	13:55
End Time	
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	70 F No wind Partly cloudy
Water Conditions (calm, small riffles, choppy, etc.)	Calm
Pool Elevation (NOAA TDAO3)	158.20
Other Observations	Foam on water

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	5/15/2017
Start Time	10:45
End Time	11:05
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	70 F Wind 5-10 mph from W Partly cloudy
Water Conditions (calm, small riffles, choppy, etc.)	Calm
Pool Elevation (NOAA TDAO3)	157.80
Other Observations	Foam on water

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	6/2/2017 and 6/23/2017
Start Time	9:50; 15:25
End Time	10:15; 15:45
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	85 F; 90 F Wind 5-10 mph from W; wind 10 mph from W Clear during both inspections
Water Conditions (calm, small ripples, choppy, etc.)	Calm; light ripples
Pool Elevation (NOAA TDAO3)	157.03; 158.25
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	7/11/2017
Start Time	16:50
End Time	17:05
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	82 F Wind 15 mph from W
Water Conditions (calm, small ripples, choppy, etc.)	Light ripples
Pool Elevation (NOAA TDAO3)	158.18
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	8/2/2017 - 8/5/2017
Start Time	Various
End Time	Various
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	<p>2 August 2017: Sheen, initially observed around 12 pm (noon), was visible from just east of the concrete slab (former pump house) to approximately 100 yards downstream to the southwest. The sheen included occasional patches approximately 3 inches wide by 1.5 feet (elongated in the upstream/downstream direction), as well as several smaller diffuse patches. The smallest patches were approximately 3 inches in diameter. One patch approximately 1 foot in diameter was observed with an oil droplet in the center. Oil sheen and an oil droplet samples were collected for laboratory analysis. Oil sheen or droplets were not observed after 2:30 pm; wind (from the east) had increased since noon.</p> <p>3 August 2017: Sheen and oil droplets observed between approximately 1 pm and 4 pm in similar areas as on 2 August 2017. A sample of oil droplets with water was collected for laboratory analysis.</p> <p>4 August 2017: No sheen observed at 8 am, noon, 2 pm, or at 4 pm, temperature ranged from 80 °F in morning to 90-100 °F in afternoon, wind was from the west at approximately 15 to 20 mph, water surface was choppy.</p> <p>5 August 2017: No sheen observed in morning (approximately 8 and 9 am), temperature 73 °F, wind was from the west at approximately 10 mph, water was somewhat choppy.</p>
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	73 - 110 F No wind when sheen was observed, up to 20mph wind when no sheen was observed
Water Conditions (calm, small ripples, choppy, etc.)	Calm to choppy
Pool Elevation (NOAA TDAO3)	158.46 - 158.86
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	9/18/2017 - 9/21/2017
Start Time	Various
End Time	Various
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	<p style="text-align: center;">18 and 19 September 2017: No sheen was observed.</p> <p>20 September 2017: Sheen was observed starting at approximately 8 am, temperature was approximately 70°F, winds approximately 5 mph from the west. Approximately 5 patches of sheen were observed, each less than 5 feet from the shore and around 1 foot in diameter. Multiple small oil droplets were observed. Sheen was observed from approximately 30 feet west of the pump house pad extending approximately 100 feet west. Oil sheen was not observed during periodic monitoring throughout the day from approximately 9:30 am through 8 pm. Conditions were generally windier through the remainder of the day with periods of light rain, clouds and temperatures in the 50s and 60s °F.</p> <p>21 September 2017: Bank inspection monitoring performed in the morning and no sheen was observed on the water surface. Temperature was approximately 50°F and windy.</p>
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	See above.
Water Conditions (calm, small ripples, choppy, etc.)	Calm to choppy
Pool Elevation (NOAA TDAO3)	159.09 - 159.13
Other Observations	

FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM

Monitoring Personnel	Steve Misner
Date	10/19/17
Start Time	1340
End Time	1420
Start Location	Former pump house
End Location	west out fall
Sheen Observed? If yes, describe location and characteristics	No sheen observed
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	wind 5-8 mph to east Temp: 60°F cloudy 0.02 in pcp prior to inspection
Water Conditions (calm, small ripples, choppy, etc.)	small ripples
Pool Elevation (NOAA TDAO3)	159.22 USACE Forebay Elevation
Other Observations	None

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	11/8/2017 and 11/29/2017 - 12/1/2017
Start Time	Various
End Time	Various
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	<p>No oil sheen or droplets were observed on the water surface of the Columbia River on 8 November 2017.</p> <p>Oil sheen was observed within an area of approximately a 10-inch diameter circle at approximately 1:30 pm and 2:30 pm on the water surface of the Columbia River on 29 November 2017. Oil sheen was not observed during the rest of the day on 29 November 2017, nor on the following two days (30 November 2017 and 1 December 2017). No oil sheen samples were collected due to the limited volume observed.</p>
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	<p>38 F Wind 3 mph 0.13 inches precipitation</p>
Water Conditions (calm, small ripples, choppy, etc.)	Calm to choppy
Pool Elevation (NOAA TDAO3)	158.79
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	RYAN HULTZREN
Date	12/21/2017
Start Time 1035 AM	1035,
End Time	1047, PERIODICALLY UNTIL 1730 DURING DAY
Start Location	EAST OF DUMP HOUSE #2 CONCRETE
End Location	NWTP OUTFALL
Sheen Observed? If yes, describe location and characteristics	NO SHEEN OBSERVED IN MORNING (1035-1047) NOR THROUGHOUT THE DAY. LAST OBSERVATION AT APPROXIMATELY 1730.
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	WNW 1 mph, 35°F, CALM, CLOUDY, HIGH FOG LIGHT BREEZE, NO PRECIPITATION
Water Conditions (calm, small ripples, choppy, etc.)	CALM, CLEAR
Pool Elevation (NOAA TDAO3)	159.33 USACE ANGLAGE FOREBAY ELEV.
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	<i>KYAN HULTQVIST</i>
Date	<i>12/22/2017</i>
Start Time	<i>0900</i>
End Time	<i>0915</i>
Start Location	<i>EAST OF ALUMHOUSE #2</i>
End Location	<i>WWTP OUTFALL</i>
Sheen Observed? If yes, describe location and characteristics	<i>NO SHEEN OBSERVED</i>
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	<i>WNW 5-10 mph, 42°F, CLOUDY NO PRECIPITATION</i>
Water Conditions (calm, small ripples, choppy, etc.)	<i>CALM / SMALL RIPPLES</i>
Pool Elevation (NOAA TDAO3)	<i>159 USACE Average Forebay Elevation</i>
Other Observations	

FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM

Monitoring Personnel	Alice Robinson
Date	1-18-17
Start Time	9:15 AM
End Time	9:40 AM
Start Location	concrete pad (former pump house)
End Location	Wishram WWTP outfall
Sheen Observed? If yes, describe location and characteristics	No.
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	Wind \approx 3-5 mph from N Temp \approx 45°F precip 0.1-0.2" in 24h, not currently raining overcast
Water Conditions (calm, small riffles, choppy, etc.)	calm, very small ripples
Pool Elevation (NOAA TDAO3)	158.9'
Other Observations	Note.

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	2/27/2018
Start Time	10:30
End Time	10:45
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	39 F Wind 0 mph Overcast
Water Conditions (calm, small riffles, choppy, etc.)	
Pool Elevation (NOAA TDAO3)	158.29
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	3/26/2018
Start Time	
End Time	
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	
Water Conditions (calm, small riffles, choppy, etc.)	
Pool Elevation (NOAA TDAO3)	158.21
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	4/26/2028
Start Time	9:45
End Time	10:05
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	50 F Wind 0 mph
Water Conditions (calm, small riffles, choppy, etc.)	Calm
Pool Elevation (NOAA TDAO3)	157.92
Other Observations	

FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM

Monitoring Personnel	Steve Masner
Date	5/15/18
Start Time	1300
End Time	1330
Start Location	Four Powderhouse loc. Pump
End Location	outfall WWTP.
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	east at 15 mph, 85°F, 0 pcp in last 24 hrs clear.
Water Conditions (calm, small ripples, choppy, etc.)	small ripples to calm
Pool Elevation (NOAA TDAO3)	159.00
Other Observations	None

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	6/18/2018 - 6/28/2018
Start Time	Various
End Time	Various
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	<p>20 June 2018: During pre-probing of sediment for Dart installation, as part of the ongoing nearshore investigation, sheen (possibly biogenic) was observed on the water surface at two locations just offshore of monitoring well WMW-17: one to the southeast (at 8:34 am) and one to the southwest (at 10:35 am) of WMW-17, both approximately 20 to 25 feet away from the shoreline. Sheen was observed as small, approximately 4 to 6-inch diameter areas in both locations. Oil sheen was not observed during the rest of the day on 20 June 2018, nor on 21 or 22 June 2018. No samples were collected for analysis.</p> <p>24 June 2018: Oil sheen was observed at approximately 9:30 am and again around 10:30-11 am. Sunny, temperature approximately 70°F, no wind, water surface of Columbia River was calm. Sheen was observed on the river surface, approximately 2 feet from shore near well WMW-16, at approximately 9:30 am, one area with a 5-inch diameter and smaller areas with diameters less than 2 inches. At 10:30 am, an oil droplet approximately 0.5 inch in diameter surrounded by an area of sheen approximately 10 inches in diameter was observed from the boat performing the nearshore investigation work (approximately 20 feet from shore in the vicinity of WMW-17). Around 11 am, a diffuse patch of sheen approximately 4 feet in length and 2 inches in width was observed along the bank approximately 1 foot from the shore near well WMW-17.</p> <p>Oil sheen was not observed during the rest of the day on 24 June 2018, nor on 25, 26, or 28 June 2018. No samples were collected for analysis.</p>
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	<p>67 - 95 F Wind 0 - 30 mph 0 inches precipitation</p>
Water Conditions (calm, small riffles, choppy, etc.)	Calm to choppy (typically calm when sheen observed)
Pool Elevation (NOAA TDAO3)	158.37 - 159.46

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	AR
Date	6/18/2018 - 6/28/2018
Start Time	Various
Other Observations	

FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM

Monitoring Personnel	Steve Misner
Date	7/26/18
Start Time	1410
End Time	1430
Start Location	Emr pump location
End Location	WWTP outfall
Sheen Observed? If yes, describe location and characteristics	NO
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	Wind E at ~ 10-15 mph Temp 100° F Clear, NO PCP prior 24 hours
Water Conditions (calm, small ripples, choppy, etc.)	Moderate ripples to light chop
Pool Elevation (NOAA TDAO3)	
Other Observations	None

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	RH
Date	8/8/2018
Start Time	9:40
End Time	14:30
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	<p>Sheen and oil droplets observed in mutiple disconnected locations between well WMW-18 to approximately 10 feet east of well WMW-17. At 9:50, starting approximately 10 feet east of well WMW-17 and extending 20 feet east, a 20-foot long by 0.5-foot wide area of sheen was observed approximately 20 feet south of shoreline. At 9:55 winds from west and movement of water, the sheen extent narrowed to approximately 20-feet by 0.25-feet. Sheen moved with river towards east. Approximately 10 feet east of well WMW-18 a 3-foot by 3-foot area of sheen was observed 5 feet south of the shoreline. In line with well WMW-18, multiple small areas of sheen approximately 6 inches in diameter were observed approximately 5 feet south of the shoreline. At 10:00 wind from the west/southwest moved water and sheen towards the shoreline, dispersing the sheen. By this time most of the larger areas of sheen were broken up into smaller areas. A sample was collected.</p> <p>At 14:30 sheen was observed near Former Pump House #2 approximately 20 feet east and west of the structure. Water was very calm, temperature 104 F.</p>
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	<p>90 F Wind 4 mph from west 0 inches precipitation Clear/hazy sky</p>
Water Conditions (calm, small riffles, choppy, etc.)	Calm, small riffles with wind
Pool Elevation (NOAA TDAO3)	158.76

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	RH
Date	8/8/2018
Start Time	9:40
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	RH
Date	8/9/2018
Start Time	7:20
End Time	15:50
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	<p>7:20 - 7:30: No sheen or oil droplets observed between Former Pump House #2 and WWTP outfall to river. River level midway up the outfall pipe (higher than on 8/8/2018). River slightly choppy, wind approximately 8 mph from west. Clear, hazy sky. Temperature 77 F.</p> <p>12:00: No sheen or oil droplets observed. Temperature 99 F with light breeze. Wind WNW 9 mph. Hazy skies. River water level high.</p> <p>15:50: No sheen or oil droplets observed. Temperature 104 F with light breeze. Wind WNW 9 mph. Hazy skies. High water level, relatively clam water.</p>
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	See above.
Water Conditions (calm, small ripples, choppy, etc.)	Calm, small ripples with wind
Pool Elevation (NOAA TDAO3)	159.18
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	RH
Date	8/10/2018
Start Time	12:00
End Time	
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No sheen or oil droplets observed
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	90 F Wind 13 mph WNW 0 inches precipitation
Water Conditions (calm, small riffles, choppy, etc.)	Lightly choppy water
Pool Elevation (NOAA TDAO3)	158.86
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	Ryan Hultgren
Date	09/20/18
Start Time	9:15:00 AM
End Time	9:25:00 AM
Start Location	Former Pump House #2 (near well WMW-18)
End Location	WWTP outfall to Columbia River
Sheen Observed? If yes, describe location and characteristics	No oil sheen or oil droplets observed
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	60 deg F, 10-20 mph from west, windy, partly cloudy / sunny
Water Conditions (calm, small ripples, choppy, etc.)	Very choppy water, moving from west to east (same direction as wind)
Pool Elevation (NOAA TDAO3)	The Dalles Dam Average Forebay Elevation 09/20/18: 159.00
Other Observations	Columbia River water level at bottom of WWTP outfall pipe

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	KET
Date	10/17/18
Start Time	0700
End Time	0723
Start Location	NWTP outfall to Columbia River
End Location	Former pump house 2, near WW-10
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	40° F, no precip, wind ENE 2mph, no clouds
Water Conditions (calm, small ripples, choppy, etc.)	Calm, slight wind moving water W to E near berm
Pool Elevation (NOAA TDAO3)	
Other Observations	Water level below outfall invert

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	KT/BR
Date	11/5/2018 - 11/7/2018
Start Time	Daily during groundwater monitoring activities
End Time	Daily during groundwater monitoring activities
Start Location	WWTP Outfall
End Location	Concrete Pad
Sheen Observed? If yes, describe location and characteristics	No sheen or oil droplets observed
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	42 - 60 F Wind 2 - 13 mph 0 inches precipitation
Water Conditions (calm, small riffles, choppy, etc.)	Very choppy
Pool Elevation (NOAA TDAO3)	158.18 - 158.57
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	KET & MG
Date	12/5/18
Start Time	1448
End Time	1520
Start Location	WTP outfall to Columbia W
End Location	Conc pad WMW-18
Sheen Observed? If yes, describe location and characteristics	No sheen
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	34° : cloudy, wind ENE 10 mph, 0 in precip
Water Conditions (calm, small ripples, choppy, etc.)	choppy / small ripples
Pool Elevation (NOAA TDAO3)	
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	Matthew Grzegorzewski
Date	2/22/19
Start Time	1:00
End Time	12:00
Start Location	WWTP Outfall to Columbia
End Location	Concrete Pad WMW-18
Sheen Observed? If yes, describe location and characteristics	No sheen
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	34°F, Partly sunny, no precip, 4 mph wind SE
Water Conditions (calm, small ripples, choppy, etc.)	Small ripples
Pool Elevation (NOAA TDAO3)	
Other Observations	WSE: 59 inches below top of WWTP outfall pipe

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	KET/MG
Date	3/1/19
Start Time	0800
End Time	1100
Start Location	Concrete pad by WMW-18
End Location	WWTP Outfall
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	33 F, light snow, wind 10mph ESE, cloudy
Water Conditions (calm, small riffles, choppy, etc.)	small riffles
Pool Elevation (NOAA TDAO3)	158.60
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	Matthew Grzegorzewski
Date	3-14-19
Start Time	930
End Time	1000
Start Location	WWTP outfall pipe
End Location	WMW - 21
Sheen Observed? If yes, describe location and characteristics	No sheen observed.
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	34°F, sunny, 10% cloud cover, calm
Water Conditions (calm, small ripples, choppy, etc.)	calm, minimal ripples
Pool Elevation (NOAA TDAO3)	
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	RYAN HULTGREN
Date	6/4/19
Start Time	1600
End Time	1615
Start Location	NEAR RMD-2, GO WEST TOWARD OUTFALL THEN BACK TOWARD EAST
End Location	CONCRETE PUMPHOUSE # STRUCTURE
Sheen Observed? If yes, describe location and characteristics	NO SHEEN OBSERVED
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	STRONG WINDS BLOWING TO THE EAST
Water Conditions (calm, small ripples, choppy, etc.)	CHOPPY, WIND BLOWN TO EAST/WORTHEAST TO SHORE
Pool Elevation (NOAA TDAO3)	158.94 158.94 (ANG FOREBAY ELEV. ^{THE} SALES DAM)
Other Observations	WATER LEVEL COLUMBIA RIVER NEAR BOTTOM OF WWTP OUTFALL PIPE (SEE PICTURES). DID NOT MEASURE LEVEL DIRECTLY.

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	A. Robinson
Date	7-22 and 7-23
Start Time	7:22 - 11:15 10:30 7:23 - 10:10 10:10
End Time	7-22 11:15 7-23 10:10
Start Location	~ MW-14
End Location	concrete pad
Sheen Observed? If yes, describe location and characteristics	None
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	winds 15 mph E to ESE, ~ 90°F, no precipitation, mostly clear sky
Water Conditions (calm, small ripples, choppy, etc.)	choppy
Pool Elevation (NOAA TDAO3)	
Other Observations	None

FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM

Monitoring Personnel	Robinson
Date	7-24-19
Start Time	15:00
End Time	15:15
Start Location	WML-15
End Location	concrete pad
Sheen Observed? If yes, describe location and characteristics	no
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	~92°F, winds 20 mph
Water Conditions (calm, small ripples, choppy, etc.)	choppy w/ whitecaps
Pool Elevation (NOAA TDAO3)	
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	Robinson
Date	7-25-19
Start Time	16:00 (and throughout afternoon)
End Time	16:16
Start Location	WMLW-15
End Location	concrete pad
Sheen Observed? If yes, describe location and characteristics	no
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	~95°F, calm, clear
Water Conditions (calm, small ripples, choppy, etc.)	calm
Pool Elevation (NOAA TDAO3)	
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	<i>Robinson</i>
Date	<i>7-26-19</i>
Start Time	<i>7:45</i>
End Time	<i>7:55</i>
Start Location	<i>WMW-14</i>
End Location	<i>concrete pad</i>
Sheen Observed? If yes, describe location and characteristics	<i>no</i>
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	<i>~80°F, calm, clear sky</i>
Water Conditions (calm, small ripples, choppy, etc.)	<i>small ripples</i>
Pool Elevation (NOAA TDAO3)	
Other Observations	<i>none</i>

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	KET
Date	7/27/19
Start Time	0655
End Time	0710
Start Location	conc. pad by WMW-18
End Location	WWTP outfall to Columbia
Sheen Observed? If yes, describe location and characteristics	No sheen
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	Wind W 16 MPH 68°F 0 in precip Mostly sunny
Water Conditions (calm, small ripples, choppy, etc.)	small ripples
Pool Elevation (NOAA TDAO3)	
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	KEE
Date	7/20/19
Start Time	1425
End Time	1440
Start Location	WMW-14
End Location	conc. pad by WMW-18
Sheen Observed? If yes, describe location and characteristics	No sheen observed
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	85°F Sunny Wind W @ mph 0 in precip
Water Conditions (calm, small riffles, choppy, etc.)	calm
Pool Elevation (NOAA TDAO3)	
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	KBT
Date	7/29/19
Start Time	0940
End Time	1000
Start Location	WMW-18
End Location	WMW-14
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	68°F Wind W 7mph 0" precip SUNNY
Water Conditions (calm, small ripples, choppy, etc.)	Small ripples
Pool Elevation (NOAA TDAO3)	
Other Observations	

FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM

Monitoring Personnel	YET
Date	8/8/19
Start Time	0755
End Time	0810
Start Location	WMW-18
End Location	WMW-16
Sheen Observed? If yes, describe location and characteristics	NO
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	15 mph to E, 70°F, slight precip during inspection, cloudy
Water Conditions (calm, small ripples, choppy, etc.)	Choppy
Pool Elevation (NOAA TDAO3)	
Other Observations	

FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM

Monitoring Personnel	KEI
Date	8/19/19
Start Time	1200
End Time	1210
Start Location	WMW-18
End Location	WMW-14
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	slightly breezy, ~ 85° F, no precip, sunny
Water Conditions (calm, small ripples, choppy, etc.)	small ripples
Pool Elevation (NOAA TDAO3)	
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	KBT
Date	8/12/19
Start Time	1420
End Time	1440
Start Location	WMW-16
End Location	WMW-18
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	82° F, wind WNW 9 mph, no precip, SUNNY
Water Conditions (calm, small ripples, choppy, etc.)	calm
Pool Elevation (NOAA TDAO3)	
Other Observations	

**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	KET
Date	8/19/19
Start Time	1430
End Time	1445
Start Location	WMW-14
End Location	WMW-18
Sheen Observed? If yes, describe location and characteristics	No
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	89°F, wind W 17mph, no precip, sunny
Water Conditions (calm, small ripples, choppy, etc.)	small ripples + wake from boats
Pool Elevation (NOAA TDAO3)	
Other Observations	

FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM

Monitoring Personnel	Blonia Gonzalez
Date	09/23/2019
Start Time	1310
End Time	1340
Start Location	MW-14
End Location	MW-19
Sheen Observed? If yes, describe location and characteristics	NO sheen observed.
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	windy, overcast, 63°F, rain previous day, wind
Water Conditions (calm, small riffles, choppy, etc.)	choppy water.
Pool Elevation (NOAA TDAO3)	
Other Observations	

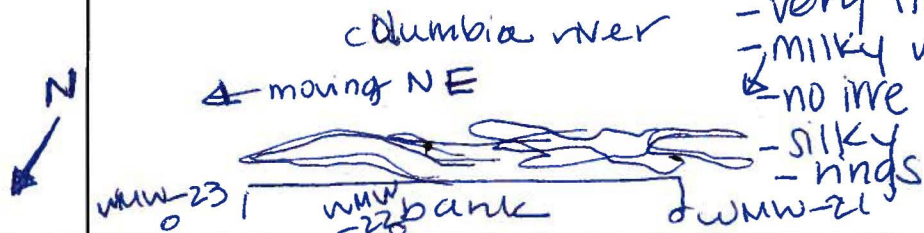
**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	Silvia Gonzalez
Date	11/12/19
Start Time	1200 - 1220
End Time	
Start Location	WMW-23
End Location	WMW-14
Sheen Observed? If yes, describe location and characteristics	NO sheen
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	Moderate wind speed in NW direction, approx 50°F, clouds w some breakage, light precipitation in AM
Water Conditions (calm, small ripples, choppy, etc.)	moderate ripples
Pool Elevation (NOAA TDAO3)	
Other Observations	none

FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM

Monitoring Personnel	Blonda Gonzalez
Date	11/13/19
Start Time	1300
End Time	1315
Start Location	WMW-23
End Location	WMW-14
Sheen Observed? If yes, describe location and characteristics	No sheen
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	Strong winds and very choppy water wind direction NW, temp approx 45°F
Water Conditions (calm, small ripples, choppy, etc.)	choppy water
Pool Elevation (NOAA TDAO3)	
Other Observations	none

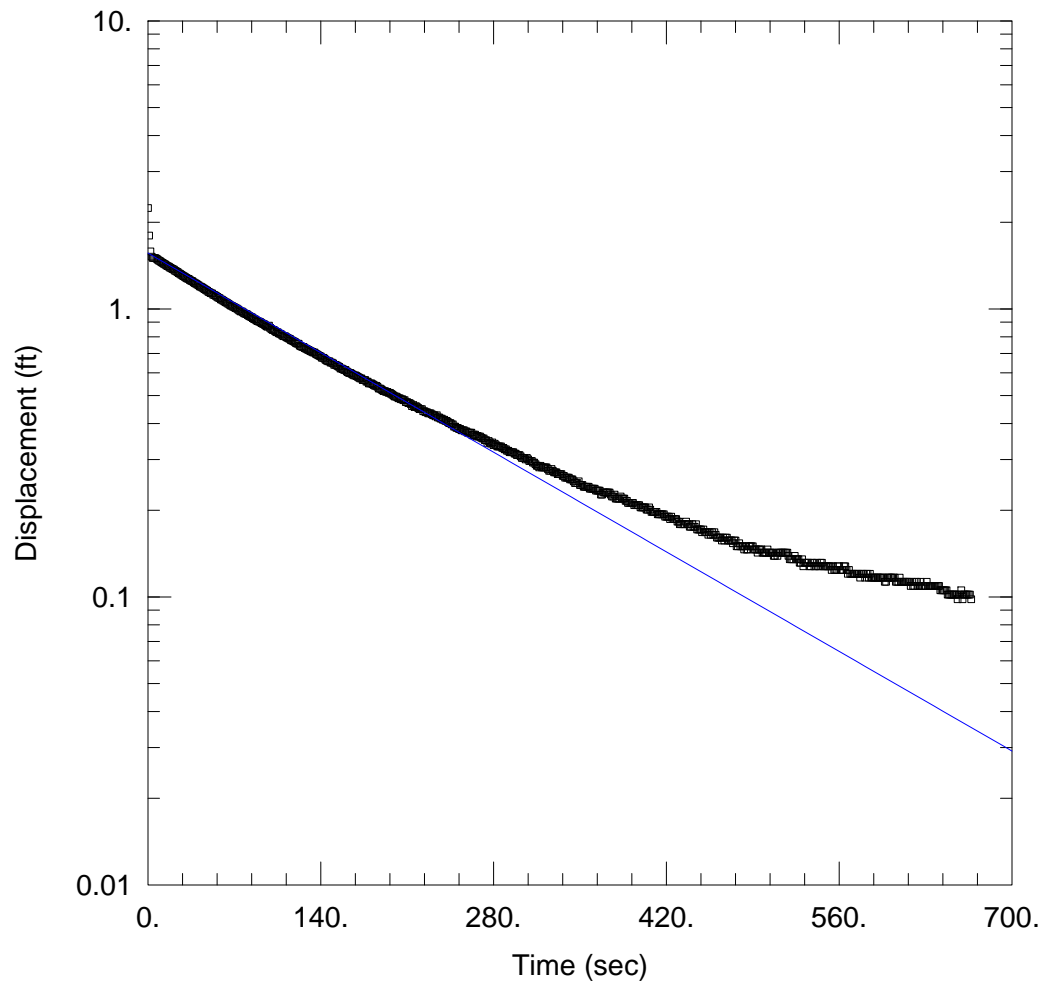
**FIELD FORM
BANK INSPECTION OBSERVATIONS
BNSF WISHRAM**

Monitoring Personnel	Glenn Gonzalez
Date	11/14/19
Start Time	1010
End Time	1040
Start Location	WMW-23
End Location	WMW-14
Sheen Observed? If yes, describe location and characteristics	no sheen
Weather: wind speed/direction; temperature (degrees F); precipitation (amount 24 hours prior to inspection); cloud cover	little wind, NW direction, cloudy + slightly foggy.
Water Conditions (calm, small ripples, choppy, etc.)	calm light ripples
Pool Elevation (NOAA TDAO3)	
Other Observations	<p>biofilm from WMW-23 to WMW-21 approx 15 yards</p> <p>Columbia river  </p> <ul style="list-style-type: none"> - attached - very stringy - milky white sheen - no irv - silky - frags

Appendix J

Slug Test Aqtesolv Outputs

2016 RI Work Plan



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_1F.aqt
 Date: 11/19/18

Time: 11:34:53

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-1)

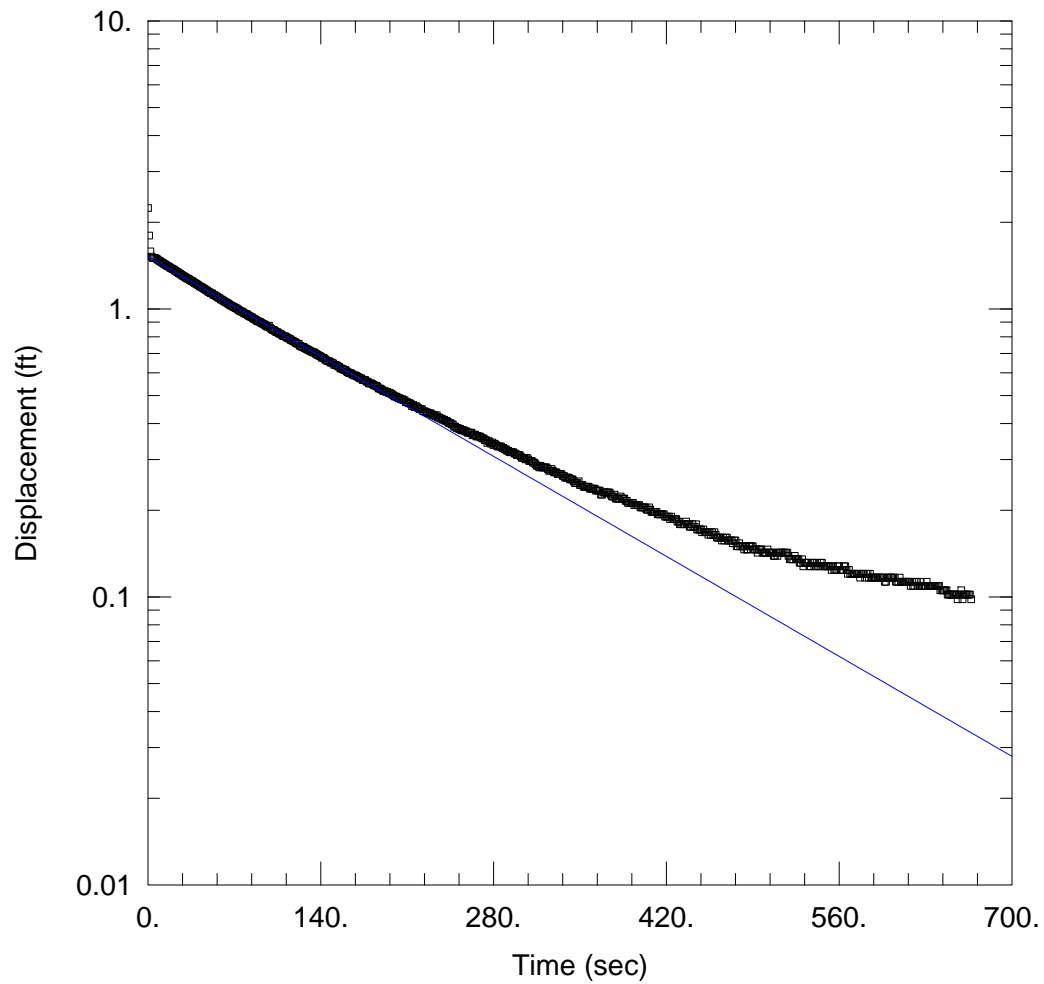
Initial Displacement: 2.241 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 5.396E-6 ft/sec

Solution Method: Bower-Rice
 y0 = 1.563 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_1F.aqt
 Date: 11/19/18

Time: 11:35:16

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-1)

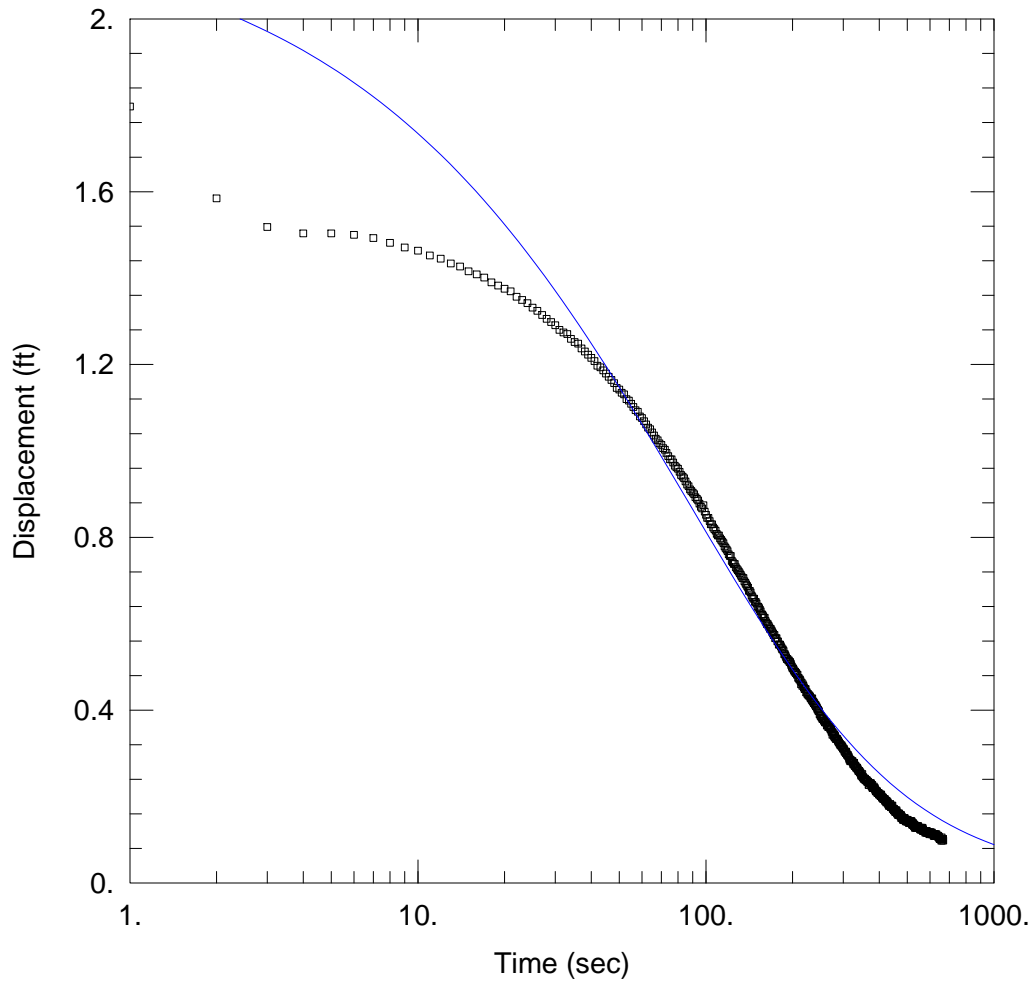
Initial Displacement: 2.241 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 7.189E-6 ft/sec

Solution Method: Hvorslev
 y0 = 1.523 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_1F.aqt
 Date: 11/19/18

Time: 11:36:56

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

WELL DATA (RMD-1)

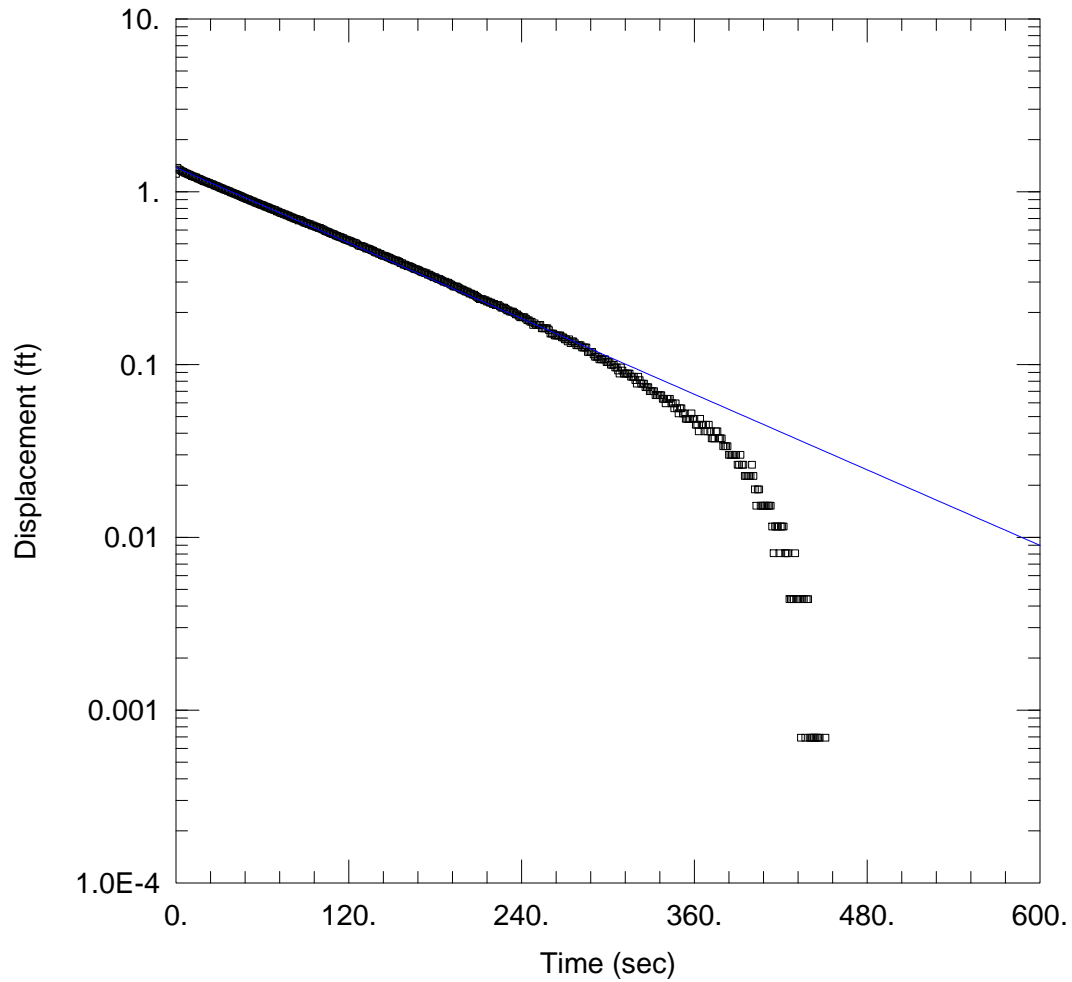
Initial Displacement: 2.241 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 3.548E-6 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.003059 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_2R.aqt
 Date: 11/19/18

Time: 11:32:35

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-1)

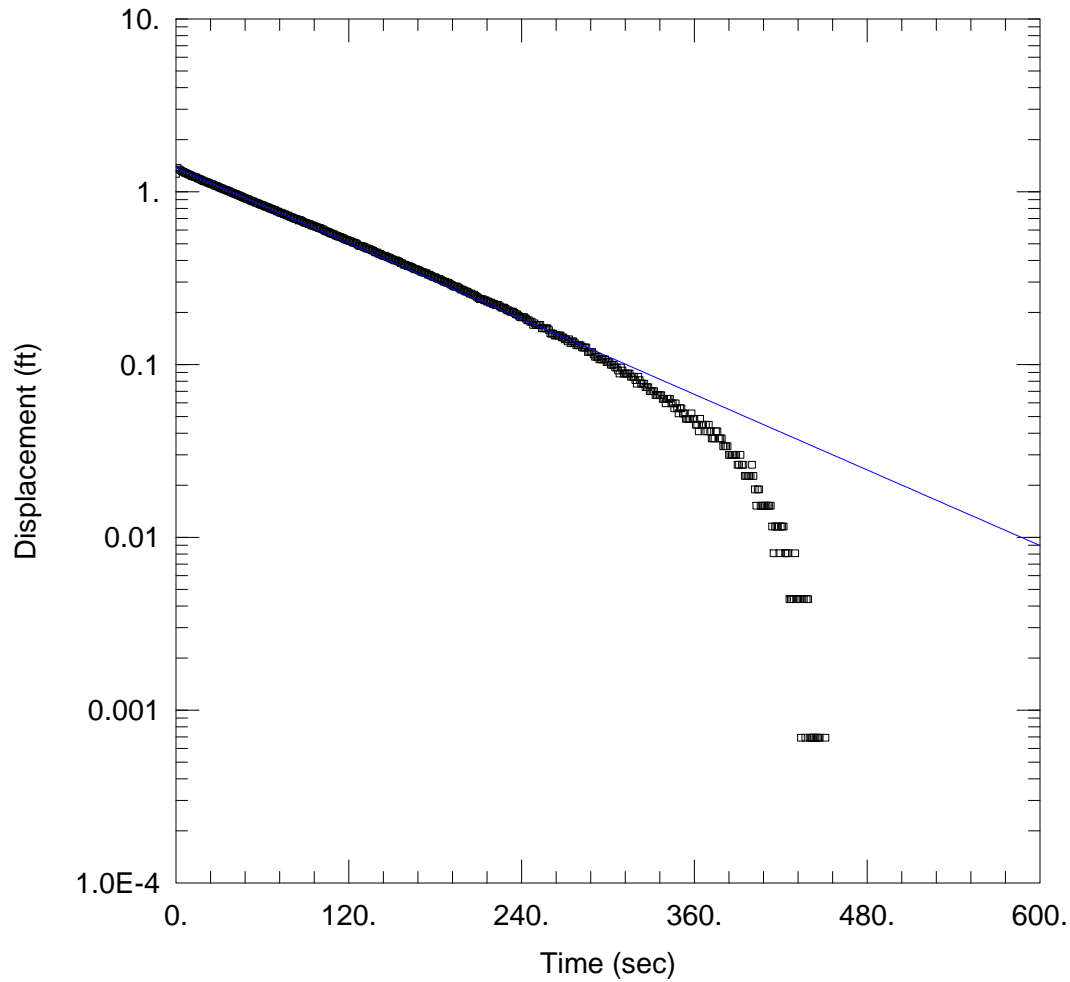
Initial Displacement: 1.269 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 7.959E-6 ft/sec

Solution Method: Bower-Rice
 y0 = 1.378 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_2R.aqt
 Date: 11/19/18

Time: 11:32:52

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-1)

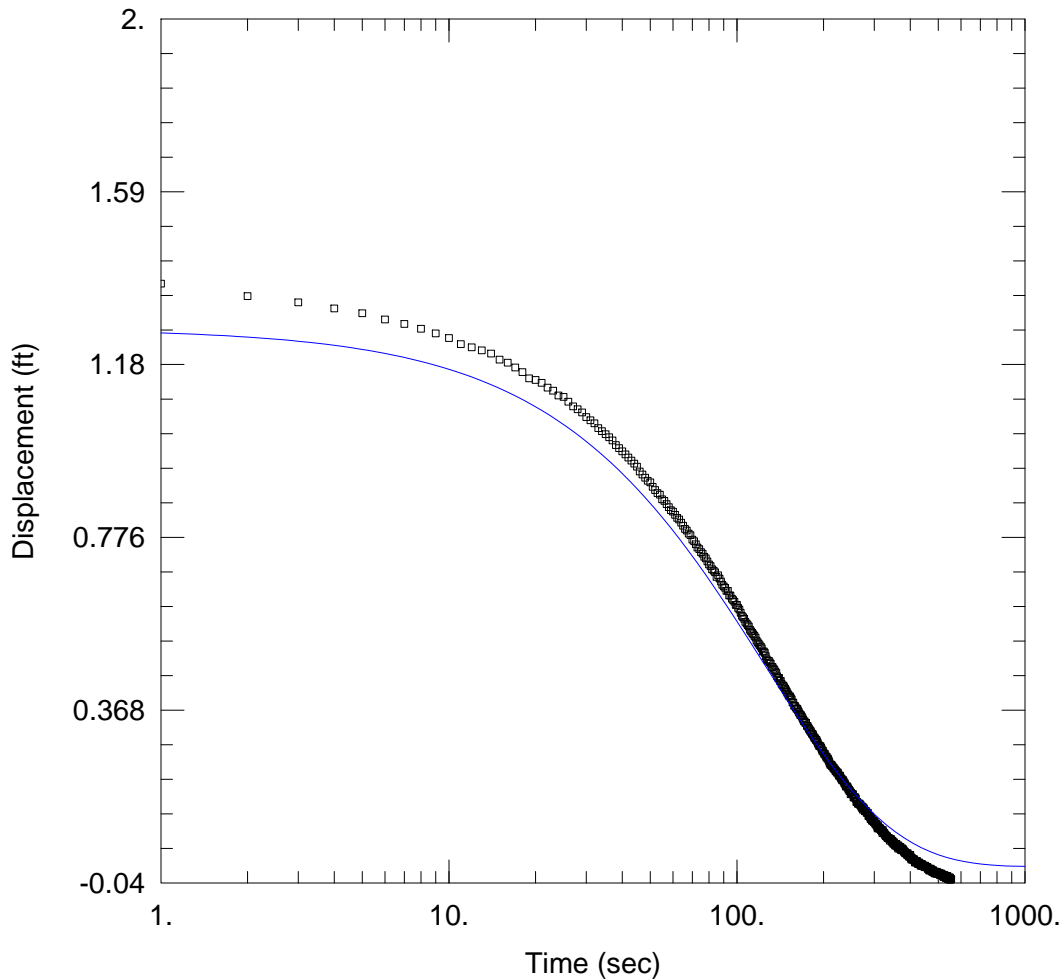
Initial Displacement: 1.269 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 1.056E-5 ft/sec

Solution Method: Hvorslev
 y0 = 1.378 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_2R.aqt
 Date: 11/19/18

Time: 11:33:41

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

WELL DATA (RMD-1)

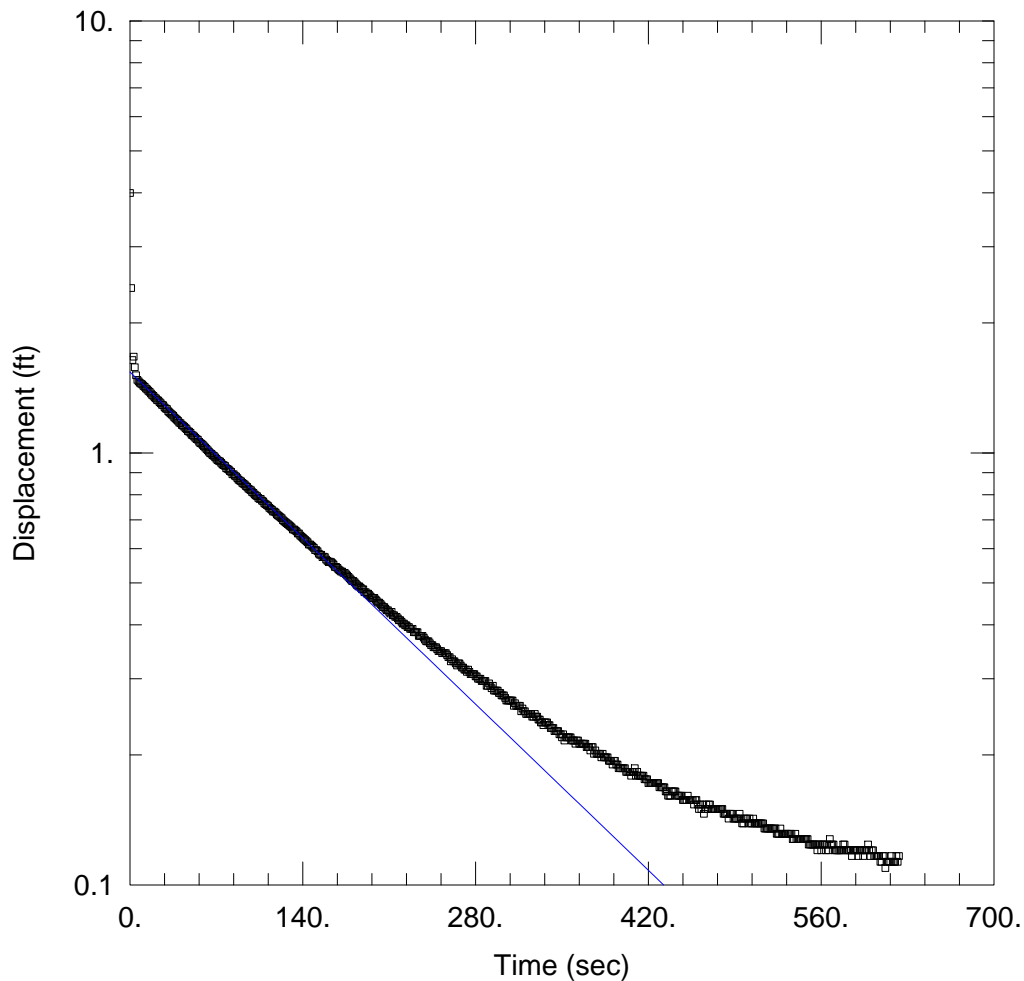
Initial Displacement: 1.269 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 8.68E-6 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 3.906E-12 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_3F.aqt
 Date: 11/19/18

Time: 11:29:53

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-1)

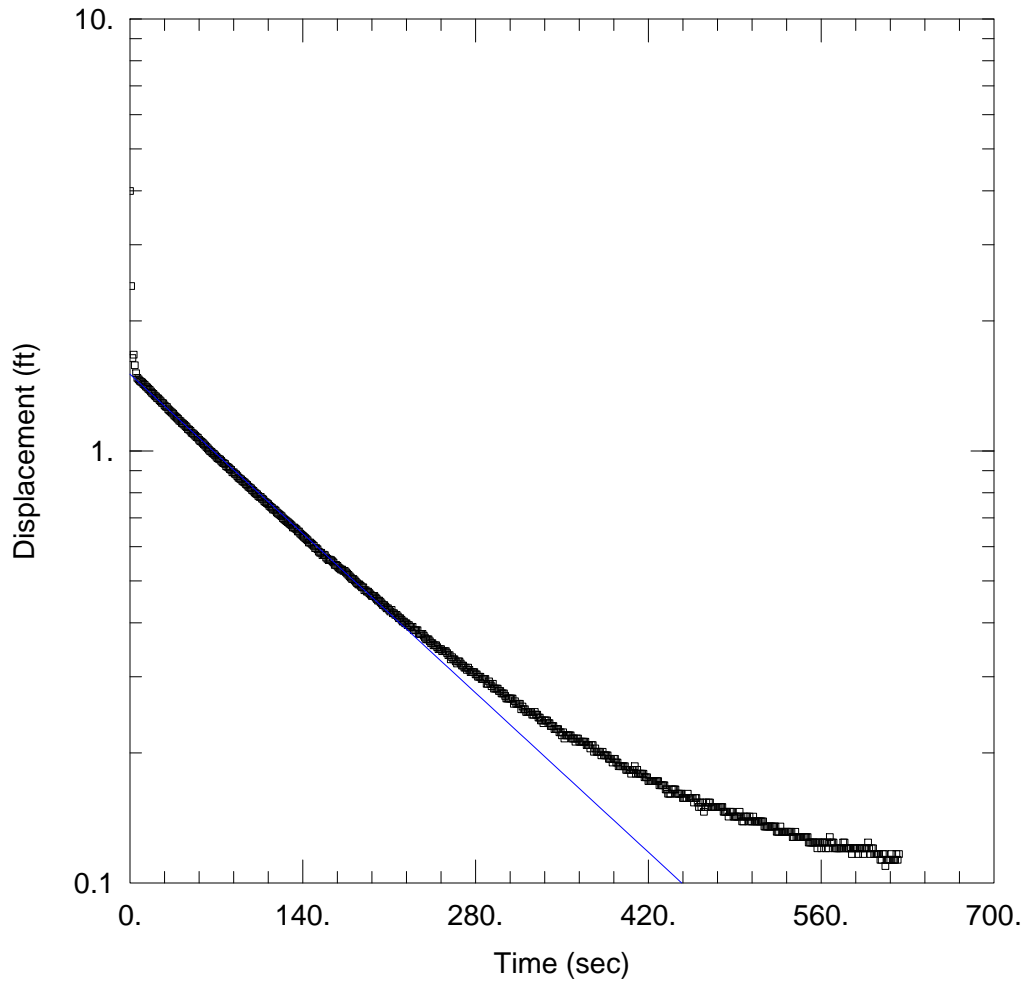
Initial Displacement: 3.995 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 5.998E-6 ft/sec

Solution Method: Bower-Rice
 y0 = 1.539 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_3F.aqt
 Date: 11/19/18

Time: 11:30:14

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-1)

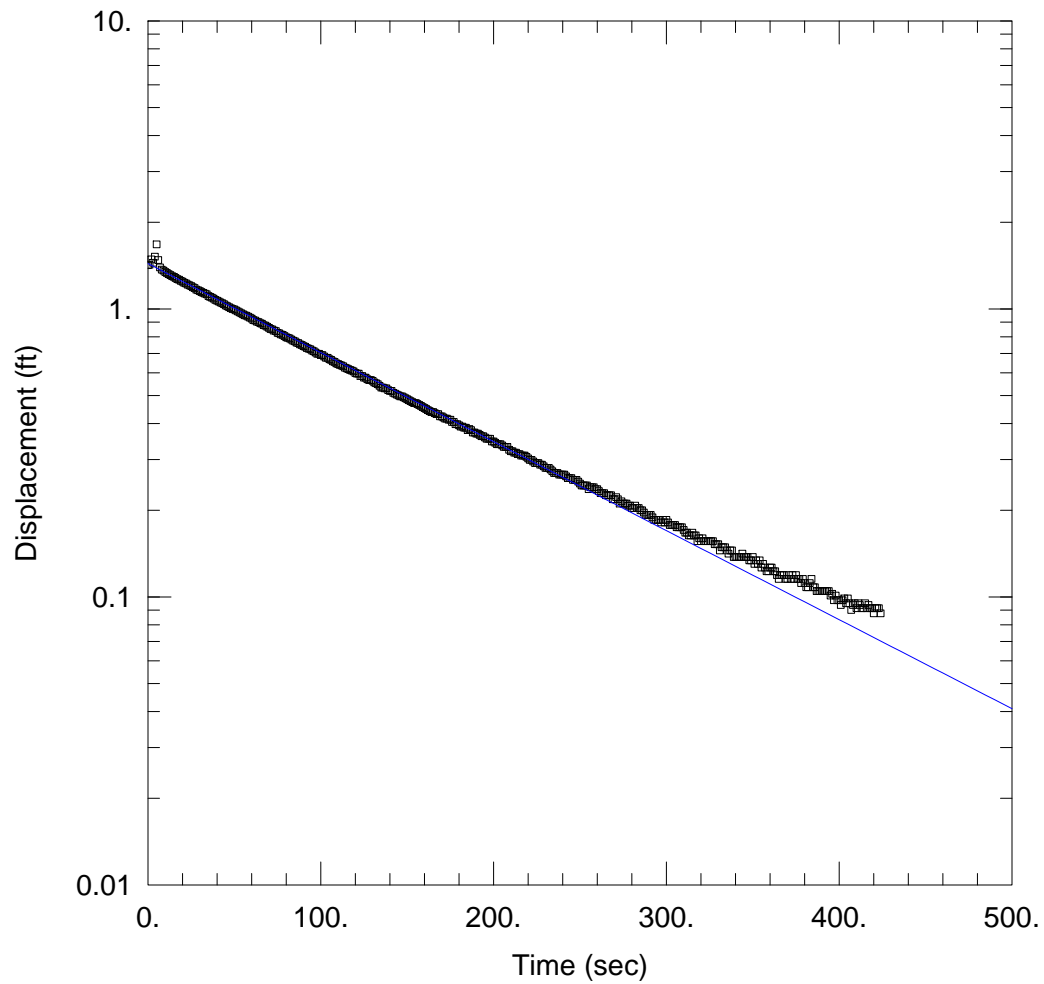
Initial Displacement: 3.995 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 7.634E-6 ft/sec

Solution Method: Hvorslev
 y0 = 1.505 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_4R.aqt
 Date: 11/19/18

Time: 11:27:55

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-1)

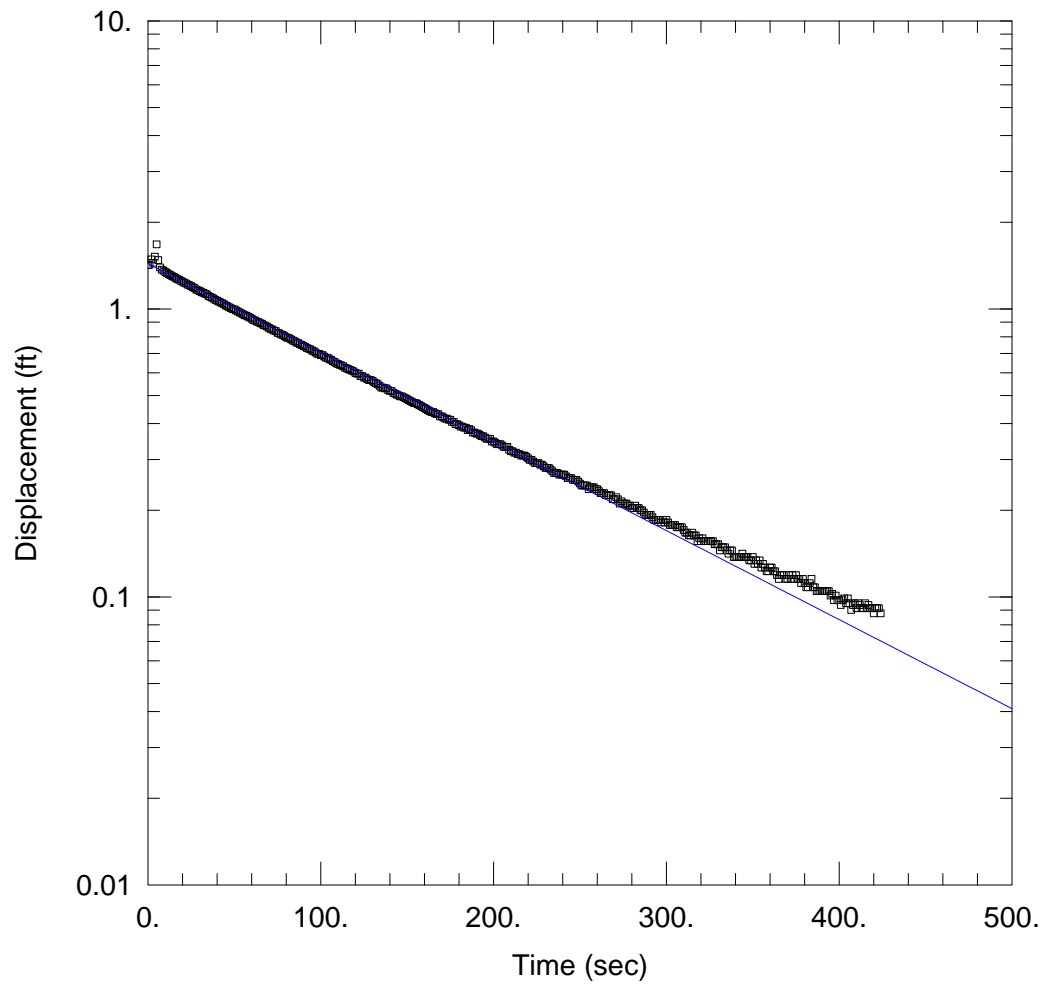
Initial Displacement: 1.42 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 6.752E-6 ft/sec

Solution Method: Bower-Rice
 y0 = 1.437 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_4R.aqt
 Date: 11/19/18

Time: 11:28:17

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-1)

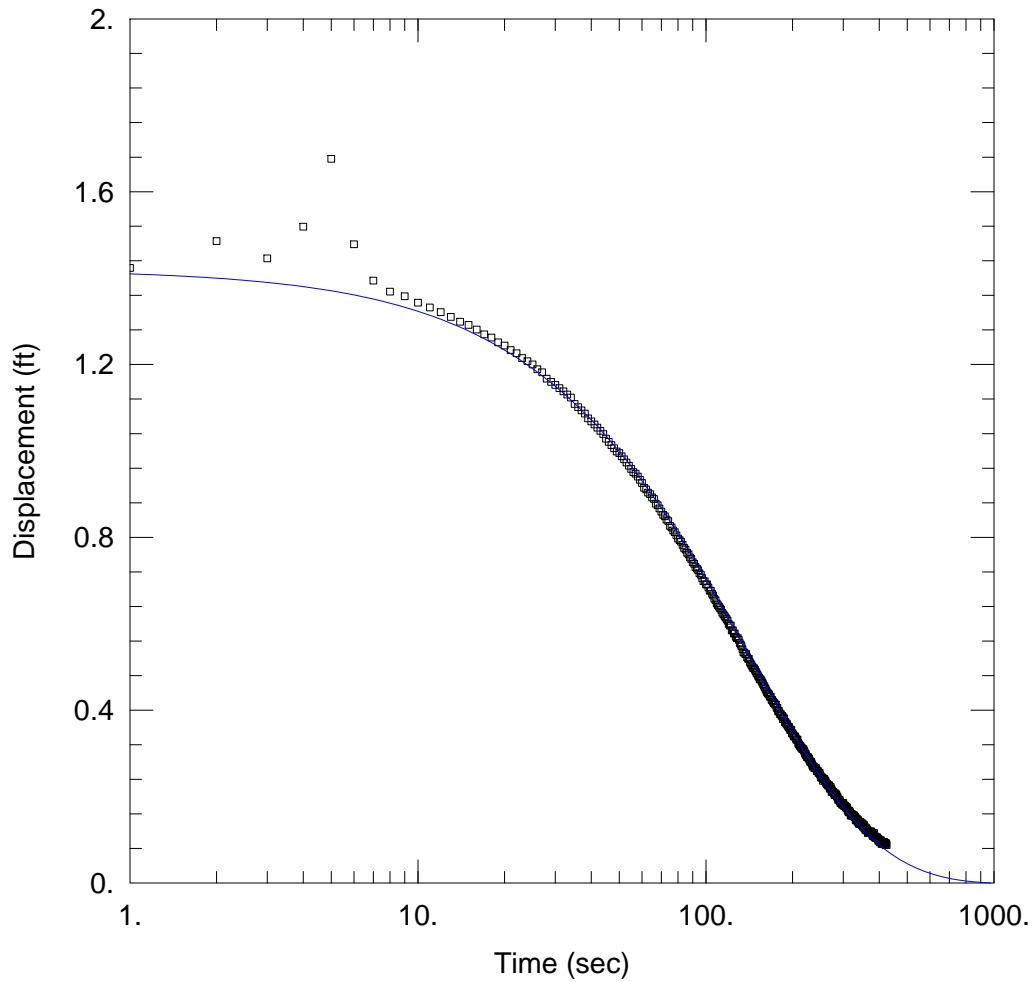
Initial Displacement: 1.42 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 8.955E-6 ft/sec

Solution Method: Hvorslev
 y0 = 1.436 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_4R.aqt
 Date: 11/19/18

Time: 11:28:47

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

WELL DATA (RMD-1)

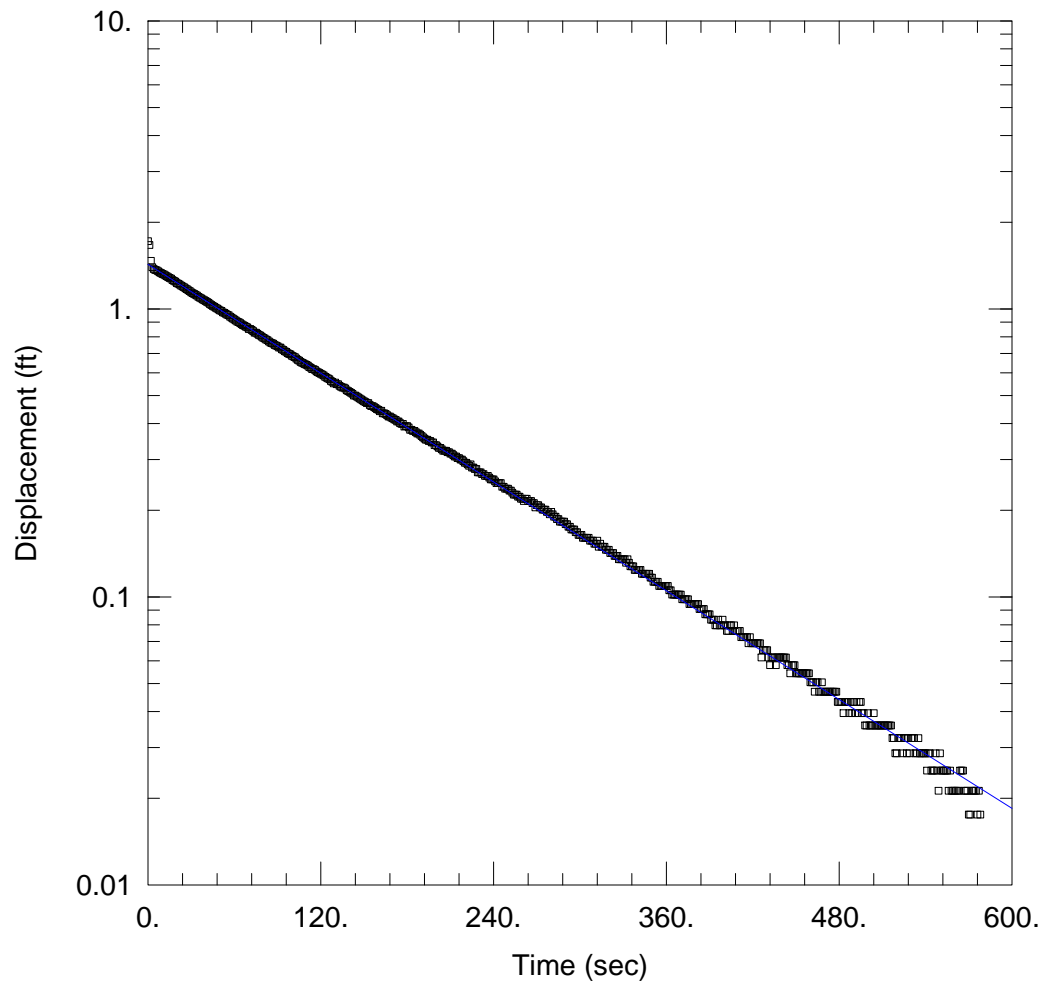
Initial Displacement: 1.42 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 7.776E-6 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 3.906E-12 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_5F_BR.aqt
 Date: 10/19/18

Time: 14:27:06

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-1)

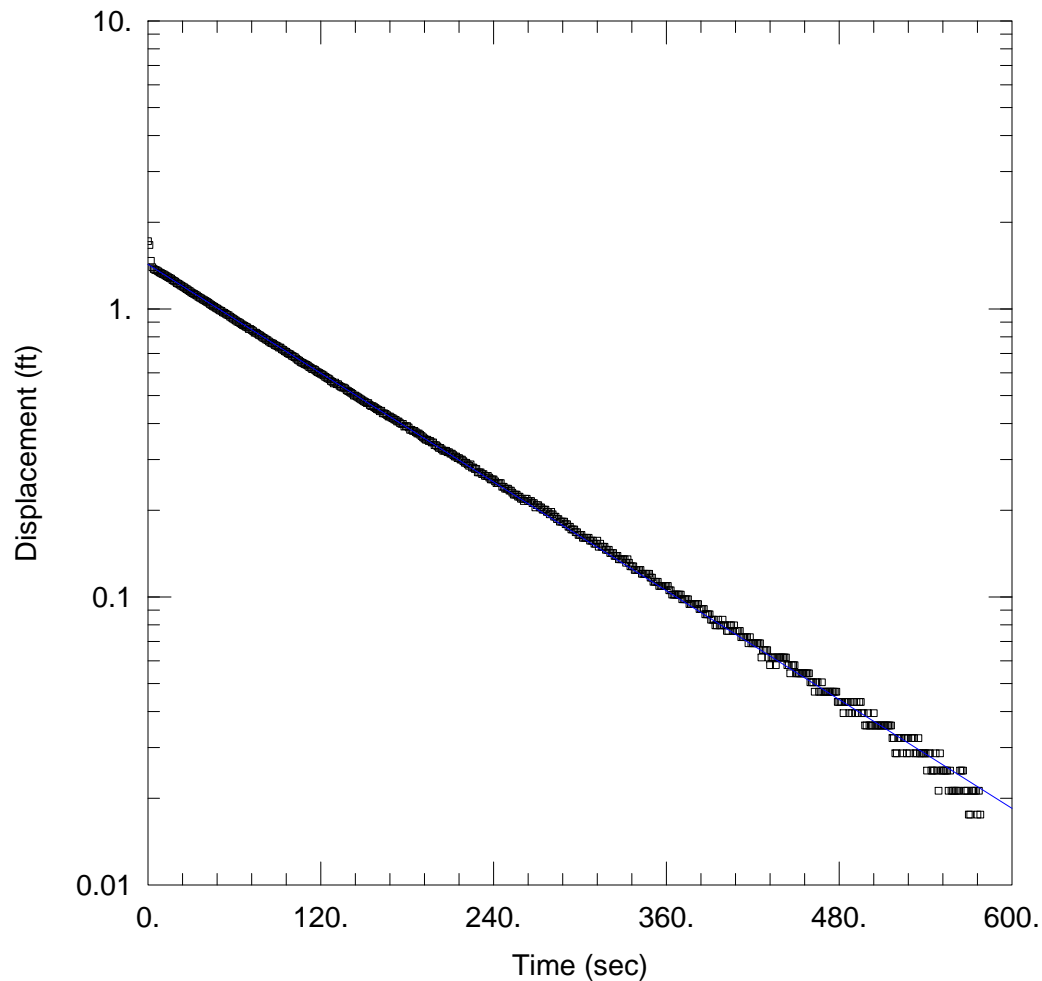
Initial Displacement: 1.72 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 6.878E-6 ft/sec

Solution Method: Bower-Rice
 y0 = 1.428 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_5F_HV.aqt
 Date: 10/19/18

Time: 14:25:02

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-1)

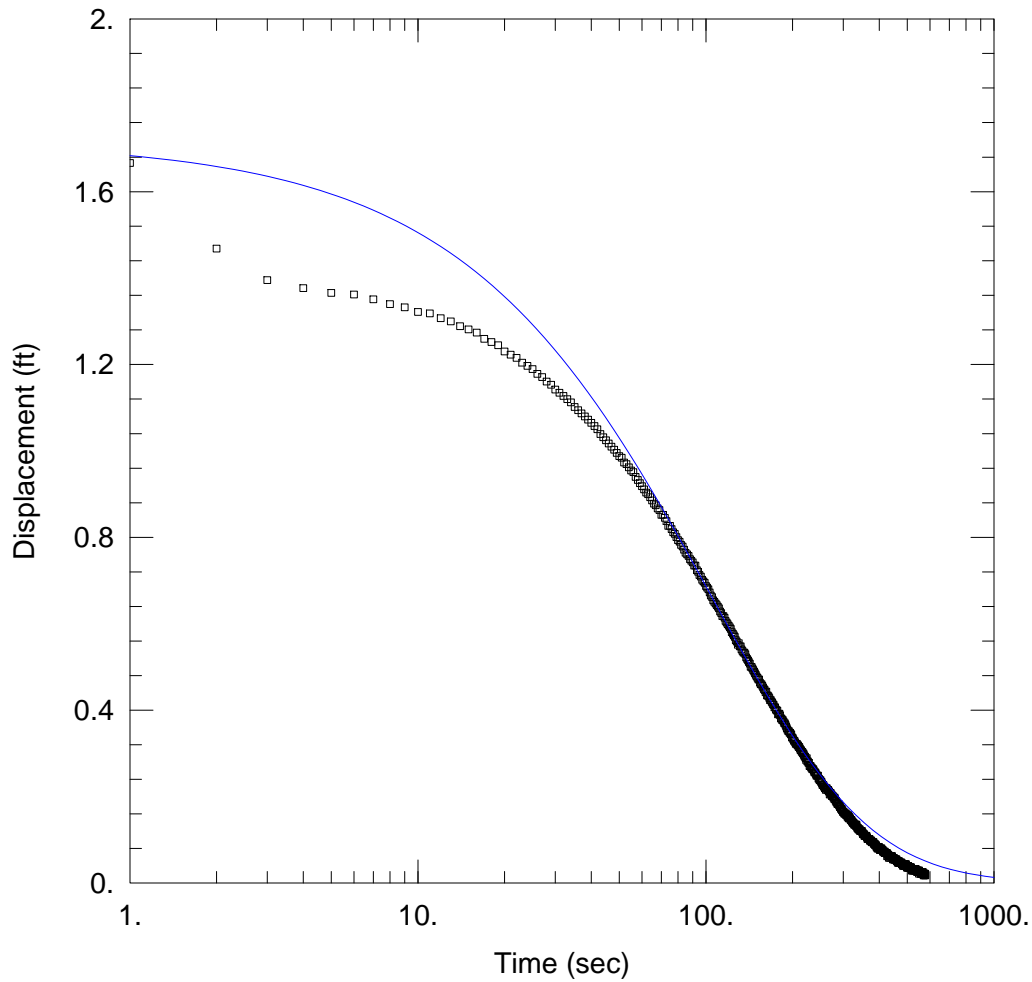
Initial Displacement: 1.72 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 9.124E-6 ft/sec

Solution Method: Hvorslev
 y0 = 1.428 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_5F_KGS.aqt
 Date: 10/19/18

Time: 15:48:49

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

WELL DATA (RMD-1)

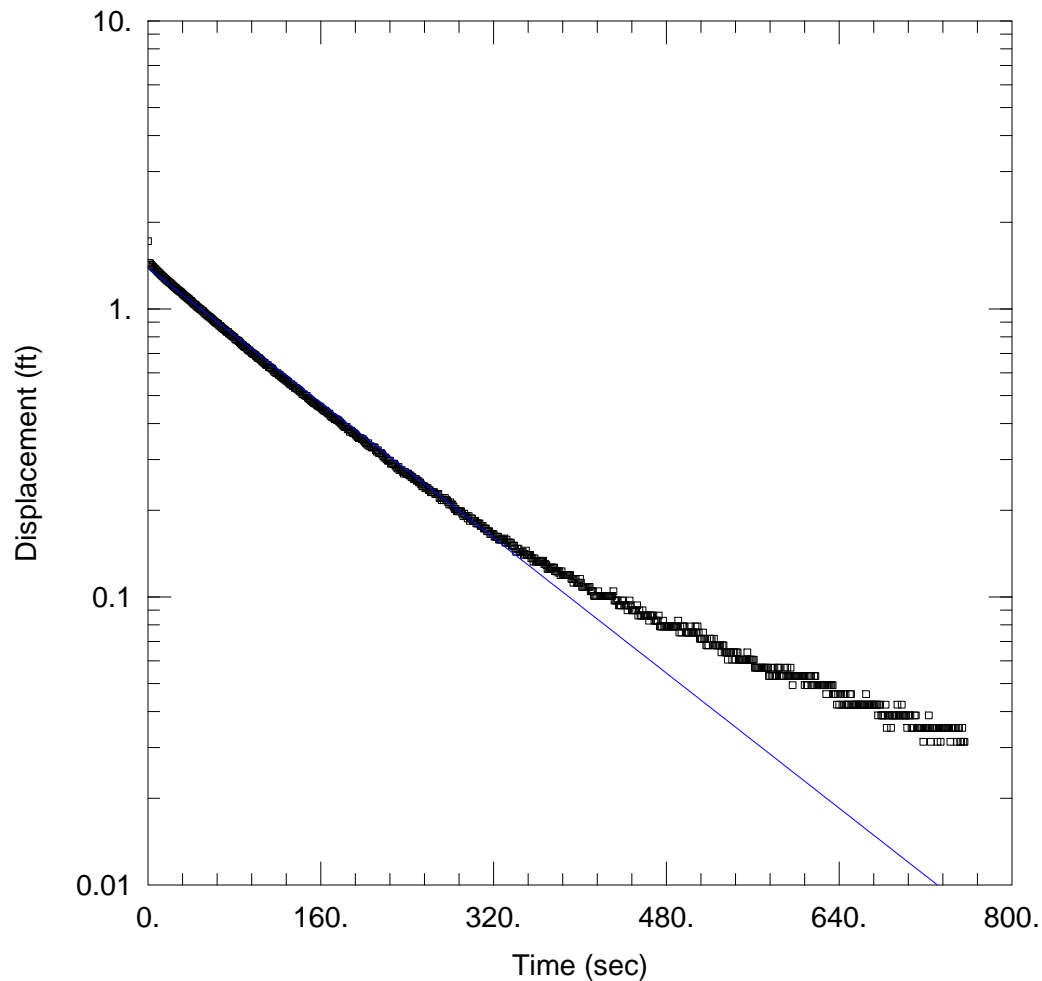
Initial Displacement: 1.72 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 8.336E-6 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 2.204E-5 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_BR.aqt
 Date: 10/19/18

Time: 10:56:30

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-1)

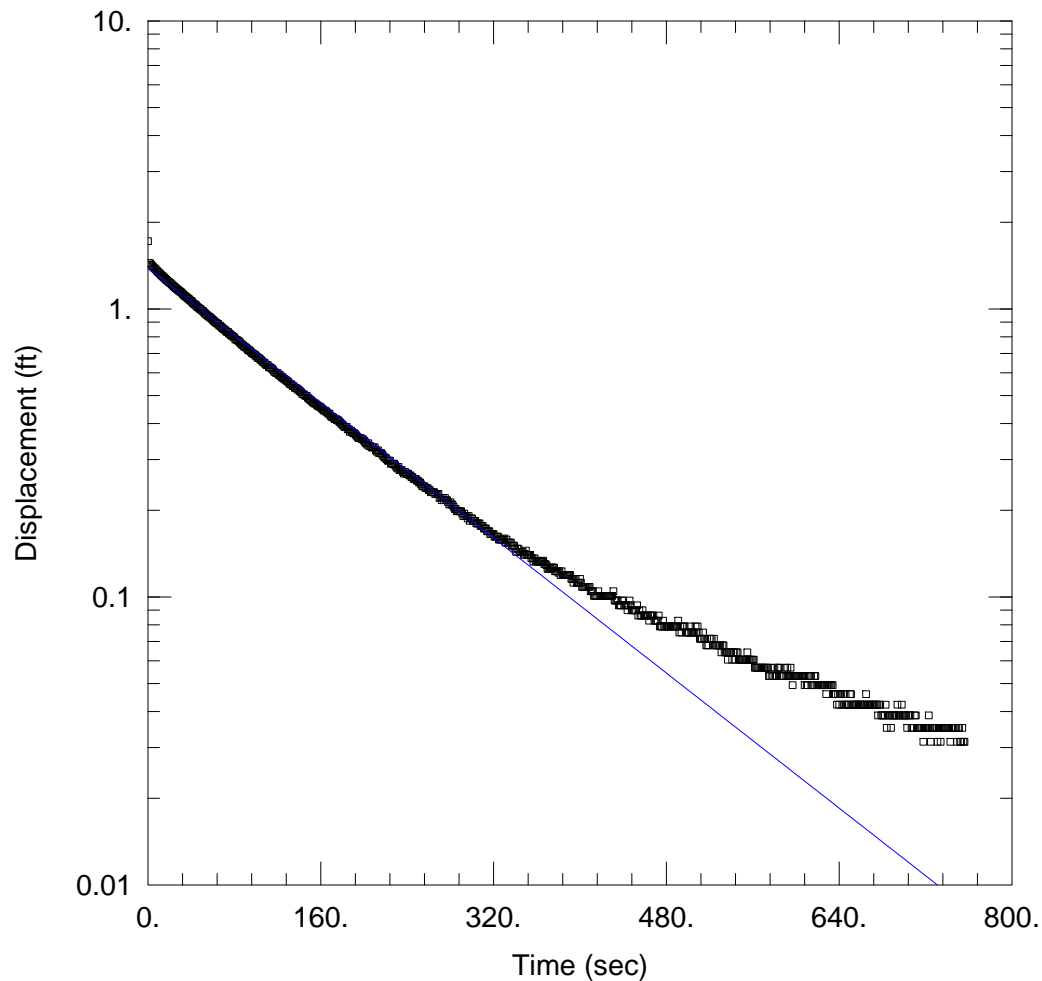
Initial Displacement: 1.72 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 6.405E-6 ft/sec

Solution Method: Bower-Rice
 y0 = 1.389 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1_6R_HV.aqt
 Date: 10/19/18

Time: 14:18:02

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-1)

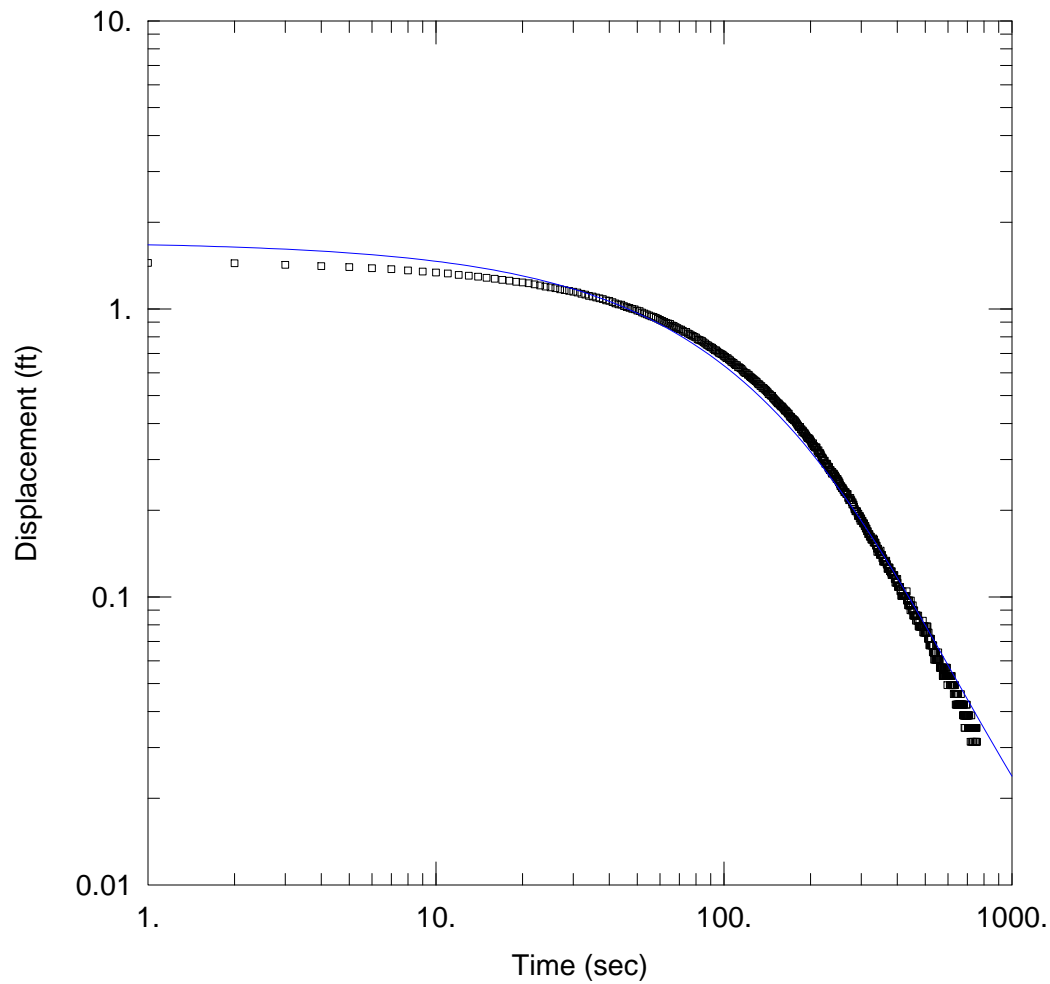
Initial Displacement: 1.72 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 8.495E-6 ft/sec

Solution Method: Hvorslev
 y0 = 1.389 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-1.aqt
 Date: 10/19/18

Time: 10:55:29

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-1
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 29.83 ft

WELL DATA (RMD-1)

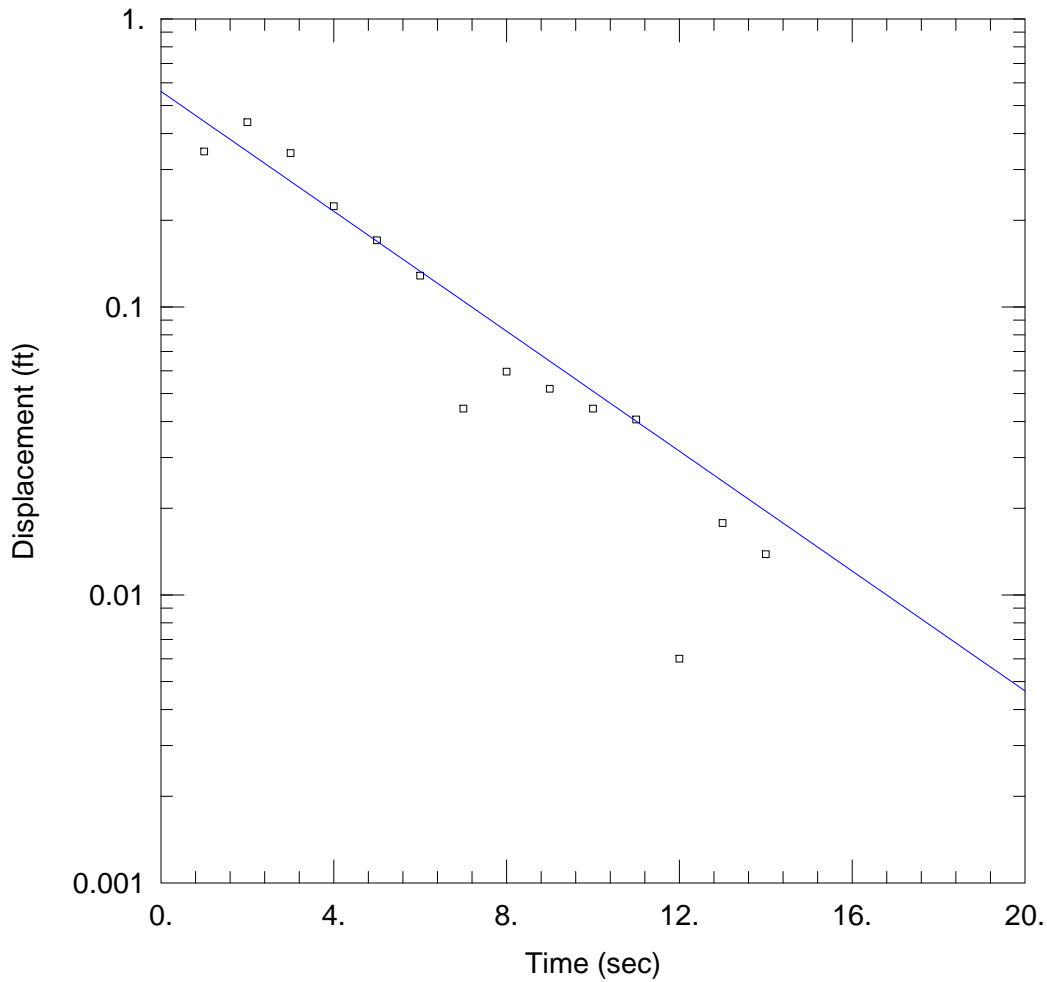
Initial Displacement: 1.72 ft
 Total Well Penetration Depth: 29.83 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 29.83 ft
 Screen Length: 15. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 7.742E-6 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 8.749E-5 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-1F.aqt
 Date: 11/12/18

Time: 15:15:03

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-4)

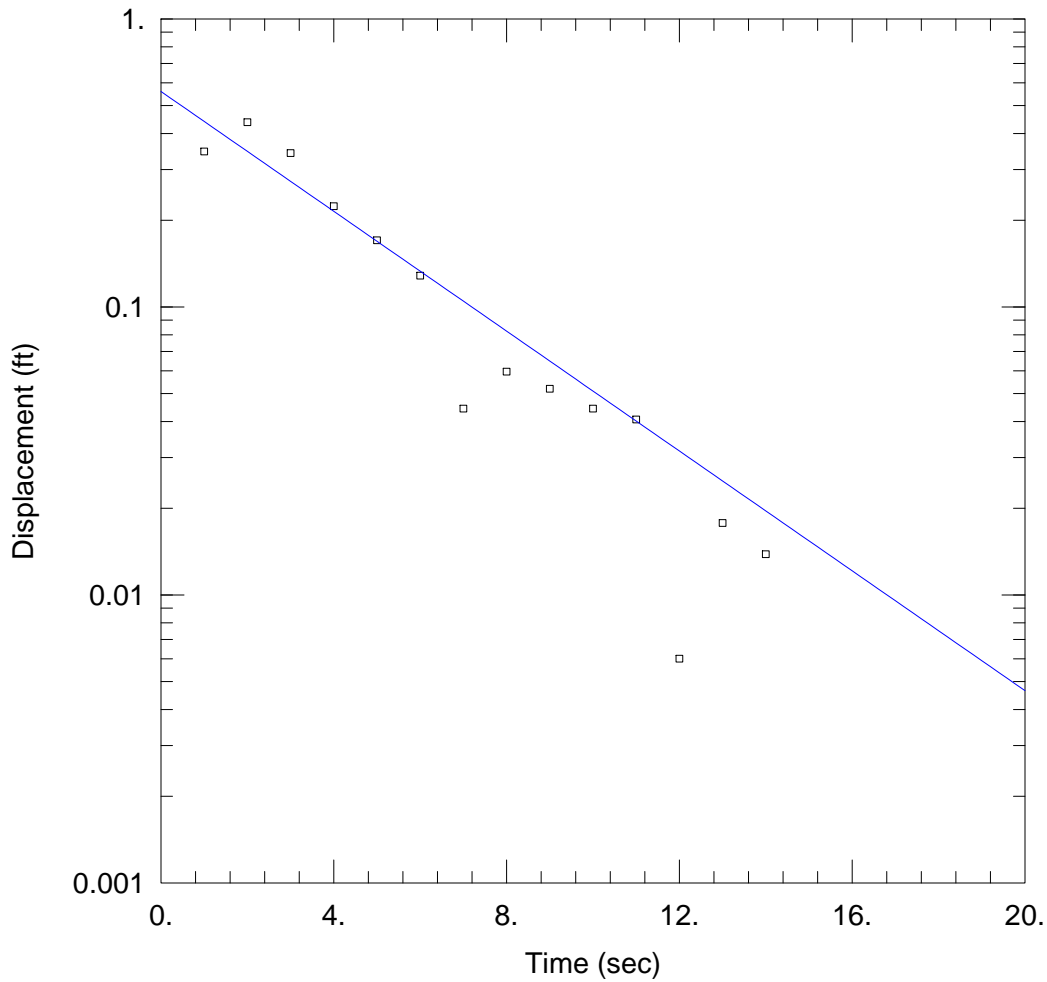
Initial Displacement: 1.344 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0001629 ft/sec

Solution Method: Bouwer-Rice
 y0 = 0.56 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-1F.aqt
 Date: 11/12/18

Time: 15:15:38

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-4)

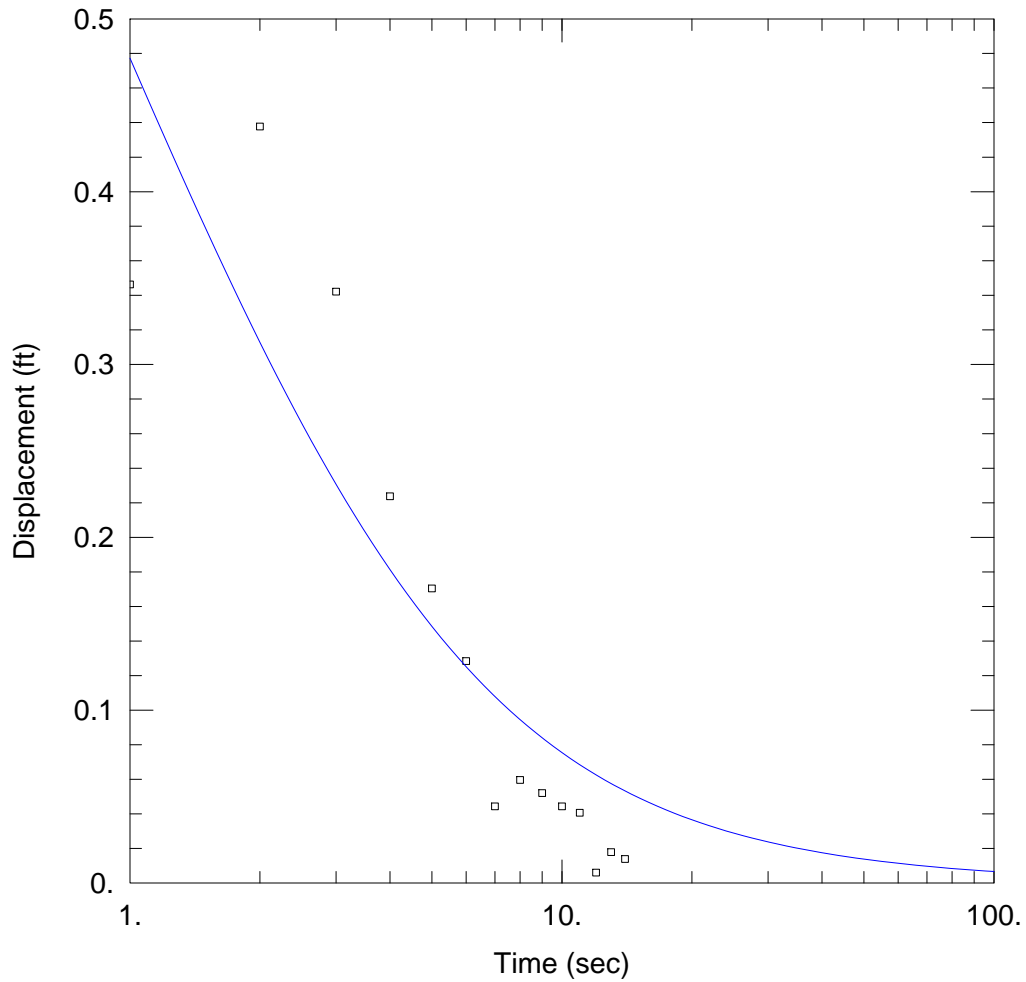
Initial Displacement: 1.344 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0002093 ft/sec

Solution Method: Hvorslev
 y0 = 0.5598 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-1F.aqt
 Date: 11/12/18

Time: 15:16:05

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

WELL DATA (RMD-4)

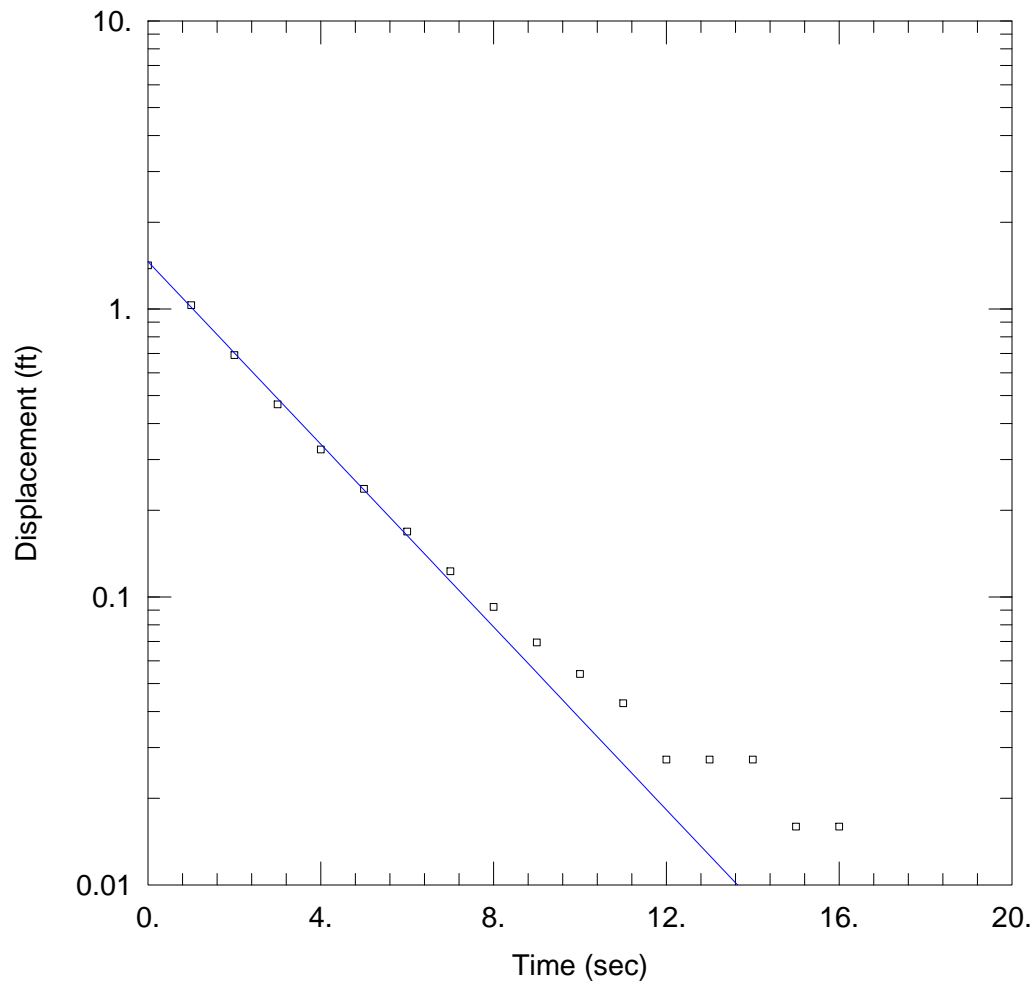
Initial Displacement: 1.344 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.000166 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.001932 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-2R.aqt
 Date: 11/12/18

Time: 15:14:06

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-4)

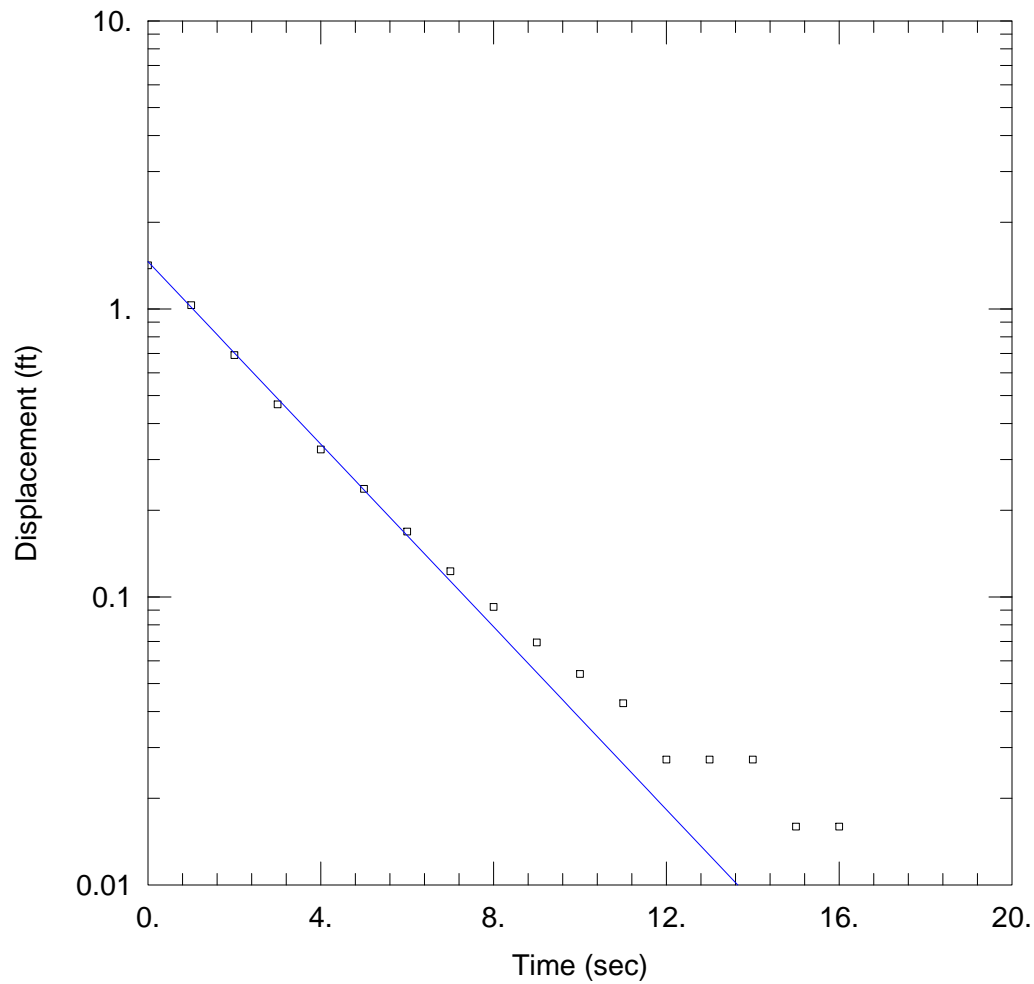
Initial Displacement: 1.417 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0002483 ft/sec

Solution Method: Bower-Rice
 y0 = 1.46 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-2R.aqt
 Date: 11/12/18

Time: 15:13:46

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-4)

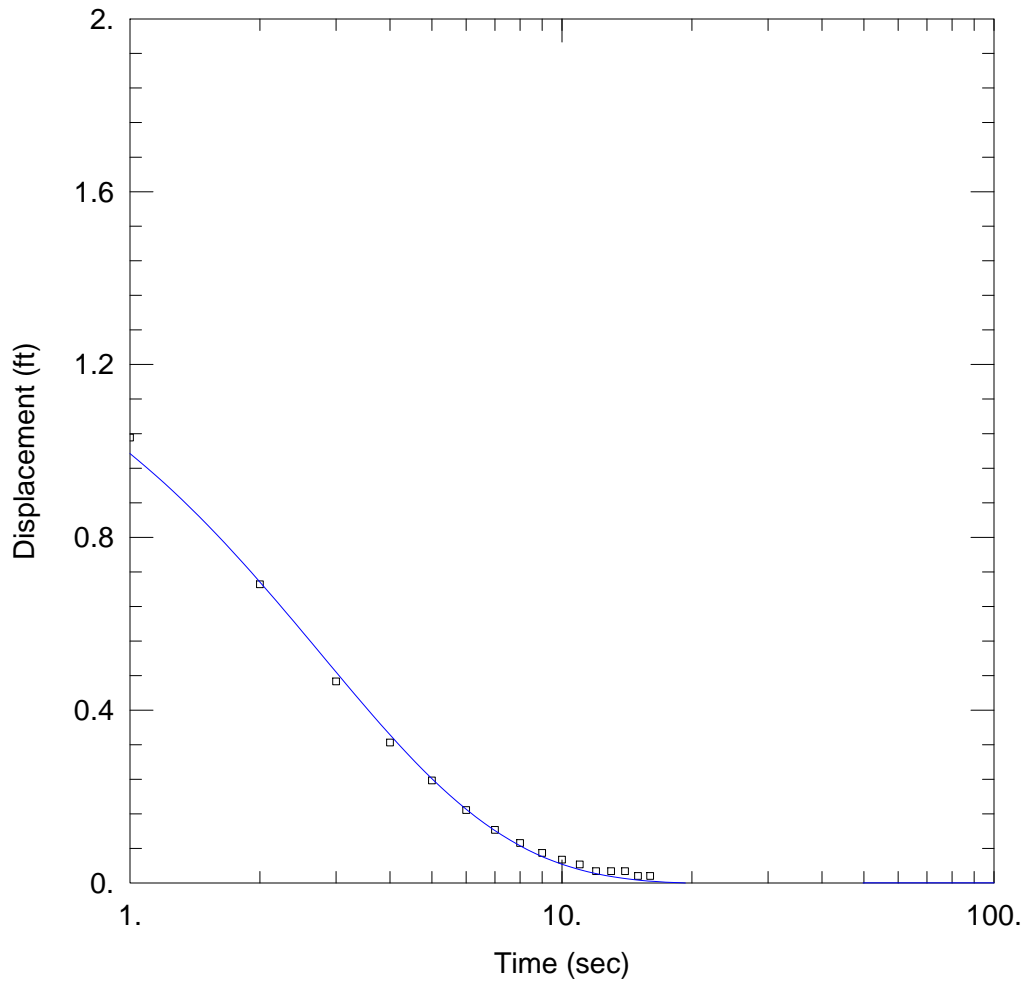
Initial Displacement: 1.417 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.000319 ft/sec

Solution Method: Hvorslev
 y0 = 1.459 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-2R.aqt
 Date: 11/12/18

Time: 15:13:26

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

WELL DATA (RMD-4)

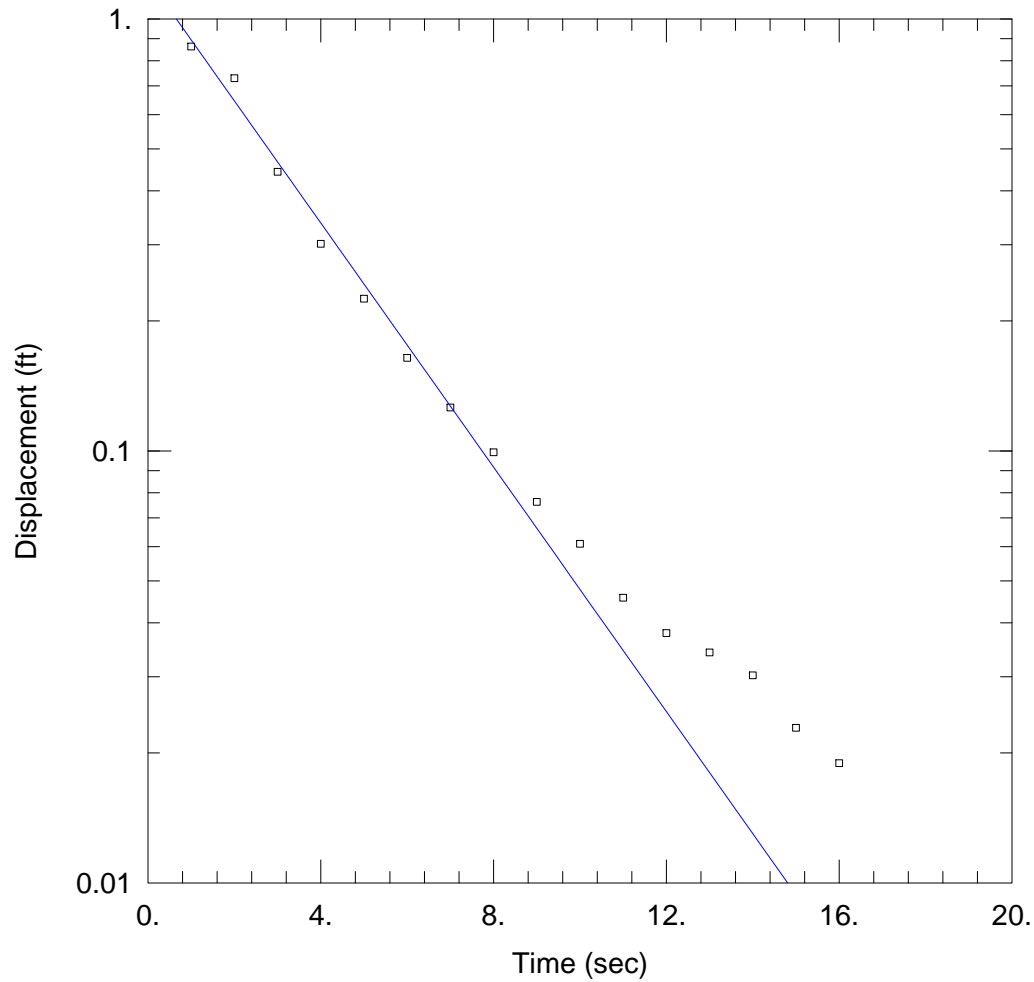
Initial Displacement: 1.417 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0002747 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 1.985E-12 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-3F.aqt
 Date: 11/12/18

Time: 15:08:45

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-4)

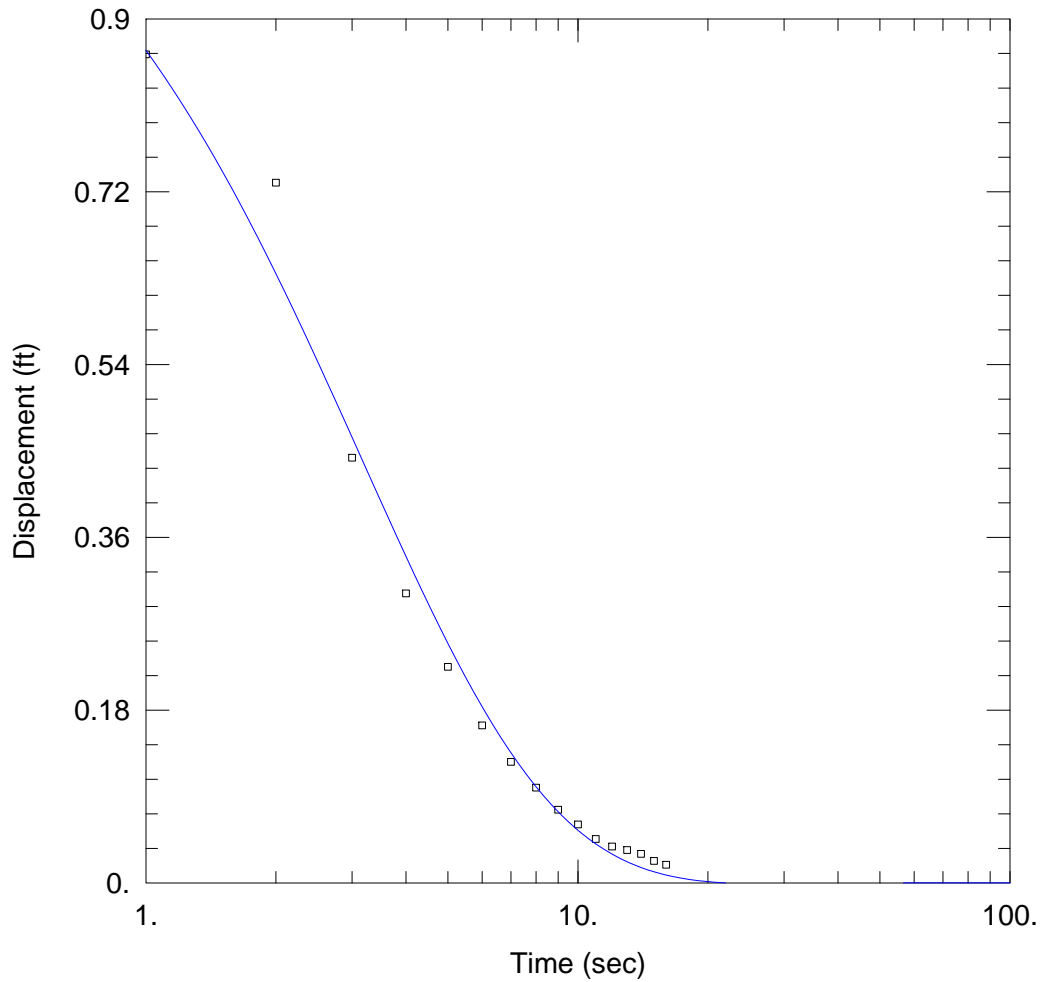
Initial Displacement: 1.184 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0002212 ft/sec

Solution Method: Bower-Rice
 y0 = 1.238 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-3F.aqt
 Date: 11/12/18

Time: 15:09:45

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

WELL DATA (RMD-4)

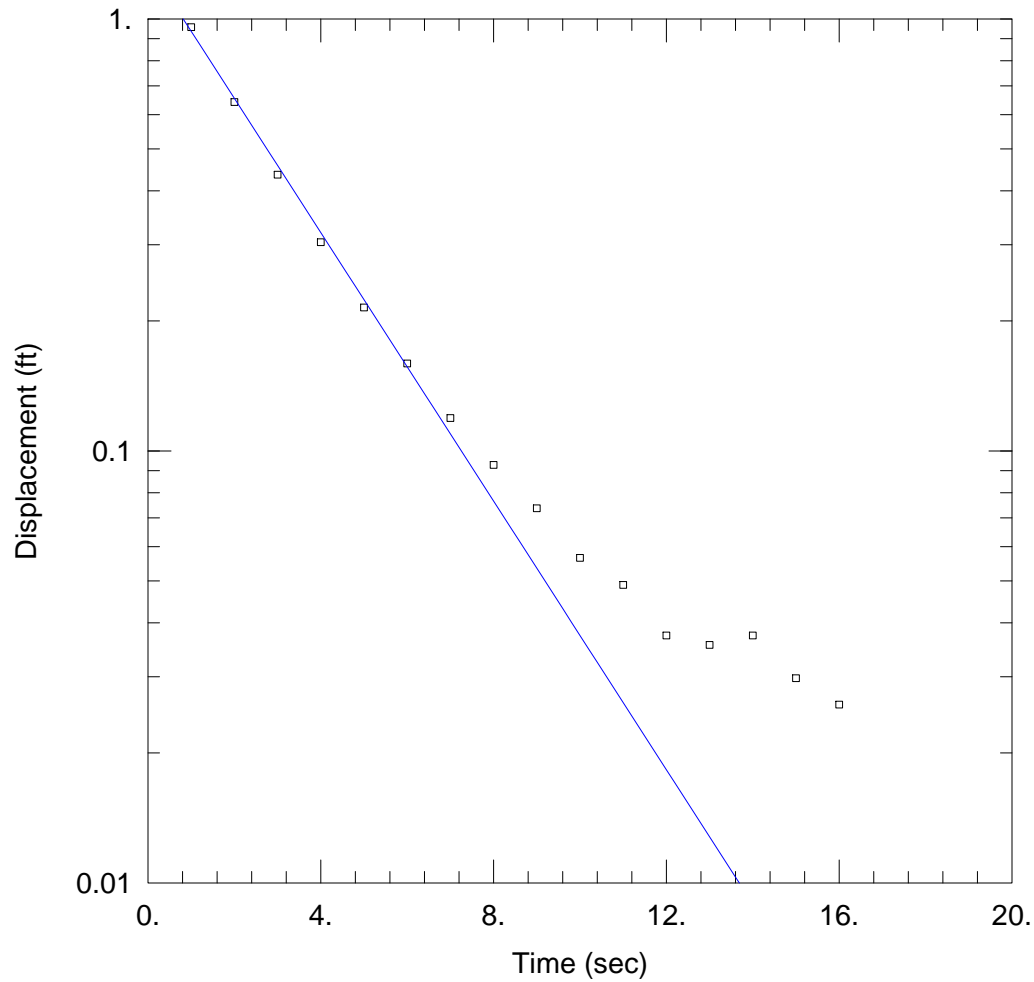
Initial Displacement: 1.184 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0002413 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 1.985E-12 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-4R.aqt
 Date: 11/12/18

Time: 15:05:35

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-4)

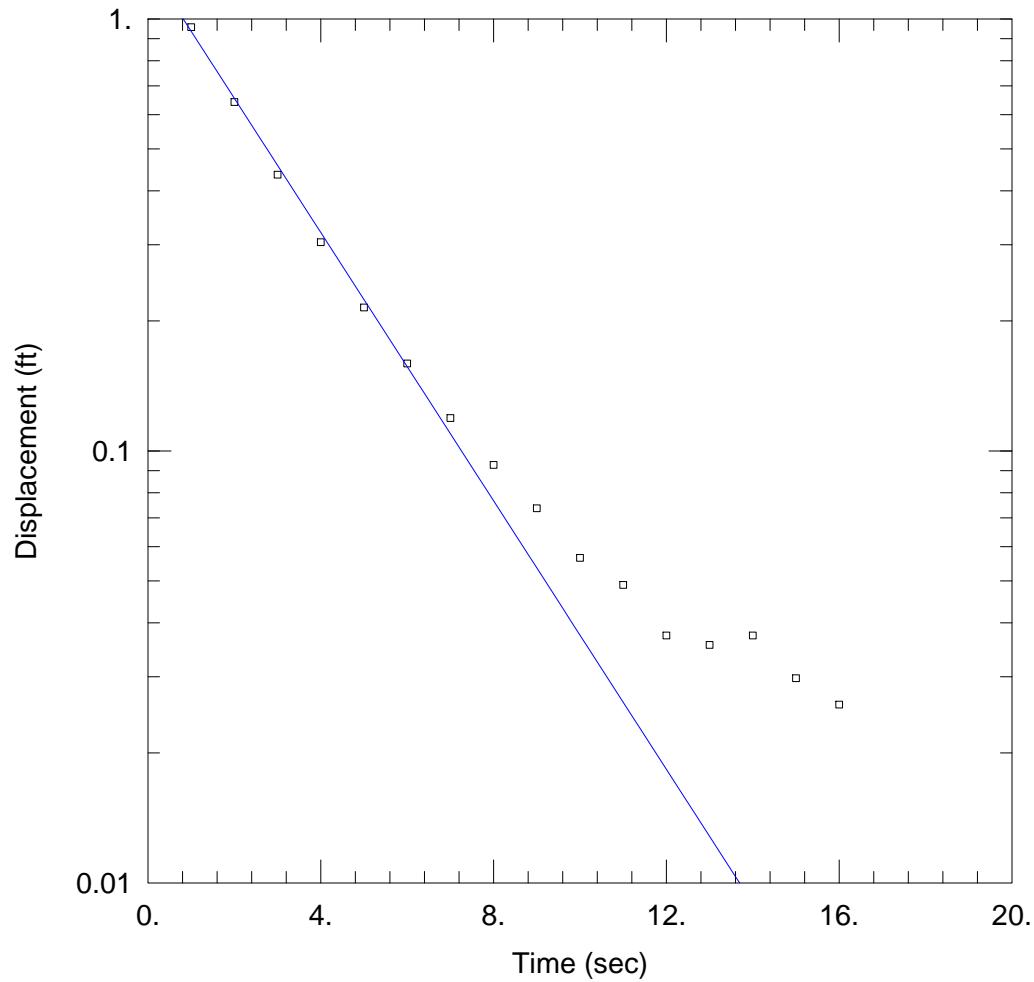
Initial Displacement: 1.368 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0002432 ft/sec

Solution Method: Bower-Rice
 y0 = 1.339 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-4R.aqt
 Date: 11/12/18

Time: 15:05:14

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-4)

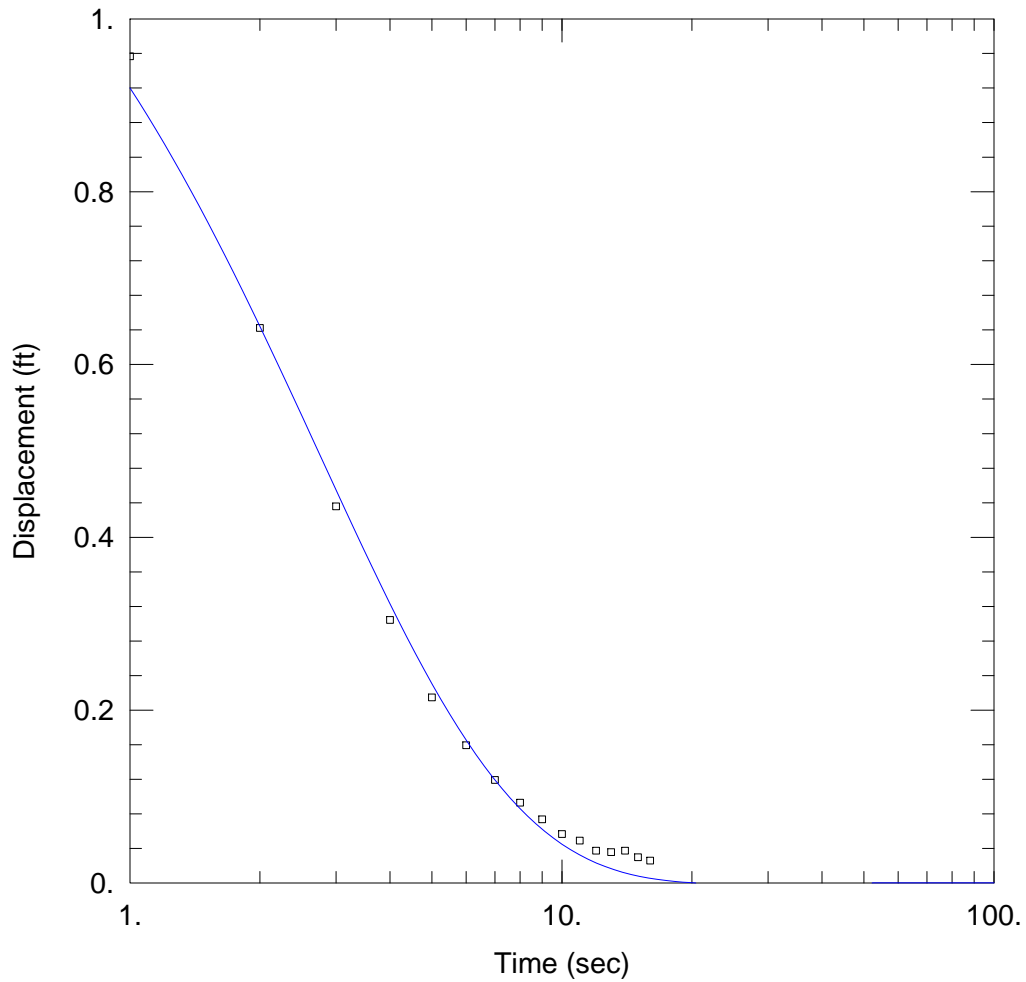
Initial Displacement: 1.368 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0003125 ft/sec

Solution Method: Hvorslev
 y0 = 1.338 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-4R.aqt
 Date: 11/12/18

Time: 15:04:50

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

WELL DATA (RMD-4)

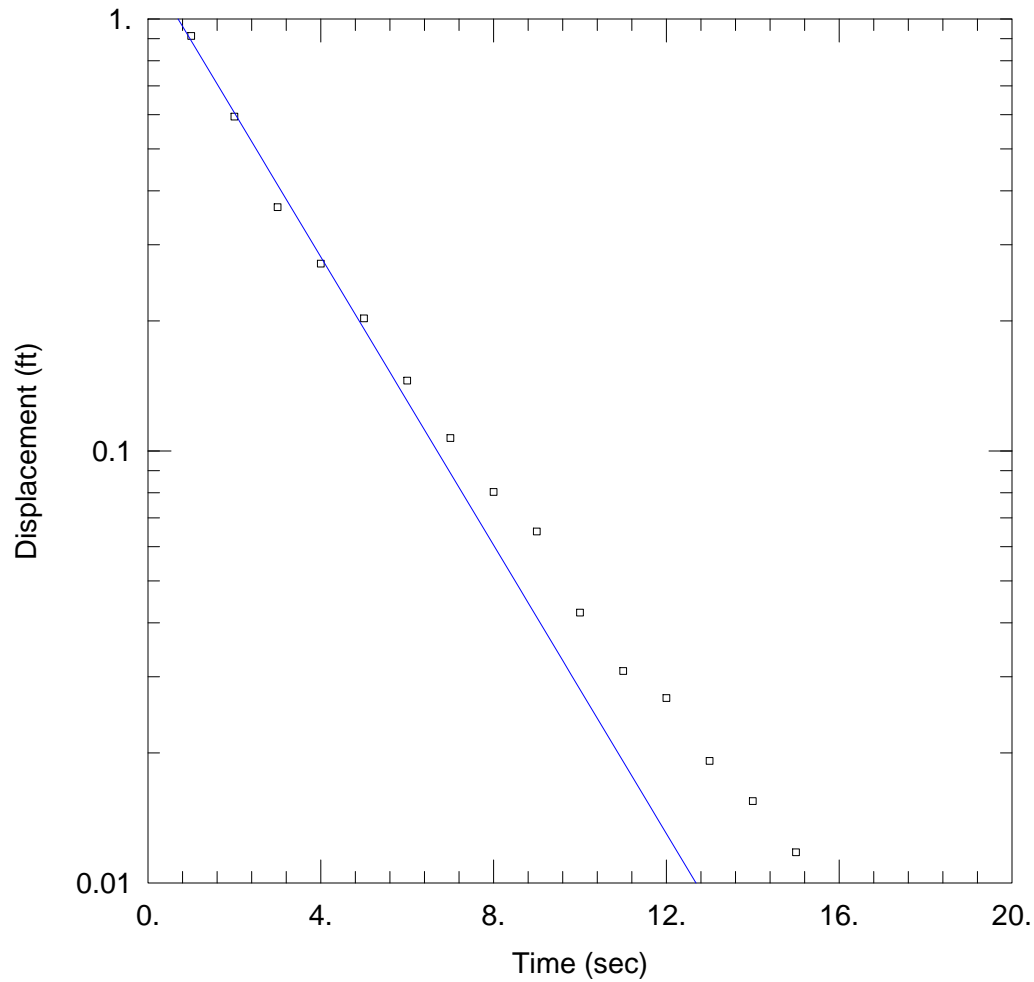
Initial Displacement: 1.368 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0002805 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 5.239E-7 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-5F.aqt
 Date: 11/12/18

Time: 14:56:00

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-4)

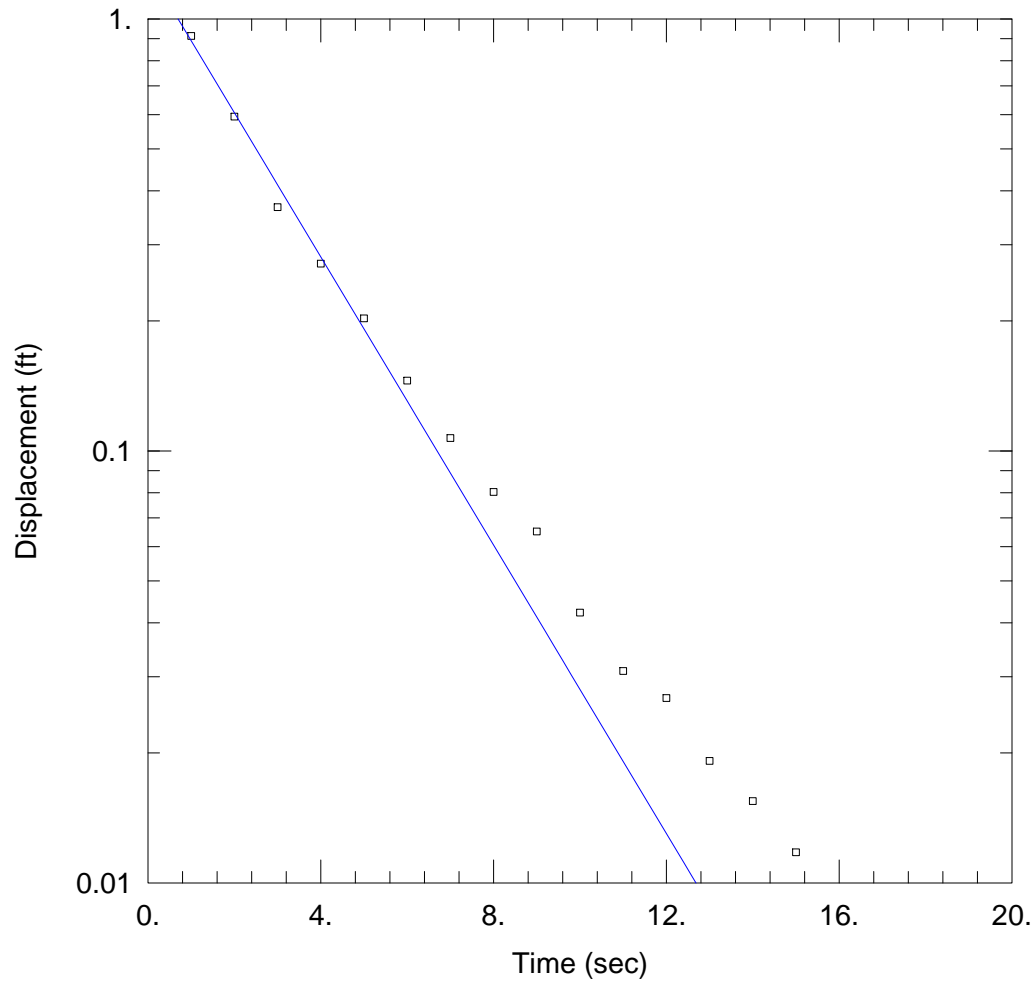
Initial Displacement: 1.368 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0002611 ft/sec

Solution Method: Bower-Rice
 y0 = 1.307 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-5F.aqt
 Date: 11/12/18

Time: 14:56:22

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-4)

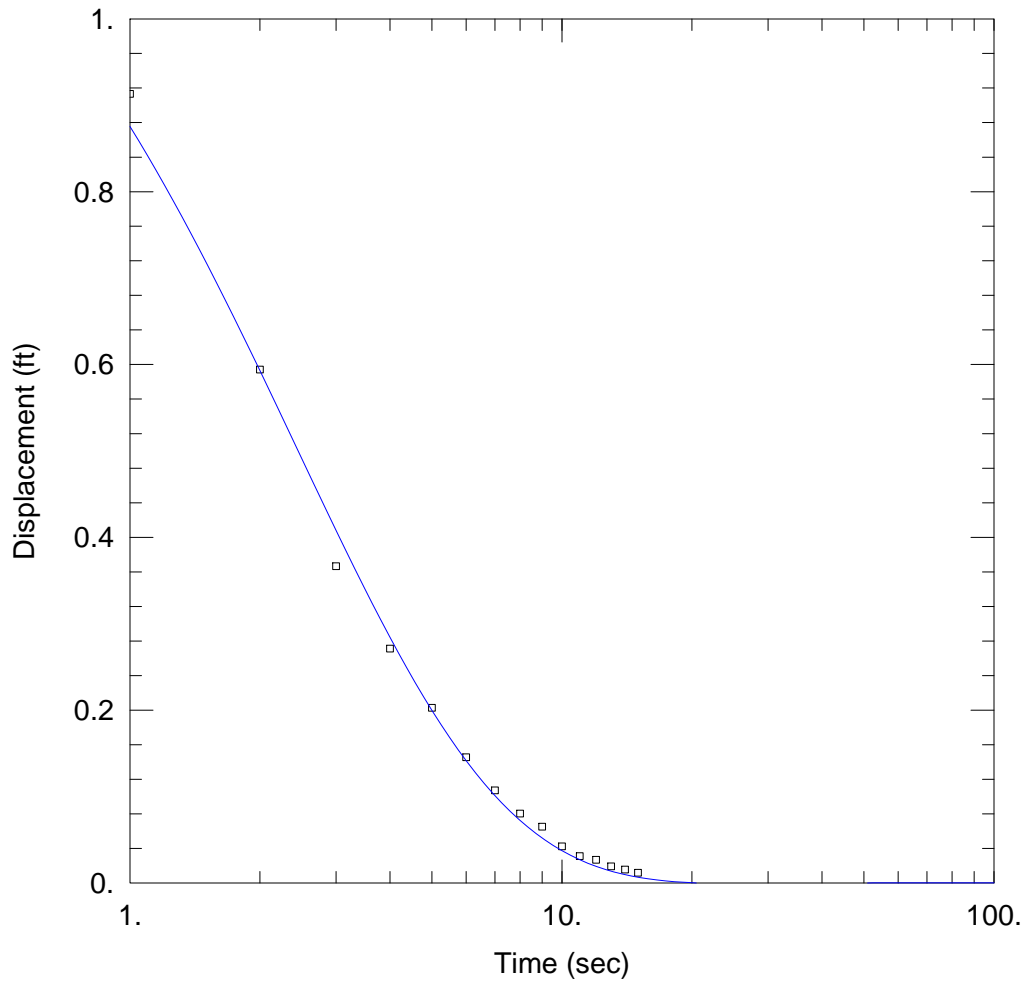
Initial Displacement: 1.368 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0003357 ft/sec

Solution Method: Hvorslev
 y0 = 1.307 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-5F.aqt
 Date: 11/12/18

Time: 14:56:46

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

WELL DATA (RMD-4)

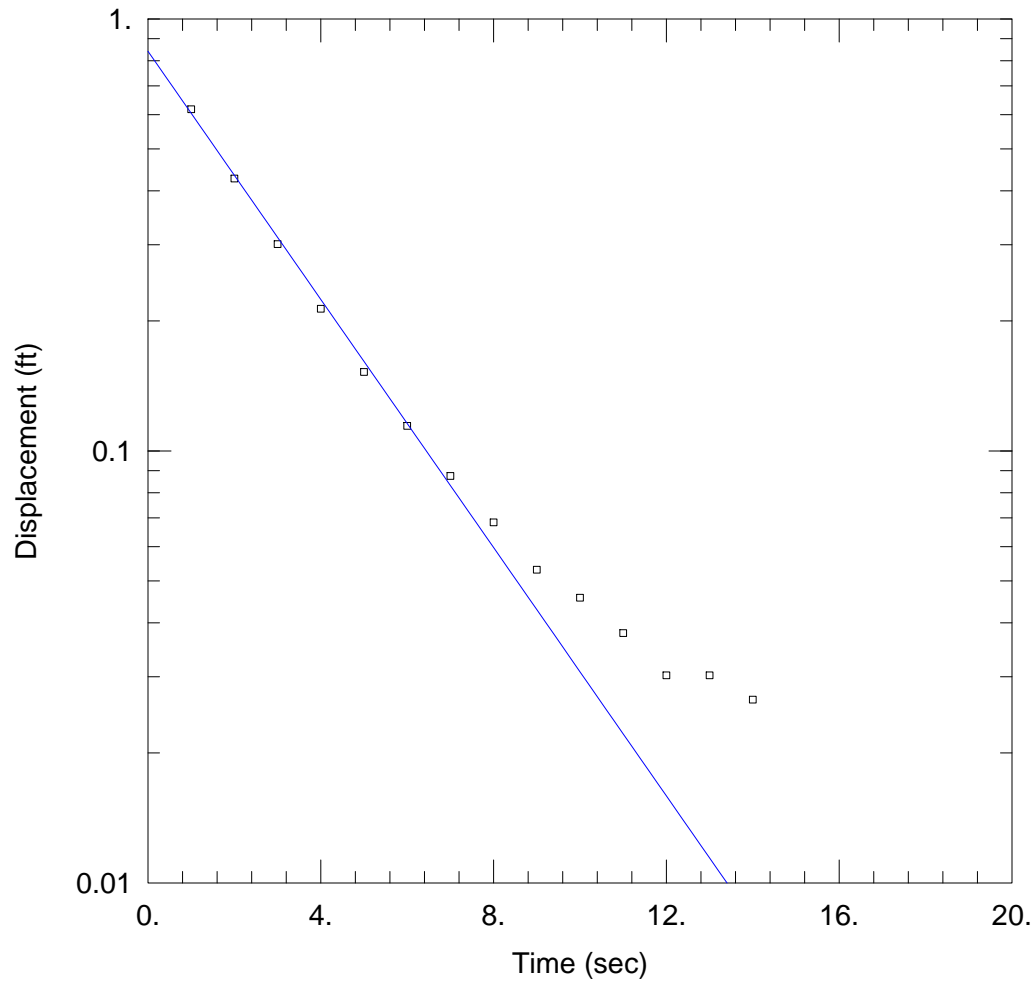
Initial Displacement: 1.368 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0003055 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 9.38E-7 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-6R.aqt
 Date: 11/12/18

Time: 14:58:13

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-4)

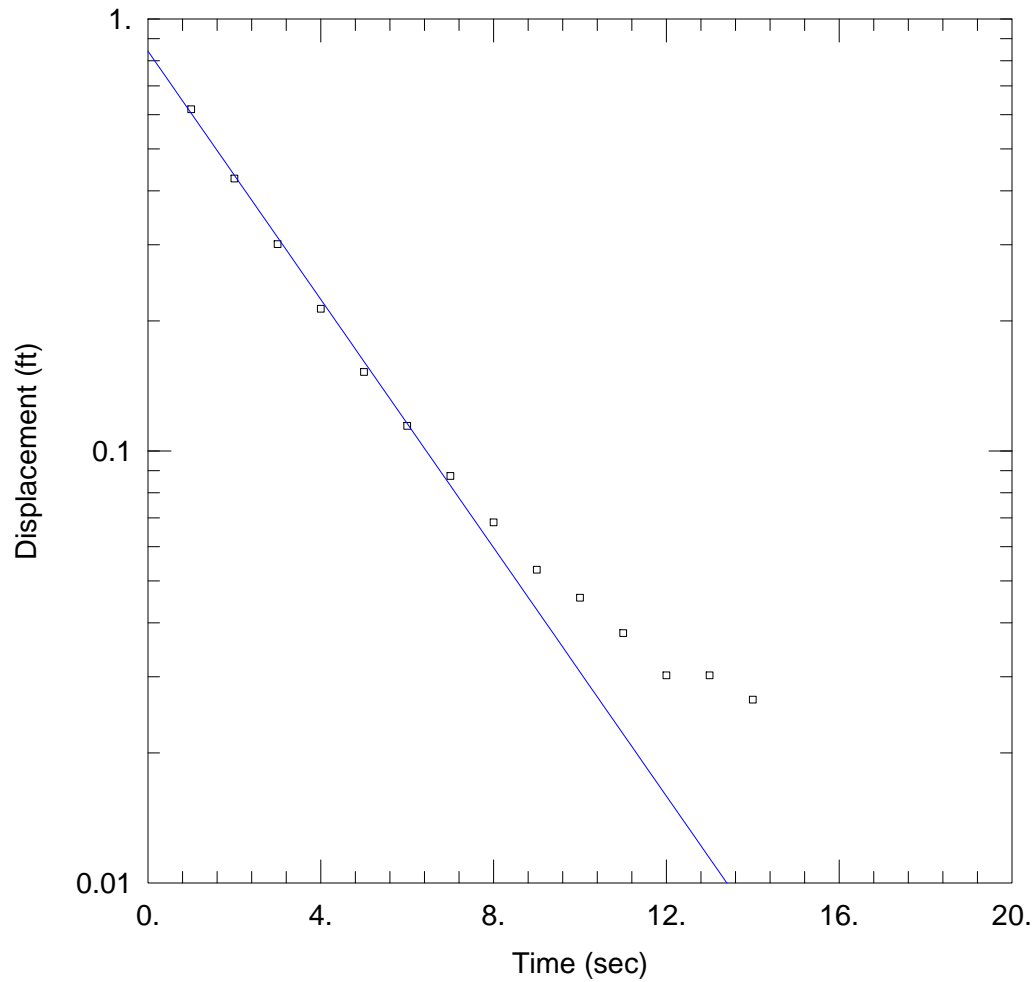
Initial Displacement: 1.121 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0002248 ft/sec

Solution Method: Bower-Rice
 y0 = 0.8417 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-6R.aqt
 Date: 11/12/18

Time: 14:58:30

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-4)

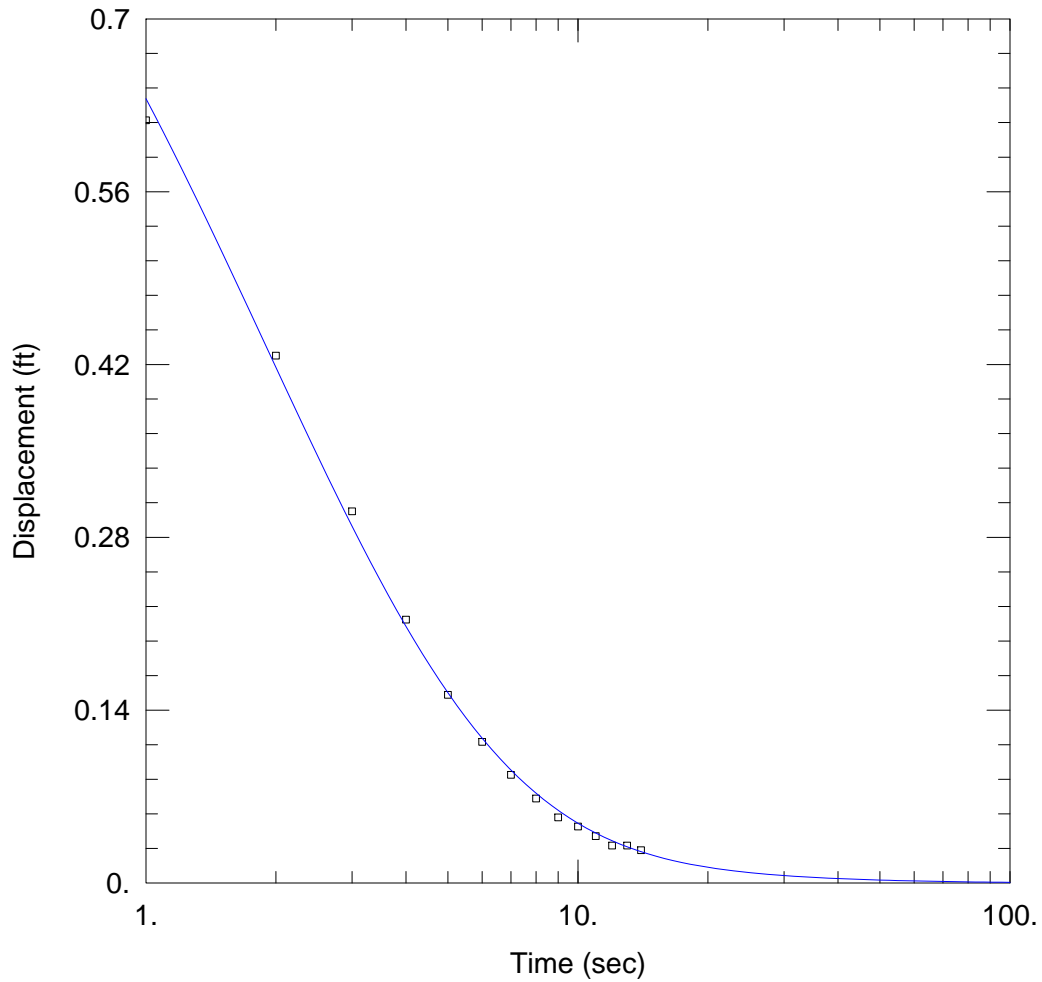
Initial Displacement: 1.121 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0002891 ft/sec

Solution Method: Hvorslev
 y0 = 0.8419 ft



WELL TEST ANALYSIS

Data Set: N:\...\RMD-4-6R.aqt
 Date: 11/12/18

Time: 14:59:01

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: RMD-4
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 50.37 ft

WELL DATA (RMD-4)

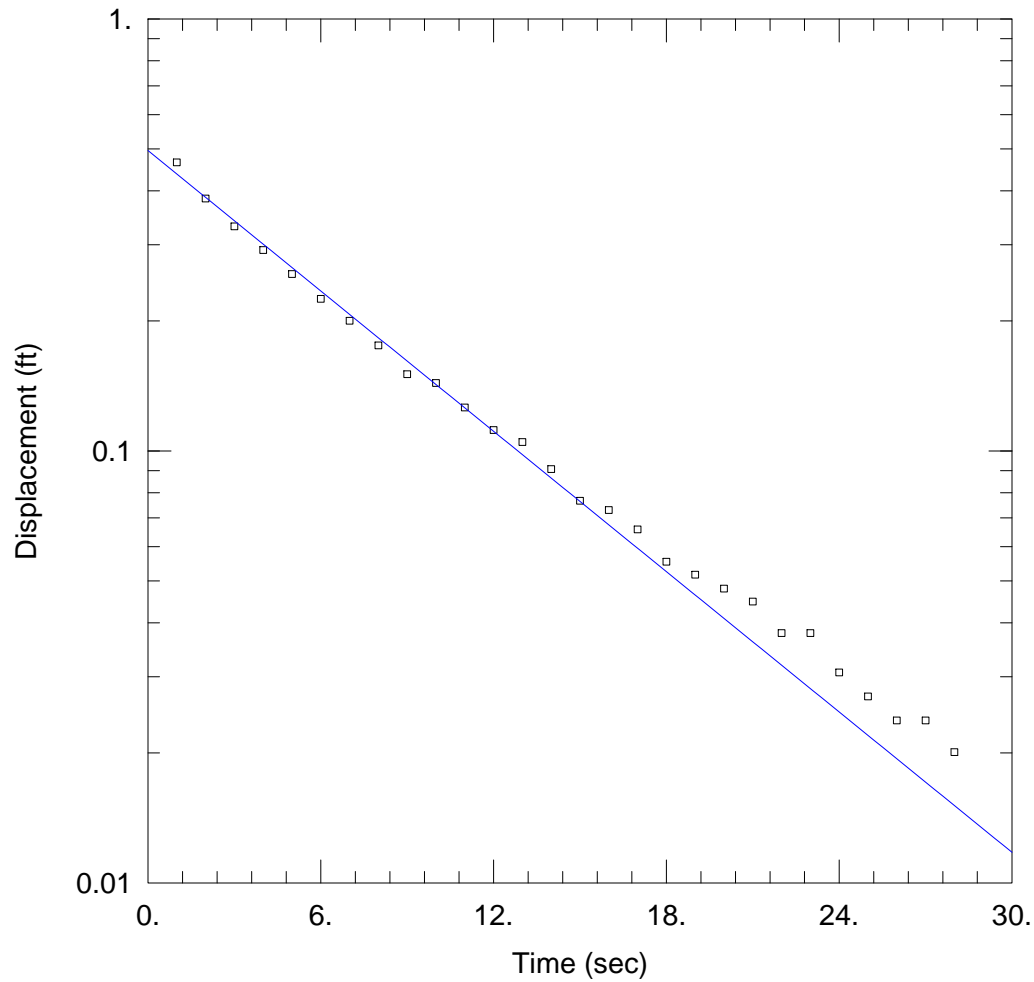
Initial Displacement: 1.121 ft
 Total Well Penetration Depth: 50.37 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 50.37 ft
 Screen Length: 20. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0002856 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 1.514E-5 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_1F.aqt
 Date: 11/12/18

Time: 15:28:22

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

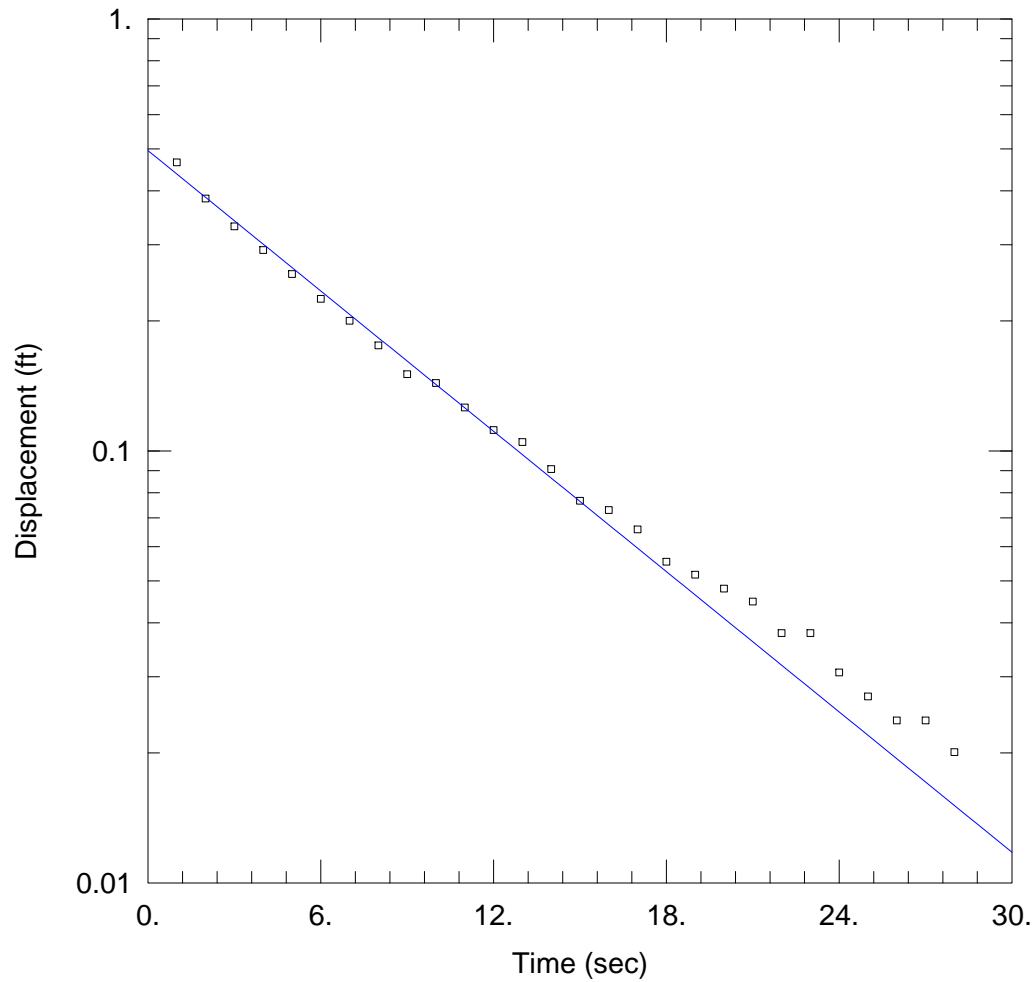
Saturated Thickness: 14.51 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-5)

Initial Displacement: 1.095 ft Static Water Column Height: 14.51 ft
 Total Well Penetration Depth: 14.51 ft Screen Length: 10. ft
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 0.0001308 ft/sec y0 = 0.4957 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_1F.aqt
 Date: 11/12/18

Time: 15:28:06

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

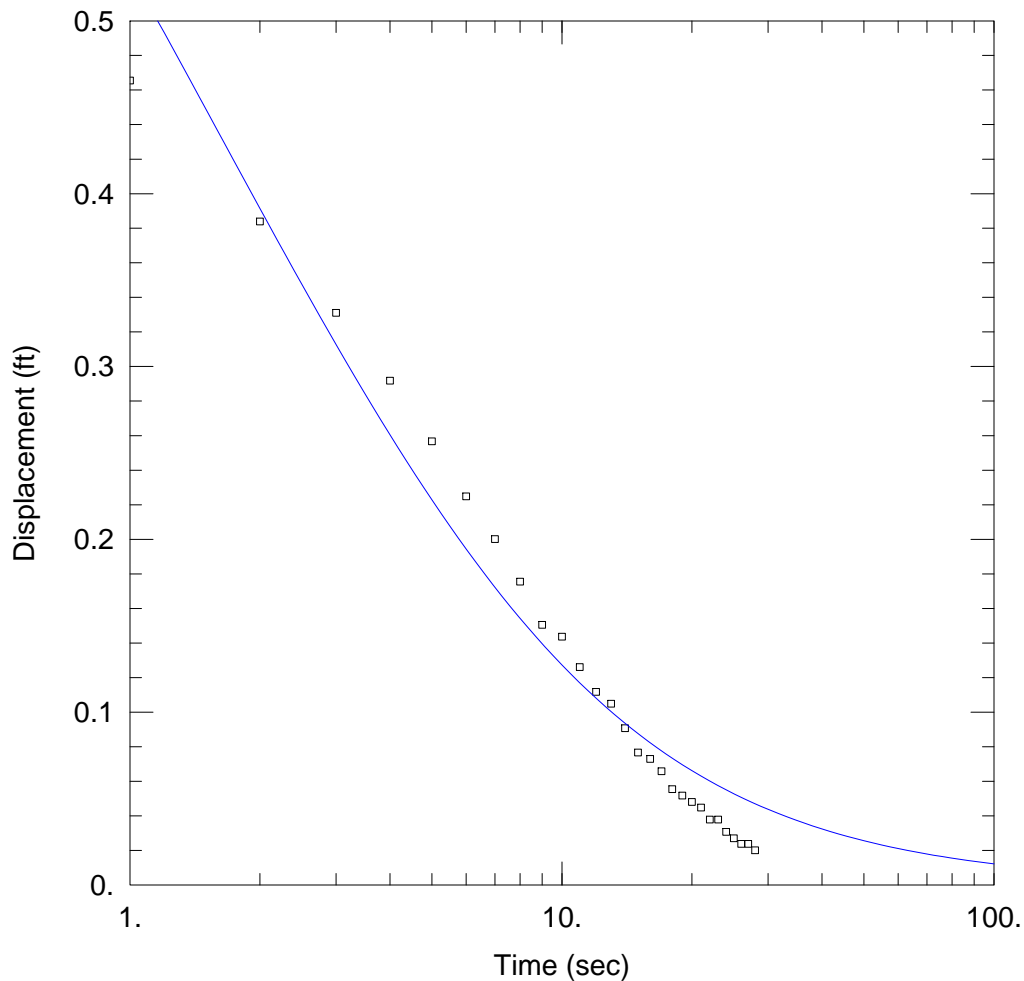
Saturated Thickness: 14.51 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-5)

Initial Displacement: 1.095 ft Static Water Column Height: 14.51 ft
 Total Well Penetration Depth: 14.51 ft Screen Length: 10. ft
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 0.0001882 ft/sec y0 = 0.4956 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_1F.aqt
 Date: 11/12/18

Time: 15:27:47

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 14.51 ft

WELL DATA (WMW-5)

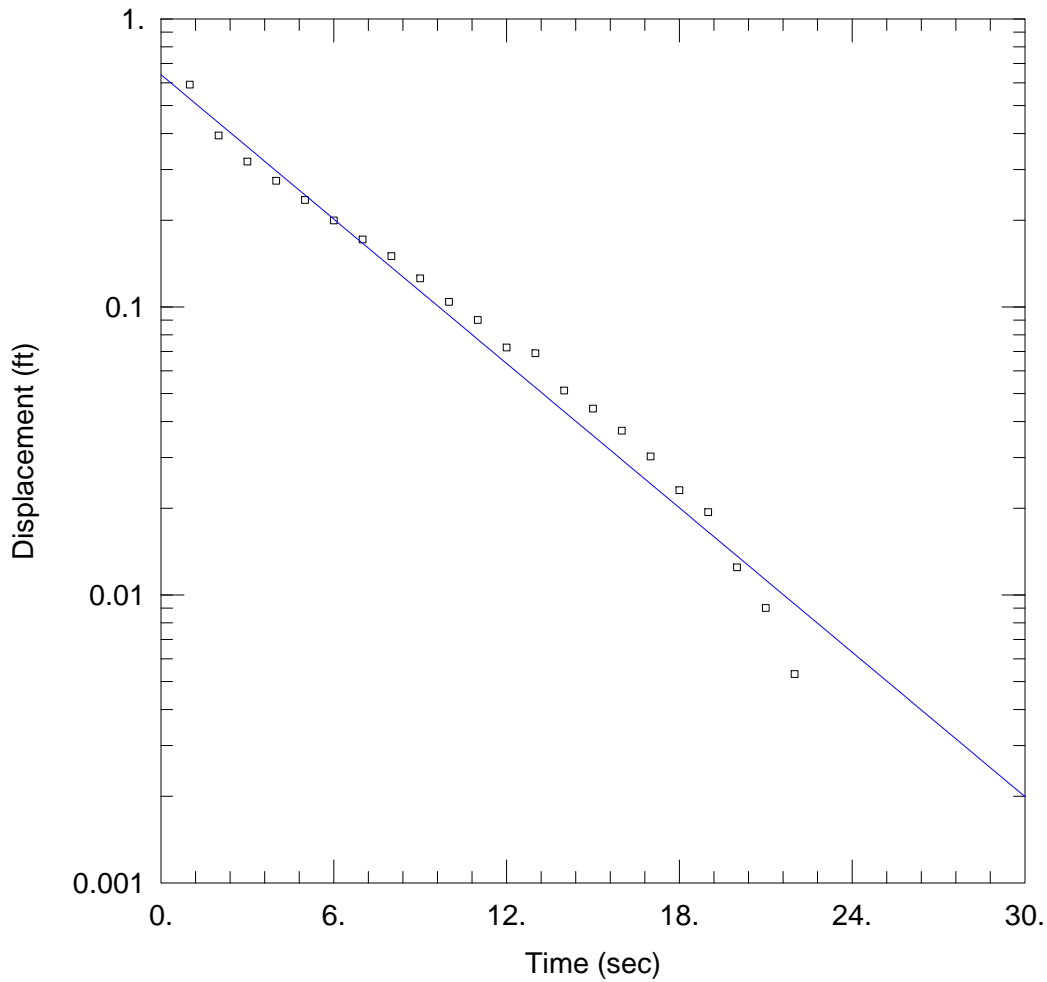
Initial Displacement: 1.095 ft
 Total Well Penetration Depth: 14.51 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 14.51 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0001455 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.004829 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_2R.aqt
 Date: 11/12/18

Time: 15:29:55

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

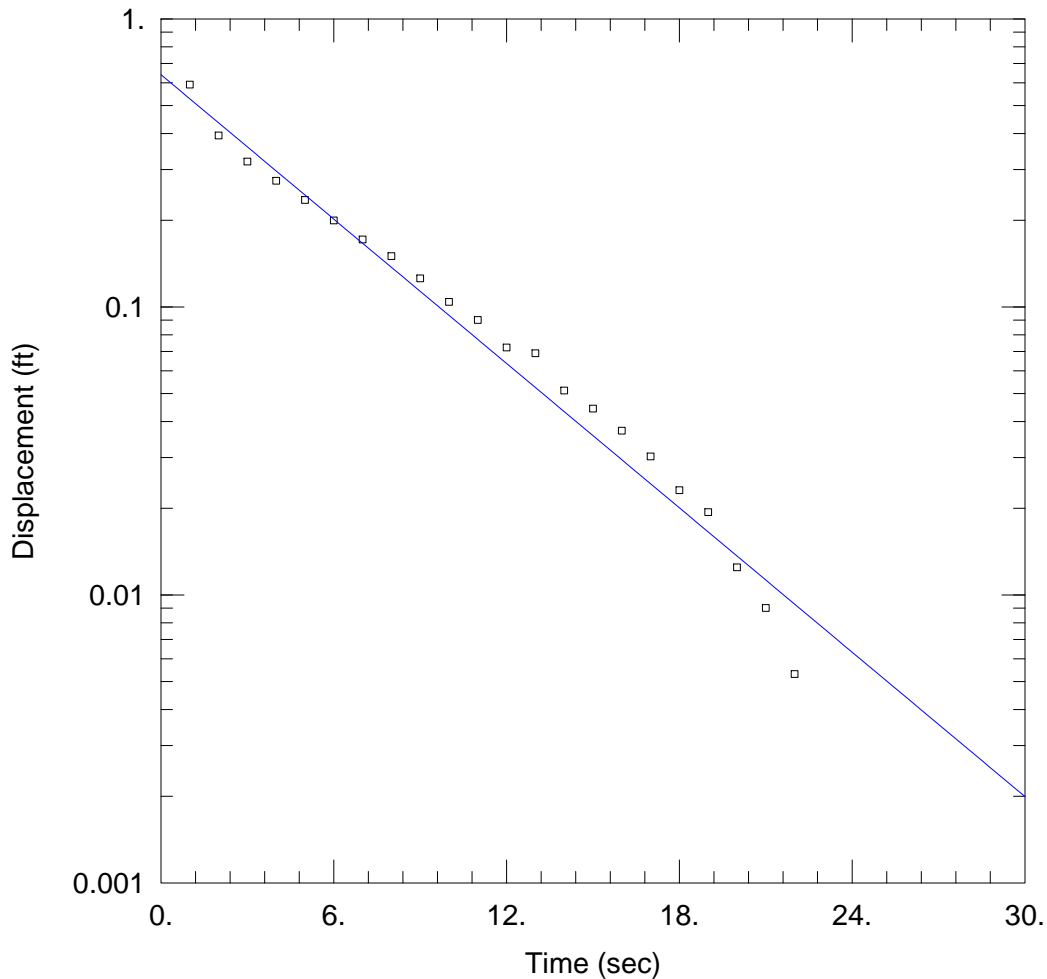
Saturated Thickness: 14.51 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-5)

Initial Displacement: 2.245 ft Static Water Column Height: 14.51 ft
 Total Well Penetration Depth: 14.51 ft Screen Length: 10. ft
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bower-Rice
 K = 0.0002019 ft/sec y0 = 0.6402 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_2R.aqt
 Date: 11/12/18

Time: 15:30:17

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 14.51 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-5)

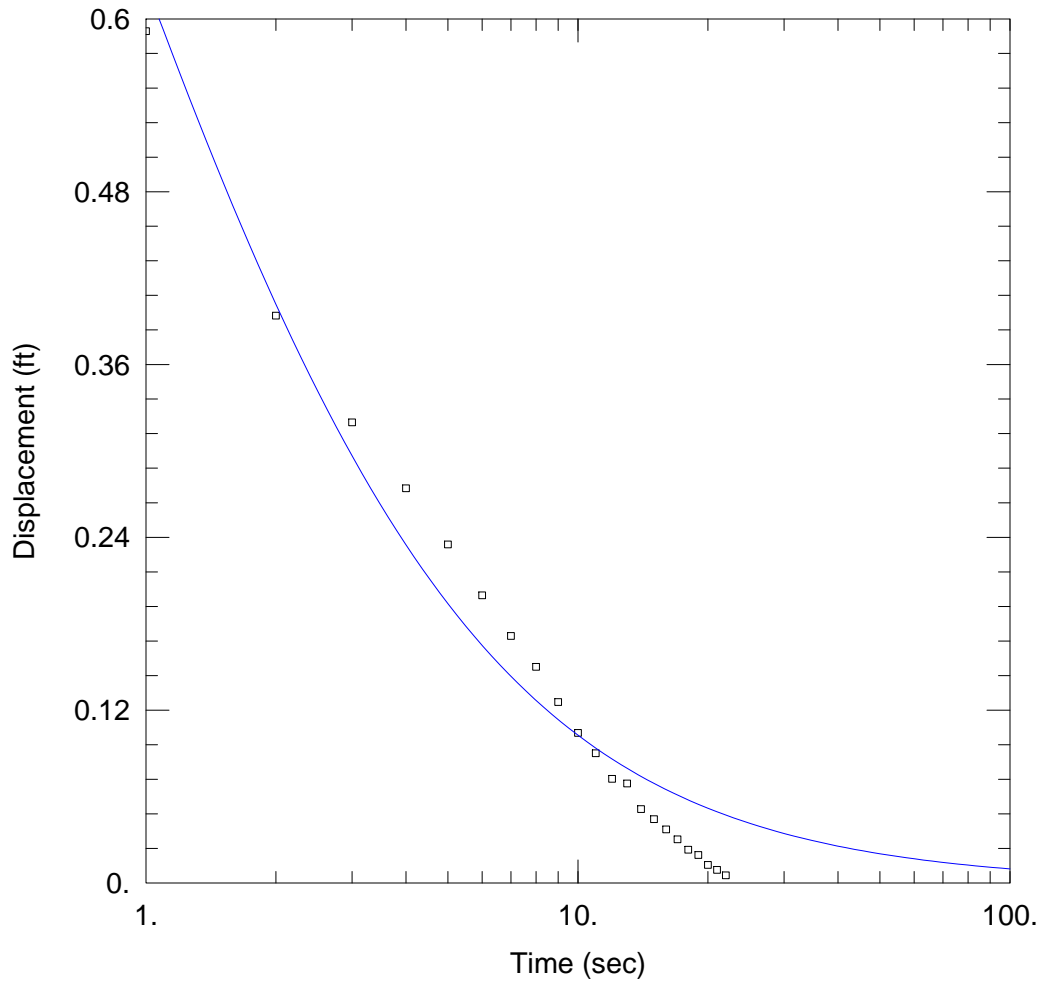
Initial Displacement: 2.245 ft
 Total Well Penetration Depth: 14.51 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 14.51 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0002904 ft/sec

Solution Method: Hvorslev
 y0 = 0.6402 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_2R.aqt
 Date: 11/12/18

Time: 15:30:43

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 14.51 ft

WELL DATA (WMW-5)

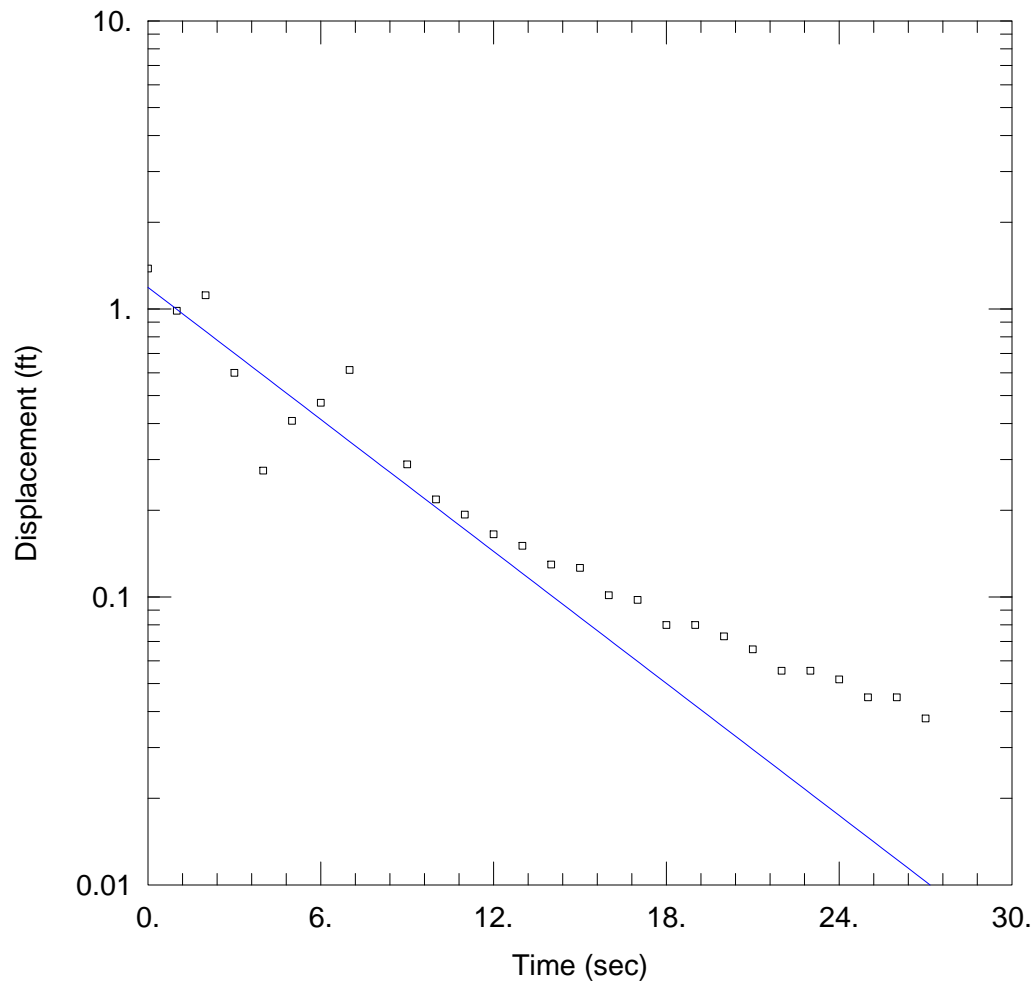
Initial Displacement: 2.245 ft
 Total Well Penetration Depth: 14.51 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 14.51 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0003517 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.00811 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_3F.aqt
 Date: 11/12/18

Time: 15:31:49

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 14.51 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-5)

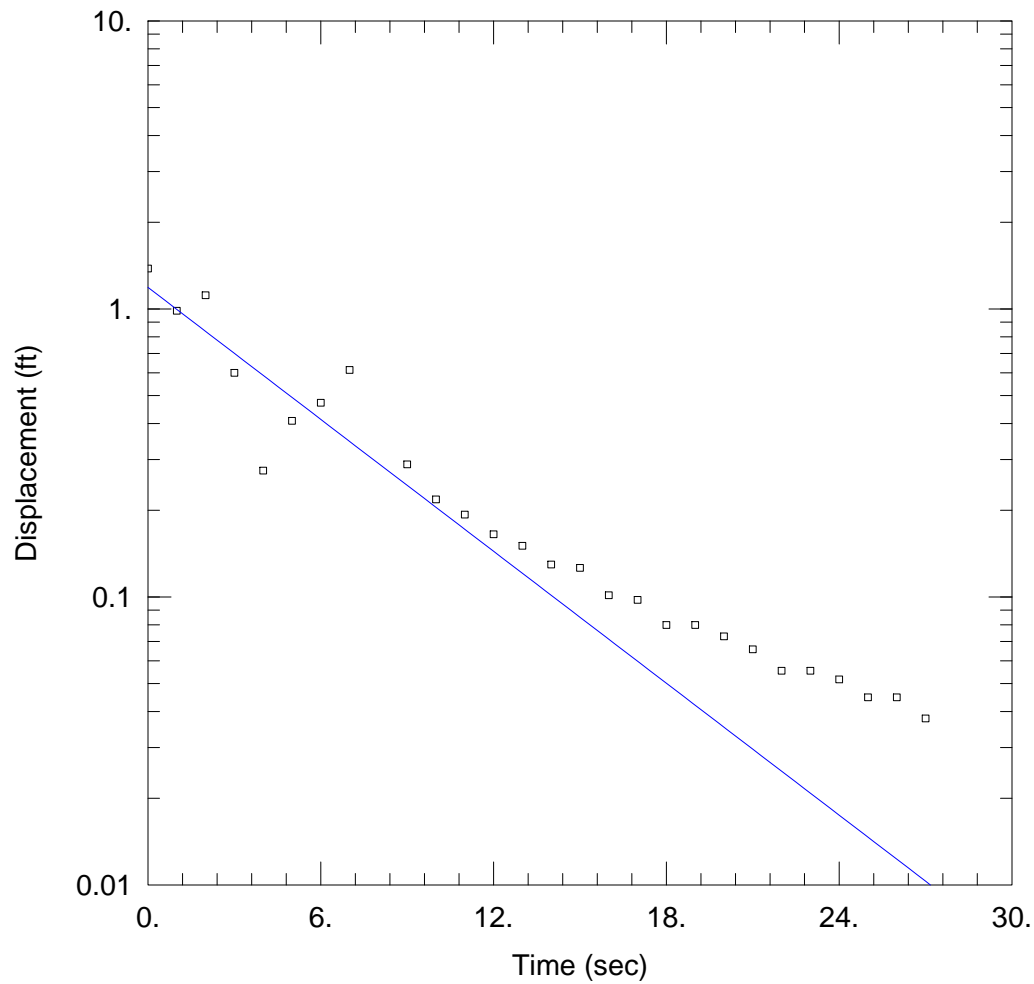
Initial Displacement: 1.381 ft
 Total Well Penetration Depth: 14.51 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 14.51 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0001846 ft/sec

Solution Method: Bower-Rice
 y0 = 1.188 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_3F.aqt
 Date: 11/12/18

Time: 15:32:06

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

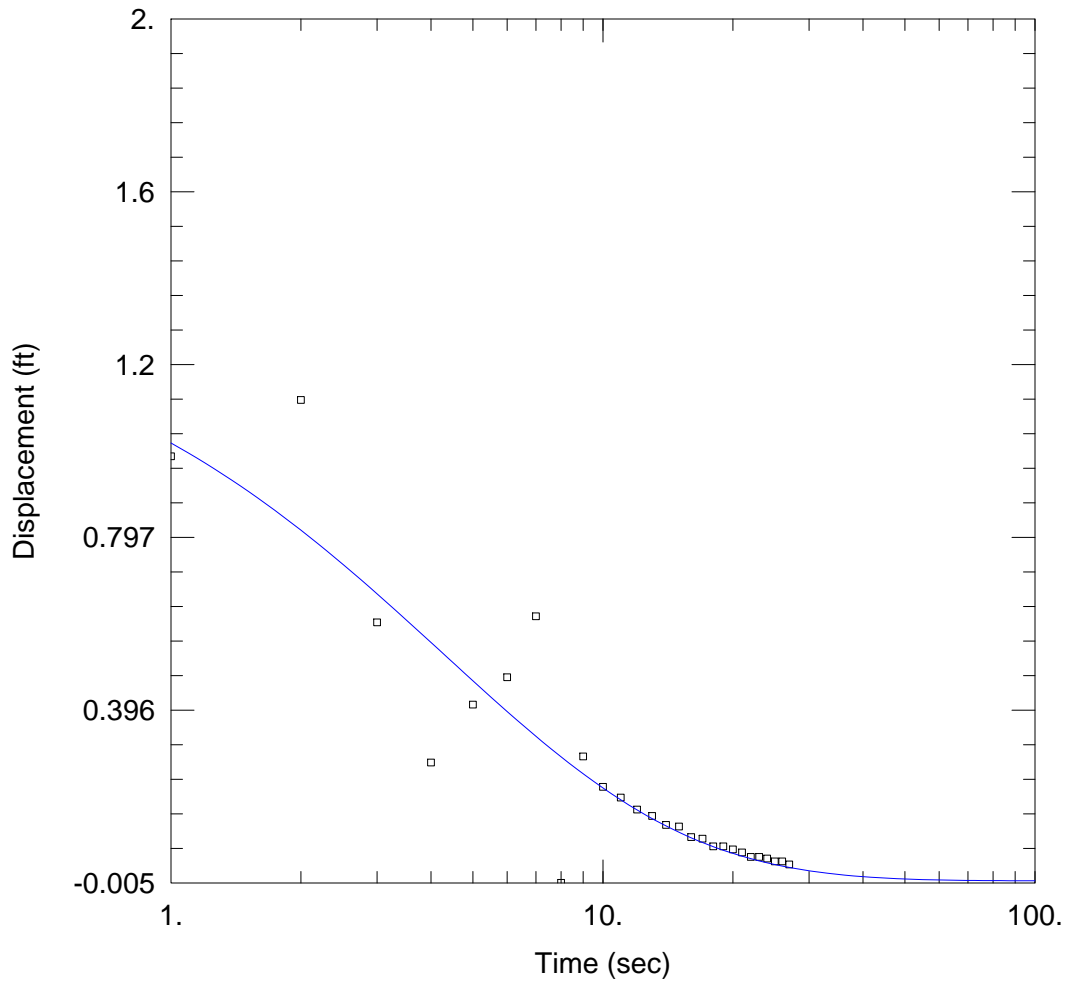
Saturated Thickness: 14.51 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-5)

Initial Displacement: 1.381 ft Static Water Column Height: 14.51 ft
 Total Well Penetration Depth: 14.51 ft Screen Length: 10. ft
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 0.0002654 ft/sec y0 = 1.188 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_3F.aqt
 Date: 11/12/18

Time: 15:32:31

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 14.51 ft

WELL DATA (WMW-5)

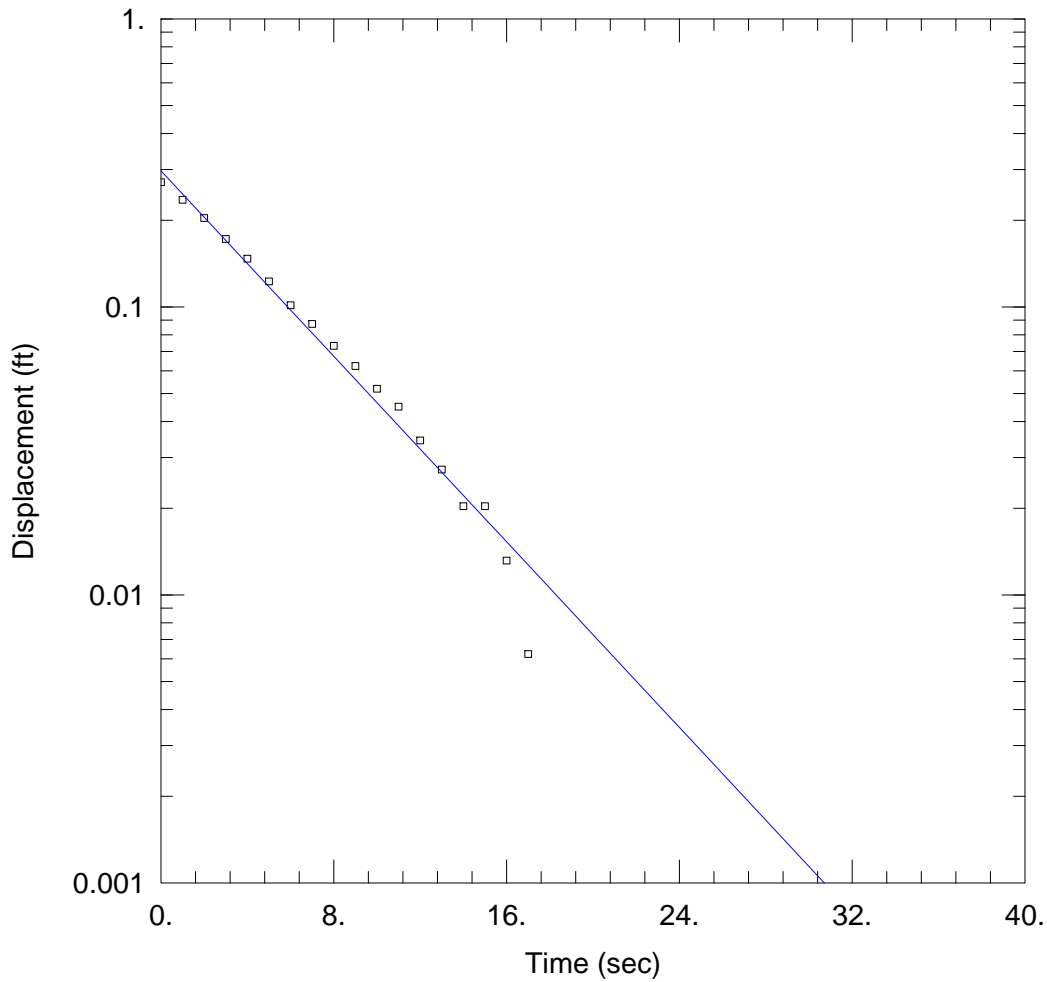
Initial Displacement: 1.381 ft
 Total Well Penetration Depth: 14.51 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 14.51 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0002287 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 5.373E-5 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_4R.aqt
 Date: 11/12/18

Time: 15:34:33

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 14.51 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-5)

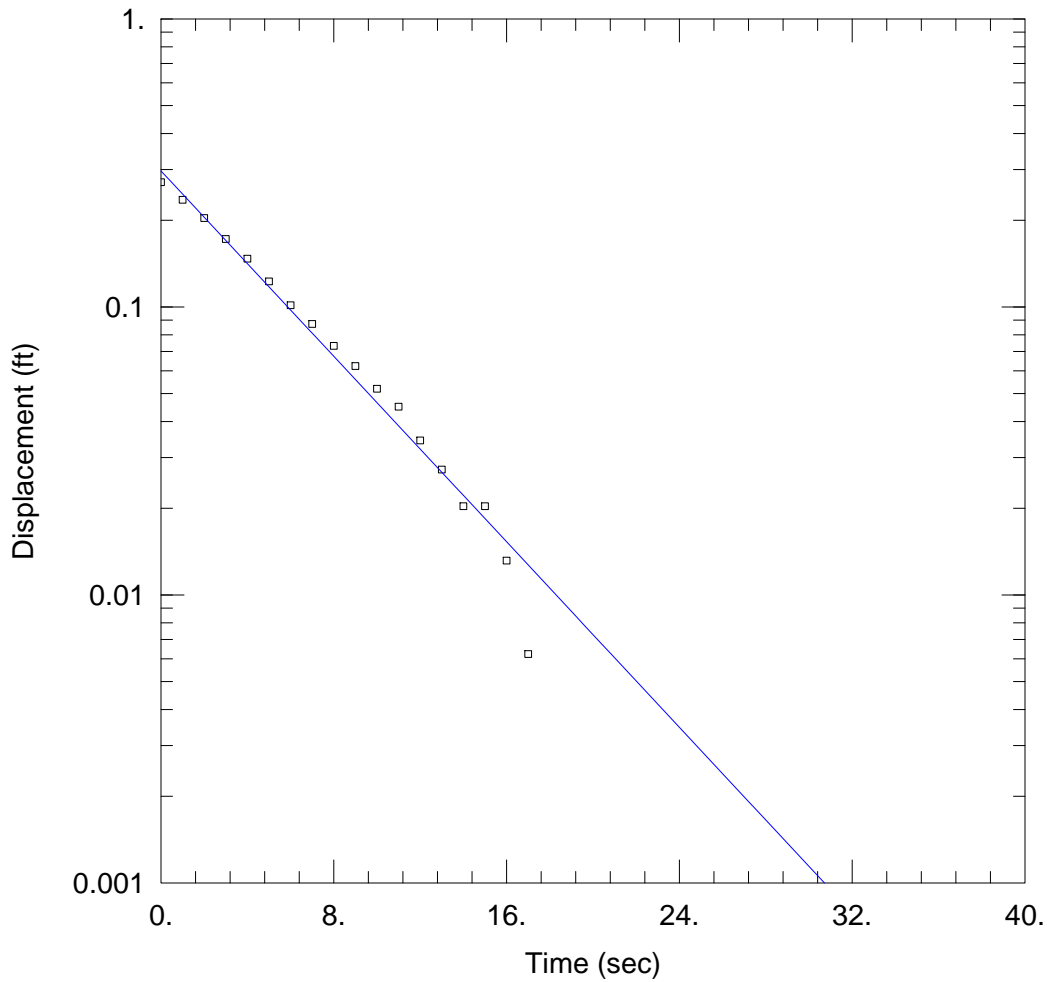
Initial Displacement: 0.2711 ft
 Total Well Penetration Depth: 14.51 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 14.51 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0001945 ft/sec

Solution Method: Bower-Rice
 y0 = 0.2967 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_4R.aqt
 Date: 11/12/18

Time: 15:35:00

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 14.51 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-5)

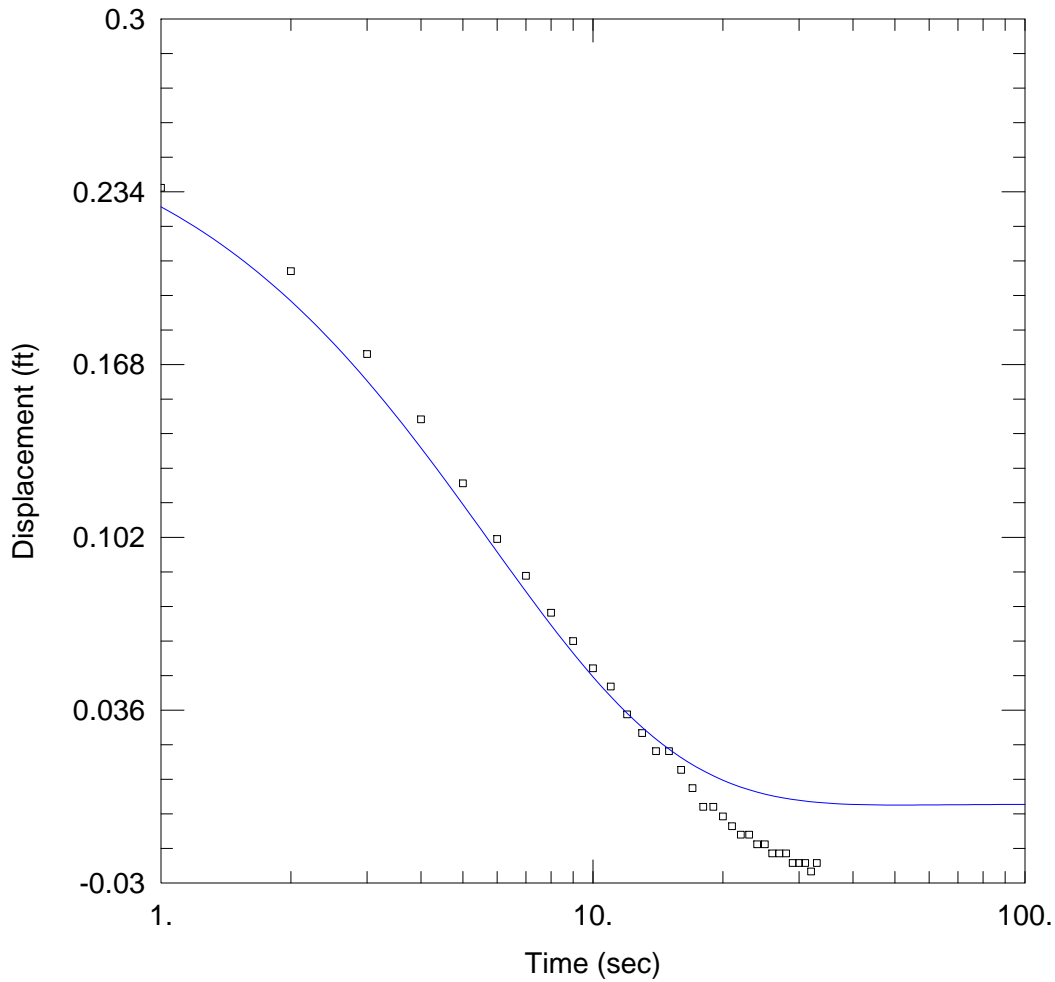
Initial Displacement: 0.2711 ft
 Total Well Penetration Depth: 14.51 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 14.51 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0002797 ft/sec

Solution Method: Hvorslev
 y0 = 0.2966 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_4R.aqt
 Date: 11/12/18

Time: 15:35:21

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 14.51 ft

WELL DATA (WMW-5)

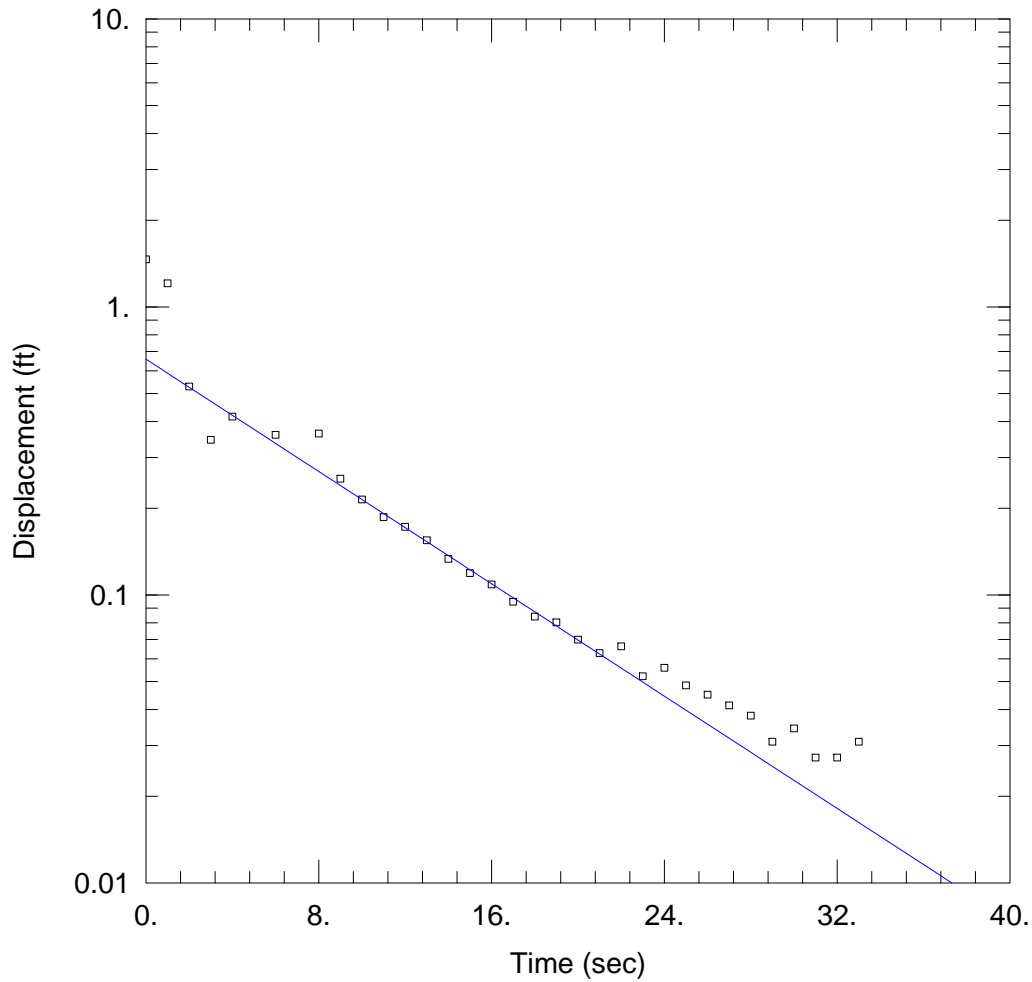
Initial Displacement: 0.2711 ft
 Total Well Penetration Depth: 14.51 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 14.51 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0002109 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 1.429E-11 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_5F.aqt
 Date: 11/12/18

Time: 15:41:16

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

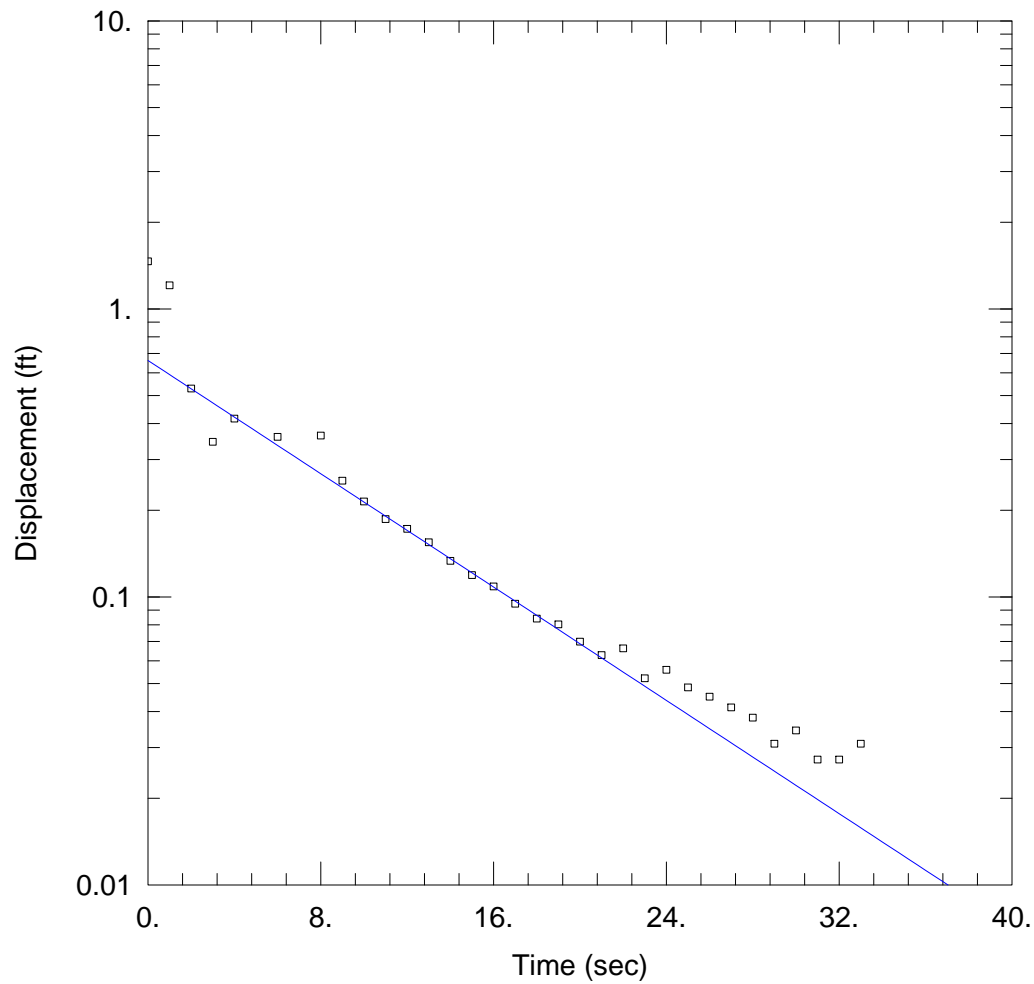
Saturated Thickness: 14.51 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-5)

Initial Displacement: 1.463 ft Static Water Column Height: 14.51 ft
 Total Well Penetration Depth: 14.51 ft Screen Length: 10. ft
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 0.0001177 ft/sec y0 = 0.6584 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_5F.aqt
 Date: 11/12/18

Time: 15:42:37

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

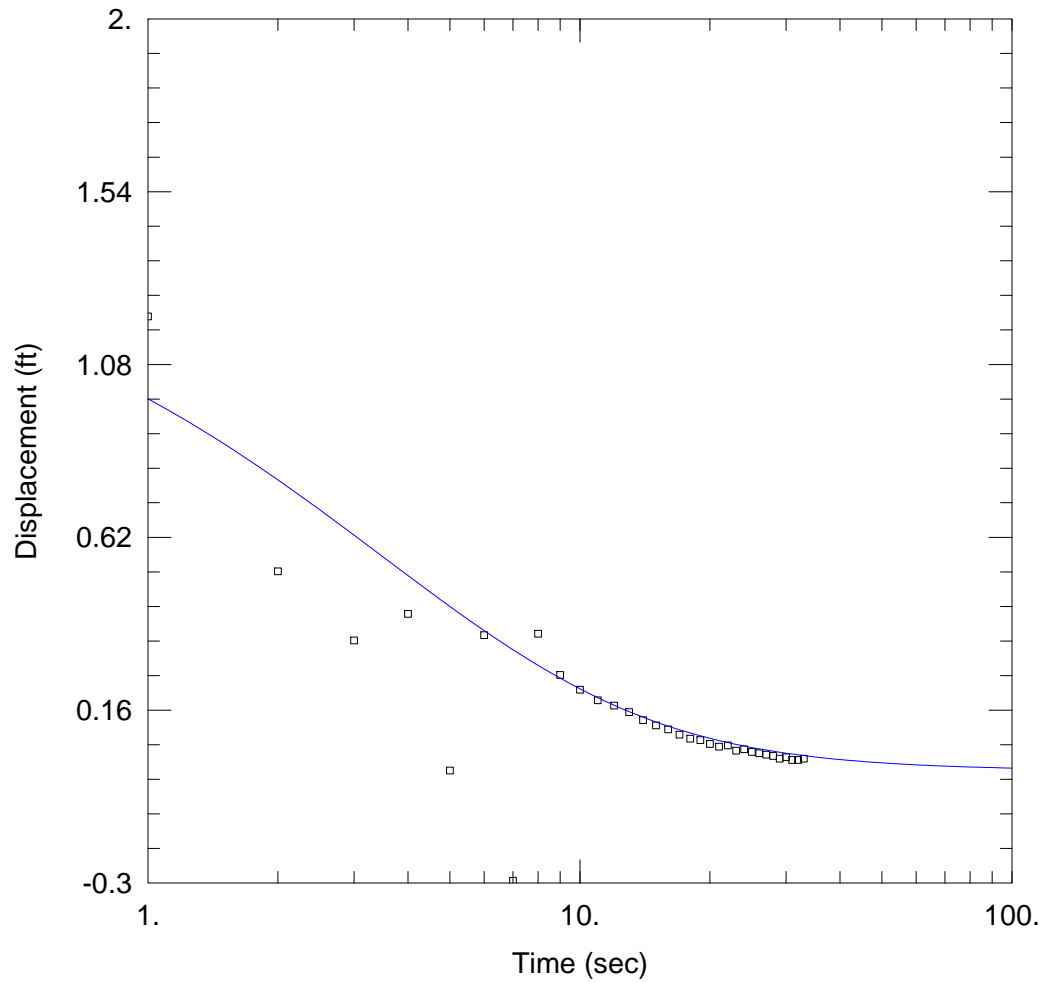
Saturated Thickness: 14.51 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-5)

Initial Displacement: 1.463 ft Static Water Column Height: 14.51 ft
 Total Well Penetration Depth: 14.51 ft Screen Length: 10. ft
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 0.0001709 ft/sec y0 = 0.6623 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_5F.aqt
 Date: 11/12/18

Time: 15:43:00

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 14.51 ft

WELL DATA (WMW-5)

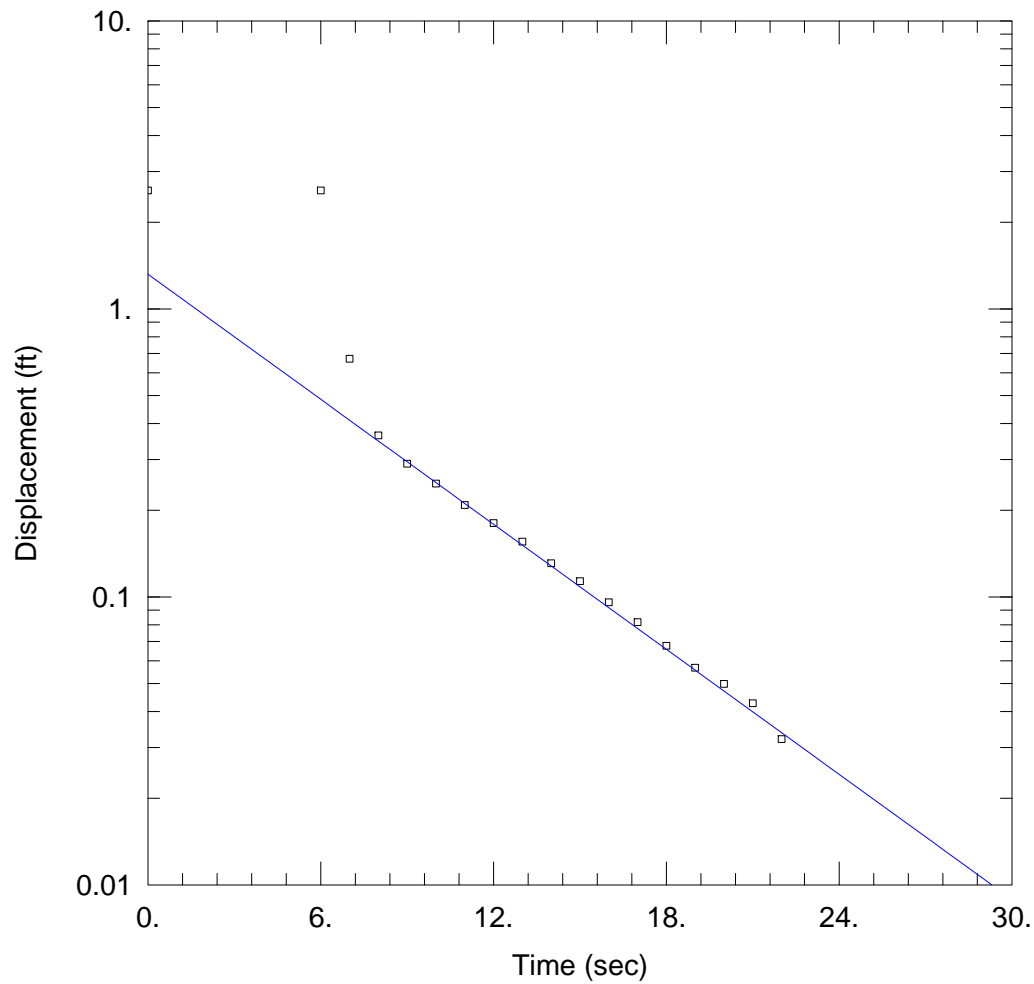
Initial Displacement: 1.463 ft
 Total Well Penetration Depth: 14.51 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 14.51 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0002048 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.0002562 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_6R.aqt
 Date: 11/12/18

Time: 15:44:08

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 14.51 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-5)

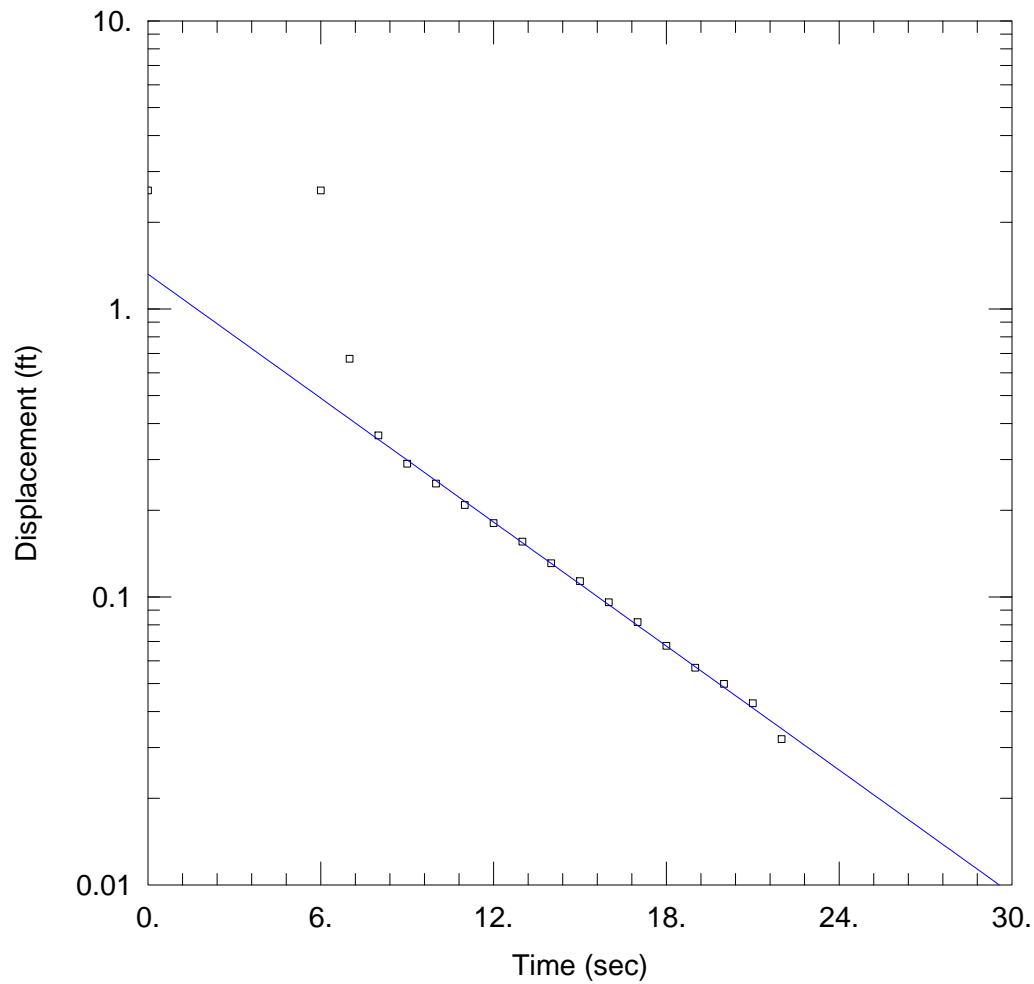
Initial Displacement: 2.578 ft
 Total Well Penetration Depth: 14.51 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 14.51 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0001748 ft/sec

Solution Method: Bouwer-Rice
 y0 = 1.319 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_6R.aqt
 Date: 11/12/18

Time: 15:44:32

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 14.51 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-5)

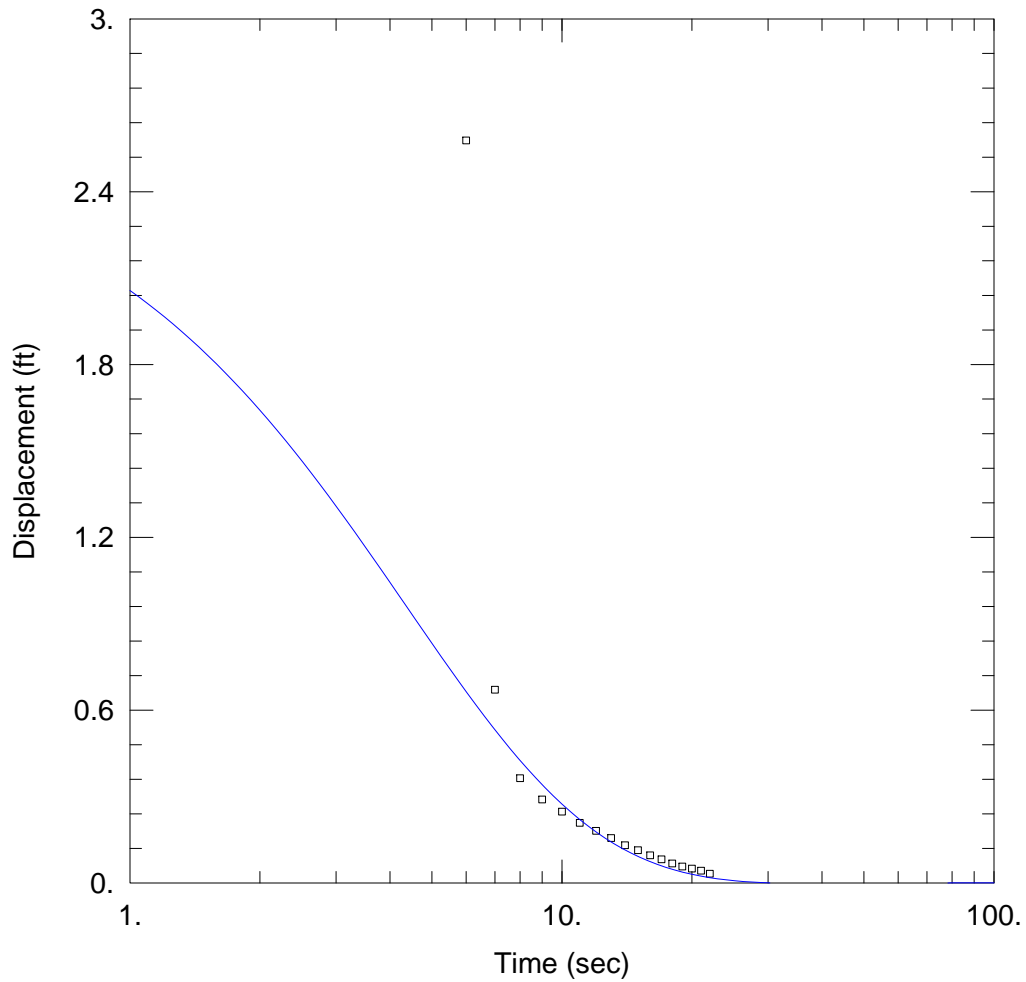
Initial Displacement: 2.578 ft
 Total Well Penetration Depth: 14.51 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 14.51 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0002494 ft/sec

Solution Method: Hvorslev
 y0 = 1.32 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-5_6R.aqt
 Date: 11/12/18

Time: 15:45:06

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-5
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 14.51 ft

WELL DATA (WMW-5)

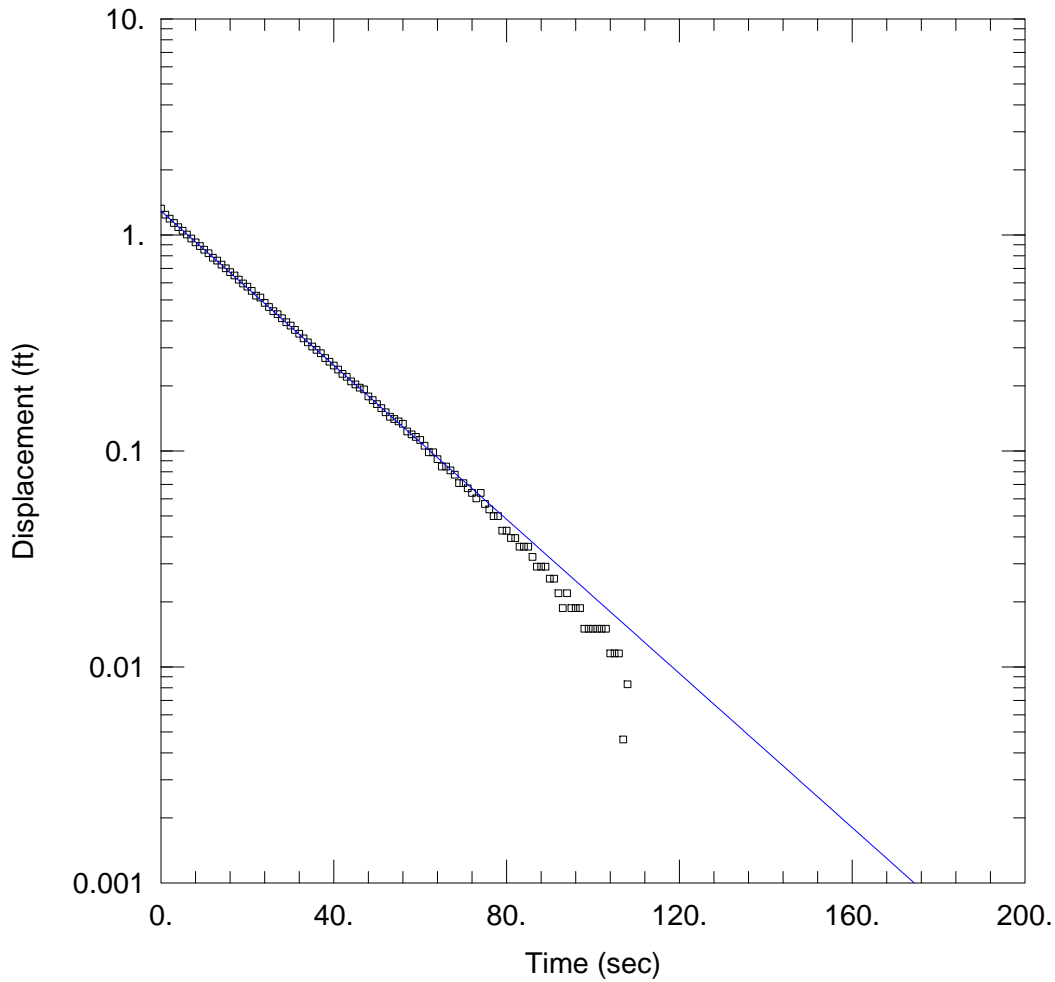
Initial Displacement: 2.578 ft
 Total Well Penetration Depth: 14.51 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 14.51 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.000277 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 1.429E-11 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-7_1R.aqt
 Date: 11/13/18

Time: 09:08:49

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-7
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 7.72 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-7)

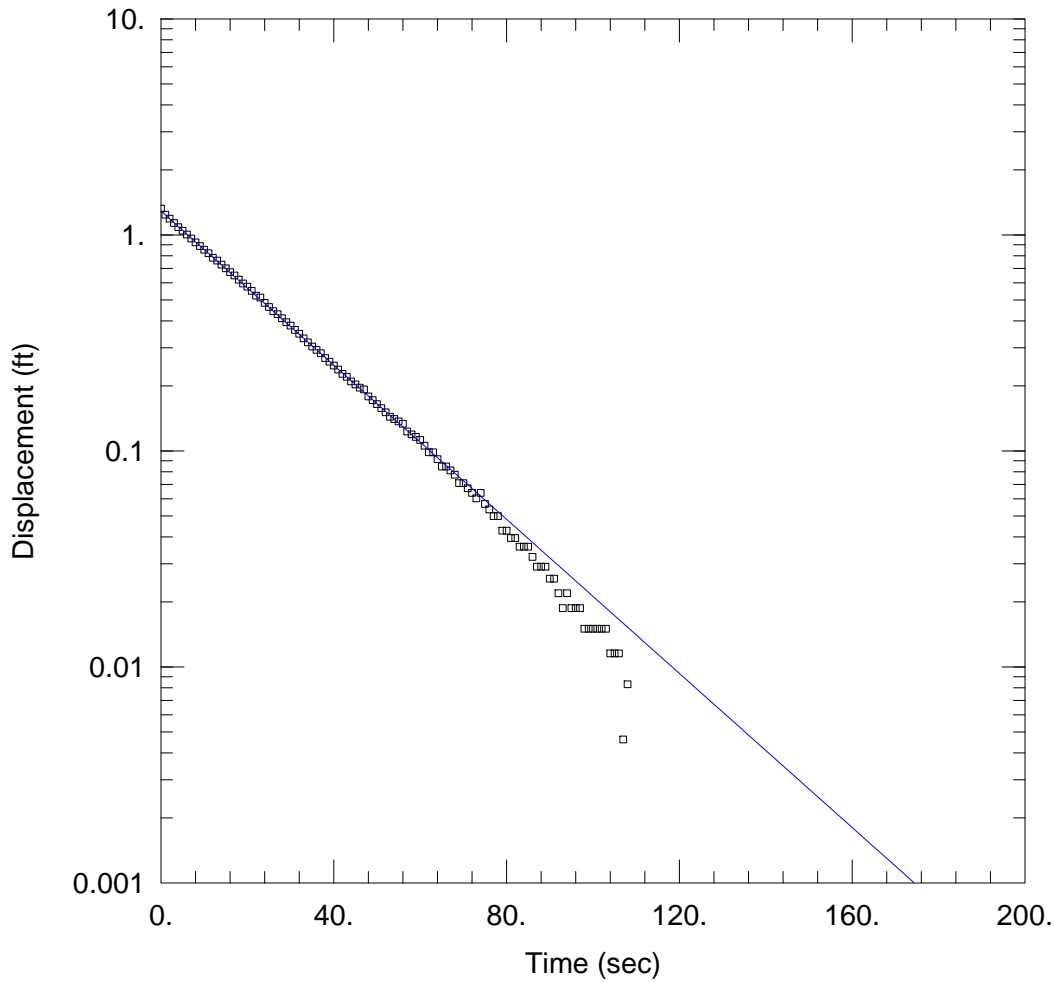
Initial Displacement: 1.324 ft
 Total Well Penetration Depth: 7.72 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 7.72 ft
 Screen Length: 7.72 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 4.756E-5 ft/sec

Solution Method: Bower-Rice
 y0 = 1.29 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-7_1R.aqt
 Date: 11/13/18

Time: 09:09:06

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-7
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 7.72 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-7)

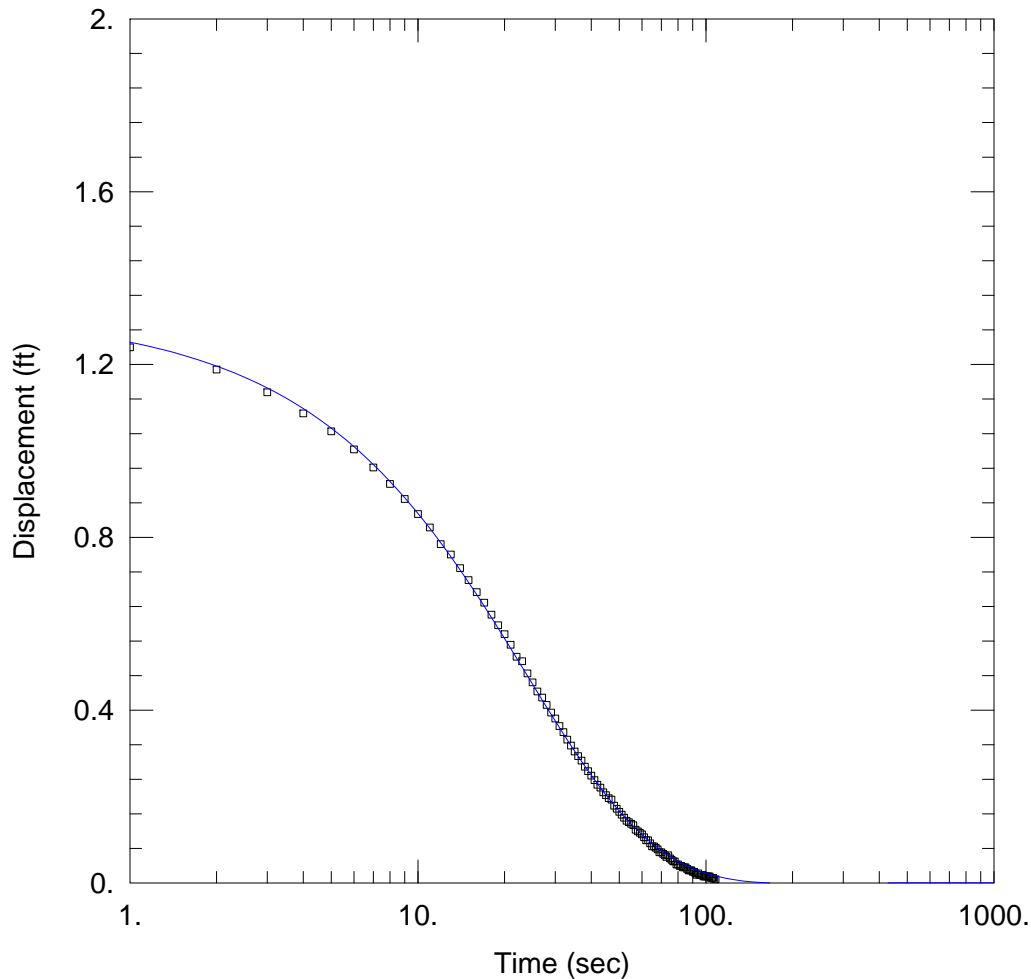
Initial Displacement: 1.324 ft
 Total Well Penetration Depth: 7.72 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 7.72 ft
 Screen Length: 7.72 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 9.71E-5 ft/sec

Solution Method: Hvorslev
 y0 = 1.29 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-7_1R.aqt
 Date: 11/13/18

Time: 09:09:24

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-7
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 7.72 ft

WELL DATA (WMW-7)

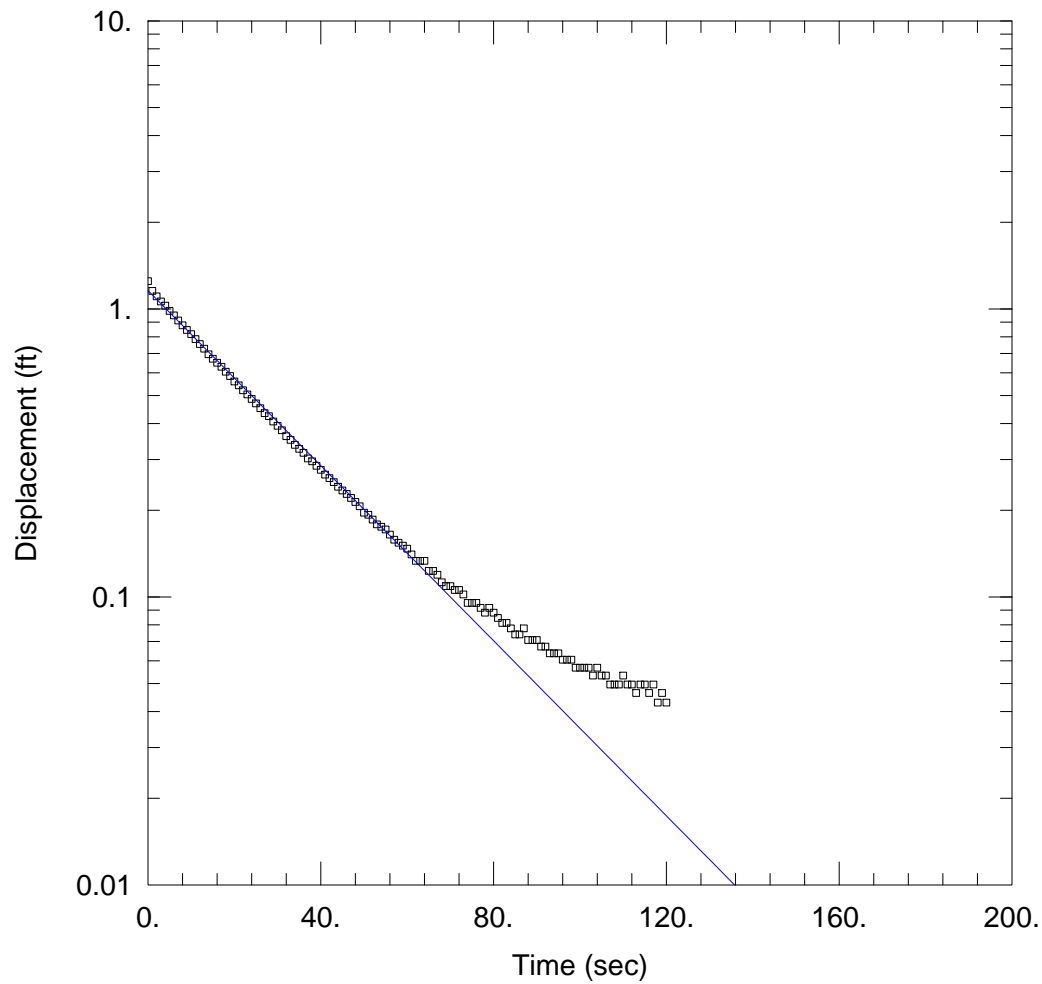
Initial Displacement: 1.324 ft
 Total Well Penetration Depth: 7.72 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 7.72 ft
 Screen Length: 7.72 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 5.312E-5 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 8.202E-6 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-7_2R.aqt
 Date: 11/13/18

Time: 09:07:03

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-7
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 7.72 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-7)

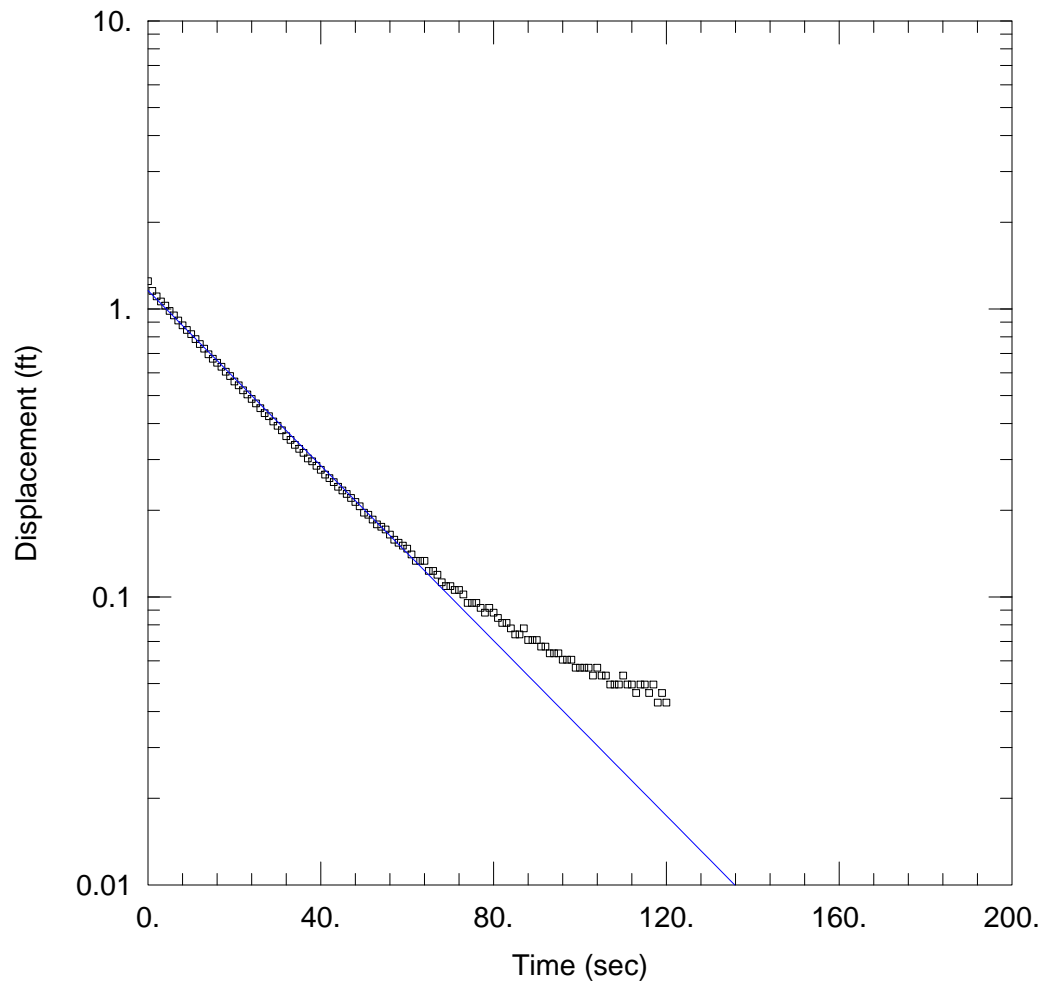
Initial Displacement: 1.249 ft
 Total Well Penetration Depth: 7.72 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 7.72 ft
 Screen Length: 7.72 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 4.052E-5 ft/sec

Solution Method: Bower-Rice
 y0 = 1.158 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-7_2R.aqt
 Date: 11/13/18

Time: 09:07:21

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-7
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 7.72 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-7)

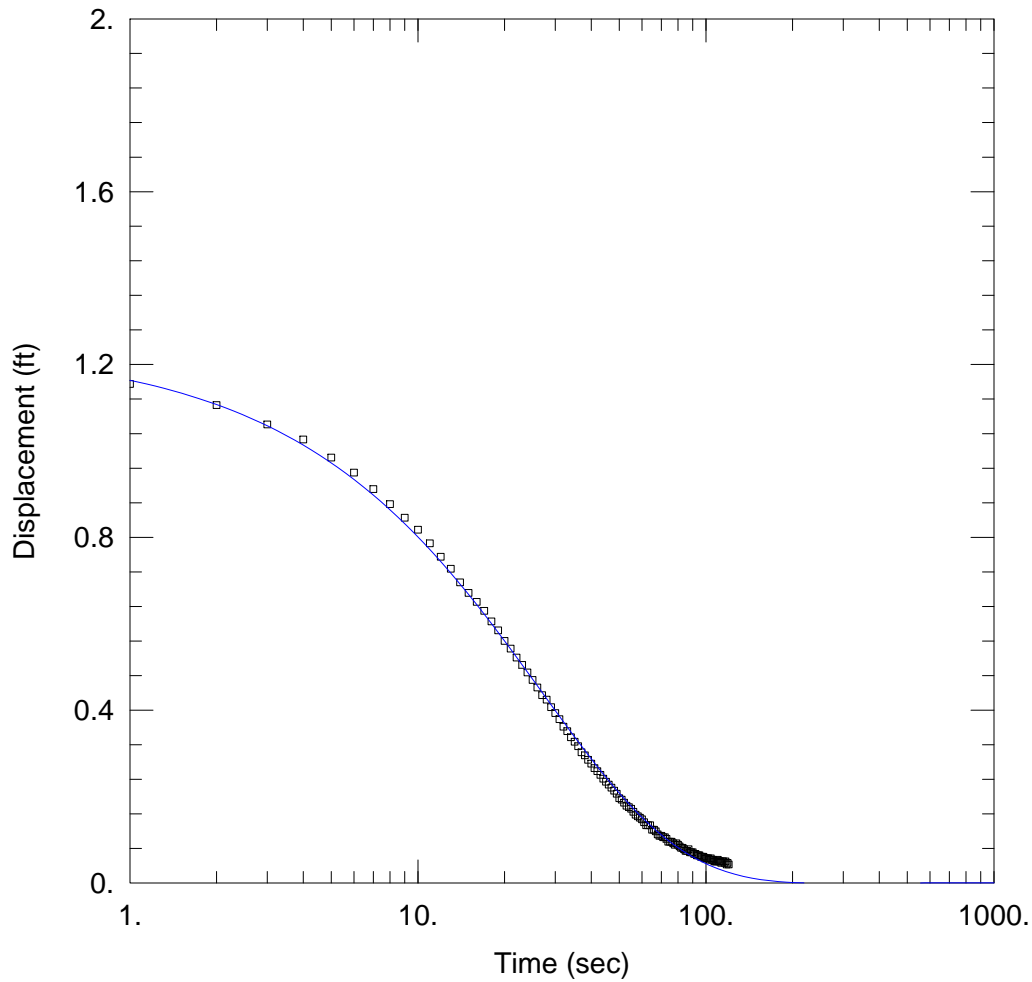
Initial Displacement: 1.249 ft
 Total Well Penetration Depth: 7.72 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 7.72 ft
 Screen Length: 7.72 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 8.271E-5 ft/sec

Solution Method: Hvorslev
 y0 = 1.158 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-7_2R.aqt
 Date: 11/13/18

Time: 09:07:41

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-7
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 7.72 ft

WELL DATA (WMW-7)

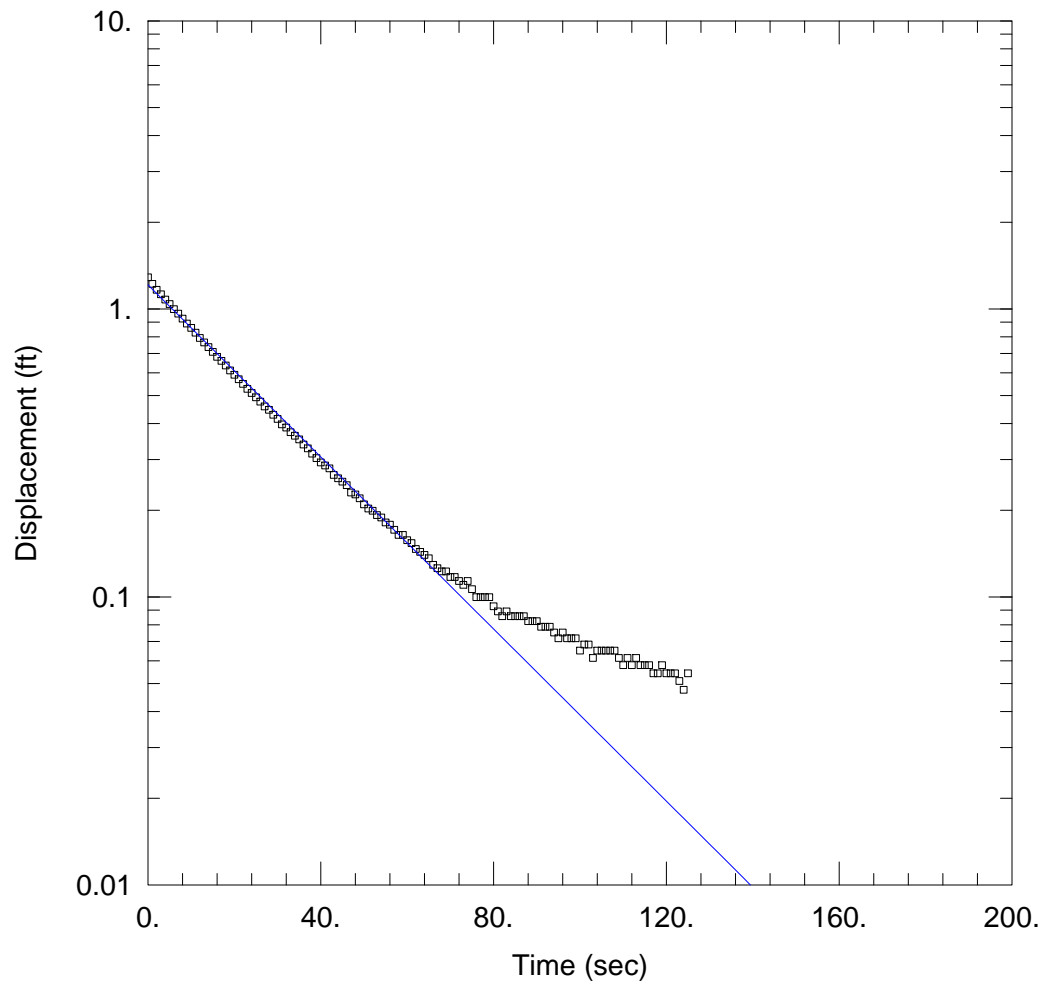
Initial Displacement: 1.249 ft
 Total Well Penetration Depth: 7.72 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 7.72 ft
 Screen Length: 7.72 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 4.663E-5 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 4.658E-5 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-7_3R.aqt
 Date: 11/13/18

Time: 09:11:24

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-7
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 7.72 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-7)

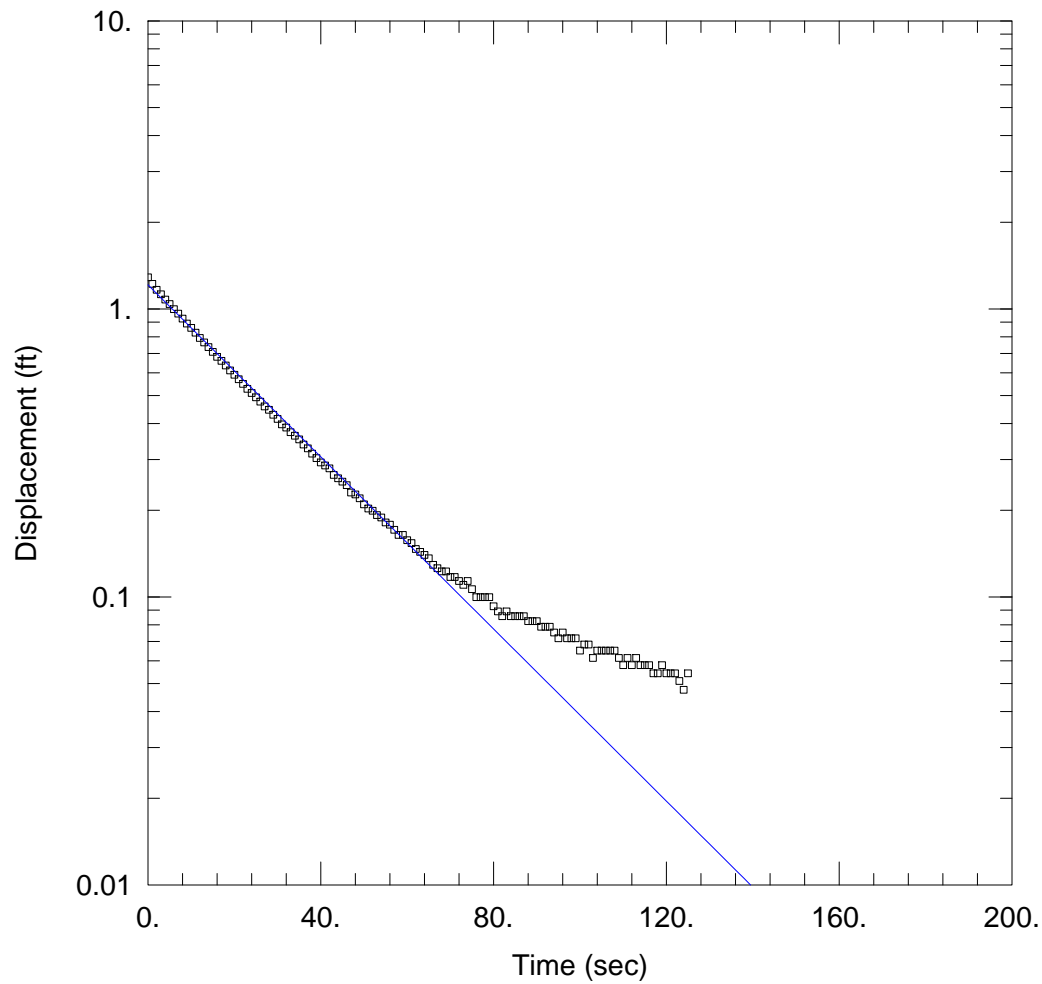
Initial Displacement: 1.287 ft
 Total Well Penetration Depth: 7.72 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 7.72 ft
 Screen Length: 7.72 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 3.983E-5 ft/sec

Solution Method: Bower-Rice
 y0 = 1.212 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-7_3R.aqt
 Date: 11/13/18

Time: 09:11:50

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-7
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 7.72 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-7)

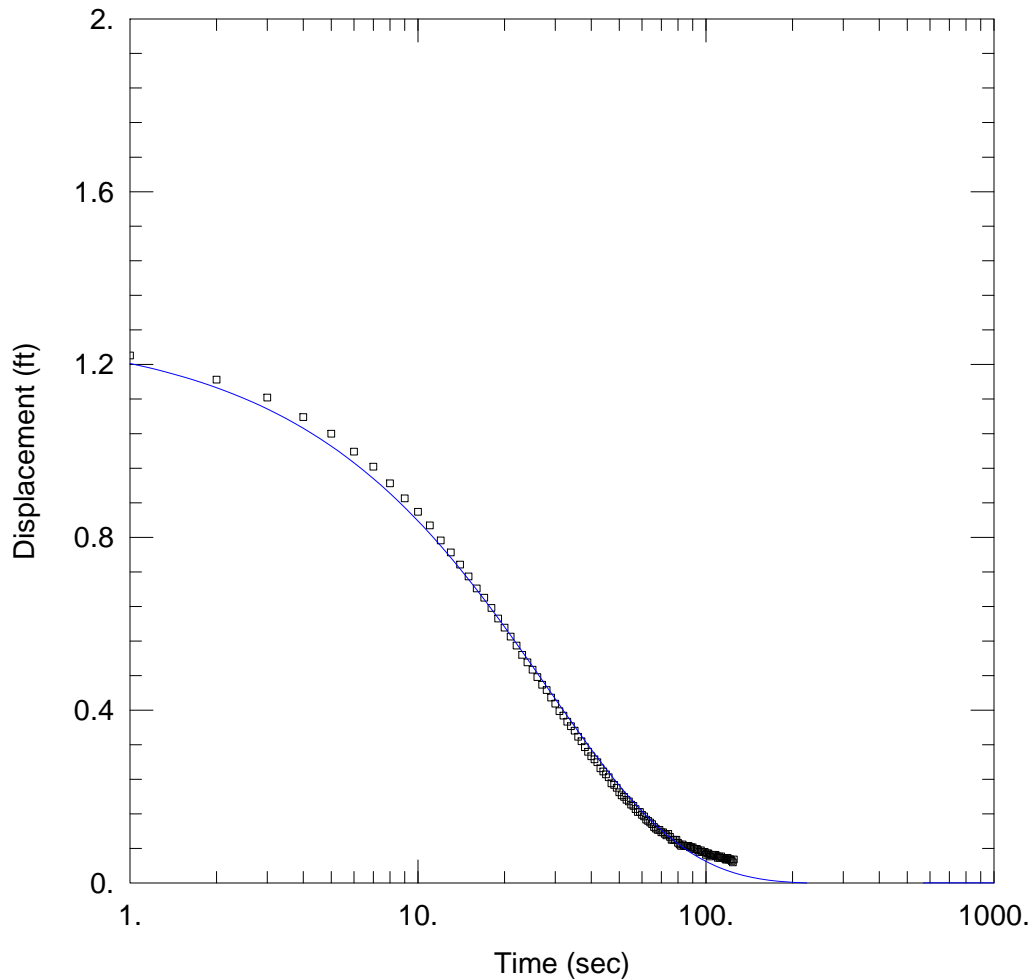
Initial Displacement: 1.287 ft
 Total Well Penetration Depth: 7.72 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 7.72 ft
 Screen Length: 7.72 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 8.131E-5 ft/sec

Solution Method: Hvorslev
 y0 = 1.212 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-7_3R.aqt
 Date: 11/13/18

Time: 09:12:14

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-7
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 7.72 ft

WELL DATA (WMW-7)

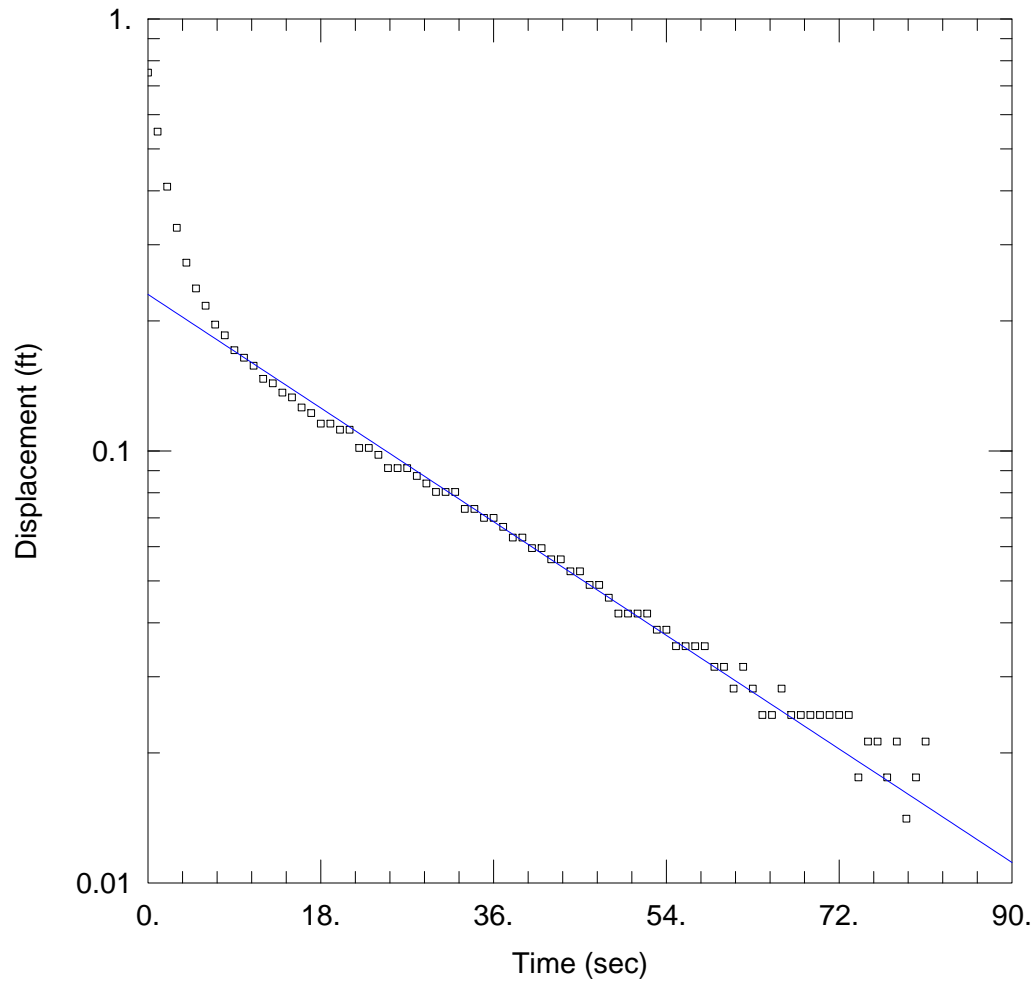
Initial Displacement: 1.287 ft
 Total Well Penetration Depth: 7.72 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 7.72 ft
 Screen Length: 7.72 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 $K_r = 4.512E-5 \text{ ft/sec}$
 $K_z/K_r = 1.$

Solution Method: KGS Model
 $S_s = 4.368E-5 \text{ ft}^{-1}$



WELL TEST ANALYSIS

Data Set: N:\...\WMW-9_1R.aqt
 Date: 11/13/18

Time: 09:21:47

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-9
 Test Date: 2016

AQUIFER DATA

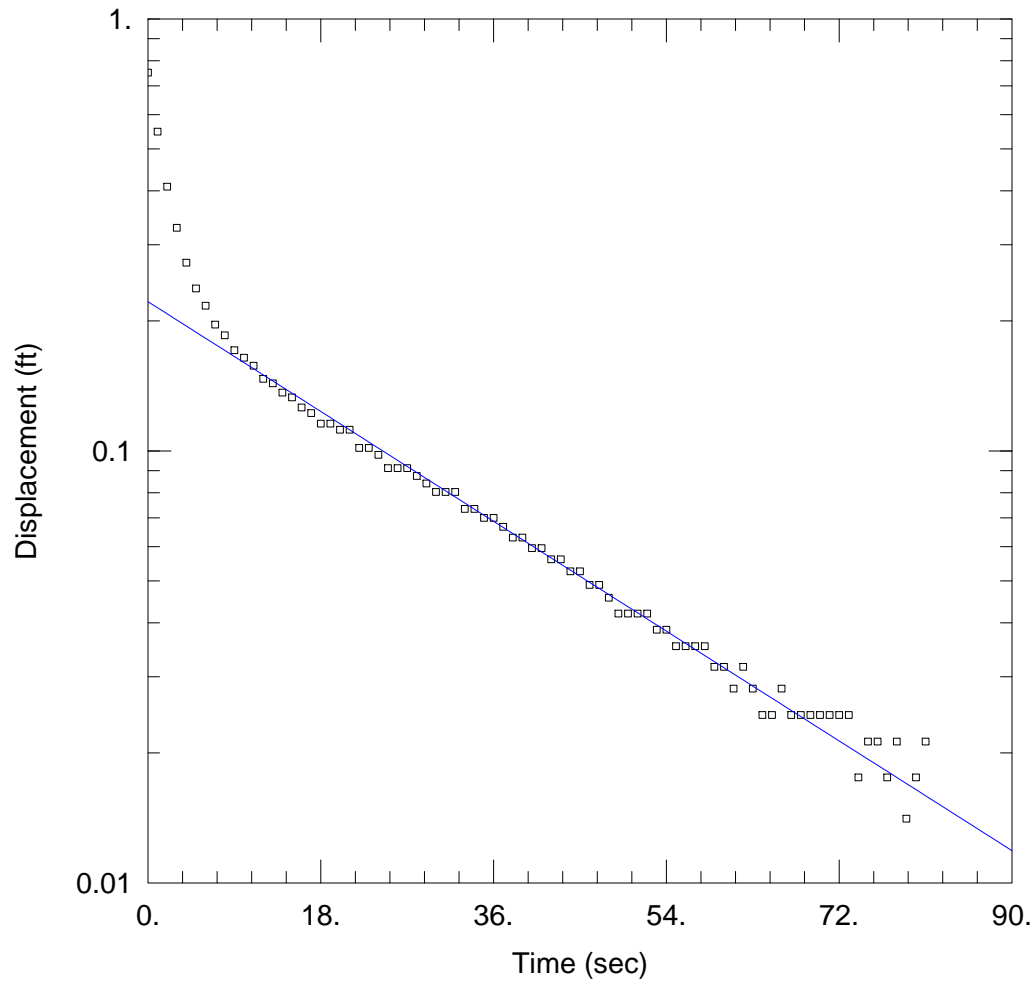
Saturated Thickness: 12.27 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-9)

Initial Displacement: 0.7513 ft Static Water Column Height: 12.27 ft
 Total Well Penetration Depth: 12.27 ft Screen Length: 12.27 ft
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bower-Rice
 K = 2.814E-5 ft/sec y0 = 0.2303 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-9_1R.aqt
 Date: 11/13/18

Time: 09:22:58

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-9
 Test Date: 2016

AQUIFER DATA

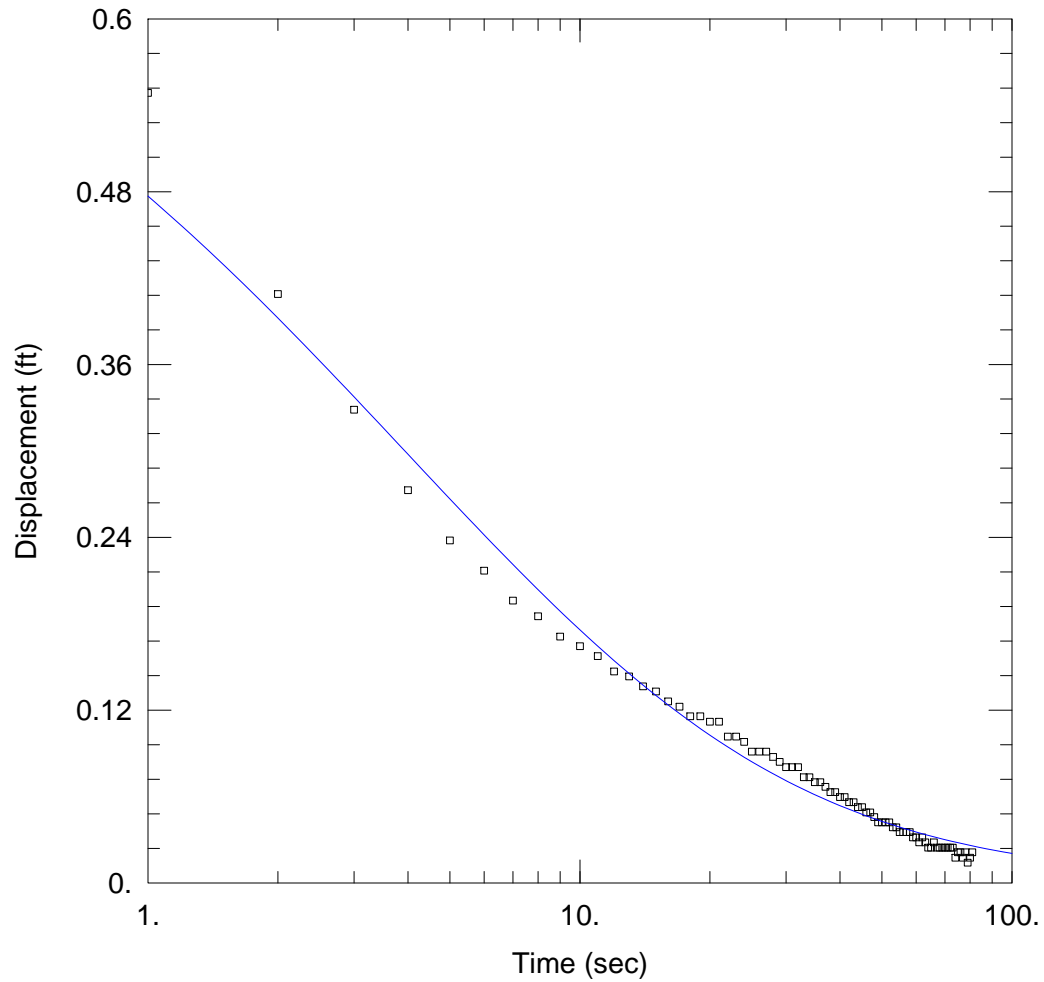
Saturated Thickness: 12.27 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-9)

Initial Displacement: 0.7513 ft Static Water Column Height: 12.27 ft
 Total Well Penetration Depth: 12.27 ft Screen Length: 12.27 ft
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 4.836E-5 ft/sec y0 = 0.2216 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-9_1R.aqt
 Date: 11/13/18

Time: 09:23:19

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-9
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.27 ft

WELL DATA (WMW-9)

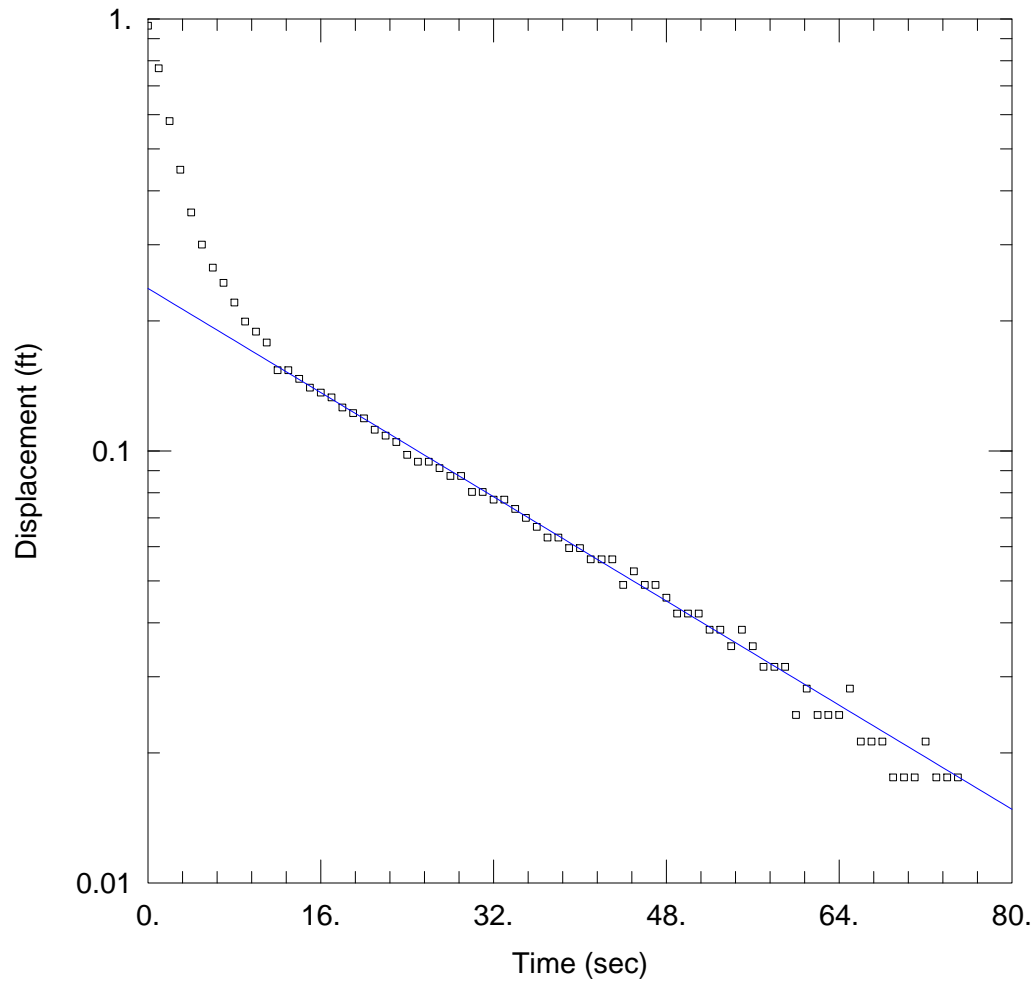
Initial Displacement: 0.7513 ft
 Total Well Penetration Depth: 12.27 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.27 ft
 Screen Length: 12.27 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 4.975E-5 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.003638 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-9_2R.aqt
 Date: 11/13/18

Time: 09:24:23

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-9
 Test Date: 2016

AQUIFER DATA

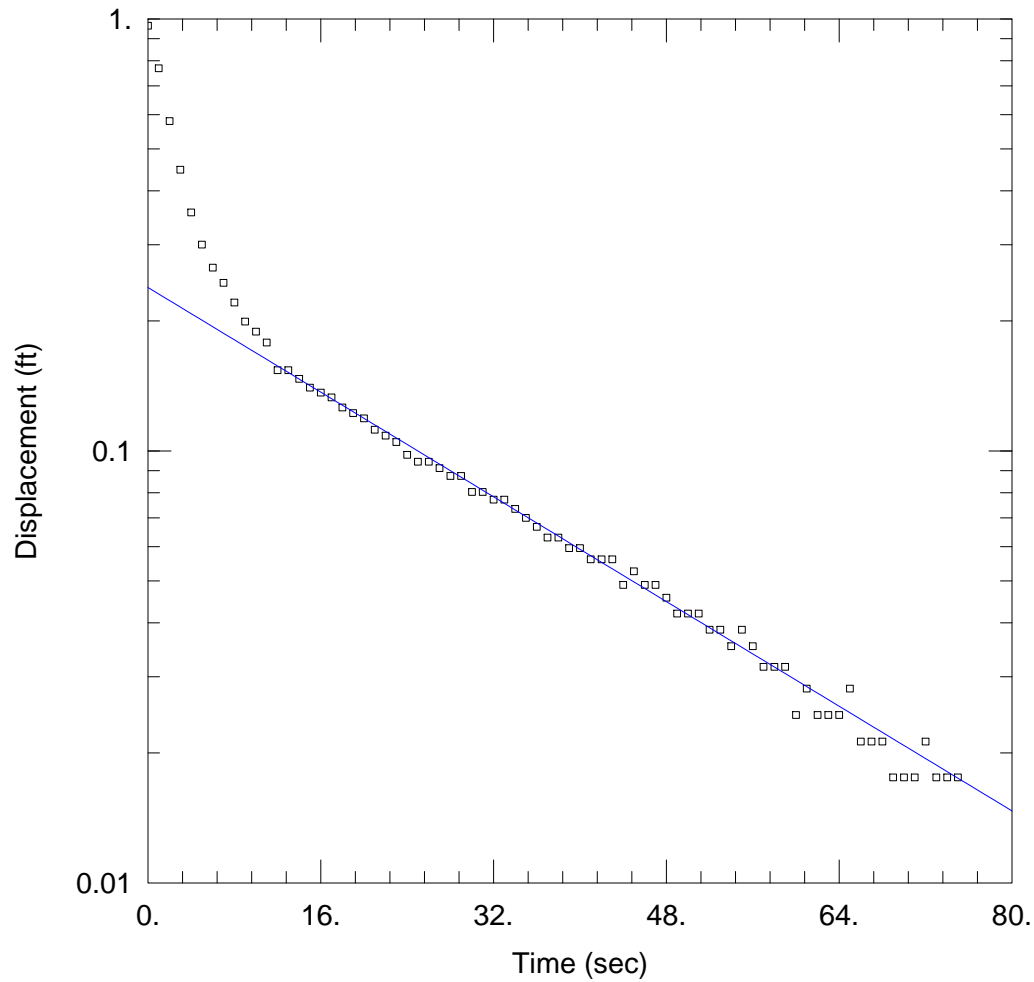
Saturated Thickness: 12.27 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-9)

Initial Displacement: 0.9642 ft Static Water Column Height: 12.27 ft
 Total Well Penetration Depth: 12.27 ft Screen Length: 12.27 ft
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bower-Rice
 K = 2.902E-5 ft/sec y0 = 0.2378 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-9_2R.aqt
 Date: 11/13/18

Time: 09:24:47

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-9
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.27 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-9)

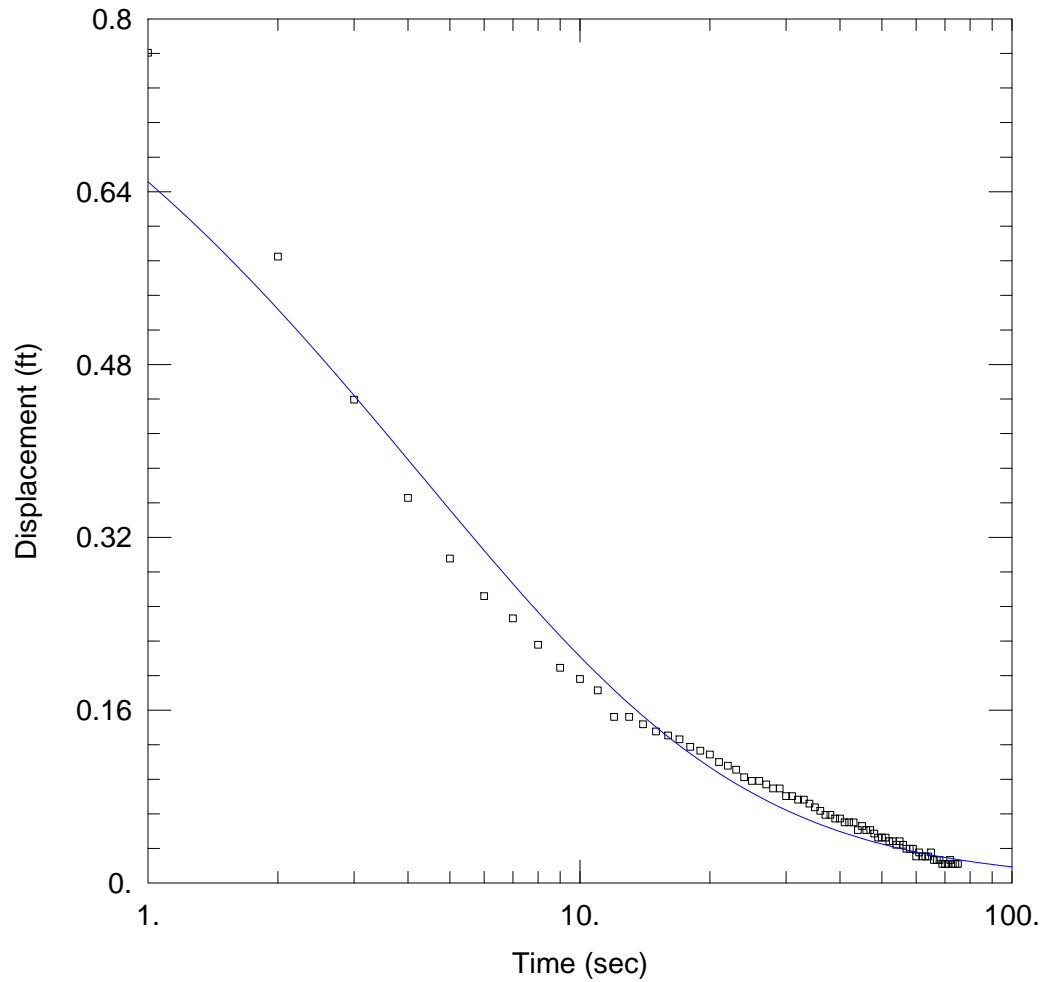
Initial Displacement: 0.9642 ft
 Total Well Penetration Depth: 12.27 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.27 ft
 Screen Length: 12.27 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 5.186E-5 ft/sec

Solution Method: Hvorslev
 y0 = 0.2389 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-9_2R.aqt
 Date: 11/13/18

Time: 09:25:06

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-9
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.27 ft

WELL DATA (WMW-9)

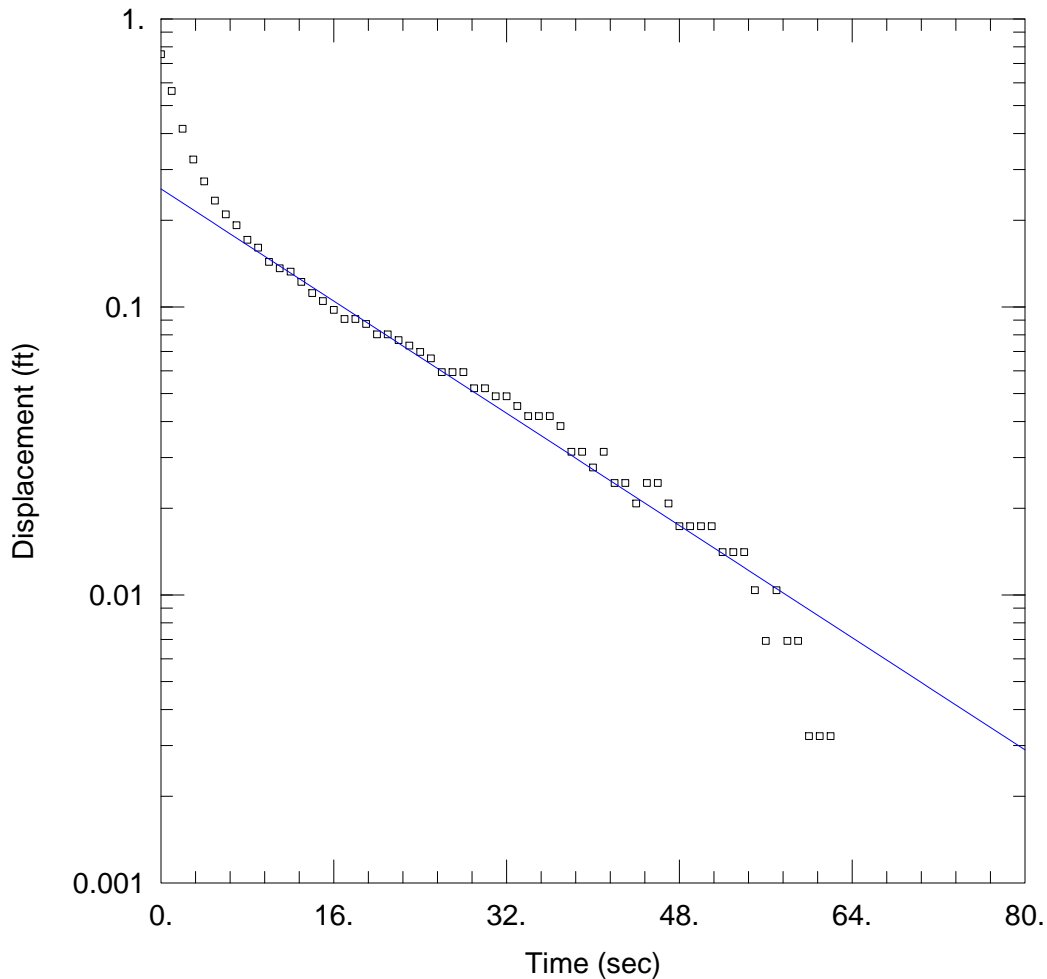
Initial Displacement: 0.9642 ft
 Total Well Penetration Depth: 12.27 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.27 ft
 Screen Length: 12.27 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 8.054E-5 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.00113 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-9_3R.aqt
 Date: 11/13/18

Time: 09:25:59

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-9
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.27 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-9)

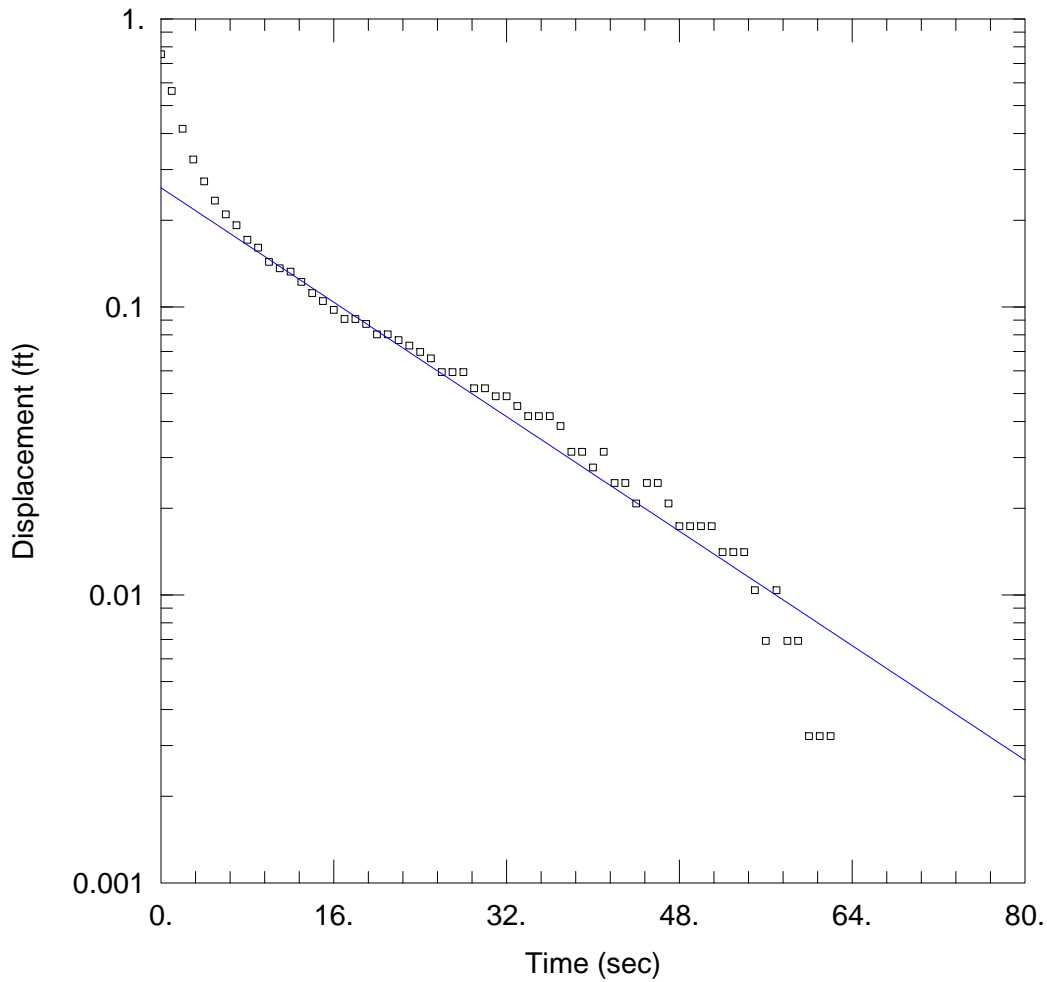
Initial Displacement: 0.7546 ft
 Total Well Penetration Depth: 12.27 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.27 ft
 Screen Length: 12.27 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 4.687E-5 ft/sec

Solution Method: Bower-Rice
 y0 = 0.2568 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-9_3R.aqt
 Date: 11/13/18

Time: 09:26:37

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-9
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.27 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-9)

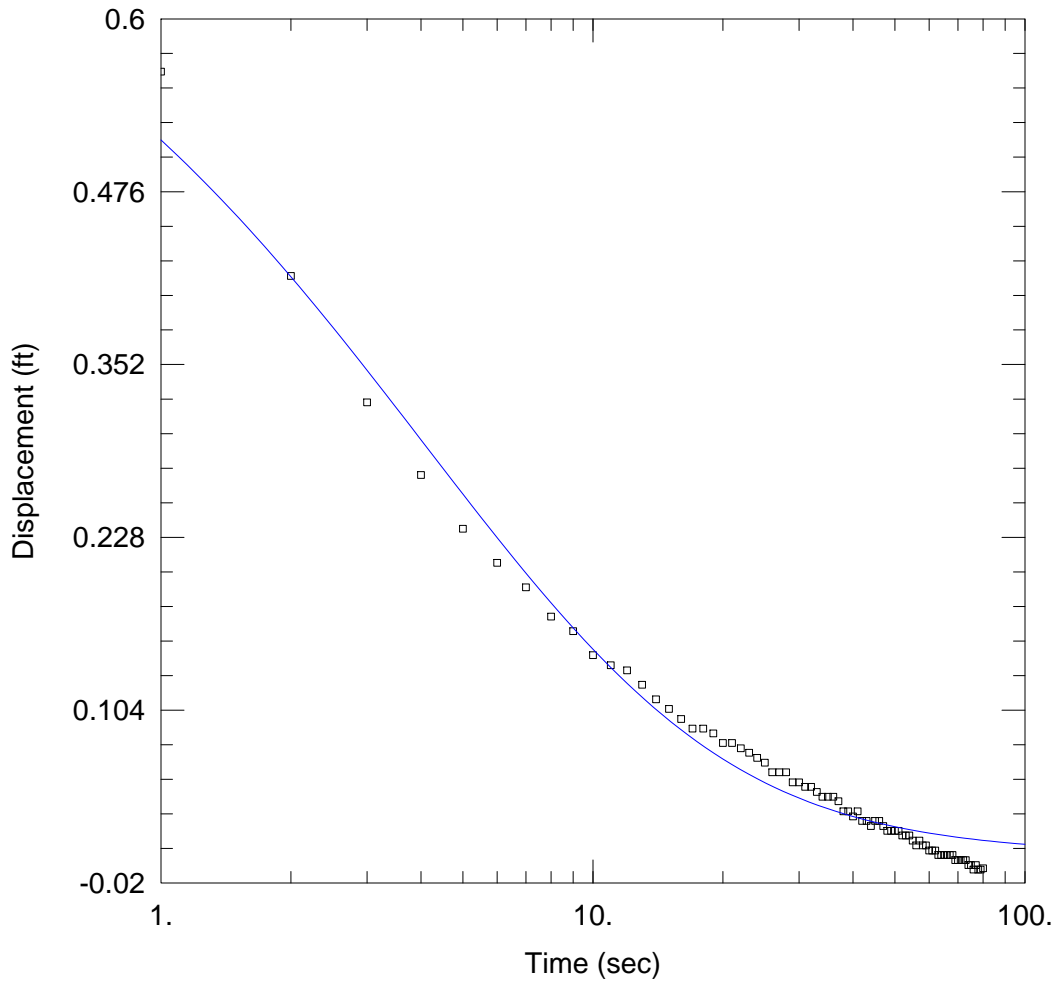
Initial Displacement: 0.7546 ft
 Total Well Penetration Depth: 12.27 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.27 ft
 Screen Length: 12.27 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 8.505E-5 ft/sec

Solution Method: Hvorslev
 y0 = 0.2592 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-9_3R.aqt
 Date: 11/13/18

Time: 09:33:39

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-9
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.27 ft

WELL DATA (WMW-9)

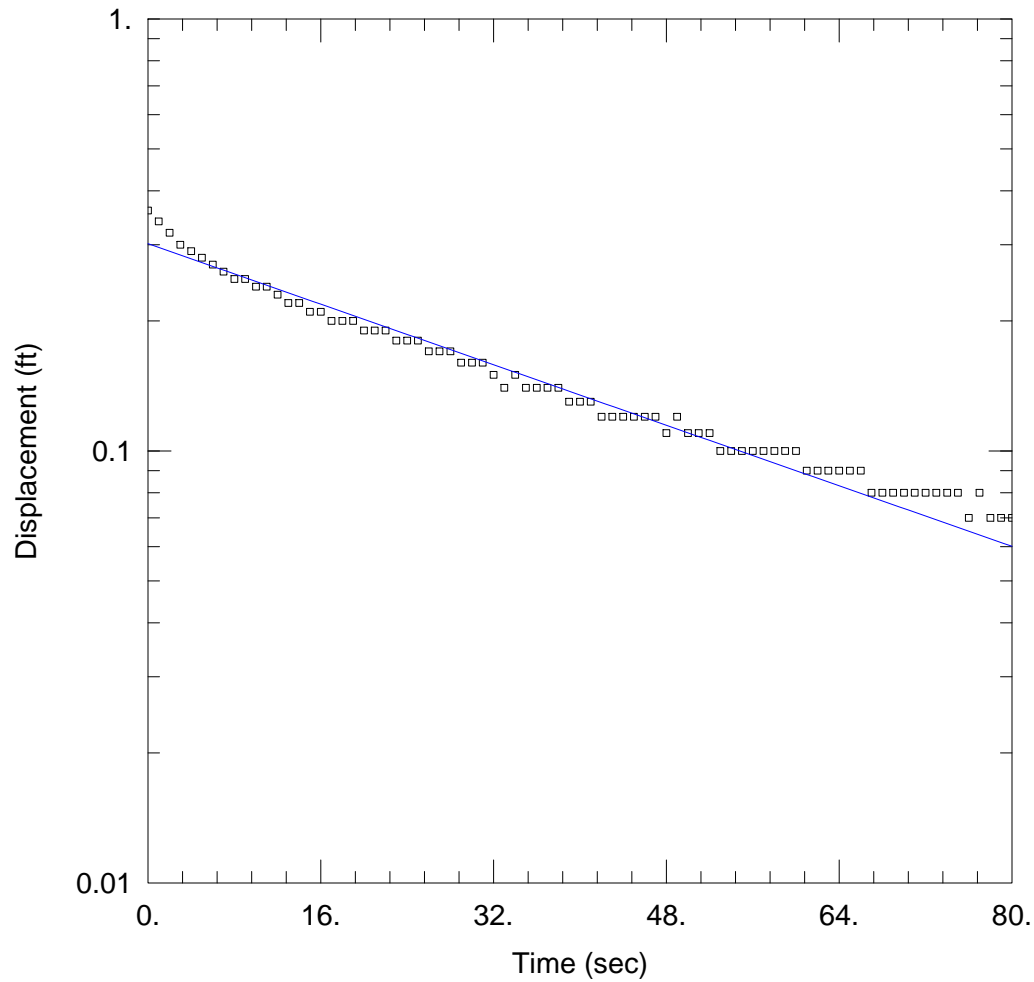
Initial Displacement: 0.7546 ft
 Total Well Penetration Depth: 12.27 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.27 ft
 Screen Length: 12.27 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0001036 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.000633 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-15_1R.aqt
 Date: 11/13/18

Time: 09:53:18

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

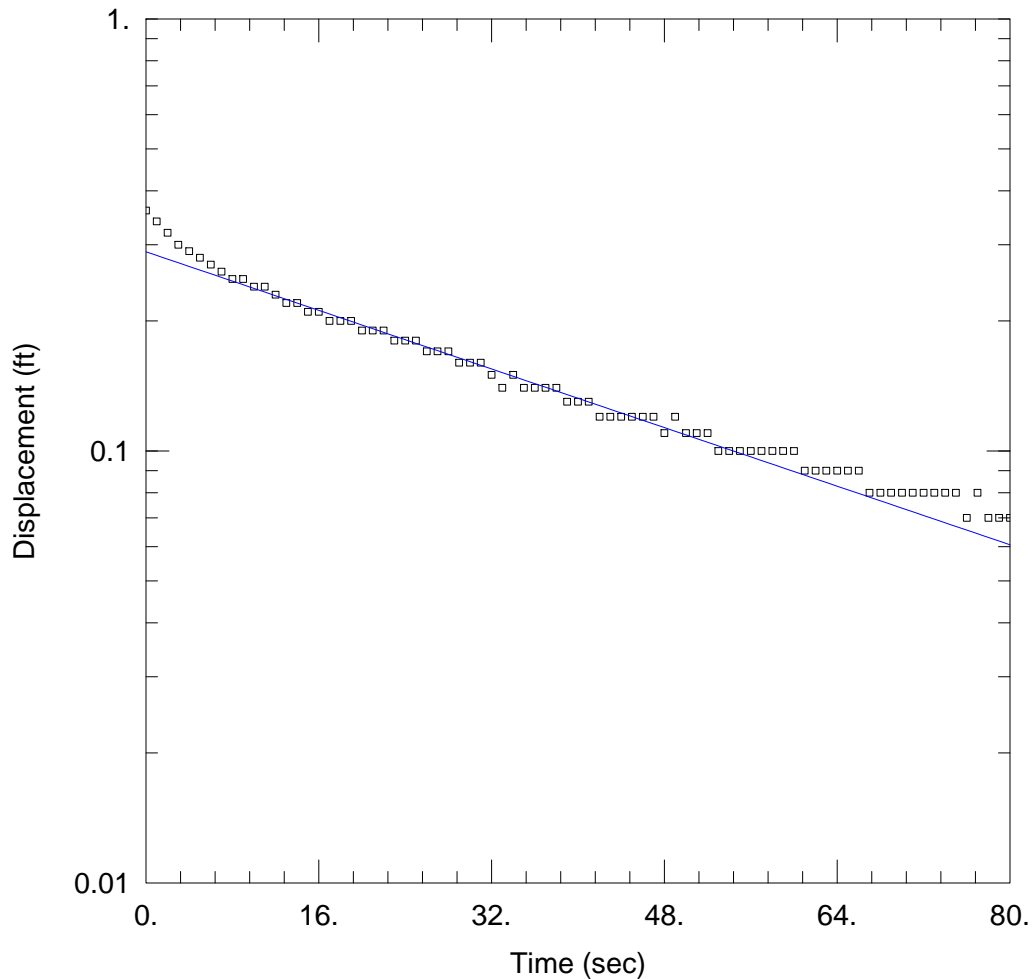
Saturated Thickness: 12.18 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-15)

Initial Displacement: 0.36 ft Static Water Column Height: 12.18 ft
 Total Well Penetration Depth: 12.18 ft Screen Length: 12.18 ft
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 1.695E-5 ft/sec y0 = 0.3018 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-15_1R.aqt
 Date: 11/13/18

Time: 09:54:37

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.18 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-15)

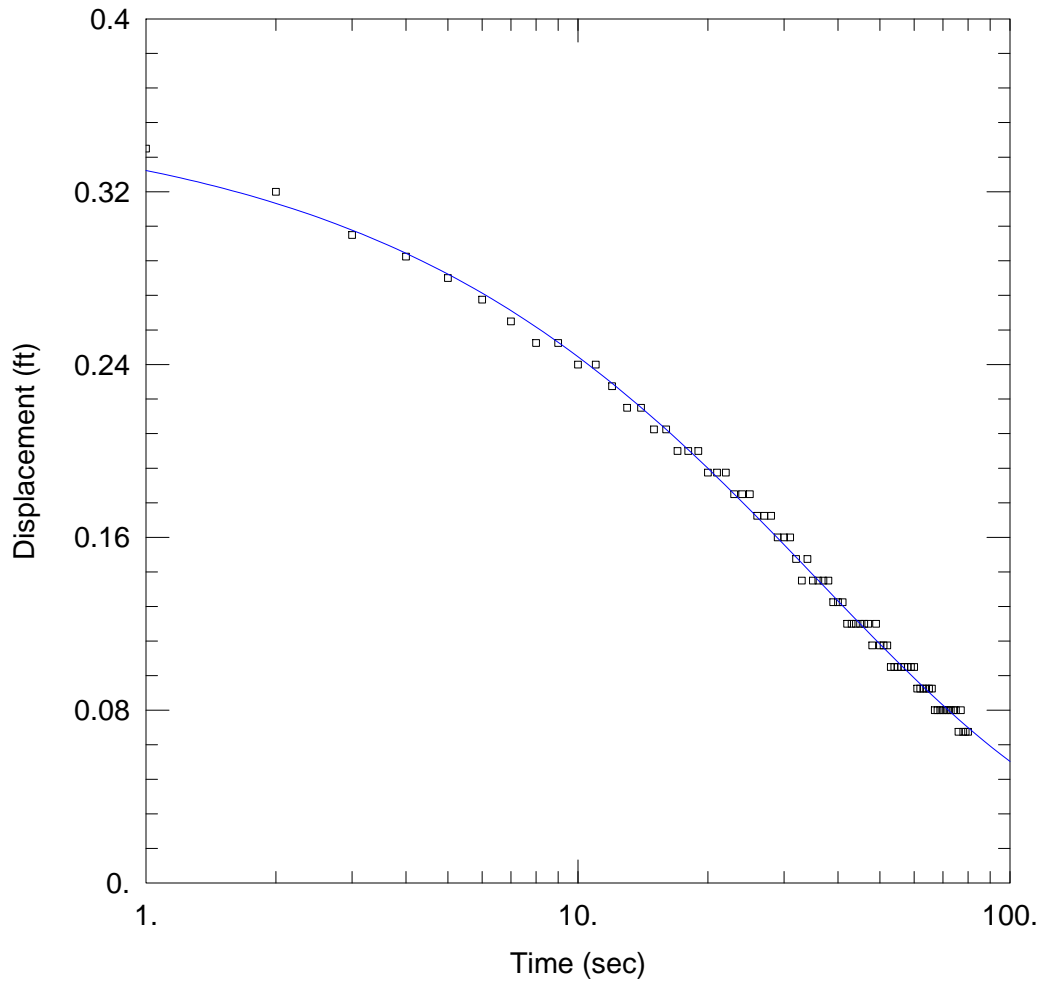
Initial Displacement: 0.36 ft
 Total Well Penetration Depth: 12.18 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.18 ft
 Screen Length: 12.18 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 2.924E-5 ft/sec

Solution Method: Hvorslev
 y0 = 0.289 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-15_1R.aqt
 Date: 11/13/18

Time: 09:55:00

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.18 ft

WELL DATA (WMW-15)

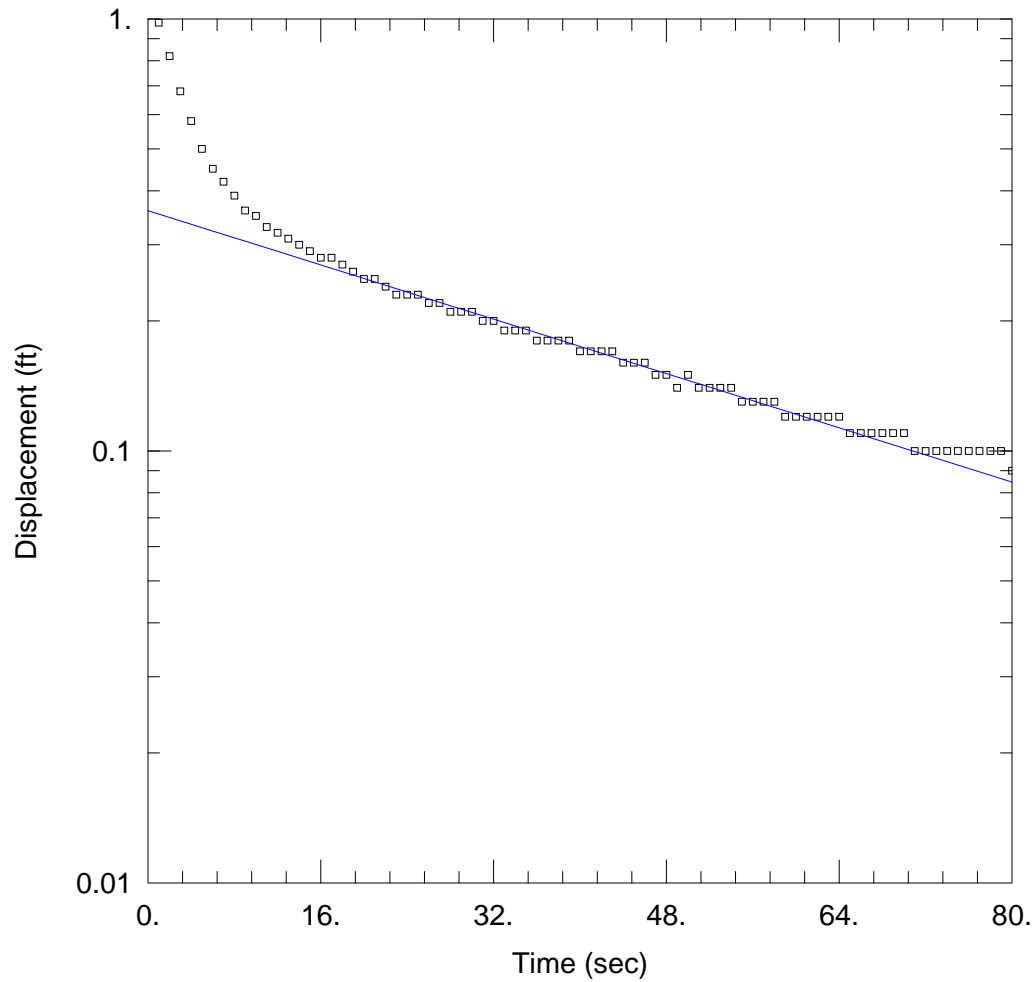
Initial Displacement: 0.36 ft
 Total Well Penetration Depth: 12.18 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.18 ft
 Screen Length: 12.18 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 1.475E-5 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.000289 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-15_2R.aqt
 Date: 11/13/18

Time: 09:58:21

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

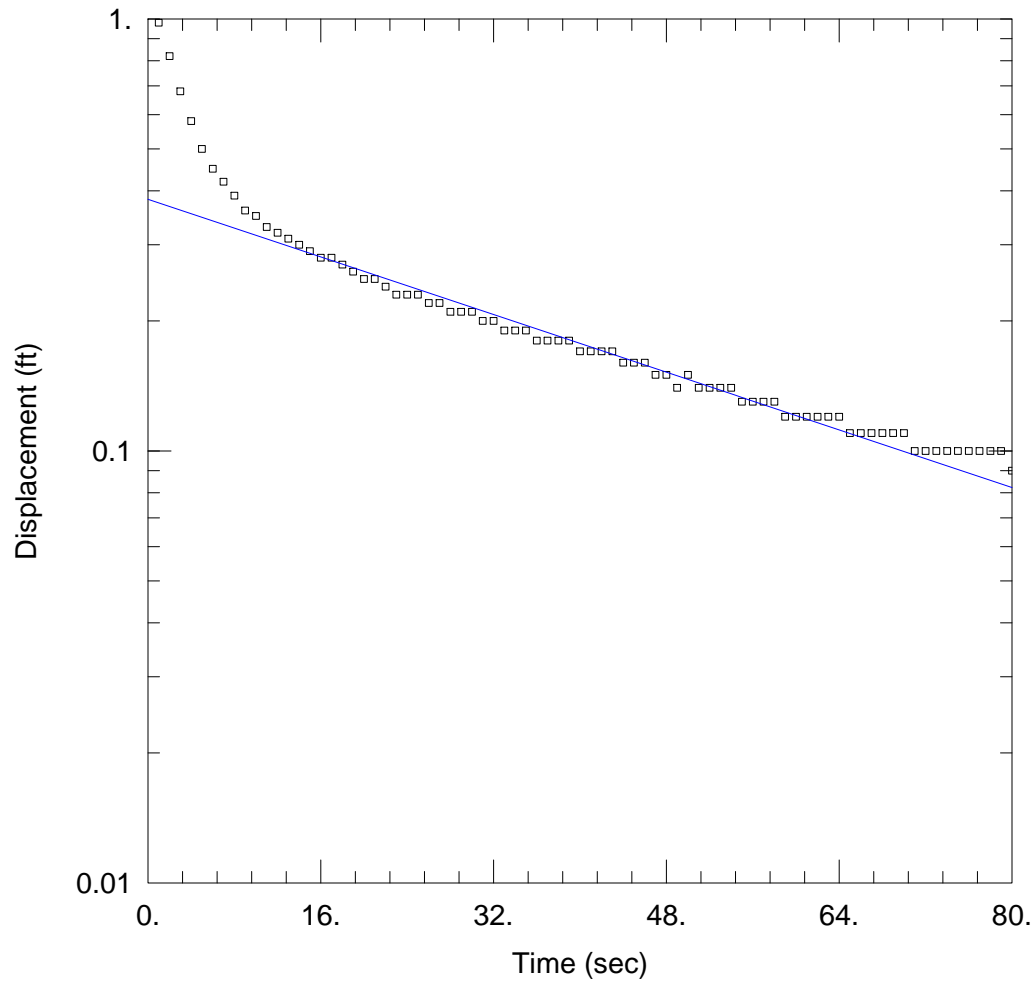
Saturated Thickness: 12.18 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-15)

Initial Displacement: 1.1 ft Static Water Column Height: 12.18 ft
 Total Well Penetration Depth: 12.18 ft Screen Length: 12.18 ft
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bower-Rice
 K = 1.52E-5 ft/sec y0 = 0.3599 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-15_2R.aqt
 Date: 11/13/18

Time: 10:00:35

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.18 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-15)

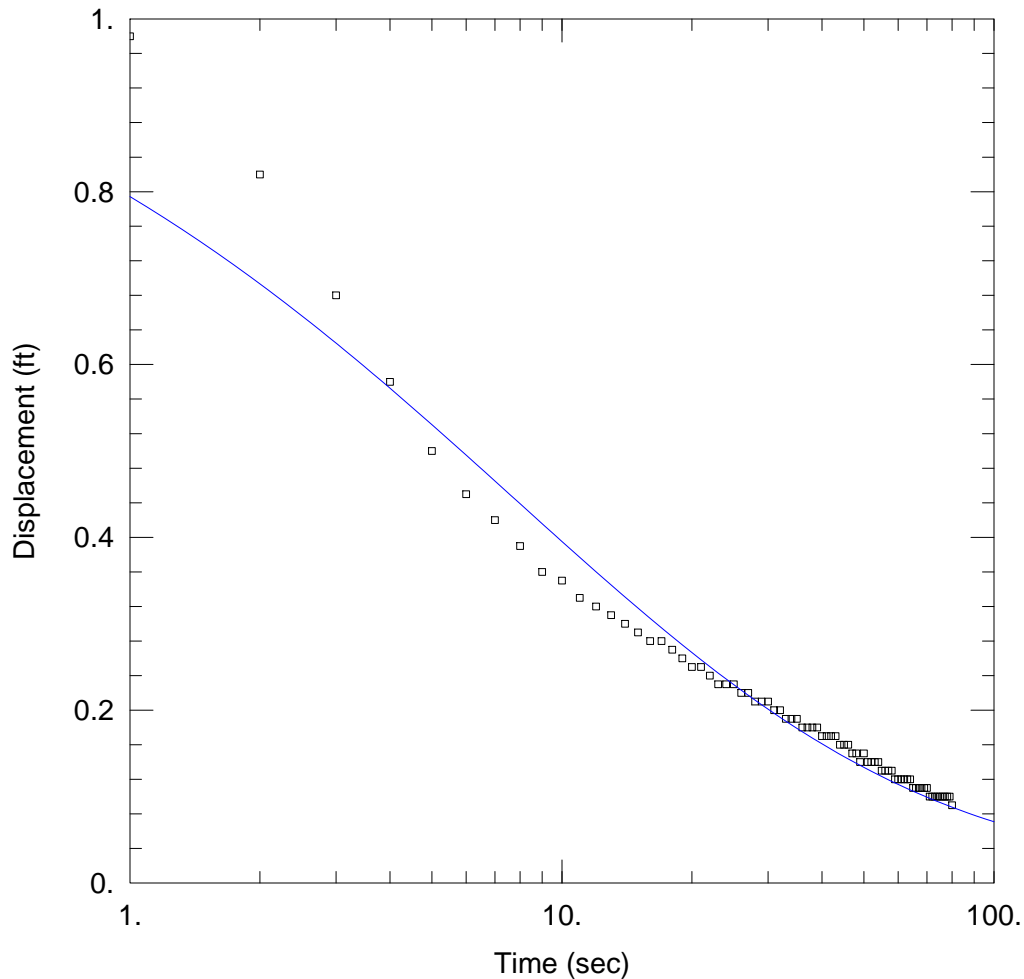
Initial Displacement: 1.1 ft
 Total Well Penetration Depth: 12.18 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.18 ft
 Screen Length: 12.18 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 2.876E-5 ft/sec

Solution Method: Hvorslev
 y0 = 0.3822 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-15_2R.aqt
 Date: 11/13/18

Time: 10:07:27

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.18 ft

WELL DATA (WMW-15)

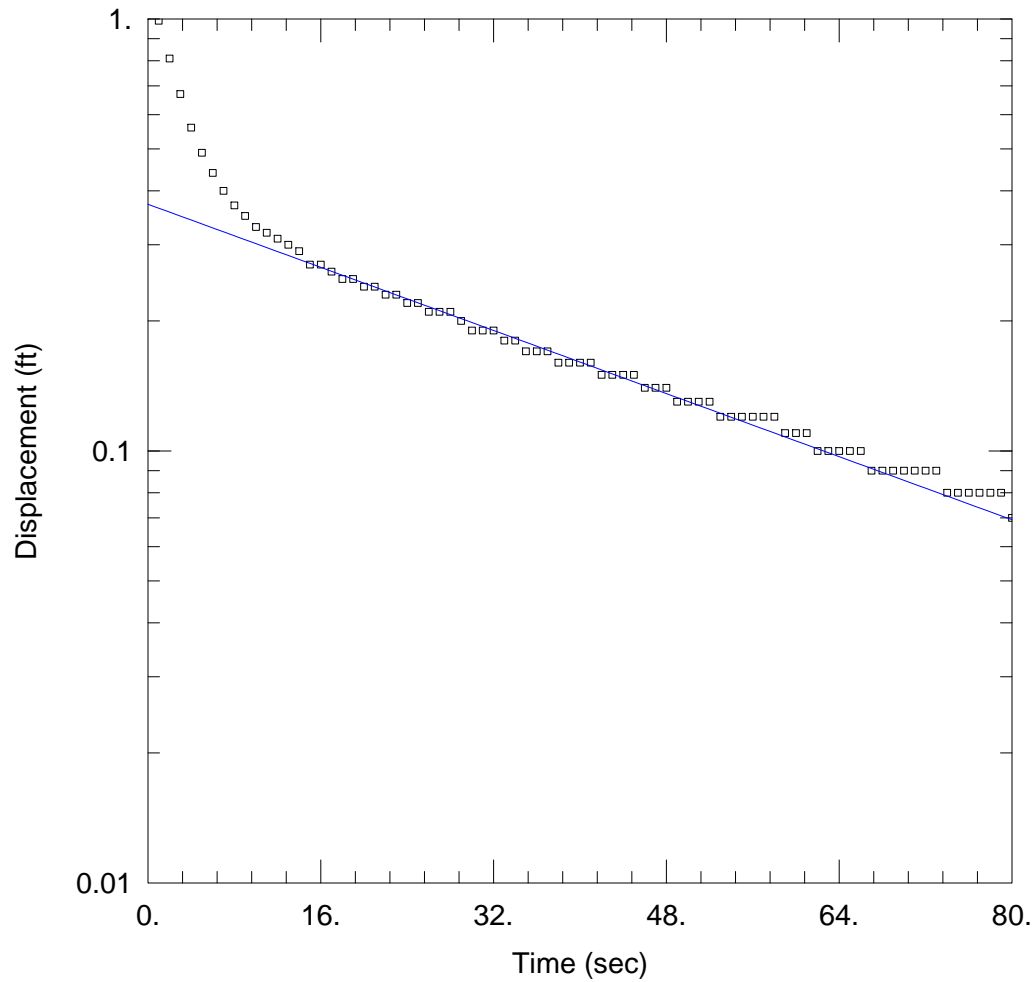
Initial Displacement: 1.1 ft
 Total Well Penetration Depth: 12.18 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.18 ft
 Screen Length: 12.18 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 2.108E-5 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.004848 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-15_3R.aqt
 Date: 11/13/18

Time: 10:08:46

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.18 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-15)

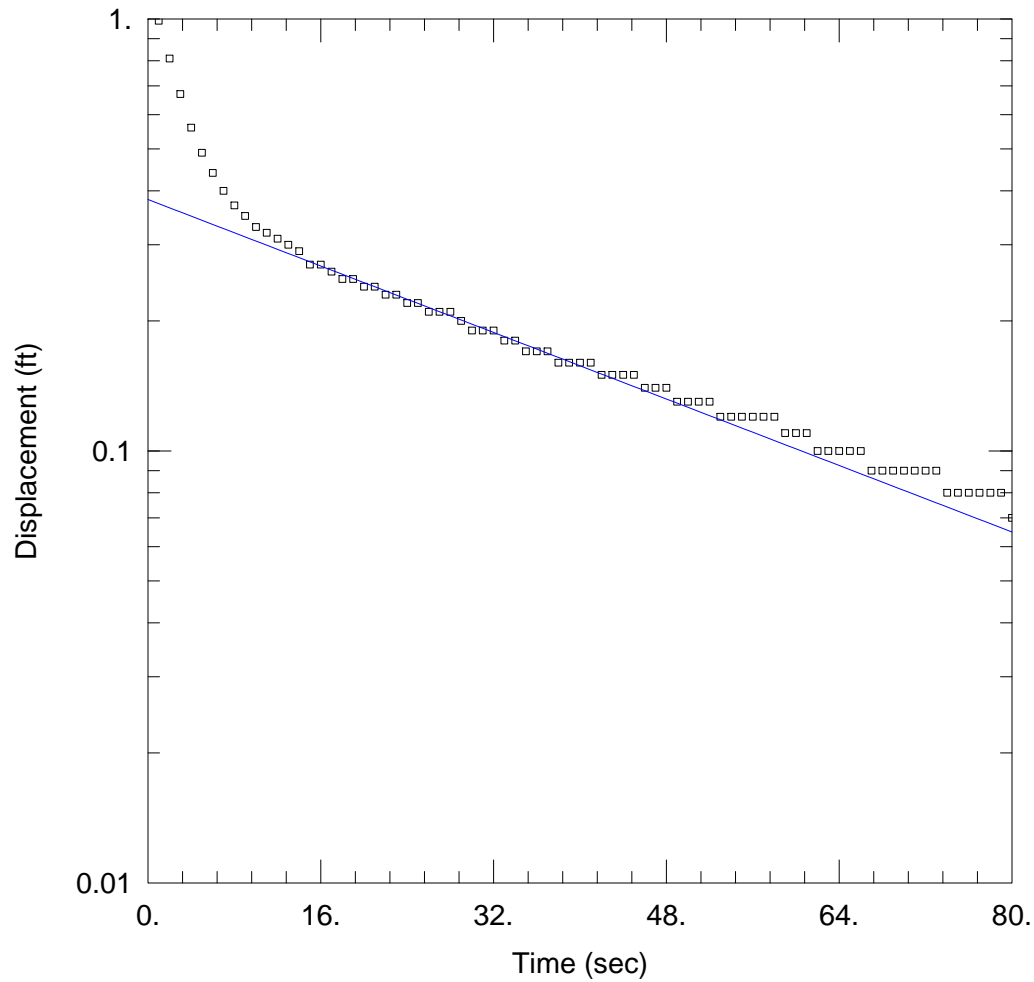
Initial Displacement: 1.28 ft
 Total Well Penetration Depth: 12.18 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.18 ft
 Screen Length: 12.18 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 1.767E-5 ft/sec

Solution Method: Bower-Rice
 y0 = 0.3724 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-15_3R.aqt
 Date: 11/13/18

Time: 10:09:15

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

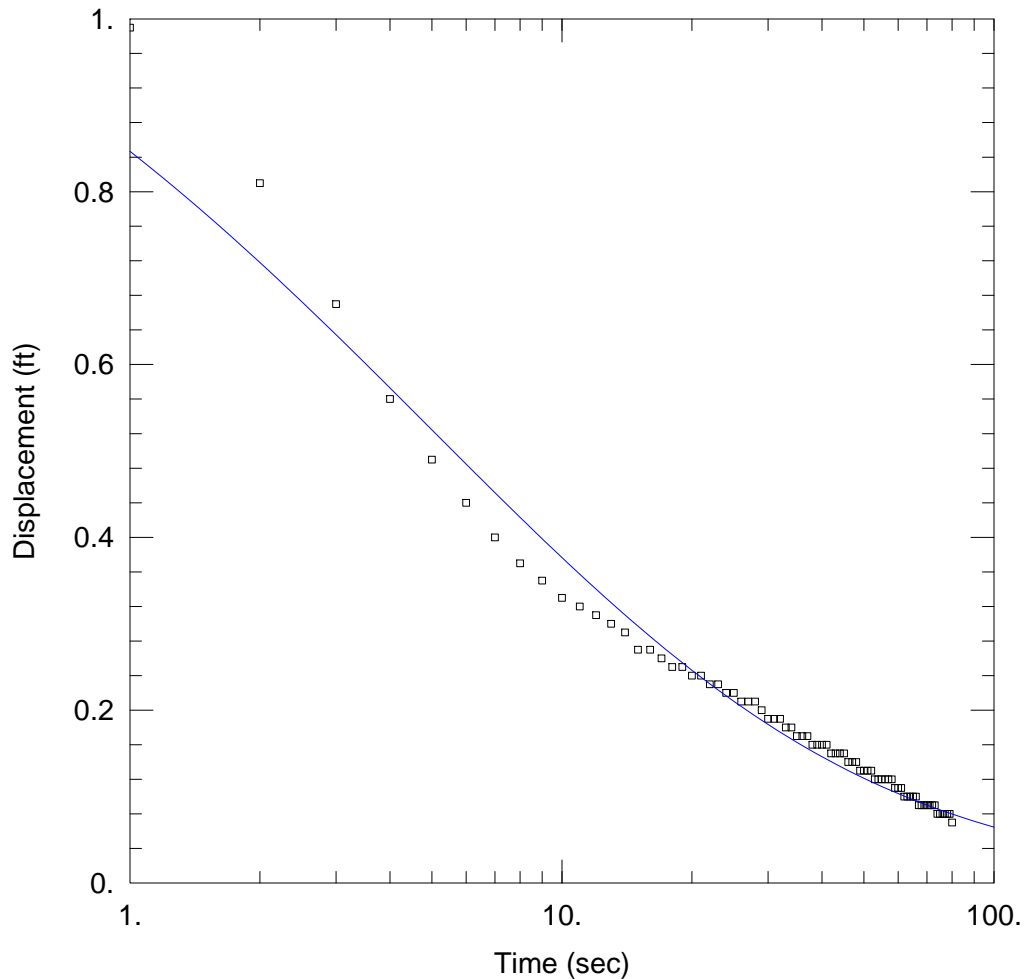
Saturated Thickness: 12.18 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-15)

Initial Displacement: 1.28 ft Static Water Column Height: 12.18 ft
 Total Well Penetration Depth: 12.18 ft Screen Length: 12.18 ft
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 3.318E-5 ft/sec y0 = 0.3819 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-15_3R.aqt
 Date: 11/13/18

Time: 10:09:37

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.18 ft

WELL DATA (WMW-15)

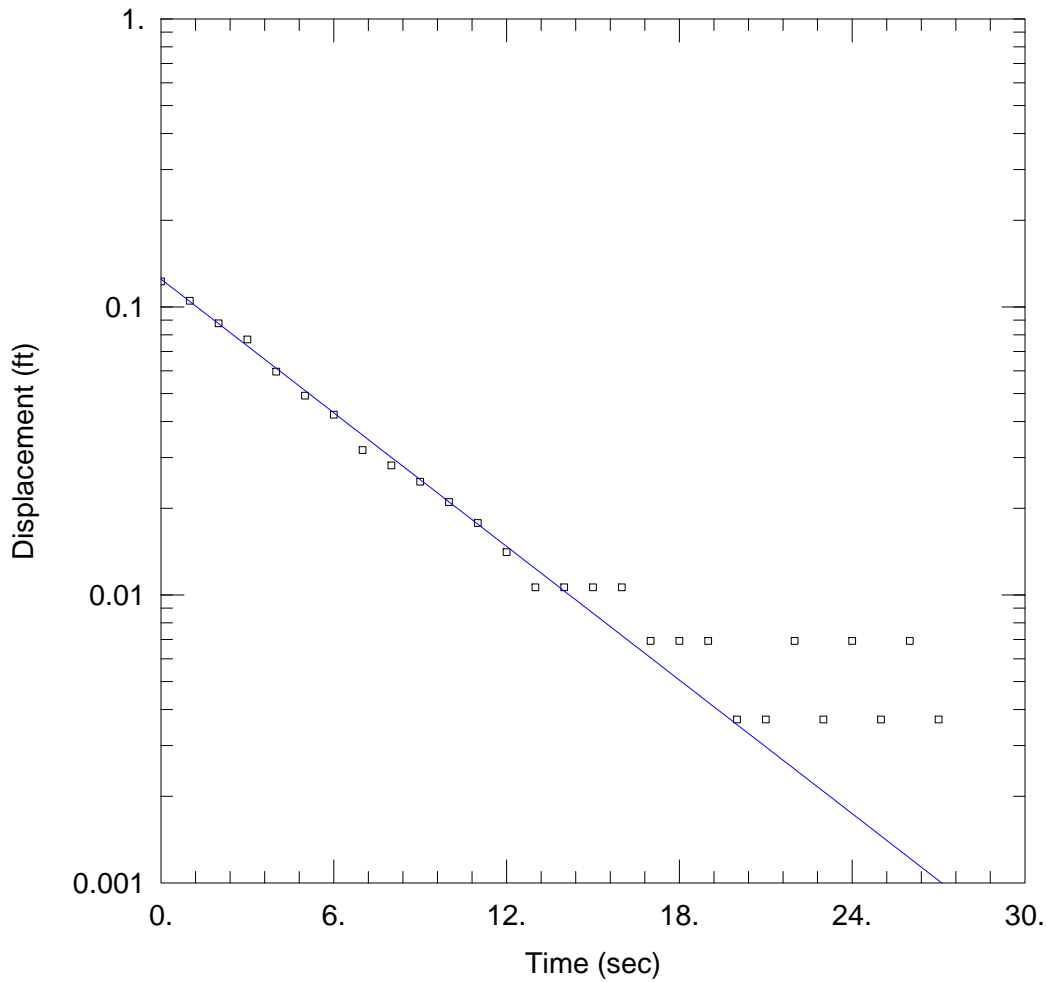
Initial Displacement: 1.28 ft
 Total Well Penetration Depth: 12.18 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.18 ft
 Screen Length: 12.18 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 2.519E-5 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.007024 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-18_1R.aqt
 Date: 11/13/18

Time: 10:13:50

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.61 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-18)

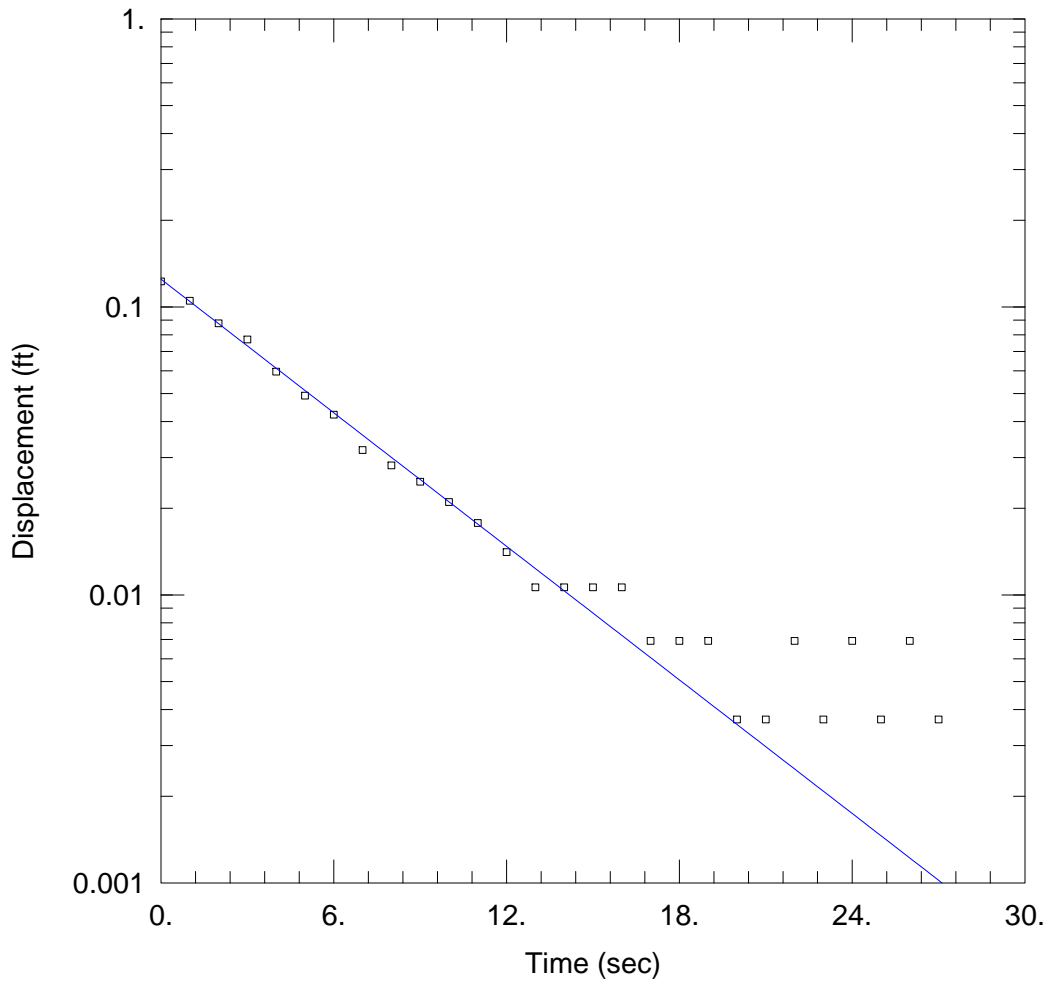
Initial Displacement: 0.1226 ft
 Total Well Penetration Depth: 12.61 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.61 ft
 Screen Length: 12.61 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.000146 ft/sec

Solution Method: Bower-Rice
 y0 = 0.1249 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-18_1R.aqt
 Date: 11/13/18

Time: 10:14:13

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.61 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-18)

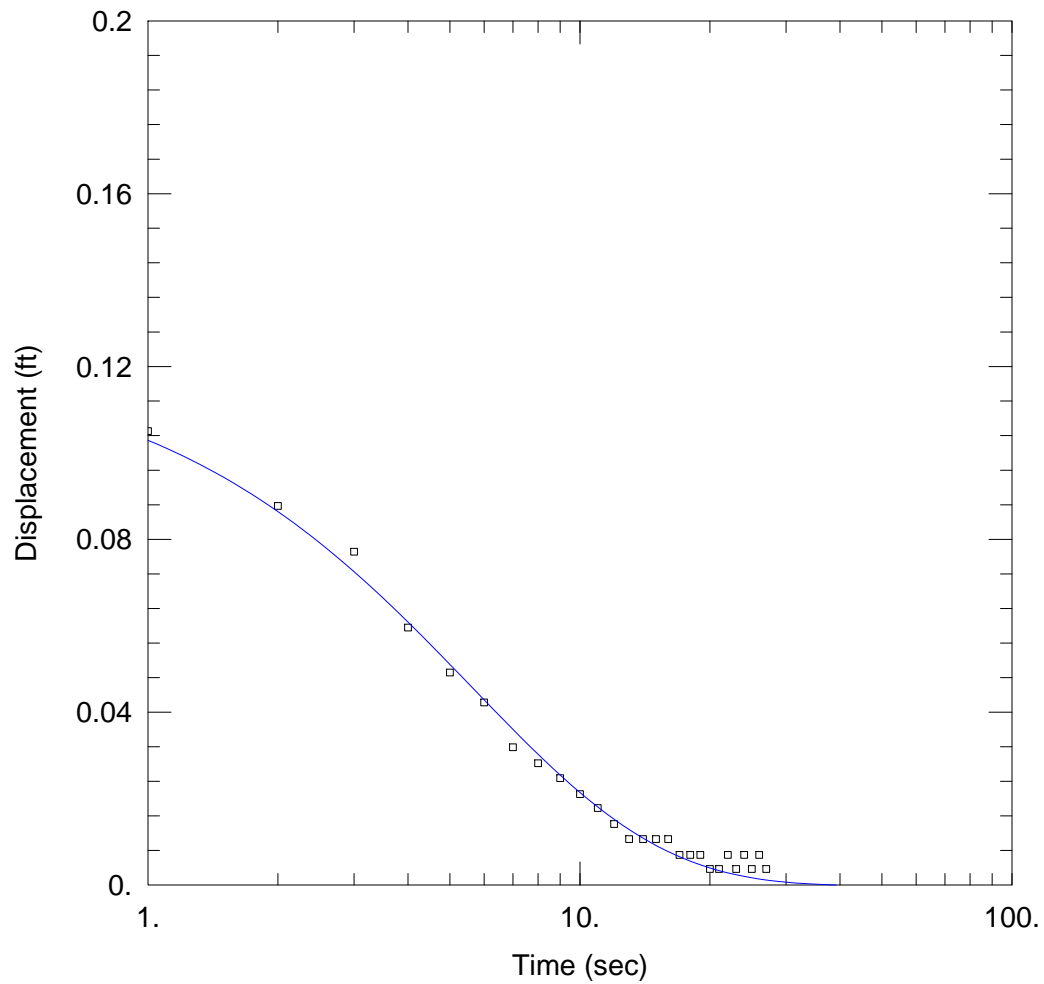
Initial Displacement: 0.1226 ft
 Total Well Penetration Depth: 12.61 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.61 ft
 Screen Length: 12.61 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0002576 ft/sec

Solution Method: Hvorslev
 y0 = 0.1248 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-18_1R.aqt
 Date: 11/13/18

Time: 10:14:34

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.61 ft

WELL DATA (WMW-18)

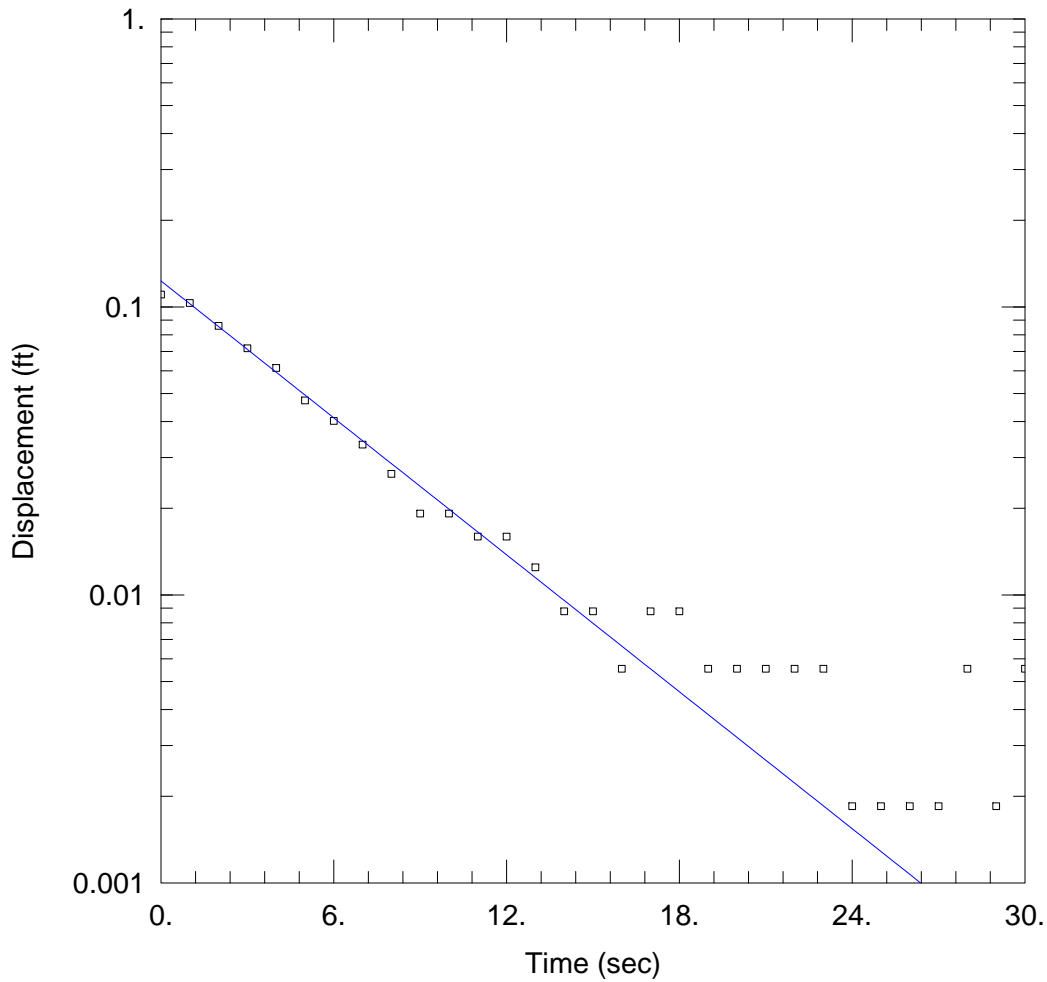
Initial Displacement: 0.1226 ft
 Total Well Penetration Depth: 12.61 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.61 ft
 Screen Length: 12.61 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0001571 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 1.111E-11 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-18_2R.aqt
 Date: 11/13/18

Time: 10:15:20

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.61 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-18)

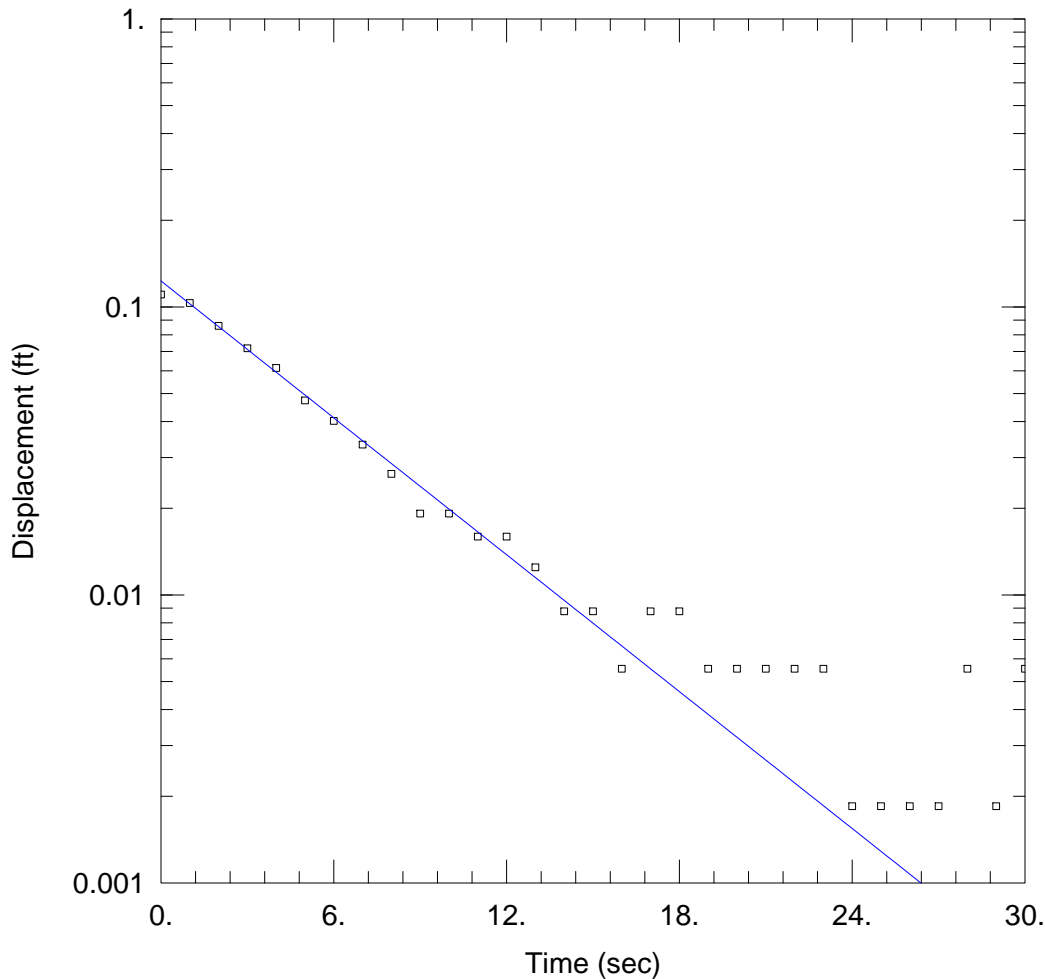
Initial Displacement: 0.1104 ft
 Total Well Penetration Depth: 12.61 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.61 ft
 Screen Length: 12.61 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0001496 ft/sec

Solution Method: Bower-Rice
 y0 = 0.1231 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-18_2R.aqt
 Date: 11/13/18

Time: 10:17:06

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.61 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-18)

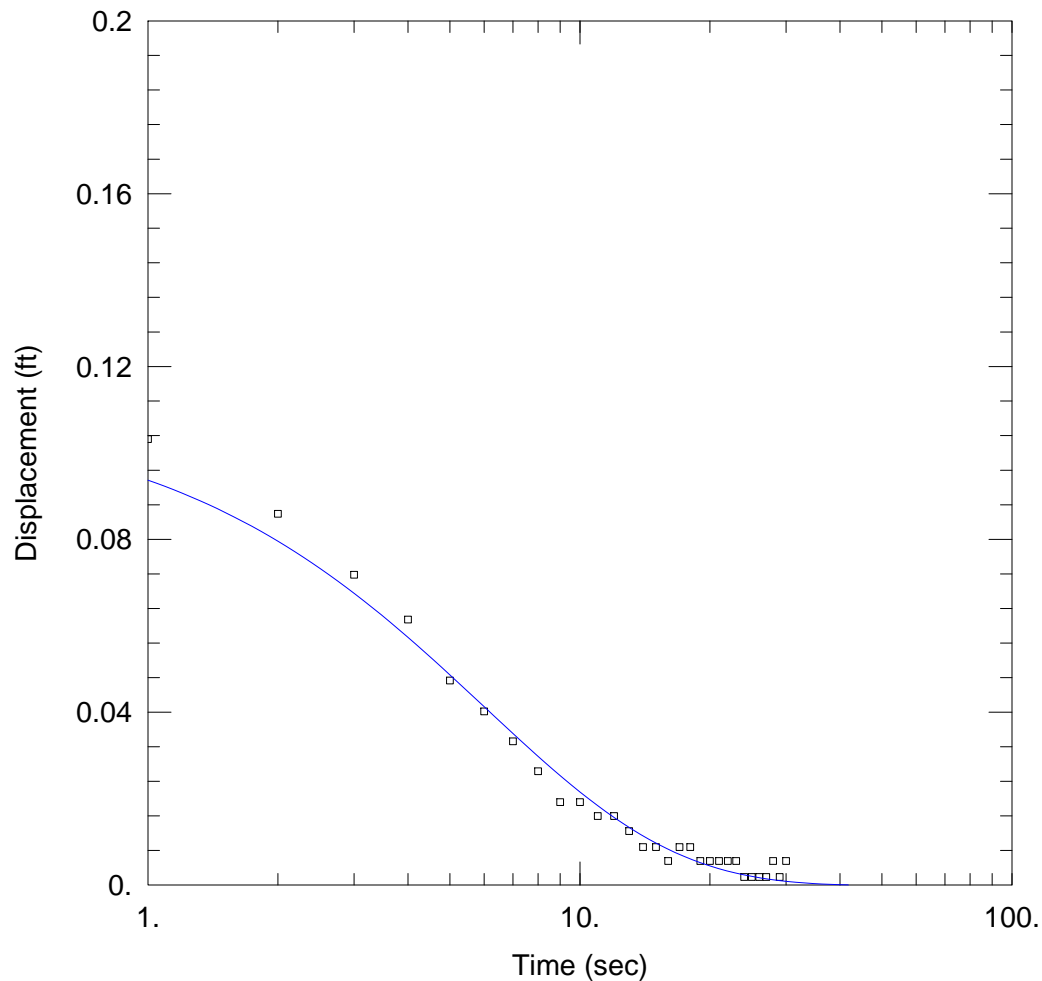
Initial Displacement: 0.1104 ft
 Total Well Penetration Depth: 12.61 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.61 ft
 Screen Length: 12.61 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.000264 ft/sec

Solution Method: Hvorslev
 y0 = 0.1231 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-18_2R.aqt
 Date: 11/13/18

Time: 10:17:29

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.61 ft

WELL DATA (WMW-18)

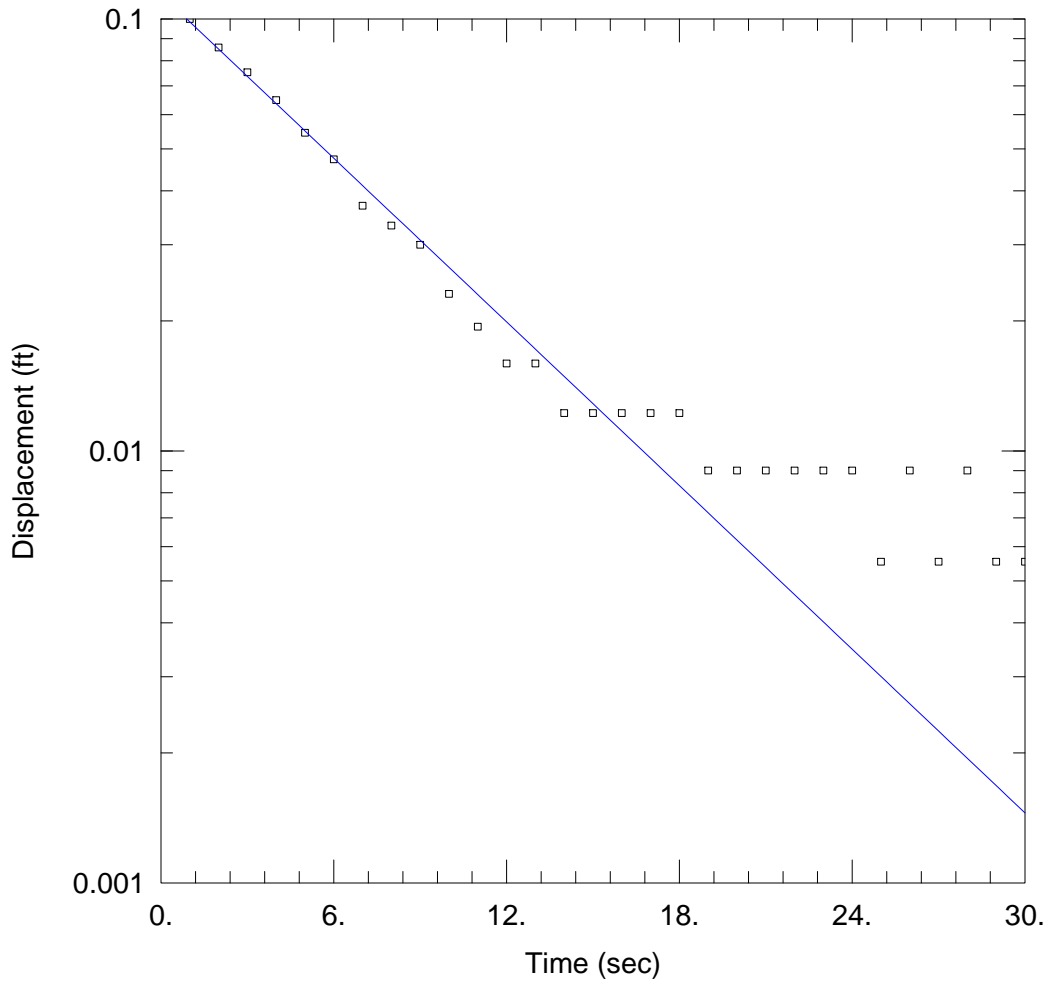
Initial Displacement: 0.1104 ft
 Total Well Penetration Depth: 12.61 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.61 ft
 Screen Length: 12.61 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.000147 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 1.111E-11 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-18_3R.aqt
 Date: 11/13/18

Time: 10:19:34

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.61 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-18)

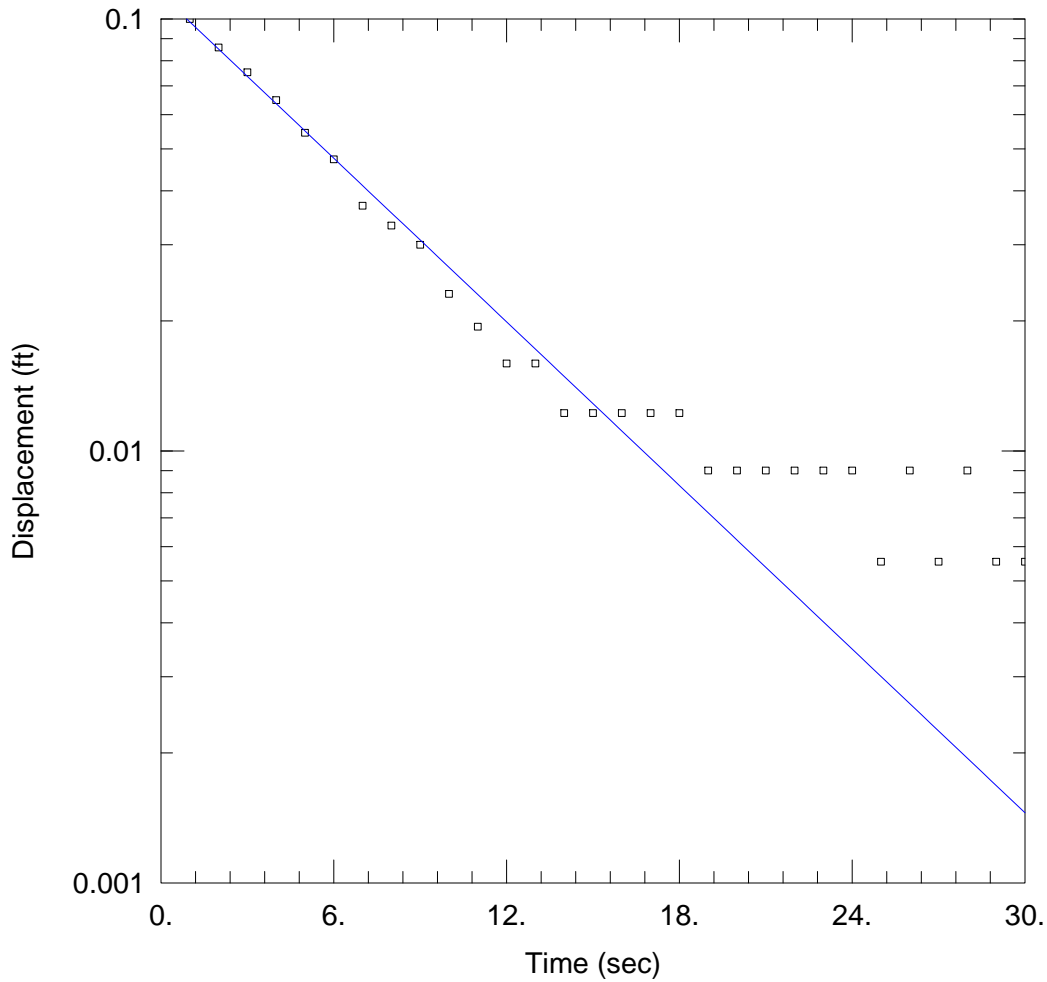
Initial Displacement: 0.1104 ft
 Total Well Penetration Depth: 12.61 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.61 ft
 Screen Length: 12.61 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0001192 ft/sec

Solution Method: Bower-Rice
 y0 = 0.1139 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-18_3R.aqt
 Date: 11/13/18

Time: 10:20:14

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.61 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-18)

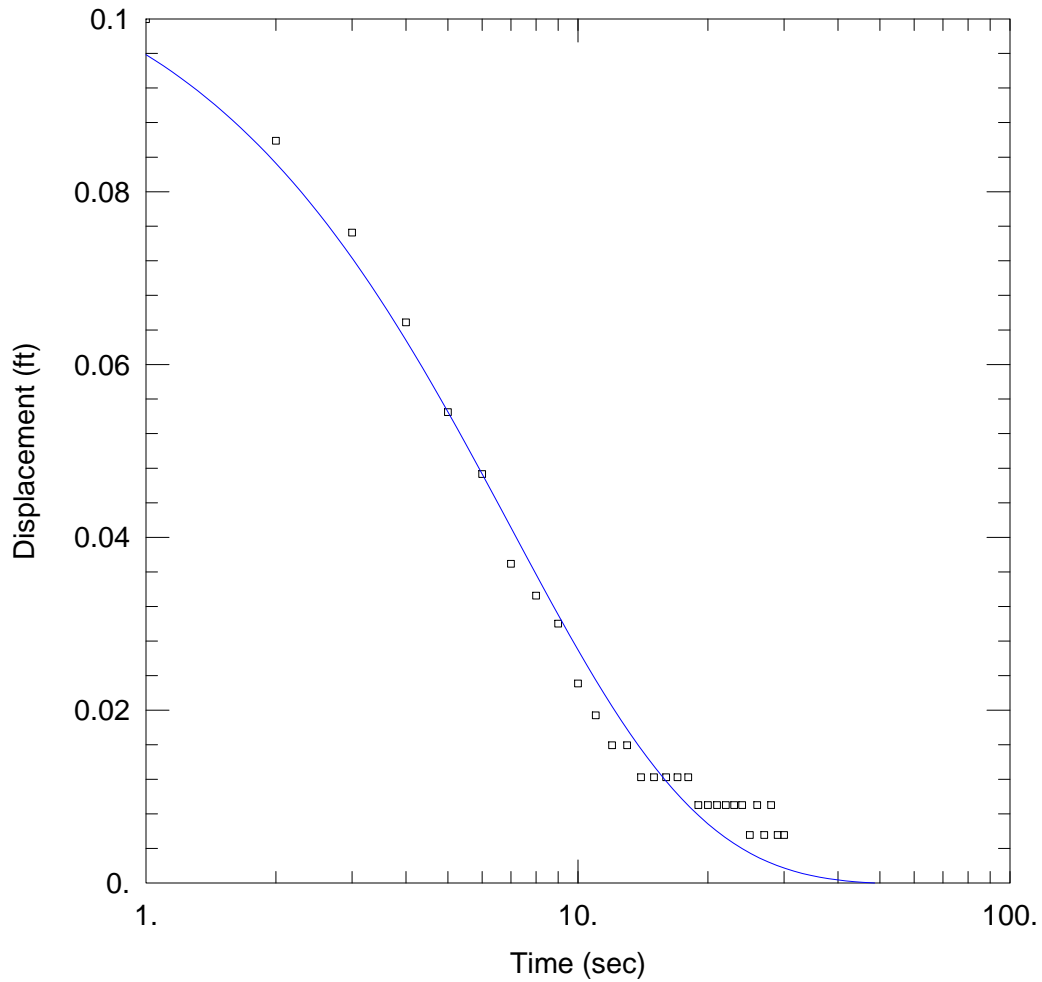
Initial Displacement: 0.1104 ft
 Total Well Penetration Depth: 12.61 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 12.61 ft
 Screen Length: 12.61 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0002104 ft/sec

Solution Method: Hvorslev
 y0 = 0.1139 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-18_3R.aqt
 Date: 11/13/18

Time: 10:20:36

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1696120
 Location: Wishram Railyard, Washington
 Test Well: WMW-15
 Test Date: 2016

AQUIFER DATA

Saturated Thickness: 12.61 ft

WELL DATA (WMW-18)

Initial Displacement: 0.1104 ft
 Total Well Penetration Depth: 12.61 ft
 Casing Radius: 0.083 ft

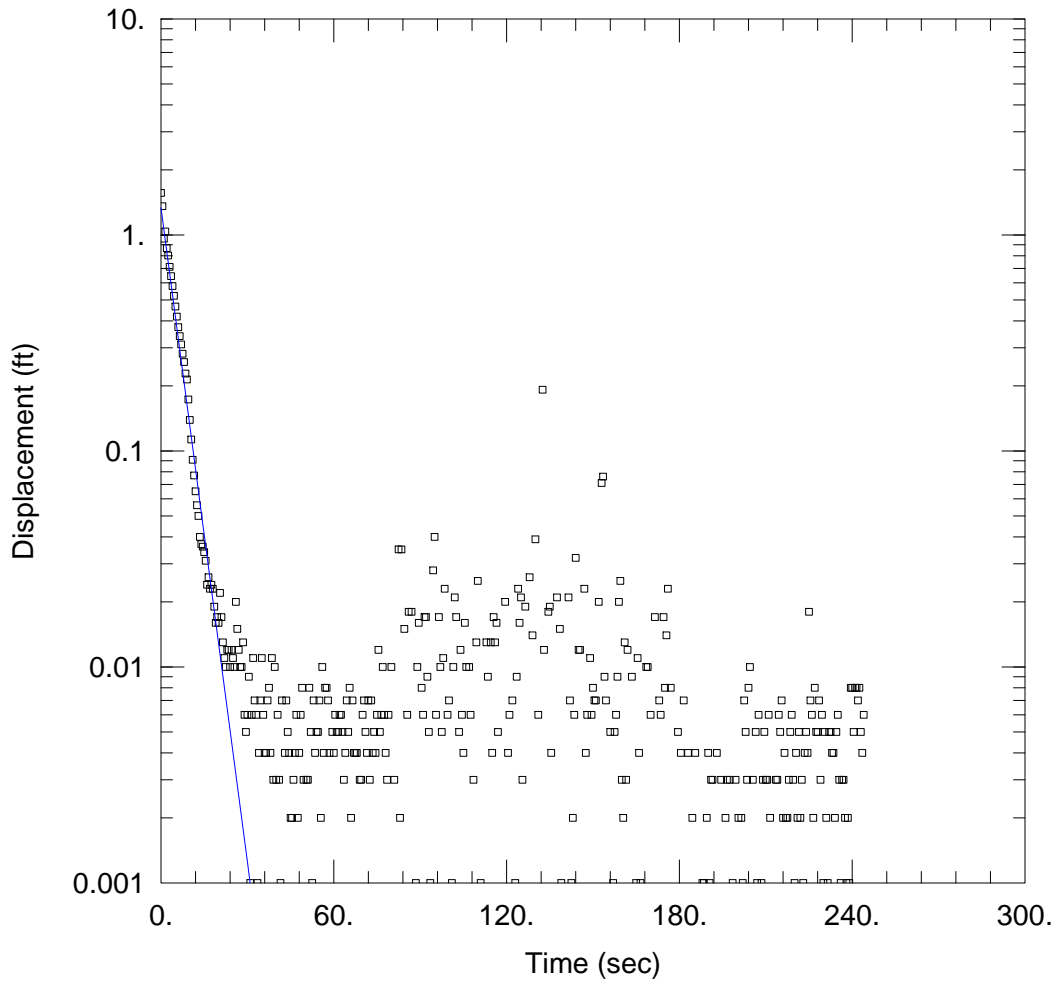
Static Water Column Height: 12.61 ft
 Screen Length: 12.61 ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0001265 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 1.111E-11 ft⁻¹

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TEST 1 - FALLING

Data Set: N:\...\RMD-06-1F.aqt
 Date: 10/05/18

Time: 14:29:23

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: RMD-06
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.89 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-06)

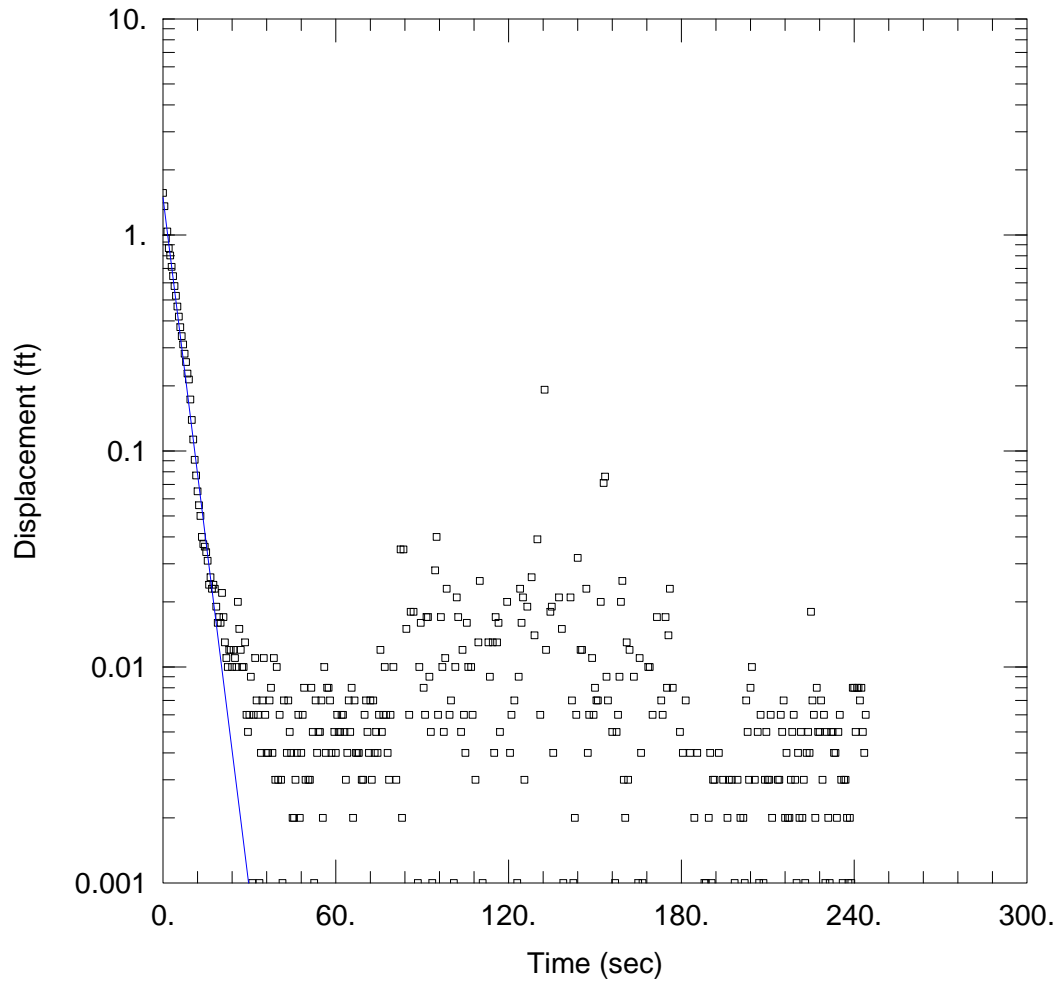
Initial Displacement: 1.566 ft
 Total Well Penetration Depth: 47.89 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 47.89 ft
 Screen Length: 20. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0001799 ft/sec

Solution Method: Bower-Rice
 y0 = 1.336 ft



TEST 1 - FALLING

Data Set: N:\...\RMD-06-1F.aqt
 Date: 10/05/18

Time: 14:27:45

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: RMD-06
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.89 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-06)

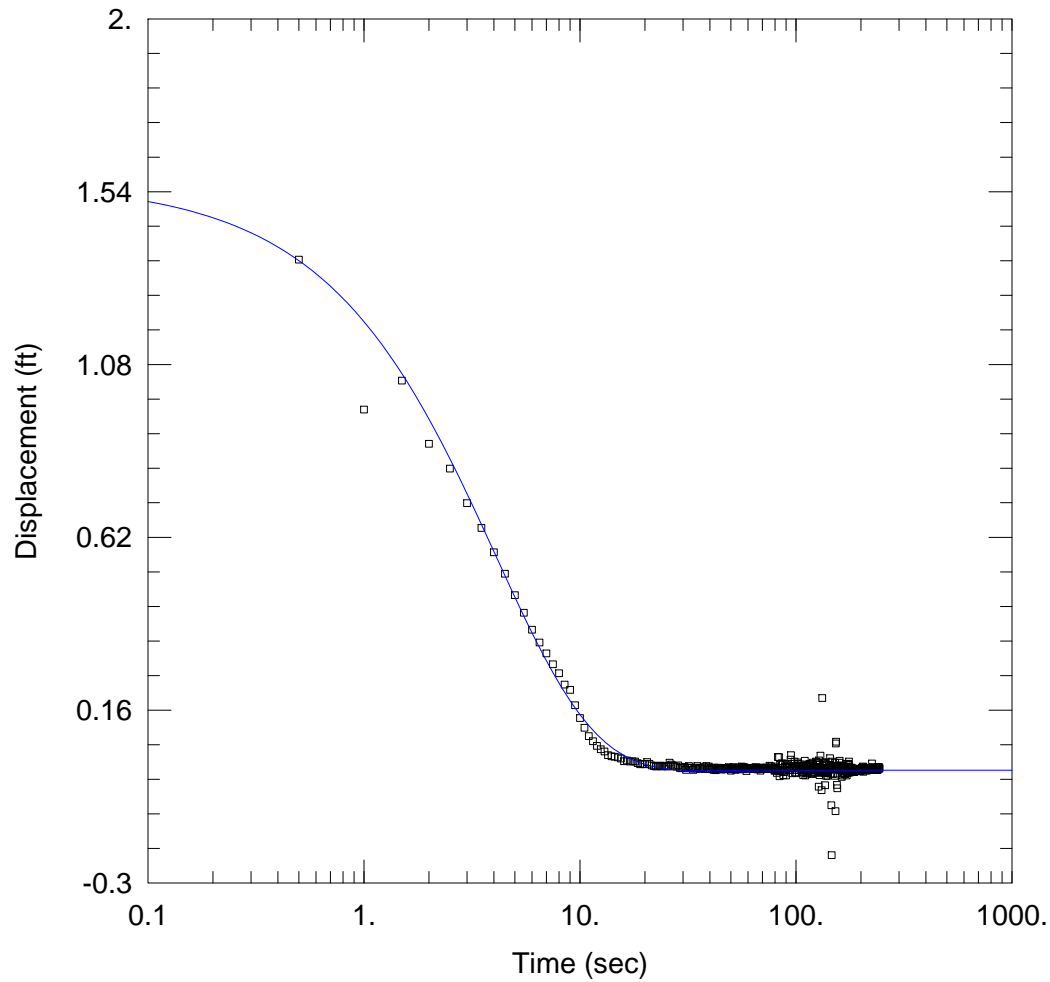
Initial Displacement: 1.566 ft
 Total Well Penetration Depth: 47.89 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 47.89 ft
 Screen Length: 20. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.000244 ft/sec

Solution Method: Hvorslev
 y0 = 1.489 ft



TEST 1 - FALLING

Data Set: N:\...\RMD-06-1F.aqt
 Date: 10/05/18

Time: 14:27:01

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: RMD-06
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.89 ft

WELL DATA (RMD-06)

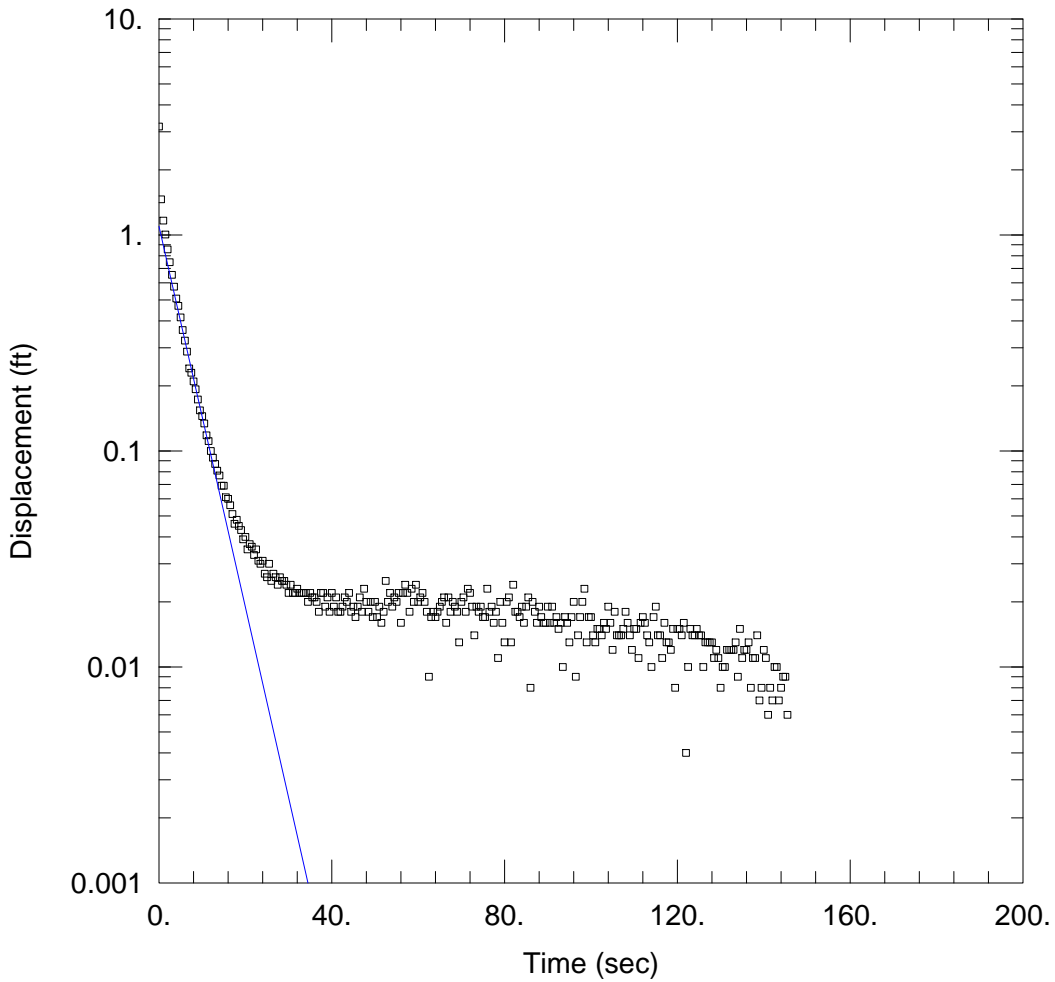
Initial Displacement: 1.566 ft
 Total Well Penetration Depth: 47.89 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 47.89 ft
 Screen Length: 20. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0002166 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 6.158E-7 ft⁻¹



TEST 2 - RISING

Data Set: N:\...\RMD-06-2R.aqt
 Date: 10/05/18

Time: 14:25:24

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: RMD-06
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.9 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-06)

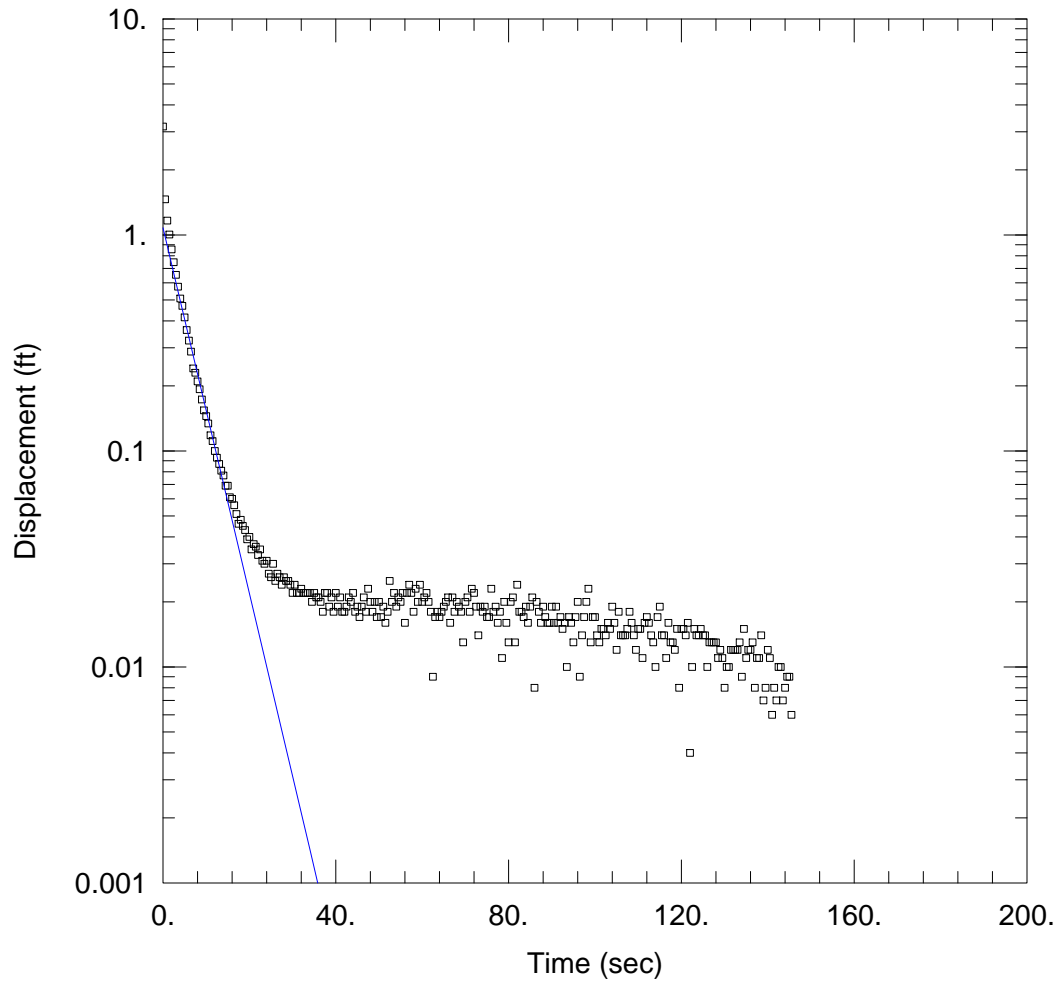
Initial Displacement: 3.174 ft
 Total Well Penetration Depth: 47.9 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 47.9 ft
 Screen Length: 20. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0001571 ft/sec

Solution Method: Bower-Rice
 y0 = 1.096 ft



TEST 2 - RISING

Data Set: N:\...\RMD-06-2R.aqt
 Date: 10/05/18

Time: 14:24:49

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: RMD-06
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.9 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-06)

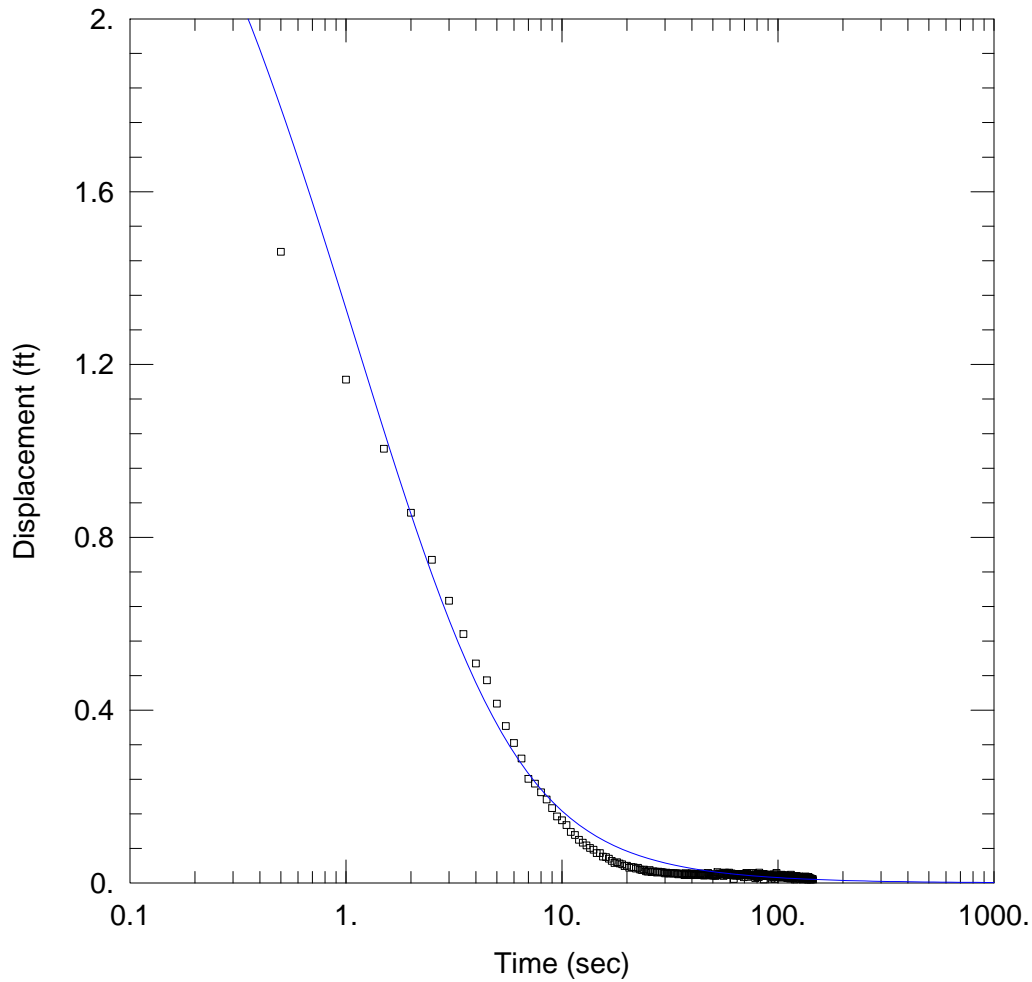
Initial Displacement: 3.174 ft
 Total Well Penetration Depth: 47.9 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 47.9 ft
 Screen Length: 20. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0001936 ft/sec

Solution Method: Hvorslev
 y0 = 1.08 ft



TEST 2 - RISING

Data Set: N:\...\RMD-06-2R.aqt
 Date: 10/05/18

Time: 14:04:08

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: RMD-06
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.9 ft

WELL DATA (RMD-06)

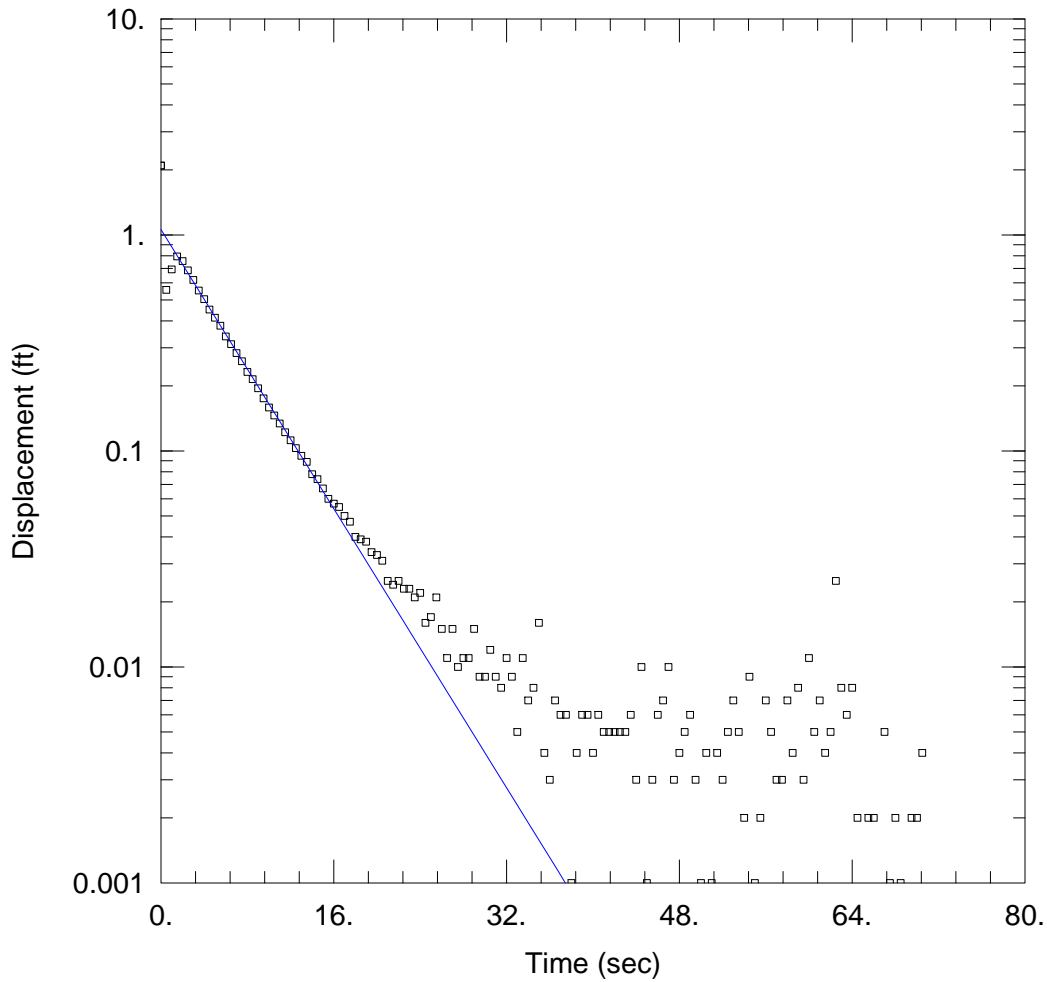
Initial Displacement: 3.174 ft
 Total Well Penetration Depth: 47.9 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 47.9 ft
 Screen Length: 20. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0002133 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.002088 ft⁻¹



TEST 3 - FALLING

Data Set: N:\...\RMD-06-3F.aqt
 Date: 10/05/18

Time: 14:02:17

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: RMD-06
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.89 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-06)

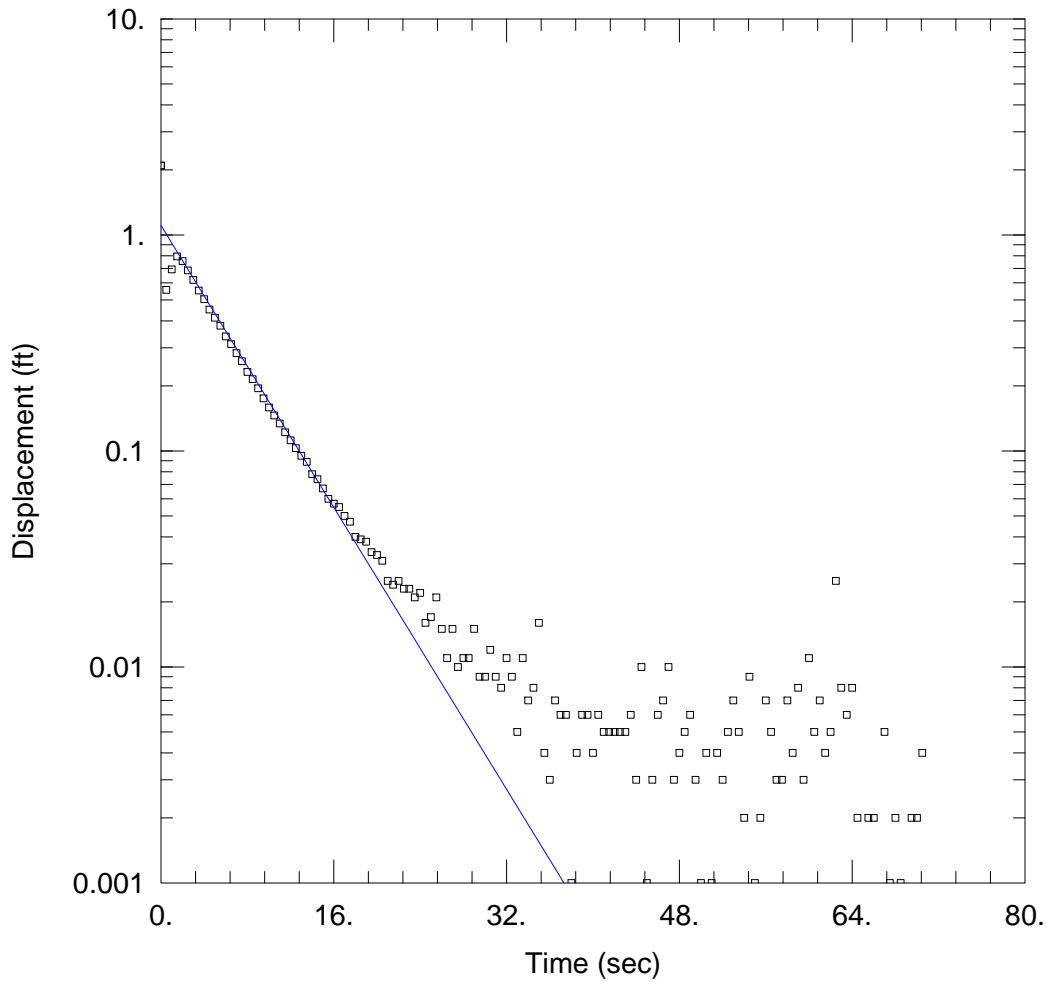
Initial Displacement: 2.094 ft
 Total Well Penetration Depth: 47.89 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 47.89 ft
 Screen Length: 20. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.000144 ft/sec

Solution Method: Bower-Rice
 y0 = 1.058 ft



TEST 3 - FALLING

Data Set: N:\...\RMD-06-3F.aqt
 Date: 10/05/18

Time: 14:01:54

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: RMD-06
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.89 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-06)

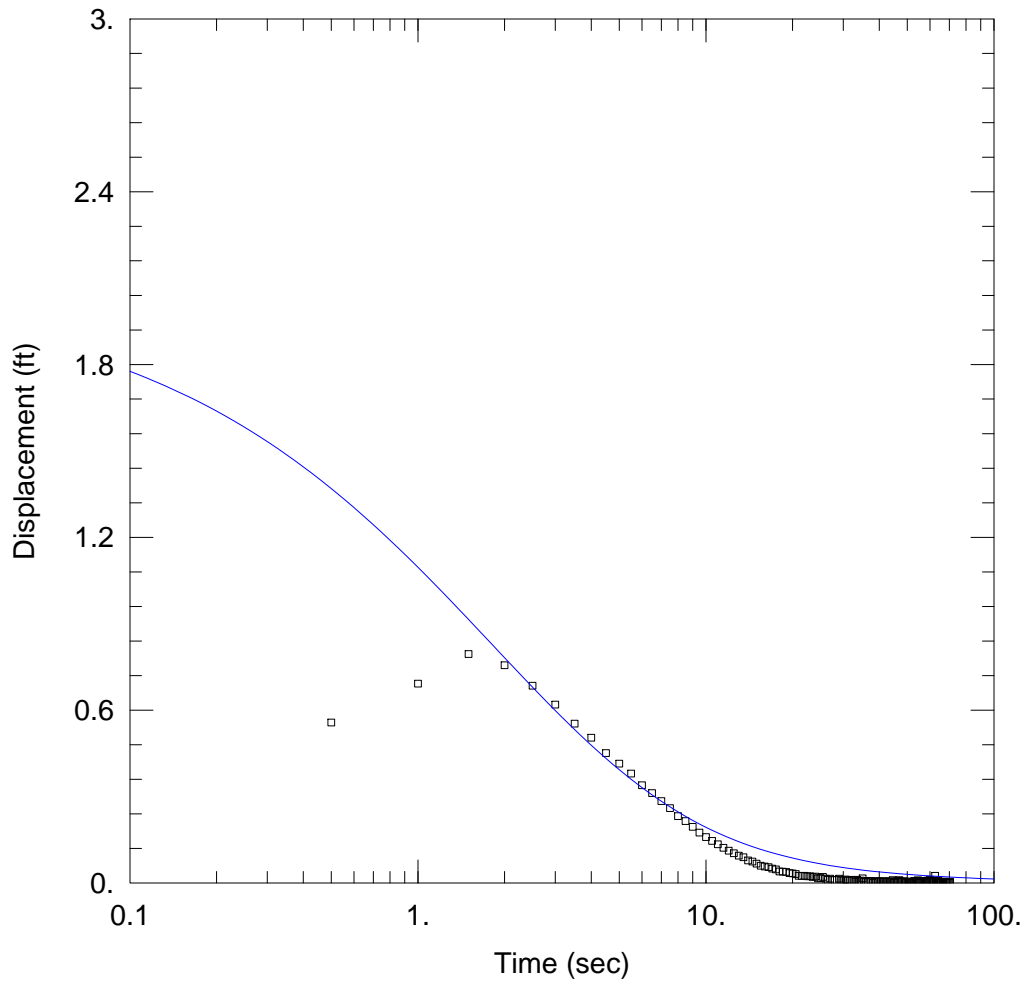
Initial Displacement: 2.094 ft
 Total Well Penetration Depth: 47.89 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 47.89 ft
 Screen Length: 20. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0001866 ft/sec

Solution Method: Hvorslev
 y0 = 1.106 ft



TEST 3 - FALLING

Data Set: N:\...\RMD-06-3F.aqt
 Date: 10/05/18

Time: 14:00:44

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: RMD-06
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.89 ft

WELL DATA (RMD-06)

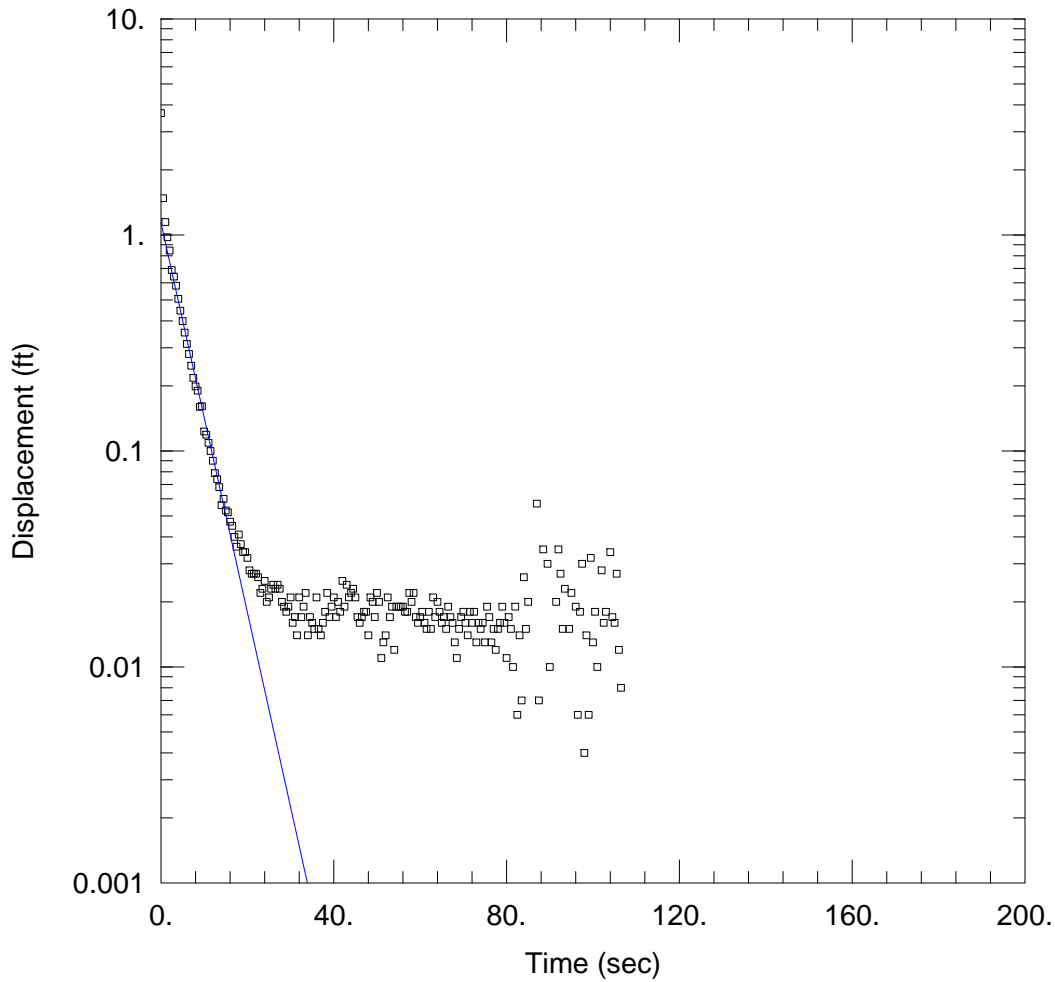
Initial Displacement: 2.094 ft
 Total Well Penetration Depth: 47.89 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 47.89 ft
 Screen Length: 20. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0001311 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.002088 ft⁻¹



TEST 4 - RISING

Data Set:

Date: 10/05/18

Time: 13:43:55

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants

Client: BNSF Railway Company

Project: 1896120*04

Location: Wishram Railyard, Washington

Test Well: RMD-06

Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.9 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-06)

Initial Displacement: 3.668 ft

Static Water Column Height: 47.9 ft

Total Well Penetration Depth: 47.9 ft

Screen Length: 20. ft

Casing Radius: 0.083 ft

Well Radius: 0.125 ft

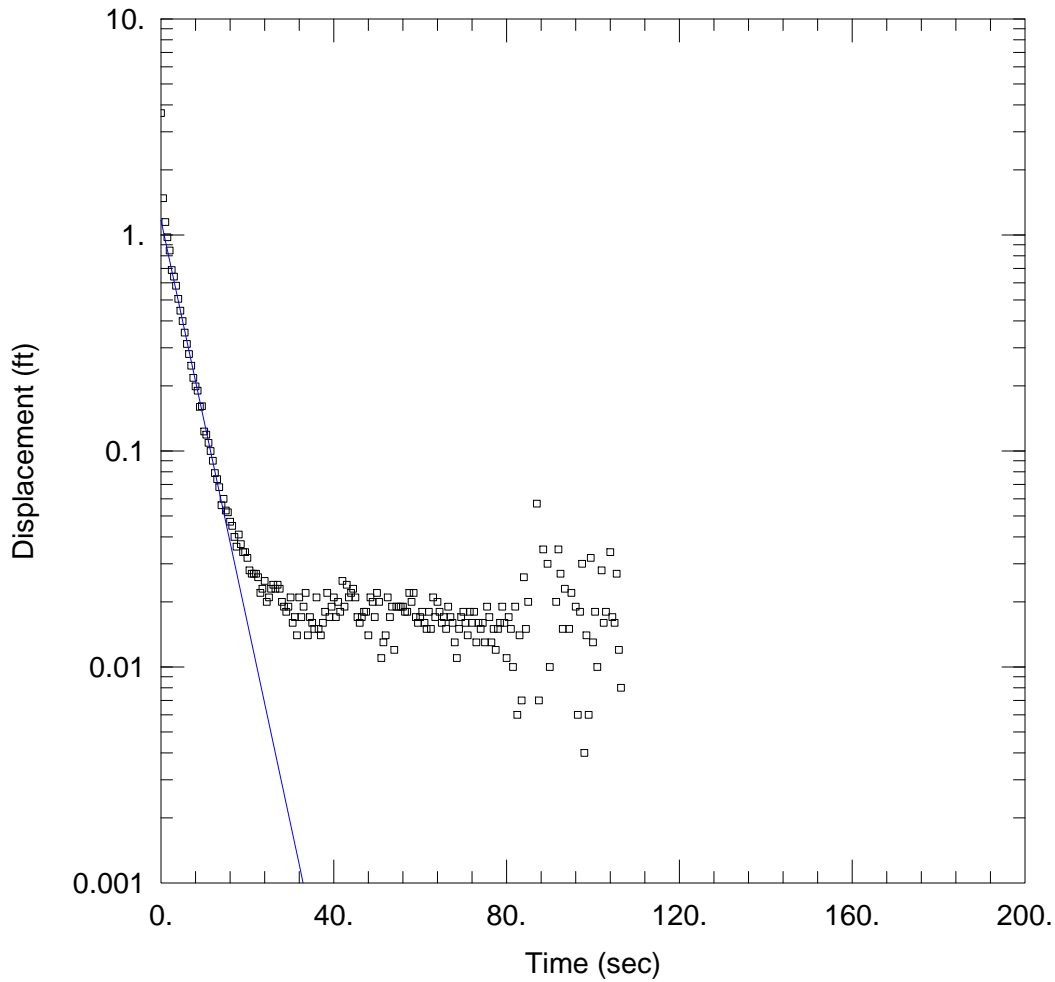
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bower-Rice

K = 0.001127 ft/sec

y0 = 1.137 ft



TEST 4 - RISING

Data Set:

Date: 10/05/18

Time: 13:45:34

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants

Client: BNSF Railway Company

Project: 1896120*04

Location: Wishram Railyard, Washington

Test Well: RMD-06

Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.9 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-06)

Initial Displacement: 3.668 ft

Static Water Column Height: 47.9 ft

Total Well Penetration Depth: 47.9 ft

Screen Length: 20. ft

Casing Radius: 0.083 ft

Well Radius: 0.125 ft

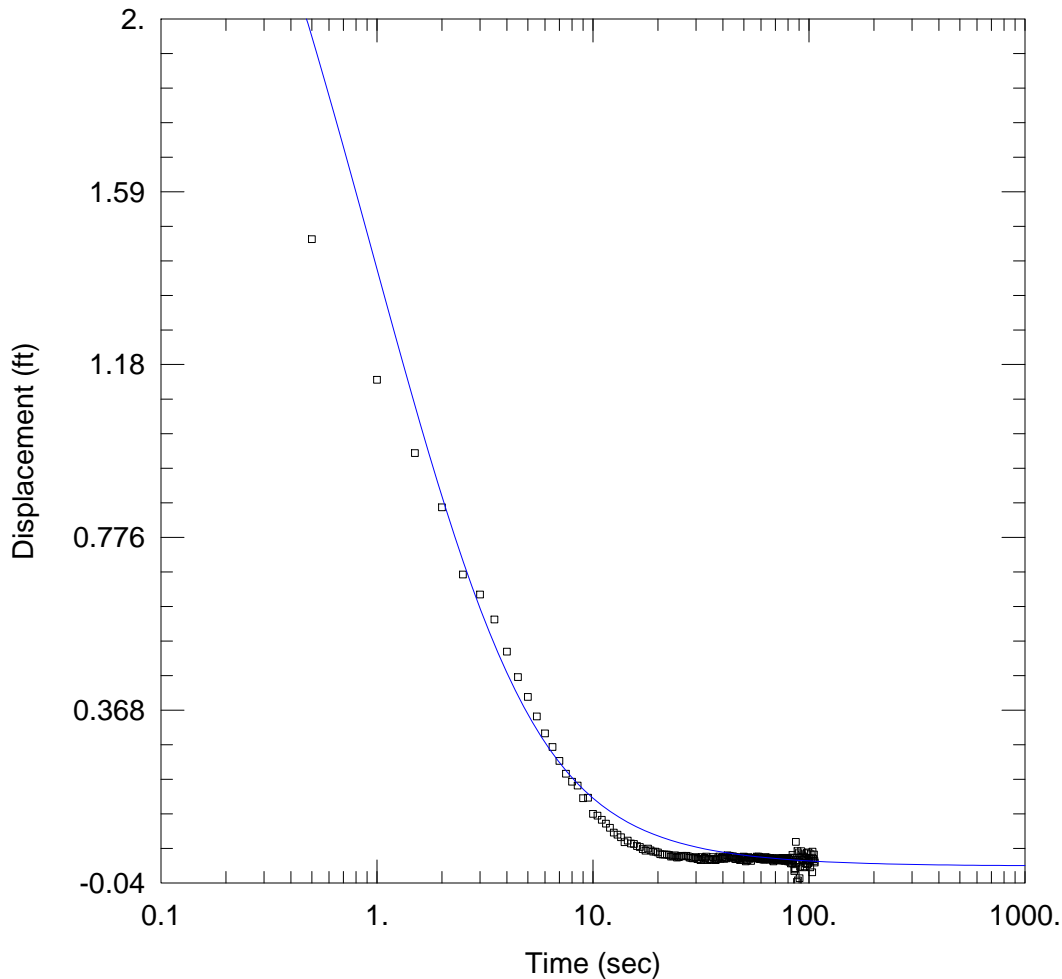
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 0.0001876 ft/sec

y0 = 1.169 ft



TEST 4 - RISING

Data Set:

Date: 10/05/18

Time: 13:47:32

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants

Client: BNSF Railway Company

Project: 1896120*04

Location: Wishram Railyard, Washington

Test Well: RMD-06

Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.9 ft

WELL DATA (RMD-06)

Initial Displacement: 3.668 ft

Total Well Penetration Depth: 47.9 ft

Casing Radius: 0.083 ft

Static Water Column Height: 47.9 ft

Screen Length: 20. ft

Well Radius: 0.125 ft

SOLUTION

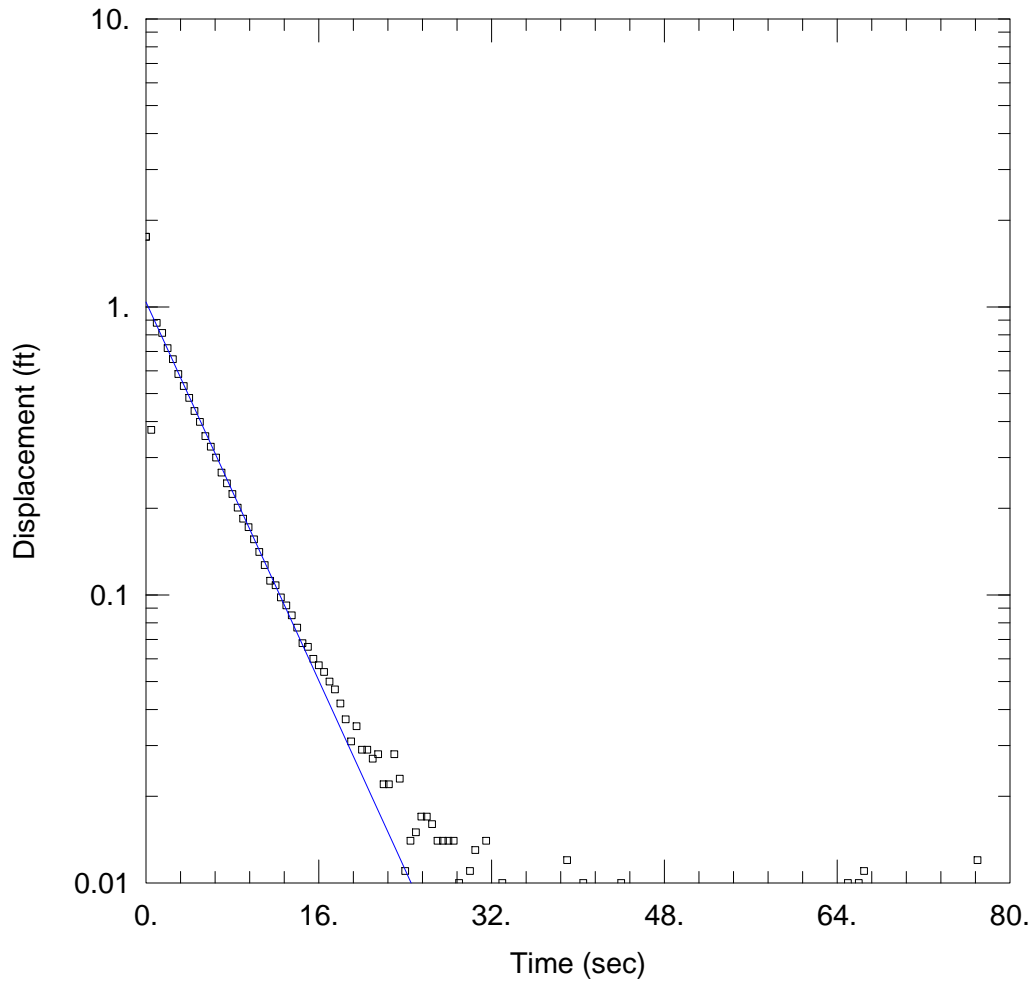
Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 0.0002494 ft/sec

Ss = 0.002088 ft⁻¹

Kz/Kr = 1.



TEST 5 - FALLING

Data Set: N:\...\RMD-06-5F.aqt
 Date: 10/05/18

Time: 14:38:29

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: RMD-06
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.9 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-06)

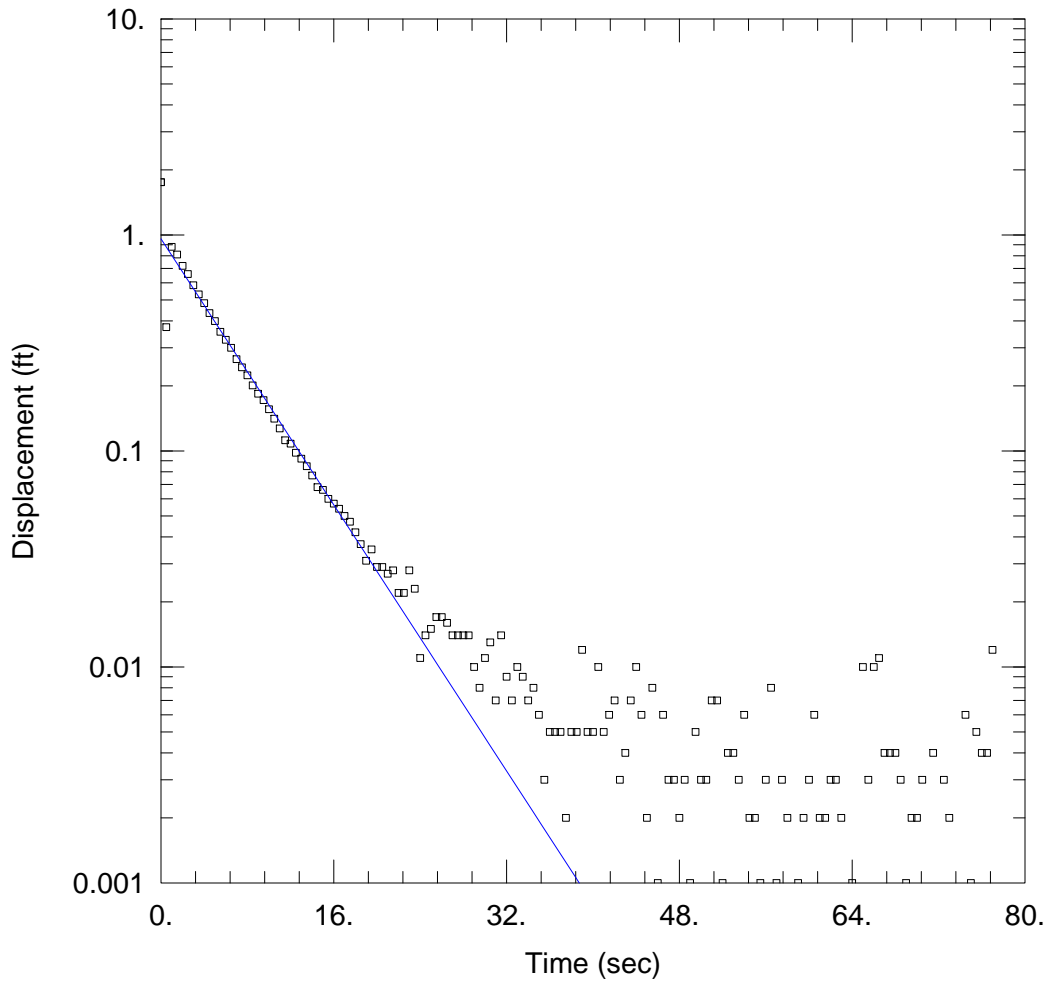
Initial Displacement: 1.753 ft
 Total Well Penetration Depth: 47.89 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 47.9 ft
 Screen Length: 20. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.001026 ft/sec

Solution Method: Bower-Rice
 y0 = 1.04 ft



TEST 5 - FALLING

Data Set: N:\...\RMD-06-5F.aqt
 Date: 10/05/18

Time: 14:38:58

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: RMD-06
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.9 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-06)

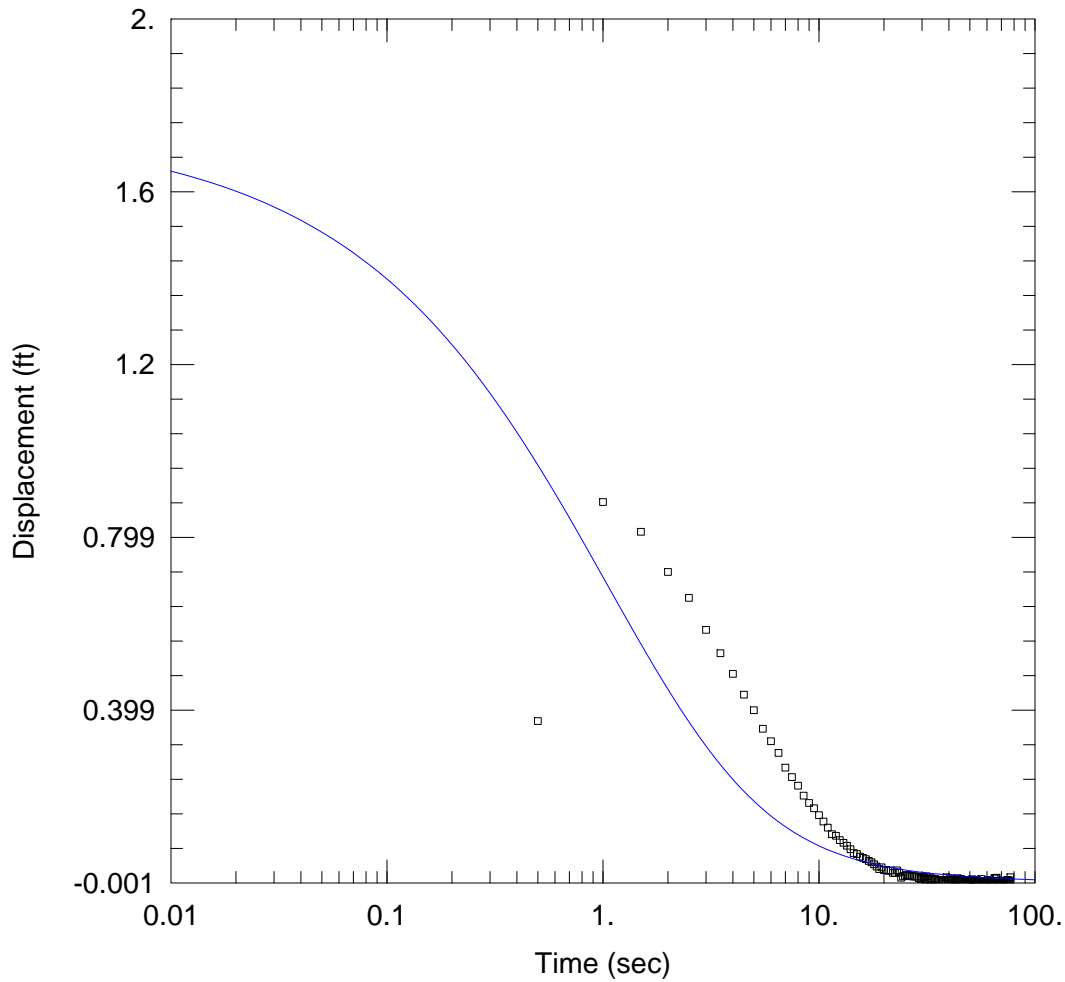
Initial Displacement: 1.753 ft
 Total Well Penetration Depth: 47.89 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 47.9 ft
 Screen Length: 20. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.000155 ft/sec

Solution Method: Hvorslev
 y0 = 0.9598 ft



TEST 5 - FALLING

Data Set: N:\...\RMD-06-5F.aqt
 Date: 10/05/18

Time: 14:46:21

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: RMD-06
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.9 ft

WELL DATA (RMD-06)

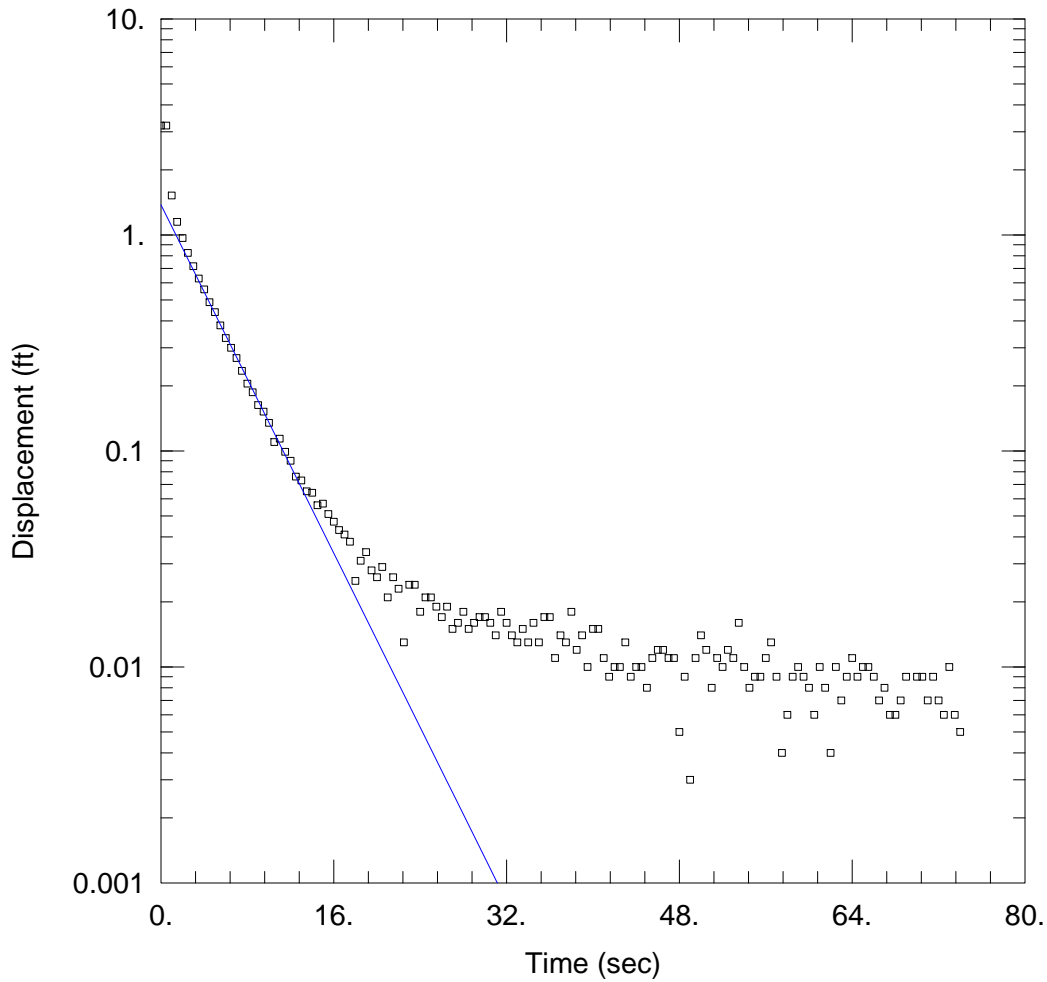
Initial Displacement: 1.753 ft
 Total Well Penetration Depth: 47.89 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 47.9 ft
 Screen Length: 20. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0002285 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.002088 ft⁻¹



TEST 6 - RISING

Data Set:

Date: 10/05/18

Time: 14:52:03

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants

Client: BNSF Railway Company

Project: 1896120*04

Location: Wishram Railyard, Washington

Test Well: RMD-06

Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.9 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-06)

Initial Displacement: 3.207 ft

Static Water Column Height: 47.9 ft

Total Well Penetration Depth: 47.9 ft

Screen Length: 20. ft

Casing Radius: 0.083 ft

Well Radius: 0.125 ft

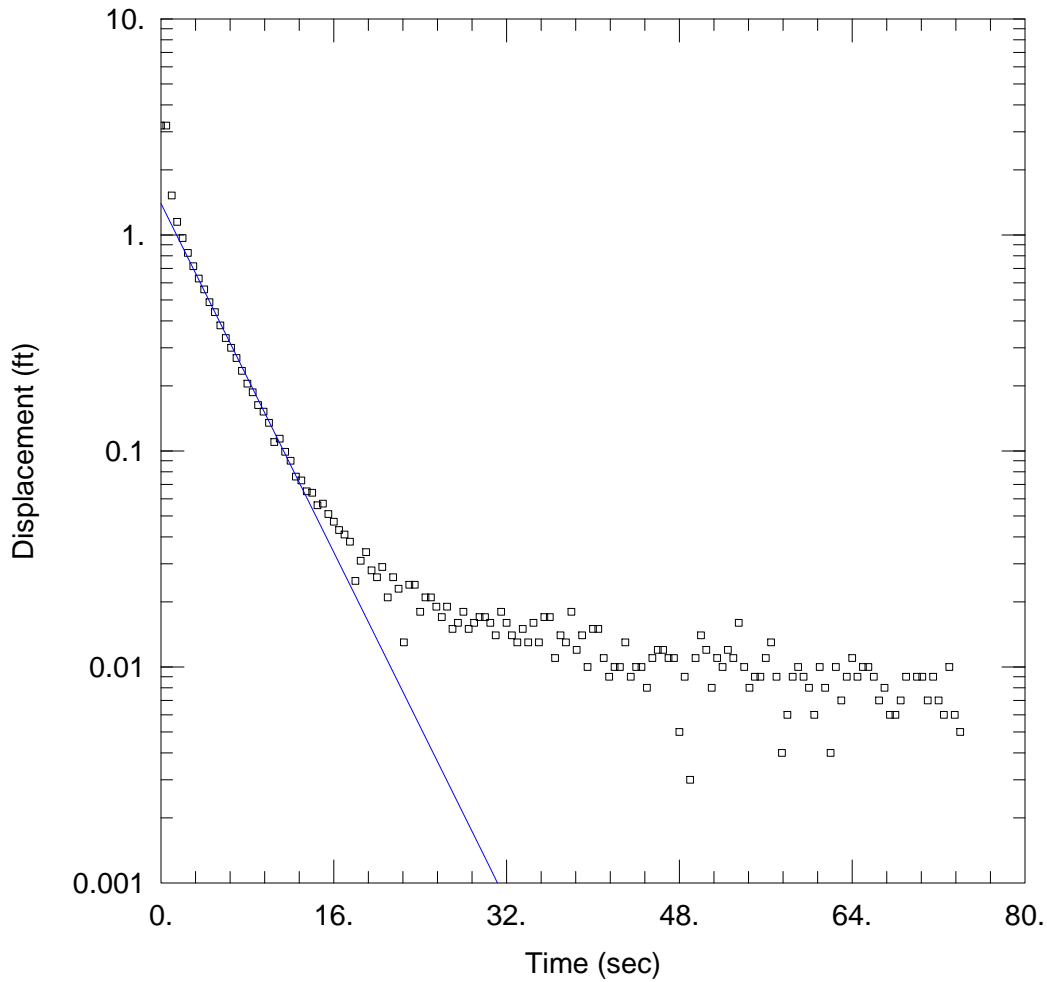
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bower-Rice

K = 0.001259 ft/sec

y0 = 1.378 ft



TEST 6 - RISING

Data Set:

Date: 10/05/18

Time: 14:52:55

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants

Client: BNSF Railway Company

Project: 1896120*04

Location: Wishram Railyard, Washington

Test Well: RMD-06

Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.9 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMD-06)

Initial Displacement: 3.207 ft

Static Water Column Height: 47.9 ft

Total Well Penetration Depth: 47.9 ft

Screen Length: 20. ft

Casing Radius: 0.083 ft

Well Radius: 0.125 ft

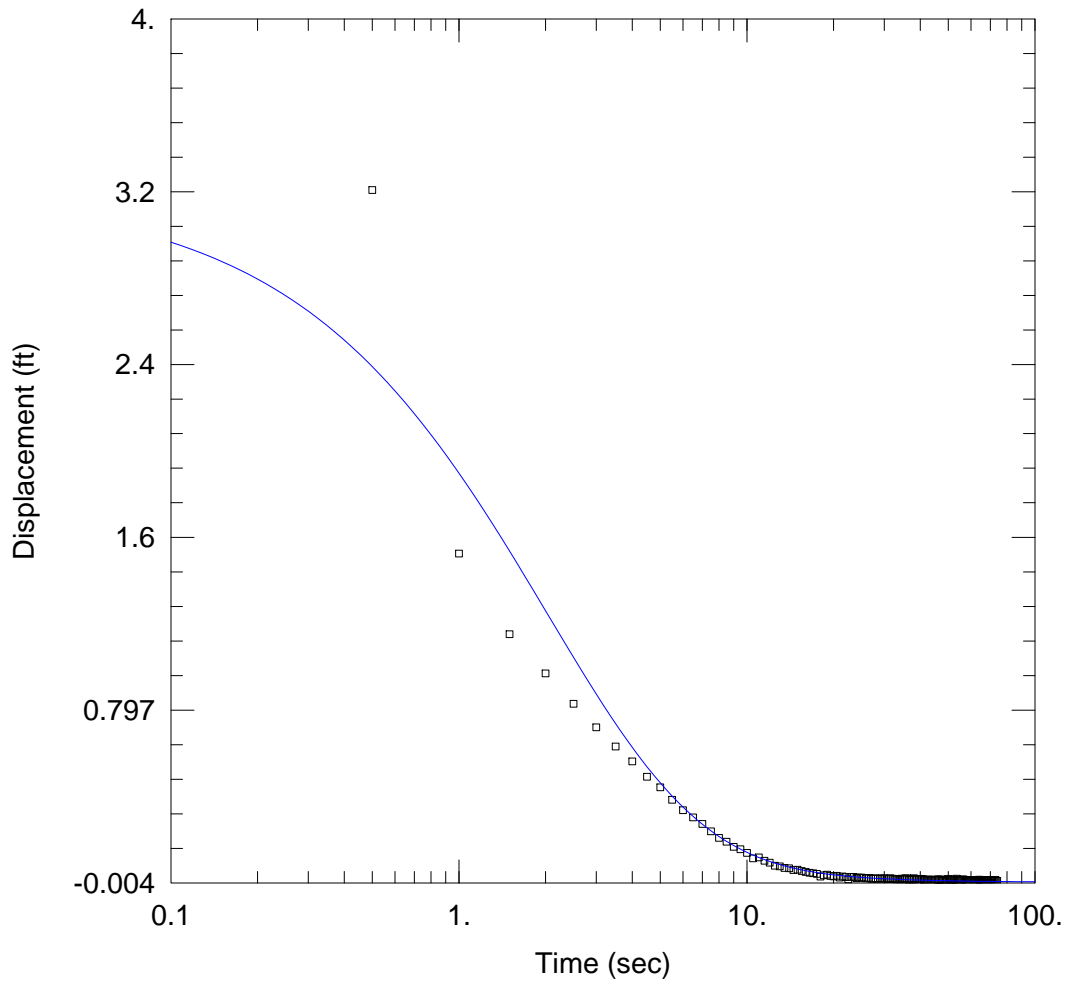
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 0.0002031 ft/sec

y0 = 1.398 ft



TEST 6 - RISING

Data Set:
Date: 10/05/18

Time: 14:53:39

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: RMD-06
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 47.9 ft

WELL DATA (RMD-06)

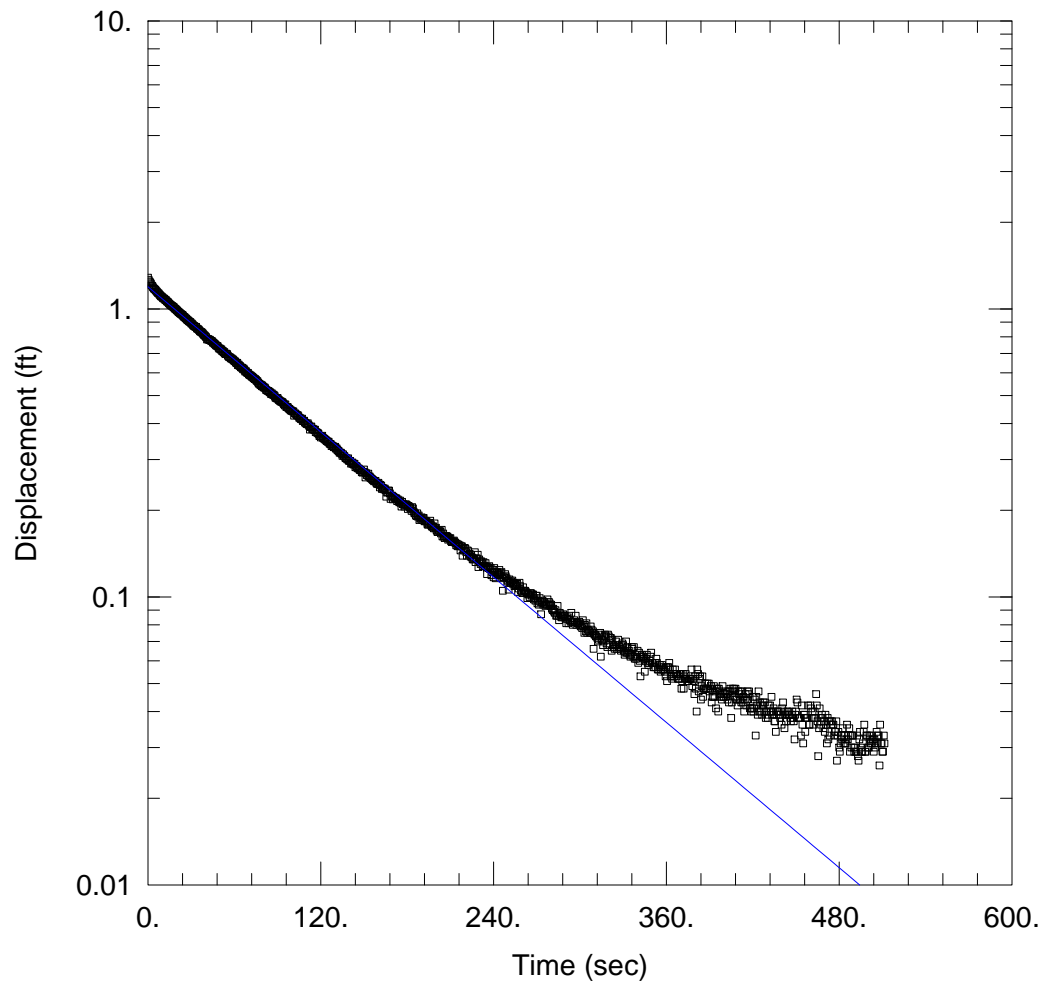
Initial Displacement: 3.207 ft
 Total Well Penetration Depth: 47.9 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 47.9 ft
 Screen Length: 20. ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0003215 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 1.802E-5 ft⁻¹



WELL TEST ANALYSIS

Data Set: N:\...\WMW-20-1.aqt
 Date: 10/03/18

Time: 11:45:53

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-20
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 3.966 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-20)

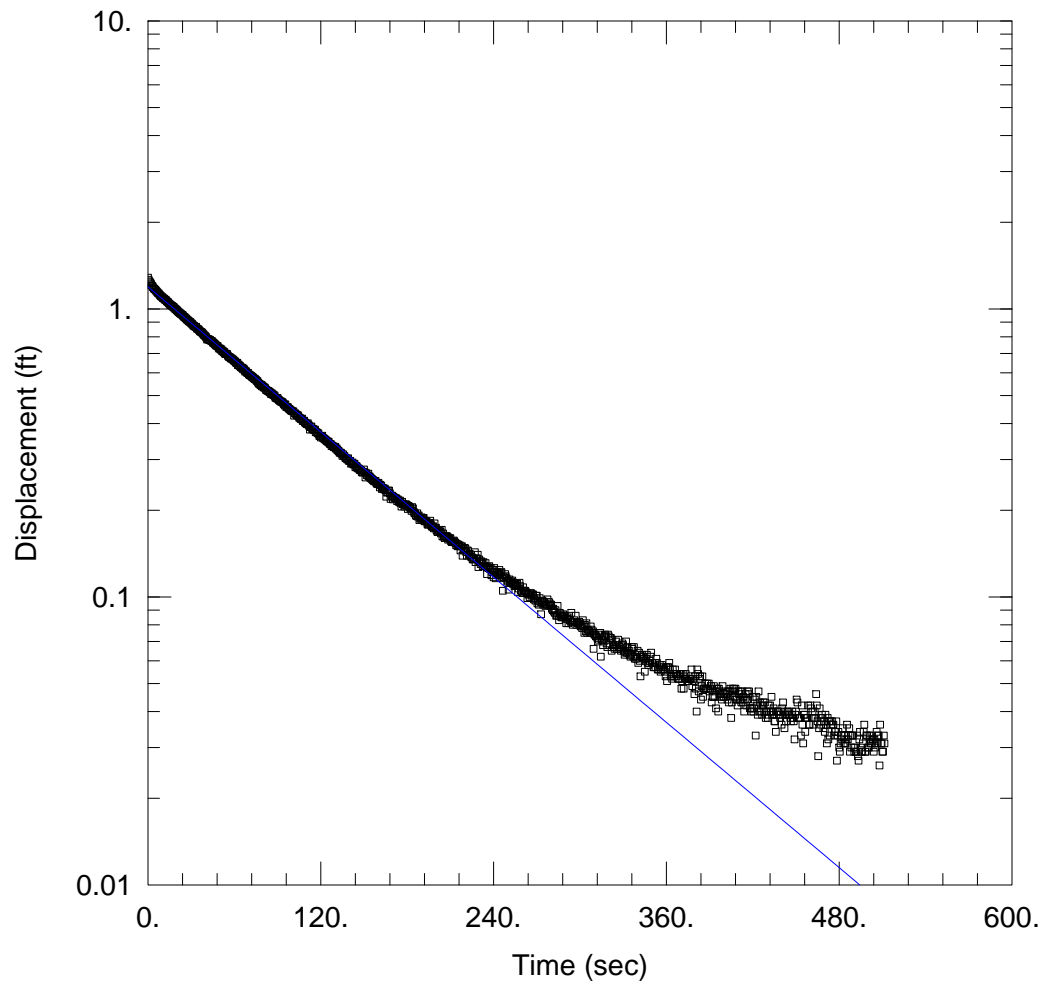
Initial Displacement: 1.284 ft
 Total Well Penetration Depth: 3.966 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 3.966 ft
 Screen Length: 3.966 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 2.2E-5 ft/sec

Solution Method: Bower-Rice
 y0 = 1.194 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-20-1.aqt
 Date: 10/03/18

Time: 11:47:49

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-20
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 3.966 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-20)

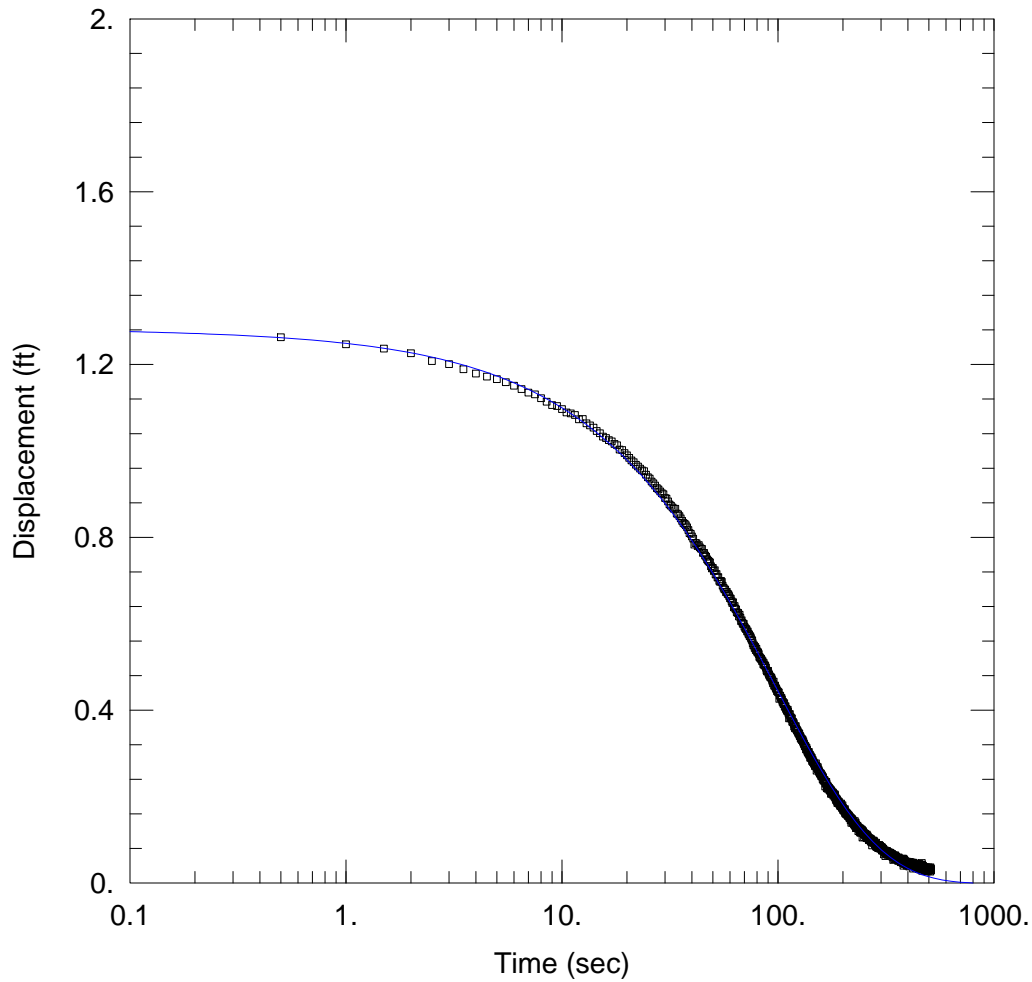
Initial Displacement: 1.284 ft
 Total Well Penetration Depth: 3.966 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 3.966 ft
 Screen Length: 3.966 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 4.451E-5 ft/sec

Solution Method: Hvorslev
 y0 = 1.193 ft



WELL TEST ANALYSIS

Data Set: N:\...\WMW-20-1.aqt
 Date: 10/03/18

Time: 11:49:30

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-20
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 3.966 ft

WELL DATA (WMW-20)

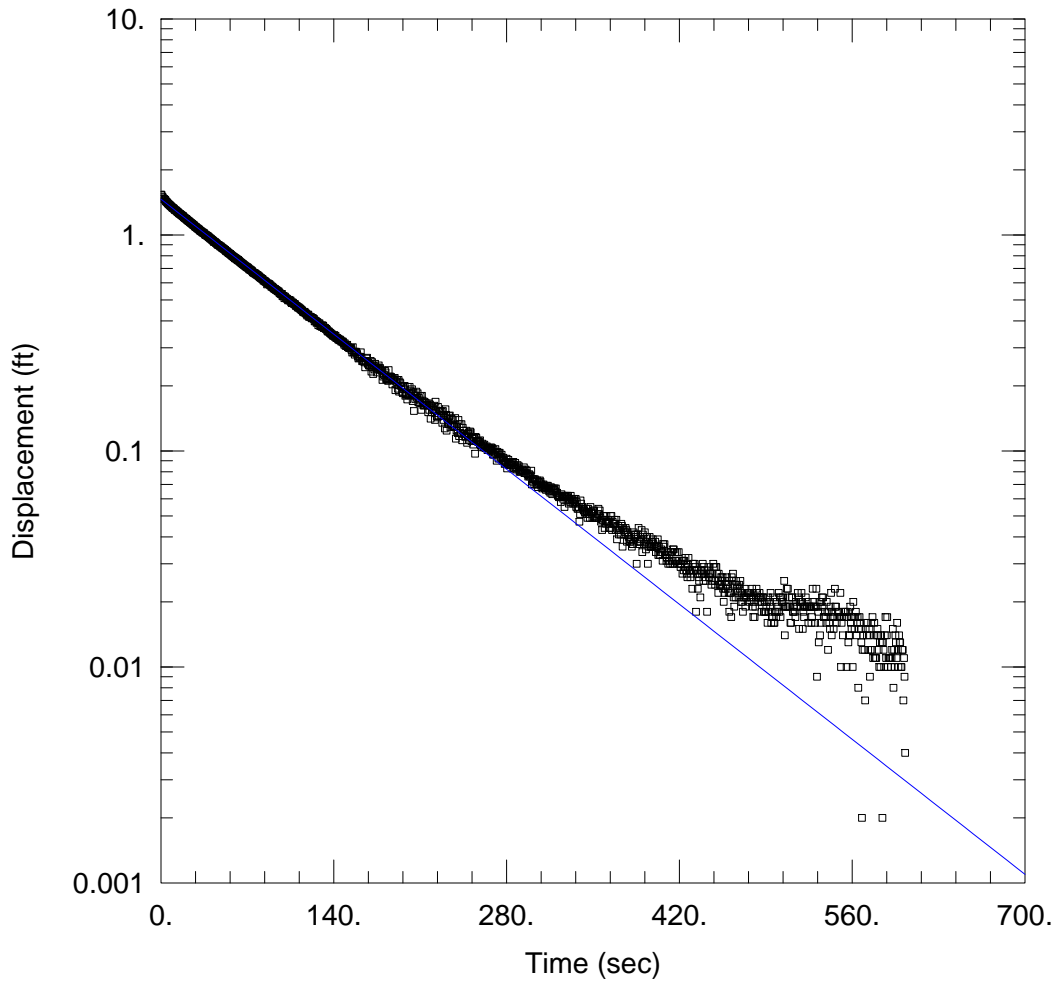
Initial Displacement: 1.284 ft
 Total Well Penetration Depth: 3.966 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 3.966 ft
 Screen Length: 3.966 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 2.527E-5 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.0003504 ft⁻¹



TEST 2

Data Set: N:\...\WMW-20-2.aqt
 Date: 10/03/18

Time: 12:06:14

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-20
 Test Date: 8/28/18

AQUIFER DATA

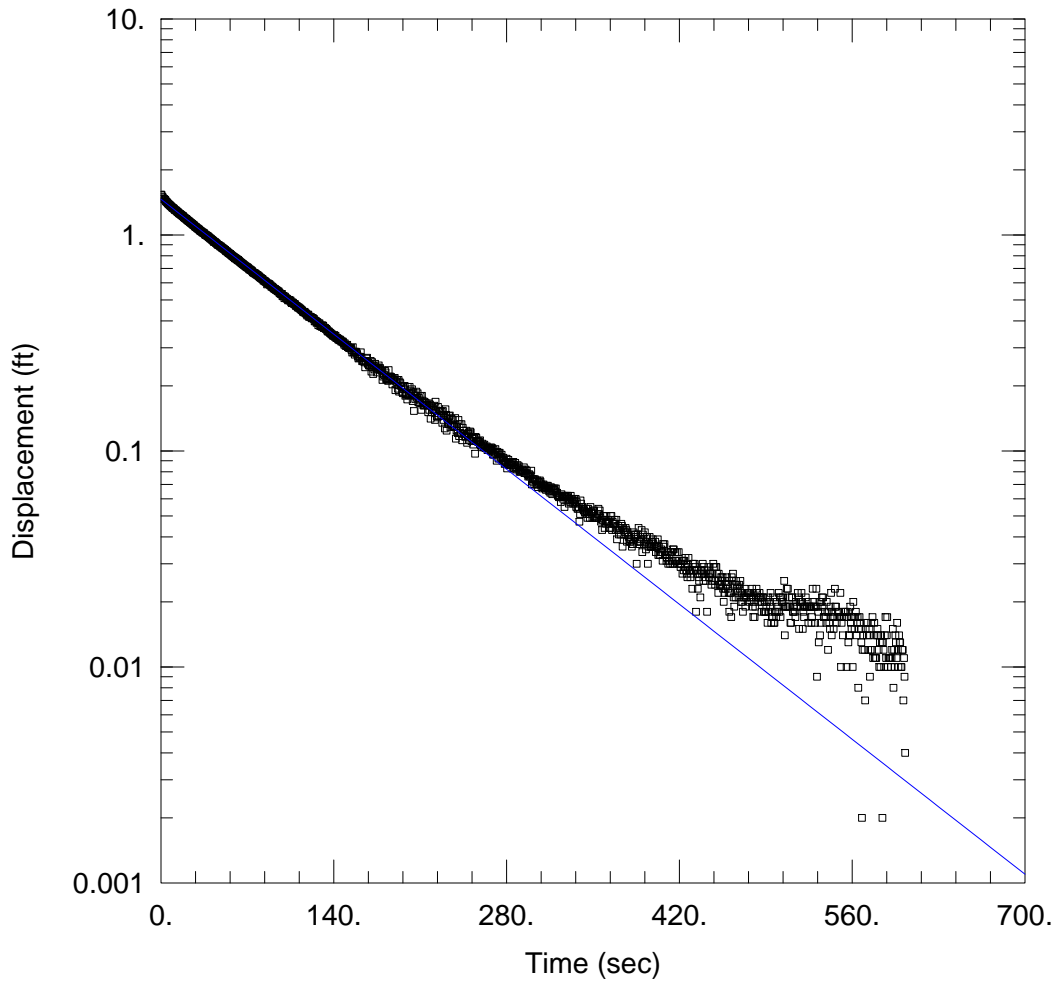
Saturated Thickness: 3.444 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-20)

Initial Displacement: 1.536 ft Static Water Column Height: 3.444 ft
 Total Well Penetration Depth: 3.444 ft Screen Length: 3.444 ft
 Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bower-Rice
 K = 2.568E-5 ft/sec y0 = 1.464 ft



TEST 2

Data Set: N:\...\WMW-20-2.aqt
 Date: 10/03/18

Time: 12:11:47

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-20
 Test Date: 8/28/18

AQUIFER DATA

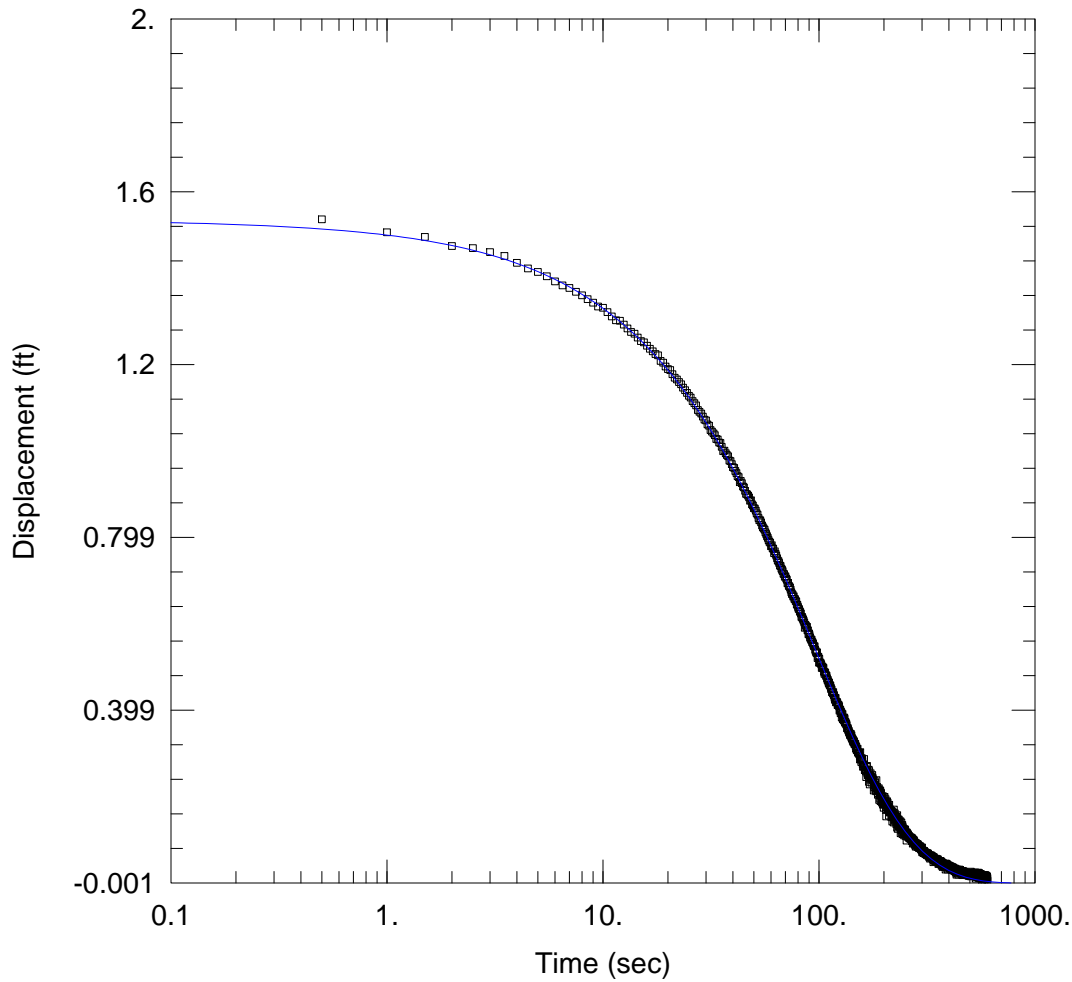
Saturated Thickness: 3.444 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-20)

Initial Displacement: 1.536 ft Static Water Column Height: 3.444 ft
 Total Well Penetration Depth: 3.444 ft Screen Length: 3.444 ft
 Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 5.448E-5 ft/sec $y_0 =$ 1.464 ft



TEST 2

Data Set: N:\...\WMW-20-2.aqt
 Date: 10/03/18

Time: 12:12:49

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-20
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 3.444 ft

WELL DATA (WMW-20)

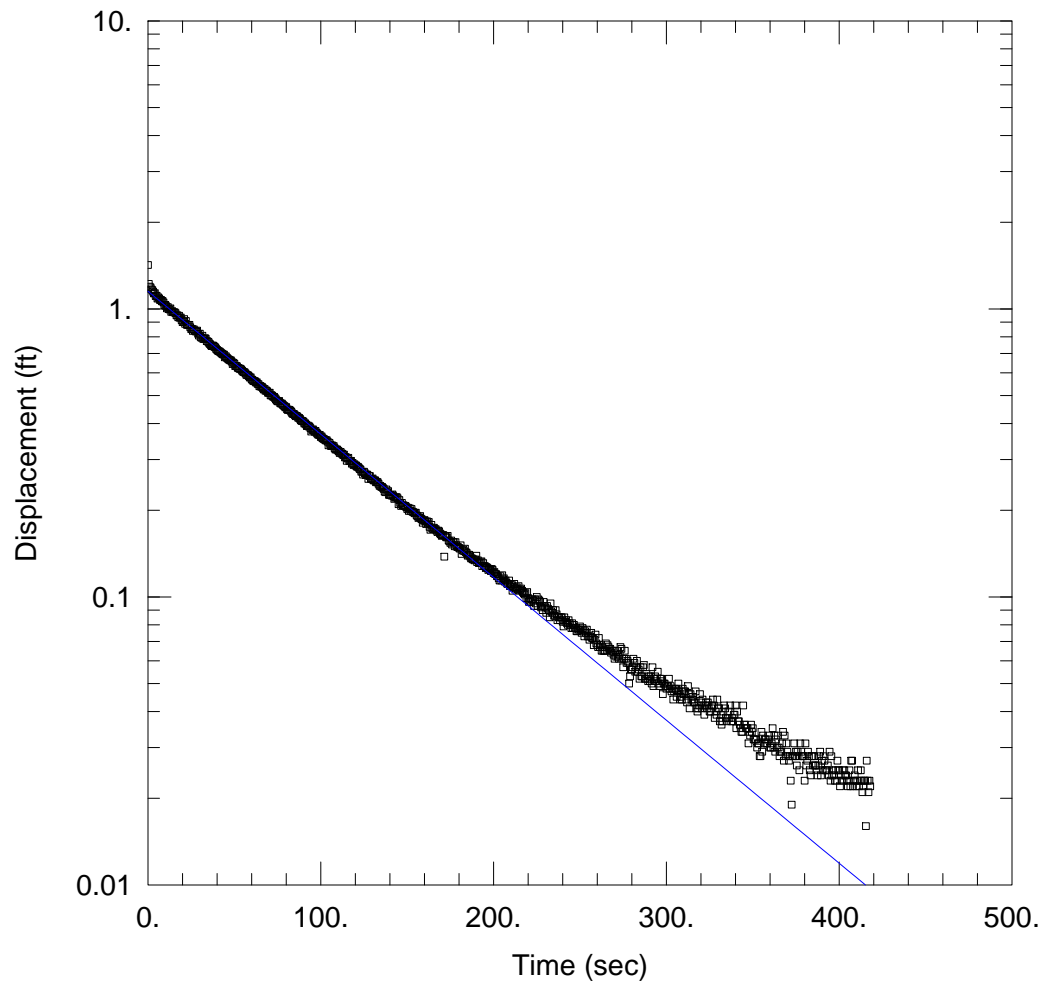
Initial Displacement: 1.536 ft
 Total Well Penetration Depth: 3.444 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 3.444 ft
 Screen Length: 3.444 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 $K_r = 2.916E-5$ ft/sec
 $K_z/K_r = 1.$

Solution Method: KGS Model
 $S_s = 0.0002449$ ft⁻¹



TEST 3

Data Set:
Date: 10/03/18

Time: 12:24:46

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-20
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 3.969 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-20)

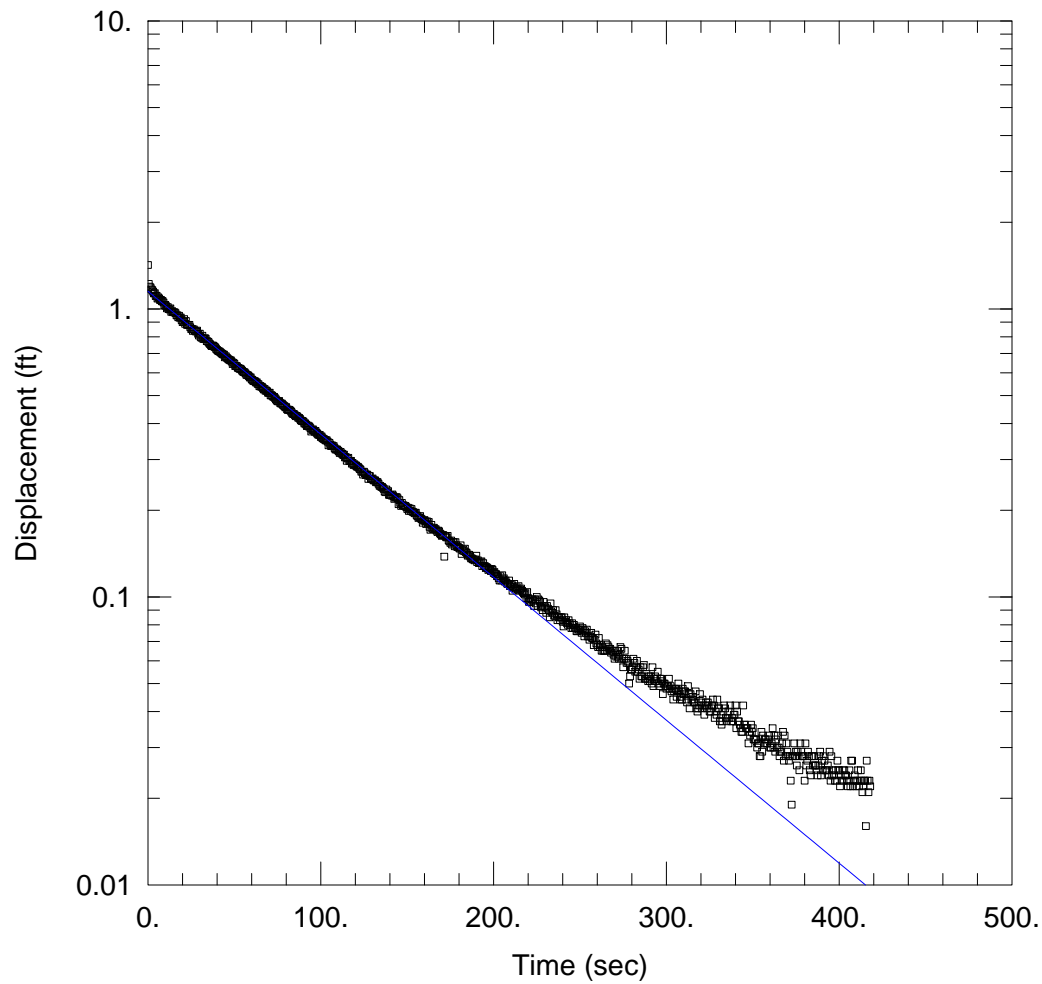
Initial Displacement: 1.421 ft
 Total Well Penetration Depth: 3.969 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 3.969 ft
 Screen Length: 3.969 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 2.598E-5 ft/sec

Solution Method: Bower-Rice
 y0 = 1.152 ft



TEST 3

Data Set:
Date: 10/03/18

Time: 12:26:12

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-20
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 3.969 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-20)

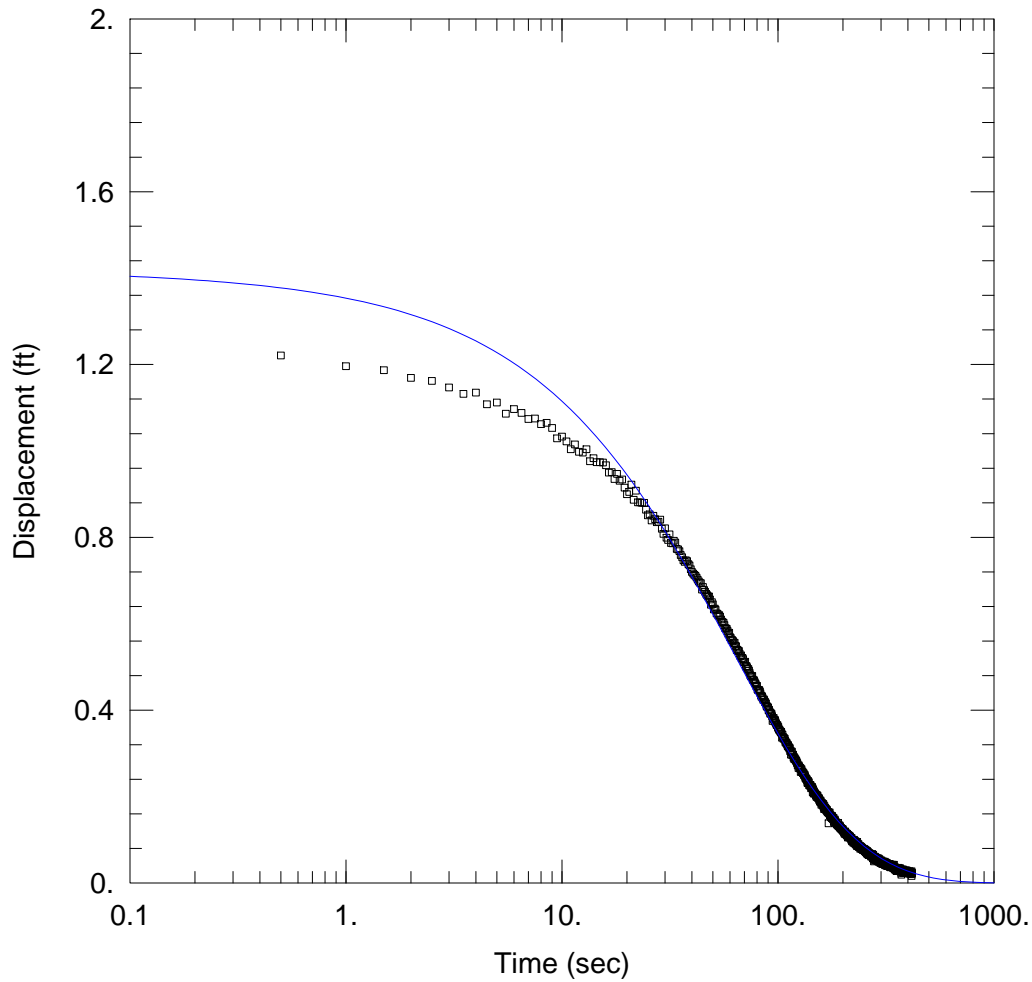
Initial Displacement: 1.421 ft
 Total Well Penetration Depth: 3.969 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 3.969 ft
 Screen Length: 3.969 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 5.256E-5 ft/sec

Solution Method: Hvorslev
 y0 = 1.152 ft



TEST 3

Data Set: N:\...\WMW-20-3.aqt
 Date: 10/03/18

Time: 12:27:49

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-20
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 3.969 ft

WELL DATA (WMW-20)

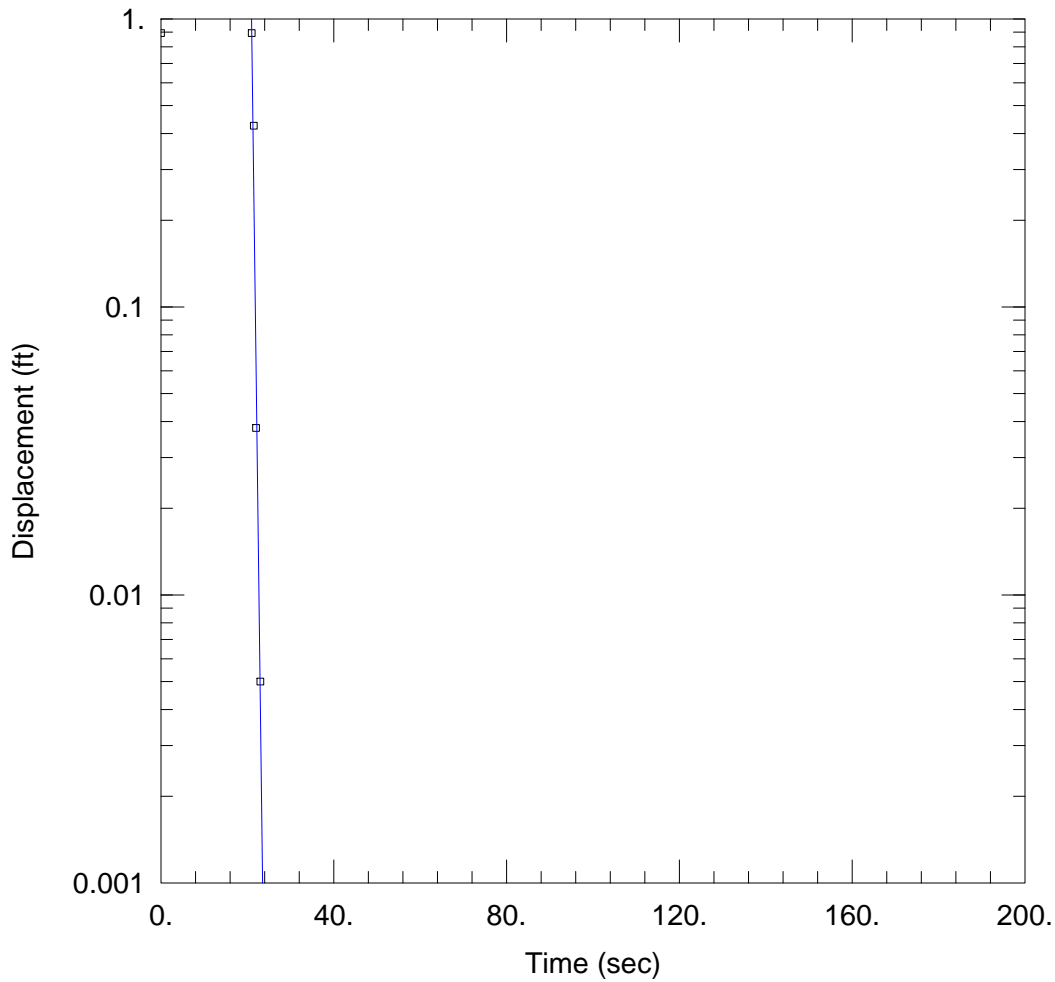
Initial Displacement: 1.421 ft
 Total Well Penetration Depth: 3.969 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 3.969 ft
 Screen Length: 3.969 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 3.267E-5 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.001186 ft⁻¹



TEST 1

Data Set:

Date: 10/03/18

Time: 12:36:56

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants

Client: BNSF Railway Company

Project: 1896120*04

Location: Wishram Railyard, Washington

Test Well: WMW-22

Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 4.496 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-22)

Initial Displacement: 0.893 ft

Static Water Column Height: 4.496 ft

Total Well Penetration Depth: 4.496 ft

Screen Length: 4.496 ft

Casing Radius: 0.083 ft

Well Radius: 0.125 ft

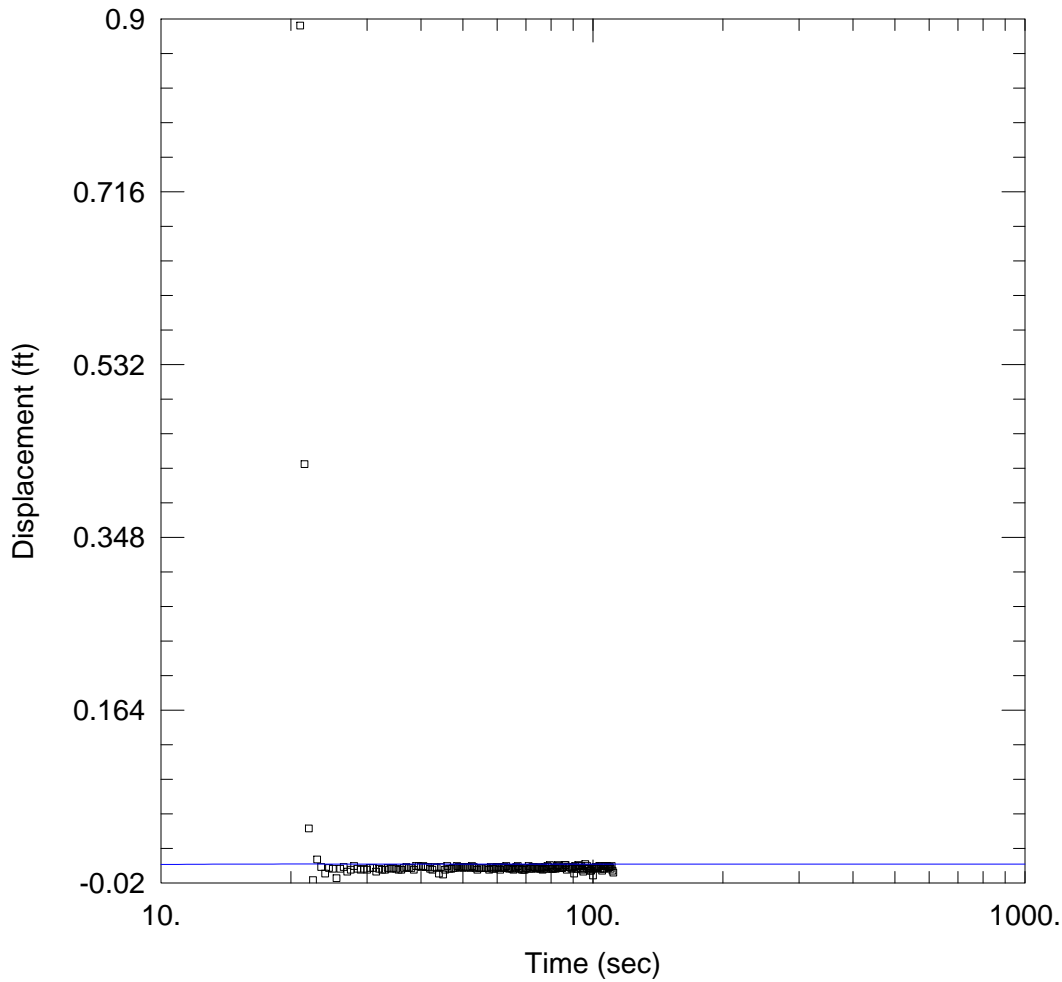
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.00568 ft/sec

y0 = 6.427E+24 ft



TEST 1

Data Set: N:\...\WMW-22-1.aqt
 Date: 10/03/18

Time: 12:40:27

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-22
 Test Date: 8/28/18

AQUIFER DATA

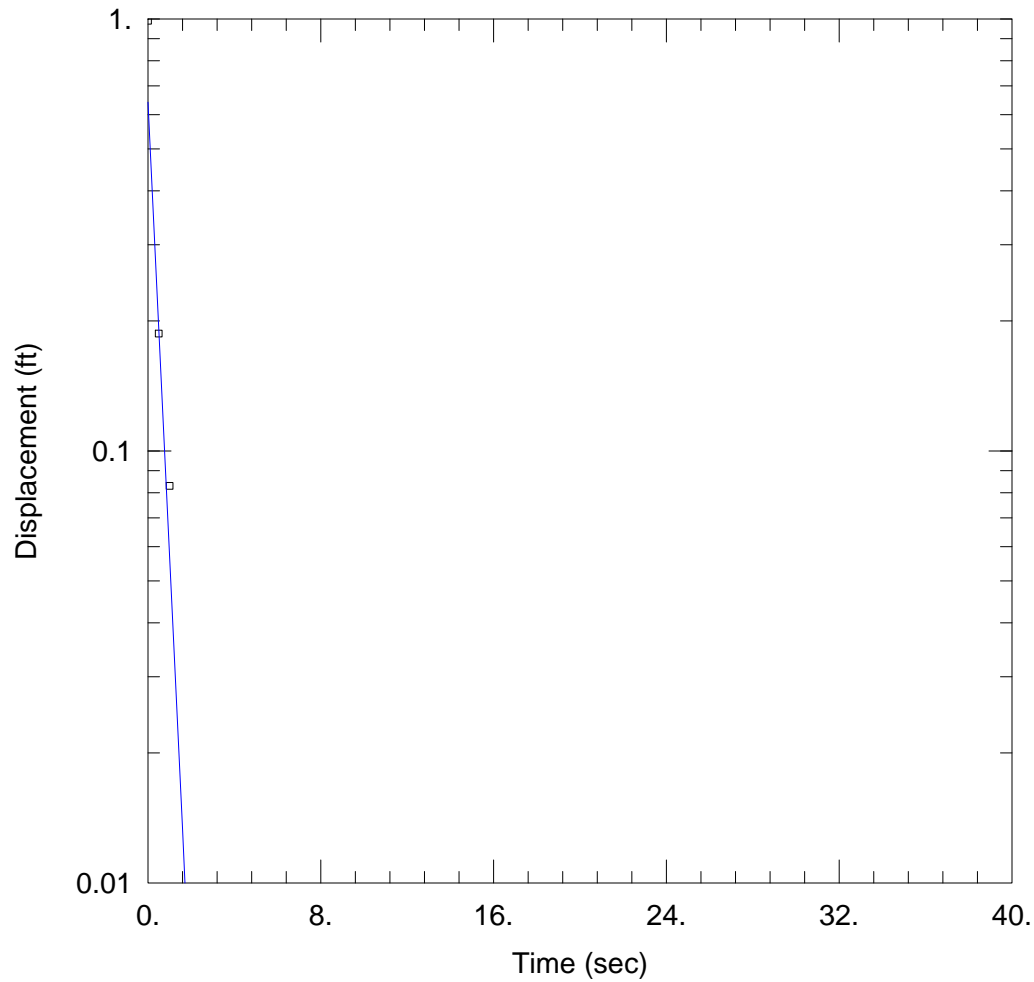
Saturated Thickness: 4.496 ft

WELL DATA (WMW-22)

Initial Displacement: <u>0.893 ft</u>	Static Water Column Height: <u>4.496 ft</u>
Total Well Penetration Depth: <u>4.496 ft</u>	Screen Length: <u>4.496 ft</u>
Casing Radius: <u>0.083 ft</u>	Well Radius: <u>0.125 ft</u>

SOLUTION

Aquifer Model: <u>Unconfined</u>	Solution Method: <u>KGS Model</u>
Kr = <u>0.002887 ft/sec</u>	Ss = <u>2.981E-10 ft⁻¹</u>
Kz/Kr = <u>1.</u>	



TEST 2

Data Set:

Date: 10/03/18

Time: 12:50:52

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants

Client: BNSF Railway Company

Project: 1896120*04

Location: Wishram Railyard, Washington

Test Well: WMW-22

Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 4.504 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-22)

Initial Displacement: 0.99 ft

Static Water Column Height: 4.504 ft

Total Well Penetration Depth: 4.504 ft

Screen Length: 4.504 ft

Casing Radius: 0.083 ft

Well Radius: 0.125 ft

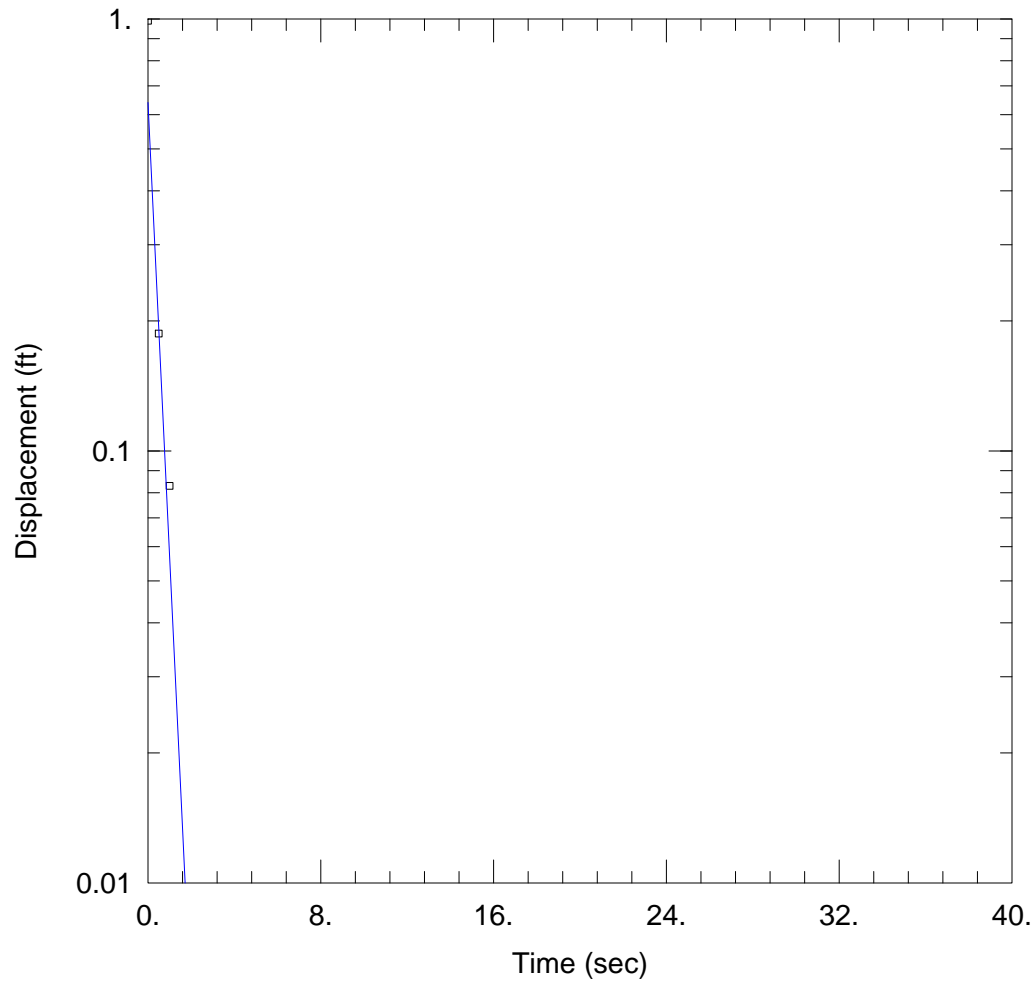
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bower-Rice

K = 0.005046 ft/sec

y0 = 0.6415 ft



TEST 2

Data Set:

Date: 10/03/18

Time: 12:51:44

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants

Client: BNSF Railway Company

Project: 1896120*04

Location: Wishram Railyard, Washington

Test Well: WMW-22

Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 4.504 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-22)

Initial Displacement: 0.99 ft

Static Water Column Height: 4.504 ft

Total Well Penetration Depth: 4.504 ft

Screen Length: 4.504 ft

Casing Radius: 0.083 ft

Well Radius: 0.125 ft

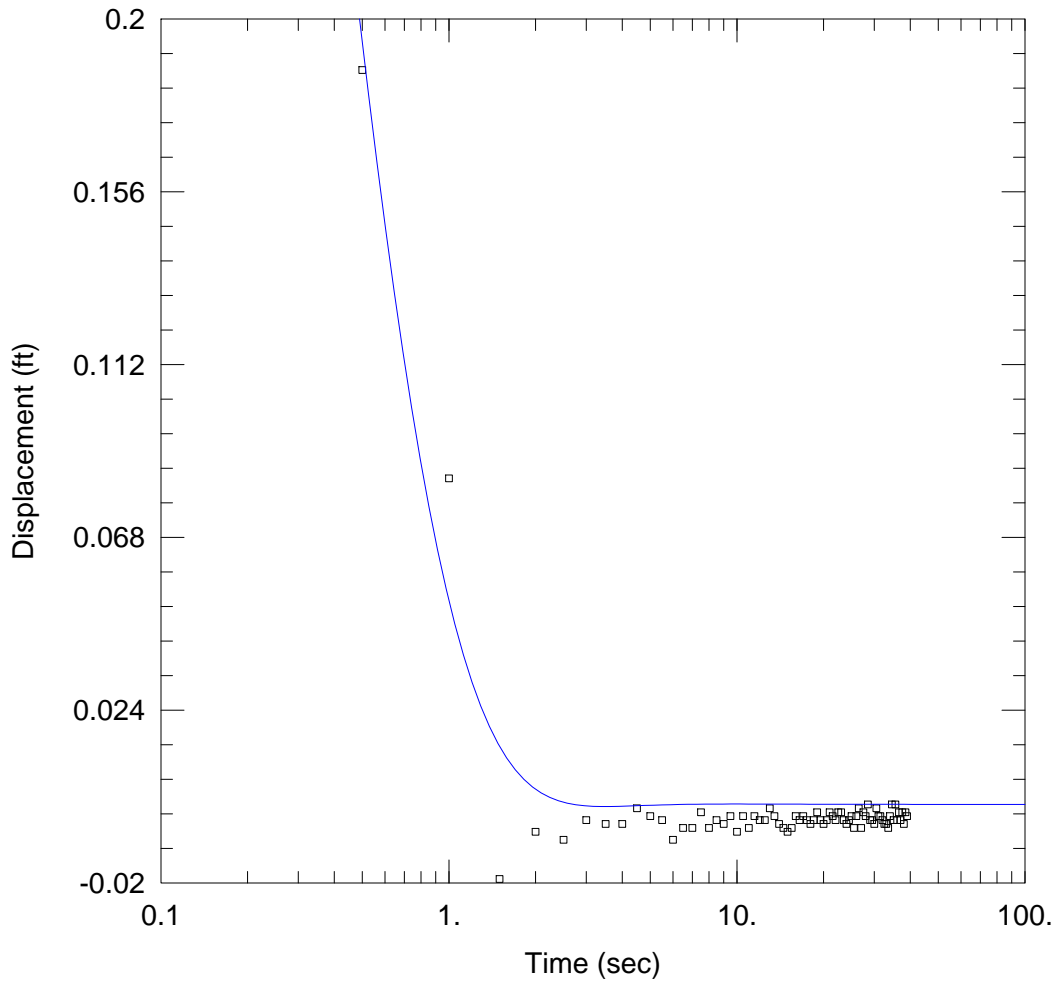
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 0.009802 ft/sec

y0 = 0.6406 ft



TEST 2

Data Set:

Date: 10/03/18

Time: 12:52:47

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants

Client: BNSF Railway Company

Project: 1896120*04

Location: Wishram Railyard, Washington

Test Well: WMW-22

Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 4.504 ft

WELL DATA (WMW-22)

Initial Displacement: 0.99 ft

Total Well Penetration Depth: 4.504 ft

Casing Radius: 0.083 ft

Static Water Column Height: 4.504 ft

Screen Length: 4.504 ft

Well Radius: 0.125 ft

SOLUTION

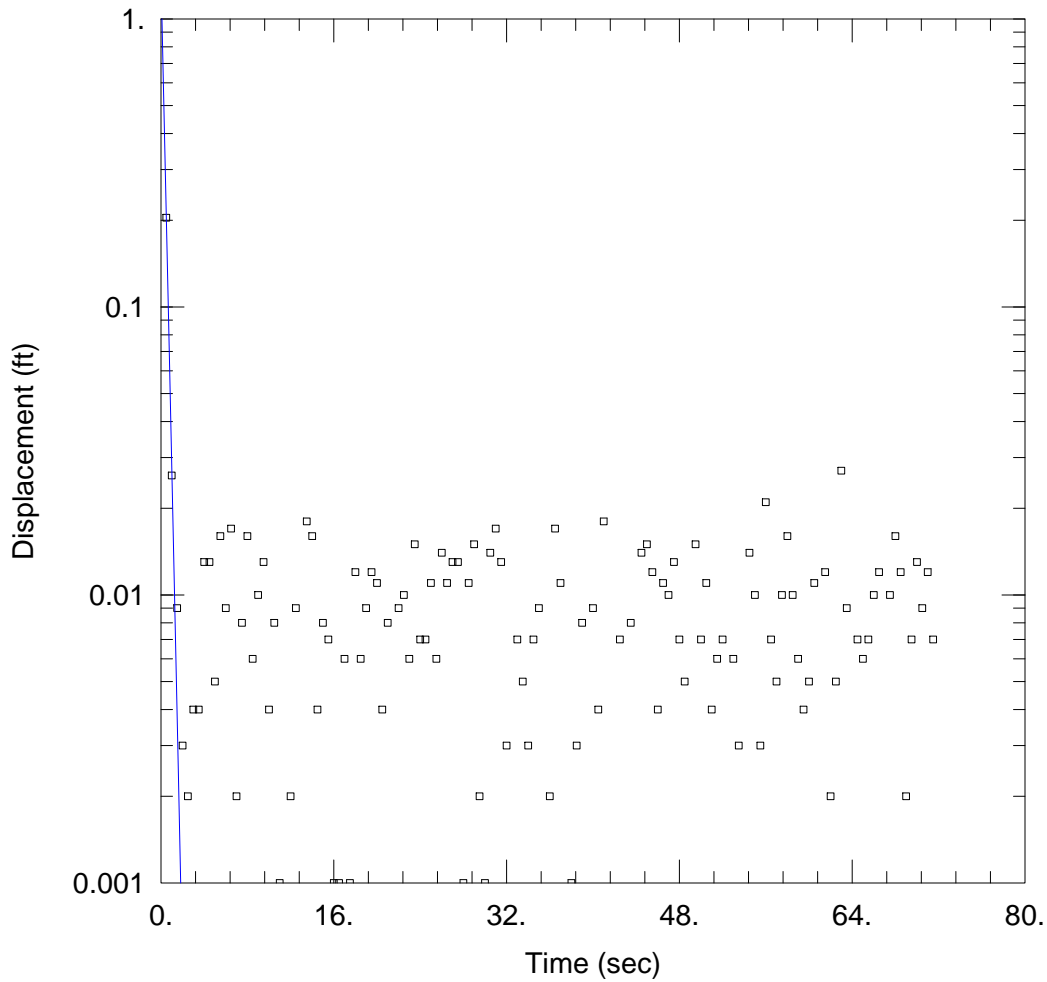
Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 0.007497 ft/sec

Ss = 0.0003653 ft⁻¹

Kz/Kr = 1.



TEST 3

Data Set: N:\...\WMW-22-3.aqt
 Date: 10/03/18

Time: 13:07:08

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-22
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 4.502 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-22)

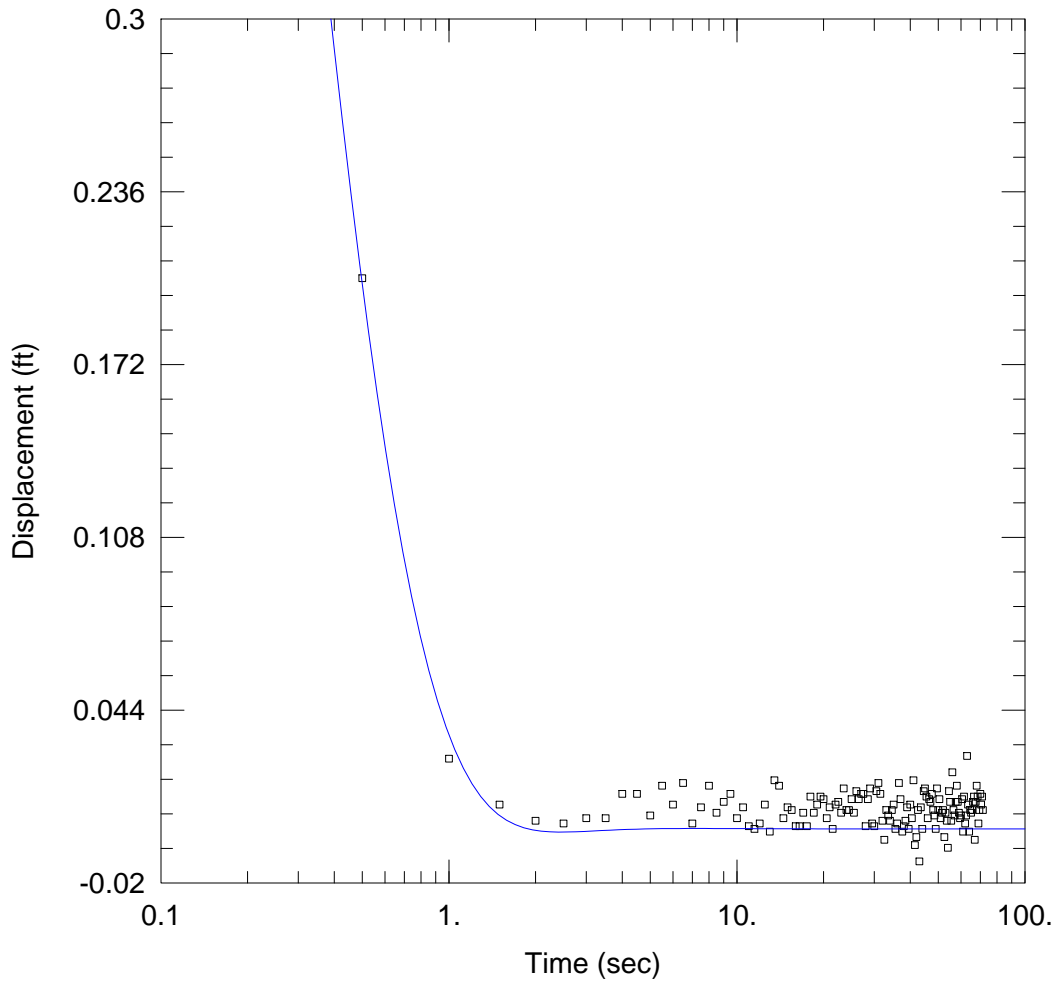
Initial Displacement: 1.231 ft
 Total Well Penetration Depth: 4.502 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 4.502 ft
 Screen Length: 4.502 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.01622 ft/sec

Solution Method: Hvorslev
 y0 = 1.508 ft



TEST 3

Data Set: N:\...\WMW-22-3.aqt
 Date: 10/03/18

Time: 13:07:57

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-22
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 4.502 ft

WELL DATA (WMW-22)

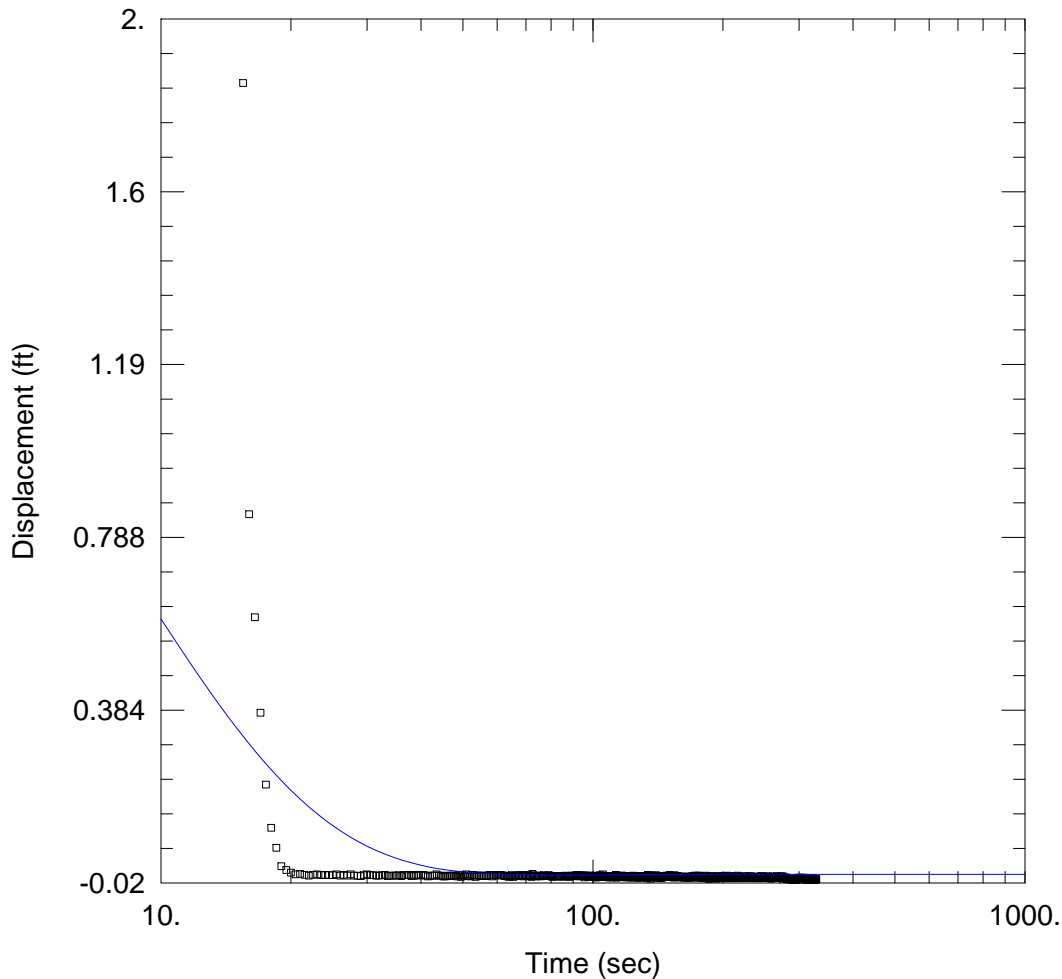
Initial Displacement: 1.231 ft
 Total Well Penetration Depth: 4.502 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 4.502 ft
 Screen Length: 4.502 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.008231 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 2.247E-11 ft⁻¹



TEST 1

Data Set: N:\...\WMW-23-1.aqt
 Date: 10/03/18

Time: 13:20:26

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-23
 Test Date: 8/29/18

AQUIFER DATA

Saturated Thickness: 7.566 ft

WELL DATA (WMW-23)

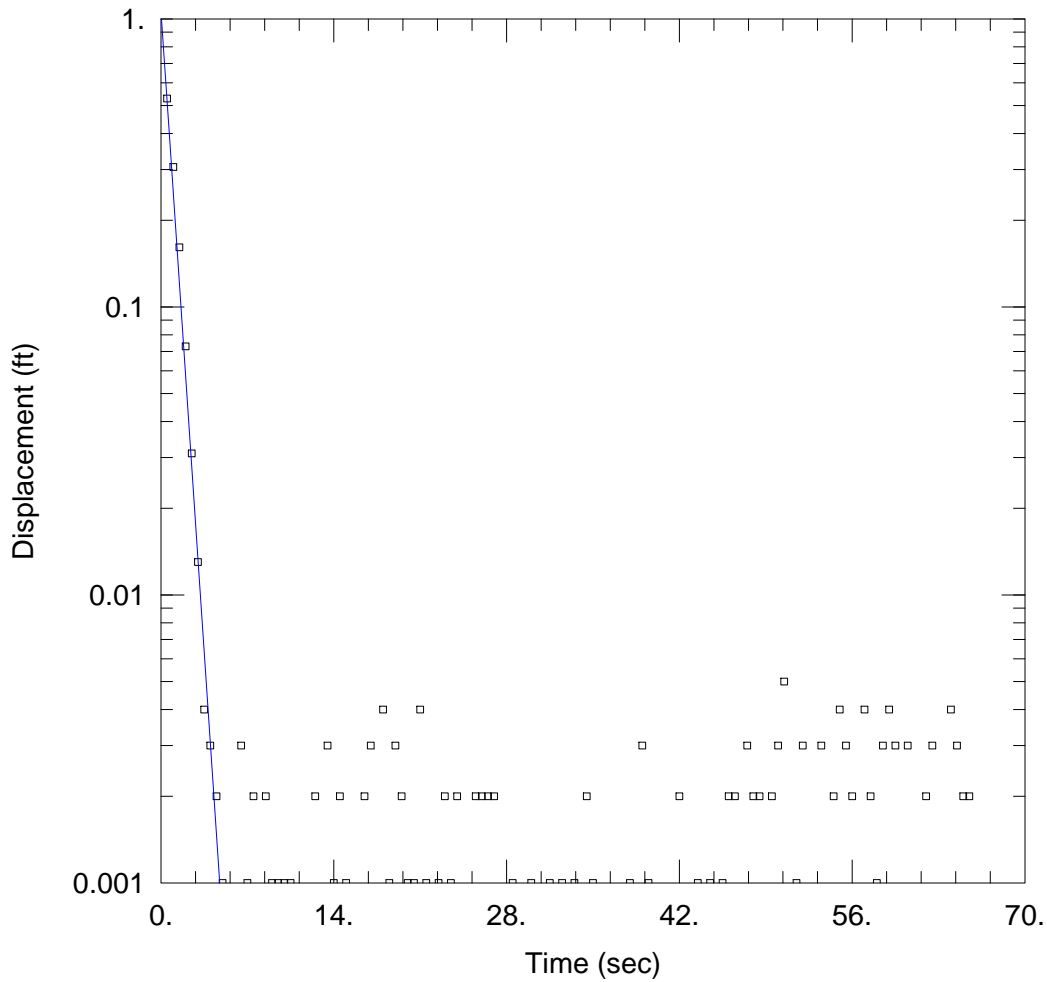
Initial Displacement: 1.852 ft
 Total Well Penetration Depth: 7.566 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 7.566 ft
 Screen Length: 7.566 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0001781 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 1.322E-11 ft⁻¹



TEST 2

Data Set: N:\...\WMW-23-2.aqt
 Date: 10/03/18

Time: 13:27:09

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-23
 Test Date: 8/29/18

AQUIFER DATA

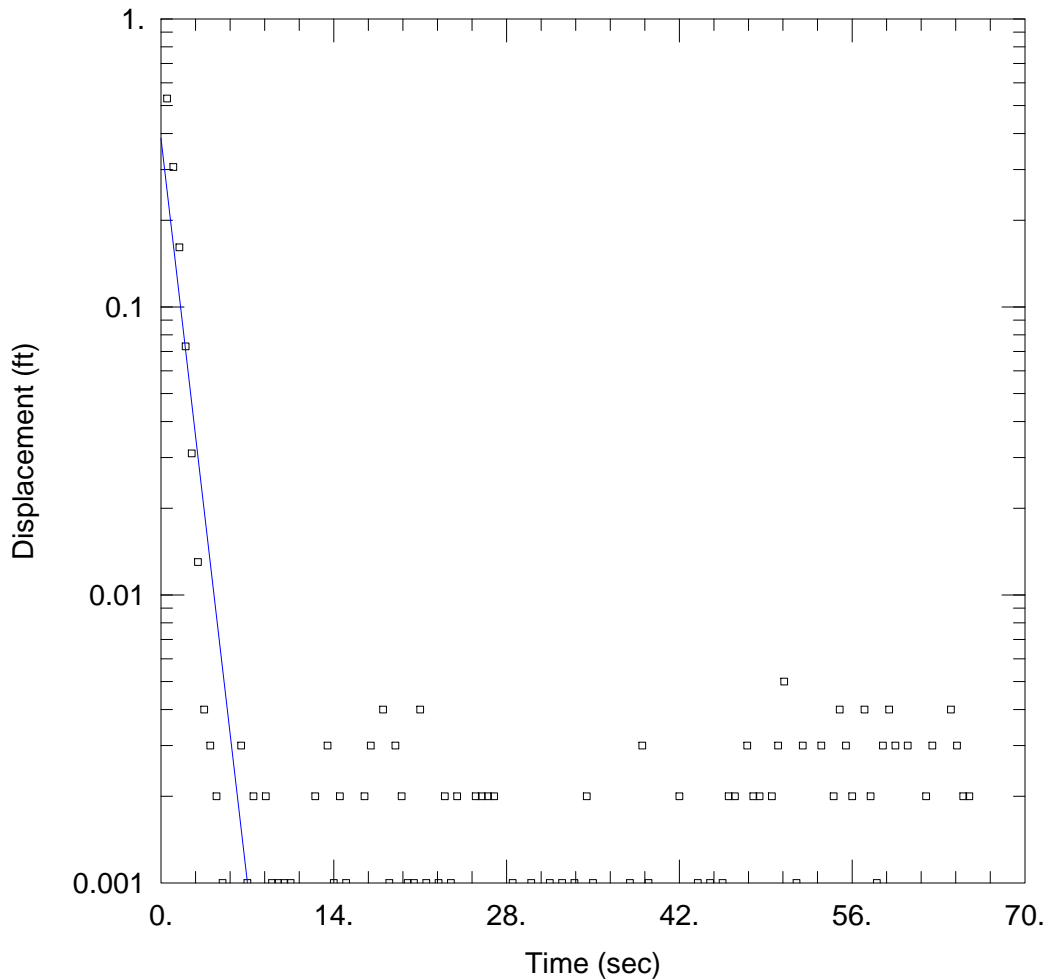
Saturated Thickness: 7.638 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-23)

Initial Displacement: 1.644 ft Static Water Column Height: 7.638 ft
 Total Well Penetration Depth: 7.638 ft Screen Length: 7.638 ft
 Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bower-Rice
 K = 0.002086 ft/sec y0 = 1.076 ft



TEST 2

Data Set: N:\...\WMW-23-2.aqt
 Date: 10/03/18

Time: 13:28:07

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-23
 Test Date: 8/29/18

AQUIFER DATA

Saturated Thickness: 7.638 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-23)

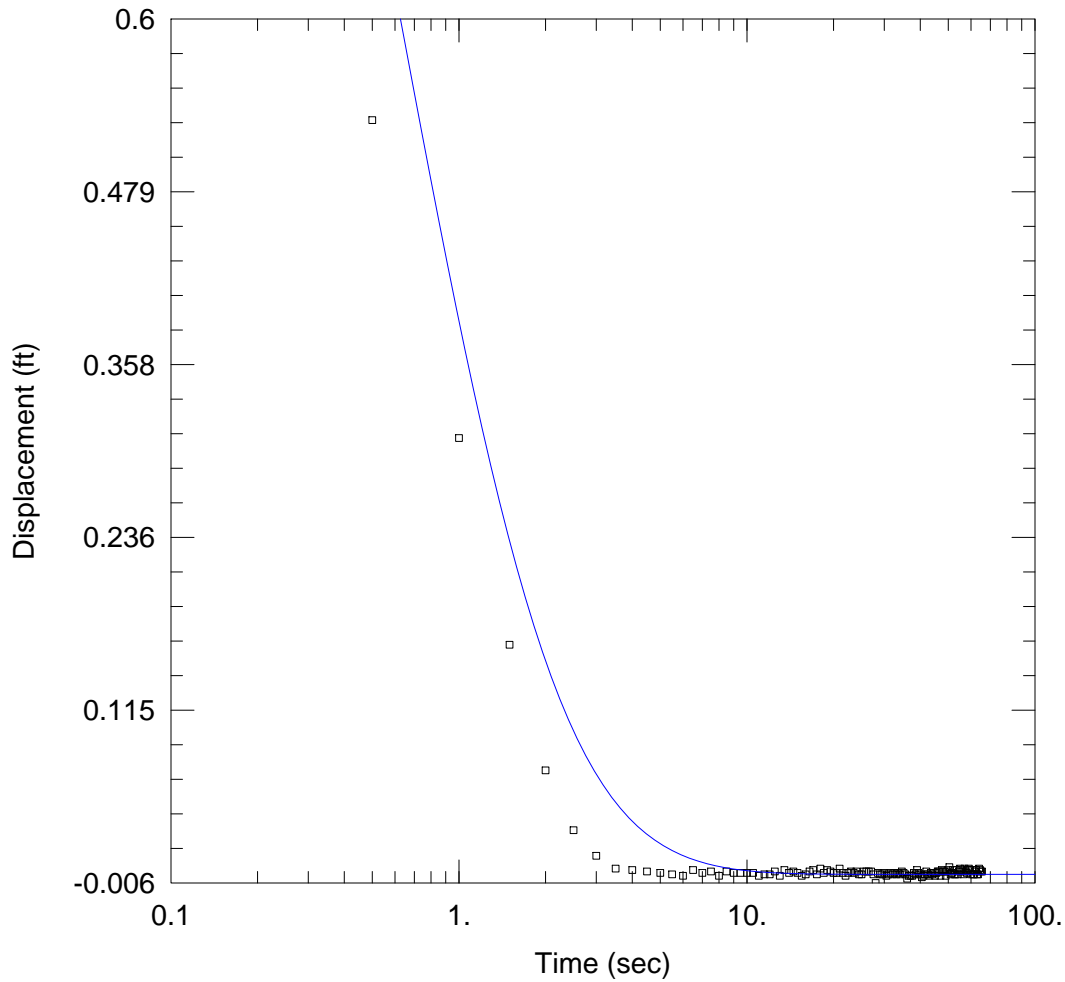
Initial Displacement: 1.644 ft
 Total Well Penetration Depth: 7.638 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 7.638 ft
 Screen Length: 7.638 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.002031 ft/sec

Solution Method: Hvorslev
 y0 = 0.3847 ft



TEST 2

Data Set: N:\...\WMW-23-2.aqt
 Date: 10/03/18

Time: 13:29:36

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-23
 Test Date: 8/29/18

AQUIFER DATA

Saturated Thickness: 7.638 ft

WELL DATA (WMW-23)

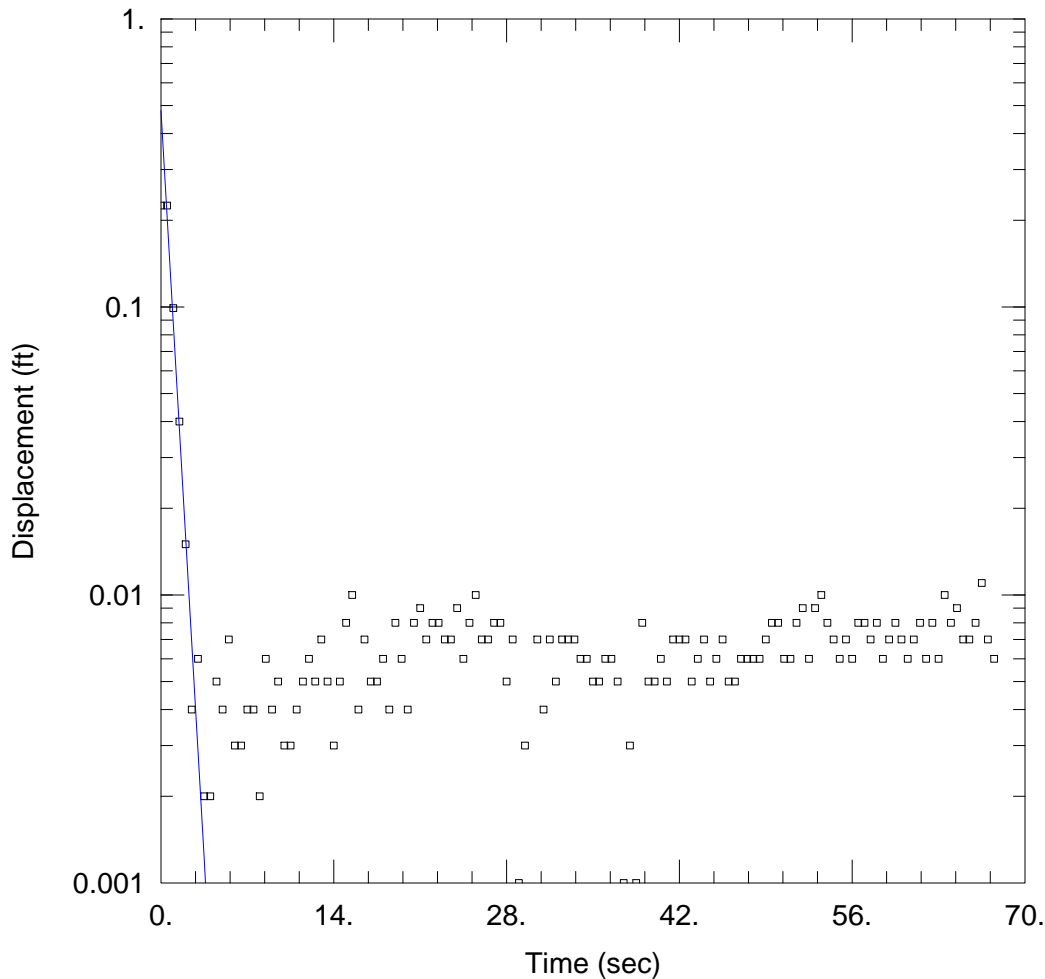
Initial Displacement: 1.644 ft
 Total Well Penetration Depth: 7.638 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 7.638 ft
 Screen Length: 7.638 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.002031 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.000373 ft⁻¹



TEST 3

Data Set: N:\...\WMW-23-3.aqt
 Date: 10/03/18

Time: 13:37:55

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-23
 Test Date: 8/29/18

AQUIFER DATA

Saturated Thickness: 7.634 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-23)

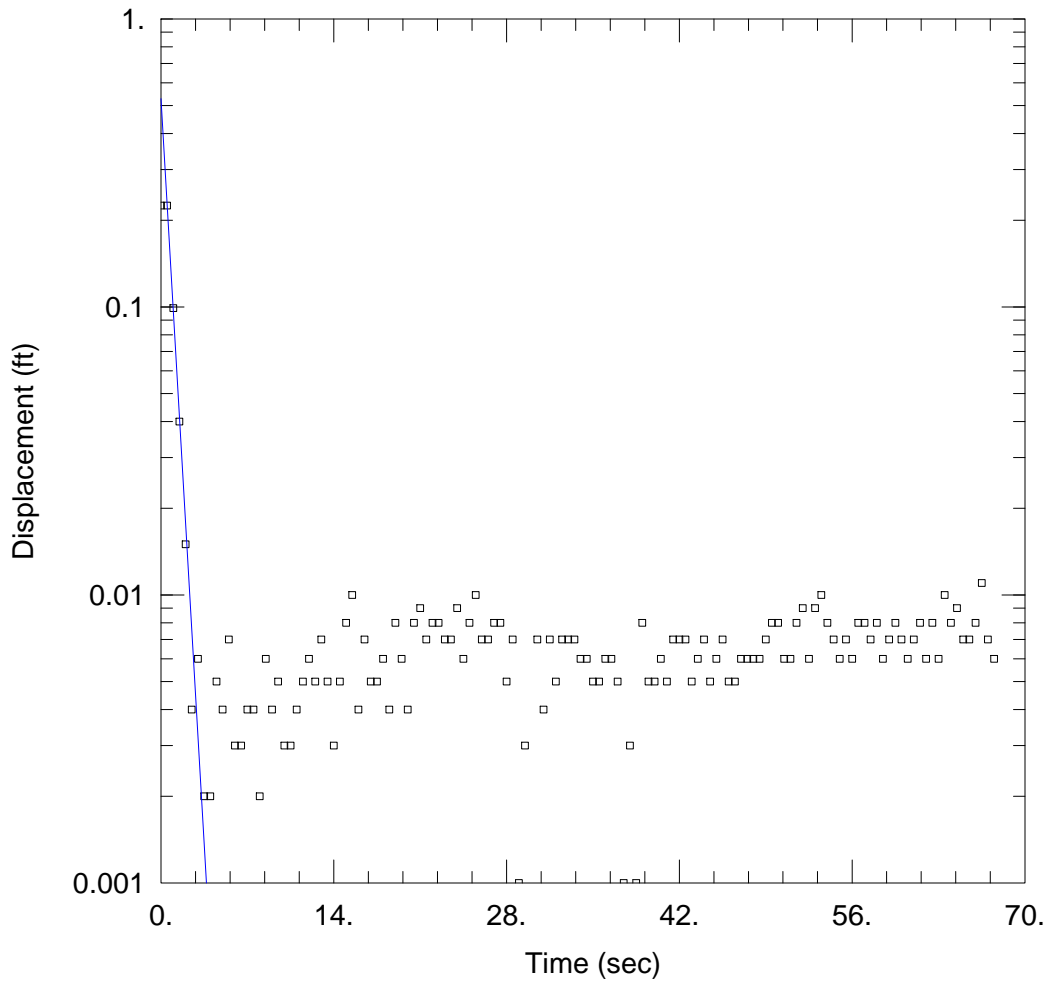
Initial Displacement: 0.225 ft
 Total Well Penetration Depth: 7.634 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 7.634 ft
 Screen Length: 7.634 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.002431 ft/sec

Solution Method: Bower-Rice
 y0 = 0.4804 ft



TEST 3

Data Set: N:\...\WMW-23-3.aqt
 Date: 10/03/18

Time: 13:38:37

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-23
 Test Date: 8/29/18

AQUIFER DATA

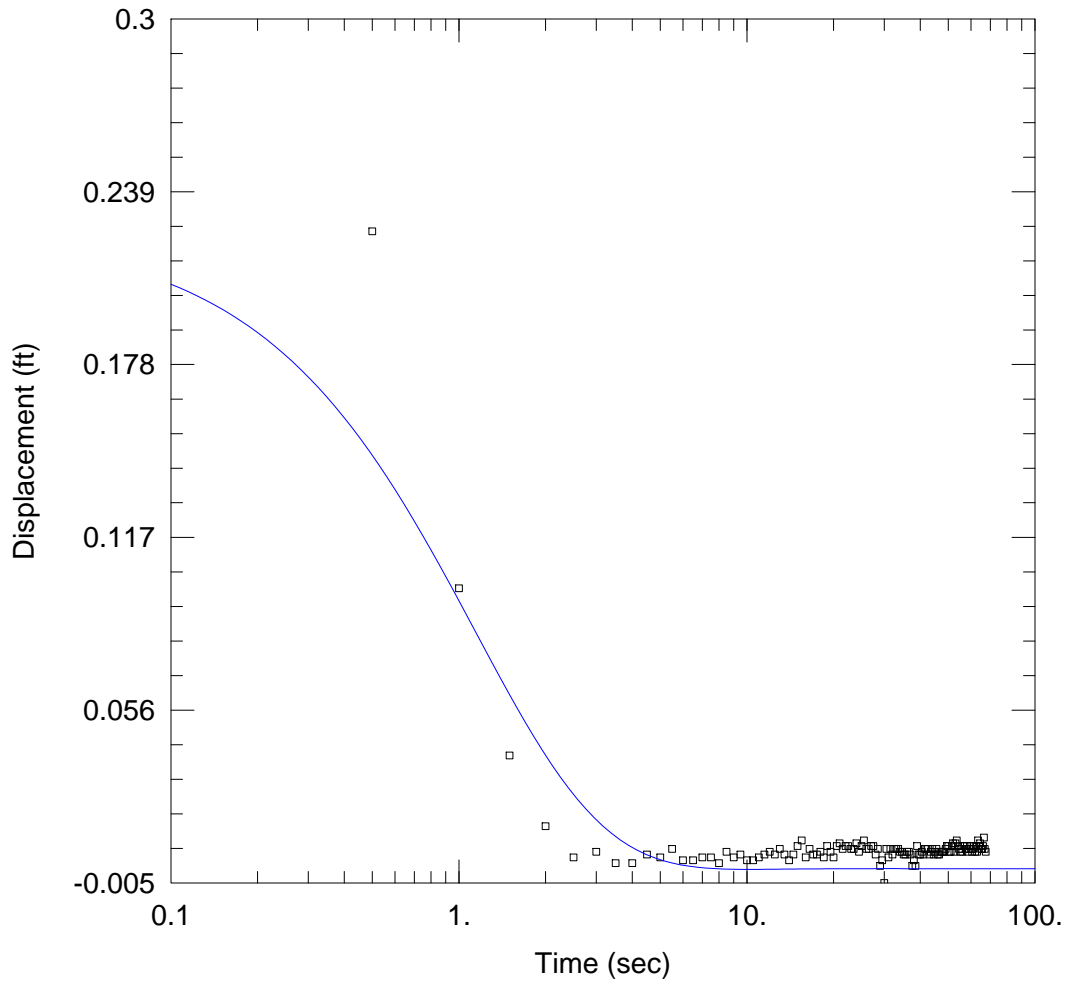
Saturated Thickness: 7.634 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-23)

Initial Displacement: 0.225 ft Static Water Column Height: 7.634 ft
 Total Well Penetration Depth: 7.634 ft Screen Length: 7.634 ft
 Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 0.00407 ft/sec y0 = 0.5287 ft



TEST 3

Data Set: N:\...\WMW-23-3.aqt
 Date: 10/03/18

Time: 13:39:50

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-23
 Test Date: 8/29/18

AQUIFER DATA

Saturated Thickness: 7.634 ft

WELL DATA (WMW-23)

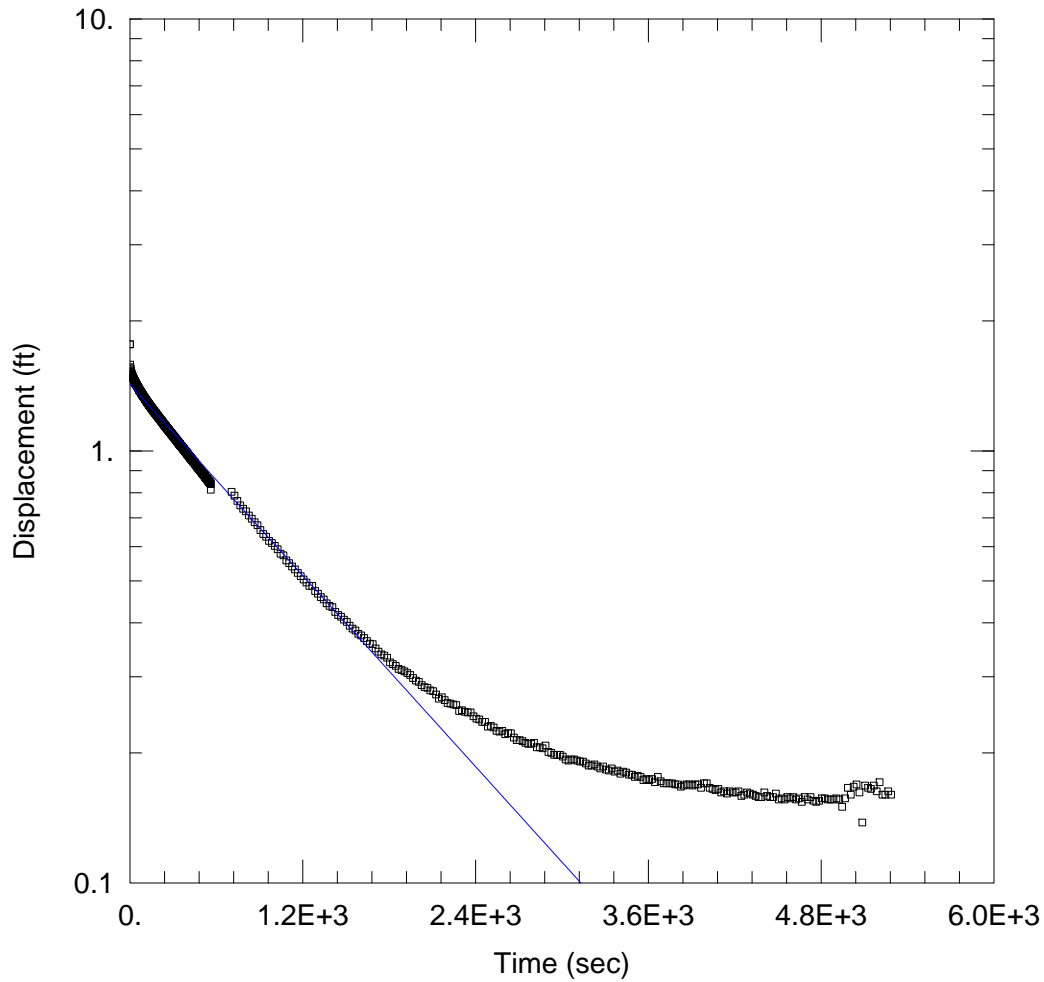
Initial Displacement: 0.225 ft
 Total Well Penetration Depth: 7.634 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 7.634 ft
 Screen Length: 7.634 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.001355 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 1.31E-11 ft⁻¹



WMW-26

Data Set: N:\...\WMW-26-1.aqt
 Date: 10/03/18

Time: 14:07:31

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-23
 Test Date: 8/28/18

AQUIFER DATA

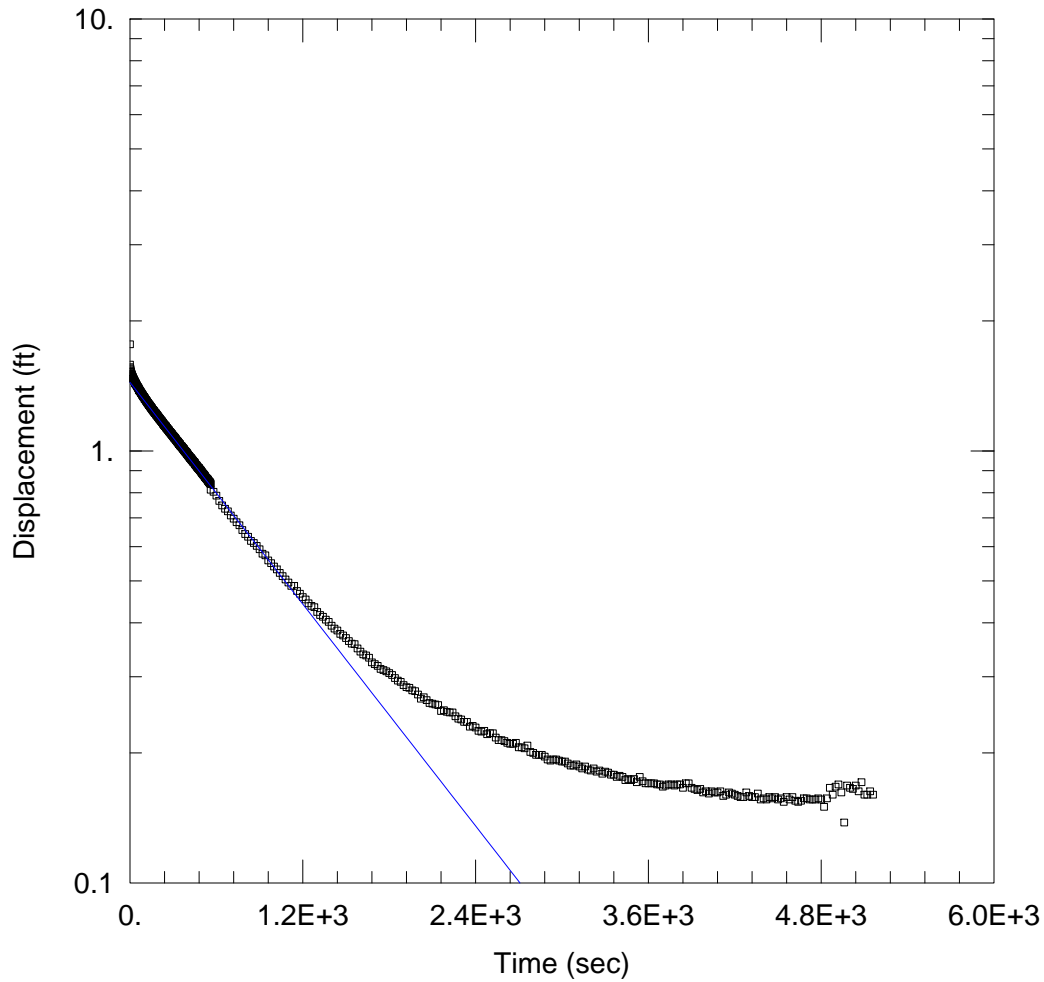
Saturated Thickness: 3.615 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-26)

Initial Displacement: 1.765 ft Static Water Column Height: 3.615 ft
 Total Well Penetration Depth: 3.615 ft Screen Length: 3.615 ft
 Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bower-Rice
 K = 2.052E-6 ft/sec y0 = 1.424 ft



TEST 1 REV

Data Set:

Date: 10/05/18

Time: 07:58:29

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants

Client: BNSF Railway Company

Project: 1896120*04

Location: Wishram Railyard, Washington

Test Well: WMW-26

Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 3.615 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-26)

Initial Displacement: 1.765 ft

Static Water Column Height: 3.615 ft

Total Well Penetration Depth: 3.615 ft

Screen Length: 3.615 ft

Casing Radius: 0.083 ft

Well Radius: 0.125 ft

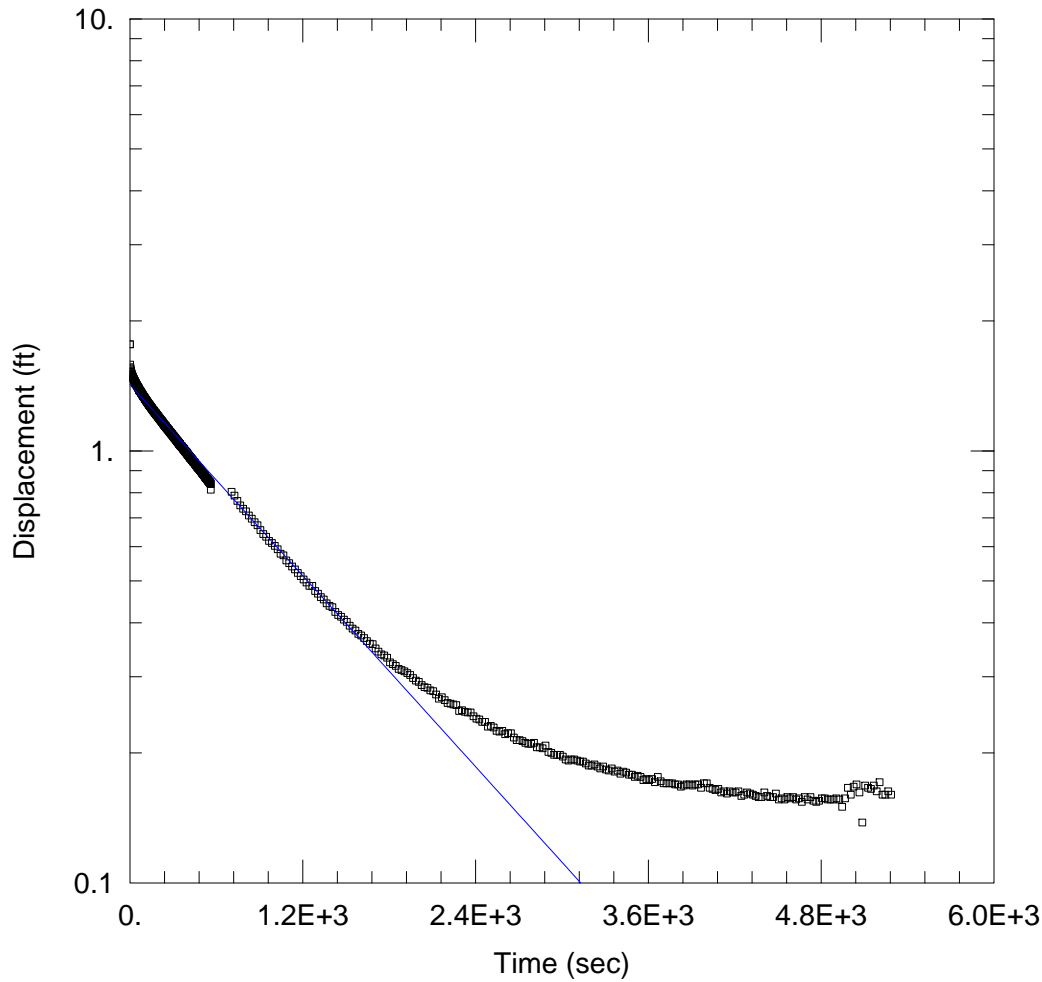
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bower-Rice

K = 2.384E-6 ft/sec

y0 = 1.442 ft



WMW-26

Data Set: N:\...\WMW-26-1.aqt
 Date: 10/03/18

Time: 14:08:08

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-23
 Test Date: 8/28/18

AQUIFER DATA

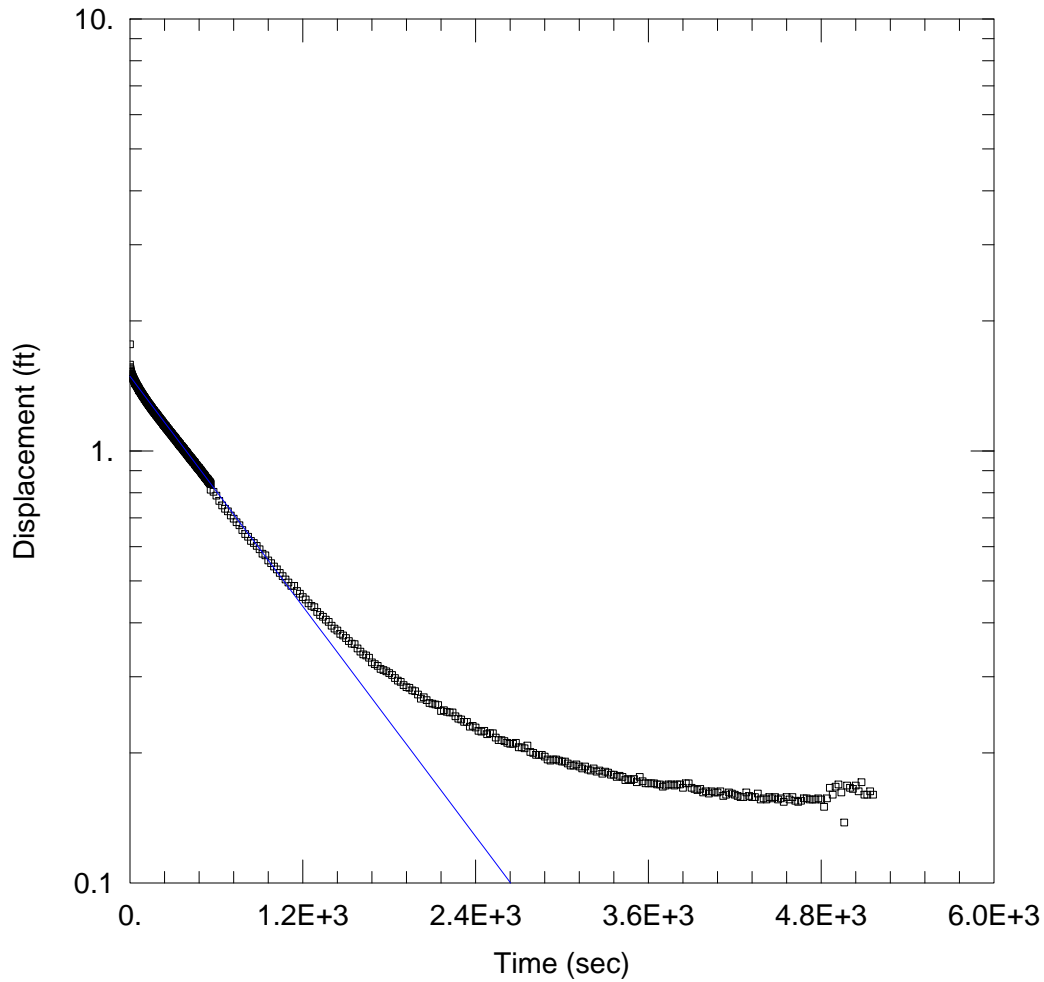
Saturated Thickness: 3.615 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-26)

Initial Displacement: 1.765 ft Static Water Column Height: 3.615 ft
 Total Well Penetration Depth: 3.615 ft Screen Length: 3.615 ft
 Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 4.284E-6 ft/sec y0 = 1.424 ft



TEST 1 REV

Data Set:

Date: 10/05/18

Time: 07:59:13

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants

Client: BNSF Railway Company

Project: 1896120*04

Location: Wishram Railyard, Washington

Test Well: WMW-26

Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 3.615 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-26)

Initial Displacement: 1.765 ft

Static Water Column Height: 3.615 ft

Total Well Penetration Depth: 3.615 ft

Screen Length: 3.615 ft

Casing Radius: 0.083 ft

Well Radius: 0.125 ft

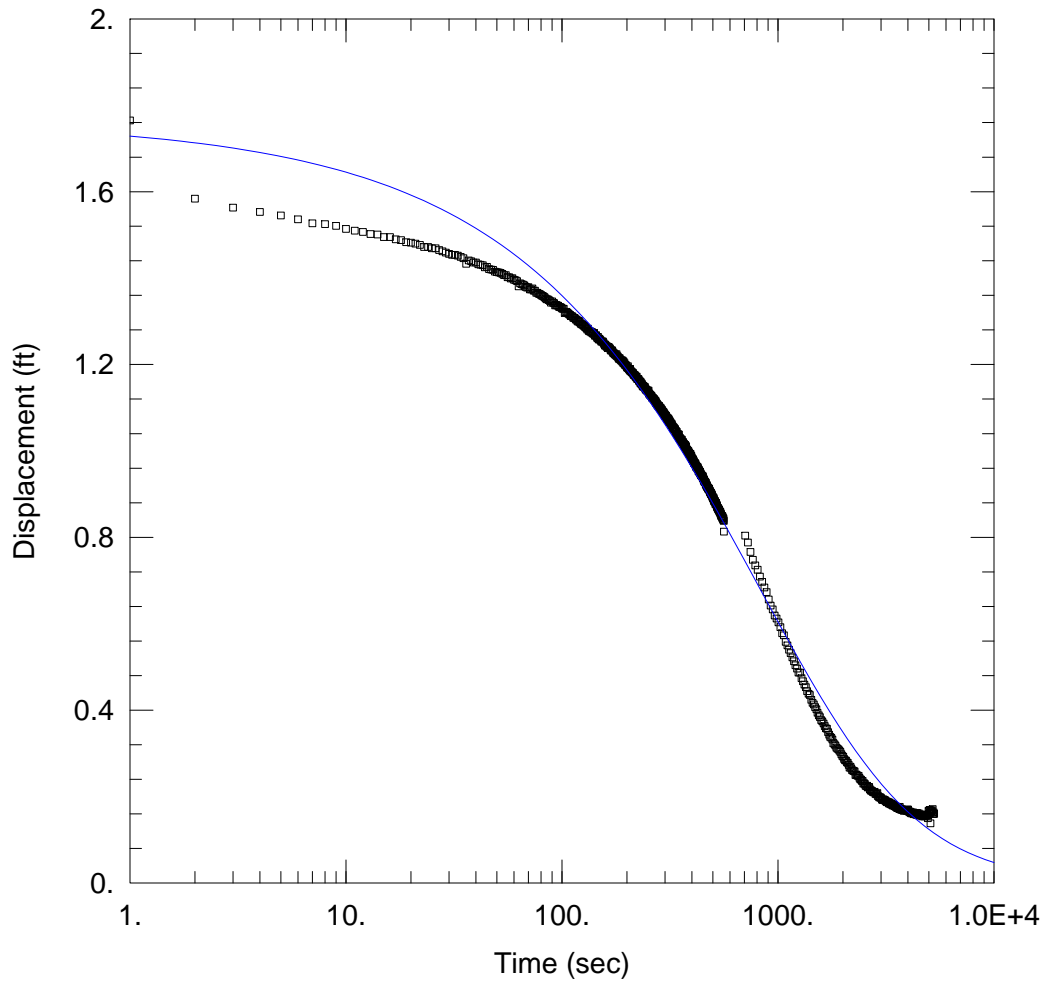
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 5.158E-6 ft/sec

y0 = 1.489 ft



WMW-26

Data Set: N:\...\WMW-26-1.aqt
 Date: 10/03/18

Time: 14:16:27

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-23
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 3.615 ft

WELL DATA (WMW-26)

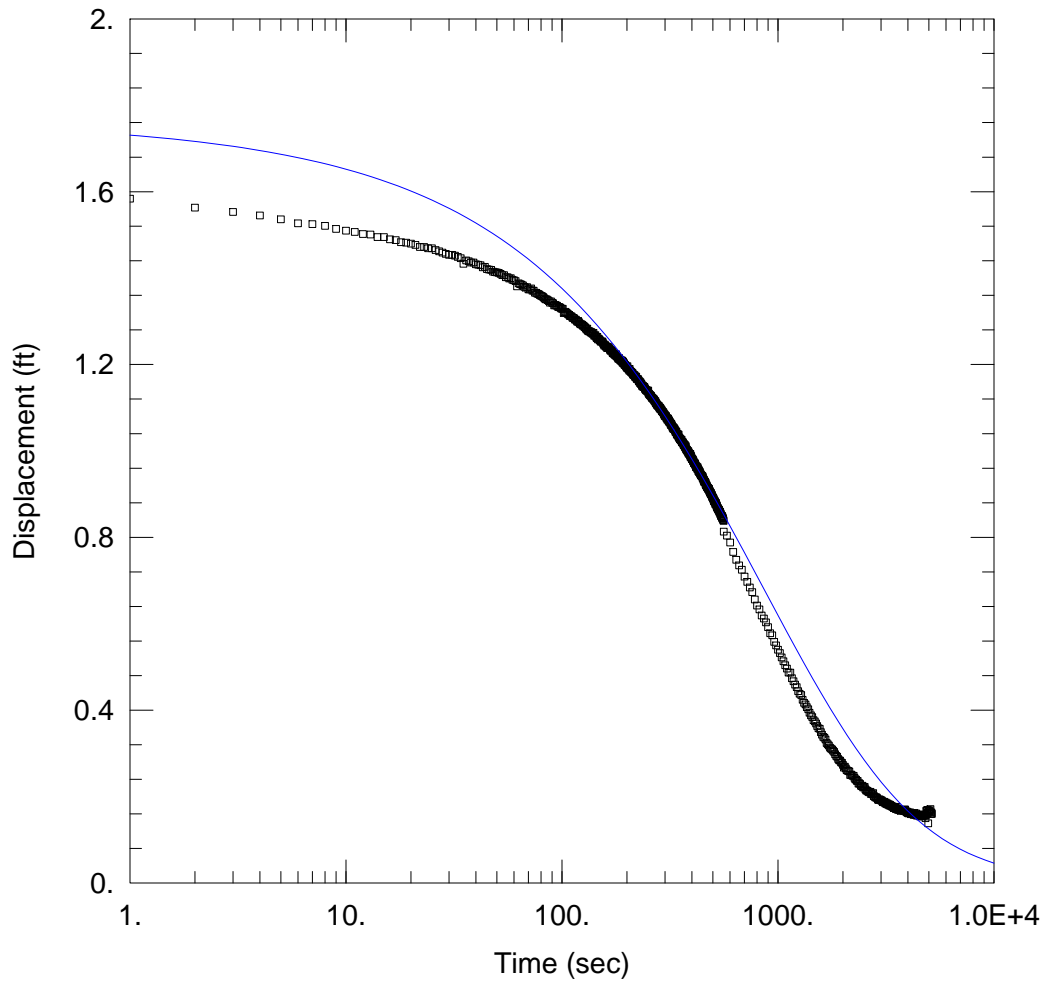
Initial Displacement: 1.765 ft
 Total Well Penetration Depth: 3.615 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 3.615 ft
 Screen Length: 3.615 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 1.568E-6 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.01161 ft⁻¹



TEST 1 REV

Data Set:

Date: 10/05/18

Time: 08:00:09

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants

Client: BNSF Railway Company

Project: 1896120*04

Location: Wishram Railyard, Washington

Test Well: WMW-26

Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 3.615 ft

WELL DATA (WMW-26)

Initial Displacement: 1.765 ft

Total Well Penetration Depth: 3.615 ft

Casing Radius: 0.083 ft

Static Water Column Height: 3.615 ft

Screen Length: 3.615 ft

Well Radius: 0.125 ft

SOLUTION

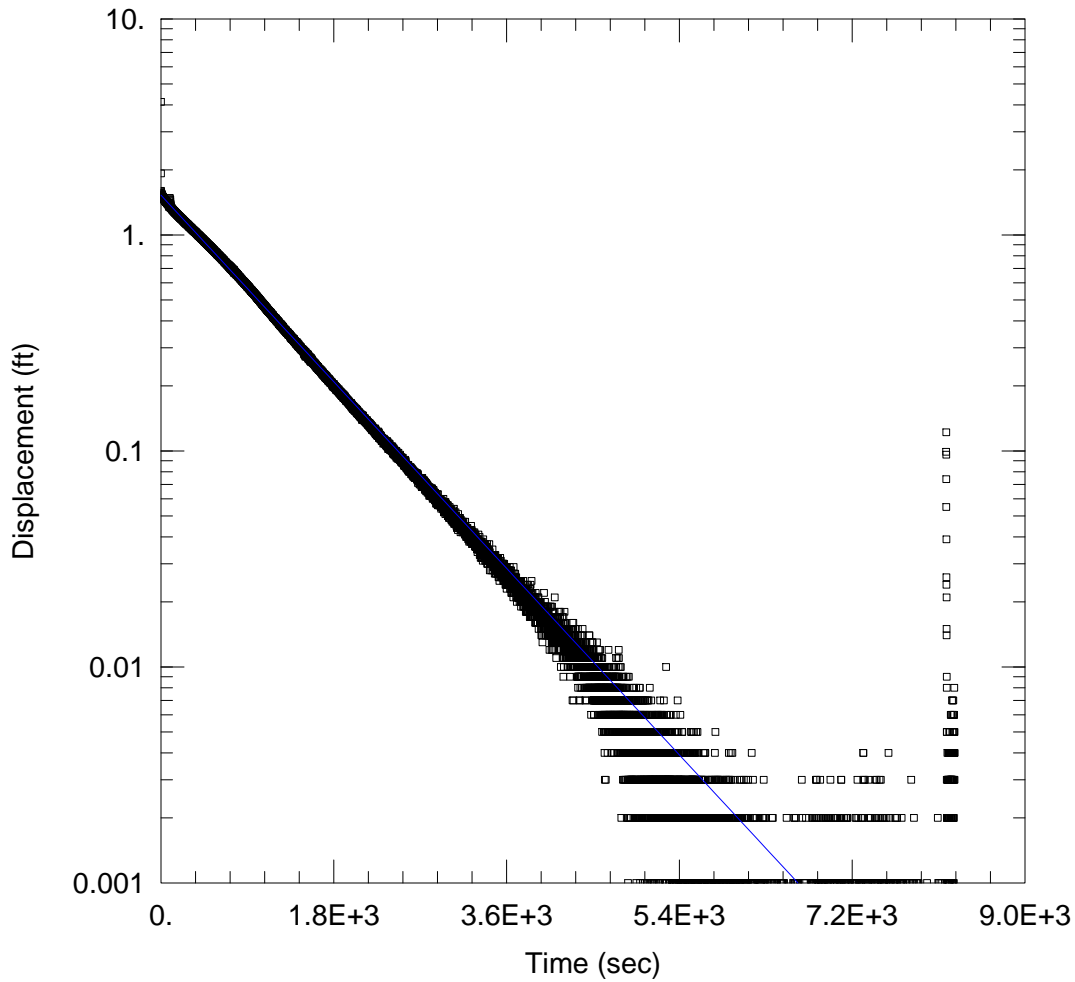
Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 1.58E-6 ft/sec

Ss = 0.009991 ft⁻¹

Kz/Kr = 1.



TEST 2

Data Set: N:\...\WMW-26-2.aqt
 Date: 10/03/18

Time: 14:23:02

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-26
 Test Date: 8/29/18

AQUIFER DATA

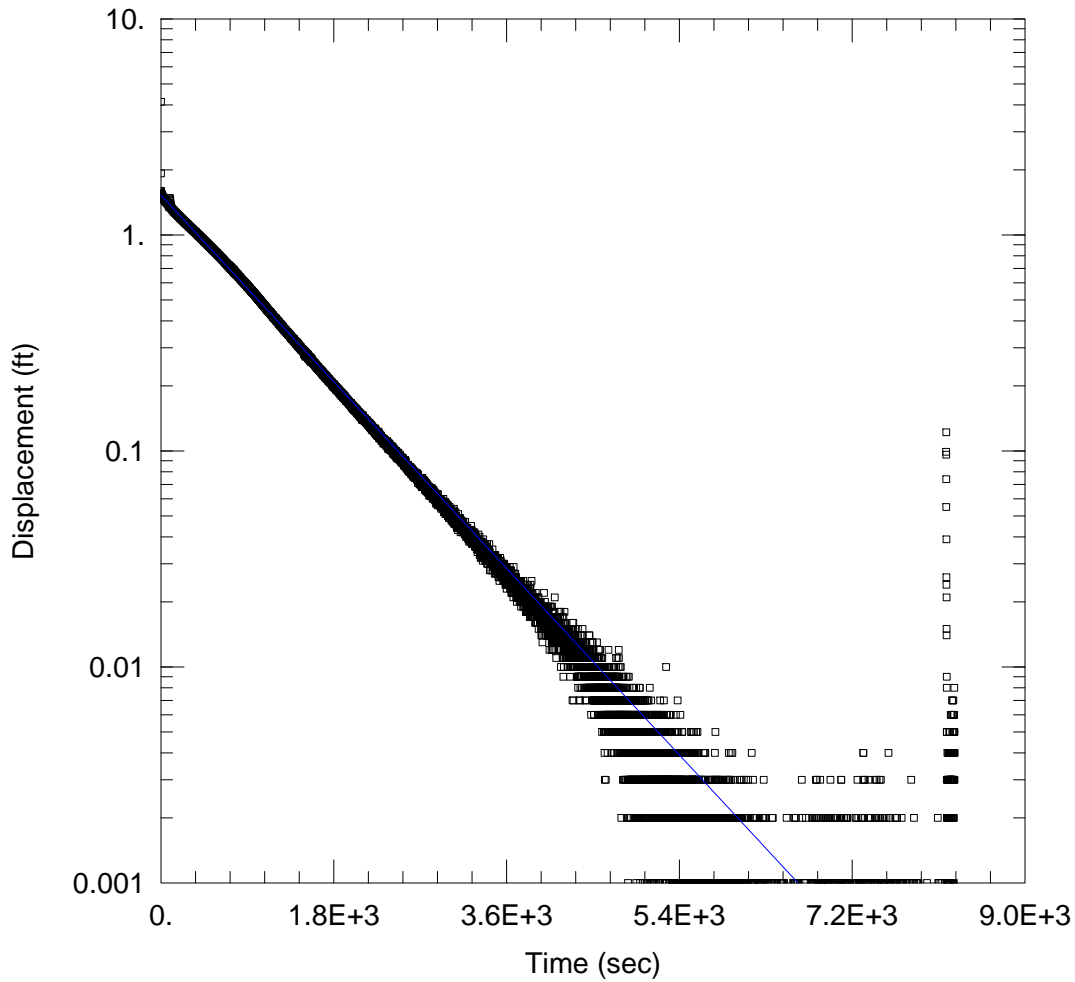
Saturated Thickness: 5.779 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-26)

Initial Displacement: 4.128 ft Static Water Column Height: 5.779 ft
 Total Well Penetration Depth: 5.779 ft Screen Length: 5.779 ft
 Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bower-Rice
 K = 1.93E-6 ft/sec y0 = 1.527 ft



TEST 2

Data Set: N:\...\WMW-26-2.aqt
 Date: 10/03/18

Time: 14:23:55

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-26
 Test Date: 8/29/18

AQUIFER DATA

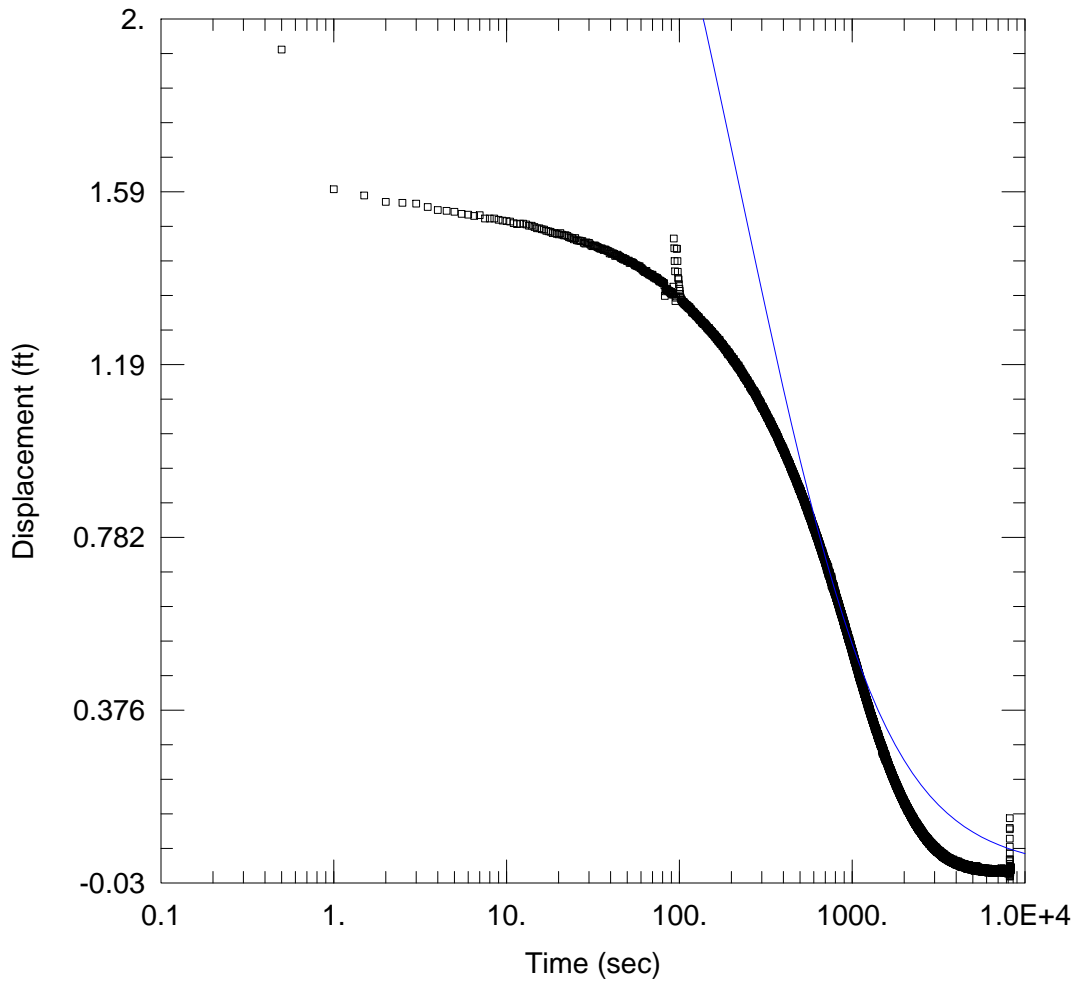
Saturated Thickness: 5.779 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-26)

Initial Displacement: 4.128 ft Static Water Column Height: 5.779 ft
 Total Well Penetration Depth: 5.779 ft Screen Length: 5.779 ft
 Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 3.489E-6 ft/sec y0 = 1.527 ft



TEST 2

Data Set: N:\...\WMW-26-2.aqt
 Date: 10/03/18

Time: 14:37:29

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-26
 Test Date: 8/29/18

AQUIFER DATA

Saturated Thickness: 5.779 ft

WELL DATA (WMW-26)

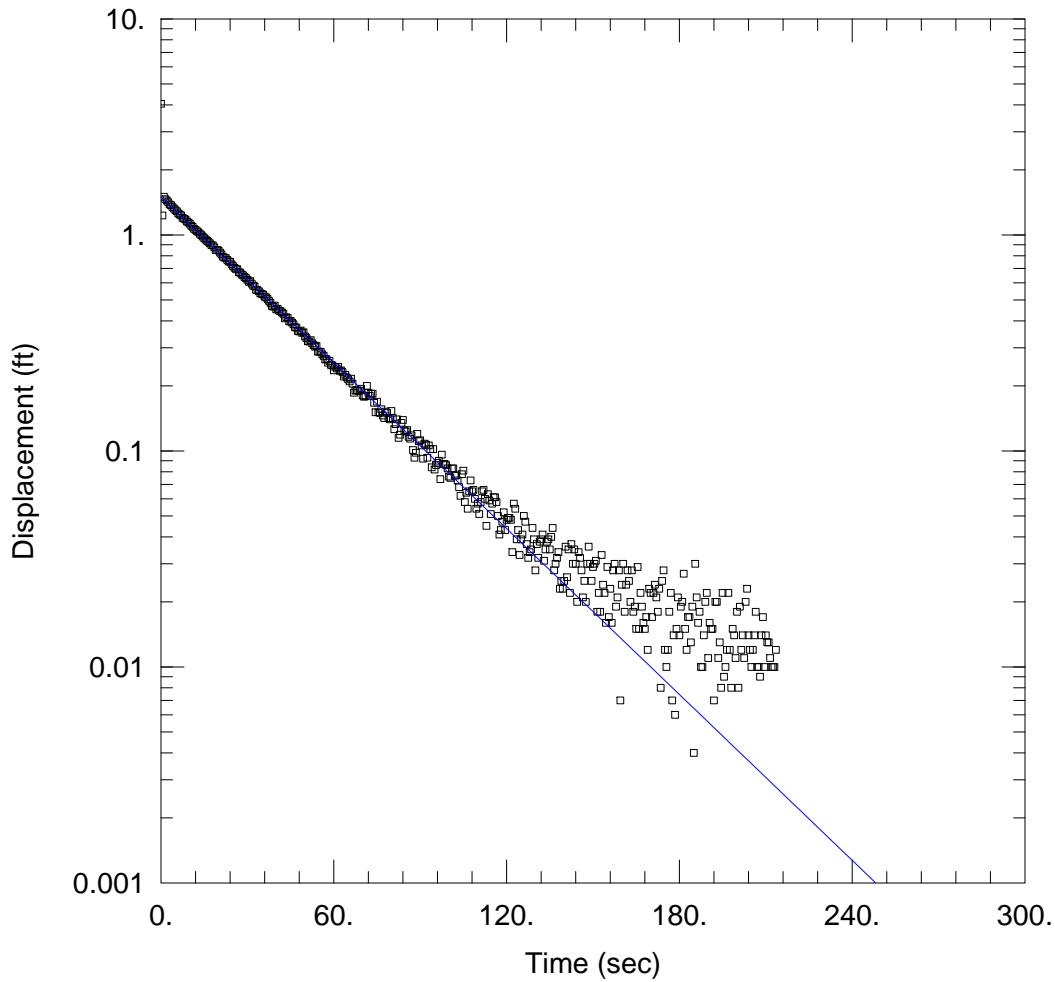
Initial Displacement: 4.128 ft
 Total Well Penetration Depth: 5.779 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 5.779 ft
 Screen Length: 5.779 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 2.614E-6 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.0173 ft⁻¹



WMW-28

Data Set: N:\...\WMW-28-1.aqt
Date: 10/03/18

Time: 14:44:17

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
Client: BNSF Railway Company
Project: 1896120*04
Location: Wishram Railyard, Washington
Test Well: WMW-26
Test Date: 8/28/18

AQUIFER DATA

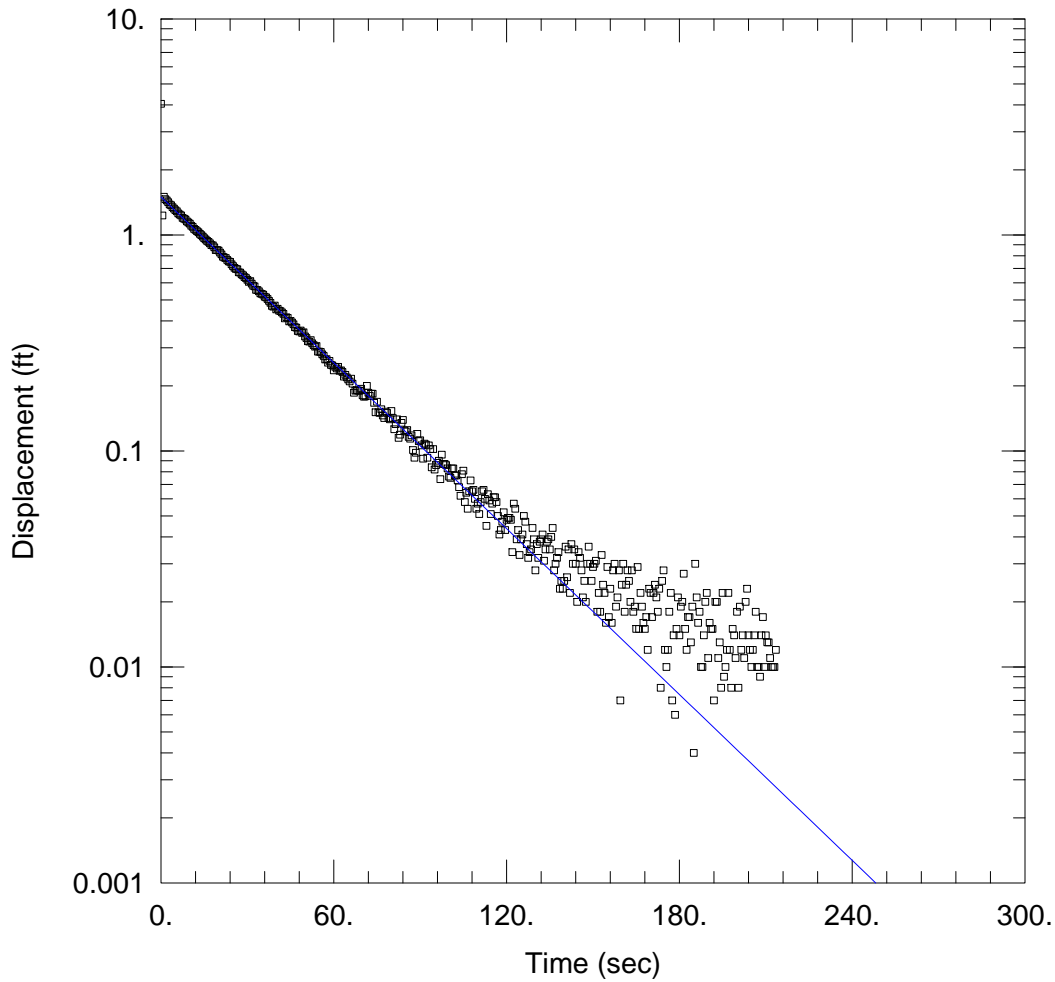
Saturated Thickness: 6.817 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-28)

Initial Displacement: 4.043 ft Static Water Column Height: 6.817 ft
Total Well Penetration Depth: 6.817 ft Screen Length: 6.817 ft
Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bower-Rice
K = 4.562E-5 ft/sec $y_0 =$ 1.499 ft



WMW-28

Data Set: N:\...\WMW-28-1.aqt
 Date: 10/03/18

Time: 14:44:52

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-26
 Test Date: 8/28/18

AQUIFER DATA

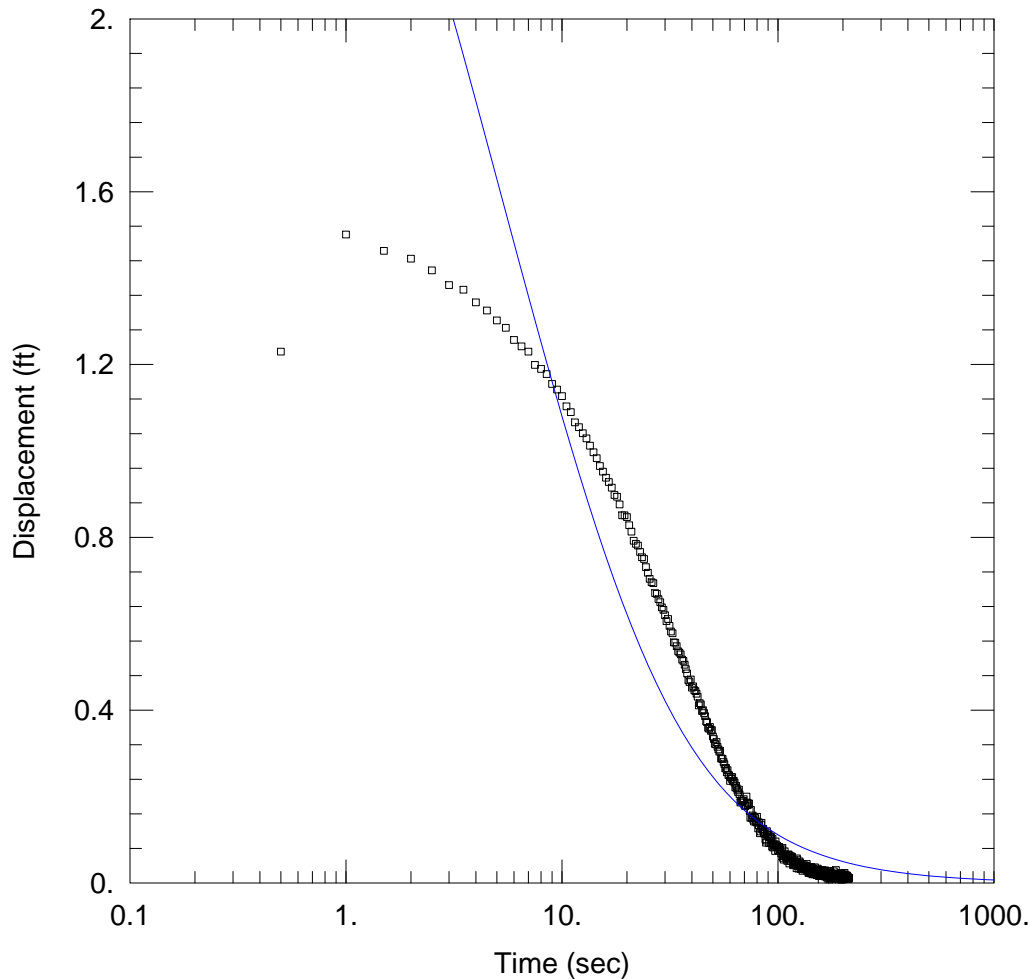
Saturated Thickness: 6.817 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-28)

Initial Displacement: 4.043 ft Static Water Column Height: 6.817 ft
 Total Well Penetration Depth: 6.817 ft Screen Length: 6.817 ft
 Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 7.889E-5 ft/sec $y_0 =$ 1.499 ft



WMW-28

Data Set: N:\...\WMW-28-1.aqt
 Date: 10/03/18

Time: 14:46:38

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-26
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 6.817 ft

WELL DATA (WMW-28)

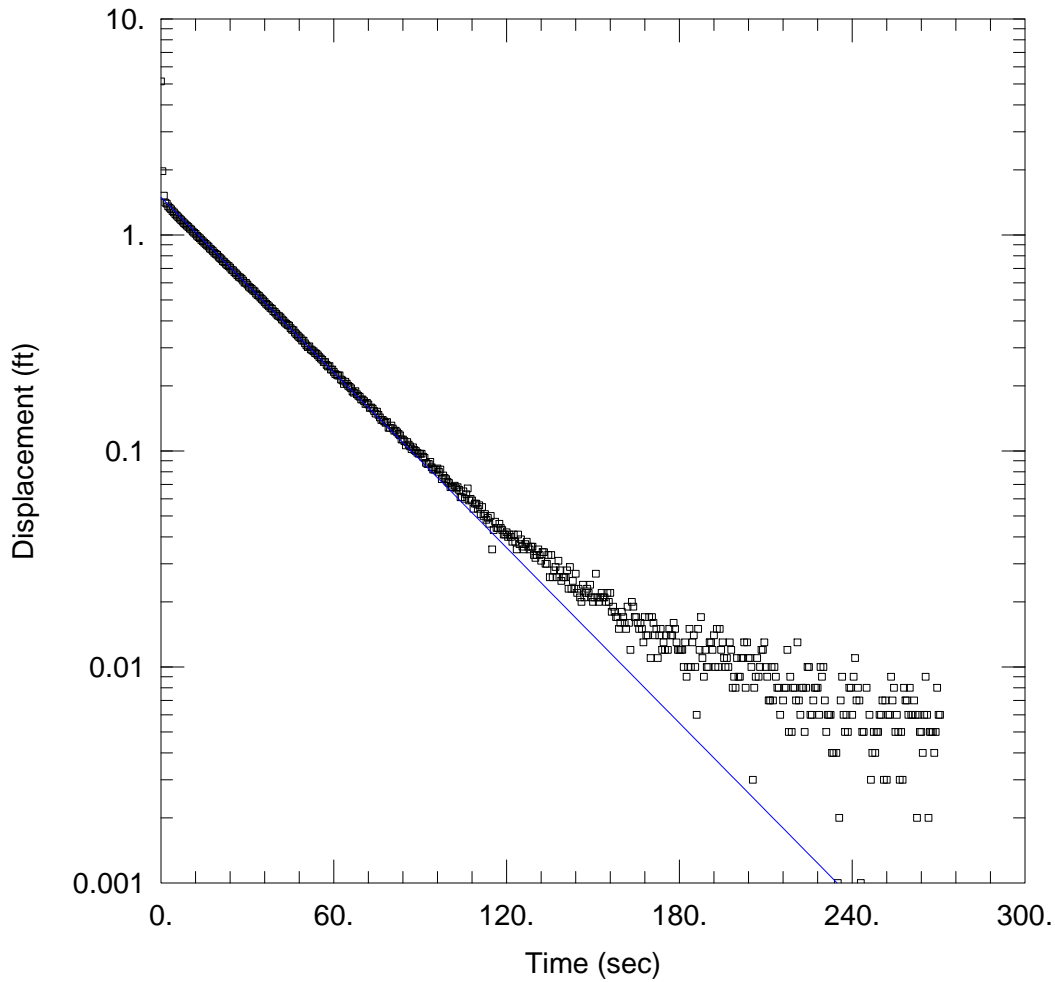
Initial Displacement: 4.043 ft
 Total Well Penetration Depth: 6.817 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 6.817 ft
 Screen Length: 6.817 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 9.249E-5 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.01467 ft⁻¹



WMW-28

Data Set: N:\...\WMW-28-2.aqt
Date: 10/03/18

Time: 14:52:06

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
Client: BNSF Railway Company
Project: 1896120*04
Location: Wishram Railyard, Washington
Test Well: WMW-26
Test Date: 8/28/18

AQUIFER DATA

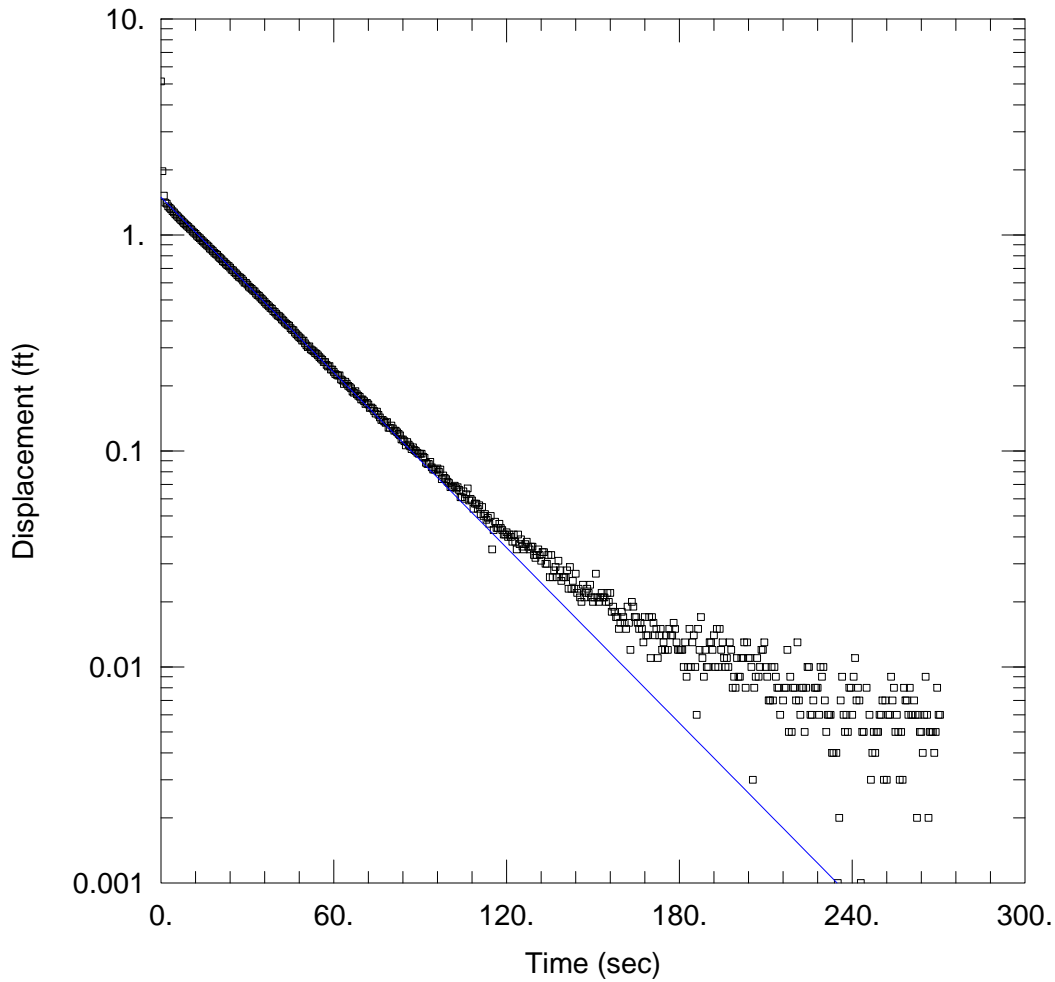
Saturated Thickness: 6.8 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-28)

Initial Displacement: 5.137 ft Static Water Column Height: 6.8 ft
Total Well Penetration Depth: 6.8 ft Screen Length: 6.8 ft
Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bower-Rice
K = 4.83E-5 ft/sec y0 = 1.495 ft



WMW-28

Data Set: N:\...\WMW-28-2.aqt
 Date: 10/03/18

Time: 14:52:50

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-26
 Test Date: 8/28/18

AQUIFER DATA

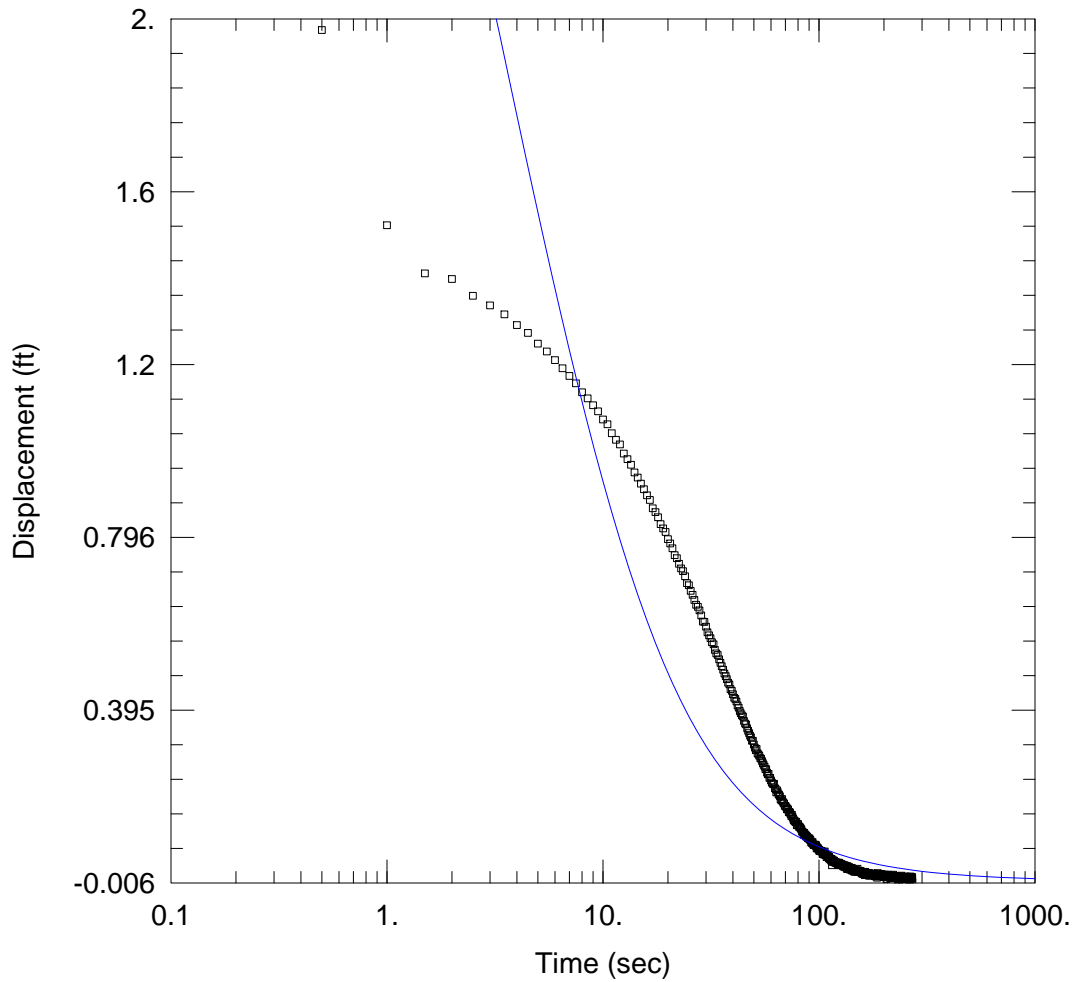
Saturated Thickness: 6.8 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-28)

Initial Displacement: 5.137 ft Static Water Column Height: 6.8 ft
 Total Well Penetration Depth: 6.8 ft Screen Length: 6.8 ft
 Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 8.357E-5 ft/sec y0 = 1.495 ft



WMW-28

Data Set: N:\...\WMW-28-2.aqt
 Date: 10/03/18

Time: 14:55:41

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-26
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 6.8 ft

WELL DATA (WMW-28)

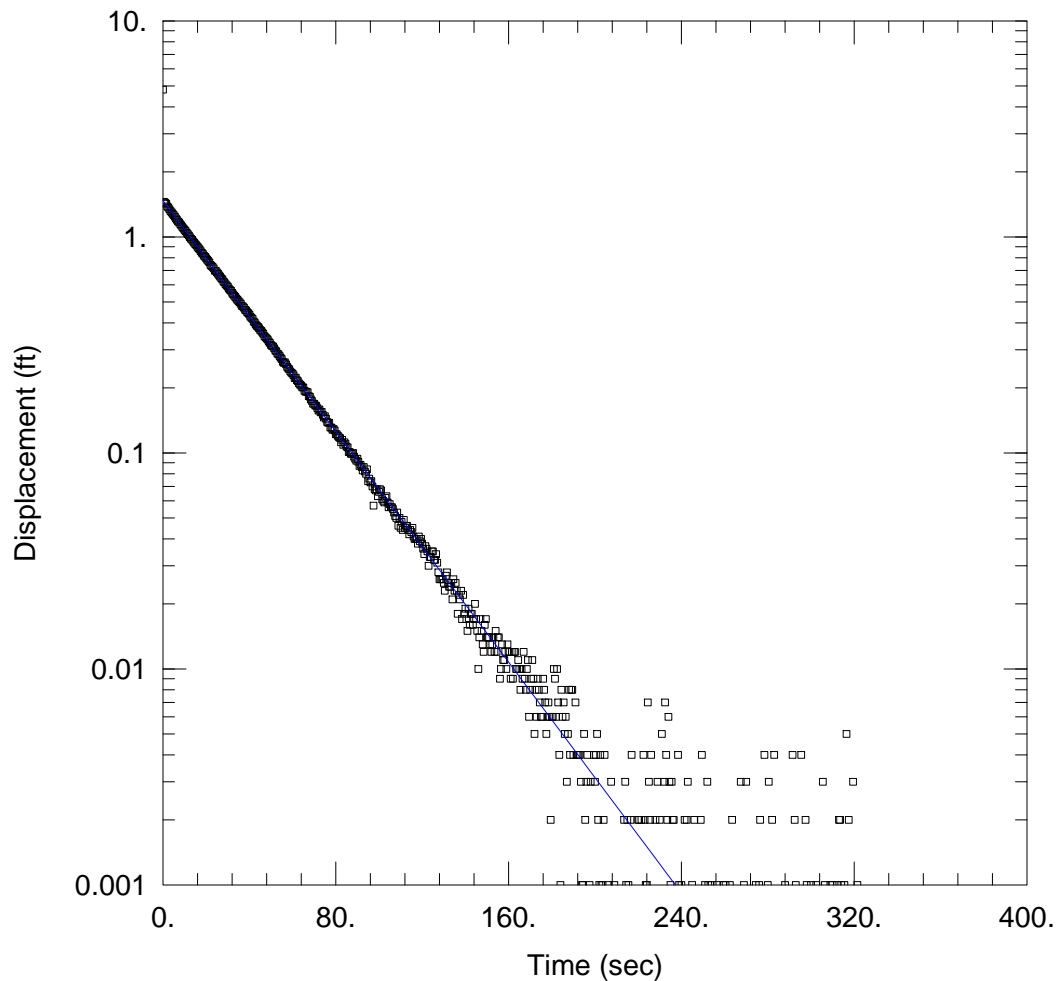
Initial Displacement: 5.137 ft
 Total Well Penetration Depth: 6.8 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 6.8 ft
 Screen Length: 6.8 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 0.0001545 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.01471 ft⁻¹



TEST 3

Data Set: N:\...\WMW-28-3.aqt
 Date: 10/05/18

Time: 08:07:25

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-28
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 6.791 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-28)

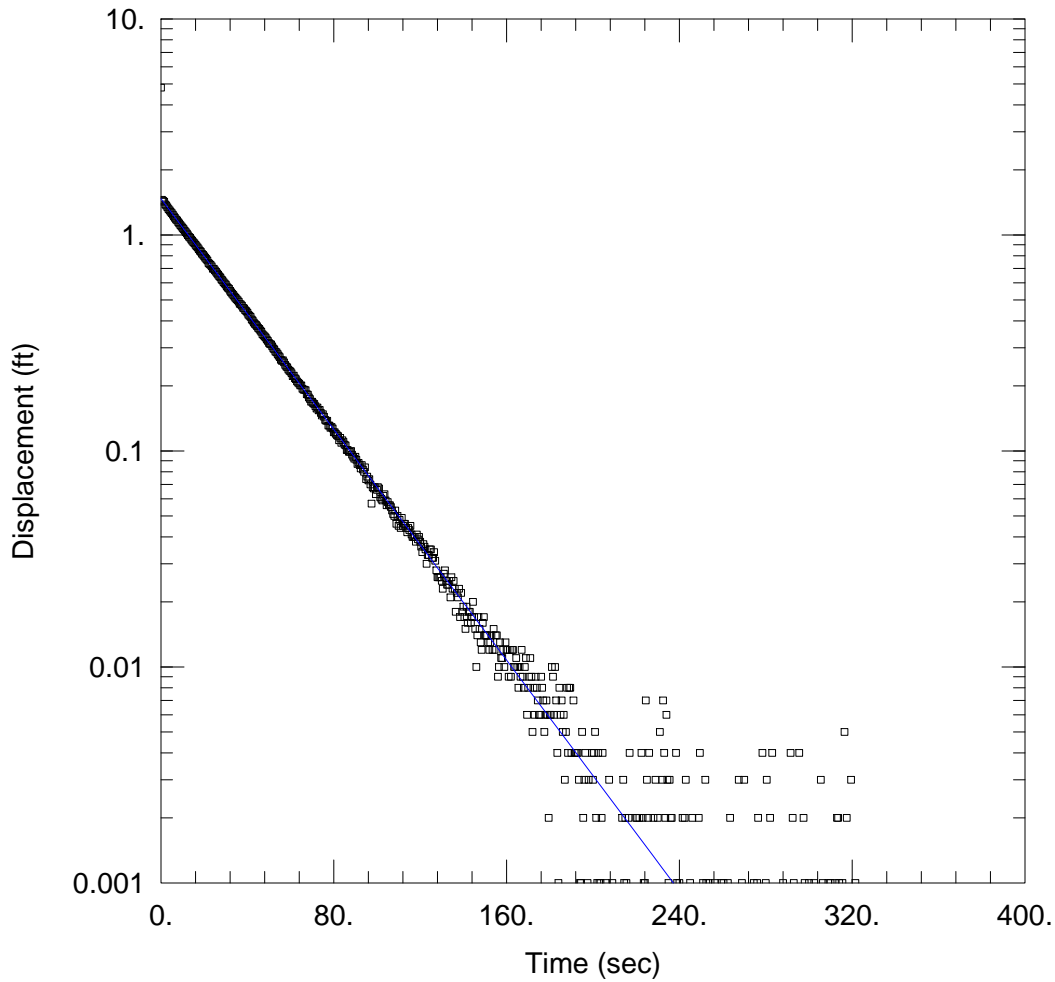
Initial Displacement: 4.806 ft
 Total Well Penetration Depth: 6.791 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 6.791 ft
 Screen Length: 6.791 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 4.774E-5 ft/sec

Solution Method: Bower-Rice
 y0 = 1.472 ft



TEST 3

Data Set: N:\...\WMW-28-3.aqt
 Date: 10/05/18

Time: 08:10:03

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-28
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 6.791 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-28)

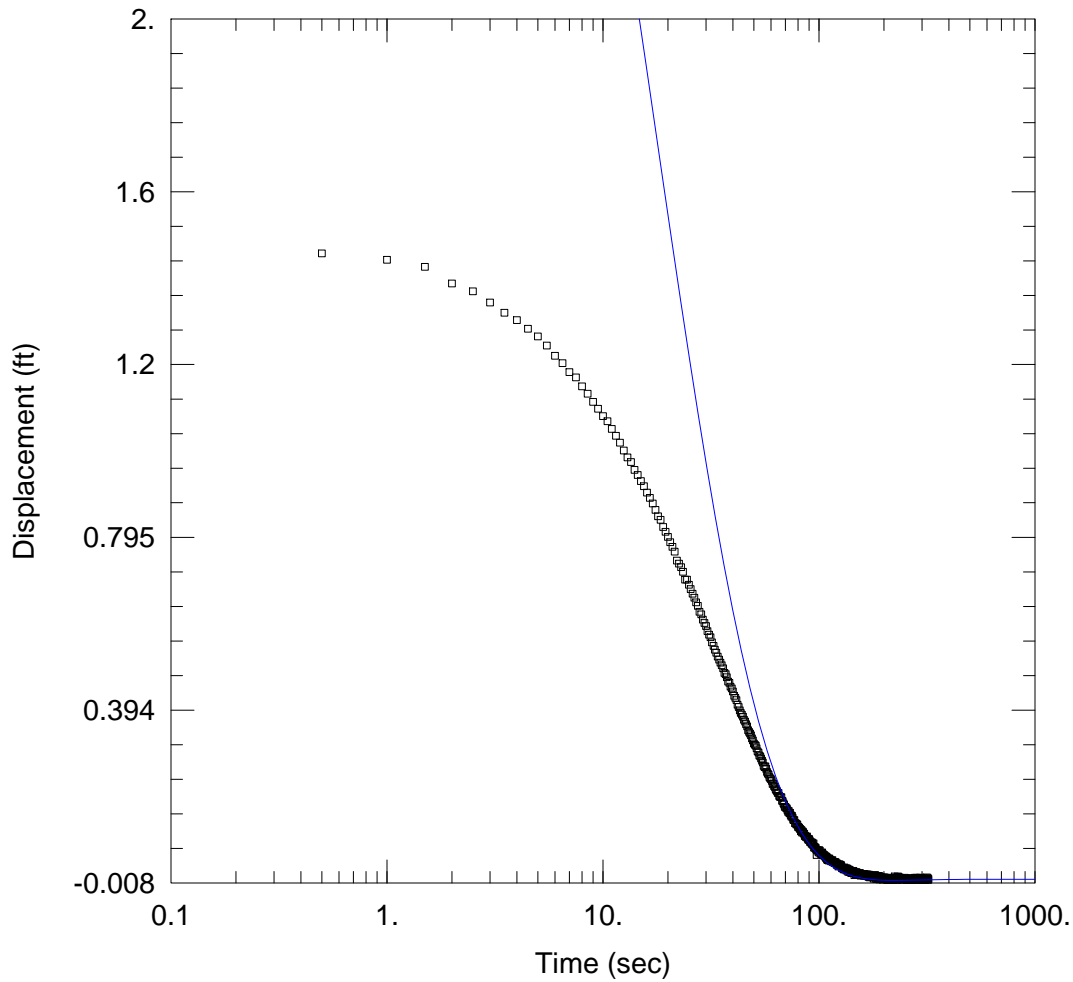
Initial Displacement: 4.806 ft
 Total Well Penetration Depth: 6.791 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 6.791 ft
 Screen Length: 6.791 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 8.264E-5 ft/sec

Solution Method: Hvorslev
 y0 = 1.472 ft



TEST 3

Data Set: N:\...\WMW-28-3.aqt
 Date: 10/05/18

Time: 08:11:38

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-28
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 6.791 ft

WELL DATA (WMW-28)

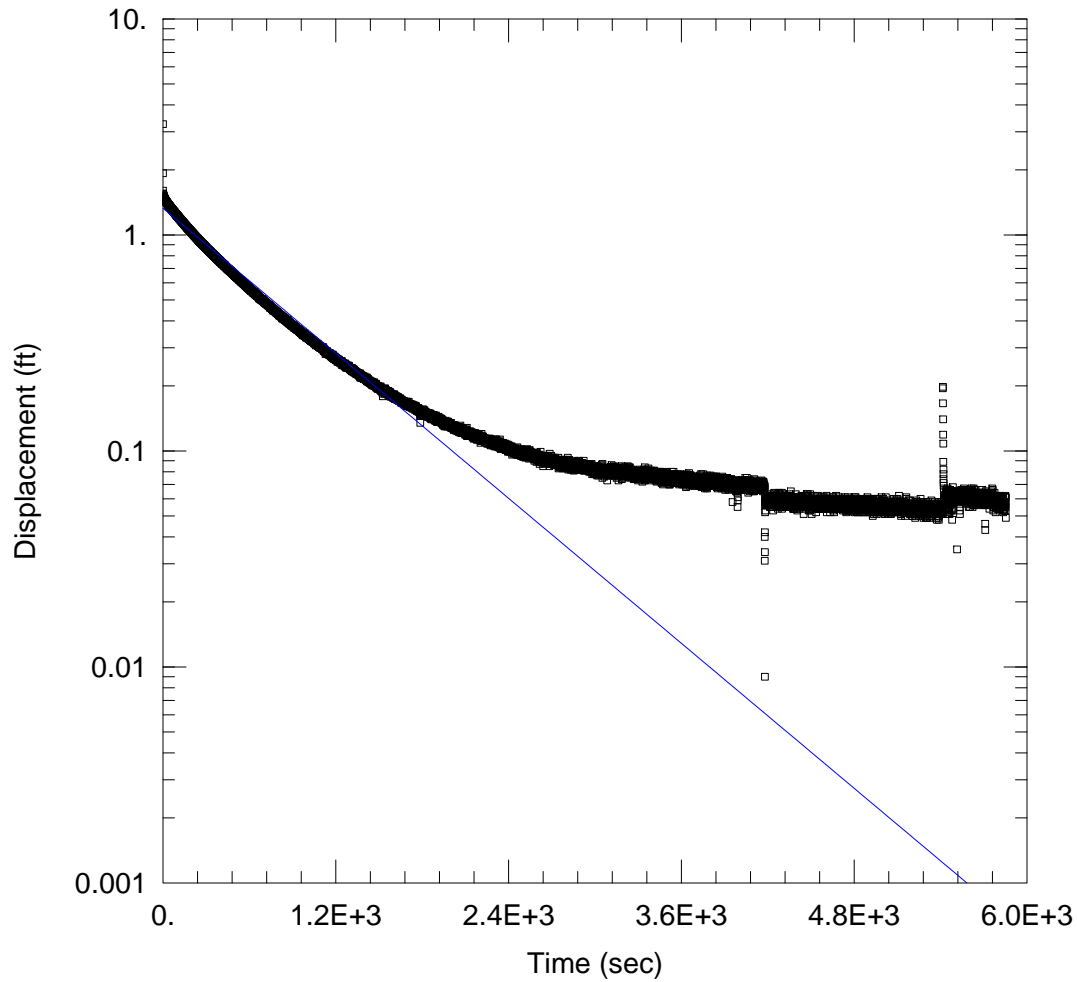
Initial Displacement: 4.806 ft
 Total Well Penetration Depth: 6.791 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 6.791 ft
 Screen Length: 6.791 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 9.128E-5 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.0001473 ft⁻¹



TEST 1

Data Set: N:\...\WMW-30-1.aqt
 Date: 10/05/18

Time: 08:34:07

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-30
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 6.453 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-30)

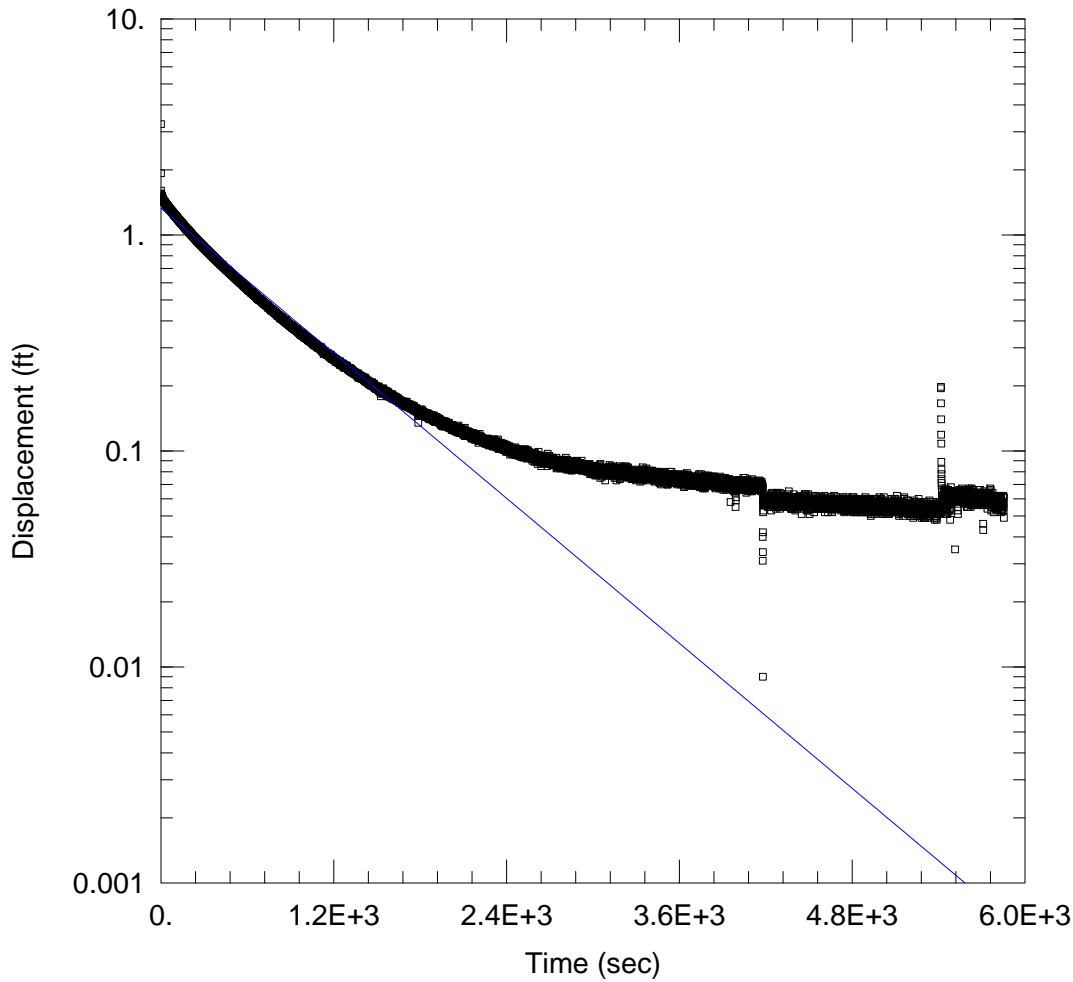
Initial Displacement: 3.259 ft
 Total Well Penetration Depth: 6.453 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 6.453 ft
 Screen Length: 6.453 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 2.077E-6 ft/sec

Solution Method: Bower-Rice
 y0 = 1.329 ft



TEST 1

Data Set: N:\...\WMW-30-1.aqt
 Date: 10/05/18

Time: 08:35:23

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-30
 Test Date: 8/28/18

AQUIFER DATA

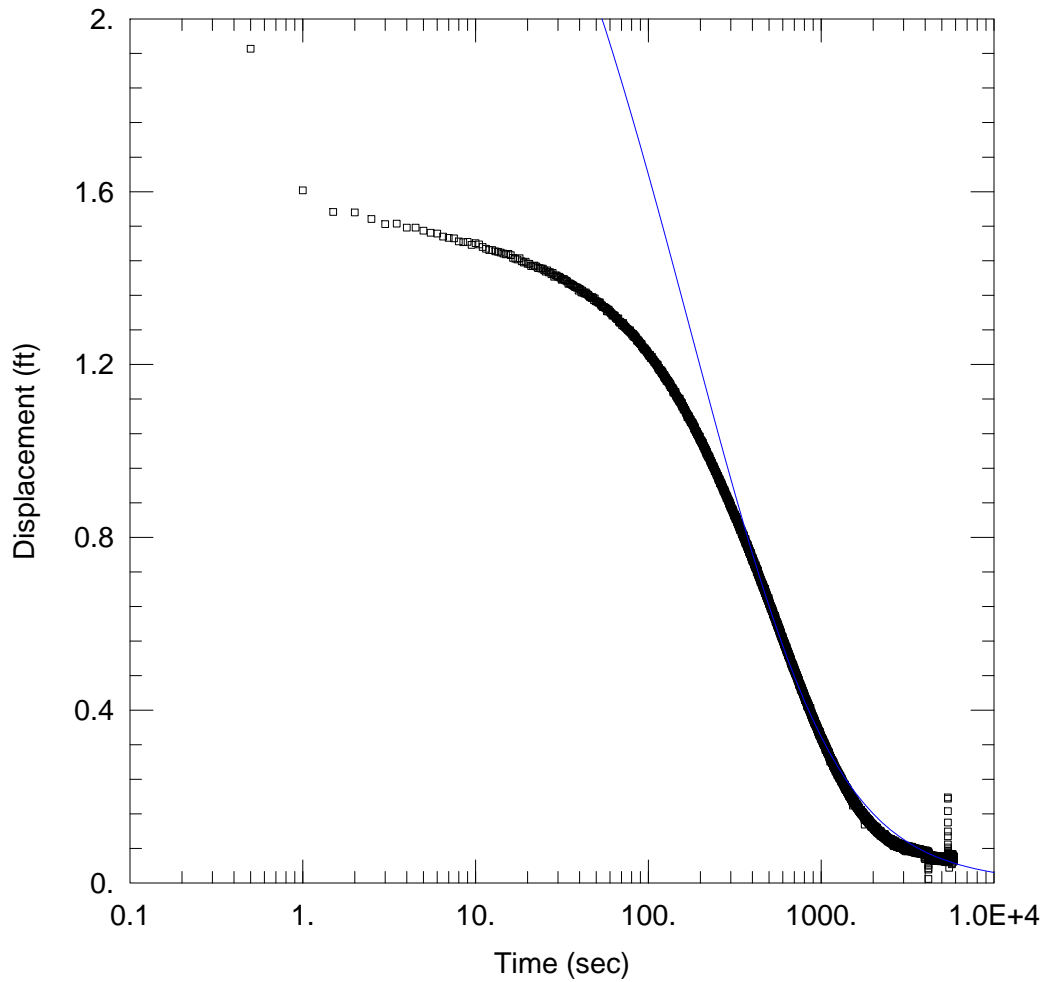
Saturated Thickness: 6.453 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-30)

Initial Displacement: 3.259 ft Static Water Column Height: 6.453 ft
 Total Well Penetration Depth: 6.453 ft Screen Length: 6.453 ft
 Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 3.643E-6 ft/sec y0 = 1.329 ft



TEST 1

Data Set: N:\...\WMW-30-1.aqt
 Date: 10/05/18

Time: 08:41:35

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-30
 Test Date: 8/28/18

AQUIFER DATA

Saturated Thickness: 6.453 ft

WELL DATA (WMW-30)

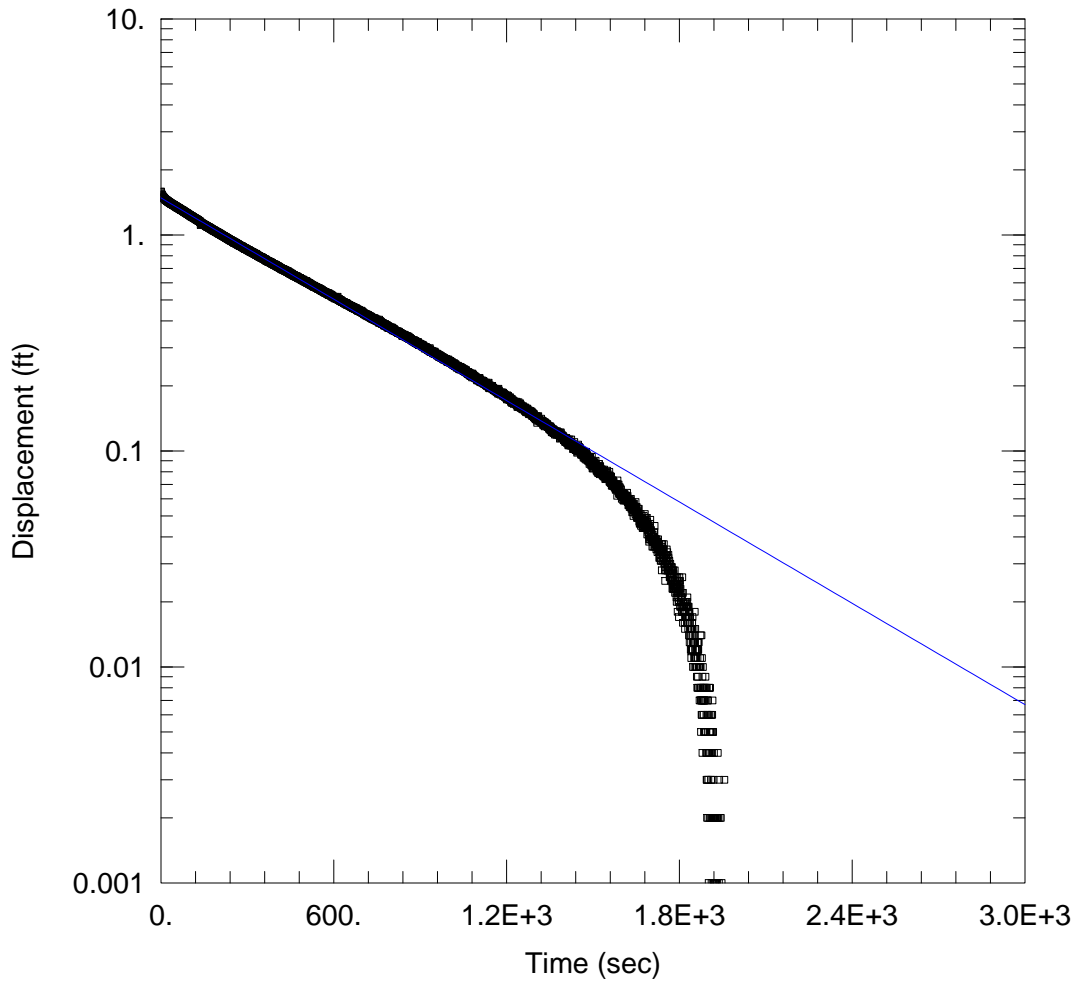
Initial Displacement: 3.259 ft
 Total Well Penetration Depth: 6.453 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 6.453 ft
 Screen Length: 6.453 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 2.929E-6 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.0155 ft⁻¹



TEST 2

Data Set:

Date: 10/05/18

Time: 10:30:50

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants

Client: BNSF Railway Company

Project: 1896120*04

Location: Wishram Railyard, Washington

Test Well: WMW-30

Test Date: 8/29/18

AQUIFER DATA

Saturated Thickness: 6.56 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-30)

Initial Displacement: 1.588 ft

Static Water Column Height: 6.56 ft

Total Well Penetration Depth: 6.56 ft

Screen Length: 6.56 ft

Casing Radius: 0.083 ft

Well Radius: 0.125 ft

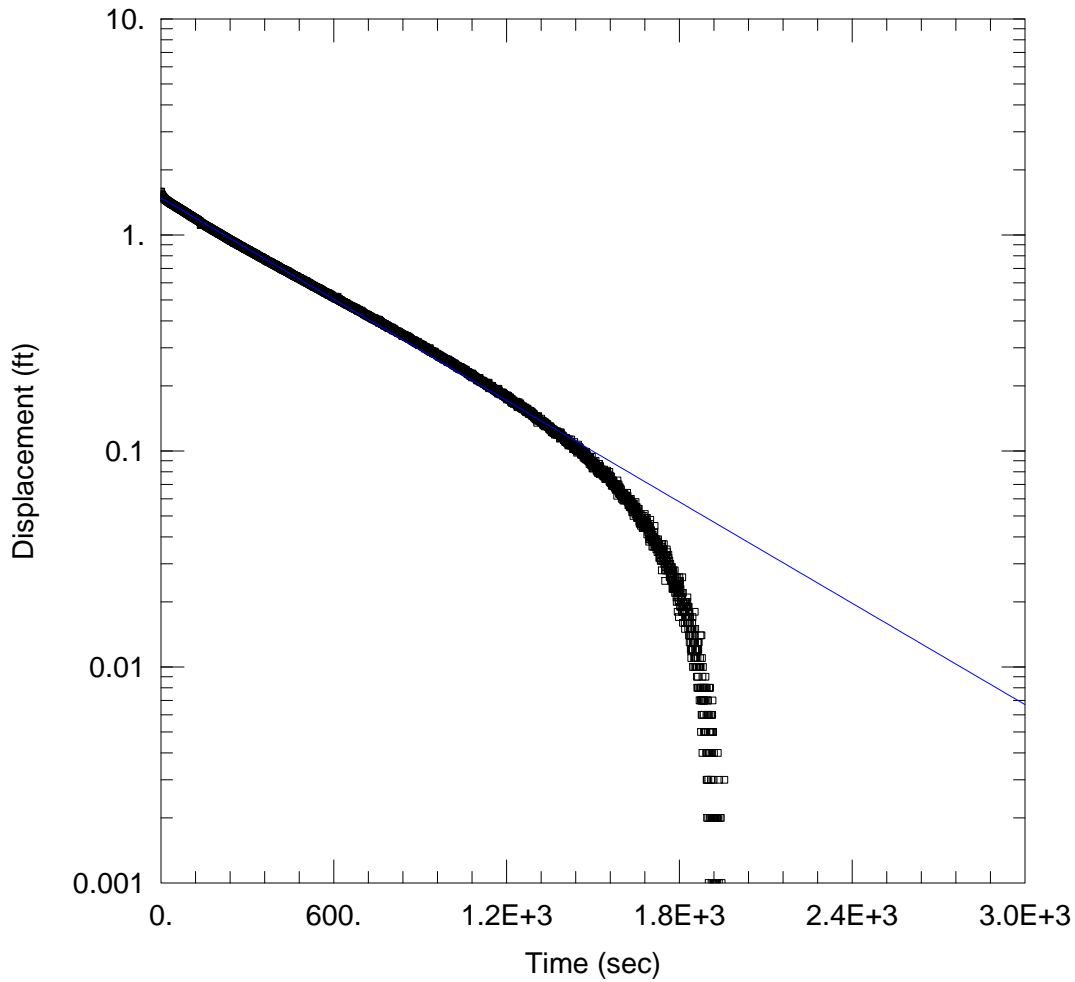
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 2.868E-6 ft/sec

y0 = 1.484 ft



TEST 2

Data Set: N:\...\WMW-30-2.aqt
 Date: 10/05/18

Time: 10:31:33

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-30
 Test Date: 8/29/18

AQUIFER DATA

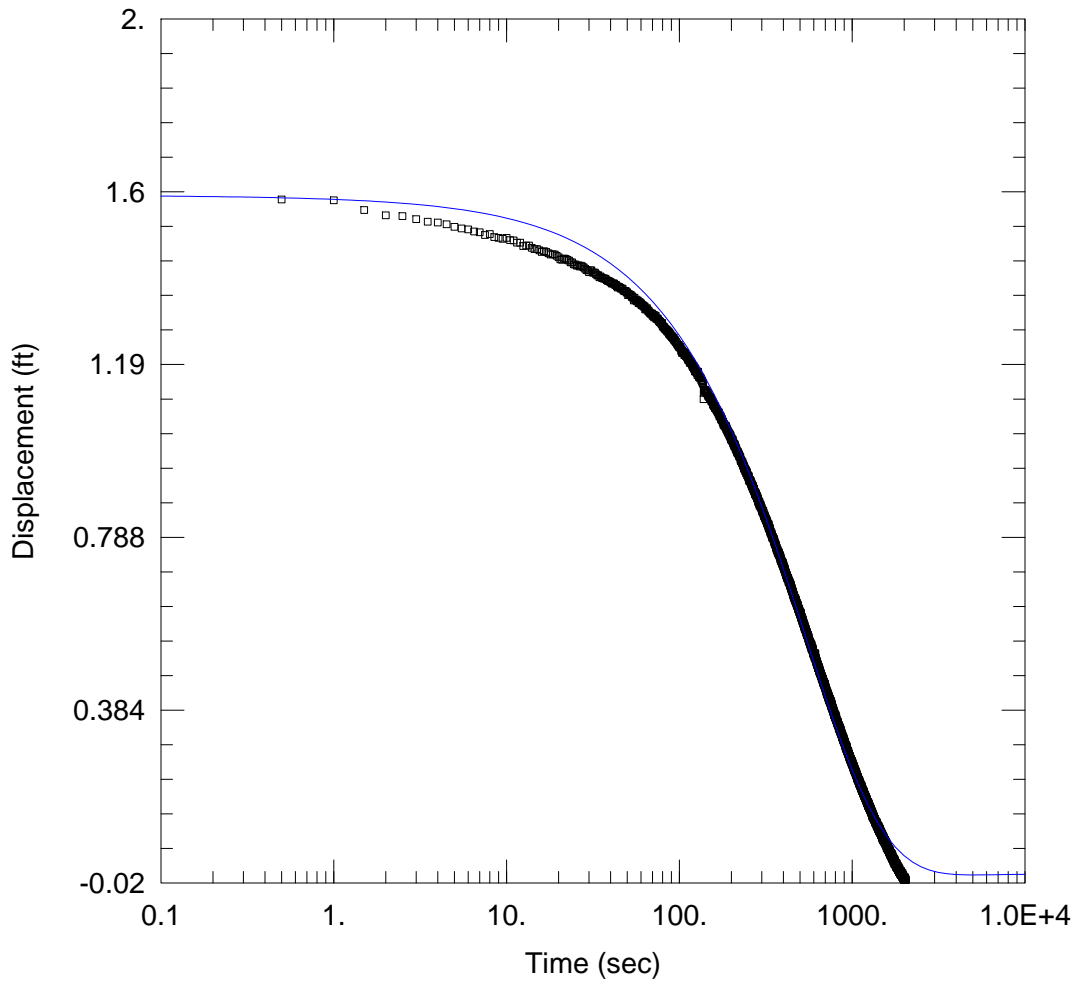
Saturated Thickness: 6.56 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-30)

Initial Displacement: 1.588 ft Static Water Column Height: 6.56 ft
 Total Well Penetration Depth: 6.56 ft Screen Length: 6.56 ft
 Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 5.009E-6 ft/sec $y_0 =$ 1.484 ft



TEST 2

Data Set: N:\...\WMW-30-2.aqt
 Date: 10/05/18

Time: 10:33:02

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-30
 Test Date: 8/29/18

AQUIFER DATA

Saturated Thickness: 6.56 ft

WELL DATA (WMW-30)

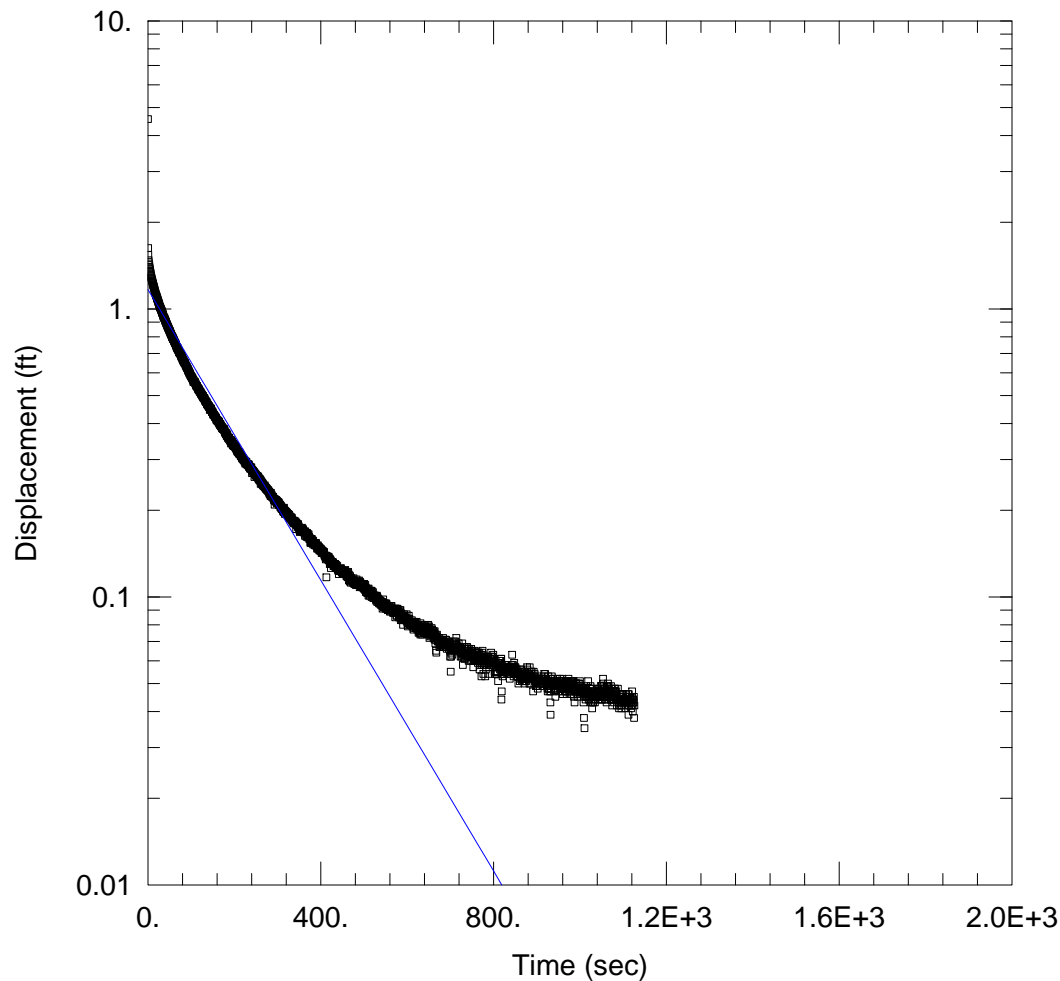
Initial Displacement: 1.588 ft
 Total Well Penetration Depth: 6.56 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 6.56 ft
 Screen Length: 6.56 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 $K_r = 3.348E-6$ ft/sec
 $K_z/K_r = 1.$

Solution Method: KGS Model
 $S_s = 5.294E-5$ ft⁻¹



TEST 1

Data Set: N:\...\WMW-31-1.aqt
 Date: 10/05/18

Time: 10:38:56

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-31
 Test Date: 8/29/18

AQUIFER DATA

Saturated Thickness: 6.473 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-31)

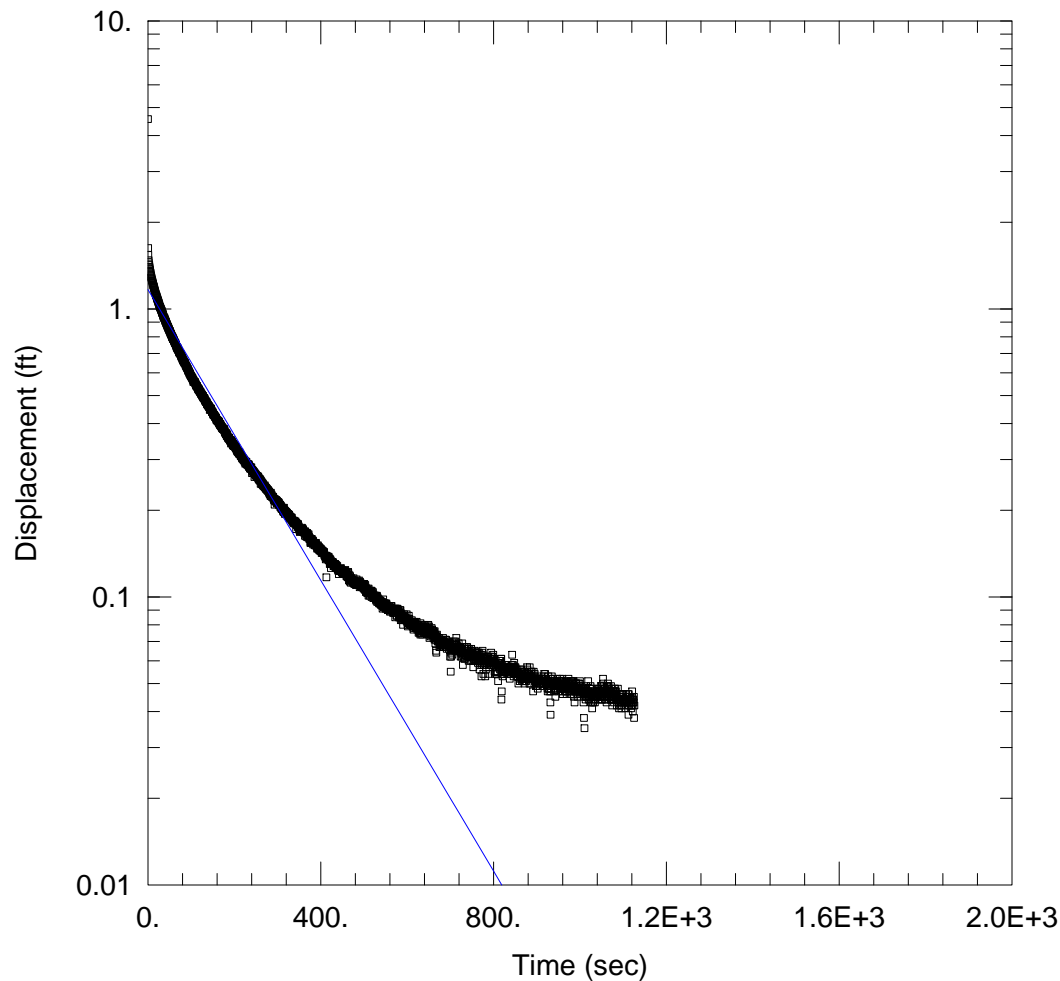
Initial Displacement: 4.561 ft
 Total Well Penetration Depth: 6.473 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 6.473 ft
 Screen Length: 6.473 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 9.345E-6 ft/sec

Solution Method: Bouwer-Rice
 y0 = 1.167 ft



TEST 1

Data Set: N:\...\WMW-31-1.aqt
 Date: 10/05/18

Time: 10:39:34

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-31
 Test Date: 8/29/18

AQUIFER DATA

Saturated Thickness: 6.473 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-31)

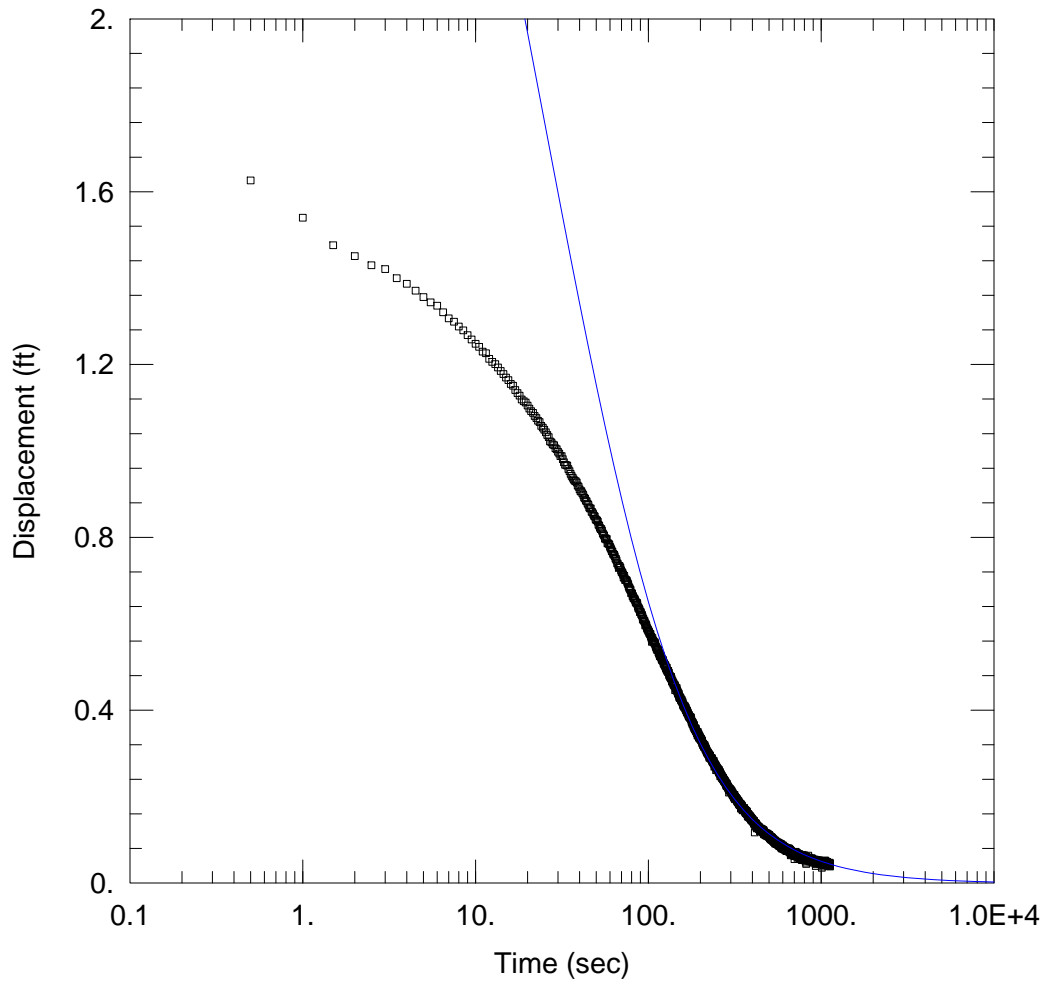
Initial Displacement: 4.561 ft
 Total Well Penetration Depth: 6.473 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 6.473 ft
 Screen Length: 6.473 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 1.638E-5 ft/sec

Solution Method: Hvorslev
 y0 = 1.167 ft



TEST 1

Data Set: N:\...\WMW-31-1.aqt
 Date: 10/05/18

Time: 10:42:18

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-31
 Test Date: 8/29/18

AQUIFER DATA

Saturated Thickness: 6.473 ft

WELL DATA (WMW-31)

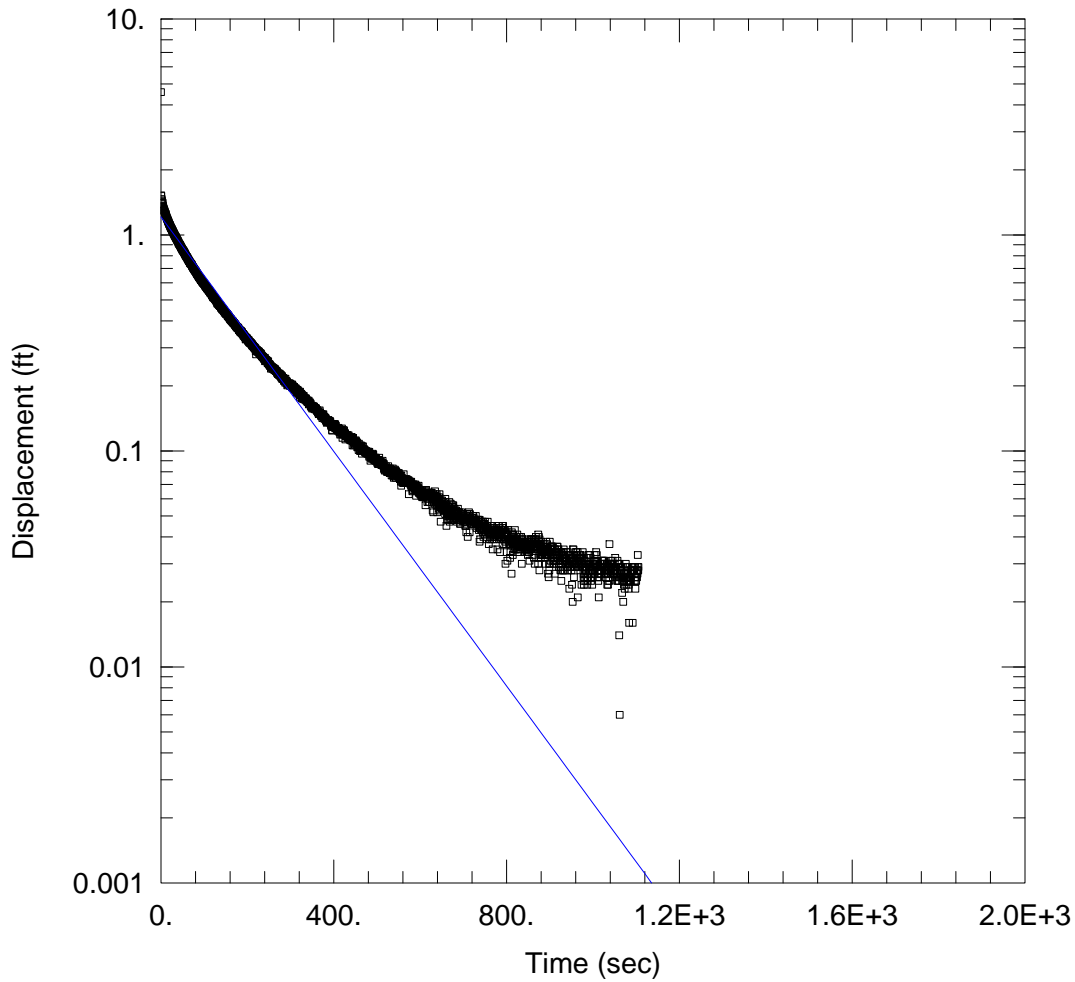
Initial Displacement: 4.561 ft
 Total Well Penetration Depth: 6.473 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 6.473 ft
 Screen Length: 6.473 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 $K_r = 2.109E-5$ ft/sec
 $K_z/K_r = 1.$

Solution Method: KGS Model
 $S_s = 0.01545$ ft⁻¹



TEST 2

Data Set: N:\...\WMW-31-2.aqt
 Date: 10/05/18

Time: 10:46:35

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-31
 Test Date: 8/29/18

AQUIFER DATA

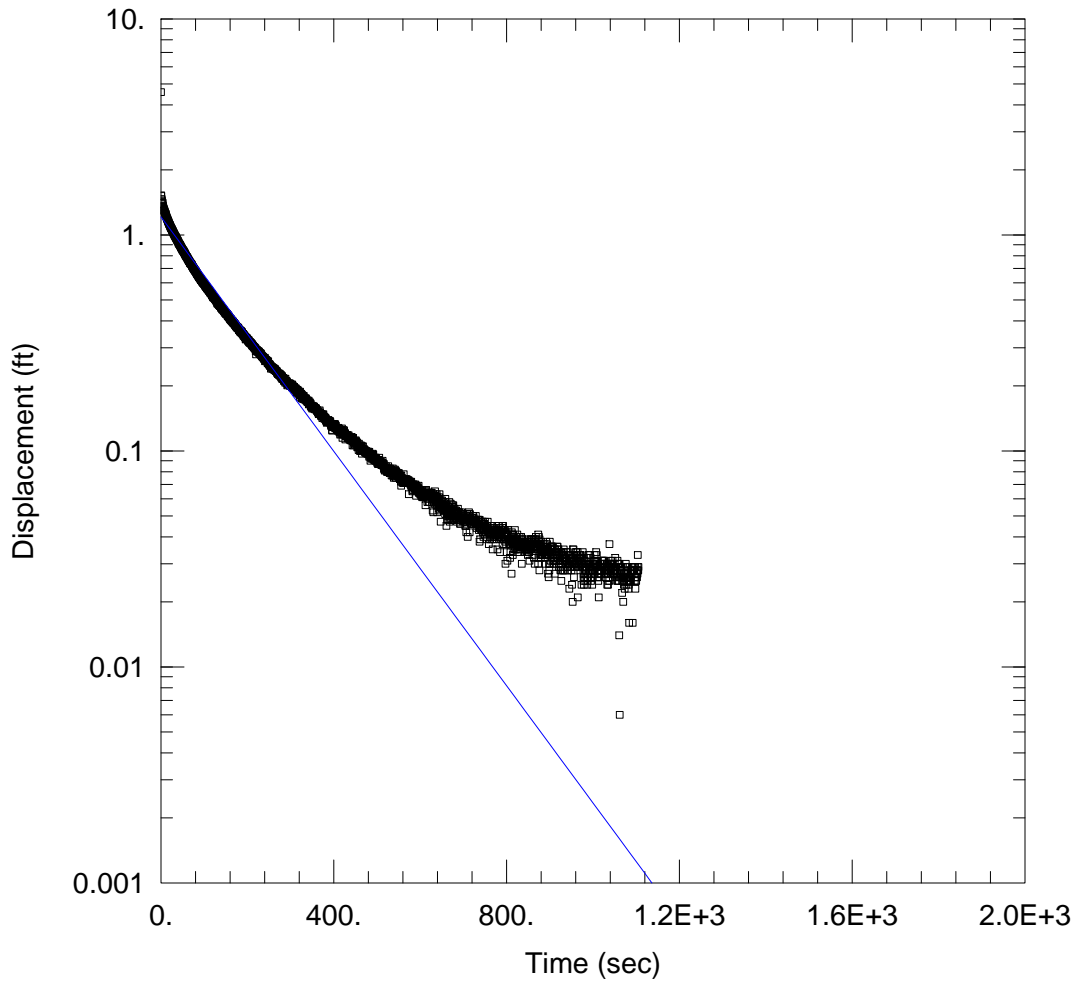
Saturated Thickness: 6.46 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-31)

Initial Displacement: 4.582 ft Static Water Column Height: 6.46 ft
 Total Well Penetration Depth: 6.46 ft Screen Length: 6.46 ft
 Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bower-Rice
 K = 1.007E-5 ft/sec y_0 = 1.212 ft



TEST 2

Data Set: N:\...\WMW-31-2.aqt
 Date: 10/05/18

Time: 10:47:30

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-31
 Test Date: 8/29/18

AQUIFER DATA

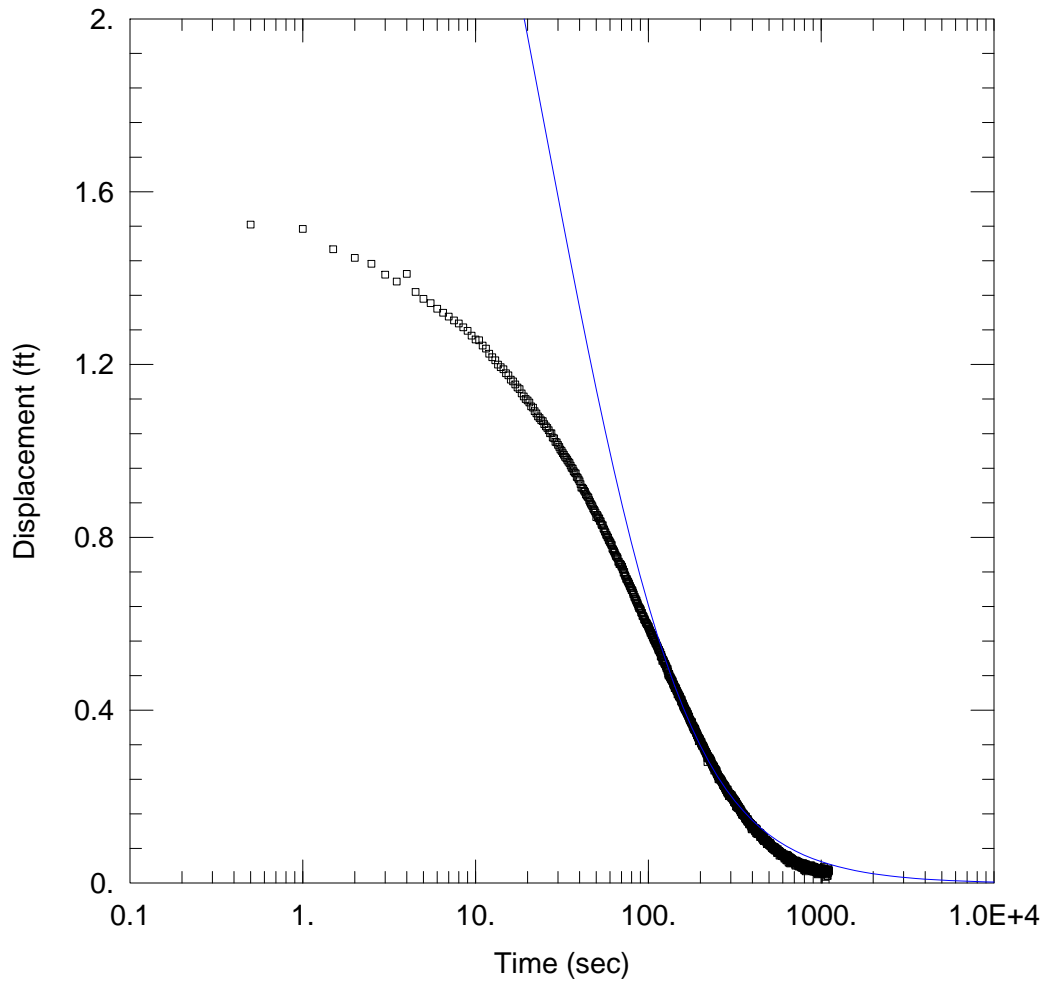
Saturated Thickness: 6.46 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-31)

Initial Displacement: 4.582 ft Static Water Column Height: 6.46 ft
 Total Well Penetration Depth: 6.46 ft Screen Length: 6.46 ft
 Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 1.765E-5 ft/sec y0 = 1.212 ft



TEST 2

Data Set: N:\...\WMW-31-2.aqt
 Date: 10/05/18

Time: 11:20:08

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-31
 Test Date: 8/29/18

AQUIFER DATA

Saturated Thickness: 6.46 ft

WELL DATA (WMW-31)

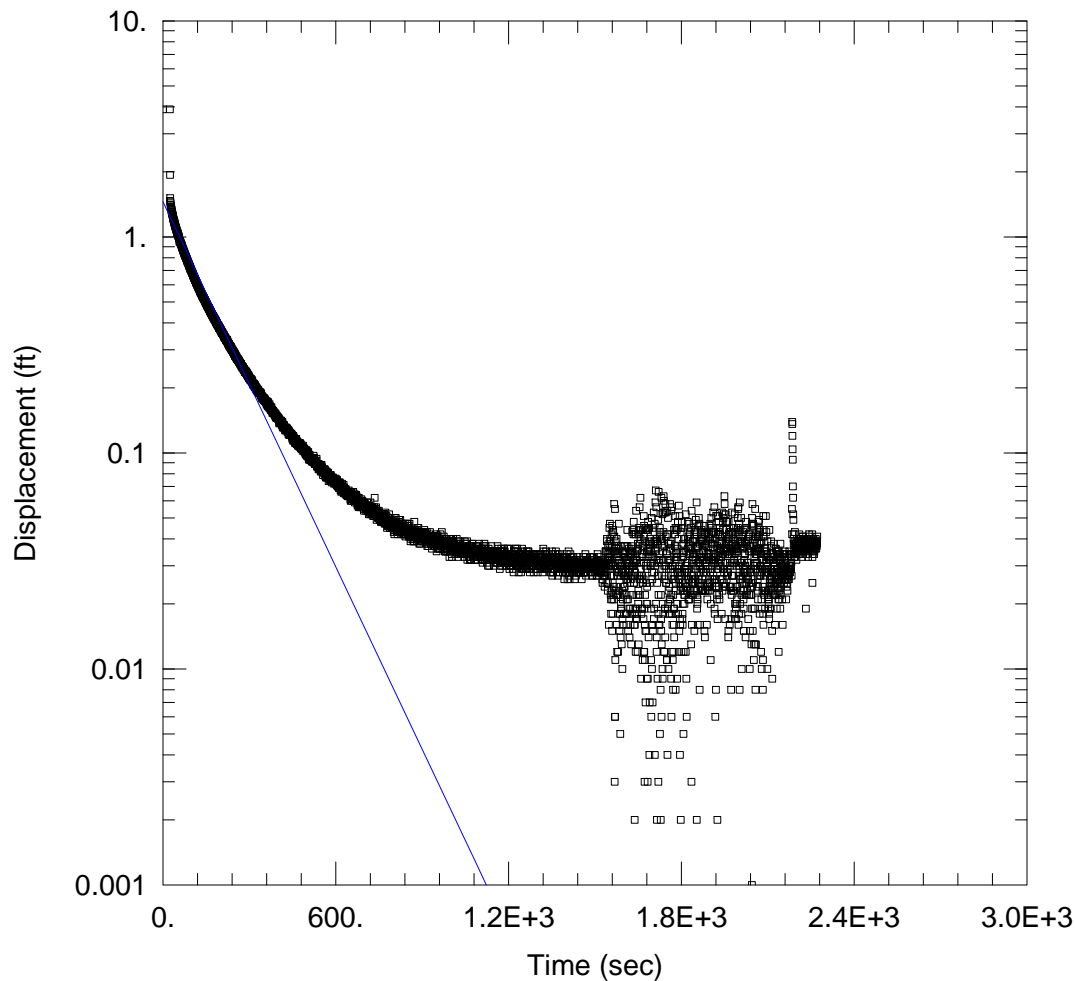
Initial Displacement: 4.582 ft
 Total Well Penetration Depth: 6.46 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 6.46 ft
 Screen Length: 6.46 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 Kr = 2.152E-5 ft/sec
 Kz/Kr = 1.

Solution Method: KGS Model
 Ss = 0.01548 ft⁻¹



TEST 3

Data Set: N:\...\WMW-31-3.aqt
 Date: 10/05/18

Time: 11:26:41

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-31
 Test Date: 8/29/18

AQUIFER DATA

Saturated Thickness: 6.476 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-31)

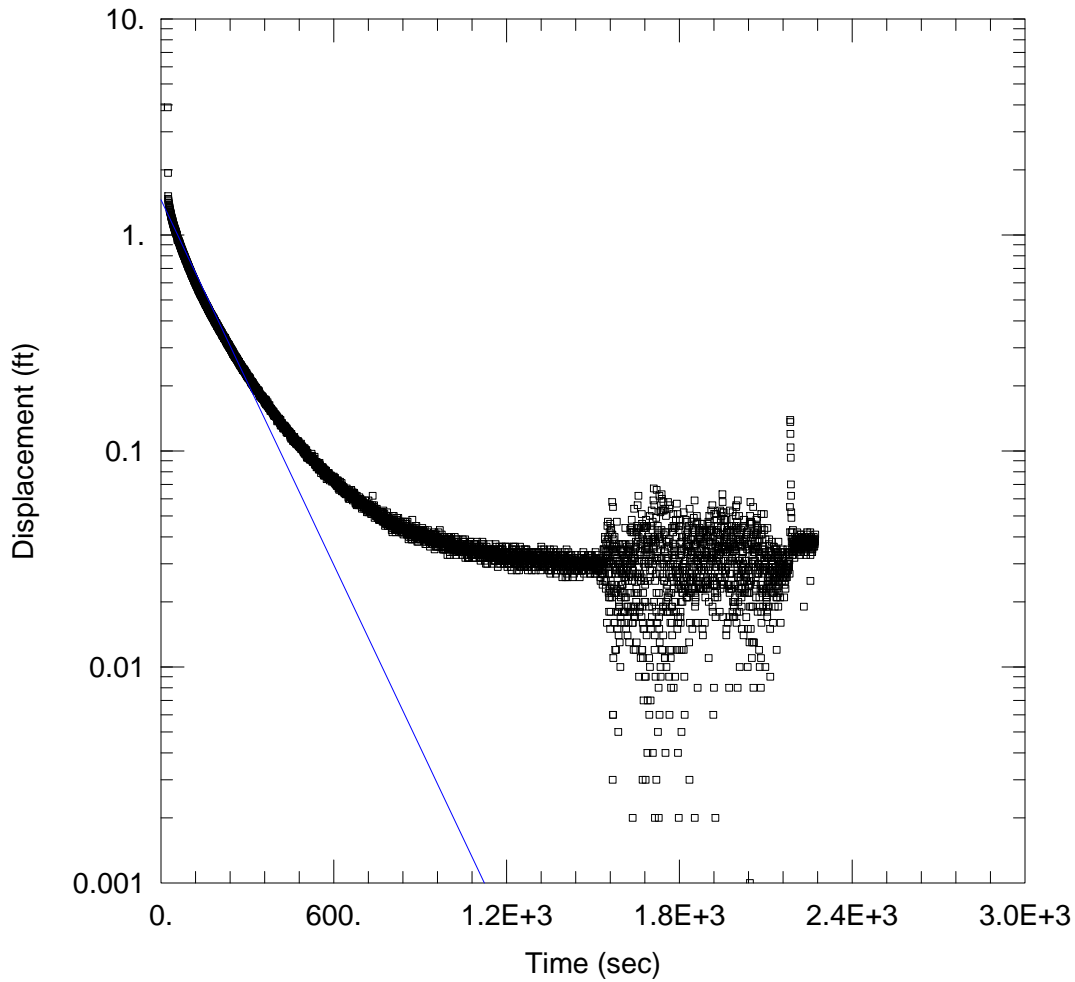
Initial Displacement: 3.894 ft
 Total Well Penetration Depth: 6.476 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 6.476 ft
 Screen Length: 6.476 ft
 Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined
 K = 1.043E-5 ft/sec

Solution Method: Bower-Rice
 y0 = 1.453 ft



TEST 3

Data Set: N:\...\WMW-31-3.aqt
 Date: 10/05/18

Time: 11:27:10

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-31
 Test Date: 8/29/18

AQUIFER DATA

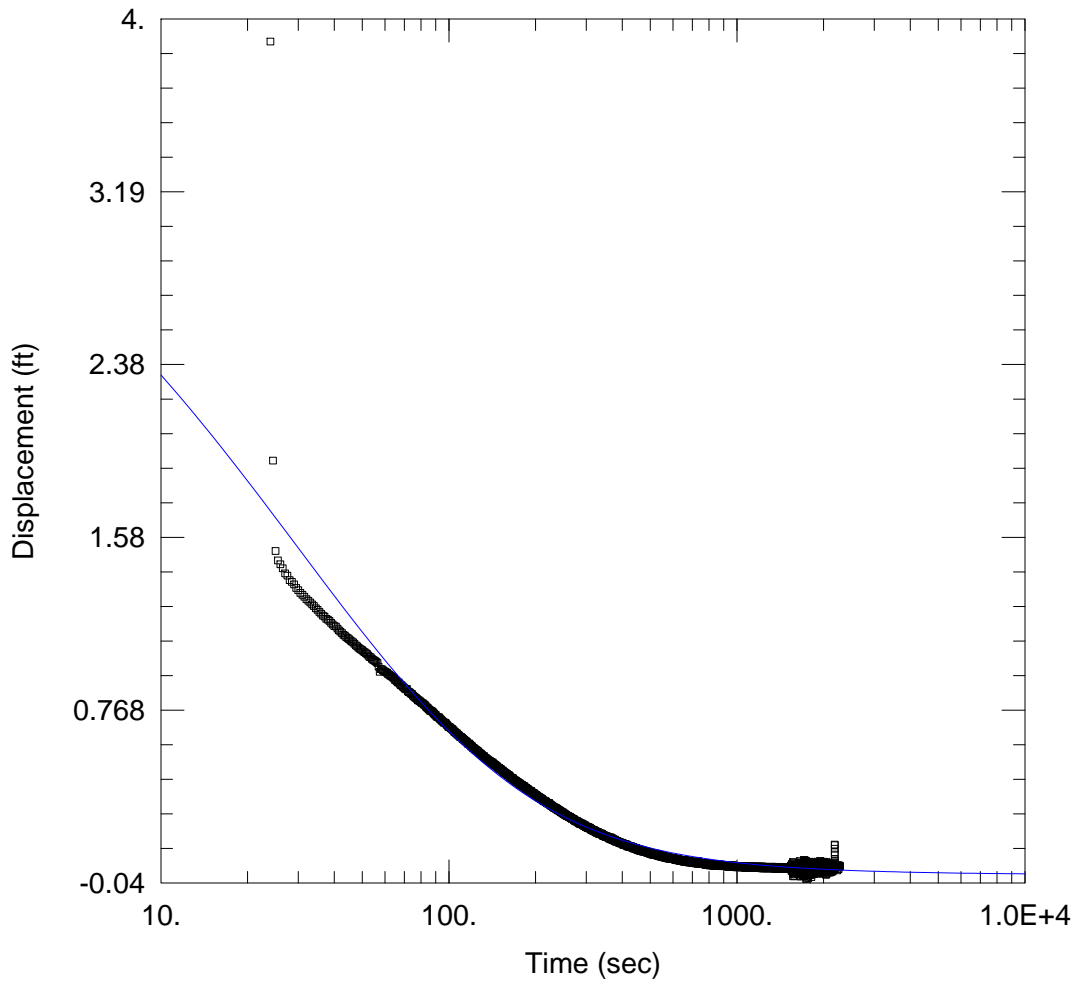
Saturated Thickness: 6.476 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WMW-31)

Initial Displacement: 3.894 ft Static Water Column Height: 6.476 ft
 Total Well Penetration Depth: 6.476 ft Screen Length: 6.476 ft
 Casing Radius: 0.083 ft Well Radius: 0.125 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 1.828E-5 ft/sec y0 = 1.453 ft



TEST 3

Data Set: N:\...\WMW-31-3.aqt
 Date: 10/05/18

Time: 11:28:46

PROJECT INFORMATION

Company: Kennedy/Jenks Consultants
 Client: BNSF Railway Company
 Project: 1896120*04
 Location: Wishram Railyard, Washington
 Test Well: WMW-31
 Test Date: 8/29/18

AQUIFER DATA

Saturated Thickness: 6.476 ft

WELL DATA (WMW-31)

Initial Displacement: 3.894 ft
 Total Well Penetration Depth: 6.476 ft
 Casing Radius: 0.083 ft

Static Water Column Height: 6.476 ft
 Screen Length: 6.476 ft
 Well Radius: 0.125 ft

SOLUTION

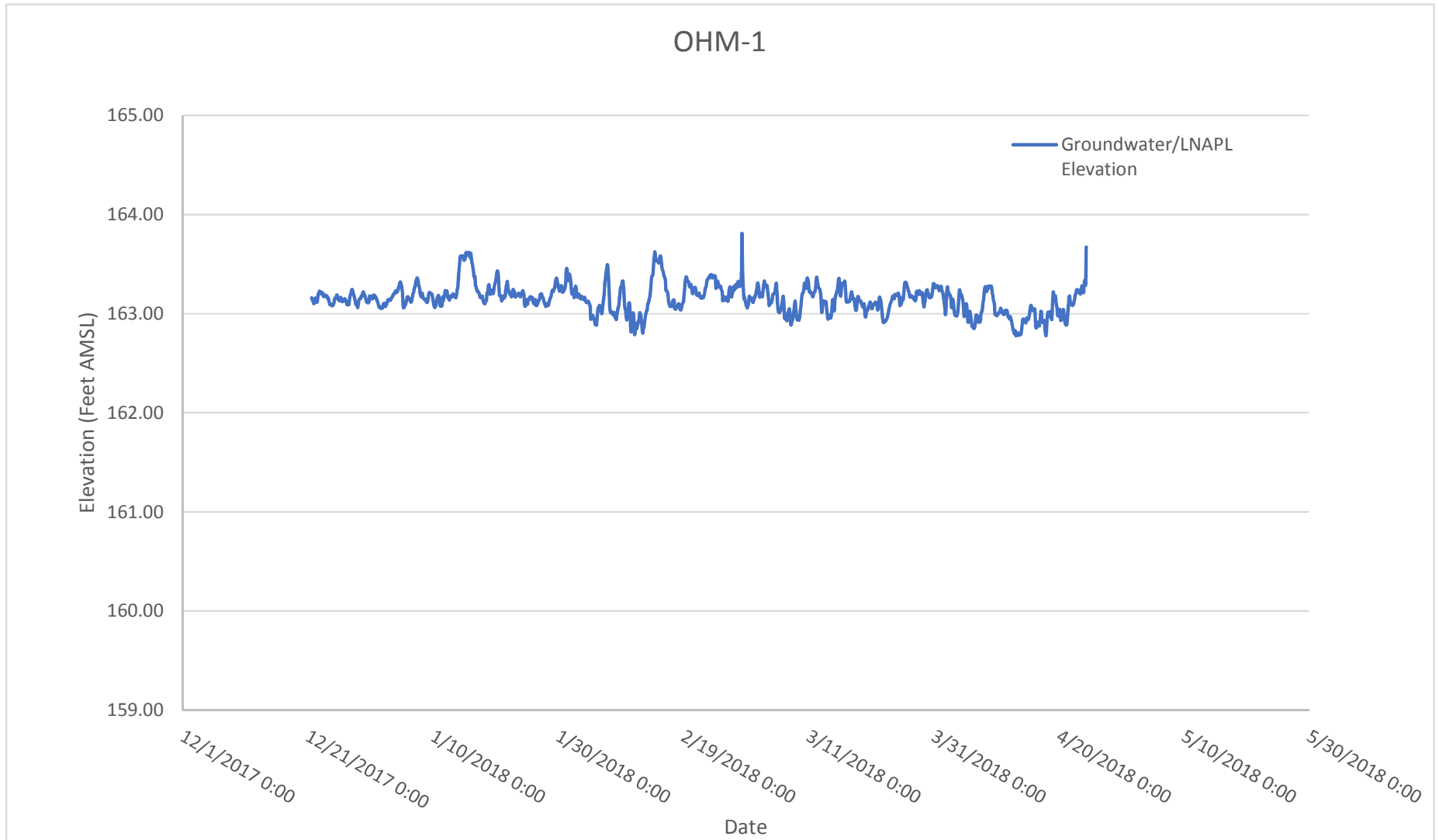
Aquifer Model: Unconfined
 $K_r = 1.713E-5$ ft/sec
 $K_z/K_r = 1.$

Solution Method: KGS Model
 $S_s = 0.01544$ ft⁻¹

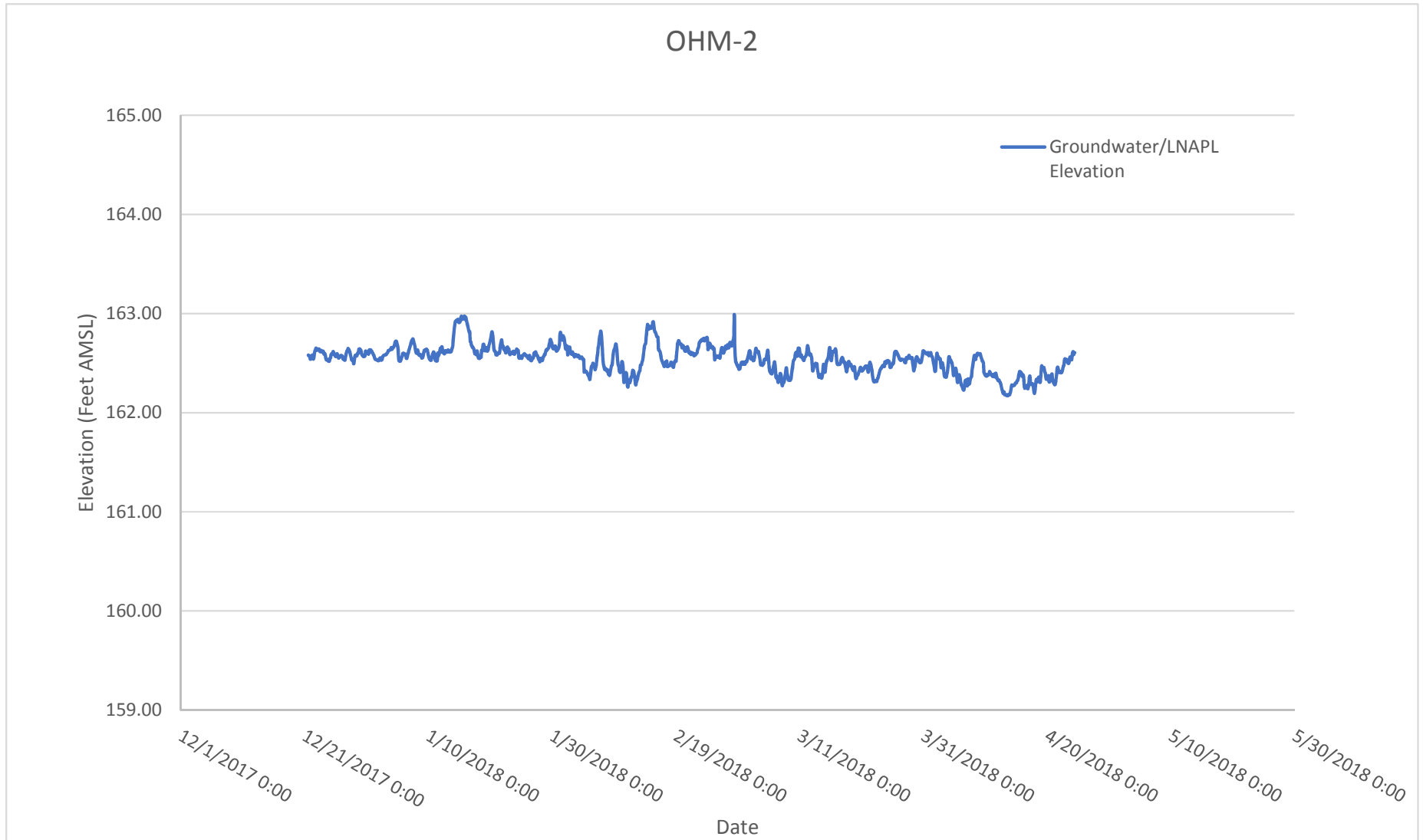
Appendix K

Transducer Data Plots

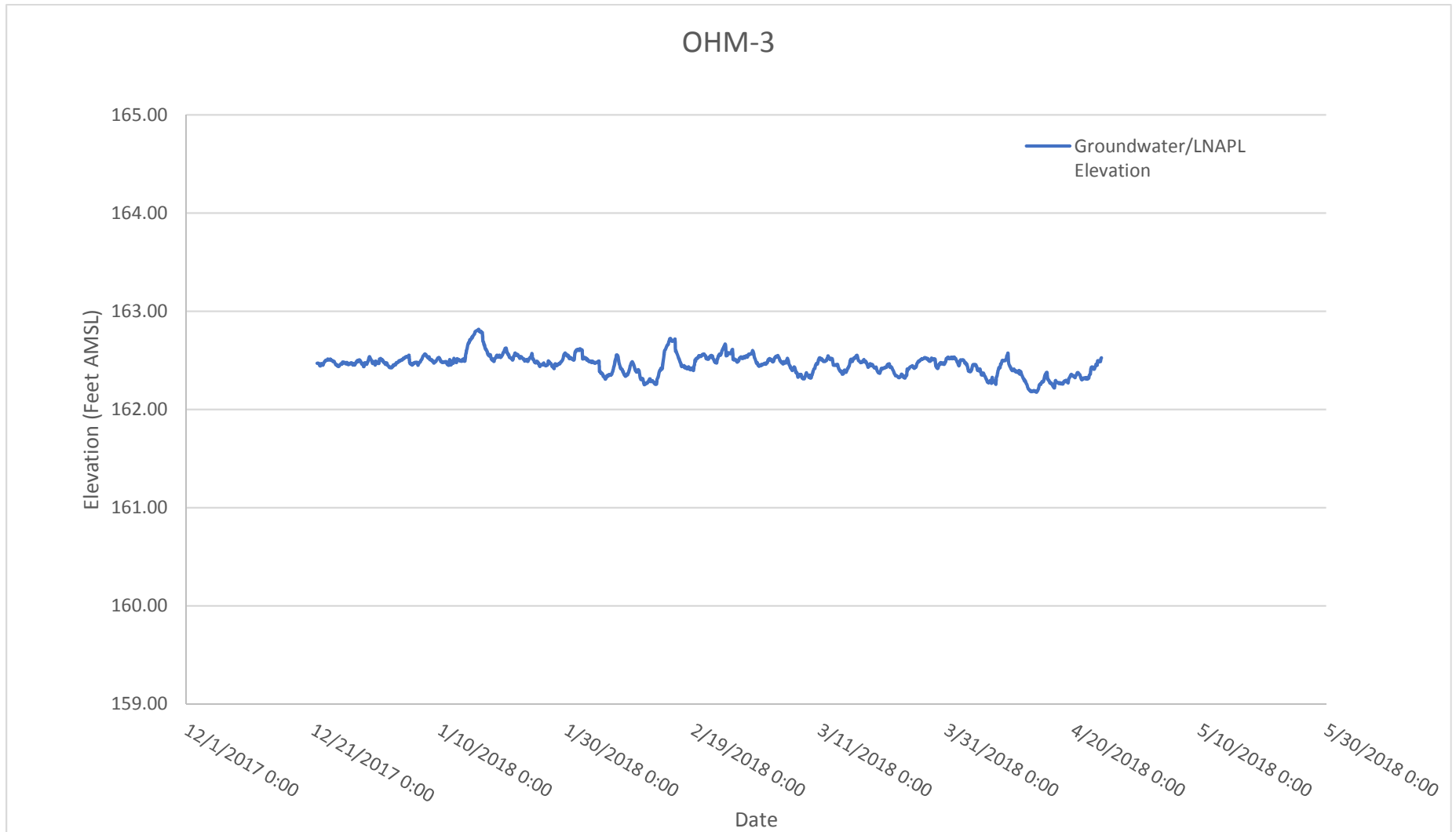
OHM-1 Pressure Transducer Data
December 2017 Through April 2018



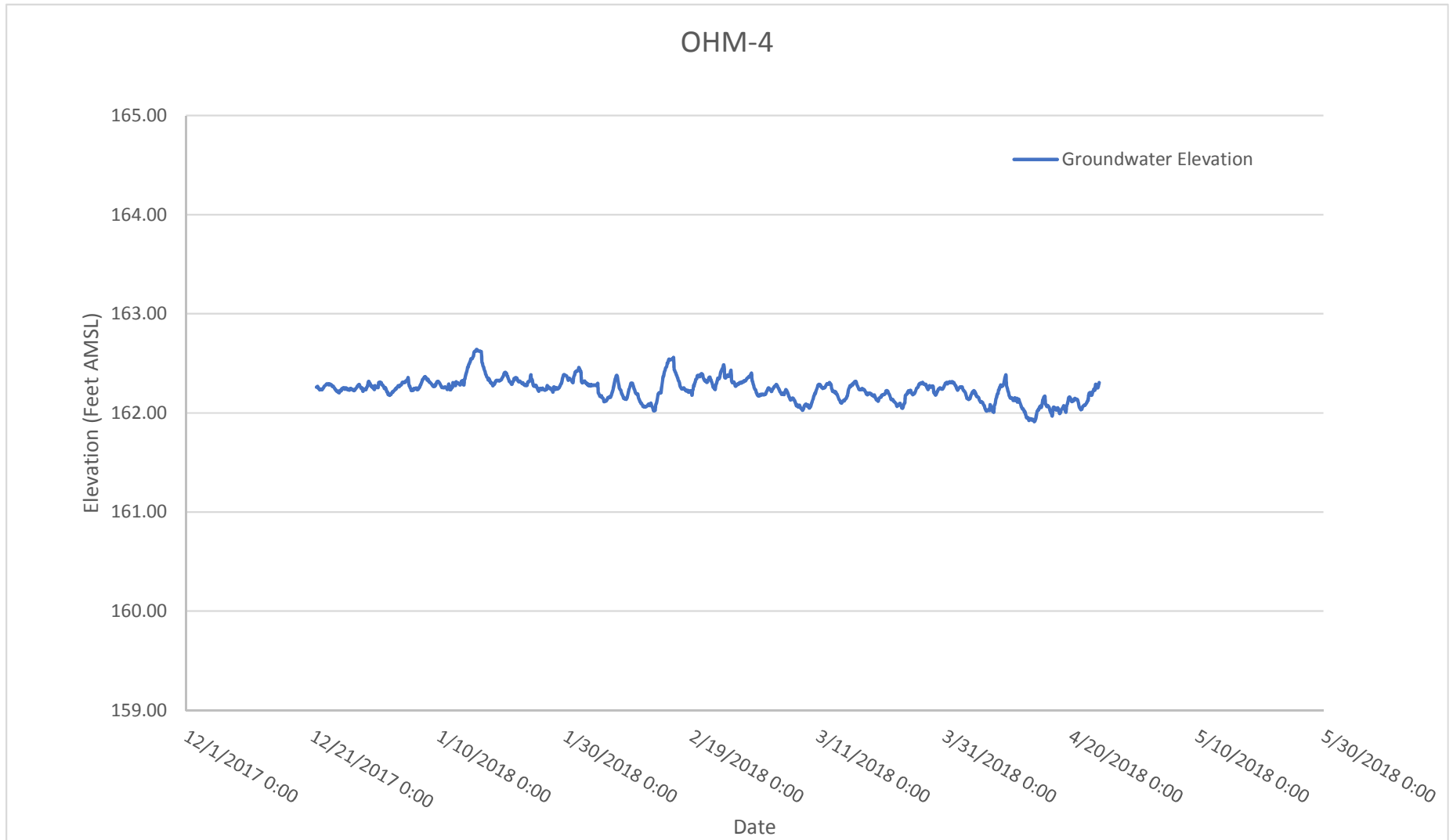
WMW-18 Pressure Transducer Data
December 2017 Through April 2018



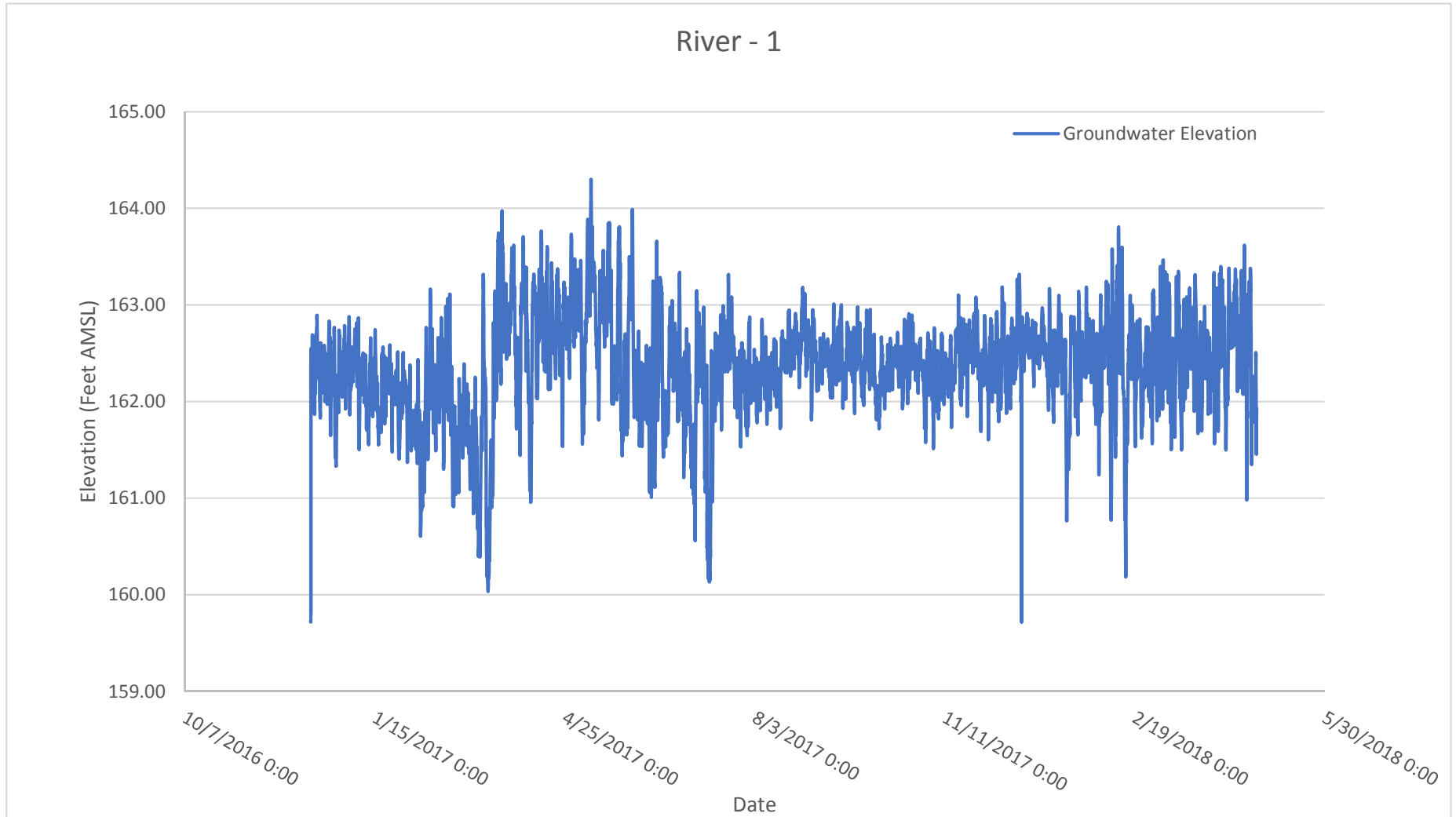
WMW-18 Pressure Transducer Data
December 2017 Through April 2018



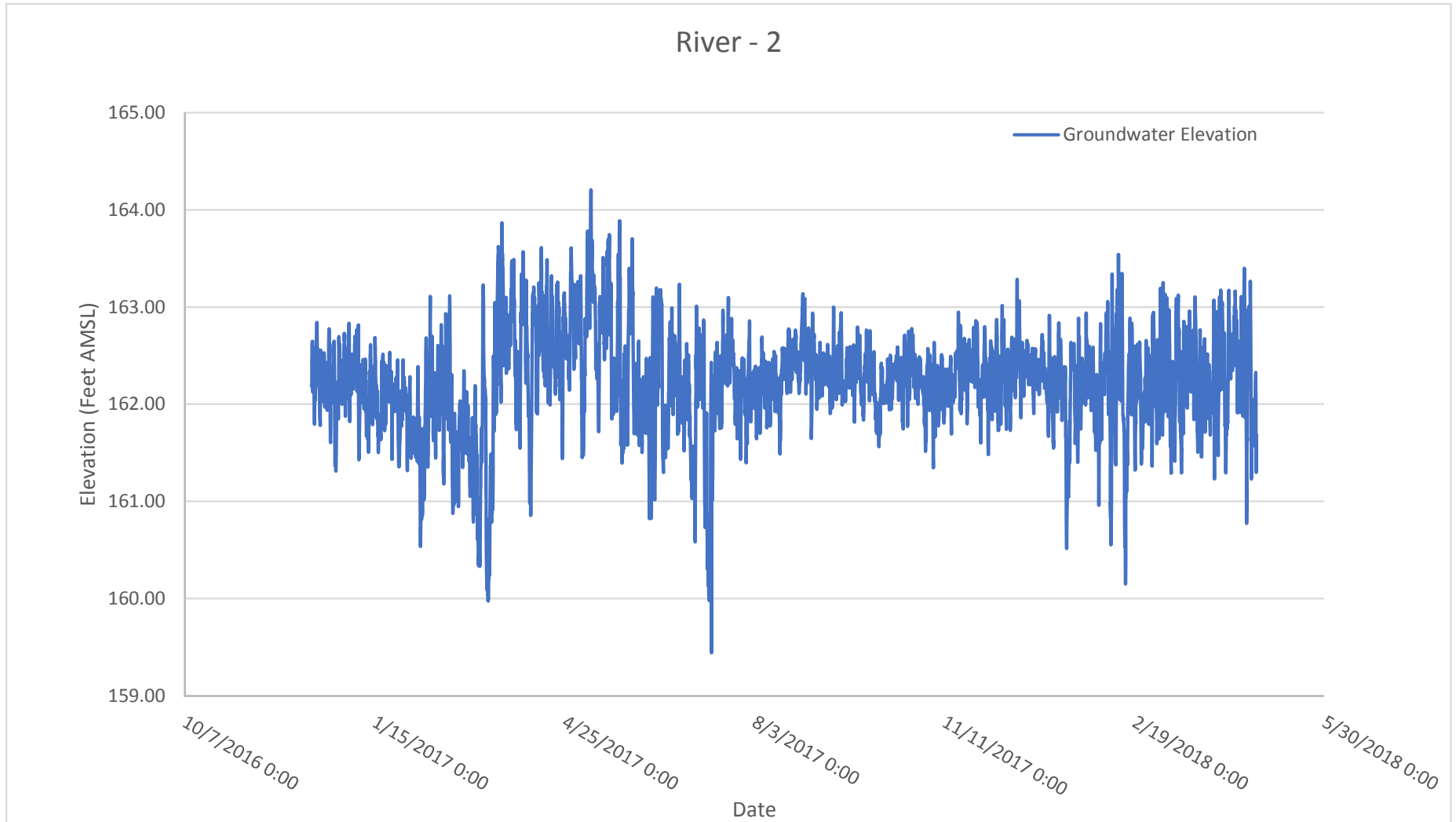
WMW-18 Pressure Transducer Data
December 2017 Through April 2018



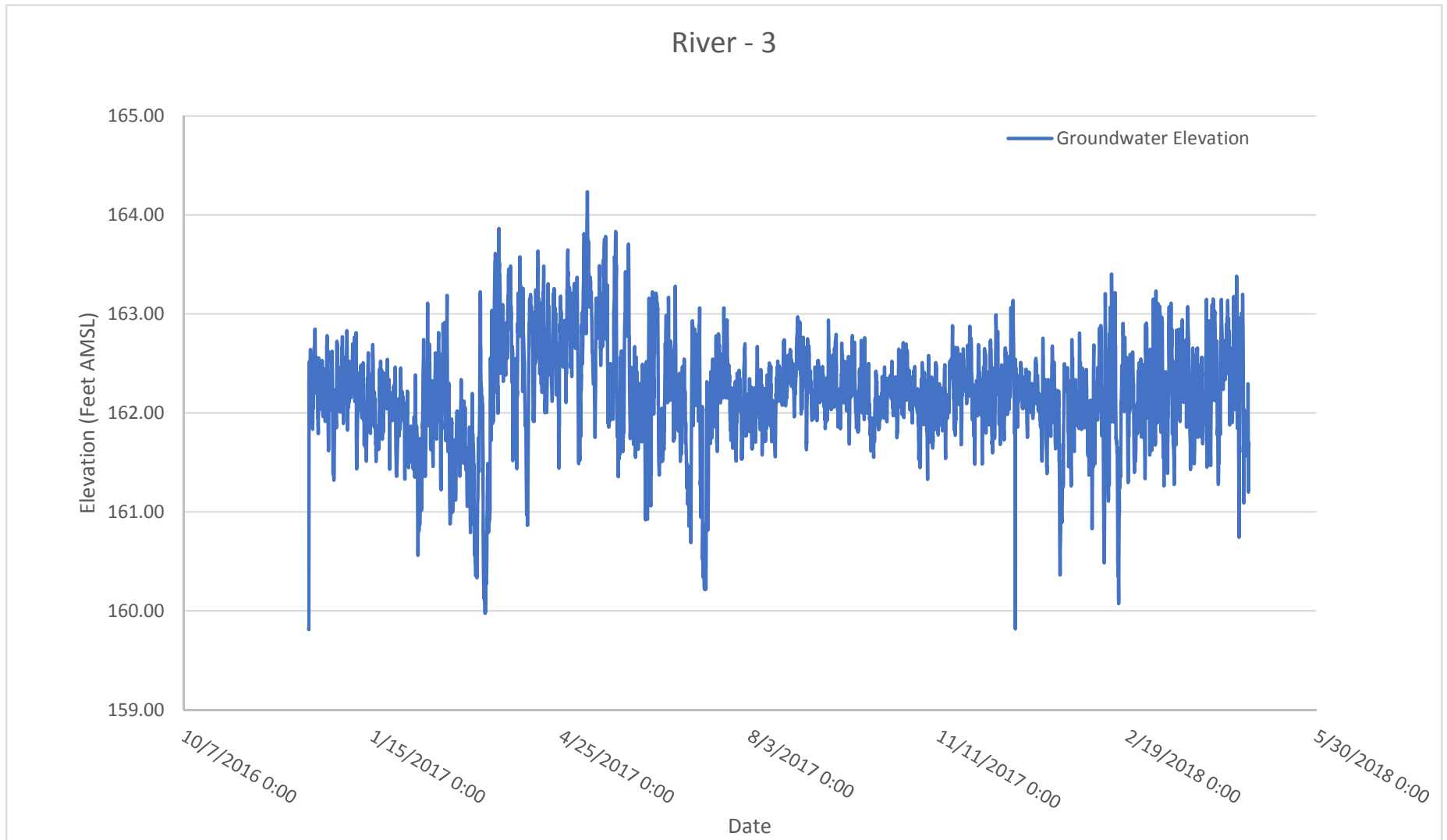
River - 1 Pressure Transducer Data
December 2016 Through April 2018



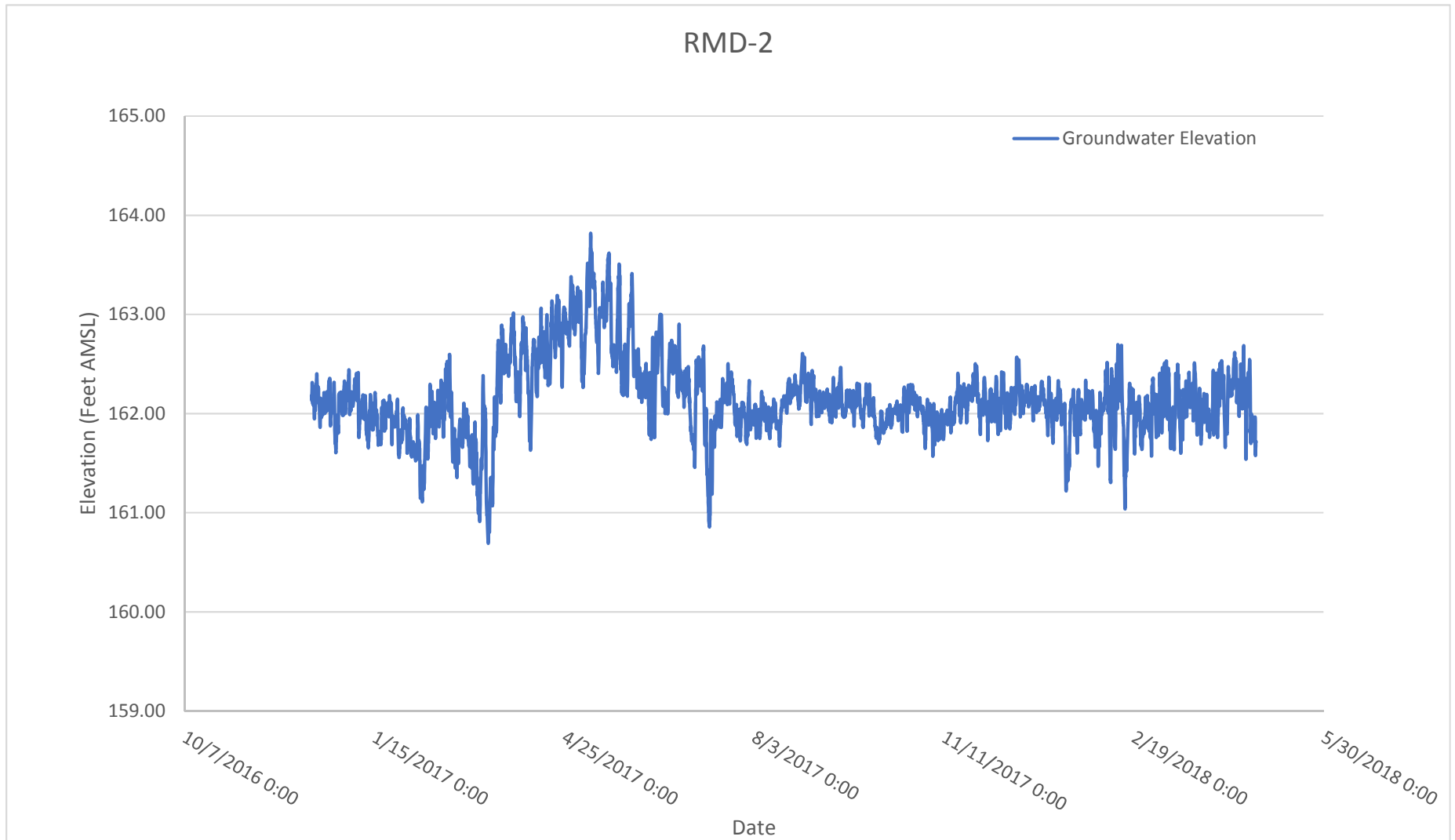
River - 2 Pressure Transducer Data
December 2016 Through April 2018



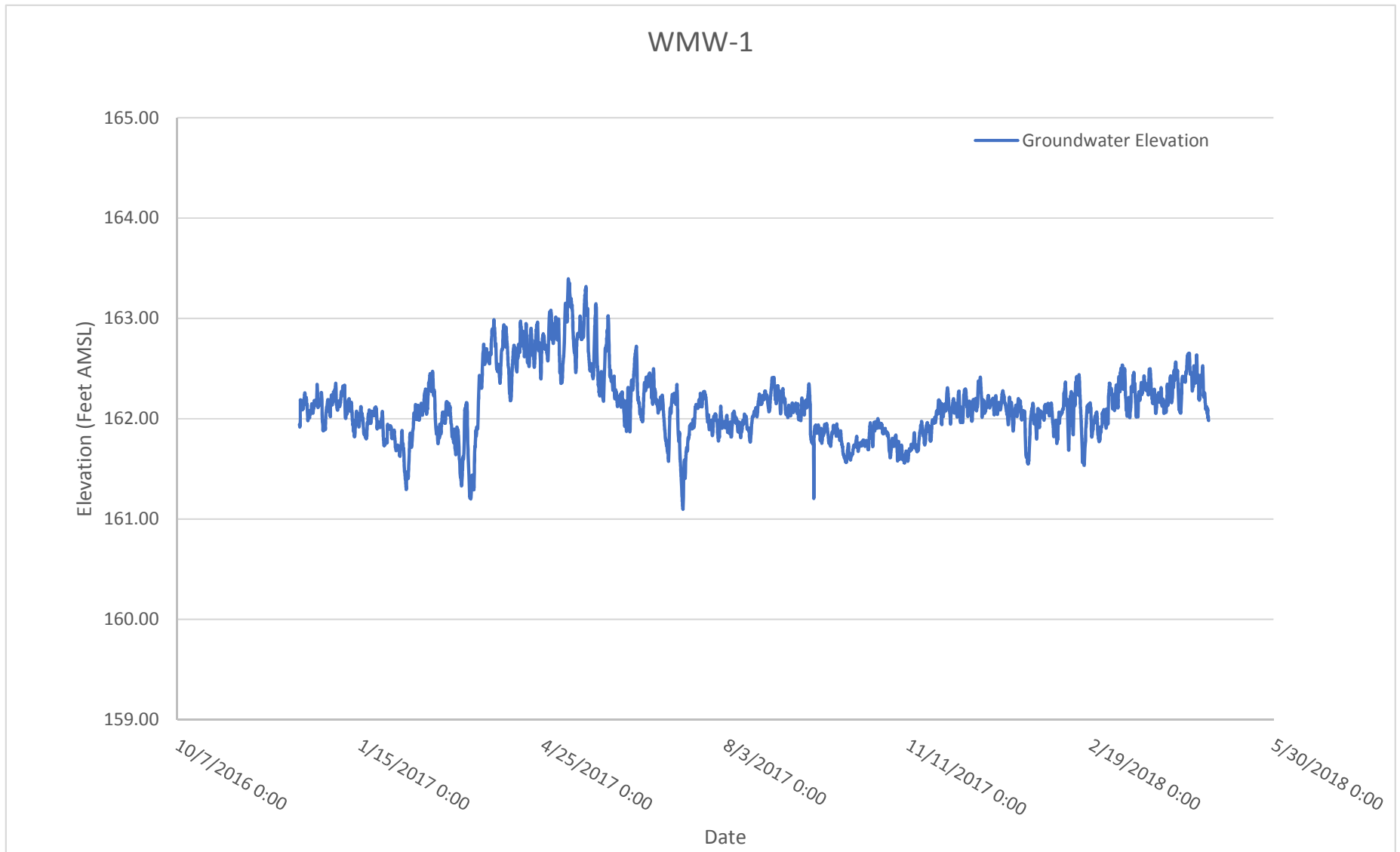
River - 3 Pressure Transducer Data
December 2016 Through April 2018



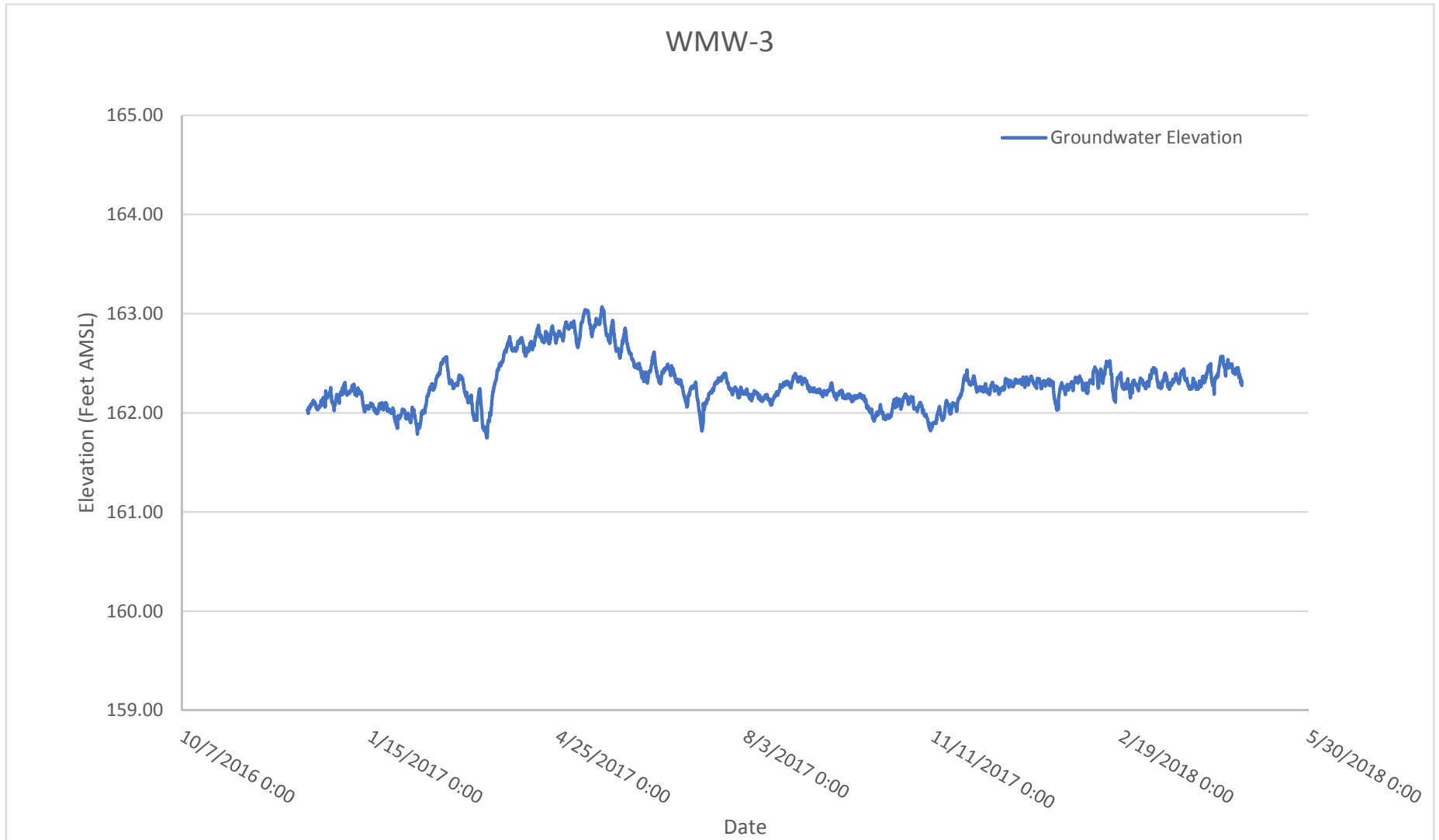
RMD-2 Pressure Transducer Data
December 2016 Through April 2018



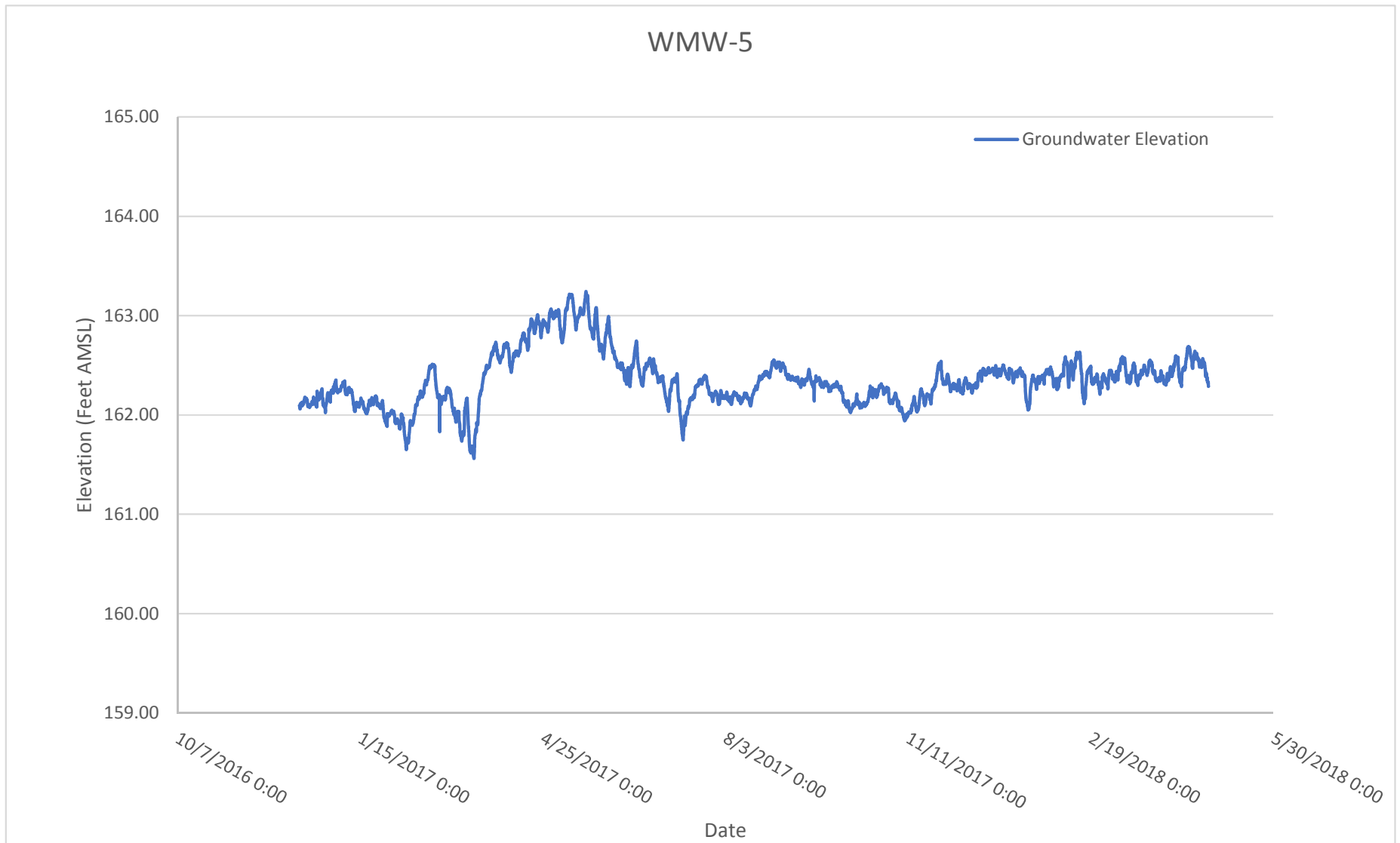
WMW-1 Pressure Transducer Data
December 2016 Through April 2018



WMW-3 Pressure Transducer Data
December 2016 Through April 2018



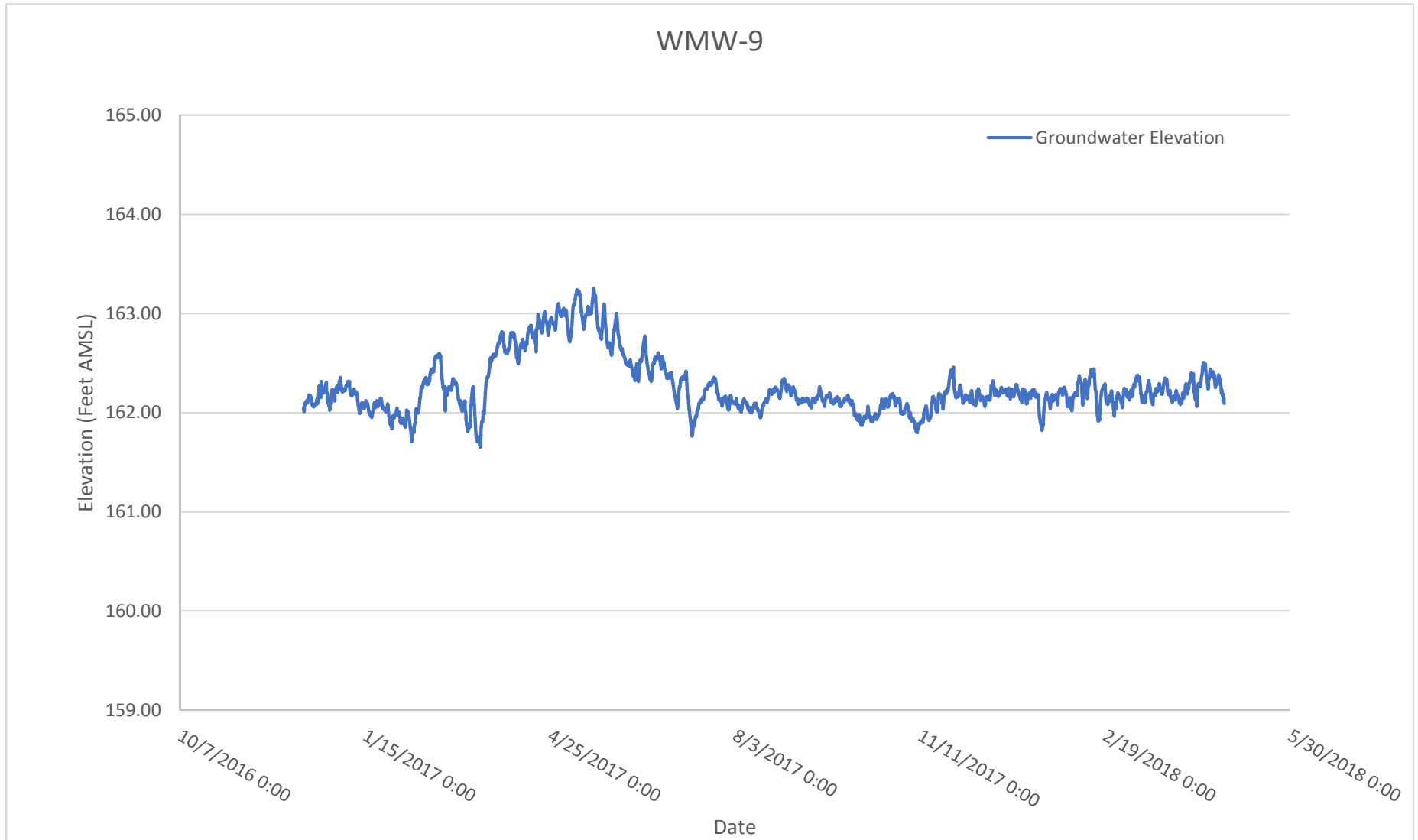
WMW-5 Pressure Transducer Data
December 2016 Through April 2018



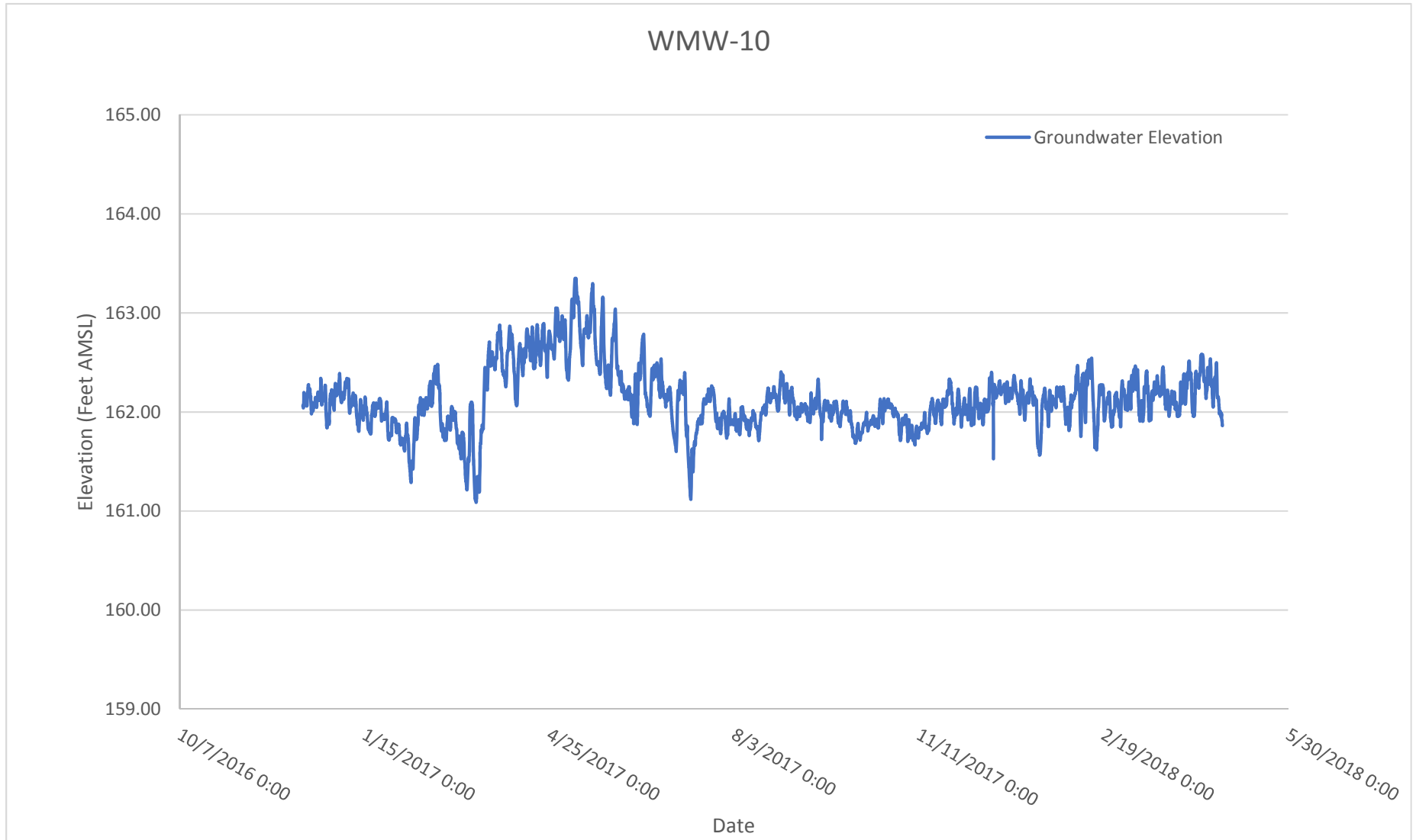
WMW-8 Pressure Transducer Data
December 2016 Through April 2018



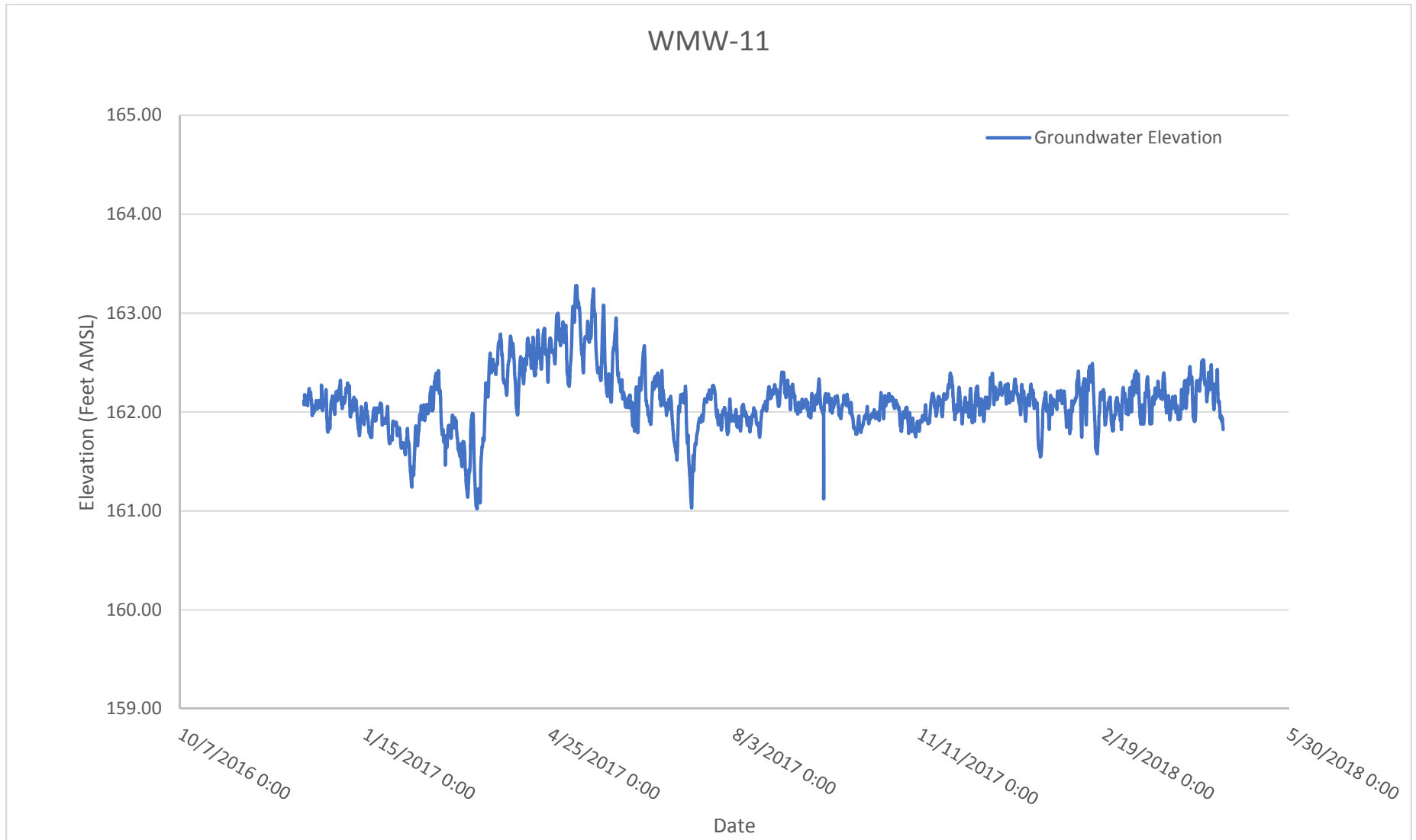
WMW-9 Pressure Transducer Data
December 2016 Through April 2018



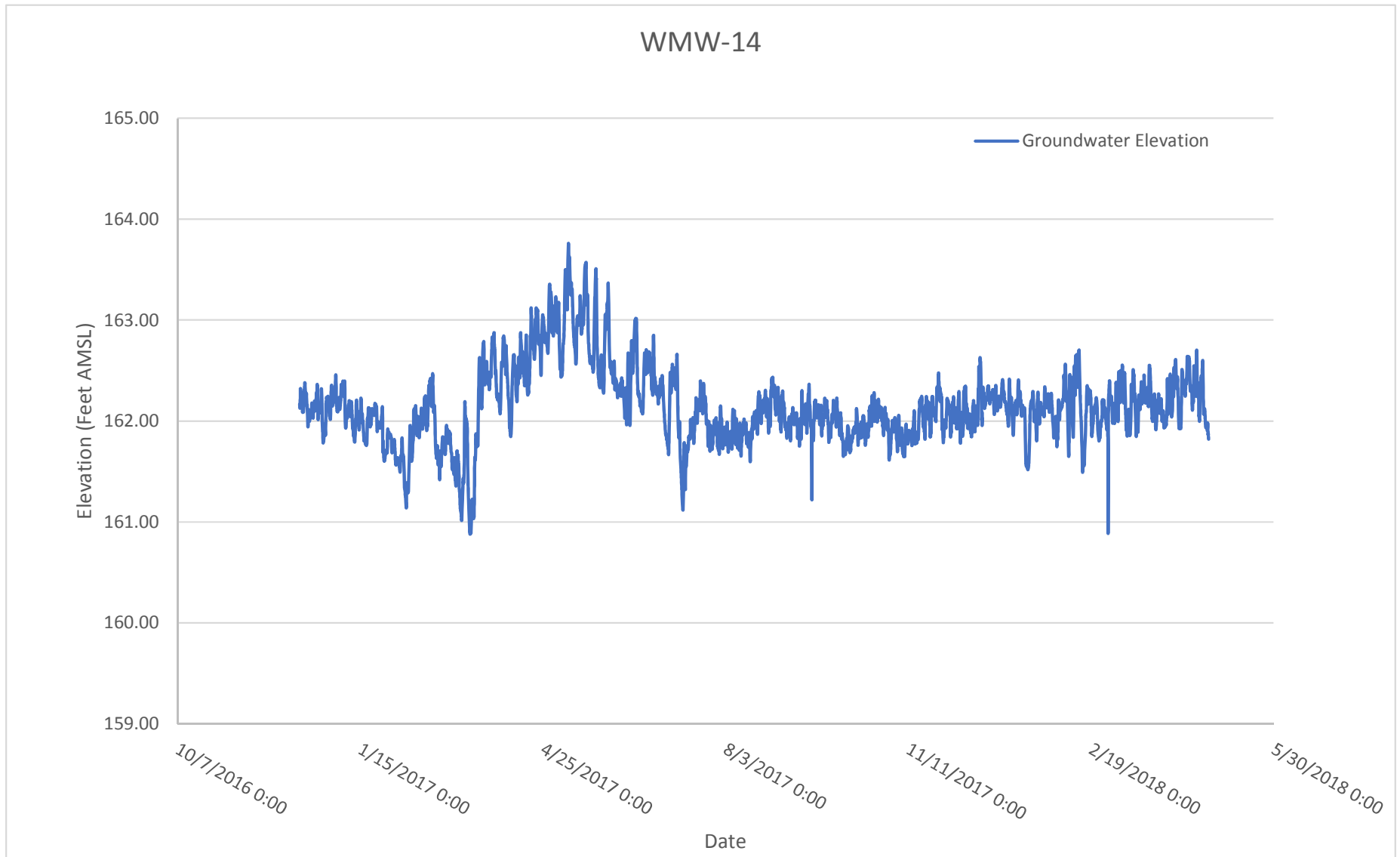
WMW-10 Pressure Transducer Data
December 2016 Through April 2018



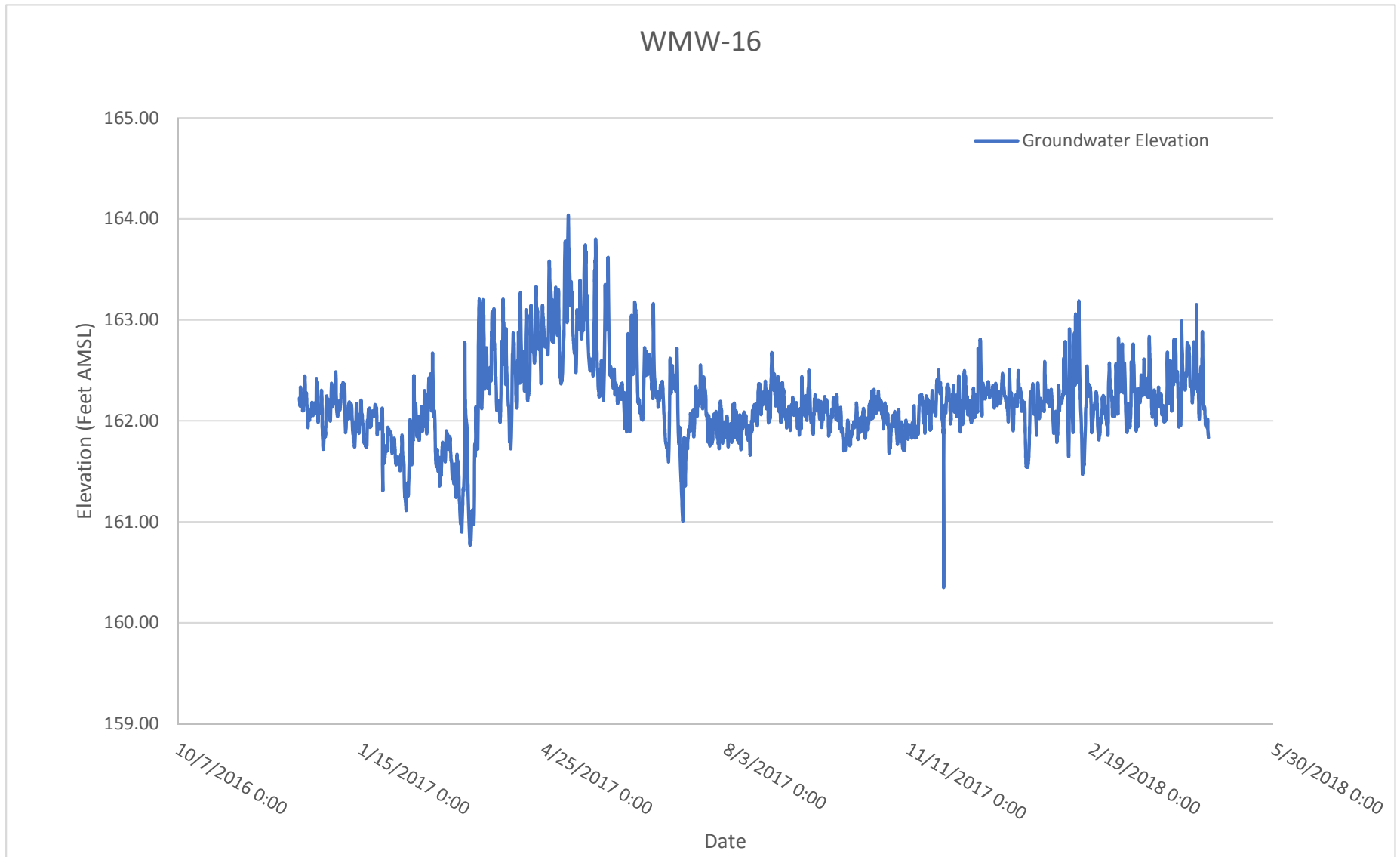
WMW-11 Pressure Transducer Data
December 2016 Through April 2018



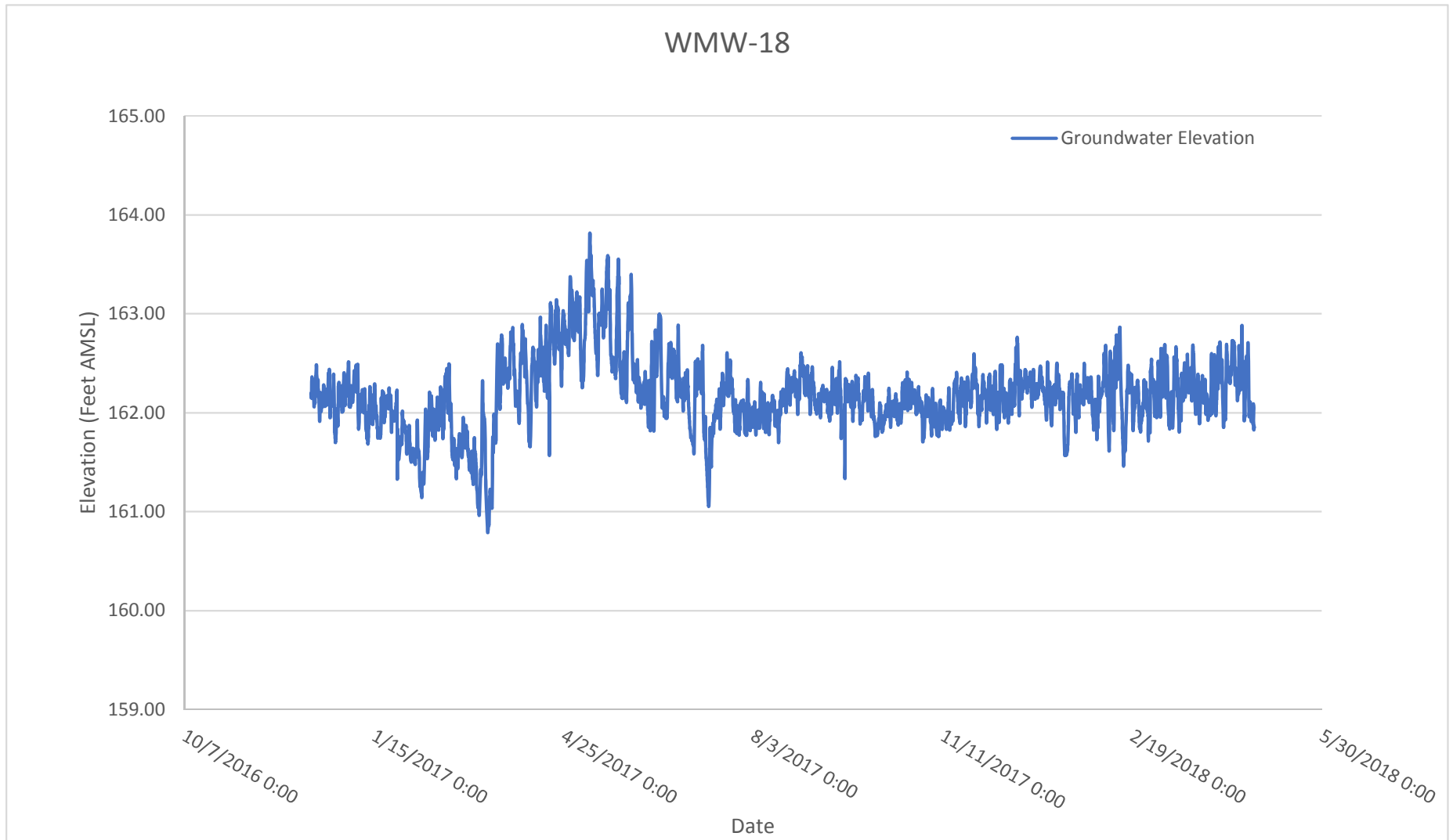
WMW-14 Pressure Transducer Data
December 2016 Through April 2018



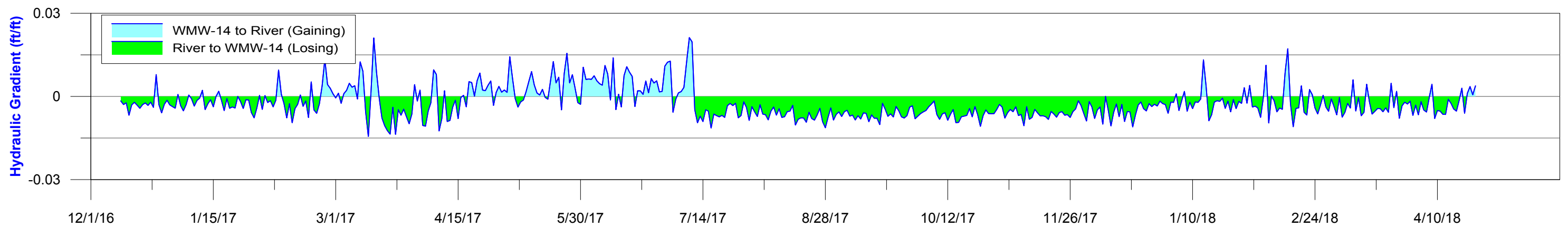
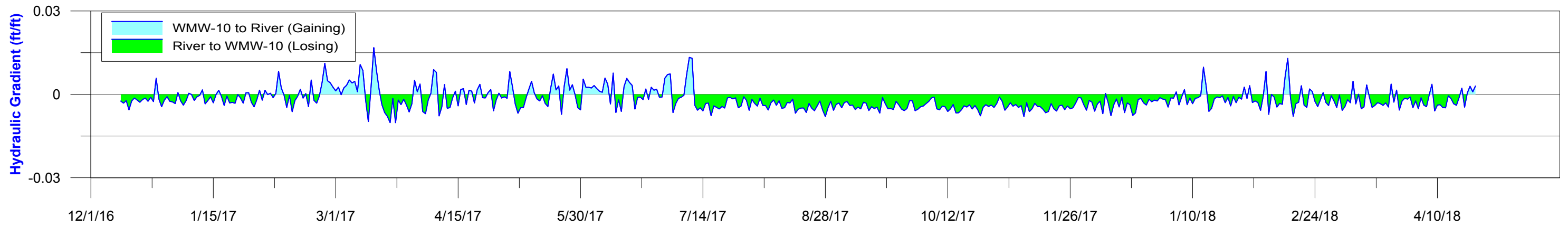
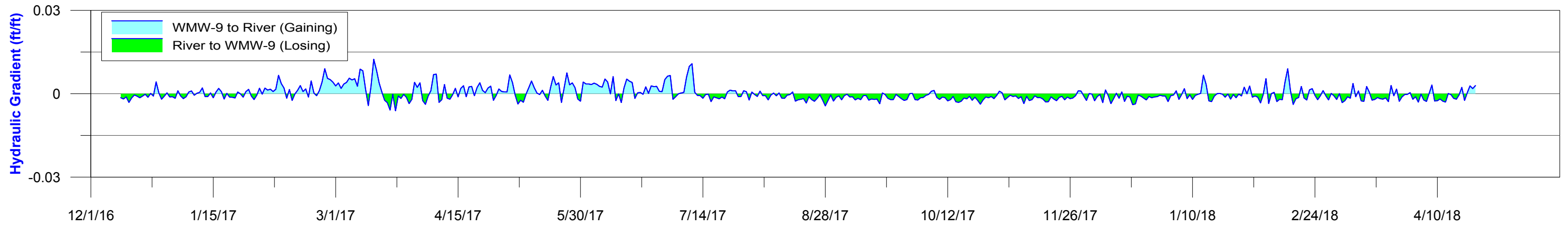
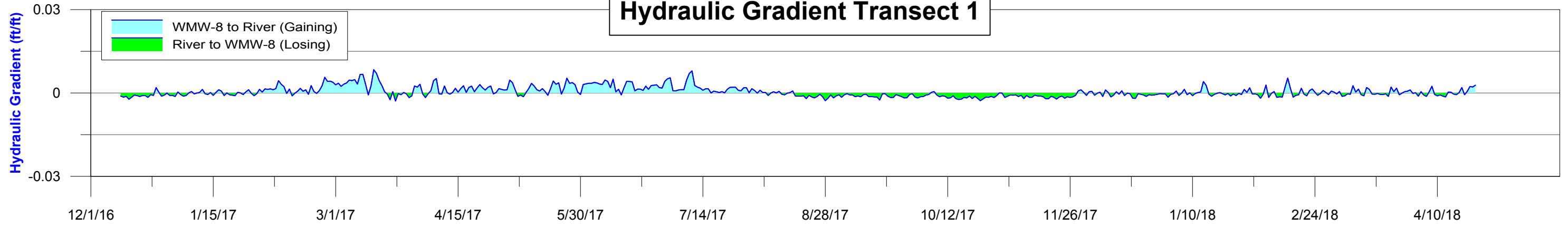
WMW-16 Pressure Transducer Data
December 2016 Through April 2018



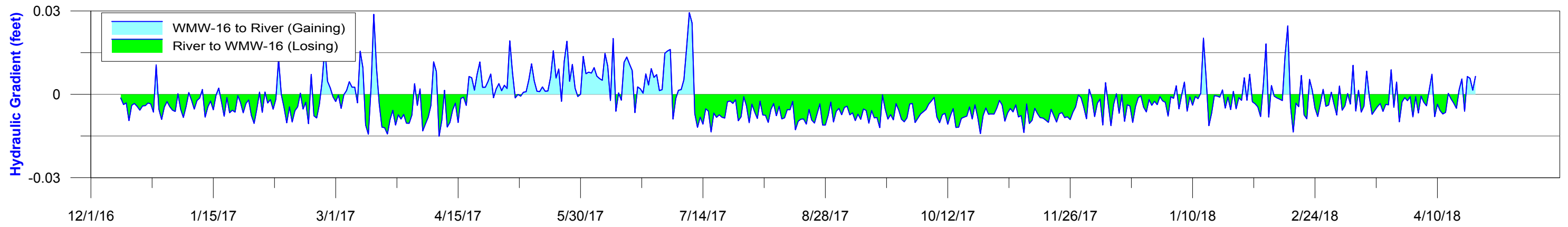
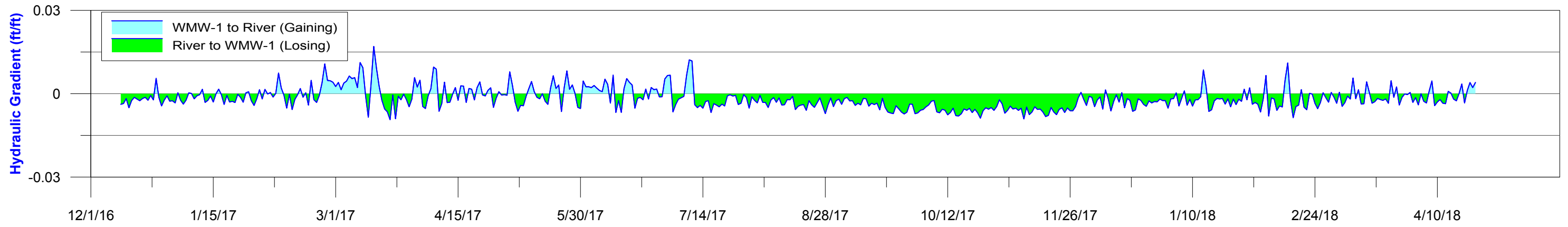
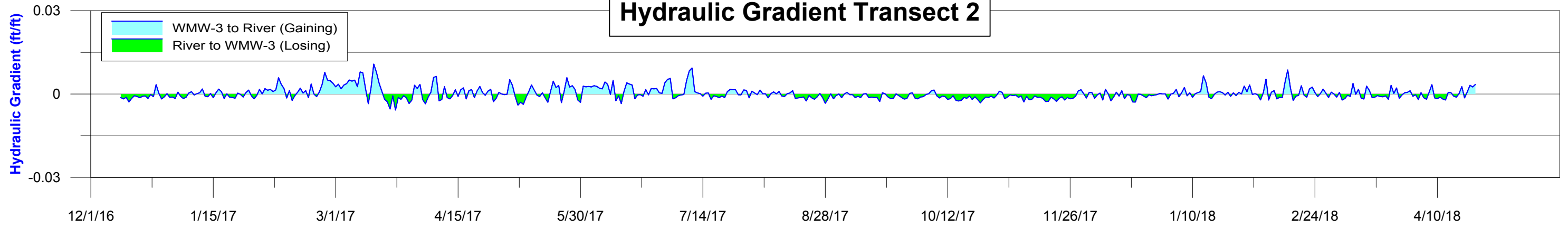
WMW-18 Pressure Transducer Data
December 2016 Through April 2018



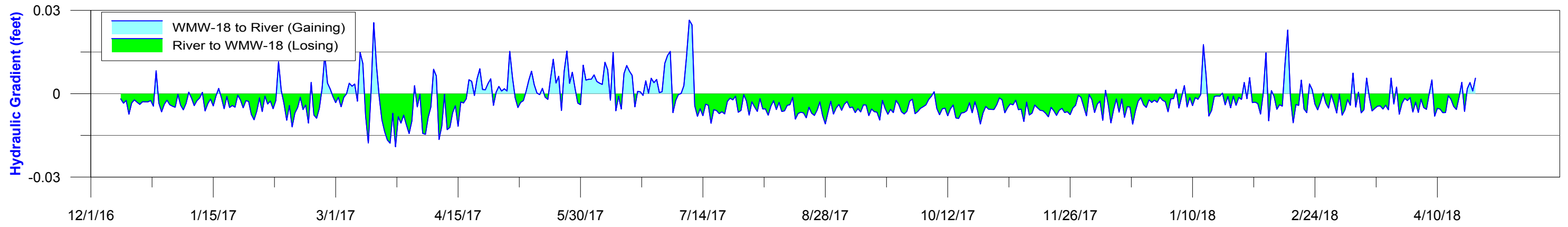
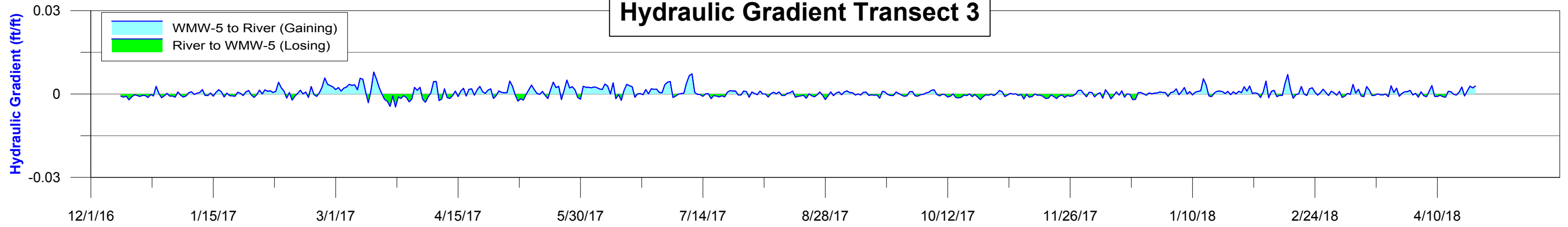
Hydraulic Gradient Transect 1



Hydraulic Gradient Transect 2



Hydraulic Gradient Transect 3



Appendix L

Hydraulic Gradient Analysis and Data Plots

Appendix L

Analysis of Groundwater and River Transducer Data

Introduction

Beginning in December 2016, transducer pressure data – convertible into hydraulic heads – were collected every two hours from three river locations as well as from multiple monitoring well locations (WMW-1, WMW-3, WMW-5, WMW-8, WMW-9, WMW-10, WMW-11, WMW-14, WMW-16, and WMW-18). Given the temporal resolution, these data sets provide a means for quantitative analysis regarding groundwater flow direction, with respect to the river, as a function of time. However, groundwater-riparian hydraulic interactions can entail both attenuation and lag in river water level fluctuations before a given water level perturbation (e.g., Figure 1) reaches a nearby monitoring well. To address the issue of the migration of “peaks” and “troughs” in the river impacting groundwater elevation on different time scales, a one-dimensional linear model with a periodic boundary condition was employed to partially correct out the effects of lag and attenuation (Van Wijk and de Vries, 1963), expressed as Equation-1:

$$h(x, t) = \bar{h} + A \frac{\left[\sin \left(\omega t - \frac{x}{d} \right) \right]}{\exp \left(\frac{x}{d} \right)}$$

where h is the hydraulic head, x the distance from the river bank to a monitoring point, ω the radial frequency ($= 2\pi/T$, where T is the period), and d the damping distance as given by Equation-2:

$$d = \sqrt{\frac{2D}{\omega}} = \sqrt{\frac{2Kb}{S_y \omega}}$$

Here, D is the aquifer hydraulic diffusivity, K the hydraulic conductivity, b the aquifer thickness, and S_y the specific yield. The above relationship is subject to idealizing assumptions pertaining to a homogeneous aquifer, one-dimensional flow between the river and groundwater, and no additional source/sinks for groundwater other than the river itself.

The complex nature of the fluctuating boundary condition imposed by the river elevation itself requires an additional analytical component to inform Equation-1. Because the boundary condition employed by Equation-1 is sinusoidal, the complex river elevation behavior in time can be approximated using a Fourier series, which adds the terms of sine and cosine series over a large range of frequencies to mimic the observed behavior (Equation-3):

$$y = a_0 + \sum_{j=1}^J \left[a_j \cos\left(\frac{2\pi jt}{T}\right) + b_j \sin\left(\frac{2\pi jt}{T}\right) \right]$$

A Fourier series consisting of an arbitrary number of terms can be fit to the data using a general linear regression model, so that the coefficients in the Fourier series (e.g., a and b values, or the associated amplitudes for each frequency) can be determined that minimize the error between observation and predictions. Because Equation-1, the groundwater pressure signal perturbation relationship is linear, multiple solutions for different frequencies, as expressed by a Fourier series, can simply be superimposed to calculate the idealized response in groundwater elevation at a certain distance and time.

Results and Discussion

A Fourier series fit to the time-dependent average elevations calculated from the three river transducers from the data set spanning April 2017 through March 2018 is shown on Figure 2 for the first 100 days of that time period. The series was fit using 120 terms, effectively including perturbations with frequencies larger than approximately three days and excluding shorter “spikes” in the data. This represents the source term used in Equation-1.

Assuming an average hydraulic conductivity of 10 ft/day (based in part upon slug test results obtained from a subset of the instrumented wells), a specific yield of 0.1, and an average aquifer saturated thickness of 40 feet, simulated groundwater elevations associated with the observed river elevations are compared with groundwater transducer data on Figures 3 through 12. With the predicted values as a reference, higher-than-modeled groundwater elevations imply net flow toward the river from a given monitoring well location, whereas lower-than-modeled observations imply net flow away from the river.

Monthly averaged observed and modeled river and groundwater elevations are summarized in Tables L-1A and L-1B. The monthly averaged groundwater elevations, minus the corresponding monthly average river elevations across the monitoring well locations, are shown in Table L-2A. By this data-only metric, negative numbers imply flow away from the river, or a losing stream condition, whereas positive numbers imply a gaining stream condition. In comparison, average measured groundwater elevations, minus corresponding average modeled elevations, are shown in Table L-2B. As noted, negative values, or lower-than-modeled groundwater elevations, imply a losing stream condition, whereas positive values, or higher-than-modeled groundwater elevations, imply a gaining stream condition.

The approaches summarized in Tables L-2A and L-2B are in good agreement and indicate a losing stream condition during the summer and fall months across all well locations, and a gaining stream condition in the spring months for a majority of the wells. Overall, across all wells and the entire year, a losing condition is encountered more often than a gaining one.

Example average groundwater elevation distributions for implied gaining conditions (June) and losing conditions (November) are shown on Figures 13 and 14. With the inclusion of the river

transducer data and locations, the overall reversal of flow directions, as indicated by Tables L-2A and 2B, is apparent.

Reference

W. Van Wijk and D. de Vries, 1963. Periodic temperature variations in a homogeneous soil, in *Physics of Plant Environment* (W.R. van Wijk, ed.), North-Holland Publishing, Amsterdam.

TABLE L-1A AND L-1B

**MONTHLY MEASURED AND MODELLED RIVER AND GROUNDWATER ELEVATIONS
BNSF Wishram Railyard, Wishram, Washington**

Table L-1A: Monthly Average Measured River and Groundwater Elevations

Month	River	WMW-1	WMW-3	WMW-5	WMW-8	WMW-9	WMW-10	WMW-11	WMW-14	WMW-16	WMW-18
Apr	162.68	162.70	162.74	162.77	163.04	162.80	162.63	162.56	162.64	162.64	162.58
May	162.75	162.76	162.84	162.95	163.24	162.95	162.75	162.69	162.93	162.93	162.86
Jun	162.17	162.23	162.43	162.47	162.94	162.49	162.25	162.16	162.40	162.38	162.31
Jul	162.04	161.94	162.20	162.19	162.60	162.16	161.93	161.90	161.96	161.99	162.01
Aug	162.31	162.05	162.22	162.27	162.16	162.13	162.01	162.04	161.99	162.06	162.11
Sep	162.34	162.01	162.22	162.36	162.04	162.14	162.03	162.09	162.02	162.11	162.15
Oct	162.26	161.79	162.07	162.19	161.87	162.04	161.93	162.00	161.96	162.02	162.06
Nov	162.27	161.82	162.06	162.17	161.94	162.07	161.94	162.01	161.97	162.03	162.07
Dec	162.37	162.14	162.28	162.35	162.25	162.18	162.11	162.13	162.12	162.23	162.21
Jan	162.17	162.02	162.27	162.37	162.19	162.14	162.09	162.06	162.09	162.15	162.14
Feb	162.21	162.03	162.32	162.40	162.24	162.19	162.12	162.08	162.12	162.20	162.18
Mar	162.33	162.25	162.32	162.42	162.39	162.21	162.17	162.13	162.18	162.26	162.23

Table L-1B: Monthly Average Modeled River and Groundwater Elevations

Month	River	WMW-1	WMW-3	WMW-5	WMW-8	WMW-9	WMW-10	WMW-11	WMW-14	WMW-16	WMW-18
Apr	162.68	162.58	162.49	162.46	162.42	162.53	162.60	162.61	162.64	162.64	162.63
May	162.76	162.72	162.67	162.65	162.61	162.70	162.73	162.74	162.75	162.75	162.75
Jun	162.17	162.26	162.33	162.36	162.39	162.30	162.24	162.23	162.21	162.20	162.21
Jul	162.03	162.06	162.12	162.14	162.19	162.09	162.05	162.05	162.04	162.04	162.04
Aug	162.31	162.28	162.26	162.25	162.24	162.27	162.29	162.29	162.30	162.30	162.30
Sep	162.35	162.35	162.36	162.35	162.35	162.36	162.35	162.35	162.35	162.35	162.35
Oct	162.25	162.27	162.28	162.29	162.29	162.28	162.27	162.27	162.26	162.26	162.26
Nov	162.27	162.27	162.27	162.27	162.28	162.27	162.27	162.27	162.27	162.27	162.27
Dec	162.37	162.35	162.34	162.34	162.33	162.35	162.36	162.36	162.36	162.36	162.36
Jan	162.17	162.22	162.25	162.26	162.28	162.24	162.21	162.20	162.19	162.19	162.19
Feb	162.21	162.21	162.22	162.23	162.24	162.22	162.21	162.21	162.21	162.21	162.21
Mar	162.33	162.32	162.30	162.30	162.29	162.31	162.32	162.33	162.33	162.33	162.33

Note:

All data results presented in elevation units of feet above mean sea level.

TABLE L-2A AND L-2B

**MONTHLY AVERAGE RIVER VERSUS GROUNDWATER ELEVATIONS
BNSF Wishram Railyard, Wishram, Washington**

Table L-2A: Monthly Average Measured Groundwater Elevation Minus River Elevation

Month	WMW-1	WMW-3	WMW-5	WMW-8	WMW-9	WMW-10	WMW-11	WMW-14	WMW-16	WMW-18
Apr	0.02	0.07	0.10	0.37	0.13	-0.05	-0.12	-0.04	-0.03	-0.09
May	0.01	0.09	0.20	0.49	0.19	0.00	-0.06	0.18	0.17	0.10
Jun	0.06	0.26	0.30	0.76	0.32	0.07	-0.02	0.23	0.20	0.14
Jul	-0.10	0.17	0.16	0.56	0.12	-0.11	-0.13	-0.08	-0.05	-0.02
Aug	-0.26	-0.10	-0.04	-0.16	-0.19	-0.31	-0.27	-0.33	-0.25	-0.20
Sep	-0.33	-0.13	0.01	-0.31	-0.20	-0.31	-0.26	-0.32	-0.23	-0.19
Oct	-0.46	-0.19	-0.07	-0.39	-0.21	-0.32	-0.25	-0.30	-0.24	-0.19
Nov	-0.45	-0.21	-0.10	-0.33	-0.20	-0.33	-0.26	-0.30	-0.24	-0.19
Dec	-0.22	-0.09	-0.02	-0.12	-0.19	-0.25	-0.24	-0.24	-0.13	-0.15
Jan	-0.15	0.10	0.20	0.02	-0.03	-0.08	-0.11	-0.08	-0.02	-0.03
Feb	-0.19	0.11	0.18	0.03	-0.03	-0.09	-0.14	-0.09	-0.02	-0.04
Mar	-0.08	-0.01	0.09	0.05	-0.12	-0.16	-0.21	-0.15	-0.07	-0.10

Table L-2B: Monthly Average Measured Groundwater Minus Modeled Groundwater Elevation

Month	WMW-1	WMW-3	WMW-5	WMW-8	WMW-9	WMW-10	WMW-11	WMW-14	WMW-16	WMW-18
Apr	0.12	0.25	0.31	0.62	0.28	0.03	-0.05	0.00	0.00	-0.05
May	0.04	0.16	0.30	0.64	0.25	0.02	-0.05	0.18	0.18	0.11
Jun	-0.03	0.09	0.12	0.55	0.19	0.01	-0.08	0.19	0.17	0.10
Jul	-0.13	0.08	0.05	0.41	0.06	-0.13	-0.15	-0.08	-0.05	-0.03
Aug	-0.23	-0.04	0.02	-0.09	-0.14	-0.28	-0.25	-0.31	-0.24	-0.19
Sep	-0.34	-0.14	0.00	-0.31	-0.22	-0.32	-0.26	-0.33	-0.24	-0.20
Oct	-0.48	-0.22	-0.10	-0.42	-0.24	-0.34	-0.26	-0.31	-0.25	-0.20
Nov	-0.45	-0.21	-0.10	-0.33	-0.20	-0.32	-0.26	-0.29	-0.24	-0.19
Dec	-0.21	-0.06	0.01	-0.08	-0.17	-0.24	-0.23	-0.24	-0.13	-0.15
Jan	-0.20	0.02	0.10	-0.10	-0.09	-0.12	-0.14	-0.10	-0.04	-0.06
Feb	-0.18	0.10	0.17	0.00	-0.03	-0.09	-0.13	-0.09	-0.01	-0.03
Mar	-0.07	0.02	0.12	0.10	-0.10	-0.16	-0.20	-0.15	-0.07	-0.10

Notes:

Values in Table L-2A represent measured (Table L-1A) monthly average groundwater elevations minus monthly average river elevations. Results are presented in units of feet.

Values in Table L-2B represent measured (Table L-1A) minus modeled (Table L-1B) monthly average groundwater elevations.

Cell shading indicates the following conditions with respect to the Columbia River.

- Losing stream condition (negative result from groundwater elevation minus river elevation)
- Gaining stream condition (positive result from groundwater elevation minus river elevation)

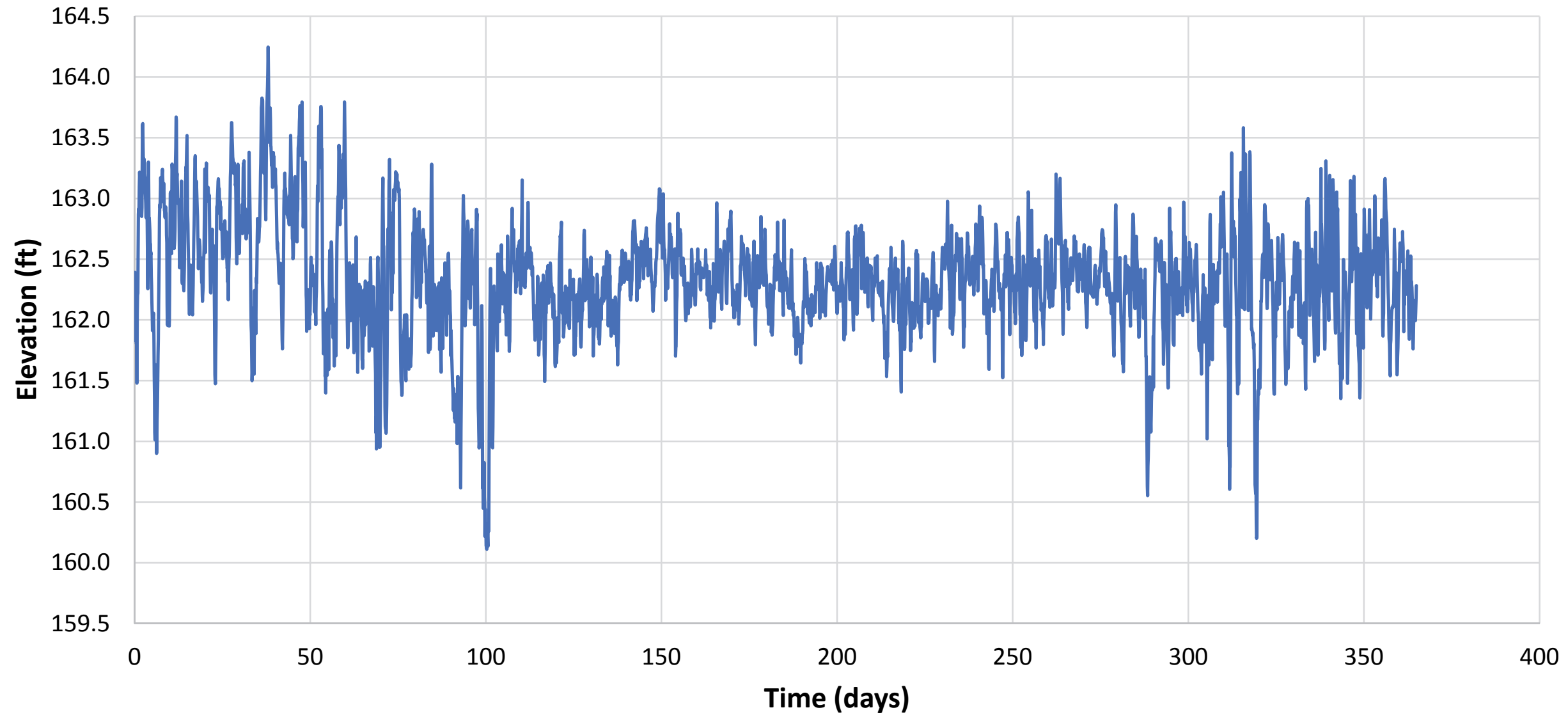


Figure 1: Average River Elevation (ft above MSL), April 2017 – March 2018

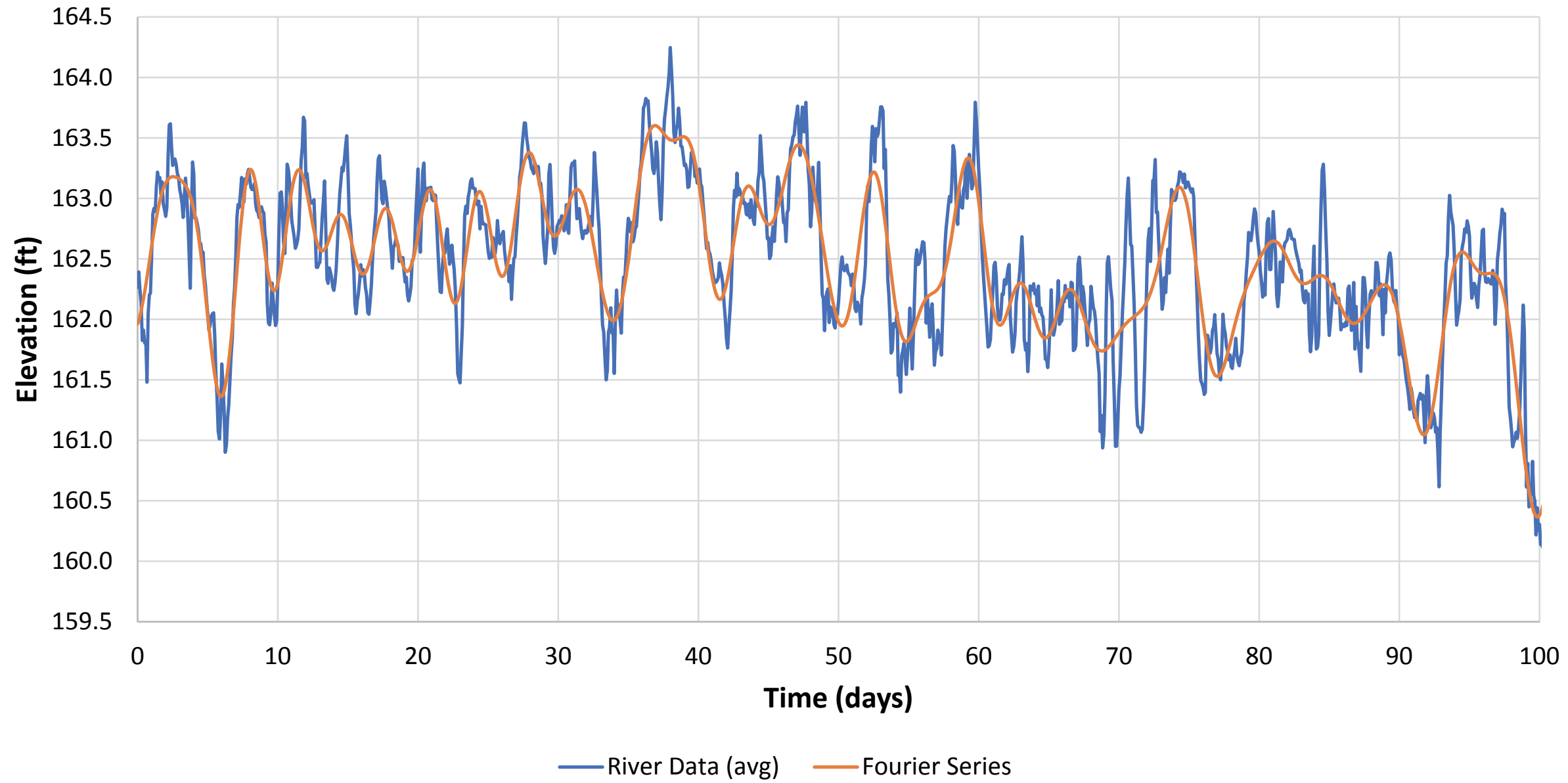


Figure 2: Average River Elevation (ft above MSL) and Fourier Series Approximation for First 100 days

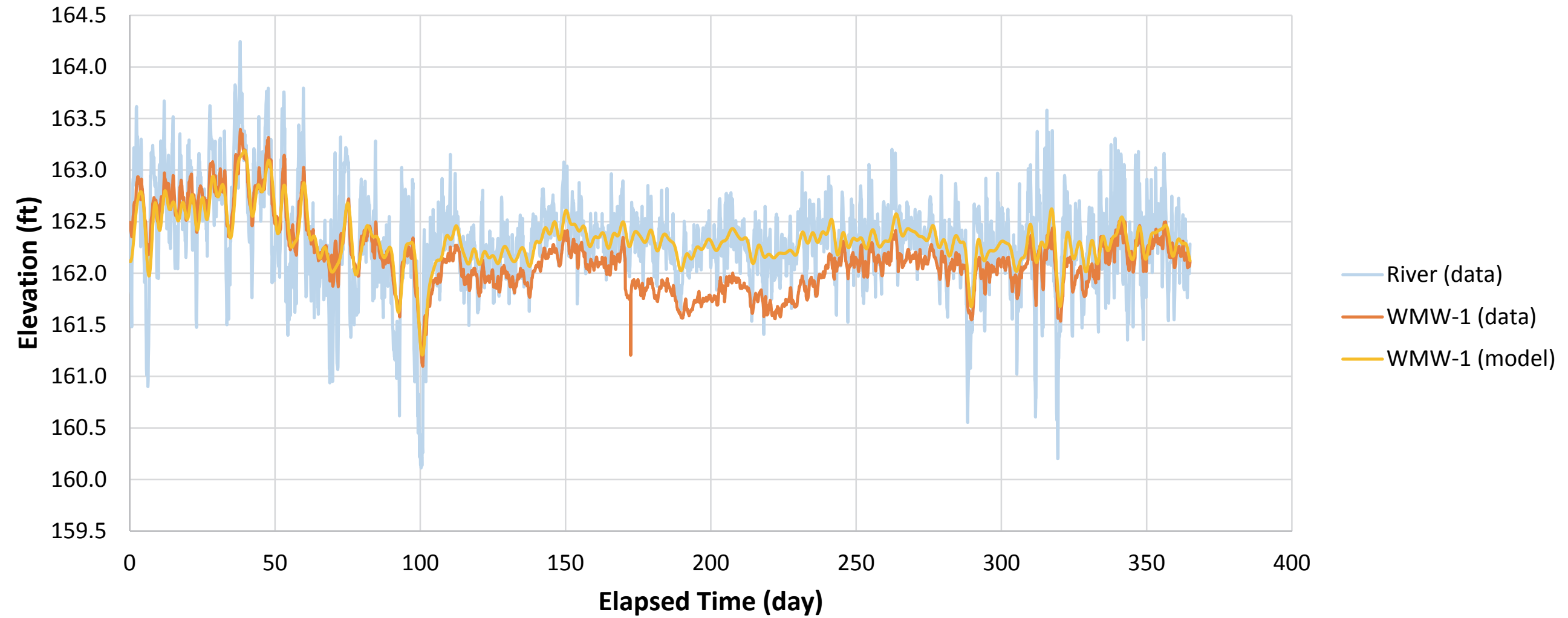


Figure 3: Comparison of Observed and Modeled Groundwater Elevation (ft above MSL) at WMW-1 with Average River Elevation

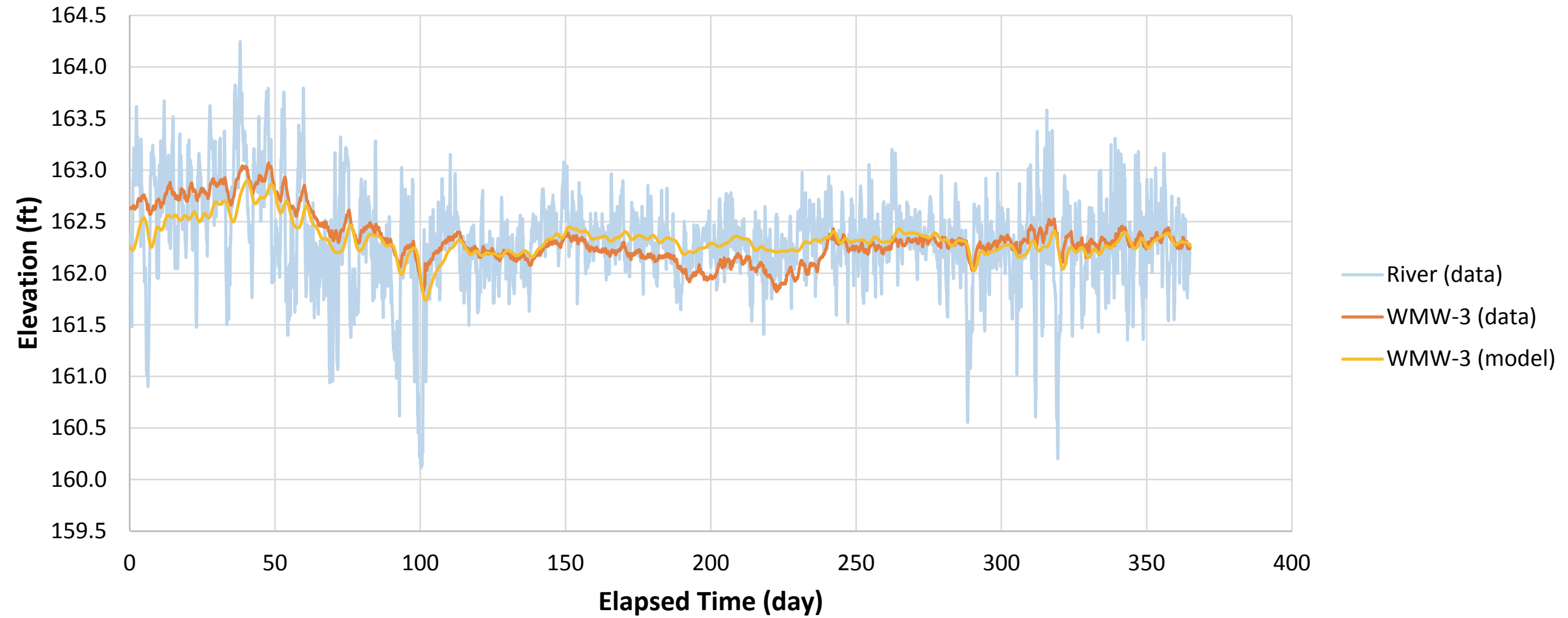


Figure 4: Comparison of Observed and Modeled Groundwater Elevation (ft above MSL) at WMW-3 with Average River Elevation

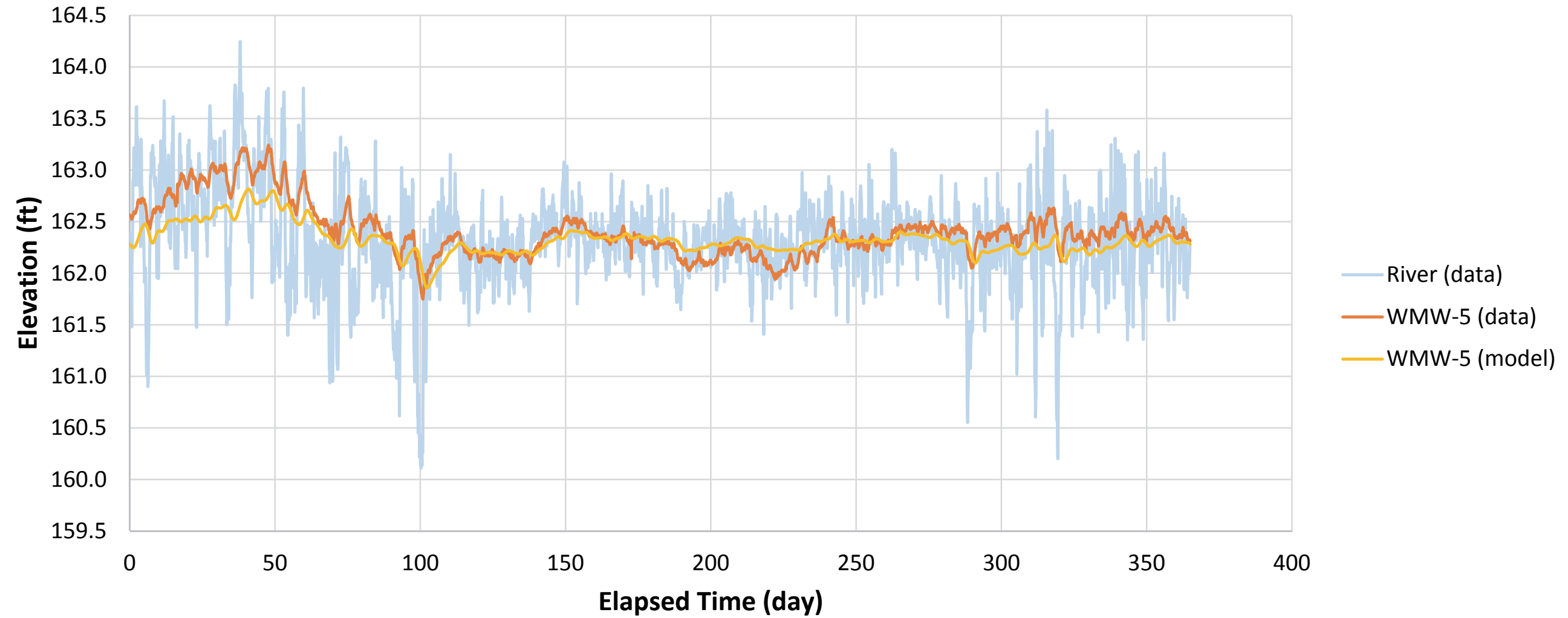


Figure 5: Comparison of Observed and Modeled Groundwater Elevation (ft above MSL) at WMW-5 with Average River Elevation

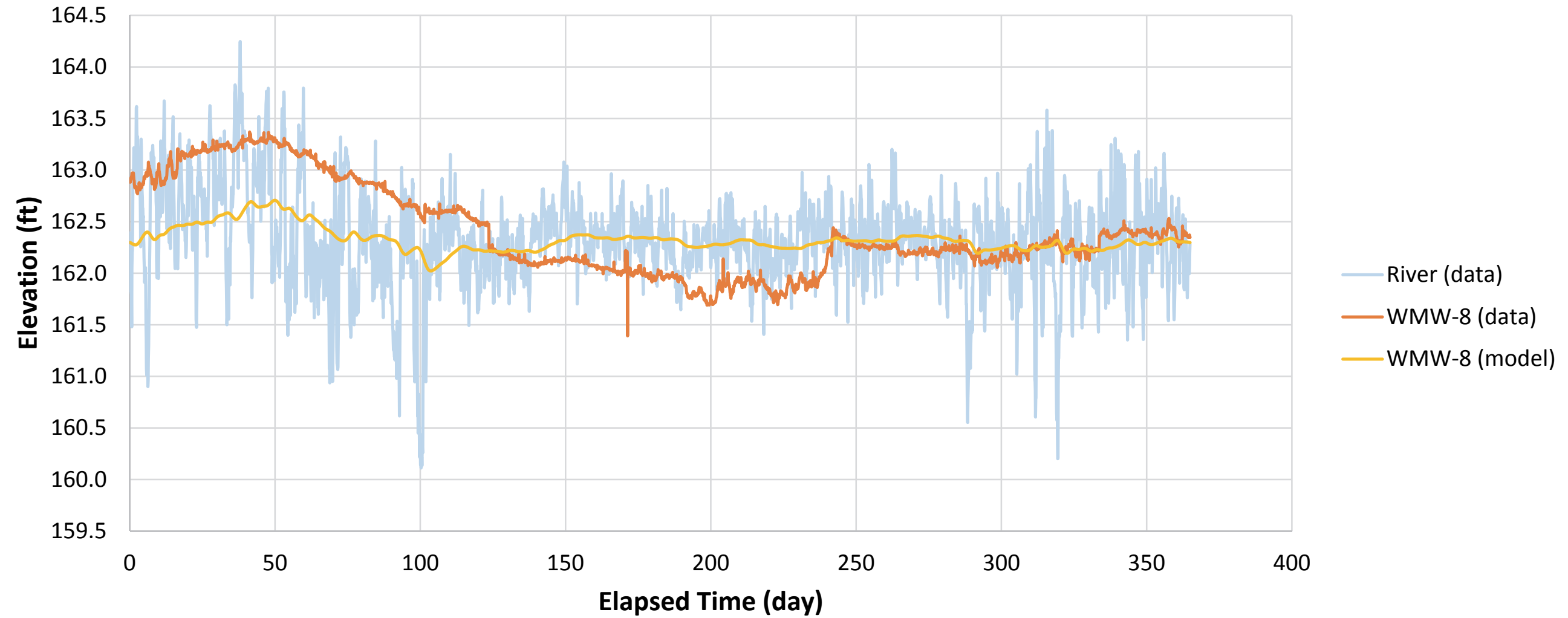


Figure 6: Comparison of Observed and Modeled Groundwater Elevation (ft above MSL) at WMW-8 with Average River Elevation

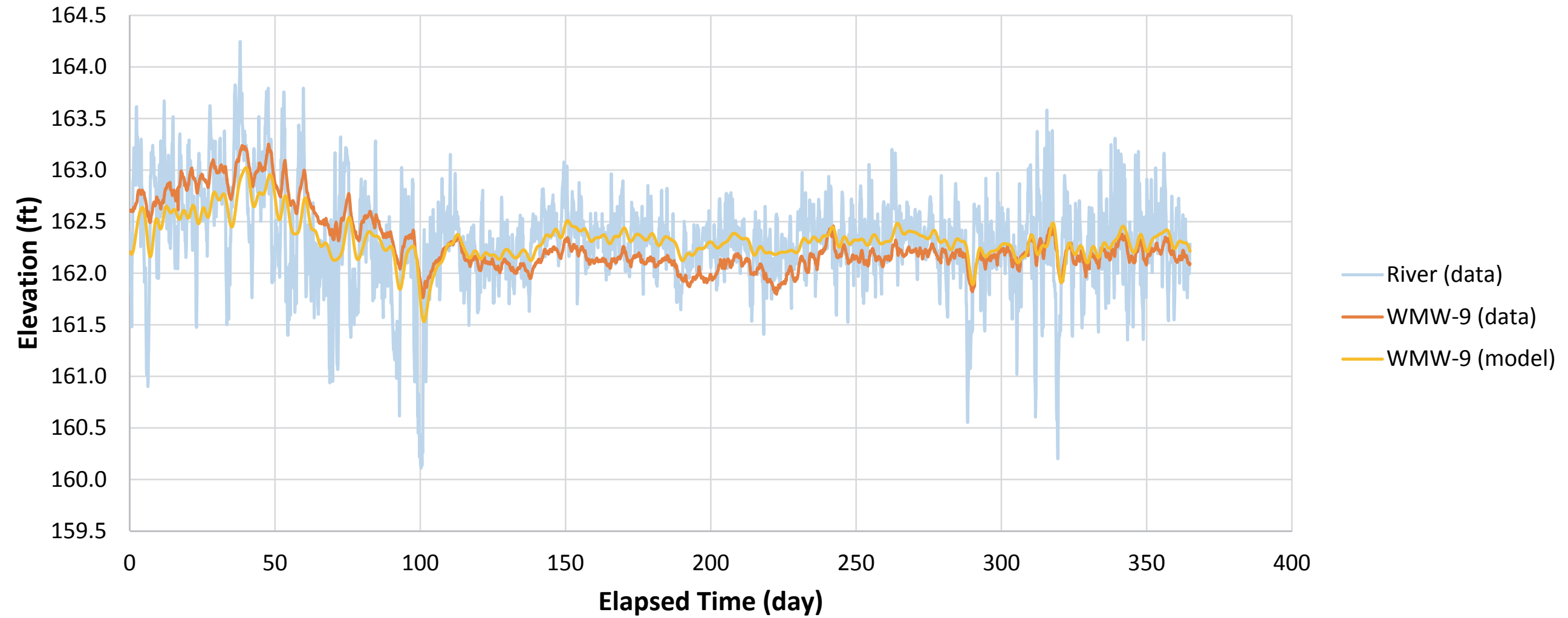


Figure 7: Comparison of Observed and Modeled Groundwater Elevation (ft above MSL) at WMW-9 with Average River Elevation

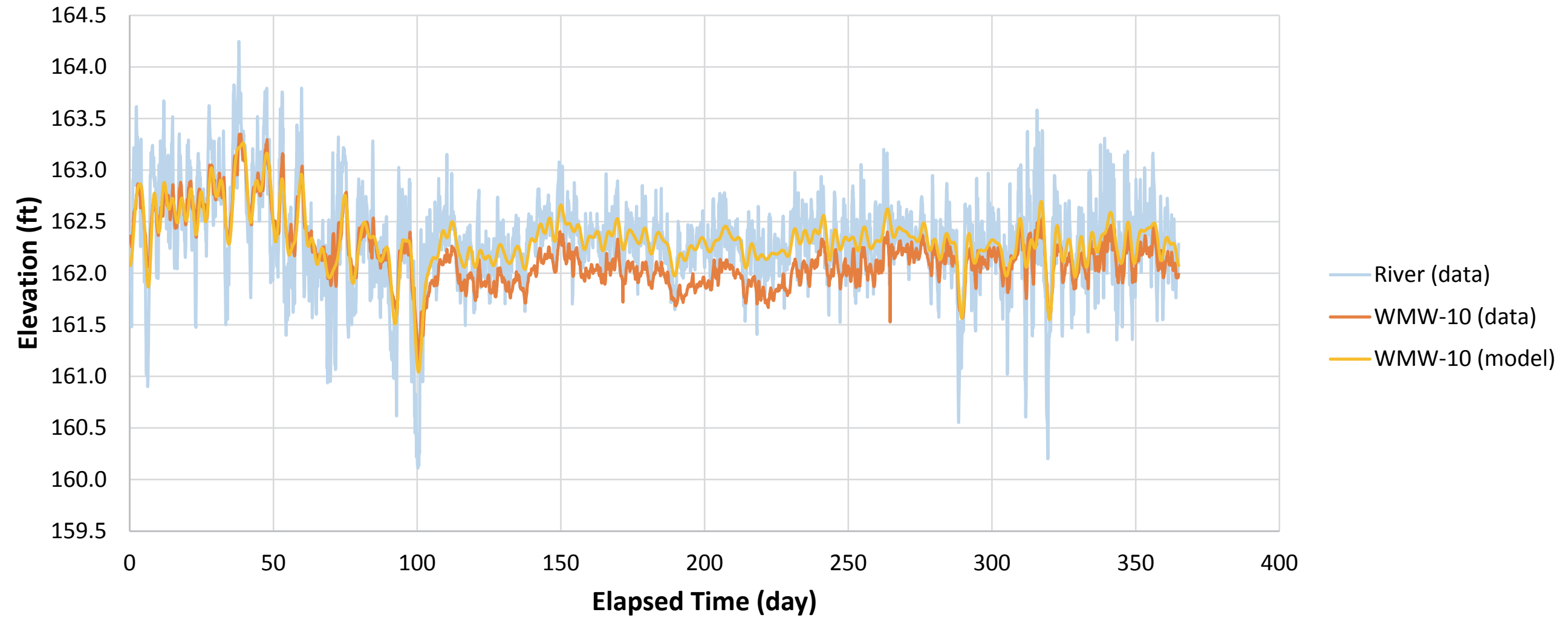


Figure 8: Comparison of Observed and Modeled Groundwater Elevation (ft above MSL) at WMW-10 with Average River Elevation

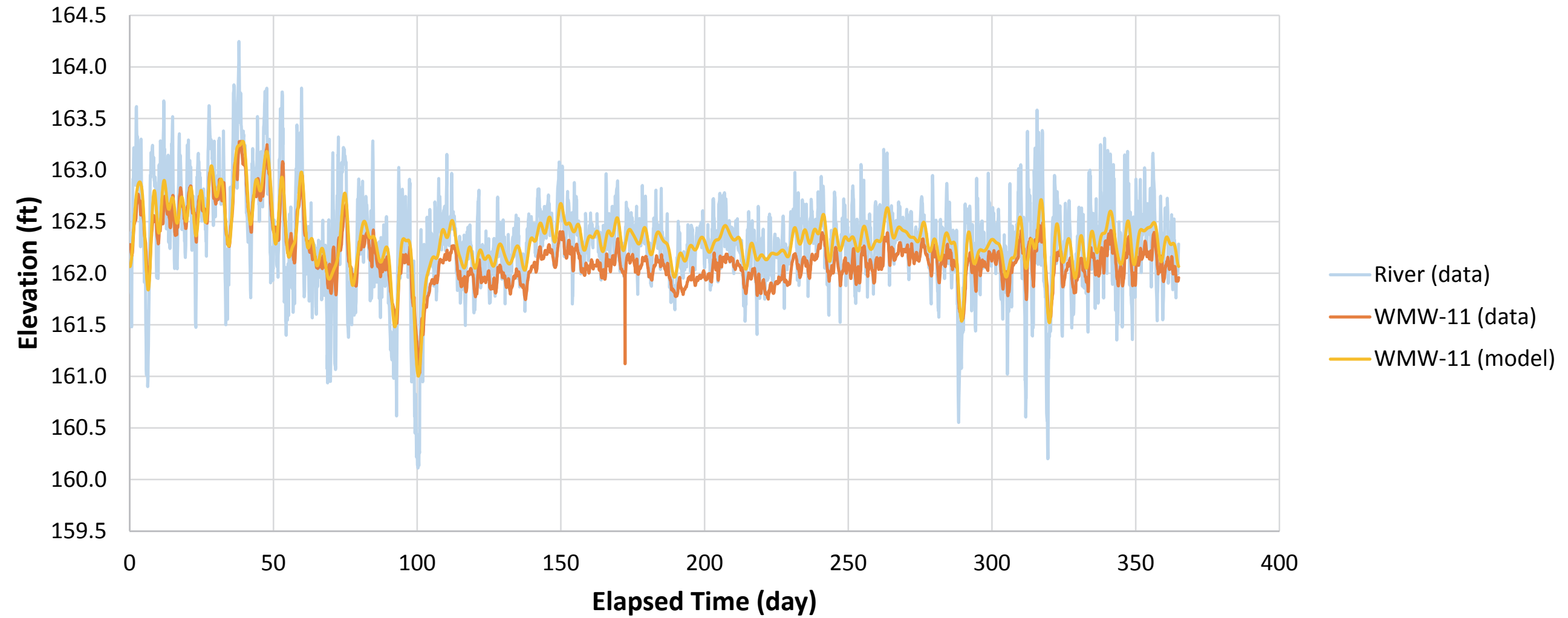


Figure 9: Comparison of Observed and Modeled Groundwater Elevation (ft above MSL) at WMW-11 with Average River Elevation

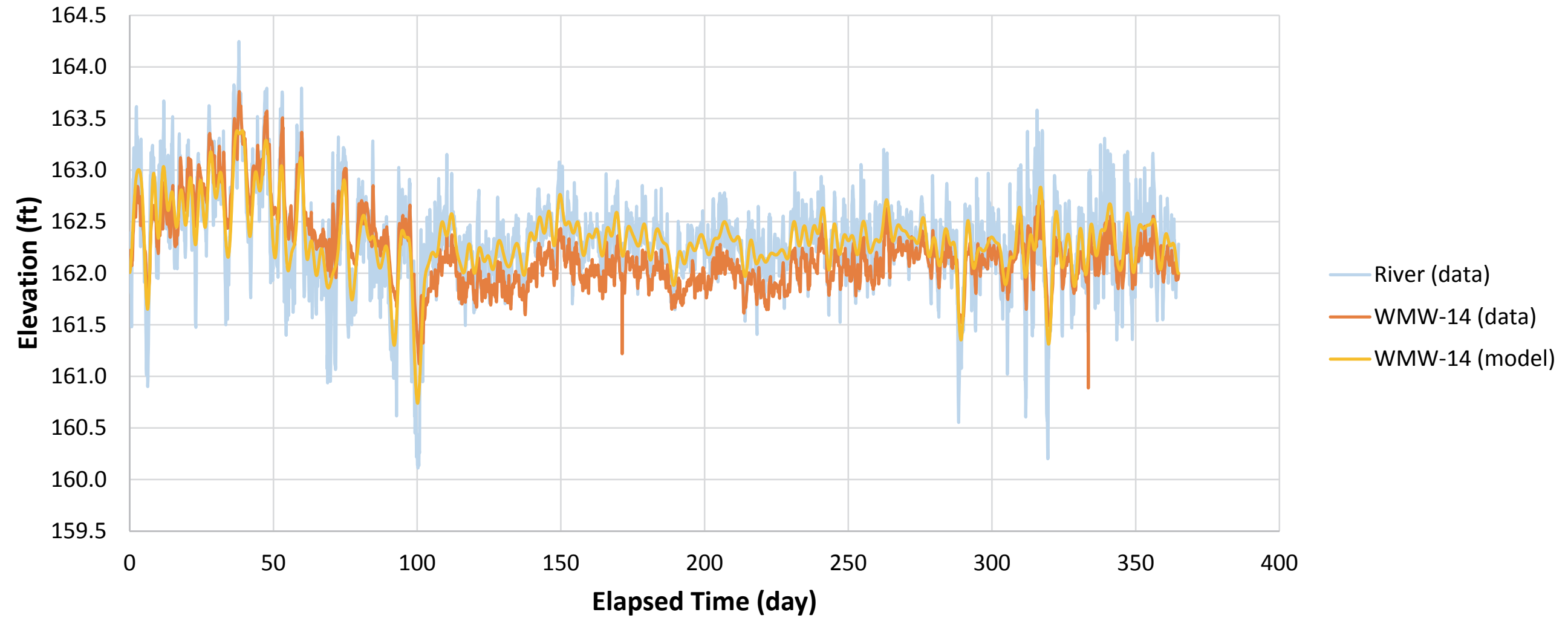


Figure 10: Comparison of Observed and Modeled Groundwater Elevation (ft above MSL) at WMW-14 with Average River Elevation

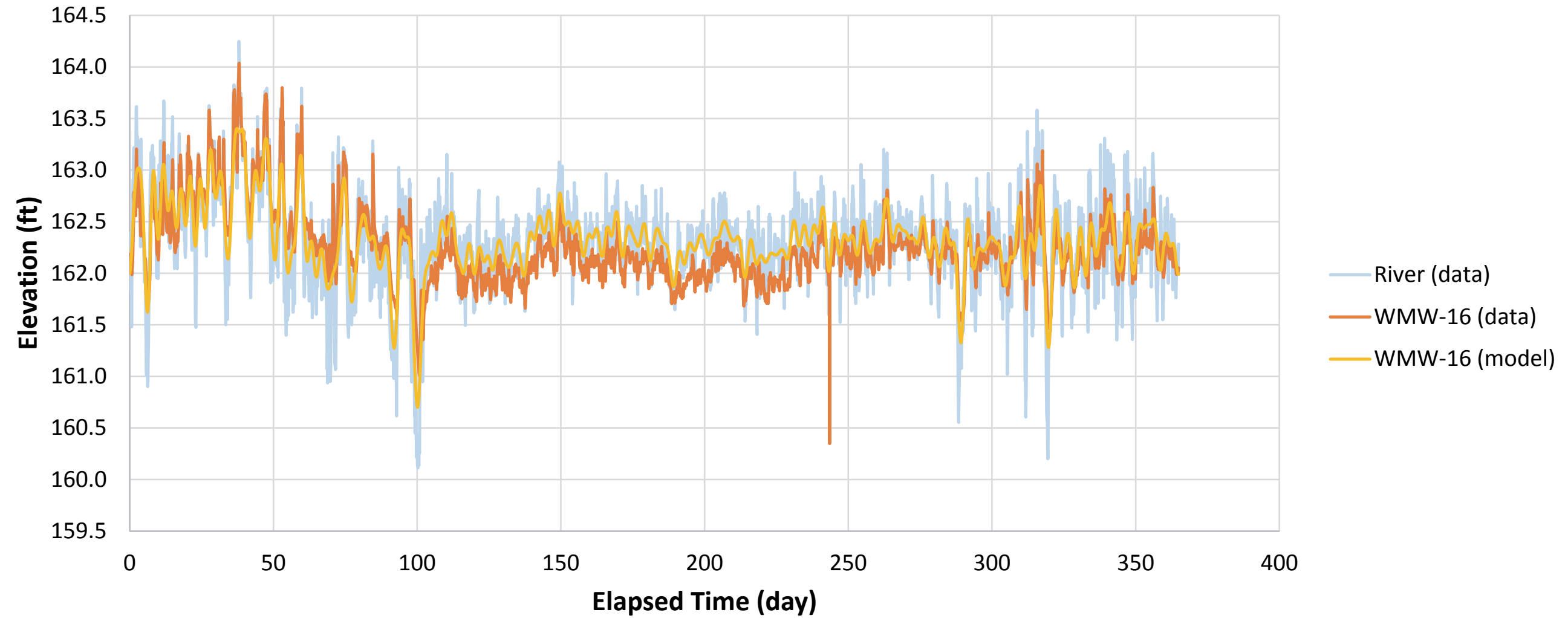


Figure 11: Comparison of Observed and Modeled Groundwater Elevation (ft above MSL) at WMW-1 with Average River Elevation

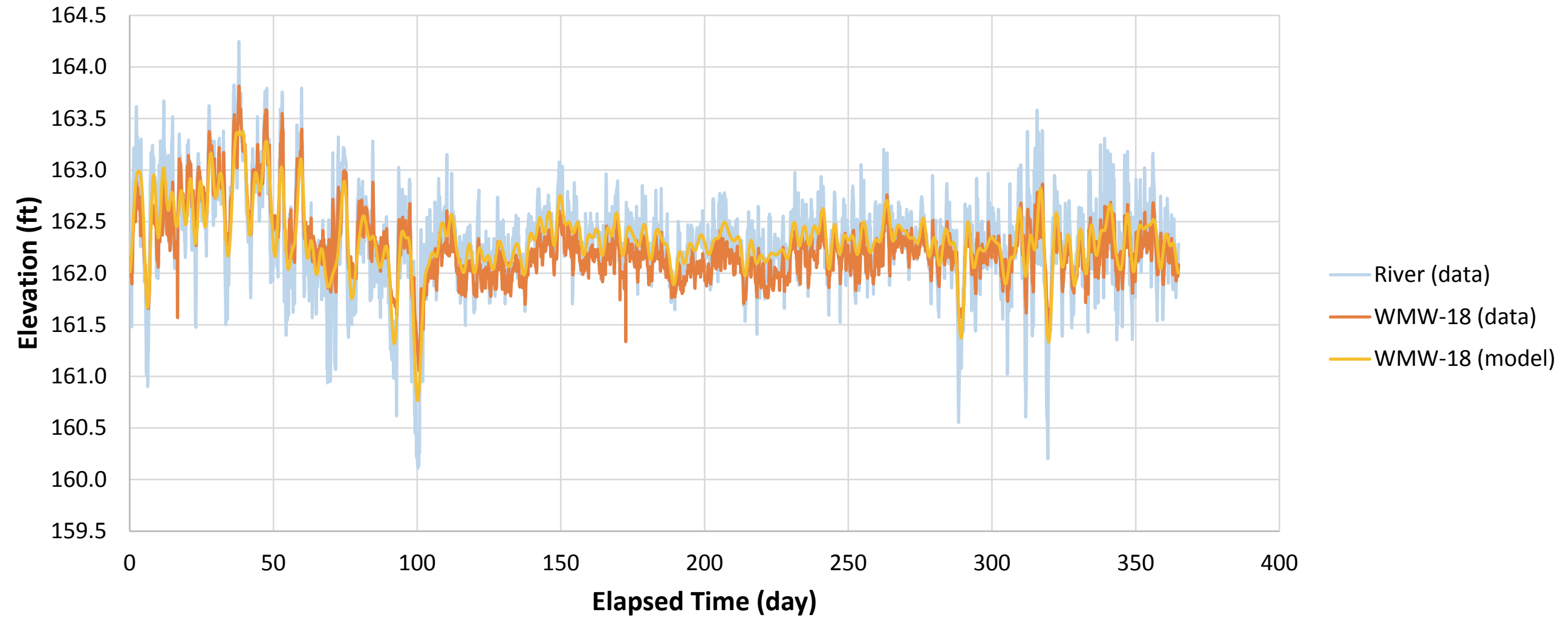
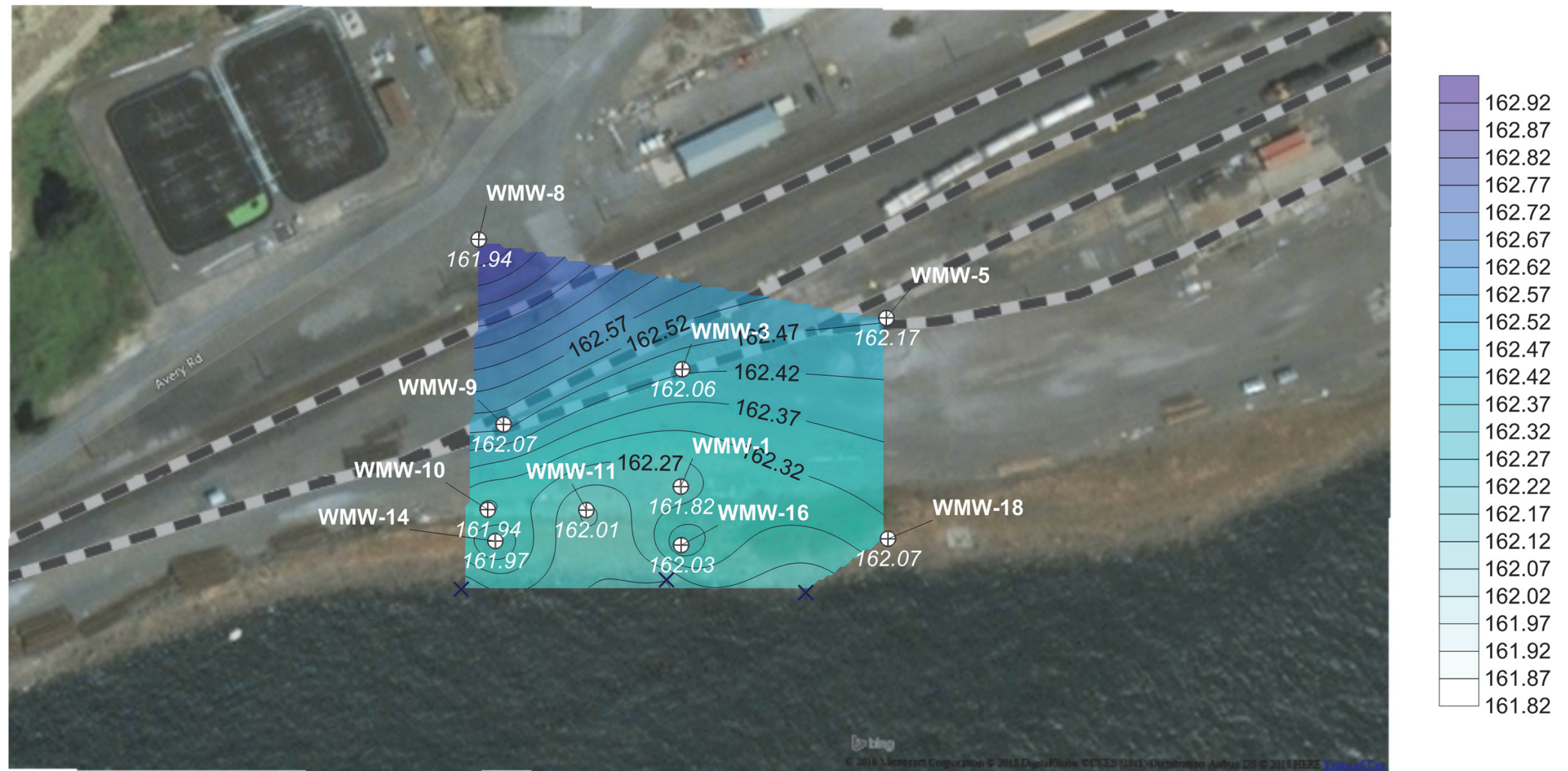


Figure 12: Comparison of Observed and Modeled Groundwater Elevation (ft above MSL) at WMW-18 with Average River Elevation



Scale = feet

Figure 13: Interpolated Averaged Groundwater Elevations (ft above MSL) in June 2017:
Apparent Gaining Stream Condition



Scale = feet

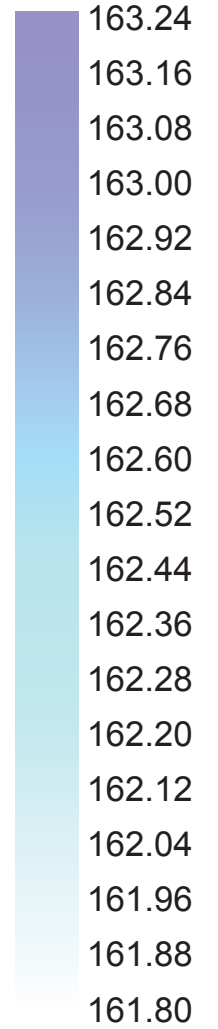
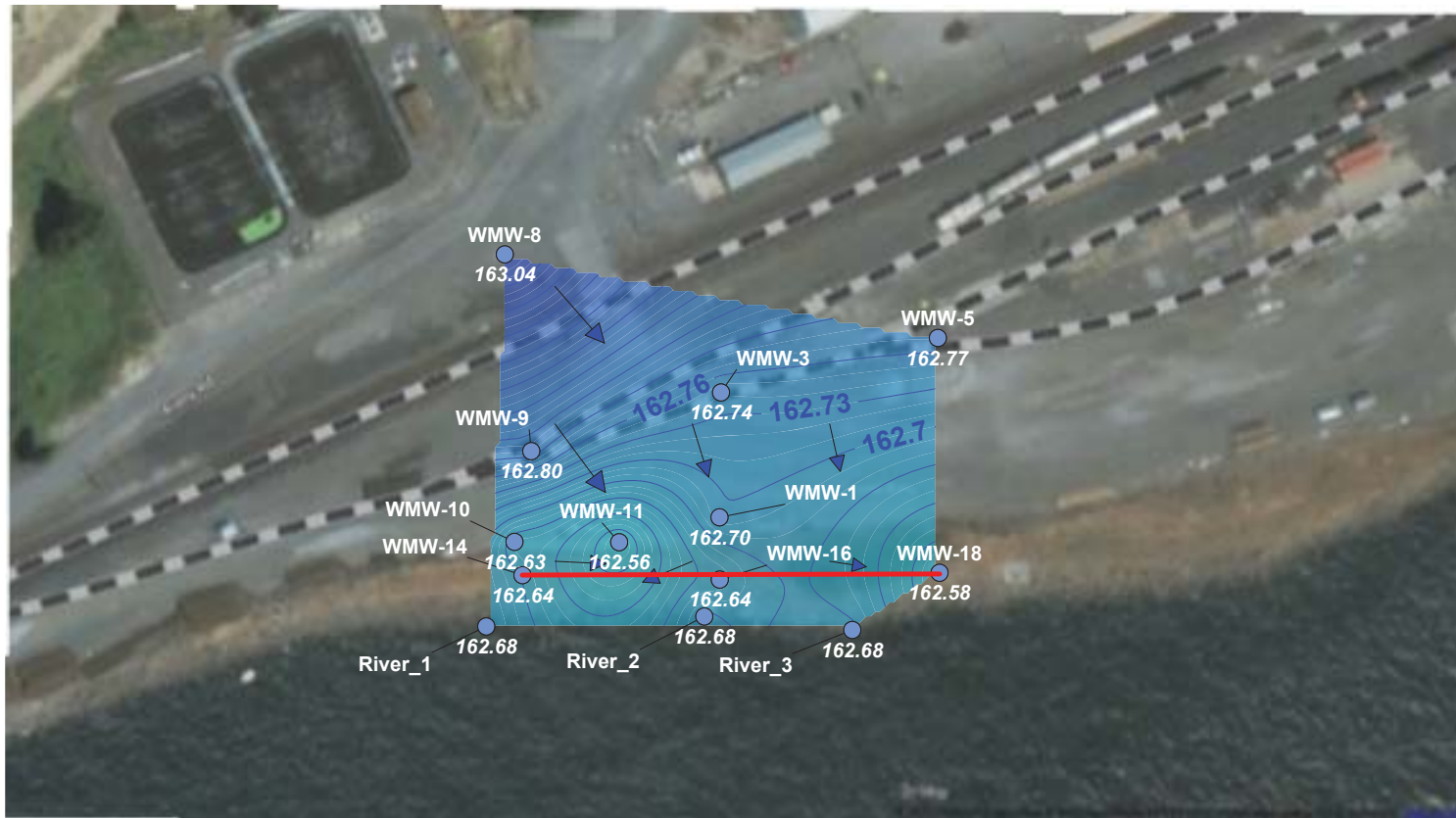
Figure 14: Interpolated Averaged Groundwater Elevations (ft above MSL) in November 2017: Apparent Losing Stream Condition

Appendix M

Groundwater Maps

Average Groundwater Flow Maps

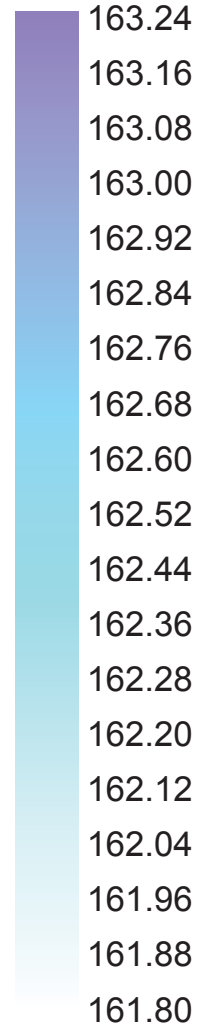
April 2017



Scale = feet

Monthly Average Groundwater
Elevation Maps

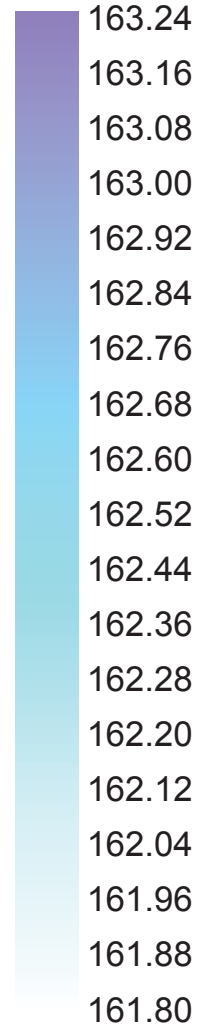
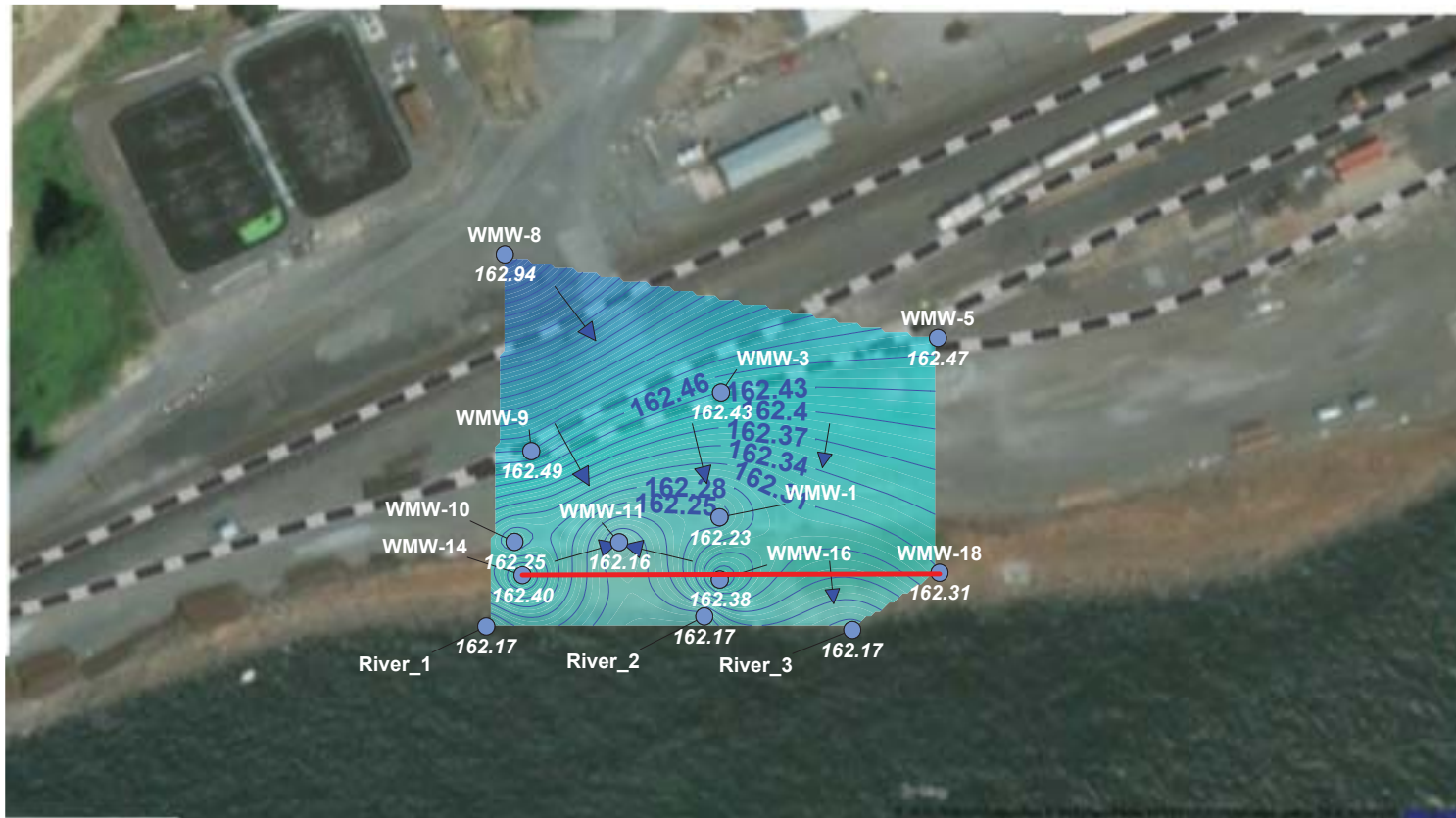
May 2017



Scale = feet

Monthly Average Groundwater
Elevation Maps

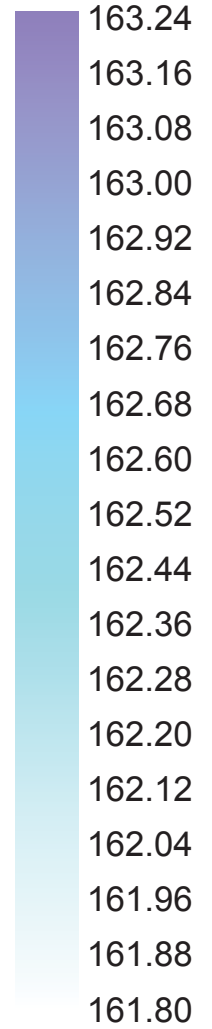
June 2017



Scale = feet

Monthly Average Groundwater
Elevation Maps

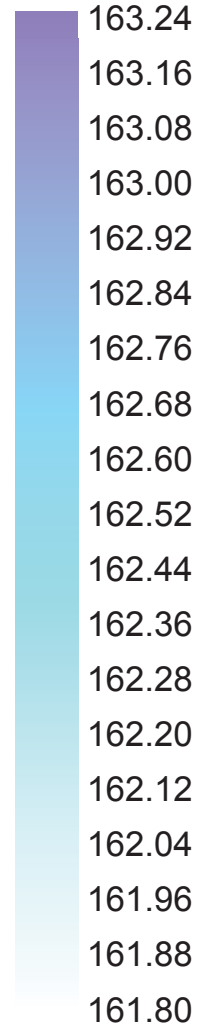
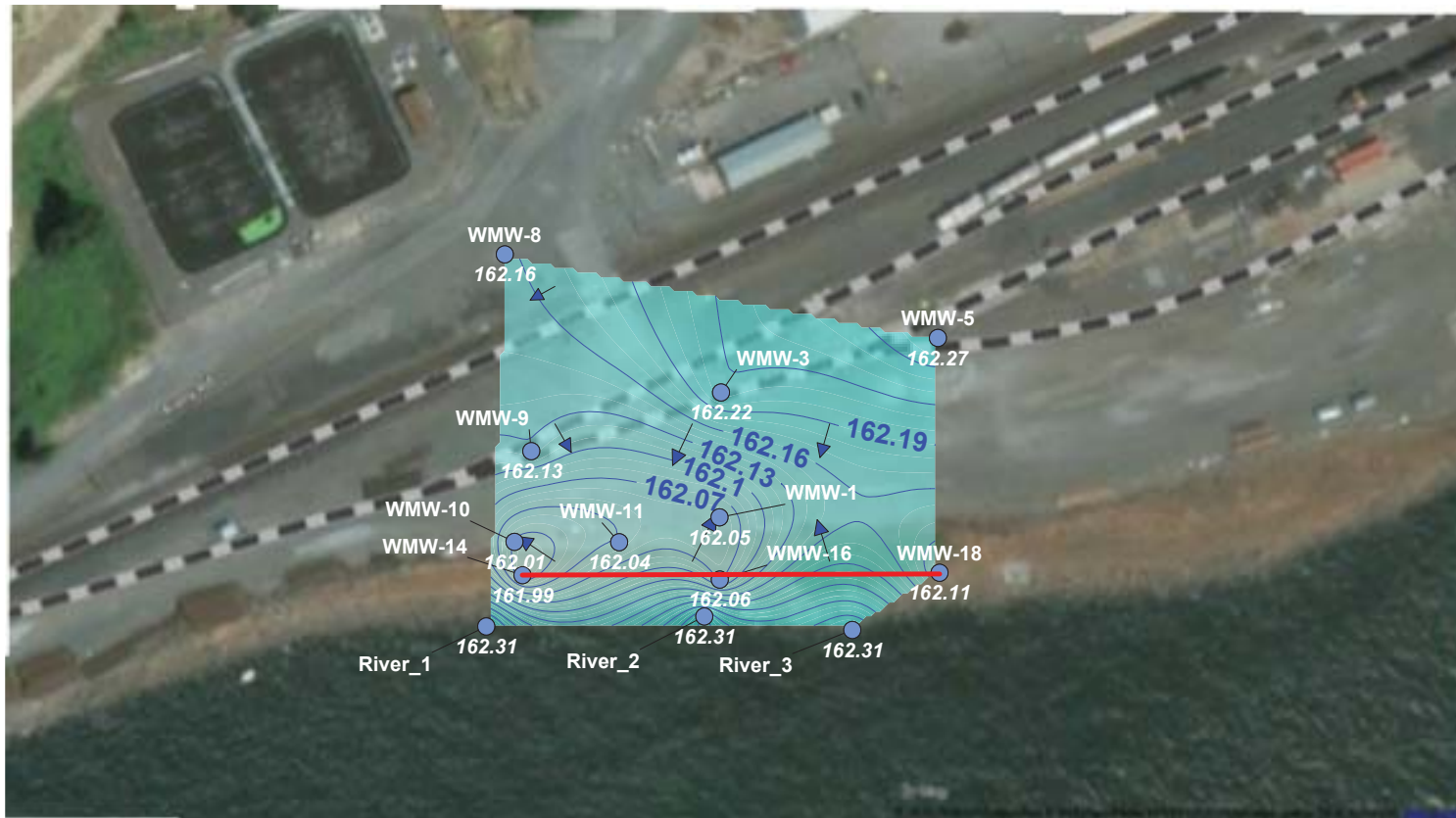
July 2017



Scale = feet

Monthly Average Groundwater
Elevation Maps

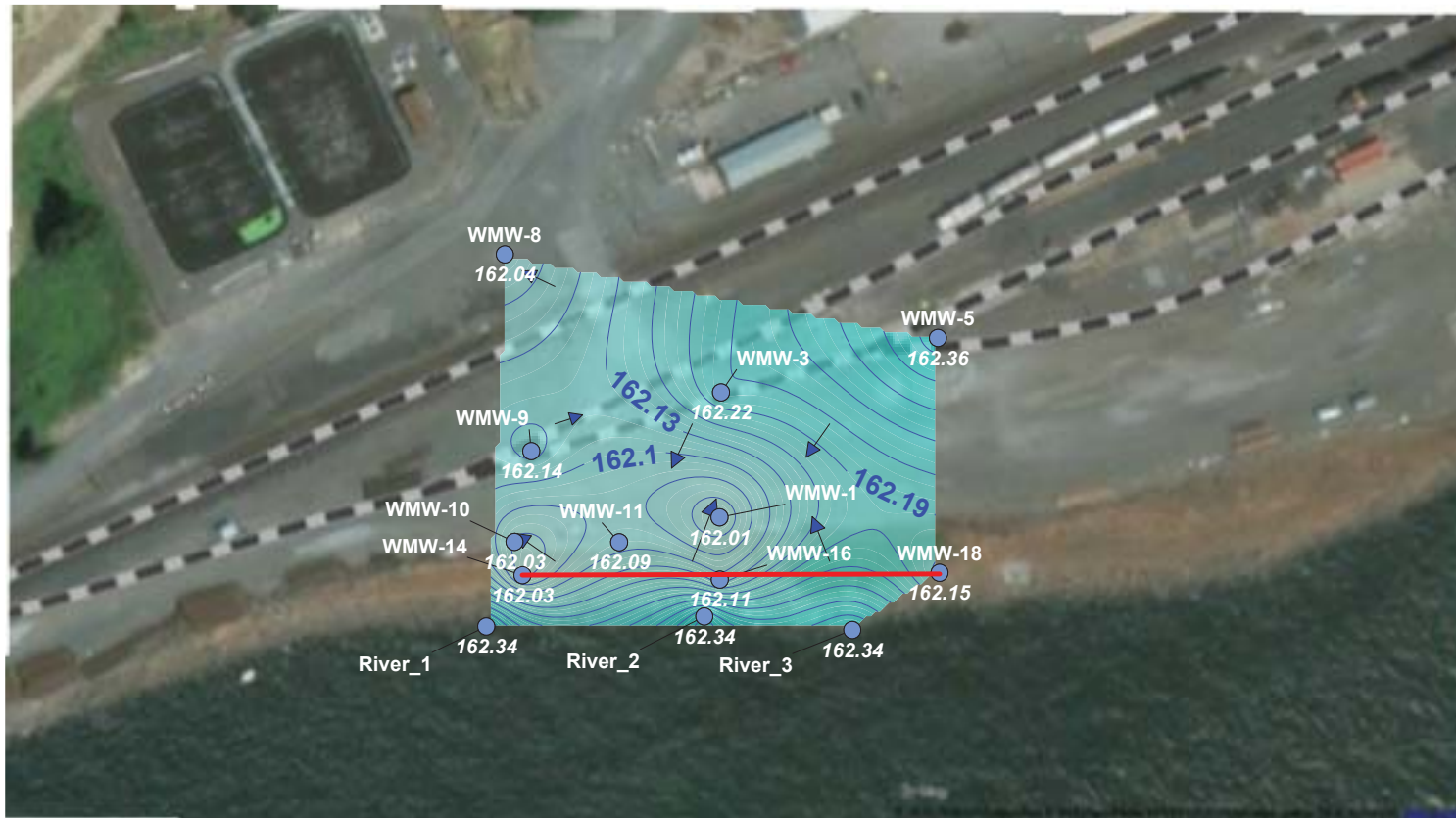
August 2017



Scale = feet

Monthly Average Groundwater
Elevation Maps

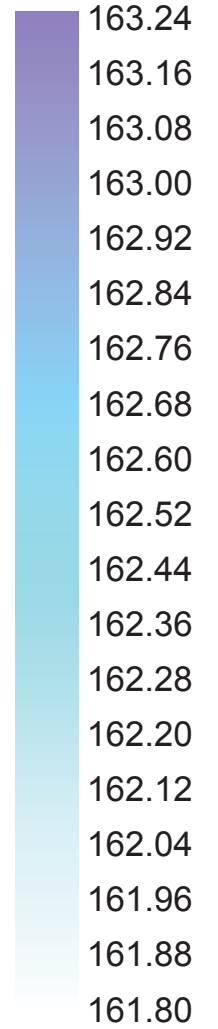
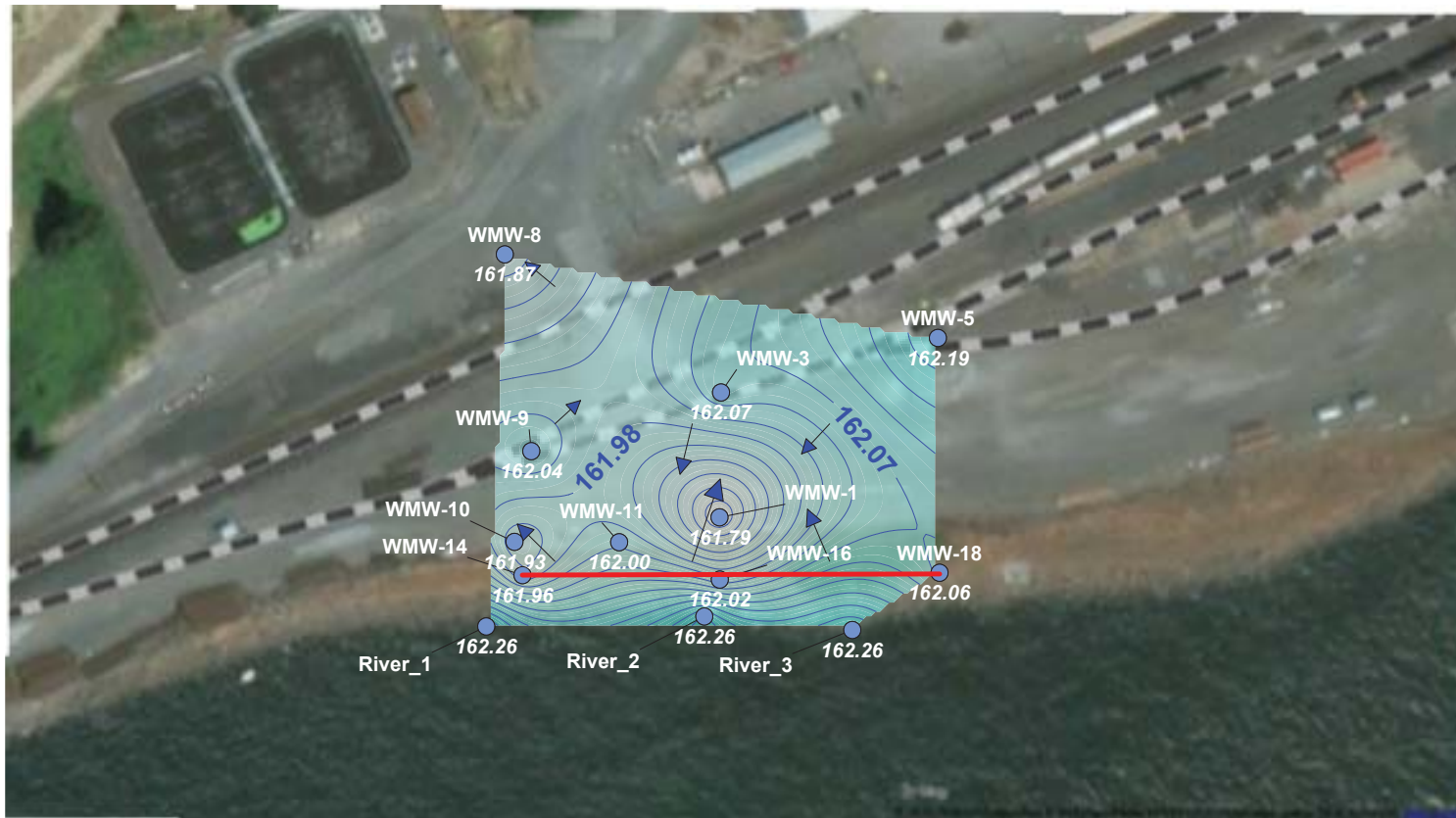
September 2017



Scale = feet

Monthly Average Groundwater
Elevation Maps

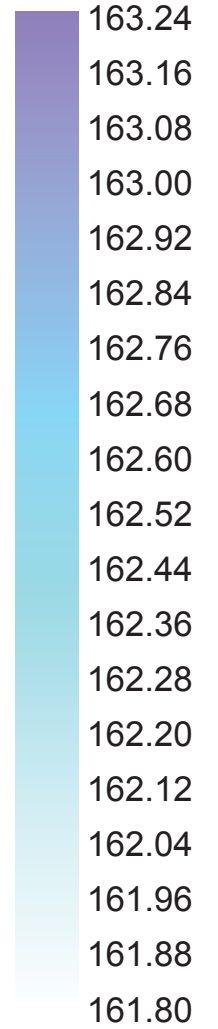
October 2017



Scale = feet

Monthly Average Groundwater
Elevation Maps

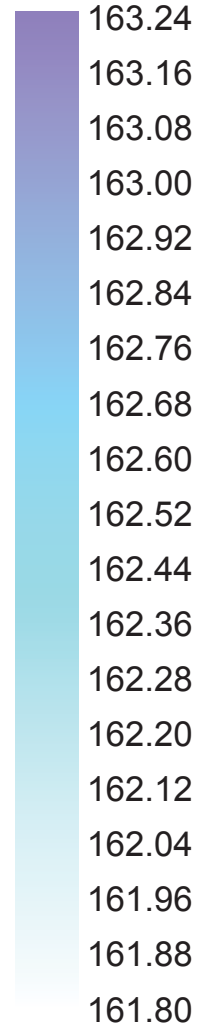
November 2017



Scale = feet

Monthly Average Groundwater
Elevation Maps

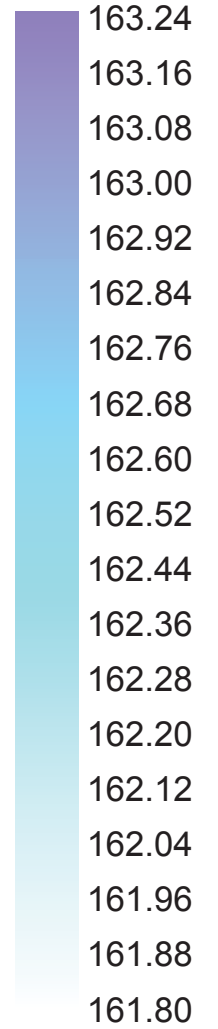
December 2017



Scale = feet

Monthly Average Groundwater Elevation Maps

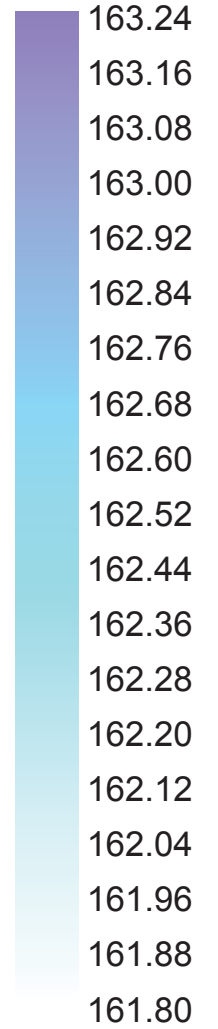
January 2018



Scale = feet

Monthly Average Groundwater
Elevation Maps

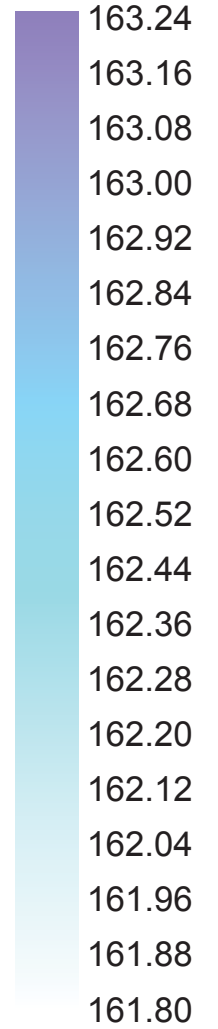
February 2018



Scale = feet

Monthly Average Groundwater
Elevation Maps

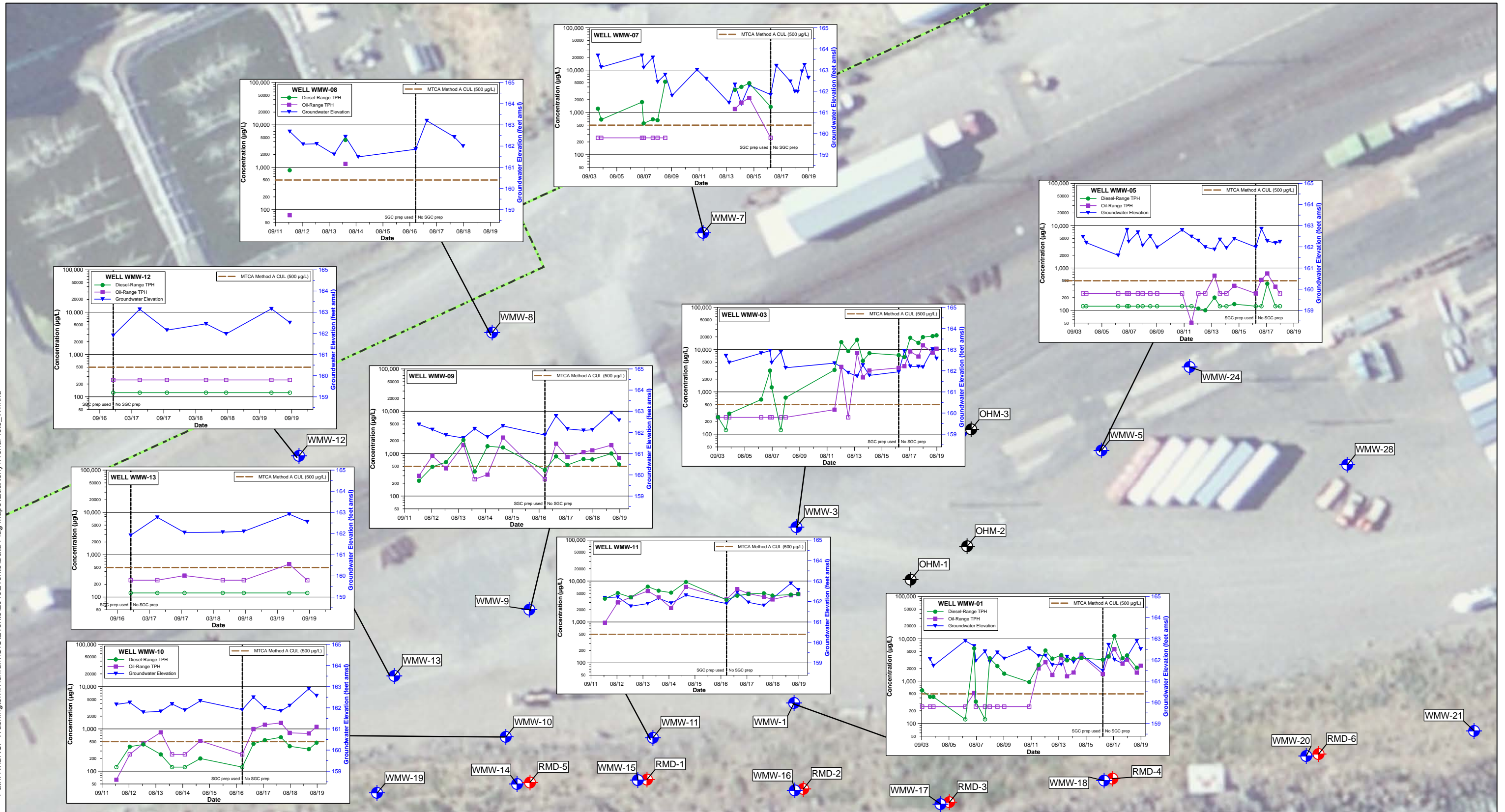
March 2018



Scale = feet

Monthly Average Groundwater Elevation Maps

Groundwater TPH Concentration Trend Maps



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

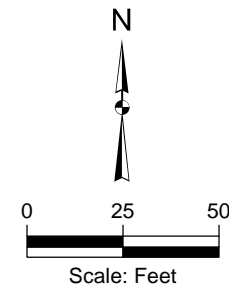
Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Legend

- Shallow Monitoring Well
- Oil Head Monitoring Well
- Deep Monitoring Well
- Approximate BNSF Property Line

Notes:

1. Locations are approximate.
2. For laboratory results where diesel-range organics (DRO) and/or oil-range organics (ORO) were not detected above applicable reporting limits, half of the reporting limit is shown. Typical reporting limits were 200 µg/L for DRO and 250 µg/L for ORO.



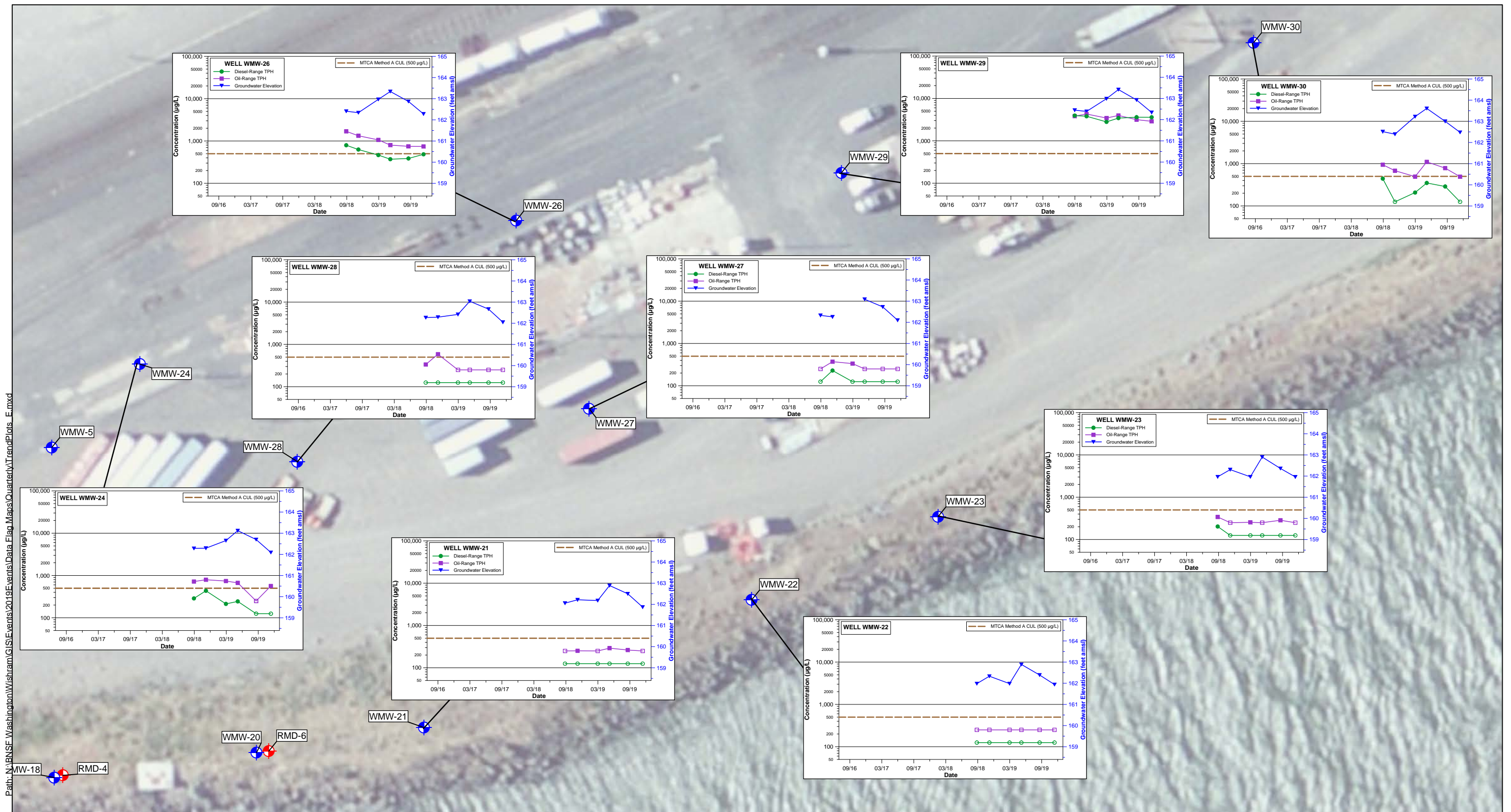
Kennedy/Jenks Consultants

BNSF Wishram Rail Yard
Wishram, Washington

Groundwater Diesel and Oil Trend Plots - West

Figure M-1

K/J Project Number 1996120.00



Path: N:\BNSF\Washington\Wishram\GIS\Events\2019\Events\2019Events\QuarterlyTrendPlots_E.mxd

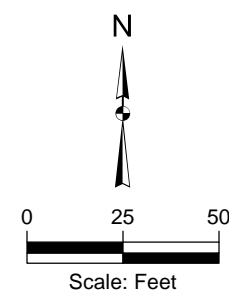
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Legend

- Shallow Monitoring Well
- Oil Head Monitoring Well
- Deep Monitoring Well
- Approximate BNSF Property Line

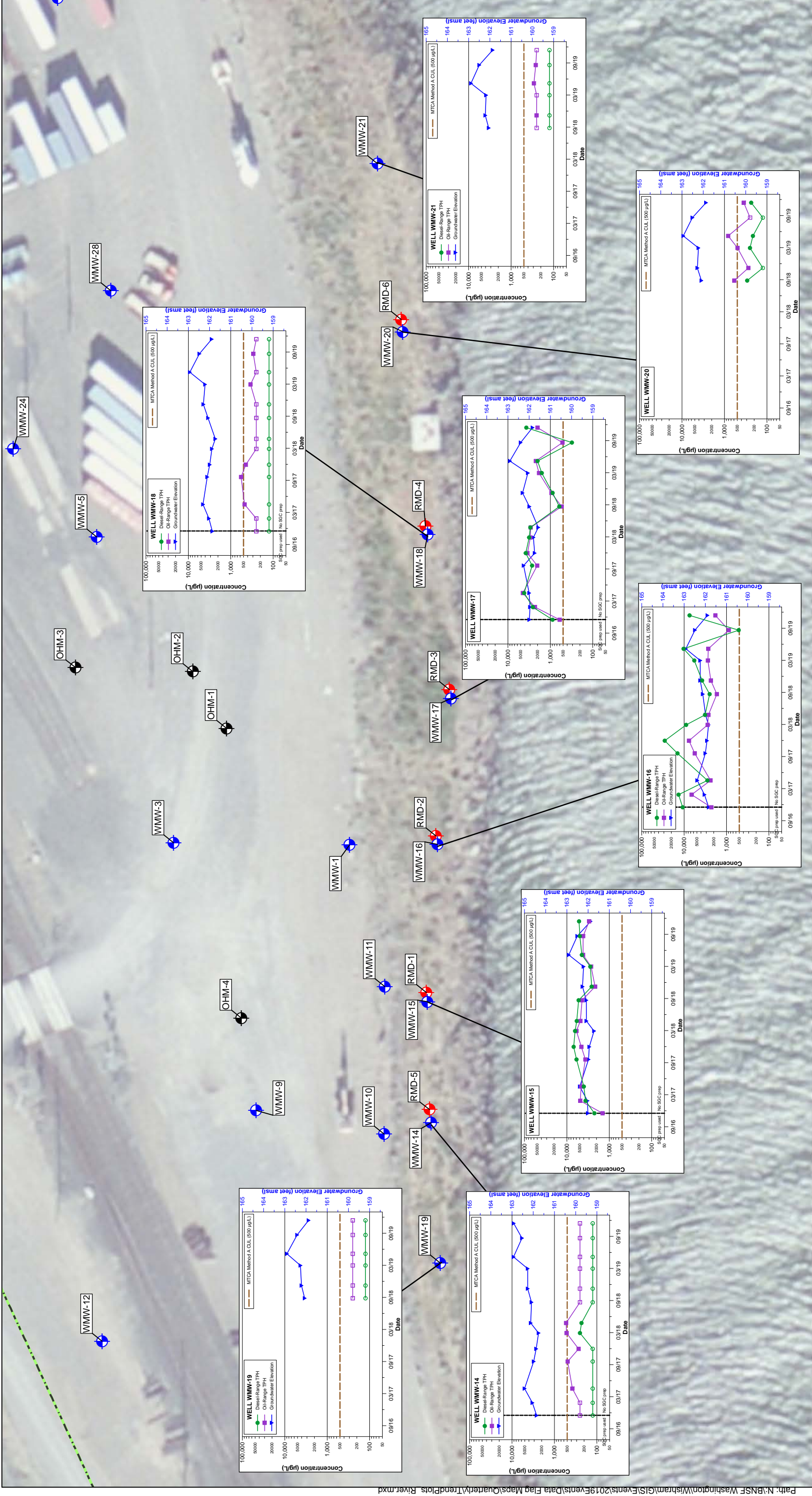
Notes:
 1. Locations are approximate.
 2. For laboratory results where diesel-range organics (DRO) and/or oil-range organics (ORO) were not detected above applicable reporting limits, half of the reporting limit is shown. Typical reporting limits were 200 µg/L for DRO and 250 µg/L for ORO.



Kennedy/Jenks Consultants
 BNSF Wishram Rail Yard
 Wishram, Washington

**Groundwater Diesel and Oil Trend
 Plots - East**

Figure M-2
 K/J Project Number 1996120.00



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

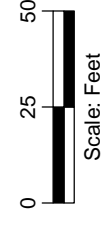
Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Legend

- Shallow Monitoring Well
- Oil Head Monitoring Well
- Deep Monitoring Well
- Approximate BNSF Property Line

Notes:

1. Locations are approximate.
2. For laboratory results where diesel-range organics (DRO) and/or oil-range organics (ORO) were not detected above applicable reporting limits, half of the reporting limit is shown. Typical reporting limits were 200 µg/L for DRO and 250 µg/L for ORO.



Kennedy/Jenks Consultants

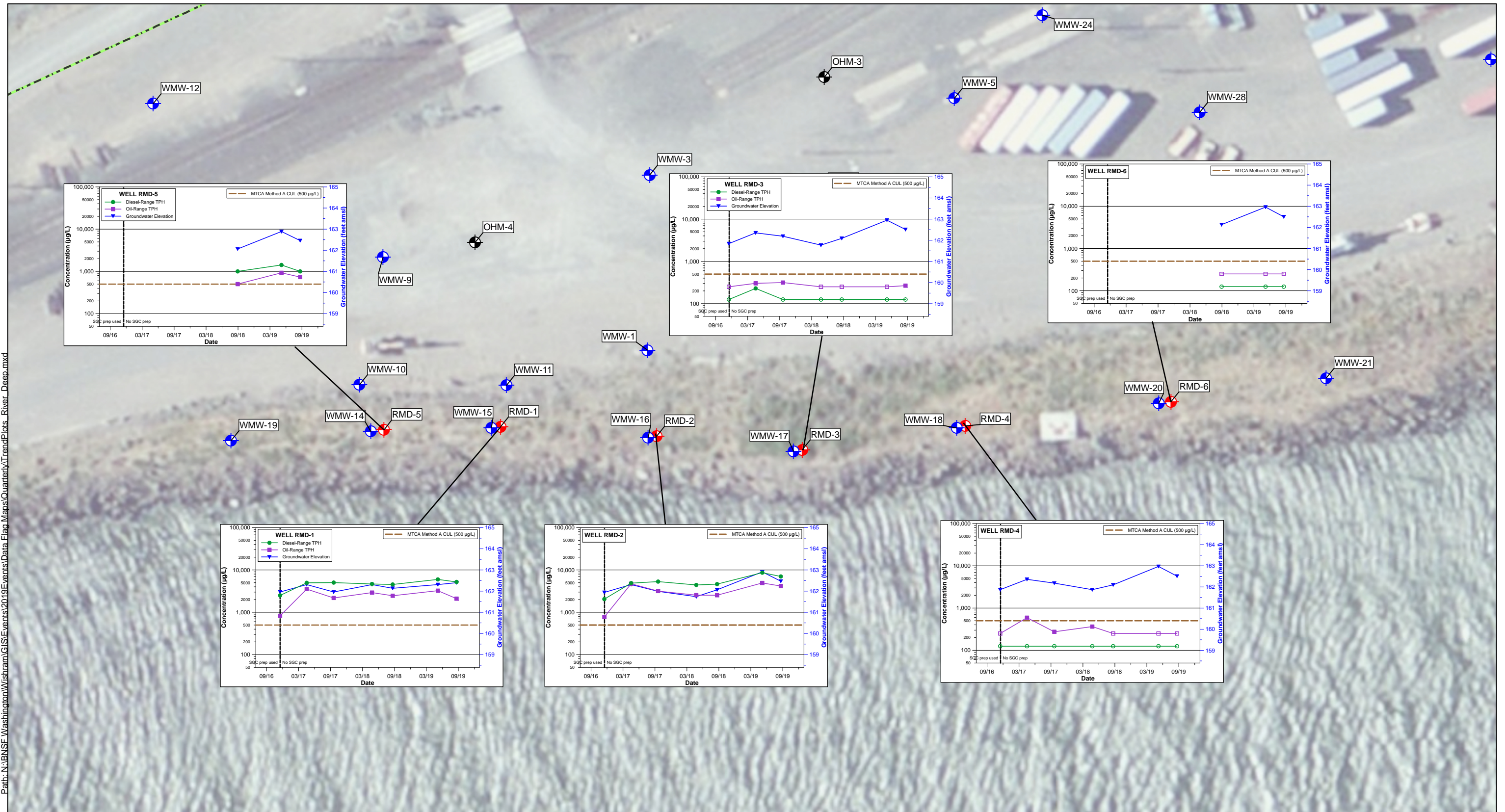
BNSF Wishram Railway
Wishram, Washington

**Groundwater Diesel and Oil Trend
Plots - Shallow River Wells**

Figure M-3

K/J Project Number 1996120.00

Path: N:\BNSF Washington\Wishram\GIS\Events\2019\Events\19\TrendPlots\River_Deep.mxd



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

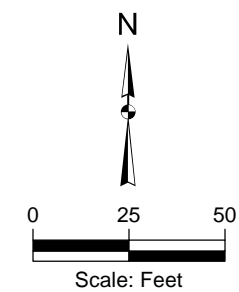
Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Legend

- Shallow Monitoring Well
- Oil Head Monitoring Well
- Deep Monitoring Well
- Approximate BNSF Property Line

Notes:

1. Locations are approximate.
2. For laboratory results where diesel-range organics (DRO) and/or oil-range organics (ORO) were not detected above applicable reporting limits, half of the reporting limit is shown. Typical reporting limits were 200 µg/L for DRO and 250 µg/L for ORO.



Kennedy/Jenks Consultants

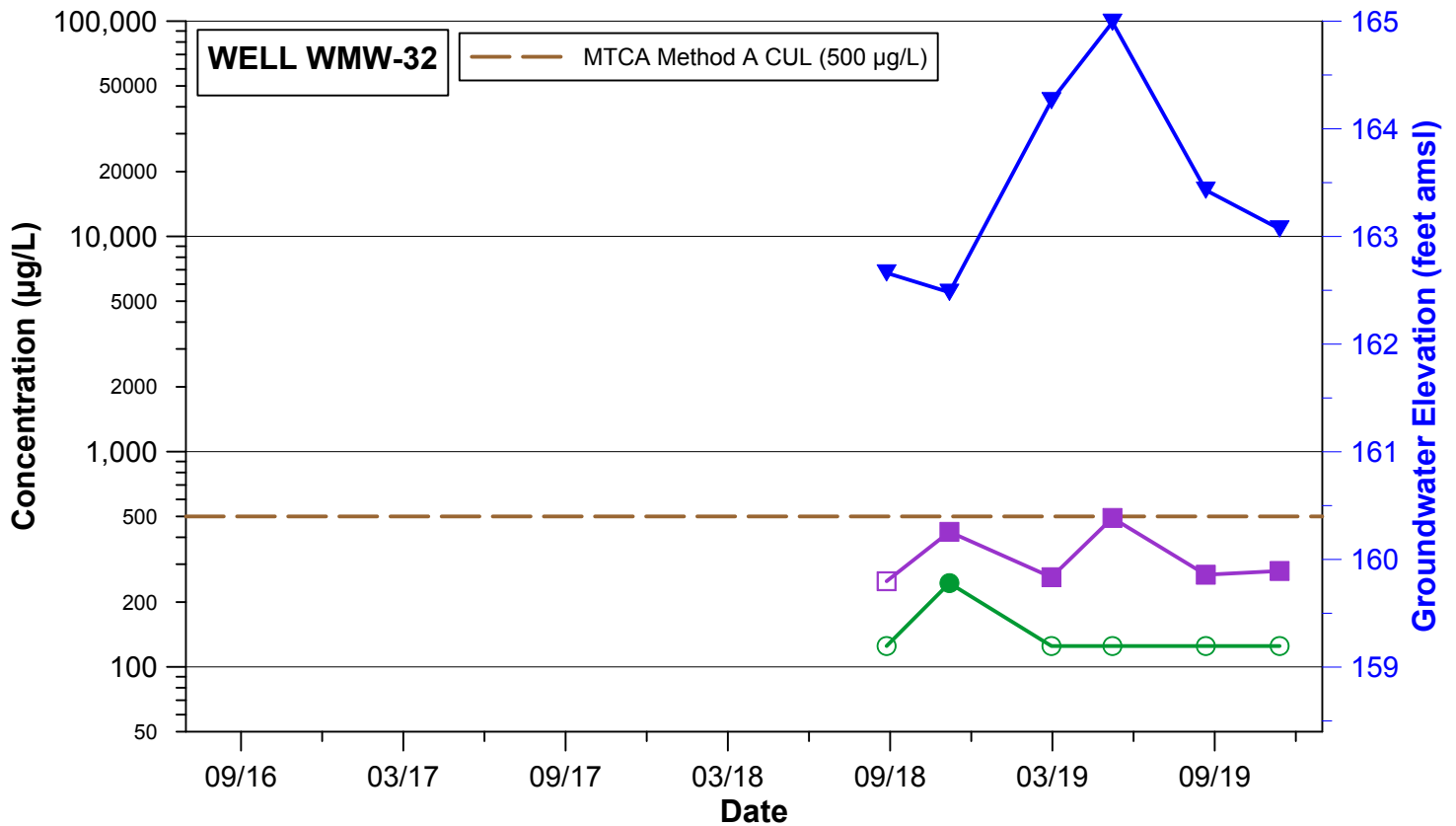
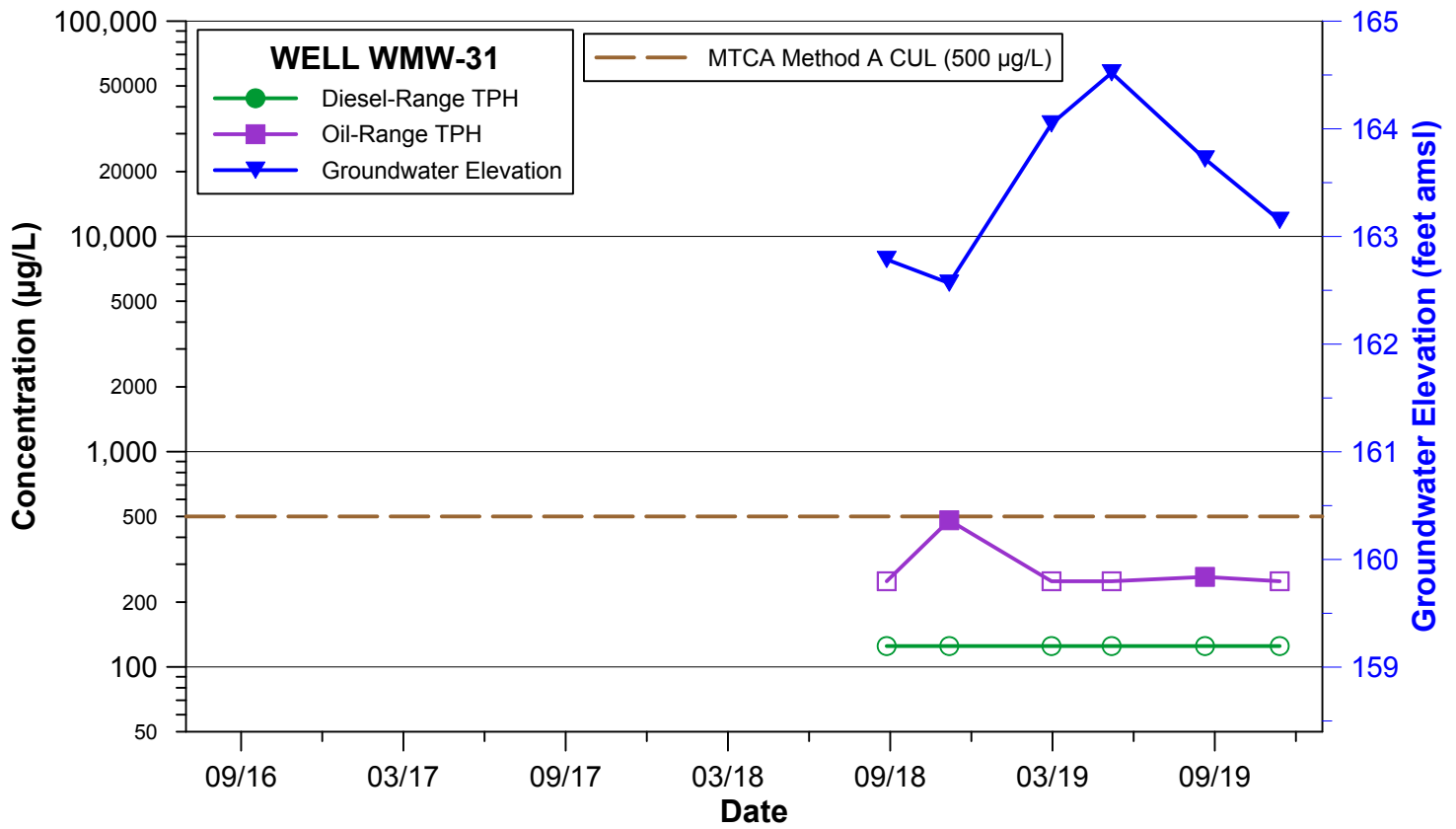
BNSF Wishram Rail Yard
Wishram, Washington

Groundwater Diesel and Oil Trend Plots - Deep River Wells

Figure M-4

K/J Project Number 1996120.00

FIGURE M-5
DIESEL- AND OIL-RANGE ORGANICS IN GROUNDWATER TREND CHARTS
BNSF Wishram Railyard, Wishram, Washington



Notes: µg/L = micrograms per liter. feet amsl = feet above mean sea level.
 Filled symbols indicate detected concentrations. Open symbols indicate not detected (ND) results, shown as 125 µg/L for diesel- and 250 µg/L for oil-range organics, which are half the maximum historical reporting limits.
 Groundwater samples were analyzed by NWTPH-Dx without silica gel cleanup preparation (SGC prep).

Appendix N

Former Water Wells Assessment

**Monthly Progress Report
BNSF Track Switching Facility (Agreed Order DE12897)
Wishram, Washington**

Ecology Manager:	<u>John Mefford</u>
BNSF Manager:	<u>Shane DeGross</u>
Prepared by Kennedy/Jenks Consultants:	<u>Ryan Hultgren</u>
Reporting Period:	<u>1 through 30 September 2018</u>
Date Submitted:	<u>15 October 2018</u>

BNSF Railway Company (BNSF) is conducting a remedial investigation (RI) and feasibility study (FS) for the BNSF Track Switching Facility in Wishram, Washington (aka Wishram Railyard, FSID 1625461). The work is being conducted with Ecology oversight under Agreed Order No. DE 12897 (AO). This progress report is being submitted pursuant to Paragraph VII.H of the AO.

Progress Made During This Reporting Period

- On 14 September 2018, BNSF submitted the August 2018 Monthly Progress Report to Ecology.
- On 19 September 2018, BNSF (and its consultants Kennedy/Jenks Consultants and Jacobs) met with Ecology and the representatives of the Yakama Nation to discuss the Conceptual Site Model (CSM) and status of ongoing activities conducted under the RI Work Plan Addendum and Nearshore Sediment Initial Investigation Work Plan.
 - On 21 September 2018, Ecology transmitted to BNSF via email a copy of meeting minutes prepared by Ecology for the 19 September meeting. BNSF provided comments back to Ecology via email on 24 September 2018.
 - On 28 September 2018, BNSF submitted to Ecology via email electronic versions of the slide presentation files from the 19 September 2018 meeting.
- On 19 and 20 September 2018, Kennedy/Jenks Consultants performed bank inspection monitoring. Observations are summarized under the Bank Inspection Results section.
- On 20 September 2018, attempts were made to locate former water supply Well #1 which was reportedly abandoned on 20 December 1928, according to historical railroad documents.
 - An area of approximately 30 feet long (west to east) by 20 feet wide (north to south) by depths ranging from 2 to 3 feet below ground surface (bgs) was excavated with a track-mounted excavator in the vicinity of a former pump house and approximate location of the former well. The excavated area included soil, blackberry bushes and grasses, assorted concrete debris (broken up pieces of concrete footings, slabs, etc.), and metallic debris. A mounded area with concrete and large bolts was also broken up and cleared. No evidence of Well #1 was observed in the excavated area. The excavation was backfilled with excavated materials and the surface compacted with the excavator bucket. See attached photographs.
 - An area of approximately 10 feet long (north to south) by 6 feet wide (west to east) near a suspected former utility pole, based on a historical aerial photograph from 1951, was also excavated to a depth of approximately 4 feet bgs. This area was approximately 30 feet west of the suspected Well #1 location. A concrete footing for a 3-foot diameter metal pipe structure was exposed, however, no evidence of Well #1 was observed. See attached photographs.
 - BNSF, Kennedy/Jenks, and Jacobs observed excavation activities; excavated soil was monitored by Jacobs for cultural artifacts.

**Monthly Progress Report
BNSF Track Switching Facility (Agreed Order DE12897)
Wishram, Washington**

Deviations from the Work Plan

- Section 3.2.1 of the RI Work Plan Addendum indicated that deep monitoring wells RMD-5 and RMD-6 would be installed using 0.040-inch slotted casing. The slot size was a typographical error; the wells were installed with 0.020-inch slotted casing, consistent with existing deep monitoring wells RMD-1 through RMD-4.

Bank Inspection Results

- No oil sheen or droplets were observed on the water surface of the Columbia River during bank inspections conducted on 19 and 20 September 2018. Photographs were taken, and a written log was prepared.

Key Activities/Schedule for Next Reporting Period

- Conduct monthly bank monitoring.
- Continue upland RI addendum activities including assessment of former water supply wells, validation of field and laboratory results, evaluation of the field and laboratory results with respect to the RI objectives (defining the nature and extent of site-related impacts in the uplands area) and begin preparation of the Draft RI Report.
- Continue inundated lands initial investigation activities including data validation of laboratory results and evaluation of the field and laboratory data with respect to the initial investigation objectives and begin preparation of the Draft Inundated Lands Initial Investigation Report.
- Begin preparation of the cultural resources monitoring report for the RIWP Addendum and initial investigation activities.
- BNSF will continue to assist with coordinating schedules between Ecology, BNSF and the Yakama Nation for a meeting to discuss the uplands RI data in advance of preparing the Draft RI Report. An agenda will be provided by BNSF in advance of the meeting.
- Submit data collected during RIWP Addendum and inundated lands initial investigation field activities to Ecology's EIM system. Following data validation and verification, survey data and well construction information (as applicable) and laboratory analytical results from soil, reconnaissance groundwater, monitoring well groundwater, and sediment samples will be uploaded to EIM. Laboratory analytical reports will also be submitted to Ecology.

Potential Problems Identified and Suggested Resolutions

- No potential problems were encountered during this reporting period.

Deliverables Submitted This Reporting Period

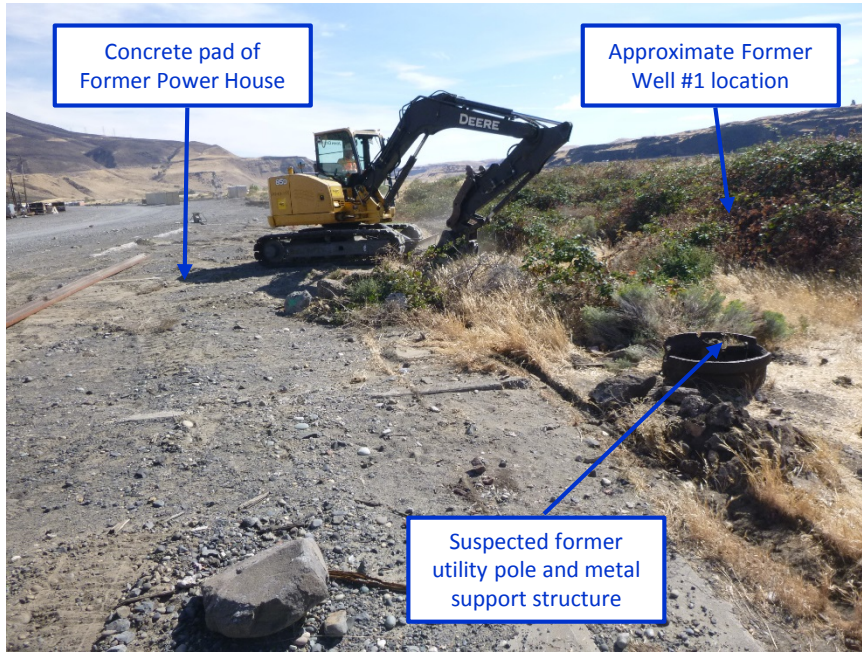
- None.

EIM Results Submitted This Reporting Period

- None.

**Monthly Progress Report
BNSF Track Switching Facility (Agreed Order DE12897)
Wishram, Washington**

Kennedy/Jenks Consultants



**Monthly Progress Report
BNSF Track Switching Facility (Agreed Order DE12897)
Wishram, Washington**

Kennedy/Jenks Consultants



Appendix O

Desktop Review of Potable Water Sources

Public Water Supply Well Logs

Appli: 9278
 Permit: 8664

STATE OF WASHINGTON
 DEPARTMENT OF CONSERVATION
 DIVISION OF WATER RESOURCES

WELL LOG

Record by Driller
 Source Driller's Record

Location: State of WASHINGTON
 County Klickitat
 Area _____
 Map _____
 SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec 7 T. 2 N., R. 15 E., W. $\text{\textcircled{O}}$
 Diagram of Section

Drilling Co. Riebe Well Drilling
 Address 1503 E. Nob Hill Blvd. Yakima, Wash.,
 Method of Drilling rotary Date _____, 19____
 Owner Coffield & Sons
 Address Box 58, Wishram, Washington 98673
 Land surface, datum 550 ft above _____
 SWL: 101 Date March 8, 1968 Dims 8" x 267'

CORRE- LATION	MATERIAL	From (feet)	To (feet)
------------------	----------	----------------	--------------

(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)

	IRRIGATION & MUNICIPAL		
	No well log available from 0' to 98'		
	Basalt, broken heavily creviced, black and gray, water in the broken basalt	98	267
	Casing: +1' to 240'		
	Seal: original 8" casing in place		
	Pump: Myers, Ses 1500 8 Stage	15	HP
	Bailer test: 150 gpm with 164'	DD	after 4 hrs
	Temp. 54°		
	(reworked old well)		

2 15E 7N

The Department of Ecology does NOT Warrant the Data and/or the Information on this Well Report.

PWSIO # 97950 Source # 05



WASHINGTON STATE
DEPARTMENT OF
E C O L O G Y

Well Tagging Form

Unique Well Tag No: AFL-873

RECORD VERIFICATION (check one)

- Well Report available (please attach this form to the well report and submit it to the Ecology Regional Office near you)
- Verification inconclusive
- Well Report not available

Wishram Water Sys

WELL OWNERSHIP, IF DIFFERENT FROM WELL REPORT

First Name: _____ Last Name: _____

Street Address: _____

City: _____ State: _____

LOCATION OF WELL, IF DIFFERENT FROM WELL REPORT

Well Address: _____

City: _____ County: _____

N. R. _____ W.M. Sec. _____ 1/4 of the _____

FOR AGENCY USE ONLY

Latitude _____ "

Longitude _____ "

Elevation at land surface _____ feet/meters (circle one)

- GPS
- Topographic Map
- Survey
- Computer generated
- Digital Altimeter
- Topographic Map
- Other _____

Additional information, if available:

Location marked on topographic map (please attach)

Location marked on air photo (please attach)

WATER WELL REPORT
STATE OF WASHINGTON

Start Card No. W25804
Water Right Permit No. N/A

(1) OWNER: Name P.U.D. / WISHRAM 919 Address WISHRAM, WA 98673-

(2) LOCATION OF WELL: County KLIKITAT - SE 1/4 NE 1/4 Sec 18 T 2N N., R 15E WM
(2a) STREET ADDRESS OF WELL (or nearest address) SAME

(3) PROPOSED USE: MUNICIPAL

(4) TYPE OF WORK: Owner's Number of well # 2
(If more than one)
NEW WELL Method: ROTARY

(5) DIMENSIONS: Diameter of well 8 inches
Drilled 550 ft. Depth of completed well 550 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 8" Dia. from -1 ft. to 29 ft.
WBDRD " Dia. from ft. to ft.
" Dia. from ft. to ft.

Perforations: NO
Type of perforator used
SIZE of perforations " in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: NO
Manufacturer's Name
Type Model No.
Diam. slot size from ft. to ft.
Diam. slot size from ft. to ft.

Gravel packed: NO
Gravel placed from ft. to ft. Size of gravel

Surface seal: YES To what depth? 30 ft.
Material used in seal CEMENT & BENTONITE.
Did any strata contain unusable water? NO
Type of water? Depth of strata ft.
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type H.P.

(8) WATER LEVELS: Land-surface elevation
above mean sea level ... ft.
Static level 147 ft. below top of well Date 10/25/93
Artesian Pressure lbs. per square inch Date
Artesian water controlled by

(9) WELL TESTS: Drawdown is amount water level is lowered below static level.
Was a pump test made? NO If yes, by whom?
Yield: gal./min with ft. drawdown after hrs.

Recovery data
Time Water Level Time Water Level Time Water Level

Date of test / /
Bailer test gal./min. ft. drawdown after hrs.
Air test 250 gal./min. w/ stem set at 540 ft. for 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? NO

(10) WELL LOG
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the nature of the material in each stratum penetrated, at least one entry for each change in formation.

MATERIAL	FROM
SAND	0
BROWN BASALT, FRACTURED	12
BROWN & GRAY BASALT, MEDIUM	18
GRAY BASALT, MEDIUM HARD	35
GRAY BASALT, HARD	70
BLACK BASALT, POROUS, WATER BEARING	210
GRAY BASALT, HARD	232
GRAY BASALT, POROUS, MEDIUM HARD	430
GRAY BASALT, HARD	440
GRAY BASALT GREEN SEAMS	455
HARD W/ WATER BEARING	455
GRAY BASALT, HARD	475
GRAY BASALT GREEN SEAMS	535
, WATER BEARING, HARD	535

Work started 10/19/93 Completed 10/25/93

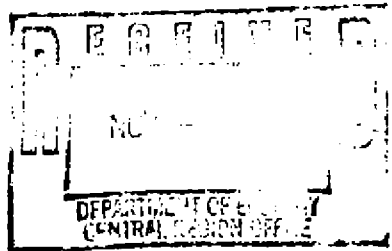
WELL CONSTRUCTOR CERTIFICATION:
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME M-K WELL DRILLING CO.
(Person, firm, or corporation) (Type or print)

ADDRESS BOX 470 DALLASPORT, WA.

[SIGNED] *[Signature]* License No. 833 & 834

Contractor's
Registration No. MKDRIC134PE Date 10/25/93



The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report



WATER WELL REPORT

Original & 1st copy - Ecology, 2nd copy - owner, 3rd copy - driller

Construction/Decommission ("x" in circle)

- Construction
 Decommission ORIGINAL INSTALLATION

Notice of Intent Number

PROPOSED USE: Domestic Industrial Municipal
 DeWater Irrigation Test Well Other

TYPE OF WORK: Owner's number of well (if more than one) _____
 New well Reconditioned Method: Dug Bored Driven
 Deepened Cable Rotary Jetted

DIMENSIONS: Diameter of well 10 inches, drilled 453 ft.
 Depth of completed well 450 ft.

CONSTRUCTION DETAILS

Casing Welded 16" Diam. from +1.2 ft. to 68 ft.
 Installed: Liner installed 10" Diam. from +2 ft. to 423 ft.
 Threaded 10" Diam. From 448 ft. to 450 ft.

Perforations: Yes No
 Type of perforator used _____

SIZE of perfs _____ in. by _____ in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: Yes No K-Pac Location _____
 Manufacturer's Name Alloy Machine
 Type V-shaped wire wrap Model No. 10PS 304 SS
 Diam. 10" Slot size .040 from 423 ft. to 448 ft.
 Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: Yes No Size of gravel/sand Pea*
 Materials placed from 412 ft. to 453 ft.

Surface Seal: Yes No To what depth? 68** ft.
 Material used in seal Cement
 Did any strata contain unusable water? Yes No
 Type of water? _____ Depth of strata _____
 Method of sealing strata off _____

PUMP: Manufacturer's Name _____
 Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
 Static level 84 ft. below top of well Date 7-19-17
 Artesian pressure _____ lbs. per square inch Date _____
 Artesian water is controlled by _____ (cap. valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
 Was a pump test made? Yes No If yes, by whom? SWS
 Yield: 300 gal./min. with 9.4 ft. drawdown after 24 hrs.
 Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
 Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
<u>0</u>	<u>95.4</u>	<u>1000</u>	<u>89.79</u>		
<u>10</u>	<u>94.12</u>				
<u>100</u>	<u>93.04</u>				

Date of test 7-19-17

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
 Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
 Artesian flow _____ g.p.m. Date _____
 Temperature of water 74 Was a chemical analysis made? Yes No

CURRENT

Notice of Intent No. WE27476
 Unique Ecology Well ID Tag No. AAR 991
 Water Right Permit No. CG4-GWC6528-A
 Property Owner Name PUD No 1 of Klickitat County
 Well Street Address At the end of Smith Road
 City Wishram County Klickitat
 Location SE 1/4-1/4 NW 1/4 Sec 17 Twn 2N R 15 EWM
 (s, t, r Still REQUIRED) Or WWM
 Lat/Long
 Lat Deg _____ Lat Min/Sec _____
 Long Deg _____ Long Min/Sec _____
 Tax parcel No. (Required) 02151700000100

CONSTRUCTION OR DECOMMISSION PROCEDURE
 Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Soil, sandy loam, brown, occasional rock	0	13
Soil, silty loam with some sandy brown dry powder	13	17
Soil, silty loam, brown, packed with some gravel 4" minus	17	23
Rock, brown and grey, medium, fractured, broken, weathered	23	31
Rock, grey, medium	31	37
Sand, tan and dark grey, fine, packed	37	49
Gravel, 1" minus, some sand, tan and dark grey	49	57
Basalt, grey, medium hard	57	60
Basalt, grey, hard	60	68
Basalt, grey, hard, fractured	68	71
Basalt, dark grey, hard, fractured, vesicular	71	77
Basalt, grey, hard	77	227
Basalt, grey, hard, some fractures	227	257
Claystone, blackish grey, medium hard, with clay, grey	257	262
Clay, bluish grey, medium soft	262	280
Sand, grey, medium, with wood and some cementation	280	292
Siltstone, grey, hard	292	430
Basalt, black, medium, fractured, vesicular, broken	430	434
Basalt, dark grey, medium hard, vesicular, fractured	434	441
Basalt, brown, medium, broken, vesic., w/ clay, firm, light green	441	445
Basalt, grey, medium, broken, vesicular	445	448
Basalt, grey, hard	448	453
*10/20 CSSI Sand from 402' to 412'		
**Additional seals were installed to 402'		
-Steel ring welded between the 16" and 10"		
-Steel plate welded on bottom of 10"		
-Maass 10J4 pitless adapter with 30" bury		
Start Date <u>5/18/17</u> Completed Date <u>9/13/17</u>		

RECEIVED
SEP 21 2017
 Dept of Ecology
 Central Regional Office

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Driller Engineer Trainee Name Steve Schneider
 Driller/Engineer/Trainee Signature _____
 Driller or trainee License No. 0649
 IF TRAINEE: Driller's License No: _____
 Driller's Signature: _____

Drilling Company Schneider Water Services
 Address 21881 River RD NE
 City, State, Zip St. Paul, OR 97137
 Contractor's
 Registration No. SCHNEEI940R8 Date 9/15/17

ECY 050-1-20 (Rev 02-2010) To request ADA accommodation including materials in a format for the visually impaired, call Ecology Water Resources Program at 360-407-6872. Persons with impaired hearing may call Washington Relay Service at 711. Persons with speech disability may call TTY at 877-833-6341.

Water Rights Records

**Water Rights Records from Washington Department of Ecology Water Resources Explorer
 Accessed 18 December 2018**

Record No.	Person or Organization	Priority Date	Record Status	Imaged	Metered	Low Flow Provision	Application No.	Permit No.	Certificate No.	Record Type
G4-32618	Lavine, Garyc	1/5/1998	Active	Y	N	N	...	...	...	New Application
G4-122044CL	Burlington Northern,	1/1/1926	Active	N	N	N	...	...	...	Claim
G4-122045CL	Burlington Northern,	1/1/1930	Active	N	N	N	...	...	...	Claim
G4-116815CL	Smith, Otis	1/1/1948	Active	N	N	N	...	...	...	Claim
S4-116816CL	Smith, Otis	01/01/1898	Active	N	N	N	...	...	...	Claim
S4-103473CL	Delaney, Ralph H	1/1/1900	Active	N	N	N	...	...	...	Claim
S4-096272CL	Kochel, Lawrence S	01/01/1881	Active	N	N	N	...	...	...	Claim
G4-038375CL	Lyon, Lewis	1/1/1900	Active	N	N	N	...	...	...	Claim
G4-*09278CWRIS	Coffield & Sons,	3/8/1968	Active	Y	N	N	9278	8664	6528	Certificate
G4-*00904SWRIS	Sp & S Ry Co,	10/1/1927	Active	Y	N	N	904	...	819	Certificate
G4-*00905SWRIS	Sp & S Ry Co,	8/16/1930	Active	Y	N	N	905	...	820	Certificate
G4-30396	Klickitat Cnty Pud 1 *,	9/4/1990	Active	Y	Y	N	...	G4-30396	...	Permit
S4-301764CL	Kayser Nate,	01/01/1861	Active	N	N	N	...	...	...	Claim
S3-+00935CWRIS	Coffield & Sons,	9/17/1969	Active	Y	N	N	21826	...	S3+00935 C	Certificate
CG4-GWC6528-A	Klickitat Cnty Pud 1- Doug Miller,	12/23/2004	Active	Y	Y	Y	9278	8664	6528	Change-ROE
CS3-00935C	Klickitat Cnty Pud 1- Doug Miller,	12/23/2004	Active	Y	Y	Y	21826	S3-00935P	S3+00935 C	Change-ROE
CG4-GWC6528-A@1	Klickitat Cnty Pud 1 *,	2/6/2017	Active	Y	Y	N	9278	8664	6528	Change-ROE
CG4-30396P	Klickitat Cnty Pud 1 *,	4/13/2018	Active	Y	Y	N	...	G4-30396	...	Change-ROE

Well Log Search Records

DISCLAIMER

Well Log Data and Image(s) released from the Department of Ecology are provided on an “AS IS” basis, without warranty of any kind.

The data and/or image(s) may not be accurate, complete, legible, or otherwise reliable.

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The user of this well log assumes the entire risk that the data and/or image may be inaccurate, incomplete, illegible, or otherwise reliable.

Some loss of information can occur from scanning a document. Small dots that end abbreviated words or decimals that separate whole numbers from fractions can sometimes be lost as a result of scanning. If a number has a gap between its digits or if the line that boxes it has white space where there should be a continuous line, then any associated numeric value should be scrutinized. Poorly scanned documents can be rescanned from the original paper if reported to us. Use the Well Log Contact Us page to report image quality or content concerns.

PUBLIC DISCLOSURE

Please take notice that state law states that **all private citizen names and addresses may not** be used for any solicitation/commercial purpose.

Well Log Data Export

Data Dictionary

The table below lists the data field names, descriptions, and examples of each data item that makes up the well log data extract file.

Column Name	Description	Example
well_log_id	WELL LOG ID. A sequential number generated by the system to track a well log record.	100564
well_tag_nr	WELL TAG NUMBER. The number issued by the Department of Ecology that is stamped on a metal tag that is attached to the actual well.	AAA-000
project_tag_nr	PROJECT TAG NUMBER – The number issued by the property owner or consulting firm to track the well. This number is NOT affiliated with Ecology’s tag number in any way.	MW-001
nit_id_nr	NOTICE OF INTENT ID NUMBER. A sequential number issued by the Department of Ecology to track the Notice of Intent to Construct or Decommission a Well.	W072515
well_depth_qt	WELL DEPTH. Depth of the well in feet.	55
well_diameter_qt	WELL DIAMETER. Diameter of the casing of the well in inches.	6
well_owner_nm	WELL OWNER NAME. The name of the original property owner who had the well drilled.	John Smith
township_nr	TOWNSHIP. The identifier describing which Township the well falls within. Based on the Washington State Public Land Survey (PLS).	05

range_nr	RANGE. The identifier describing the Range location of the well. (PLS)	15
range_dir_cd	RANGE DIRECTION. The direction code describing further which range the well falls within. Washington State is divided into two halves – ‘West’ and ‘East’. (PLS)	E
section_nr	SECTION. The identifier describing which Section the well falls within. (PLS)	06
qtr_section_cd	QUARTER SECTION (1/4). The identifier describing which Quarter section the well falls within. (PLS)	NW
qtr_qtr_section_cd	QUARTER-QUARTER SECTION (1/4-1/4). The identifier describing which Quarter-Quarter section the well falls within. (PLS)	SW
well_comp_dt	WELL COMPLETION DATE. Date the well was drilled.	1/1/1997
county_nm	COUNTY NAME. County name where the well is located.	King
well_type_cd	WELL TYPE. Code which indicates the well type. See appendix for code descriptions.	W
driller_nr	DRILLER LICENSE NUMBER. License number of the well driller.	2327
well_log_rcv_dt	WELL LOG RECEIVAL DATE. Date the Department of Ecology received the well log form.	1/6/1997
tax_parcel_nr	TAX PARCEL IDENTIFIER. County Assessor code of the parcel where the well was drilled.	232019130050

st_plane_xcoord_nr	STATE PLANE X-COORDINATE. The horizontal geographic coordinate value of the well within the WA State Plane Coordinate System (adjusted to the quarter-quarter, quarter, or whole section).	2031126
st_plane_ycoord_nr	STATE PLANE Y-COORDINATE. The vertical geographic coordinate value of the well within the WA State Plane Coordinate System (adjusted to the quarter-quarter, quarter, or whole section).	780897

Appendix

Well Type Codes:

W Water
R Resource Protection
A Abandonment

well_log_id	well_tag_nr	nit_id_nr	well_depth_qt	well_diameter_qt	well_owner_nm	well_comp_dt	well_log_recv_dt
143847	AFL874	W025804	550		8 PUD/WISHRAM	10/25/1993	11/1/1993
144595			180		6 RICHARD TROUTMAN	3/2/1979	
144596			300		6 RICHARD TROUTMAN SPOKANE, PORTLAND	6/2/1979	
296882			399		15 & SEATTLE RY CO	12/23/1926	10/1/1927
341489	AHK335	W160753	380		6 MICHAEL SUMMERS	7/10/2002	8/5/2002
367346	AHK330	W171119	602		6 JAMES DOUGAL GARY AND LYNDA	7/30/2003	8/11/2003
417933	ALC273	W189156	675		8 LAVINE	8/11/2005	8/26/2005
1581936	BIN746	W357798	385		6 Mark Portukalian PUD No 1 Of Klickitat	7/18/2016	7/25/2016
1642314	AAR991	WE27476	450		10 County	9/13/2017	9/21/2017

Appendix P

Terrestrial Ecological Evaluation

Table 749-1

Simplified Terrestrial Ecological Evaluation-Exposure Analysis Procedure

Estimate the area of contiguous (connected) <u>undeveloped land</u> on the site or within 500 feet of any area of the site to the nearest 1/2 acre (1/4 acre if the area is less than 0.5 acre).																						
1) From the table below, find the number of points corresponding to the area and enter this number in the field to the right.																						
	<table border="1"> <thead> <tr> <th style="text-align: center;">Area (acres)</th> <th style="text-align: center;">Points</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">0.25 or less</td><td style="text-align: center;">4</td></tr> <tr><td style="text-align: center;">0.5</td><td style="text-align: center;">5</td></tr> <tr><td style="text-align: center;">1.0</td><td style="text-align: center;">6</td></tr> <tr><td style="text-align: center;">1.5</td><td style="text-align: center;">7</td></tr> <tr><td style="text-align: center;">2.0</td><td style="text-align: center;">8</td></tr> <tr style="border: 2px solid blue;"><td style="text-align: center;">2.5 acres</td><td style="text-align: center;">9</td></tr> <tr><td style="text-align: center;">3.0</td><td style="text-align: center;">10</td></tr> <tr><td style="text-align: center;">3.5</td><td style="text-align: center;">11</td></tr> <tr><td style="text-align: center;">4.0 or more</td><td style="text-align: center;">12</td></tr> </tbody> </table>	Area (acres)	Points	0.25 or less	4	0.5	5	1.0	6	1.5	7	2.0	8	2.5 acres	9	3.0	10	3.5	11	4.0 or more	12	9
Area (acres)	Points																					
0.25 or less	4																					
0.5	5																					
1.0	6																					
1.5	7																					
2.0	8																					
2.5 acres	9																					
3.0	10																					
3.5	11																					
4.0 or more	12																					
2) Is this an <u>industrial</u> or <u>commercial</u> property? If yes, enter a score of 3. If no, enter a score of 1		3																				
3) ^a Enter a score in the box to the right for the habitat quality of the site, using the following rating system ^b . High=1, Intermediate=2, Low=3		3																				
4) Is the undeveloped land likely to attract wildlife? If yes, enter a score of 1 in the box to the right. If no, enter a score of 2. ^c		1																				
5) Are there any of the following soil contaminants present: Chlorinated dioxins/furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, pentachlorobenzene? If yes, enter a score of 1 in the box to the right. If no, enter a score of 4.		4																				
6) Add the numbers in the boxes on lines 2-5 and enter this number in the box to the right. If this number is larger than the number in the box on line 1, the simplified evaluation may be ended.		11																				

Notes for Table 749-1

^a It is expected that this habitat evaluation will be undertaken by an experienced field biologist. If this is not the case, enter a conservative score of (1) for questions 3 and 4.

^b **Habitat rating system.** Rate the quality of the habitat as high, intermediate or low based on your professional judgment as a field biologist. The following are suggested factors to consider in making this evaluation:

Low: Early successional vegetative stands; vegetation predominantly noxious, nonnative, exotic plant species or weeds. Areas severely disturbed by human activity, including intensively cultivated croplands. Areas isolated from other habitat used by wildlife.

High: Area is ecologically significant for one or more of the following reasons: Late-[successional](#) native plant communities present; relatively high species diversity; used by an uncommon or rare species; [priority habitat](#) (as defined by the Washington Department of fish and Wildlife); part of a larger area of habitat where size or fragmentation may be important for the retention of some species.

Intermediate: Area does not rate as either high or low.

^c Indicate "yes" if the area attracts wildlife or is likely to do so. Examples: Birds frequently visit the area to feed; evidence of high use b mammals (tracks, scat, etc.); habitat "island" in an industrial area; unusual features of an area that make it important for feeding animals; heavy use during seasonal migrations.

[\[Area Calculation Aid\]](#) [\[Aerial Photo with Area Designations\]](#) [TEE Table 749-1] [\[Index of Tables\]](#)

[\[Exclusions Main\]](#) [\[TEE Definitions\]](#) [\[Simplified or Site-Specific?\]](#) [\[Simplified Ecological Evaluation\]](#) [\[Site-Specific Ecological Evaluation\]](#) [\[WAC 173-340-7493\]](#)

[\[TEE Home\]](#)



Path: LandUseTEE.mxd © 2020 Kennedy/Jenks Consultants

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Legend

- Approximate BNSF Property Line
- Approximate Extent of Uplands RI
- 500-foot Buffer around RI extent
- Existing Site Feature
- Former Site Feature

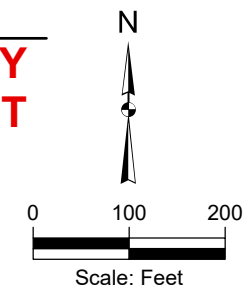
2010 WA Land Use Designations

- Developed Land
- Land Developed Since 2010
- Undeveloped Land

Notes:

1. Locations are approximate.
2. 2010 Washington (WA) Land Use Designations obtained from Washington Geospatial Open Data Portal website.
3. Developed Land = grouping of Household - single family units, Railroad/Transit Transportation, Highway and street right of way, Parks, Agriculture, Government and Miscellaneous services, Utilities, Retail Trade, Motor Vehicle Transportation.

PRELIMINARY
DRAFT



Kennedy/Jenks Consultants

BNSF Wishram Rail Yard
Wishram, Washington

**Terrestrial Ecological Evaluation
Land Use Designations
(Aerial Photo 6/14/2019)**

1896120°00
July 2020

Figure P-1

Appendix Q

Petroleum Vapor Intrusion Evaluation

**SUMMARY OF SOIL ANALYTICAL RESULTS FOR VAPOR INTRUSION EVALUATION
BNSF Wishram Railyard, Wishram, Washington**

Chemical	Units	Criteria for PVI (Impl Memo #14)	Location ID																						
			WSB-1	WSB-1	WSB-2	WSB-2	WSB-3	WSB-3	M-2-14	M-2-8	T-7	T-8	T-9	T-10	B-18-25	B-18-25	B-18-25								
Parent Sample ID	Sample Date	Sample Depth	Water Table Note	Notes	Pre-Bioventing System Operation																	Bioventing System Operation (2012-2019)			
Sample ID	Parent Sample ID	Sample Date	Sample Depth	Water Table Note	Notes	WSB-1-10	WSB-1-15	WSB-2-8	WSB-2-14	WSB-3-10	WSB-3-16	M-2-14 20051108	M-2-8 20051108	T-7-12	T-8-11	T-9-14	T-10-11.5	B-18-25(2-2.5)	DUP-04-20180821	B-18-25(9.5-10)					
Sample ID	Parent Sample ID	Sample Date	Sample Depth	Water Table Note	Notes	9/2/2003	9/2/2003	9/2/2003	9/2/2003	9/2/2003	9/2/2003	11/8/2005	11/8/2005	5/20/2010	5/20/2010	5/20/2010	5/20/2010	8/21/2018	8/21/2018	8/21/2018					
Sample ID	Parent Sample ID	Sample Date	Sample Depth	Water Table Note	Notes	10 ft	15 ft	8 ft	14 ft	10 ft	16 ft	14 ft	8 ft	12 ft	11 ft	14 ft	11.5 ft	2-2.5 ft	2-2.5 ft	9.5-10 ft					
Sample ID	Parent Sample ID	Sample Date	Sample Depth	Water Table Note	Notes	AWT	BWT	AWT	AWT	AWT	BWT	BWT	AWT	BWT	BWT	BWT	BWT	AWT	AWT	AWT					
Sample ID	Parent Sample ID	Sample Date	Sample Depth	Water Table Note	Notes				PAHs SW8270 without SIM			Excavation confirmation soil sample.	Excavation confirmation soil sample.												
Chemical	Units	Criteria for PVI (Impl Memo #14)	MTCA A then Lowest B	Soil Protective of GW (Vadose)	Soil Protective of GW (Saturated)	Pre-Bioventing System Operation																	Bioventing System Operation (2012-2019)		
NWTPH-Gx																									
Gasoline-Range Organics	mg/kg	250	30	Method A		--	--	--	--	--	--	--	--	< 5.9	< 5.4	< 6.3	< 6.1	--	--	--					
NWTPH-Dx - without silica gel cleanup																									
Diesel-Range Organics	mg/kg	250	2,000	Method A		--	--	--	--	--	--	--	--	--	--	--	--	< 88.9	< 46.7	< 4.85					
Oil-Range Organics	mg/kg		2,000	Method A		--	--	--	--	--	--	--	--	--	--	--	--	276	< 117	< 12.1					
TPH-Dx Sum (HalfDL_WA)	mg/kg		2,000	Method A		--	--	--	--	--	--	--	--	--	--	--	--	320	< 23.4	< 2.43					
TPH-Dx Sum (HitsOnly)	mg/kg		2,000	Method A		--	--	--	--	--	--	--	--	--	--	--	--	276	ND	ND					
NWTPH-Dx - with silica gel cleanup																									
Diesel-Range Organics	mg/kg	250	2,000	Method A		47.6	< 0.0250	6,900	15,700	< 0.0250	< 0.0250	182	89.9	< 24.5	< 20.4	< 21.9	< 24.8	--	--	--					
Oil-Range Organics	mg/kg		2,000	Method A		359	< 0.0500	4,710	10,500	< 0.0500	< 0.0500	< 27.7	< 27.3	< 98.1	< 81.6	< 87.4	< 99.3	--	--	--					
TPH-Dx Sum (HalfDL_WA)	mg/kg		2,000	Method A		407	< 0.0125	11,600	26,200	< 0.0125	< 0.0125	196	104	< 12.3	< 10.2	< 11.0	< 12.4	--	--	--					
TPH-Dx Sum (HitsOnly)	mg/kg		2,000	Method A		407	ND	11,600	26,200	ND	ND	182	89.9	ND	ND	ND	ND	--	--	--					
BTEX																									
Benzene	mg/kg	100	0.03	Method A	0.027	0.0017	< 0.05	< 0.05	< 0.1	< 0.1	< 0.05	< 0.05	--	--	< 0.0235	< 0.0217	< 0.0253	< 0.0242	< 0.00113	< 0.00121	< 0.00121				
Toluene	mg/kg		7	Method A	4.5	0.27	0.0147	< 0.05	< 0.1	< 0.1	< 0.05	< 0.05	--	--	< 0.0294	< 0.0271	< 0.0316	< 0.0303	0.0225	0.0134	< 0.00606				
Ethylbenzene	mg/kg		6	Method A	5.9	0.34	< 0.05	< 0.05	0.178	0.687	< 0.05	< 0.05	--	--	< 0.0294	< 0.0271	< 0.0316	< 0.0303	< 0.00283	< 0.00303	< 0.00303				
Xylene, m,p-	mg/kg																		0.0200	0.0141	< 0.00485				
Xylene, o-	mg/kg		16,000	Method B Non cancer	14	0.84	--	--	--	--	--	--	--	--	--	--	--	--	0.0154	0.00850	< 0.00303				
Total Xylenes (HalfDL_WA)	mg/kg		9	Method A	14	0.83	--	--	--	--	--	--	--	--	--	--	--	--	0.0354	0.0226	< 0.00152				
Xylene, total	mg/kg		9	Method A	14	0.83	< 0.1	< 0.1	0.0817	0.739	< 0.1	< 0.1	--	--	< 0.0882	< 0.0814	< 0.0947	< 0.0909	--	--	--				
Polycyclic Aromatic Hydrocarbons using SIM																									
1-Methylnaphthalene	mg/kg		34	Method B Cancer			--	--	--	--	--	--	--	--	--	--	--	--	0.0412	0.0274	< 0.0242				
2-Methylnaphthalene	mg/kg		320	Method B Non cancer			--	--	--	61.9	--	--	--	--	--	--	--	--	0.0441	0.0310	< 0.0242				
Anthracene	mg/kg		24,000	Method B Non cancer	2300	110	--	--	--	< 16.5	--	--	--	--	--	--	--	--	0.0123	0.00843	< 0.00727				
Benzo(a)anthracene	mg/kg						--	--	--	< 16.5	--	--	--	--	--	--	--	--	0.0304	0.0139	< 0.00727				
Benzo(a)pyrene	mg/kg		0.1	Method A	3.9	0.19	--	--	--	< 16.5	--	--	--	--	--	--	--	--	0.0491	0.0202	< 0.00727				
Benzo(b)fluoranthene	mg/kg						--	--	--	< 16.5	--	--	--	--	--	--	--	--	0.0610	0.0314	< 0.00727				
Benzo(k)fluoranthene	mg/kg						--	--	--	< 16.5	--	--	--	--	--	--	--	--	0.0213	0.00783	< 0.00727				
Chrysene	mg/kg						--	--	--	< 16.5	--	--	--	--	--	--	--	--	0.0375	0.0173	< 0.00727				
Dibenz(a,h)anthracene	mg/kg						--	--	--	< 16.5	--	--	--	--	--	--	--	--	0.00933	< 0.00700	< 0.00727				
Indeno(1,2,3-c,d)pyrene	mg/kg						--	--	--	< 16.5	--	--	--	--	--	--	--	--	0.0318	0.0138	< 0.00727				
Naphthalene	mg/kg		5	Method A	4.5	0.24	--	--	--	23.8	--	--	--	--	--	--	--	--	0.0380	0.0294	< 0.0242				
Total Naphthalene (HalfDL_WA)	mg/kg		5	Method A	4.5	0.24	--	--	--	85.7	--	--	--	--	--	--	--	--	0.123	0.0878	< 0.0121				
Total Naphthalene (HitsOnly)	mg/kg		5	Method A	4.5	0.24	--	--	--	85.7	--	--	--	--	--	--	--	--	0.123	0.0878	< 0.00				
Total cPAH TEQ (HalfDL_WA)	mg/kg		0.1	Method A	3.9	0.19	--	--	--	< 8.25	--	--	--	--	--	--	--	--	0.0649	0.0274	< 0.00364				
Total cPAH TEQ (HitsOnly)	mg/kg		0.1	Method A	3.9	0.19	--	--	--	< 0.00	--	--	--	--	--	--	--	--	0.0649	0.0271	< 0.00				
Volatle Organic Compounds																									
1,2-Dibromoethane (EDB)	mg/kg		0.005	Method A			--	--	--	--	--	--	--	--	--	--	--	--	< 0.00283	< 0.00303	< 0.00303				
1,2-Dichloroethane (EDC)	mg/kg		11	Method B Cancer	0.023	0.0016	--	--	--	--	--	--	--	--	--	--	--	--	< 0.00283	< 0.00303	< 0.00303				
Naphthalene	mg/kg		5	Method A	4.5	0.24	--	--	--	--	--	--	--	--	--	--	--	--	0.0160	< 0.0152	< 0.0152				
Metals																									
Arsenic	mg/kg		20	Method A	2.9	0.15	--	--	4.3	5.27	--	--	--	--	--	--	--	--	2.31	< 2.33	< 2.42				
Barium	mg/kg		16,000	Method B Non cancer	1600	83	--	--	4,680	6,500	--	--	--	--	--	--	--	--	95.3	83.5	103				
Lead	mg/kg		250	Method A	3000	150	--	--	387	37.1	--	--	--	--	--	--	--	--	19.4	20.0	4.61				

**SUMMARY OF SOIL ANALYTICAL RESULTS FOR VAPOR INTRUSION EVALUATION
BNSF Wishram Railyard, Wishram, Washington**

34300	Detected concentrations above the cleanup level are shaded blue and bolded.
<i>< 0.18</i>	Non-detect values above the cleanup level are shaded gray and italicized.
1700	Detected concentrations at or above the method reporting limit are shown in bold.
<u>1700</u>	Detected concentrations above the screening level for soil protective of groundwater in the vadose or saturated zone are underlined and bolded.

Abbreviations and Symbols

"AWT" denotes soil sample collected above the water table in the vadose zone. Results compared to MTCA CULs (see below) and soil protective of groundwater in the vadose zone screening levels.

"BWT" denotes soil sample collected below the water table in the saturated zone. Results compared to MTCA CULs (see below) and soil protective of groundwater in the saturated zone screening levels.

" - - " denotes not measured, not available, or not applicable.

" < " denotes not detected at or above the indicated method reporting limit.

"ND" denotes that the result was not detected and the method reporting limit is unknown.

"B" denotes that the value has been qualified due to blank contamination by the laboratory.

"DUP" denotes a field duplicate sample. Primary sample ID is provided beneath the duplicate sample ID.

"E" indicates that the concentration exceeded the calibration curve and is an estimate.

"J" indicates an estimated concentration based on either the being less than the laboratory reporting limit or data validation findings.

"J+" indicates an estimated concentration likely biased high based on data validation findings or as reported by the laboratory.

"U" denotes that the value has been qualified as undetected (at the detected concentration if above the method reporting limit) due to blank contamination.

"Y" denotes that the chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.

ft = feet

mg/kg = milligrams per kilogram

µg/kg = milligrams per kilogram

Total TPH-Dx = Total TPH-Dx concentrations were calculated by summing diesel-range organics (DRO) and oil-range organics (ORO) concentrations. Non-detects were included as noted.

Total cPAHs = Possible Total Carcinogenic Polycyclic Aromatic hydrocarbons (cPAHs) are based on the relative toxicity of each cPAH to benzo(a)pyrene and were calculated by multiplying the individual cPAH concentrations by a toxicity equivalency factor (TEF) and summing the adjusted concentrations. Non-detects were included as noted.

Total Naphthalenes = Total Naphthalenes concentrations were calculated by summing 1-Methylnaphthalene, 2-Methylnaphthalene, and Naphthalene concentrations. Non-detects were included as noted.

Total Xylenes = Total Xylenes concentrations were calculated by summing Xylene, m,p- and Xylene, o- concentrations. Non-detects were included as noted.

(HitsOnly) = If an individual chemical was not detected, it was not included in the calculation.

(HalfDL_WA) = If an individual chemical was not detected, a value of one half the method reporting limit was used as the concentration in the calculation, except when all chemicals used in the calculation were not detected then one half the lowest method reporting limit was used as the total concentration.

Cleanup Levels (CUL)

Cleanup level values based on Model Toxics Control Act (MTCA) Method A values for unrestricted land use (Method A) based on Washington State Administrative Code (WAC) 173-340-740 Table 740-1.

Where MTCA Method A values are not available, the lowest of MTCA Method B values (B Cancer or B Non Cancer) from Cleanup Levels and Risk Calculation (CLARC) tables have been used (Accessed January 2020).

Methods

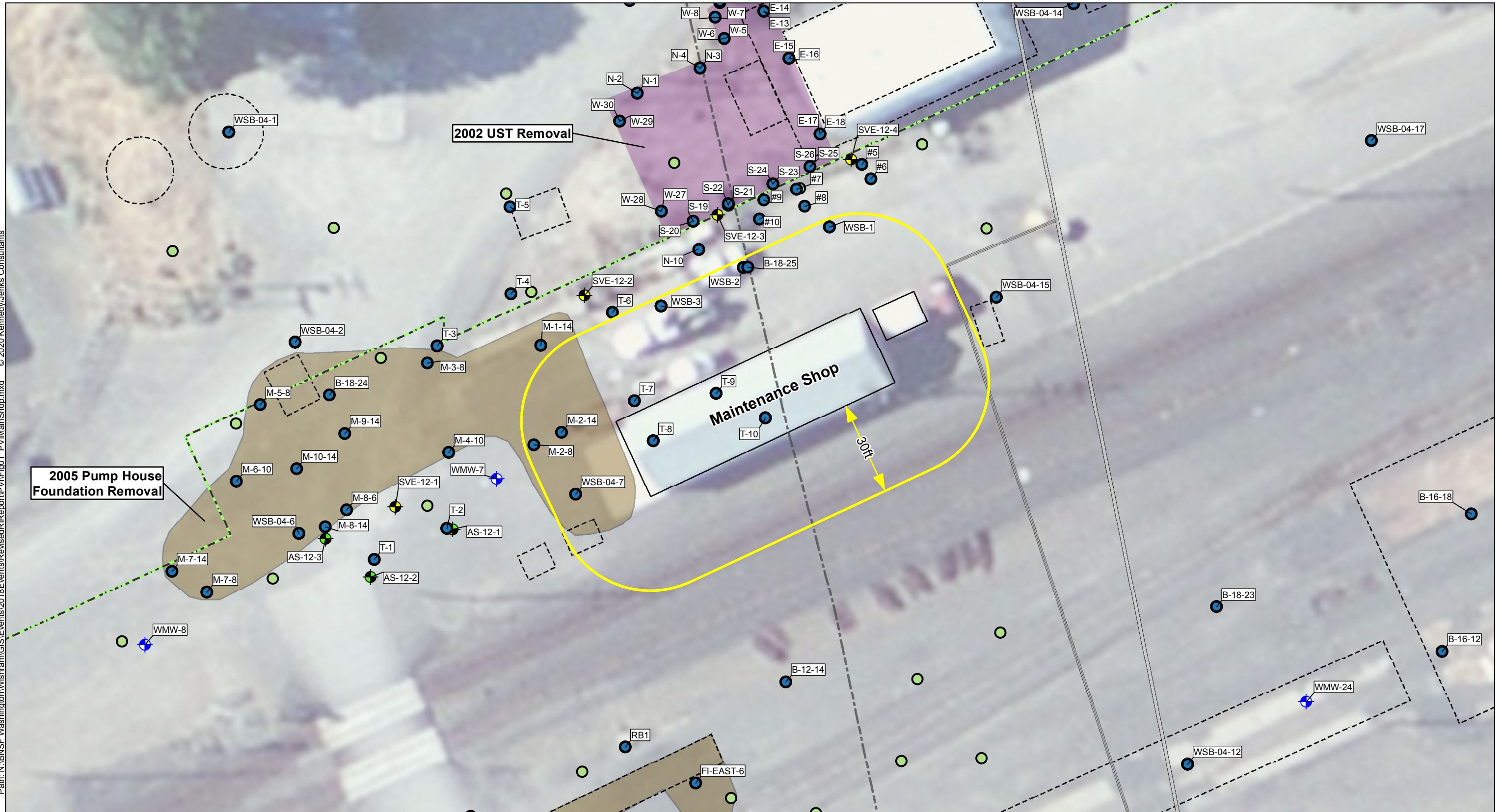
Samples analyzed for gasoline-range organics (GRO) using Northwest Total Petroleum Hydrocarbon (NWTPH)-Gx and diesel- and oil-range organics (DRO and ORO) using NWTPH-Dx (with or without silica gel cleanup as noted).

Samples analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) and Volatile Organic Compounds using EPA Method 8021 or 8260.

Samples analyzed for metals using EPA Method 6010, 3060, or 7471.

Samples analyzed for Semivolatile Organic Compound using EPA Method 8270 with selective ion monitoring (SIM). In cases where SIM was not used, it is noted in the notes row.

Path: N:\BNSF_Washington\Wishram\GIS\Events\2018\Events\RevisedRIR\Report\VI\Fig01_PVI/MainShop.mxd © 2020 Kennedy/Jenks Consultants

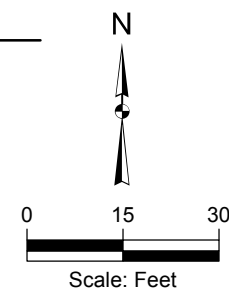


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Legend

- LIF Location
- Shallow Monitoring Well
- Abandoned Monitoring Well
- Air Sparge Well
- Bioventing Well
- Soil Sample (2002-2018)
- Maintenance Shop 30ft Buffer
- Approximate Previous Excavation Area (2002)
- Approximate Previous Excavation Area (2005/2010)



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 BNSF Wishram Railway
 Wishram, Washington

Sample Locations Near Maintenance Shop

1896120*00
 July 2020

Figure Q-1