



CORRECTIVE ACTION PLAN PFAS TREATMENT SYSTEM

TOWN OF NORTH CASTLE WATER DISTRICT #4 SCHOOL STREET SYSTEM

TOWN OF NORTH CASTLE
WESTCHESTER COUNTY, NEW YORK

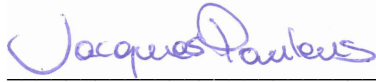
PROJECT NO.: 31401096.005
DATE: APRIL 2022

WSP USA
4 RESEARCH DRIVE, SUITE 204
SHELTON, CT 06484

PHONE: +1 (203) 929-8555
FAX: +1 (203) 926-9140
WSP.COM

SIGNATURES

PREPARED BY:



Jacques Pauleus
Environmental Engineer

REVIEWED BY:



Michael J. Shortell
Senior Lead Consulting Environmental Engineer



Stephen K. Rupar, P.E.
Vice President



TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
2.0 PROJECT BACKGROUND.....	1
2.1 Background.....	1
3.0 ALTERNATIVES ANALYSIS	2
3.1 Drilling Well 1 Deeper.....	2
3.2 Installing an Ion Exchange Filtration System	3
3.3 Installing a GAC Filtration System.....	3
4.0 SUMMARY AND COMPARISON OF ALTERNATIVES	4
5.0 RECOMMENDED AND SELECTED ALTERNATIVES.....	5



TABLE

PAGE

TABLE 1: Summary of Existing School Street Potable Supply Wells.....	1
--	---

APPENDICES

I	Notice of Violation
II	Laboratory Report

SHEET

SHEET 1:	Site Plan
----------	-----------

1.0 INTRODUCTION

WSP USA (WSP), on behalf of the Town of North Castle (Town) is providing the following Corrective Action Plan Evaluation (CAP) in response to the notice of violation (NOV), dated November 16, 2021, regarding the exceedance of New York State maximum contaminant level (MCL) for perfluorooctanoic acid (PFOA) of 10 ng/l (nanograms per liter) detected in water samples collected from Well 1 in the School Street treatment facility. The CAP is in accordance with: 1) the New York State Sanitary Code, Part 5 - Drinking Water Supplies; 2) The Recommended Standards for Water Works, 2018 Edition; 3) the New York State Department of Health Guidelines for Rural Water Supply; and 4) the Interim Recommendations for Granular Activated Carbon Installations - Design Review, Startup and Operations, 2021.

PFAS are a group of over 4,000 synthetically-manufactured chemicals that can be found in a variety of items including food packaging, commercial household products, firefighting foams and in production facilities. These chemicals have been used since the 1940s and a wide range of products were developed using PFAS because of their unique physical and chemical properties. PFAS are found in many common household products that resist grease, water and oil.

2.0 PROJECT BACKGROUND

2.1 Background

The existing School Street water-supply system consists of two water-supply wells, Well 1 (also known as Well 1A), and Well 2 (also known as Well 1C). Table 1 indicates the NYSDEC permitted pumping rates for Wells 1 and Well 2. However, the two wells have a combined withdrawal limited to 100 gpm (gallons per minute) because of the School Street treatment facility system constraints. Sheet 1 displays a site location map that identifies the location of Well 1 and Well 2, as well as the district boundary.

Table 1: Summary of Existing School Street Potable Supply Wells

Well Identification	Source Type	Well Depth (ft bg)	Max Rate Source Capacity (gpm)
School Street Well 1	Bedrock	145	125
School Street Well 2	Unconsolidated	68	85

ft bg – feet below grade

gpm – gallons per minute

As previously indicated, this CAP is in response to an NOV from Westchester County Department of Health (WCDOH) regarding the exceedance of PFOA detected in water samples collected from Well 1 in the School Street treatment facility. The Notice of Violation is included as Appendix I; laboratory reports that identify the PFOA concentrations that were detected in Well 1 above the MCL are included in Appendix II.

Well 1 and Well 2 were installed by the United States Environmental Protection Agency (USEPA) in 1988 on the Town-owned property located on School Street. These wells and the distribution system were installed in response to contamination documented in downtown Armonk as a result of releases from dry cleaning facilities and gas stations that operated in the area. The existing water treatment equipment consists of four greensand filters and two granular activated carbon (GAC) adsorption vessels that were installed to mitigate potential contamination. The capacity of the treatment system limits the combined production of the School Street wells to 100 gpm.

Well 1 is a bedrock well that has a total depth of 145 feet. Well 2 is a sand and gravel well located approximately 20 feet away from Well 1. Well 2 is screened from approximately 46 to 68 ft bg. The well screen is 10 inches in diameter with a 0.25-inch slot size, surrounded by a 3-inch envelope of 0.25-inch Morie gravel pack.

Wells 1 and Well 2 are equipped with Goulds submersible pumps, 100H10-05 and 100H07-04, respectively. The manufacturer's information sheets for the pumps and the pump curves are included in Appendix III. Within the existing treatment building, the two separate raw water transmission lines from Well 1 and Well 2 are combined into a single header that flows through a greensand filtration system to reduce high iron and manganese concentrations. The greensand filtration system consists of four 60-inch vessels placed in parallel configuration; each pressure vessel is rated for 25 gpm (total capacity: 4 vessels x 25 gpm = 100 gpm). Prior to entering the greensand filtration system, the groundwater is injected with a solution of sodium hypochlorite and a solution of potassium permanganate to oxidize and precipitate dissolved iron and manganese in the groundwater. The greensand filters include a layer of anthracite that is intended to remove the oxidizing chemicals from the water stream prior to the GAC units. After the greensand filtration equipment, groundwater is conveyed to an existing GAC system, consisting of two sixty-inch vessels positioned in a parallel configuration that are intended to remove any volatile organic compounds (VOCs) associated with the dry cleaning and gas stations. Groundwater leaving the GAC vessels is then disinfected with a solution of sodium hypochlorite prior to entering two 10,000-gallon hydropneumatic tanks used for storage and contact time. Two 3-HP Goulds transfer pumps operating alternately convey water from the hydropneumatic tanks to the District's 1,000,000-gallon atmospheric storage tank.

3.0 ALTERNATIVES ANALYSIS

Three alternatives were evaluated to address the MCL exceedance. The alternatives include drilling Well 1 deeper, the installation of a GAC filtration system or an ion exchange (resin) filtration system. These treatment options are discussed further below.

3.1 Drilling Well 1 Deeper

The purpose of drilling Well 1 deeper would be to encounter deeper water bearing fractures that may dilute the PFOA that has been detected in previous water sampling events. The PFOA concentrations that have been detected slightly exceed the MCL; therefore, it would be reasonable to conclude that drilling the well deeper has the potential to decrease the PFOA concentration in the groundwater from Well 1. Well deepening has been selected as an alternative in lieu of drilling a new well deeper because the 100-foot ownership and 200-foot sanitary control radii for a new well cannot be maintained. In order to deepen Well 1, the well would need to be taken offline for approximately 2 to 4 months to allow for well deepening activities and conducting a 72-hour yield test that includes the collection of water samples for a full New York State Part 5 water-quality analysis. The results of the 72-hour yield test and water-quality sampling would then be documented in a report and submitted to the WCDOH, and assuming there are no water quality concerns, to request authorization to place the well back in service. Well 1 is needed to meet the increased water demand associated with summertime; therefore, well deepening activities would be initiated in the fall/winter when system water demands are lower.

3.2 Installing an Ion Exchange Filtration System

Ion exchange involves the use of synthetic resins made up of highly porous, polymeric material that is acid, base, and water insoluble with a fixed charge which is used to remove charged contaminant ions through the exchange sites of the media.

To reduce the PFAS concentrations below the MCL, groundwater pumped from Wells 1 and Well 2 would flow through high-pressure vessels filled with resin. A vendor was contacted to obtain specifications for the ion exchange treatment of the PFAS compounds in the water-supply system. To maximize the effectiveness of ion exchange treatment of PFAS compounds in the water, all traces of oxidants would be removed from the groundwater before entering the resin vessels, prolonged contact of the resin with oxidants such as chlorine, chloramine, hypochlorite, or permanganate can destroy the resin and also increase the potential for nitrosamine formation. Additionally, a 5-micron cartridge filter rated for the peak flow would be placed before the resin vessels to prevent blockage and subsequent channeling within the resin bed. Ion exchange requires two to three minutes of empty bed contact time versus the 10 to 15 minutes for GAC, which translate to smaller vessels being needed for ion exchange.

To promote redundancy in the system, the ion exchange treatment system would consist of two treatment trains. The resin vessels in each treatment train would be placed in series in a lead/lag configuration and equipped with ion exchange resin as a media. Pressure gauges and sample ports would be positioned pre-, mid- and post-filter to monitor the performance.

The peak design flow for each treatment would be 100 gpm. The resin vessels in each treatment train shall consist of one primary and one secondary resin vessel in series. Each resin vessel is constructed of carbon steel with a two-part epoxy internal lining. The resin vessels are 42-inch in diameter with an overall height of 9 feet. The ion exchange treatment system would operate in this configuration until the media in the primary vessel becomes exhausted (i.e., breakthrough). The exhausted resin in the primary vessel would be removed and replaced with new resin. At this point, the valves would be adjusted so the secondary vessel becomes the primary vessel and the resin vessel with the newly installed resin would become the secondary vessel. The cycle would be repeated as necessary to maintain PFAS concentrations below the MCL. Additionally, dedicated valves would be made available to switch from Treatment Train A (TTA) to Treatment Train B (TTB) or vice versa. The exhausted resin would be removed from the property for offsite disposal pursuant to applicable NYSDEC and RCRA regulations.

A vendor was consulted to provide an estimate of the resin changeout frequency based on influent PFAS concentrations and water chemistry and the pumping rate (100 gpm = 144,000 gpd). Based on this information, the system would be able to treat 60 million gallons before a changeout is required, this translates to a changeout frequency of 13 to 14 months. Changeouts may be required sooner for reasons other than PFAS breakthrough such as significant pressure drop or biological fouling within the vessels.

Both treatment trains would be placed in the existing treatment facility, no additional structure or further modification would be necessary.

3.3 Installing a GAC Filtration System

GAC is one of the most studied and effective treatment options for removal of PFOS/PFOA and is currently the most common treatment method. GAC's highly porous nature provides large surfaces to which contaminant adsorb. GAC is available in two forms, bituminous (coal based) and coconut shell-based carbon products which have been proven successful for PFOS and PFOA reduction. However, coconut shell-based media experience quicker breakthrough than coal-based carbons. Therefore, a coal-based media would be used.

To reduce the PFAS concentrations below the MCL, groundwater pumped from Wells 1 and Well 2 would flow through multiple high pressure GAC vessels. The system design must consider a minimum

contact time (ranging between 10 and 15 minutes) and a minimum superficial velocity (typically greater than 1 gpm/sf) through the carbon vessels to properly design for PFAS treatment. These two design factors are competing interests in the sense that a low enough volumetric flow rate is desired to achieve sufficient contact time in the carbon vessels for treatment; however, the superficial velocity (i.e., gpm/sf) through the carbon vessels can't be too low because preferential flow paths (i.e., channeling) will develop in the carbon vessels, which can lead to pre-mature breakthrough of the PFAS compounds.

Per WCDOH recommendation, the proposed GAC treatment system would consist of two treatment trains to promote redundancy in the system. Each treatment train would be designed to treat the existing system peak flow rate of 100 gpm. The GAC vessels in each treatment train would be placed in series in a lead/lag configuration and equipped with GAC as a media as prescribed in Section II-A, in the April 26, 2021 New York State Department of Health (NYSDOH) Interim Recommendations for Granular Activated Carbon Installations – Design Review, Startup and Operations. Pressure gauges and sample ports would be positioned pre-, mid- and post-filter to monitor the performance.

A vendor was contacted to obtain preliminary sizing information if GAC were utilized, the GAC vessels for each treatment train would consist of one primary and one secondary carbon vessel in series. Each carbon vessel would be constructed of carbon steel with a two-part epoxy internal lining. The carbon vessels would be 72-inch diameter with an overall height of 11.4 feet with each vessel having a total weight of 4,550 lbs. In addition, the vendor was requested to provide the GAC changeout frequency based on influent PFAS concentrations and water chemistry and the pumping rate (100 gpm = 144,000 gpd). Based on this information, the system can treat 55 to 60 million gallons before a changeout is required, which translates to a changeout frequency of 13 to 14 months. Changeouts may be required sooner for reasons other than PFAS breakthrough such as significant pressure drop or biological fouling within the vessels.

In light of the limited space available in the existing facility and the layout of the existing treatment equipment, modifications to the existing building or an additional structure would be necessary to accommodate the larger pressure vessels associated with the two GAC treatment trains.

4.0 SUMMARY AND COMPARISON OF ALTERNATIVES

As discussed in previous sections, alternate PFOS/PFOA approaches including drilling Well 1 deeper, GAC and ion exchange treatment systems were evaluated to reduce the PFOA concentration in Well 1. WSP considers the best alternative to reduce the PFOA concentration in Well 1 would be to deepen the well with the intent of encountering deeper water bearing fractures that have the potential to introduce better water quality to the well. However, the effectiveness of deepening the well cannot be determined until the drilling activities are complete and the well is subjected to a 72-hour yield testing with NYS Part 5 water quality sampling. Upon completion of the drilling and testing activities, the PFOA concentration in Well 1 would be known and if the PFOA concentration is less than the MCL, no additional water treatment equipment would be needed to address PFOA. However, in the event that well deepening does not reduce the PFOA concentration in Well 1, either GAC or ion exchange water treatment equipment would be necessary to reduce the PFOA concentration. While GAC is currently the most common treatment method for removal of PFOA, modifications to the existing treatment facility would be necessary to accommodate the larger vessels associated with GAC treatment. Ion exchange has proven to be an effective technology for PFOA treatment and has a significantly smaller footprint, and as such, ion exchange can be easily integrated into the existing School Street treatment infrastructure. Given the available space and the effectiveness of both treatment methods proceeding with ion exchange treatment system would be the better alternative.

5.0 RECOMMENDED AND SELECTED ALTERNATIVES

The alternative that has been selected is to drill Well 1 deeper in conjunction with 72-hour yield testing that includes the collection of a water sample for a full NYS Part 5 water-quality analysis. In the event that well deepening does not mitigate the problem, then an ion exchange treatment system would be designed to reduce the PFOA concentration from Well 1.

cmm

April 26, 2022

H:\NORTHCAST\Water District 4\2022\Corrective Action Plan\PFAS Report.docx

APPENDIX I

George Latimer
County Executive

Sherlita Amler, M.D.
Commissioner of Health

November 16, 2021

Town of North Castle
15 Bedford Road
Armonk, NY 10504
ATTN: Hon Michael J. Schiliro, Supervisor

RE: Violation ID: 2022 12 (Revised)
Public Water Supply
North Castle WD#4
North Castle (T)
PWS ID: NY 5922909

Dear Supervisor Schiliro:

A review of Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) sampling results for the third quarter 2021 monitoring period for the above referenced public water supply revealed that the PFOA levels exceeded the Maximum Contamination Level (MCL) of 0.0000100 milligrams per liter (mg/L) with an average value for the quarter of 0.0000118 mg/L at School street well #1. This constitutes non-compliance with Part 5, Subpart 5-1, Section 5-1.52, and Table 3 of the New York State Sanitary Code (NYSSC).

You are reminded that Tier 2 Public Notification must be made within thirty (30) days (i.e. by December 1, 2021) in accordance with Part 5, Subpart 5-1, Section 5-1.52 (Table 13) and 5-1.78 of the New York State Sanitary Code, and that within ten (10) days of completing the Public Notification, certification shall be submitted to the Department with a copy of the notice which was distributed. A draft of the notice must be submitted to this Department for review prior to distribution.

Please find the attached Notices of Violation generated by the New York State Department of Health Safe Drinking Water Information System (SDWIS) and recorded on its database.

In light of the above, it is requested that a proposal to provide a corrective action to the above MCL violations must be submitted to this Department no later than December 31, 2021.

Should you have any questions or require additional information, please Ms. Xinxin Li at (914) 864-5490 or the undersigned at (914) 864-7348.

Please be advised that this revised notice of violation letter supersedes the original violation letter issued by this Department dated November 1, 2021.

Very truly yours,



Zaw Thein, P.E.
Associate Engineer
Bureau of Environmental Quality

ZT:XL
encl.

cc: Sal Misiti, Director of Water & Sewer Operations
Andy Tse, NYSDOH
File

November 1, 2021
NOTICE OF VIOLATION
New York State Sanitary Code, 10 NYCRR Part 5

Re: 02 - MCL, AVERAGE
Violation ID: 2022 12
Determination Date: November 1, 2021
NORTH CASTLE WD #4
PWS ID: NY5922909
NORTH CASTLE (T), WESTCHESTER
County

Violation ID: 2022 12
Determination Date: 11/1/2021
Violation Type:
Name: 02 - MCL, AVERAGE
Analyte Group: PERFLUOROCTANOIC ACID (PFOA) - 2806
Analyte Name: PERFLUOROCTANOIC ACID (PFOA)
Analyte Code: 2806
Compliance Period Begin: 7/1/2021
Compliance Period End: 9/30/2021
Violation Period Begin Date: 7/1/2021
Violation Period End Date: 9/30/2021

Reference Enforcement ID: 2022 32

APPENDIX II



ANALYTICAL REPORT

Lab Number:	L2207392
Client:	Town of North Castle Water Department 15 Business Park Drive Armonk, NY 10504
ATTN:	Sal Misiti
Phone:	(914) 273-3000
Project Name:	TOWN OF NORTH CASTLE
Project Number:	WELL 1(Q4 '21)CONFIR
Report Date:	02/25/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com



Project Name: TOWN OF NORTH CASTLE
Project Number: WELL 1(Q4 '21)CONFIR

Lab Number: L2207392
Report Date: 02/25/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2207392-01	SCHOOL ST WELL 1	DW	WD4 SCHOOL ST	02/10/22 11:40	02/11/22
L2207392-02	FB	DW	WD4 SCHOOL ST	02/10/22 11:45	02/11/22

Project Name: TOWN OF NORTH CASTLE
Project Number: WELL 1(Q4 '21)CONFIR

Lab Number: L2207392
Report Date: 02/25/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: TOWN OF NORTH CASTLE
Project Number: WELL 1(Q4 '21)CONFIR

Lab Number: L2207392
Report Date: 02/25/22

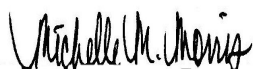
Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Michelle M. Morris

Title: Technical Director/Representative

Date: 02/25/22

ORGANICS

SEMIVOLATILES

Project Name: TOWN OF NORTH CASTLE**Lab Number:** L2207392**Project Number:** WELL 1(Q4 '21)CONFIR**Report Date:** 02/25/22**SAMPLE RESULTS**

Lab ID: L2207392-01

Date Collected: 02/10/22 11:40

Client ID: SCHOOL ST WELL 1

Date Received: 02/11/22

Sample Location: WD4 SCHOOL ST

Field Prep: Not Specified

Sample Depth:

Matrix: Dw

Extraction Method: EPA 533

Analytical Method: 136,533

Extraction Date: 02/22/22 17:30

Analytical Date: 02/24/22 16:26

Analyst: MP

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	4.74		ng/l	1.80	0.600	1
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	1.80	0.600	1
Perfluoropentanoic Acid (PFPeA)	7.30		ng/l	1.80	0.600	1
Perfluorobutanesulfonic Acid (PFBS)	3.70		ng/l	1.80	0.600	1
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	1.80	0.600	1
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEEESA)	ND		ng/l	1.80	0.600	1
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	1.80	0.600	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.80	0.600	1
Perfluorohexanoic Acid (PFHxA)	6.94		ng/l	1.80	0.600	1
Perfluoropentanesulfonic Acid (PFPeS)	1.01	J	ng/l	1.80	0.600	1
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	1.80	0.600	1
Perfluoroheptanoic Acid (PFHpA)	3.52		ng/l	1.80	0.600	1
Perfluorohexanesulfonic Acid (PFHxS)	9.38		ng/l	1.80	0.600	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	1.80	0.600	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.80	0.600	1
Perfluorooctanoic Acid (PFOA)	10.4		ng/l	1.80	0.600	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.80	0.600	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.80	0.600	1
Perfluorooctanesulfonic Acid (PFOS)	9.49		ng/l	1.80	0.902	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	1.80	0.600	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.80	0.600	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.80	0.600	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.80	0.600	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	1.80	0.600	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.80	0.600	1

Project Name: TOWN OF NORTH CASTLE**Lab Number:** L2207392**Project Number:** WELL 1(Q4 '21)CONFIR**Report Date:** 02/25/22**SAMPLE RESULTS**

Lab ID: L2207392-01

Date Collected: 02/10/22 11:40

Client ID: SCHOOL ST WELL 1

Date Received: 02/11/22

Sample Location: WD4 SCHOOL ST

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	100		50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	90		50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	110		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	144		50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	100		50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	92		50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	119		50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	91		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	122		50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	102		50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	114		50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	96		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	112		50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	112		50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	107		50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	93		50-200

Project Name: TOWN OF NORTH CASTLE**Lab Number:** L2207392**Project Number:** WELL 1(Q4 '21)CONFIR**Report Date:** 02/25/22**SAMPLE RESULTS**

Lab ID: L2207392-02
 Client ID: FB
 Sample Location: WD4 SCHOOL ST

Date Collected: 02/10/22 11:45
 Date Received: 02/11/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Dw
 Analytical Method: 136,533
 Analytical Date: 02/24/22 16:35
 Analyst: MP

Extraction Method: EPA 533
 Extraction Date: 02/22/22 17:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.85	0.618	1
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	1.85	0.618	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	1.85	0.618	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.85	0.618	1
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	1.85	0.618	1
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEEESA)	ND		ng/l	1.85	0.618	1
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	1.85	0.618	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.85	0.618	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.85	0.618	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.85	0.618	1
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	1.85	0.618	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.85	0.618	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.85	0.618	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	1.85	0.618	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.85	0.618	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.85	0.618	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.85	0.618	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.85	0.618	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.85	0.929	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	1.85	0.618	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.85	0.618	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.85	0.618	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.85	0.618	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	1.85	0.618	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.85	0.618	1

Project Name: TOWN OF NORTH CASTLE**Lab Number:** L2207392**Project Number:** WELL 1(Q4 '21)CONFIR**Report Date:** 02/25/22**SAMPLE RESULTS**

Lab ID: L2207392-02

Date Collected: 02/10/22 11:45

Client ID: FB

Date Received: 02/11/22

Sample Location: WD4 SCHOOL ST

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	106		50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	106		50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	117		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	108		50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	111		50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	104		50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	123		50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	102		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	109		50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	114		50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	113		50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	105		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	106		50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	118		50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	114		50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	111		50-200

Project Name: TOWN OF NORTH CASTLE
Project Number: WELL 1(Q4 '21)CONFIR

Lab Number: L2207392
Report Date: 02/25/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 136,533
Analytical Date: 02/24/22 13:15
Analyst: MP

Extraction Method: EPA 533
Extraction Date: 02/22/22 17:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab for sample(s): 01-02 Batch: WG1607926-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.668
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	2.00	0.668
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.668
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.668
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	2.00	0.668
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEEESA)	ND		ng/l	2.00	0.668
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	2.00	0.668
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.668
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.668
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.668
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	2.00	0.668
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.668
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.668
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.668
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	0.668
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.668
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.668
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.668
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	1.00
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.668
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	0.668
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.668
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.668
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.668
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.668

Project Name: TOWN OF NORTH CASTLE
Project Number: WELL 1(Q4 '21)CONFIR

Lab Number: L2207392
Report Date: 02/25/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 136,533
 Analytical Date: 02/24/22 13:15
 Analyst: MP

Extraction Method: EPA 533
 Extraction Date: 02/22/22 17:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab for sample(s): 01-02 Batch: WG1607926-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	104		50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	98		50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	111		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	101		50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	105		50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	103		50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	116		50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	103		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	109		50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	108		50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	108		50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	100		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	101		50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	110		50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	104		50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	111		50-200

Lab Control Sample Analysis **Batch Quality Control**

Project Name: TOWN OF NORTH CASTLE

Project Number: WELL 1(Q4 '21)CONFIR

Lab Number: L2207392

Report Date: 02/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab Associated sample(s): 01-02 Batch: WG1607926-2								
Perfluorobutanoic Acid (PFBA)	102		-		70-130	-		30
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	93		-		70-130	-		30
Perfluoropentanoic Acid (PFPeA)	105		-		70-130	-		30
Perfluorobutanesulfonic Acid (PFBS)	105		-		70-130	-		30
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	101		-		70-130	-		30
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEEESA)	103		-		70-130	-		30
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	84		-		70-130	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	107		-		70-130	-		30
Perfluorohexanoic Acid (PFHxA)	101		-		70-130	-		30
Perfluoropentanesulfonic Acid (PFPeS)	92		-		70-130	-		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	104		-		70-130	-		30
Perfluoroheptanoic Acid (PFHpA)	103		-		70-130	-		30
Perfluorohexanesulfonic Acid (PFHxS)	96		-		70-130	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	104		-		70-130	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	97		-		70-130	-		30
Perfluorooctanoic Acid (PFOA)	97		-		70-130	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	100		-		70-130	-		30
Perfluorononanoic Acid (PFNA)	100		-		70-130	-		30
Perfluorooctanesulfonic Acid (PFOS)	90		-		70-130	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	96		-		70-130	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	103		-		70-130	-		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: TOWN OF NORTH CASTLE

Lab Number: L2207392

Project Number: WELL 1(Q4 '21)CONFIR

Report Date: 02/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab Associated sample(s): 01-02 Batch: WG1607926-2								
Perfluorodecanoic Acid (PFDA)	98		-		70-130	-		30
Perfluoroundecanoic Acid (PFUnA)	102		-		70-130	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	90		-		70-130	-		30
Perfluorododecanoic Acid (PFDoA)	98		-		70-130	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	108				50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	100				50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	111				50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	103				50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	108				50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	100				50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	117				50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	104				50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	113				50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	107				50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	109				50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	103				50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	100				50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	109				50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	105				50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	111				50-200

Matrix Spike Analysis

Batch Quality Control

Project Name: TOWN OF NORTH CASTLE

Project Number: WELL 1(Q4 '21)CONFIR

Lab Number: L2207392

Report Date: 02/25/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab		Associated sample(s): 01-02			QC Batch ID: WG1607926-3		QC Sample: L2207360-01		Client ID: MS Sample			
Perfluorobutanoic Acid (PFBA)	3.04	39.1	44.7	107	-	-	-	-	70-130	-	-	30
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND	39.1	33.6	86	-	-	-	-	70-130	-	-	30
Perfluoropentanoic Acid (PFPeA)	3.46	39.1	45.0	106	-	-	-	-	70-130	-	-	30
Perfluorobutanesulfonic Acid (PFBS)	4.37	34.7	41.4	107	-	-	-	-	70-130	-	-	30
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND	39.1	39.7	102	-	-	-	-	70-130	-	-	30
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND	34.9	36.7	105	-	-	-	-	70-130	-	-	30
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND	39.1	32.0	82	-	-	-	-	70-130	-	-	30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	36.7	39.5	108	-	-	-	-	70-130	-	-	30
Perfluorohexanoic Acid (PFHxA)	4.02	39.1	43.2	100	-	-	-	-	70-130	-	-	30
Perfluoropentanesulfonic Acid (PFPeS)	ND	36.7	34.3	93	-	-	-	-	70-130	-	-	30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	39.1	41.4	106	-	-	-	-	70-130	-	-	30
Perfluoroheptanoic Acid (PFHpA)	2.85	39.1	45.0	108	-	-	-	-	70-130	-	-	30
Perfluorohexanesulfonic Acid (PFHxS)	1.44J	35.6	36.5	102	-	-	-	-	70-130	-	-	30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	36.9	36.7	99	-	-	-	-	70-130	-	-	30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	37.2	37.2	100	-	-	-	-	70-130	-	-	30
Perfluorooctanoic Acid (PFOA)	14.3	39.1	52.7	98	-	-	-	-	70-130	-	-	30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	37.3	40.1	108	-	-	-	-	70-130	-	-	30
Perfluorononanoic Acid (PFNA)	ND	39.1	39.2	100	-	-	-	-	70-130	-	-	30
Perfluorooctanesulfonic Acid (PFOS)	4.71	36.3	39.4	96	-	-	-	-	70-130	-	-	30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	36.5	37.1	102	-	-	-	-	70-130	-	-	30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	37.5	40.7	108	-	-	-	-	70-130	-	-	30
Perfluorodecanoic Acid (PFDA)	ND	39.1	38.8	99	-	-	-	-	70-130	-	-	30

Matrix Spike Analysis

Batch Quality Control

Project Name: TOWN OF NORTH CASTLE
Project Number: WELL 1(Q4 '21)CONFIR

Lab Number: L2207392
Report Date: 02/25/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab			Associated sample(s): 01-02			QC Batch ID: WG1607926-3			QC Sample: L2207360-01		Client ID: MS Sample	
Perfluoroundecanoic Acid (PFUnA)	ND	39.1	39.8	102		-	-		70-130	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	36.9	36.9	100		-	-		70-130	-		30
Perfluorododecanoic Acid (PFDoA)	ND	39.1	39.7	102		-	-		70-130	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	99				50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	121				50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	115				50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	81				50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	93				50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	80				50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	87				50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	78				50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	115				50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	98				50-200
Perfluoro[13C4]Butanoic Acid (MPFBA)	90				50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	81				50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	107				50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	77				50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	80				50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	106				50-200

Lab Duplicate Analysis Batch Quality Control

Project Name: TOWN OF NORTH CASTLE

Project Number: WELL 1(Q4 '21)CONFIR

Lab Number: L2207392

Report Date: 02/25/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1607926-4 QC Sample: L2207362-01 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	1.89J	1.71J	ng/l	NC		30
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND	ND	ng/l	NC		30
Perfluoropentanoic Acid (PFPeA)	1.93J	2.00J	ng/l	NC		30
Perfluorobutanesulfonic Acid (PFBS)	1.13J	1.12J	ng/l	NC		30
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND	ND	ng/l	NC		30
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND	ND	ng/l	NC		30
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	2.26	2.46	ng/l	8		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	1.05J	1.00J	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	1.93J	2.00J	ng/l	NC		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	4.11	4.17	ng/l	1		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	3.46	3.58	ng/l	3		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis Batch Quality Control

Project Name: TOWN OF NORTH CASTLE
Project Number: WELL 1(Q4 '21)CONFIR

Lab Number: L2207392
Report Date: 02/25/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1607926-4 QC Sample: L2207362-01 Client ID: DUP Sample						
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
11-Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	103		95		50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	91		85		50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	101		97		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	134		126		50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	104		89		50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	97		87		50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	109		105		50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	101		87		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	122		117		50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	106		93		50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	106		103		50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	96		86		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	102		103		50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	101		99		50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	94		94		50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	101		87		50-200

Project Name: TOWN OF NORTH CASTLE**Lab Number:** L2207392**Project Number:** WELL 1(Q4 '21)CONFIR**Report Date:** 02/25/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information**Cooler** **Custody Seal**

A Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2207392-01A	Plastic 250ml Ammonium Acetate preserved	A	NA		3.8	Y	Absent		A2-533(28)
L2207392-01B	Plastic 250ml Ammonium Acetate preserved	A	NA		3.8	Y	Absent		A2-533(28)
L2207392-02A	Plastic 250ml Ammonium Acetate preserved	A	NA		3.8	Y	Absent		A2-533(28)

Project Name: TOWN OF NORTH CASTLE
Project Number: WELL 1(Q4 '21)CONFIR

Serial_No:02252220:30
Lab Number: L2207392
Report Date: 02/25/22

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name: TOWN OF NORTH CASTLE
Project Number: WELL 1(Q4 '21)CONFIR

Lab Number: L2207392
Report Date: 02/25/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: TOWN OF NORTH CASTLE
Project Number: WELL 1(Q4 '21)CONFIR

Lab Number: L2207392
Report Date: 02/25/22

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers



Project Name: TOWN OF NORTH CASTLE
Project Number: WELL 1(Q4 '21)CONFIR

Lab Number: L2207392
Report Date: 02/25/22

Data Qualifiers

- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: DU Report with 'J' Qualifiers



Project Name: TOWN OF NORTH CASTLE
Project Number: WELL 1(Q4 '21)CONFIR

Lab Number: L2207392
Report Date: 02/25/22

REFERENCES

- 136 Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). EPA Method 533, EPA Document 815-B-19-020, November 2019.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Alpha Analytical, Inc.

ID No.:17873

Facility: **Company-wide**

Revision 19

Department: **Quality Assurance**

Published Date: 4/2/2021 1:14:23 PM

Title: **Certificate/Approval Program Summary**

Page 1 of 1

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility**EPA 624/624.1:** m/p-xylene, o-xylene, Naphthalene**EPA 625/625.1:** alpha-Terpineol**EPA 8260C/8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.**EPA 8270D/8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.**Mansfield Facility****SM 2540D:** TSS**EPA 8082A:** NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B


The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:**Drinking Water****EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,****EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B****EPA 332:** Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.****Non-Potable Water****SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,****SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.**EPA 624.1:** Volatile Halocarbons & Aromatics,**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.****Mansfield Facility:****Drinking Water****EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.****EPA 522, EPA 537.1.****Non-Potable Water****EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.**EPA 245.1 Hg.****SM2340B**

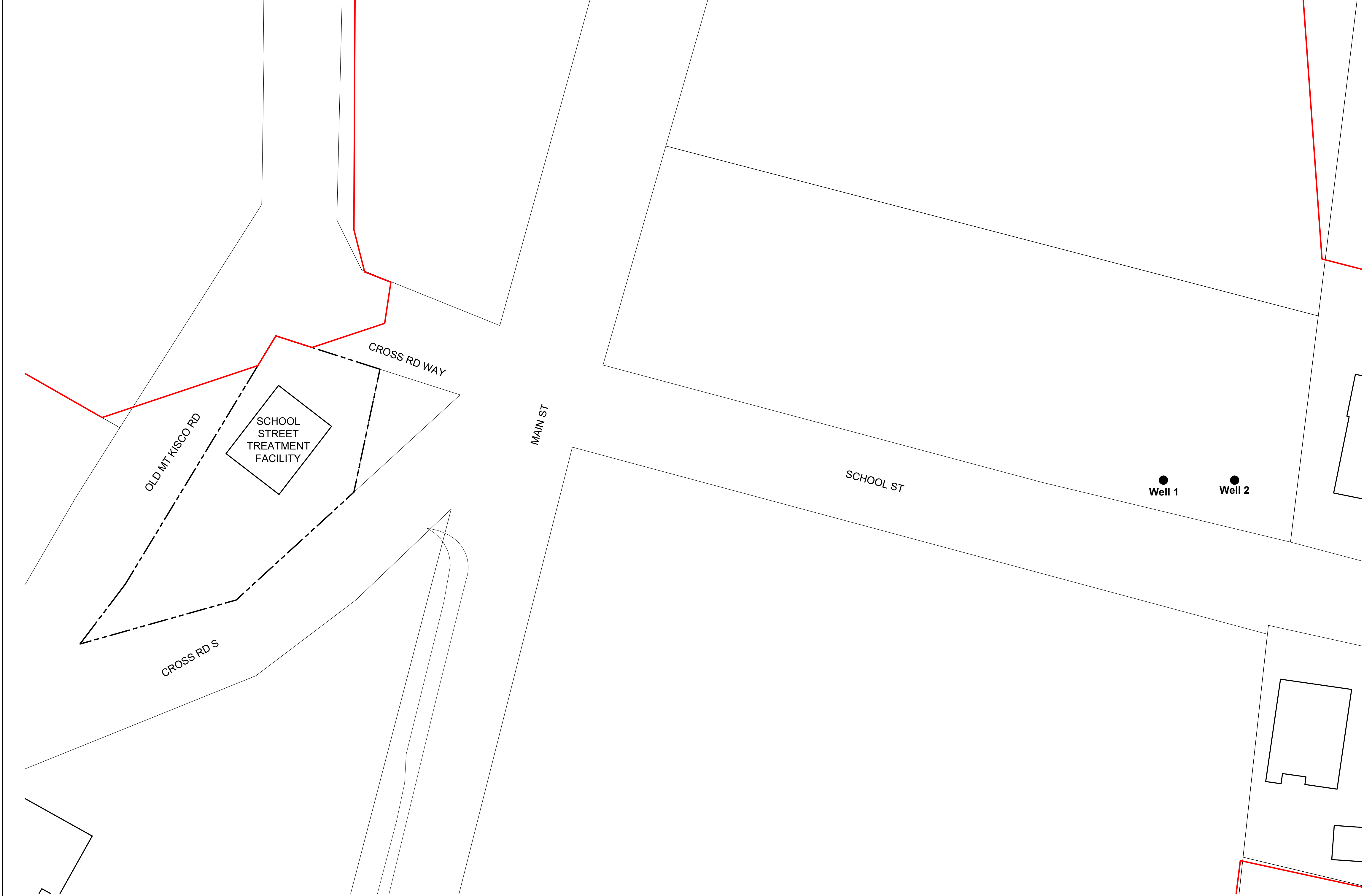
For a complete listing of analytes and methods, please contact your Alpha Project Manager.

 NEW YORK CHAIN OF CUSTODY Westborough, MA 01581 8 Walkup Dr. TEL: 508-898-9220 FAX: 508-898-9193		Service Centers Mahwah, NJ 07430: 35 Whitney Rd, Suite 5 Albany, NY 12205: 14 Walker Way Tonawanda, NY 14150: 275 Cooper Ave, Suite 105		Page <u>1</u> of <u>2</u>		Date Rec'd in Lab <u>2/12/22</u>		ALPHA Job # <u>220792</u>	
		Project Information Project Name: <u>TOWN OF NORTH CASTLE</u> Project Location: <u>WDY SCHOOL ST</u> Project # <u>WELL 1 Q4'2D CONFIRMATION</u> (Use Project name as Project #) <input type="checkbox"/>		Deliverables <input type="checkbox"/> ASP-A <input type="checkbox"/> ASP-B <input type="checkbox"/> EQuIS (1 File) <input type="checkbox"/> EQuIS (4 File) <input type="checkbox"/> Other		Billing Information <input type="checkbox"/> Same as Client Info PO #			
Client Information Client: <u>TOWN OF NORTH CASTLE</u> Address: <u>15 BUSINESS PARK DR</u> <u>ARMONK NY 10504</u> Phone: <u>914 273-3000 X55</u> Fax: Email: <u>SMISITI@NORTHCASTLE.NY.GOV</u>		Project Manager: <u>SAL MISITI</u> ALPHAQuote #: Turn-Around Time Standard <input checked="" type="checkbox"/> Rush (only if pre approved) <input type="checkbox"/>		Regulatory Requirement <input type="checkbox"/> NY TOGS <input type="checkbox"/> NY Part 375 <input type="checkbox"/> AWQ Standards <input type="checkbox"/> NY CP-51 <input type="checkbox"/> NY Restricted Use <input checked="" type="checkbox"/> Other <input type="checkbox"/> NY Unrestricted Use <input type="checkbox"/> NYC Sewer Discharge		Disposal Site Information Please identify below location of applicable disposal facilities. Disposal Facility: <input type="checkbox"/> NJ <input type="checkbox"/> NY <input type="checkbox"/> Other:			
These samples have been previously analyzed by Alpha <input type="checkbox"/>		Other project specific requirements/comments: <u>Q4'21 CONFIRMATION SCH ST WELL 1</u> Please specify Metals or TAL.		ANALYSIS		Sample Filtration <input type="checkbox"/> Done <input type="checkbox"/> Lab to do <input type="checkbox"/> Lab to do (Please Specify below) Sample Specific Comments			
ALPHA Lab ID (Lab Use Only)		Sample ID		Collection Date Time		Sample Matrix		Sampler's Initials	
<u>07392-01</u> <u>-02</u>		<u>SCHOOL ST WELL 1</u> <u>F3</u>		<u>2/10/22 11:40am</u> <u>2/10/22 11:45am</u>		<u>SM</u> <u>SM</u>		<u>SM</u> <u>SM</u>	
Preservative Code: A = None B = HCl C = HNO ₃ D = H ₂ SO ₄ E = NaOH F = MeOH G = NaHSO ₄ H = Na ₂ S ₂ O ₃ K/E = Zn Ac/NaOH O = Other		Container Code P = Plastic A = Amber Glass V = Vial G = Glass B = Bacteria Cup C = Cube O = Other E = Encore D = BOD Bottle		Westboro: Certification No: MA935 Mansfield: Certification No: MA015		Container Type <u>P</u> Preservative		Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)	
Form No: 01-25 HC (rev. 30-Sept-2013)		Relinquished By: <u>Paul Lacro</u> <u>AAL</u> <u>2/11</u>		Date/Time <u>2/11/22 8:55am</u> <u>2/11/22 9:51</u> <u>2/11</u>		Received By: <u>Paul Lacro</u> <u>AAL</u> <u>2/11/22 8:55</u> <u>2/11 1800</u> <u>2/11/22 0300</u>		Date/Time <u>2/11/22 8:55</u> <u>2/11 1800</u> <u>2/11/22 0300</u>	

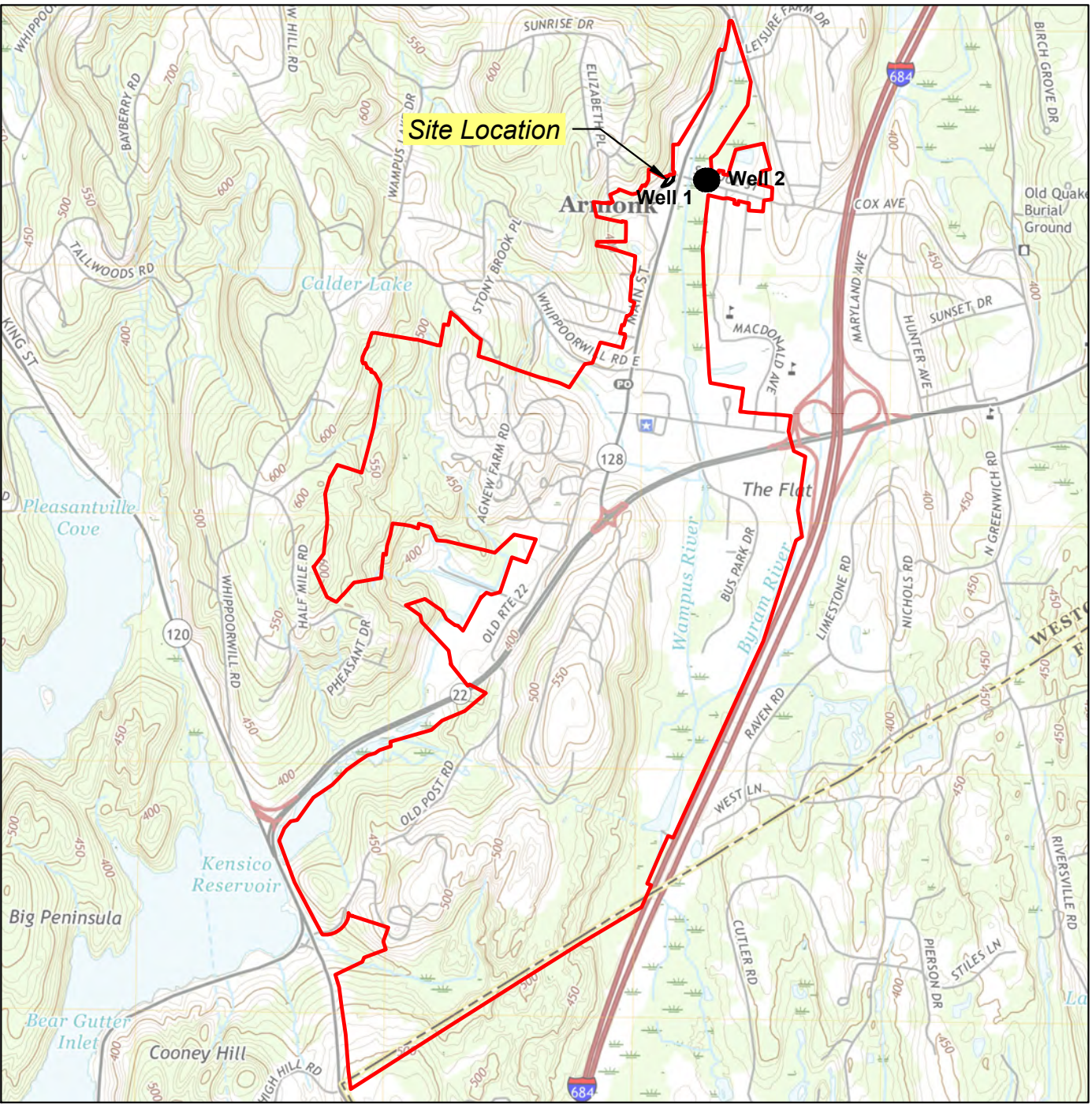
SHEET

D

C:\DWG\Town of North Castle\Water District 401 Old Mt Kisco Rd\1_SitePlan.dwg_Layout1_4/19/2022 9:08:09 AM_DWG To PDF.pcd



- LEGEND
- PROPERTY BOUNDARY
 - WATER DISTRICT #4 BOUNDARY
 - WATER DISTRICT #4 PRODUCTION WELL LOCATION



SOURCE: USGS TOPOGRAPHIC QUADRANGLES MOUNT KISCO, NEW YORK-CONNECTICUT (2019) AND GLENVILLE, CONNECTICUT-NEW YORK (2018).

SITE LOCATION MAP
SCALE: 1" = 2000'



WSP
WSP USA Inc.
4 Research Drive, Suite 204
Shelton, Connecticut 06484
(203) 929-8555

School Street System
91 Old Mount Kisco Road
Armonk, New York

SITE PLAN

DRAWN BY
CHECKED
APPROVED
DATE

RAC
JP
MS
04/19/22

SEAL

REVISIONS

REV	DESCRIPTION
1	Revised
2	Revised
3	Revised

1 of 2

Sheet Number
1