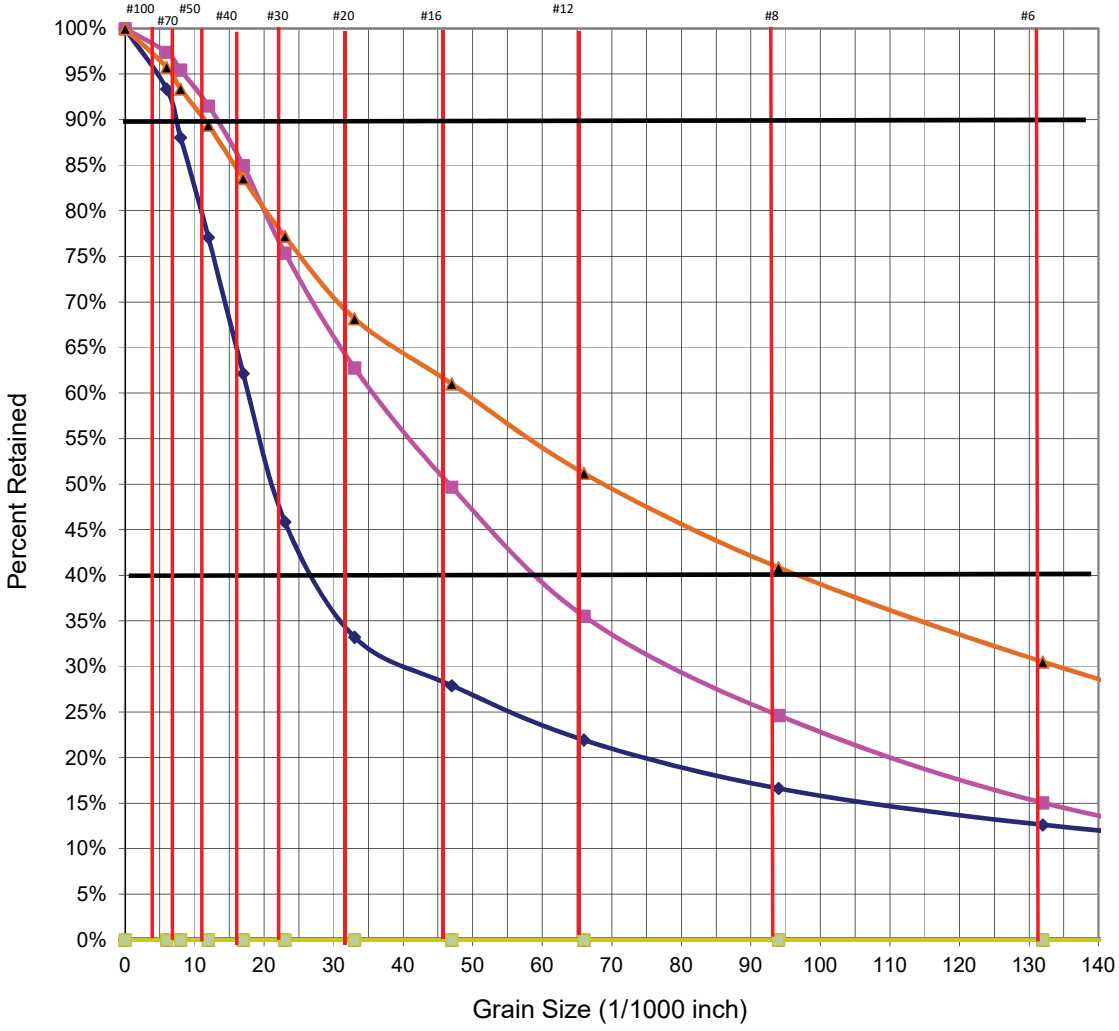
Attachment 4
Johnson Sieve Analysis and
Screen Recommendations

Johnson Screens
651-636-3900

Johnson Screens

SAND ANALYSIS



Job Name Hoosick Falls - CHA-#3473
Location Hoosick Falls, NY
Driller Smith Well Drilling

Sample ID 022819-1
Analyzed by: Al Smith, 651-638-3160
Date: 3/1/2019

Casing ϕ 10"
Screen ϕ 10" Telescope Size

Yield 400 GPM
SWL (ft) 15' (Estimated)

Recommended Slot Size 100 Slot From 75' - 89', 50 Slot 89' - 105'
Recommended Gravel Pack Not Applicable

Based exclusively on the samples provided by the contractor, a sieve analysis graph and suggested screen slot size is provided as requested. Since numerous construction considerations and site circumstances influence successful well completion, Johnson Screens assumes no responsibility for final well performance nor awareness of local regulations pertaining to well installations.

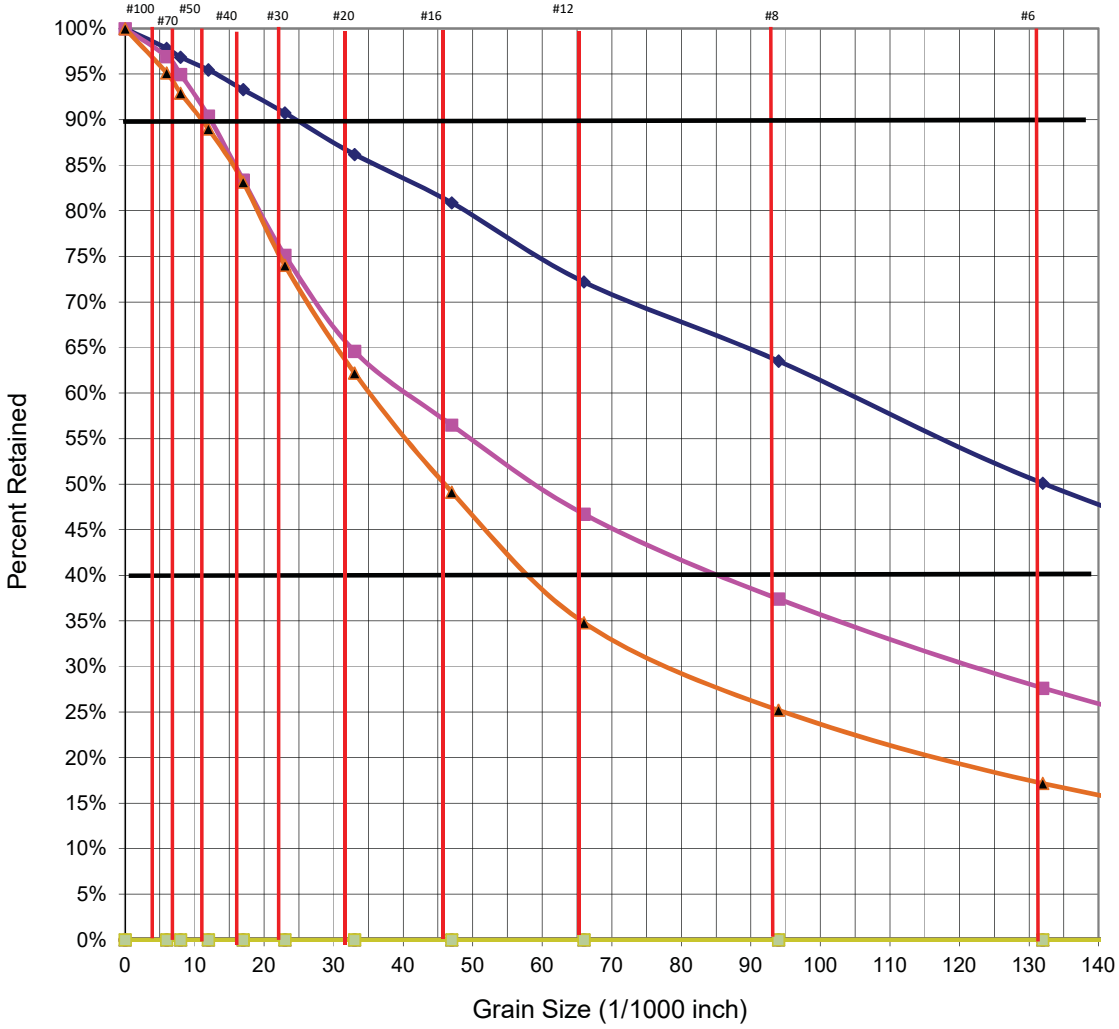
Prepared by:Smith, Albert

Send Samples to 1950 Old Highway 8, New Brighton, MN 55112

Johnson Screens
651-636-3900

Johnson Screens

SAND ANALYSIS



Job Name Hoosick Falls - CHA-#3473
Location Hoosick Falls, NY
Driller Smith Well Drilling

Sample ID 022819-1
Analyzed by: Al Smith, 651-638-3160
Date: 3/1/2019

Casing ϕ 10"
Screen ϕ 10" Telescope Size

Yield 400 GPM
SWL (ft) 15' (Estimated)

Recommended Slot Size 100 Slot 75' - 89', 50 Slot 89' - 105'
Recommended Gravel Pack Not Applicable

Based exclusively on the samples provided by the contractor, a sieve analysis graph and suggested screen slot size is provided as requested. Since numerous construction considerations and site circumstances influence successful well completion, Johnson Screens assumes no responsibility for final well performance nor awareness of local regulations pertaining to well installations.

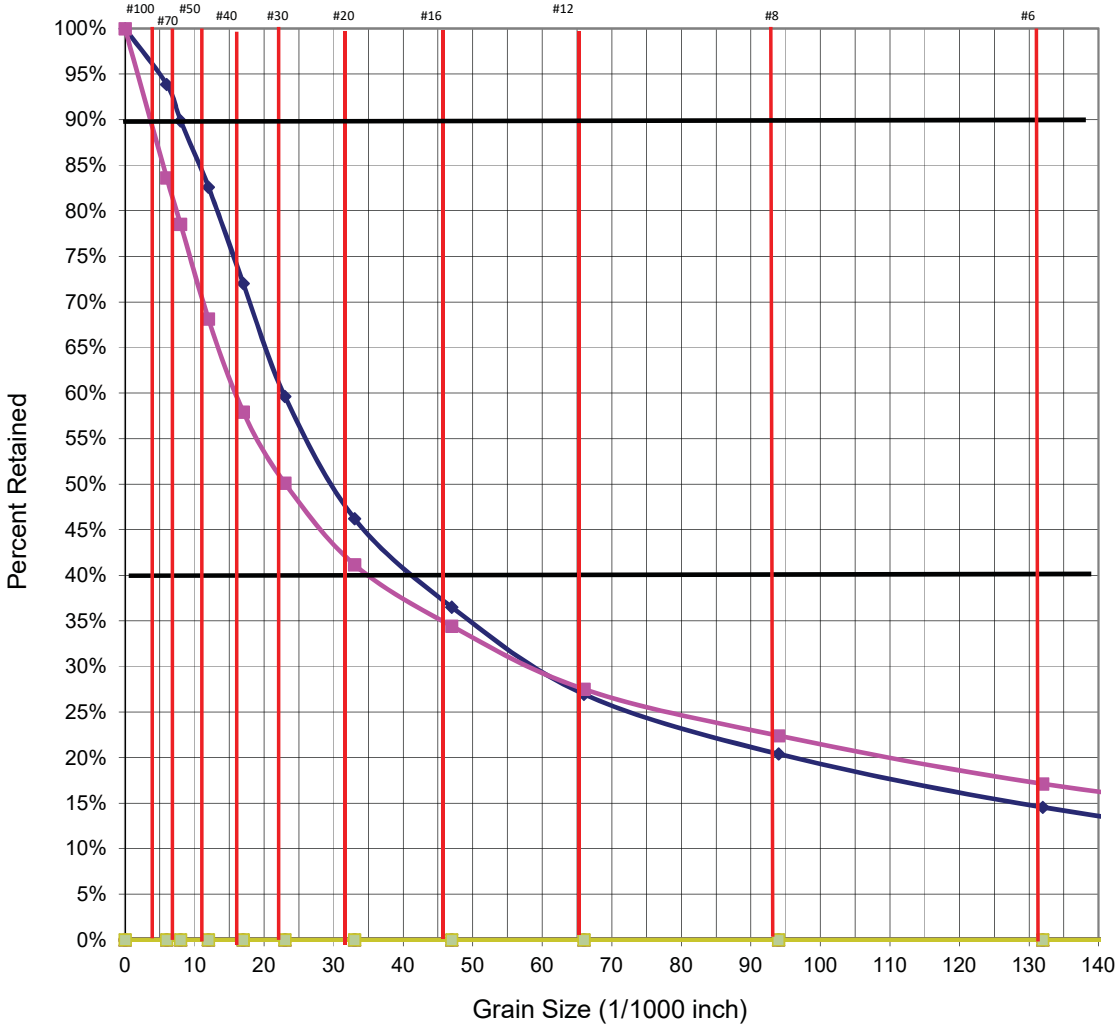
Prepared by:Smith, Albert

Send Samples to 1950 Old Highway 8, New Brighton, MN 55112

Johnson Screens
651-636-3900

Johnson Screens

SAND ANALYSIS



Job Name Hoosick Falls - CHA-#3473
Location Hoosick Falls, NY
Driller Smith Well Drilling

Sample ID 022819-1
Analyzed by: Al Smith, 651-638-3160
Date: 3/1/2019

Casing ϕ 10"
Screen ϕ 10" Telescope Size

Yield 400 GPM
SWL (ft) 15' (Estimated)

Recommended Slot Size 100 Slot 75' - 89', 50 Slot 89' - 105'
Recommended Gravel Pack Not Applicable

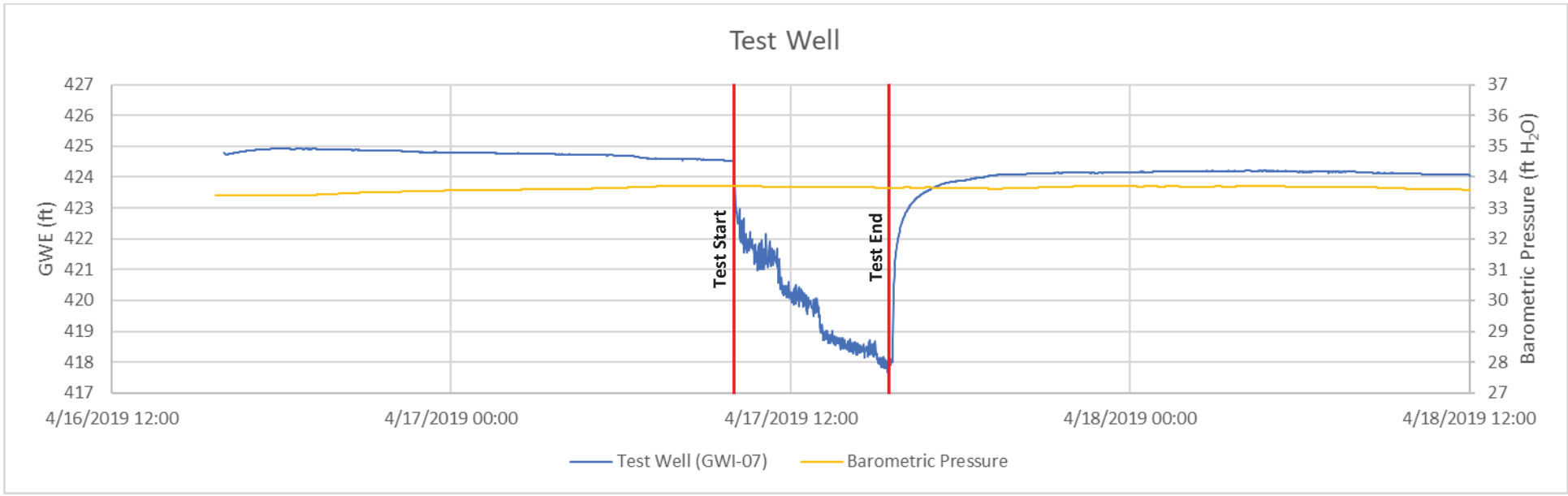
Based exclusively on the samples provided by the contractor, a sieve analysis graph and suggested screen slot size is provided as requested. Since numerous construction considerations and site circumstances influence successful well completion, Johnson Screens assumes no responsibility for final well performance nor awareness of local regulations pertaining to well installations.

Prepared by:Smith, Albert

Send Samples to 1950 Old Highway 8, New Brighton, MN 55112

Attachment 5

Step Test – Hydrographs & Barometric Pressure



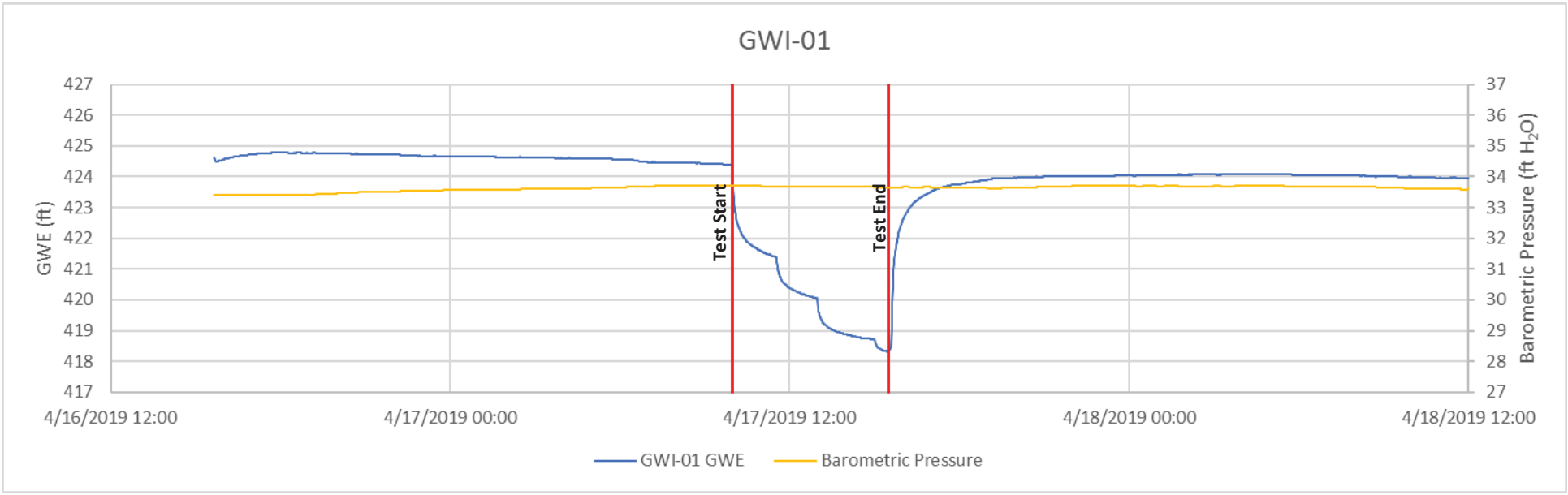
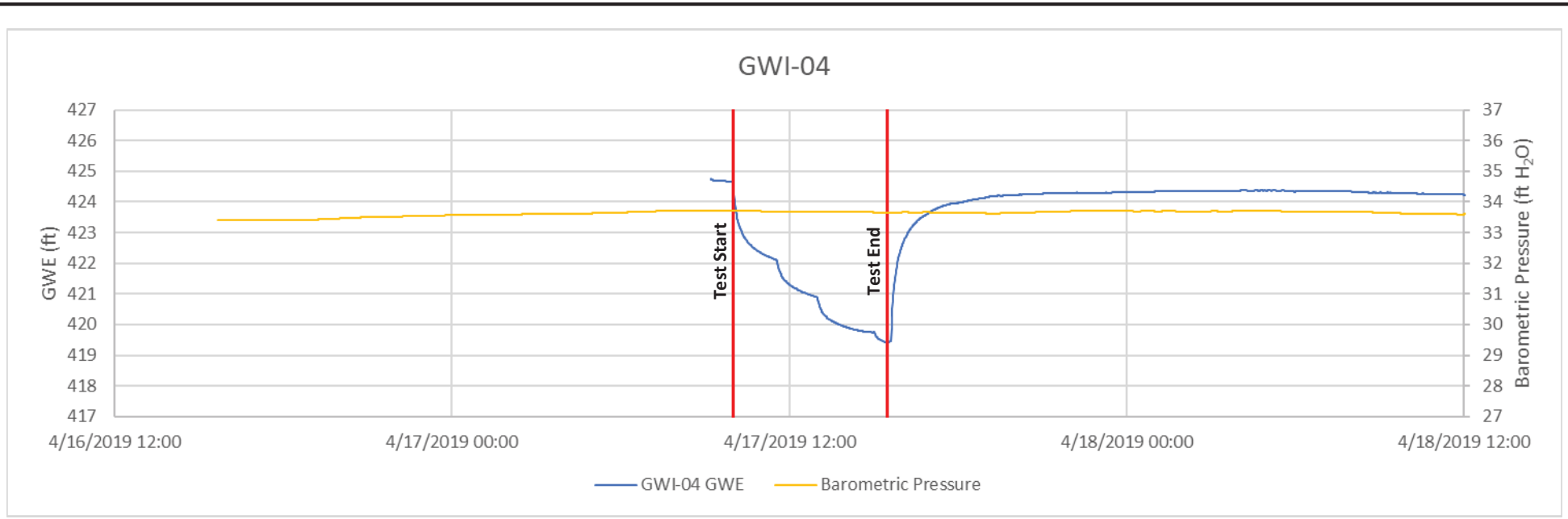


Figure A5-1: April 2019 Step Test: Groundwater Elevation & Barometric Pressure

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists



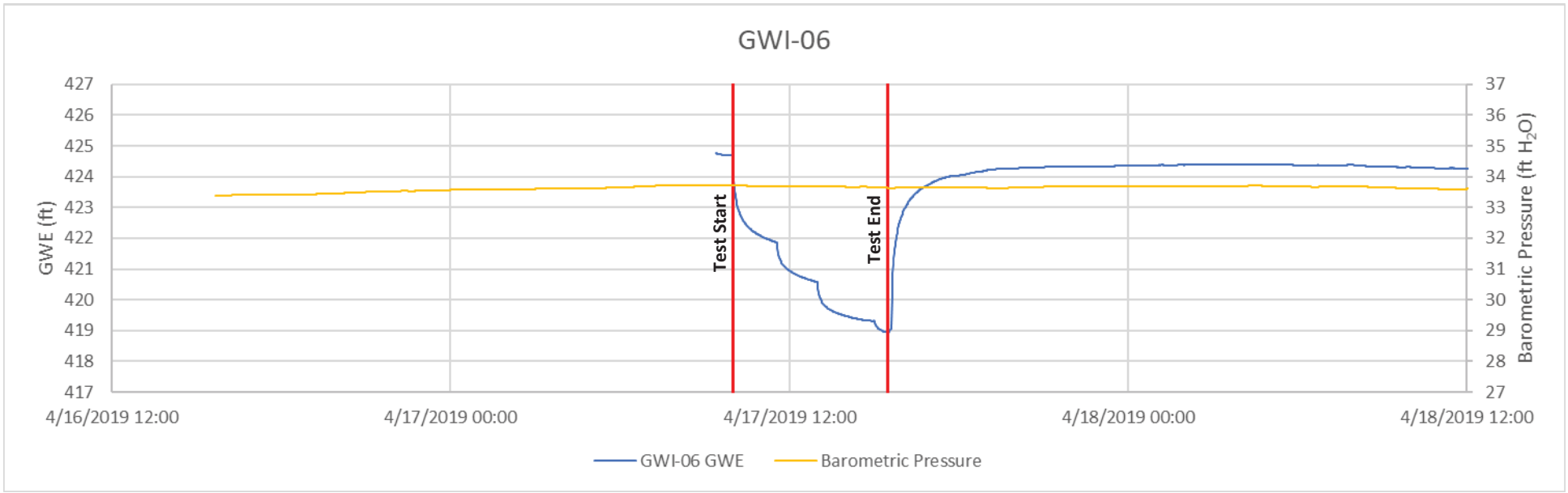


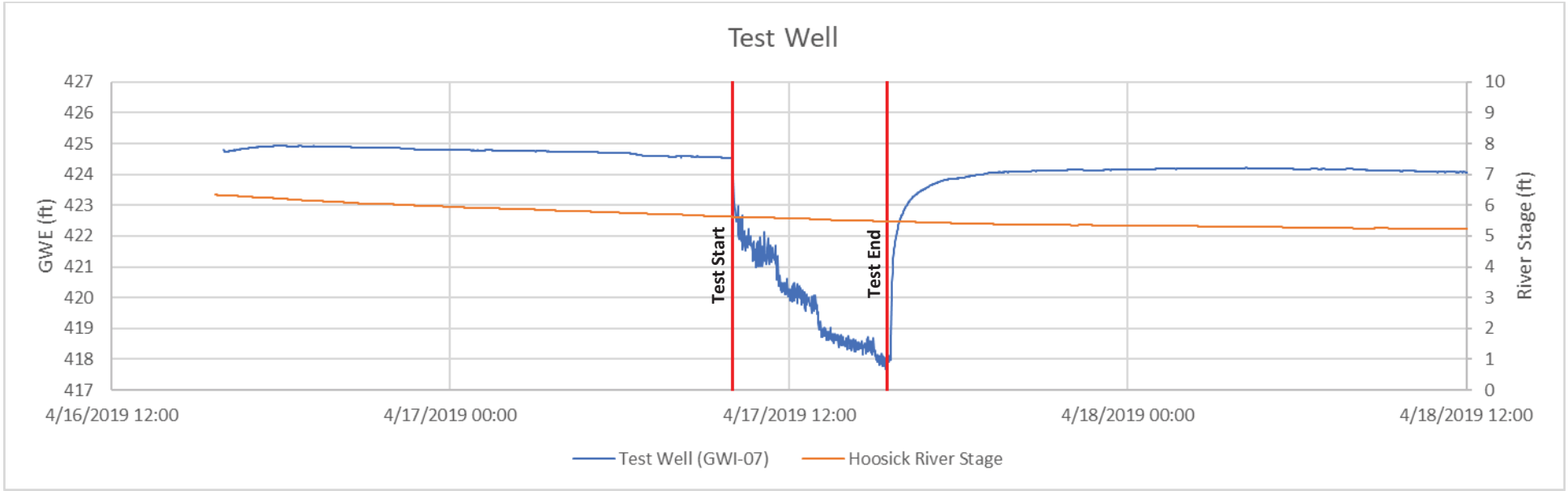
Figure A5-2: April 2019 Step Test: Groundwater Elevation & Barometric Pressure

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

Attachment 6

Step Test – Hydrographs & River Stage



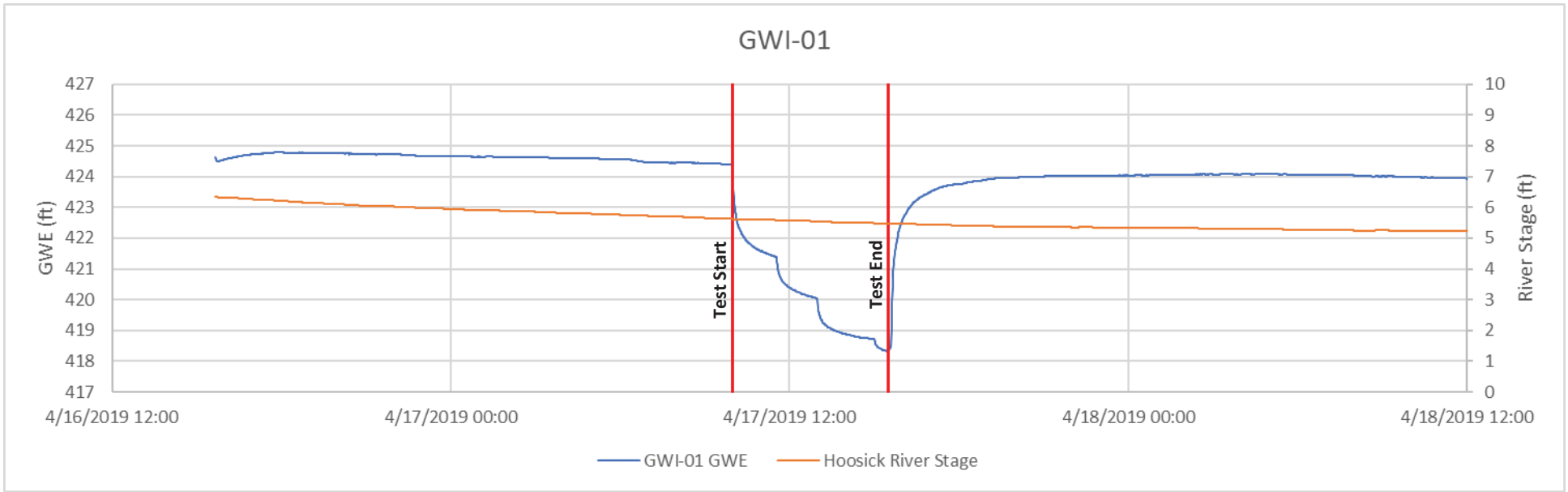
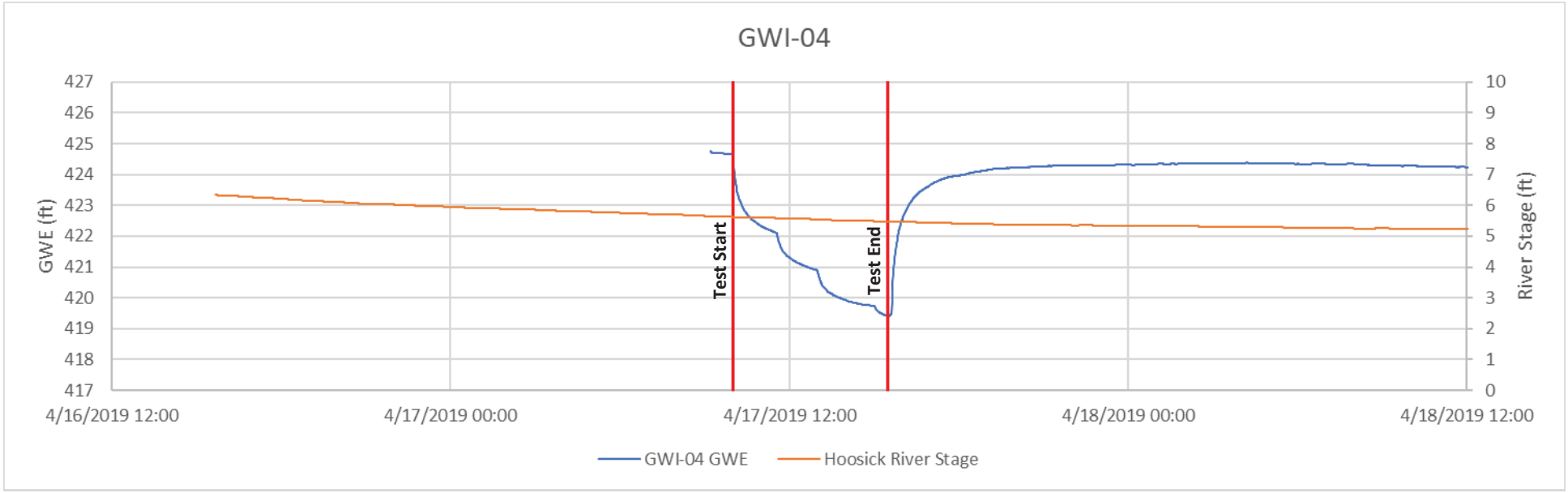


Figure A6-1: April 2019 Step Test: Groundwater Elevation & Hoosick River Stage

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists



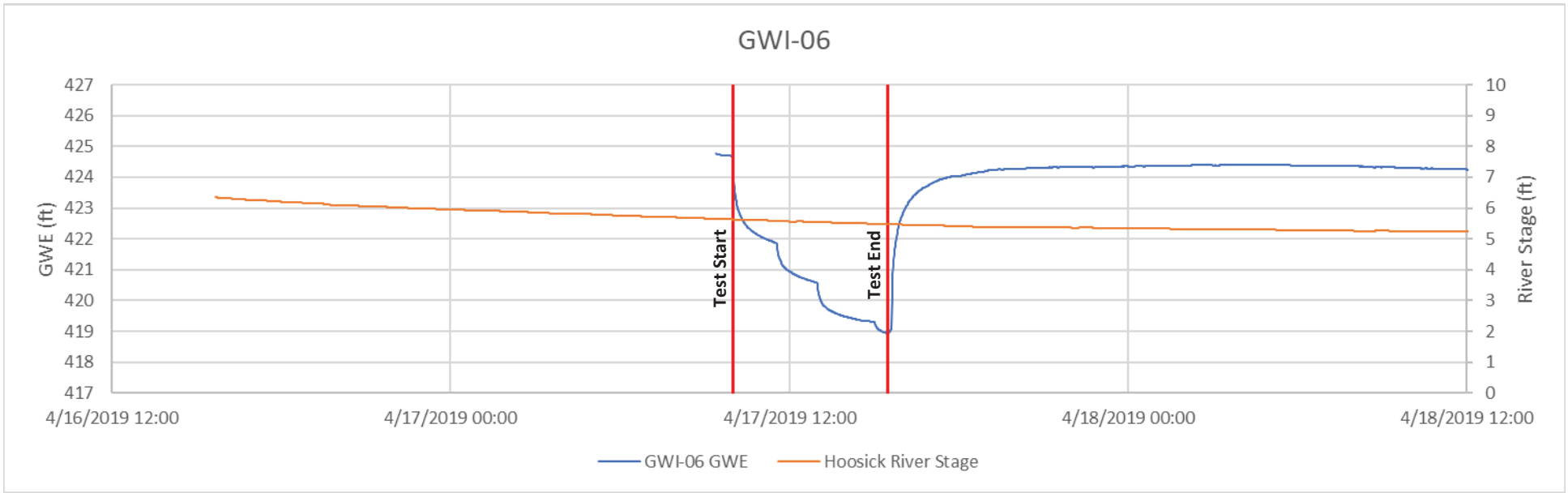


Figure A6-2: April 2019 Step Test: Groundwater Elevation & Hoosick River Stage

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

Attachment 7
Microscopic Particulate Analysis

ENVIRONMENTAL ASSOCIATES LTD. ENVIRONMENTAL CONSULTANTS, ANALYSES & RESEARCH

Susan N. Boutros, Ph.D.
President

SAMPLING FOR MICROSCOPIC PARTICULATES ANALYSIS (MPA) FOR GROUNDWATER

The following sampling procedures for Microscopic Particulate Analysis (MPA), are taken from the EPA "Consensus Method for Determining Groundwater under the Direct Influence of Surface Water Using Microscopic Particulate Analysis(MPA)".

For MPA testing of groundwater for determination of potential surface water influence the minimum sample volume is 500 gallons, and the recommended sample volume is 1000 gallons collected over an 8-24 hr period. All sites should be inspected before sampling to determine the equipment appropriate to the location. If possible at the time of sampling the temperature of the water should be measured and other samples taken for turbidity, and bacteria (total coliforms, fecal coliforms and /or standard plate counts). If possible with finished water samples choose sample sites prior to chlorination. If chlorination cannot be avoided please contact the laboratory for further information on how to sample a chlorinated supply.

EQUIPMENT SPECIFICATIONS

1. Ten inch cartridge filter housing Model LT10 or equivalent:
   Parker Hannifin corp.
   Lebanon, Indiana 46052
2. Ten inch 1μm polypropylene, yarn wound (string), nominal porosity cartridge filter (Carborundum honeycomb filter tube M39R10A or equivalent)
3. Pressure regulator (Watts IR56) plus pressure gauge.
4. Water meter
5. Flow control valve rated at 1.0 gal./min.
6. Inlet and discharge hoses

SAMPLE COLLECTION

1. Assemble the equipment (Figure 1). Be certain that the sampler is assembled with the correct direction of flow at the filter holder and the water meter as indicated by the arrows on both devices.

2. Check all connections for leaks. Flush the unit without a filter for 3-5 minutes with the source water to be sampled.

3. Record the date, time of day and gallon reading from the water meter before and after sampling. Document the name, address and location of each sample site in addition to the exact sample point. With ground water systems identify the source as a spring, dug well, drilled well, artesian well or other. Document the distance to the nearest river, stream, irrigation canal, lake or pond.

4. Use aseptic technique to insert the filter into housing to prevent contamination of the sample. Tighten housing with the plastic wrench provided. Make sure rubber washer or "o" ring is in place between filter housing bowl and base.

5. After installing filter turn water on slowly with the unit in an upright position. Invert unit to make sure all the air within the housing has been expelled. When the housing is full of water, return unit to upright position and turn volume on completely.

Susan N. Boutros, Ph.D.
President

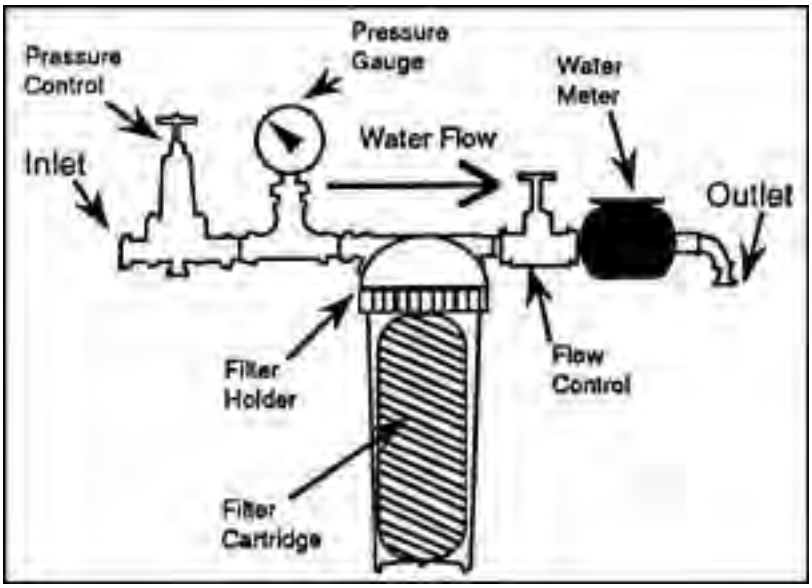


Figure 1: Sampling Equipment

6. Adjust flow rate to 1.0 gpm, record the meter reading and time.

7. Check reading on pressure gauge. If not reading between 10-30 psi adjust regulator. The sampling unit should be allowed to run for an 8-24 hour period collecting from 500 to 1000 gallons.

8. After filtering sample turn off the faucet or pump and disconnect hose from incoming water source. Record the meter reading and time.

9. The filter housing should be disconnected and the top removed. The water from the filter housing should be poured into a zip-lock bag, and the filter aseptically removed and placed in the same bag with the water from the housing. The bag should sealed, labeled and placed inside a second zip lock bag.

10. Pack the filter(s) in a plastic ice chest with a bag of ice and /or blue ice packs. If possible, place the filter bags in an upright position with the seal at the top. If you use ice, we recommend that you double bag it using zip-lock bags to prevent leaking. The carrier may refuse to deliver a package that leaks. If you use blue ice, wrap it in newspaper or other insulating material so that it does not freeze the filters.

11. Fill out the sample data sheet providing all information requested, and place them in plastic bags. Send data sheet and filters via 24-hour Federal Express or UPS to:

Environmental Associates Ltd
Attn.: Dr. Susan Boutros
24 Oak Brook Dr.
Ithaca, NY 14850

The maximum transit /holding time for samples should not exceed 48 hours. If you have any questions please call the laboratory at (607) 272-8902 .

ENVIRONMENTAL ASSOCIATES LTD.
24 Oak Brook Drive, Ithaca, NY 14850
(607) 272-8902 Fax (607) 256-7092

REPORT: MICROSCOPIC PARTICULATE ANALYSIS

Client: Will Pierce
CHA Consulting Inc
III Winners Circle
Albany NY 12205-0307

FILTER ID: 46909

Station/Body of water: La Croix Test Well

RECEIPT OF FILTER:

Date Received: 5/3/2019 # of filters: 1 Type: wound Carrier: FedEx

COLLECTION:

Collector:	William Pierce	Date & Time Collected:	5/2/2019 08:25
Temperature:	10.18 °C	Turbidity:	5.32
Water Type:	Ground Water (GW)	Date & Time Processed:	5/3/2019 10:00 AM
		Date Analyzed:	5/8/2019

FILTER PROCESSING

Color of water around filter:	clear	Total volume of sediment:	0.02
Filter color:	white	Volume of sediment/100 gallons:	0.0017
Color of sediment:	rust	Phase equivalent gallon volume examined:	118
# gallons filtered:	1201.18		

ANALYSIS OF PARTICULATES:

key = (EH) - extremely heavy [>20/field @ 100X] (H) - heavy [10-20/field @ 100X]
(M) -moderate [4-9/field @ 100X] (R) - rare [<1-3/field @ 100X] (NF) - none found

PARTICULATE DEBRIS	Quantity	Description
Large part. 5 μm & larger	EH	fine silt
Small part. up to 5 μm	EH	fine amorphous debris
Plant debris	NF	

OTHER ORGANISMS	Quantity	Description
Nematodes	NF	
Nematode eggs	NF	
Rotifers	NF	
Crustaceans	NF	
Crustacean eggs	NF	
Insects	NF	
Other	EH	iron bacteria

PROTOZOANS	Quantity	Description
Other Coccidia	NF	
Other protozoans	NF	

ALGAE	Quantity	Description
Green Algae	NF	
Diatoms	NF	
Blue-Green Algae	NF	
Flagellated Algae	NF	

COMMENTS:

Iron bacteria were the only biological organisms observed. Based upon microscopic particulate analysis and the proposed EPA risk factors associated with bio-indicators there is a low risk of surface contamination (EPA risk factors= 0 low risk).
Revised 5/10/2019 E.B. Report was revised to reflect client's corrected dates of sampling May 1 - May 2. May 2 2019 counts as the date collected, thus the sample was received within the 48 hour hold time. All paperwork is enclosed with the report. **DISREGARD:**
Quality Note: ~~There is a 48 hour hold time from the time the sample is taken off the sample tap until processing. It at arrived at the laboratory at 9:43 AM and was processed at 10:00 AM.~~

Environmental Associates Ltd. certifies that all quality control elements associated with the above data have been met except as may be noted in the comments section. Results relate only to the sample.

REPORT REVIEWED BY:  **DATE:** May 8, 2019

S. Boutros President & Lab Director

ENVIRONMENTAL ASSOCIATES LTD.
24 Oak Brook Drive, Ithaca, NY 14850
(607) 272-8902 Fax (607) 256-7092

REPORT: MICROSCOPIC PARTICULATE ANALYSIS
EPA 910/9-92-029

Date: 5/2/2019

EAL Sample ID:	Well ID#	Utility Name
46909	La Croix Test Well	CHA Consulting Inc

EPA Relative Surface Water Risk Factors

Primary Particulates	#/100 gallon	Relative Frequency	Relative Risk Factor	Comments
Diatoms	0	NF	0	
Other Algae	0	NF	0	
Insects/larvae	0	NF	0	
Rotifers	0	NF	0	
Plant Debris (with chloro.)	0	NF	0	

EPA Relative Risk = Low Risk

Secondary Particulates				
Nematodes	0			
Crustaceans	0			
Amoeba	0			
Non-photo. flag. & ciliates	0			
Photosynthetic flagellates	0			
Other:	0	EH	Iron bacteria are not considered a risk factor.	

COMMENTS: Iron bacteria were the only biological organisms observed. Based upon microscopic particulate analysis and the proposed EPA risk factors associated with bio-indicators there is a low risk of surface contamination (EPA risk factors= 0 low risk).
Revised 5/10/2019 E.B. Report was revised to reflect client's corrected dates of sampling May 1 - May 2. May 2 2019 counts as the date collected, thus the sample was received within the 48 hour hold time. All paperwork is enclosed with the report. **DISREGARD: Quality Note:** ~~There is a 48 hour hold time from the time the sample is taken off the sample tap until processing. It at arrived at the laboratory at 9:43 AM and was processed at 10:00 AM.~~

REFERENCE: Consensus Method for Determining Groundwaters Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA) US EPA Manchester Environmental Laboratory, EPA 910/9-92-029, October 1992.

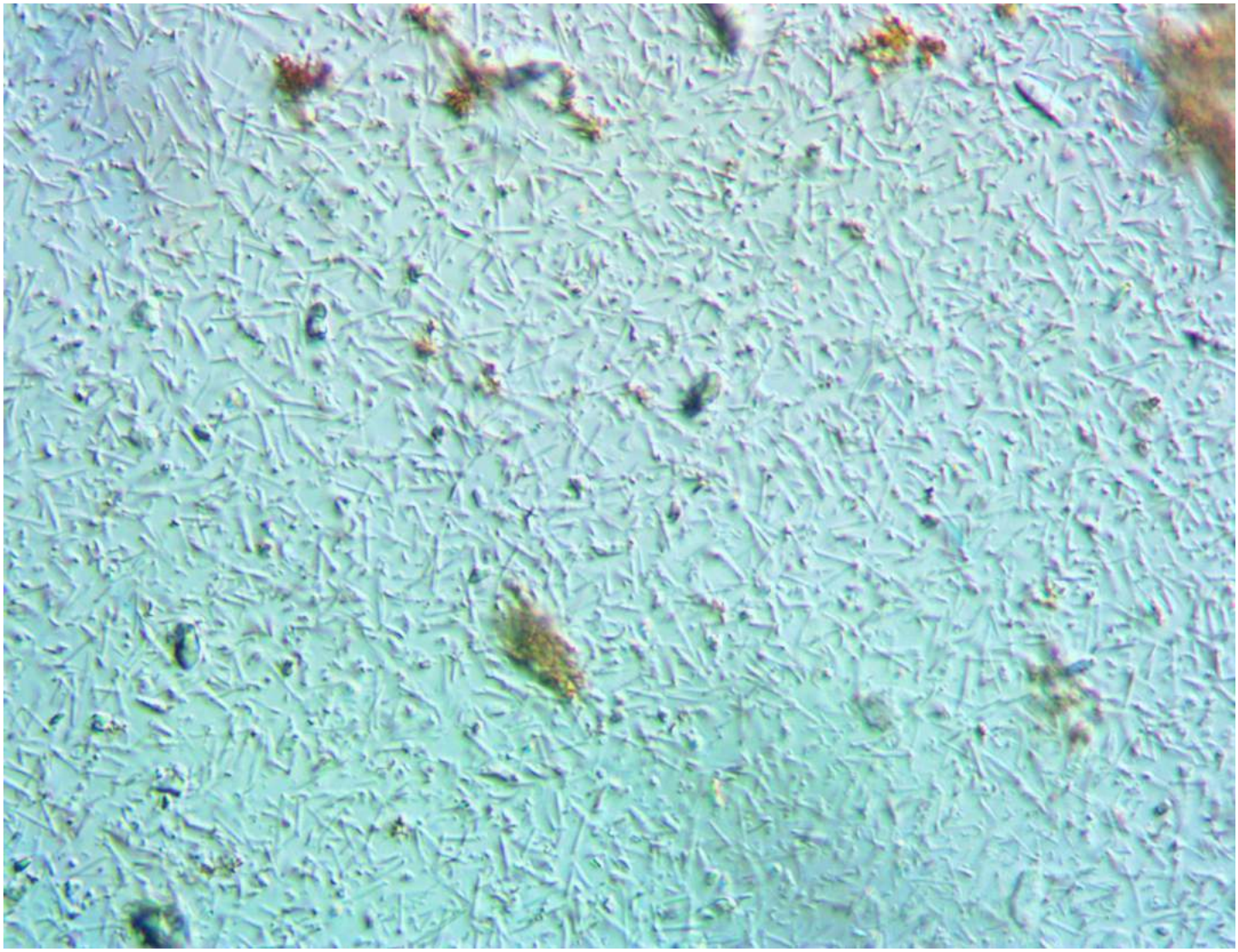
Environmental Associates Ltd. certifies that all quality control elements associated with the above data have been met except as may be noted in the comments section. Results relate only to the sample.

REPORT REVIEWED BY: Susan N. Boutros **DATE:** May 8, 2019

Dr. Susan Boutros President & Lab Director

Environmental Associates, Ltd.

46909 **Client** CHA Consulting Inc



46909A Typical sediment with iron bacteria 400X

EA ENGINEERING SCIENCE AND TECHNOLOGY, PBC

Sample ID Sheet & Chain of Custody for

Client Information

Client Code: AD-14840

Client Address:
Organization: CHA Consulting Inc
Contact Person Name: Mr. | Will | Pierce
Street Address: III Winners Circle
City: Albany | State: NY | Zip: 12205
Phone: 518-453-8736 | FAX:

Billing Address:
Organization: CHA Consulting Inc
Contact Person Name: | Accounts | Payable
Street Address: P.O. Box 5269
City: Albany | State: NY | Zip: 12205
Phone: 518-453-8736 | FAX:

Purchase Order #

Payment Method: ⊘ Account with EAL ○ Electronic Check (ACH) ○ Discover ○ Mastercard ○ Visa ○ Cash

Sample Information (Mandatory Data in Grey Area)

Water Source Name: LaCroix Test Well | Potable or Nonpotable: Potable | Exact Sample Point Location: | PWS or Well ID#:

Meter Reading

Start: Date ~~4-31-19~~ 5-1-19 (KSL) | Time 13:00 | Serial Number on Filter* | 18959.13 gal. Meter Reading

Optional Data*:
- Water Temp.: 10.183 °C
- Water pH: 7.71 pH
- Turbidity: 8.41 ~~8.41~~ NTU
- Spec. Conductivity Start: 547.9 mS cm
- Total Cl Residual: NA mg/L
- Cl Free: NA mg/L

10986 | Meter Serial # 08006346

Stop: Date 5-2-19 (MAP) | Time 08:25 | 20160.31 gal. Meter Reading

Optional Data*:
- Water Temp.: 10.218 °C
- Water pH: 7.70 pH
- Turbidity: ~~5.32~~ 5.32 NTU
- Spec. Conductivity Start: 598.3 uS cm
- Total Cl Residual: N/A mg/L
- Cl Free: N/A mg/L

1201.18 Total Gallons | Meter Multiplier

Corrected Number of gallons filtered: 1201.18
(1 Gallon = 3.785 Liters)

Will Pierce
Person Collecting Sample (Please Print Clearly):

Collector's Signature:

Next Day Shipping Service Please mark with X
☒ Fed Ex ☐ UPS ☐ DHL ☐ Other

Next Day Shipping Number:

Expedited Processing Request *

- ○ Weekend Receipt
- ○ Weekend Receipt & Processing
- ○ 24 Hour
- ○ 48 Hour
- ○ 3 Day
- ○ 5 Day

Telephone Result: ○ Yes ○ No | Telephone #:
Fax Result: ○ Yes ○ No | Fax #:

* Please note extra fees are added for expedited processing times. In order to invoke this service the lab must be notified by phone and signing the line below.

All Times and Dates Must be Filled Or Sample Will Be Rejected
And Client Charged $50 for Time to Make Correction At Lab

Chain of Custody

I hereby agree to pay the extra charges associated with Expedited Service _____ Signature

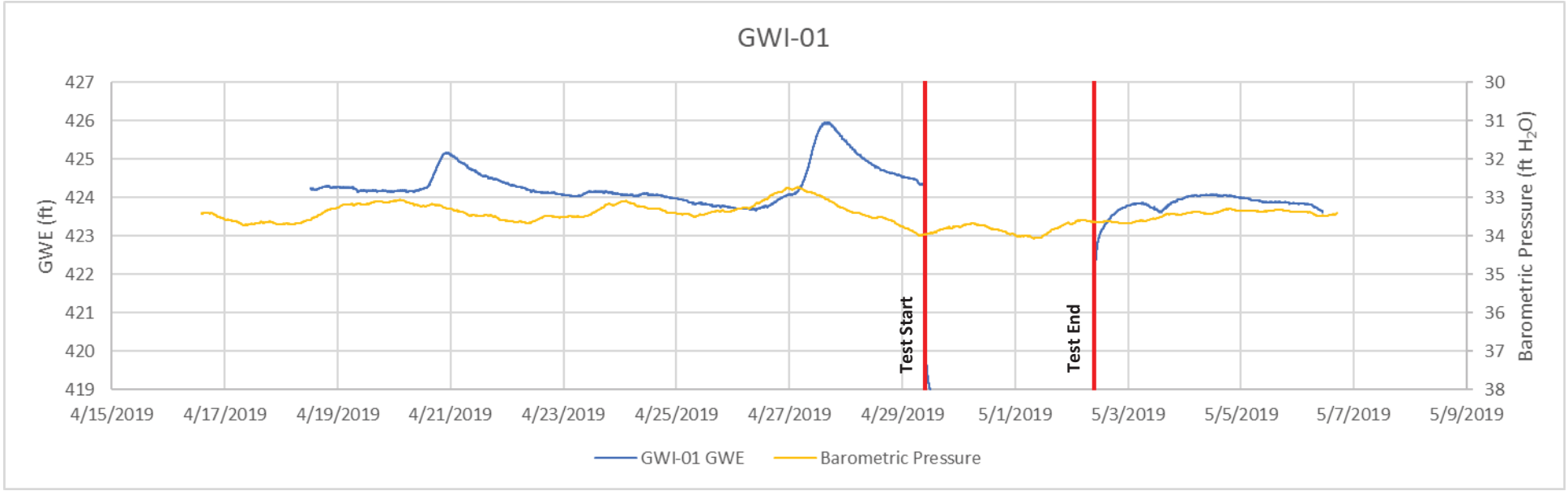
[signature]	5-2-19	1420			

Incomplete information may delay analysis and or invalidate results.

Requirements for MPA: Need at least 500 gallons sampled and must arrive at lab at or below 3°C and arrive at within 48 hour.

*Note incorrect date was initially recorded. This error was corrected [illegible]

Attachment 8
Pumping Test Hydrographs
with Barometric Pressure Data



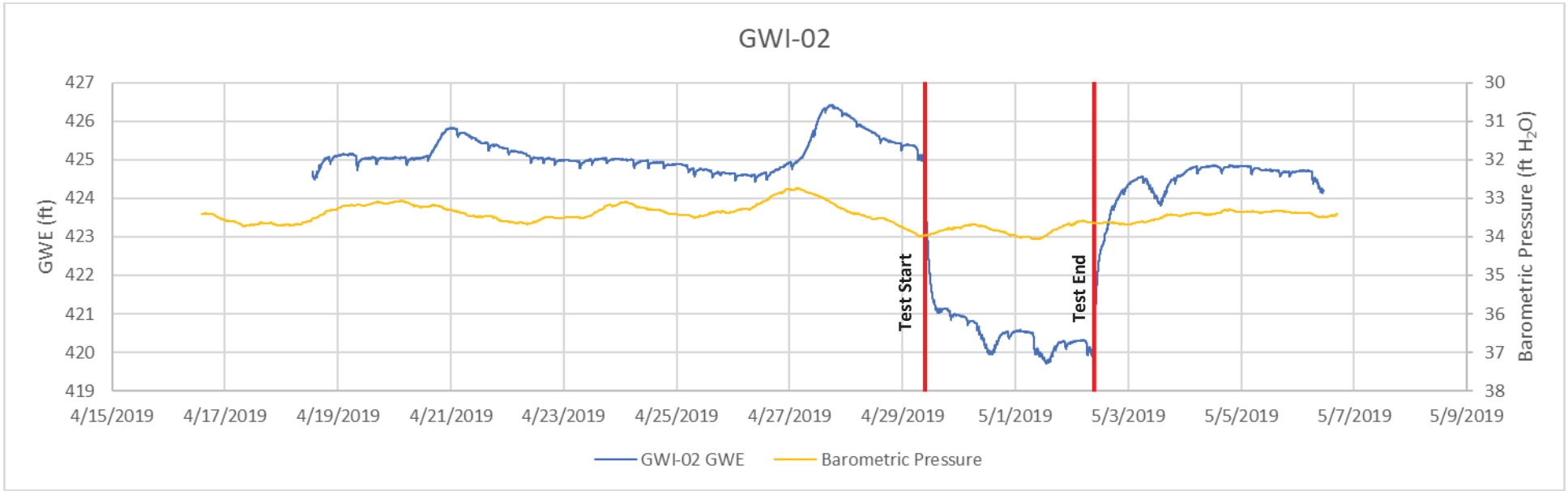
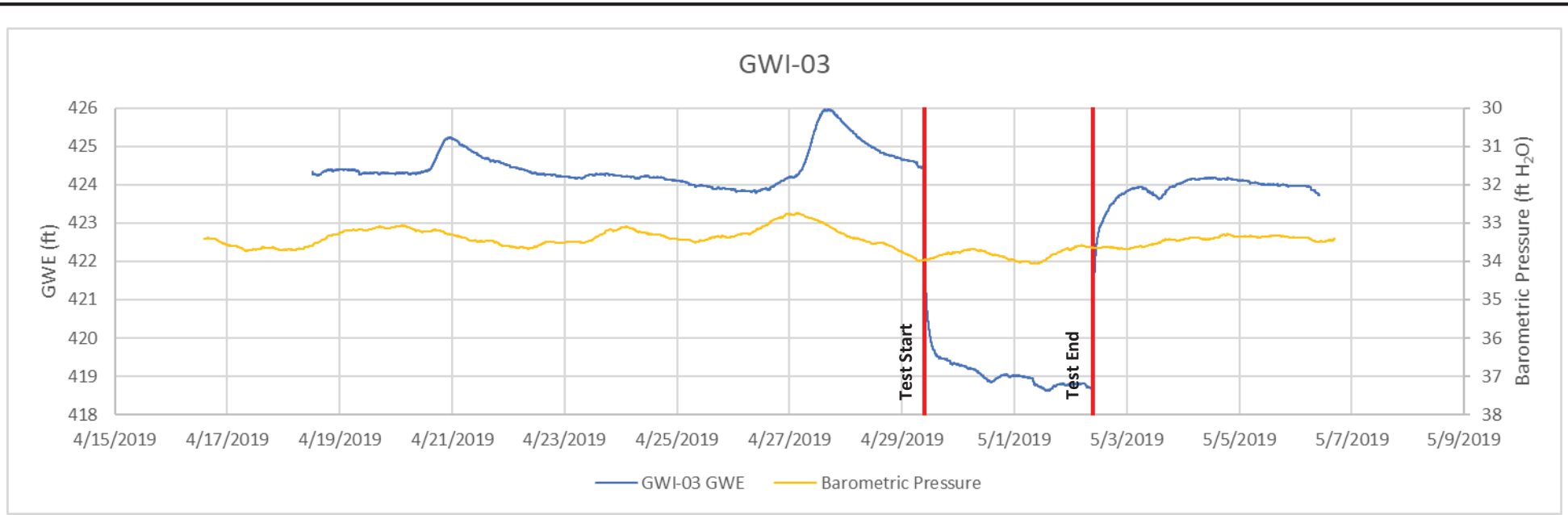


Figure A8-1: April 2019 Pumping Test: Barometric Pressure & Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



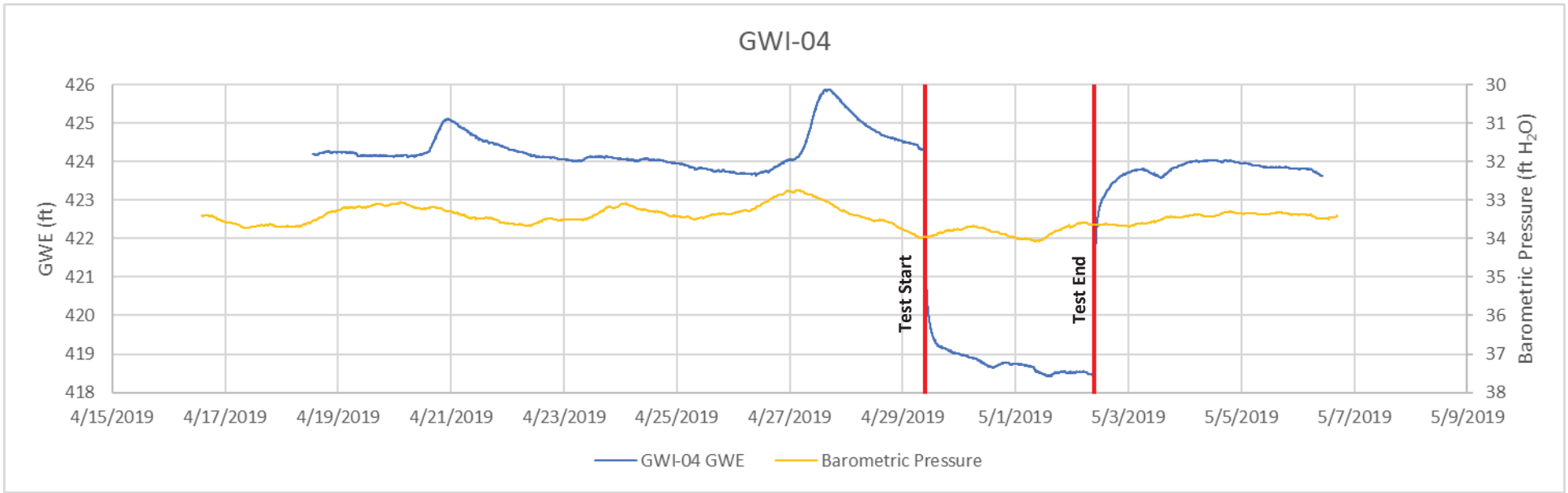
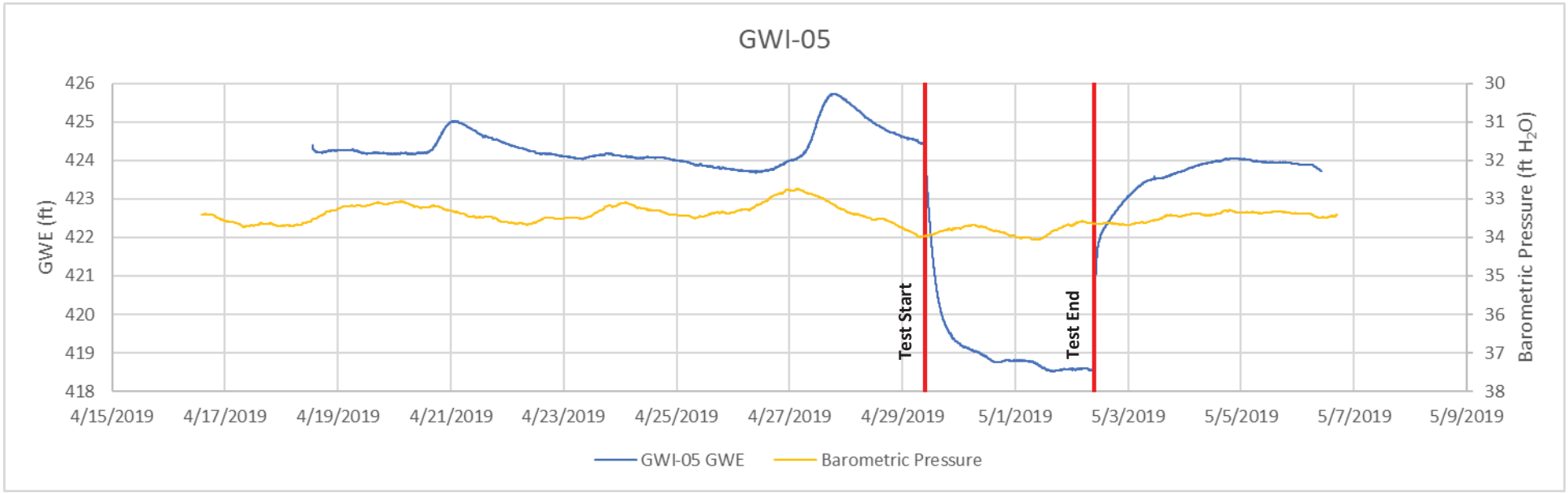


Figure A8-2: April 2019 Pumping Test: Barometric Pressure & Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



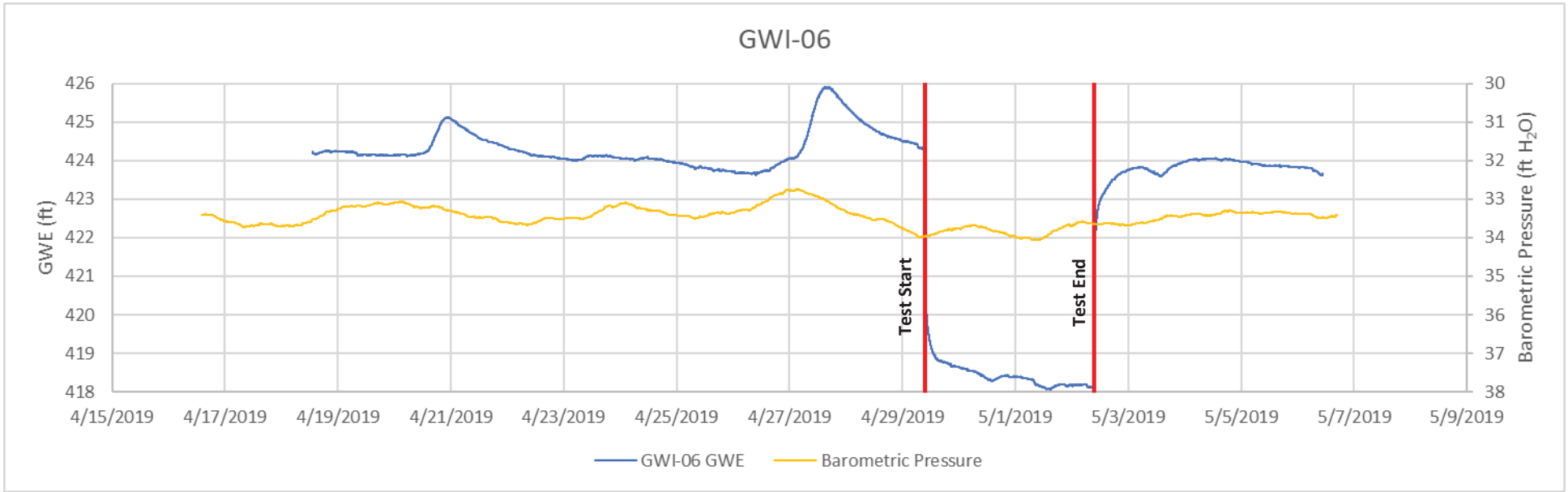
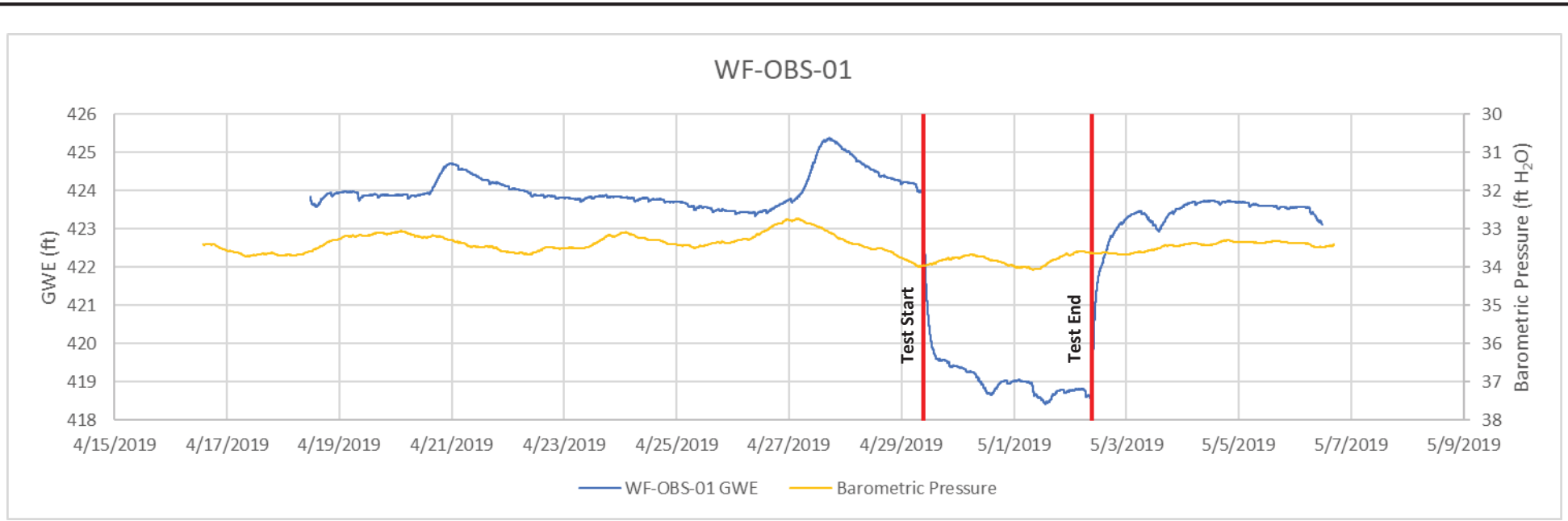


Figure A8-3: April 2019 Pumping Test: Barometric Pressure & Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



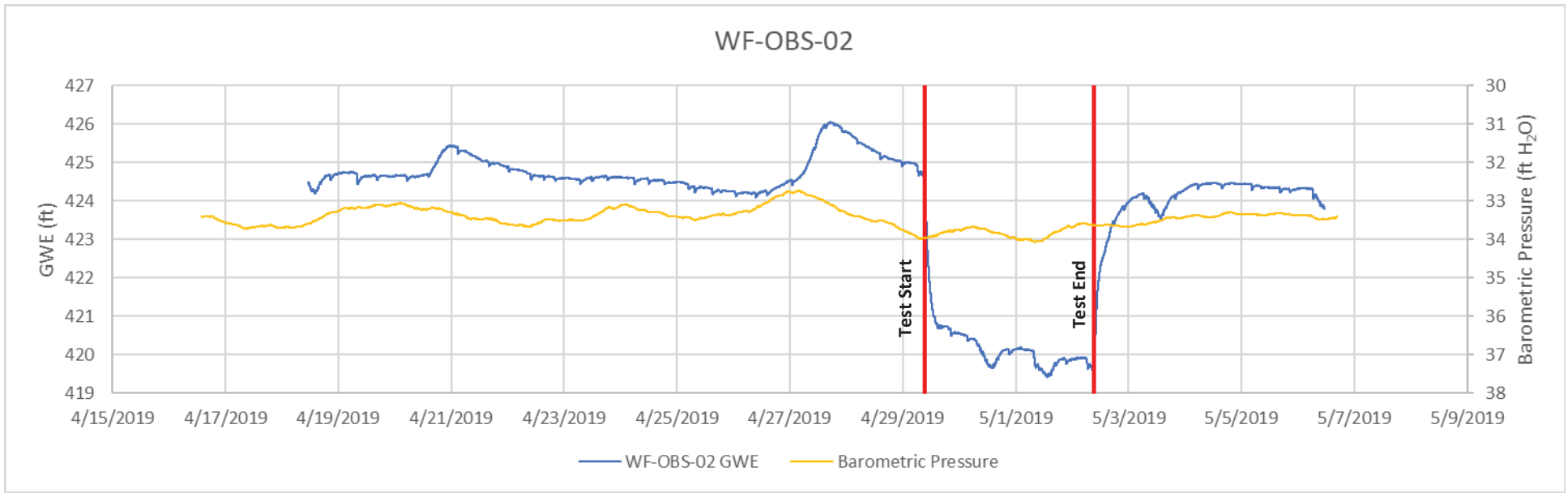
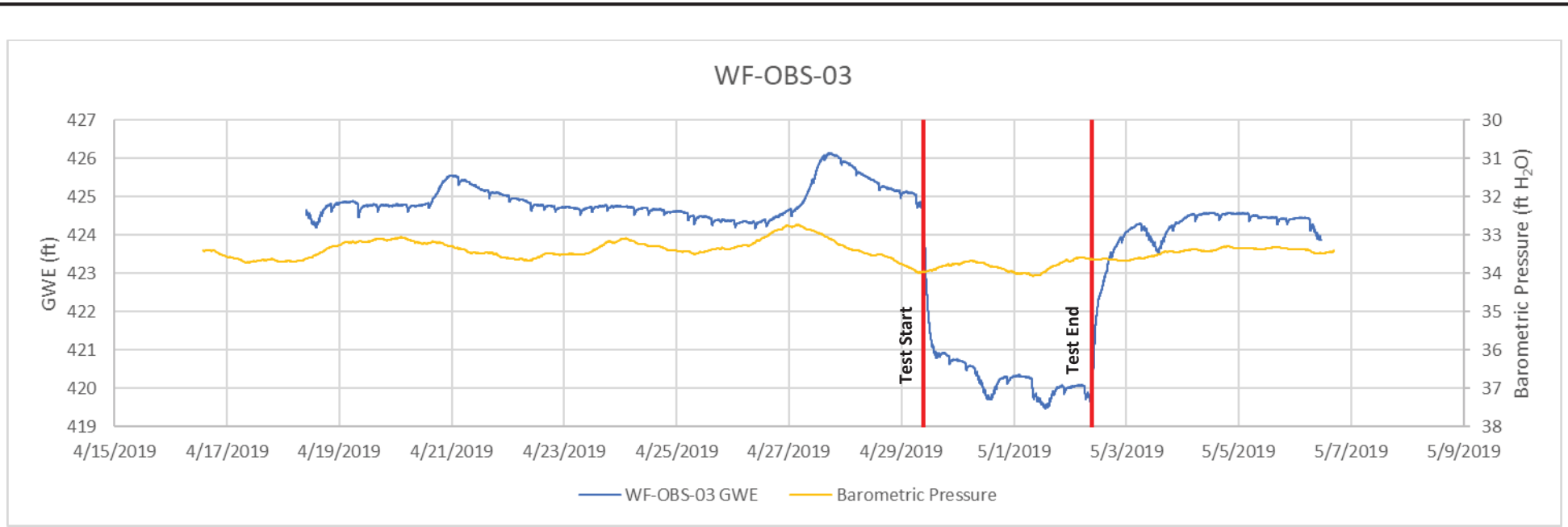


Figure A8-4: April 2019 Pumping Test: Barometric Pressure & Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



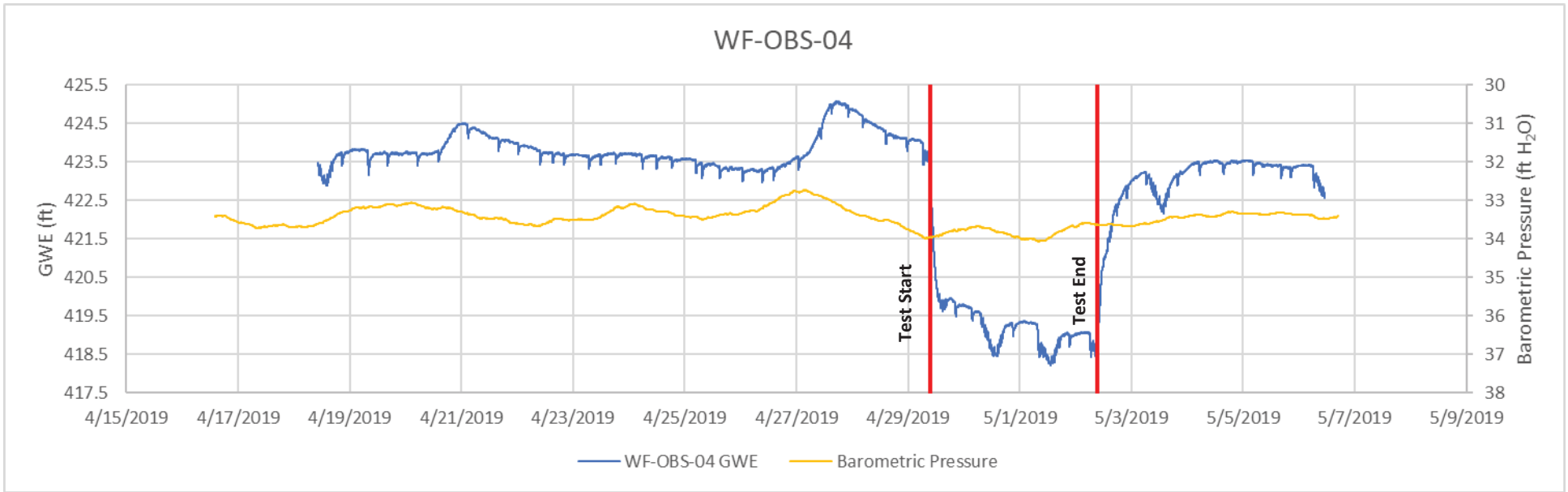
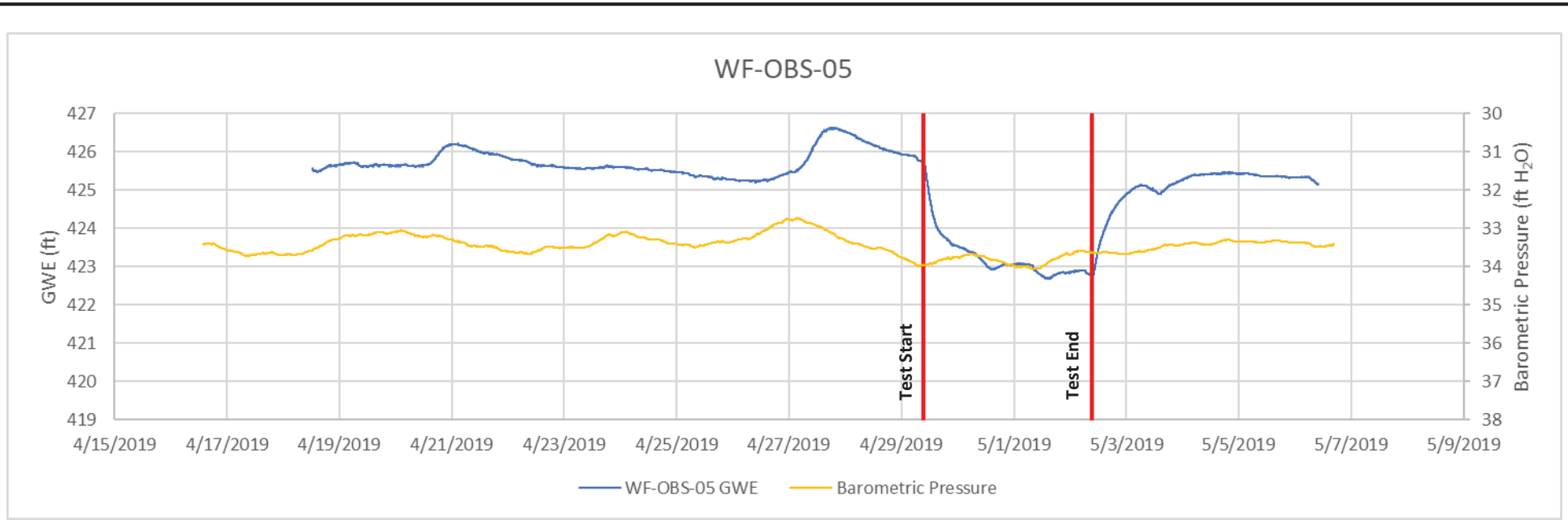


Figure A8-5: April 2019 Pumping Test: Barometric Pressure & Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



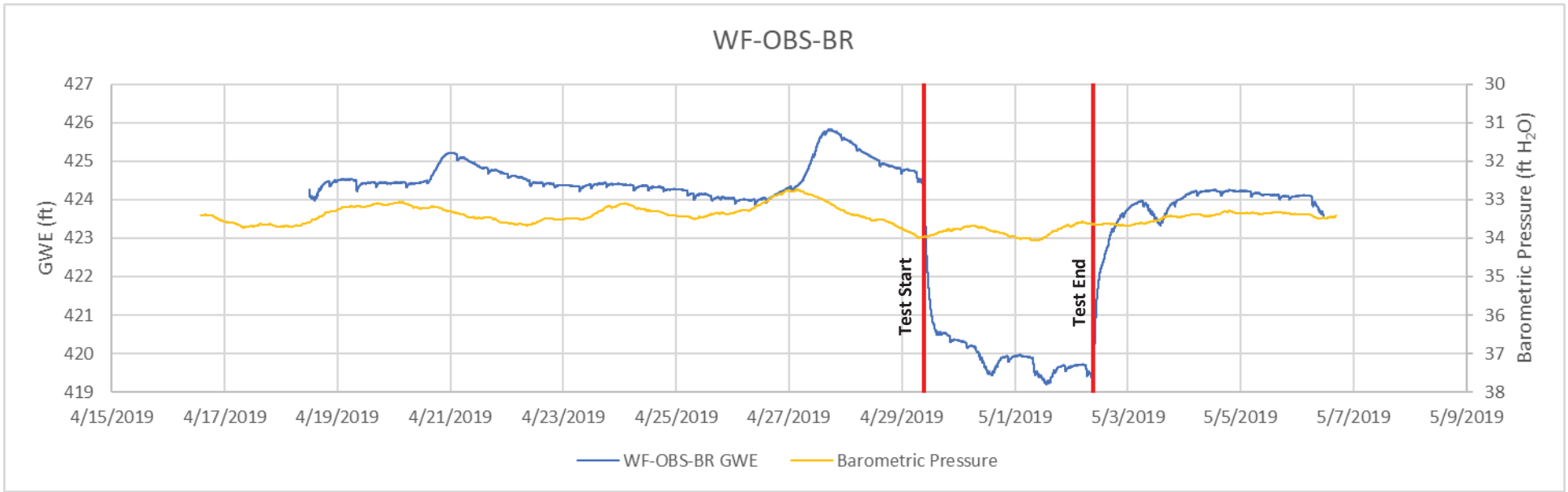
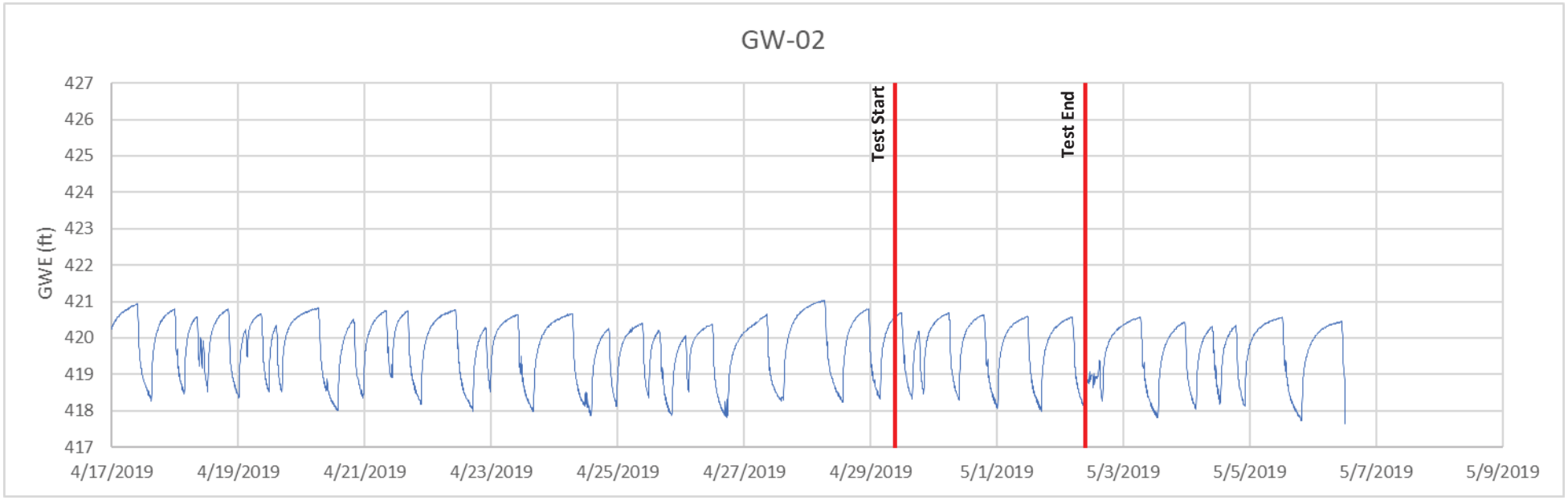


Figure A8-6: April 2019 Pumping Test: Barometric Pressure & Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



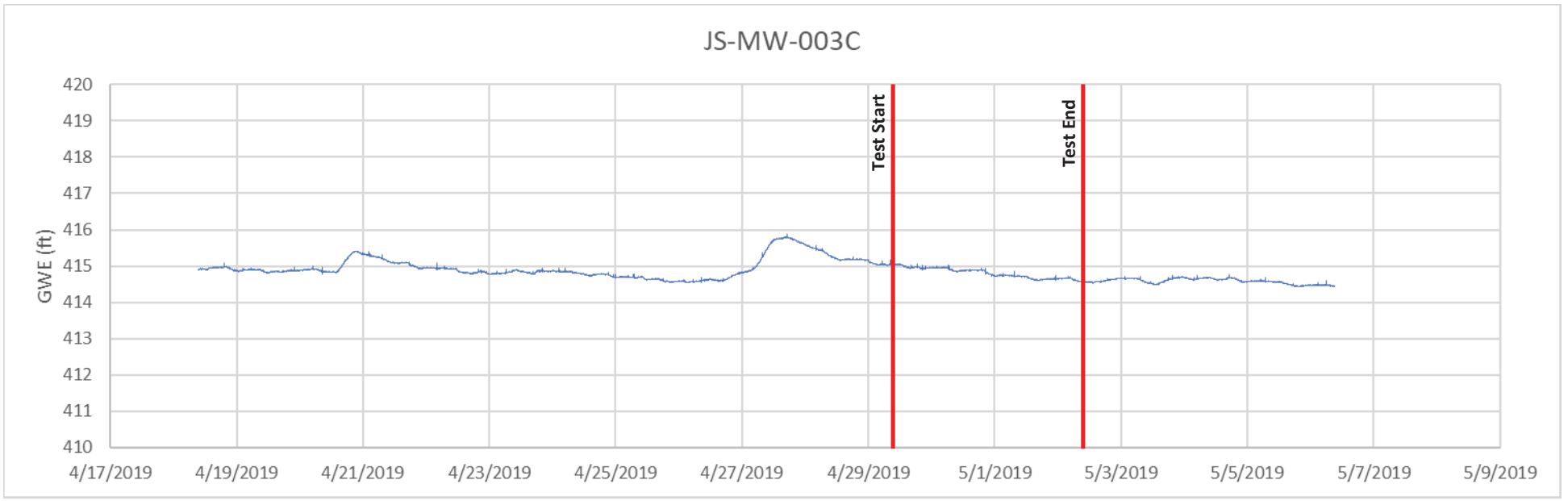
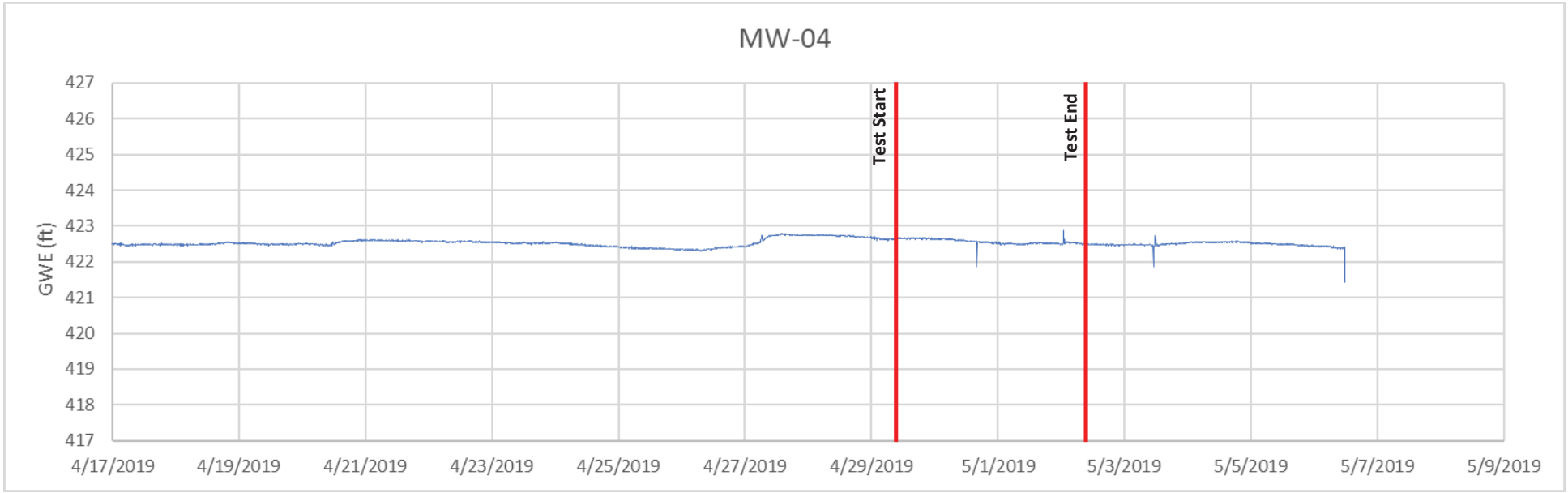


Figure A8-7: April 2019 Pumping Test:
Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



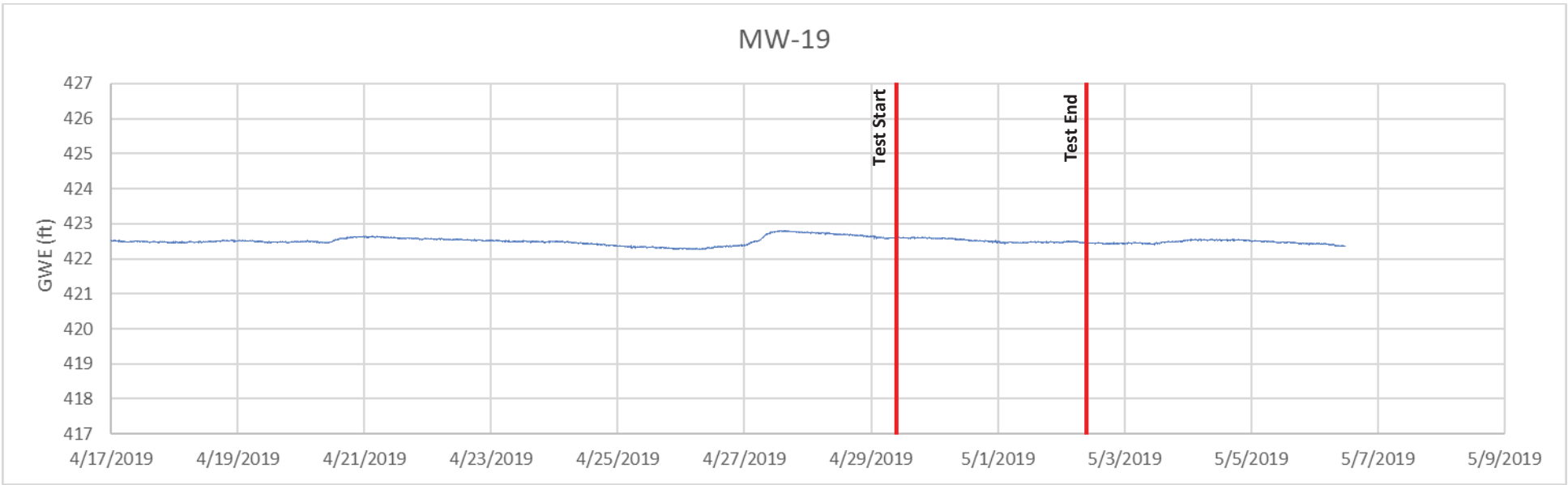


Figure A8-8: April 2019 Pumping Test:
Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists

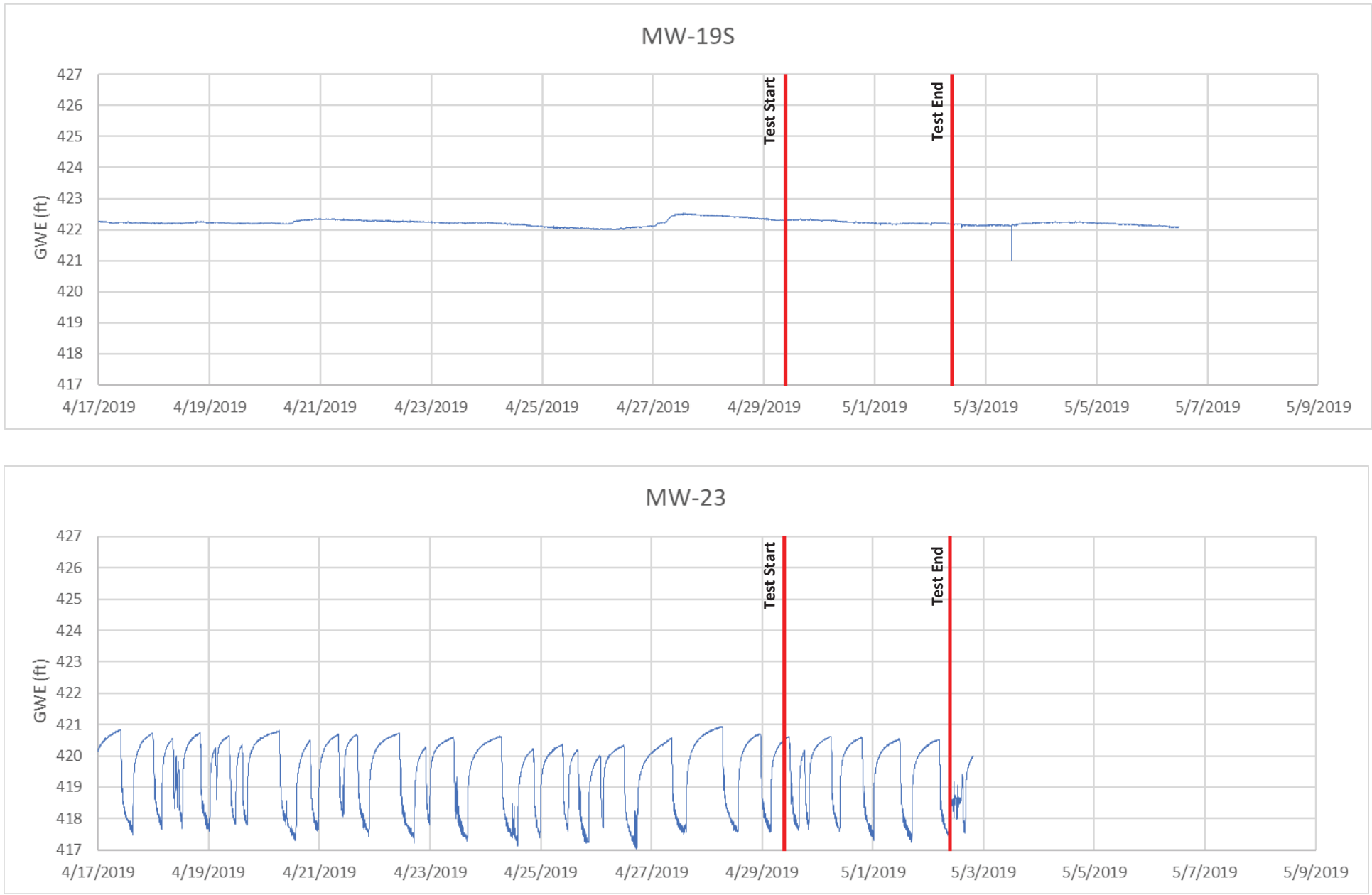
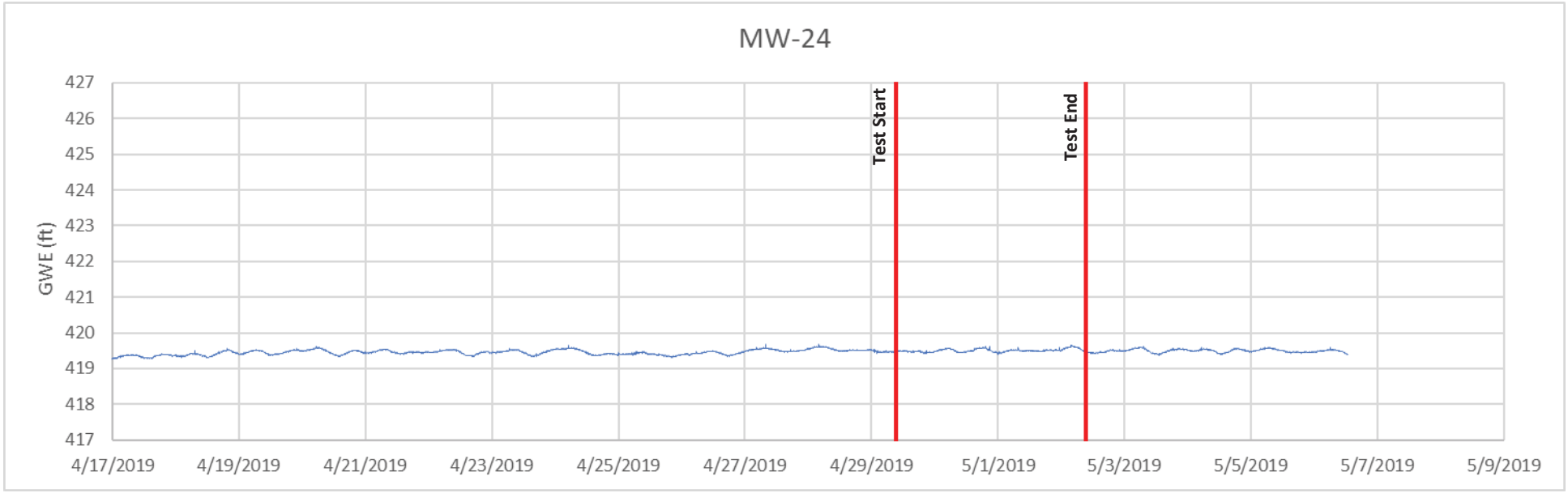


Figure A8-9: April 2019 Pumping Test:
Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



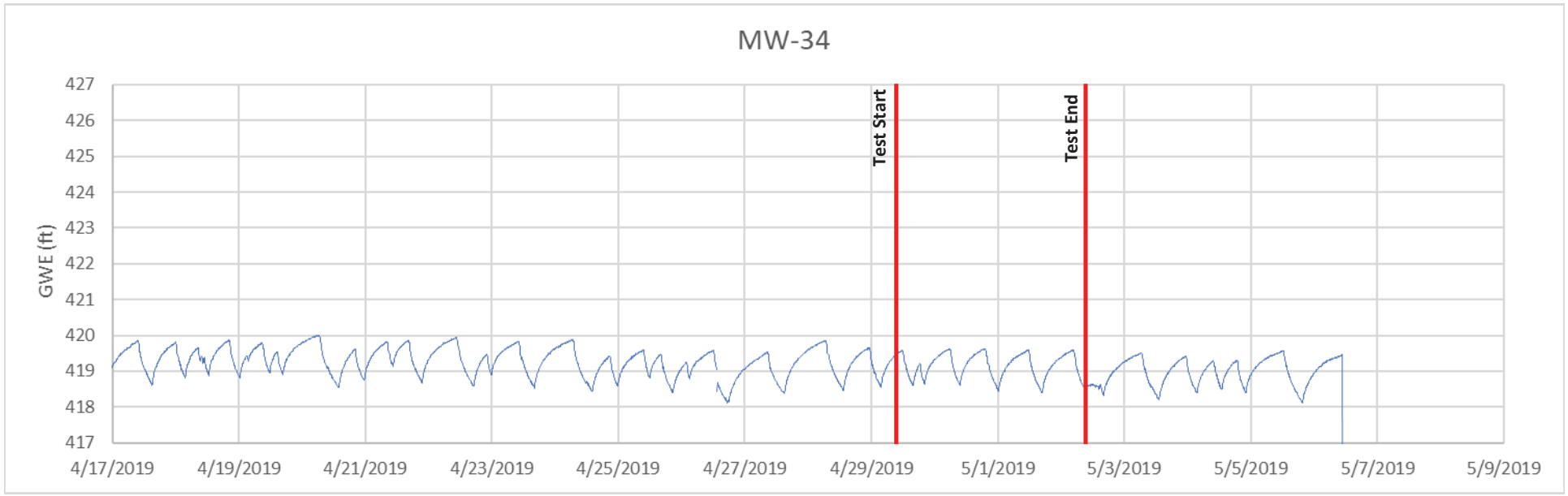
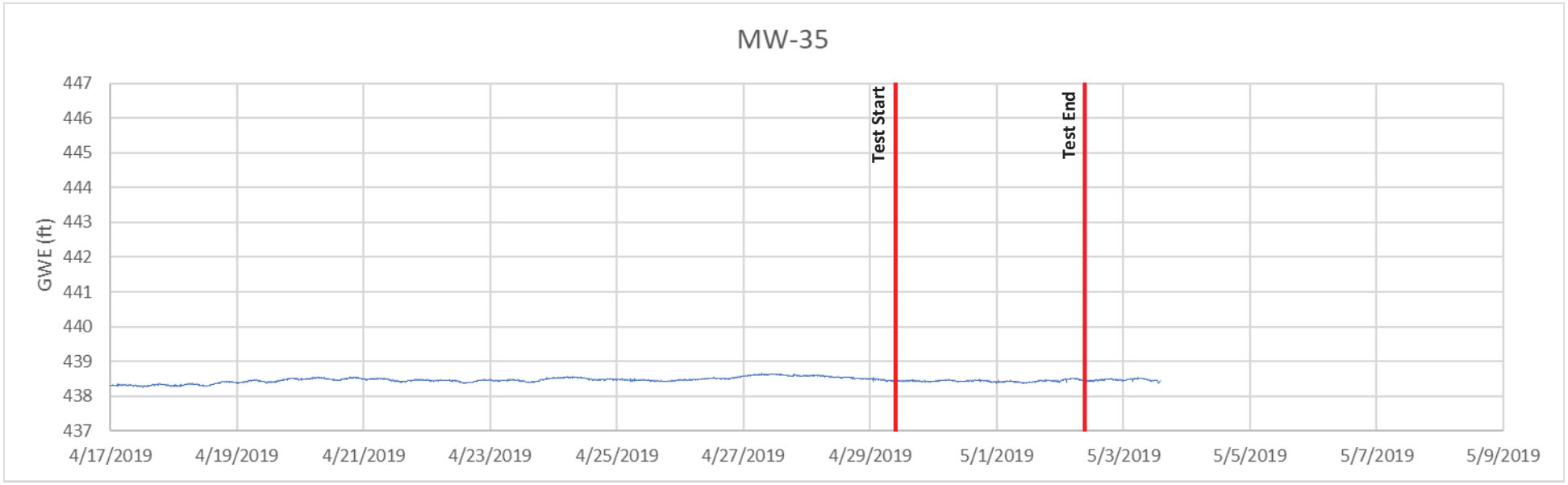


Figure A8-10: April 2019 Pumping Test:
Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



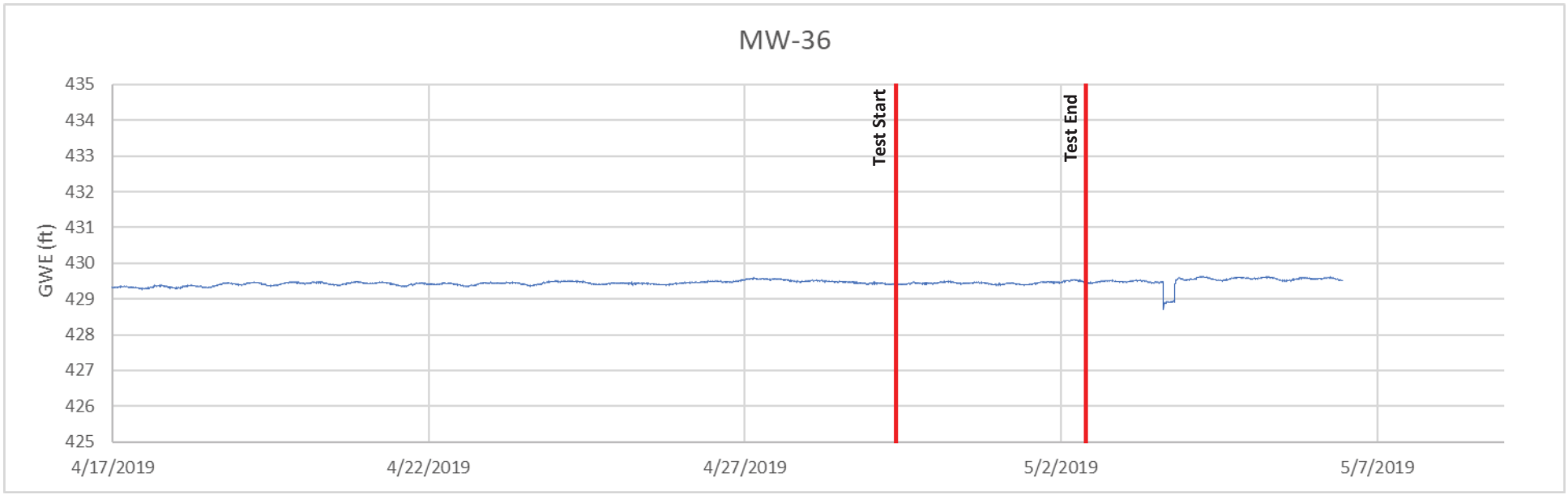
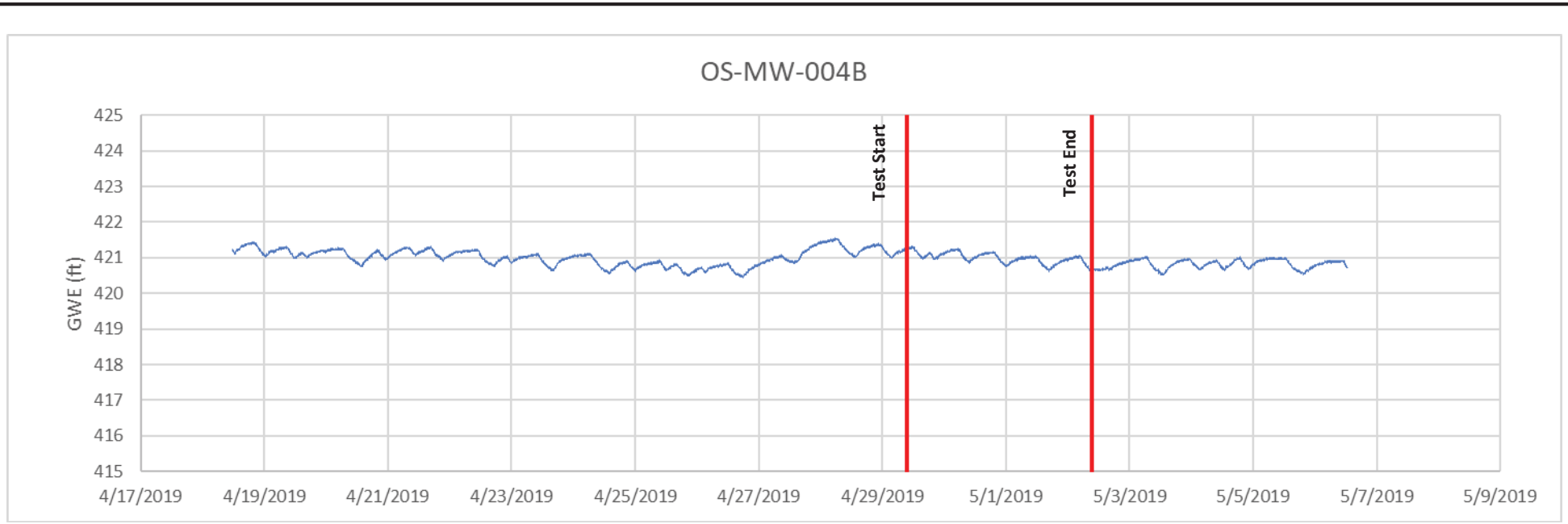


Figure A8-11: April 2019 Pumping Test:
Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



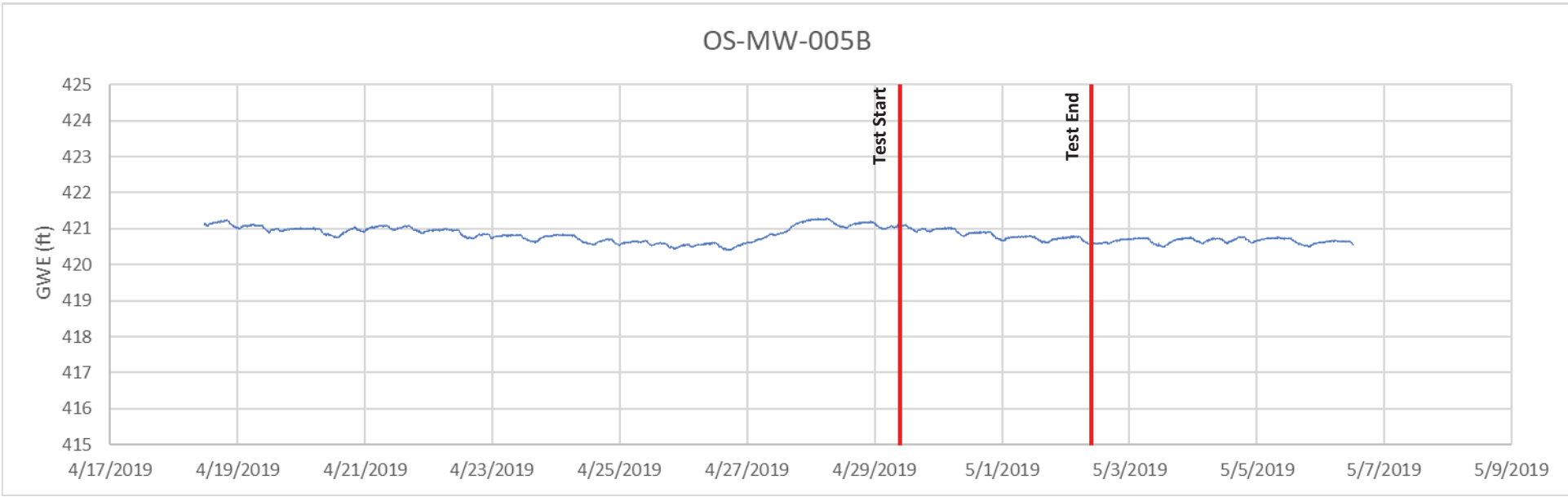
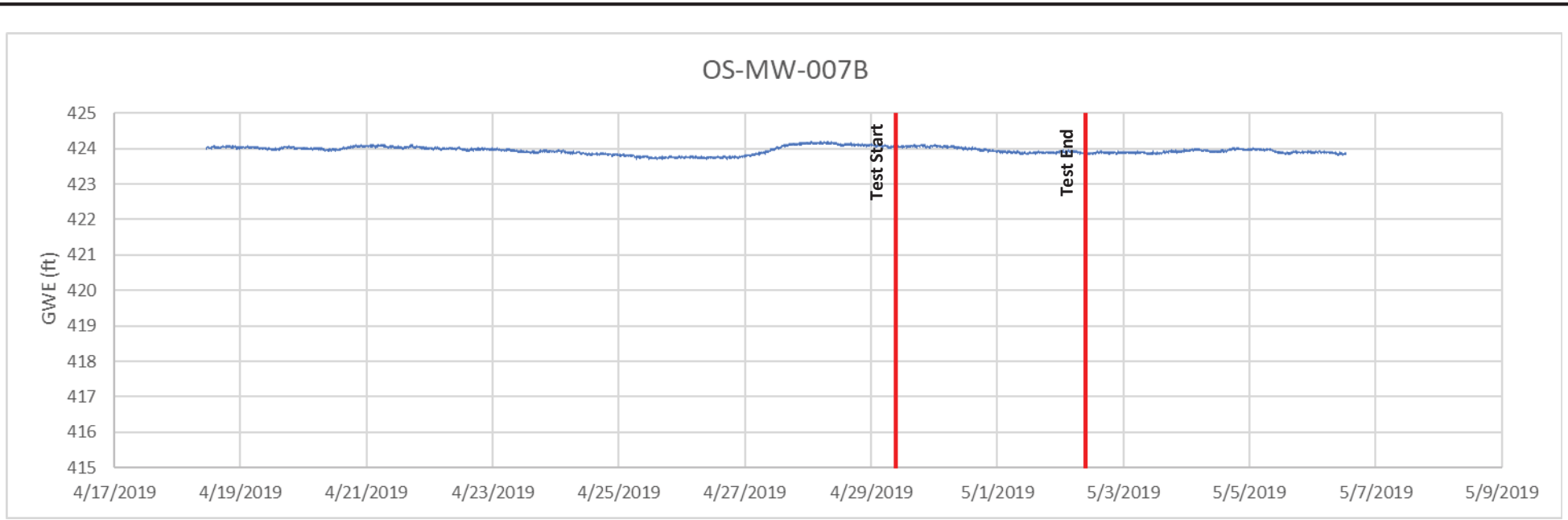


Figure A8-12: April 2019 Pumping Test:
Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



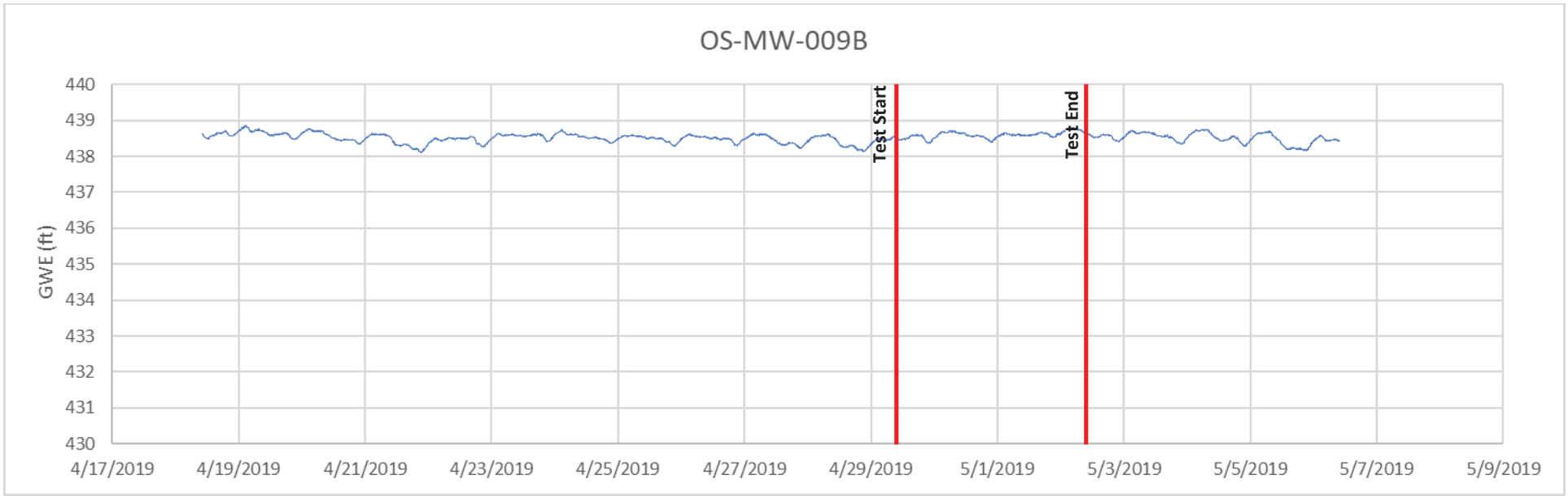
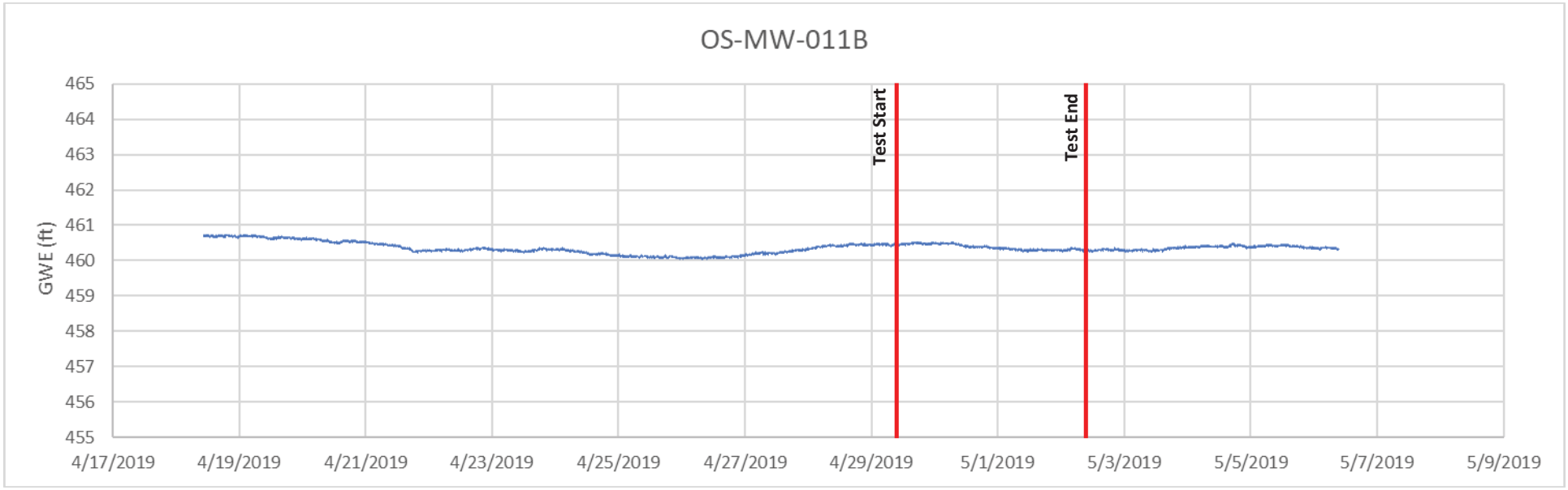


Figure A8-13: April 2019 Pumping Test:
Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



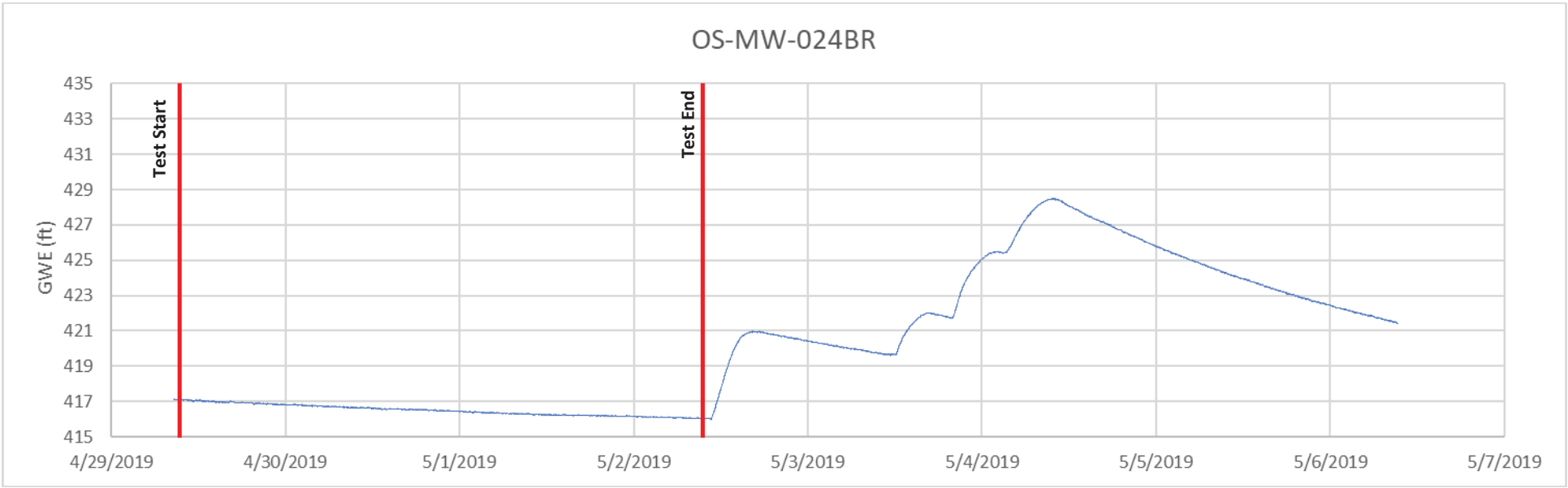
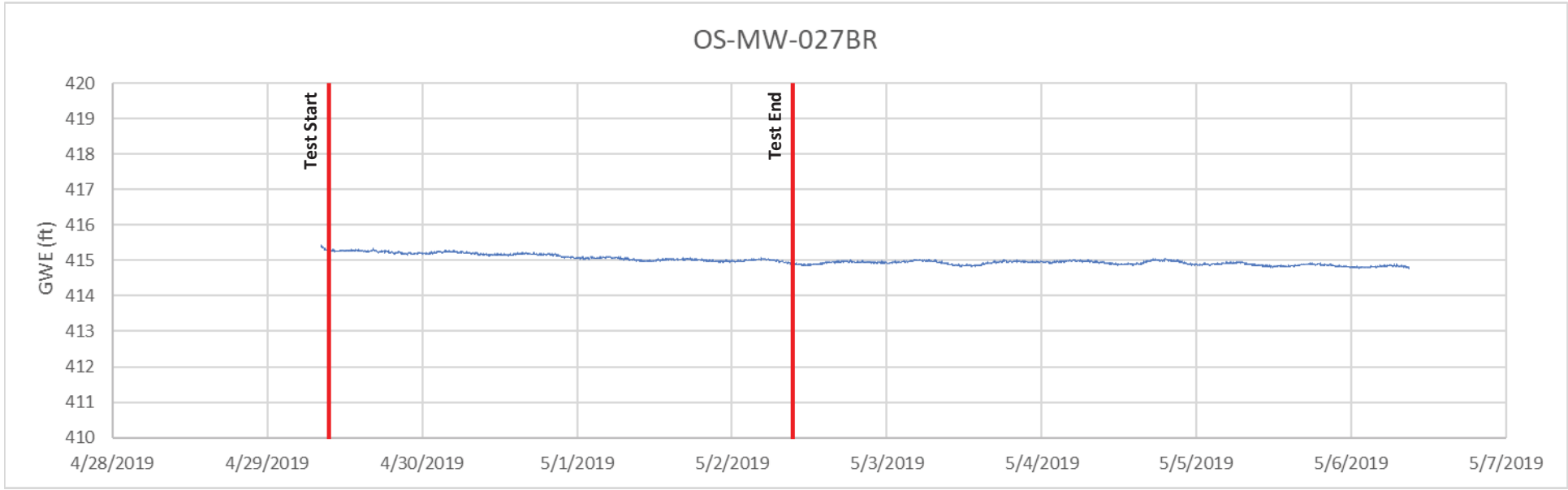


Figure A8-14: April 2019 Pumping Test:
Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



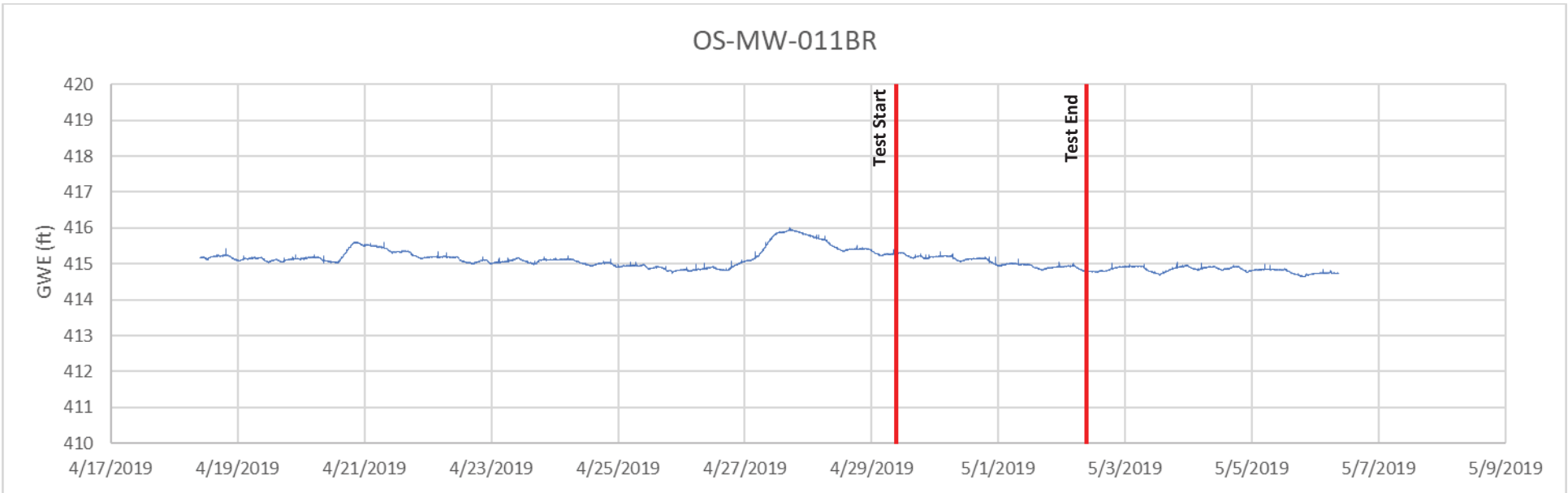


Figure A8-15: April 2019 Pumping Test:
Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists

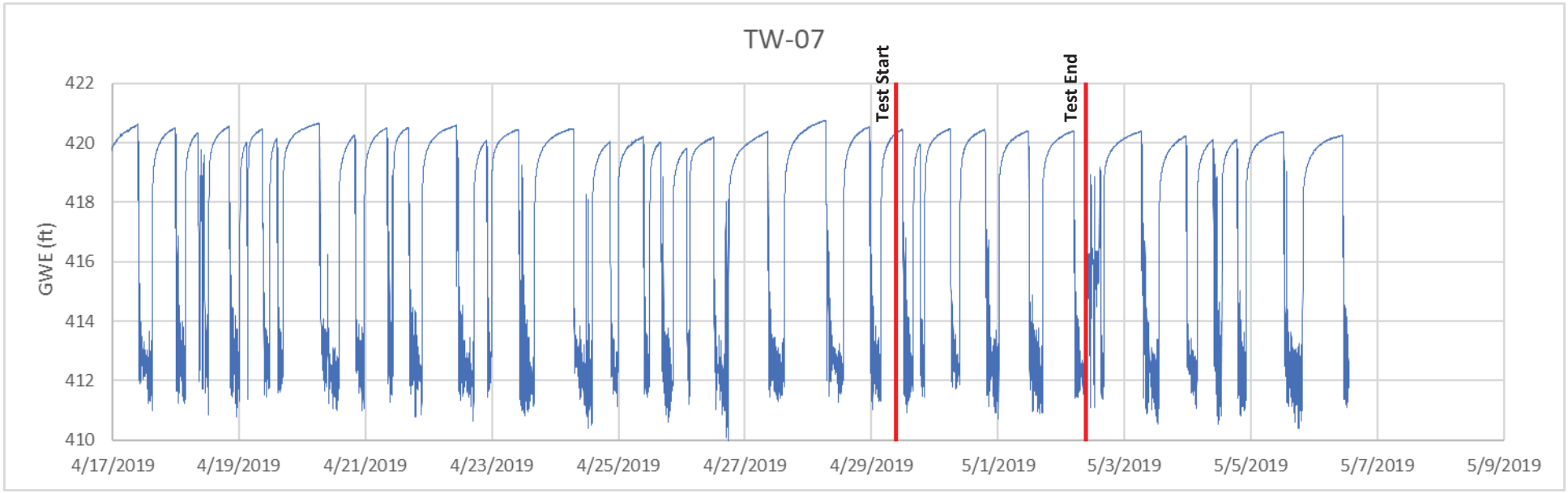


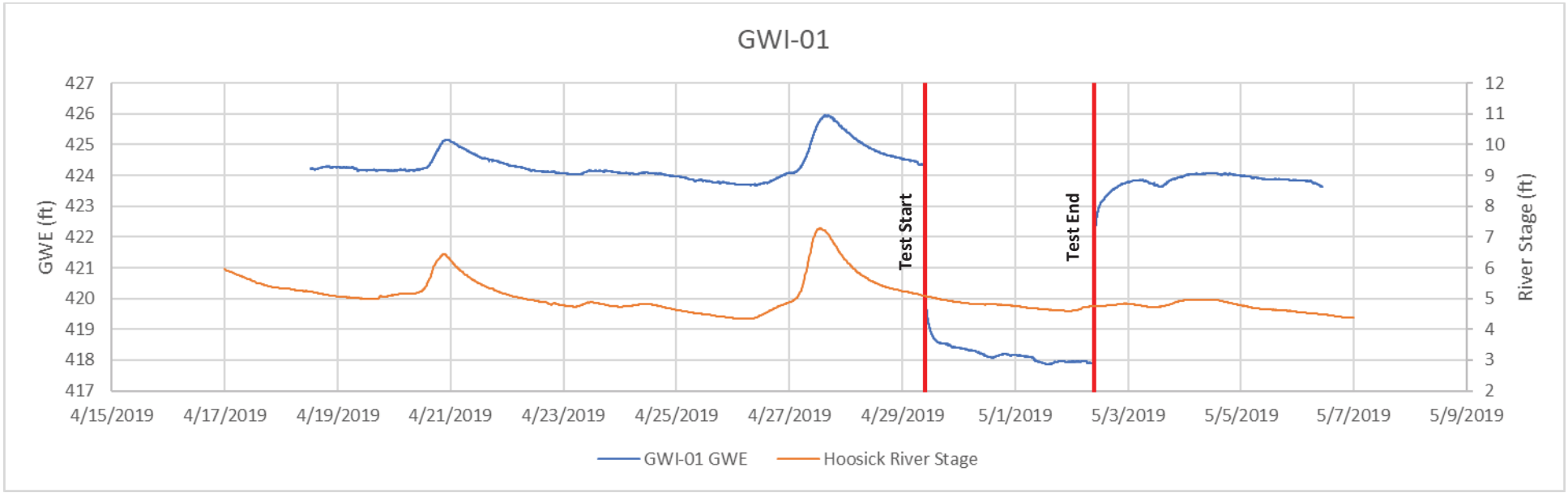
Figure A8-16: April 2019 Pumping Test:
Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists

Attachment 9

Pumping Test Hydrographs with River Stage

(GWI & WF)



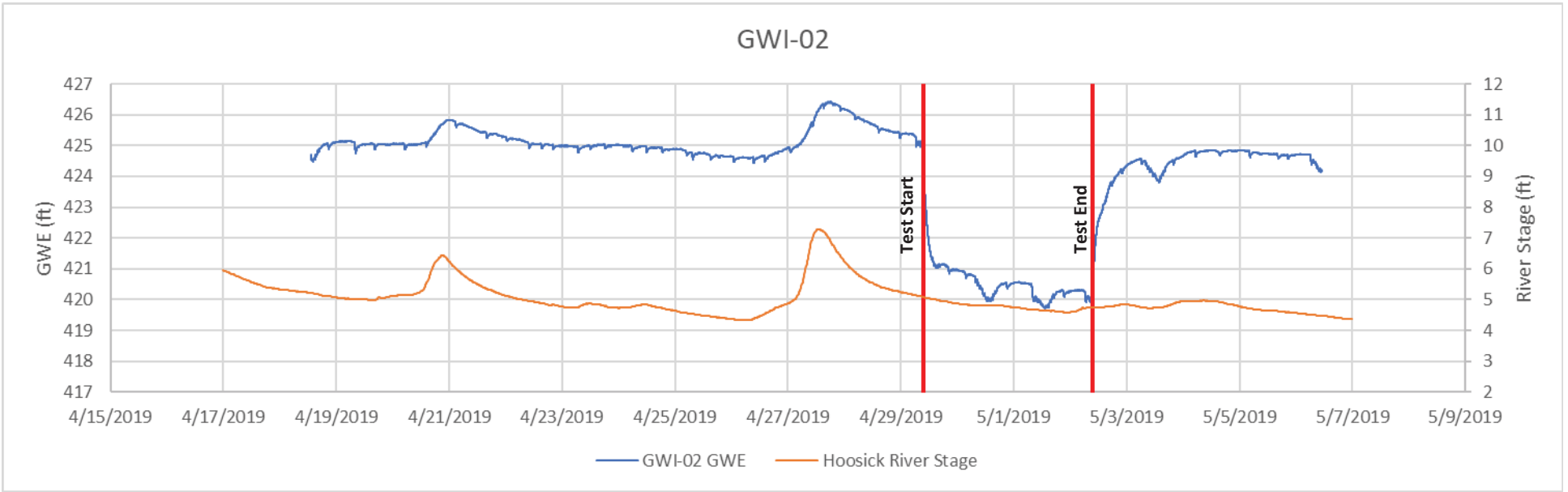
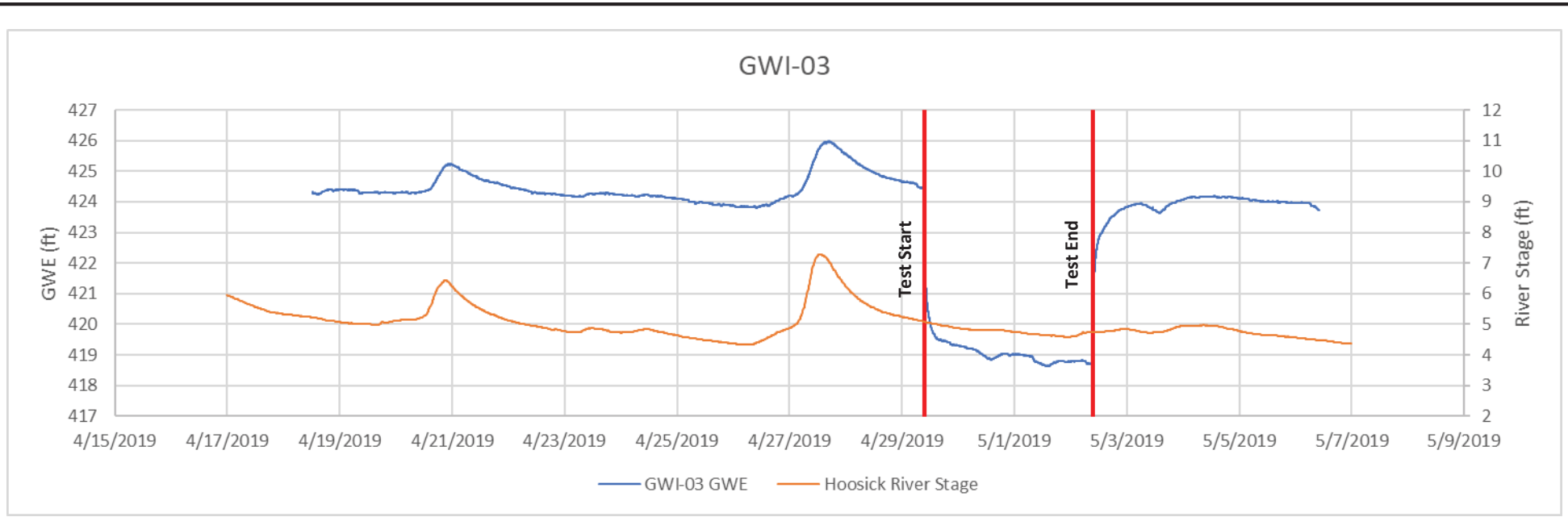


Figure A9-1: April 2019 Pumping Test: Hoosick - River Stage & Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



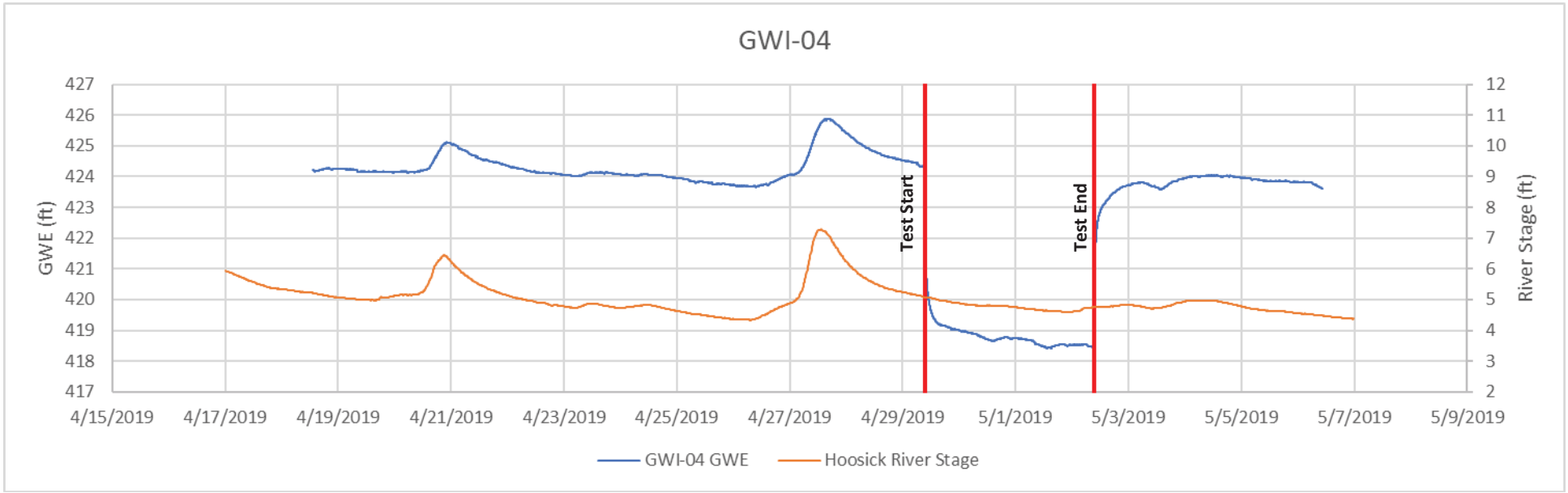
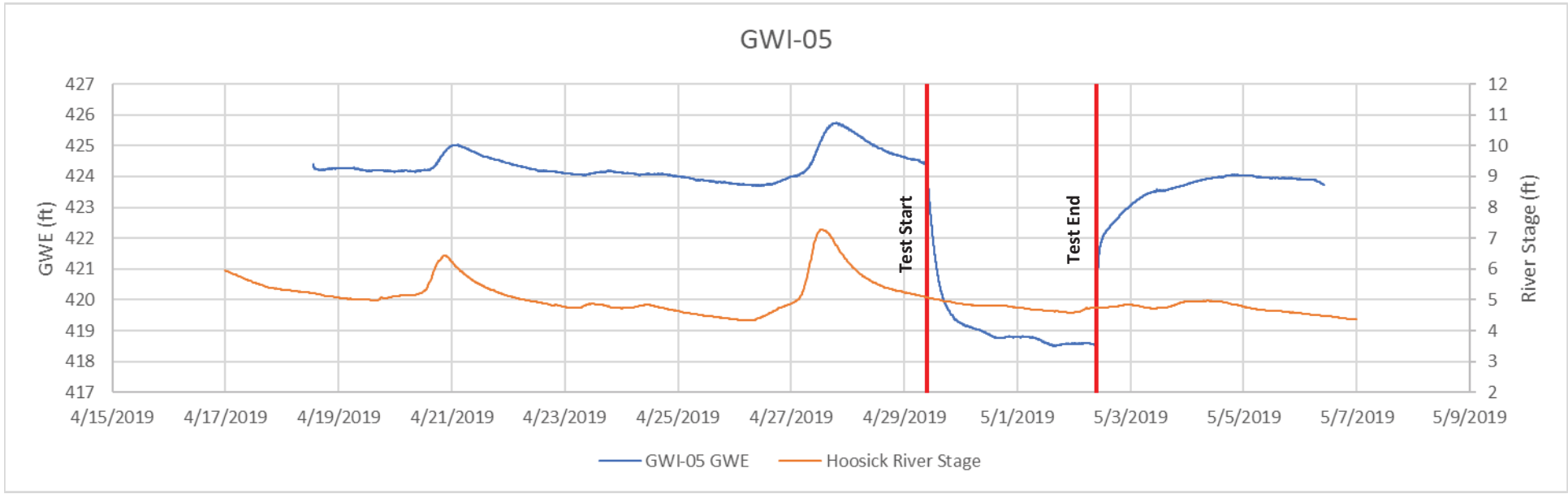


Figure A9-2: April 2019 Pumping Test - Hoosick River Stage & Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



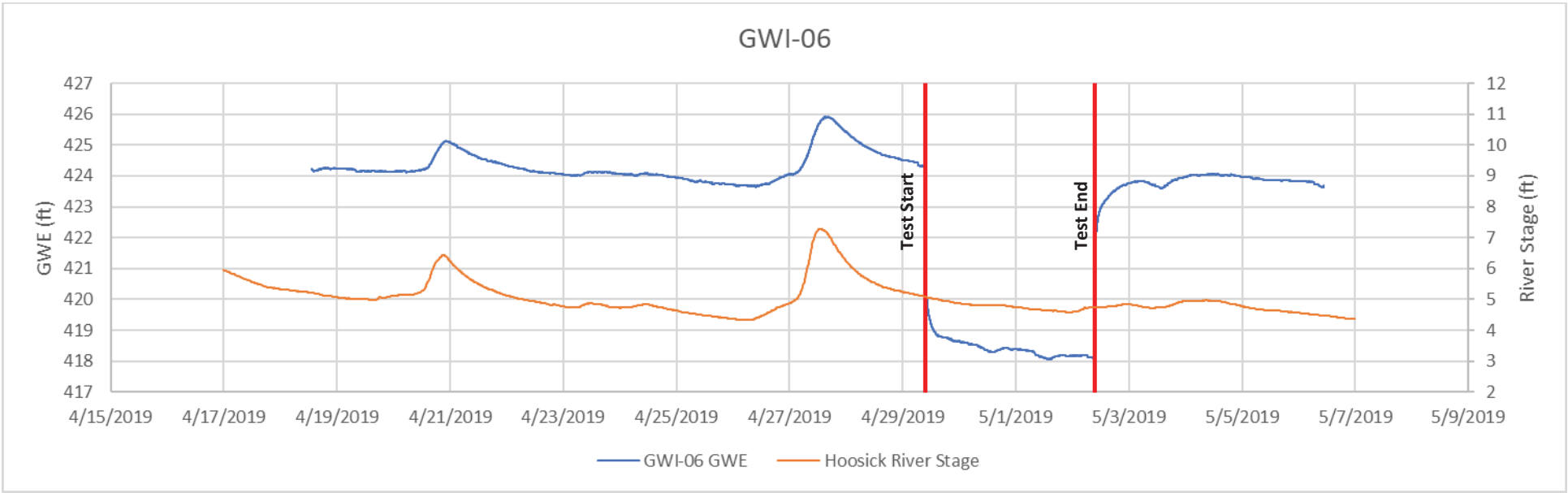
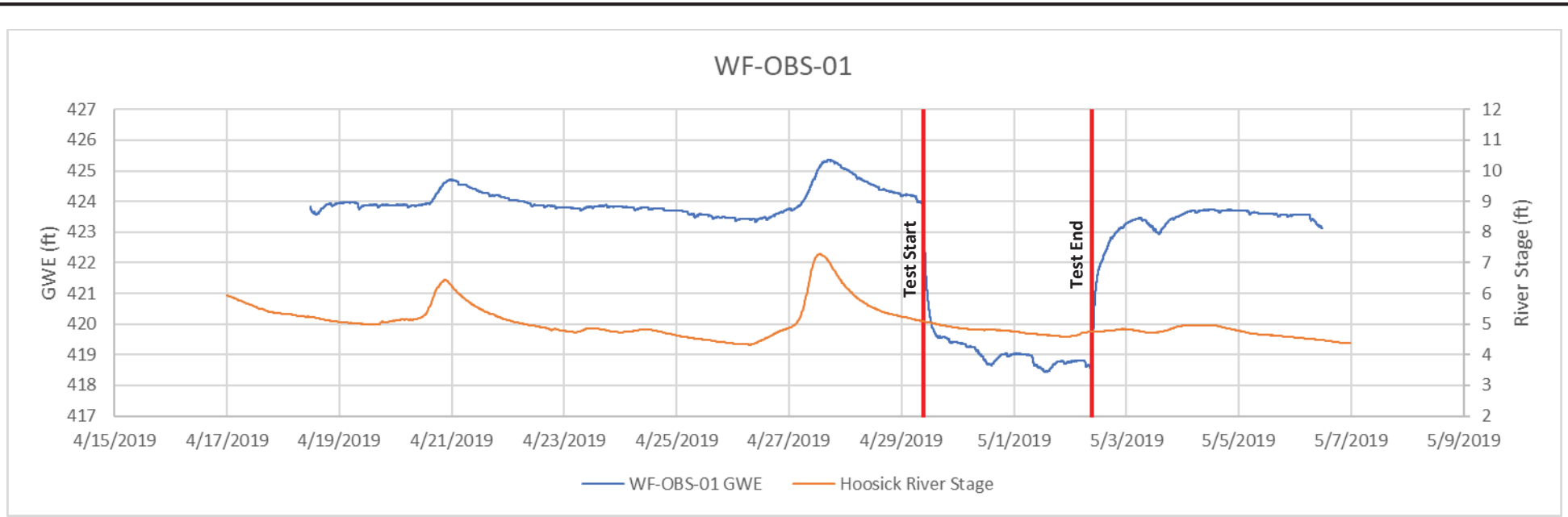


Figure A9-3: April 2019 Pumping Test - Hoosick River Stage & Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



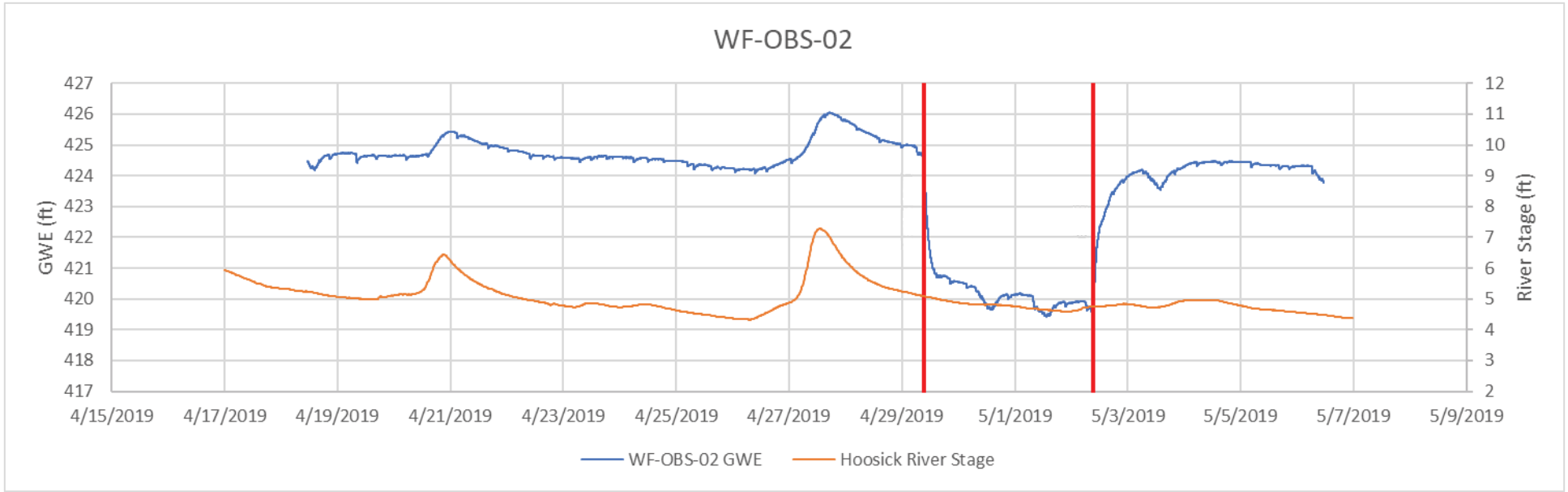
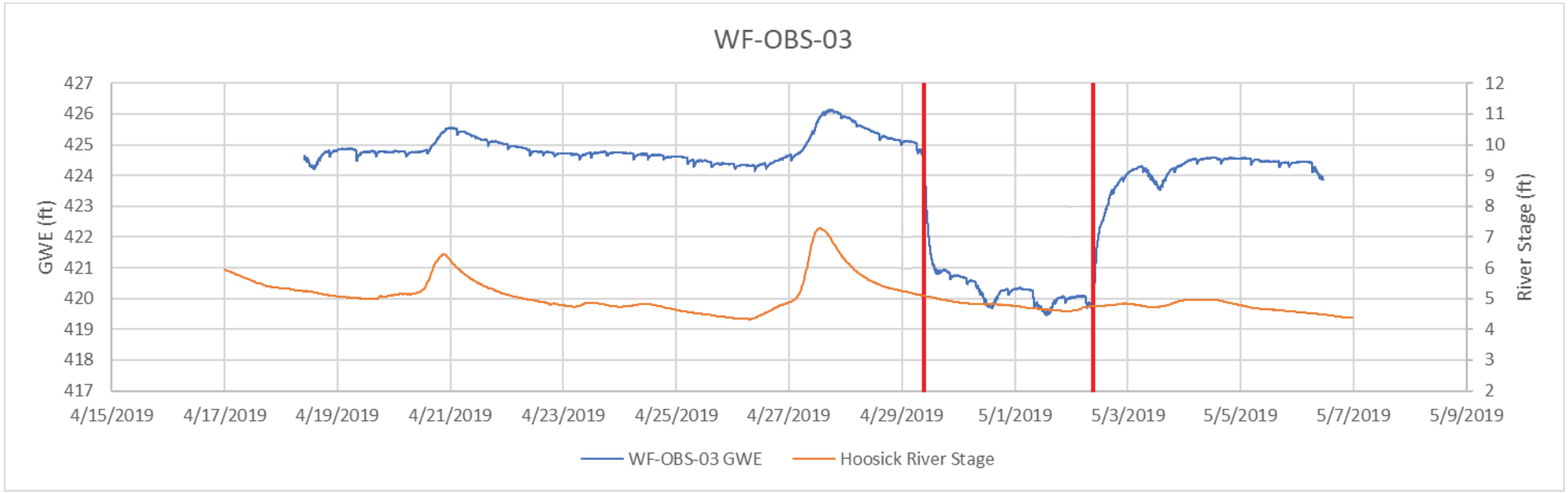


Figure A9-4: April 2019 Pumping Test - Hoosick River Stage & Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



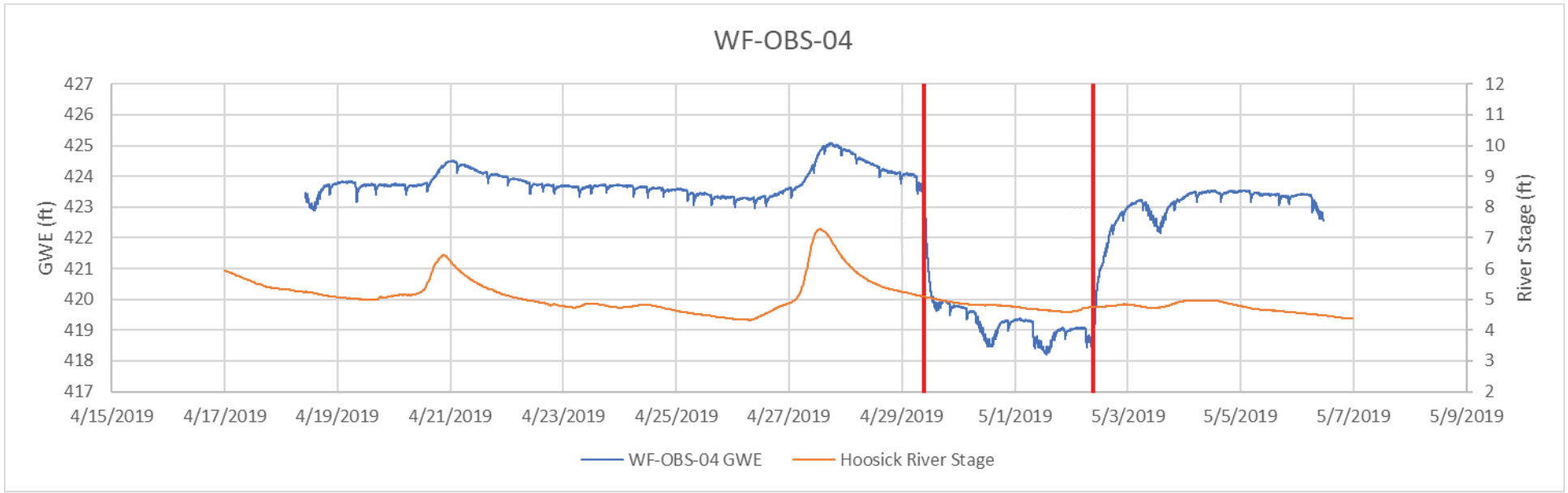
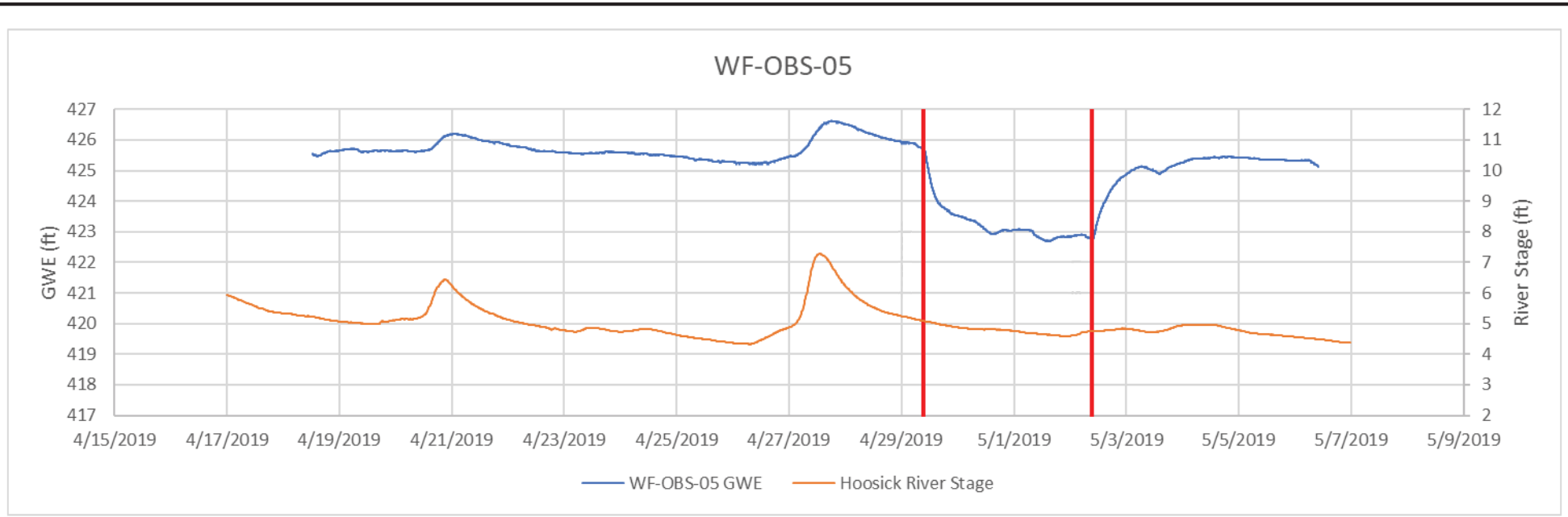


Figure A9-5: April 2019 Pumping Test - Hoosick River Stage & Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists



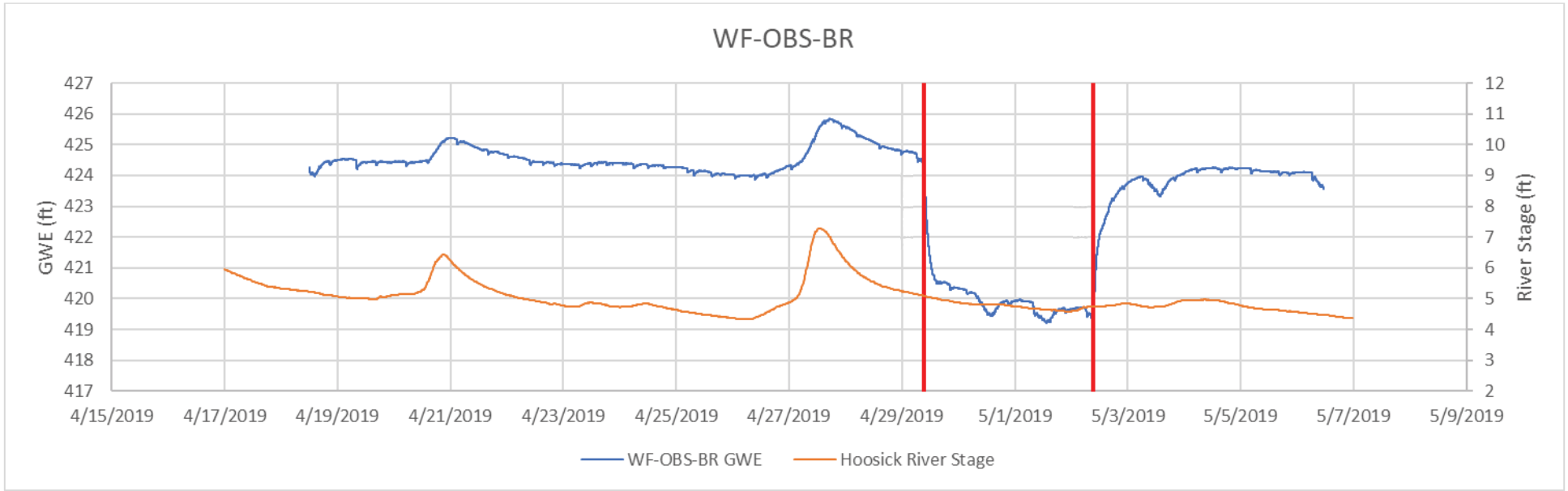


Figure A9-6: April 2019 Pumping Test - Hoosick River Stage & Groundwater Elevation *Hoosick Falls, New York*

Mutch Associates, LLC
Environmental Engineers and Scientists

Attachment 10

Pumping Test – River Efficiency Calculation (GWI & WF)

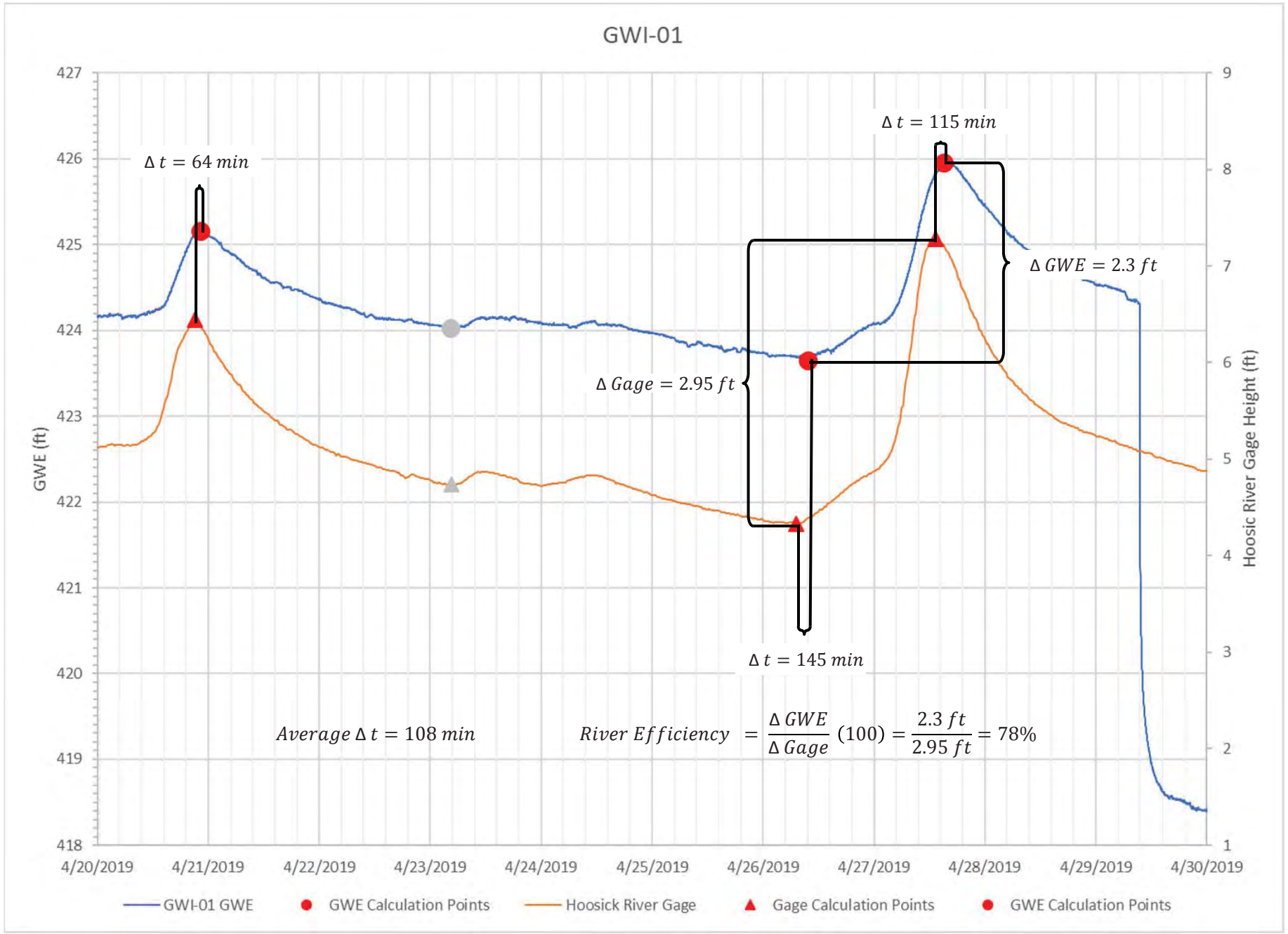


Figure A10-1: April 2019 Pump Test – River Efficiency Calculation of GWI-01

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

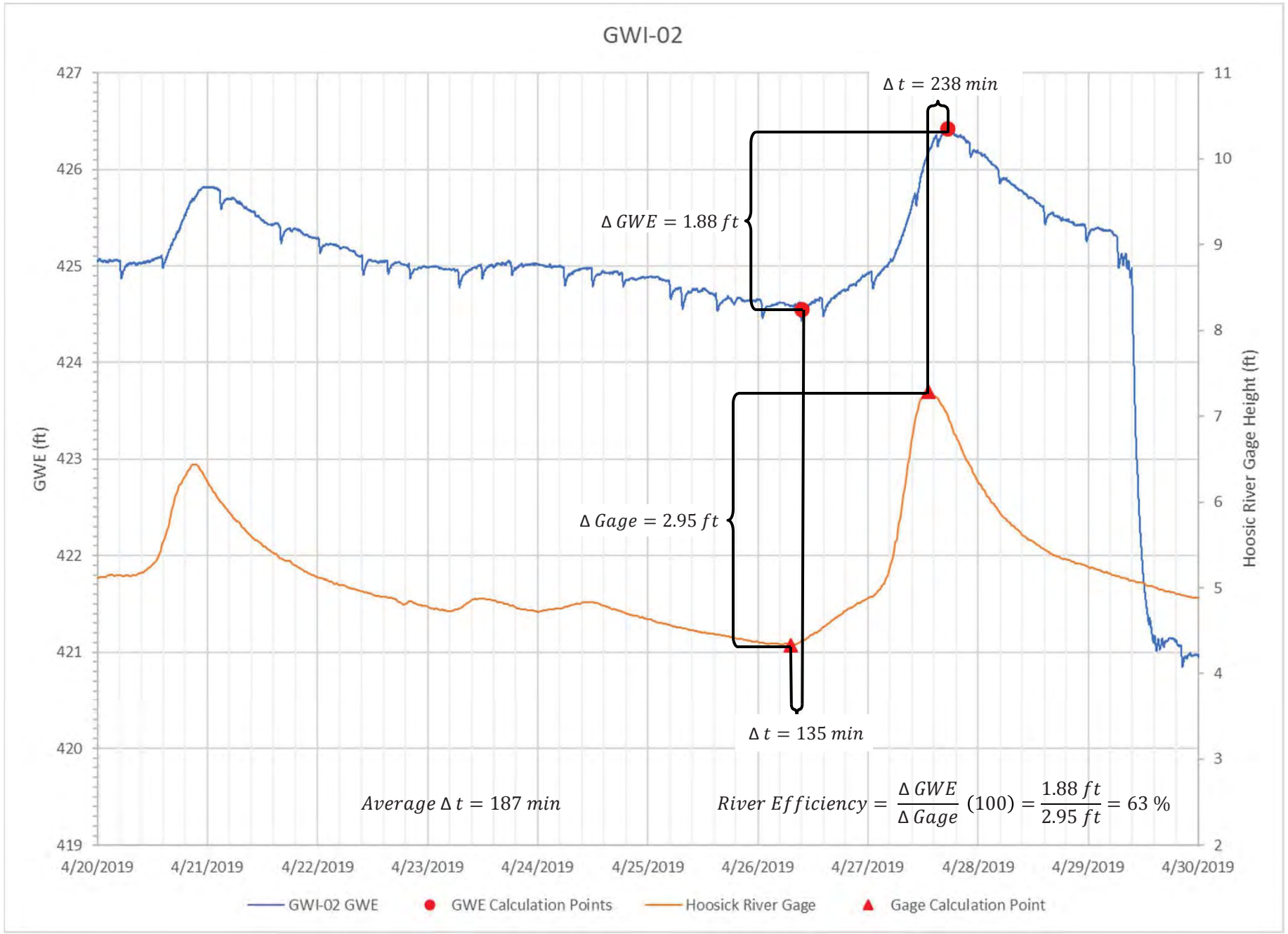


Figure A10-2: April 2019 Pump Test – River Efficiency Calculation of GWI-02

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

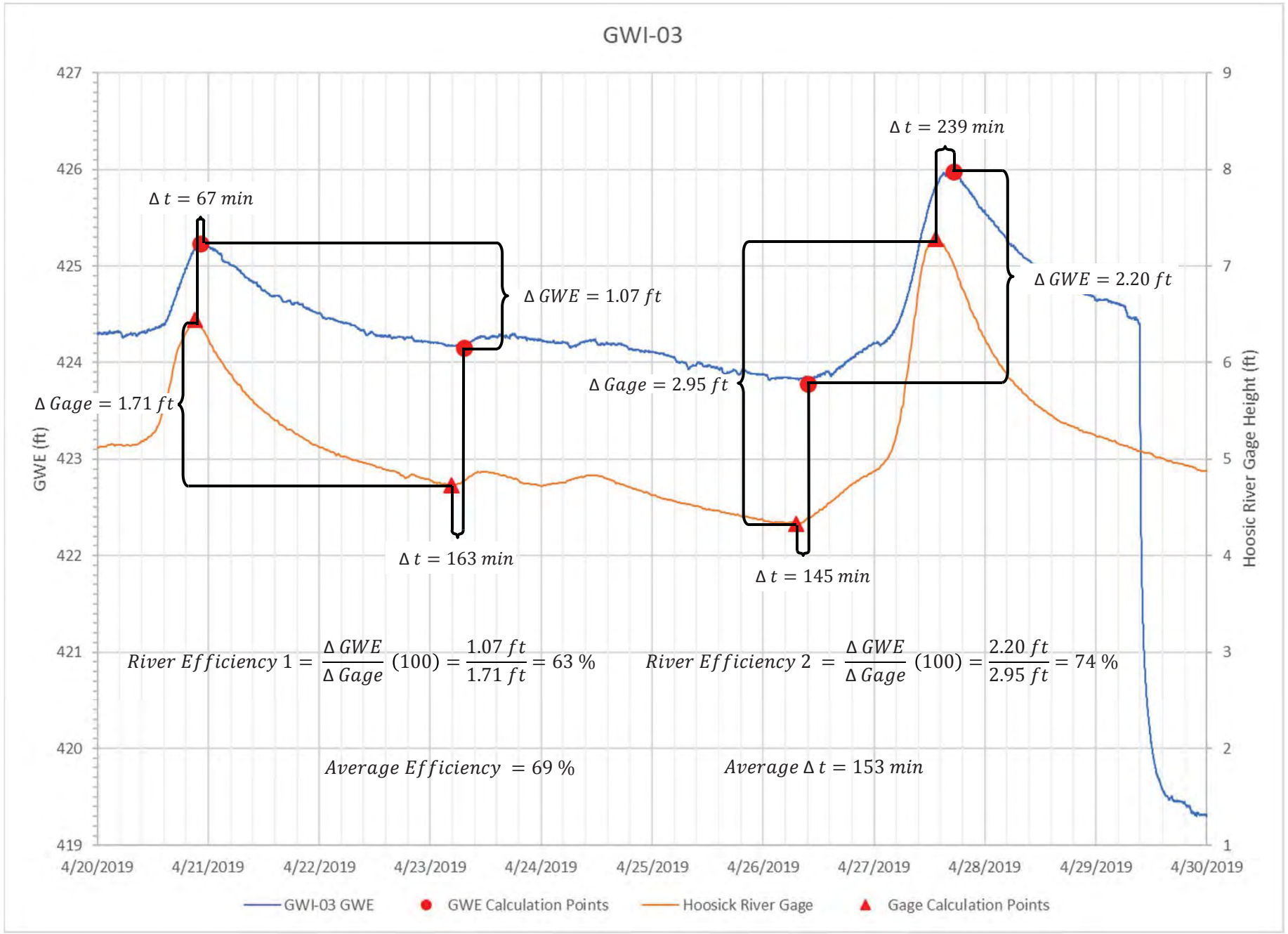


Figure A10-3: April 2019 Pump Test – River Efficiency Calculation of GWI-03

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

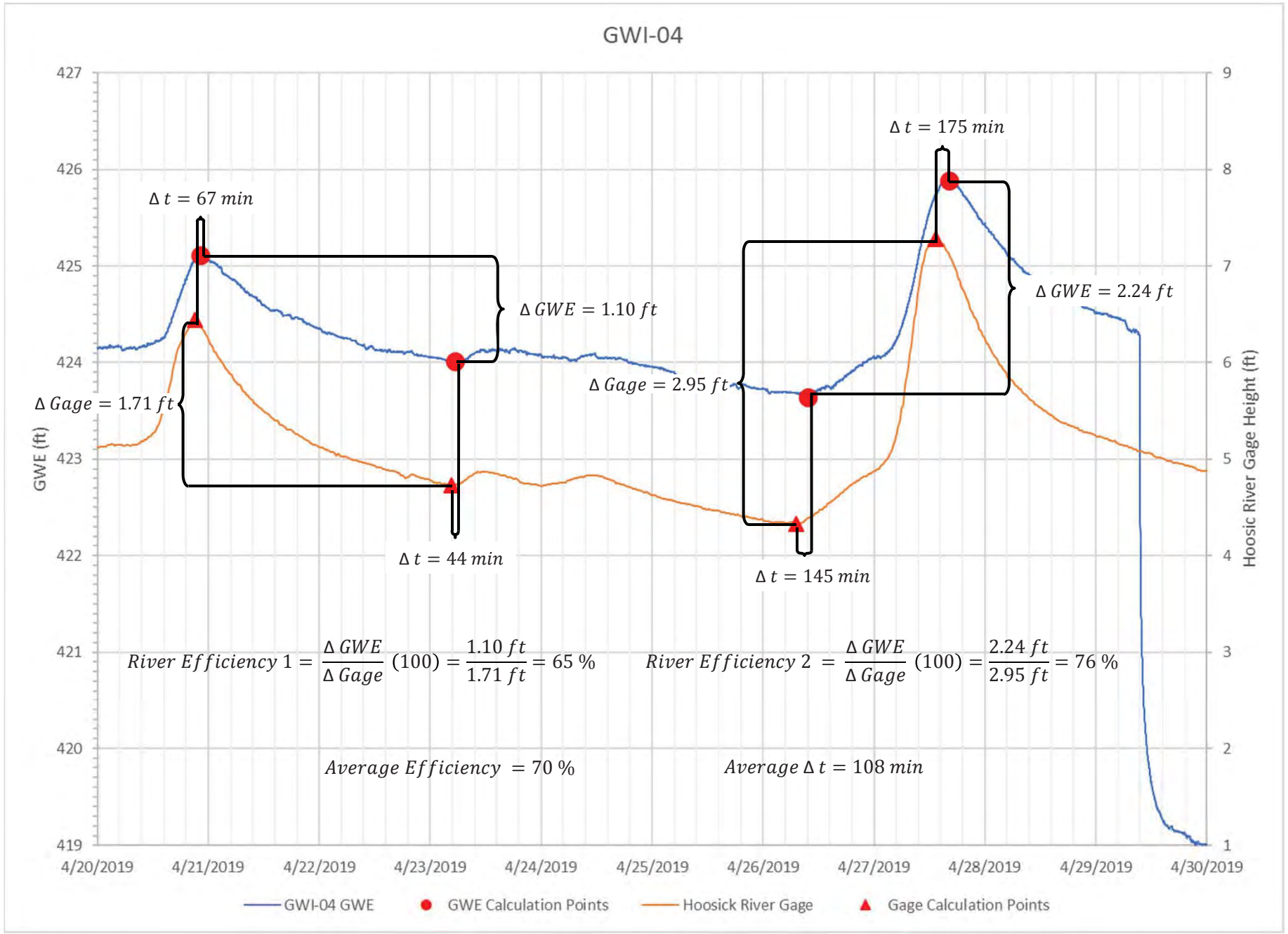


Figure A10-4: April 2019 Pump Test – River Efficiency Calculation of GWI-04

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

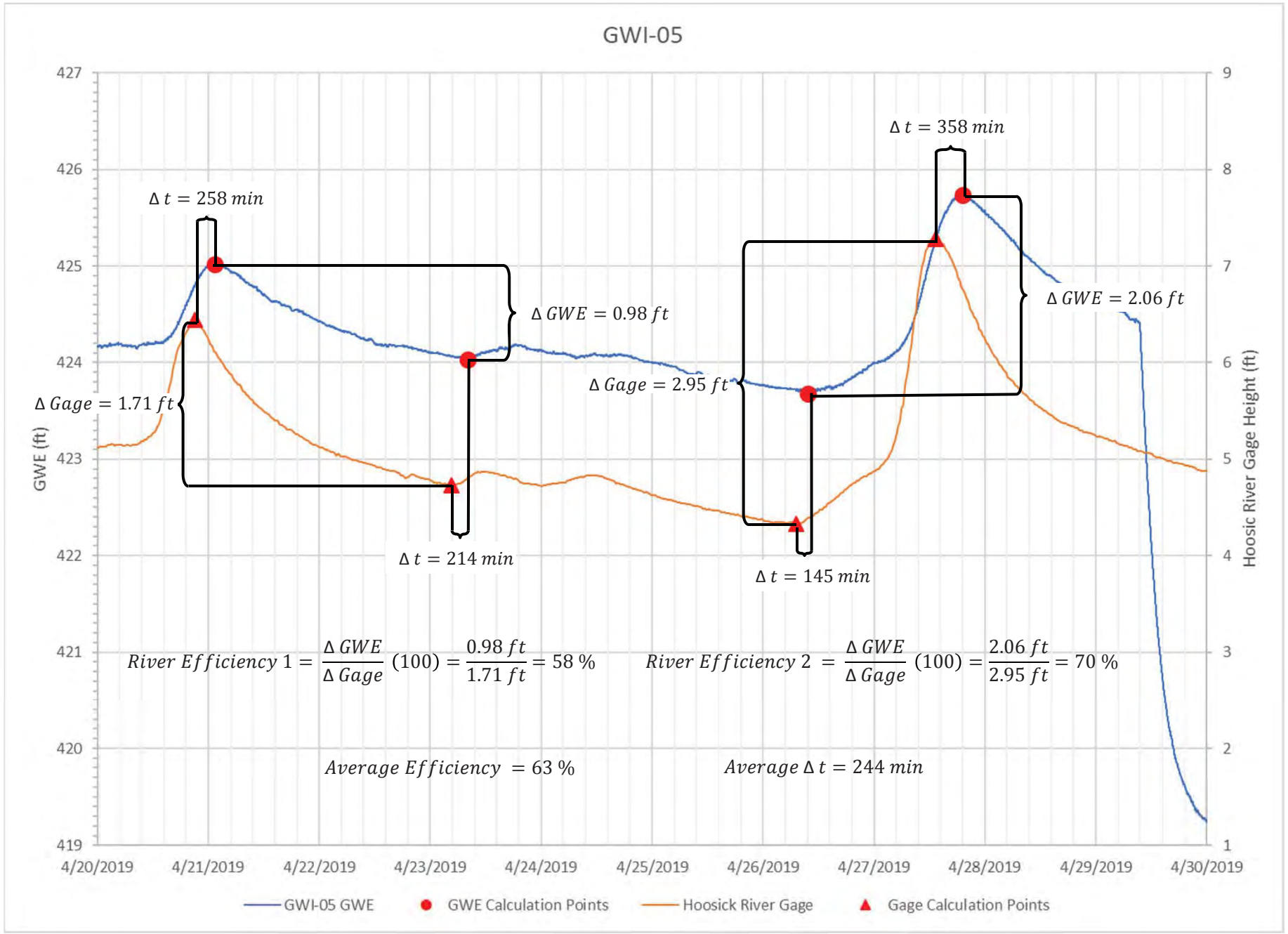


Figure A10-5: April 2019 Pump Test – River Efficiency Calculation of GWI-05

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

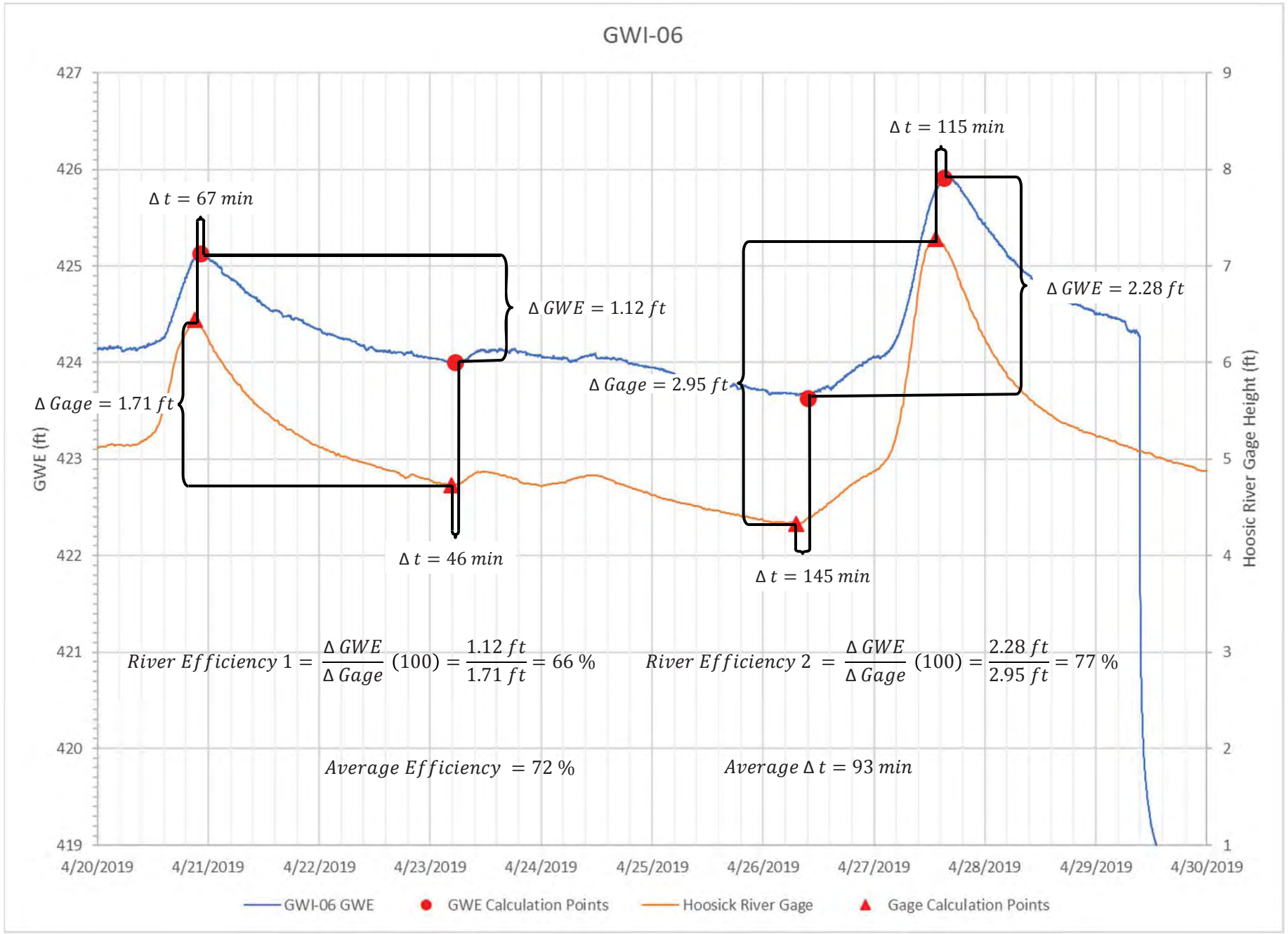


Figure A10-6: April 2019 Pump Test – River Efficiency Calculation of GWI-06

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

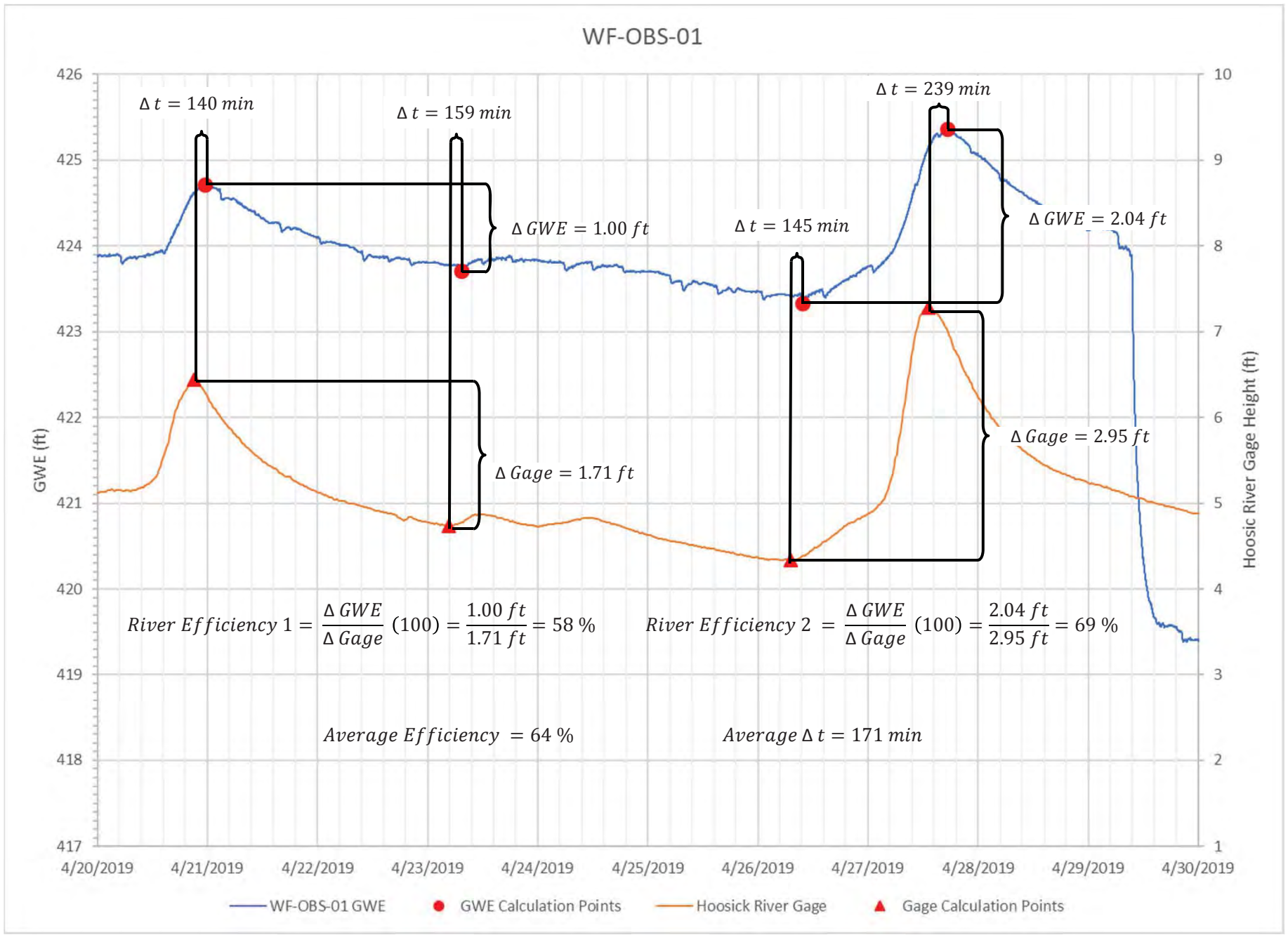


Figure A10-7: April 2019 Pump Test – River Efficiency Calculation of WF-OBS-01

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

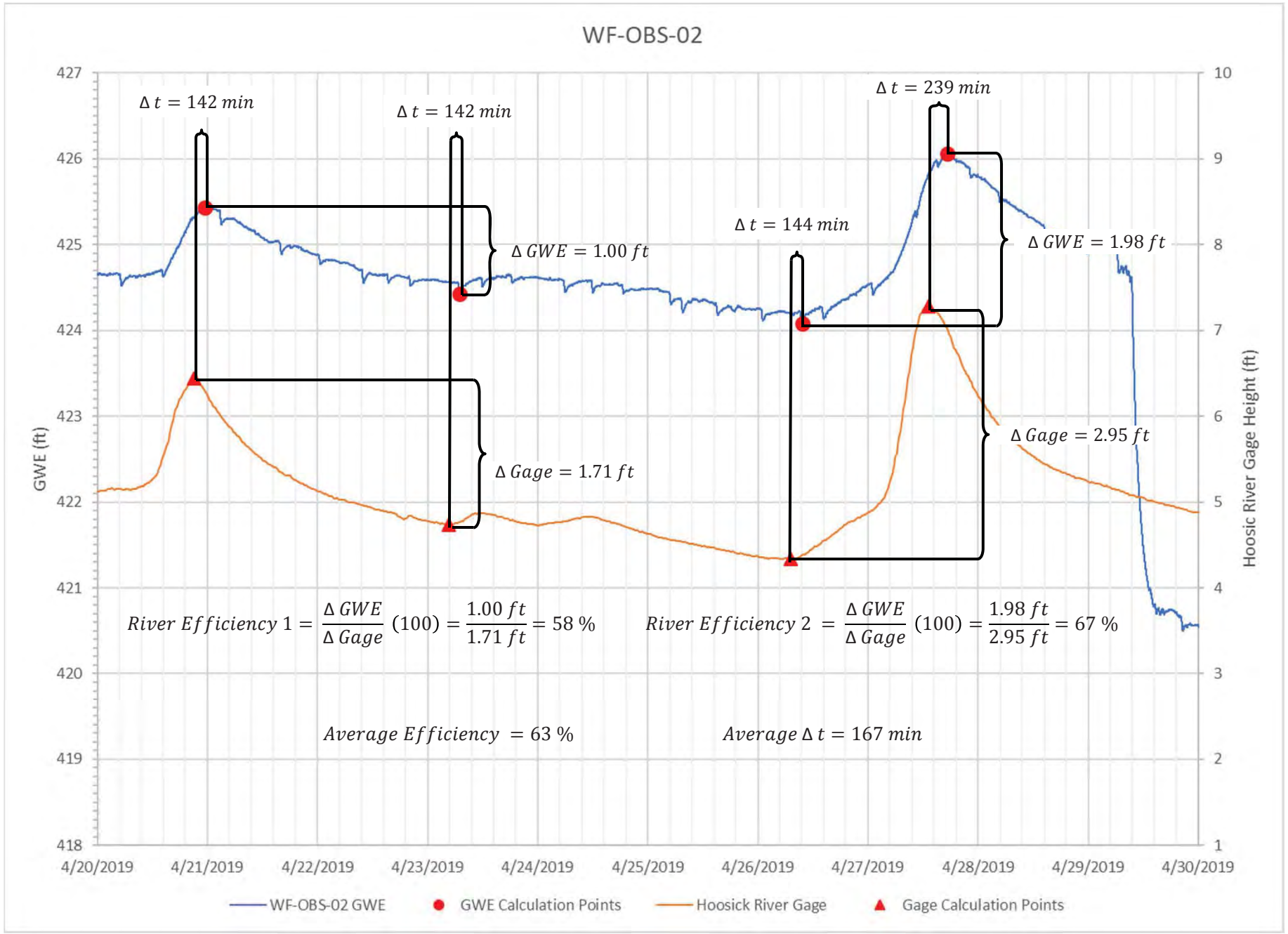


Figure A10-8: April 2019 Pump Test – River Efficiency Calculation of WF-OBS-02

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

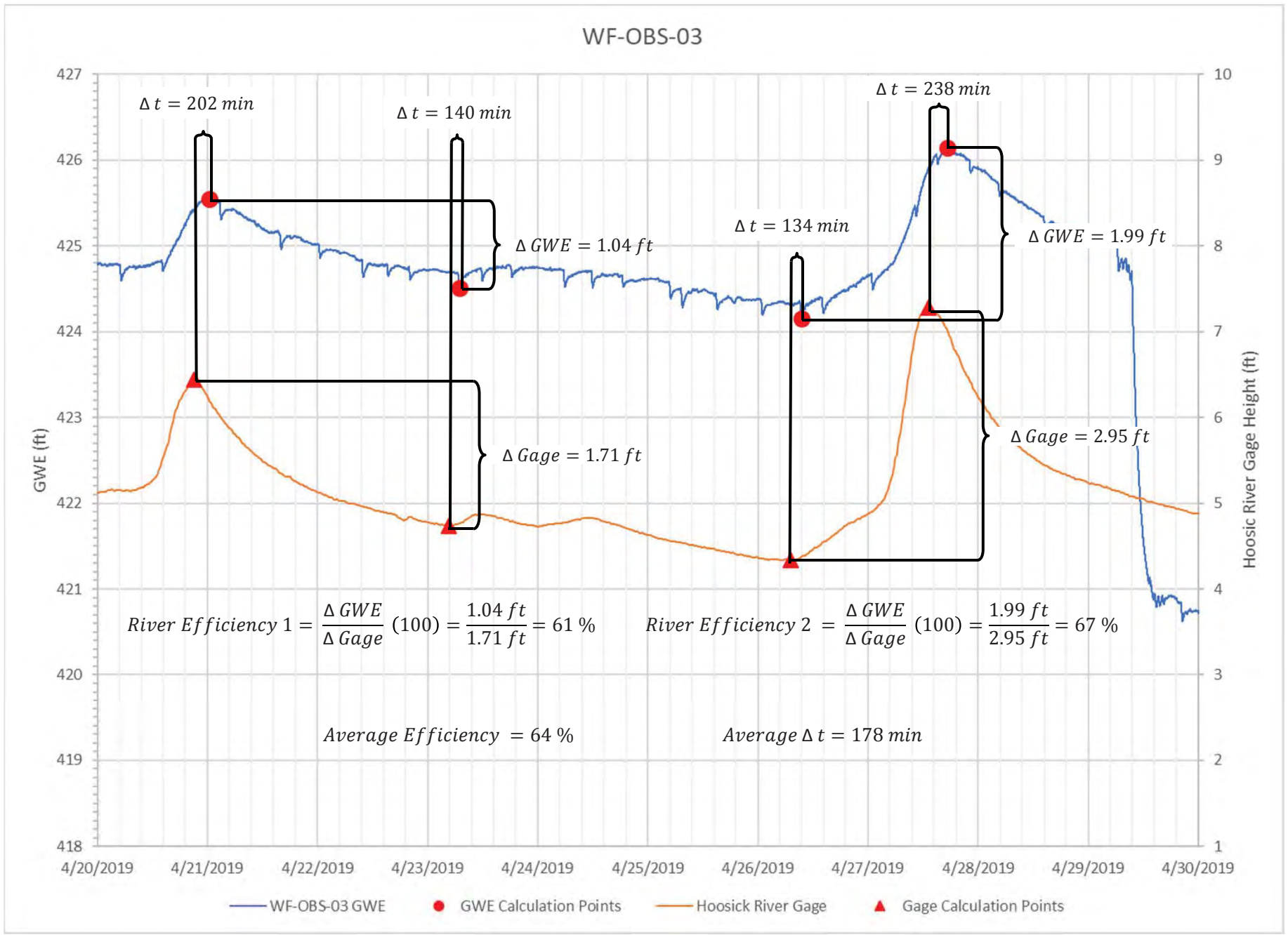


Figure A10-9: April 2019 Pump Test – River Efficiency Calculation of WF-OBS-03

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

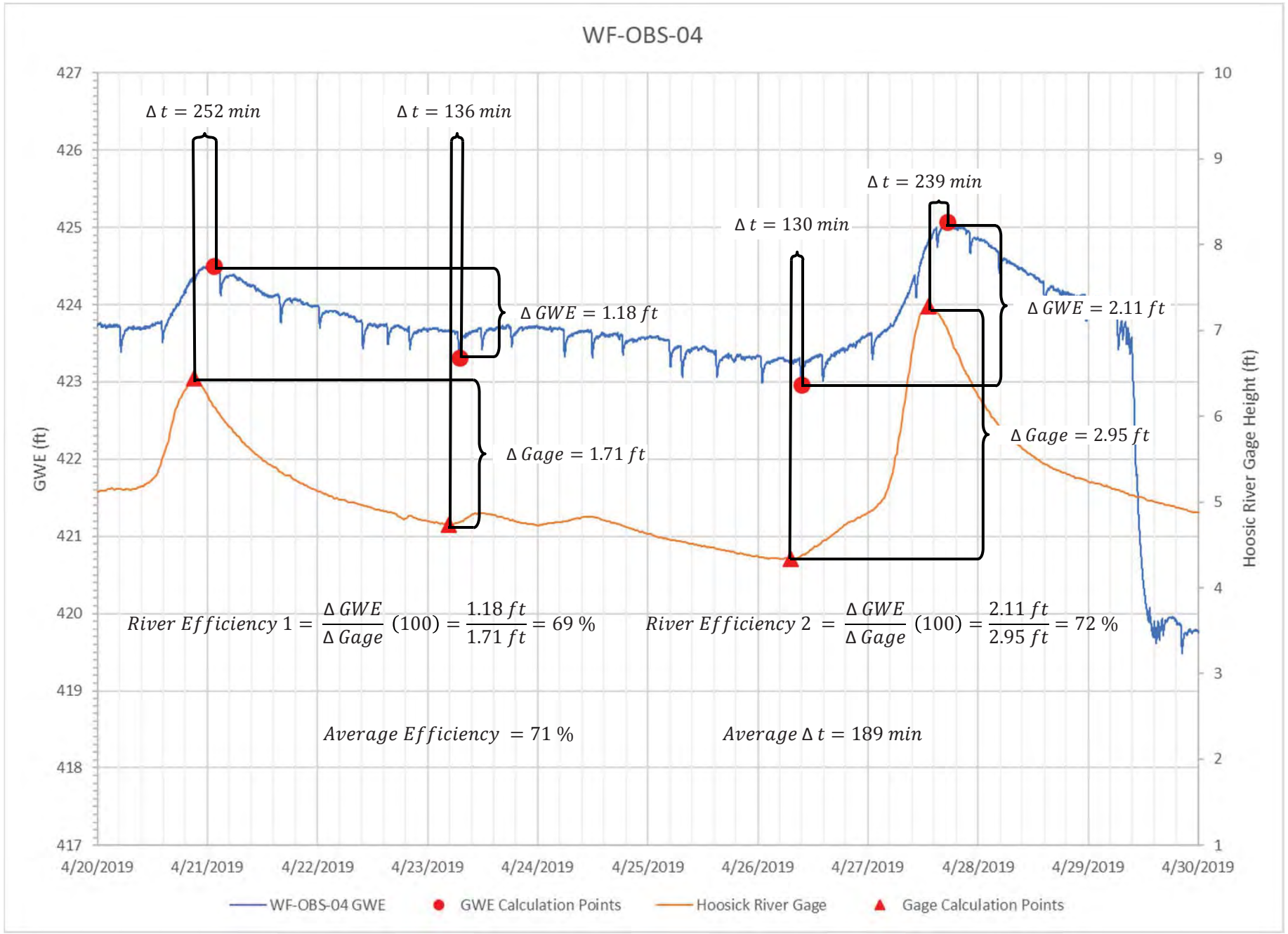


Figure A10-10: April 2019 Pump Test – River Efficiency Calculation of WF-OBS-04

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

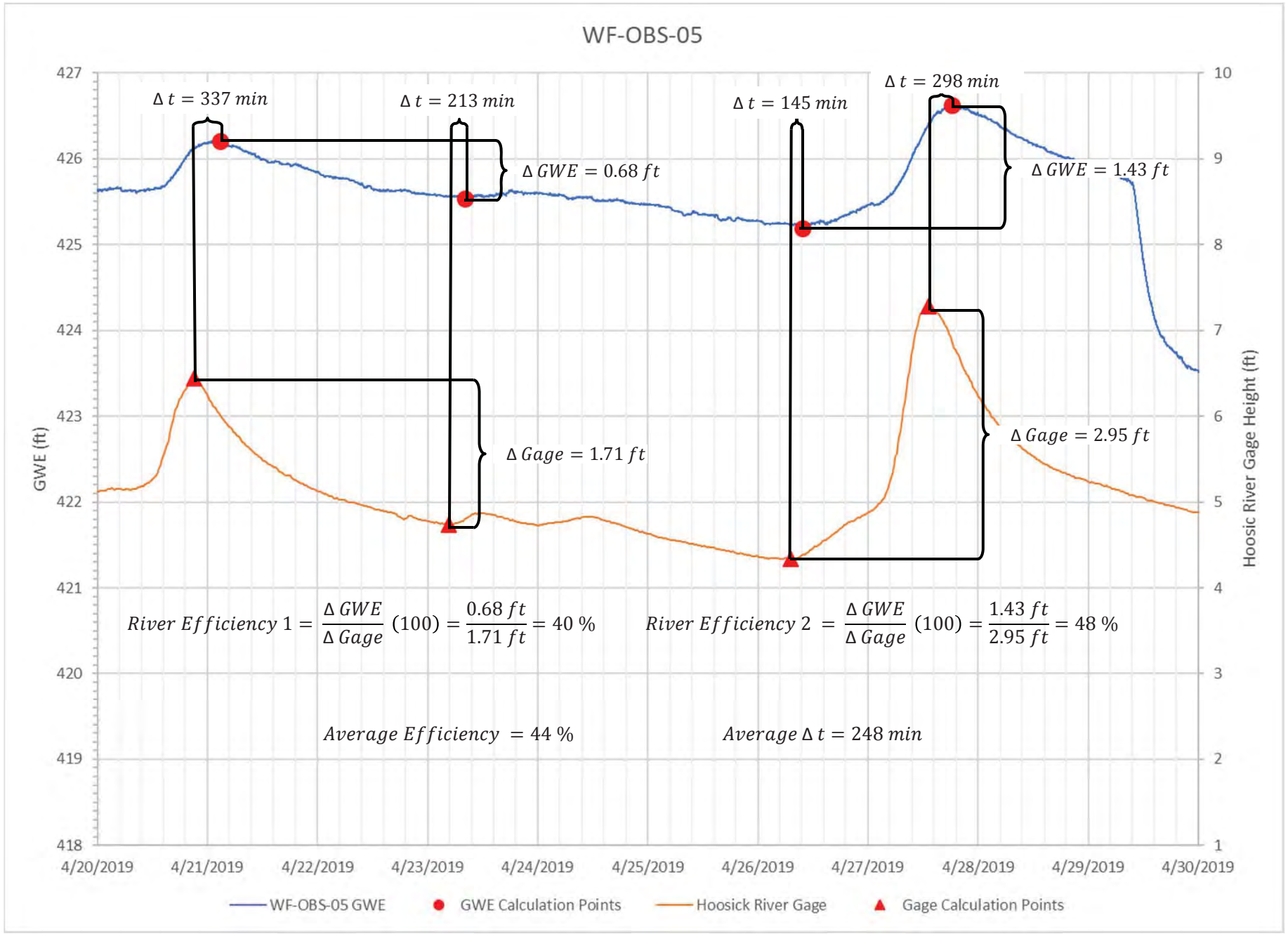


Figure A10-11: April 2019 Pump Test – River Efficiency Calculation of WF-OBS-05

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

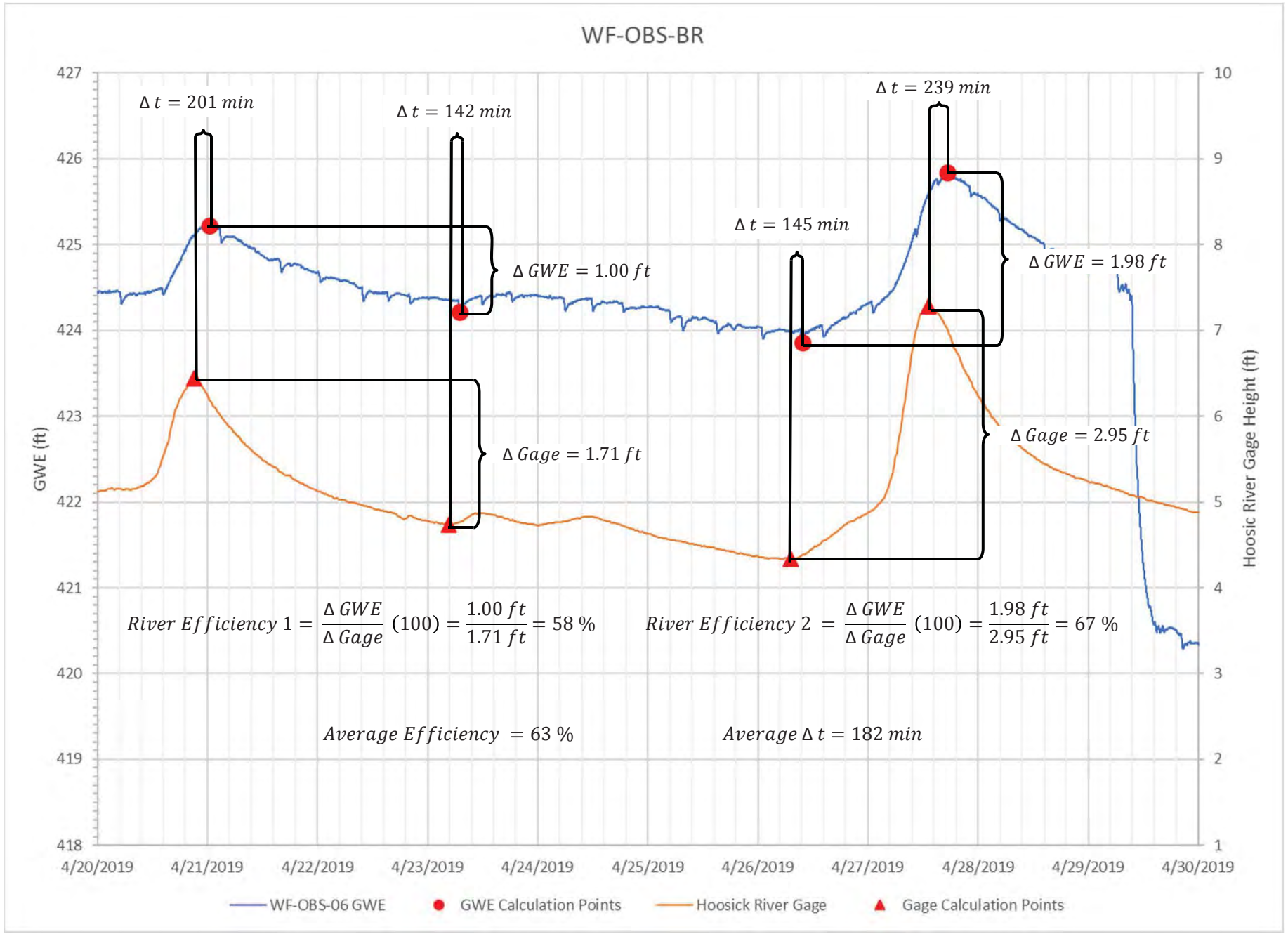


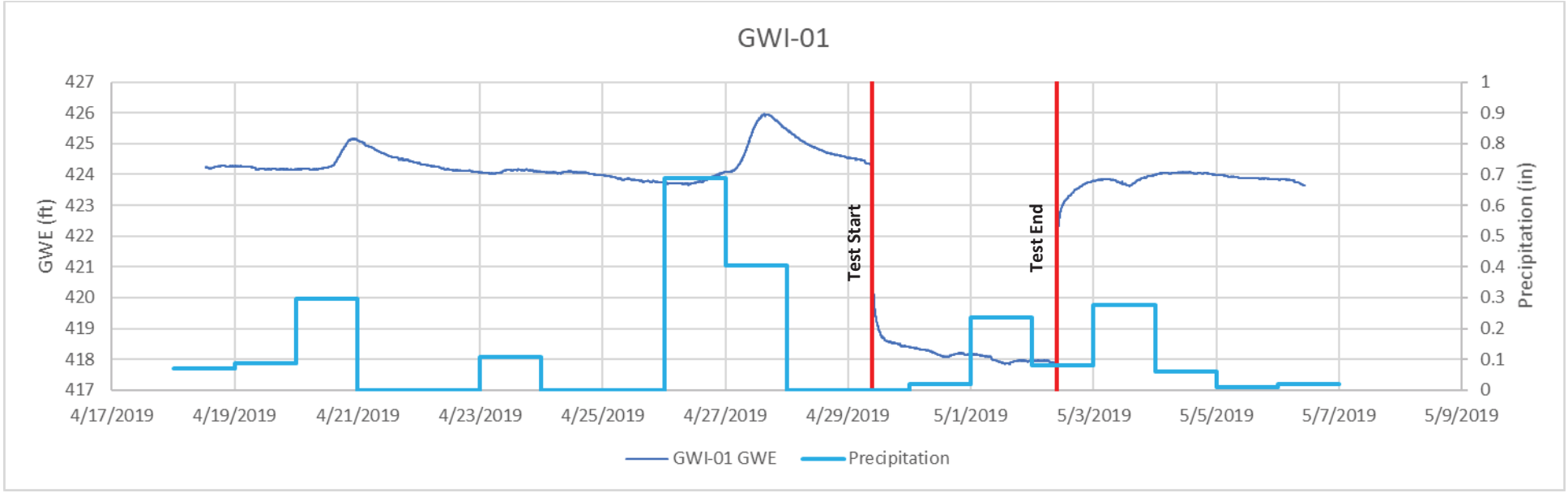
Figure A10-12: April 2019 Pump Test – River Efficiency Calculation of WF-OBS-BR

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

Attachment 11

Pumping Test – Hydrographs & Precipitation (GWI & WF)



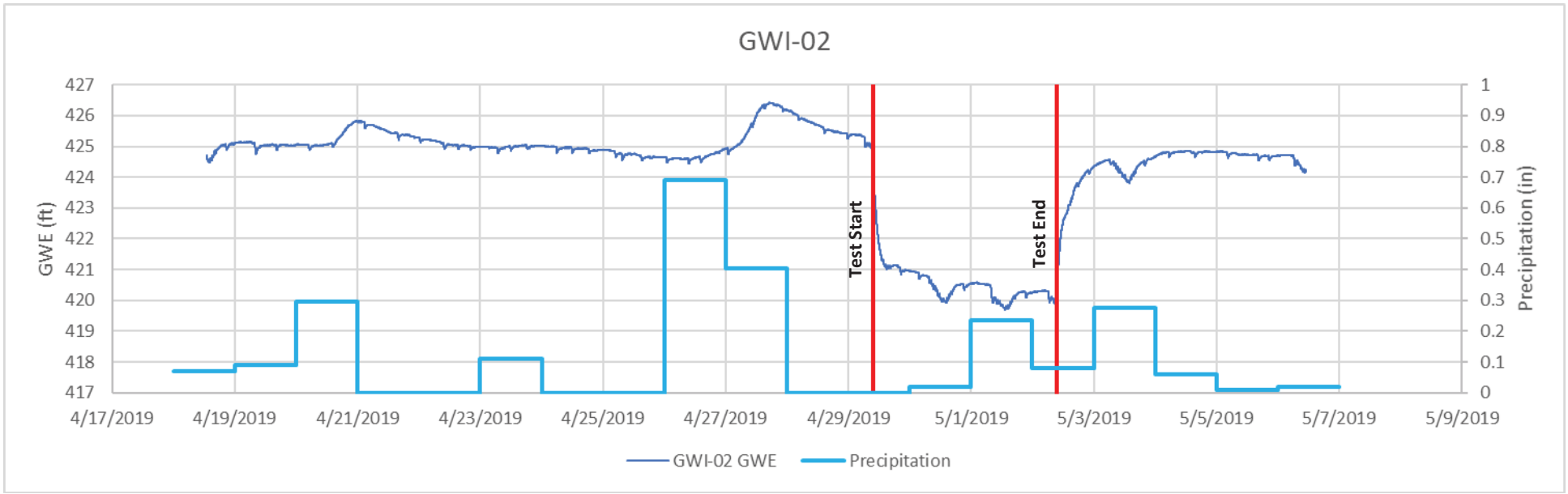
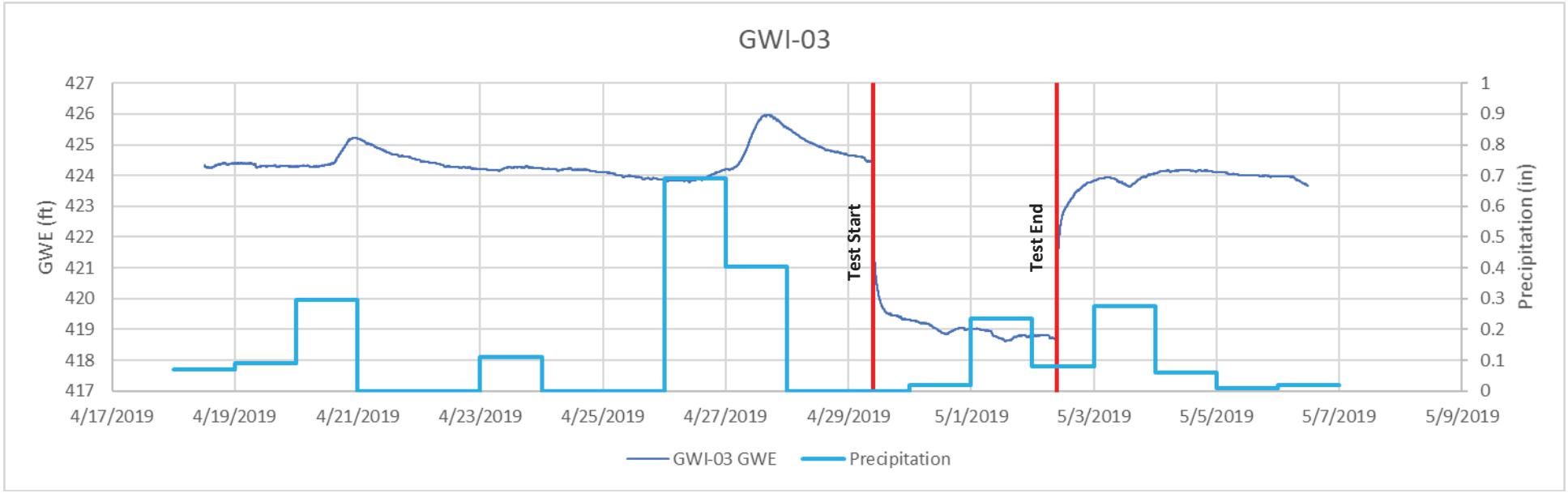


Figure A11-1: April 2019 Pumping Test: Precipitation & Groundwater Elevation

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists



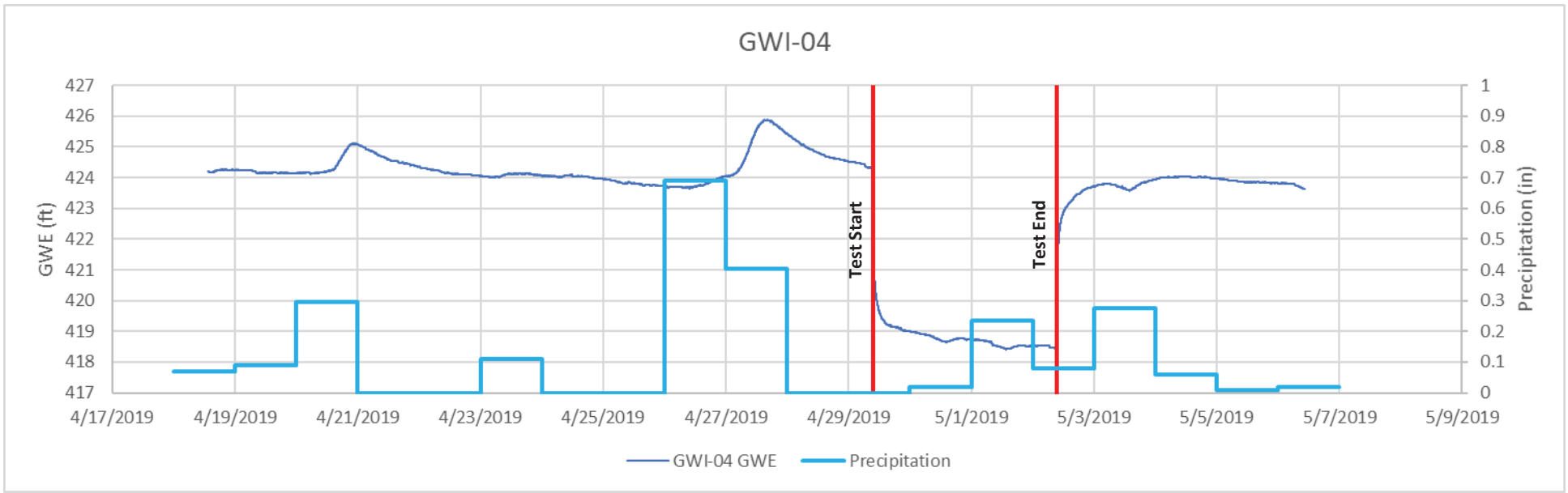
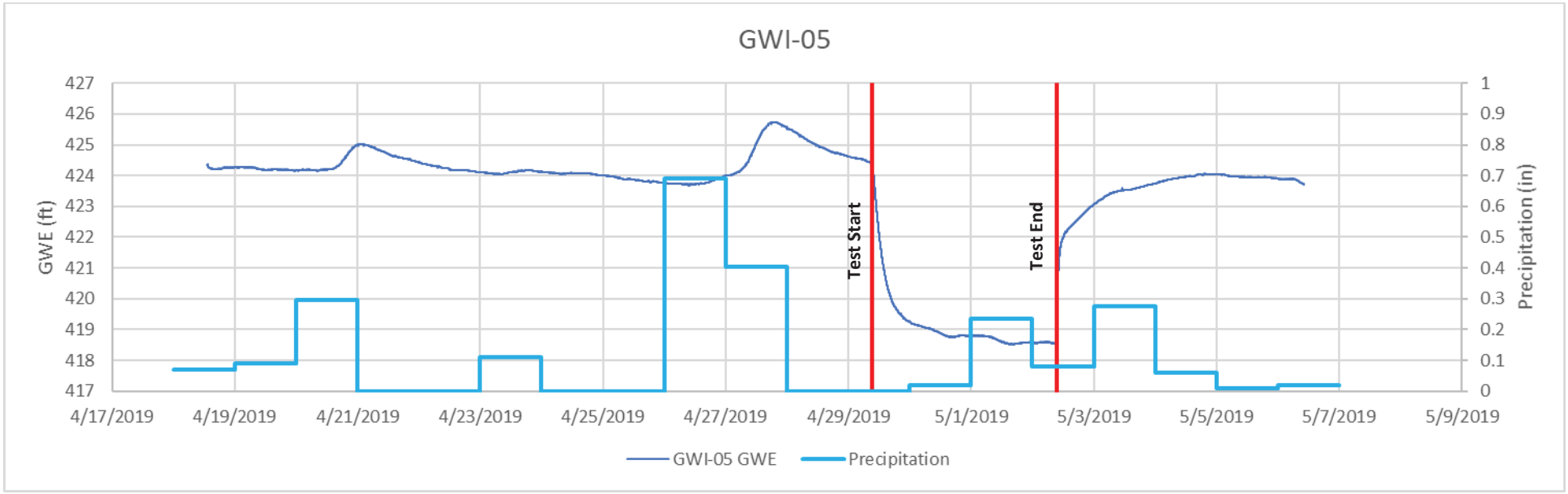


Figure A11-2: April 2019 Pumping Test: Precipitation & Groundwater Elevation

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists



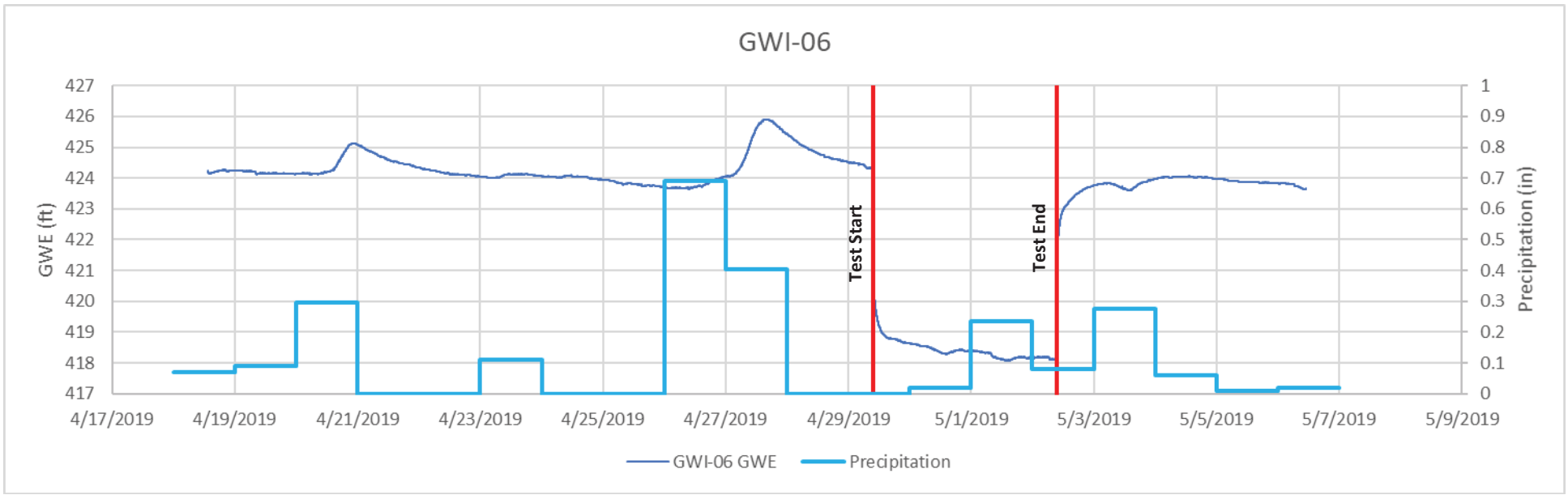
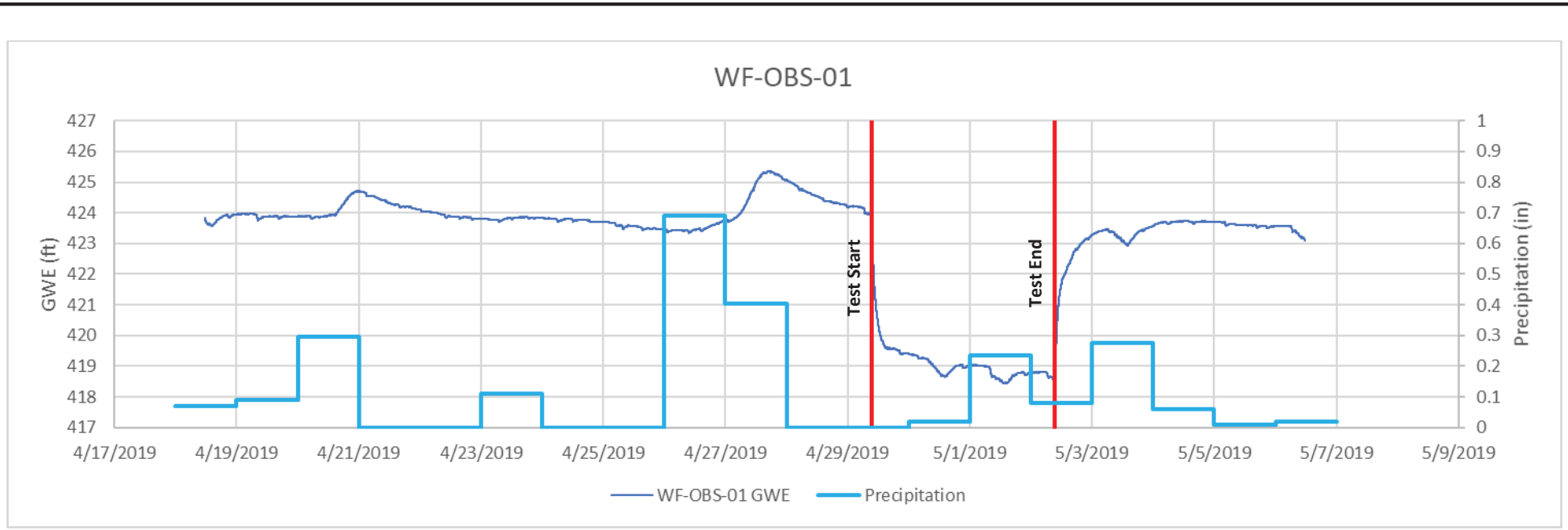


Figure A11-3: April 2019 Pumping Test: Precipitation & Groundwater Elevation

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists



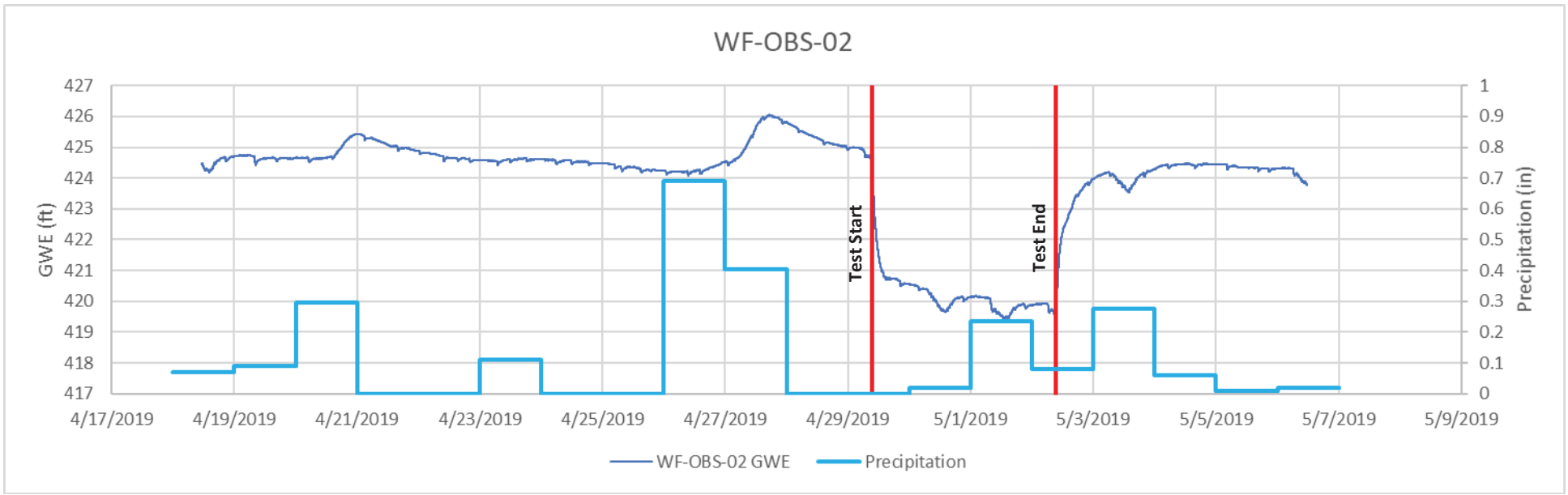
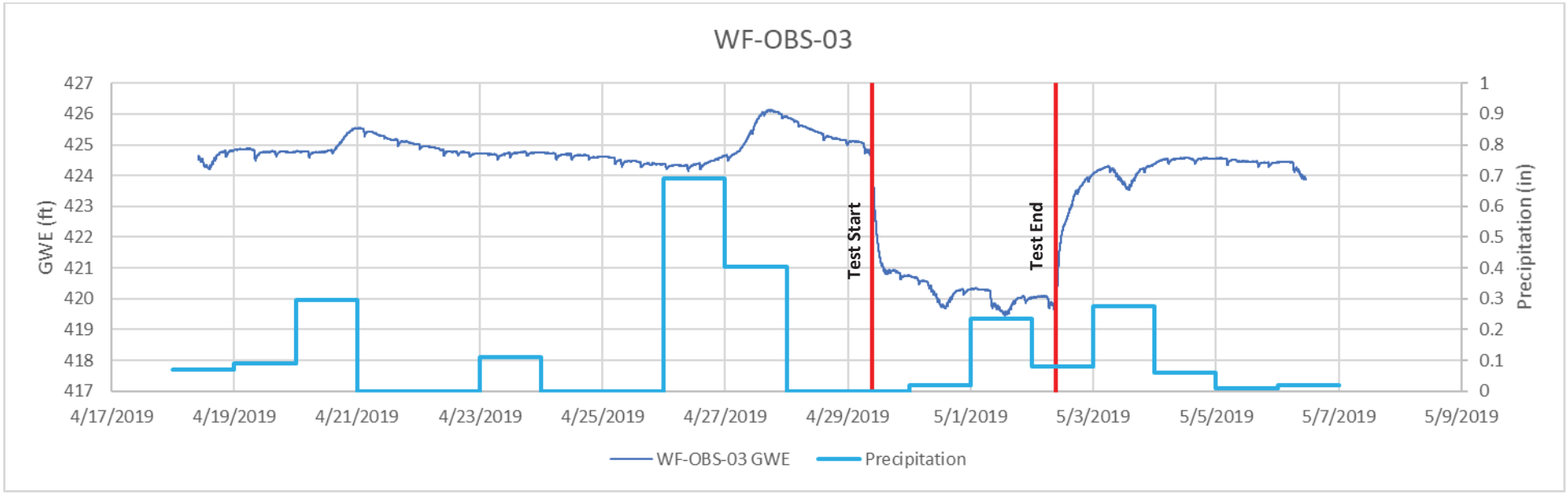


Figure A11-4: April 2019 Pumping Test: Precipitation & Groundwater Elevation
Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists



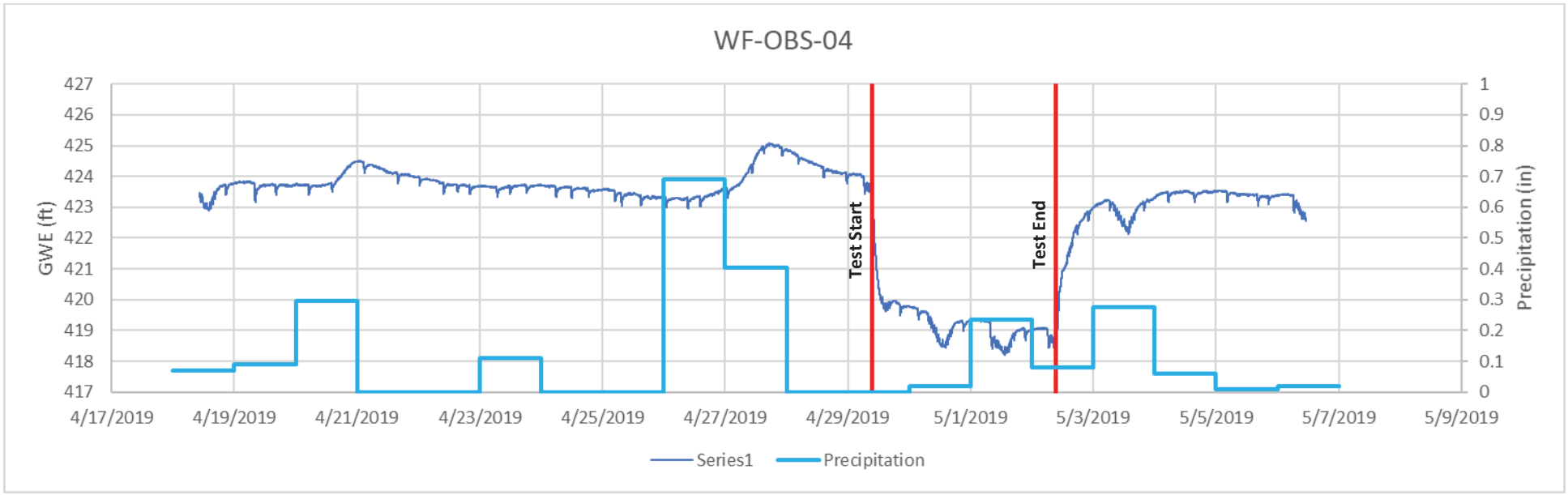


Figure A11-5: April 2019 Pumping Test: Precipitation & Groundwater Elevation

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

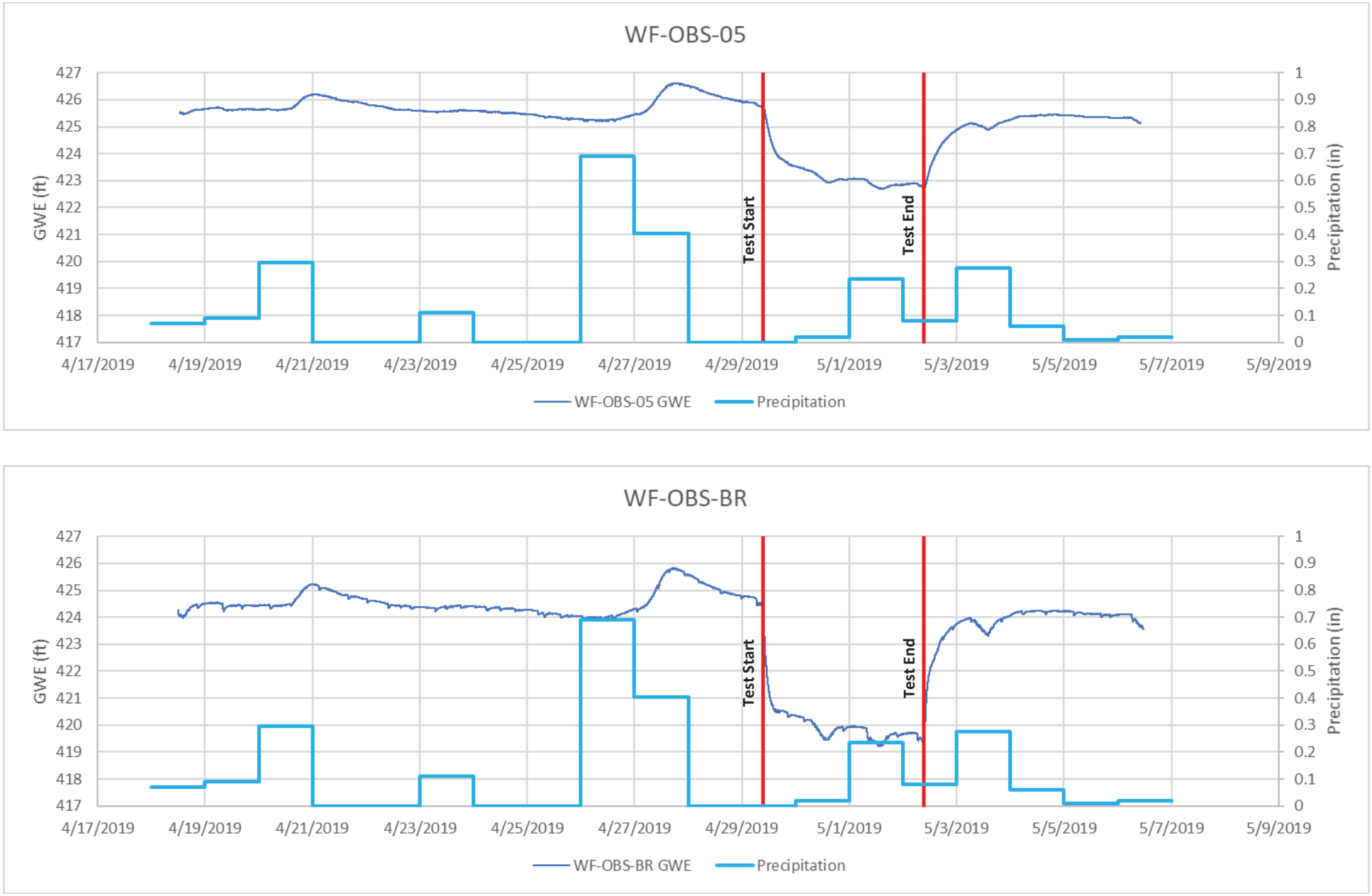


Figure A11-6: April 2019 Pumping Test: Precipitation & Groundwater Elevation

Hoosick Falls, New York

Mutch Associates, LLC
Environmental Engineers and Scientists

Attachment 12
Supplemental Hydrogeologic Investigation Work Plan

ERM

Environmental Resources Management
95 Glastonbury Boulevard
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6 April 2020

Mr. Ian Bielby, PE
New York State Department of Environmental Conservation
Chief, Section C - Special Projects Bureau
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-0001

Reference: 0405697.13

Re: Addendum to:
Supplemental Hoosic Valley Aquifer Groundwater Source Investigation Work Plan[1]
Order on Consent and Administrative Settlement; Index No. CO 4-20160212-18

Dear Mr. Bielby:

On behalf of Honeywell International and Saint-Gobain Performance Plastics, ERM is pleased to present this addendum to the work plan referenced above. This addendum will address further investigation as recommended by NYSDEC to gain a better understanding of the aquifer system in the geographic area located between the Village Wellfield and the LaCroix/Wysocki test well locations. It is not currently known if the semi-confined aquifer penetrated by the LaCroix and Wysocki test wells is continuous with similar deposits present elsewhere in the Hoosic Valley to the north, Similarly, it also is not known if the semi-confining layer present to the north and in the vicinity of the LaCroix and Wysocki test wells is continuous.

Further investigation, which could be done under the ongoing Municipal Water Supply Study (MWSS) or as part of any pre-design work once the Department selects a remedial action, should be directed to better understand whether the semi-confined aquifer is continuous in the geographic area located between the Village Wellfield and the LaCroix/Wysocki test well locations and specifically to develop information regarding the extent of the confining layer in this area. Therefore, an investigation scope of work is proposed that includes the following elements:

- Investigate aquifer conditions on Property #2[2] (see Figure 1) via the following:

[1] Dated July 2018, hereafter referred to as the "Work Plan". NYSDEC approval was provided in their letter dated 20 June 2018.

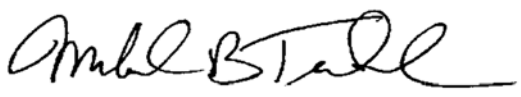
[2] The companies have secured access to Property #2 (see Figure 1). This property is strategically located within the data gap area. The exact location and length of the survey line may change based on direction from the property owner or other access considerations to be determined in the field.

- Conduct a subsurface geophysical survey (seismic and resistivity) along the approximate line shown on Figure 1 and in accordance with Section 2.1 of the Work Plan.
- Based on these results, select two locations for test borings along the geophysical transect extending five feet into the upper bedrock. This work will be conducted in accordance with Section 2.2 of the Work Plan.
- In both boring locations, install a shallow-deep monitoring well couplet. Screen settings will be determined based on the geophysical survey and test boring results. Monitoring well installation and development will follow the methods described in Section 2.3 of the Work Plan. The wells will be surveyed for horizontal and vertical control by a New York State licensed surveyor as per Section 2.8 of the Work Plan.
- The wells will be sampled for PFAS: 22 constituents as listed in Section 2.4 of the Work Plan. Analysis will be conducted by an ELAP-certified laboratory using EPA Method 537-1.1 Modified. This analytical method will achieve detection limits ranging from 2.0 to 10 ng/L. The data will be validated with documentation in a Data Usability Summary Report.
- Collect additional water level data, either in concert with another valley-wide monitoring event, or as a standalone limited project. This work would include:
  - Install and survey a staff gauge in the Hoosic River adjacent to nearest shallow-deep monitoring well couplet and perform a limited synoptic groundwater/surface water level measurement event in selected locations between the Wysocki test well and the Village Wellfield.
  - Monitor water levels in the shallow-deep monitoring well couplet using pressure transducers/data loggers for several days to determine if the water levels respond to cycling of Village Well 7.

- The results of the above tasks will be compiled in a Technical Memorandum and submitted to NYSDEC for review and approval.

The scope of work described above is proposed to be completed in place of the work described in Section 5 of the Work Plan. Please contact Mike Teetsel of ERM at 860-466-8530 or Tim Johnson of Anchor QEA at 315-414-2029 if you have any questions.

Yours sincerely,



Michael B. Teetsel CPG, LEP
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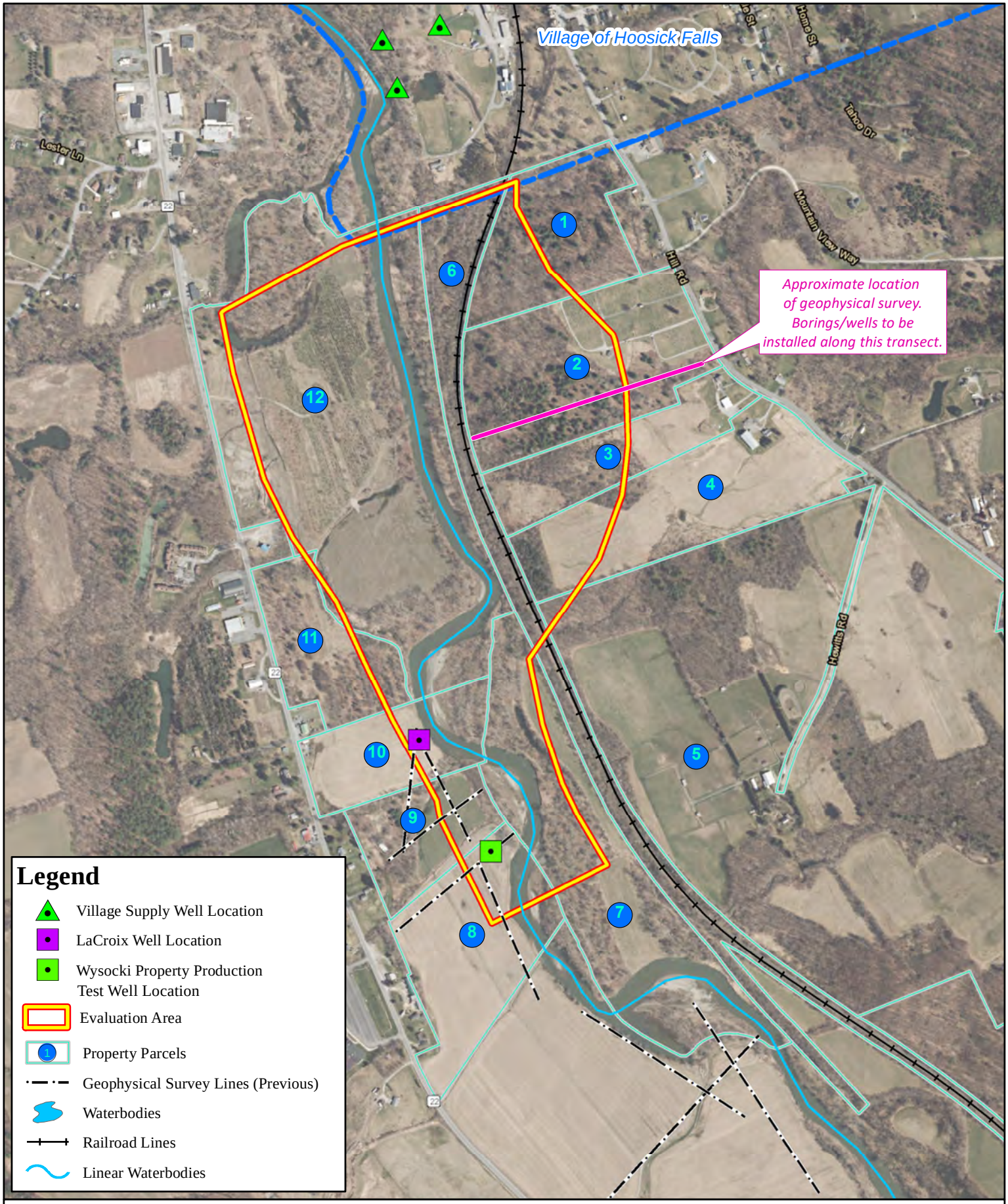

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Figure 1 - Proposed Data Gap Investigation

Hoosick Falls Municipal Water Supply Study
Village of Hoosick Falls, Rensselaer County, New York

N W E S

1 inch = 825 feet

Project No. : 32091

April 2020

0 400 800 Feet

Attachment 13

Supplemental Hydrogeologic Investigation Report, Data Gap Area Memorandum

Technical Memorandum

Addendum to:
Village of Hoosick Falls Water Supply Study
Appendix C – Hydrogeologic Report

13 November 2020

Project No.: 0375746.03

The business of sustainability

Document details	
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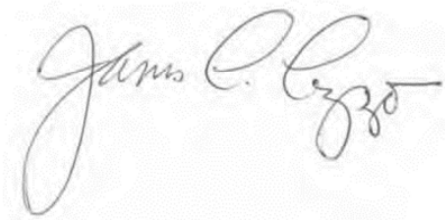
Client Name	Honeywell

Signature Page

Technical Memorandum

Addendum to:
Village of Hoosick Falls Water Supply Study
Appendix C – Hydrogeologic Report



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FIGURES

TABLES

APPENDICES

1. INTRODUCTION

This Technical Memorandum documents findings from the investigation of hydrogeologic conditions south of the Village of Hoosick Falls municipal water supply well field and north of new test wells constructed to production well standards installed to potentially replace the current Village supply wells. This location has not previously been investigated and is referred to as a "data gap area" (Figure 1). This document is an addendum to Appendix C – Hydrogeologic Report in the "Village of Hoosick Falls Municipal Water Supply Study" (CHA & ERM, November 2020). The Municipal Water Supply Study (MWSS) was prepared pursuant to Order on Consent and Administrative Settlement, Index No. CO 4-20160212-18 and fulfills the requirement to prepare a study of alternate potable water sources for the Village of Hoosick Falls.

Option 1 in the MWSS involves a potential new groundwater source. A scope of work to further evaluate this option entitled "Supplemental Hoosic Valley Aquifer Groundwater Source Investigation Work Plan" (CHA & ERM, July 2018) was approved by NYSDEC. The findings of this work were presented as Appendix C in the MWSS and identified the aforementioned data gap area. A subsequent Work Plan to investigate the data gap area was developed by ERM on behalf of Honeywell and Saint Gobain (ERM letter dated 6 April 2020) and approved by NYSDEC on 17 April 2020.

2. COMPLETED SCOPE OF WORK

The supplemental investigation outlined in the approved work plan was designed to further investigate the extent of the semi-confined aquifer in the Hoosic Valley in the geographic area between the Village well field and the LaCroix/Wysocki test well locations[1] and develop information regarding the extent and continuity of the confining layer in this area. The supplemental investigation was conducted on Property #2 as depicted on Figure 1. This location was selected based on access and its strategic location within the "data gap area". The scope of work included the following elements:

- Perform surface geophysics (seismic and resistivity), which are indirect investigative techniques, to select two test boring locations that extend five feet into the upper bedrock to confirm the subsurface geology. The borings were installed using a roto-sonic drill rig that produced a continuous core at each location.
- Install shallow-deep monitoring well couplets at each boring location. Screen settings were determined based on the lithologic findings. Each well was developed by surge block and pumping.
- Sample monitoring well pairs for 21 per- and poly-fluoroalkyl substances (PFAS) using low-flow methodology. The analyses were conducted by an ELAP-certified laboratory using EPA Method 537-1.1 (modified).

[1] Two test wells were installed south of the Village on properties owned by the Wysocki and LaCroix families.

3. INVESTIGATION RESULTS

The geophysical survey line, soil boring and well locations are shown in Figure 1. The following sections detail the results of these supplemental investigative activities.

3.1 Geophysics & Test Borings

Hager-Richter Geoscience, Inc. (HRGS) was contracted to perform a geophysical survey along the line shown on Figure 1. This work was intended to inform the selection of test boring locations. HRGS used a combination of seismic refraction and electrical resistivity methods to:

- Estimate the combined thickness of unconsolidated materials (sediments) and weathered bedrock;
- Estimate the depth to competent bedrock; and
- Estimate, to the degree possible, major unconsolidated strata.

The geophysical survey was performed by HRGS on 23-24 July 2020. Appendix A provides the full HRGS report which includes adjustments indicated by data from the borings conducted after completion of the survey. A summary of findings is included below.

The seismic survey shows three distinct velocity layers; the uppermost layer is interpreted to represent unsaturated material; the intermediate layer represents saturated material of undifferentiated texture, and the lowermost layer is interpreted to represent bedrock. The results indicate depth to bedrock of 50 to 70 feet below grade on the west end of the line near the Hoosic River, 60 to 80 feet in the central part of the line and deepening to 140 to 170 feet in the eastern portion of the line.

The resistivity profile indicates a 15-20-foot-thick upper zone that increases in clay content from west to east. The deeper unconsolidated material above bedrock exhibited moderate resistivity, indicative of sand along with silt and clay.

As stated above, geophysical surveys are indirect investigative techniques whose results benefit from verification using direct investigative methods (i.e., test borings). Hence, for the purpose of this investigation geophysics primarily served as a screening tool to initially assess the subsurface geology and select test boring locations. In the case of resistivity, results are strongly dependent on the extent to which clay minerals are present in the subsurface material. Deposits with a very high percentage of clay are more readily discernable by resistivity. But when deposits are mixed with a significant silt component, as observed in boring log GWI/MW-09 (discussed below) the resistivity results are not as useful for distinguishing the subsurface stratigraphy and more reliance is given to observations from direct investigation (i.e., test borings).

Based on the findings of the geophysical survey, two locations were selected for test borings. As noted on Figure 1, these were situated at either end of the geophysical survey line where depth to bedrock was greatest (survey stations 0050 and 1300). Lithologic logs are provided in Appendix B.

Observations during the test borings show similarities in the stratigraphy found elsewhere in the valley. A significant silt and/or clay confining unit is present in both borings, starting at the surface in boring GWI-08 and nine feet below grade in GWI-09. Its approximate thickness ranges between 25 and 40 feet. Physical inspections of core logs (e.g., texture) suggest more silt in the confining unit at GWI-09 located on the west end of the line.

The silt and clay confining unit is underlain in both borings by a sand and gravel unit which likely correlates with the semi-confined aquifer noted at other locations in the valley.

Differences between the test borings, both between the locations as well as what has been typically observed in similar deposits in the Hoosic Valley-fill sequence, were also noted. The stratigraphic sequence in boring GWI-08 is thicker than typically observed and includes a deeper sand and gravel

unit[2]. Based on qualitative observations recorded in the boring logs, the sand and gravel encountered in the "data gap area" contains more fines than at other valley locations which is indicative of lower permeability.

3.2 Monitoring Well Installation

Two monitoring well couplets (total of four individual wells) were installed. Screen settings were targeted to the more permeable sandy zones. Due to differences in the thickness of the unconsolidated zone and the stratigraphy encountered, screen settings varied significantly between GWI-08 and GWI-09. The monitoring well designations and screen zones are indicated below:

- GWI/MW-08B – 55 to 65 feet below grade (bg)
- GWI/MW-08C – 110 to 120 feet bg
- GWI/MW-09A – 8 to 18 feet bg
- GWI/MW-09B – 38 to 48 feet bg

A north-south cross-section is provided in Figure 3. This section is an update of the cross-section provided in the MWSS Appendix C – Hydrogeologic Report (Figure 5b) that in various areas relies on new test borings that have been installed as part of area-wide investigations.

The cross-section is based on geologic observations obtained from 23 borings, 13 located north of the municipal well field and 10 borings from the municipal well field south to the alternative new groundwater area that is described as Option 1 in the MWSS. As shown in the cross-section, the regional confining unit comprised of silt and clay and underlying sand and gravel aquifer are interpreted to be continuous through this line of section.

3.3 Groundwater Quality

Groundwater sampling was conducted on 20-21 August 2020; a summary of the final validated results for PFAS are included on Table 1. Only one groundwater sample from shallow well GWI/MW-09A screened above the confining unit was found to contain PFOA or PFOS in excess of the recently adopted maximum contaminant level (MCL) of 10 ng/L. The PFOA concentration at GWI/MW-09A is 530 ng/L. The groundwater samples from the deeper wells screened below the observed confining unit and in the unit that could be the source of drinking water, exhibited a PFOA concentration of ND and 2.5 ng/l.

Existing groundwater quality data (see Figure 2) were reviewed to provide context to this finding and the following observations are noted:

- There are no other shallow monitoring wells[3] in proximity to the current study area. The nearest shallow monitoring wells are located in the off-site McCaffrey Street and River Road study areas, approximately 2,000 to 3,000 feet north and northwest of GWI/MW-09A. PFOA concentrations in the shallow monitoring wells shown on Figure 2 range widely but the average is 424 ng/L and the median is 300 ng/L.
- Sampling data exists for private supply wells of unknown construction[4] on Hill Road and Route 22. There are 22 private wells approximately 1500 to 2500 feet from GWI/MW-09A. Seven of

[2] This condition is atypical, but has also been found in a few specific locations, generally, but not exclusively, on the eastern side of the valley-fill sequence.

[3] Wells screened in the unconfined aquifer, at or near the water table.

[4] There is no construction information available for these private supply wells. The depth and open intervals are unknown.

these wells were ND (<2.0 ng/L) for PFOA. The detected PFOA concentrations in the other remaining wells ranged from 3.1 to 420 ng/L.

Other PFAS detections from the current investigation include the following:

- GWI/MW-08B – no additional confirmed detections
- GWI/MW-08C – PFBA (9.0 ng/L); PFHxA (0.53 ng/L); 6:2 FTS (6.4 ng/L)
- GWI/MW-09A – PFBS (0.32 ng/L); PFHpA (13 ng/l); PFHxA (6.3 ng/L); PFPeA (0.69)
- GWI/MW-09B – PFHpA (0.26 ng/L); PFOA (2.5 ng/L); PFPeA (0.42); 6:2 FTS (2.2 ng/L)

3.4 Data Quality

The laboratory analytical data have been reviewed for quality control. Data validation is documented in a Data Usability Summary Report provided as Appendix C. No data were rejected. A few results were changed to non-detect based on detections in the laboratory method blank.

3.5 Groundwater Level Monitoring

The approved Work Plan also included a program of water level collection. The scoping and coordination of this part of the program is in process and will be coordinated with NYSDEC prior to completion. This groundwater level monitoring program is targeted for late fall 2020 and will be coordinated with the Village to assess hydraulic responses associated with the pumping of Village supply wells 3 and 7. The data may be used to inform hydrogeologic conditions under pumping stress as part of subsequent evaluations. The findings of the groundwater level monitoring program will be documented in a separate data submission (memorandum or equivalent) to the Department.

4. SUMMARY

As reported in Appendix C – Hydrogeologic Investigation Report of the MWSS (November 2020), there was no observed effect on water levels in monitoring wells the vicinity of the LaCroix test well as a result of cyclic pumping of Village supply well #7. Similarly, there was no observed effect in water levels in monitoring wells in the vicinity of the Village well field during the 72-hour aquifer test at the LaCroix property. This indicates there is limited, if any, hydraulic connection between the Village well field and the LaCroix property test well.

However, due to the distance between the LaCroix test well and the Village well field (approximately one mile) as well as absence of geologic information regarding the confining unit (i.e., glaciolacustrine silt and clay), which was observed at the LaCroix property, this supplemental investigation was intended to extend the evaluation of the confining unit in the geographic area between the Village Wellfield and the LaCroix/Wysocki test well locations and provide information on PFAS groundwater quality in both shallow and deeper geologic units separated by the confining unit.

As a result of this investigation, the regional confining unit observed elsewhere in the Hoosic Valley was confirmed to be present in the “data gap area”. The presence of the confining unit indicates there are geologic deposits (i.e., silt/clay) that would limit the vertical transmission of groundwater between the shallow sand/silt/gravel and deeper sand/gravel deposits. The underlying sand and gravel deposit encountered in borings GWI/MW-08 and GWI/MW-09 likely correlates with the semi-confined aquifer zone noted elsewhere in the valley. However, the sand and gravel deposit in the data gap area contained more fine-grained materials than observed at other locations in the valley, and as a result, may not be as permeable.

The investigation found that groundwater samples from the deeper wells screened below the observed confining unit and in the unit that could be the source of drinking water, exhibited a PFOA concentration of ND and 2.5 ng/l. The groundwater sample obtained from monitoring well GWI/MW-09A, screened above the confining layer in the shallow, unconfined unit comprised of silt, clay, sand and gravel contained PFOA at 530 ng/L.

The difference in PFOA concentrations between the shallow and deeper unit observed in the GWI/MW-09 well cluster indicates the confining layer separating the two zones is limiting groundwater movement from the shallow to deep aquifer. A potential new groundwater source at the Wysocki and LaCroix test well locations (Option 1) would extract water from the deeper sand and gravel unit below the confining layer. The difference in PFOA concentration observed at GMI/MW-09 which is approximately 2,000 feet north-north west of the Wysocki and LaCroix test well locations, indicates it is unlikely that elevated PFOA concentration observed in the shallow zone above the confining unit will impact a potential new groundwater source described in Option 1.

Nonetheless, Option 1, New Groundwater Source described in the MWSS includes either maintaining the existing GAC units at the Village water treatment plant operational if they are needed in the future to treat water from the new groundwater source (Option 1A) or include the existing GAC units in the treatment train of the new groundwater source from the onset of operation (Option 1B). Both Options 1A and 1B would include sentinel monitoring wells in the area between the existing Village supply wells and a potential new groundwater source, as an early warning of any possible contaminant migration toward the new groundwater source.

The information developed in this supplemental investigation suggests that the confining unit and underlying aquifer observed at the LaCroix property extend to the area of investigation; expanding and supporting the findings set forth in the Hydrogeologic Investigation Report (Appendix C) of the MWSS. Furthermore, it supports the viability of the LaCroix/Wysocki area as a potential new groundwater source consistent with the elements of Options 1A and 1B as set forth in the MWSS.

Future regional groundwater water level measurement events will include these new monitoring wells and the final scope will be coordinated with the Agency prior to completion.

FIGURES

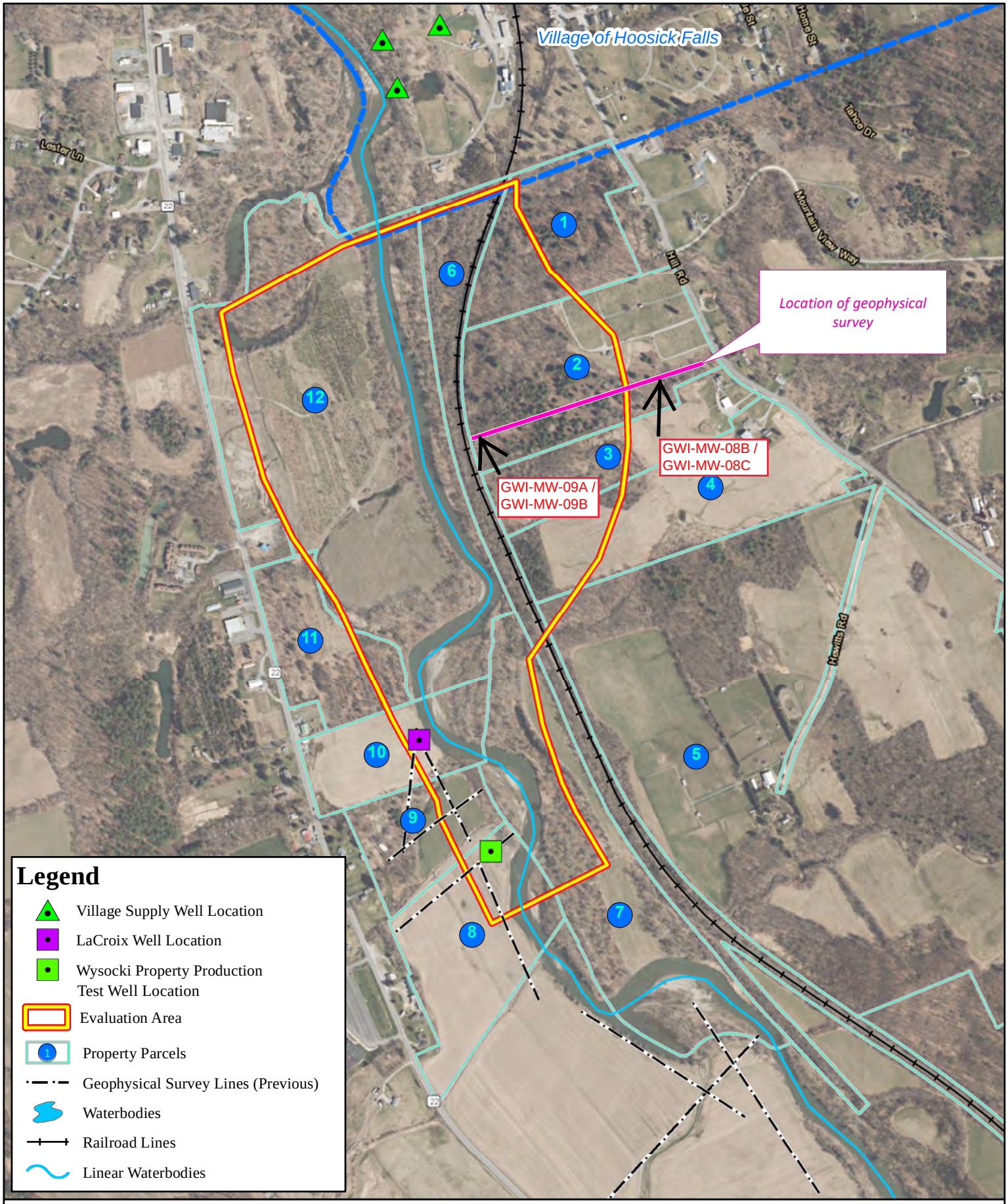

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Figure 1 - Data Gap Investigation

Hoosick Falls Municipal Water Supply Study
Village of Hoosick Falls, Rensselaer County, New York

N W E S

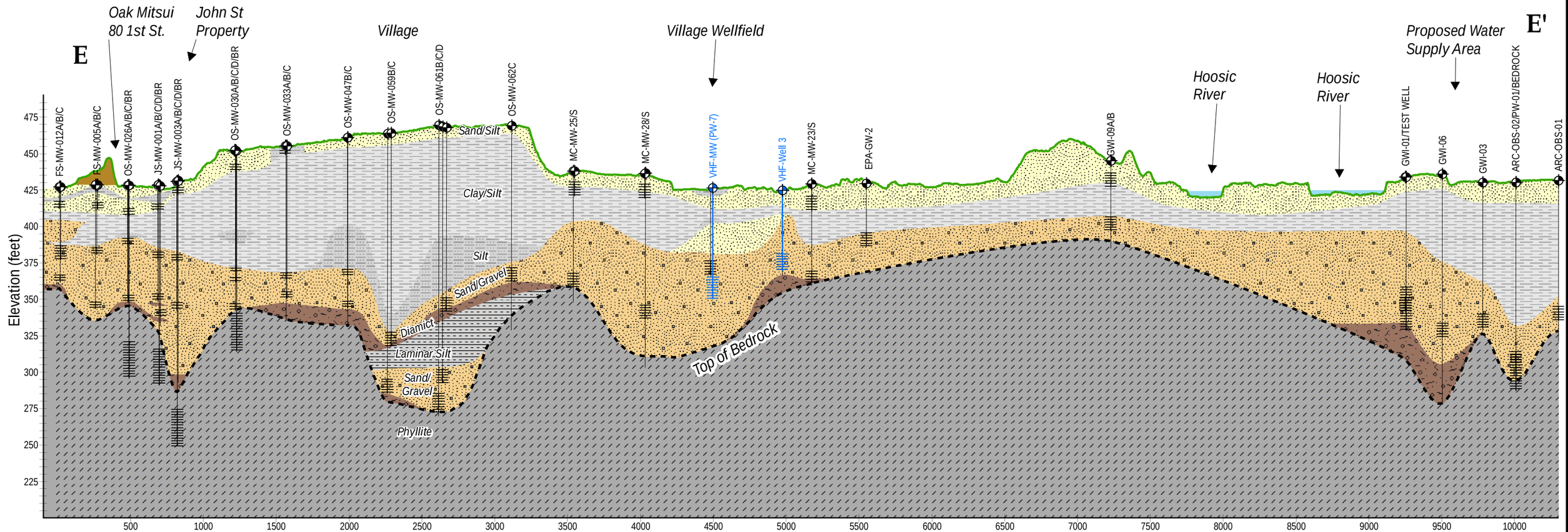
1 inch = 825 feet

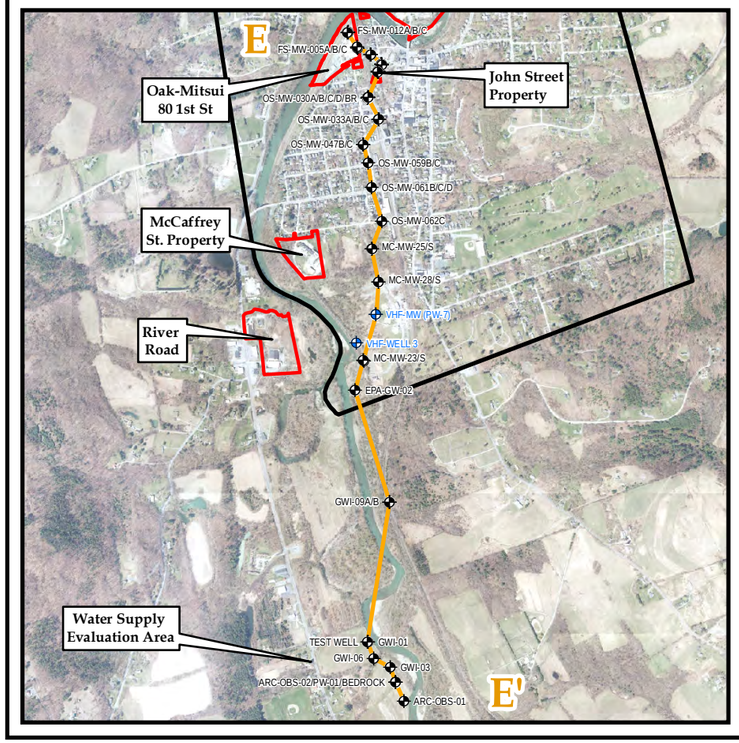
Project No. : 32091

September 2020

0 400 800 Feet

NOTE: “Figure 2: PFOA in Select Wells” of this Attachment to appendix C has been removed from the public version of this document to protect personal privacy.





Legend

- Village Supply Wells
- Monitoring Wells
- Transect Line
- Ground Surface
- Approximate Property Boundaries
- Village of Hoosick Falls Boundary
- Monitoring Well Screen
- Borehole Lines

Predominant Geologic Material

- Fill
- Sand & Silt
- Silt
- Clay & Silt
- Sand & Gravel
- Laminar Silt & Clay
- Diamict
- Phyllite

NOTES:
- Geologic units estimated based on interpolation of borelog information
-Vertical Exaggeration = 10X

Figure 3: Geologic Cross Section E-E'
Town of Hoosick
New York

ERM

Q:\Boston\Team\DMMV\Clients_A_E\Arnold and Porter\Hoosick Falls\MXD\CrossSections\2020-06_RR_JS_MS_PaleoSections\Figure6_SectionE_RegionalSection_10x_v2_20201015.mxd - Caldwell.Payne - 11/10/2020

TABLE

1 GROUNDWATER SAMPLING RESULTS

TABLE 1

Data Gap Area Groundwater Samplling Results

Hoosick Falls, NY

Location ID Sample Type Sample ID Sample Date		NYCRR Part 703	GWI-08B N GWI-MW-08B(08262020)-B1 8/26/2020	GWI-08B FD GWI-DUP(08262020) 8/26/2020	GWI-08C N GWI-MW-08C-B1(08262020) 8/26/2020	GWI-09A N GWI-MW-09A(08262020)-B1 8/26/2020	GWI-09B N GWI-MW-09B-B1(08262020) 8/26/2020
Analyte	Result Unit						
NEtFOSAA	ng/l		1.7 U	1.7 U	1.7 U	1.7 U	1.6 U
NMeFOSAA	ng/l		2.8 U	2.8 U	2.7 U	2.8 U	2.7 U
Perfluorobutanesulfonic acid (PFBS)	ng/l		0.18 U	0.18 U	0.18 U	**0.32 J**	0.17 U
Perfluorobutanoic Acid (PFBA)	ng/l		0.48 U	2.1 U	**9**	4.2 U	1.8 U
Perfluorodecane Sulfonic Acid	ng/l		0.29 U	0.29 U	0.28 U	0.28 U	0.28 U
Perfluorodecanoic acid (PFDA)	ng/l		0.28 U	0.28 U	0.27 U	0.28 U	0.27 U
Perfluorododecanoic acid (PFDoA)	ng/l		0.49 U	0.49 U	0.49 U	0.49 U	0.48 U
Perfluoroheptane Sulfonate (PFHPS)	ng/l		0.17 U	0.17 U	0.17 U	0.17 U	0.16 U
Perfluoroheptanoic acid (PFHpA)	ng/l		0.22 U	0.22 U	0.22 U	**13**	**0.26 J**
Perfluorohexanesulfonic acid (PFHxS)	ng/l		0.37 U	0.29 U	0.29 U	0.4 U	0.32 U
Perfluorohexanoic acid (PFHxA)	ng/l		0.52 U	0.52 U	**0.53 J**	**6.3**	0.5 U
Perfluorononanoic acid (PFNA)	ng/l		0.24 U	0.24 U	0.24 U	0.24 U	0.23 U
Perfluorooctane Sulfonamide (FOSA)	ng/l		1.2 U	1.1 U	1.4 U	0.32 U	0.93 U
Perfluorooctanesulfonic acid (PFOS)	ng/l	10	0.48 U	0.48 U	0.48 U	0.48 U	0.47 U
Perfluorooctanoic acid (PFOA)	ng/l	10	0.76 U	0.76 U	0.75 U	**530 J**	**2.5**
Perfluoropentanoic Acid (PFPeA)	ng/l		0.44 U	0.44 U	0.43 U	**0.69 J**	**0.42 J**
Perfluorotetradecanoic acid (PFTA)	ng/l		0.26 U	0.26 U	0.53 U	0.26 U	0.25 U
Perfluorotridecanoic Acid (PFTriA)	ng/l		1.2 U	1.2 U	1.2 U	1.2 U	1.1 U
Perfluoroundecanoic Acid (PFUnA)	ng/l		0.98 U	0.99 U	0.97 U	0.98 U	0.95 U
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/l		1.8 U	1.8 U	1.8 U	1.8 U	1.7 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/l		1.8 U	1.8 U	**6.4 J**	1.8 U	**2.2 J**

N = Normal Environmental Sample

FD = Field Duplicate Sample

J = Reported value is estimated.

U = Indicates the analyte was analyzed for but not detected.

Appendix A
Hager-Richter Geophysical Survey Report

HAGER-RICHTER
GEOSCIENCE, INC.

SURFACE GEOPHYSICAL SURVEY
AQUIFER CHARACTERIZATION
HOOSICK VALLEY, NEW YORK

Prepared for:

Environmental Resources Management
95 Glastonbury Boulevard; Suite 101
Glastonbury, CT | 06033

Prepared by:

Hager-Richter Geoscience, Inc.
dba HR Geological Services in New York
8 Industrial Way - D10
Salem, New Hampshire 03079

File 18SG14
October, 2020

HAGER-RICHTER
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GEOPHYSICS FOR THE ENGINEERING COMMUNITY
SALEM, NEW HAMPSHIRE
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October 13, 2020
File 18SG14

Michael B. Teetsel, CPG, LEP
Principal Consultant, Geologist
Environmental Resources Management
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Dir: 860-466-8530
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Email: Mike.Teetsel@erm.com

RE: Surface Geophysical Survey
Aquifer Characterization
Hoosick Valley, New York

Dear Mr. Teetsel:

In this report, we summarize the results of a surface geophysical survey conducted by Hager-Richter Geoscience, Inc., dba HR Geological Services in New York, (HRGS) for an aquifer characterization study in the Hoosic Valley, New York, for Environmental Resources Management, (ERM) in July 2020. Preliminary results were provided to ERM in July 2020. The scope of the survey and area of interest were specified by ERM.

INTRODUCTION

ERM is conducting an aquifer investigation project in the Hoosick Valley of New York, in the general vicinity of the Town of Hoosick, New York. In order to aid their investigations, ERM requested a surface geophysical survey to determine the depth of rock and characterize overburden stratigraphy. ERM specified one (1) transect for geophysical surveying located southwest of the intersection of Hill Road and Mountainview Way, in Hoosick Falls, New York. The general locations of the transect is shown in Figure 1.

According to boring logs for borings performed in the valley, lithology broadly consists of (from the top down) 10 to 20 feet of sand; 20 to 100 feet of clay and silt, generally considered to be an aquitard; and 15 to 40 feet of sand, gravel, and silt, generally considered to be an aquifer. Bedrock varies in depth from a few tens of feet in the valley wall areas to more than 150 feet in the valley floor areas.

OBJECTIVE

The objective of the surface geophysical survey was to determine the depth and configuration of the bedrock surface and to characterize the overburden stratigraphy, including that of a confining clay layer, along one (1) transect specified by ERM.

THE SURVEY

Amanda Fabian, P.G., Alexis Martinez, and Ariana Martinez of HRGS conducted the surface geophysical survey on July 23 and 24, 2020. The project was coordinated with Mr. Teetsel of ERM. The locations of the geophysical survey lines were surveyed by HRGS using differential global positioning (DGPS). Elevations along the survey lines were determined from 2-meter digital elevation models "u_6330074900_2_meter.img" and "u_6345074900_2_meter.img" available from gis.ny.gov and are relative to NAVD88.

EQUIPMENT & PROCEDURES

General

The surface geophysical surveys were conducted using seismic refraction profiling and electrical resistivity imaging (ERI). Seismic refraction and ERI data were acquired along the specified transect totaling approximately 1,650 linear feet for each survey.

Seismic Refraction Profiling

Seismic refraction data were acquired along the transect totaling 1,650 feet. Figure 1 shows the location of the seismic refraction transect.

We used our 48-channel seismograph (two 24-channel Geometrics Geodes) connected to, and controlled by, a notebook PC computer. The software provides for the acquisition, display, plotting, filtering and storage of seismic data. The seismogram image presented in real time on the notebook screen allows the operator to verify the quality of the data. The stored digital data are later transferred at the end of the field day for storage, backup, and future data processing.

The Geodes were coupled to two 24-element seismic spread cables for a total of 48 geophones. The geophones measure only the vertical component of the compressional wave energy, and their resonant frequency is 14 Hz. The geophones are equipped with a vertical 3-inch spike that is pressed into the soil so that the geophone case is contacting the ground surface. A geophone spacing of five feet was used.

A seismic trigger is attached to the hammer and sends an electrical impulse via a cable to the seismograph at the exact time of impact to start the seismograph recording. The core of the seismic trigger is a piezoelectric crystal, which emits a small electrical impulse when its crystal structure is distorted by a sharp impact, such as a hammer blow. The timing mechanism in the

seismograph is factory calibrated and does not require additional calibration according to manufacturing specifications.

Seismic energy was provided by a 12-lb sledge hammer striking a metal base plate. We recorded up to seven "shots" per cable spread - one shot off each end of the cable, one shot at each end of the cable, and three shots interior to the cable, as access allowed. The number of stacks per shot location is variable, and the quality of the stacked seismic signal for each shot location was verified in the field with the visual display. The seismic refraction data were acquired using a 200-millisecond recording length and a sample interval of 0.02833 milliseconds.

The seismic data were analyzed using the Generalized Reciprocal Method (GRM) of seismic refraction interpretation. The method is described in detail in Palmer (1980)[1]. GRM allows for some variation in the surface topography as well as lateral variation in the seismic velocity of the upper layers. The method uses the principle of migration whereby the refractor need only be planar over a short distance, thus allowing the calculation of depth to an undulating interface. In addition, GRM is relatively insensitive to dip angles as high as 20°, unlike most other methods that can be sensitive to dips as low as 5°. GRM also allows for the calculation of depth below each geophone instead of below only the shot points as in the Time-Intercept and Crossover Distance methods. The GRM software that we use for data analysis (IXRefraX by Interpex) contains several internal tests for data consistency.

The results were used to construct an interpreted velocity profile of the subsurface for the seismic line. The velocities of seismic waves are functions of the types of geologic materials through which they pass. One can thus infer the general subsurface stratigraphy from the velocities determined. Seismic velocities are expressed in feet per second (fps).

Electrical Resistivity Imaging Survey

The ERI survey was conducted using an AGI Super Sting R8 earth resistivity instrument with an addressable multi-electrode system for electrical imaging surveys. ERI incorporates both vertical electrical sounding and lateral profiling to produce a data set suitable to create a two-dimensional resistivity model.

The Super Sting R8 allows automatic measurement of several types of array, i.e., most combinations of current and voltage electrode connections can be controlled by the Super Sting system. Fifty-six (56) electrodes, or any multiple of fourteen (14) electrodes (with a maximum of 254 electrodes) can be used with the Super Sting system.

ERI data were acquired using a Schlumberger array configuration with electrode spacing of 20 feet. This array configuration and electrode spacing provides an approximate depth of exploration of about 140 to 150 feet.

[1] Palmer, Derecke (1980) The Generalized Reciprocal Method of Seismic Refraction Interpretation, Society of Exploration Geophysicists, 104 p.

The Super Sting R8 earth resistivity instrument measures the contact resistance of each electrode, and, if the resistance of any electrode is judged to be excessive, salt water is poured on the ground around that electrode to decrease the surface resistance. After the contact resistance of all electrodes is satisfactory, the data are acquired under program control. The electrodes are moved to the next survey line and the procedures repeated.

The resulting data sets are inverted using AGI EarthImager 2D, commercially licensed software, to create two-dimensional resistivity models. Apparent resistivity values are calculated with a forward modeling subroutine, and a smoothness-constrained least-squares optimization routine is used to invert the data. Both finite-difference and finite-element forward modeling techniques are available in the software.

Although there are many ways to display the results of 2D resistivity inversions, the essential element is a plot of the distribution of resistivity as a function of depth and distance along the survey line. The choice of scales affects the appearance of the plots and further emphasizes particular aspects of the results, and the choice is most commonly between linear and logarithmic scales, although others could be made. A resistivity image profile can be made to highlight either local detail or regional information.

The interpretation of resistivity plots is based upon the experience of the interpreter, his/her knowledge of typical values or ranges of values of resistivity for the types of geologic materials expected below a survey line. The interpreter uses the measured values to infer what materials are present - including soil and/or rock types, porosity, permeability, presence or absence of contamination, the presence of such geological features as faults and fracture zones, and the presence of such man-made features as tar pits, concrete walls, slurry walls, and former lagoons.

LIMITATIONS OF THE METHODS

Seismic Refraction

As with all geophysical methods, the seismic refraction method is based on the assumption that the local geology is uncomplicated. In particular, the seismic refraction method assumes that interfaces between geologic materials correlate with sharp increases in seismic velocity and that the interfaces between geologic units are relatively flat-lying. The method is not very sensitive to lateral variations within layers, and relatively subtle features such as fracture zones within bedrock generally cannot be detected unless there is a topographic expression of the feature and/or a significant drop in bedrock velocity. The accuracy of the method is degraded in areas with strong topographic relief and/or where the interfaces have apparent dips greater than about 20°. *In general, the accuracy of depths determined is stated to be about 10% or 2 feet, whichever is greater.*

Where two materials do not exhibit contrasting velocities, or where velocities gradually increase with depth, a clear refracted signal is not generated, and the GRM method cannot be used to distinguish the two materials. In some cases, the "geophysical contact" between materials with contrasting velocities does not correlate exactly with the "geologic contact." For example, where

a highly weathered bedrock is overlain by a dense material such as till, the velocity range of the weathered bedrock might overlap or approach the velocity range of the till, and the two materials cannot be distinguished seismically. In such cases, the depth determined by GRM is the depth of *competent* bedrock, which might be located at some depth below the geologic contact.

The depth relations of the water table and bedrock may constitute a significant problem for processing with GRM. This problem is that of a "blind layer." A blind layer occurs where the thickness of the saturated overburden is less than about half the depth of bedrock. In such cases, the water-saturated material immediately above bedrock is "blind" in the sense that no refracted seismic energy from it will be received as a first arrival of seismic energy, and all methods used to reduce the seismic data to determine the depth of bedrock, the objective of this survey, use *only* first arrivals. Thus, the saturated layer will not be detected where it is close to bedrock, and most methods of seismic data reduction will indicate that bedrock is considerably shallower than it actually is. Although GRM, the method used by HRGS to reduce the seismic refraction data, does not use first arrivals through the water saturated zone (because there is none to use) in such cases, GRM determines the depth of bedrock correctly by using the *average* velocity of the saturated and unsaturated zones.

Electrical Resistivity Imaging

As with any of the electrical geophysical methods, resistivity data are subject to certain limitations, including site surface and subsurface conditions and structures, electrical and “geological” noise, and target depth and size. Interference from cultural features as buildings, fencing, railroad tracks, and underground and overhead power lines is common at many sites, particularly at active industrial sites. Thus, for certain applications, the use of the resistivity method in urban settings might be inappropriate.

The subsurface is three dimensional in character, and although the resistivity data are acquired along a line, the data are affected by resistivity changes off-line. Therefore, unless there are parallel survey lines that are spaced appropriately, resistivity changes off-line may be interpreted as changes below the survey line. This limitation is particularly significant for single survey lines. A further limitation of the resistivity method arises at the ends of a survey line where the data density is necessarily reduced.

The target depth, size, and of course, resistivity contrast may pose limitations. These three parameters, generally characterized as large or small, are important in the survey design,[1] and extreme values can limit the usefulness of the resistivity method. For example: a small target, a granite boulder 2 ft in diameter at a large depth of 20 ft or more, even with very high resistivity

[1] The parameters depth and size scale to the electrode spacing. A “large depth” is any depth greater than 10 times the electrode spacing. A “small depth” is any depth less than 3 times the electrode spacing. Depths less than 10 but greater than 3 times the electrode spacing are termed “intermediate depths.” A “large size” is any size greater than 2½ times the electrode spacing. A “small size” is any size less than 1 times the electrode spacing. Sizes less than 2½ but greater than 1 times the electrode spacing are termed “intermediate sizes.” Resistivity contrast refers to the ratio of the resistivity of one material to that of the second material. A large resistivity contrast is any such ratio of at least 100. A small resistivity contrast is any such ratio no greater than 0.5. Ratios less than 100 but greater than 0.5 are termed “intermediate ratios.”

contrast, 10^5 Ohm-m in a medium of 0.2 Ohm-m, cannot be detected. A target of reasonable size, a granite boulder 2 ft in diameter at a shallow depth of 6 ft or less, may not be detectable where the resistivity contrast is low, 10^5 Ohm-m in a medium of 10^4 Ohm-m.

RESULTS

General

Seismic refraction and ERI surveys were conducted along one (1) transect totaling approximately 1,650 feet, to determine the depth and configuration of the bedrock surface and to characterize the overburden stratigraphy.

Seismic Refraction

General. The location of the seismic line is shown in Figure 1. The results of the seismic survey are shown in profile form in the lower panel of Figure 2 and are listed in Table 1.

Data Quality. The quality of the seismic refraction data ranges from good to very good. A measure of the accuracy of the data can be obtained by comparing the depths determined seismically with depths reported from nearby borings that intersect bedrock. For the present survey, two borings intersect the transect. The depth of bedrock based on boring logs provided by ERM are consistent with the seismically determined depth.

A measure of the internal consistency of the data can be obtained by comparing the depths determined seismically at the intersections of seismic lines. Intersections are not available in this survey. Based on the results for similar projects, H-R estimates the accuracy (standard deviation) of the *depths* of competent bedrock determined by the seismic refraction survey to be about ± 10% of the depth of bedrock, or ± 2 feet), whichever is greater.

Interpretation of Velocities. Materials with three distinct velocity ranges were detected based on the GRM interpretation of the seismic data. The upper material exhibits a compressional wave velocity range of 1,100 to 3,060 feet per second (fps) and is interpreted to consist of unsaturated sediment. The middle material exhibits a compressional wave velocity range of 4,490 fps to 7,690 fps and is interpreted as saturated soils consisting of clay, sand and silt deposits in the lower end of the range, and weathered bedrock in the higher end of the range.

The lowest material exhibits a compressional wave velocity of 10,750 fps to 21,500 fps and is interpreted to consist of competent bedrock. Where the top of bedrock is highly fractured and/or deeply weathered, it might exhibit lower velocities that cannot be detected as a distinct layer on the basis of the seismic refraction data. Thus, the top of rock determined on the basis of seismic refraction data is generally the top of competent bedrock, which might be located somewhat below the geologic contact between the overburden and bedrock. We note that the middle layer exhibits a broad variation of compressional wave velocity. In areas with greater velocity the interface between weathered and sound bedrock may not appear well defined (see below).

Bedrock Elevation and Configuration. The bedrock surface undulates, with several highs and lows present along the line. The depth of competent bedrock along the seismic line varies from about 46 feet to about 144 feet, and bedrock elevation varies from about 342 feet to 426 feet, for a total apparent relief of approximately 84 feet.

Electrical Resistivity Imaging

ERI data were acquired along one traverse totaling approximately 1,650 feet. The location of the ERI Line is shown in Figure 2. An inverted electrical resistivity models for the ERI line is shown in the upper panel of Figure 2. The ERI data shown was acquired using the Schlumberger array configuration.

The horizontal axes in Figure 2 is the profile distance along the ground surface, and the vertical axes is elevation in feet. The red and orange colors typically indicate relatively high resistivity materials such as dry sand and gravel located above the water table or bedrock, and the blue colors typically indicate relatively low resistivity materials such as saturated or conductive soils and clays. The intermediate colors (yellow/green/light blue) typically indicate moderately conductive materials such as partially saturated or moist soils and zones of weathered/fractured bedrock.

The ERI profile is characterized, from the top down, by (1) an upper 20 to 30-ft thick layer consisting of high resistivity materials at the south end of the line and low resistivity values in the middle and north end of the line, (2) a zone of intermediate resistivity values, and (3) a deeper zone of higher resistivity values. For the uppermost layer, HRGS infers that high resistivity values present at the south end correlate with unsaturated coarse materials and low resistivity values present in the middle and north portions of the line correlates with clay and silt layers.

The moderate resistivity middle zone may correlate with alternating sand (green to yellow) and silt (light blue) layers as shown in the simplified boring log for GWI-B/MW-08B&C boring.

The bedrock surface as determined by seismic refraction GRM analysis (a more accurate method of determining the depth of the bedrock surface than the ERI method) has been superimposed on the ERI profile shown in Figure 2. For potions of the valley floor, the seismically determined top of bedrock approximately corresponds with the top of the deeper moderate to high resistivity zone. For other portions of the valley floor (e.g. central portion of the Line), the seismically determined top of bedrock is significantly shallower than the top of the moderate to high resistivity zone. For this area, top of bedrock may not be very well defined seismically due to the presence a very thick fractured or weathered zone.

CONCLUSIONS

Based upon the results of the surface geophysical survey conducted by HRGS as part of an aquifer characterization investigation study in Hoosick Valley, New York, in July 2020, we conclude the following:

- Bedrock depth varies between 46 feet to about 144 feet, and bedrock elevation varies from about 342 feet to 426 feet, for a total apparent relief of approximately 84 feet.

- Possible zones of sand and silt were detected between an upper zone of clay/unsaturated soils at the surface and bedrock.

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Except as expressly provided in this limitations section, HRGS makes no other representation or warranty of any kind whatsoever, oral or written, expressed or implied; and all implied warranties of merchantability and fitness for a particular purpose, are hereby disclaimed. If you have any questions or comments on this letter report, please contact us at your convenience. It has been a pleasure to work with ERM on this project. We look forward to working with you again in the future.

Sincerely yours,
HAGER-RICHTER GEOSCIENCE, INC.

José Carlos Cambero Calzada, P.G. (NY 000899)

Senior Geophysicist

Attachments: Figures 1 – 2

TABLE 1
SEISMIC REFRACTION RESULTS
AQUIFER CHARACTERIZATION
HOOSIC VALLEY, NEW YORK

Station (ft)	Easting (ft)	Northing (ft)	Surface Elevation (ft)	Bedrock Depth (ft)	Bedrock Elevation (ft)
0	799552.8	1477802.8	439.2	48.2	391
10	799562.2	1477807.8	441.4	48.2	393.2
20	799571.6	1477812.8	443.5	48.2	395.3
30	799581	1477817.8	445.7	48.2	397.5
40	799590.4	1477822.6	447.9	46	401.9
50	799599.8	1477827.6	450	48.8	401.2
60	799609.2	1477832.6	452.2	50.1	402.1
70	799618.6	1477837.6	454.3	49.6	404.7
80	799628	1477842.6	456.5	50.9	405.6
90	799637.4	1477847.6	458.7	53	405.7
100	799646.8	1477852.6	460.8	53.9	407
110	799656.2	1477857.6	463	53.9	409.1
120	799665.6	1477862.5	465.2	53.7	411.5
130	799674.9	1477867.5	467.3	52.9	414.5
140	799684.4	1477872.5	469.5	54.1	415.4
150	799693.8	1477877.5	471.7	55.2	416.4
160	799703.1	1477883.4	472.6	54.9	417.7
170	799712.4	1477889.1	473.5	58.3	415.3
180	799721.8	1477895	474.5	60.5	414
190	799731.1	1477900.9	475.4	61.7	413.7
200	799740.4	1477906.6	476.4	68.4	408
210	799749.8	1477912.5	477.3	70.5	406.9
220	799759.1	1477918.4	478.2	70.3	407.9
230	799768.4	1477924.1	479.2	69.5	409.7
240	799777.8	1477930	480.1	74.8	405.3
250	799787.1	1477935.9	481.1	72.9	408.2
260	799796.4	1477941.6	482	70.3	411.7
270	799805.8	1477947.5	482.9	74.3	408.6
280	799815.1	1477953.4	483.9	72.3	411.6
290	799824.4	1477959.1	484.8	66.2	418.7
300	799833.8	1477965	485.8	62.8	422.9
310	799842.1	1477970.1	486	63.1	422.9
320	799850.4	1477975.4	486.3	66.1	420.2
330	799858.6	1477980.5	486.5	67.6	418.9
340	799866.9	1477985.8	486.8	75.1	411.7
350	799875.2	1477990.9	487	82.6	404.5

Estimated standard deviation of depth of interfaces for seismic lines is normally taken as 10% or 2 feet, whichever is greater. Depths and elevations of bedrock determined here are for competent bedrock. Heavily weathered or highly fractured bedrock may occur at shallower depths. The easting and northing coordinates are relative to New York State Plane East NAD83 (CORS96) in US survey feet. Elevations along the seismic lines were determined from 2-meter digital elevation models “u_6345074600_2_meter.img” and “u_6345074500_2_meter.img” available at gis.ny.gov relative to NAVD88.

TABLE 1 (CONTINUED)
SEISMIC REFRACTION RESULTS

Station (ft)	Easting (ft)	Northing (ft)	Surface Elevation (ft)	Bedrock Depth (ft)	Bedrock Elevation (ft)
360	799883.6	1477996.1	487.3	83.6	403.7
370	799891.8	1478001.2	487.5	84.4	403.1
380	799900.1	1478006.5	487.8	100.2	387.5
390	799908.4	1478011.6	488	100.8	387.2
400	799916.8	1478016.9	488.3	101.7	386.6
410	799925	1478022	488.5	103.8	384.7
420	799933.3	1478027.2	488.8	106.7	382.1
430	799941.6	1478032.4	489	108.8	380.3
440	799949.9	1478037.6	489.3	109.7	379.6
450	799958.2	1478042.8	489.5	110.2	379.4
460	799966.5	1478048	489.8	111.5	378.3
470	799974.8	1478053.1	490	114.2	375.8
480	799983.6	1478055	489.8	116.6	373.2
490	799992.3	1478057	489.6	125.7	363.8
500	800001	1478058.9	489.3	127.2	362.2
510	800009.8	1478060.9	489.1	128.6	360.5
520	800018.5	1478062.8	488.9	130	358.8
530	800027.2	1478064.8	488.6	133	355.6
540	800036	1478066.6	488.4	134.5	354
550	800044.7	1478068.6	488.2	135.9	352.3
560	800053.4	1478070.5	488	137.3	350.7
570	800062.2	1478072.4	487.7	138.7	349
580	800070.9	1478074.4	487.5	140.1	347.4
590	800079.7	1478076.2	487.3	141.5	345.7
600	800088.4	1478078.2	487	143	344.1
610	800097.1	1478080.1	486.8	144.4	342.4
620	800105.9	1478082.1	486.6	130.5	356.1
630	800115.1	1478084.6	486.5	132.4	354.1
640	800124.9	1478088	486.6	132.4	354.2
650	800134.8	1478091.4	486.7	119.7	367
660	800144.7	1478094.8	486.8	111.1	375.7
670	800154.6	1478098.1	486.9	112.2	374.7
680	800164.4	1478101.6	487	105.7	381.3
690	800174.3	1478105	487.2	95.2	392
700	800184.2	1478108.4	487.3	92.9	394.3
710	800194.1	1478111.8	487.4	96.2	391.2
720	800203.9	1478115.1	487.5	97.4	390.1
730	800213.8	1478118.5	487.6	97.3	390.3
740	800223.7	1478122	487.7	96.1	391.6
750	800233.6	1478125.4	487.8	85.6	402.2

Estimated standard deviation of depth of interfaces for seismic lines is normally taken as 10% or 2 feet, whichever is greater. Depths and elevations of bedrock determined here are for competent bedrock. Heavily weathered or highly fractured bedrock may occur at shallower depths. The easting and northing coordinates are relative to New Hampshire State Plane NAD83 (CORS96) in US survey feet. Elevations along the seismic lines were determined from plans provided by Golder and are relative to mean sea level (MSL).

TABLE 1 (CONTINUED)
SEISMIC REFRACTION RESULTS

Station (ft)	Easting (ft)	Northing (ft)	Surface Elevation (ft)	Bedrock Depth (ft)	Bedrock Elevation (ft)
760	800243.4	1478128.8	488	84.9	403
770	800253.3	1478132.1	488.1	86.8	401.3
780	800262.4	1478135.8	488.4	86.4	402
790	800271.6	1478139.5	488.7	77.7	411.1
800	800280.7	1478143.1	489	77.7	411.4
810	800289.8	1478146.8	489.4	79.1	410.3
820	800298.9	1478150.5	489.7	80.5	409.2
830	800308.1	1478154.1	490	80.5	409.6
840	800317.2	1478157.8	490.4	74.8	415.5
850	800326.2	1478161.5	490.7	64.3	426.4
860	800335.4	1478165.1	491	68.6	422.4
870	800344.5	1478168.8	491.3	66.1	425.3
880	800353.6	1478172.5	491.7	68.9	422.8
890	800362.8	1478176.1	492	71.8	420.2
900	800371.9	1478179.8	492.3	74.5	417.8
910	800381	1478183.5	492.7	77.4	415.3
920	800390.1	1478187.1	493	78.6	414.4
930	800399.3	1478191	492.8	80	412.7
940	800408.6	1478195	492.5	81.5	411
950	800417.8	1478198.9	492.3	80.9	411.5
960	800427	1478202.8	492.1	83.8	408.3
970	800436.2	1478206.8	491.9	90.8	401.1
980	800445.4	1478210.6	491.7	92.3	399.4
990	800454.6	1478214.5	491.5	96.9	394.6
1000	800463.9	1478218.5	491.2	101.4	389.8
1010	800473.1	1478222.4	491	105.3	385.7
1020	800482.3	1478226.2	490.8	109.9	380.8
1030	800491.5	1478230.2	490.6	111.4	379.2
1040	800500.8	1478234.1	490.4	124.5	365.9
1050	800509.9	1478238	490.1	124.4	365.7
1060	800519.2	1478242	489.9	125.8	364.1
1070	800528.4	1478245.9	489.7	125.1	364.6
1080	800537.8	1478249.1	490.1	122.9	367.2
1090	800547.1	1478252.4	490.5	119.6	370.8
1100	800556.5	1478255.6	490.9	118	372.9
1110	800565.8	1478258.9	491.3	118.8	372.5
1120	800575.2	1478262.1	491.7	120.9	370.8
1130	800584.6	1478265.4	492.1	122.9	369.2
1140	800593.9	1478268.6	492.5	125	367.5
1150	800603.3	1478271.9	492.9	125.6	367.2

Estimated standard deviation of depth of interfaces for seismic lines is normally taken as 10% or 2 feet, whichever is greater. Depths and elevations of bedrock determined here are for competent bedrock. Heavily weathered or highly fractured bedrock may occur at shallower depths. The easting and northing coordinates are relative to New Hampshire State Plane NAD83 (CORS96) in US survey feet. Elevations along the seismic lines were determined from plans provided by Golder and are relative to mean sea level (MSL).

TABLE 1 (CONTINUED)
SEISMIC REFRACTION RESULTS

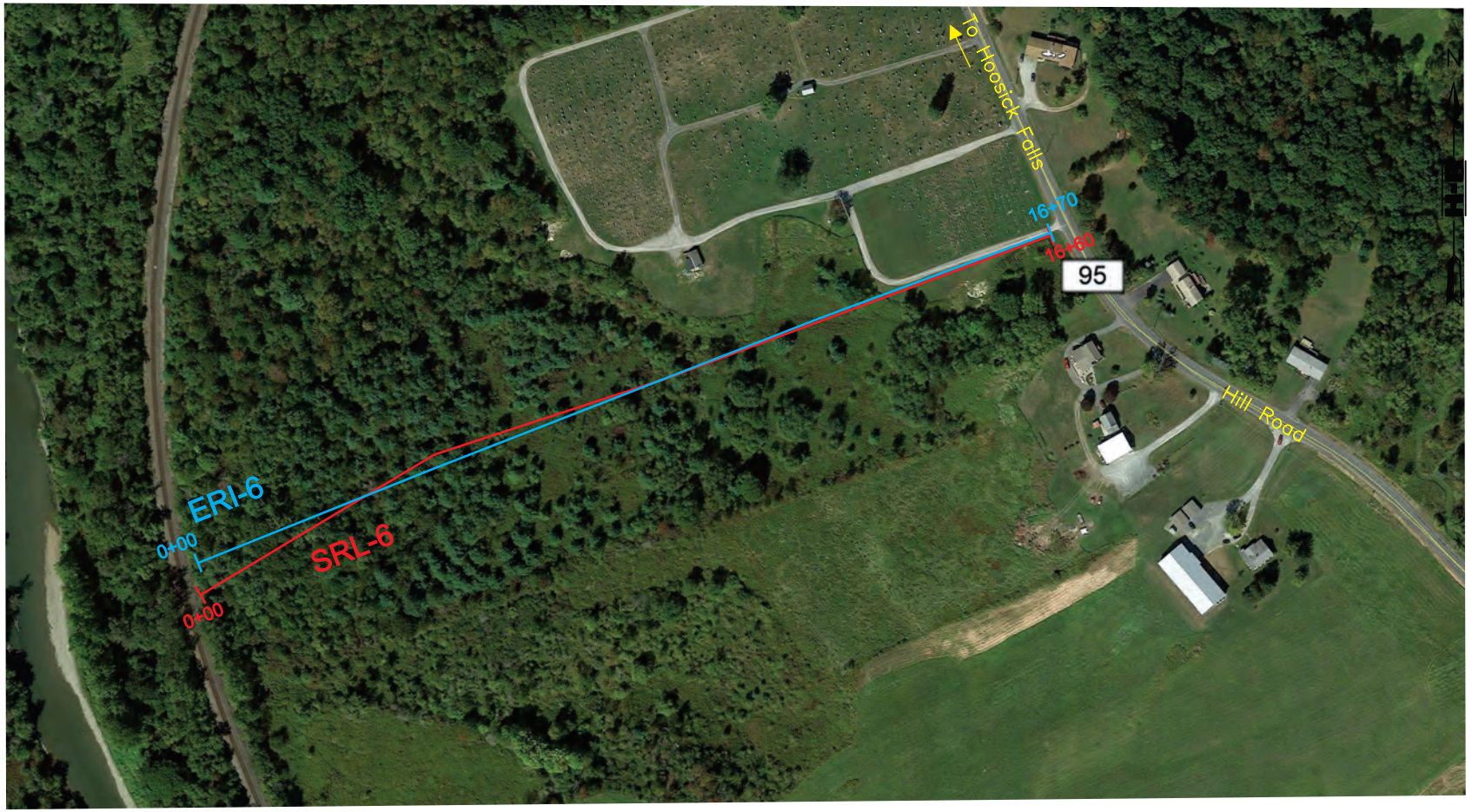
Station (ft)	Easting (ft)	Northing (ft)	Surface Elevation (ft)	Bedrock Depth (ft)	Bedrock Elevation (ft)
1160	800612.7	1478275.1	493.2	116.7	376.5
1170	800622.1	1478278.4	493.6	114.4	379.2
1180	800631.4	1478281.6	494	123.1	371
1190	800640.8	1478284.9	494.4	124.9	369.5
1200	800650.1	1478288.1	494.8	128.6	366.2
1210	800659.5	1478291.4	495.2	125.7	369.6
1220	800668.9	1478294.6	495.6	124.4	371.2
1230	800678.1	1478297.8	496.2	125.2	371
1240	800687.3	1478300.9	496.8	126.5	370.3
1250	800696.5	1478304	497.4	130.3	367
1260	800705.8	1478307.1	498	130.3	367.6
1270	800714.9	1478310.2	498.6	132	366.5
1280	800724.2	1478313.4	499.2	124.4	374.8
1290	800733.4	1478316.5	499.7	125.9	373.9
1300	800742.6	1478319.5	500.3	122.3	378
1310	800751.8	1478322.6	500.9	122.3	378.6
1320	800761.1	1478325.8	501.5	119.7	381.8
1330	800770.2	1478328.9	502.1	104.1	398
1340	800779.5	1478332	502.7	104.1	398.6
1350	800788.7	1478335.1	503.3	102.7	400.6
1360	800797.9	1478338.2	503.9	101.3	402.6
1370	800807.1	1478341.4	504.5	93.2	411.3
1380	800816.3	1478344.6	505.3	91.4	413.9
1390	800825.6	1478347.9	506.2	91.4	414.8
1400	800834.8	1478351.1	507.1	90.2	416.9
1410	800843.9	1478354.4	508	94	414
1420	800853.2	1478357.6	508.8	92.9	415.9
1430	800862.4	1478360.9	509.7	98.7	411
1440	800871.6	1478364.1	510.6	101.1	409.5
1450	800880.8	1478367.4	511.5	103.1	408.3
1460	800890	1478370.6	512.3	105.2	407.1
1470	800899.2	1478373.9	513.2	106.9	406.3
1480	800908.4	1478377.1	514.1	111.7	402.4
1490	800917.6	1478380.4	515	107.4	407.5
1500	800926.8	1478383.6	**515.8**	117.9	397.9
1510	800936.1	1478386.9	516.7	118.6	398.1
1520	800945.2	1478390.1	517.6	119.4	398.2
1530	800954.6	1478393.5	517.8	119.4	398.5
1540	800963.9	1478396.9	518.1	120.1	398
1550	800973.2	1478400.4	518.3	118.1	400.2

Estimated standard deviation of depth of interfaces for seismic lines is normally taken as 10% or 2 feet, whichever is greater. Depths and elevations of bedrock determined here are for competent bedrock. Heavily weathered or highly fractured bedrock may occur at shallower depths. The easting and northing coordinates are relative to New Hampshire State Plane NAD83 (CORS96) in US survey feet. Elevations along the seismic lines were determined from plans provided by Golder and are relative to mean sea level (MSL).

TABLE 1 (CONTINUED)
SEISMIC REFRACTION RESULTS

Station (ft)	Easting (ft)	Northing (ft)	Surface Elevation (ft)	Bedrock Depth (ft)	Bedrock Elevation (ft)
1560	800982.6	1478403.8	518.6	120.3	398.3
1570	800991.9	1478407.1	518.9	119.6	399.3
1580	801001.2	1478410.5	519.1	118.8	400.3
1590	801010.5	1478413.9	519.4	114.3	405.1
1600	801019.8	1478417.4	519.6	113.4	406.2
1610	801029.1	1478420.8	519.9	112.6	407.3
1620	801038.4	1478424.1	520.1	112.7	407.5
1630	801047.8	1478427.5	520.4	112.1	408.3
1640	801057.1	1478430.9	520.6	112.1	408.5
1650	801066.4	1478434.4	520.9	119.2	401.7

Estimated standard deviation of depth of interfaces for seismic lines is normally taken as 10% or 2 feet, whichever is greater. Depths and elevations of bedrock determined here are for competent bedrock. Heavily weathered or highly fractured bedrock may occur at shallower depths. The easting and northing coordinates are relative to New Hampshire State Plane NAD83 (CORS96) in US survey feet. Elevations along the seismic lines were determined from plans provided by Golder and are relative to mean sea level (MSL).



SCALE (feet)

0 300 600

LOCATION

NOTE

Modified from Bing aerial photograph.

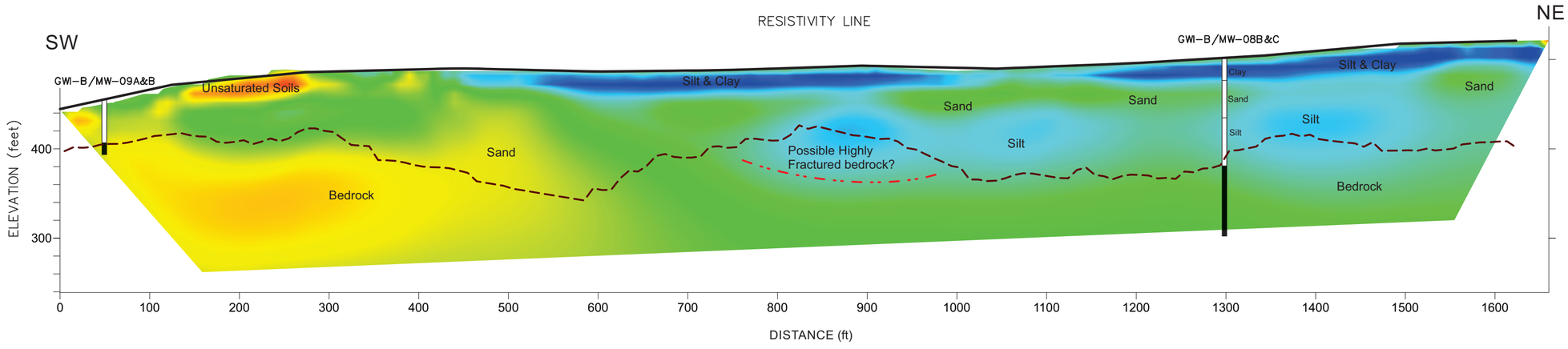
* DBA HR Geological Services in New York

Figure 1
General Site Location
Aquifer Characterization
Hoosick Valley, New York

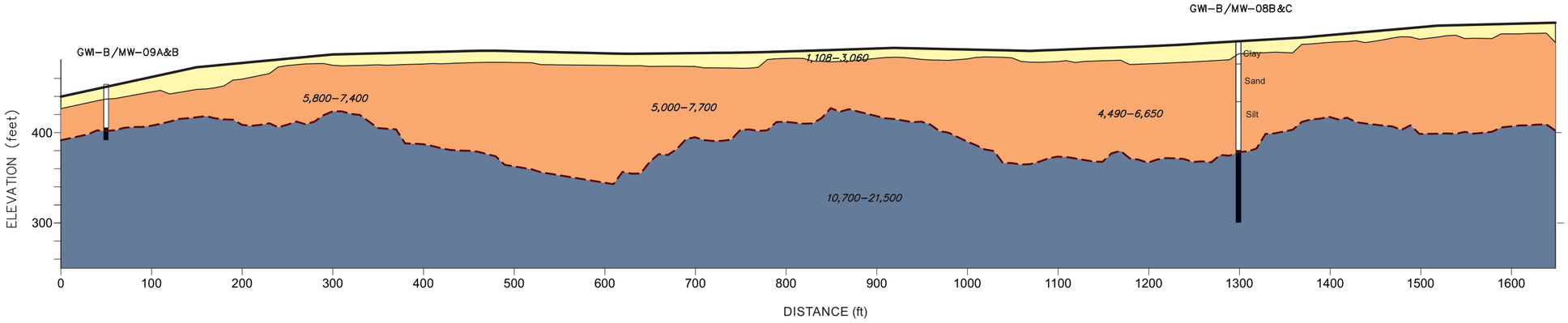
File 18SG14 | October 2020

HAGER–RICHTER
Salem, NH – Fords, NJ*

RESISTIVITY LINE

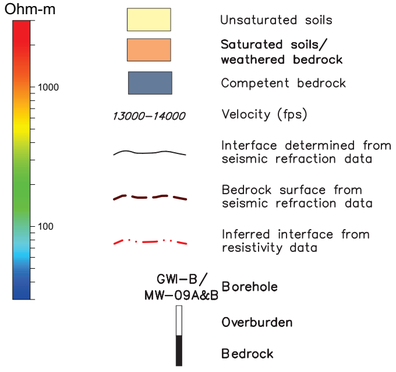


SEISMIC LINE



SCALE (feet)

0 100 200



NOTES:

1. Resistivity data acquired using an AGI SuperSting R8 with the **Schlumberger** electrode configuration, 56 electrodes, and a 20 foot electrode spacing.
2. Resistivity data processed and inverted using Earthimager2D Software by AGI.
3. Estimated accuracy (standard deviation) of depth of bedrock is ±10% or 2 feet, whichever is greater.
4. The depths determined for bedrock are depths of competent rock; weathered and/or fractured bedrock might occur at shallower depths.
5. Elevations along the seismic lines were determined from 2–meter digital elevation models "u_6330074900_2_meter.img" and "u_6345074900_2_meter.img" available at gis.ny.gov relative to NAVD88.
6. Seismic data were analyzed using the Generalized Reciprocal Method.

Figure 2
Results
Aquifer Characterization
Hoosick Valley, New York

File 18SG14 | October, 2020

HAGER–RICHTER
Salem, NH – Fords, NJ*

* DBA HR Geological Services in New York

Appendix B
Lithologic and Well Construction Logs

ERM
5784 Widewaters Parkway
Syracuse, NY 13214
Telephone: +1 (315) 445-2554

GWI-B/MW-08B&C

Client: Arnold & Porter **Project Name:** Hoosick Falls

Project Number: 0375746 **Project Location:** Hoosick Falls, New York

DRILLING CONTRACTOR: Cascade Drilling
DRILLING METHOD: Hand Auger/ Sonic Drilling
DATE BORING COMPLETED: 8/6/2020
DATE WELL INSTALLED: 8/7/2020
GROUND ELEVATION: not available
PVC ELEVATION: not available
NOTES:

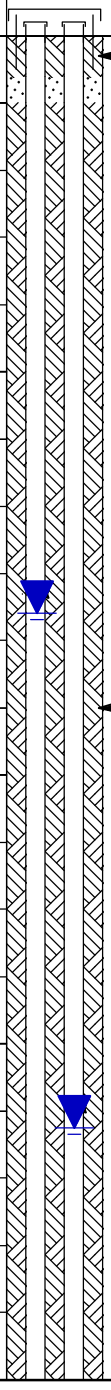
TOTAL DEPTH: 125 feet bgs
DIAMETER: 6 inches
LOGGED BY: J. Edmonds
CHECKED BY: H. Usle
NORTHING: not available
EASTING: not available

ACRONYM LEGEND
amsl = above mean sea level
bgs = below ground surface
PID = photoionization detector
ppm = parts per million
HA = hand auger
NR = no recovery
SC = sonic coring

GRAPHIC LOG LEGEND
Low Plasticity Clay; Low Plasticity Gravelly Clay; Gravelly Silt; Silt; Poorly-graded Sand with Silt; Poorly-graded Sandy Gravel; Poorly-graded Gravelly Sand; Poorly-graded Sand; Phyllite

DEPTH (feet)	SAMPLE TYPE	RECOVERY (inches)	RECOVERY %	U.S.C.S.	MATERIAL DESCRIPTION	PID (ppm)
0						0.0
				CL	Light Gray, CLAY, dense, dry.	0.0
	HA	60	100			0.0
3.0						
						0.0
						0.0
5						
						0.0
				CL	Light Gray To Brown, CLAY, medium stiff to stiff, damp to moist.	0.0
	SC	60	100			0.0
						0.0
						0.0
10						
10.0						
						0.0
						0.0
	SC	60	100	CL	Gray, CLAY, medium stiff, damp to moist.	0.0
						0.0
						0.0
15						
15.0						
						0.0
						0.0
	SC	50	83	CL	Gray, CLAY, medium stiff, moist.	0.0
						0.0
						0.0
20						
20.0						

WELL DIAGRAM



ERM
5784 Widewaters Parkway
Syracuse, NY 13214
Telephone: +1 (315) 445-2554

Client: Arnold & Porter **Project Name:** Hoosick Falls

Project Number: 0375746 **Project Location:** Hoosick Falls, New York

DEPTH (feet)	SAMPLE TYPE	RECOVERY (inches)	RECOVERY %	U.S.C.S.	MATERIAL DESCRIPTION	PID (ppm)
	SC	38	63	CL	Gray, CLAY, some subangular gravel, poorly sorted, medium stiff, damp. *(continued)*	0.0
						0.0
						0.0
						0.0
25						0.0
					25.0	
				CL	Gray, CLAY, with subangular and subrounded coarse gravel, poorly sorted, soft to medium stiff, damp to moist.	0.0
					27.0	0.0
	SC	36	60	ML	Gray, SILT, with subangular and subrounded fine sand and coarse gravel, poorly sorted, soft, moist.	0.0
						0.0
30						0.0
					30.0	
				ML	Gray, SILT, with subangular and subrounded fine sand and coarse gravel, poorly sorted, soft, moist.	0.0
						0.0
	SC	40	67			0.0
					33.0	
				ML	Dark Gray, SILT, little subangular and subrounded coarse sand and gravel, poorly sorted, soft to medium stiff, damp.	0.0
						0.0
35						
					35.0	
				ML	Dark Gray, SILT, little subangular and subrounded coarse sand and gravel, poorly sorted, soft to medium stiff, damp.	0.0
					36.0	
	SC	36	60	SP-SM	Gray, FINE TO COARSE SAND AND GRAVEL, with subangular and subrounded silt, poorly sorted, medium stiff, damp.	0.0
						0.0
						0.0
40						0.0
						0.0
					41.0	
	SC	48	80	ML	Gray, SILT, some subrounded fine sand and medium gravel, moderately sorted, medium stiff, damp.	0.0
						0.0

WELL DIAGRAM: Bentonite Grout Seal

ERM
5784 Widewaters Parkway
Syracuse, NY 13214
Telephone: +1 (315) 445-2554

Client: Arnold & Porter **Project Name:** Hoosick Falls

Project Number: 0375746 **Project Location:** Hoosick Falls, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
45					ML		Gray, SILT, some subrounded fine sand and medium gravel, moderately sorted, medium stiff, damp. *(continued)*	0.0 0.0	Bentonite Grout Seal
							45.0		
					ML		Gray, SILT, some subrounded fine sand and medium gravel, moderately sorted, medium stiff, moist.	0.0 0.0	
							47.0		
		SC	50	83				0.0 0.0	
50					GP		Gray, FINE TO MEDIUM SANDY GRAVEL, trace subrounded to subangular silt, poorly sorted, loose, moist to wet.	0.0 0.0 0.0	Bentonite Seal
							52.0		
		SC	54	90	ML		Gray, SILT, with subrounded to subangular coarse sand and gravel, poorly sorted, loose to medium dense, damp to moist.	0.0 0.0 0.0	Filter Sand (#0)
55							55.0		
		SC	60	100	SP-SM		Gray, COARSE SAND, GRAVEL AND SILT, trace subrounded to subangular cobbles, poorly sorted, loose, damp.	0.0 0.0	
							58.0		
60					SP-SM		Gray, COARSE SAND, GRAVEL AND SILT, trace subrounded to subangular cobbles, poorly sorted, loose, wet.	0.0 0.0	Well Screen (2" SCH 40 PVC/ 0.01" slot)
							60.0		
		SC	60	100	SP-SM		Gray To Dark Gray, COARSE SAND, GRAVEL AND SILT, subrounded to subangular moderately sorted, loose, wet.	0.0 0.0 0.0 0.0	
65							65.0		End Cap
					SP-SM		Gray To Dark Gray, COARSE SAND, GRAVEL AND SILT, subrounded to subangular moderately sorted, loose, dry.	0.0	
							66.0		

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Syracuse, NY 13214
Telephone: +1 (315) 445-2554

Client: Arnold & Porter **Project Name:** Hoosick Falls

Project Number: 0375746 **Project Location:** Hoosick Falls, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		SC	60.0	100	ML		Gray, SILT, soft to medium stiff, damp. *(continued)*	0.0	
								0.0	
								0.0	Bentonite Seal
70								0.0	
							70.0		
		SC	60.0	100	ML		Gray, SILT, stiff to very stiff, dry.	0.0	
								0.0	
								0.0	
								0.0	Bentonite Grout Seal
75								0.0	
							75.0		
		SC	60.0	100				0.0	
								0.0	
								0.0	
								0.0	
								0.0	
80								0.0	
					ML		Gray, SILT, stiff, dry.	0.0	
								0.0	
								0.0	
								0.0	
								0.0	
85		SC	40.0	33				0.0	
								0.0	
								0.0	
								0.0	
								0.0	

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Client: Arnold & Porter **Project Name:** Hoosick Falls

Project Number: 0375746 **Project Location:** Hoosick Falls, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
90								0.0	
								0.0	
								0.0	Bentonite Grout Seal
		SC	55.0	92				0.0	
								0.0	
95					ML		Gray, SILT, stiff, dry. *(continued)*	0.0	
								0.0	
								0.0	
		SC	60.0	100				0.0	
								0.0	
100								0.0	
							100.0		
								0.0	
								0.0	
		SC	28.0	47	ML		Gray, SILT, with subangular and subrounded coarse sand and gravel, poorly sorted, medium stiff, moist.	0.0	
								0.0	
105								0.0	
							105.0		
								0.0	Bentonite Seal
								0.0	
		SC	60.0	100	ML		Gray, SILT, with subrounded to subangular coarse sand and gravel, poorly sorted, medium stiff to soft, moist.	0.0	
								0.0	
								0.0	Filter Sand (#0)
110								0.0	
							110.0		
					SP		Dark Gray, FINE TO MEDIUM SAND, with subrounded to subangular phyllite, poorly sorted, loose, wet.	0.0	
								0.0	

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Syracuse, NY 13214
Telephone: +1 (315) 445-2554

GWI-B/MW-08B&C

Client: Arnold & Porter **Project Name:** Hoosick Falls

Project Number: 0375746 **Project Location:** Hoosick Falls, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
115		SC	12.0	20	SP		Dark Gray, FINE TO MEDIUM SAND, with subrounded to subangular phyllite, poorly sorted, loose, wet. *(continued)*	0.0 0.0 0.0	
							115.0		
120		SC	60.0	100	SP		Dark Gray To Black, FINE TO MEDIUM SAND, some subrounded to subangular phyllite, poorly sorted, loose, moist to wet.	0.0 0.0 0.0 0.0 0.0	Well Screen (2" SCH 40 PVC/ 0.01" slot) End Cap
							120.0		
125		SC	50.0	83			Dark Gray To Black, PHYLLITE, dry.	0.0 0.0 0.0 0.0 0.0	Filter Sand (#0) Bentonite Seal
							125.0		
							Bottom of Boring @ 125.0 feet bgs		
130									
135									

ERM
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Syracuse, NY 13214
Telephone: +1 (315) 445-2554

GWI-B/MW-09A&B

Client: Arnold & Porter **Project Name:** Hoosick Falls

Project Number: 0375746 **Project Location:** Hoosick Falls, New York

DRILLING CONTRACTOR: Cascade Drilling
DRILLING METHOD: Hand Auger/ Sonic Drilling
DATE BORING COMPLETED: 8/6/2020
DATE WELL INSTALLED: 8/11/2020
GROUND ELEVATION: not available
PVC ELEVATION: not available
NOTES:

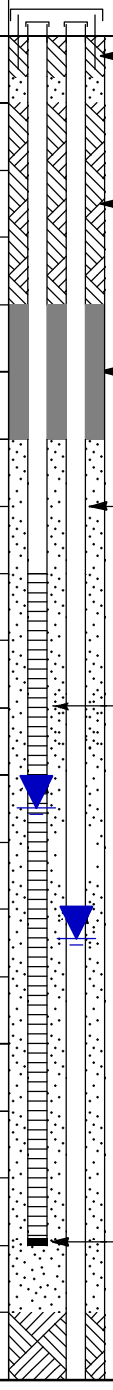
TOTAL DEPTH: 60 feet bgs
DIAMETER: 6 inches
LOGGED BY: J. Edmonds
CHECKED BY: H. Usle
NORTHING: not available
EASTING: not available

ACRONYM LEGEND
amsl = above mean sea level
bgs = below ground surface
PID = photoionization detector
ppm = parts per million
HA = hand auger
NR = no recovery
SC = sonic coring

GRAPHIC LOG LEGEND
Sandy Silt; Silt; Silty Sand; Silty Clay; Gravelly Silt; Poorly-graded Gravelly Sand; Poorly-graded Sandy Gravel; Poorly-graded Gravel; Phyllite

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
					ML		Dark Brown, SILT, with subrounded fine to medium sand, moderately sorted, soft, dry.	0.0
							1.0	0.0
		HA	60	100	ML		Brown, SILT, little subrounded fine sand, moderately sorted, soft to medium stiff, damp.	0.0
								0.0
							4.0	
5					SM		Dark Brown To Brown, SILTY SAND, with rounded to subangular gravel, (0.5-1" diameter), poorly sorted, loose to medium dense, damp.	0.0
					CL-ML		5.0 Brown, CLAYEY SILT, some subrounded to subangular gravel, (0.5" diameter), poorly sorted, soft to medium stiff, wet.	0.0
							6.0	0.0
		SC	36	60	ML		Brown, SILT, with subrounded gravel, (0.5-1" diameter), trace organics, poorly sorted, stiff, moist.	0.0
								0.0
							9.0	
10					SP		Brown To Gray, SAND AND GRAVEL, subrounded to subangular (1-2" diameter), poorly sorted, loose to medium dense, moist.	0.0
							10.0	
					SM		Brown, SILTY FINE SAND, with subrounded to subangular gravel, (2" diameter), poorly sorted, loose, moist.	0.0
								0.0
		SC	60.0	100			12.5	
					GP		Brown, GRAVEL, with subrounded to subangular fine to medium sand, (1-1.5" diameter), moderately sorted, very loose, saturated.	0.0
								0.0
15							15.0	
					CL-ML		Gray, CLAYEY SILT, trace subrounded gravel, (0.5-1" diameter), poorly sorted, stiff, dry to moist.	0.0
								0.0
		SC	60	100				0.0
							18.0	
					ML		Gray, SANDY SILT, some subrounded gravel, (0.5" diameter), poorly sorted, hard, dry.	0.0
20							20.0	0.0

WELL DIAGRAM



ERM
5784 Widewaters Parkway
Syracuse, NY 13214
Telephone: +1 (315) 445-2554

Client: Arnold & Porter **Project Name:** Hoosick Falls

Project Number: 0375746 **Project Location:** Hoosick Falls, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
					ML		Gray, SANDY SILT, some subrounded gravel, (0.5" diameter), poorly sorted, stiff, moist. *(continued)*	0.0	
								0.0	
							22.5	0.0	
					CL-ML		Gray, CLAYEY SILT, trace subrounded gravel, (1-2" diameter), poorly sorted, stiff, dry.	0.0	
25		SC	60	50				0.0	
					CL-ML		25.0 Gray, CLAYEY SILT, trace subrounded gravel, (0.5" diameter), poorly sorted, stiff, moist.	0.0	
							26.0		Bentonite Grout Seal
					CL-ML		Gray, CLAY AND SILT, trace subrounded gravel, (0.5-1" diameter), poorly sorted, stiff, dry.	0.0	
								0.0	
							28.5	0.0	
					ML		Gray, SANDY SILT, with subangular gravel, (0.5-1" diameter), poorly sorted, stiff, dry.	0.0	
30							30.0		
		SC	42	70	ML		Gray, SANDY SILT, with subrounded to subangular gravel, (0.5-1" diameter), poorly sorted, soft to stiff, moist.	0.0	
								0.0	
								0.0	
								0.0	
35								0.0	Bentonite Seal
								0.0	
		SC	60	100				0.0	Filter Sand (#0)
							37.5	0.0	
					GP		Gray, SANDY GRAVEL, subangular and subrounded (2-2.5" diameter), moderately sorted, loose, dry.	0.0	
40							40.0	0.0	Well Screen (2" SCH 40 PVC/ 0.01" slot)
					GP		Gray, SANDY GRAVEL, subangular and subrounded (2-2.5" diameter), moderately sorted, loose, moist to wet.	0.0	
							41.0		
					CL-ML		Dark Gray To Light Brown, CLAYEY SILT, with subangular gravel, (0.5" diameter), phyllite fragments, poorly sorted, stiff, moist.	0.0	
		SC	NM				43.0	0.0	

ERM
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GWI-B/MW-09A&B

Client: Arnold & Porter **Project Name:** Hoosick Falls

Project Number: 0375746 **Project Location:** Hoosick Falls, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
					GP		Gray, GRAVEL, angular (0.5-1" diameter), phyllite fragments, well sorted, loose, saturated. *(continued)*	0.0	
							44.0		
45					SM		Gray And Brown, SILTY SAND, with angular gravel, (0.5" diameter), phyllite fragments, poorly sorted, loose to medium dense, wet.	0.0	
							45.0		
					GP		Gray, GRAVEL, with subrounded to subangular sand, (0.5-1" diameter), phyllite fragments, moderately sorted, loose, wet.	0.0	
							46.0		
					CL-ML		Gray, SILTY CLAY, with subrounded gravel, (0.5-1" diameter), phyllite fragments, moderately sorted, low plasticity, moist.	0.0	
		SC	48	80				0.0	End Cap
							48.0		
								0.0	Filter Sand (#0)
50								0.0	
								0.0	
							Light Gray To White, WEATHERED PHYLLITE, angular clasts, gravel, and silt, (2-2.5" diameter), well sorted, loose, dry.	0.0	
		SC	36	60				0.0	Bentonite Seal
								0.0	
55								0.0	
							55.0		
								0.0	
								0.0	
		SC	42	70			Dark Gray, PHYLLITE, dry.	0.0	
								0.0	
60							60.0	0.0	
							Bottom of Boring @ 60.0 feet bgs		
65									

Appendix C
Data Usability Summary Report

ENVIRONMENTAL
Data Services, Inc.

DATA USABILITY SUMMARY REPORT (DUSR)

Site: Arnold & Porter, Hoosick, New York Date: September 18, 2020

SDG : 320-64137-1

Laboratory: Eurofins Test America, Sacramento, California

EDS Sample ID	Client Sample ID	Laboratory Sample Numbers	Matrix
1	GWI-MW-08B(08262020)-B1	320-64137-1	Water
2	GWI-MW-09A(08262020)-B1	320-64137-2	Water
2MS	GWI-MW-09A(08262020)-B1MS	320-64137-2MS	Water
2MSD	GWI-MW-09A(08262020)-B1MSD	320-64137-2MSD	Water
2DL	GWI-MW-09A(08262020)-B1DL	320-64137-2DL	Water
2DLMS	GWI-MW-09A(08262020)-B1DLMS	320-64137-2DLMS	Water
2DLMSD	GWI-MW-09A(08262020)-B1DLMSD	320-64137-2DLMSD	Water
3	GWI-MW-09B-B1(08262020)	320-64137-3	Water
4	GWI-MW-08C-B1(08262020)	320-64137-4	Water
5	EB-GWI-B1MF(08262020)	320-64137-5	Water
6	GWI-DUP(08262020)	320-64137-6	Water

Note (s): The laboratory reports positively identified results between the reporting limit (RL) and the method detection limit (MDL) with a J. These results are considered estimated, however still valid and useable for project objectives.

PERFLUORINATED COMPOUNDS (PFCs)

USEPA Method 537 Modified

The analytical method, the NYSDEC ASP, the USEPA CLP National Functional Guidelines for Organic Data Review (January 2017), and the reviewer's professional judgment were used in evaluating the data in this summary report.

Holding Times (HT) - All HT criteria were met.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) - The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values except for the following.

MS/MSD Sample	Compound	MS %R/MSD %R/RPD	Qualifier	Affected Samples
2	PFOA	164%/168%/OK	None	4X Rule Applies
2DL	PFDS	69%/OK/OK	UJ	2DL
	PFOA	283%/339%/OK	None	4X Rule Applies

Laboratory Control Sample (LCS) - All percent recoveries (%R) met QC criteria.

Method Blank (MB) - The method blanks exhibited the following target compounds.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
MB 320-408762/1-A	PFBA	0.448	U	1, 2, 3, 6
	PFHxS	0.297	U	1, 2, 3, 4, 5, 6
	FOSA	0.657	U	1, 2, 3, 4, 6
	PFTeA	0.314	U	4

Equipment Blank (EB) - Equipment blank sample EB-GWI-B1MF(08262020) was free of target compounds.

Initial Calibration (ICAL) - The ICAL exhibited acceptable %RSD and/or correlation coefficients.

Continuing Calibration (CCV) - The CCVs exhibited acceptable percent difference (%D) values.

Surrogate Recoveries - All samples exhibited acceptable surrogate recoveries.

Internal Standards - All internal standards met area response and retention time (RT) criteria except for the following.

EDS Sample	Compound	Area Count	Qualifier	Affected Samples
2DL	13C2-PFOA	Low	J	2DL

Field Duplicate - Field duplicate samples are summarized below. The precision was acceptable.

Compound	GWI-MW-08B(08262020)-B1 ng/L	GWI-DUP(08262020) ng/L	RPD	Qualifier
None	ND	ND	-	-

Sample Analysis - EDS Sample 2 exhibited a high concentration of PFOA over the instrument calibration range and was flagged (E) by the laboratory. The sample was diluted and reanalyzed and he dilution result for PFOA should be used for reporting purposes.

Data Qualifier	Definition
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The analyte is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limits is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the samples.

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

1

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-64137-1

SDG No.:

Client Sample ID: GWI-MW-08B(08262020)-B1 Lab Sample ID: 320-64137-1

Matrix: Water Lab File ID: 2020.09.02_A18_PFC_A_015.d

Analysis Method: 537 (modified) Date Collected: 08/26/2020 13:55

Extraction Method: 3535 Date Extracted: 09/01/2020 18:41

Sample wt/vol: 280(mL) Date Analyzed: 09/02/2020 12:24

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 20(uL) GC Column: Gemini C18 3x50 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 408973 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	1.8	U	18	1.8
39108-34-4	8:2 FTS	1.8	U	18	1.8
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.7	U	18	1.7
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2.8	U	18	2.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.18	U	1.8	0.18
375-22-4	Perfluorobutanoic acid (PFBA)	0.48	~~J B~~ U	1.8	0.31
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.29	U	1.8	0.29
335-76-2	Perfluorodecanoic acid (PFDA)	0.28	U	1.8	0.28
307-55-1	Perfluorododecanoic acid (PFDoA)	0.49	U	1.8	0.49
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.17	U	1.8	0.17
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.22	U	1.8	0.22
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.37	~~J B~~ U	1.8	0.15
307-24-4	Perfluorohexanoic acid (PFHxA)	0.52	U	1.8	0.52
375-95-1	Perfluorononanoic acid (PFNA)	0.24	U	1.8	0.24
754-91-6	Perfluorooctanesulfonamide (FOSA)	1.2	~~J B~~ U	1.8	0.31
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.48	U	1.8	0.48
335-67-1	Perfluorooctanoic acid (PFOA)	0.76	U	1.8	0.76
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.44	U	1.8	0.44
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.26	U	1.8	0.26
72629-94-8	Perfluorotridecanoic acid (PFTriA)	1.2	U	1.8	1.2
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.98	U	1.8	0.98

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

2

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-64137-1

SDG No.:

Client Sample ID: GWI-MW-09A(08262020)-B1 Lab Sample ID: 320-64137-2

Matrix: Water Lab File ID: 2020.09.02_A18_PFC_A_016.d

Analysis Method: 537 (modified) Date Collected: 08/26/2020 15:30

Extraction Method: 3535 Date Extracted: 09/01/2020 18:41

Sample wt/vol: 280.8(mL) Date Analyzed: 09/02/2020 12:34

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 20(uL) GC Column: Gemini C18 3x50 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 408973 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	1.8	U	18	1.8
39108-34-4	8:2 FTS	1.8	U	18	1.8
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.7	U	18	1.7
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2.8	U	18	2.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.32	J	1.8	0.18
375-22-4	Perfluorobutanoic acid (PFBA)	4.2	~~B~~ U	1.8	0.31
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.28	U	1.8	0.28
335-76-2	Perfluorodecanoic acid (PFDA)	0.28	U	1.8	0.28
307-55-1	Perfluorododecanoic acid (PFDoA)	0.49	U	1.8	0.49
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.17	U	1.8	0.17
375-85-9	Perfluoroheptanoic acid (PFHpA)	13		1.8	0.22
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.40	~~J B~~ U	1.8	0.15
307-24-4	Perfluorohexanoic acid (PFHxA)	6.3		1.8	0.52
375-95-1	Perfluorononanoic acid (PFNA)	0.24	U	1.8	0.24
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.32	~~J B~~ U	1.8	0.31
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.48	U	1.8	0.48
335-67-1	*Perfluorooctanoic acid (PFOA)*	530 ~~540~~ ~~B~~ J		18 ~~1.8~~	1.6 ~~0.76~~
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.69	J	1.8	0.44
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.26	U	1.8	0.26
72629-94-8	Perfluorotridecanoic acid (PFTriA)	1.2	U	1.8	1.2
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.98	U	1.8	0.98

2DL

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-64137-1

SDG No.:

Client Sample ID: GWI-MW-09A(08262020)-B1 DL Lab Sample ID: 320-64137-2 DL

Matrix: Water Lab File ID: 2020.09.04_A18_PFC_A_024.d

Analysis Method: 537 (modified) Date Collected: 08/26/2020 15:30

Extraction Method: 3535 Date Extracted: 09/01/2020 18:41

Sample wt/vol: 280.8(mL) Date Analyzed: 09/04/2020 11:27 use original

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 20(uL) GC Column: Gemini C18 3x50 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 409734 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	18	U	180	18
39108-34-4	8:2 FTS	18	U	180	18
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17	U	180	17
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	28	U	180	28
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	U	18	1.8
375-22-4	Perfluorobutanoic acid (PFBA)	3.1	U	18	3.1
335-77-3	Perfluorodecanesulfonic acid (PFDS)	2.8	U	18	2.8
335-76-2	Perfluorodecanoic acid (PFDA)	2.8	U	18	2.8
307-55-1	Perfluorododecanoic acid (PFDoA)	4.9	U	18	4.9
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	1.7	U	18	1.7
375-85-9	Perfluoroheptanoic acid (PFHpA)	13	J	18	2.2
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.5	U	18	1.5
307-24-4	Perfluorohexanoic acid (PFHxA)	5.4	J	18	5.2
375-95-1	Perfluorononanoic acid (PFNA)	2.4	U	18	2.4
754-91-6	Perfluorooctanesulfonamide (FOSA)	3.1	U	18	3.1
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	4.8	~~U~~ ~~PH~~ UJ	18	4.8
335-67-1	Perfluorooctanoic acid (PFOA)	530	J	18	7.6
2706-90-3	Perfluoropentanoic acid (PFPeA)	4.4	U	18	4.4
376-06-7	Perfluorotetradecanoic acid (PFTeA)	2.6	U	18	2.6
72629-94-8	Perfluorotridecanoic acid (PFTriA)	12	U	18	12
2058-94-8	Perfluoroundecanoic acid (PFUnA)	9.8	U	18	9.8

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

3

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-64137-1

SDG No.:

Client Sample ID: GWI-MW-09B-B1(08262020) Lab Sample ID: 320-64137-3

Matrix: Water Lab File ID: 2020.09.02_A18_PFC_A_019.d

Analysis Method: 537 (modified) Date Collected: 08/26/2020 15:50

Extraction Method: 3535 Date Extracted: 09/01/2020 18:41

Sample wt/vol: 288.7(mL) Date Analyzed: 09/02/2020 13:02

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 20(uL) GC Column: Gemini C18 3x50 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 408973 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	2.2	J	17	1.7
39108-34-4	8:2 FTS	1.7	U	17	1.7
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.6	U	17	1.6
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2.7	U	17	2.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.17	U	1.7	0.17
375-22-4	Perfluorobutanoic acid (PFBA)	1.8	~~B~~ U	1.7	0.30
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.28	U	1.7	0.28
335-76-2	Perfluorodecanoic acid (PFDA)	0.27	U	1.7	0.27
307-55-1	Perfluorododecanoic acid (PFDoA)	0.48	U	1.7	0.48
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.16	U	1.7	0.16
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.26	J	1.7	0.22
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.32	~~J B~~ U	1.7	0.15
307-24-4	Perfluorohexanoic acid (PFHxA)	0.50	U	1.7	0.50
375-95-1	Perfluorononanoic acid (PFNA)	0.23	U	1.7	0.23
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.93	~~J B~~ U	1.7	0.30
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.47	U	1.7	0.47
335-67-1	Perfluorooctanoic acid (PFOA)	2.5		1.7	0.74
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.42	J	1.7	0.42
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.25	U	1.7	0.25
72629-94-8	Perfluorotridecanoic acid (PFTriA)	1.1	U	1.7	1.1
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.95	U	1.7	0.95

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

4

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-64137-1

SDG No.:

Client Sample ID: GWI-MW-08C-B1(08262020) Lab Sample ID: 320-64137-4

Matrix: Water Lab File ID: 2020.09.02_A18_PFC_A_020.d

Analysis Method: 537 (modified) Date Collected: 08/26/2020 16:50

Extraction Method: 3535 Date Extracted: 09/01/2020 18:41

Sample wt/vol: 282.5(mL) Date Analyzed: 09/02/2020 13:11

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 20(uL) GC Column: Gemini C18 3x50 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 408973 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	6.4	J	18	1.8
39108-34-4	8:2 FTS	1.8	U	18	1.8
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.7	U	18	1.7
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2.7	U	18	2.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.18	U	1.8	0.18
375-22-4	Perfluorobutanoic acid (PFBA)	9.0	~~B~~	1.8	0.31
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.28	U	1.8	0.28
335-76-2	Perfluorodecanoic acid (PFDA)	0.27	U	1.8	0.27
307-55-1	Perfluorododecanoic acid (PFDoA)	0.49	U	1.8	0.49
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.17	U	1.8	0.17
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.22	U	1.8	0.22
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.29	~~J B~~ U	1.8	0.15
307-24-4	Perfluorohexanoic acid (PFHxA)	0.53	J	1.8	0.51
375-95-1	Perfluorononanoic acid (PFNA)	0.24	U	1.8	0.24
754-91-6	Perfluorooctanesulfonamide (FOSA)	1.4	~~J B~~ U	1.8	0.31
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.48	U	1.8	0.48
335-67-1	Perfluorooctanoic acid (PFOA)	0.75	U	1.8	0.75
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.43	U	1.8	0.43
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.53	~~J B~~ U	1.8	0.26
72629-94-8	Perfluorotridecanoic acid (PFTriA)	1.2	U	1.8	1.2
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.97	U	1.8	0.97

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

5

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-64137-1

SDG No.:

Client Sample ID: EB-GWI-B1MF(08262020) Lab Sample ID: 320-64137-5

Matrix: Water Lab File ID: 2020.09.03_A18_PFC_A_007.d

Analysis Method: 537 (modified) Date Collected: 08/26/2020 17:30

Extraction Method: 3535 Date Extracted: 09/01/2020 18:41

Sample wt/vol: 281.6(mL) Date Analyzed: 09/03/2020 11:04

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 20(uL) GC Column: Gemini C18 3x50 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 409338 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	1.8	U	18	1.8
39108-34-4	8:2 FTS	1.8	U	18	1.8
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.7	U	18	1.7
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2.8	U	18	2.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.18	U	1.8	0.18
375-22-4	Perfluorobutanoic acid (PFBA)	0.31	U	1.8	0.31
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.28	U	1.8	0.28
335-76-2	Perfluorodecanoic acid (PFDA)	0.28	U	1.8	0.28
307-55-1	Perfluorododecanoic acid (PFDoA)	0.49	U	1.8	0.49
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.17	U	1.8	0.17
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.22	U	1.8	0.22
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.30	~~J B~~ U	1.8	0.15
307-24-4	Perfluorohexanoic acid (PFHxA)	0.51	U	1.8	0.51
375-95-1	Perfluorononanoic acid (PFNA)	0.24	U	1.8	0.24
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.31	U	1.8	0.31
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.48	U	1.8	0.48
335-67-1	Perfluorooctanoic acid (PFOA)	0.75	U	1.8	0.75
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.44	U	1.8	0.44
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.26	U	1.8	0.26
72629-94-8	Perfluorotridecanoic acid (PFTriA)	1.2	U	1.8	1.2
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.98	U	1.8	0.98

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

6

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-64137-1

SDG No.:

Client Sample ID: GWI-DUP(08262020) Lab Sample ID: 320-64137-6

Matrix: Water Lab File ID: 2020.09.02_A18_PFC_A_022.d

Analysis Method: 537 (modified) Date Collected: 08/26/2020 12:00

Extraction Method: 3535 Date Extracted: 09/01/2020 18:41

Sample wt/vol: 278.8(mL) Date Analyzed: 09/02/2020 13:29

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 20(uL) GC Column: Gemini C18 3x50 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 408973 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	1.8	U	18	1.8
39108-34-4	8:2 FTS	1.8	U	18	1.8
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.7	U	18	1.7
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2.8	U	18	2.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.18	U	1.8	0.18
375-22-4	Perfluorobutanoic acid (PFBA)	2.1	~~B~~ U	1.8	0.31
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.29	U	1.8	0.29
335-76-2	Perfluorodecanoic acid (PFDA)	0.28	U	1.8	0.28
307-55-1	Perfluorododecanoic acid (PFDoA)	0.49	U	1.8	0.49
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.17	U	1.8	0.17
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.22	U	1.8	0.22
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.29	~~J B~~ U	1.8	0.15
307-24-4	Perfluorohexanoic acid (PFHxA)	0.52	U	1.8	0.52
375-95-1	Perfluorononanoic acid (PFNA)	0.24	U	1.8	0.24
754-91-6	Perfluorooctanesulfonamide (FOSA)	1.1	~~J B~~ U	1.8	0.31
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.48	U	1.8	0.48
335-67-1	Perfluorooctanoic acid (PFOA)	0.76	U	1.8	0.76
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.44	U	1.8	0.44
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.26	U	1.8	0.26
72629-94-8	Perfluorotridecanoic acid (PFTriA)	1.2	U	1.8	1.2
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.99	U	1.8	0.99

Appendix D – Tomhannock Reservoir PFAS Laboratory Results

NEW YORK STATE OF OPPORTUNITY. | Department of Health

ANDREW M. CUOMO
Governor

HOWARD A. ZUCKER, M.D., J.D.
Commissioner

SALLY DRESLIN, M.S., R.N.
Executive Deputy Commissioner

July 31, 2018

Chris Wheland, Superintendent of Public Utilities
City of Troy
433 River Street
Troy, NY 12601

Re: City of Troy Water Treatment Plant
Water Sample Results
Troy (C), Rensselaer County

Dear Mr. Wheland,

The New York State Department of Health (DOH) recently tested your drinking water system for perfluoroalkyl substances (PFAS) as part of our efforts to test for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) throughout the state. Samples were collected from two locations at the Tomhannock Reservoir: one from the intake point and one from the reservoir at the spillway. One sample was also collected from the entry point (i.e., "finished" or fully-treated water) at the Troy water treatment facility.

PFOA and PFOS were not detected in your system. The U.S. Environmental Protection Agency (EPA) health advisory level is 70 parts per trillion for PFOA and PFOS combined. Complete testing results are enclosed. Note that the testing for PFOA and PFOS includes fourteen additional PFAS, which were also not detected in your system.

If you have any questions, please contact the New York State Department of Health Bureau of Water Supply Protection at 518-402-7650; email: bpwsp@health.ny.gov.

Additional information is available at the U.S. EPA's website: https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos.

Sincerely,

William Gilday

William Gilday, P.E.
Chief, Operations Section
Bureau of Water Supply Protection

Enclosures

cc: R. Swider – NYSDOH CAEH Regional Director
R. Elder – Rensselaer County DOH
K. Anders/J. Deming – NYSDOH BEEI

New York State Department of Health
Wadsworth Center

Biggs Laboratory
PO Box 509
Albany, NY 12201
CLIA# 33D0654341

David Axelrod Institute
120 New Scotland Avenue
Albany, NY 12208
CLIA# 33D2005937

Griffin Laboratory
5668 State Farm Road
Slingerlands, NY 12159
CLIA# 33D2005935

Report No: **EHS1800024923-SR-1**

Report Date: **06/13/2018**

REQUESTED BY: DIRECTOR-WCENVIRO

ATTN: MIN-SOOK KIM
DIRECTOR'S OFFICE
DIVISION OF ENVIRONMENTAL HEALTH SCIENCES
WADSWORTH CENTER
PO BOX 509
EMPIRE STATE PLAZA
ALBANY NY 12201-0509

Wadsworth Center - Environmental Labs

County: RENSSELAER
City (or) Town: TROY
Submitted by: MIN-SOOK KIM
Collected by: MIN-SOOK KIM

Grab/Collection Date: 06/08/2018 09:21
Date received: 06/08/2018 11:32

Location/Project/Facility Name: NY4100050, TROY CITY PWS - TROY (C)
Sampling Location Details: ENTRY POINT TO DISTRIBUTION SYSTEM A
Chlorinated: Yes

FINAL LABORATORY REPORT

Biggs Laboratory
NYS ELAP ID: 10763

Laboratory of Organic Analytical Chemistry
Lab Director: Dr. David Spink
Contact: Nicole Cairns 518-473-0323

Sample Id: EHS1800024923-01

Sample Type: Finished Water

Received Temperature (°C): **16.0**

Received State: **Cooling**

Lab Tracking Id: A

Perfluoroalkyl Substances (PFASs) in Drinking Water by Ultra Performance Liquid Chromatography (UPLC) Tandem Mass Spectrometry (MS/MS): ISO 25101

Start Date: 6/11/2018 Analysis Date: 6/11/2018

Perfluorobutanoic acid (PFBA):	**<5.00 ng/L; Test associated with low internal standard recovery; result may be biased.**	
Perfluoropentanoic acid (PFPeA):	**<2.00 ng/L**	
Perfluorohexanoic acid (PFHxA):	**<2.00 ng/L**	
Perfluoroheptanoic acid (PFHpA):	**<2.00 ng/L; Test associated with high internal standard recovery; result may be biased.**	
Perfluorooctanoic acid (PFOA):	**<2.00 ng/L**	NELAP
Perfluorononanoic acid (PFNA):	**<2.00 ng/L**	
Perfluorodecanoic acid (PFDA):	**<2.00 ng/L**	
Perfluoroundecanoic acid (PFUnA):	**<5.00 ng/L**	
Perfluorododecanoic acid (PFDoA):	**<5.00 ng/L**	
Perfluoropropanesulfonic acid (PFPrS):	**<1.83 ng/L**	
Perfluorobutanesulfonic acid (PFBS):	**<1.77 ng/L**	
Perfluoropentansulfonic acid (PFPeS):	**<1.88 ng/L**	
Perfluorohexanesulfonic acid (PFHxS):	**<1.89 ng/L**	
Perfluoroheptanesulfonic acid (PFHpS):	**<1.90 ng/L**	
Perfluorooctanesulfonic acid (PFOS):	**<1.91 ng/L; Test associated with low internal standard recovery; result may be biased.**	NELAP
Perfluorooctanesulfonamide (PFOSA):	**<5.00 ng/L**	

NELAP: National Environmental Laboratory Approval Program Accreditation

Biggs Laboratory
PO Box 509
Albany, NY 12201
CLIA# 33D0654341

David Axelrod Institute
120 New Scotland Avenue
Albany, NY 12208
CLIA# 33D2005937

Griffin Laboratory
5668 State Farm Road
Slingerlands, NY 12159
CLIA# 33D2005935

Report No: **EHS1800024923-SR-1**

Report Date: **06/13/2018**

Report retrieved via NYSDOH Health Commerce System by czd01 on 06/20/2018

END OF REPORT

The Laboratory Director authorizes the release of this report. The results in this report relate only to the sample submitted to the laboratory.

New York State Department of Health
Wadsworth Center

Biggs Laboratory
PO Box 509
Albany, NY 12201
CLIA# 33D0654341

David Axelrod Institute
120 New Scotland Avenue
Albany, NY 12208
CLIA# 33D2005937

Griffin Laboratory
5668 State Farm Road
Slingerlands, NY 12159
CLIA# 33D2005935

Report No: **EHS1800024924-SR-1**

Report Date: **06/13/2018**

Report retrieved via NYSDOH Health Commerce System by czd01 on 06/20/2018

REQUESTED BY: DIRECTOR-WCENVIRO

DIRECTOR'S OFFICE
DIVISION OF ENVIRONMENTAL HEALTH SCIENCES
WADSWORTH CENTER
PO BOX 509
EMPIRE STATE PLAZA
ALBANY NY 12201-0509

Wadsworth Center - Environmental Labs

County: RENSSELAER
Submitted by: LOAC-QAQC
Collected by: LOAC-QAQC

Submitter's Reference Number: FRB A

Grab/Collection Date: 06/08/2018
Date received: 06/08/2018 11:32

Location/Project/Facility Name: FIELD REAGENT BLANK
Sampling Location Details: PREPARED ON: 6/7/18 WITH SAMPLE(S): EHS1800024923

FINAL LABORATORY REPORT

Biggs Laboratory
NYS ELAP ID: 10763

Laboratory of Organic Analytical Chemistry
Lab Director: Dr. David Spink
Contact: Nicole Cairns 518-473-0323

Sample Id: EHS1800024924-01

Sample Type: Field Blank

Received Temperature (°C): **15.2**

Received State: **Cooling**

Lab Tracking Id: FRB A

Perfluoroalkyl Substances (PFASs) in Drinking Water by Ultra Performance Liquid Chromatography (UPLC) Tandem Mass Spectrometry (MS/MS): ISO 25101

Start Date: 6/11/2018 Analysis Date: 6/11/2018

Perfluorobutanoic acid (PFBA):	**<5.00 ng/L**	
Perfluoropentanoic acid (PFPeA):	**<2.00 ng/L**	
Perfluorohexanoic acid (PFHxA):	**<2.00 ng/L**	
Perfluoroheptanoic acid (PFHpA):	**<2.00 ng/L**	
Perfluorooctanoic acid (PFOA):	**<2.00 ng/L**	NELAP
Perfluorononanoic acid (PFNA):	**<2.00 ng/L**	
Perfluorodecanonic acid (PFDA):	**<2.00 ng/L**	
Perfluoroundecanoic acid (PFUnA):	**<5.00 ng/L**	
Perfluorododecanoic acid (PFDoA):	**<5.00 ng/L**	
Perfluoropropanesulfonic acid (PFPrS):	**<1.83 ng/L**	
Perfluorobutanesulfonic acid (PFBS):	**<1.77 ng/L**	
Perfluoropentansulfonic acid (PFPeS):	**<1.88 ng/L**	
Perfluorohexanesulfonic acid (PFHxS):	**<1.89 ng/L**	
Perfluoroheptanesulfonic acid (PFHpS):	**<1.90 ng/L**	
Perfluorooctanesulfonic acid (PFOS):	**<1.91 ng/L**	NELAP
Perfluorooctanesulfonamide (PFOSA):	**<5.00 ng/L**	

NELAP: National Environmental Laboratory Approval Program Accreditation

END OF REPORT

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New York State Department of Health
Wadsworth Center

Biggs Laboratory
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Albany, NY 12201
CLIA# 33D0654341

David Axelrod Institute
120 New Scotland Avenue
Albany, NY 12208
CLIA# 33D2005937

Griffin Laboratory
5668 State Farm Road
Slingerlands, NY 12159
CLIA# 33D2005935

Report No: **EHS1800024925-SR-1**
Report Date: **06/13/2018**
Report retrieved via NYSDOH Health Commerce System by czd01 on 06/20/2018

REQUESTED BY: DIRECTOR-WCENVIRO

ATTN: MIN-SOOK KIM
DIRECTOR'S OFFICE
DIVISION OF ENVIRONMENTAL HEALTH SCIENCES
WADSWORTH CENTER
PO BOX 509
EMPIRE STATE PLAZA
ALBANY NY 12201-0509

Wadsworth Center - Environmental Labs

County: RENSSELAER
City (or) Town: TROY
Submitted by: MN-SOOK KIM
Collected by: MN-SOOK KIM

Grab/Collection Date: 06/08/2018 10:23
Date received: 06/08/2018 11:32

Location/Project/Facility Name: NY4100050, TROY CITY PWS - TROY (C)
Sampling Location Details: RAW WATER INTAKE B1
Chlorinated: No

FINAL LABORATORY REPORT

Biggs Laboratory
NYS ELAP ID: 10763

Laboratory of Organic Analytical Chemistry
Lab Director: Dr. David Spink
Contact: Nicole Cairns 518-473-0323

Sample Id: EHS1800024925-01
Sample Type: Raw Water

Received Temperature (°C): **15.0**
Received State: **Cooling**

Lab Tracking Id: B1

Perfluoroalkyl Substances (PFASs) in Drinking Water by Ultra Performance Liquid Chromatography (UPLC) Tandem Mass Spectrometry (MS/MS): ISO 25101

Start Date: 6/11/2018 Analysis Date: 6/11/2018

Perfluorobutanoic acid (PFBA):	**<5.00 ng/L; Test associated with low internal standard recovery; result may be biased.**	
Perfluoropentanoic acid (PFPeA):	**<2.00 ng/L**	
Perfluorohexanoic acid (PFHxA):	**<2.00 ng/L**	
Perfluoroheptanoic acid (PFHpA):	**<2.00 ng/L**	
Perfluorooctanoic acid (PFOA):	**<2.00 ng/L**	NELAP
Perfluorononanoic acid (PFNA):	**<2.00 ng/L**	
Perfluorodecanoic acid (PFDA):	**<2.00 ng/L**	
Perfluoroundecanoic acid (PFUnA):	**<5.00 ng/L**	
Perfluorododecanoic acid (PFDoA):	**<5.00 ng/L**	
Perfluoropropanesulfonic acid (PFPrS):	**<1.83 ng/L**	
Perfluorobutanesulfonic acid (PFBS):	**<1.77 ng/L**	
Perfluoropentansulfonic acid (PFPeS):	**<1.88 ng/L**	
Perfluorohexanesulfonic acid (PFHxS):	**<1.89 ng/L**	
Perfluoroheptanesulfonic acid (PFHpS):	**<1.90 ng/L**	
Perfluorooctanesulfonic acid (PFOS):	**<1.91 ng/L; Test associated with low internal standard recovery; result may be biased.**	NELAP
Perfluorooctanesulfonamide (PFOSA):	**<5.00 ng/L**	

NOTES:

[1] Sample extracted light brown in color, which remained in the final extract.

NELAP: National Environmental Laboratory Approval Program Accreditation

END OF REPORT

The Laboratory Director authorizes the release of this report. The results in this report relate only to the sample submitted to the laboratory.

New York State Department of Health
Wadsworth Center

Biggs Laboratory
PO Box 509
Albany, NY 12201
CLIA# 33D0654341

David Axelrod Institute
120 New Scotland Avenue
Albany, NY 12208
CLIA# 33D2005937

Griffin Laboratory
5668 State Farm Road
Slingerlands, NY 12159
CLIA# 33D2005935

Report No: **EHS1800024926-SR-1**
Report Date: **06/13/2018**
Report retrieved via NYSDOH Health Commerce System by czd01 on 06/20/2018

REQUESTED BY: DIRECTOR-WCENVIRO

ATTN: MIN-SOOK KIM
DIRECTOR'S OFFICE
DIVISION OF ENVIRONMENTAL HEALTH SCIENCES
WADSWORTH CENTER
PO BOX 509
EMPIRE STATE PLAZA
ALBANY NY 12201-0509

Wadsworth Center - Environmental Labs

County: RENSSELAER
City (or) Town: TROY
Submitted by: NMIN-SOOK KIM
Collected by: NMIN-SOOK KIM

Grab/Collection Date: 06/08/2018 10:24
Date received: 06/08/2018 11:32

Location/Project/Facility Name: NY4100050, TROY CITY PWS - TROY (C)
Sampling Location Details: RAW WATER INTAKE DUPLICATE B2
Chlorinated: No

FINAL LABORATORY REPORT

Biggs Laboratory
NYS ELAP ID: 10763

Laboratory of Organic Analytical Chemistry
Lab Director: Dr. David Spink
Contact: Nicole Cairns 518-473-0323

Sample Id: EHS1800024926-01
Sample Type: Raw Water

Received Temperature (°C): **12.0**
Received State: **Cooling**

Lab Tracking Id: B2

Perfluoroalkyl Substances (PFASs) in Drinking Water by Ultra Performance Liquid Chromatography (UPLC) Tandem Mass Spectrometry (MS/MS): ISO 25101

Start Date: 6/11/2018 Analysis Date: 6/11/2018

Perfluorobutanoic acid (PFBA):	**<5.00 ng/L; Test associated with low internal standard recovery; result may be biased.**	
Perfluoropentanoic acid (PFPeA):	**<2.00 ng/L**	
Perfluorohexanoic acid (PFHxA):	**<2.00 ng/L**	
Perfluoroheptanoic acid (PFHpA):	**<2.00 ng/L**	
Perfluorooctanoic acid (PFOA):	**<2.00 ng/L**	NELAP
Perfluorononanoic acid (PFNA):	**<2.00 ng/L**	
Perfluorodecanoic acid (PFDA):	**<2.00 ng/L**	
Perfluoroundecanoic acid (PFUnA):	**<5.00 ng/L**	
Perfluorododecanoic acid (PFDoA):	**<5.00 ng/L**	
Perfluoropropanesulfonic acid (PFPrS):	**<1.83 ng/L**	
Perfluorobutanesulfonic acid (PFBS):	**<1.77 ng/L**	
Perfluoropentansulfonic acid (PFPeS):	**<1.88 ng/L**	
Perfluorohexanesulfonic acid (PFHxS):	**<1.89 ng/L**	
Perfluoroheptanesulfonic acid (PFHpS):	**<1.90 ng/L**	
Perfluorooctanesulfonic acid (PFOS):	**<1.91 ng/L; Test associated with low internal standard recovery; result may be biased.**	NELAP
Perfluorooctanesulfonamide (PFOSA):	**<5.00 ng/L**	

NOTES:

[1] Sample extracted light brown in color, which remained in the final extract.

Biggs Laboratory
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CLIA# 33D0654341

David Axelrod Institute
120 New Scotland Avenue
Albany, NY 12208
CLIA# 33D2005937

Griffin Laboratory
5668 State Farm Road
Slingerlands, NY 12159
CLIA# 33D2005935

Report No: **EHS1800024926-SR-1**
Report Date: **06/13/2018**
Report retrieved via NYSDOH Health Commerce System by czd01 on 06/20/2018

NELAP: National Environmental Laboratory Approval Program Accreditation

END OF REPORT

The Laboratory Director authorizes the release of this report. The results in this report relate only to the sample submitted to the laboratory.

New York State Department of Health
Wadsworth Center

Biggs Laboratory
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CLIA# 33D0654341

David Axelrod Institute
120 New Scotland Avenue
Albany, NY 12208
CLIA# 33D2005937

Griffin Laboratory
5668 State Farm Road
Slingerlands, NY 12159
CLIA# 33D2005935

Report No: **EHS1800024927-SR-1**
Report Date: **06/13/2018**
Report retrieved via NYSDOH Health Commerce System by czd01 on 06/20/2018

REQUESTED BY: DIRECTOR-WCENVIRO

DIRECTOR'S OFFICE
DIVISION OF ENVIRONMENTAL HEALTH SCIENCES
WADSWORTH CENTER
PO BOX 509
EMPIRE STATE PLAZA
ALBANY NY 12201-0509

Wadsworth Center - Environmental Labs

County: RENSSELAER
Submitted by: LOAC-QAQC
Collected by: LOAC-QAQC

Submitter's Reference Number: FRB B

Grab/Collection Date: 06/08/2018
Date received: 06/08/2018 11:32

Location/Project/Facility Name: FIELD REAGENT BLANK
Sampling Location Details: PREPARED ON: 6/7/18 WITH SAMPLE(S): EHS1800024925 - 24926

FINAL LABORATORY REPORT

Biggs Laboratory
NYS ELAP ID: 10763

Laboratory of Organic Analytical Chemistry
Lab Director: Dr. David Spink
Contact: Nicole Cairns 518-473-0323

Sample Id: EHS1800024927-01

Sample Type: Field Blank

Received Temperature (°C): **14.1**

Received State: **Cooling**

Lab Tracking Id: FRB B

Perfluoroalkyl Substances (PFASs) in Drinking Water by Ultra Performance Liquid Chromatography (UPLC) Tandem Mass Spectrometry (MS/MS): ISO 25101

Start Date: 6/11/2018 Analysis Date: 6/11/2018

Perfluorobutanoic acid (PFBA):	**<5.00 ng/L**	
Perfluoropentanoic acid (PFPeA):	**<2.00 ng/L**	
Perfluorohexanoic acid (PFHxA):	**<2.00 ng/L**	
Perfluoroheptanoic acid (PFHpA):	**<2.00 ng/L**	
Perfluorooctanoic acid (PFOA):	**<2.00 ng/L**	NELAP
Perfluorononanoic acid (PFNA):	**<2.00 ng/L**	
Perfluorodecanoic acid (PFDA):	**<2.00 ng/L**	
Perfluoroundecanoic acid (PFUnA):	**<5.00 ng/L**	
Perfluorododecanoic acid (PFDoA):	**<5.00 ng/L**	
Perfluoropropanesulfonic acid (PFPrS):	**<1.83 ng/L**	
Perfluorobutanesulfonic acid (PFBS):	**<1.77 ng/L**	
Perfluoropentansulfonic acid (PFPeS):	**<1.88 ng/L**	
Perfluorohexanesulfonic acid (PFHxS):	**<1.89 ng/L**	
Perfluoroheptanesulfonic acid (PFHpS):	**<1.90 ng/L**	
Perfluorooctanesulfonic acid (PFOS):	**<1.91 ng/L**	NELAP
Perfluorooctanesulfonamide (PFOSA):	**<5.00 ng/L**	

NELAP: National Environmental Laboratory Approval Program Accreditation

END OF REPORT

The Laboratory Director authorizes the release of this report. The results in this report relate only to the sample submitted to the laboratory.

New York State Department of Health
Wadsworth Center

Biggs Laboratory
PO Box 509
Albany, NY 12201
CLIA# 33D0654341

David Axelrod Institute
120 New Scotland Avenue
Albany, NY 12208
CLIA# 33D2005937

Griffin Laboratory
5668 State Farm Road
Slingerlands, NY 12159
CLIA# 33D2005935

Report No: **EHS1800024928-SR-2**

****Replaces information in report No: EHS1800024928-SR-1 (Report Date: 06/13/2018)**

Report Date: **07/31/2018**

Report retrieved via NYSDOH Health Commerce System by czd01 on 07/31/2018

REQUESTED BY: DIRECTOR-WCENVIRO

ATTN: MIN-SOOK KIM
DIRECTOR'S OFFICE
DIVISION OF ENVIRONMENTAL HEALTH SCIENCES
WADSWORTH CENTER
PO BOX 509
EMPIRE STATE PLAZA
ALBANY NY 12201-0509

Wadsworth Center - Environmental Labs

County: RENSSELAER
City (or) Town: TROY
Submitted by: MIN-SOOK KIM
Collected by: MIN-SOOK KIM

Grab/Collection Date: 06/08/2018 10:37
Date received: 06/08/2018 11:32

Location/Project/Facility Name: NY4100050, TROY CITY PWS - TROY (C)
Sampling Location Details: SLUICE GATE SPILLWAY C
Chlorinated: No

FINAL LABORATORY REPORT

Biggs Laboratory
NYS ELAP ID: 10763

Laboratory of Organic Analytical Chemistry
Lab Director: Dr. David Spink
Contact: Nicole Cairns 518-473-0323

Sample Id: EHS1800024928-01

Sample Type: Raw Water

Received Temperature (°C): **13.4**

Received State: **Cooling**

Lab Tracking Id: C

Perfluoroalkyl Substances (PFASs) in Drinking Water by Ultra Performance Liquid Chromatography (UPLC) Tandem Mass Spectrometry (MS/MS): ISO 25101

Start Date: 6/11/2018 Analysis Date: 6/11/2018

Perfluorobutanoic acid (PFBA):	**<5.00 ng/L; Test associated with low internal standard recovery; result may be biased.**	
Perfluoropentanoic acid (PFPeA):	**<2.00 ng/L**	
Perfluorohexanoic acid (PFHxA):	**<2.00 ng/L**	
Perfluoroheptanoic acid (PFHpA):	**<2.00 ng/L**	
Perfluorooctanoic acid (PFOA):	**<2.00 ng/L**	NELAP
Perfluorononanoic acid (PFNA):	**<2.00 ng/L**	
Perfluorodecanonic acid (PFDA):	**<2.00 ng/L**	
Perfluoroundecanoic acid (PFUnA):	**<5.00 ng/L**	
Perfluorododecanoic acid (PFDoA):	**<5.00 ng/L**	
Perfluoropropanesulfonic acid (PFPrS):	**<1.83 ng/L**	
Perfluorobutanesulfonic acid (PFBS):	**<1.77 ng/L**	
Perfluoropentansulfonic acid (PFPeS):	**<1.88 ng/L**	
Perfluorohexanesulfonic acid (PFHxS):	**<1.89 ng/L**	
Perfluoroheptanesulfonic acid (PFHpS):	**<1.90 ng/L**	
Perfluorooctanesulfonic acid (PFOS):	**<1.91 ng/L**	NELAP
Perfluorooctanesulfonamide (PFOSA):	**<5.00 ng/L**	

NOTES:

[1] Sample extracted light brown in color, which remained in the final extract.

Biggs Laboratory
PO Box 509
Albany, NY 12201
CLIA# 33D0654341

David Axelrod Institute
120 New Scotland Avenue
Albany, NY 12208
CLIA# 33D2005937

Griffin Laboratory
5668 State Farm Road
Slingerlands, NY 12159
CLIA# 33D2005935

Report No: **EHS1800024928-SR-2**

****Replaces information in report No: EHS1800024928-SR-1 (Report Date: 06/13/2018)**

Report Date: **07/31/2018**

Report retrieved via NYSDOH Health Commerce System by czd01 on 07/31/2018

NELAP: National Environmental Laboratory Approval Program Accreditation

END OF REPORT

The Laboratory Director authorizes the release of this report. The results in this report relate only to the sample submitted to the laboratory.

New York State Department of Health
Wadsworth Center

Biggs Laboratory
PO Box 509
Albany, NY 12201
CLIA# 33D0654341

David Axelrod Institute
120 New Scotland Avenue
Albany, NY 12208
CLIA# 33D2005937

Griffin Laboratory
5668 State Farm Road
Slingerlands, NY 12159
CLIA# 33D2005935

Report No: **EHS1800024929-SR-1**

Report Date: **06/13/2018**

Report retrieved via NYSDOH Health Commerce System by czd01 on 06/20/2018

REQUESTED BY: DIRECTOR-WCENVIRO

DIRECTOR'S OFFICE
DIVISION OF ENVIRONMENTAL HEALTH SCIENCES
WADSWORTH CENTER
PO BOX 509
EMPIRE STATE PLAZA
ALBANY NY 12201-0509

Wadsworth Center - Environmental Labs

County: RENSSELAER
Submitted by: LOAC-QAQC
Collected by: LOAC-QAQC

Submitter's Reference Number: FRB C

Grab/Collection Date: 06/08/2018
Date received: 06/08/2018 11:32

Location/Project/Facility Name: FIELD REAGENT BLANK
Sampling Location Details: PREPARED ON: 6/7/18 WITH SAMPLE(S): EHS1800024928

FINAL LABORATORY REPORT

Biggs Laboratory
NYS ELAP ID: 10763

Laboratory of Organic Analytical Chemistry
Lab Director: Dr. David Spink
Contact: Nicole Cairns 518-473-0323

Sample Id: EHS1800024929-01

Sample Type: Field Blank

Received Temperature (°C): **13.6**

Received State: **Cooling**

Lab Tracking Id: FRB C

Perfluoroalkyl Substances (PFASs) in Drinking Water by Ultra Performance Liquid Chromatography (UPLC) Tandem Mass Spectrometry (MS/MS): ISO 25101

Start Date: 6/11/2018 Analysis Date: 6/11/2018

Perfluorobutanoic acid (PFBA):	**<5.00 ng/L**	
Perfluoropentanoic acid (PFPeA):	**<2.00 ng/L**	
Perfluorohexanoic acid (PFHxA):	**<2.00 ng/L**	
Perfluoroheptanoic acid (PFHpA):	**<2.00 ng/L**	
Perfluorooctanoic acid (PFOA):	**<2.00 ng/L**	NELAP
Perfluorononanoic acid (PFNA):	**<2.00 ng/L**	
Perfluorodecanonic acid (PFDA):	**<2.00 ng/L**	
Perfluoroundecanoic acid (PFUnA):	**<5.00 ng/L**	
Perfluorododecanoic acid (PFDoA):	**<5.00 ng/L**	
Perfluoropropanesulfonic acid (PFPrS):	**<1.83 ng/L**	
Perfluorobutanesulfonic acid (PFBS):	**<1.77 ng/L**	
Perfluoropentansulfonic acid (PFPeS):	**<1.88 ng/L**	
Perfluorohexanesulfonic acid (PFHxS):	**<1.89 ng/L**	
Perfluoroheptanesulfonic acid (PFHpS):	**<1.90 ng/L**	
Perfluorooctanesulfonic acid (PFOS):	**<1.91 ng/L**	NELAP
Perfluorooctanesulfonamide (PFOSA):	**<5.00 ng/L**	

NELAP: National Environmental Laboratory Approval Program Accreditation

END OF REPORT

The Laboratory Director authorizes the release of this report. The results in this report relate only to the sample submitted to the laboratory.

New York State Department of Health
Wadsworth Center

Biggs Laboratory
PO Box 509
Albany, NY 12201
CLIA# 33D0654341

David Axelrod Institute
120 New Scotland Avenue
Albany, NY 12208
CLIA# 33D2005937

Griffin Laboratory
5668 State Farm Road
Slingerlands, NY 12159
CLIA# 33D2005935

Report No: **EHS1800024930-SR-1**
Report Date: **06/13/2018**
Report retrieved via NYSDOH Health Commerce System by czd01 on 06/20/2018

REQUESTED BY: DIRECTOR-WCENVIRO

DIRECTOR'S OFFICE
DIVISION OF ENVIRONMENTAL HEALTH SCIENCES
WADSWORTH CENTER
PO BOX 509
EMPIRE STATE PLAZA
ALBANY NY 12201-0509

Submitter's Reference Number: LRB

Wadsworth Center - Environmental Labs

County: RENSSELAER
Submitted by: LOAC-QAQC
Collected by: LOAC-QAQC

Grab/Collection Date: 06/08/2018
Date received: 06/08/2018 11:32

Location/Project/Facility Name: LABORATORY REAGENT BLANK
Sampling Location Details: PREPARED ON: 6/8/18 EXTRACTED WITH: EHS1800024923 - 24929

FINAL LABORATORY REPORT

Biggs Laboratory
NYS ELAP ID: 10763

Laboratory of Organic Analytical Chemistry
Lab Director: Dr. David Spink
Contact: Nicole Cairns 518-473-0323

Sample Id: EHS1800024930-01
Sample Type: Method Blank

Lab Tracking Id: LRB

Perfluoroalkyl Substances (PFASs) in Drinking Water by Ultra Performance Liquid Chromatography (UPLC) Tandem Mass Spectrometry (MS/MS): ISO 25101

Start Date: 6/11/2018 Analysis Date: 6/11/2018

Perfluorobutanoic acid (PFBA):	**<5.00 ng/L**	
Perfluoropentanoic acid (PFPeA):	**<2.00 ng/L**	
Perfluorohexanoic acid (PFHxA):	**<2.00 ng/L**	
Perfluoroheptanoic acid (PFHpA):	**<2.00 ng/L**	
Perfluorooctanoic acid (PFOA):	**<2.00 ng/L**	NELAP
Perfluorononanoic acid (PFNA):	**<2.00 ng/L**	
Perfluorodecanonic acid (PFDA):	**<2.00 ng/L**	
Perfluoroundecanoic acid (PFUnA):	**<5.00 ng/L**	
Perfluorododecanoic acid (PFDoA):	**<5.00 ng/L**	
Perfluoropropanesulfonic acid (PFPrS):	**<1.83 ng/L**	
Perfluorobutanesulfonic acid (PFBS):	**<1.77 ng/L**	
Perfluoropentansulfonic acid (PFPeS):	**<1.88 ng/L**	
Perfluorohexanesulfonic acid (PFHxS):	**<1.89 ng/L**	
Perfluoroheptanesulfonic acid (PFHpS):	**<1.90 ng/L**	
Perfluorooctanesulfonic acid (PFOS):	**<1.91 ng/L**	NELAP
Perfluorooctanesulfonamide (PFOSA):	**<5.00 ng/L**	

NELAP: National Environmental Laboratory Approval Program Accreditation

END OF REPORT

The Laboratory Director authorizes the release of this report. The results in this report relate only to the sample submitted to the laboratory.

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, LLC.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

Report Prepared for:

James Murphy
PASI Long Island
2190 Technology Drive
Schenectady NY 12308

REPORT OF LABORATORY ANALYSIS FOR PFAAs

Report Information:

Pace Project #: 10469684
Sample Receipt Date: 04/05/2019
Client Project #: 7084299
Client Sub PO #: N/A
State Cert #: 11647

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 PFAA Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Kirsten Hogberg, your Pace Project Manager.

This report has been reviewed by:

May 10, 2019
Kirsten Hogberg, Project Manager
(612) 607-6407
(612) 607-6444 (fax)
kirsten.hogberg@pacelabs.com

Report Prepared Date:
May 10, 2019

Report of Laboratory Analysis

Pace Analytical Services, LLC
1700 Elm Street, Suite 200
Minneapolis, MN 55414
(612) 607-1700

EPA Method 537 V1.1
Sample Analysis Summary

Client's Sample ID	MELROSE RAW	Date Extracted	05/02/2019
Lab Sample ID	7084299002	Total Amount Extracted	0 mL
Filename	B190419B_011	ICAL ID	190418C02
Matrix	Drinking_Water	Starting CCal	B190419B_003
Collected	04/01/2019	Ending CCal	B190419B_016
Received	04/05/2019	Method Blank Filename	B190419B_005

Compound	Concentration (ng/L)	PQL (ng/L)	MDL (ng/L)	Dilution	Analyzed	CAS No.	Qual.
PFOA	ND	1.9	0.29	1	04/19/201921:21	335-67-1	
PFOS	ND	1.8	0.50	1	04/19/201921:21	1763-23-1	

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	4.0	3.6	90	70 - 130	Pass
13C2_PFDA	4.0	3.8	95	70 - 130	Pass
d5-EtFOSAA	8.0	8.2	103	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C2_PFOA	399824	209565 - 628694	295887 - 591775	Pass
13C4_PFOS	732408	393144 - 1179432	517600 - 1035201	Pass
d3-MeFOSAA	244709	112527 - 337581	154263 - 308526	Pass

50-150% of Ical area
70-140% of the preceding CCV area

Pace Analytical Services, LLC
1700 Elm Street, Suite 200
Minneapolis, MN 55414
(612) 607-1700

EPA Method 537 V1.1
Sample Analysis Summary

Client's Sample ID	PLANT FINISH	Date Extracted	05/02/2019
Lab Sample ID	7084299004	Total Amount Extracted	0 mL
Filename	B190419B_013	ICAL ID	190418C02
Matrix	Drinking_Water	Starting CCal	B190419B_003
Collected	04/01/2019	Ending CCal	B190419B_016
Received	04/05/2019	Method Blank Filename	B190419B_005

Compound	Concentration (ng/L)	PQL (ng/L)	MDL (ng/L)	Dilution	Analyzed	CAS No.	Qual.
PFOA	ND	2.0	0.30	1	04/19/201921:44	335-67-1	
PFOS	ND	1.8	0.51	1	04/19/201921:44	1763-23-1	

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	4.0	3.7	92	70 - 130	Pass
13C2_PFDA	4.0	3.8	96	70 - 130	Pass
d5-EtFOSAA	8.0	9.0	113	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C2_PFOA	389662	209565 - 628694	295887 - 591775	Pass
13C4_PFOS	759105	393144 - 1179432	517600 - 1035201	Pass
d3-MeFOSAA	228396	112527 - 337581	154263 - 308526	Pass

50-150% of Ical area
70-140% of the preceding CCV area

(518) 525-5475 **ST. PETER'S HOSPITAL ENVIRONMENTAL LABORATORY** 19 WAREHOUSE ROW ALBANY, NEW YORK 12205

Renss. County Dept. of Health

County Office Building
Troy ,NY 12180

Printed On 3/22/2016

Sample ID: **AW02809**
Date Received: 03/07/2016
Time Received: 16:49
Time Finalized: 03/21/2016
PO Number:
Your Ref:

Customer: Rensselaer Cnty DOH
Owner: City of Troy PWS
Sample Loc: 1600 7th Ave
Sample Pt: 2nd Floor Mop Sink CWT

Collect Date: 03/07/2016
Collect Time: 09:40
Collected by: IAN CARY
Receipt Temp: 2.4 C On Ice Chilling

Water Source:
Chlorinated: Yes *Field Residual Chlorine:* 0.55

Potability: Yes
Grab/Comp: Grab

Laboratory Report

Test	Result	MCL	Qualifiers	Units	Method Used	Analyst	Analysis Date
Perfluorobutanesulfonic acid	<0.030		S+	ug/L	EPA 537	SUB*	3/16/2016
Perfluoroheptanoic acid	<0.0033		S+	ug/L	EPA 537	SUB*	3/16/2016
Perfluorohexanesulfonic acid	<0.010		S+	ug/L	EPA 537	SUB*	3/16/2016
Perfluorononanoic acid	<0.00067			ug/L	EPA 537	SUB*	3/16/2016
Perfluorooctanesulfonic acid	<0.0013			ug/L	EPA 537	SUB*	3/16/2016
Perfluorooctanoic acid (PFOA)	0.0025		J	ug/L	EPA 537	SUB*	3/16/2016

Qualifiers Key:

X	Exceeds maximum contamination limit	R	Duplication outside acceptance limits	H	Hold time exceeded
T	Temperature outside specifications	A	Sample contained air bubble or headspace	B	Analyte detected in blank
P	Sample preserved in lab	Z	Analysis is not state-certified	C	Incorrect bottle received
S(+/-)	Lab control sample outside acceptance limits	M(+/-)	Matrix spike recovery outside acceptance limits		

Legend: < Less Than, > Greater Than mg/L=PPM, ug/L=PPB If no collection time was given, 00:00 is reported

MCL = Maximum Contaminant Level referenced from New York State Subpart 5-1 of the Public Drinking Water Standards and/or National Primary/Secondary Drinking Water Standards.

Note 1: Per ELAP requirements, water analyzed for alkalinity, color, conductivity, nitrate, nitrite, sulfate, organics, UV absorbance, non-potable bacteriological analyses, BOD/CBOD, solids and phosphorus (total & ortho), should be received on ice to indicate the chilling process was begun. ELAP requirements specify that temperatures equal to or less than 4 degrees C are required for potable samples and equal to or less than 6 degrees C for non-potable samples. Samples should not be frozen.

Comments:

SUB* EPA Method 537 analysis was completed by Pace Analytical. Prep method EPA 537 completed on 03/11/16. Laboratory control sample (LCS) exceeded QC limits as noted. Test results below reporting limits. Results unaffected by high bias.

J- PFOA result is estimated.

Surrogates:
Perfluorohexanoic acid 130% (70-130%)
Perfluorodecanoic acid 109% (70-130%)

John Wilson
Environmental Laboratory Supervisor and contact person
If you have questions, please call.
(518) 525-5480/5479

Reviewed by Brian Collins
These results relate to samples as received.

New York State DOH E.L.A.P. # 10350

March 30, 2016

CASE NARRATIVE

This data package (SDG ID: 16030340) consists of 2 drinking water samples and 2 water samples received on 03/16/2016. The samples are from Project Name: CITY OF TROY WTP MONTHLY.

This sample delivery group consists of the following samples:

Lab Sample ID	Client ID	Collection Date
AT06071	REAGENT DI	03/16/2016 09:00
AT06072	INTAKE RAW	03/16/2016 08:40
AT06073	PLANT FILTER	03/16/2016 09:04
AT06074	PLANT FINISH	03/16/2016 09:30

Sample Delivery and Receipt Conditions

(1.) Lab provided sample pickup service on 03/16/2016.

(2.) All samples were received at the laboratory intact and within holding times.

(3.) All samples were received at the laboratory properly preserved, if applicable.

Total Organic Carbon Analysis

Analysis for Total Organic Carbon was performed by Standard Methods 5310B. The following technical and administrative items were noted for the analysis:

(1.) All quality assurance parameters were met for this analysis, unless otherwise noted.

Subcontract Analysis

(1.) Please see the PACE-LI Laboratory report for quality assurance details related to the Alkalinity, Ammonia, TKN and TON analyses.

(2.) Please see the PACE-FL Laboratory report for quality assurance details related to the PFOA, TOC, Chlorate and Chlorite analyses.

Respectfully submitted,

Nicole D. Johnson
Project Manager

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

ANALYTICAL RESULTS

Project: 16030340 TROY MONTHLY
Pace Project No.: 35234571

Sample: AT06072 **Lab ID: 35234571001** Collected: 03/16/16 08:40 Received: 03/17/16 10:30 Matrix: Drinking Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
537 Perfluorinated Compounds	Analytical Method: EPA 537 Preparation Method: EPA 537							
Perfluorobutanesulfonic acid	**<0.090**	ug/L	0.090	1	03/22/16 10:00	03/22/16 01:38	375-73-5	
Perfluoroheptanoic acid	**<0.010**	ug/L	0.010	1	03/22/16 10:00	03/22/16 01:38	375-85-9	L2
Perfluorohexanesulfonic acid	**<0.030**	ug/L	0.030	1	03/22/16 10:00	03/22/16 01:38	355-46-4	
Perfluorononanoic acid	**<0.020**	ug/L	0.020	1	03/22/16 10:00	03/22/16 01:38	375-95-1	L2
Perfluorooctanesulfonic acid	**<0.040**	ug/L	0.040	1	03/22/16 10:00	03/22/16 01:38	1763-23-1	
Perfluorooctanoic acid	**<0.0020**	ug/L	0.0020	1	03/22/16 10:00	03/22/16 01:38	335-67-1	L2
Surrogates								
Perfluorohexanoic acid (S)	88	%	70-130	1	03/22/16 10:00	03/22/16 01:38		
Perfluorodecanoic acid (S)	79	%	70-130	1	03/22/16 10:00	03/22/16 01:38		

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REPORT OF LABORATORY ANALYSIS

March 21, 2016

CASE NARRATIVE

This data package (SDG ID: 16030280) consists of 1 drinking water sample received on 03/14/2016. The sample is from Project Name: PFOA - SPECIAL.

This sample delivery group consists of the following samples:

Lab Sample ID	Client ID	Collection Date
AT05797	PLANT FINISH	03/14/2016 12:35

Sample Delivery and Receipt Conditions

(1.) Lab provided sample pickup service on 03/14/2016.

(2.) All samples were received at the laboratory intact and within holding times.

(3.) All samples were received at the laboratory properly preserved, if applicable.

Subcontract Analysis

(1.) Please see the PACE-FL Laboratory report for quality assurance details related to the PFOA analysis.

Respectfully submitted,

Nicole D. Johnson
Project Manager

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

ANALYTICAL RESULTS

Project: 16030280 PFOA SPECIAL
Pace Project No.: 35234129

Sample: AT05797 **Lab ID: 35234129001** Collected: 03/14/16 12:35 Received: 03/15/16 14:05 Matrix: Drinking Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
537 Perfluorinated Compounds	Analytical Method: EPA 537 Preparation Method: EPA 537							
Perfluorobutanesulfonic acid	**<0.090**	ug/L	0.090	1	03/18/16 09:45	03/19/16 04:54	375-73-5	
Perfluoroheptanoic acid	**<0.010**	ug/L	0.010	1	03/18/16 09:45	03/19/16 04:54	375-85-9	
Perfluorohexanesulfonic acid	**<0.030**	ug/L	0.030	1	03/18/16 09:45	03/19/16 04:54	355-46-4	
Perfluorononanoic acid	**<0.020**	ug/L	0.020	1	03/18/16 09:45	03/19/16 04:54	375-95-1	
Perfluorooctanesulfonic acid	**<0.040**	ug/L	0.040	1	03/18/16 09:45	03/19/16 04:54	1763-23-1	
Perfluorooctanoic acid	**<0.0020**	ug/L	0.0020	1	03/18/16 09:45	03/19/16 04:54	335-67-1	
Surrogates								
Perfluorohexanoic acid (S)	112	%	70-130	1	03/18/16 09:45	03/19/16 04:54		
Perfluorodecanoic acid (S)	94	%	70-130	1	03/18/16 09:45	03/19/16 04:54		

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REPORT OF LABORATORY ANALYSIS

NEW YORK STATE OF OPPORTUNITY. | Department of Environmental Conservation

FINAL

Tomhannock Reservoir, Rensselaer County

Per- and Polyfluoroalkyl Substances

Trip Report

May 2019

Revised June 2019

PREPARED BY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF ENVIRONMENTAL REMEDIATION

www.dec.ny.gov

1.0 Introduction

Sampling was conducted the first week of April 2019 at the Tomhannock Reservoir (the Reservoir) in the Town of Pittstown, NY as part of the ongoing collection of data associated with the water supply study for the Village of Hoosick Falls and the evaluation of potential new drinking water sources. The New York State Department of Environmental Conservation (NYSDEC) utilized Arcadis (Engineering Contract D007618-WA 54) to implement field work under NYSDEC oversight. Analysis of the samples was performed by Eurofins (Contract 136490). Sampling of environmental media was completed to assess the Reservoir for the presence of per- and polyfluoroalkyl substances (PFAS) in the subject surface water and sediment. Sampling was performed in accordance with NYSDEC's "Tomhannock Reservoir Sampling Plan for per- and polyfluoroalkyl Substances" (Work Plan) provided in Appendix A. This report has been prepared to summarize field activities performed and present analytical results for the sampling of the Reservoir.

2.0 Background

As part of the water supply study several options are being evaluated as potential sources of municipal water for the community of Hoosick Falls including a new groundwater source, a new surface water source (the Reservoir), new interconnections to facilitate purchase of water from other municipal supplies, and continued treatment. The Reservoir is also being evaluated as an alternative for a new interconnection with an existing water supply. The Reservoir is owned by the city of Troy (the City) and has a reported capacity of 12.3 billion gallons providing a yield of 32 million gallons per day (mgd). The Reservoir was therefore determined to have sufficient storage to meet demands of both the City, existing customers, and the Village of Hoosick Falls within a conservative factor of safety (Arcadis 2016). This was confirmed by the safe yield analysis performed by the City and documented in the final report, "Safe Yield Study" (CDM Smith 2018). Sampling access was obtained in coordination with the City, New York State Department of Health (NYSDOH), and the Rensselaer County Health Department (RCDOH).

3.0 Environmental Sampling

NYSDEC performed sampling to evaluate if the Reservoir is impacted by PFAS, including perfluorooctonoic acid (PFOA). The data will be used as one of the criteria to compare different water source options included in the pending municipal water supply study report expected in summer 2019.

Co-located surface water and sediment samples, and associated QA/QC samples, were collected from three locations along the length of the reservoir as shown on Figure 1. Samples were collected from predetermined sites based on locations sampled by NYSDOH in 2018, at the conceptual raw water intake, and at an upgradient location in the southern portion of the waterbody. Samples were initially anticipated to be collected during winter, beneath the overlaying ice using an ice auger as detailed in the Work Plan but due to variable ice conditions and health and safety concerns, sampling was deferred to a date when the water was open. A non-motorized jon boat was procured by Arcadis, decontaminated and approved by the City for use to access specified sample locations.

Surface water samples were collected from two discrete depths within the water column at each sample location. The first was collected approximately five feet above the mudline and the second was collected

within five feet of the surface. Samples were collected using a peristaltic pump with the intake of the tubing positioned at the desired depth within the water column. Samples were collected directly into laboratory-provided containers after pumping for one minute to remove water from the tubing that would have entered the tube from the top of the water column. Water quality parameters were documented at the time of sample collection. A total of seven surface water samples, including a duplicate and MS/MSD QA/QC samples, were collected as part of this sampling effort.

Sediment samples were collected using a stainless-steel petite ponar 'grab' sampler. Upon contact with the sediment surface, the ponar line was drawn upwards, closing the dredge to collect the sediment sample. A total of four co-located sediment samples, including one duplicate QA/QC sample, were collected after surface water sampling was completed at designated locations. The sediment sample collected at Sample Location 2 was not submitted for analysis of TOC or pH. The substrate material at this location was not suitable for the sampling method used, resulting in collection of insufficient volume.

4.0 Data Quality

4.1 Quality Assurance/Quality Control (QA/QC)

All samples were collected following guidelines provided in the Work Plan and in accordance with the NYSDEC approved Quality Assurance Project Plan (QAPP) prepared by Arcadis for NYSDEC-issued work assignments (Arcadis 2010). Samples were collected using conservative protocols as outlined in NYSDEC, Division of Environmental Remediation (DER) guidance (provided in the Work Plan) to prevent PFAS contamination of samples from materials and media unrelated to the study area. Sampling procedures used were consistent with NYSDEC March 1991 sampling guidelines and protocols.

QA/QC samples were collected in accordance with the QAPP and Work Plan to evaluate data quality and potential cross-contamination from sampling equipment. QA/QC samples collected included duplicates of each environmental media sampled, matrix spike/matrix duplicate (MS/MSD), and equipment blanks of each piece of equipment used as part of this sampling effort.

4.2 Data Usability

The laboratory analytical results were reviewed by a DER chemist for consistency with DER's Analytical Services Protocol (ASP). A Data Usability Summary Report (DUSR) was prepared and is provided in Appendix B. The DUSR summarizes any data deficiencies, analytical protocol deviations, and quality control concerns that should be considered when using data. An EDD will be prepared and uploaded to NYSDEC's Environmental Information Management System (EIMS), EQuIS.

The data are usable as reported by the lab except for the samples noted under the "BLANK" criteria. The equipment blank detections for gloves and tubing were likely laboratory contamination and not contamination from the field sampling activities or the materials used in the field. The equipment blanks for the sediment samples had small detections of perfluorobutanoic acid (PFBA) and perfluorohexanesulfonic acid (PFHxS) that are likely attributed to lab contamination. There were other detections in the sediment equipment blanks but they were not detected in the sediment samples so there was no impact to the sediment results.

There are some other detections in the samples that could be attributed to laboratory method blank contamination. There are a couple different ways that data can be handled and those are noted in the comments/action section of the data review summary.

5.0 Analytical Results

All samples were analyzed for the current DER list of 21 PFAS compounds at the NYSDOH-ELAP certified Eurofins (formerly Test America) laboratory in Sacramento, CA using Modified EPA Method 537. Sediment samples were additionally analyzed for total organic carbon (TOC) via Lloyd Kahn and pH via Method 9045D with the exception of the sediment sample collected from Sample Location 2 (TR-02).

All samples were placed in laboratory-provided containers, labeled, and stored in ice. Samples were delivered to the project laboratory by Arcadis under standard chain-of-custody procedures. A NYSDEC ASP Category A deliverable was prepared for the data and is provided in Appendix C. An EDD will be prepared and uploaded to NYSDEC EQuIS database by Arcadis. A NYSDEC ASP Category B deliverable is available upon request.

5.1 Surface Water Samples

Concentrations of PFAS ranged from non-detect at the method detection limit to 9.0 parts per trillion (ppt) for perfluorododecanoic acid (PFDoA), detected in sample TR-SW-2(5). Of the seven surface water samples collected, TR-SW-2(5) had the greatest number of detections of the 21 compounds analyzed for under modified method 537 including perfluorononanoic acid (PFNA) at 5.9 ppt, perfluorodecanoic acid (PFDA) at 3.5 ppt, perfluorotridecanoic acid (PFTriA) at 7.3 ppt, perfluoroundecanoic acid (PFUnA) at 5.7 ppt, perfluorotetradecanoic acid (PFTeA) at 3.0 ppt (estimated value, see Table 1 Notes), and PFDoA at 9.0 ppt, as previously mentioned. PFOA was detected in three other samples at varying depths including: at a concentration of 2.5 ppt in sample TR-SW-3 (5) at a depth of 5 feet below the water surface; at a concentration of 2.1 ppt in sample TR-SW-2(14) at a depth of 14 feet below the water surface; at a concentration of 1.9 in TR-SW-DUP-1; and at a concentration of 2.2 ppt in sample TR-SW-3(11.5) at a depth of 11.5 feet below the water surface. PFBA was detected in TR-SW-3(5), 5 feet below the water surface, and in TR-SW-DUP-1 at a concentration of 1.9 ppt (estimated values, see Table 1 Notes).

Analytical results for all surface water samples are summarized in Table 3 and provided in the Category A Laboratory report, Appendix C.

5.2 Sediment Samples

Concentrations of all analyzed PFAS were non-detect above the laboratory reporting limits (0.26 – 2.0 ppt) with the exception of PFBA, detected in TR-SED-1, TR-SED-3, and TR-SED-DUP-1 at concentrations of 1.6 ppt, 1.5 ppt, and 1.3 ppt (estimated values, see Table 2 Notes), respectively.

The pH values in samples ranged of 6.5 to 8.5.

The TOC results for sediment samples ranged from 30,100 to 35,500 mg/kg.

Analytical results for sediment samples are provided in Table 2 and provided in the Category A Laboratory report, Appendix C.

6.0 References

Arcadis, 2016. Draft Memorandum - Village of Hoosick Falls Alternative Water Supply Study, NYSDEC WA D0076618-43, Site #442008, Arcadis, June 17, 2016.

CDM Smith, 2018. Final Report – City of Troy, New York, Tomhannock Reservoir, Safe Yield Study. CDM Smith, August 2018.

Tables

Table 1. Surface Water Sample Analytical Results

Constituent	Units	Sample ID/Sample Location						
		TR-SW-1(5)/TR-01	TR-SW-1(20)/TR-01	TR-SW-2(5)/TR-02	TR-SW-2(14)/TR-02	TR-SW-3(5)-1/TR-03	TR-SW-3(11.5)/TR-03	TR-SW-DUP-1/TR-03
PFBA	ng/L	1.7 J+	1.6 J+	1.3 J+	1.5 J+	**1.9 J+**	1.9 J+	**1.9 J+**
PFPeA	ng/L	0.95 J	0.75 J	1.0 J	0.88 J	1.4 J	0.98 J	1.2 J
PFHxA	ng/L	0.75 J	<2.0	0.78 J	0.77 J	1.1 J	1.2 J	1.1 J
PFHpA	ng/L	0.70 J	0.47 J	0.74 J	0.56 J	0.83 J	0.80 J	0.85 J
PFOA	ng/L	1.9 J	1.6 J	2.0	**2.1**	**2.5**	**2.2**	**1.9**
PFNA	ng/L	<2.0	<2.0	**5.9**	0.33 J	0.28 J	0.67 J	0.27 J
PFDA	ng/L	<2.0	<2.0	**3.5**	<2.0	<1.8	0.69 J	<1.8
PFUnA	ng/L	<2.0	<2.0	**5.7**	<2.0	<1.8	<2.0	<1.8
PFDoA	ng/L	<2.0	<2.0	**9.0**	<2.0	<1.8	<2.0	<1.8
PFTriA	ng/L	<2.0	<2.0	**7.3**	<2.0	<1.8	<2.0	<1.8
PFTeA	ng/L	0.34 J+	0.29 J+	**3.0 J+**	0.31 J+	<1.8	<2.0	<1.8
PFBS	ng/L	0.37 J	0.25 J	0.31 J	0.32 J	0.32 J	0.33 J	0.34 J
PFHxS	ng/L	0.48 J+	0.42 J+	0.53 J+	0.50 J+	0.43 J+	0.48 J+	0.45 J+
PFHpS	ng/L	<2.0	<2.0	<2.0	<2.0	<1.8	<2.0	<1.8
PFOS	ng/L	0.72 J	0.64 J	1.2 J	0.88 J	0.98 J	1.1 J	1.1 J
PFDS	ng/L	<2.0	<2.0	<2.0	<2.0	<1.8	<2.0	<1.8
FOSA	ng/L	<2.0	<2.0	<2.0	<2.0	<1.8	<2.0	<1.8
NMeFOSAA	ng/L	<20	<20	<20	<20	<18	<20	<18
NEtFOSAA	ng/L	<20	<20	<20	<20	<18	<20	<18
6:2 FTS	ng/L	<20	<20	<20	<20	<18	<20	<18
8:2 FTS	ng/L	<20	<20	<20	<20	<18	<20	<18

Notes

PFAS - Analyzed via Modified USEPA Method 537

J+ - Estimated result that is also biased high due to presence of the compound in lab method blank

J - Estimated values. J qualified results represent values above the method detection limit but below the reporting limit. Results are estimated but can be reported with 99% confidence that the measured concentration is distinguishable from the method blank. J Values < RL are included for informational purposes.

RL - Reporting Limit

NA – Sample not analyzed for this parameter

Bold denotes detected value above reporting limit

Table 2. Sediment Sample Analytical Results

Constituent	Units	Sample ID/Sample Location			
		TR-SED-1/TR-01	TR-SED-2/TR-02	TR-SED-3/TR-03	TR-SED-DUP-1/TR-03
PFBA	µg/kg	**1.6 J+**	0.15 J+	**1.5 J+**	**1.3 J+**
PFPeA	µg/kg	<0.69	<0.26	<0.71	<0.61
PFHxA	µg/kg	<0.69	<0.26	<0.71	<0.61
PFHpA	µg/kg	<0.69	<0.26	<0.71	<0.61
PFOA	µg/kg	<0.69	<0.26	<0.71	<0.61
PFNA	µg/kg	<0.69	<0.26	<0.71	<0.61
PFDA	µg/kg	<0.69	<0.26	<0.71	<0.61
PFUnA	µg/kg	<0.69	0.083 J	<0.71	<0.61
PFDoA	µg/kg	<0.69	<0.26	<0.71	<0.61
PFTriA	µg/kg	<0.69	<0.26	<0.71	<0.61
PFTeA	µg/kg	<0.69	<0.26	<0.71	<0.61
PFBS	µg/kg	<0.69	<0.26	<0.71	<0.61
PFHxS	µg/kg	<0.69	<0.26	<0.71	<0.61
PFHpS	µg/kg	<0.69	<0.26	<0.71	<0.61
PFOS	µg/kg	<1.7	<0.64	<1.8	<1.5
PFDS	µg/kg	<0.69	<0.26	<0.71	<0.61
FOSA	µg/kg	<0.69	<0.26	<0.71	<0.61
NMeFOSAA	µg/kg	<6.9	<2.6	<7.1	<6.1
NEtFOSAA	µg/kg	<6.9	<2.6	<7.1	<6.1
6:2 FTS	µg/kg	<6.9	<2.6	1.2 J	<6.1
8:2 FTS	µg/kg	<6.9	<2.6	<7.1	<6.1
pH	SU	6.3	NA	6.5	6.4
TOC	mg/kg	**30100**	NA	**35500**	**30800**

Notes

PFAS - Analyzed via Modified USEPA Method 537

pH - Analyzed via Method 9045D

TOC - Total Organic Carbon analyzed via Method Lloyd Kahn

J+ - Estimated result that is also biased high due to presence of the compound in lab method blank

J - Estimated values. J qualified results represent values above the method detection limit but below the reporting limit. Results are estimated but can be reported with 99% confidence that the measured concentration is distinguishable from the method blank. J Values < RL are included for informational purposes.

RL - Reporting Limit

NA – Sample not analyzed for this parameter

Bold denotes detected value above reporting limit

Table 3. Rinse Blank/Field Blank Sample Analytical Results

Constituent	Units	Sample ID				
		TR-RB-SED BOWLS	TR-RB-TUBING1	TR-RB-SED SAMPLER	TR-RB-SED SAMPLER 2	TR-RB-GLOVES
PFBA	ng/L	<1.7	<2.0	<1.7	<1.9	<1.8
PFPeA	ng/L	<1.7	<2.0	<1.7	<1.9	<1.8
PFHxA	ng/L	<1.7	<2.0	0.69 J	<1.9	<1.8
PFHpA	ng/L	<1.7	<2.0	0.32 J	<1.9	<1.8
PFOA	ng/L	<1.7	<2.0	0.73 J	<1.9	<1.8
PFNA	ng/L	<1.7	<2.0	<1.7	<1.9	<1.8
PFDA	ng/L	<1.7	<2.0	0.30 J	<1.9	<1.8
PFUnA	ng/L	<1.7	<2.0	<1.7	<1.9	<1.8
PFDoA	ng/L	<1.7	<2.0	<1.7	1.3 J	<1.8
PFTriA	ng/L	<1.7	<2.0	<1.7	<1.9	<1.8
PFTeA	ng/L	<1.7	<2.0	<1.7	0.49 J	<1.8
PFBS	ng/L	<1.7	<2.0	<1.7	<1.9	<1.8
PFHxS	ng/L	<1.7	<2.0	<1.7	<1.9	<1.8
PFHpS	ng/L	<1.7	<2.0	<1.7	<1.9	<1.8
PFOS	ng/L	<1.7	<2.0	0.73 J	<1.9	<1.8
PFDS	ng/L	<1.7	<2.0	0.51 J	<1.9	<1.8
FOSA	ng/L	<1.7	<2.0	<1.7	<1.9	<1.8
NMeFOSAA	ng/L	<17	<20	<17	<19	<18
NEtFOSAA	ng/L	<17	<20	<17	<19	<18
6:2 FTS	ng/L	<17	<20	<17	<19	<18
8:2 FTS	ng/L	<17	<20	<17	<19	<18

Notes

PFAS - Analyzed via Modified USEPA Method 537

J - Estimated values. J qualified results represent values above the method detection limit but below the reporting limit. Results are estimated but can be reported with 99% confidence that the measured concentration is distinguishable from the method blank. J Values < RL are included for informational purposes.

RL - Reporting Limit

Figures

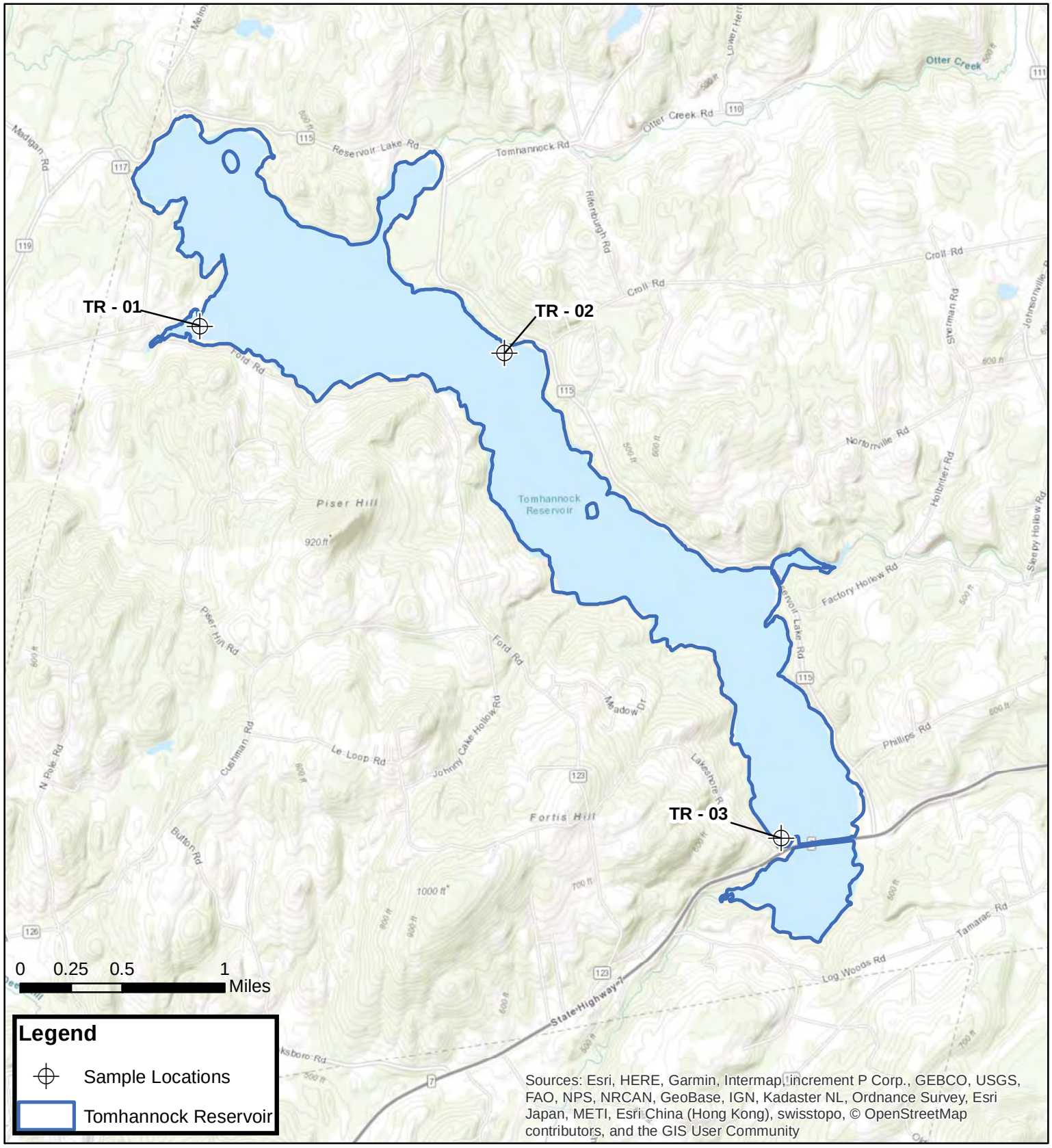

Figure 1
NYSDEC FINAL
Tomhannock Reservoir, Rensselaer County
PFAS Sample Location and Results

N

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Appendix A

New York State Department of Environmental Conservation
Tomhannock Reservoir Sampling Plan for
Per- and Poly-fluoroalkyl Substances

New York State Department of Environmental Conservation
Tomhannock Reservoir Sampling Plan
for
Per- and Polyfluoroalkyl Substances

Purpose

Various options are being evaluated to supply the Village of Hoosick Falls with a source of drinking water. One option under consideration to serve this purpose is the Tomhannock Reservoir (Reservoir) in the Town of Pittstown, Rensselaer County. To fully evaluate the viability of the Reservoir to serve as a source of drinking water, risk assessors and managers need to understand whether the potential source is impacted by Per- and polyfluoroalkyl Substances (PFAS) including perfluorooctonoic acid (PFOA).

Scope

Sampling of the Reservoir will include the collection of co-located surface water and sediment samples along with accompanying QA/QC samples. Samples will be collected from three locations in the Reservoir encompassing nearly the entire length of the waterbody. A surface water sample will be collected from multiple depths at each location. One sample of the ice cover will also be analyzed for PFAS. It is anticipated that samples will be collected from the frozen surface.

Sample Location Rationale

Sample locations are based on locations previously sampled by New York State Department of Health (NYSDOH) and the conceptual raw water intake location, as well as, the generally "upgradient" end of the reservoir (southern end). Sample locations are shown on the attached figure.

Access and Coordination

Request for access will be submitted to the City of Troy, the municipality responsible for maintenance and security of the reservoir. Sampling activities will be coordinated with the city, NYSDOH and Rensselaer County Health Department (RCDOH). Points of contact for the parties follows later in this work plan.

Sampling Procedures and Precautions

Procedures used for this effort will be consistent with the "NYSDEC March 1991 Sampling Guidelines and Protocols." Precautions identified in NYSDEC, Division of Environmental Remediation (DER) guidance (included with this work plan) will be followed during collection of all samples.

At each location identified on Figure 1, an ice auger will be used to determine the ice thickness in the vicinity. In consultation with Division of Operations staff responsible for posting ice fishing advisories and ice conditions, a minimum of 3" is required to safely conduct activities on the ice surface. Test holes will be drilled every fifteen feet to ensure that the thickness of the ice is not changing.

Once on station, the ice auger will be used to drill a hole so that the core sampler can be lowered into the water and the depth to the reservoir sediment surface (mud line) will be measured. The depth will be recorded on the sediment sample collection field log

A submersible pump will then be used to collect the surface water samples in this location. One sample will be collected from approximately five feet above the mudline. Tubing will be attached to the core and extension rods used to collect sediment.

Lower rod with tubing attached to the prescribed depth and hold position. Purge water from the tubing until any water not from the prescribed depth has been expelled. The sample jar will now be filled from the pump.

A second sample will be collected within five feet of the surface utilizing the same process. If the total depth of the water column is 30 feet or more, a third sample will be collected at the midpoint of the water column.

The core will then be pushed into the sediment to obtain the sample. The full length of the core should be driven into the sediment and then removed and brought up to the surface for transfer to the collection jar. The jar will then be labeled and placed in a cooler with ice.

Record GPS data from the sample location before relocating.

Analysis

All samples will be analyzed for the current list of 21 PFAS analytes using Modified EPA Method 527 or ISO 25101 analyses by a laboratory holding ELAP certification for PFOA and PFOS in drinking water for these methods.

All analytical data will be validated and a DUSR will be provided with the final report. The standby engineer will prepare and submit validated EDDs for all data packages.

Quality Assurance/Quality Control

The following will be collected for QA/QC per 20 samples:
One duplicate sample
One ms/msd
One trip blank
One equipment blank

Equipment

Core Barrel with Butterfly Flap
Extension Rods
Submersible pump/Battery or other
Water quality meter
Tubing
Tape Measure/Lead line
Camera
PFAS-free water
Sample log forms (surface water/sediment)
GPS unit.

Contacts

The following are the various agency points of contact for this sampling effort:

NYSDEC
Ian Beilby
625 Broadway
Albany NY, 12233-7013
518-402-9639
Ian.beilby@dec.ny.gov

Barbara Firebaugh
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NYSDOH
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RCDOH
Richard Elder
Rensselaer County
518-270-2632
relder@rensco.com

City of Troy
Christopher Wheland
Troy Water Treatment Plant
518-237-0193
chris.wheland@troyny.gov

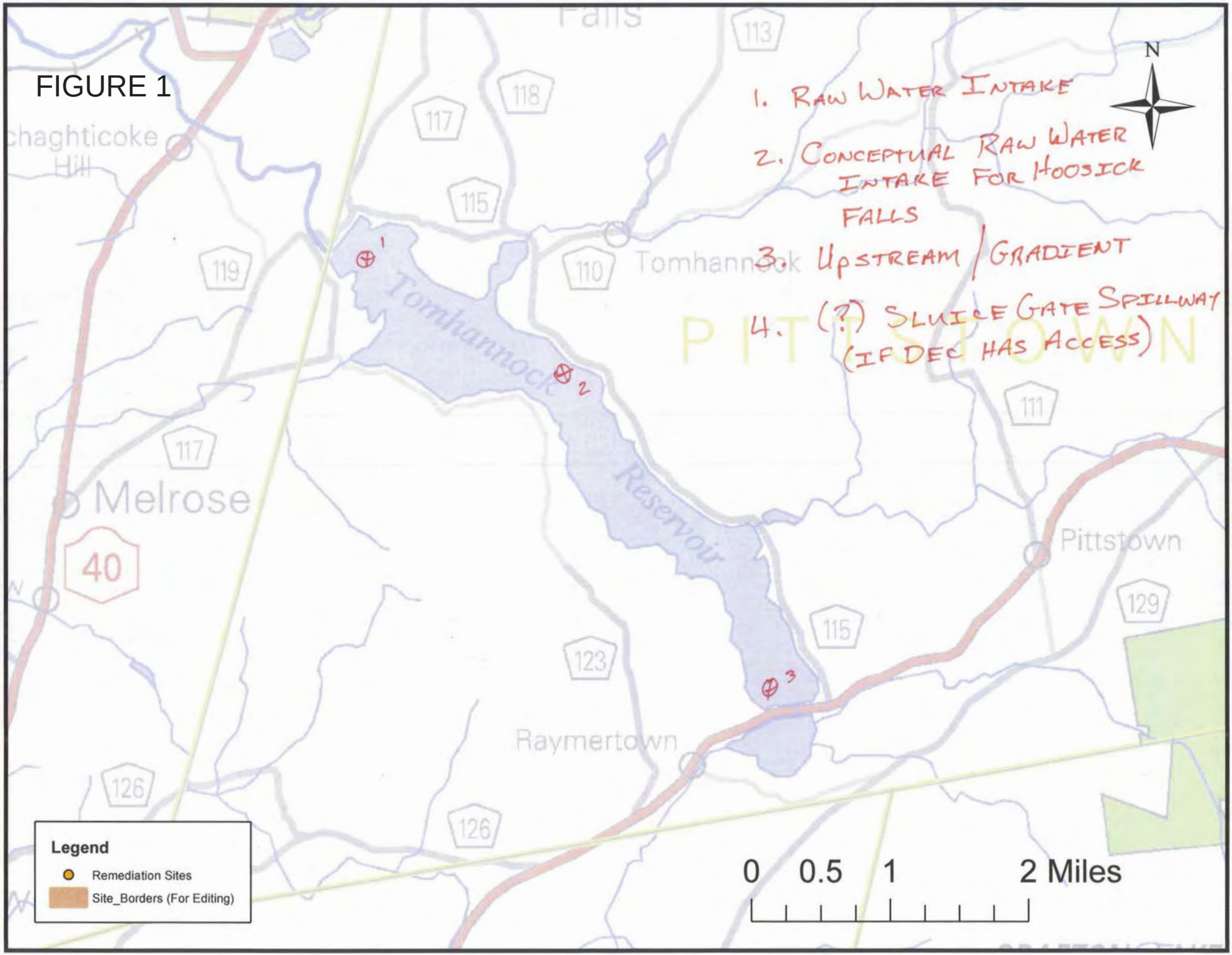


FIGURE 1
1. Raw Water Intake
2. Conceptual Raw Water Intake for Hoosick Falls
3. Upstream / Gradient
4. (?) Sluice Gate Spillway (If DEC has Access)
N
Tomhannock Reservoir
Melrose
Pittstown
Raymertown
Tomhannock
Legend
Remediation Sites
Site_Borders (For Editing)
0 0.5 1 2 Miles

Collection of Surface Water Samples for Perfluorooctanoic Acid (PFOA) and Perfluorinated Compounds (PFCs) Protocol

Samples collected using this protocol are intended to be analyzed for perfluorooctanoic acid (PFOA) and other perfluorinated compounds by Modified (Low Level) Test Method 537. Reporting limits of 2 nanograms per liter.

The sampling procedure used must be consistent with the NYSDEC March 1991 SAMPLING GUIDELINES AND PROTOCOLS
http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf with the following materials limitations.

At this time acceptable materials for sampling include: stainless steel, high density polyethylene (HDPE), PVC, silicone, acetate and polypropylene. Equipment blanks should be generated at least daily. Additional materials may be acceptable if pre-approved by NYSDEC. Requests to use alternate equipment should include clean equipment blanks. All sampling equipment components and sample containers should not come in contact with aluminum foil, low density polyethylene (LDPE), glass or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer. Standard two step decontamination using detergent and clean water rinse will be performed for equipment that does come in contact with PFC materials. Where conditions permit, (e.g. creek or pond) sampling devices (e.g. stainless steel cup) should be rinsed with site medium to be sampled prior to collection of the sample. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFC materials must be avoided. Many food and drink packaging materials and "plumbers thread seal tape" contain PFCs.

All clothing worn by sampling personnel must have been laundered multiple times. The sampler must wear nitrile gloves while filling and sealing the sample bottles.

Pre-cleaned sample bottles with closures, coolers, sample labels and a chain of custody form will be provided by the laboratory.

1. Fill two pre-cleaned 500 mL HDPE or polypropylene bottle with the sample.
2. Cap the bottles with an acceptable cap and liner closure system.
3. Label the sample bottles.
4. Fill out the chain of custody.
5. Place in a cooler maintained at 4 ± 2º Celsius.

Collect one equipment blank for every sample batch, not to exceed 20 samples.

Collect one field duplicate for every sample batch, not to exceed 20 samples.

Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, not to exceed 20 samples.

Request appropriate data deliverable (Category A or B) and an electronic data deliverable.

Collection of Shallow Soil Samples for Perfluorooctanoic Acid (PFOA) and Perfluorinated Compounds (PFCs) Protocol

General

The objective of this protocol is to give general guidance for the collection of soil samples for PFC analysis. The sampling procedure used must be consistent with the NYSDEC March 1991 SAMPLING GUIDELINES AND PROTOCOLS http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf with the following materials limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFOA and other PFCs by Modified (Low Level) via the modified (low level) EPA Test Method **537**. Based on four laboratories, the PFC reporting limits range from 0.1 to 3 micrograms per kilogram. One 8 ounce high density polyethylene (HDPE) container is required for each sample. Pre-cleaned sample containers, coolers, sample labels and a chain of custody form will be provided by the laboratory.

Sampling Location and Survey

Shallow soil sampling will generally be confined to surface or near-surface soils and/or sediments with hand equipment. For screening purposes, sampling of this type should be conducted in potential depositional areas. Sample locations shall be located and recorded.

Equipment

At this time acceptable materials for sampling include: stainless steel, high density polyethylene (HDPE), PVC, silicone, acetate and polypropylene. Additional materials may be acceptable if proven not to contain PFCs. All sampling equipment components and sample containers should not come in contact with aluminum foil, low density polyethylene (LDPE), glass or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer. A list of acceptable equipment is provided below, but other equipment may be considered appropriate at a later date.

- stainless steel spoon
- stainless steel bowl
- carbon steel hand auger without any coatings

Equipment Decontamination

Standard two step decontamination using detergent and clean water rinse will be performed for equipment that does come in contact with PFC materials.

Sampling Techniques

Sampling is often conducted in areas where a vegetative turf has been established. In these cases a clean stainless steel spoon should be used to carefully remove the turf so that it may be replaced at the conclusion of sampling. Surface soil samples (e.g. 0 to 6 inches below surface) shall then be collected using a pre-cleaned, stainless steel spoon. Shallow subsurface soil samples (e.g. 6 to ~36 inches below surface) may be collected by digging a hole using a hand auger. When the desired subsurface depth is reached, a pre-cleaned hand auger shall be used to obtain the sample.

When the soil sample is obtained, it should be deposited into a stainless steel bowl for mixing prior to filling the sample containers. The soil should be placed directly into the bowl and mixed thoroughly by rolling the material into the middle until the material is homogenized.

Sample Identification and Logging

A label shall be attached to each sample container with an identification consistent with the format indicated below. Each sample shall be included on the chain of custody (COC).

- Each sample shall be labelled as Street#, Street Name, date, Sample S#, Depth Interval (e.g. 2MainSt-3-30-16-S1-0-2).
- Each duplicate shall be labelled as a blind duplicate identified as “date, DUP, # (e.g. 3-30-16-DUP1).

Quality Assurance/Quality Control

- Immediately place samples in cooler maintained at 4 ± 2º Celsius.
- Collect one field duplicate for every sample batch, not to exceed 20 samples. The duplicate shall consist of an additional sample at a given location.
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, not to exceed 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC.
- Request appropriate data deliverable (Category A or B) and an electronic data deliverable.

Documentation

A soil log or sample log shall document the location of the sample/borehole, depth of the sample, duplicate sample, visual description of the material and any other observations or notes determined to be appropriate.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler must wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFC materials must be avoided. All clothing worn by sampling personnel must have been laundered multiple times.

Appendix B

Data Usability Summary Report

SITE Tomhannock Resevoir	**SDG No.** 480-151471-1
LABORATORY Test America Sacramento	**NO. OF SAMPLES** 16
SAMPLE ID TR-RB-SED BOWL STR-RB-TUBING1 TR-RB-SED SAMPLER TR-RB-SED SAMPLER 2 TR-RB-GLOVES TR-SW-DUP-1 TR-SW-3(11.5) TR-SED-1 TR-SED-2 TR-SED-3 TR-SED-DUP-1 TR-SW-3(5) TR-SW-2(5) TR-SW-2(14) TR-SW-1(5) TR-SW-1(20)	**COMPLETION DATE** 6/6/2019
DATES SAMPLED 4/3/2019, 4/5/2019	**ANALYTICAL METHOD** 537 Modified

PFAS Non-Potable Water and Solid

Review Criteria	Acceptance Criteria	Criteria Met (Y/N)	Comments/Action
Preservation and Holding Times	< 14 days to extract, 28 days to analyze extract <10C when received at the lab (not to exceed 10C within the first 48 hours)	Sampled: 4/3/2019, 4/5/2019 Prepared: 4/9/2019, 4/11/2019 Analyzed: 4/12/2019, 4/13/2019, 4/16/2019, 4/17/2019 Criteria were met	No action necessary
Calibration	-5 Standards -%RSD <20 -R^2 > 0.99 (linear fit)	Criteria were met	No action necessary
Blanks	No detections above the reporting limit	**TR-RB GLOVES and TR-RB-TUBING 1** The small detections of PFBA and PFHxS are likely from lab contamination and not field contamination **TR-RB-SED BOWLS, TR-RB-SED SAMPLER, and TR-RB-SED SAMPLER 2** The small detections of PFBA and PFHxS are likely from lab contamination and not field contamination	Change results to ND at the RL Change results to ND at the RL

		TR-RB- SED SAMPLER 2 also had one small detection of PFDoA but this compound was not detected in the soil samples therefore there is no affect on the data.	No action necessary
		TR-SED1, TR-SED3, TR-SED DUP1 PFBA result is >10X the blank amount	J+ qualify PFBA result
		TR-SED 2 PFBA was detected in the method blank. Result is less than 10x the blank concentration	J+ qualify PFBA result
		TR-SW DUP 1, TR-SW-3(11.5), TR-SW-3(5) PFBA and PFHxS were detected in the method blank. Results were less than10x the blank concentration	J+ qualify PFBA and PFHxS
		TR-SW-2(5), TR-SW-2(14), TR-SW-1(5), TR-SW-1(20) PFBA, PFHxS, PFTeA were detected in the method blank. Results were less than 10x the blank amount.	J+ qualify PFBA, PFHxS, and PFTeA results
Initial Calibration Verification	LL ICV 50-150% HL ICV 70-130%	Criteria were met	No action necessary
Continuing Calibration Checks (CCC)	Frequency – beginning and end of run, and after every 10^{th} sample 70-130% Recovery	Criteria were met	No action necessary

Duplicates	RPD ≤ 30%	Blind field duplicates were collected on: TR-SW-3(5) TW-SED-1 Results were less than 2x the reporting limit therefore the RPDs were not calculated	No action necessary
MS/MSD	In house limits 70-130% RPD <30%	Criteria were met	No action necessary
Extracted Internal Standards (Isotope Dilution Analytes)	50-150%	M2 8:2 FTS recovered high (179%) in sample TR-RB-SED SAMPLER 2 Compound was not detected in the sample.	No action necessary
Lab Control Spike	70-130% or in-house control limits 1 per 20 samples	Criteria were met	No action necessary
Sample Result Info Accuracy	Sample information on result pages must match COC	Sample information on the result pages matched the COC	No action necessary
Peak Integration	Peaks must be integrated properly	Criteria were met	No action necessary
Secondary ion (qualifier ion) monitoring	Secondary ion transition should be monitored, and the ratio of quantifier ion to qualifier ion must be within lab defined criteria	Secondary ions were monitored Ion ratios for PFOA in TR-SW-3(5) were outside of the limits	PFOA result for TR-SW-3(5) is qualified by the lab with an “I”
Signal to noise ratio	Signal to noise ratio should be calculated for each compound. s/n > 3 for quant ion	Signal to noise criteria were met except for results lower than the reporting limit. Criteria were met	No action necessary
Branched and linear isomers	Both branched and linear isomers should be used for calibration curves and sample quantification	Branched and linear isomer standards were used for calibration and isomers integrated in samples.	No action necessary
Ion Transitions	PFOA 413 > 369 PFOS 499 > 80 PFHxS 399 > 80 PFBS 299 > 80 6:2 FTS 427 > 407 8:2 FTS 527 > 507	The correct ion transitions were monitored.	No action necessary

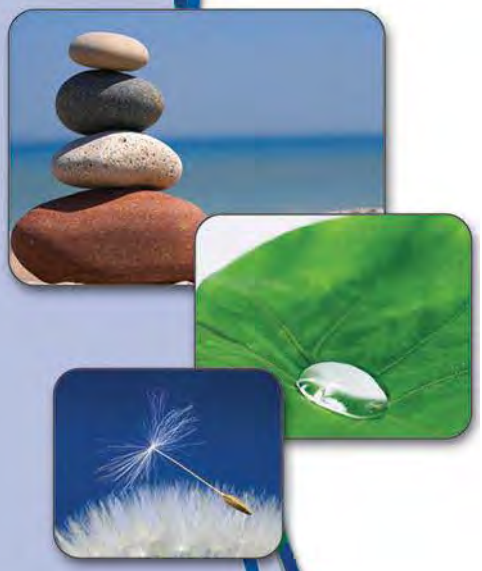
	NEtFOSAA 584 > 419 NMeFOSAA 570 > 419		
Reporting Limits	Must meet project objectives 2 ng/L for water (PFOA and PFOS) 1 ug/kg for soil	Water reporting limits were 2ppt except for 6:2 FTS, 8:2 FTS, NMeFOSAA, NEtFOSAA which were 20 ppt. These elevated RLs have been pre-approved. Soil reporting limits were 0.20 ug/kg for most PFAS, 2.0 ug/kg for 6:2 FTS, 8:2 FTS, NMeFOSAA, NEtFOSAA And PFOS at 0.5ug/kg before correction for % solids	No action necessary

Appendix C

Category A Laboratory Results

Package

eurofins | Environment Testing TestAmerica



ANALYTICAL REPORT

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-151471-1
Laboratory Sample Delivery Group: Tomhannock Reservoir
Client Project/Site: HOOSICK FALLS Rt 22 #1510556

For:
New York State D.E.C.
625 Broadway
Division of Environmental Remediation
Albany, New York 12233-7014

Attn: Susan Edwards

Joseph V. Giacomazza

Authorized for release by:
4/24/2019 12:03:00 PM
Joe Giacomazza, Project Management Assistant II
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Designee for

Judy Stone, Senior Project Manager
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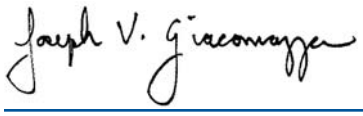
This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed within the body of this report. Release of the data contained in this sample data package and in the electronic data deliverable has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.



Joe Giacomazza
Project Management Assistant II
4/24/2019 12:03:00 PM

Table of Contents

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Qualifiers

LCMS

Qualifier	Qualifier Description
*	Isotope Dilution analyte is outside acceptance limits.
B	Compound was found in the blank and sample.
F1	MS and/or MSD Recovery is outside acceptance limits.
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 480-151471-1

Laboratory: Eurofins TestAmerica, Buffalo

Narrative

Job Narrative
480-151471-1

Receipt
The samples were received on 4/6/2019 1:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.2º C.

LCMS
Method(s) 537 (modified): Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for M2-8:2 FTS in the following sample: TR-RB-SED SAMPLER 2 (480-151471-4). Re-analysis was performed with concurring results. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method(s) 537 (modified): Isotope Dilution Analyte (IDA) recoveries are above the method recommended limit for M2-6:2 FTS and M2-8:2 FTS in the following samples: TR-SED-1 (480-151471-8), TR-SED-1 (480-151471-8[MS]) and TR-SED-DUP-1 (480-151471-11). Re-analysis was performed with concurring results. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method(s) 537 (modified): Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for M2-6:2 FTS in the following sample: TR-SED-1 (480-151471-8[MSD]). Re-analysis was performed with concurring results. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method(s) 537 (modified): The matrix spike recovery for preparation batch 320-287004 and analytical batch 320-287732 was outside control limits for Perfluoroundecanoic acid (PFUnA). Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
Method(s) 9045D: This analysis is normally performed in the field and has a method-defined holding time of 15 minutes. The following samples has been qualified with the "HF" flag to indicate analysis was performed in the laboratory outside the 15 minute timeframe: TR-SED-1 (480-151471-8), TR-SED-3 (480-151471-10), TR-SED-DUP-1 (480-151471-11) and (480-151471-B-8 DU).

Method(s) Lloyd Kahn: The continuing calibration blank (CCB) for analytical batch 200-141921 contained Total Organic Carbon above the reporting limit (RL). All reported samples associated with this CCB were either ND for this analyte or contained this analyte at a concentration greater than 10X the value found in the CCB; therefore, re-analysis of samples was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-287119.

Method(s) SHAKE: After the final volume, the following samples are light-yellow: TR-SED-1 (480-151471-8), TR-SED-1 (480-151471-8[MS]), TR-SED-1 (480-151471-8[MSD]), TR-SED-3 (480-151471-10) and TR-SED-DUP-1 (480-151471-11).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-RB-SED BOWLS — Lab Sample ID: 480-151471-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.73	J B	1.7	0.30	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.28	J B	1.7	0.15	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TR-RB-TUBING1 — Lab Sample ID: 480-151471-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.75	J B	2.0	0.35	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.34	J B	2.0	0.17	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TR-RB-SED SAMPLER — Lab Sample ID: 480-151471-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.67	J B	1.7	0.30	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.69	J	1.7	0.50	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.32	J	1.7	0.21	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.73	J	1.7	0.73	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.30	J I	1.7	0.27	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.0	J B	1.7	0.15	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.73	J I	1.7	0.46	ng/L	1		537 (modified)	Total/NA
Perfluorodecanesulfonic acid (PFDS)	0.51	J	1.7	0.27	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TR-RB-SED SAMPLER 2 — Lab Sample ID: 480-151471-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.80	J B	1.9	0.34	ng/L	1		537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	1.3	J	1.9	0.53	ng/L	1		537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.49	J B	1.9	0.28	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.33	J B	1.9	0.17	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TR-RB-GLOVES — Lab Sample ID: 480-151471-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.75	J B	1.8	0.32	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.31	J B	1.8	0.15	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TR-SW-DUP-1 — Lab Sample ID: 480-151471-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.9	B	1.8	0.32	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	1.2	J	1.8	0.45	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	1.1	J I	1.8	0.53	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.85	J	1.8	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.9		1.8	0.78	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.27	J	1.8	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.34	J	1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.45	J B	1.8	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.1	J	1.8	0.49	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TR-SW-3(11.5) — Lab Sample ID: 480-151471-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.9	J B	2.0	0.35	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.98	J	2.0	0.49	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	1.2	J	2.0	0.57	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Buffalo

Detection Summary

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-SW-3(11.5) (Continued) — Lab Sample ID: 480-151471-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.80	J	2.0	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.2		2.0	0.84	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.67	J	2.0	0.27	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.69	J	2.0	0.31	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.33	J	2.0	0.20	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.48	J B	2.0	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.1	J	2.0	0.53	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TR-SED-1 — Lab Sample ID: 480-151471-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.6	B	0.69	0.097	ug/Kg	1	☼	537 (modified)	Total/NA
pH	6.3	HF			SU	1		9045D	Total/NA
Temperature	21°	HF			Degrees C	1		9045D	Total/NA
Total Organic Carbon	30100	^	1000	380	mg/Kg	1		Lloyd Kahn	Total/NA

Client Sample ID: TR-SED-2 — Lab Sample ID: 480-151471-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.15	J B	0.26	0.036	ug/Kg	1	☼	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.083	J I	0.26	0.046	ug/Kg	1	☼	537 (modified)	Total/NA

Client Sample ID: TR-SED-3 — Lab Sample ID: 480-151471-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.5	B	0.71	0.099	ug/Kg	1	☼	537 (modified)	Total/NA
6:2 FTS	1.2	J	7.1	0.53	ug/Kg	1	☼	537 (modified)	Total/NA
pH	6.5	HF			SU	1		9045D	Total/NA
Temperature	21°	HF			Degrees C	1		9045D	Total/NA
Total Organic Carbon	35500	^	1000	380	mg/Kg	1		Lloyd Kahn	Total/NA

Client Sample ID: TR-SED-DUP-1 — Lab Sample ID: 480-151471-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.3	B	0.61	0.085	ug/Kg	1	☼	537 (modified)	Total/NA
pH	6.4	HF			SU	1		9045D	Total/NA
Temperature	21°	HF			Degrees C	1		9045D	Total/NA
Total Organic Carbon	30800	^	1000	380	mg/Kg	1		Lloyd Kahn	Total/NA

Client Sample ID: TR-SW-3(5) — Lab Sample ID: 480-151471-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.9	B	1.8	0.32	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	1.4	J	1.8	0.45	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	1.1	J	1.8	0.54	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.83	J	1.8	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.5	I	1.8	0.79	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.28	J	1.8	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.32	J	1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.43	J B	1.8	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.98	J	1.8	0.50	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-SW-2(5) — Lab Sample ID: 480-151471-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.3	J B	2.0	0.35	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	1.0	J	2.0	0.48	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.78	J	2.0	0.57	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.74	J	2.0	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.0		2.0	0.84	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	5.9		2.0	0.27	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	3.5		2.0	0.31	ng/L	1		537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	5.7		2.0	1.1	ng/L	1		537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	9.0		2.0	0.54	ng/L	1		537 (modified)	Total/NA
Perfluorotridecanoic acid (PFTriA)	7.3		2.0	1.3	ng/L	1		537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	3.0	B	2.0	0.29	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.31	J	2.0	0.20	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.53	J B	2.0	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.2	J	2.0	0.53	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TR-SW-2(14) — Lab Sample ID: 480-151471-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.5	J B	2.0	0.34	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.88	J	2.0	0.48	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.77	J	2.0	0.57	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.56	J	2.0	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.1		2.0	0.83	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.33	J	2.0	0.27	ng/L	1		537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.31	J I B	2.0	0.28	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.32	J	2.0	0.20	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.50	J B	2.0	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.88	J I	2.0	0.53	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TR-SW-1(5) — Lab Sample ID: 480-151471-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.7	J B	2.0	0.35	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.95	J	2.0	0.49	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.75	J	2.0	0.58	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.70	J	2.0	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.9	J	2.0	0.85	ng/L	1		537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.34	J I B	2.0	0.29	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.37	J	2.0	0.20	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.48	J I B	2.0	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.72	J	2.0	0.54	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TR-SW-1(20) — Lab Sample ID: 480-151471-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.6	J B	2.0	0.35	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.75	J	2.0	0.49	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.47	J	2.0	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.6	J	2.0	0.85	ng/L	1		537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.29	J B	2.0	0.29	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.25	J	2.0	0.20	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.42	J B	2.0	0.17	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-SW-1(20) (Continued)

Lab Sample ID: 480-151471-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	0.64	J	2.0	0.54	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-RB-SED BOWLS
Date Collected: 04/03/19 08:20
Date Received: 04/06/19 01:00

Lab Sample ID: 480-151471-1
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.73**	**J B**	1.7	0.30	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluoropentanoic acid (PFPeA)	ND		1.7	0.42	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluorohexanoic acid (PFHxA)	ND		1.7	0.50	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluoroheptanoic acid (PFHpA)	ND		1.7	0.21	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluorooctanoic acid (PFOA)	ND		1.7	0.73	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluorononanoic acid (PFNA)	ND		1.7	0.23	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluorodecanoic acid (PFDA)	ND		1.7	0.27	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.94	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.47	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7	1.1	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7	0.25	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.7	0.17	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluorohexanesulfonic acid (PFHxS)	**0.28**	**J B**	1.7	0.15	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.7	0.16	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.7	0.46	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.7	0.27	ng/L		04/09/19 12:49	04/13/19 20:35	1
Perfluorooctanesulfonamide (FOSA)	ND		1.7	0.30	ng/L		04/09/19 12:49	04/13/19 20:35	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		17	2.7	ng/L		04/09/19 12:49	04/13/19 20:35	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		17	1.6	ng/L		04/09/19 12:49	04/13/19 20:35	1
6:2 FTS	ND		17	1.7	ng/L		04/09/19 12:49	04/13/19 20:35	1
8:2 FTS	ND		17	1.7	ng/L		04/09/19 12:49	04/13/19 20:35	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*94*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
13C5 PFPeA	*95*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
13C2 PFHxA	*92*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
13C4 PFHpA	*100*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
13C4 PFOA	*97*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
13C5 PFNA	*101*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
13C2 PFDA	*112*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
13C2 PFUnA	*118*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
13C2 PFDoA	*124*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
13C2 PFTeDA	*111*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
13C3 PFBS	*96*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
18O2 PFHxS	*96*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
13C4 PFOS	*97*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
13C8 FOSA	*91*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
d3-NMeFOSAA	*77*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
d5-NEtFOSAA	*100*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
M2-6:2 FTS	*111*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*
M2-8:2 FTS	*122*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:35*	*1*

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-RB-TUBING1
Date Collected: 04/03/19 08:10
Date Received: 04/06/19 01:00

Lab Sample ID: 480-151471-2
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.75**	**J B**	2.0	0.35	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluoropentanoic acid (PFPeA)	ND		2.0	0.48	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.57	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.84	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.54	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluorohexanesulfonic acid (PFHxS)	**0.34**	**J B**	2.0	0.17	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0	0.19	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.53	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0	0.32	ng/L		04/09/19 12:49	04/13/19 20:44	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0	0.35	ng/L		04/09/19 12:49	04/13/19 20:44	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		04/09/19 12:49	04/13/19 20:44	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		04/09/19 12:49	04/13/19 20:44	1
6:2 FTS	ND		20	2.0	ng/L		04/09/19 12:49	04/13/19 20:44	1
8:2 FTS	ND		20	2.0	ng/L		04/09/19 12:49	04/13/19 20:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*92*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
13C5 PFPeA	*98*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
13C2 PFHxA	*95*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
13C4 PFHpA	*100*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
13C4 PFOA	*105*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
13C5 PFNA	*106*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
13C2 PFDA	*109*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
13C2 PFUnA	*103*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
13C2 PFDoA	*98*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
13C2 PFTeDA	*102*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
13C3 PFBS	*98*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
18O2 PFHxS	*101*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
13C4 PFOS	*96*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
13C8 FOSA	*85*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
d3-NMeFOSAA	*99*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
d5-NEtFOSAA	*103*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
M2-6:2 FTS	*109*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*
M2-8:2 FTS	*108*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:44*	*1*

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-RB-SED SAMPLER
Date Collected: 04/03/19 11:55
Date Received: 04/06/19 01:00

Lab Sample ID: 480-151471-3
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.67**	**J B**	1.7	0.30	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluoropentanoic acid (PFPeA)	ND		1.7	0.42	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluorohexanoic acid (PFHxA)	**0.69**	**J**	1.7	0.50	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluoroheptanoic acid (PFHpA)	**0.32**	**J**	1.7	0.21	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluorooctanoic acid (PFOA)	**0.73**	**J**	1.7	0.73	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluorononanoic acid (PFNA)	ND		1.7	0.23	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluorodecanoic acid (PFDA)	**0.30**	**J I**	1.7	0.27	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.94	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.47	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7	1.1	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7	0.25	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.7	0.17	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluorohexanesulfonic acid (PFHxS)	**1.0**	**J B**	1.7	0.15	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.7	0.16	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluorooctanesulfonic acid (PFOS)	**0.73**	**J I**	1.7	0.46	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluorodecanesulfonic acid (PFDS)	**0.51**	**J**	1.7	0.27	ng/L		04/09/19 12:49	04/13/19 20:54	1
Perfluorooctanesulfonamide (FOSA)	ND		1.7	0.30	ng/L		04/09/19 12:49	04/13/19 20:54	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		17	2.7	ng/L		04/09/19 12:49	04/13/19 20:54	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		17	1.6	ng/L		04/09/19 12:49	04/13/19 20:54	1
6:2 FTS	ND		17	1.7	ng/L		04/09/19 12:49	04/13/19 20:54	1
8:2 FTS	ND		17	1.7	ng/L		04/09/19 12:49	04/13/19 20:54	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*94*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
13C5 PFPeA	*93*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
13C2 PFHxA	*95*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
13C4 PFHpA	*96*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
13C4 PFOA	*100*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
13C5 PFNA	*101*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
13C2 PFDA	*118*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
13C2 PFUnA	*118*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
13C2 PFDoA	*130*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
13C2 PFTeDA	*120*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
13C3 PFBS	*96*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
18O2 PFHxS	*98*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
13C4 PFOS	*94*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
13C8 FOSA	*91*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
d3-NMeFOSAA	*83*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
d5-NEtFOSAA	*107*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
M2-6:2 FTS	*121*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*
M2-8:2 FTS	*133*		*25 - 150*	*04/09/19 12:49*	*04/13/19 20:54*	*1*

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-RB-SED SAMPLER 2
Date Collected: 04/05/19 12:30
Date Received: 04/06/19 01:00

Lab Sample ID: 480-151471-4
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.80**	**J B**	1.9	0.34	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluoropentanoic acid (PFPeA)	ND		1.9	0.48	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.56	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.83	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluorododecanoic acid (PFDoA)	**1.3**	**J**	1.9	0.53	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.3	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluorotetradecanoic acid (PFTeA)	**0.49**	**J B**	1.9	0.28	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluorohexanesulfonic acid (PFHxS)	**0.33**	**J B**	1.9	0.17	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.9	0.18	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.52	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.9	0.31	ng/L		04/11/19 05:35	04/12/19 23:01	1
Perfluorooctanesulfonamide (FOSA)	ND		1.9	0.34	ng/L		04/11/19 05:35	04/12/19 23:01	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		04/11/19 05:35	04/12/19 23:01	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		04/11/19 05:35	04/12/19 23:01	1
6:2 FTS	ND		19	1.9	ng/L		04/11/19 05:35	04/12/19 23:01	1
8:2 FTS	ND		19	1.9	ng/L		04/11/19 05:35	04/12/19 23:01	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*102*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
13C5 PFPeA	*106*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
13C2 PFHxA	*108*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
13C4 PFHpA	*107*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
13C4 PFOA	*105*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
13C5 PFNA	*114*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
13C2 PFDA	*120*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
13C2 PFUnA	*123*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
13C2 PFDoA	*117*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
13C2 PFTeDA	*117*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
13C3 PFBS	*108*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
18O2 PFHxS	*107*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
13C4 PFOS	*108*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
13C8 FOSA	*115*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
d3-NMeFOSAA	*92*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
d5-NEtFOSAA	*131*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
M2-6:2 FTS	*135*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*
M2-8:2 FTS	*179*	*	*25 - 150*	*04/11/19 05:35*	*04/12/19 23:01*	*1*

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-RB-GLOVES

Lab Sample ID: 480-151471-5

Date Collected: 04/03/19 08:15

Matrix: Water

Date Received: 04/06/19 01:00

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.75**	**J B**	1.8	0.32	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluoropentanoic acid (PFPeA)	ND		1.8	0.44	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.53	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.23	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.77	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.24	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.28	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.50	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.26	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.18	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluorohexanesulfonic acid (PFHxS)	**0.31**	**J B**	1.8	0.15	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8	0.17	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	0.49	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8	0.29	ng/L		04/09/19 12:49	04/13/19 21:03	1
Perfluorooctanesulfonamide (FOSA)	ND		1.8	0.32	ng/L		04/09/19 12:49	04/13/19 21:03	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		18	2.8	ng/L		04/09/19 12:49	04/13/19 21:03	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		18	1.7	ng/L		04/09/19 12:49	04/13/19 21:03	1
6:2 FTS	ND		18	1.8	ng/L		04/09/19 12:49	04/13/19 21:03	1
8:2 FTS	ND		18	1.8	ng/L		04/09/19 12:49	04/13/19 21:03	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*95*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
13C5 PFPeA	*93*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
13C2 PFHxA	*94*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
13C4 PFHpA	*97*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
13C4 PFOA	*97*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
13C5 PFNA	*98*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
13C2 PFDA	*106*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
13C2 PFUnA	*108*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
13C2 PFDoA	*126*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
13C2 PFTeDA	*129*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
13C3 PFBS	*96*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
18O2 PFHxS	*95*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
13C4 PFOS	*92*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
13C8 FOSA	*90*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
d3-NMeFOSAA	*98*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
d5-NEtFOSAA	*97*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
M2-6:2 FTS	*115*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*
M2-8:2 FTS	*110*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:03*	*1*

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-SW-DUP-1
Date Collected: 04/03/19 00:00
Date Received: 04/06/19 01:00

Lab Sample ID: 480-151471-6
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.9	B	1.8	0.32	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluoropentanoic acid (PFPeA)	1.2	J	1.8	0.45	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluorohexanoic acid (PFHxA)	1.1	J I	1.8	0.53	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluoroheptanoic acid (PFHpA)	0.85	J	1.8	0.23	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluorooctanoic acid (PFOA)	1.9		1.8	0.78	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluorononanoic acid (PFNA)	0.27	J	1.8	0.25	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.28	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.50	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.27	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluorobutanesulfonic acid (PFBS)	0.34	J	1.8	0.18	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluorohexanesulfonic acid (PFHxS)	0.45	J B	1.8	0.16	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8	0.17	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluorooctanesulfonic acid (PFOS)	1.1	J	1.8	0.49	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8	0.29	ng/L		04/09/19 12:49	04/13/19 21:13	1
Perfluorooctanesulfonamide (FOSA)	ND		1.8	0.32	ng/L		04/09/19 12:49	04/13/19 21:13	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		18	2.8	ng/L		04/09/19 12:49	04/13/19 21:13	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		18	1.7	ng/L		04/09/19 12:49	04/13/19 21:13	1
6:2 FTS	ND		18	1.8	ng/L		04/09/19 12:49	04/13/19 21:13	1
8:2 FTS	ND		18	1.8	ng/L		04/09/19 12:49	04/13/19 21:13	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*71*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
13C5 PFPeA	*88*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
13C2 PFHxA	*87*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
13C4 PFHpA	*96*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
13C4 PFOA	*100*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
13C5 PFNA	*106*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
13C2 PFDA	*110*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
13C2 PFUnA	*102*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
13C2 PFDoA	*95*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
13C2 PFTeDA	*93*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
13C3 PFBS	*90*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
18O2 PFHxS	*93*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
13C4 PFOS	*94*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
13C8 FOSA	*92*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
d3-NMeFOSAA	*98*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
d5-NEtFOSAA	*98*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
M2-6:2 FTS	*114*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*
M2-8:2 FTS	*120*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:13*	*1*

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-SW-3(11.5)
Date Collected: 04/03/19 10:25
Date Received: 04/06/19 01:00

Lab Sample ID: 480-151471-7
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.9	J B	2.0	0.35	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluoropentanoic acid (PFPeA)	0.98	J	2.0	0.49	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluorohexanoic acid (PFHxA)	1.2	J	2.0	0.57	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluoroheptanoic acid (PFHpA)	0.80	J	2.0	0.25	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluorooctanoic acid (PFOA)	2.2		2.0	0.84	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluorononanoic acid (PFNA)	0.67	J	2.0	0.27	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluorodecanoic acid (PFDA)	0.69	J	2.0	0.31	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.54	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluorobutanesulfonic acid (PFBS)	0.33	J	2.0	0.20	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluorohexanesulfonic acid (PFHxS)	0.48	J B	2.0	0.17	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0	0.19	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluorooctanesulfonic acid (PFOS)	1.1	J	2.0	0.53	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0	0.32	ng/L		04/09/19 12:49	04/13/19 21:51	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0	0.35	ng/L		04/09/19 12:49	04/13/19 21:51	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		04/09/19 12:49	04/13/19 21:51	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		04/09/19 12:49	04/13/19 21:51	1
6:2 FTS	ND		20	2.0	ng/L		04/09/19 12:49	04/13/19 21:51	1
8:2 FTS	ND		20	2.0	ng/L		04/09/19 12:49	04/13/19 21:51	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*72*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
13C5 PFPeA	*89*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
13C2 PFHxA	*83*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
13C4 PFHpA	*94*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
13C4 PFOA	*100*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
13C5 PFNA	*107*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
13C2 PFDA	*108*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
13C2 PFUnA	*100*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
13C2 PFDoA	*97*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
13C2 PFTeDA	*93*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
13C3 PFBS	*93*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
18O2 PFHxS	*95*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
13C4 PFOS	*95*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
13C8 FOSA	*91*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
d3-NMeFOSAA	*96*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
d5-NEtFOSAA	*98*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
M2-6:2 FTS	*120*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*
M2-8:2 FTS	*117*		*25 - 150*	*04/09/19 12:49*	*04/13/19 21:51*	*1*

Client Sample ID: TR-SED-1

Date Collected: 04/05/19 11:20
Date Received: 04/06/19 01:00

Lab Sample ID: 480-151471-8

Matrix: Solid
Percent Solids: 27.9

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1.6**	**B**	0.69	0.097	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluoropentanoic acid (PFPeA)	ND		0.69	0.27	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluorohexanoic acid (PFHxA)	ND		0.69	0.15	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluoroheptanoic acid (PFHpA)	ND		0.69	0.10	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluorooctanoic acid (PFOA)	ND		0.69	0.30	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluorononanoic acid (PFNA)	ND		0.69	0.12	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluorodecanoic acid (PFDA)	ND		0.69	0.076	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluoroundecanoic acid (PFUnA)	ND	F1	0.69	0.12	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluorododecanoic acid (PFDoA)	ND		0.69	0.23	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluorotridecanoic acid (PFTriA)	ND		0.69	0.18	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.69	0.19	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.69	0.087	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.69	0.11	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		0.69	0.12	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.7	0.69	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluorodecanesulfonic acid (PFDS)	ND		0.69	0.14	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
Perfluorooctanesulfonamide (FOSA)	ND		0.69	0.28	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		6.9	1.4	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		6.9	1.3	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
6:2 FTS	ND		6.9	0.52	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1
8:2 FTS	ND		6.9	0.87	ug/Kg	☼	04/09/19 08:31	04/12/19 10:20	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*81*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
13C5 PFPeA	*94*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
13C2 PFHxA	*86*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
13C4 PFHpA	*92*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
13C4 PFOA	*92*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
13C5 PFNA	*89*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
13C2 PFDA	*97*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
13C2 PFUnA	*103*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
13C2 PFDoA	*87*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
13C2 PFTeDA	*47*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
13C3 PFBS	*103*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
18O2 PFHxS	*91*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
13C4 PFOS	*88*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
13C8 FOSA	*80*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
d3-NMeFOSAA	*83*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
d5-NEtFOSAA	*116*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
M2-6:2 FTS	*192*	*	*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*
M2-8:2 FTS	*181*	*	*25 - 150*	*04/09/19 08:31*	*04/12/19 10:20*	*1*

General Chemistry

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	**6.3**	**HF**			SU			04/10/19 13:57	1
Temperature	**21°**	**HF**			Degrees C			04/10/19 13:57	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**30100**	**^**	1000	380	mg/Kg			04/11/19 17:16	1

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-SED-2
Date Collected: 04/05/19 10:00
Date Received: 04/06/19 01:00

Lab Sample ID: 480-151471-9
Matrix: Solid
Percent Solids: 77.1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.15**	**J B**	0.26	0.036	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluoropentanoic acid (PFPeA)	ND		0.26	0.098	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluorohexanoic acid (PFHxA)	ND		0.26	0.054	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluoroheptanoic acid (PFHpA)	ND		0.26	0.037	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluorooctanoic acid (PFOA)	ND		0.26	0.11	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluorononanoic acid (PFNA)	ND		0.26	0.046	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluorodecanoic acid (PFDA)	ND		0.26	0.028	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluoroundecanoic acid (PFUnA)	**0.083**	**J I**	0.26	0.046	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluorododecanoic acid (PFDoA)	ND		0.26	0.086	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluorotridecanoic acid (PFTriA)	ND		0.26	0.065	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.26	0.069	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.26	0.032	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.26	0.040	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		0.26	0.045	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.64	0.26	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluorodecanesulfonic acid (PFDS)	ND		0.26	0.050	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
Perfluorooctanesulfonamide (FOSA)	ND		0.26	0.10	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.6	0.50	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.6	0.47	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
6:2 FTS	ND		2.6	0.19	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1
8:2 FTS	ND		2.6	0.32	ug/Kg	☼	04/09/19 08:31	04/12/19 10:48	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*90*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
13C5 PFPeA	*93*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
13C2 PFHxA	*88*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
13C4 PFHpA	*96*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
13C4 PFOA	*87*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
13C5 PFNA	*96*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
13C2 PFDA	*96*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
13C2 PFUnA	*95*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
13C2 PFDoA	*88*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
13C2 PFTeDA	*85*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
13C3 PFBS	*94*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
18O2 PFHxS	*85*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
13C4 PFOS	*84*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
13C8 FOSA	*84*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
d3-NMeFOSAA	*86*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
d5-NEtFOSAA	*102*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
M2-6:2 FTS	*107*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*
M2-8:2 FTS	*132*		*25 - 150*	*04/09/19 08:31*	*04/12/19 10:48*	*1*

Client Sample ID: TR-SED-3

Date Collected: 04/05/19 12:45
Date Received: 04/06/19 01:00

Lab Sample ID: 480-151471-10

Matrix: Solid
Percent Solids: 27.3

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.5	B	0.71	0.099	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluoropentanoic acid (PFPeA)	ND		0.71	0.27	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluorohexanoic acid (PFHxA)	ND		0.71	0.15	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluoroheptanoic acid (PFHpA)	ND		0.71	0.10	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluorooctanoic acid (PFOA)	ND		0.71	0.30	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluorononanoic acid (PFNA)	ND		0.71	0.13	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluorodecanoic acid (PFDA)	ND		0.71	0.078	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluoroundecanoic acid (PFUnA)	ND		0.71	0.13	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluorododecanoic acid (PFDoA)	ND		0.71	0.24	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluorotridecanoic acid (PFTriA)	ND		0.71	0.18	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.71	0.19	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.71	0.088	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.71	0.11	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		0.71	0.12	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	0.71	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluorodecanesulfonic acid (PFDS)	ND		0.71	0.14	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
Perfluorooctanesulfonamide (FOSA)	ND		0.71	0.29	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		7.1	1.4	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		7.1	1.3	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
6:2 FTS	1.2	J	7.1	0.53	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1
8:2 FTS	ND		7.1	0.88	ug/Kg	☼	04/09/19 08:31	04/17/19 15:23	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*60*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
13C5 PFPeA	*71*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
13C2 PFHxA	*63*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
13C4 PFHpA	*74*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
13C4 PFOA	*79*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
13C5 PFNA	*77*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
13C2 PFDA	*81*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
13C2 PFUnA	*82*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
13C2 PFDoA	*76*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
13C2 PFTeDA	*75*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
13C3 PFBS	*76*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
18O2 PFHxS	*70*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
13C4 PFOS	*75*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
13C8 FOSA	*60*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
d3-NMeFOSAA	*65*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
d5-NEtFOSAA	*77*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
M2-6:2 FTS	*147*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*
M2-8:2 FTS	*131*		*25 - 150*	*04/09/19 08:31*	*04/17/19 15:23*	*1*

General Chemistry

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.5	HF			SU			04/10/19 14:02	1
Temperature	21°	HF			Degrees C			04/10/19 14:02	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	35500	^	1000	380	mg/Kg			04/11/19 17:32	1

Client Sample ID: TR-SED-DUP-1

Date Collected: 04/05/19 00:00
Date Received: 04/06/19 01:00

Lab Sample ID: 480-151471-11

Matrix: Solid
Percent Solids: 31.8

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1.3**	**B**	0.61	0.085	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluoropentanoic acid (PFPeA)	ND		0.61	0.23	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluorohexanoic acid (PFHxA)	ND		0.61	0.13	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluoroheptanoic acid (PFHpA)	ND		0.61	0.088	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluorooctanoic acid (PFOA)	ND		0.61	0.26	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluorononanoic acid (PFNA)	ND		0.61	0.11	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluorodecanoic acid (PFDA)	ND		0.61	0.067	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluoroundecanoic acid (PFUnA)	ND		0.61	0.11	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluorododecanoic acid (PFDoA)	ND		0.61	0.20	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluorotridecanoic acid (PFTriA)	ND		0.61	0.15	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.61	0.16	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.61	0.076	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.61	0.094	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		0.61	0.11	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.5	0.61	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluorodecanesulfonic acid (PFDS)	ND		0.61	0.12	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
Perfluorooctanesulfonamide (FOSA)	ND		0.61	0.25	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		6.1	1.2	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		6.1	1.1	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
6:2 FTS	ND		6.1	0.45	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1
8:2 FTS	ND		6.1	0.76	ug/Kg	☼	04/09/19 08:31	04/12/19 11:07	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*74*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
13C5 PFPeA	*86*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
13C2 PFHxA	*79*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
13C4 PFHpA	*84*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
13C4 PFOA	*88*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
13C5 PFNA	*81*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
13C2 PFDA	*90*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
13C2 PFUnA	*93*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
13C2 PFDoA	*81*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
13C2 PFTeDA	*68*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
13C3 PFBS	*90*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
18O2 PFHxS	*82*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
13C4 PFOS	*77*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
13C8 FOSA	*71*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
d3-NMeFOSAA	*77*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
d5-NEtFOSAA	*101*		*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
M2-6:2 FTS	*185*	*	*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*
M2-8:2 FTS	*154*	*	*25 - 150*	*04/09/19 08:31*	*04/12/19 11:07*	*1*

General Chemistry

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	**6.4**	**HF**			SU			04/10/19 14:05	1
Temperature	**21°**	**HF**			Degrees C			04/10/19 14:05	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	**30800**	**^**	1000	380	mg/Kg			04/11/19 17:37	1

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-SW-3(5)
Date Collected: 04/03/19 10:30
Date Received: 04/06/19 01:00

Lab Sample ID: 480-151471-12
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1.9**	**B**	1.8	0.32	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluoropentanoic acid (PFPeA)	**1.4**	**J**	1.8	0.45	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluorohexanoic acid (PFHxA)	**1.1**	**J**	1.8	0.54	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluoroheptanoic acid (PFHpA)	**0.83**	**J**	1.8	0.23	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluorooctanoic acid (PFOA)	**2.5**	**I**	1.8	0.79	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluorononanoic acid (PFNA)	**0.28**	**J**	1.8	0.25	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.29	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.51	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.27	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluorobutanesulfonic acid (PFBS)	**0.32**	**J**	1.8	0.18	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluorohexanesulfonic acid (PFHxS)	**0.43**	**J B**	1.8	0.16	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8	0.18	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluorooctanesulfonic acid (PFOS)	**0.98**	**J**	1.8	0.50	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8	0.30	ng/L		04/09/19 12:49	04/13/19 22:00	1
Perfluorooctanesulfonamide (FOSA)	ND		1.8	0.32	ng/L		04/09/19 12:49	04/13/19 22:00	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		18	2.9	ng/L		04/09/19 12:49	04/13/19 22:00	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		18	1.8	ng/L		04/09/19 12:49	04/13/19 22:00	1
6:2 FTS	ND		18	1.8	ng/L		04/09/19 12:49	04/13/19 22:00	1
8:2 FTS	ND		18	1.8	ng/L		04/09/19 12:49	04/13/19 22:00	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*72*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
13C5 PFPeA	*88*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
13C2 PFHxA	*84*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
13C4 PFHpA	*94*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
13C4 PFOA	*100*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
13C5 PFNA	*104*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
13C2 PFDA	*107*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
13C2 PFUnA	*103*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
13C2 PFDoA	*101*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
13C2 PFTeDA	*96*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
13C3 PFBS	*91*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
18O2 PFHxS	*96*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
13C4 PFOS	*94*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
13C8 FOSA	*92*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
d3-NMeFOSAA	*97*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
d5-NEtFOSAA	*95*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
M2-6:2 FTS	*115*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*
M2-8:2 FTS	*117*		*25 - 150*	*04/09/19 12:49*	*04/13/19 22:00*	*1*

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-SW-2(5)

Date Collected: 04/05/19 09:15
Date Received: 04/06/19 01:00

Lab Sample ID: 480-151471-13

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.3	J B	2.0	0.35	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluoropentanoic acid (PFPeA)	1.0	J	2.0	0.48	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluorohexanoic acid (PFHxA)	0.78	J	2.0	0.57	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluoroheptanoic acid (PFHpA)	0.74	J	2.0	0.25	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluorooctanoic acid (PFOA)	2.0		2.0	0.84	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluorononanoic acid (PFNA)	5.9		2.0	0.27	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluorodecanoic acid (PFDA)	3.5		2.0	0.31	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluoroundecanoic acid (PFUnA)	5.7		2.0	1.1	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluorododecanoic acid (PFDoA)	9.0		2.0	0.54	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluorotridecanoic acid (PFTriA)	7.3		2.0	1.3	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluorotetradecanoic acid (PFTeA)	3.0	B	2.0	0.29	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluorobutanesulfonic acid (PFBS)	0.31	J	2.0	0.20	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluorohexanesulfonic acid (PFHxS)	0.53	J B	2.0	0.17	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0	0.19	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluorooctanesulfonic acid (PFOS)	1.2	J	2.0	0.53	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0	0.32	ng/L		04/11/19 05:35	04/12/19 23:10	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0	0.35	ng/L		04/11/19 05:35	04/12/19 23:10	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		04/11/19 05:35	04/12/19 23:10	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		04/11/19 05:35	04/12/19 23:10	1
6:2 FTS	ND		20	2.0	ng/L		04/11/19 05:35	04/12/19 23:10	1
8:2 FTS	ND		20	2.0	ng/L		04/11/19 05:35	04/12/19 23:10	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*77*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
13C5 PFPeA	*101*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
13C2 PFHxA	*100*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
13C4 PFHpA	*102*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
13C4 PFOA	*102*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
13C5 PFNA	*108*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
13C2 PFDA	*105*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
13C2 PFUnA	*105*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
13C2 PFDoA	*97*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
13C2 PFTeDA	*77*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
13C3 PFBS	*101*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
18O2 PFHxS	*95*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
13C4 PFOS	*105*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
13C8 FOSA	*104*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
d3-NMeFOSAA	*110*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
d5-NEtFOSAA	*113*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
M2-6:2 FTS	*121*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*
M2-8:2 FTS	*138*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:10*	*1*

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-SW-2(14)
Date Collected: 04/05/19 09:25
Date Received: 04/06/19 01:00

Lab Sample ID: 480-151471-14
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.5	J B	2.0	0.34	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluoropentanoic acid (PFPeA)	0.88	J	2.0	0.48	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluorohexanoic acid (PFHxA)	0.77	J	2.0	0.57	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluoroheptanoic acid (PFHpA)	0.56	J	2.0	0.25	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluorooctanoic acid (PFOA)	2.1		2.0	0.83	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluorononanoic acid (PFNA)	0.33	J	2.0	0.27	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.30	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.54	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluorotetradecanoic acid (PFTeA)	0.31	J I B	2.0	0.28	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluorobutanesulfonic acid (PFBS)	0.32	J	2.0	0.20	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluorohexanesulfonic acid (PFHxS)	0.50	J B	2.0	0.17	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0	0.19	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluorooctanesulfonic acid (PFOS)	0.88	J I	2.0	0.53	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0	0.31	ng/L		04/11/19 05:35	04/12/19 23:20	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0	0.34	ng/L		04/11/19 05:35	04/12/19 23:20	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.0	ng/L		04/11/19 05:35	04/12/19 23:20	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		04/11/19 05:35	04/12/19 23:20	1
6:2 FTS	ND		20	2.0	ng/L		04/11/19 05:35	04/12/19 23:20	1
8:2 FTS	ND		20	2.0	ng/L		04/11/19 05:35	04/12/19 23:20	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*82*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
13C5 PFPeA	*95*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
13C2 PFHxA	*99*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
13C4 PFHpA	*101*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
13C4 PFOA	*97*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
13C5 PFNA	*110*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
13C2 PFDA	*110*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
13C2 PFUnA	*105*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
13C2 PFDoA	*101*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
13C2 PFTeDA	*79*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
13C3 PFBS	*101*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
18O2 PFHxS	*99*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
13C4 PFOS	*103*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
13C8 FOSA	*107*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
d3-NMeFOSAA	*110*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
d5-NEtFOSAA	*113*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
M2-6:2 FTS	*117*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*
M2-8:2 FTS	*129*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:20*	*1*

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-SW-1(5)

Date Collected: 04/05/19 11:00
Date Received: 04/06/19 01:00

Lab Sample ID: 480-151471-15

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1.7**	**J B**	2.0	0.35	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluoropentanoic acid (PFPeA)	**0.95**	**J**	2.0	0.49	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluorohexanoic acid (PFHxA)	**0.75**	**J**	2.0	0.58	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluoroheptanoic acid (PFHpA)	**0.70**	**J**	2.0	0.25	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluorooctanoic acid (PFOA)	**1.9**	**J**	2.0	0.85	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluorotetradecanoic acid (PFTeA)	**0.34**	**J I B**	2.0	0.29	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluorobutanesulfonic acid (PFBS)	**0.37**	**J**	2.0	0.20	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluorohexanesulfonic acid (PFHxS)	**0.48**	**J I B**	2.0	0.17	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0	0.19	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluorooctanesulfonic acid (PFOS)	**0.72**	**J**	2.0	0.54	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0	0.32	ng/L		04/11/19 05:35	04/12/19 23:29	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0	0.35	ng/L		04/11/19 05:35	04/12/19 23:29	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		04/11/19 05:35	04/12/19 23:29	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		04/11/19 05:35	04/12/19 23:29	1
6:2 FTS	ND		20	2.0	ng/L		04/11/19 05:35	04/12/19 23:29	1
8:2 FTS	ND		20	2.0	ng/L		04/11/19 05:35	04/12/19 23:29	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*86*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
13C5 PFPeA	*103*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
13C2 PFHxA	*103*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
13C4 PFHpA	*105*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
13C4 PFOA	*103*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
13C5 PFNA	*118*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
13C2 PFDA	*120*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
13C2 PFUnA	*110*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
13C2 PFDoA	*106*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
13C2 PFTeDA	*85*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
13C3 PFBS	*101*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
18O2 PFHxS	*105*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
13C4 PFOS	*108*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
13C8 FOSA	*115*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
d3-NMeFOSAA	*119*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
d5-NEtFOSAA	*123*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
M2-6:2 FTS	*136*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*
M2-8:2 FTS	*142*		*25 - 150*	*04/11/19 05:35*	*04/12/19 23:29*	*1*

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-SW-1(20)
Date Collected: 04/05/19 11:10
Date Received: 04/06/19 01:00

Lab Sample ID: 480-151471-16
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1.6**	**J B**	2.0	0.35	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluoropentanoic acid (PFPeA)	**0.75**	**J**	2.0	0.49	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluoroheptanoic acid (PFHpA)	**0.47**	**J**	2.0	0.25	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluorooctanoic acid (PFOA)	**1.6**	**J**	2.0	0.85	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluorotetradecanoic acid (PFTeA)	**0.29**	**J B**	2.0	0.29	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluorobutanesulfonic acid (PFBS)	**0.25**	**J**	2.0	0.20	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluorohexanesulfonic acid (PFHxS)	**0.42**	**J B**	2.0	0.17	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0	0.19	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluorooctanesulfonic acid (PFOS)	**0.64**	**J**	2.0	0.54	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0	0.32	ng/L		04/11/19 05:35	04/16/19 16:51	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0	0.35	ng/L		04/11/19 05:35	04/16/19 16:51	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		04/11/19 05:35	04/16/19 16:51	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		04/11/19 05:35	04/16/19 16:51	1
6:2 FTS	ND		20	2.0	ng/L		04/11/19 05:35	04/16/19 16:51	1
8:2 FTS	ND		20	2.0	ng/L		04/11/19 05:35	04/16/19 16:51	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*82*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
13C5 PFPeA	*100*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
13C2 PFHxA	*98*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
13C4 PFHpA	*102*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
13C4 PFOA	*96*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
13C5 PFNA	*108*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
13C2 PFDA	*114*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
13C2 PFUnA	*110*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
13C2 PFDoA	*105*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
13C2 PFTeDA	*82*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
13C3 PFBS	*99*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
18O2 PFHxS	*99*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
13C4 PFOS	*106*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
13C8 FOSA	*105*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
d3-NMeFOSAA	*105*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
d5-NEtFOSAA	*108*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
M2-6:2 FTS	*119*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*
M2-8:2 FTS	*134*		*25 - 150*	*04/11/19 05:35*	*04/16/19 16:51*	*1*

Isotope Dilution Summary

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Solid **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
480-151471-8	TR-SED-1	81	94	86	92	92	89	97	103
480-151471-8 MS	TR-SED-1	82	93	86	95	93	90	98	100
480-151471-8 MSD	TR-SED-1	81	87	84	91	92	86	94	101
480-151471-9	TR-SED-2	90	93	88	96	87	96	96	95
480-151471-10	TR-SED-3	60	71	63	74	79	77	81	82
480-151471-11	TR-SED-DUP-1	74	86	79	84	88	81	90	93
LCS 320-287004/2-A	Lab Control Sample	82	86	86	93	91	97	101	93
MB 320-287004/1-A	Method Blank	92	96	89	98	94	100	102	101

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFDoA	PFTDA	13C3-PFBS	PFHxS	PFOS	PFOSA	d3-NMeFOSA	d5-NEtFOSA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
480-151471-8	TR-SED-1	87	47	103	91	88	80	83	116
480-151471-8 MS	TR-SED-1	88	82	93	89	84	78	90	111
480-151471-8 MSD	TR-SED-1	85	65	95	86	84	77	82	105
480-151471-9	TR-SED-2	88	85	94	85	84	84	86	102
480-151471-10	TR-SED-3	76	75	76	70	75	60	65	77
480-151471-11	TR-SED-DUP-1	81	68	90	82	77	71	77	101
LCS 320-287004/2-A	Lab Control Sample	97	92	91	86	97	92	101	107
MB 320-287004/1-A	Method Blank	97	91	90	95	93	90	104	106

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		M262FTS	M282FTS						
Lab Sample ID	Client Sample ID	(25-150)	(25-150)						
480-151471-8	TR-SED-1	192 *	181 *						
480-151471-8 MS	TR-SED-1	184 *	191 *						
480-151471-8 MSD	TR-SED-1	170 *	148						
480-151471-9	TR-SED-2	107	132						
480-151471-10	TR-SED-3	147	131						
480-151471-11	TR-SED-DUP-1	185 *	154 *						
LCS 320-287004/2-A	Lab Control Sample	101	102						
MB 320-287004/1-A	Method Blank	107	113						

Surrogate Legend

PFBA = 13C4 PFBA
PFPeA = 13C5 PFPeA
PFHxA = 13C2 PFHxA
PFHpA = 13C4 PFHpA
PFOA = 13C4 PFOA
PFNA = 13C5 PFNA
PFDA = 13C2 PFDA
PFUnA = 13C2 PFUnA
PFDoA = 13C2 PFDoA
PFTDA = 13C2 PFTeDA
13C3-PFBS = 13C3 PFBS
PFHxS = 18O2 PFHxS
PFOS = 13C4 PFOS
PFOSA = 13C8 FOSA
d3-NMeFOSAA = d3-NMeFOSAA
d5-NEtFOSAA = d5-NEtFOSAA
M262FTS = M2-6:2 FTS

Isotope Dilution Summary

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

M282FTS = M2-8:2 FTS

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
480-151471-1	TR-RB-SED BOWLS	94	95	92	100	97	101	112	118
480-151471-2	TR-RB-TUBING1	92	98	95	100	105	106	109	103
480-151471-3	TR-RB-SED SAMPLER	94	93	95	96	100	101	118	118
480-151471-4	TR-RB-SED SAMPLER 2	102	106	108	107	105	114	120	123
480-151471-5	TR-RB-GLOVES	95	93	94	97	97	98	106	108
480-151471-6	TR-SW-DUP-1	71	88	87	96	100	106	110	102
480-151471-7	TR-SW-3(11.5)	72	89	83	94	100	107	108	100
480-151471-12	TR-SW-3(5)	72	88	84	94	100	104	107	103
480-151471-13	TR-SW-2(5)	77	101	100	102	102	108	105	105
480-151471-14	TR-SW-2(14)	82	95	99	101	97	110	110	105
480-151471-15	TR-SW-1(5)	86	103	103	105	103	118	120	110
480-151471-15 MS	TR-SW-1(5)	84	105	106	100	103	114	114	108
480-151471-15 MSD	TR-SW-1(5)	89	110	103	108	106	117	114	110
480-151471-16	TR-SW-1(20)	82	100	98	102	96	108	114	110
LCS 320-287119/2-A	Lab Control Sample	97	100	99	103	100	106	107	105
LCS 320-287552/2-A	Lab Control Sample	102	107	102	106	104	115	115	109
LCSD 320-287119/3-A	Lab Control Sample Dup	97	101	99	102	102	108	108	101
MB 320-287119/1-A	Method Blank	93	97	98	101	101	107	105	101
MB 320-287552/1-A	Method Blank	99	102	93	99	102	104	115	108

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFDoA	PFTDA	13C3-PFBS	PFHxS	PFOS	PFOSA	I-NMeFOSA	5-NEtFOSA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
480-151471-1	TR-RB-SED BOWLS	124	111	96	96	97	91	77	100
480-151471-2	TR-RB-TUBING1	98	102	98	101	96	85	99	103
480-151471-3	TR-RB-SED SAMPLER	130	120	96	98	94	91	83	107
480-151471-4	TR-RB-SED SAMPLER 2	117	117	108	107	108	115	92	131
480-151471-5	TR-RB-GLOVES	126	129	96	95	92	90	98	97
480-151471-6	TR-SW-DUP-1	95	93	90	93	94	92	98	98
480-151471-7	TR-SW-3(11.5)	97	93	93	95	95	91	96	98
480-151471-12	TR-SW-3(5)	101	96	91	96	94	92	97	95
480-151471-13	TR-SW-2(5)	97	77	101	95	105	104	110	113
480-151471-14	TR-SW-2(14)	101	79	101	99	103	107	110	113
480-151471-15	TR-SW-1(5)	106	85	101	105	108	115	119	123
480-151471-15 MS	TR-SW-1(5)	106	84	107	100	107	109	110	110
480-151471-15 MSD	TR-SW-1(5)	105	86	107	97	111	113	118	122
480-151471-16	TR-SW-1(20)	105	82	99	99	106	105	105	108
LCS 320-287119/2-A	Lab Control Sample	101	102	98	99	99	92	106	99
LCS 320-287552/2-A	Lab Control Sample	111	106	103	109	110	116	119	123
LCSD 320-287119/3-A	Lab Control Sample Dup	102	108	100	101	100	94	102	105
MB 320-287119/1-A	Method Blank	99	101	95	97	96	89	98	104
MB 320-287552/1-A	Method Blank	102	96	100	101	103	102	109	118

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		M262FTS	M282FTS						
Lab Sample ID	Client Sample ID	(25-150)	(25-150)						
480-151471-1	TR-RB-SED BOWLS	111	122						
480-151471-2	TR-RB-TUBING1	109	108						
480-151471-3	TR-RB-SED SAMPLER	121	133						
480-151471-4	TR-RB-SED SAMPLER 2	135	179 *						

Isotope Dilution Summary

Client: New York State D.E.C.
Job ID: 480-151471-1
Project/Site: HOOSICK FALLS Rt 22 #1510556
SDG: Tomhannock Reservoir

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Water
Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)									
Lab Sample ID	Client Sample ID	M262FTS (25-150)	M282FTS (25-150)								
480-151471-5	TR-RB-GLOVES	115	110								
480-151471-6	TR-SW-DUP-1	114	120								
480-151471-7	TR-SW-3(11.5)	120	117								
480-151471-12	TR-SW-3(5)	115	117								
480-151471-13	TR-SW-2(5)	121	138								
480-151471-14	TR-SW-2(14)	117	129								
480-151471-15	TR-SW-1(5)	136	142								
480-151471-15 MS	TR-SW-1(5)	133	137								
480-151471-15 MSD	TR-SW-1(5)	122	150								
480-151471-16	TR-SW-1(20)	119	134								
LCS 320-287119/2-A	Lab Control Sample	111	112								
LCS 320-287552/2-A	Lab Control Sample	119	126								
LCSD 320-287119/3-A	Lab Control Sample Dup	112	111								
MB 320-287119/1-A	Method Blank	110	107								
MB 320-287552/1-A	Method Blank	121	144								

Surrogate Legend

PFBA = 13C4 PFBA
PFPeA = 13C5 PFPeA
PFHxA = 13C2 PFHxA
PFHpA = 13C4 PFHpA
PFOA = 13C4 PFOA
PFNA = 13C5 PFNA
PFDA = 13C2 PFDA
PFUnA = 13C2 PFUnA
PFDoA = 13C2 PFDoA
PFTDA = 13C2 PFTeDA
13C3-PFBS = 13C3 PFBS
PFHxS = 18O2 PFHxS
PFOS = 13C4 PFOS
PFOSA = 13C8 FOSA
d3-NMeFOSAA = d3-NMeFOSAA
d5-NEtFOSAA = d5-NEtFOSAA
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 FTS

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-287004/1-A
Matrix: Solid
Analysis Batch: 287732

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 287004

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.0432	J	0.20	0.028	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluoropentanoic acid (PFPeA)	ND		0.20	0.077	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.042	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.029	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.086	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.036	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.036	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.067	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.051	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.054	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.031	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		0.20	0.035	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.50	0.20	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluorodecanesulfonic acid (PFDS)	ND		0.20	0.039	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
Perfluorooctanesulfonamide (FOSA)	ND		0.20	0.082	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.39	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.37	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
6:2 FTS	ND		2.0	0.15	ug/Kg		04/09/19 08:31	04/12/19 08:16	1
8:2 FTS	ND		2.0	0.25	ug/Kg		04/09/19 08:31	04/12/19 08:16	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*92*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
13C5 PFPxA	*9H*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
13C2 PFp OA	*: 9*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
13C4 PFp 7A	*9:*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
13C4 PFNA	*94*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
13C5 PFDA	*100*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
13C2 PFUA	*102*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
13C2 PFn 8A	*101*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
13C2 PFUTA	*9o*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
13C2 PFSxUA	*91*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
13C3 PFB6	*90*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
1: N2 PFp O6	*95*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
13C4 PFN6	*93*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
13C: FN6A	*90*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
d3-DMxFN6AA	*104*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
d5-DEtFN6AA	*10H*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
M2-H2 FS6	*10o*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*
M2-: e2 FS6	*113*		*25 - 150*	*04/09/19 0: e31*	*04/12/19 0: e1H*	*1*

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-287004/2-A
Matrix: Solid
Analysis Batch: 288802

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 287004

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	2.00	2.14		ug/Kg		107	81 - 133
Perfluoropentanoic acid (PFPeA)	2.00	2.07		ug/Kg		103	79 - 120
Perfluorohexanoic acid (PFHxA)	2.00	2.05		ug/Kg		102	75 - 125
Perfluoroheptanoic acid (PFHpA)	2.00	2.11		ug/Kg		106	76 - 124
Perfluorooctanoic acid (PFOA)	2.00	2.11		ug/Kg		106	76 - 121
Perfluorononanoic acid (PFNA)	2.00	2.06		ug/Kg		103	74 - 126
Perfluorodecanoic acid (PFDA)	2.00	2.02		ug/Kg		101	74 - 124
Perfluoroundecanoic acid (PFUnA)	2.00	2.14		ug/Kg		107	74 - 114
Perfluorododecanoic acid (PFDoA)	2.00	2.03		ug/Kg		102	75 - 123
Perfluorotridecanoic acid (PFTriA)	2.00	2.00		ug/Kg		100	43 - 116
Perfluorotetradecanoic acid (PFTeA)	2.00	1.94		ug/Kg		97	22 - 129
Perfluorobutanesulfonic acid (PFBS)	1.77	1.85		ug/Kg		105	73 - 142
Perfluorohexanesulfonic acid (PFHxS)	1.82	1.79		ug/Kg		98	75 - 121
Perfluoroheptanesulfonic Acid (PFHpS)	1.90	1.90		ug/Kg		100	78 - 146
Perfluorooctanesulfonic acid (PFOS)	1.86	1.83		ug/Kg		98	69 - 131
Perfluorodecanesulfonic acid (PFDS)	1.93	1.87		ug/Kg		97	54 - 113
Perfluorooctanesulfonamide (FOSA)	2.00	2.11		ug/Kg		105	62 - 135
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2.00	2.00		ug/Kg		100	65 - 135
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2.00	1.93	J	ug/Kg		97	65 - 135
6:2 FTS	1.90	2.52		ug/Kg		133	65 - 135
8:2 FTS	1.92	1.99	J	ug/Kg		104	65 - 135

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFBA	*: 2*		*25 - 150*
13C5 PFPxA	*: H*		*25 - 150*
13C2 PFp OA	*: H*		*25 - 150*
13C4 PFp 7A	*93*		*25 - 150*
13C4 PFNA	*91*		*25 - 150*
13C5 PFDA	*9o*		*25 - 150*
13C2 PFUA	*101*		*25 - 150*
13C2 PFn 8A	*93*		*25 - 150*
13C2 PFUTA	*9o*		*25 - 150*
13C2 PFSxUA	*92*		*25 - 150*
13C3 PFB6	*91*		*25 - 150*
1: N2 PFp O6	*: H*		*25 - 150*
13C4 PFN6	*9o*		*25 - 150*
13C: FN6A	*92*		*25 - 150*
d3-DMxFN6AA	*101*		*25 - 150*
d5-DEtFN6AA	*10o*		*25 - 150*

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-287004/2-A
Matrix: Solid
Analysis Batch: 288802

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 287004

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
M2-H2 FS6	101		25 - 150
M2-: e2 FS6	102		25 - 150

Lab Sample ID: 480-151471-8 MS
Matrix: Solid
Analysis Batch: 287732

Client Sample ID: TR-SED-1
Prep Type: Total/NA
Prep Batch: 287004

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	1.6	B	7.05	8.51		ug/Kg	☼	99	81 - 133
Perfluoropentanoic acid (PFPeA)	ND		7.05	6.37		ug/Kg	☼	90	79 - 120
Perfluorohexanoic acid (PFHxA)	ND		7.05	7.26		ug/Kg	☼	103	75 - 125
Perfluoroheptanoic acid (PFHpA)	ND		7.05	6.65		ug/Kg	☼	94	76 - 124
Perfluorooctanoic acid (PFOA)	ND		7.05	6.50		ug/Kg	☼	92	76 - 121
Perfluorononanoic acid (PFNA)	ND		7.05	6.88		ug/Kg	☼	98	74 - 126
Perfluorodecanoic acid (PFDA)	ND		7.05	7.80		ug/Kg	☼	111	74 - 124
Perfluoroundecanoic acid (PFUnA)	ND	F1	7.05	9.04	F1	ug/Kg	☼	128	74 - 114
Perfluorododecanoic acid (PFDoA)	ND		7.05	6.90		ug/Kg	☼	98	75 - 123
Perfluorotridecanoic acid (PFTriA)	ND		7.05	7.26		ug/Kg	☼	103	43 - 116
Perfluorotetradecanoic acid (PFTeA)	ND		7.05	6.91		ug/Kg	☼	98	22 - 129
Perfluorobutanesulfonic acid (PFBS)	ND		6.23	6.47		ug/Kg	☼	104	73 - 142
Perfluorohexanesulfonic acid (PFHxS)	ND		6.41	6.21		ug/Kg	☼	97	75 - 121
Perfluoroheptanesulfonic Acid (PFHpS)	ND		6.71	7.62		ug/Kg	☼	114	78 - 146
Perfluorooctanesulfonic acid (PFOS)	ND		6.54	6.57		ug/Kg	☼	101	69 - 131
Perfluorodecanesulfonic acid (PFDS)	ND		6.79	7.04		ug/Kg	☼	104	54 - 113
Perfluorooctanesulfonamide (FOSA)	ND		7.05	6.94		ug/Kg	☼	99	62 - 135
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		7.05	7.50		ug/Kg	☼	106	65 - 135
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		7.05	7.04		ug/Kg	☼	100	65 - 135
6:2 FTS	ND		6.68	6.64	J	ug/Kg	☼	99	65 - 135
8:2 FTS	ND		6.75	6.35	J	ug/Kg	☼	94	65 - 135

Isotope Dilution	MS %Recovery	MS Qualifier	Limits
13C4 PFBA	: 2		25 - 150
13C5 PFPxA	93		25 - 150
13C2 PFp OA	: H		25 - 150
13C4 PFp 7A	95		25 - 150
13C4 PFNA	93		25 - 150
13C5 PFDA	90		25 - 150
13C2 PFUA	9:		25 - 150
13C2 PFn 8A	100		25 - 150
13C2 PFUTA	: :		25 - 150

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: 480-151471-8 MS
Matrix: Solid
Analysis Batch: 287732

Client Sample ID: TR-SED-1
Prep Type: Total/NA
Prep Batch: 287004

Isotope Dilution	MS %Recovery	MS Qualifier	Limits
13C2 PFSxUA	: 2		25 - 150
13C3 PFB6	93		25 - 150
1: N2 PFp O6	: 9		25 - 150
13C4 PFN6	: 4		25 - 150
13C: FN6A	o:		25 - 150
d3-DMxFN6AA	90		25 - 150
d5-DEtFN6AA	111		25 - 150
M2-H2 FS6	1: 4	*	25 - 150
M2-: e2 FS6	191	*	25 - 150

Lab Sample ID: 480-151471-8 MSD
Matrix: Solid
Analysis Batch: 287732

Client Sample ID: TR-SED-1
Prep Type: Total/NA
Prep Batch: 287004

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	1.6	B	6.89	8.58		ug/Kg	☼	102	81 - 133	1	30
Perfluoropentanoic acid (PFPeA)	ND		6.89	6.60		ug/Kg	☼	96	79 - 120	3	30
Perfluorohexanoic acid (PFHxA)	ND		6.89	6.71		ug/Kg	☼	97	75 - 125	8	30
Perfluoroheptanoic acid (PFHpA)	ND		6.89	6.88		ug/Kg	☼	100	76 - 124	3	30
Perfluorooctanoic acid (PFOA)	ND		6.89	6.62		ug/Kg	☼	96	76 - 121	2	30
Perfluorononanoic acid (PFNA)	ND		6.89	7.05		ug/Kg	☼	102	74 - 126	3	30
Perfluorodecanoic acid (PFDA)	ND		6.89	7.08		ug/Kg	☼	103	74 - 124	10	30
Perfluoroundecanoic acid (PFUnA)	ND	F1	6.89	7.79		ug/Kg	☼	113	74 - 114	15	30
Perfluorododecanoic acid (PFDoA)	ND		6.89	6.54		ug/Kg	☼	95	75 - 123	5	30
Perfluorotridecanoic acid (PFTriA)	ND		6.89	6.09		ug/Kg	☼	88	43 - 116	18	30
Perfluorotetradecanoic acid (PFTeA)	ND		6.89	6.37		ug/Kg	☼	92	22 - 129	8	30
Perfluorobutanesulfonic acid (PFBS)	ND		6.09	6.05		ug/Kg	☼	99	73 - 142	7	30
Perfluorohexanesulfonic acid (PFHxS)	ND		6.27	6.35		ug/Kg	☼	101	75 - 121	2	30
Perfluoroheptanesulfonic Acid (PFHpS)	ND		6.55	7.14		ug/Kg	☼	109	78 - 146	7	30
Perfluorooctanesulfonic acid (PFOS)	ND		6.39	6.44		ug/Kg	☼	101	69 - 131	2	30
Perfluorodecanesulfonic acid (PFDS)	ND		6.64	6.47		ug/Kg	☼	98	54 - 113	8	30
Perfluorooctanesulfonamide (FOSA)	ND		6.89	6.92		ug/Kg	☼	101	62 - 135	0	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		6.89	6.69	J	ug/Kg	☼	97	65 - 135	11	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		6.89	7.03		ug/Kg	☼	102	65 - 135	0	30
6:2 FTS	ND		6.53	6.72	J	ug/Kg	☼	103	65 - 135	1	30
8:2 FTS	ND		6.60	6.75	J	ug/Kg	☼	102	65 - 135	6	30

Isotope Dilution	MSD %Recovery	MSD Qualifier	Limits
13C4 PFBA	: 1		25 - 150
13C5 PFPxA	: o		25 - 150

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: 480-151471-8 MSD
Matrix: Solid
Analysis Batch: 287732

Client Sample ID: TR-SED-1
Prep Type: Total/NA
Prep Batch: 287004

Isotope Dilution	MSD %Recovery	MSD Qualifier	Limits
13C2 PFpOA	: 4		25 - 150
13C4 PFp7A	91		25 - 150
13C4 PFNA	92		25 - 150
13C5 PFDA	: H		25 - 150
13C2 PFUA	94		25 - 150
13C2 PFn8A	101		25 - 150
13C2 PFUTA	: 5		25 - 150
13C2 PFSxUA	H5		25 - 150
13C3 PFB6	95		25 - 150
1: N2 PFpO6	: H		25 - 150
13C4 PFN6	: 4		25 - 150
13C: FN6A	oo		25 - 150
d3-DMxFN6AA	: 2		25 - 150
d5-DEtFN6AA	105		25 - 150
M2-H2 FS6	1o0	*	25 - 150
M2-: e2 FS6	14:		25 - 150

Lab Sample ID: MB 320-287119/1-A
Matrix: Water
Analysis Batch: 288020

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 287119

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.05	J	2.0	0.35	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluoropentanoic acid (PFPeA)	ND		2.0	0.49	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluorohexanesulfonic acid (PFHxS)	0.350	J	2.0	0.17	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0	0.19	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0	0.32	ng/L		04/09/19 12:49	04/13/19 20:06	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0	0.35	ng/L		04/09/19 12:49	04/13/19 20:06	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		04/09/19 12:49	04/13/19 20:06	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		04/09/19 12:49	04/13/19 20:06	1
6:2 FTS	ND		20	2.0	ng/L		04/09/19 12:49	04/13/19 20:06	1
8:2 FTS	ND		20	2.0	ng/L		04/09/19 12:49	04/13/19 20:06	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	93		25 - 150	04/09/19 12:49	04/13/19 20:06	1
13C5 PFPxA	9o		25 - 150	04/09/19 12:49	04/13/19 20:06	1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-287119/1-A
Matrix: Water
Analysis Batch: 288020

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 287119

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFp OA	9:		25 - 150	04/09/19 12e49	04/13/19 20e0H	1
13C4 PFp 7A	101		25 - 150	04/09/19 12e49	04/13/19 20e0H	1
13C4 PFNA	101		25 - 150	04/09/19 12e49	04/13/19 20e0H	1
13C5 PFDA	10o		25 - 150	04/09/19 12e49	04/13/19 20e0H	1
13C2 PFUA	105		25 - 150	04/09/19 12e49	04/13/19 20e0H	1
13C2 PFn 8A	101		25 - 150	04/09/19 12e49	04/13/19 20e0H	1
13C2 PFUTA	99		25 - 150	04/09/19 12e49	04/13/19 20e0H	1
13C2 PFSxUA	101		25 - 150	04/09/19 12e49	04/13/19 20e0H	1
13C3 PFB6	95		25 - 150	04/09/19 12e49	04/13/19 20e0H	1
1: N2 PFp O6	9o		25 - 150	04/09/19 12e49	04/13/19 20e0H	1
13C4 PFN6	9H		25 - 150	04/09/19 12e49	04/13/19 20e0H	1
13C: FN6A	: 9		25 - 150	04/09/19 12e49	04/13/19 20e0H	1
d3-DMxFN6AA	9:		25 - 150	04/09/19 12e49	04/13/19 20e0H	1
d5-DEtFN6AA	104		25 - 150	04/09/19 12e49	04/13/19 20e0H	1
M2-H2 FS6	110		25 - 150	04/09/19 12e49	04/13/19 20e0H	1
M2-: e2 FS6	10o		25 - 150	04/09/19 12e49	04/13/19 20e0H	1

Lab Sample ID: LCS 320-287119/2-A
Matrix: Water
Analysis Batch: 288020

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 287119

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	40.0	41.9		ng/L		105	70 - 130
Perfluoropentanoic acid (PFPeA)	40.0	38.9		ng/L		97	66 - 126
Perfluorohexanoic acid (PFHxA)	40.0	39.5		ng/L		99	66 - 126
Perfluoroheptanoic acid (PFHpA)	40.0	40.1		ng/L		100	66 - 126
Perfluorooctanoic acid (PFOA)	40.0	41.2		ng/L		103	64 - 124
Perfluorononanoic acid (PFNA)	40.0	40.2		ng/L		100	68 - 128
Perfluorodecanoic acid (PFDA)	40.0	38.4		ng/L		96	69 - 129
Perfluoroundecanoic acid (PFUnA)	40.0	37.4		ng/L		94	60 - 120
Perfluorododecanoic acid (PFDoA)	40.0	40.2		ng/L		101	71 - 131
Perfluorotridecanoic acid (PFTriA)	40.0	40.6		ng/L		102	72 - 132
Perfluorotetradecanoic acid (PFTeA)	40.0	38.8		ng/L		97	68 - 128
Perfluorobutanesulfonic acid (PFBS)	35.4	35.2		ng/L		99	73 - 133
Perfluorohexanesulfonic acid (PFHxS)	36.4	34.4		ng/L		94	63 - 123
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	39.4		ng/L		103	68 - 128
Perfluorooctanesulfonic acid (PFOS)	37.1	36.7		ng/L		99	67 - 127
Perfluorodecanesulfonic acid (PFDS)	38.6	38.7		ng/L		100	68 - 128
Perfluorooctanesulfonamide (FOSA)	40.0	41.3		ng/L		103	70 - 130
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	36.9		ng/L		92	67 - 127

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-287119/2-A
Matrix: Water
Analysis Batch: 288020

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 287119

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)			40.0	37.5		ng/L		94	65 - 125		
6:2 FTS			37.9	39.6		ng/L		104	66 - 126		
8:2 FTS			38.3	38.7		ng/L		101	67 - 127		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFBA	*90*		*25 - 150*
13C5 PFPxA	*100*		*25 - 150*
13C2 PFpOA	*99*		*25 - 150*
13C4 PFp7A	*103*		*25 - 150*
13C4 PFNA	*100*		*25 - 150*
13C5 PFDA	*10H*		*25 - 150*
13C2 PFUA	*10o*		*25 - 150*
13C2 PFn8A	*105*		*25 - 150*
13C2 PFUTA	*101*		*25 - 150*
13C2 PFSxUA	*102*		*25 - 150*
13C3 PFB6	*9:*		*25 - 150*
1: N2 PFpO6	*99*		*25 - 150*
13C4 PFN6	*99*		*25 - 150*
13C: FN6A	*92*		*25 - 150*
d3-DMxFN6AA	*10H*		*25 - 150*
d5-DEtFN6AA	*99*		*25 - 150*
M2-H2 FS6	*111*		*25 - 150*
M2-: 2 FS6	*112*		*25 - 150*

Lab Sample ID: LCSD 320-287119/3-A
Matrix: Water
Analysis Batch: 288020

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 287119

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)			40.0	42.4		ng/L		106	70 - 130	1	30
Perfluoropentanoic acid (PFPeA)			40.0	38.4		ng/L		96	66 - 126	1	30
Perfluorohexanoic acid (PFHxA)			40.0	38.7		ng/L		97	66 - 126	2	30
Perfluoroheptanoic acid (PFHpA)			40.0	40.7		ng/L		102	66 - 126	2	30
Perfluorooctanoic acid (PFOA)			40.0	40.0		ng/L		100	64 - 124	3	30
Perfluorononanoic acid (PFNA)			40.0	38.7		ng/L		97	68 - 128	4	30
Perfluorodecanoic acid (PFDA)			40.0	39.2		ng/L		98	69 - 129	2	30
Perfluoroundecanoic acid (PFUnA)			40.0	38.5		ng/L		96	60 - 120	3	30
Perfluorododecanoic acid (PFDoA)			40.0	40.2		ng/L		101	71 - 131	0	30
Perfluorotridecanoic acid (PFTriA)			40.0	40.7		ng/L		102	72 - 132	0	30
Perfluorotetradecanoic acid (PFTeA)			40.0	37.7		ng/L		94	68 - 128	3	30
Perfluorobutanesulfonic acid (PFBS)			35.4	35.6		ng/L		101	73 - 133	1	30
Perfluorohexanesulfonic acid (PFHxS)			36.4	33.3		ng/L		91	63 - 123	3	30
Perfluoroheptanesulfonic Acid (PFHpS)			38.1	39.6		ng/L		104	68 - 128	1	30

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-287119/3-A
Matrix: Water
Analysis Batch: 288020

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 287119

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)			37.1	36.6		ng/L		99	67 - 127	0	30
Perfluorodecanesulfonic acid (PFDS)			38.6	39.3		ng/L		102	68 - 128	2	30
Perfluorooctanesulfonamide (FOSA)			40.0	41.9		ng/L		105	70 - 130	1	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)			40.0	38.0		ng/L		95	67 - 127	3	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)			40.0	37.8		ng/L		95	65 - 125	1	30
6:2 FTS			37.9	39.0		ng/L		103	66 - 126	2	30
8:2 FTS			38.3	39.1		ng/L		102	67 - 127	1	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C4 PFBA	*9o*		*25 - 150*
13C5 PFPxA	*101*		*25 - 150*
13C2 PFp OA	*99*		*25 - 150*
13C4 PFp 7A	*102*		*25 - 150*
13C4 PFNA	*102*		*25 - 150*
13C5 PFDA	*10:*		*25 - 150*
13C2 PFUA	*10:*		*25 - 150*
13C2 PFn 8A	*101*		*25 - 150*
13C2 PFUTA	*102*		*25 - 150*
13C2 PFSxUA	*10:*		*25 - 150*
13C3 PFB6	*100*		*25 - 150*
1: N2 PFp O6	*101*		*25 - 150*
13C4 PFN6	*100*		*25 - 150*
13C: FN6A	*94*		*25 - 150*
d3-DMxFN6AA	*102*		*25 - 150*
d5-DEtFN6AA	*105*		*25 - 150*
M2-H2 FS6	*112*		*25 - 150*
M2-: e2 FS6	*111*		*25 - 150*

Lab Sample ID: MB 320-287552/1-A
Matrix: Water
Analysis Batch: 287957

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 287552

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.620	J	2.0	0.35	ng/L		04/11/19 05:35	04/12/19 22:13	1
Perfluoropentanoic acid (PFPeA)	ND		2.0	0.49	ng/L		04/11/19 05:35	04/12/19 22:13	1
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		04/11/19 05:35	04/12/19 22:13	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		04/11/19 05:35	04/12/19 22:13	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		04/11/19 05:35	04/12/19 22:13	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		04/11/19 05:35	04/12/19 22:13	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		04/11/19 05:35	04/12/19 22:13	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		04/11/19 05:35	04/12/19 22:13	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		04/11/19 05:35	04/12/19 22:13	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		04/11/19 05:35	04/12/19 22:13	1
Perfluorotetradecanoic acid (PFTeA)	0.463	J	2.0	0.29	ng/L		04/11/19 05:35	04/12/19 22:13	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		04/11/19 05:35	04/12/19 22:13	1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-287552/1-A
Matrix: Water
Analysis Batch: 287957

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 287552

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	0.325	J	2.0	0.17	ng/L		04/11/19 05:35	04/12/19 22:13	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0	0.19	ng/L		04/11/19 05:35	04/12/19 22:13	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		04/11/19 05:35	04/12/19 22:13	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0	0.32	ng/L		04/11/19 05:35	04/12/19 22:13	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0	0.35	ng/L		04/11/19 05:35	04/12/19 22:13	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		04/11/19 05:35	04/12/19 22:13	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		04/11/19 05:35	04/12/19 22:13	1
6:2 FTS	ND		20	2.0	ng/L		04/11/19 05:35	04/12/19 22:13	1
8:2 FTS	ND		20	2.0	ng/L		04/11/19 05:35	04/12/19 22:13	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*99*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
13C5 PFPxA	*102*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
13C2 PFp OA	*93*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
13C4 PFp 7A	*99*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
13C4 PFNA	*102*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
13C5 PFDA	*104*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
13C2 PFUA	*115*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
13C2 PFn 8A	*10:*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
13C2 PFUTA	*102*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
13C2 PFSxUA	*9H*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
13C3 PFB6	*100*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
1: N2 PFp O6	*101*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
13C4 PFN6	*103*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
13C: FN6A	*102*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
d3-DMxFN6AA	*109*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
d5-DEtFN6AA	*11:*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
M2-H2 FS6	*121*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*
M2-: 2 FS6	*144*		*25 - 150*	*04/11/19 05:35*	*04/12/19 22:13*	*1*

Lab Sample ID: LCS 320-287552/2-A
Matrix: Water
Analysis Batch: 287957

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 287552

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	40.0	41.9		ng/L		105	70 - 130
Perfluoropentanoic acid (PFPeA)	40.0	37.9		ng/L		95	66 - 126
Perfluorohexanoic acid (PFHxA)	40.0	40.9		ng/L		102	66 - 126
Perfluoroheptanoic acid (PFHpA)	40.0	40.0		ng/L		100	66 - 126
Perfluorooctanoic acid (PFOA)	40.0	40.1		ng/L		100	64 - 124
Perfluorononanoic acid (PFNA)	40.0	40.4		ng/L		101	68 - 128
Perfluorodecanoic acid (PFDA)	40.0	41.8		ng/L		104	69 - 129
Perfluoroundecanoic acid (PFUnA)	40.0	40.9		ng/L		102	60 - 120
Perfluorododecanoic acid (PFDoA)	40.0	41.3		ng/L		103	71 - 131

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-287552/2-A
Matrix: Water
Analysis Batch: 287957

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 287552

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorotridecanoic acid (PFTriA)	40.0	41.7		ng/L		104	72 - 132
Perfluorotetradecanoic acid (PFTeA)	40.0	38.6		ng/L		96	68 - 128
Perfluorobutanesulfonic acid (PFBS)	35.4	37.3		ng/L		106	73 - 133
Perfluorohexanesulfonic acid (PFHxS)	36.4	34.0		ng/L		93	63 - 123
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	38.3		ng/L		101	68 - 128
Perfluorooctanesulfonic acid (PFOS)	37.1	37.5		ng/L		101	67 - 127
Perfluorodecanesulfonic acid (PFDS)	38.6	39.2		ng/L		102	68 - 128
Perfluorooctanesulfonamide (FOSA)	40.0	38.9		ng/L		97	70 - 130
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	36.4		ng/L		91	67 - 127
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	35.4		ng/L		88	65 - 125
6:2 FTS	37.9	34.7		ng/L		92	66 - 126
8:2 FTS	38.3	38.9		ng/L		101	67 - 127

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFBA	*102*		*25 - 150*
13C5 PFPxA	*10o*		*25 - 150*
13C2 PFp OA	*102*		*25 - 150*
13C4 PFp 7A	*10H*		*25 - 150*
13C4 PFNA	*104*		*25 - 150*
13C5 PFDA	*115*		*25 - 150*
13C2 PFUA	*115*		*25 - 150*
13C2 PFn 8A	*109*		*25 - 150*
13C2 PFUTA	*111*		*25 - 150*
13C2 PFSxUA	*10H*		*25 - 150*
13C3 PFB6	*103*		*25 - 150*
1: N2 PFp O6	*109*		*25 - 150*
13C4 PFN6	*110*		*25 - 150*
13C: FN6A	*11H*		*25 - 150*
d3-DMxFN6AA	*119*		*25 - 150*
d5-DEtFN6AA	*123*		*25 - 150*
M2-H2 FS6	*119*		*25 - 150*
M2-: e2 FS6	*12H*		*25 - 150*

Lab Sample ID: 480-151471-15 MS
Matrix: Water
Analysis Batch: 288537

Client Sample ID: TR-SW-1(5)
Prep Type: Total/NA
Prep Batch: 287552

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	1.7	J B	38.8	39.8		ng/L		98	70 - 130
Perfluoropentanoic acid (PFPeA)	0.95	J	38.8	38.0		ng/L		96	66 - 126
Perfluorohexanoic acid (PFHxA)	0.75	J	38.8	37.6		ng/L		95	66 - 126

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: 480-151471-15 MS
Matrix: Water
Analysis Batch: 288537

Client Sample ID: TR-SW-1(5)
Prep Type: Total/NA
Prep Batch: 287552

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluoroheptanoic acid (PFHpA)	0.70	J	38.8	39.5		ng/L		100	66 - 126
Perfluorooctanoic acid (PFOA)	1.9	J	38.8	38.0		ng/L		93	64 - 124
Perfluorononanoic acid (PFNA)	ND		38.8	38.2		ng/L		99	68 - 128
Perfluorodecanoic acid (PFDA)	ND		38.8	36.8		ng/L		95	69 - 129
Perfluoroundecanoic acid (PFUnA)	ND		38.8	40.2		ng/L		104	60 - 120
Perfluorododecanoic acid (PFDoA)	ND		38.8	36.3		ng/L		94	71 - 131
Perfluorotridecanoic acid (PFTriA)	ND		38.8	34.7		ng/L		90	72 - 132
Perfluorotetradecanoic acid (PFTeA)	0.34	J I B	38.8	37.6		ng/L		96	68 - 128
Perfluorobutanesulfonic acid (PFBS)	0.37	J	34.3	33.1		ng/L		96	73 - 133
Perfluorohexanesulfonic acid (PFHxS)	0.48	J I B	35.3	33.9		ng/L		95	63 - 123
Perfluoroheptanesulfonic Acid (PFHpS)	ND		36.9	38.1		ng/L		103	68 - 128
Perfluorooctanesulfonic acid (PFOS)	0.72	J	36.0	36.5		ng/L		100	67 - 127
Perfluorodecanesulfonic acid (PFDS)	ND		37.4	35.3		ng/L		94	68 - 128
Perfluorooctanesulfonamide (FOSA)	ND		38.8	37.8		ng/L		97	70 - 130
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		38.8	36.5		ng/L		94	67 - 127
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		38.8	35.5		ng/L		92	65 - 125
6:2 FTS	ND		36.8	33.8		ng/L		92	66 - 126
8:2 FTS	ND		37.1	37.3		ng/L		100	67 - 127

Isotope Dilution	*MS %Recovery*	*MS Qualifier*	*Limits*
13C4 PFBA	*: 4*		*25 - 150*
13C5 PFPxA	*105*		*25 - 150*
13C2 PFp OA	*10H*		*25 - 150*
13C4 PFp 7A	*100*		*25 - 150*
13C4 PFNA	*103*		*25 - 150*
13C5 PFDA	*114*		*25 - 150*
13C2 PFUA	*114*		*25 - 150*
13C2 PFn 8A	*10:*		*25 - 150*
13C2 PFUTA	*10H*		*25 - 150*
13C2 PFSxUA	*: 4*		*25 - 150*
13C3 PFB6	*10o*		*25 - 150*
1: N2 PFp O6	*100*		*25 - 150*
13C4 PFN6	*10o*		*25 - 150*
13C: FN6A	*109*		*25 - 150*
d3-DMxFN6AA	*110*		*25 - 150*
d5-DEtFN6AA	*110*		*25 - 150*
M2-H2 FS6	*133*		*25 - 150*
M2-: 2 FS6	*13o*		*25 - 150*

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: 480-151471-15 MSD
Matrix: Water
Analysis Batch: 287957

Client Sample ID: TR-SW-1(5)
Prep Type: Total/NA
Prep Batch: 287552

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	1.7	J B	40.0	41.7		ng/L		100	70 - 130	6	30
Perfluoropentanoic acid (PFPeA)	0.95	J	40.0	37.9		ng/L		92	66 - 126	3	30
Perfluorohexanoic acid (PFHxA)	0.75	J	40.0	41.6		ng/L		102	66 - 126	8	30
Perfluoroheptanoic acid (PFHpA)	0.70	J	40.0	38.2		ng/L		94	66 - 126	6	30
Perfluorooctanoic acid (PFOA)	1.9	J	40.0	39.7		ng/L		95	64 - 124	1	30
Perfluorononanoic acid (PFNA)	ND		40.0	41.0		ng/L		102	68 - 128	11	30
Perfluorodecanoic acid (PFDA)	ND		40.0	41.6		ng/L		104	69 - 129	5	30
Perfluoroundecanoic acid (PFUnA)	ND		40.0	39.0		ng/L		98	60 - 120	1	30
Perfluorododecanoic acid (PFDoA)	ND		40.0	44.2		ng/L		111	71 - 131	14	30
Perfluorotridecanoic acid (PFTriA)	ND		40.0	45.5		ng/L		114	72 - 132	18	30
Perfluorotetradecanoic acid (PFTeA)	0.34	J I B	40.0	43.9		ng/L		109	68 - 128	15	30
Perfluorobutanesulfonic acid (PFBS)	0.37	J	35.3	35.3		ng/L		99	73 - 133	0	30
Perfluorohexanesulfonic acid (PFHxS)	0.48	J I B	36.4	35.8		ng/L		97	63 - 123	10	30
Perfluoroheptanesulfonic Acid (PFHpS)	ND		38.1	36.8		ng/L		97	68 - 128	4	30
Perfluorooctanesulfonic acid (PFOS)	0.72	J	37.1	35.4		ng/L		93	67 - 127	3	30
Perfluorodecanesulfonic acid (PFDS)	ND		38.5	32.3		ng/L		84	68 - 128	4	30
Perfluorooctanesulfonamide (FOSA)	ND		40.0	37.4		ng/L		94	70 - 130	3	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		40.0	35.3		ng/L		88	67 - 127	4	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		40.0	35.0		ng/L		87	65 - 125	2	30
6:2 FTS	ND		37.9	38.1		ng/L		101	66 - 126	13	30
8:2 FTS	ND		38.3	35.3		ng/L		92	67 - 127	3	30

Isotope Dilution	*MSD %Recovery*	*MSD Qualifier*	*Limits*
13C4 PFBA	*: 9*		*25 - 150*
13C5 PFPxA	*110*		*25 - 150*
13C2 PFp OA	*103*		*25 - 150*
13C4 PFp 7A	*10:*		*25 - 150*
13C4 PFNA	*10H*		*25 - 150*
13C5 PFDA	*11o*		*25 - 150*
13C2 PFUA	*114*		*25 - 150*
13C2 PFn 8A	*110*		*25 - 150*
13C2 PFUTA	*105*		*25 - 150*
13C2 PFSxUA	*: H*		*25 - 150*
13C3 PFB6	*10o*		*25 - 150*
1: N2 PFp O6	*9o*		*25 - 150*
13C4 PFN6	*111*		*25 - 150*
13C: FN6A	*113*		*25 - 150*
d3-DMxFN6AA	*11:*		*25 - 150*
d5-DEtFN6AA	*122*		*25 - 150*

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: 480-151471-15 MSD
Matrix: Water
Analysis Batch: 287957

Client Sample ID: TR-SW-1(5)
Prep Type: Total/NA
Prep Batch: 287552

Isotope Dilution	MSD %Recovery	MSD Qualifier	Limits
M2-H2 FS6	122		25 - 150
M2-2 FS6	150		25 - 150

Method: 9045D - pH

Lab Sample ID: LCS 200-141848/5
Matrix: Solid
Analysis Batch: 141848

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	6.00	6.0		SU		100	99.2 - 100.9 71

Lab Sample ID: 480-151471-8 DU
Matrix: Solid
Analysis Batch: 141848

Client Sample ID: TR-SED-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	6.3	HF	6.3	HF	SU		0.2	5
Temperature	21°	HF	21°	HF	Degrees C		NaN	10

Method: Lloyd Kahn - Organic Carbon, Total (TOC)

Lab Sample ID: MB 200-141921/5
Matrix: Solid
Analysis Batch: 141921

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	ND		1000	380	mg/Kg			04/11/19 15:19	1

Lab Sample ID: LCS 200-141921/6
Matrix: Solid
Analysis Batch: 141921

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	9260	9763		mg/Kg		105	75 - 125

Lab Sample ID: 480-151471-8 MS
Matrix: Solid
Analysis Batch: 141921

Client Sample ID: TR-SED-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	30100	^	37200	59010		mg/Kg		78	75 - 125

Lab Sample ID: 480-151471-8 MSD
Matrix: Solid
Analysis Batch: 141921

Client Sample ID: TR-SED-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	30100	^	35700	60530		mg/Kg		85	75 - 125	3	20

LCMS

Prep Batch: 287004

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-151471-8	TR-SED-1	Total/NA	Solid	SHAKE	
480-151471-9	TR-SED-2	Total/NA	Solid	SHAKE	
480-151471-10	TR-SED-3	Total/NA	Solid	SHAKE	
480-151471-11	TR-SED-DUP-1	Total/NA	Solid	SHAKE	
MB 320-287004/1-A	Method Blank	Total/NA	Solid	SHAKE	
LCS 320-287004/2-A	Lab Control Sample	Total/NA	Solid	SHAKE	
480-151471-8 MS	TR-SED-1	Total/NA	Solid	SHAKE	
480-151471-8 MSD	TR-SED-1	Total/NA	Solid	SHAKE	

Prep Batch: 287119

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-151471-1	TR-RB-SED BOWLS	Total/NA	Water	3535	
480-151471-2	TR-RB-TUBING1	Total/NA	Water	3535	
480-151471-3	TR-RB-SED SAMPLER	Total/NA	Water	3535	
480-151471-5	TR-RB-GLOVES	Total/NA	Water	3535	
480-151471-6	TR-SW-DUP-1	Total/NA	Water	3535	
480-151471-7	TR-SW-3(11.5)	Total/NA	Water	3535	
480-151471-12	TR-SW-3(5)	Total/NA	Water	3535	
MB 320-287119/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-287119/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-287119/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Prep Batch: 287552

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-151471-4	TR-RB-SED SAMPLER 2	Total/NA	Water	3535	
480-151471-13	TR-SW-2(5)	Total/NA	Water	3535	
480-151471-14	TR-SW-2(14)	Total/NA	Water	3535	
480-151471-15	TR-SW-1(5)	Total/NA	Water	3535	
480-151471-16	TR-SW-1(20)	Total/NA	Water	3535	
MB 320-287552/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-287552/2-A	Lab Control Sample	Total/NA	Water	3535	
480-151471-15 MS	TR-SW-1(5)	Total/NA	Water	3535	
480-151471-15 MSD	TR-SW-1(5)	Total/NA	Water	3535	

Analysis Batch: 287732

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-151471-8	TR-SED-1	Total/NA	Solid	537 (modified)	287004
480-151471-9	TR-SED-2	Total/NA	Solid	537 (modified)	287004
480-151471-11	TR-SED-DUP-1	Total/NA	Solid	537 (modified)	287004
MB 320-287004/1-A	Method Blank	Total/NA	Solid	537 (modified)	287004
480-151471-8 MS	TR-SED-1	Total/NA	Solid	537 (modified)	287004
480-151471-8 MSD	TR-SED-1	Total/NA	Solid	537 (modified)	287004

Analysis Batch: 287957

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-151471-4	TR-RB-SED SAMPLER 2	Total/NA	Water	537 (modified)	287552
480-151471-13	TR-SW-2(5)	Total/NA	Water	537 (modified)	287552
480-151471-14	TR-SW-2(14)	Total/NA	Water	537 (modified)	287552
480-151471-15	TR-SW-1(5)	Total/NA	Water	537 (modified)	287552
MB 320-287552/1-A	Method Blank	Total/NA	Water	537 (modified)	287552
LCS 320-287552/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	287552

LCMS (Continued)

Analysis Batch: 287957 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-151471-15 MSD	TR-SW-1(5)	Total/NA	Water	537 (modified)	287552

Analysis Batch: 288020

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-151471-1	TR-RB-SED BOWLS	Total/NA	Water	537 (modified)	287119
480-151471-2	TR-RB-TUBING1	Total/NA	Water	537 (modified)	287119
480-151471-3	TR-RB-SED SAMPLER	Total/NA	Water	537 (modified)	287119
480-151471-5	TR-RB-GLOVES	Total/NA	Water	537 (modified)	287119
480-151471-6	TR-SW-DUP-1	Total/NA	Water	537 (modified)	287119
480-151471-7	TR-SW-3(11.5)	Total/NA	Water	537 (modified)	287119
480-151471-12	TR-SW-3(5)	Total/NA	Water	537 (modified)	287119
MB 320-287119/1-A	Method Blank	Total/NA	Water	537 (modified)	287119
LCS 320-287119/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	287119
LCSD 320-287119/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	287119

Analysis Batch: 288537

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-151471-16	TR-SW-1(20)	Total/NA	Water	537 (modified)	287552
480-151471-15 MS	TR-SW-1(5)	Total/NA	Water	537 (modified)	287552

Analysis Batch: 288802

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-151471-10	TR-SED-3	Total/NA	Solid	537 (modified)	287004
LCS 320-287004/2-A	Lab Control Sample	Total/NA	Solid	537 (modified)	287004

General Chemistry

Analysis Batch: 141848

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-151471-8	TR-SED-1	Total/NA	Solid	9045D	
480-151471-10	TR-SED-3	Total/NA	Solid	9045D	
480-151471-11	TR-SED-DUP-1	Total/NA	Solid	9045D	
LCS 200-141848/5	Lab Control Sample	Total/NA	Solid	9045D	
480-151471-8 DU	TR-SED-1	Total/NA	Solid	9045D	

Analysis Batch: 141921

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-151471-8	TR-SED-1	Total/NA	Solid	Lloyd Kahn	
480-151471-10	TR-SED-3	Total/NA	Solid	Lloyd Kahn	
480-151471-11	TR-SED-DUP-1	Total/NA	Solid	Lloyd Kahn	
MB 200-141921/5	Method Blank	Total/NA	Solid	Lloyd Kahn	
LCS 200-141921/6	Lab Control Sample	Total/NA	Solid	Lloyd Kahn	
480-151471-8 MS	TR-SED-1	Total/NA	Solid	Lloyd Kahn	
480-151471-8 MSD	TR-SED-1	Total/NA	Solid	Lloyd Kahn	

Analysis Batch: 287973

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-151471-8	TR-SED-1	Total/NA	Solid	D 2216	
480-151471-9	TR-SED-2	Total/NA	Solid	D 2216	
480-151471-10	TR-SED-3	Total/NA	Solid	D 2216	
480-151471-11	TR-SED-DUP-1	Total/NA	Solid	D 2216	

General Chemistry (Continued)

Analysis Batch: 287973 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-151471-8 DU	TR-SED-1	Total/NA	Solid	D 2216	

Lab Chronicle

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-RB-SED BOWLS — Lab Sample ID: 480-151471-1

Date Collected: 04/03/19 08:20 — **Matrix: Water**
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			287119	04/09/19 12:49	JER	TAL SAC
Total/NA	Analysis	537 (modified)		1	288020	04/13/19 20:35	JRB	TAL SAC

Client Sample ID: TR-RB-TUBING1 — Lab Sample ID: 480-151471-2

Date Collected: 04/03/19 08:10 — **Matrix: Water**
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			287119	04/09/19 12:49	JER	TAL SAC
Total/NA	Analysis	537 (modified)		1	288020	04/13/19 20:44	JRB	TAL SAC

Client Sample ID: TR-RB-SED SAMPLER — Lab Sample ID: 480-151471-3

Date Collected: 04/03/19 11:55 — **Matrix: Water**
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			287119	04/09/19 12:49	JER	TAL SAC
Total/NA	Analysis	537 (modified)		1	288020	04/13/19 20:54	JRB	TAL SAC

Client Sample ID: TR-RB-SED SAMPLER 2 — Lab Sample ID: 480-151471-4

Date Collected: 04/05/19 12:30 — **Matrix: Water**
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			287552	04/11/19 05:35	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1	287957	04/12/19 23:01	AAR	TAL SAC

Client Sample ID: TR-RB-GLOVES — Lab Sample ID: 480-151471-5

Date Collected: 04/03/19 08:15 — **Matrix: Water**
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			287119	04/09/19 12:49	JER	TAL SAC
Total/NA	Analysis	537 (modified)		1	288020	04/13/19 21:03	JRB	TAL SAC

Client Sample ID: TR-SW-DUP-1 — Lab Sample ID: 480-151471-6

Date Collected: 04/03/19 00:00 — **Matrix: Water**
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			287119	04/09/19 12:49	JER	TAL SAC
Total/NA	Analysis	537 (modified)		1	288020	04/13/19 21:13	JRB	TAL SAC

Client Sample ID: TR-SW-3(11.5)

Lab Sample ID: 480-151471-7

Date Collected: 04/03/19 10:25
Matrix: Water
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			287119	04/09/19 12:49	JER	TAL SAC
Total/NA	Analysis	537 (modified)		1	288020	04/13/19 21:51	JRB	TAL SAC

Client Sample ID: TR-SED-1

Lab Sample ID: 480-151471-8

Date Collected: 04/05/19 11:20
Matrix: Solid
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9045D		1	141848	04/10/19 13:57	MJZ	TAL BUR
Total/NA	Analysis	D 2216		1	287973	04/12/19 15:45	JMD	TAL SAC
Total/NA	Analysis	Lloyd Kahn		1	141921	04/11/19 17:16	MJZ	TAL BUR

Client Sample ID: TR-SED-1

Lab Sample ID: 480-151471-8

Date Collected: 04/05/19 11:20
Matrix: Solid
Date Received: 04/06/19 01:00
Percent Solids: 27.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			287004	04/09/19 08:31	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1	287732	04/12/19 10:20	AAR	TAL SAC

Client Sample ID: TR-SED-2

Lab Sample ID: 480-151471-9

Date Collected: 04/05/19 10:00
Matrix: Solid
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1	287973	04/12/19 15:45	JMD	TAL SAC

Client Sample ID: TR-SED-2

Lab Sample ID: 480-151471-9

Date Collected: 04/05/19 10:00
Matrix: Solid
Date Received: 04/06/19 01:00
Percent Solids: 77.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			287004	04/09/19 08:31	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1	287732	04/12/19 10:48	AAR	TAL SAC

Client Sample ID: TR-SED-3

Lab Sample ID: 480-151471-10

Date Collected: 04/05/19 12:45
Matrix: Solid
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9045D		1	141848	04/10/19 14:02	MJZ	TAL BUR
Total/NA	Analysis	D 2216		1	287973	04/12/19 15:45	JMD	TAL SAC
Total/NA	Analysis	Lloyd Kahn		1	141921	04/11/19 17:32	MJZ	TAL BUR

Client Sample ID: TR-SED-3

Lab Sample ID: 480-151471-10

Date Collected: 04/05/19 12:45
Matrix: Solid
Date Received: 04/06/19 01:00
Percent Solids: 27.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			287004	04/09/19 08:31	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1	288802	04/17/19 15:23	S1M	TAL SAC

Client Sample ID: TR-SED-DUP-1

Lab Sample ID: 480-151471-11

Date Collected: 04/05/19 00:00
Matrix: Solid
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9045D		1	141848	04/10/19 14:05	MJZ	TAL BUR
Total/NA	Analysis	D 2216		1	287973	04/12/19 15:45	JMD	TAL SAC
Total/NA	Analysis	Lloyd Kahn		1	141921	04/11/19 17:37	MJZ	TAL BUR

Client Sample ID: TR-SED-DUP-1

Lab Sample ID: 480-151471-11

Date Collected: 04/05/19 00:00
Matrix: Solid
Date Received: 04/06/19 01:00
Percent Solids: 31.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			287004	04/09/19 08:31	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1	287732	04/12/19 11:07	AAR	TAL SAC

Client Sample ID: TR-SW-3(5)

Lab Sample ID: 480-151471-12

Date Collected: 04/03/19 10:30
Matrix: Water
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			287119	04/09/19 12:49	JER	TAL SAC
Total/NA	Analysis	537 (modified)		1	288020	04/13/19 22:00	JRB	TAL SAC

Client Sample ID: TR-SW-2(5)

Lab Sample ID: 480-151471-13

Date Collected: 04/05/19 09:15
Matrix: Water
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			287552	04/11/19 05:35	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1	287957	04/12/19 23:10	AAR	TAL SAC

Client Sample ID: TR-SW-2(14)

Lab Sample ID: 480-151471-14

Date Collected: 04/05/19 09:25
Matrix: Water
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			287552	04/11/19 05:35	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1	287957	04/12/19 23:20	AAR	TAL SAC

Lab Chronicle

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Client Sample ID: TR-SW-1(5)

Lab Sample ID: 480-151471-15

Date Collected: 04/05/19 11:00
Matrix: Water
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			287552	04/11/19 05:35	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1	287957	04/12/19 23:29	AAR	TAL SAC

Client Sample ID: TR-SW-1(20)

Lab Sample ID: 480-151471-16

Date Collected: 04/05/19 11:10
Matrix: Water
Date Received: 04/06/19 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			287552	04/11/19 05:35	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1	288537	04/16/19 16:51	CBW	TAL SAC

Laboratory References:

TAL BUR = Eurofins TestAmerica, Burlington, 30 Community Drive, Suite 11, South Burlington, VT 05403, TEL (802)660-1990

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Laboratory: Eurofins TestAmerica, Buffalo

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
New York	NELAP	2	10026	03-31-20

Laboratory: Eurofins TestAmerica, Burlington

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
New York	NELAP	2	10391	04-01-20

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
9045D		Solid	pH
9045D		Solid	Temperature

Laboratory: Eurofins TestAmerica, Sacramento

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
New York	NELAP	2	11666	04-01-20

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
537 (modified)	3535	Water	6:2 FTS
537 (modified)	3535	Water	8:2 FTS
537 (modified)	3535	Water	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)
537 (modified)	3535	Water	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)
537 (modified)	3535	Water	Perfluorobutanesulfonic acid (PFBS)
537 (modified)	3535	Water	Perfluorobutanoic acid (PFBA)
537 (modified)	3535	Water	Perfluorodecanesulfonic acid (PFDS)
537 (modified)	3535	Water	Perfluorodecanoic acid (PFDA)
537 (modified)	3535	Water	Perfluorododecanoic acid (PFDoA)
537 (modified)	3535	Water	Perfluoroheptanesulfonic Acid (PFHpS)
537 (modified)	3535	Water	Perfluoroheptanoic acid (PFHpA)
537 (modified)	3535	Water	Perfluorohexanesulfonic acid (PFHxS)
537 (modified)	3535	Water	Perfluorohexanoic acid (PFHxA)
537 (modified)	3535	Water	Perfluorononanoic acid (PFNA)
537 (modified)	3535	Water	Perfluorooctanesulfonamide (FOSA)
537 (modified)	3535	Water	Perfluorooctanesulfonic acid (PFOS)
537 (modified)	3535	Water	Perfluorooctanoic acid (PFOA)
537 (modified)	3535	Water	Perfluoropentanoic acid (PFPeA)
537 (modified)	3535	Water	Perfluorotetradecanoic acid (PFTeA)
537 (modified)	3535	Water	Perfluorotridecanoic acid (PFTriA)
537 (modified)	3535	Water	Perfluoroundecanoic acid (PFUnA)
537 (modified)	SHAKE	Solid	6:2 FTS
537 (modified)	SHAKE	Solid	8:2 FTS
537 (modified)	SHAKE	Solid	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)
537 (modified)	SHAKE	Solid	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)
537 (modified)	SHAKE	Solid	Perfluorobutanesulfonic acid (PFBS)

Laboratory: Eurofins TestAmerica, Sacramento (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
New York	NELAP	2	11666	04-01-20

537 (modified)	SHAKE	Solid	Perfluorobutanoic acid (PFBA)
537 (modified)	SHAKE	Solid	Perfluorodecanesulfonic acid (PFDS)
537 (modified)	SHAKE	Solid	Perfluorodecanoic acid (PFDA)
537 (modified)	SHAKE	Solid	Perfluorododecanoic acid (PFDoA)
537 (modified)	SHAKE	Solid	Perfluoroheptanesulfonic Acid (PFHpS)
537 (modified)	SHAKE	Solid	Perfluoroheptanoic acid (PFHpA)
537 (modified)	SHAKE	Solid	Perfluorohexanesulfonic acid (PFHxS)
537 (modified)	SHAKE	Solid	Perfluorohexanoic acid (PFHxA)
537 (modified)	SHAKE	Solid	Perfluorononanoic acid (PFNA)
537 (modified)	SHAKE	Solid	Perfluorooctanesulfonamide (FOSA)
537 (modified)	SHAKE	Solid	Perfluorooctanesulfonic acid (PFOS)
537 (modified)	SHAKE	Solid	Perfluorooctanoic acid (PFOA)
537 (modified)	SHAKE	Solid	Perfluoropentanoic acid (PFPeA)
537 (modified)	SHAKE	Solid	Perfluorotetradecanoic acid (PFTeA)
537 (modified)	SHAKE	Solid	Perfluorotridecanoic acid (PFTriA)
537 (modified)	SHAKE	Solid	Perfluoroundecanoic acid (PFUnA)
D 2216		Solid	Percent Moisture
D 2216		Solid	Percent Solids

Method Summary

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL SAC
9045D	pH	SW846	TAL BUR
D 2216	Percent Moisture	ASTM	TAL SAC
Lloyd Kahn	Organic Carbon, Total (TOC)	EPA	TAL BUR
3535	Solid-Phase Extraction (SPE)	SW846	TAL SAC
SHAKE	Shake Extraction with Ultrasonic Bath Extraction	SW846	TAL SAC

Protocol References:

ASTM = ASTM International

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUR = Eurofins TestAmerica, Burlington, 30 Community Drive, Suite 11, South Burlington, VT 05403, TEL (802)660-1990

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: New York State D.E.C.
Project/Site: HOOSICK FALLS Rt 22 #1510556

Job ID: 480-151471-1
SDG: Tomhannock Reservoir

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-151471-1	TR-RB-SED BOWLS	Water	04/03/19 08:20	04/06/19 01:00
480-151471-2	TR-RB-TUBING1	Water	04/03/19 08:10	04/06/19 01:00
480-151471-3	TR-RB-SED SAMPLER	Water	04/03/19 11:55	04/06/19 01:00
480-151471-4	TR-RB-SED SAMPLER 2	Water	04/05/19 12:30	04/06/19 01:00
480-151471-5	TR-RB-GLOVES	Water	04/03/19 08:15	04/06/19 01:00
480-151471-6	TR-SW-DUP-1	Water	04/03/19 00:00	04/06/19 01:00
480-151471-7	TR-SW-3(11.5)	Water	04/03/19 10:25	04/06/19 01:00
480-151471-8	TR-SED-1	Solid	04/05/19 11:20	04/06/19 01:00
480-151471-9	TR-SED-2	Solid	04/05/19 10:00	04/06/19 01:00
480-151471-10	TR-SED-3	Solid	04/05/19 12:45	04/06/19 01:00
480-151471-11	TR-SED-DUP-1	Solid	04/05/19 00:00	04/06/19 01:00
480-151471-12	TR-SW-3(5)	Water	04/03/19 10:30	04/06/19 01:00
480-151471-13	TR-SW-2(5)	Water	04/05/19 09:15	04/06/19 01:00
480-151471-14	TR-SW-2(14)	Water	04/05/19 09:25	04/06/19 01:00
480-151471-15	TR-SW-1(5)	Water	04/05/19 11:00	04/06/19 01:00
480-151471-16	TR-SW-1(20)	Water	04/05/19 11:10	04/06/19 01:00

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone (916) 373-5600 Fax (916) 372-1059

Albany #224

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: J. Duquette	Lab PM: Stone, Judy L	Carrier Tracking No(s):	COC No: 480-128403-28998.1
Client Contact: Ms. Katie Bidwell	Phone: 518 709 8487	E-Mail: judy.stone@testamericainc.com		Page: Page 1 of 2
Company: ARCADIS U.S. Inc		Analysis Requested		Job #:
Address: 855 Route 146 Suite 210	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, M - Hexane, N - None, O - AsNaO2, ...4S, ...O3, ...2O3, ...4, ...odecahydrate, ...ne, ...-5, (specify)
City: Clifton Park	TAT Requested (days): Std			
State, Zip: NY, 12065				
Phone: 518-402-9813(Tel)	PO #: Callout ID 136490			
Email: katie.bidwell@arcadis-us.com	WO #:			
Project Name: HOOSICK FALLS Rt 22 #1510556	Project #: 48019304			Other:
Site: Tomhannock Reservoir	SSOW#:			

480-151471 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFC_IDA - PFAS, Standard List (21 Analytes)	PFC_IDA - PFAS, Standard List	Moisture - Moisture	9045D, Lloyd_Kahn	Total Number of cor	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
TR-RB-SED Bowls	4/3/19	0820	G	Water			X				2	
TR-RB-Tubing1	4/3/19	0810		Water			X				2	
TR-RB-SED Sampler	4/3/19	1155		Water			X				2	
TR-RB-SED Sampler 2	4/5/19	1230		Water			X				2	
TR-RB-Gloves	4/3/19	0815		Water			X				2	
TR-SW-Dup-1	4/3/19	—		Water			X				2	
TR-SW-3(11.5')	4/3/19	1025		Water			X				2	
TR-SED-1	4/5/19	1120		Solid	X		X		X	X	6	MS/MSD
TR-SED-2	4/5/19	1000		Solid			X				1	PFAS Only due to volume
TR-SED-3	4/5/19	1245		Solid			X		X	X	3	
TR-SED-Dup-1	4/5/19	—		Solid			X		X	X	3	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	J. Duquette	4/5/19 / 1415	Arcadis	Karl Zaden	4-5-19 1415	TA
2	Karl Zaden	4-5-19 1700	TA	[illegible]	04/06/19 0100	
3						

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 2.2 #1

Ver: 01/16/2019

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone (916) 373-5600 Fax (916) 372-1059

Albany
#224

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: J. Duquette	Lab PM: Stone, Judy L	Carrier Tracking No(s):	COC No: 480-128403-28998.1
Client Contact: Ms. Katie Bidwell	Phone: 518 709 8487	E-Mail: judy.stone@testamericainc.com		Page: Page 2 of 2
Company: ARCADIS U.S. Inc		Analysis Requested		Job #:
Address: 855 Route 146 Suite 210	Due Date Requested:			Preservation Codes:
City: Clifton Park	TAT Requested (days): Std.			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
State, Zip: NY, 12065				
Phone: 518-402-9813(Tel)	PO #: Callout ID 136490			
Email: katie.bidwell@arcadis-us.com	WO #:			Other:
Project Name: HOOSICK FALLS Rt 22 #1510556	Project #: 48019304			
Site: Tomhannock Reservoir	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFC_IDA - PFAS, Standard List (21 Analytes)	PFC_IDA - PFAS, Standard List	Moisture - Moisture	9045D, Lloyd_Kahn	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
TR-SW-3(5')	4/3/19	1030	G	Water			X				2	
TR-SW-2(5')	4/5/19	0915		Water			X				2	
TR-SW-2(14')	4/5/19	0925		Water			X				2	
TR-SW-1(5')	4/5/19	1100		Water		X	X				6	MS/MSD
TR-SW-1(20')	4/5/19	1110		Water			X				2	
				Water								
				Water								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
J. Duquette	4/5/19 1415	Arcadis	Karl Linder	4-5-19 1415	TA
Karl Linder	4-5-19 1700	TA		04/06/19 0100	

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 2.2 #1

Ver: 01/16/2019

4/24/2019

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

Chain of Custody Record

480-151471 Chain of Custody

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Stone, Judy L	COC No: 480-48772.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: judy.stone@testamericainc.com	State of Origin: New York	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): NELAP - New York	Job #: 480-151471-1
Address: 30 Community Drive, Suite 11,	Due Date Requested: 4/17/2019		
City: South Burlington	TAT Requested (days):		
State, Zip: VT, 05403			
Phone: 802-660-1990(Tel) 802-660-1919(Fax)	PO #:		
Email:	WO #:		
Project Name: HOOSICK FALLS Rt 22 #1510556	Project #: 48019304		
Site:	SSOW#:		

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Lloyd_Kahn/ Routine Lloyd Kahn	9045D/ pH	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
TR-SED-1 (480-151471-8)	4/5/19	11:20 Eastern		Solid			X	X	1	, Record/report temp when pH is taken.
TR-SED-1 (480-151471-8MS)	4/5/19	11:20 Eastern	MS	Solid			X	X	1	, Record/report temp when pH is taken.
TR-SED-1 (480-151471-8MSD)	4/5/19	11:20 Eastern	MSD	Solid			X	X	1	, Record/report temp when pH is taken.
TR-SED-3 (480-151471-10)	4/5/19	12:45 Eastern		Solid			X	X	2	, Record/report temp when pH is taken.
TR-SED-DUP-1 (480-151471-11)	4/5/19	Eastern		Solid			X	X	2	, Record/report temp when pH is taken.

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time:	Company	Received by	Date/Time:	Company
[signature]	4-6-19 1435	TAB	[signature]	4/9/19 10:22	TA Buf
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☒ Yes ☐ No	Custody Seal No.: 610147	Cooler Temperature(s) °C and Other Remarks: 1.8

Ver: 01/16/2019

ORIGIN ID:DKKA (716) 691-2600
CHAR BRONSON
TEST AMERICA
10 HAZELWOOD

AMHERST , NY 14228
UNITED STATES US

SHIP DATE: 08APR19
ACTWGT: 12.20 LB
CAD: 846654/CAFE3211
DIMS: 15x13x10 IN

BILL RECIPIENT

TO SAMPLE MGT.
TA BURLINGTON
30 COMMUNITY DRIVE
SUITE 11
SOUTH BURLINGTON VT 05403
(802) 660-1990 REF: BURLINGTON
DEPT: SAMPLE CONTROL

FedEx Express

TRK# 0201 4276 0719 3774

TUE - 09 APR 10:30A
PRIORITY OVERNIGHT

NC BTVA

05403
VT-US BTV

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone (916) 373-5600 Fax (916) 372-1059

Albany #224

Chain of Custody Record

TestAmerica

Client Information	Sampler: J. Duquette	Lab PM: Stone, Judy L	Carrier Tracking No(s):	COC No: 480-128403-28998.1
Client Contact: Ms. Katie Bidwell	Phone: 518 709 8487	E-Mail: judy.stone@testamericainc.com		Page: Page 1 of 2
Company: ARCADIS U.S. Inc				Job #:
Address: 855 Route 146 Suite 210	Due Date Requested:			
City: Clifton Park	TAT Requested (days): Std			
State, Zip: NY, 12065				
Phone: 518-402-9813(Tel)	PO #: Callout ID 136490			
Email: katie.bidwell@arcadis-us.com	WO #:			
Project Name: HOOSICK FALLS Rt 22 #1510556	Project #: 48019304			
Site: Tomhannock Reservoir	SSOW#:			

480-151471 Chain of Custody

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFC_IDA - PFAS, Standard List (21 Analytes)	PFC_IDA - PFAS, Standard List	~~Moisture - Moisture~~ pH	9045D, Lloyd_Kahn	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
TR-RB-SED Bowls	4/3/19	0820	G	Water			X				2	
TR-RB-Tubing1	4/3/19	0810		Water			X				2	
TR-RB-SED Sampler	4/3/19	1155		Water			X				2	
TR-RB-SED Sampler 2	4/5/19	1230		Water			X				2	
TR-RB-Gloves	4/3/19	0815		Water			X				2	
TR-SW-Dup-1	4/3/19	—		Water			X				2	
TR-SW-3(11.5')	4/3/19	1025		Water			X				2	
TR-SED-1	4/5/19	1120		Solid	X	X	X		X	X	6	MS/MSD
TR-SED-2	4/5/19	1600		Solid			X				1	PFAS Only due to volume
TR-SED-3	4/5/19	1245		Solid			X		X	X	3	
TR-SED-Dup-1	4/5/19	—		Solid			X		X	X	3	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	J. Duquette	4/5/19 / 1415	Arcadis	Karl Locher	4-5-19 1415	TA
2	Karl Locher	4-5-19 1700	TA		4/6/19 920	TA-SAC
3						

Custody Seals Intact: ☑ Yes ☐ No | Custody Seal No.: seal

Cooler Temperature(s) °C and Other Remarks: 0.7°C 0.3°C

Ver: 01/16/2019

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone (916) 373-5600 Fax (916) 372-1059

Albany #224

Chain of Custody Record

TestAmerica

Client Information	Sampler: J. Duquette	Lab PM: Stone, Judy L	Carrier Tracking No(s):	COC No: 480-128403-28998.1
Client Contact: Ms. Katie Bidwell	Phone: 518 709 8487	E-Mail: judy.stone@testamericainc.com		Page: Page 2 of 2
Company: ARCADIS U.S. Inc				Job #:
Address: 855 Route 146 Suite 210	Due Date Requested:			
City: Clifton Park	TAT Requested (days): Std.			
State, Zip: NY, 12065				
Phone: 518-402-9813(Tel)	PO #: Callout ID 136490			
Email: katie.bidwell@arcadis-us.com	WO #:			
Project Name: HOOSICK FALLS Rt 22 #1510556	Project #: 48019304			
Site: Tomhannock Reservoir	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFC_IDA - PFAS, Standard List (21 Analytes)	PFC_IDA - PFAS, Standard List	Moisture - Moisture	9045D, Lloyd_Kahn	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
TR-SW-3(5')	4/3/19	1030	G	Water			X				2	
TR-SW-2(5')	4/5/19	0915		Water			X				2	
TR-SW-2(14')	4/5/19	0925		Water			X				2	
TR-SW-1(5')	4/5/19	1100		Water		X	X				6	MS/MSD
TR-SW-1(20')	4/5/19	1110		Water			X				2	
				Water								
				Water								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	J. Duquette	4/5/19 1415	Arcadis	Karl Lauder	4-5-19 1415	TA
2	Karl Lauder	4-5-19 1700	TA		4/6/19 920	TA-SAC
3						

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.: Seal
Cooler Temperature(s) °C and Other Remarks: 0.7°C 0.3°C

Ver: 01/16/2019

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Sacramento
Sample Receiving Notes

480-151471 Field Sheet

Job:

Tracking # 4635 9989 4949 SO / PO / FO / 2-Day / SAT / Ground / UPS / Courier / Drop Off / GSO / OnTrac / Goldstreak / USPS / Other

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations. File in the job folder with the COC.

Notes:

Therm. ID: AK-2 / AK-3 / AK-5 / AK-7 / HACCP / Other (-1.0°C)

Ice Wet Gel Other

Cooler Custody Seal: Seal

Sample Custody Seal: —

Cooler ID: 1 of 2

Temp: Observed 0.7°C Corrected 0.7°C

From: Temp Blank ☑ Sample ☐

NCM Filed: Yes ☐ No ☐

	Yes	No	NA
Perchlorate has headspace(1/3 bottle[1])?	☐	☐	☑
Alkalinity has no headspace?	☐	☐	☑
CoC is complete w/o discrepancies?	☑	☐	☐
Samples received within holding time?	☑	☐	☐
Sample preservatives verified?	☐	☐	☑
Cooler compromised/tampered with?	☐	☑	☐
Samples compromised/tampered with?	☐	☑	☐
Samples w/o discrepancies?	☑	☐	☐
Sample containers have legible labels?	☑	☐	☐
Containers are not broken or leaking?	☑	☐	☐
Sample date/times are provided.	☑	☐	☐
Appropriate containers are used?	☑	☐	☐
Sample bottles are completely filled?	☑	☐	☐
Zero headspace?[2]	☐	☐	☑
Multiphasic samples are not present?	☑	☐	☐
Sample temp OK?	☑	☐	☐
Sample out of temp?	☐	☑	☐

Initials: MAN Date: 4/6/19

[1]For a 250mL polyethylene container, filled no higher than the 200mL mark on the bottle.
[2]Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4").

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Sacramento
Sample Receiving Notes

Job: _____

Tracking # 4635 9989 4950 SC / PC / FO / 2-Day / SAT / Ground / UPS / Courier / Drop Off / GSO / OnTrac / Goldstreak / USPS / Other _____

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations. File in the job folder with the COC.

Notes: _____

Therm. ID: AK-2 / AK-3 / AK-5 / AK-7 / HACCP / Other____ (-1.0°C)

Ice____ Wet____ Gel____ Other____

Cooler Custody Seal: Seal

Sample Custody Seal: _____

Cooler ID: 2 of 2

Temp: Observed 0.3°C Corrected 0.3°C

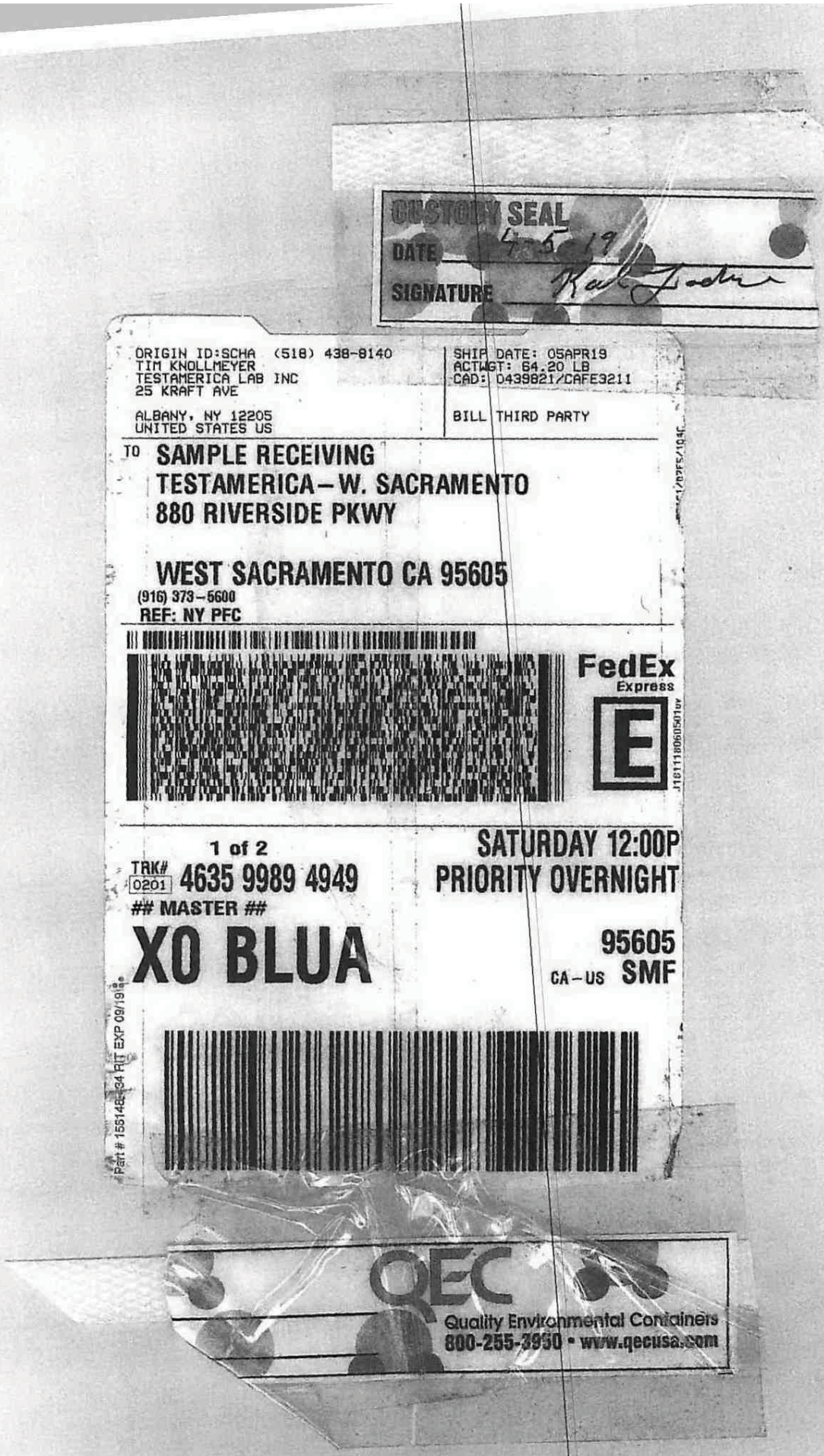
From: Temp Blank ☑ Sample ☐

NCM Filed: Yes ☐ No ☐

	Yes	No	NA
Perchlorate has headspace(1/3 bottle[1])?	☐	☐	☑
Alkalinity has no headspace?	☐	☐	☑
CoC is complete w/o discrepancies?	☑	☐	☐
Samples received within holding time?	☑	☐	☐
Sample preservatives verified?	☐	☐	☑
Cooler compromised/tampered with?	☐	☑	☐
Samples compromised/tampered with?	☐	☑	☐
Samples w/o discrepancies?	☑	☐	☐
Sample containers have legible labels?	☑	☐	☐
Containers are not broken or leaking?	☑	☐	☐
Sample date/times are provided.	☑	☐	☐
Appropriate containers are used?	☑	☐	☐
Sample bottles are completely filled?	☑	☐	☐
Zero headspace?[2]	☐	☐	☑
Multiphasic samples are not present?	☑	☐	☐
Sample temp OK?	☑	☐	☐
Sample out of temp?	☐	☑	☐

Initials: MAN Date: 4/6/19

[1]For a 250mL polyethylene container, filled no higher than the 200mL mark on the bottle.
[2]Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4").


CUSTODY SEAL
DATE 4-5-19
SIGNATURE
ORIGIN ID:SCHA (518) 438-8140
TIM KNOLLMEYER
TESTAMERICA LAB INC
25 KRAFT AVE
ALBANY, NY 12205
UNITED STATES US
SHIP DATE: 05APR19
ACTWGT: 64.20 LB
CAD: 0439821/CAFE3211
BILL THIRD PARTY
TO SAMPLE RECEIVING
TESTAMERICA-W. SACRAMENTO
880 RIVERSIDE PKWY
WEST SACRAMENTO CA 95605
(916) 373-5600
REF: NY PFC
FedEx
Express
1 of 2
TRK# 0201 4635 9989 4949
MASTER
SATURDAY 12:00P
PRIORITY OVERNIGHT
XO BLUA
95605
CA-US SMF
Part # 155146-34 RIT EXP 09/19
QEC
Quality Environmental Containers
800-255-3930 • www.qecusa.com

ORIGIN ID:SCHA (518) 438-8140
TIM KNOLLMEYER
TESTAMERICA LAB INC
25 KRAFT AVE

ALBANY, NY 12205
UNITED STATES US

SHIP DATE: 05APR19
ACTWGT: 64.20 LB
CAD: 0439821/CAFE3211

BILL THIRD PARTY

TO SAMPLE RECEIVING
TESTAMERICA-W. SACRAMENTO
880 RIVERSIDE PKWY

WEST SACRAMENTO CA 95605
(916) 373-5600
REF: NY PFC

FedEx Express

2 of 2
MPS# 0263 4635 9989 4950
Mstr# 4635 9989 4949

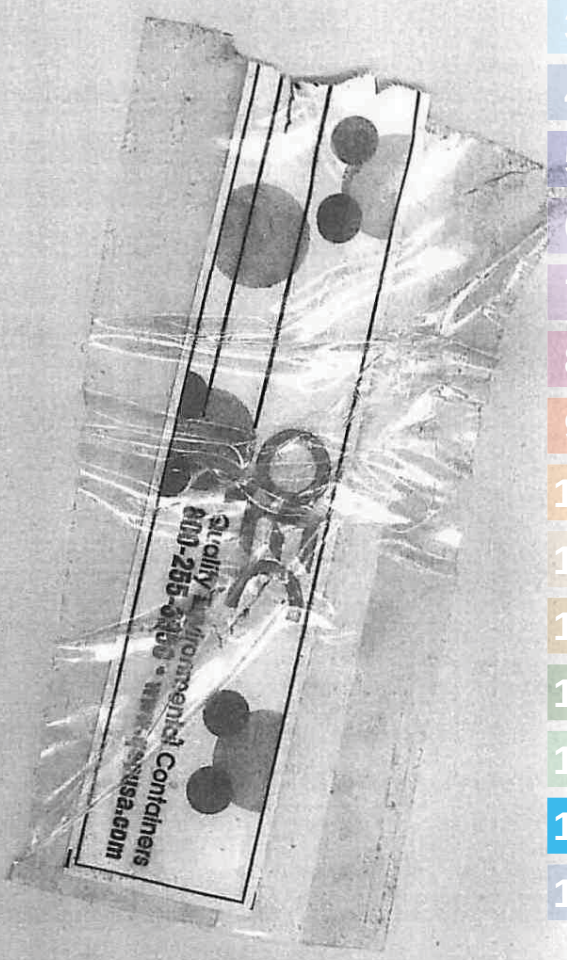
SATURDAY 12:00P
PRIORITY OVERNIGHT

0201

XO BLUA

95605
CA-US SMF

Part # 156...464 RIT EXP 09/19



Login Sample Receipt Checklist

Client: New York State D.E.C.

Job Number: 480-151471-1
SDG Number: Tomhannock Reservoir

Login Number: 151471
List Number: 1
Creator: Harper, Marcus D

List Source: Eurofins TestAmerica, Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCADIS
Samples received within 48 hours of sampling.	False	
Samples requiring field filtration have been filtered in the field.	N/A	
Chlorine Residual checked.	N/A	

Login Sample Receipt Checklist

Client: New York State D.E.C.

Job Number: 480-151471-1
SDG Number: Tomhannock Reservoir

Login Number: 151471
List Number: 3
Creator: McNabb, Robert W

List Source: Eurofins TestAmerica, Burlington
List Creation: 04/09/19 11:09 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	True	610147
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	1.8ºC
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: New York State D.E.C.

Job Number: 480-151471-1
SDG Number: Tomhannock Reservoir

Login Number: 151471
List Number: 2
Creator: Her, David A

List Source: Eurofins TestAmerica, Sacramento
List Creation: 04/08/19 09:46 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	Seal present with no number.
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	0.7c 0.3c
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix E – Cost Estimates

Hoosick Falls Drinking Water Study
Option 1A - New Ground Water Supply

Ground Water Connection Direct Costs						
No.	Item	Quantity	Unit	Unit Cost	Total Cost	
1	Well development and pump testing	2	LS	$ 100,000	$ 200,000	
2	Wellhead, pump, and motor install	2	LS	$ 80,000	$ 160,000	
3	8" Water Main (Open-Cut)	3,400	LF	$ 110	$ 374,000	
4	8" Valves	4	EA	$ 4,000	$ 16,000	
5	12" Water Main (Open-Cut on Roads)	11,100	LF	$ 130	$ 1,443,000	
6	12" Water Main Bridge Crossing	1	EA	$ 120,000	$ 120,000	
7	12" Valves	12	EA	$ 5,500	$ 66,000	
8	Connection to WTP	1	LS	$ 25,000	$ 25,000	
9	Traffic Control	60	Days	$ 125	$ 7,500	
10	Topsoil & Seeding	100	SY	$ 20	$ 2,000	
11	Pavement restoration	1,900	SY	$ 130	$ 247,000	
12	Flushing Hydrant	4	EA	$ 7,000	$ 28,000	
13	Rock removal	200	CY	$ 200	$ 40,000	
14	Bendway Weirs	1	LS	$ 35,000	$ 35,000	
15	Riprap Armoring	7,000	SF	$ 7	$ 49,000	
16	Bioengineered Streambank Protection	16,000	SF	$ 3	$ 40,000	
WTP Upgrades Direct Costs (to meet future demand)						
17	Finished Water Pump Upgrades	2	EA	$ 25,000	$ 50,000	
18	Chemical System Upgrades	1	LS	$ 50,000	$ 50,000	
19	Miscellaneous WTP Improvements	1	LS	$ 100,000	$ 100,000	
	Construction Subtotal				$ 3,052,500	
	Construction Contingency			*30%*	$ 915,750	
	Total Direct Construction Costs				**$ 3,968,000**	
	Engineering & Permitting			*14%*	$ 555,520	
	Construction Adminstation			*8%*	$ 317,440	
	Legal, Admin, Easements			*5%*	$ 198,400	
	Total Indirect Costs				**$ 1,071,000**	
Annual Operation & Maintenance Costs (2019 dollars)						
20	GAC Media Replacement			$ 129,000 per year		
21	GAC System Operator Labor			$ 11,700 per year		
22	GAC System Monitoring and Testing			$ 73,200 per year		
23	Remote Wellhead Operator Labor			$ 4,320 per year		
24	Pumping Energy			$ 34,235 per year		
25	Maintenance of Existing Wells, Membranes, & GAC			$ 27,660 per year		
26	Groundwater Quality Monitoring			$ 12,000 per year		
	Total Direct and Indirect Costs (Net Present Terms)				**$ 4,990,000**	
	Total O&M Costs (Net Present Terms)				**$ 2,718,000**	
	Total Option Cost (Net Present Terms)				**$ 7,708,000**	

Notes and Assumptions

1. Unit costs presented above are based on recent similar projects and/or construction price indices.
2. The O&M for this option contemplates continued use of the existing GAC system, specifically GAC media replacement, system operator labor and GAC system monitoring and testing for a period of 3 years.
3. Pipe installation rate is assumed to be 200 LF per day.
4. Valves would be placed every 1,000 feet. Flushing hydrants would be placed every 5,000 feet, plus one at each well.
5. Pavement restoration would be required for Village roadways; all other areas would be installed in unpaved shoulder.
6. New wells are estimated to require 8 man-hrs per month above normal operations due to remote location.
7. Present costs includes a 30 year analysis with 2% cost inflation factor and 2.5% discount rate.
8. The new ground water source is assumed to be online at end of year 3, with full capacity GAC in use for interim.
9. Assume GAC replacement every 8 months at $86,000 until new well source online.
10. During implementation, the full capacity GAC system is estimated to require 5 man-hrs per week at a rate of $45/hr.
11. Pump electric use is 33 kW, calculated using average flow of 0.44 MGD. Electric rate estimated at $0.12/kWh.
12. Once option is implemented, periodically operating Well 7, microfiltration units, and full capacity GAC system is estimated to require 4 man-hours once per week.
13. GW Quality Monitoring estimate includes lab costs, sampler labor, and annual analysis and reporting.
14. Existing WTP O&M costs are not included in analysis.
15. Maintenance of existing wells, membranes, & GAC includes long-term periodic operation and monitoring.

Hoosick Falls Drinking Water Study

Option 1B - New Ground Water Supply (with GAC use)

Ground Water Connection Direct Costs					
No.	Item	Quantity	Unit	Unit Cost	Total Cost
1	Well development and pump testing	2	LS	$ 100,000	$ 200,000
2	Wellhead, pump, and motor install	2	LS	$ 80,000	$ 160,000
3	8" Water Main (Open-Cut)	3,400	LF	$ 110	$ 374,000
4	8" Valves	4	EA	$ 4,000	$ 16,000
5	12" Water Main (Open-Cut on Roads)	11,100	LF	$ 130	$ 1,443,000
6	12" Water Main Bridge Crossing	1	EA	$ 120,000	$ 120,000
7	12" Valves	12	EA	$ 5,500	$ 66,000
8	Connection to WTP	1	LS	$ 25,000	$ 25,000
9	Traffic Control	60	Days	$ 125	$ 7,500
10	Topsoil & Seeding	100	SY	$ 20	$ 2,000
11	Pavement restoration	1,900	SY	$ 130	$ 247,000
12	Flushing Hydrant	4	EA	$ 7,000	$ 28,000
13	Rock removal	200	CY	$ 200	$ 40,000
14	Bendway Weirs	1	LS	$ 35,000	$ 35,000
15	Riprap Armoring	7,000	SF	$ 7	$ 49,000
16	Bioengineered Streambank Protection	16,000	SF	$ 3	$ 40,000
WTP Upgrades Direct Costs (to meet future demand)					
17	Finished Water Pump Upgrades	2	EA	$ 25,000	$ 50,000
18	Chemical System Upgrades	1	LS	$ 50,000	$ 50,000
19	Miscellaneous WTP Improvements	1	LS	$ 100,000	$ 100,000
	Construction Subtotal				$ 3,052,500
	Construction Contingency			*30%*	$ 915,750
	Total Direct Construction Costs				**$ 3,968,000**
	Engineering & Permitting			*14%*	$ 555,520
	Construction Adminstation			*8%*	$ 317,440
	Legal, Admin, Easements			*5%*	$ 198,400
	Total Indirect Costs				**$ 1,071,000**
Annual Operation & Maintenance Costs (2019 dollars)					
20	GAC Media Replacement			$ 129,000 per year	
21	GAC System Operator Labor			$ 11,700 per year	
22	GAC System Monitoring and Testing			$ 73,200 per year	
23	Remote Wellhead Operator Labor			$ 4,320 per year	
24	Pumping Energy			$ 34,235 per year	
25	Maintenance of Existing Wells, Membranes, & GAC			$ 64,260 per year	
26	Groundwater Quality Monitoring			$ 12,000 per year	
	Total Direct and Indirect Costs (Net Present Terms)				**$ 4,990,000**
	Total O&M Costs (Net Present Terms)				**$ 4,702,000**
	Total Option Cost (Net Present Terms)				**$ 9,692,000**

Notes and Assumptions

1. Unit costs presented above are based on recent similar projects and/or construction price indices.
2. The O&M for this option contemplates continued use of the existing GAC system, specifically GAC media replacement, system operator labor and GAC system monitoring and testing for a period of 30 years. GAC replacement is projected at every 36 months.
3. Pipe installation rate is assumed to be 200 LF per day.
4. Valves would be placed every 1,000 feet. Flushing hydrants would be placed every 5,000 feet, plus one at each well.
5. Pavement restoration would be required for Village roadways; all other areas would be installed in unpaved shoulder.
6. New wells are estimated to require 8 man-hrs per month above normal operations due to remote location.
7. Present costs includes a 30 year analysis with 2% cost inflation factor and 2.5% discount rate.
8. The new ground water source is assumed to be online at end of year 3, with full capacity GAC in use for interim.
9. Assume GAC replacement every 8 months at $86,000 until new well source online.
10. During implementation, the full capacity GAC system is estimated to require 5 man-hrs per week at a rate of $45/hr.
11. Pump electric use is 33 kW, calculated using average flow of 0.44 MGD. Electric rate estimated at $0.12/kWh.
12. Once option is implemented, periodically operating Well 7, microfiltration units, and full capacity GAC system is estimated to require 4 man-hours once per week.
13. GW Quality Monitoring estimate includes lab costs, sampler labor, and annual analysis and reporting.
14. Existing WTP O&M costs are not included in analysis.
15. Maintenance of existing wells, membranes, & GAC includes long-term periodic operation and monitoring.

Hoosick Falls Drinking Water Study
Option 2 - New Surface Water Supply

Surface Water Connection Direct Costs						
No.	Item	Quantity	Unit	Unit Cost	Total Cost	
1	Traffic control (10.4 miles)	350	days	$ 125	$ 43,750	
2	Jack & Bore RR	2	LS	$ 200,000	$ 400,000	
3	16-inch water main (Open-Cut)	63,500	LF	$ 170	$ 10,795,000	
4	16-inch water main (HDD)	7,000	LF	$ 400	$ 2,800,000	
5	Pavement restoration (2.1 mi)	6,160	SY	$ 130	$ 800,800	
6	Hydrant	14	EA	$ 7,000	$ 98,700	
7	16" Butterfly Valves	71	EA	$ 7,500	$ 528,750	
8	Connection to existing WTP	1	LS	$ 25,000	$ 25,000	
9	Topsoil & Seeding	29,200	SY	$ 20	$ 584,000	
10	Air release valve Pit	10	EA	$ 30,000	$ 300,000	
11	16" Bridge crossing	1	EA	$ 200,000	$ 200,000	
12	RW Pump station & Intake Structure	1	LS	$ 1,750,000	$ 1,750,000	
13	PRV station	4	EA	$ 50,000	$ 200,000	
14	Rock removal	200	CY	$ 200	$ 40,000	
15	Coagulant dosing system	1	LS	$ 50,000	$ 50,000	
16	Membrane Treatability Pilot Study	1	LS	$ 75,000	$ 75,000	
WTP Upgrades Direct Costs (to meet future demand)						
17	Microfiltration Units	8	EA	$ 12,000	$ 96,000	
18	Finished Water Pump Upgrades	2	EA	$ 25,000	$ 50,000	
19	Chemical System Upgrades	1	LS	$ 50,000	$ 50,000	
20	Miscellaneous WTP Improvements	1	LS	$ 100,000	$ 100,000	
	Construction Subtotal				$	18,987,000
	Construction Contingency			*30%*	$	5,696,100
	Total Direct Construction Costs				**$**	**24,683,000**
	Engineering & Permitting			*14%*	$	3,455,620
	Construction Adminstation			*8%*	$	1,974,640
	Legal, Admin, Easements			*5%*	$	1,234,150
	Total Indirect Costs				**$**	**6,664,000**
Annual Operation & Maintenance Costs (2019 dollars)						
21	GAC Media Replacement			$ 129,000 per year		
22	GAC System Operator Labor			$ 11,700 per year		
23	GAC System Monitoring and Testing			$ 73,200 per year		
24	Intake & PS Operator Labor			$ 10,820 per year		
25	Intake & PS Equipment Maintenance			$ 40,000 per year		
26	Pumping Energy			$ 60,560 per year		
27	Long-Term Peridoic Maintenance of GAC			$ 27,660 per year		
	Total Direct and Indirect Costs (Net Present Terms)				**$**	**30,967,000**
	O&M Costs (Net Present Terms)				**$**	**4,250,000**
	Total Option Cost (Net Present Terms)				**$**	**35,217,000**

Notes and Assumptions

1. Unit costs presented above are based on recent similar projects and/or construction price indices.
2. The O&M for this option contemplates continued use of the existing GAC system, specifically GAC media replacement, system operator labor and GAC system monitoring and testing for a period of 4 years.
3. Pipe installation rate is assumed to be 200 LF per day.
4. Valves would be placed every 1,000 feet. Flushing hydrants would be placed every 5,000 feet.
5. Pavement restoration would be required for Village roadways; all other areas would be installed in unpaved shoulder.
6. Air release valves and PRV stations are located based on alignment elevation profile using contour data.
7. Present costs includes a 30 year analysis with 2% cost inflation factor and 2.5% discount rate.
8. The new surface water source is assumed to be operational at the end of year 4. The full capacity GAC system will be utilized during construction.
9. Assume GAC replacement every 8 months at $86,000 until new surface water source online.
10. During implementation, the full capacity GAC system is estimated to require 5 man-hrs per week at a rate of $45/hr.
11. New surface water source is estimated to require 20 man-hrs per month at $45/hr.
12. Pump electric use is 58 kW, calculated using average flow of 0.44 MGD. Electric rate estimated at $0.12/kWh.
13. Once option is implemented, periodically operating the full capacity GAC system is estimated to require 4 man-hours once per week. Long-term periodic maintenance of GAC includes monitoring costs.
14. Existing WTP O&M costs are not included in analysis.

Hoosick Falls Drinking Water Study
Option 3 - Interconnection with Existing Public Water Supply

Interconnection Direct Costs						
No.	Item	Quantity	Unit	Unit Cost	Total Cost	
1	Traffic control (10.1 miles)	480	days	$ 125	$ 60,000	
2	Jack & Bore RR	2	LS	$ 200,000	$ 400,000	
3	16-inch water main (Open-Cut)	85,500	LF	$ 170	$ 14,535,000	
4	16-inch water main (HDD)	9,500	LF	$ 350	$ 3,325,000	
5	Pavement restoration (2.1 mi)	6,160	SY	$ 130	$ 800,800	
6	16" Valves	95	EA	$ 7,500	$ 712,500	
7	Connection to existing water system	1	LS	$ 25,000	$ 25,000	
8	Topsoil & Seeding	41,400	SY	$ 20	$ 828,000	
9	Flushing Hydrant	19	EA	$ 7,000	$ 133,000	
10	Air release valve	10	EA	$ 30,000	$ 300,000	
11	16" Bridge crossing	1	EA	$ 200,000	$ 200,000	
12	Booster pump station	1	LS	$ 1,250,000	$ 1,250,000	
13	Pressure reducing station	4	EA	$ 50,000	$ 200,000	
14	Rock removal	3,400	CY	$ 200	$ 680,000	
WTP Upgrades Direct Costs (to meet future demand)						
15	Finished Water Pump Upgrades	2	EA	$ 25,000	$ 50,000	
16	Chemical System Upgrades	1	LS	$ 50,000	$ 50,000	
17	Miscellaneous WTP Improvements	1	LS	$ 100,000	$ 100,000	
	Construction Subtotal				$ 23,649,300	
	Construction Contingency			*30%*	$ 7,094,790	
	Total Direct Construction Costs				**$ 30,744,000**	
	Engineering & Planning			*14%*	$ 4,304,160	
	Construction Administration			*8%*	$ 2,459,520	
	Legal, Admin, Easements			*5%*	$ 1,537,200	
	Total Indirect Costs				**$ 8,301,000**	
Annual Operation & Maintenance Costs (2019 dollars)						
18	GAC Media Replacement			$ 129,000 per year		
19	GAC System Operator Labor			$ 11,700 per year		
20	GAC System Monitoring and Testing			$ 73,200 per year		
21	PS Operator Labor			$ 10,800 per year		
22	PS Equipment Maintenance			$ 15,000 per year		
23	Pumping Energy			$ 62,300 per year		
24	Water Purchase Cost			$ 320,000 per year		
	Total Direct and Indirect Costs (Net Present Terms)				**$ 38,477,000**	
	O&M Costs (Net Present Terms)				**$ 10,478,000**	
	Total Option Cost (Net Present Terms)				**$ 48,956,000**	

Notes and Assumptions

1. Unit costs presented above are based on recent similar projects and/or construction price indices.
2. The O&M for this option contemplates continued use of the existing GAC system, specifically GAC media replacement, system operator labor and GAC system monitoring and testing for a period of 5 years.
3. Pipe installation rate is assumed to be 200 LF per day.
4. Valves would be placed every 1,000 feet. Flushing hydrants would be placed every 5,000 feet.
5. Pavement restoration would be required for Village roadways; all other areas would be installed in unpaved shoulder.
6. Air release valves and PRV stations are located based on alignment elevation profile using contour data.
7. Present costs includes a 30 year analysis with 2% cost inflation factor and 2.5% discount rate.
8. The interconnection is assumed to be operational at the end of year 5. The full capacity GAC system will be utilized during construction.
9. Assume GAC replacement every 8 months at $86,000 until new interconnection online.
10. During implementation, the full capacity GAC system is estimated to require 5 man-hrs per week at a rate of $45/hr.
11. New pump station is estimated to require 20 man-hrs per month at $45/hr.
12. Pump electric use is 59 kW, calculated using average flow of 0.44 MGD. Electric rate estimated at $0.12/kWh.
13. Cost to purchase water from Troy is estimated at $1.99 per 1,000 gallons.
14. Existing WTP O&M costs are not included in analysis.

Hoosick Falls Drinking Water Study

Option 4 - Continued Use of Public Supply Wells #3 and #7 with Treatment through Full Capacity GAC System

Full Capacity GAC Direct Costs					
No.	Item	Quantity	Unit	Unit Cost	Total Cost
1	Contract 2E (bid result)				$ 116,285
2	Contract 2H (bid result)				$ 109,750
3	Contract 2P (bid result)				$ 21,000
4	Contract 2G (bid result)				$ 1,298,500
	Full Capacity GAC Construction Costs (already incurred)				**$ 1,545,535**
WTP Upgrades Direct Costs (to meet future demand)					
5	Microfiltration Units	8	EA	$ 12,000	$ 96,000
6	Finished Water Pump Upgrades	2	EA	$ 25,000	$ 50,000
7	Chemical System Upgrades	1	LS	$ 50,000	$ 50,000
8	Miscellaneous WTP Improvements	1	LS	$ 100,000	$ 100,000
	WTP Upgrade Subtotal				$ 296,000
	Construction Contingency			*30%*	$ 88,800
	WTP Upgrade Construction Costs				**$ 385,000**
	Total Construction Costs				**$ 1,931,000**
	Engineering & Permitting (assumed)			*12%*	$ 231,720
	Construction Administration (assumed)			*8%*	$ 154,480
	Legal, Admin, Easements (assumed)			*5%*	$ 96,550
	Total Indirect Costs				**$ 483,000**
Annual Operation & Maintenance Costs (2019 dollars)					
9	GAC Media Replacement			$ 129,000 per year	
10	GAC System Operator Labor			$ 11,700 per year	
11	GAC System Monitoring and Testing			$ 73,200 per year	
	Total Direct and Indirect Costs (Net Present Terms)				**$ 2,414,000**
	O&M Costs (Net Present Terms)				**$ 5,954,000**
	Total Option Cost (Net Present Terms)				**$ 8,368,000**

Notes and Assumptions

1. Unit costs presented above are based on recent similar projects and/or construction price indices.
2. The O&M for this option contemplates continued use of the existing GAC system, specifically GAC media replacement, system operator labor and GAC system monitoring and testing for a period of 30 years. GAC replacement is projected at every 8 months.
3. Present costs includes a 30 year analysis with 2% cost inflation factor and 2.5% discount rate.
4. Assume GAC replacement every 8 months at $86,000 until new interconnection online.
5. The full capacity GAC system is estimated to require 5 man-hrs per week at a rate of $45/hr.
6. Contract 2E included all electrical and communication work for the GAC system, including but not limited to, temp facilities, transformers, wiring, connections, lighting, SCADA, and fire alarm system.
7. Contract 2H included all HVAC work for the GAC system, including but not limited to, fuel tank, boiler unit and pumps, exhaust fans, unit heaters, dehumidifiers, testing, adjusting, and balancing.
8. Contract 2P included all small plumbing work for the GAC system, including but not limited to, site sewer connection, floor drains, and boiler make up water.
9. Contract 2G included furnishing and installing the GAC system, including all work not covered under other contracts, temporary controls, site preparation, foundation, storm drains, metal building, process piping, tanks, pumps, instrumentation equipment and removal of the temporary GAC system.
10. Existing WTP O&M costs are not included in analysis.
11. Construction costs for the Full Capacity GAC System ($1.5M) are included in the above estimates but have already been expended. Hence, the future cost for Option 4 would be $6.9M.

Hoosick Falls Drinking Water Study

Option 5 - Continued Use of Public Supply Wells #3 and #7 with Treatment through Full Capacity GAC System and PFOA Remediation through the McCaffrey Street IRM

Full Capacity GAC Direct Costs					
No.	Item	Quantity	Unit	Unit Cost	Total Cost
1	Contract 2E (bid result)				$ 116,285
2	Contract 2H (bid result)				$ 109,750
3	Contract 2P (bid result)				$ 21,000
4	Contract 2G (bid result)				$ 1,298,500
	Full Capacity GAC Construction Costs (already incurred)				**$ 1,545,535**
WTP Upgrades Direct Costs (to meet future demand)					
5	Microfiltration Units	8	EA	$ 12,000	$ 96,000
6	Finished Water Pump Upgrades	2	EA	$ 25,000	$ 50,000
7	Chemical System Upgrades	1	LS	$ 50,000	$ 50,000
8	Miscellaneous WTP Improvements	1	LS	$ 100,000	$ 100,000
	WTP Upgrade Subtotal				$ 296,000
	Construction Contingency			*30%*	$ 88,800
	WTP Upgrade Construction Costs				**$ 385,000**
Site Remediation Direct Costs					
9	Civil site work	1	LS	$ 265,000	$ 265,000
10	Groundwater treatment system equipment	1	LS	$ 175,000	$ 175,000
	Site Remediation Subtotal				$ 440,000
	Construction Contingency			*30%*	$ 132,000
	Site Remediation Direct Costs				**$ 572,000**
	Total Direct Costs				**$ 2,503,000**
	Engineering & Planning			*12%*	$ 300,360
	Construction Administration			*8%*	$ 200,240
	Legal, Admin, Easements			*5%*	$ 125,150
	Total Indirect Costs				**$ 626,000**
Annual Operation & Maintenance Costs (2019 dollars)					
11	GAC Media Replacement			$ 129,000 per year	
12	GAC System Operator Labor			$ 11,700 per year	
13	GAC System Monitoring and Testing			$ 73,200 per year	
14	Site Remediation Operation Costs			$ 183,000 per year	
	Total Direct and Indirect Costs (Net Present Terms)				**$ 3,129,000**
	O&M Costs (Net Present Terms)				**$ 8,998,000**
	Total Option Cost (Net Present Terms)				**$ 12,127,000**

Notes and Assumptions

1. Unit costs presented above are based on recent similar projects and/or construction price indices.
2. The O&M for this option contemplates continued use of the existing GAC system, specifically GAC media replacement, system operator labor and GAC system monitoring and testing for a period of 30 years.
3. Present costs includes a 30 year analysis with 2% cost inflation factor and 2.5% discount rate.
4. Refer to Option 4 for Full Capacity GAC cost detail.
5. Assume GAC replacement every 8 months at $86,000.
6. GAC replacement frequency increases to 10 months at year 6 due to IRM control of PFAS. Replacement requency increases to a max of 36 months at year 16.
7. The full capacity GAC system is estimated to require 5 man-hrs per week at a rate of $45/hr.
8. PFOA influent concentrations were assumed to decline from an average of 496 ppt to 40 ppt over a period of 22 years.
9. Site remediation O&M costs include treatment system operation, annual GAC replacement, periodic pump replacement, and power.
10. Existing WTP O&M costs are not included in analysis.
11. Construction costs for the Full Capacity GAC System ($1.5M) and IRM ($0.6M) are included in the above estimates but have already been expended. Hence, the future cost for Option 5 would be $10.6M.