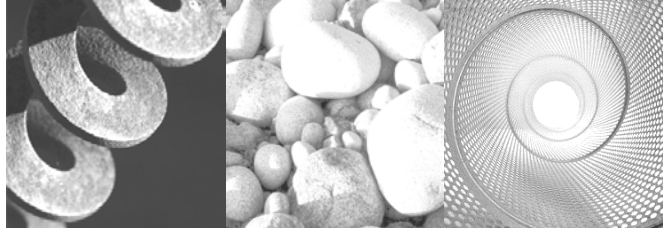


Appendix F Emerging Contaminant Groundwater Sampling Work, Report and NYSDEC Approval



Consulting
Engineers and
Scientists

Emerging Contaminant Groundwater Sampling Report

National Grid Downstate New York MGP Sites

Brooklyn, Queens, and Long Island, New York

Submitted to:

National Grid
175 East Old Country Road
Hicksville, NY 11801

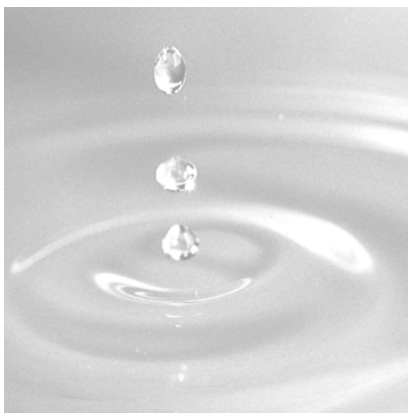
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February 2019
Project 1803556

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FEBRUARY 2019

CERTIFICATION STATEMENT

I, KATHLEEN SLIMON, certify that I am currently a New York State registered professional engineer and that this Groundwater Sampling Report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10).

Date

Kathleen Slimon
GEI Consultants, Inc. P.C.
New York State Professional Engineer
License Number 094322

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

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- B. Laboratory Data Usability Summary Reports (Electronic Only)

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DRAFT

Abbreviations and Acronyms

bgs	below ground surface
DER	Division of Environmental Remediation
D&B	Dvirka and Bartilucci
EPA	Environmental Protection Agency
GEI	GEI Consultants, Inc., P.C.
LIPA	Long Island Power Authority
LIRR	Long Island Railroad
LNG	liquified natural gas
LPG	liquified petroleum gas
MGP	Manufactured Gas Plant
MTA	Metropolitan Transportation Authority
NAPL	Non-Aqueous Phase Liquid
NCI	National Cancer Institute
ng/L	nanogram per liter
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PFOA	Perfluorooctanoic acid
PFAS	Per- and Polyfluoroalkyl Substances
PFBA	Perfluorobutanoic acid
PFHxS	Perfluorohexanesulfonic acid
PFOS	Perfluorooctane sulfonic acid
ppt	parts per trillion
PS&S	Paulus, Sokolowski and Sartor Engineering PC
PSEG	Public Service Enterprise Group
SNG	substitute natural gas
SCWA	Suffolk County Water Authority
TCA	Trichloroethane
µg/L	micrograms per liter

Executive Summary

This report has been prepared by GEI Consultants, Inc., P.C. (GEI) on behalf of National Grid and presents the results of emerging contaminant groundwater sampling at the downstate former Manufactured Gas Plant (MGP) sites. As a result of certain emerging contaminants having been found in a number of drinking water supplies in New York State, the Clean Water Infrastructure Act of 2017 directed the New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), to build a comprehensive database, evaluate, and prioritize inactive solid waste sites statewide to determine any potential impacts from emerging contaminants on drinking water sources. To implement this directive, NYSDEC issued letters to remediation sites with existing monitoring wells requesting the collection of groundwater samples and submittal of data for per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. National Grid has an extensive monitoring well network at various MGP sites in New York. Therefore, by letters dated May 30, 2018, NYSDEC requested National Grid sample a select number of existing monitoring wells from specified former MGP sites for PFAS and 1,4-dioxane in order to utilize existing well infrastructure to satisfy NYSDEC's commitment to analyze representative groundwater samples at remediation sites for emerging contaminants.

PFAS and 1,4-dioxane have historically not been evaluated at MGP remediation sites because they are not associated with former MGP operations. It is well documented that PFAS were not manufactured before the 1940's and 1,4 dioxane was not manufactured prior to 1951, which makes it highly unlikely that these chemicals were used at MGP sites. PFAS are a large group of highly soluble manmade chemicals that have been widely used since the 1940s to make fluoropolymer coatings and are present in a multitude of everyday products to increase resistance to stains, grease, heat, and water. 1,4-Dioxane is used primarily as a solvent in paints, varnishes, lacquers, cosmetics, deodorants, cleaning and detergent preparations, and in scintillating fluids and was not manufactured prior to 1951. Many of the sites identified for sampling by NYSDEC have been sold and used for other purposes since their use as MGP sites and are located within highly industrial areas with many potential sources of the 1,4-dioxane and PFAS compounds.

The emerging contaminant groundwater sampling was performed in accordance with the *Emerging Contaminant Groundwater Sampling Work Plan, National Grid Downstate and Upstate New York MGP Sites* (Work Plan) letter from National Grid to NYSDEC, dated September 4, 2018. In accordance with the NYSDEC-approved Work Plan, precautions were taken during sampling for PFAS to minimize the potential for false detections.

Groundwater sampling was completed at 18 of the 24 downstate former MGP sites identified in the Work Plan between September 24, 2018 and October 23, 2018. Sampling has not been completed at the following six sites due to site access issues.

- Babylon MGP Site
- Citizens MGP – Carroll Gardens Site
- Jamaica Gas and Light MGP Site
- Metropolitan Works MGP Site
- Union Station Holder Site
- Williamsburg Works MGP Site

National Grid is continuing to seek access to these sites from the current property owners. The data for these sites will be submitted in the future after access has been obtained, the sampling has been completed, and validated analytical data is available.

At the 18 sites where sampling has been completed, two to five groundwater wells were selected for sampling at each site to represent upgradient, on site, and downgradient groundwater conditions, where possible. Groundwater samples were collected at a total of 54 wells and analyzed for PFAS and 1,4-dioxane. Each sample was analyzed by Test America (Edison, New Jersey and Burlington, Vermont) for the following analyses in accordance with the Work Plan:

- Modified United States Environmental Protection Agency (EPA) Method 537
- 1,4-dioxane by EPA Method SIM 8270D

Quality Assurance/Quality Control samples were collected in accordance with the Work Plan and Quality Assurance Project Plan.

1,4-Dioxane was detected at concentrations above the NYSDEC Groundwater and Drinking Water Screening Level (0.35 ug/L) at six of the 18 sites, in a total of eight of the 54 wells sampled. Five sites had concentrations of 1,4-dioxane detected above the Screening Level in only one of the wells sampled at the site and one site had concentrations of 1,4-dioxane detected in all three wells sampled at this site.

PFAS compounds were detected at concentrations above the NYSDEC Screening Levels at 16 of the 18 sites in 36 of the 54 wells sampled. The two sites that did not have concentrations of PFAS compounds above the Screening Levels were the Glen Cove and Sag Harbor sites. Of the 16 sites that had PFAS concentrations above the Screening Levels, 12 sites (20 wells) had concentrations above the higher Groundwater Screening Levels.

1. Introduction

This report has been prepared by GEI Consultants, Inc., P.C. (GEI) on behalf of National Grid and presents the results of emerging contaminant groundwater sampling at the downstate former Manufactured Gas Plant (MGP) sites. The emerging contaminant groundwater sampling was performed in accordance with the *Emerging Contaminant Groundwater Sampling Work Plan, National Grid Downstate and Upstate New York MGP Sites* (Work Plan) letter from National Grid to the New York State Department of Environmental Conservation (NYSDEC) dated September 4, 2018.

As a result of certain emerging contaminants having been found in a number of drinking water supplies in New York State, the Clean Water Infrastructure Act of 2017 directed NYSDEC, in consultation with New York State Department of Health (NYSDOH), to build a comprehensive database, evaluate, and prioritize inactive solid waste sites statewide to determine any potential impacts from emerging contaminants on drinking water sources. To implement this directive, NYSDEC issued letters to remediation sites with existing monitoring wells requesting the collection of groundwater samples and submittal of data for per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. National Grid has an extensive monitoring well network at various MGP sites in New York. Therefore, by letters dated May 30, 2018, NYSDEC requested National Grid sample a select number of existing monitoring wells from specified former MGP sites for PFAS and 1,4-dioxane in order to utilize existing well infrastructure to satisfy NYSDEC's commitment to analyze representative groundwater samples at remediation sites for emerging contaminants. Many of the sites identified for sampling by NYSDEC have been sold and used for other purposes since their use as MGP sites and are located within highly industrial areas with many potential sources of the 1,4-dioxane and PFAS compounds.

PFAS are a large group of highly soluble manmade chemicals that have been widely used since the 1940s to make fluoropolymer coatings and everyday products more resistant to stains, grease, heat, and water (EPA, 2018a and 2018b). Fluoropolymer coatings are blends of resins and lubricants used in products such as water-repellent clothing, furniture, adhesives, paint and varnish, food packaging, heat-resistant non-stick cooking surfaces and insulation of electrical wires (NYSDEC, 2018). Although the use of perfluorooctanoic acid (PFOA) is being phased out, the chemical is still used to make household and commercial products that resist heat and repel stains. Perfluorooctane sulfonic acid (PFOS) is used in fire-fighting foam and is a newly listed hazardous substance (as is PFOA). PFAS are highly soluble, stable, and have low volatility. They are dispersed by air emissions into the atmosphere or deposited directly to surface water or the land surface. PFAS present in unsaturated soils leach downward through the subsurface with precipitation and are transported via groundwater flow. Since PFAS were not manufactured prior to the 1940s and

are not associated with former MGP site operations, it is highly unlikely that these chemicals were used at MGP sites.

1,4-Dioxane is used primarily as a solvent in paints, varnishes, lacquers, cosmetics, deodorants, cleaning and detergent preparations, and in scintillating fluids. 1,4-Dioxane often has been used with chlorinated solvents, particularly 1,1,1-trichloroethane (TCA), as a stabilizer and corrosion inhibitor (EPA, 2018c). Commercial production of 1,4-dioxane in the United States was first reported in 1951 (NCI, 1985). Since 1,4-dioxane was not manufactured prior to 1951 and is not associated with former MGP site operations, it is highly unlikely that this chemical was used at MGP sites.

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2. Scope of Work

2.1 Groundwater Sampling Summary

Groundwater sampling was completed at 18 of the 24 downstate former MGP sites identified in the Work Plan between September 24, 2018 and October 23, 2018. Sampling has not been completed at the following six sites due to site access issues.

- Babylon MGP Site
- Citizens MGP – Carroll Gardens Site
- Jamaica Gas and Light MGP Site
- Metropolitan Works MGP Site
- Union Station Holder Site
- Williamsburg Works MGP Site

National Grid is continuing to seek access to these sites from the current property owners. The data for these sites will be submitted in the future after access has been obtained, the sampling has been completed, and validated analytical data is available.

For the 18 sites where sampling has been completed, the Work Plan identified sampling a total of two to five groundwater wells at each site to represent upgradient, on site, and downgradient groundwater conditions, where possible. The wells were selected based on a review of site specific groundwater conditions and the location of existing groundwater monitoring wells. Some of the wells identified in the Work Plan were damaged, contained non-aqueous phase liquid (NAPL), or could not be located. For these wells, replacement wells were identified in the field and sampled. A summary of wells sampled at each of the sites, any deviations from the Work Plan, and the sampling dates are provided in Table 1. The rationale for well selection is provided with the discussion of results for each of the sites in Section 3 below. Groundwater samples were collected at a total of 54 wells and analyzed for PFAS and 1,4-dioxane in accordance with the Work Plan.

2.2 Sampling and Analysis Program

The Work Plan provides the means and methods for sampling groundwater and analyzing for 1,4-dioxane and PFAS. The samples were collected in accordance with the Field Sampling Plan and NYSDEC Guidance, which provide specific precautions to be taken during sampling for PFAS to minimize the potential for false detections. Depth to groundwater measured from each well prior to sampling and final groundwater discharge parameters recorded for each well are provided in Appendix A.

Each sample was analyzed by Test America (Edison, New Jersey and Burlington, Vermont), NYSDOH Environmental Laboratory Approval Program certified and National Environmental Laboratory Accreditation Program-accredited laboratories, for the following analyses in accordance with the Work Plan:

- Modified United States Environmental Protection Agency (EPA) Method 537
- 1,4-Dioxane by EPA Method SIM 8270D

Quality Assurance/Quality Control samples were collected in accordance with the Work Plan and Quality Assurance Project Plan.

Analytical results were provided in a New York State Category B data deliverable format. The data was validated by GEI in accordance with New York State Analytical Service Protocols. Data usability summary reports were prepared to document the adequacy of the analytical data obtained from the laboratory and to discuss any quality control non-compliance issues or limitations on the use of the data. In December 2018, GEI provided the data in the NYSDEC-required format. The data usability summary reports are provided in Appendix B.

3. Findings

The discussion below presents the analytical results from groundwater samples collected at each site and a comparison to the NYSDEC Screening Values provided in the August 20, 2018 NYSDEC letter (NYSDEC 2018a). Groundwater analytical results for each site are compared to the NYSDEC Screening Values and summarized in Tables 2 through 19. Groundwater monitoring well locations and analytical results at concentrations above the NYSDEC Screening Values are provided in Figures 1 through 18 for each of the sites.

The location of water supply wells within a ½-mile of each of the sites was identified through review of existing well search information provided in previous site investigation reports and review of information provided by NYSDEC's Google Earth Water Wells map that provides information on water supply wells installed after April 2000. The location of water supply wells identified within a ½-mile of the site is provided in Figures 19 through 26, for each of the applicable sites.

3.1 Bay Ridge Holder Stations A & B Site

The validated analytical results for the Bay Ridge Holder Station site compared against the NYSDEC Screening Levels are provided in Table 2. The groundwater monitoring well locations and analytes detected at concentrations above the NYSDEC Screening Levels are provided in Figure 1.

There are currently no existing groundwater monitoring wells on Bay Ridge Holder Station A. The following two groundwater monitoring wells identified in the Work Plan were sampled on Bay Ridge Holder Station B:

- MW-112: upgradient on-site well located on the southern upgradient corner of Holder Station B; and
- MW-105: downgradient off-site well located on the sidewalk downgradient of the north-central Holder Station B property line.

Concentrations of PFOA are above the Drinking Water Screening Level but are below the Groundwater Screening Level in both MW-112 and MW-105. Total PFAS concentrations range from 116.89 ng/L in the downgradient location (MW-105) to 238.7 ng/L at upgradient sample location MW-112. Concentrations of 1,4-dioxane were not detected in either sample.

Holder Station B operated as a holder station from prior to 1905 until between 1956 and 1966 and is currently owned and operated by National Grid. A natural gas gate station and vacant land occupy the eastern portion of the site and baseball fields are present on the western portion of the site (AECOM, 2012).

There are no water supply wells within a ½ mile of the site (Environmental Data Resources Inc. (EDR) 2005) and there were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000.

3.2 Bay Shore MGP Site

The validated analytical results for the Bay Shore site compared against the NYSDEC Screening Levels are provided in Table 3. The groundwater monitoring well locations and analytes detected at concentrations above the NYSDEC Screening Levels are provided in Figure 2.

The following five groundwater monitoring wells identified in the Work Plan were sampled at the Bay Shore former MGP site:

- MW-29S: upgradient on-site well located on the Brightwaters Yard portion of Operable Unit 3 (OU-3);
- OU3MW-11S: downgradient on-site well located on the Brightwaters Yard portion of OU-3;
- MW-09I: upgradient on-site well located on the upgradient OU-1 site boundary in the gas regulating station;
- BMW-41I: on-site well in OU-1 North; and
- OU2MW-57I: off-site well downgradient of OU-1 on the upgradient OU-2 boundary, immediately downgradient of the former King Bear/Summers Lumber properties.

Concentrations of PFOS were above the Drinking Water Screening Level but were below the Groundwater Screening Level in samples collected from the OU-1 on-site well BMW-41I and OU-1 downgradient well OU2MW-57I. There were no analytes detected above the NYSDEC Screening Levels at the OU-1 upgradient well or the wells sampled on OU-3. Total PFAS values ranged from 53.11 ng/L at MW-29S to 104.98 ng/L at OU2MW-57I. Concentrations of 1,4-dioxane were not detected in any sample.

The site operated as an MGP from 1889 to 1973. The OU-1 and OU-3 Brightwaters Yard portion of the site is currently owned by National Grid. OU-1 North was the location of the main MGP operations and is currently vacant with the exception of a natural gas regulating station on the northern property boundary. The highest PFAS concentration detected was in OU2MW-57I, which is located downgradient of the King Bear/Summers Lumber properties that were not part of the MGP operations. These properties were operated as an automobile service center and lumber yard prior to being purchased by National Grid to facilitate the remediation of MGP impacts. A former drywell associated with the automotive operations was located immediately upgradient of OU2MW-57I. The dry well was tied to the bay drains in the former automotive service center.

There were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000. The following information on water supply wells within a ½-mile of the Bay Shore former MGP site was obtained from the 2002 Remedial Investigation Report (D&B 2002a). A total of 18 public water supply and five NYSDEC-registered private supply wells were identified in 2002 within a 1/2-mile radius of the site. The location of each water supply well is shown in Figure 19.

The Suffolk County Water Authority (SCWA) Fifth Avenue Public Water Supply Well Field (Station 27) is located approximately 1/4-mile northwest and upgradient of the site. The SCWA Fifth Avenue well field, consists of 18 wells, however, only two of the 18 wells were active at the time of the 2002 RI. The active wells extract water from the Magothy aquifer. Five privately owned water supply wells were identified within 1/2-mile of the site in 2002. The private well uses were identified as for irrigation or air conditioning purposes.

3.3 Clifton MGP Site

The validated analytical results for the Clifton site compared against the NYSDEC Screening Levels are provided in Table 4. The groundwater monitoring well locations and analytes detected at concentrations above the NYSDEC Screening Levels are provided in Figure 3.

The following three groundwater monitoring wells were sampled at the Clifton former MGP site:

- RW-210I: on-site upgradient well, located in the southern upgradient corner of OU-2. Intermediate well RW-210I (screened 25 to 35 ft bgs) was sampled in place of adjacent shallow well RW-210S (screened 15 to 25 ft bgs) identified in the Work Plan due to NAPL observed at RW-210S;
- RW-202S: on-site well, located on the northeastern downgradient edge of OU-2; and
- RW-23: off-site downgradient well; located at 1 Edgewater Street/Edgewater Plaza.

There were no emerging contaminants detected above the NYSDEC Screening Values at the on-site upgradient well RW-210I or the on-site well RW-202S. The concentration of PFOA was above the Groundwater Screening Level and the concentration of PFOS was above the Drinking Water Screening Level in the sample collected from the off-site downgradient well, RW-23. Total PFAS values ranged from 0.62 ng/L at RW-210I to 208.43 ng/L at RW-23. Concentrations of 1,4-dioxane were not detected in any sample.

The site operated as an MGP from 1856 to 1957. The OU-2 portion of the site is currently owned and by National Grid and is vacant land. The off-site downgradient well, RW-23, is located on Edgewater Plaza. Edgewater Plaza was a former oil terminal owned by others, and the current site use is as an office building (AECOM, 2016a).

No water supply wells have been identified within a ½ mile of the site.

3.4 Equity Works MGP Site

The validated analytical results for the Equity Works site compared against the NYSDEC Screening Levels are provided in Table 5. The groundwater monitoring well locations and analytes detected at concentrations above the NYSDEC Screening Levels are provided in Figure 4.

The following three groundwater monitoring wells identified in the Work Plan were sampled at the Equity Works former MGP site:

- MW-6B: off-site upgradient, located in the sidewalk approximately 50-feet west of the site;
- MW-8B: on site, on the northwest portion of the site; and
- MW-11B: off-site downgradient, located approximately 100-feet southeast of the site in the Federal Express truck terminal parking lot.

Concentrations of perfluorobutanoic acid (PFBA), perfluoropentanoic acid (PFPeA), PFOA and Total PFAS were above the Groundwater Screening Level and PFOS was above the Drinking Water Screening Level in the sample collected from the on-site well MW-8B. There were PFAS compounds detected above the Screening Levels in the upgradient or downgradient off-site wells. Concentrations of 1,4-dioxane were above the Groundwater Screening Level in the samples collected from all three wells. The 1,4-dioxane concentrations ranged from 0.43 ug/L in the on-site well MW-8B to 1.1 ug/L in the downgradient well MW-11B.

The site operated as an MGP from 1892 to 1929 and was decommissioned in 1933. The property was sold in 1951 and has been used for pipe and valve storage, waste recycling, and as a transfer station, and is not currently owned by National Grid (AECOM, 2016b). The site use as a solid waste transfer facility from 1989 to present is believed to have resulted in a complex nature of environmental impacts to soil and groundwater and is a potential source of 1,4-dioxane and PFAS at the site.

There were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000. There are reports of a private water supply well located at a truck wash facility upgradient of the site at 184 Maspeth Avenue as shown in Figure 20. No further details are available for this well. There were no water supply wells identified in the search performed by EDR (EDR 2004a).

3.5 Far Rockaway MGP Site

The validated analytical results for the Far Rockaway site compared against the NYSDEC Screening Levels are provided in Table 6. The groundwater monitoring well locations and

analytes detected at concentrations above the NYSDEC Screening Levels are provided in Figure 5.

The following three groundwater monitoring wells identified in the Work Plan were sampled at the Far Rockaway former MGP site:

- MW-116D: upgradient, on sidewalk on adjacent eastern property boundary;
- MW-118DR: near site, on sidewalk on adjacent downgradient western property boundary; and
- MW-119D: downgradient, approximately 100 feet west of the site downgradient of the adjacent Long Island Railroad (LIRR) property.

Concentrations of PFOA and PFOS were above the Drinking Water Screening Level in all of the samples and the PFOS concentration was above the Groundwater Screening Level in the sample collected from the near site well MW-118DR. Total PFAS ranged from 139.25 ng/L at downgradient well MW-119D to 248.99 ng/L at the near site downgradient well MW-118DR. Concentrations of 1,4-dioxane were not detected in any sample.

The site operated as a MGP between the mid 1890's and 1909. The property was sold in 1965 and is not currently owned by National Grid. Following the operation of the MGP, the site was utilized as office and manufacturing space. The site was used for plastic and other manufacturing uses from approximately 1975 until 1999.

There were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000. The results of an informal well survey performed by AECOM are presented below and on Figure 21. There were multiple water supply wells located within a ½ mile of the site, however, the current status and use of these wells has not been identified. One public supply well location (NY0003913) was identified in a 2004 EDR Report (EDR 2004b), as shown on Figure 21.

3.6 Flatbush Station A & B Site

The validated analytical results for the Flatbush Station A & B former holder site compared against the NYSDEC Screening Levels are provided in Table 7. The groundwater monitoring well locations and analytes in detected at concentrations above the NYSDEC Screening Levels are provided in Figure 6.

The following three groundwater monitoring wells identified in the Work Plan were sampled at the Flatbush Station A & B site:

- MW-2: on-site upgradient, located in the northeast corner of the current State University of New York (SUNY) parking lot;
- MW-4: on site, located immediately south of the northern SUNY parking lot, and;

- MW-7: on-site downgradient, located on the western portion of the southern downgradient site boundary.

Concentrations of PFOA and PFOS were detected above the Drinking Water Screening Level but are below the Groundwater Screening level in all three of the samples. Total PFAS concentrations ranged from 139.53 ng/L at on-site well MW-4 to 212.27 ng/L at upgradient well MW-2. Concentrations of 1,4-dioxane were not detected in any sample.

The site operated as a MGP from approximately 1873 until between 1947 and 1954. The properties were sold in 1929, 1943, 1955, and 1980 and are not currently owned by National Grid. The properties have been used for parking lots, manufacturing, auto body shop, as a garage, and packaging tobacco and candy. The current uses of the site include the SUNY parking areas and the SUNY Health Science Center (AECOM, 2016c).

There are no water supply wells within a ½ mile of the site (EDR 2004c) and there were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000.

3.7 Former Brooklyn Borough Gas Works (Coney Island) MGP Site

The validated analytical results for the Coney Island site compared against the NYSDEC Screening Levels are provided in Table 8. The groundwater monitoring well locations and analytes detected at concentrations above the NYSDEC Screening Levels are provided in Figure 7.

The following three groundwater monitoring wells identified in the Work Plan were sampled at the Coney Island site:

- MW-18: on-site upgradient, on the north-central property boundary;
- MW-2: on site, in the central portion of the site; and
- MW-16: on-site downgradient, on the south-southeastern property boundary.

Concentrations of PFOA were above the Groundwater Screening Level in all three of the samples. Concentrations of PFOS were above the Groundwater Screening Level in on site downgradient well MW-16 and on site upgradient well MW-18 and was above the Drinking Water Screening Level in on-site well MW-2. The highest PFAS concentrations were detected in on site downgradient well MW-16 with concentrations of PFBA, perfluorohexanesulfonic acid (PFHxS), PFOS, PFOA, and total PFAS above the Groundwater Screening Level. The total PFAS concentrations range from 358.12 ng/L in the duplicate sample at on site upgradient well MW-18 to 2,083.29 ng/L in the downgradient on-site well MW-16. The concentration of 1,4-dioxane was above the Groundwater Screening Level in the on-site well MW-2.

The site operated as a MGP from 1908 until 1951. Between 1952 and 1959, the site's gas manufacturing capability may have been maintained and operated for the purpose of peak shaving. From 1960 to 1966, the facility was almost completely decommissioned and demolished. In 1974, a few buildings associated with a gate station remained operational providing natural gas service. National Grid believes the gate station and gasholders were taken off line at the end of the 1970s and were reported to be subsequently decommissioned and surface features were demolished in the early 1980s (PS&S, 2013). The site is currently owned by National Grid. Immediately upgradient of the site is the elevated Belt Parkway with stormwater drainage to the ground surface below and a Metropolitan Transportation Authority (MTA) rail yard. The MTA rail yard is the largest rapid transit rail yard in the State of New York and operations have included maintenance, overhaul, storage, washing, and painting of the rail cars. The rail yard has also included a firing range for the New York City Police Department's Transit Division and a firefighting training school (New York City Department of City Planning, 2018).

There were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000. No additional well search data has been obtained for this site.

3.8 Fulton Works MGP Site

The validated analytical results for the Fulton Works former MGP site compared against the NYSDEC Screening Levels are provided in Table 9. The groundwater monitoring well locations and analytes that were detected above the NYSDEC Screening Levels are provided in Figure 8.

The following four groundwater monitoring wells were sampled at the Fulton site:

- FW-MW-19: upgradient, located northeast of Parcel VII and east of Parcel II;
- FW-MW-5R: near site, located on the northwestern boundary of Parcel II
- FW-MW-04: downgradient, located on the northwestern boundary of Parcel III. FW-MW-04 was sampled in place of FW-MW-4R due to a pressure transducer located at FW-MW-4R; and
- FW-MW-17: downgradient, located on the north central boundary of Parcel I.

Concentrations of PFOA were above the Groundwater Screening Level in three of the four wells sampled (upgradient well FW-MW-19, and downgradient wells FW-MW-04 and FW-MW-17) and was above the Drinking Water Screening Level in near site well FW-MW-5R. The concentration of PFOS was above the Drinking Water Screening Level in downgradient well FW-MW-04. The highest PFAS concentrations were detected in upgradient well FW-MW-19 with concentrations of perfluoroheptanoic acid (PFHpA), perfluorohexanoic acid (PFHxA), PFOA and total PFAS above the Groundwater Screening Level. The total PFAS

concentrations range from 65.67 ng/L in the near site well FW-MW-5R to 670.89 ng/L in the upgradient well FW-MW-19. Concentrations of 1,4-dioxane were not detected in any sample.

The site operated as an MGP from 1879 until prior to 1938. The properties were sold between 1938 and 1948 and are not currently owned by National Grid. The properties have been used for newspaper operations, garages, paint shop, metal spinning and stamping, warehouses, autobody repair work, auto and truck repair and wrecking, used car sales, iron works, and carting (GEI 2012).

There are no water supply wells within a ½ mile of the site (EDR 2004d) and there were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000.

3.9 Glen Cove MGP Site

The validated analytical results for the Glen Cove former MGP site compared against the NYSDEC Screening Levels are provided in Table 10. The groundwater monitoring well locations are provided in Figure 9.

The following three groundwater monitoring wells identified in the Work Plan were sampled at the Glen Cove site:

- PZ-06: on site upgradient, located in the northeastern corner of the site;
- GCRW-03: on site, located in the central northern portion of the site; and
- GCMW-14SR: on site downgradient, located adjacent to the central-western property line.

Concentrations of PFAS compounds were not detected above the Screening levels. Total PFAS concentrations ranged from 24.74 ng/L in on-site well GCRW-03 to 66.37 ng/L in on site downgradient well GCMW-14SR. Concentrations of 1,4-dioxane were not detected in any sample.

The site operated as a MGP from 1905 until 1929. From 1929 until between 1959 and 1966 site activities consisted solely of natural gas storage in the Hortonsphere gas holder. A major electrical substation was constructed on the site in the mid-1960s. The site is not owned by National Grid. It is currently owned by LIPA and operated by Public Service Enterprise Group (PSEG) under contract to LIPA (PS&S, 2008).

The following information on water supply wells within a ½-mile of the Glen Cove former MGP site was obtained from the 2008 Final Remedial Investigation Report (PS&S, 2008). One public water supply well owned by the City of Glen Cove was located within a ½ mile of the site as shown in Figure 22. This well is located approximately 1,600 feet upgradient of the site and is screened from 243 to 293 ft-bgs.

There were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000.

3.10 Greenpoint MGP - Energy Center Site

The validated analytical results for the Greenpoint former MGP site compared against the NYSDEC Screening Levels are provided in Table 11. The groundwater monitoring well locations are provided in Figure 10.

The following three groundwater monitoring wells identified in the Work Plan were sampled at the Greenpoint site:

- GPEC-MW-220I: on-site upgradient, located on the upgradient property boundary.
- GPEC-MW-11: on site, located in the central portion of the site; and
- GPEC- MW-3S: on-site downgradient; located at the downgradient property boundary.

The concentration of PFOA was above the Drinking Water Screening Level in the on-site upgradient well GPEC-MW-220I and above the Groundwater Screening Level in on-site downgradient well GPEC-MW-3S. The concentration of PFOS was above the Drinking Water Screening Level in on site upgradient well GPEC-MW-220I. There were no analytes detected at concentrations above the Screening Levels in on-site well GPEC-MW-11. Total PFAS concentrations ranged from 51.55 ng/L at on-site well GPEC-MW-11 to 256.17 ng/L at upgradient well GPEC-MW-220I. Concentrations of 1,4-dioxane were not detected in any sample.

The site operated as a MGP from 1927 until 1968. By the late 1960s, liquified natural gas (LNG) was stored at the site and in the mid-1970s a modern substitute natural gas (SNG) plant was built which produced 60 million cubic feet per day. The SNG was used for base load conditions. It operated for approximately 12 years before closure in 1985. The LNG facility still stands today, and the site is used as a major regional regulator station for the natural gas network. The site is currently owned by National Grid (GEI, 2016a).

There are reports of a private water supply well located at a truck wash facility upgradient of the site at 184 Maspeth Avenue as shown in Figure 23. No further details are available for this well. There were no water supply wells identified in the search performed by EDR (EDR 2004e) and there were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000.

3.11 Inwood Holder Site

The validated analytical results for the Inwood Holder site compared against the NYSDEC Screening Levels are provided in Table 12. The groundwater monitoring well locations are provided in Figure 11.

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The following three groundwater monitoring wells were sampled at the Inwood site:

- MW-52I: on-site upgradient, in the northeastern corner of the site. MW-52I (screened from 13 to 23 ft-bgs) was sampled in place of adjacent well MW-52S (screened from 1 to 11 ft-bgs) because MW-52S could not be located;
- MW-16S: on site, centrally located. MW-16S was sampled in place of MW-19S due to the presence of NAPL at MW-19S. MW-16S is approximately 100 feet downgradient of MW-19S; and
- GW-8: on site downgradient, located on the southwest portion of the site.

The highest PFAS concentrations were detected in onsite upgradient well MW-52I with the concentration of PFOS above the Groundwater Screening Levels. PFOA was detected in above the Drinking Water Screening Levels at upgradient on-site well MW-52I and downgradient onsite well GW-8. Total PFAS concentrations ranged from 37.21 ng/L at on-site well MW-16S to 237.68 ng/L at upgradient well MW-52I. The concentration of 1,4-dioxane was above the Groundwater Screening Level in the on-site downgradient well GW-8. There were no analytes detected above the Screening Levels in onsite well MW-16S.

The site operated as a holder station from as early as 1923. In 1950, nine liquified petroleum gas (LPG) tanks were installed for gas vaporization. The holder was demolished in 1993. A natural gas metering and regulation station is in operation in the northeast corner of the site (AECOM 2015). The site is currently owned by National Grid.

The Inwood site is located approximately ¼-mile northwest of the Far Rockaway site. The results of the an informal well survey performed by AECOM for the Far Rockaway site are presented below and in Figure 24. There were multiple water supply wells located within a ½ mile of the site, however, the current status and use of these wells has not been identified. One public supply well location (NY0003913) was identified in a 2004 EDR Report (EDR 2004f), as shown in Figure 24. There were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000.

3.12 Kings County Works MGP Site

The validated analytical results for the Kings County former MGP site compared against the NYSDEC Screening Levels are provided in Table 13. The groundwater monitoring well locations are provided in Figure 12.

The following three groundwater monitoring wells were sampled at the Kings County site:

- KC-MW-01: upgradient, on the eastern property line;
- KC-MW-05: onsite, located in the central portion of the site. KC-MW-05 was sampled in place of adjacent well KC-MW-04 due to NAPL observed at KC-MW-04; and
- KC-MW-09: downgradient, located on the western property line.

Concentrations of PFOA were above the Groundwater Screening Level in upgradient well KC-MW-01 and onsite well KC-MW-05 and was above the Drinking Water Screening Level in downgradient well KC-MW-09. The highest PFAS concentrations were detected in onsite well KC-MW-05 where PFBA, PFPeA, PFOA, and total PFAS were above the Groundwater Screening Levels. Total PFAS concentrations ranged from 128.55 ng/L at downgradient well KC-MW-09 to 3,783.2 ng/L at the duplicate sample of onsite well KC-MW-05. The concentration of 1,4-dioxane was above the Groundwater Screening Level in the upgradient well KC-MW-01.

The site operated as an MGP from approximately 1902 until 1951 when it converted to natural gas. The properties were sold in 1958 and 1960 and are not currently owned by National Grid. The properties have been used as a projectile works, a generating station, for meat sales, school lunch distribution, ship building, and as a lumber supply company (GEI 2016b).

There are no water supply wells within a ½ mile of the site (EDR 2010) and there were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000.

3.13 Patchogue MGP Site

The validated analytical results for the Patchogue former MGP site compared against the NYSDEC Screening Levels are provided in Table 14. The groundwater monitoring well locations and analytes detected at concentrations above the NYSDEC Screening Levels are provided in Figure 13.

The following three groundwater monitoring wells identified in the Work Plan were sampled at the Patchogue MGP site:

- MW-1: on-site upgradient well;
- MW-7S: on-site well; and
- MW-4S: on-site downgradient well.

Concentrations of PFOS were above the Groundwater Screening Level, in samples collected from downgradient well MW-4S and on-site well MW-7S. The concentration of total PFAS was above the Groundwater Screening Level in the sample collected from on-site well MW-7S. Total PFAS concentrations range from 73.34 ng/L in the upgradient location (MW-1) to 1,763.4 ng/L in the onsite location (MW-7S). Concentrations of 1,4-dioxane were not detected in any sample.

The site operated as an MGP primarily from approximately 1904 until 1914. High pressure gas purchased from Suffolk Gas & Electric (Bayshore) was distributed from the Patchogue Plant from 1915 through 1917. From 1922 through 1925, emergency gas production

occurred at the site. The property was sold in 1976 and was used as a refrigeration scrap storage yard. The property was re-acquired by Key Span in 2005 and is now owned by National Grid (Tetra Tech, 2009).

The following information on water supply wells within a ½-mile of the Patchogue MGP site was obtained from the 2009 Final Remedial Investigation Report (Tetra Tech, 2009). A total of eight NYSDEC-registered private supply wells, one public water supply well, and three other wells are located within a 1/2-mile radius of the site. The location of each water supply well is shown in Figure 25. There were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000.

3.14 Peoples Works MGP Site

The validated analytical results for the Peoples Works MGP site compared against the NYSDEC Screening Levels are provided in Table 15. The groundwater monitoring well locations and analytes detected at concentrations above the NYSDEC Screening Levels are provided in Figure 14.

The following three groundwater monitoring wells identified in the Work Plan were sampled at the Peoples Works MGP site:

- PWMW-01: onsite upgradient well;
- MW-11: onsite well; and
- MW-09: onsite downgradient well.

Concentrations of PFOA were above the Drinking Water Screening Level, but are below the Groundwater Screening Level, in samples collected from upgradient well PWMW-01 and onsite well MW-11. The concentration of PFOS was above the Drinking Water Screening Level in the sample collected from upgradient well PWMW-01. Total PFAS concentrations range from 48.07 ng/L in the downgradient location (MW-09) to 109.12 ng/L in the upgradient location (PWMW-01). 1,4-Dioxane was not detected in any sample.

The site operated as an MGP from approximately 1868 until 1887. By the mid-1890s, The People's Gas Light Company had not been in operation for several years, and the property was to be sold. The property is not owned by National Grid. The properties have been used as a brewery, for truck loading, as lumber storage, as a sugar house, for other storage, and for manufacturing (Tetra Tech 2018).

There are no water supply wells within a ½ mile of the site (EDR, 2004g) and there were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000.

3.15 Rockaway Park MGP Site

The validated analytical results for the Rockaway Park MGP site compared against the NYSDEC Screening Levels are provided in Table 16. The groundwater monitoring well locations and analytes detected at concentrations above the NYSDEC Screening Levels are provided in Figure 15.

The following three groundwater monitoring wells identified in the Work Plan were sampled at the Rockaway Park MGP site:

- MW-26S: off-site upgradient well, located on Beach 108th Street approximately 150 feet southeast of the site;
- RW-05A: on-site well, located near the downgradient property line; and
- MW-02S: off-site downgradient well, located on the north side of Beach Channel Drive approximately 75 feet north of the site.

The concentration of PFOS was above the Groundwater Screening Level and the concentration of PFOA was above the Drinking Water Screening Level, but is below the Groundwater Screening Level, in the sample collected from downgradient off-site well MW-02S. The concentration of PFBA was above the Groundwater Screening Level in the sample collected from RW-05A. There were no emerging contaminants detected at concentrations above the Screening Levels in upgradient well MW-26S. Total PFAS concentrations range from 78.84 ng/L in the upgradient location (MW-26S) to 361.06 ng/L in the downgradient location (MW-02S). 1,4-Dioxane was not detected in any sample.

The site operated as an MGP from the late 1870s until 1957 and was demolished in 1958. The property is owned by National Grid. (D&B, 2002b). The property has also been used as a former and current LIPA substations.

No water supply wells have been identified within a ½ mile of the site and there were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000.

3.16 Sag Harbor MGP Site

The validated analytical results for the Sag Harbor MGP site compared against the NYSDEC Screening Levels are provided in Table 17. The groundwater monitoring well locations are provided in Figure 16.

The following three groundwater monitoring wells identified in the Work Plan were sampled at the Sag Harbor MGP site:

- SHMW-13I: off-site upgradient well, located approximately 160 feet upgradient of the site;

- SHMW-01IR: on-site well; and
- SHMW-03I: off-site downgradient well, located approximately 40 feet downgradient of the site.

Concentrations of PFAS were not detected at concentrations above the Screening Levels in any of the three wells. Total PFAS concentrations range from 30.95 ng/L in the downgradient location (SHMW-03I) to 51.51 ng/L in the upgradient location (SHMW-13I). Concentrations of 1,4-dioxane was not detected in any well.

The site operated as an MGP from 1859 until 1930. The property was used for natural gas storage after 1930. A 100,000-cubic foot spherical gas storage tank (a Hortonsphere), three high pressure gas tanks, a compressor station building, and associated gas lines were located on the property. These structures were removed during remediation of MGP impacts in 2008 and 2009 (D&B 2002c). The property is owned by National Grid.

The following information on water supply wells within a ½-mile of the Sag Harbor MGP site was obtained from the 2002 Site Remedial Investigation (D&B 2002c). A total of five NYSDEC-registered private supply wells are located within a 1/2-mile radius of the site. The location of each water supply well is shown in Figure 26. There were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000.

3.17 Skillman St. Station Site

The validated analytical results for the Skillman St. Station site compared against the NYSDEC Screening Levels are provided in Table 18. The groundwater monitoring well locations and analytes detected at concentrations above the NYSDEC Screening Levels are provided in Figure 17.

The following two groundwater monitoring wells identified in the Work Plan were sampled at the Skillman St. Station site:

- SSMW-03: off-site upgradient well, located on Skillman Street approximately 60 feet upgradient of the site; and
- SSMW-05: off-site downgradient well, located on Bedford Avenue approximately 100 feet downgradient of the site.

Concentrations of PFOS were above the Drinking Water Screening Level, but are below the Groundwater Screening Level, in samples collected from both SSMW-03 and SSMW-05. Concentrations of PFOA were above the Groundwater Screening Level in samples collected from both SSMW-03 and SSMW-05. The concentration of total PFAS was above the Groundwater Screening Level in the sample collected from downgradient well SSMW-05. Total PFAS concentrations range from 390.14 ng/L in the upgradient location (SSMW-03,

duplicate sample) to 816.78 ng/L in the downgradient location (SSMW-05). The concentration of 1,4-dioxane was above the Groundwater Screening Level in the sample collected from downgradient well SSMW-05.

The site operated as a holder station from the 1880s until demolition of the holder station by 1935. The property was sold in 1940 and is not owned by National Grid. The properties have also been used for automobile repair and painting, steel drum storage, as a warehouse, and for industrial uniform cleaning (GEI 2014a).

No water supply wells have been identified within a ½-mile of the site (EDR 2004h) and there were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000.

3.18 Wythe Ave. Station Site

The validated analytical results for the Wythe Ave. Station site compared against the NYSDEC Screening Levels are provided in Table 19. The groundwater monitoring well locations and analytes detected at concentrations above the NYSDEC Screening Levels are provided in Figure 18.

The following two groundwater monitoring wells were sampled with respect to the Wythe Ave. Station site:

- WA-MW-04: off-site upgradient well, located on Berry Street approximately 60 feet north of the site; and
- WA-MW-01: off-site downgradient well, located on the Wythe Avenue sidewalk adjacent to the site. WA-MW-01 was sampled in place of nearby WA-MW-05 identified in the Work Plan based on concentrations of VOCs and SVOCs observed during the annual groundwater sampling event for the Wythe Ave. site at WA-MW-05.

Concentrations of PFOA were above the Drinking Water Screening Level, but are below the Groundwater Screening Level, in samples collected from both WA-MW-01 and WA-MW-04. Concentrations of PFBA, PFPeA, PFHxA, and total PFAS were above the Groundwater Screening Level in the sample collected from WA-MW-01. Total PFAS concentrations range from 183.79 ng/L in the downgradient location (WA-MW-01) to 678.77 ng/L in the upgradient location (WA-MW-04). The concentration of 1,4-dioxane was above the Groundwater Screening Level in the sample collected from WA-MW-04.

The site operated as a holder station from 1903 until demolition of the holder station 1965. The properties that make up the site were sold in 1965 and are not owned by National Grid. The properties have also been used for manufacturing, auto plating and processing, storage,

and by Standard White Metals and Consolidated Edison of New York for unknown uses (GEI 2014b).

No water supply wells have been identified within a ½ mile of the site (EDR 2004i) and there were no water supply wells within a ½-mile of the site identified on NYSDEC's water well supply map for wells installed after April 2000.

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4. Summary of Findings

Groundwater sampling for emerging contaminants has been completed at 18 of the 24 downstate former MGP sites identified in the Work Plan. Groundwater samples were collected at a total of 54 wells and analyzed for PFAS and 1,4-dioxane. Two to five groundwater wells were selected for sampling at each site to represent upgradient, onsite and downgradient groundwater conditions, where possible.

1,4-Dioxane was detected at concentrations above the NYSDEC Initial Groundwater and Drinking Water Screening Level of 0.35 ug/L at 6 of the 18 sites, in a total of eight of the 54 wells sampled. Five sites (Coney Island, Inwood Holder, Kings County Works, Skillman St. Station and Wythe Ave. Station) had concentrations of 1,4-dioxane detected above the Screening Level in only one of the wells sampled at the site and one site (Equity Works) had concentrations of 1,4-dioxane detected in all three wells sampled at this site.

PFAS compounds were detected at concentrations above the NYSDEC Screening Levels at 16 of the 18 sites in 36 of the 54 wells sampled. The two sites that did not have PFAS compounds detected at concentrations above the Screening Levels were the Glen Cove and Sag Harbor sites. Of the 16 sites that had PFAS concentrations above the Screening Levels, 12 sites (20 wells) had concentrations above the higher Groundwater Screening Levels.

1,4-Dioxane is used primarily as a solvent in paints, varnishes, lacquers, cosmetics, deodorants, cleaning and detergent preparations, and in scintillating fluids and was not manufactured prior to 1951. PFAS are a large group of highly soluble manmade chemicals that have been widely used since the 1940s to make fluoropolymer coatings and are present in a multitude of everyday products more resistant to stains, grease, heat, and water.

PFAS and 1,4-dioxane are not associated with former MGP operations. Also, since 1,4-dioxane and PFAS were not in use prior to the 1950's or 1940's, respectively, it is highly unlikely that these chemicals were used at MGP sites. Many of the sites identified above have been sold and used for other purposes since their use as MGP sites and are located within highly industrial areas with many potential sources of the 1,4-dioxane and PFAS compounds.

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Tables

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Table 1. Summary of Groundwater Samples Collected
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Site Name	Sample Date	Wells Sampled	Screened Interval (ft-bgs)
Bay Ridge A Station	10/10/18	MW-112	68 - 78
		NA	NA
		MW-105	73 - 83
Bayshore MGP	9/24/18	MW-09I	30 - 40
		BBMW-41I	25 - 30
		MW-29S	5 - 10
		OU3MW-11S	2 - 12
		OU2MW-57I	20 - 30
Clifton MGP - Staten Island	10/2/18	RW-210I ¹	25-35
		RW-202S	10 - 20
		RW-23	3 - 13
Equity Works	10/12/18	MW-6B	30 - 40
		MW-8B	30 - 40
		MW-11B	33 - 43
Far Rockaway MGP	10/4/18	MW-116D	29.9 - 39.9
		MW-118DR	29 - 39
		MW-119D	26.5 - 36.5
Flatbush Station A&B	10/9/18	MW-2	47 - 57
		MW-4	47 - 57
		MW-7	47 - 57
Former Brooklyn Borough Gas Works (Coney Island)	10/5/18	MW-18	10 - 21
		MW-2	9 - 22
		MW-16	9 - 21
Fulton Works	10/11/18	FW-MW-19	5 - 15
		FW-MW-5R	10 - 20
		FW-MW-4 ²	3-13
		FW-MW-17	8-18
Glen Cove MGP	9/25/18	PZ06	7 - 17
		GCRW03	15 - 25
		GCMW14S-R	10 - 20
Greenpoint MGP - Energy Center	10/1/18	GPEC-MW-220I	40 - 50
		GPEC-MW-11	33 - 48
		GPEC-MW-3S	25 - 40
Inwood Holder	10/23/18	MW-52I ³	13-23
		MW-16S ⁴	2-11
		GW-8	1 - 11
Kings County Works	10/5/18	KC-MW-01	22 -32
		KC-MW-05 ⁵	5-15
		KC-MW-09	5 - 15
Patchogue MGP	9/25/18	MW-1	7 - 12
		MW-7S	4 - 9
		MW-4S	5 - 10
Peoples Works	9/26/18	PWMW-01	8 - 18
		MW-11	6 - 16
		MW-9	5 - 15
Rockaway Park MGP	9/28/18	MW-26S	3 - 13
		RW-05A	10 - 20
		MW-02S	5 - 15
Sag Harbor MGP	9/27/18	SHMW-13I	35 - 45
		SHMW-01IR	35 - 45
		SHMW-03I	35 - 45
Skillman St. Station	10/3/18	SSMW-03	12 - 22
		SSMW-05	11 - 21
		NA	NA
Wythe Ave. Station	10/3/18	WA-MW-04	9 - 19
		WA-MW-01 ⁶	8-18
		NA	NA

Notes:

- 1: RW-210I(25-35) was sampled in place of RW-210S(15-25)
- 2: FW-MW-4(3-13) was sampled in place of FW-MW-4R(6-16)
- 3: MW-52I(13-23) was sampled in place of MW-52S(1-11)
- 4: MW-16S(2-11) was sampled in place of MW-19S(2-9)
- 5: KW-MW-05(5-15) was sampled in place of KW-MW-04(4-14)
- 6: WA-MW-01(8-18) was sampled in place of WA-MW-05(10-20)

Table 2. Summary of Groundwater Analytical Results – Bay Ridge Holder Stations A & B Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Sample Location	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	MW-105 10/10/2018 73-83 Downgradient	Duplicate of MW-105 10/10/2018 73-83 Downgradient	MW-112 10/10/2018 68-78 On Site Upgradient
SVOCs (ug/L)					
1,4-Dioxane	0.35	0.35	0.2 U	0.2 U	0.2 U
PFAS (ng/L)					
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	18.3 U	16.9 U	16.2 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	18.3 U	16.9 U	16.2 U
Perfluorobutanesulfonic acid (PFBS)	100	100	4.09	5.24	4.09
Perfluorobutanoic acid (PFBA)	100	100	11.5	11.7	100 J
Perfluorodecanesulfonic acid (PFDS)	100	100	1.83 U	1.69 U	1.62 U
Perfluorodecanoic acid (PFDA)	100	100	1.83 U	1.69 U	1.62 U
Perfluorododecanoic acid (PFDoA)	100	100	1.83 U	1.69 U	1.62 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	1.83 U	1.69 U	1.62 U
Perfluoroheptanoic acid (PFHpA)	100	100	15.6	14.3	16.8
Perfluorohexanoic acid (PFHxA)	100	100	12.8	12.8	28.3
Perfluorooctanesulfonamide (FOSA)	100	100	1.83 U	1.69 U	1.62 U
Perfluoropentanoic acid (PFPeA)	100	100	12	11.9	16.6
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.83 U	1.69 U	1.62 U
Perfluorotridecanoic acid (PFTriA/PFTrDA)	100	100	1.83 U	1.69 U	1.62 U
Perfluoroundecanoic acid (PFUnA)	100	100	1.83 U	1.69 U	1.62 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	18.3 U	16.9 U	16.2 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	7.15 J	6.82 J	9.5 J
Perfluorohexanesulfonic acid (PFHxS)	100	100	2.38	2.88	6.06
Perfluorononanoic acid (PFNA)	100	100	1.27 J	1.13 J	0.89 J
Perfluorooctanesulfonic acid (PFOS)	20	70	6.7	6.95	2.56
Perfluorooctanoic acid (PFOA)	20	70	43.4	41.6	53.9
Total PFAS	500	500	116.89	115.32	238.7

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 3. Summary of Groundwater Analytical Results – Bay Shore MGP Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Sample Location	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	BBMW-41I 9/24/2018 25-30 On site OU1	MW-09I 9/24/2018 30-40 On site Upgradient OU1	MW-29S 9/24/2018 5-10 On site Upgradient OU3	Duplicate of MW-29S 9/24/2018 5-10 On site Upgradient OU3	OU2MW-57I 9/24/2018 20-30 On site Downgradient OU2	OU3MW-11S 9/24/2018 2-12 On site Downgradient OU3
SVOCs (ug/L)								
1,4-Dioxane	0.35	0.35	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
PFAS (ng/L)								
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	17.4 U	17.1 U	18.5 U	19.6 U	17.9 U	18.1 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	0.47 J	17.1 U	18.5 U	19.6 U	17.9 U	18.1 U
Perfluorobutanesulfonic acid (PFBS)	100	100	4.84	4.39	2.41	2.22	4.61	5.48
Perfluorobutanoic acid (PFBA)	100	100	4.2	2.09	12.8 J	12.8 J	30.9	23.2 J
Perfluorodecane Sulfonic acid (PFDS)	100	100	1.74 U	1.71 U	1.85 U	1.96 U	1.79 U	0.91 J
Perfluorodecanoic acid (PFDA)	100	100	1.74 U	1.71 U	1.85 U	1.96 U	0.46 J	1.91
Perfluorododecanoic acid (PFDoA)	100	100	1.74 U	1.71 U	1.85 U	1.96 U	1.79 U	1.81 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	1.74 U	1.71 U	1.85 U	1.96 U	1.79 U	1.81 U
Perfluoroheptanoic acid (PFHpA)	100	100	5.27	4.7	4.2	4	4.86	4.99
Perfluorohexanoic acid (PFHxA)	100	100	5.26	5.04	3.81	3.36	4.15	7.68
Perfluorooctanesulfonamide (FOSA)	100	100	1.74 U	1.71 U	1.85 U	1.96 U	1.79 U	1.81 U
Perfluoropentanoic acid (PFPeA)	100	100	4.59	4.43	2.8	4.23	8.56	4.3
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.74 U	1.71 U	1.85 U	1.96 U	1.79 U	1.81 U
Perfluorotridecanoic acid (PFTriA/PFTrDA)	100	100	1.74 U	1.71 U	1.85 U	1.96 U	1.79 U	1.81 U
Perfluoroundecanoic acid (PFUnA)	100	100	1.74 U	1.71 U	1.85 U	1.96 U	0.53 J	1.02 J
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	17.4 U	17.1 U	18.5 U	19.6 U	17.9 U	18.1 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	17.4 U	17.1 U	2.69 J	1.98 J	17.9 U	1.46 J
Perfluorohexanesulfonic acid (PFHxS)	100	100	2.64 J	5.3	1.85 U	1.96 U	8.17	1.81 U
Perfluorononanoic acid (PFNA)	100	100	1.96	1.27 J	1.41 J	1.46 J	1.54 J	3.11
Perfluorooctanesulfonic acid (PFOS)	20	70	30.9	13.6	5.99	6.44	26.2	18.7
Perfluorooctanoic acid (PFOA)	20	70	18.4	14.8	17	18.7	15	13.2
Total PFAS	500	500	79	55.62	53.11	55.19	104.98	85.96

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 4. Summary of Groundwater Analytical Results – Clifton MGP Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Sample Location	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	RW-23 10/2/2018 3-13 Downgradient Edgewater Plaza	RW-202S 10/2/2018 10-20 On site	Duplicate of RW-202S 10/2/2018 10-20 On site	RW-210I 10/2/2018 25-35 On site Upgradient
SVOCs (ug/L)						
1,4-Dioxane	0.35	0.35	0.21 U	0.21 U	0.21 U	0.21 U
PFAS (ng/L)						
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	17.5 U	16.8 U	17.8 U	17.7 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	17.5 U	16.8 U	17.8 U	17.7 U
Perfluorobutanesulfonic acid (PFBS)	100	100	14.3	1.68 U	1.43 J	0.39 J
Perfluorobutanoic acid (PFBA)	100	100	15.3	31.3	28.8	1.77 U
Perfluorodecanesulfonic acid (PFDS)	100	100	1.75 U	1.68 U	1.78 U	1.77 U
Perfluorodecanoic acid (PFDA)	100	100	2.06	1.68 U	1.78 U	1.77 U
Perfluorododecanoic acid (PFDoA)	100	100	1.75 U	1.68 U	1.78 U	1.77 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	1.75 U	1.68 U	1.78 U	1.77 U
Perfluoroheptanoic acid (PFHpA)	100	100	17.3	1.68 U	0.43 J	1.77 U
Perfluorohexanoic acid (PFHxA)	100	100	16.5	1.68 U	0.54 J	1.77 U
Perfluorooctanesulfonamide (FOSA)	100	100	1.75 U	1.68 U	1.78 U	1.77 U
Perfluoropentanoic acid (PFPeA)	100	100	19	7.59	8.16	1.77 U
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.75 U	1.68 U	1.78 U	1.77 U
Perfluorotridecanoic acid (PFTriA/PFTrDA)	100	100	1.75 U	1.68 U	1.78 U	1.77 U
Perfluoroundecanoic acid (PFUnA)	100	100	0.27 J	1.68 U	0.27 J	0.23 J
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	17.5 U	16.8 U	17.8 U	17.7 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	17.5 U	16.8 U	17.8 U	17.7 U
Perfluorohexanesulfonic acid (PFHxS)	100	100	2.38	1.68 U	1.78 U	1.77 U
Perfluorononanoic acid (PFNA)	100	100	4.32	1.68 U	1.78 U	1.77 U
Perfluorooctanesulfonic acid (PFOS)	20	70	21.3	1.68 U	1.78 U	1.77 U
Perfluorooctanoic acid (PFOA)	20	70	95.7	1.58 J	2.4	1.77 U
Total PFAS	500	500	208.43	40.47	42.03	0.62

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 5. Summary of Groundwater Analytical Results – Equity Works MGP Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Sample Location	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	MW-6B 10/12/2018 30-40 Upgradient	MW-8B 10/12/2018 30-40 On site	Duplicate of MW-8B 10/12/2018 30-40 On site	MW-11B 10/12/2018 33-43 Downgradient
SVOCs (ug/L)						
1,4-Dioxane	0.35	0.35	0.73 J	0.43 J	0.53 J	1.1 J
PFAS (ng/L)						
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	16.2 U	0.75 J	16.2 U	16 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	16.2 U	16.6 U	16.2 U	16 U
Perfluorobutanesulfonic acid (PFBS)	100	100	1.62 U	9.03	11.5	16.7
Perfluorobutanoic acid (PFBA)	100	100	21.8 J	238 J	242 J	17.2 J
Perfluorodecanesulfonic acid (PFDS)	100	100	1.62 U	1.66 U	1.62 U	1.6 U
Perfluorodecanoic acid (PFDA)	100	100	1.62 U	1.47 J	1.22 J	1.6 U
Perfluorododecanoic acid (PFDoA)	100	100	1.62 U	1.66 U	1.62 U	1.6 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	1.62 U	0.97 J	0.86 J	1.6 U
Perfluoroheptanoic acid (PFHpA)	100	100	3.48	54	45.8	3.1 J
Perfluorohexanoic acid (PFHxA)	100	100	2.91	78.4 J	75.6	8.24
Perfluorooctanesulfonamide (FOSA)	100	100	1.62 U	0.52 J	1.62 U	1.6 U
Perfluoropentanoic acid (PFPeA)	100	100	7.63	130 J	124 J	71
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.62 U	1.66 U	1.62 U	1.6 U
Perfluorotridecanoic acid (PFTriA/PFTrDA)	100	100	1.62 U	1.66 U	1.62 U	1.6 U
Perfluoroundecanoic acid (PFUnA)	100	100	1.62 U	1.66 U	1.62 U	1.6 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	16.2 U	16.6 U	16.2 U	16 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	40.5 J	3.97 J	4.1 J	16 U
Perfluorohexanesulfonic acid (PFHxS)	100	100	1.43 J	20.2	18.7	2.8 J
Perfluorononanoic acid (PFNA)	100	100	1.62 U	6.92	6.37	0.35 J
Perfluorooctanesulfonic acid (PFOS)	20	70	1.62 U	41.6	42.2	1.6 U
Perfluorooctanoic acid (PFOA)	20	70	11.8	105	118	7.69 J
Total PFAS	500	500	89.55	690.83	690.35	127.08

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 6. Summary of Groundwater Analytical Results – Far Rockaway MGP Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Sample Location	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	MW-116D 10/4/2018 29.9-39.9 Upgradient	MW-118DR 10/4/2018 29-39 Near site	MW-119D 10/4/2018 26.5-36.5 Downgradient	Duplicate of MW-119D 10/4/2018 26.5-36.5 Downgradient
SVOCs (ug/L)						
1,4-Dioxane	0.35	0.35	0.2 U	0.2 U	0.2 U	0.2 U
PFAS (ng/L)						
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	17.4 U	17.2 U	16.3 U	16.5 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	17.4 U	17.2 U	16.3 U	16.5 U
Perfluorobutanesulfonic acid (PFBS)	100	100	2.8	3.34	2.2	2.39
Perfluorobutanoic acid (PFBA)	100	100	8.02	9.01	8.75	9.02
Perfluorodecanesulfonic acid (PFDS)	100	100	1.74 U	1.72 U	1.63 U	1.65 U
Perfluorodecanoic acid (PFDA)	100	100	1.74 U	0.33 J	0.41 J	0.35 J
Perfluorododecanoic acid (PFDoA)	100	100	1.74 U	1.72 U	1.63 U	1.65 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	1.33 J	2.07	1.6 J	1.83
Perfluoroheptanoic acid (PFHpA)	100	100	11.8	14.5	9.58	9.8
Perfluorohexanoic acid (PFHxA)	100	100	16.1	15.8	10.7	10.6
Perfluorooctanesulfonamide (FOSA)	100	100	1.74 U	1.72 U	1.63 U	1.65 U
Perfluoropentanoic acid (PFPeA)	100	100	15.1	14	10	9.6
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.74 U	1.72 U	1.63 U	1.65 U
Perfluorotridecanoic acid (PFTriA/PFTrDA)	100	100	1.74 U	1.72 U	1.63 U	1.65 U
Perfluoroundecanoic acid (PFUnA)	100	100	1.74 U	1.72 U	1.63 U	1.65 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	17.4 U	17.2 U	16.3 U	16.5 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	1.09 J	17.2 U	16.3 U	16.5 U
Perfluorohexanesulfonic acid (PFHxS)	100	100	14.8	22.5	17.1	17.6
Perfluorononanoic acid (PFNA)	100	100	1.21 J	1.94	1.71	1.48 J
Perfluorooctanesulfonic acid (PFOS)	20	70	40.4	125	48	46.5
Perfluorooctanoic acid (PFOA)	20	70	33.6	40.5	29.2	30.6
Total PFAS	500	500	146.25	248.99	139.25	139.77

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 7. Summary of Groundwater Analytical Results – Flatbush Stations A & B Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Sample Location	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	MW-2 10/9/2018 47-57 On site Upgradient	MW-4 10/9/2018 47-57 On site	MW-7 10/9/2018 47-57 On site Downgradient	Duplicate of MW-7 10/9/2018 47-57 On site Downgradient
SVOCs (ug/L)						
1,4-Dioxane	0.35	0.35	0.2 U	0.2 U	0.2 U	0.2 U
PFAS (ng/L)						
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	16.8 U	16.2 U	16.2 U	16.1 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	16.8 U	16.2 U	16.2 U	16.1 U
Perfluorobutanesulfonic acid (PFBS)	100	100	2.93	3.38	3.06	3.36
Perfluorobutanoic acid (PFBA)	100	100	10.7	22.4	5.7	6.78
Perfluorodecanesulfonic acid (PFDS)	100	100	1.68 U	1.62 U	0.57 J	0.97 J
Perfluorodecanoic acid (PFDA)	100	100	0.74 J	1.62 U	1.49 J	1.49 J
Perfluorododecanoic acid (PFDoA)	100	100	1.68 U	1.62 U	1.62 U	1.61 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	0.99 J	1.62 U	1.62 U	1.61 U
Perfluoroheptanoic acid (PFHpA)	100	100	11.8	7.16	9.36	9.09
Perfluorohexanoic acid (PFHxA)	100	100	13	5.04	10.1	9.61
Perfluorooctanesulfonamide (FOSA)	100	100	1.68 U	1.62 U	1.62 U	1.61 U
Perfluoropentanoic Acid (PFPeA)	100	100	15.2	5	10.2	10.3
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.68 U	1.62 U	1.62 U	1.61 U
Perfluorotridecanoic acid (PFTriA/PFTrDA)	100	100	0.22 J	1.62 U	1.62 U	1.61 U
Perfluoroundecanoic acid (PFUnA)	100	100	1.68 U	1.62 U	1.62 U	1.61 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	16.8 U	16.2 U	16.2 U	16.1 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	47.3 J	15.8 J	7.74 J	7.13 J
Perfluorohexanesulfonic acid (PFHxS)	100	100	3.58	2.54	5.55	5.13
Perfluorononanoic Acid (PFNA)	100	100	3.01	1.31 J	4.06	3.83
Perfluorooctanesulfonic acid (PFOS)	20	70	37.1	23.4	31.6	32.2
Perfluorooctanoic Acid (PFOA)	20	70	65.7	53.5	57.3	57.9
Total PFAS	500	500	212.27	139.53	146.73	147.79

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 8. Summary of Groundwater Analytical Results – Former Brooklyn Borough Gas Works (Coney Island) MGP Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Sample Location	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	MW-2 10/5/2018 9-22 On site	MW-16 10/5/2018 9-21 On site Downgradient	MW-18 10/5/2018 10-21 On site Upgradient	Duplicate of MW-18 10/5/2018 10-21 On site Upgradient
SVOCs (ug/L)						
1,4-Dioxane	0.35	0.35	0.63	0.24	0.092 J	0.095 J
PFAS (ng/L)						
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	85.6 U	5.29 J	4.11 J	3.72 J
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	85.6 U	85.2 U	19.4 U	19.4 U
Perfluorobutanesulfonic acid (PFBS)	100	100	7.33 J	27.5	6.66	6.18
Perfluorobutanoic acid (PFBA)	100	100	51.6	276	97.3 J	80 J
Perfluorodecanesulfonic acid (PFDS)	100	100	8.56 U	8.52 U	1.94 U	1.94 U
Perfluorodecanoic acid (PFDA)	100	100	8.56 U	8.52 U	0.43 J	0.58 J
Perfluorododecanoic acid (PFDoA)	100	100	8.56 U	8.52 U	1.94 U	1.94 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	8.56 U	33.4	1.27 J	1.54 J
Perfluoroheptanoic acid (PFHpA)	100	100	22.8	50.9	15.2	16.1
Perfluorohexanoic acid (PFHxA)	100	100	43.5	44	11	12
Perfluorooctanesulfonamide (FOSA)	100	100	8.56 U	8.52 U	2.67	2.81
Perfluoropentanoic acid (PFPeA)	100	100	56.5	68.5	28.9	36.1 J
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	8.56 U	8.52 U	1.94 U	1.94 U
Perfluorotridecanoic acid (PFTriA/PFTTrDA)	100	100	8.56 U	8.52 U	1.94 U	1.94 U
Perfluoroundecanoic acid (PFUnA)	100	100	8.56 U	8.52 U	1.94 U	1.94 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	85.6 U	85.2 U	19.4 U	19.4 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	85.6 U	85.2 U	19.4 U	19.4 U
Perfluorohexanesulfonic acid (PFHxS)	100	100	18.9	181	12.9	11.1
Perfluorononanoic acid (PFNA)	100	100	11.6	11.7	2.6	2.59
Perfluorooctanesulfonic acid (PFOS)	20	70	45.6	898	87.3	88
Perfluorooctanoic acid (PFOA)	20	70	137	487	107	97.4
Total PFAS	500	500	394.83	2083.29	377.34	358.12

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 9. Summary of Groundwater Analytical Results – Fulton Works MGP Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Sample Location	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	FW-MW-4 10/11/2018 3-13 Downgradient	FW-MW-5R 10/11/2018 10-20 Near site	FW-MW-17 10/11/2018 8-18 Downgradient	FW-MW-19 10/11/2018 5-15 Upgradient	Duplicate of FW-MW-19 10/11/2018 5-15 Upgradient
SVOCs (ug/L)							
1,4-Dioxane	0.35	0.35	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
PFAS (ng/L)							
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	16.1 U	16 U	16.1 U	16.2 U	16.2 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	16.1 U	16 U	16.1 U	0.39 J	16.2 U
Perfluorobutanesulfonic acid (PFBS)	100	100	9.44	2.33	10.7	2.03 J	4 J
Perfluorobutanoic acid (PFBA)	100	100	36.1 J	13	83.9 J	52	53.7 J
Perfluorodecanesulfonic acid (PFDS)	100	100	1.61 U	1.6 U	1.61 U	0.58 J	1.62 U
Perfluorodecanoic acid (PFDA)	100	100	1.61 U	1.6 U	0.43 J	0.49 J	0.32 J
Perfluorododecanoic acid (PFDoA)	100	100	1.61 U	1.6 U	1.61 U	0.38 J	1.62 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	1.12 J	1.6 U	1.61 U	1.62 U	1.62 U
Perfluoroheptanoic acid (PFHpA)	100	100	12.3	4.76	49.5	292	261
Perfluorohexanoic acid (PFHxA)	100	100	11.3	3.41	31.2	106	100
Perfluorooctanesulfonamide (FOSA)	100	100	1.61 U	1.6 U	1.61 U	1.62 U	1.62 U
Perfluoropentanoic acid (PFPeA)	100	100	21.2	3.33	53.1	80.4	71.8
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.61 U	1.6 U	1.61 U	1.62 U	1.62 U
Perfluorotridecanoic acid (PFTriA/PFTrDA)	100	100	1.61 U	1.6 U	1.61 U	0.21 J	1.62 U
Perfluoroundecanoic acid (PFUnA)	100	100	1.61 U	1.6 U	1.61 U	1.62 U	1.62 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	16.1 U	16 U	16.1 U	16.2 U	16.2 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	3.35 J	1.15 J	11 J	4.41 J	6.92 J
Perfluorohexanesulfonic acid (PFHxS)	100	100	2.99	0.36 J	1.16 J	1.46 J	1.89
Perfluorononanoic acid (PFNA)	100	100	2.82	0.43 J	4.6	8.62	8.07
Perfluorooctanesulfonic acid (PFOS)	20	70	34.8	1.6 U	13.3	6.92	6.79
Perfluorooctanoic acid (PFOA)	20	70	135	36.9	221	115	103
Total PFAS	500	500	270.42	65.67	479.89	670.89	617.49

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 10. Summary of Groundwater Analytical Results – Glen Cove MGP Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Sample Location	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	GCMW14S-R 9/25/2018 10-20 On site Downgradient	GCRW03 9/25/2018 15-25 On site	PZ06 9/25/2018 7-17 On site Upgradient	Duplicate of PZ06 9/25/2018 7-17 On site Upgradient
SVOCs (ug/L)						
1,4-Dioxane	0.35	0.35	0.2 U	0.2 U	0.2 U	0.2 U
PFAS (ng/L)						
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	17.7 U	18.3 U	17.6 U	17 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	17.7 U	18.3 U	17.6 U	17 U
Perfluorobutanesulfonic acid (PFBS)	100	100	9.38 J	1.83 U	3.1 J	2.43 J
Perfluorobutanoic acid (PFBA)	100	100	5.33 J	4.98 J	3.33 J	3.41 J
Perfluorodecanesulfonic acid (PFDS)	100	100	1.77 U	0.48 J	1.76 U	0.48 J
Perfluorodecanoic acid (PFDA)	100	100	1.77 U	1.92	1.76 U	1.7 U
Perfluorododecanoic acid (PFDoA)	100	100	1.77 U	0.52 J	1.76 U	1.7 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	0.72 J	0.86 J	0.87 J	0.85 J
Perfluoroheptanoic acid (PFHpA)	100	100	6.83	2.14	2.3	2.41
Perfluorohexanoic acid (PFHxA)	100	100	8.06	2.75 J	2.62 J	1.9 J
Perfluorooctanesulfonamide (FOSA)	100	100	1.77 U	1.83 U	1.76 U	1.7 U
Perfluoropentanoic acid (PFPeA)	100	100	7.41	4.22	3.66	3.02
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.77 U	1.83 U	1.76 U	1.7 U
Perfluorotridecanoic acid (PFTriA/PFTrDA)	100	100	1.77 U	1.83 U	1.76 U	1.7 U
Perfluoroundecanoic acid (PFUnA)	100	100	1.77 U	1.83 U	1.76 U	1.7 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	17.7 U	18.3 U	17.6 U	17 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	1.31 J	18.3 U	4.64 J	5.08 J
Perfluorohexanesulfonic acid (PFHxS)	100	100	2.87 J	1.83 U	6.24	6.32
Perfluorononanoic acid (PFNA)	100	100	0.92 J	1.32 J	1.08 J	1.19 J
Perfluorooctanesulfonic acid (PFOS)	20	70	6.14 J	3.17 J	9.67 J	8.52 J
Perfluorooctanoic acid (PFOA)	20	70	17.4	2.38	11.3	12.4
Total PFAS	500	500	66.37	24.74	48.81	48.01

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or parts per trillion (ppb)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 11. Summary of Groundwater Analytical Results – Greenpoint MGP Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Sample Location	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	GPEC-MW-220I 10/1/2018 40-50 On site Upgradient	GPEC-MW-11 10/1/2018 33-48 On site	GPEC-MW-3S 10/1/2018 25-40 On site Downgradient	Duplicate of GPEC-MW-3S 10/1/2018 25-40 On site Downgradient
SVOCs (ug/L)						
1,4-Dioxane	0.35	0.35	0.2 U	0.2 U	0.2 U	0.2 U
PFAS (ng/L)						
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	17.6 U	17.8 U	17.6 U	17.4 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	17.6 U	17.8 U	17.6 U	17.4 U
Perfluorobutanesulfonic acid (PFBS)	100	100	5.18	2.11	1.3 J	1.08 J
Perfluorobutanoic acid (PFBA)	100	100	17.8	19.1	9.82 J	9.9 J
Perfluorodecane Sulfonic acid (PFDS)	100	100	1.76 U	1.78 U	1.76 U	1.74 U
Perfluorodecanoic acid (PFDA)	100	100	0.34 J	1.31 J	2.11	2.08
Perfluorododecanoic acid (PFDoA)	100	100	1.76 U	1.78 U	1.76 U	1.74 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	0.79 J	1.78 U	1.76 U	1.74 U
Perfluoroheptanoic acid (PFHpA)	100	100	14.9	6.56	2.01	1.9
Perfluorohexanoic acid (PFHxA)	100	100	17	5.31	1.04 J	1.57 J
Perfluorooctanesulfonamide (FOSA)	100	100	1.76 U	1.78 U	1.76 U	1.74 U
Perfluoropentanoic acid (PFPeA)	100	100	19.6	3.03	3.66	3.76
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.76 U	1.78 U	1.76 U	1.74 U
Perfluorotridecanoic acid (PFTriA/PFTTrDA)	100	100	1.76 U	0.34 J	1.76 U	1.74 U
Perfluoroundecanoic acid (PFUnA)	100	100	0.26 J	1.14 J	0.55 J	0.32 J
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	17.6 U	17.8 U	17.6 U	17.4 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	17.6 U	17.8 U	17.6 U	17.4 U
Perfluorohexanesulfonic acid (PFHxS)	100	100	22.4	1.78 U	1.76 U	1.74 U
Perfluorononanoic acid (PFNA)	100	100	2.5	1.01 J	1.9	2.35
Perfluorooctanesulfonic acid (PFOS)	20	70	57.9	3.1	11	10.5
Perfluorooctanoic acid (PFOA)	20	70	97.5	8.54	29.4	29.4
Total PFAS	500	500	256.17	51.55	62.79	62.86

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 12. Summary of Groundwater Analytical Results – Inwood Holder Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Sample Location	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	GW-8 10/23/2018 1-11 On site Downgradient	MW-16S 10/23/2018 2-11 On site	Duplicate of MW-16S 10/23/2018 2-11 On site	MW-52I 10/23/2018 13-23 On site Upgradient
SVOCs (ug/L)						
1,4-Dioxane	0.35	0.35	0.49 J	0.2 U	0.2 U	0.2 U
PFAS (ng/L)						
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	16.6 U	16.4 U	16.4 U	16.8 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	16.6 U	16.4 U	16.4 U	16.8 U
Perfluorobutanesulfonic acid (PFBS)	100	100	8.79	0.45 J	0.6 J	11.4
Perfluorobutanoic acid (PFBA)	100	100	20.9 J	21.4	23.3	42.3 J
Perfluorodecanesulfonic acid (PFDS)	100	100	1.66 U	1.64 U	1.64 U	1.68 U
Perfluorodecanoic acid (PFDA)	100	100	1.66 U	1.64 U	1.64 U	1.38 J
Perfluorododecanoic acid (PFDoA)	100	100	1.66 U	1.64 U	1.64 U	1.68 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	1.66 U	1.64 U	1.64 U	1.29 J
Perfluoroheptanoic acid (PFHpA)	100	100	9.84	0.78 J	0.76 J	13.1
Perfluorohexanoic acid (PFHxA)	100	100	6.58	1.9	2.24	18.4
Perfluorooctanesulfonamide (FOSA)	100	100	1.66 U	1.64 U	1.64 U	1.68 U
Perfluoropentanoic acid (PFPeA)	100	100	40.3 J	9.61	10.4	21.1
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.66 U	1.64 U	1.64 U	1.68 U
Perfluorotridecanoic acid (PFTriA/PFTrDA)	100	100	1.66 U	1.64 U	1.64 U	1.68 U
Perfluoroundecanoic acid (PFUnA)	100	100	0.23 J	0.26 J	1.64 U	0.59 J
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	16.6 UJ	16.4 UJ	16.4 UJ	16.8 UJ
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	16.6 U	16.4 U	16.4 U	1.96 J
Perfluorohexanesulfonic acid (PFHxS)	100	100	1.74	1.64 U	1.64 U	8.78
Perfluorononanoic acid (PFNA)	100	100	0.31 J	1.64 U	1.64 U	5.08
Perfluorooctanesulfonic acid (PFOS)	20	70	1.98	1.64 U	1.64 U	74.2
Perfluorooctanoic acid (PFOA)	20	70	48.3	2.81	2.73	38.1
Total PFAS	500	500	138.97	37.21	40.03	237.68

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.
UJ = The results was not detected at or above the reporting limit shown and the reporting limit is estimated.

Table 13. Summary of Groundwater Analytical Results – Kings County Works MGP Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Location Name	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	KC-MW-01 10/5/2018 22-23 Upgradient	KC-MW-05 10/5/2018 6-16 On site	Duplicate of KC-MW-05 10/5/2018 6-16 On site	KC-MW-09 10/5/2018 5-15 Downgradient
SVOCs (ug/L)						
1,4-Dioxane	0.35	0.35	0.57 J	0.2 U	0.2 U	0.2 U
PFAS (ng/L)						
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	16.7 U	196 U	192 U	16.1 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	16.7 U	196 U	192 U	16.1 U
Perfluorobutanesulfonic acid (PFBS)	100	100	2.74	93.7	96.9	2.41
Perfluorobutanoic acid (PFBA)	100	100	10.9	2940 J	3210 J	28.3
Perfluorodecanesulfonic acid (PFDS)	100	100	1.67 U	19.6 U	19.2 U	1.61 U
Perfluorodecanoic acid (PFDA)	100	100	1.67 U	19.6 U	19.2 U	0.54 J
Perfluorododecanoic acid (PFDoA)	100	100	1.67 U	19.6 U	19.2 U	1.61 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	1.67 U	19.6 U	19.2 U	1.61 U
Perfluoroheptanoic acid (PFHpA)	100	100	25.2	33.2 J	28.1 J	9.91
Perfluorohexanoic acid (PFHxA)	100	100	18.3	19.6 U	11.1 J	7.9
Perfluorooctanesulfonamide (FOSA)	100	100	1.67 U	19.6 U	19.2 U	1.61 U
Perfluoropentanoic acid (PFPeA)	100	100	15.9	243	221	19.5
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.67 U	19.6 U	19.2 U	1.61 U
Perfluorotridecanoic acid (PFTriA/PFTTrDA)	100	100	1.67 U	19.6 U	19.2 U	1.61 U
Perfluoroundecanoic acid (PFUnA)	100	100	1.67 U	19.6 U	19.2 U	1.61 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	16.7 U	196 U	192 U	16.1 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	1.08 J	21.8 J	32 J	2.36 J
Perfluorohexanesulfonic acid (PFHxS)	100	100	2.44	19.6 U	19.2 U	1.5 J
Perfluorononanoic acid (PFNA)	100	100	2.9	34.1	30.1	5.43
Perfluorooctanesulfonic acid (PFOS)	20	70	5.52	19.6 U	19.2 U	6
Perfluorooctanoic acid (PFOA)	20	70	86.7	155 J	154 J	44.7
Total PFAS	500	500	171.68	3520.8	3783.2	128.55

Notes:
Analytes in blue are not detected in any sample
ng/L = nanogram per liter or parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation ground water initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 14. Summary of Groundwater Analytical Results – Patchogue MGP Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Location Name	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	MW-1 9/25/2018 7-12 On site Upgradient	MW-4S 9/25/2018 5-10 On site Downgradient	MW-7S 9/25/2018 4-9 On site	Duplicate of MW-7S 9/25/2018 4-9 On site
SVOCs (ug/L)						
1,4-Dioxane	0.35	0.35	0.2 U	0.2 U	0.2 U	0.2 U
PFAS (ng/L)						
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	2.21 J	17.6 U	7.76 J	7.59 J
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	17.4 U	17.6 U	17.9 U	18 U
Perfluorobutanesulfonic acid (PFBS)	100	100	9.02 J	18	20.8	21
Perfluorobutanoic acid (PFBA)	100	100	25	3.73 J	8.82	7.44 J
Perfluorodecane Sulfonic acid (PFDS)	100	100	1.74 U	0.47 J	1.79 U	1.8 U
Perfluorodecanoic acid (PFDA)	100	100	2.05	0.56 J	0.72 J	0.81 J
Perfluorododecanoic acid (PFDoA)	100	100	1.74 U	0.32 J	1.79 U	1.8 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	1.74 U	2.82	11.7	14.6
Perfluoroheptanoic acid (PFHpA)	100	100	2.86	3.67	6.96	6.08
Perfluorohexanoic acid (PFHxA)	100	100	6.37	2.96 J	9.05	9.89
Perfluorooctanesulfonamide (FOSA)	100	100	0.74 J	1.76 U	1.79 U	0.83 J
Perfluoropentanoic acid (PFPeA)	100	100	3.48 J	3.88	5.12 J	8.88 J
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.74 U	1.76 U	1.79 U	1.8 U
Perfluorotridecanoic acid (PFTriA/PFTrDA)	100	100	1.74 U	0.27 J	1.79 U	1.8 U
Perfluoroundecanoic acid (PFUnA)	100	100	0.75 J	0.27 J	1.79 U	1.8 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	17.4 U	17.6 U	17.9 U	18 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	0.99 J	17.6 U	17.9 U	1.03 J
Perfluorohexanesulfonic acid (PFHxS)	100	100	1.74 U	22.2	44.6	41
Perfluorononanoic acid (PFNA)	100	100	2.48	0.75 J	1.13 J	1.34 J
Perfluorooctanesulfonic acid (PFOS)	20	70	13.3 J	91.8	1630 J	1170 J
Perfluorooctanoic acid (PFOA)	20	70	4.09	12.5	16.7	17.2
Total PFAS	500	500	73.34	164.2	1763.36	1307.69

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or patrs per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 15. Summary of Groundwater Analytical Results – Peoples Works MGP Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Sample Location	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	MW-9 9/26/2018 5-15 On site Downgradient	MW-11 9/26/2018 6-16 On site	Duplicate of MW-11 9/26/2018 6-16 On site	PWMW-01 9/26/2018 8-18 On site Upgradient
SVOCs (ug/L)						
1,4-Dioxane	0.35	0.35	0.21 U	0.21 U	0.21 U	0.21 U
PFAS (ng/L)						
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	17.3 U	17.5 U	17.6 U	17.2 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	17.3 U	17.5 U	17.6 U	17.2 U
Perfluorobutanesulfonic acid (PFBS)	100	100	2.9 J	11 J	9.87 J	4.7 J
Perfluorobutanoic acid (PFBA)	100	100	1.73 U	14	14.1	4.14 J
Perfluorodecane Sulfonic acid (PFDS)	100	100	3.81	1.75 U	1.76 U	1.72 U
Perfluorodecanoic acid (PFDA)	100	100	1.84	1.75 U	1.76 U	1.72 U
Perfluorododecanoic acid (PFDoA)	100	100	1.96	1.75 U	1.76 U	1.72 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	1.73 U	1.75 U	1.15 J	1.72 U
Perfluoroheptanoic acid (PFHpA)	100	100	2.2	4.12	4.26	8.92
Perfluorohexanoic acid (PFHxA)	100	100	3.44 J	5.85	6.66	8.65
Perfluorooctanesulfonamide (FOSA)	100	100	1.43 J	1.75 U	1.76 U	1.72 U
Perfluoropentanoic acid (PFPeA)	100	100	3.78	12.8	15.6	15.9
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	0.94 J	1.75 U	1.76 U	1.72 U
Perfluorotridecanoic acid (PFTriA/PFTTrDA)	100	100	2.7	1.75 U	1.76 U	1.72 U
Perfluoroundecanoic acid (PFUnA)	100	100	1.83	0.23 J	1.76 U	1.72 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	17.3 U	17.5 U	17.6 U	17.2 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	2.65 J	17.5 U	17.6 U	17.2 U
Perfluorohexanesulfonic acid (PFHxS)	100	100	1.73 U	1.75 U	1.76 U	2.27 J
Perfluorononanoic acid (PFNA)	100	100	0.84 J	1.32 J	1.17 J	1.54 J
Perfluorooctanesulfonic acid (PFOS)	20	70	10.6 J	3.14 J	2.39 J	20.4
Perfluorooctanoic acid (PFOA)	20	70	7.15	38.4	38.1	42.6
Total PFAS	500	500	48.07	90.86	93.3	109.12

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 16. Summary of Groundwater Analytical Results – Rockaway Park MGP Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Sample Location	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	MW-02S 9/28/2018 5-15 Downgradient	MW-26S 9/28/2018 3-13 Upgradient	RW-05A 9/28/2018 10-20 On site	Duplicate of RW-05A 9/28/2018 10-20 On site
SVOCs (ug/L)						
1,4-Dioxane	0.35	0.35	0.2 U	0.2 U	0.2 U	0.2 U
PFAS (ng/L)						
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	17.2 U	17.6 U	17.6 U	17.5 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	17.2 U	17.6 U	17.6 U	17.5 U
Perfluorobutanesulfonic acid (PFBS)	100	100	11.5	3.76	2.57 J	6.25 J
Perfluorobutanoic acid (PFBA)	100	100	77 J	24.4	148 J	115 J
Perfluorodecanesulfonic acid (PFDS)	100	100	0.96 J	1.76 U	1.76 U	1.75 U
Perfluorodecanoic acid (PFDA)	100	100	4.18	1.76 U	0.65 J	0.72 J
Perfluorododecanoic acid (PFDoA)	100	100	1.72 U	1.76 U	1.76 U	1.75 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	2.15	1.76 U	1.76 U	1.75 U
Perfluoroheptanoic acid (PFHpA)	100	100	11.5	3.79	4.68 J	3.74
Perfluorohexanoic acid (PFHxA)	100	100	20	4.82	7.39 J	3.9 J
Perfluorooctanesulfonamide (FOSA)	100	100	0.57 J	1.76 U	1.76 U	1.75 U
Perfluoropentanoic acid (PFPeA)	100	100	25.2	6.58	12.7	16.8
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.72 U	1.76 U	1.76 U	1.75 U
Perfluorotridecanoic acid (PFTriA/PFTrDA)	100	100	1.72 U	1.76 U	1.76 U	1.75 U
Perfluoroundecanoic acid (PFUnA)	100	100	0.9 J	0.23 J	0.39 J	0.39 J
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	17.2 U	17.6 U	17.6 U	17.5 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	17.2 U	17.6 U	17.6 U	17.5 U
Perfluorohexanesulfonic acid (PFHxS)	100	100	22.5	2.48 J	8.8 U	3.82
Perfluorononanoic acid (PFNA)	100	100	10.7	1.08 J	1.53 J	1.28 J
Perfluorooctanesulfonic acid (PFOS)	20	70	122 J	13.6	8.99	9.15
Perfluorooctanoic acid (PFOA)	20	70	51.9	18.1	15.5	17.5
Total PFAS	500	500	361.06	78.84	202.4	178.55

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 17. Summary of Groundwater Analytical Results – Sag Harbor MGP Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Sample Location	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	SHMW-01R 9/27/2018 35-45 On site	SHMW-03I 9/27/2018 35-45 Downgradient	SHMW-13I 9/27/2018 35-45 Upgradient	Duplicate of SHMW-13I 9/27/2018 35-45 Upgradient
SVOCs (ug/L)						
1,4-Dioxane	0.35	0.35	0.21 U	0.21 U	0.21 U	0.21 U
PFAS (ng/L)						
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	16.7 U	17.1 U	17.4 U	17.7 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	16.7 U	17.1 U	17.4 U	17.7 U
Perfluorobutanesulfonic acid (PFBS)	100	100	1.67 U	1.71 U	4.28	2.85 J
Perfluorobutanoic acid (PFBA)	100	100	6.01 J	3.58 J	6.37 J	5.92 J
Perfluorodecanesulfonic acid (PFDS)	100	100	1.67 U	1.71 U	1.74 U	1.77 U
Perfluorodecanoic acid (PFDA)	100	100	1.67 U	1.71 U	0.4 J	1.77 U
Perfluorododecanoic acid (PFDoA)	100	100	1.67 U	1.71 U	1.74 U	1.77 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	0.75 J	1.71 U	0.8 J	0.76 J
Perfluoroheptanoic acid (PFHpA)	100	100	2.6	1.81	3.23	3.81
Perfluorohexanoic acid (PFHxA)	100	100	2.2	2.03	5.03	4.53
Perfluorooctanesulfonamide (FOSA)	100	100	1.67 U	1.71 U	1.74 U	1.77 U
Perfluoropentanoic acid (PFPeA)	100	100	2.7	2.44	6.44	5.99
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.67 U	1.71 U	1.74 U	1.77 U
Perfluorotridecanoic acid (PFTriA/PFTrDA)	100	100	1.67 U	1.71 U	1.74 U	1.77 U
Perfluoroundecanoic acid (PFUnA)	100	100	1.67 U	1.71 U	1.74 U	1.77 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	16.7 U	17.1 U	17.4 U	17.7 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	16.7 U	17.1 U	17.4 U	17.7 U
Perfluorohexanesulfonic acid (PFHxS)	100	100	4.79	4.69	4.76	4.08
Perfluorononanoic acid (PFNA)	100	100	4.29	1.71 U	1.74 U	1.77 U
Perfluorooctanesulfonic acid (PFOS)	20	70	10.7	8.99	9.9	9.61
Perfluorooctanoic acid (PFOA)	20	70	10.3	7.41	10.3	10.8
Total PFAS	500	500	44.34	30.95	51.51	48.35

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 18. Summary of Groundwater Analytical Results – Skillman St. Station Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

Sample Name Sample Date Sample Depth (feet) Sample Location	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	SSMW-03 10/3/2018 12-22 Upgradient	Duplicate of SSMW-03 10/3/2018 12-22 Upgradient	SSMW-05 10/3/2018 11-21 Downgradient
SVOCs (ug/L)					
1,4-Dioxane	0.35	0.35	0.21 U	0.21 U	0.42 J
PFAS (ng/L)					
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	17.6 U	17.4 U	17.8 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	0.45 J	17.4 U	17.8 U
Perfluorobutanesulfonic acid (PFBS)	100	100	10.8	9.81	14.7
Perfluorobutanoic acid (PFBA)	100	100	48.5	55.9 J	83.8
Perfluorodecanesulfonic acid (PFDS)	100	100	1.76 U	1.74 U	1.78 U
Perfluorodecanoic acid (PFDA)	100	100	0.7 J	0.83 J	5.36
Perfluorododecanoic acid (PFDoA)	100	100	1.76 U	1.74 U	1.78 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	1.55 J	1.07 J	1.05 J
Perfluoroheptanoic acid (PFHpA)	100	100	44.6	43.4	91
Perfluorohexanoic acid (PFHxA)	100	100	73.3	73.9	208
Perfluorooctanesulfonamide (FOSA)	100	100	1.76 U	1.74 U	1.02 J
Perfluoropentanoic acid (PFPeA)	100	100	69.3 J	61.4	164
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.76 U	1.74 U	1.78 U
Perfluorotridecanoic acid (PFTriA/PFTTrDA)	100	100	1.76 U	1.74 U	1.78 U
Perfluoroundecanoic acid (PFUnA)	100	100	0.28 J	0.29 J	0.36 J
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	17.6 U	17.4 U	17.8 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	3.41 J	1.63 J	5.02 J
Perfluorohexanesulfonic acid (PFHxS)	100	100	3.91	3.34	9.72
Perfluorononanoic acid (PFNA)	100	100	6.55	5.67	8.05
Perfluorooctanesulfonic acid (PFOS)	20	70	42.4	40.8	44.7 J
Perfluorooctanoic acid (PFOA)	20	70	106	92.1	180
Total PFAS	500	500	411.75	390.14	816.78

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

Validation Qualifiers:
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Table 19. Summary of Groundwater Analytical Results – Wythe Ave. Site
Emerging Contaminant Groundwater Sampling Report
National Grid
Brooklyn, Queens, and Long Island, NY

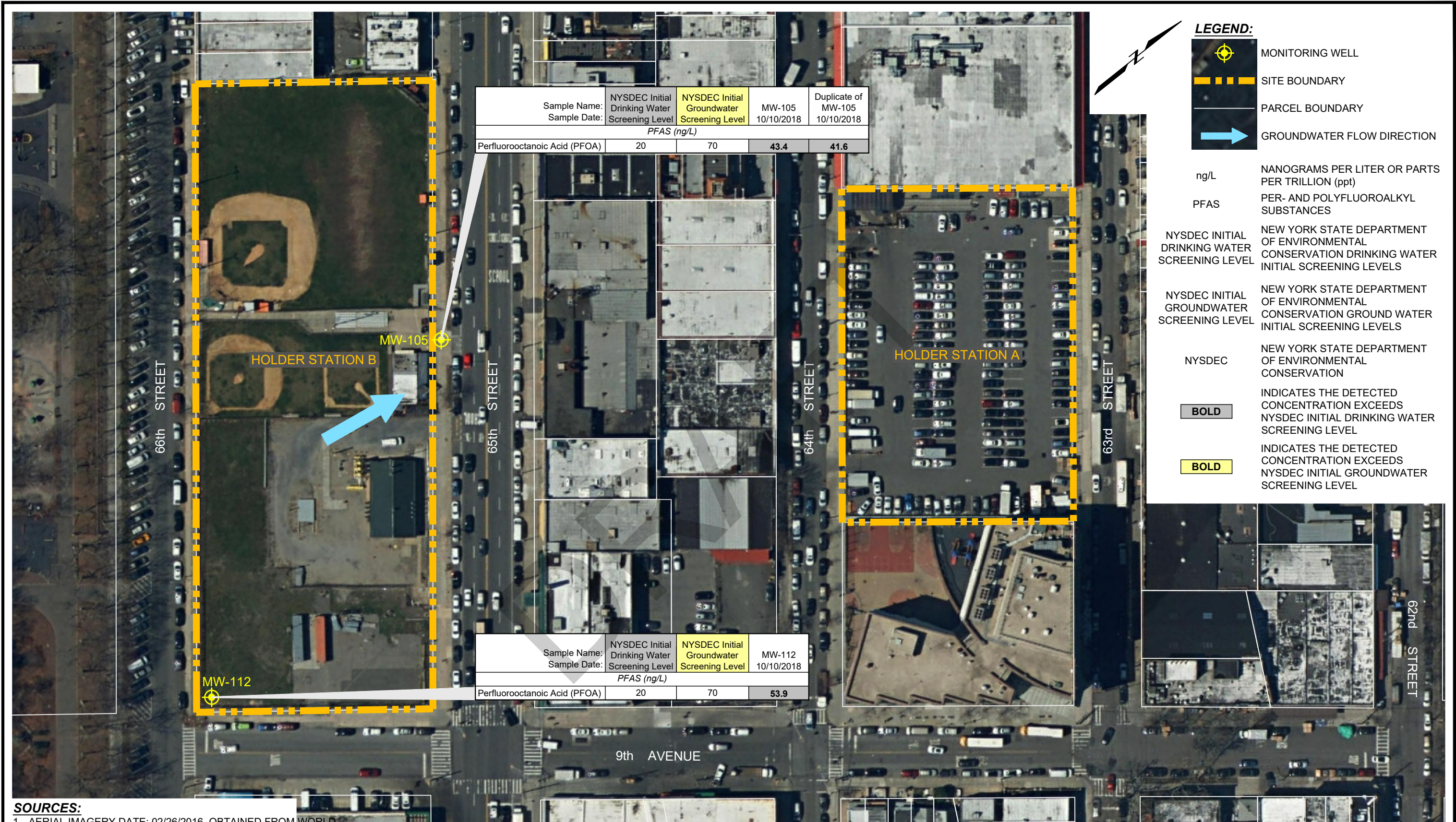
Sample Name Sample Date Sample Depth (feet) Location Name	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	WA-MW-01 10/3/2018 8-18 Downgradient	WA-MW-04 10/3/2018 9-19 Upgradient	Duplicate of WA-MW-04 10/3/2018 9-19 Upgradient
SVOCs (ug/L)					
1,4-Dioxane	0.35	0.35	0.21 U	0.55 J	0.55 J
PFAS (ng/L)					
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100	17.7 U	18 U	17.7 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	100	17.7 U	18 U	17.7 U
Perfluorobutanesulfonic acid (PFBS)	100	100	7.11	7.15	8.5
Perfluorobutanoic acid (PFBA)	100	100	177 J	46.8 J	56.9 J
Perfluorodecanesulfonic acid (PFDS)	100	100	1.77 U	1.8 U	1.77 U
Perfluorodecanoic acid (PFDA)	100	100	1.77 U	1.8 U	1.77 U
Perfluorododecanoic acid (PFDoA)	100	100	1.77 U	1.8 U	1.77 U
Perfluoroheptanesulfonic acid (PFHpS)	100	100	1.77 U	1.8 U	0.78 J
Perfluoroheptanoic acid (PFHpA)	100	100	30.6	15.9	18.5
Perfluorohexanoic acid (PFHxA)	100	100	272	17.2	19
Perfluorooctanesulfonamide (FOSA)	100	100	1.77 U	1.8 U	1.77 U
Perfluoropentanoic acid (PFPeA)	100	100	149	21.8	19.1
Perfluorotetradecanoic acid (PFTA/PFTeDA)	100	100	1.77 U	1.8 U	1.77 U
Perfluorotridecanoic acid (PFTriA/PFTTrDA)	100	100	1.77 U	1.8 U	1.77 U
Perfluoroundecanoic acid (PFUnA)	100	100	0.22 J	0.37 J	1.77 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	100	100	17.7 U	18 U	17.7 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	100	100	1.08 J	2.08 J	2.07 J
Perfluorohexanesulfonic acid (PFHxS)	100	100	0.58 J	1.96	2.31
Perfluorononanoic acid (PFNA)	100	100	2.68	1.24 J	1.61 J
Perfluorooctanesulfonic acid (PFOS)	20	70	15.4	3.39	3.92
Perfluorooctanoic acid (PFOA)	20	70	23.1	65.9	69.8
Total PFAS	500	500	678.77	183.79	202.49

Notes:
Analytes in blue are not detected in any sample.
ng/L = nanogram per liter or parts per trillion (ppt)
ug/L = micrograms per liter or parts per billion (ppb)
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
Total PFAS are calculated using detects only.
NYSDEC Initial Drinking Water Screening Level - New York State Department of Environmental Conservation drinking water initial screening levels.
NYSDEC Initial Groundwater Screening Level - New York State Department of Environmental Conservation groundwater initial screening levels.
NYSDEC = New York State Department of Environmental Conservation
Bolding indicates a detected result concentration.
Shading and bolding indicates that the detected concentration is above the NYSDEC screening level it was compared to.

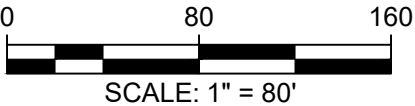
Validation Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Figures

DRAFT



- SOURCES:**
1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
 2. FIGURE 2: LOCATION OF MONITORING WELLS, FORMER BAY RIDGE HOLDER STATION A & B SITE, OPERABLE UNIT 2, PREPARED BY AECOM, DATE: 12/30/15.
 3. FIGURE 1-6: GROUNDWATER CONTOURS, PREPARED BY AECOM, DATE: 9/26/14 (GROUNDWATER CONTOURS DATED 10/10/13).



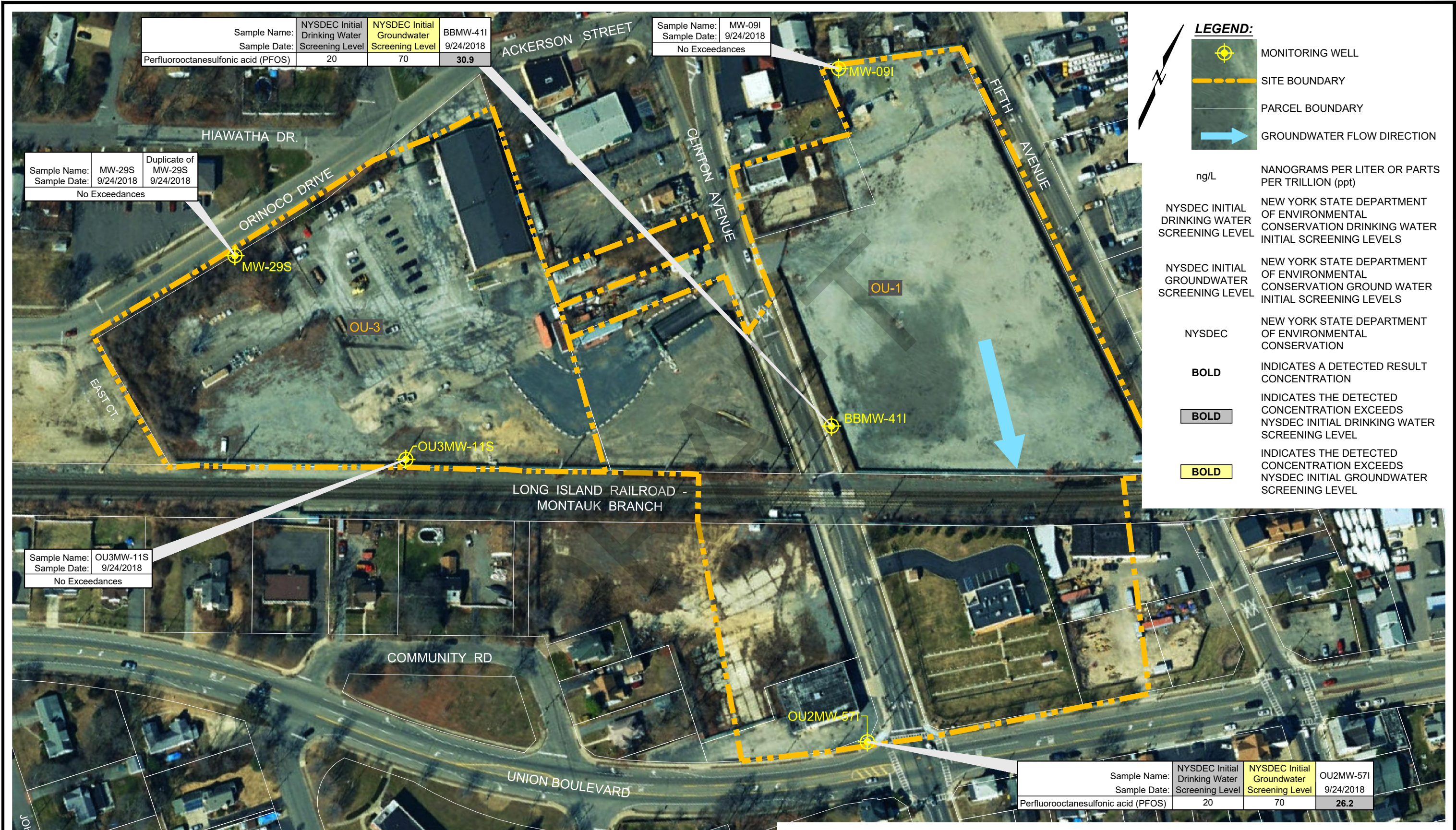
Emerging Contaminant Sampling Report
National Grid New York Former MGP Sites

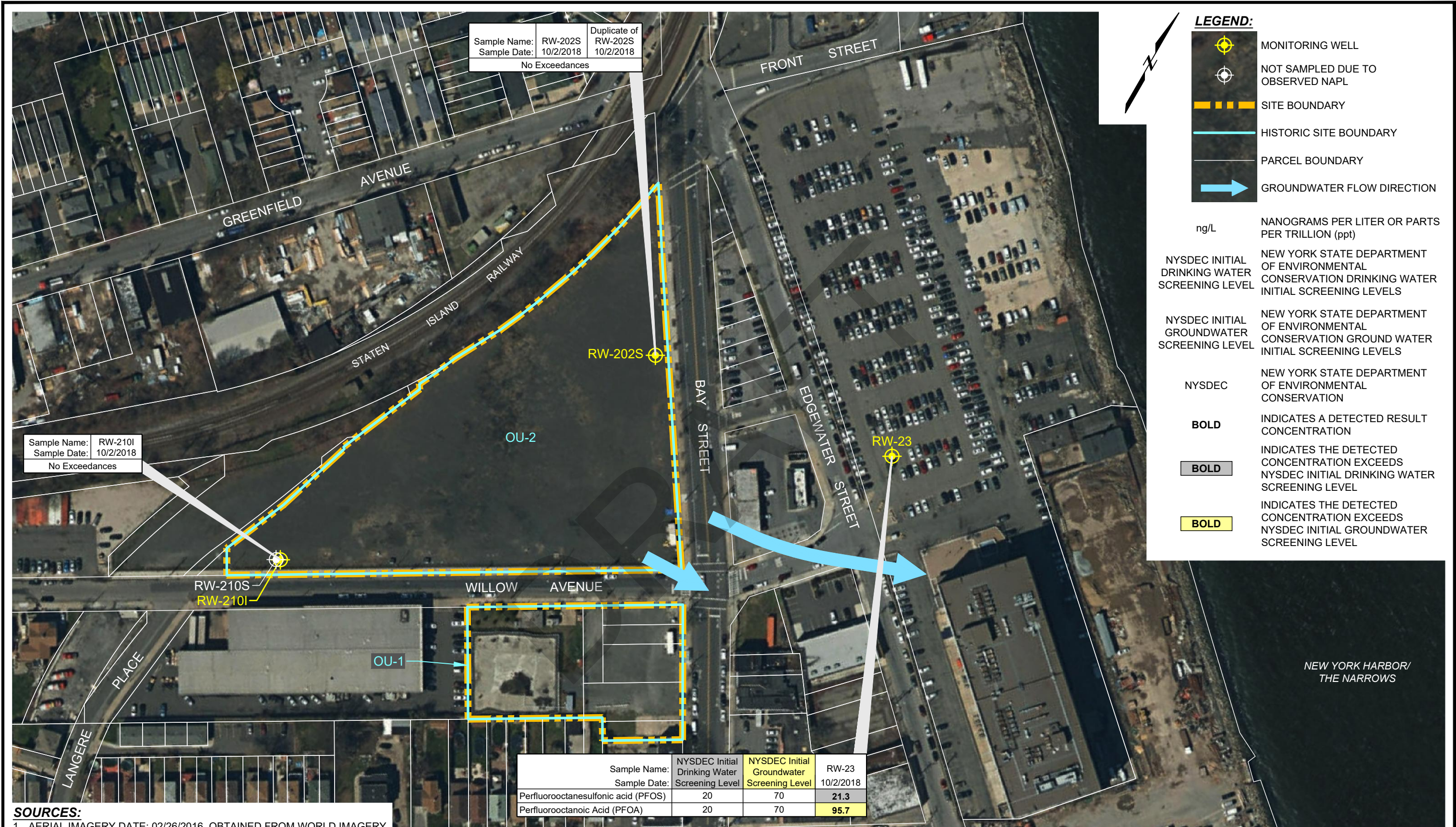
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS -
BAY RIDGE HOLDER STATIONS A & B

Project 1802728

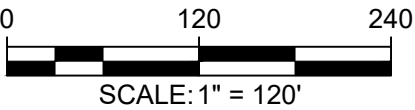
February 2019

Fig. 1





- SOURCES:**
1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
 2. INTERIM STATUS REPORT, FIGURE 2: SITE LAYOUT, PREPARED BY AECOM, DATE: 01/23/15.
 3. FOURTH SEMIANNUAL MONITORING (SA4) REPORT (JULY-DECEMBER 2-17) SITE MANAGEMENT PLAN MONITORING, FIGURE 6: GROUNDWATER CONTOURS DECEMBER 2017, PREPARED BY AECOM, DATE: 4/23/18.



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National Grid New York Former MGP Sites

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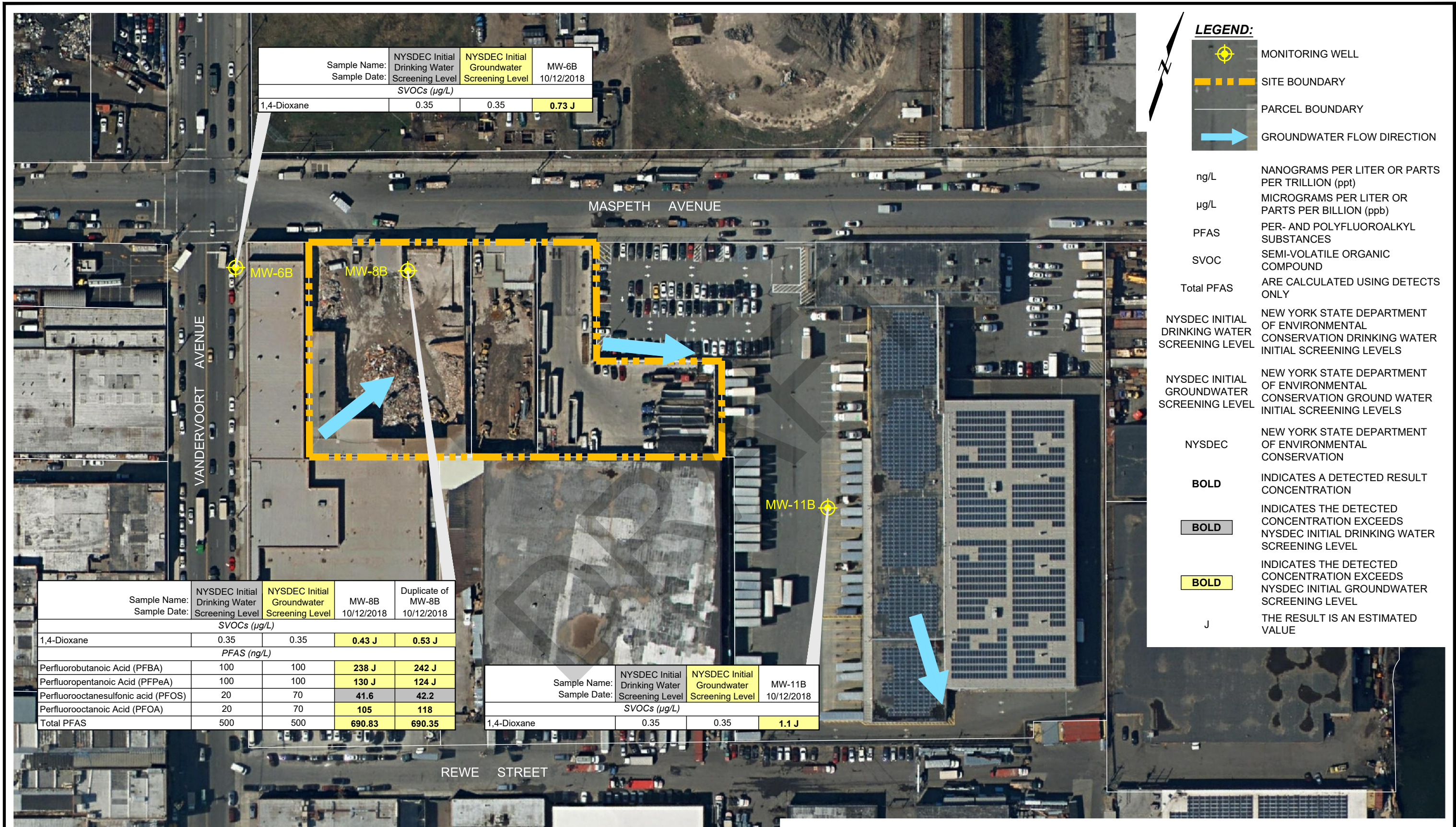


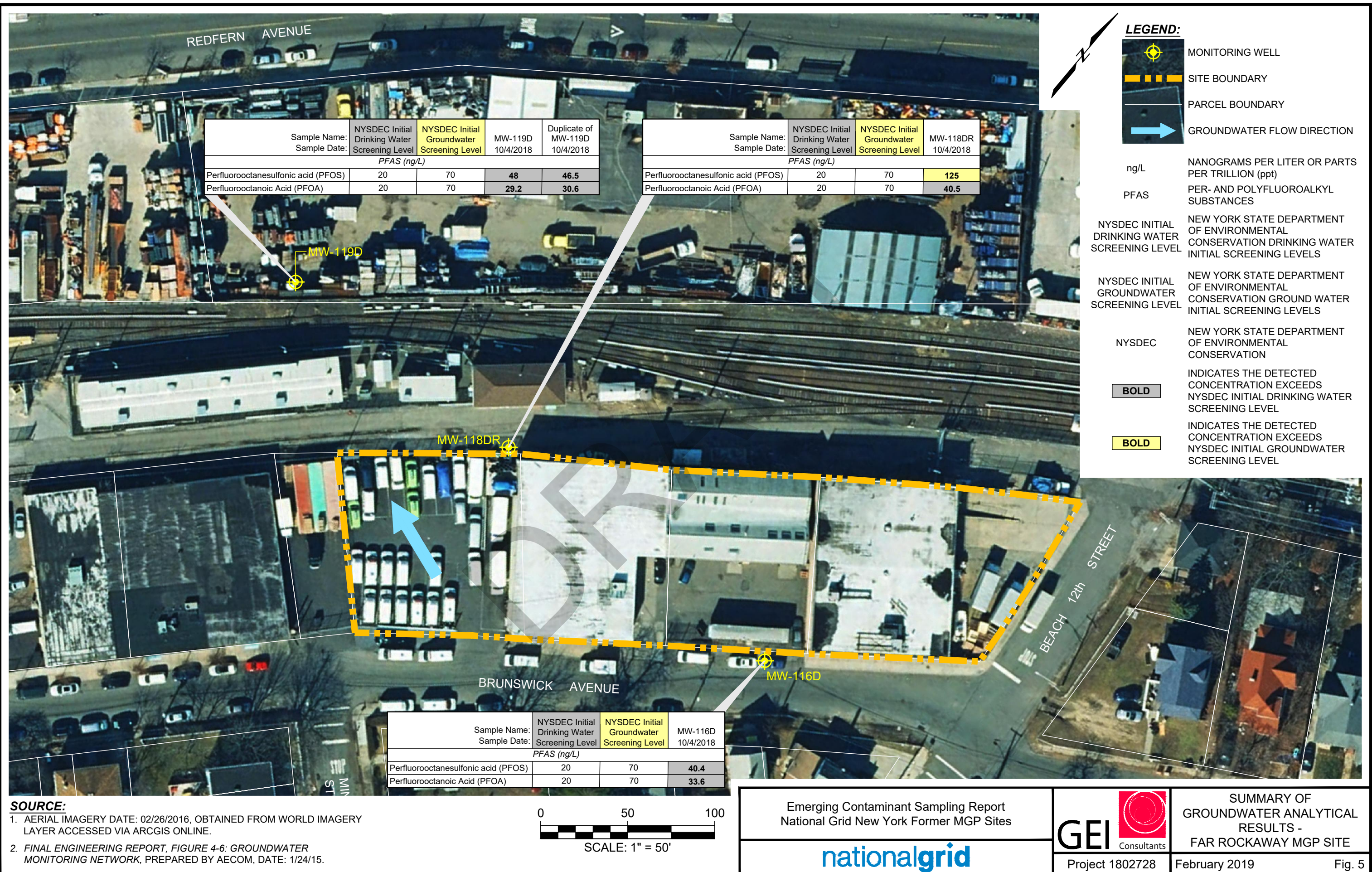
Project 1802728

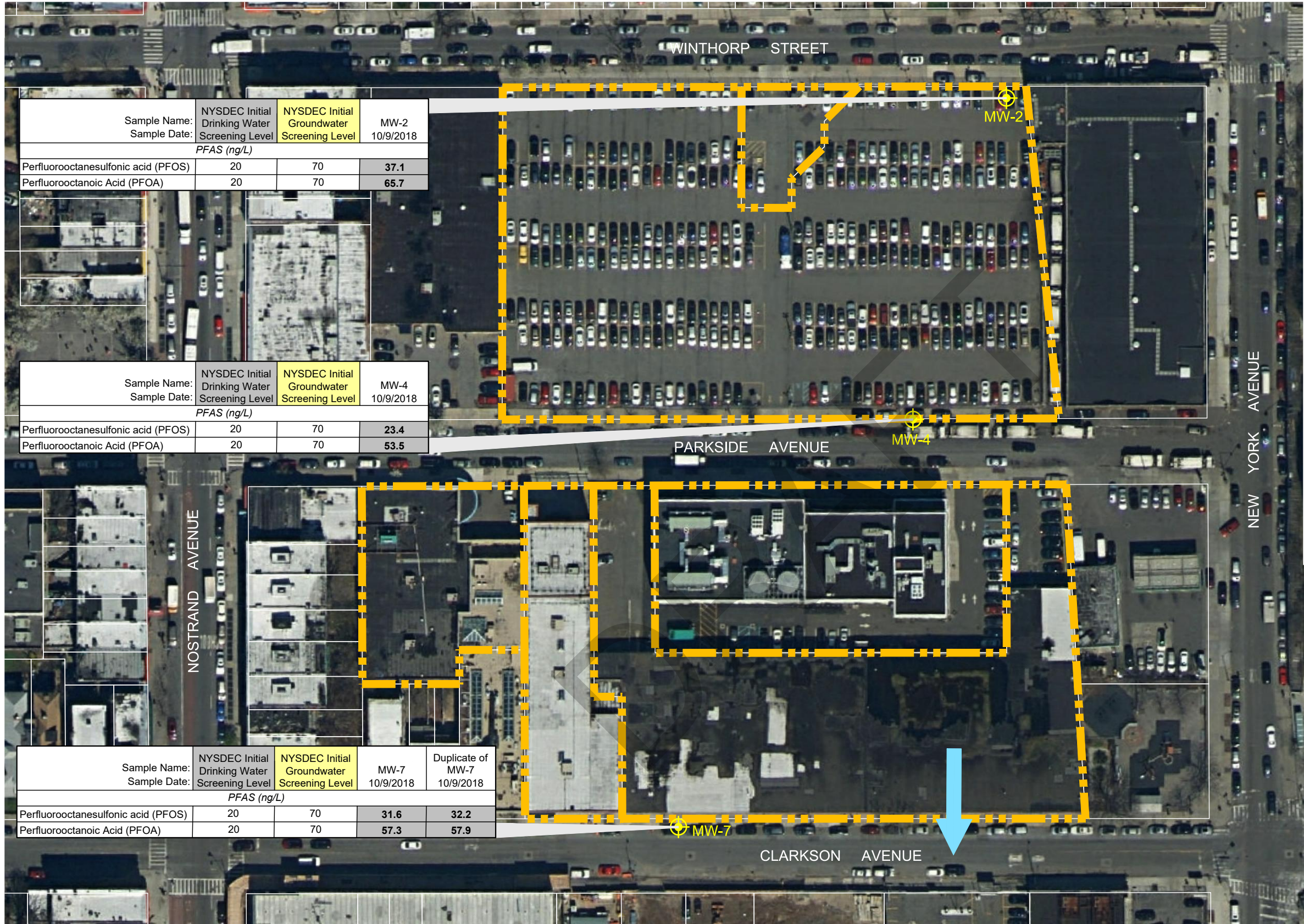
SUMMARY OF GROUNDWATER
ANALYTICAL RESULTS (ng/L) -
CLIFTON MGP SITE

February 2019

Fig. 3







LEGEND:

- MONITORING WELL
- SITE BOUNDARY
- PARCEL BOUNDARY
- GROUNDWATER FLOW DIRECTION

ng/L NANOGRAMS PER LITER OR PARTS PER TRILLION (ppt)

PFAS PER- AND POLYFLUOROALKYL SUBSTANCES

NYSDEC INITIAL DRINKING WATER SCREENING LEVEL NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION DRINKING WATER INITIAL SCREENING LEVELS

NYSDEC INITIAL GROUNDWATER SCREENING LEVEL NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION GROUND WATER INITIAL SCREENING LEVELS

NYSDEC NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

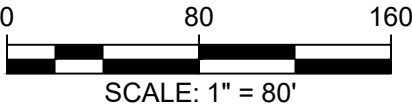
BOLD INDICATES THE DETECTED CONCENTRATION EXCEEDS NYSDEC INITIAL DRINKING WATER SCREENING LEVEL

BOLD INDICATES THE DETECTED CONCENTRATION EXCEEDS NYSDEC INITIAL GROUNDWATER SCREENING LEVEL



SOURCES:

1. AERIAL IMAGERY DATE: 03/29/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. SITE MANAGEMENT PLAN, FIGURE 1-7: GROUNDWATER ELEVATION CONTOUR MAP, PREPARED BY AECOM, DATE: 01/10/12 (GROUNDWATER CONTOURS DATED 7/28/2011).



Emerging Contaminant Sampling Report
National Grid New York Former MGP Sites

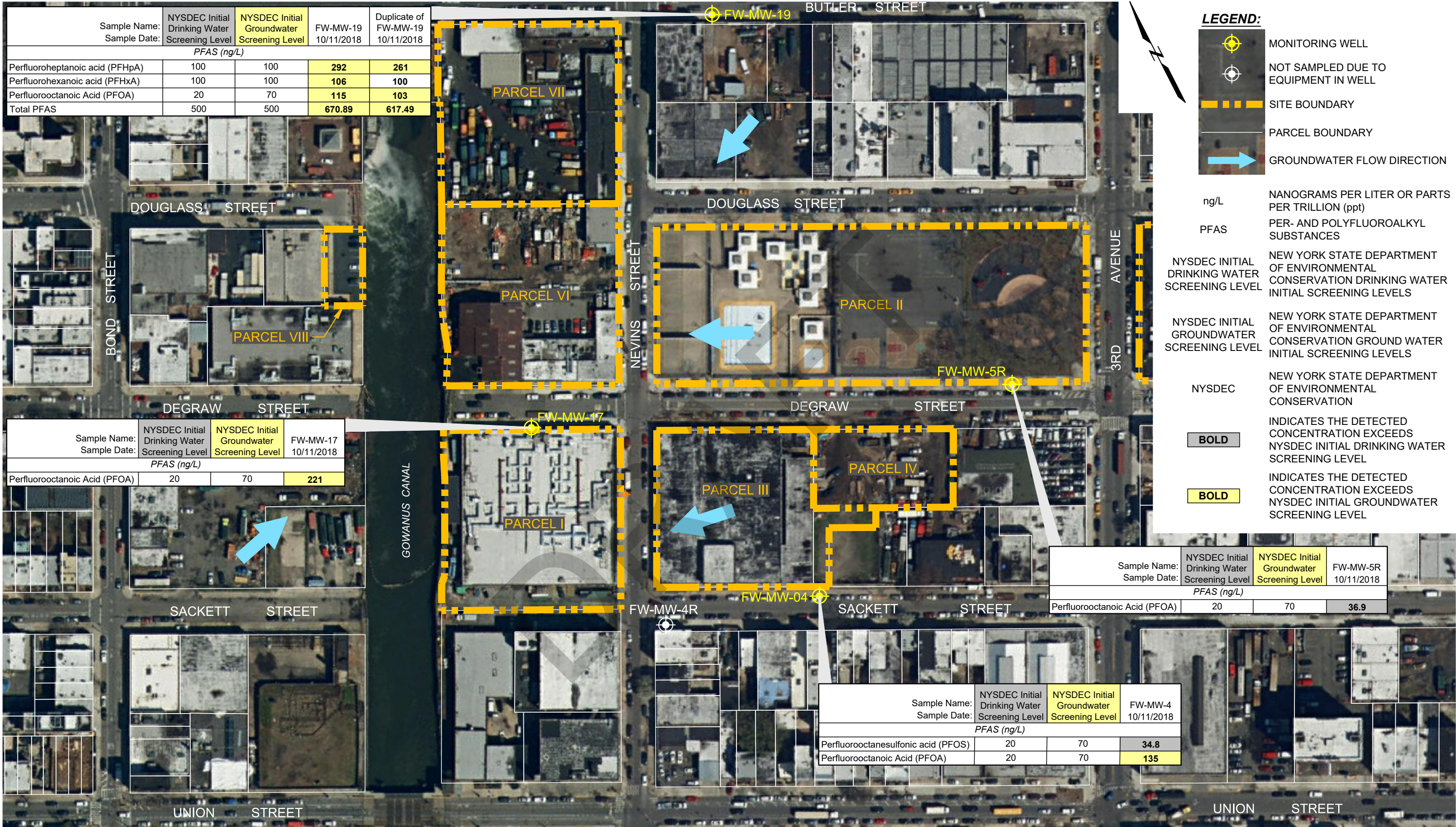
nationalgrid

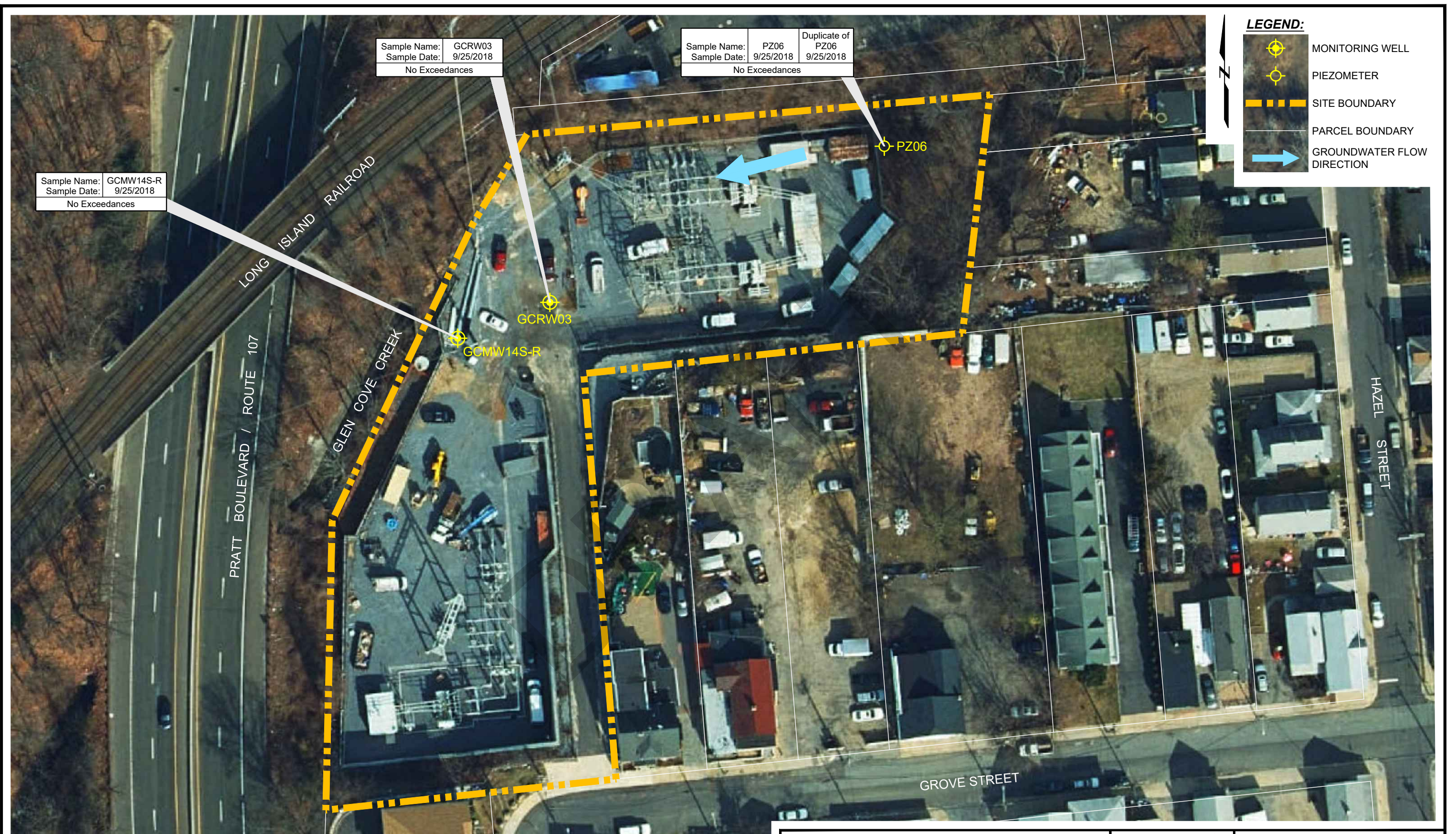
Project 1802728

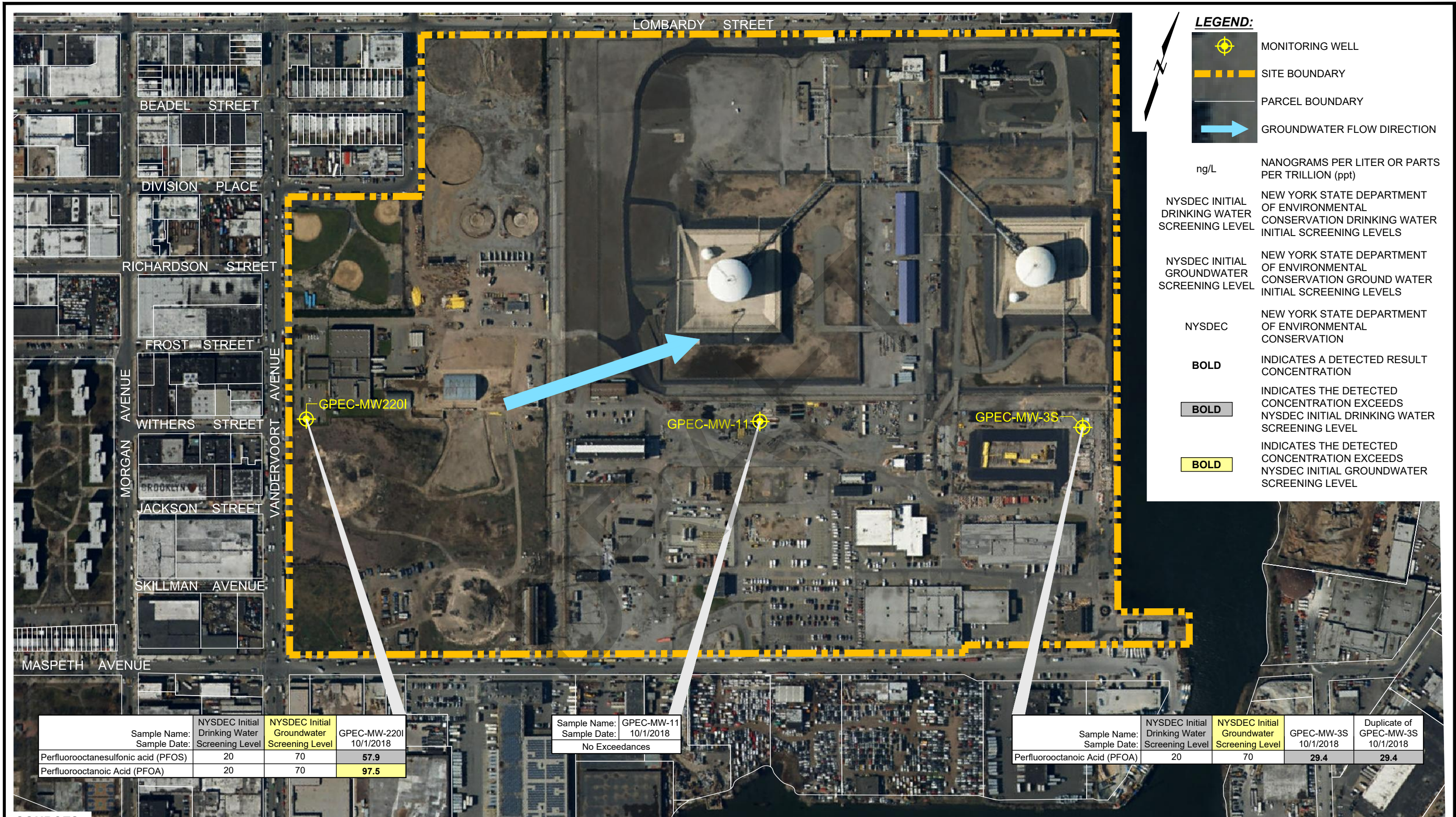
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - FLATBUSH STATION A & B SITE

February 2019

Fig. 6









Sample Name:	MW-16S	Duplicate of
Sample Date:	10/23/2018	MW-16S
		10/23/2018
No Exceedances		

LEGEND:

MONITORING WELL

NOT SAMPLED DUE TO NAPL IN WELL

NOT SAMPLED, WELL COULD NOT BE LOCATED

SITE BOUNDARY

PARCEL BOUNDARY

GROUNDWATER FLOW DIRECTION

ng/L

NANOGRAMS PER LITER OR PARTS PER TRILLION (ppt)

µg/L

MICROGRAMS PER LITER OR PARTS PER BILLION (ppb)

PFAS

PER- AND POLYFLUOROALKYL SUBSTANCES

SVOC

SEMI-VOLATILE ORGANIC COMPOUND

NYSDEC INITIAL DRINKING WATER SCREENING LEVEL

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION DRINKING WATER INITIAL SCREENING LEVELS

NYSDEC INITIAL GROUNDWATER SCREENING LEVEL

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION GROUND WATER INITIAL SCREENING LEVELS

NYSDEC

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

BOLD

INDICATES A DETECTED RESULT CONCENTRATION

BOLD

INDICATES THE DETECTED CONCENTRATION EXCEEDS NYSDEC INITIAL DRINKING WATER SCREENING LEVEL

BOLD

INDICATES THE DETECTED CONCENTRATION EXCEEDS NYSDEC INITIAL GROUNDWATER SCREENING LEVEL

J

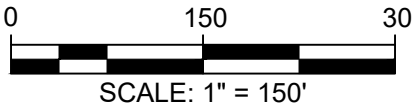
THE RESULT IS AN ESTIMATED VALUE

Sample Name:	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	GW-8
Sample Date:			10/23/2018
SVOCs (µg/L)			
1,4-Dioxane	0.35	0.35	0.49 J
PFAS (ng/L)			
Perfluorooctanoic Acid (PFOA)	20	70	48.3

Sample Name:	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	MW-52I
Sample Date:			10/23/2018
PFAS (ng/L)			
Perfluorooctanesulfonic acid (PFOS)	20	70	74.2
Perfluorooctanoic Acid (PFOA)	20	70	38.1

SOURCE:

1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. FIGURE 4-3: SHALLOW GROUNDWATER ELEVATION CONTOUR MAP, PREPARED BY AECOM, DATE: 9/30/13 (GROUNDWATER CONTOURS DATED 10/18/12).
3. SITE CHARACTERIZATION WORK PLAN, FIGURE 2: PROPOSED SAMPLE LOCATIONS, PREPARED BY GEI CONSULTANTS, INC., DATE: JULY 2007.



Emerging Contaminant Sampling Report
National Grid New York Former MGP Sites

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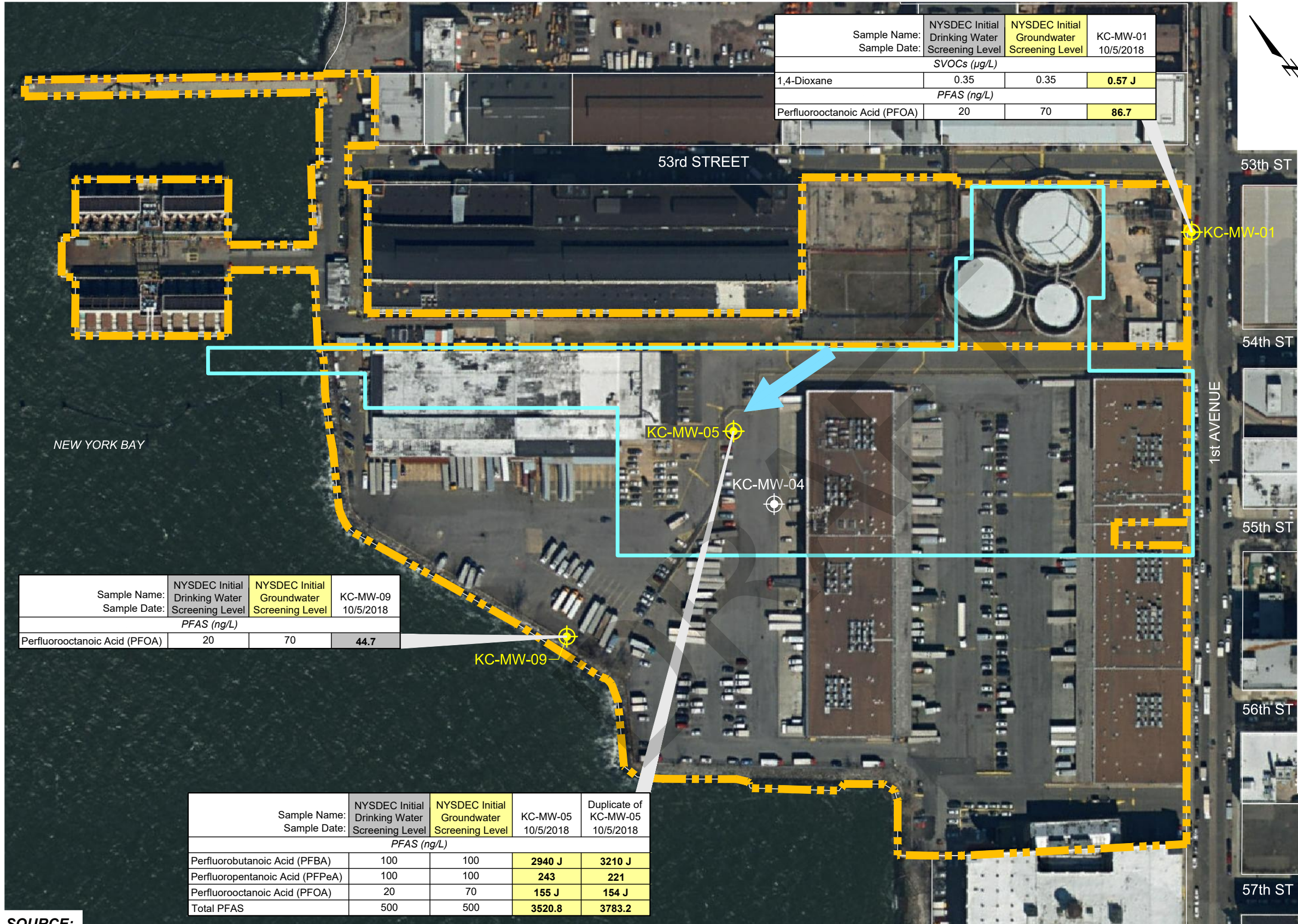


SUMMARY OF GROUNDWATER
ANALYTICAL RESULTS -
INWOOD HOLDER SITE

Project 1802728

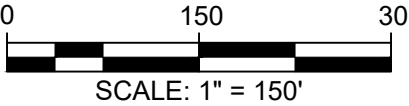
February 2019

Fig. 11



SOURCE:

1. AERIAL IMAGERY DATE: 03/96/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. FIGURES FROM *SITE CHARACTERIZATION REPORT*, PREPARED BY GEI CONSULTANTS, INC., DATE: JUNE 2016.
3. *FIG. 1: MONITORING WELL LOCATIONS*, PREPARED BY GEI CONSULTANTS, INC., DATE: MAY 2018.



Emerging Contaminant Sampling Report
National Grid New York Former MGP Sites

Project 1802728

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - KINGS COUNTY WORKS MGP SITE

February 2019

Fig. 12



Sample Name: MW-1
Sample Date: 9/25/2018
No Exceedances

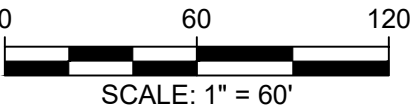
LEGEND:

- MONITORING WELL
- SITE BOUNDARY
- HISTORIC SITE BOUNDARY
- PARCEL BOUNDARY
- GROUNDWATER FLOW DIRECTION

- ng/L NANOGRAMS PER LITER OR PARTS PER TRILLION (ppt)
- PFAS PER- AND POLYFLUOROALKYL SUBSTANCES
- Total PFAS ARE CALCULATED USING DETECTS ONLY
- NYSDEC INITIAL DRINKING WATER SCREENING LEVEL NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION DRINKING WATER INITIAL SCREENING LEVELS
- NYSDEC INITIAL GROUNDWATER SCREENING LEVEL NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION GROUND WATER INITIAL SCREENING LEVELS
- NYSDEC NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
- BOLD INDICATES A DETECTED RESULT CONCENTRATION
- BOLD INDICATES THE DETECTED CONCENTRATION EXCEEDS NYSDEC INITIAL DRINKING WATER SCREENING LEVEL
- BOLD INDICATES THE DETECTED CONCENTRATION EXCEEDS NYSDEC INITIAL GROUNDWATER SCREENING LEVEL
- J THE RESULT IS AN ESTIMATED VALUE

Sample Name: Sample Date:	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	MW-4S 9/25/2018
Perfluorooctanesulfonic acid (PFOS)	20	70	91.8

Sample Name: Sample Date:	NYSDEC Initial Drinking Water Screening Level	NYSDEC Initial Groundwater Screening Level	MW-7S 9/25/2018	Duplicate of MW-7S 9/25/2018
Perfluorooctanesulfonic acid (PFOS)	20	70	1630 J	1170 J
Total PFAS	500	500	1763.36	1307.69



SOURCES:

1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. FIGURE 3-3: PRELIMINARY SITE ASSESSMENT, PREPARED BY VANASSE HANGEN BRUSTLIN, INC., 2002.
3. FIGURE 2-4: MONITORING WELL LOCATIONS, PREPARED BY TETRA TECH EC, INC.
4. FIGURE 1: WATER TABLE ELEVATION CONTOUR MAP - DECEMBER 27, 2016, PREPARED BY BROWN AND CALDWELL, DATE: 3/13/17.

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National Grid New York Former MGP Sites

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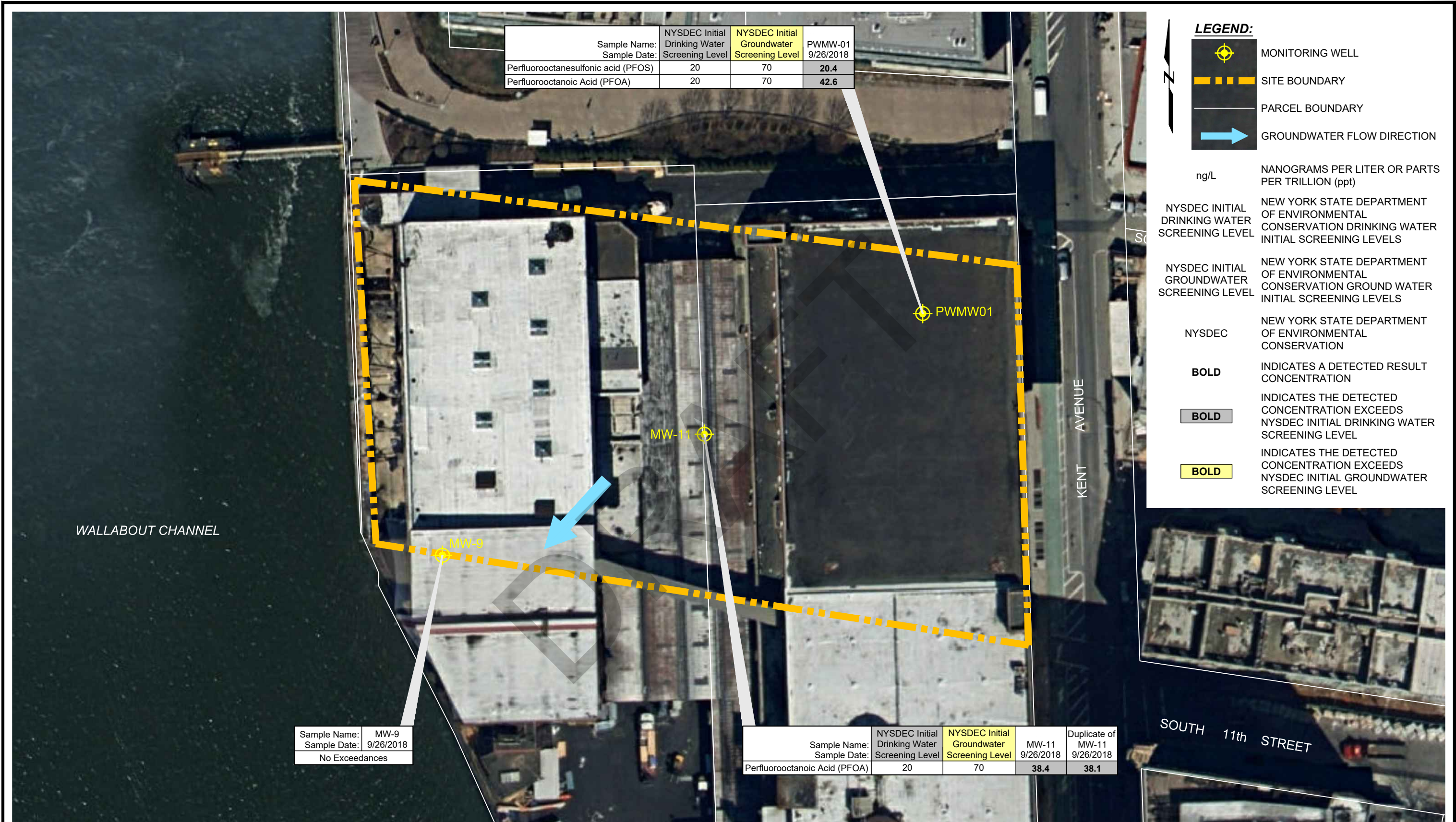


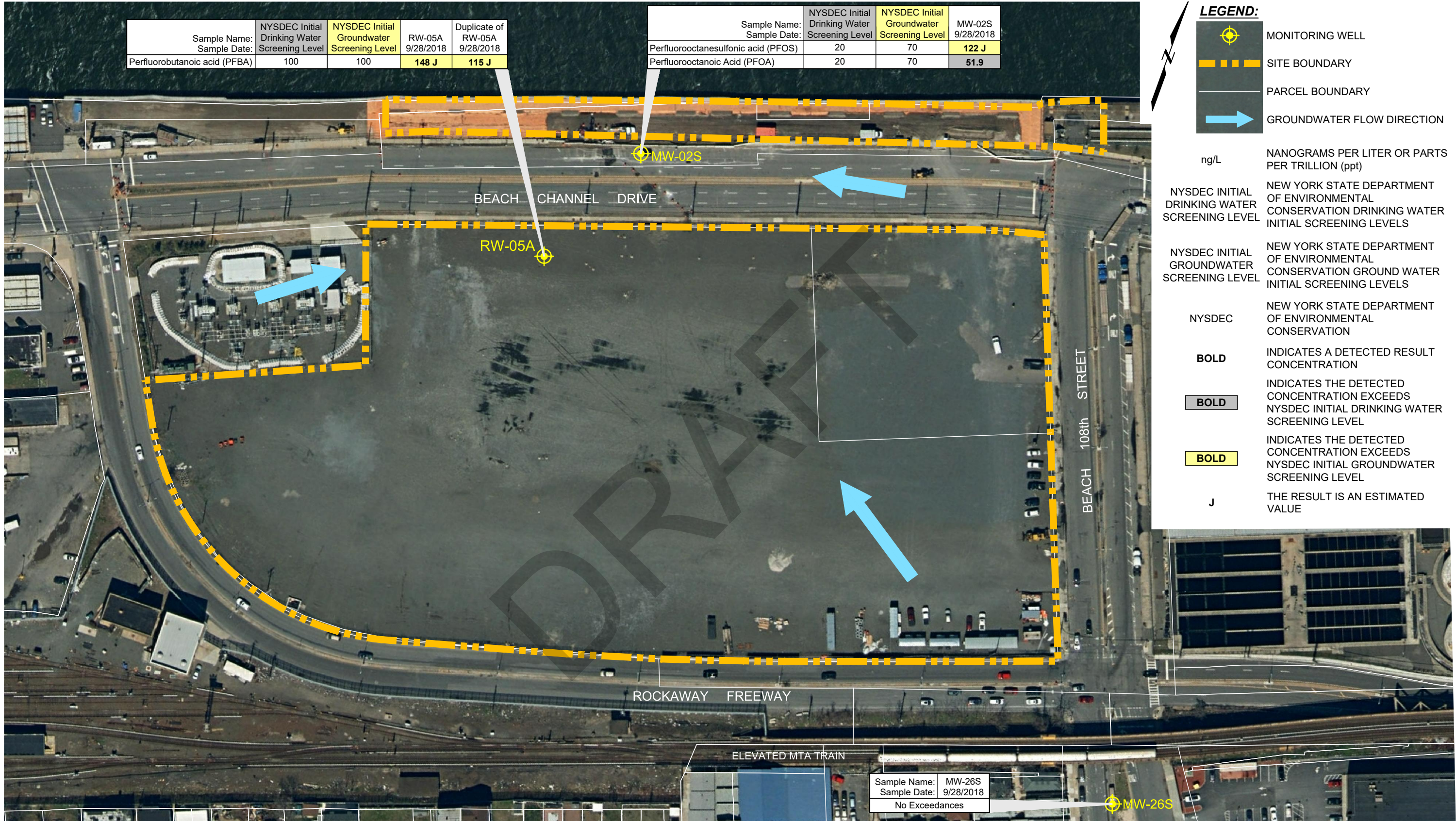
Project 1802728

SUMMARY OF GROUNDWATER
ANALYTICAL RESULTS (ng/L) -
PATCHOGUE MGP SITE

February 2019

Fig. 13





LEGEND:

- MONITORING WELL
- SITE BOUNDARY
- PARCEL BOUNDARY
- GROUNDWATER FLOW DIRECTION

ng/L NANOGRAMS PER LITER OR PARTS PER TRILLION (ppt)

NYSDEC INITIAL DRINKING WATER SCREENING LEVEL NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION DRINKING WATER INITIAL SCREENING LEVELS

NYSDEC INITIAL GROUNDWATER SCREENING LEVEL NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION GROUND WATER INITIAL SCREENING LEVELS

NYSDEC NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

BOLD INDICATES A DETECTED RESULT CONCENTRATION

BOLD INDICATES THE DETECTED CONCENTRATION EXCEEDS
NYSDEC INITIAL DRINKING WATER SCREENING LEVEL

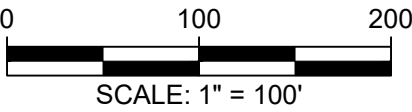
BOLD INDICATES THE DETECTED CONCENTRATION EXCEEDS
NYSDEC INITIAL GROUNDWATER SCREENING LEVEL

J THE RESULT IS AN ESTIMATED VALUE

SOURCE:

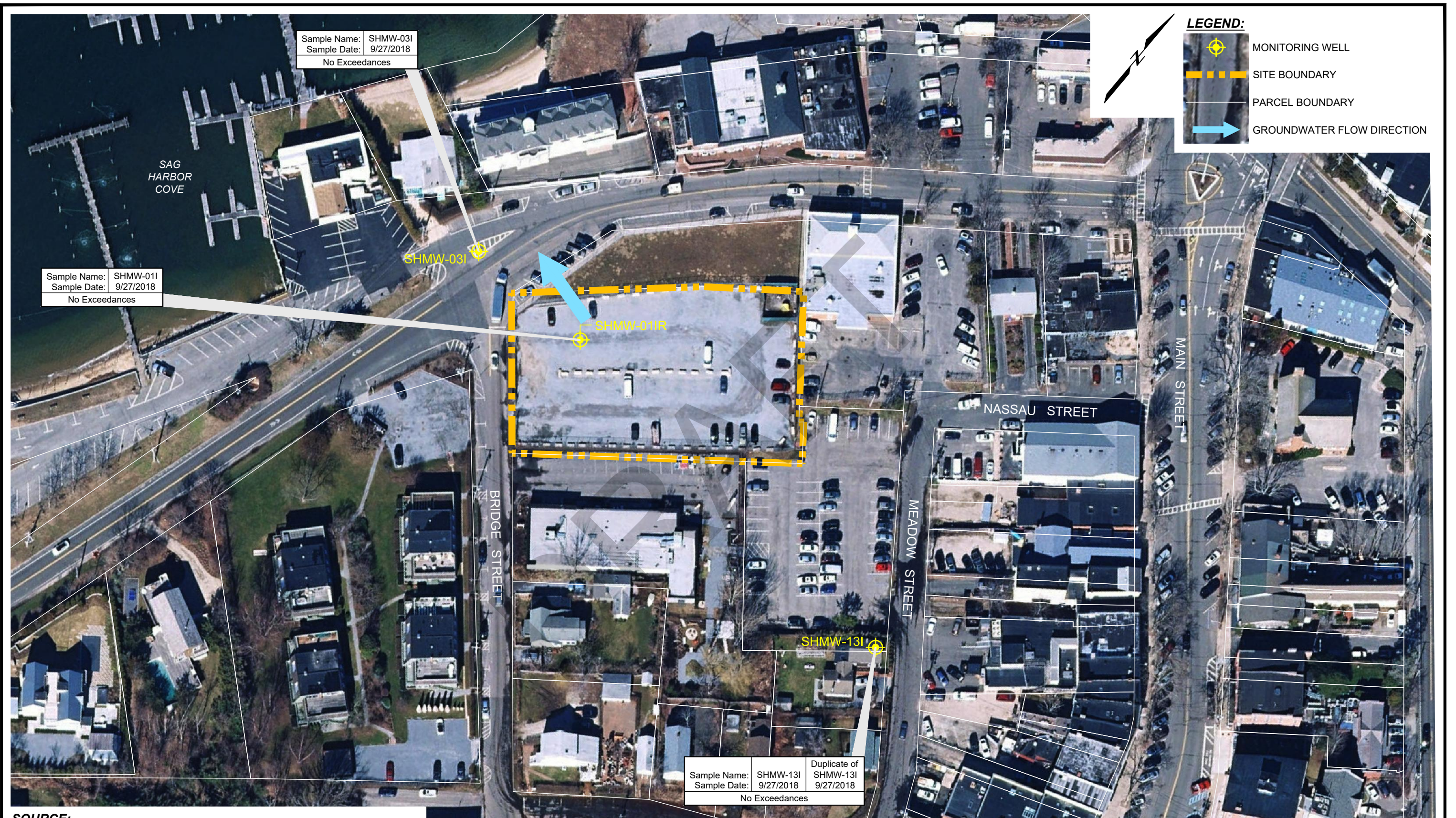
1. AERIAL IMAGERY DATE: 05/29/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.

2. GROUNDWATER MONITORING REPORT FIGURES, PREPARED BY GEI CONSULTANTS, INC., DATE: APRIL 2018 (GROUNDWATER CONTOURS DATED 12/2017).

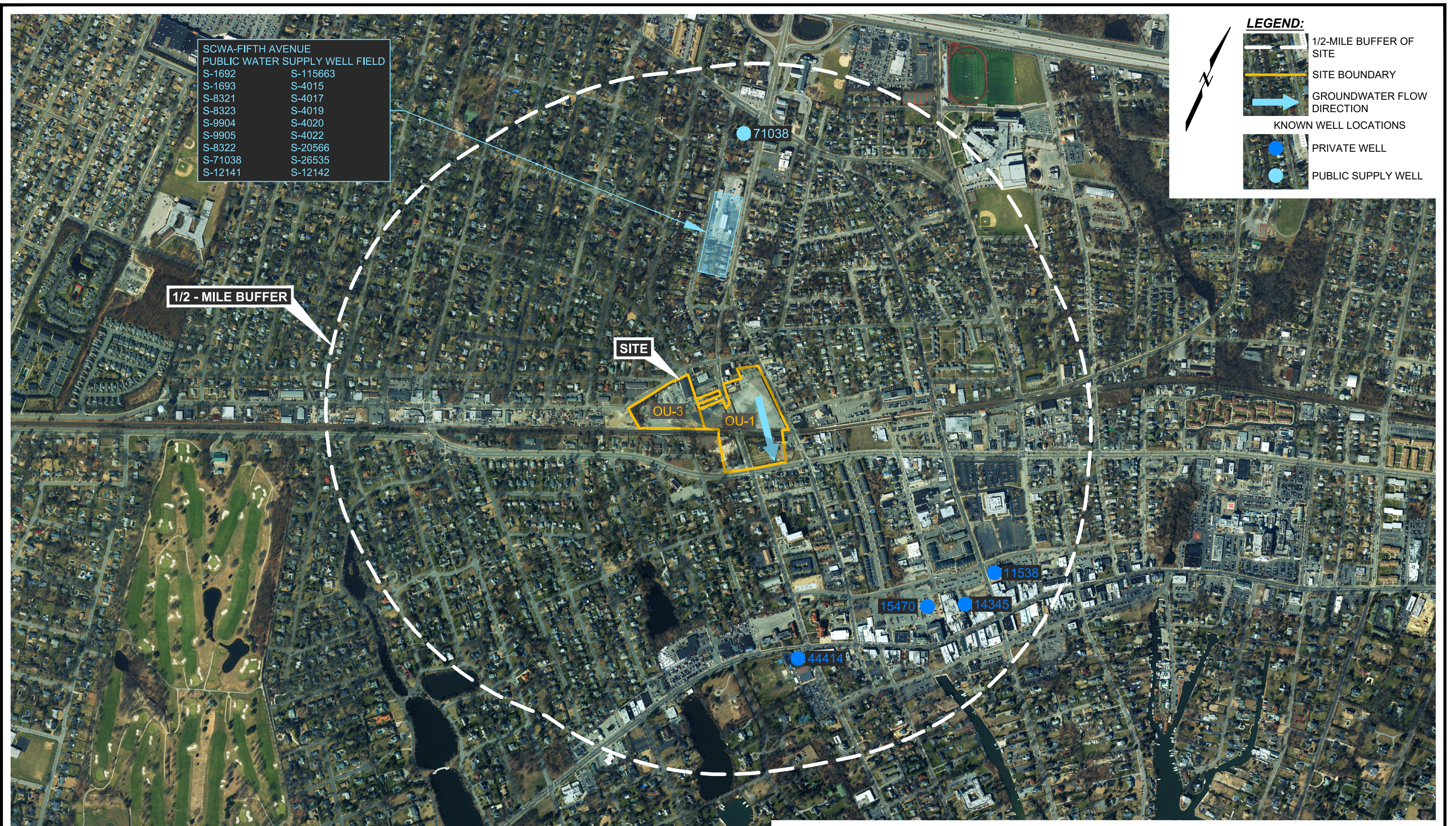


Emerging Contaminant Sampling Report National Grid New York Former MGP Sites		SUMMARY OF GROUNDWATER ANALYTICAL RESULTS (ng/L) - ROCKAWAY PARK MGP SITE

nationalgrid







SOURCE:

1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. FIG. 1-12 PUBLIC AND PRIVATE WELLS WITHIN A ONE-HALF MILE RADIUS OF SITE, PREPARED BY DVIRKA AND BARTILUCCI, DATE: 03/28/02.

Emerging Contaminant Sampling Report
National Grid New York Former MGP Sites

nationalgrid



Project 1802728

WELLS IDENTIFIED WITHIN
1/2 - MILE OF THE
BAY SHORE MGP SITE

February 2019

Fig. 19

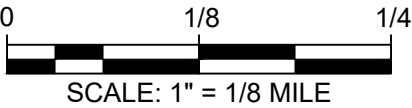


SOURCES: 1. AERIAL IMAGERY DATE: 03/29/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE. 2. REMEDIAL INVESTIGATION REPORT FIGURES, PREPARED BY AECOM, DATE: 3/20/2016 (GROUNDWATER FLOW DATE 12/4/15).	0 1/8 1/4 SCALE: 1" = 1/8 MILE	Emerging Contaminant Sampling Report National Grid New York Former MGP Sites		GEI Consultants	WELLS IDENTIFIED WITHIN 1/2 - MILE OF THE EQUITY WORKS MGP SITE
		nationalgrid			

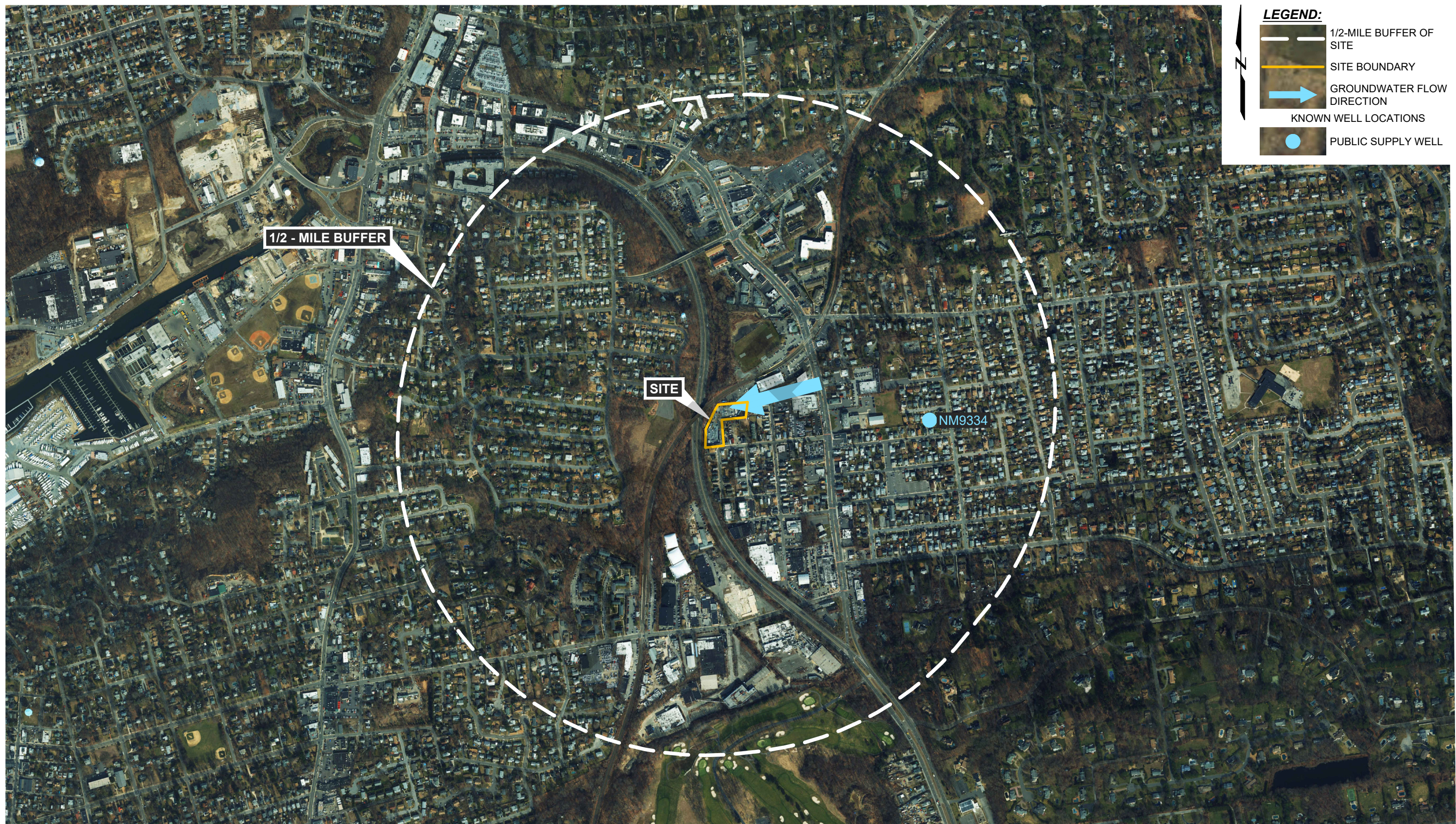


SOURCE:

1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. MAP OF WELLS IDENTIFIED DURING A 2012 FOIA REQUEST IN THE VICINITY OF THE FAR ROCKAWAY SITE PROVIDED BY PETER S. COX, PG OF AECOM IN AND EMAIL TO GEI ON 10/31/2018.
3. *PHYSICAL SETTING SOURCE MAP*, INWOOD HOLDER, INQUIRY NUMBER: 01187089.55r, PREPARED BY ENVIRONMENTAL DATA RESOURCES, INC., DATE: MAY 10, 2004.
4. *PHYSICAL SETTING SOURCE MAP*, FAR ROCKAWAY MGP, INQUIRY NUMBER: 01187089.49r, PREPARED BY ENVIRONMENTAL DATA RESOURCES, INC., DATE: MAY 07, 2004.

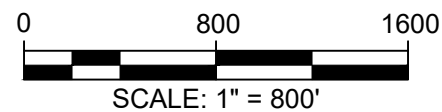


Emerging Contaminant Sampling Report National Grid New York Former MGP Sites			WELLS IDENTIFIED WITHIN 1/2 - MILE OF THE FAR ROCKAWAY MGP SITE
			
Project 1802728		February 2019	Fig. 21



SOURCE:

1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. FIGURE NO. 1-3: APPROXIMATE LOCATION OF PUBLIC SUPPLY WELLS, GLEN COVE FORMER MGP SITE, GLEN COVE, NASSAU COUNTY, NEW YORK, PREPARED BY PS&S, DATE: 09/26/08.



Emerging Contaminant Sampling Report
National Grid New York Former MGP Sites

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Project 1802728

WATER SUPPLY WELLS
IDENTIFIED WITHIN 1/2 - MILE
OF THE GLEN COVE MGP SITE

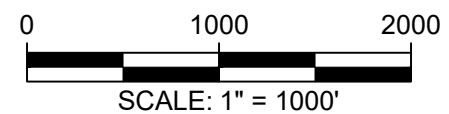
February 2019

Fig. 22



SOURCES:

1. AERIAL IMAGERY DATE: 03/29/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. FIGURES FROM *INTERIM REMEDIAL INVESTIGATION REPORT*, PREPARED BY GEI CONSULTANTS, INC., DATE: NOVEMBER 2016.



Emerging Contaminant Sampling Report
National Grid New York Former MGP Sites

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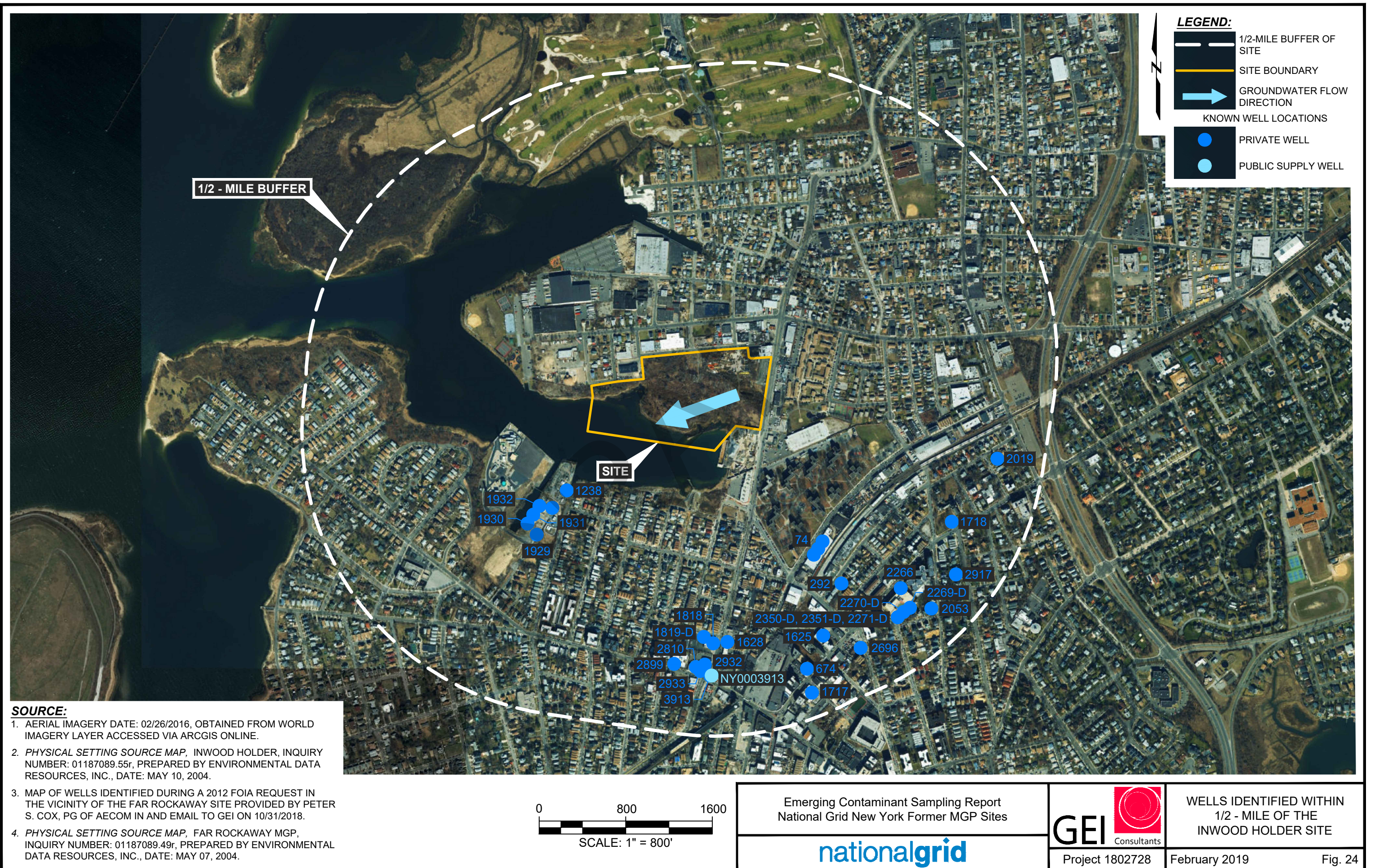


Project 1802728

WELLS IDENTIFIED WITHIN
1/2 - MILE OF THE
GREENPOINT MGP SITE

February 2019

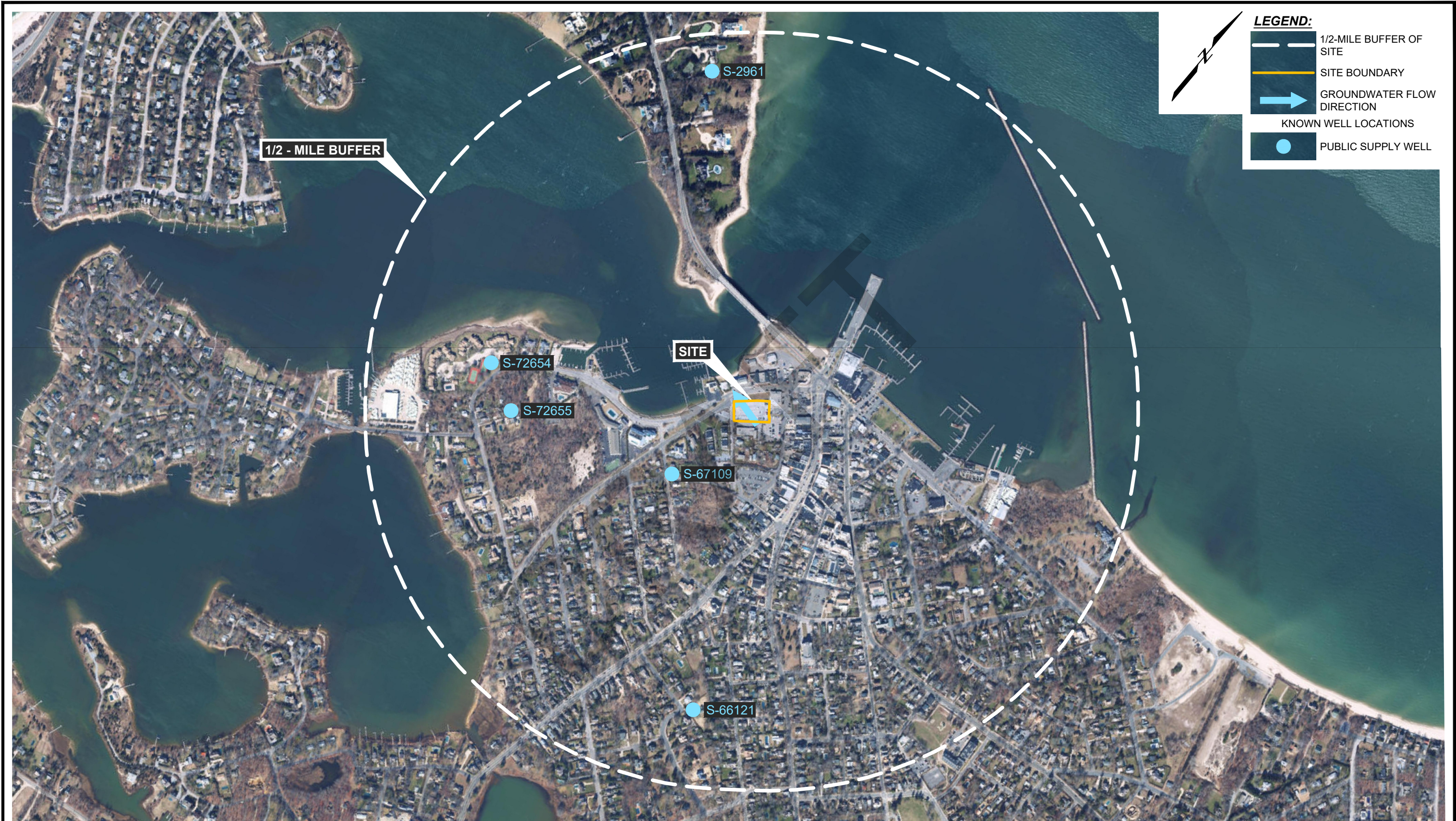
Fig. 23





SOURCES:

1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. FIGURE 3-3: PRELIMINARY SITE ASSESSMENT, PREPARED BY VANASSE HANGEN BRUSTLIN, INC., 2002.
3. FIGURE 3-4: LOCATION OF WELLS IDENTIFIED WITHIN ONE MILE OF THE SITE, PREPARED BY TETRA TECH EC, INC.



SOURCE: 1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE. 2. FIG. 1-9: PUBLIC AND PRIVATE WELLS WITHIN A ONE-HALF MILE RADIUS OF SITE, SAG HARBOR FORMER MGP SITE REMEDIAL INVESTIGATION, PREPARED BY DVIRKA AND BARTILUCCI.	Emerging Contaminant Sampling Report National Grid New York Former MGP Sites nationalgrid	GEI Consultants Project 1802728	WATER SUPPLY WELLS IDENTIFIED WITHIN 1/2 - MILE OF THE SAG HARBOR MGP SITE
			February 2019 Fig. 26

Appendix A

Groundwater Sampling Field Sheets

DRAFT

Project:	Bay Ridge - PFAS Sampling			Well ID:	MW-112	Sample Date:	10-10-18
Total Well Depth (from top of casing):	80.40'			Depth to Water (from top of casing):	71.25'		
Well Diameter:	3/4"	1"	2"	4"	Pump Intake Depth (Mid-Point of Screen Zone):		
Sampling Crew:	Craig Hayes			Purge Time:	Start:	1150	
Purging Method:	Peristaltic Pump				Finish:	1225	
Sampling Method:	Low Flow				Start:	1225	
Sample Analysis:	1, 4 Dioxane & PFAS				Sample Time:		
					Finish:		

C:\Users\chayes\Documents\Cop y of Att-E1-GW-SamplingLog.xls

MS/MSD

NUP-101018

Monitoring Well Sample Data Form

Project: Bay Ridge - PFAS Sampling

Well ID: MW-105

Sample Date: 10-10-18

Total Well Depth
(from top of casing):

84.5'

Depth to Water
(from top of casing):

76.15'

Well Diameter:

3/4"

1"

2"

4"

Sampling Crew:

Craig Hayes

Pump Intake Depth

(Mid-Point of Screen Zone):

Start: 0915

Purge Time:

Finish: 0955

Purging Method:

Peristaltic Pump

Start: 1000

Sampling Method:

Low Flow

Sample Time:

Finish:

Sample Analysis:

1, 4 Dioxane & PFAS

Purge Data

Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals.)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
920	0.4	Initial	7.22	540	0.0	1.94	22.29	2.9	287	Well Headspace PID =
925		2	7.16	5.16	0.0	0.96	22.06	2.8	258	
930		4	7.17	4.87	0.0	0.77	21.68	2.6	242	
935		6	7.17	4.76	0.0	0.63	21.55	2.5	239	
940		8	7.18	4.67	0.0	0.53	21.49	2.5	277	
945		10	7.19	4.65	0.0	0.48	21.10	2.5	236	
950		12	7.19	4.53	0.0	0.45	21.14	2.5	235	
955		14	7.19	4.48	0.0	0.46	21.14	2.5	235	

FB-101018 @0905

Bayshore PFAS Sampling

Monitoring Well Sample Data Form

MS/MSD
collected.

Project: National Grid - Bayshore OU

Well ID: 88MW-41 I

Sample Date: 9/24/18

Total Well Depth
(from top of casing):

PFAS Sampling
35.5'

Depth to Water
(from top of casing):

10.35'

Well Diameter:

3/4"

1"

2"

4"

Pump Intake Depth

(Mid-Point of Screen Zone):

Sampling Crew:

Craig Hayes

Start: 1118

Purge Time:

Finish: 1200

Purging Method:

Peristaltic Pump

Start: 1200

Sampling Method:

Low Flow

Sample Time:

Finish: 1213

Sample Analysis:

~~BTX/PAH-2-Methylnaphthalene~~ PFAS / 1,4 Dioxane

3 well volumes = 9.63 gal.

Purge Data										
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals.)	Temperature (Cel.)	pH (std. Units)	ORP (mV)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Salinity (ppt)	Comments/Observations
1120	0.4	Initial	16.95	5.79	314	0.36	2.0	2.14	0.2	Well Headspace PID = N/A
1125		1.25	15.40	5.81	304	0.32	1.1	0.75	0.2	
1130		2.5	15.33	5.78	291	0.33	1.1	0.23	0.2	
1135		3.75	15.31	5.77	283	0.33	0.7	0.00	0.2	
1140	0.4	5	15.24	5.77	280	0.33	1.4	0.00	0.2	
1145		6.25	15.16	5.77	275	0.33	1.5	0.00	0.2	
1150		7.5	15.13	5.76	274	0.33	1.6	0.00	0.2	
1155		8.75	15.12	5.75	275	0.33	1.6	0.00	0.2	
1200		10	15.11	5.74	274	0.33	1.7	0.00	0.2	MS/MSD collected.

* Removed Tubing

Monitoring Well Sample Data Form

duplicate
collected
mw-xx-092418
1400
9/24/2018

~~BTX/PAH/2-Methylanthracene~~ PFAS/1,4 Dioxane swell volumes = 3.39 gallons

Sample Time: _____
Finish: _____

* Removed Tubing

Monitoring Well Sample Data Form

Project: National Grid - Bay Shore OU-

Well ID: 002-mw-57I

Sample Date: 9/24/10

**Total Well Depth
(from top of casing):**

PFAS Sampling

32.14'

Well Diameter:

3/4"

9"

21

4th

Sampling Crew:

Craig Hayes

Purging Method:

Peristaltic Pump

Sampling Method:

Low Flow

Sample Analysis:

~~BTX/PAHs-Methylanthracene~~ PAHs/14. Dioxane

Depth to Water
(from top of casing):

6.28

Pump Intake Depth

(Mid-Point of Screen Zone):

Start: 1530

Purge Time:

Finish: 1600

Start: 1605

Sample Time:

Finish:

3 week volumes = 12.66 gallons

[illegible]

*Removed Tubing

Monitoring Well Sample Data Form

Project: National Grid - Bay Shore OU-

Well ID: OU3MW-115

Sample Date: 9-24-18

Total Well Depth (from top of casing): 15.15'

Depth to Water
(from top of casing): 6.50'

Well Diameter: 3/4" 1" 2" 4"

Pump Intake Depth
(Mid-Point of Screen Zone): _____

Sampling Crew: Craig Hayes

Start: 16⁴⁵

Purging Method: Peristaltic Pump

Purge Time: _____
Finish: 1715

Sampling Method: Low Flow

Start: 1720
Sample Time: _____
Finish: _____

Sample Analysis: BTX/PAH+2-Methylnaphthalene

1,4 Dioxane / PFAS

3 well volumes = 4.23 gallons

[illegible]

* Removed Tubing

Well Sample Data Form

Project: National Grid - Bay Shore OU-1 MD MLW-09I Sample Date: 9-24-18

Total Well Depth
(from top of casing): 44.17'

Depth to Water
(from top of casing): 10.60'

Well Diameter: 3/4" 1"

Pump Intake Depth
(Mid-Point of Screen Zone): _____

Sampling Crew: Craig Hayes

Purge Time: Start: 1425

Purging Method: Peristaltic Pump

Finish: 1500

Sampling Method: Low Flow

Sample Time: Start: 1505

Sample Analysis: BTEX/PAH+2-Methylnaphthalene/PFAS

Finish: _____

Purge Data									
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals.)	Temperature (Cel.)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Salinity (%)	Comments/Observations	
1430	0.4	Initial	15.96	0.229	1.7	6.69	0.1	Well Headspace PID =	
1435		2	16.71	0.229	1.0	1.13	0.1		
1440		4	16.92	0.229	0.3	0.61	0.1		
1445		6	17.46	0.228	0.1	0.25	0.1		
1450		8	17.98	0.228	0.7	0.17	0.1		
1455		10	18.09	0.228	0.4	0.13	0.1		
1500	0.4	12	18.42	0.228	0.6	0.13	0.1		

Duplicate
MW 100218

Sample Date: 10-2-18

Depth to Water
(from top of casing): 1.90'

Pump Intake Depth
(Mid-Point of Screen Zone): _____

Start: 1245

Purge Time: _____

Finish: _____

Start: 1300

Sample Time: _____
Finish: _____

Well volume = 33 gallons

[illegible]

* Well went dry @ 27.5 ^{gallons}, wait for recharge & then sample
Sample @ 1300
* Removed Tubing

Monitoring Well Sample Data Form

Sample Date: 10-2-18

Depth to Water
(from top of casing): 0.0'

Pump Intake Depth
(Mid-Point of Screen Zone):

Start: 1505

Purge Time: 15:35

Start: 1540

Sample Time: _____
Finish: _____

1 well volume = 26 gallons

* Removed Tubing

MS/MSD

Clifton-PFAS Sampling

RW-23

Sample Date: 10-2-18

13.15'

6.10

3/4"

1"

②

4"

Craig Hayes

Start: 0905

Finish: 0935

Peristaltic Pump

Low Flow

Start: 0940

Finish:

1, 4 Dioxane & PFAS

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Monitoring Well Sample Data Form

Project: Corey Island - HPS Sampling

Well ID: MW-16

Sample Date: 10-5-18

Total Well Depth
(from top of casing): 20.5'

Depth to Water
(from top of casing): 13.00'

Well Diameter: 3/4" 1" 2" 4"

Pump Intake Depth
(Mid-Point of Screen Zone):

Sampling Crew: Craig Hayes

Start: 0730

Purging Method: Peristaltic Pump

Purge Time: 0.1

Finish: 0800

Sampling Method: Low Flow

Start: 0805

Start: 0805

Sample Analysis: 1, 4 Dioxane & PFAS

Finish: _____

- *No dedicated tubing

[illegible]

Monitoring Well Sample Data Form

Project: emerging contaminants - coney island Well ID: MW-18 Sample Date: 10/5/18

Total Well Depth (from top of casing): ~~22.88'~~ 21'

Depth to Water (from top of casing): 11.85'

Well Diameter: 3/4" 1" 2" 4"

Pump Intake Depth (Mid-Point of Screen Zone):

Sampling Crew: Craig Hayes / m fannon

Purge Time; Start: 0730

Purging Method: Peristaltic Pump

Finish: 0808

Sampling Method: Low Flow

Sample Time; Start: 0810

Sample Analysis: 1, 4 Dioxane & PFAS

Finish: 0820

Purge Data										
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals.)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
0733	0.4	Initial	6.69	1.91	39.3	0.00	15.91		-100	Well Headspace PID =
0738		1 gal	6.81	1.87	19.7	0.00	15.99		-115	
0743		2 gal	6.80	1.96	17.0	0.00	15.93		-108	
0748		3 gal	6.80	1.98	7.7	0.00	15.87		-117	slowed down purge rate to lower turbidity.
0753		3.5 gal	6.80	2.05	4.5	0.00	15.83		-119	
0758		4 gal	6.79	2.05	3.1	0.00	15.88		-119	
0803		4.5 gal	6.80	2.05	3.2	0.00	15.90		-119	
0808		5 gal	6.80	2.05	3.2	0.00	15.91		-116	sample at 0810 Dup-100518-1 at 0830

+ dedicated tubing in well
3 well volumes = 4.47 gal

Project: Covey Island - PFAS Sampling

Well ID: RAW-2

Sample Date: 10-5-18

**Total Well Depth
(from top of casing):**

22.2'

**Depth to Water
(from top of casing):**

10.85

Well Diameter:

3/4"

411

2¹¹

4.

Sampling Crew:

Craig Hayes

Purging Method:

Peristaltic Pump

Sampling Method:

Low Flow

Sample Analysis:

1, 4 Dioxane & PFAS

Pump Intake Depth

(Mid-Point of Screen Zone):

Start:

0825

Purge Time:

Finish:

0855

~~Start:~~

0900

Sample Time:

Finish:

* Used Existing drum @ Carey Island site

Monitoring Well Sample Data Form

MS/MSD

Project: Equity - PFAS Sampling

Well ID: MW-6B

Sample Date: 10-12-18

Total Well Depth
(from top of casing): 39.65'

Depth to Water
(from top of casing): 9.80'

Well Diameter: 3/4" 1" 2" 4"

Pump Intake Depth
(Mid-Point of Screen Zone): _____

Sampling Crew: Craig Hayes

Purge Time: Start: 0735

Purging Method: Peristaltic Pump

Finish: 0805

Sampling Method: Low Flow

Sample Time: Start: 0810

Sample Analysis: 1, 4 Dioxane & PFAS

Finish: _____

Purge Data										
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals.)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
0740	0.4	Initial	8.30	2.67	194	0.66	17.71	1.4	-120	Well Headspace PID =
0745		2	7.91	2.52	83	0.75	17.39	1.3	-71	
0750		4	7.96	2.56	0.0	0.45	17.43	1.4	-86	
0755		6	8.17	2.66	0.0	0.22	17.27	1.4	-111	
0800		8	8.18	2.66	0.0	0.11	17.23	1.4	-113	
0805		10	8.18	2.67	0.0	0.01	17.15	1.4	-115	

* Had to fix tubing + Horiba @ 0750. Not getting a proper flow.

DUP-101218

Monitoring Well Sample Data Form

Project: Equity - PFAS SamplingWell ID: MW-8BSample Date: 10-12-18Total Well Depth
(from top of casing): 40.00'Depth to Water
(from top of casing): 6.20'Well Diameter: 3/4" 1" 2" 4"Pump Intake Depth
(Mid-Point of Screen Zone): _____Sampling Crew: Craig HayesPurge Time: Start: 0915Finish: 1020Purging Method: Peristaltic PumpStart: 1025Sampling Method: Low Flow

Sample Time: _____

Finish: _____

Sample Analysis: 1, 4 Dioxane & PFAS

3 well volumes = 16.00 gallons

Purge Data										
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
0955	0.2	Initial 11	7.54	2.66	0.0	0.00	15.97	1.4	-352	Well Headspace PID =
1000	.2	212	7.51	2.79	0.0	0.00	15.98	1.4	-354	
1005	.2	413	7.50	2.66	0.0	0.00	15.98	1.4	-356	
1010	.2	614	7.48	2.65	0.0	0.00	16.02	1.4	-357	
1015	.2	815	7.47	2.69	0.0	0.00	16.00	1.4	-358	
1020	.2	1016	7.47	2.70	0.0	0.00	16.01	1.4	-358	

FB-101218 @0840

*Removed Tubing

Monitoring Well Sample Data Form

Project: Equity - PFAS Sampling

Well ID: MW-11B

Sample Date: 10-12-18

Total Well Depth
(from top of casing): 45.5'

Depth to Water
(from top of casing): 8.50'

Well Diameter: 3/4" 1" 2" 4"

Pump Intake Depth
(Mid-Point of Screen Zone): _____

Sampling Crew: Craig Hayes

Purge Time: Start: 1110

Purging Method: Peristaltic Pump

Finish: 1150

Sampling Method: Low Flow

Start: 1155

Sample Analysis: 1, 4 Dioxane & PFAS

Sample Time: _____

Finish: _____

Purge Data

Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals.)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
1115	0.4	Initial	11.86	3.16	96.8	0.00	18.94	1.7	-365	Well Headspace PID =
1120		2	8.81	8.19	74.2	0.00	18.81	4.6	-336	
1125		4	7.64	10.3	54.0	0.00	18.56	5.8	-351	
1130		6	7.17	11.3	22.1	0.00	18.52	6.4	-351	
1135		8	7.16	11.6	7.6	0.00	18.44	6.6	-358	
1140		10	7.17	11.7	4.5	0.00	18.46	6.7	-362	
1145		12	7.17	11.7	2.1	0.00	18.35	6.7	-367	
1150		14	7.17	11.8	0.0	0.00	18.32	6.7	-369	

MS/MSD

Sample Date: 10-4-18

34.8'

Depth to Water (from top of casing): 4.6'

4"

2nd

4'

Craig Hayes

Pump Intake Depth
(Mid-Point of Screen Zone):

Start: 855

Purge Time:

Finish: 1016

Peristaltic Pump

Start: 1015

Low Flow

Sample Time:

Finish:

1, 4 Dioxane & PFAS

3 well volumes = 15 gallons

[illegible]

* AECOM + GEL onsite @ 0700. Did not meet w/ ^{LIRR} Ploger until 0830. CH could not find mw-116 D.
 Megan w/ AECOM found well @ 1045. CH begins mw-117 D @ 1100
 * Removed Tubing

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Duplicate
MWP-100418

Monitoring Well Sample Data Form

Project: FAR ROCKAWAY - PFAS Sampling

Well ID: MW-119D

Sample Date: 10-4-18

Total Well Depth
(from top of casing): 38.0'

Depth to Water
(from top of casing): 3.20'

Well Diameter: 3/4" 1" 2" 4"

Pump Intake Depth
(Mid-Point of Screen Zone): _____

Sampling Crew: Craig Hayes

Start: 1100

Purge Time:

Finish: 1215

Purging Method: Peristaltic Pump

Start: 1220

Sampling Method: Low Flow

Sample Time:

Finish: _____

Sample Analysis: 1, 4 Dioxane & PFAS

3 well volumes - 17 gallons

Purge Data										
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
1150	0.4	Initial	5.92	0.517	0.0	0.31	18.14	0.2	242	Well Headspace PID =
1155		215	5.89	0.520	0.0	0.00	17.89	0.3	243	
1200		416	5.86	0.526	0.0	0.00	17.87	0.3	244	
1205		617	5.82	0.535	0.0	0.00	17.83	0.3	246	
1210		817.5	5.80	0.537	0.0	0.00	17.82	0.3	246	
1215		1018	5.79	0.536	0.0	0.00	17.81	0.3	247	

* Removed Tubing

Monitoring Well Sample Data Form

Sample Date: 10-4-18

Depth to Water (from top of casing): 5.55'

Pump Intake Depth
(Mid-Point of Screen Zone): _____

Start: 1235

Purge Time: _____
Finish: 1405

Start: 1410

Finish: _____

Swell volumes = 16.14 gallons

[illegible]

* Remove 2 Tubing

MS/MSD

Sample Date: 10-9-18

Depth to Water
(from top of casing): 4580'

Pump Intake Depth
(Mid-Point of Screen Zone): _____

Start: 1030

Purge Time: Finish: 1115

Start: 1120

Sample Time: _____
Finish: _____

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Project:	Flatbush - PFAS Sampling		Well ID:	MW-4	Sample Date:	10-9-18
Total Well Depth (from top of casing):	59.00'		Depth to Water (from top of casing):	47.10'		
Well Diameter:	3/4"	1"	2"	4"		
Sampling Crew:	Craig Hayes		Pump Intake Depth (Mid-Point of Screen Zone):			
Purging Method:	Peristaltic Pump		Purge Time:	Start:	1350	
Sampling Method:	Low Flow			Finish:	1420	
Sample Analysis:	1, 4 Dioxane & PFAS		Sample Time:	Start:	1425	
				Finish:		

[illegible]

FB @ 1430

MS/MSD

Sample Date: 10-11-18

16.25

Depth to Water
(from top of casing): 6.65'

3/4"

1"

2"

4"

Craig Hayes

(Mid-Point of Screen Zone):

Start: 0825

Purge Time:

Finish: 0755

Peristaltic Pump

Start: 0900

Low Flow

Sample Time:

Finish:

1, 4 Dioxane & PFAS

Purge Data

DUP-101118

Monitoring Well Sample Data Form

Project: Fulton-PFAS SamplingWell ID: FW-MW-19Sample Date: 10-11-18Total Well Depth
(from top of casing):14.75'Depth to Water
(from top of casing):6.45'

Well Diameter:

3/4"1"2"4"

Sampling Crew:

Craig Hayes

Pump Intake Depth

(Mid-Point of Screen Zone):

Start:

0940

Purge Time:

Finish:

1020^{CR} 1010

Purging Method:

Peristaltic Pump

Start:

1025^{CR} 1015

Sampling Method:

Low Flow

Sample Time:

Finish:

Sample Analysis:

1, 4 Dioxane & PFAS

Purge Data										
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals.)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
0940	0.4	Initial	7.65	2.68	44.2	0.00	21.11	1.4	-42	Well Headspace PID =
0950		2	7.64	2.59	4.9	0.00	21.16	1.3	-37	
0955		4	7.58	2.45	0.0	0.00	21.17	1.3	-64	
1000		6	7.56	2.39	0.0	0.00	21.13	1.2	-71	
1005		8	7.54	2.36	0.0	0.00	21.08	1.2	-75	
1010		10	7.54	2.34	0.0	0.00	21.04	1.2	-77	

Project:	Fulton - PFAS Sampling			Well ID:	FW-MW-04			Sample Date:	10-11-18		
Total Well Depth (from top of casing):	12.00'			Depth to Water (from top of casing):	7.45'			Pump Intake Depth (Mid-Point of Screen Zone):			
Well Diameter:	3/4"	1"	2"	4"	Purge Time:	Start: 1030					
Sampling Crew:	Craig Hayes				Finish:	1100					
Purging Method:	Peristaltic Pump				Start:	1105					
Sampling Method:	Low Flow				Sample Time:	Finish:					
Sample Analysis:	1, 4 Dioxane & PFAS										

[illegible]

FB-10118 @ 1115

Monitoring Well Sample Data Form

Project: Fulton - PFAS Sampling Well ID: FW-MW-5R Sample Date: 10-11-18
 Total Well Depth (from top of casing): 17.701 Depth to Water (from top of casing): 12.95
 Well Diameter: 3/4" 1" 2" 4" Pump Intake Depth (Mid-Point of Screen Zone): _____
 Sampling Crew: Craig Hayes Purge Time: Start: 1120
 Purging Method: Peristaltic Pump Finish: 1150
 Sampling Method: Low Flow Sample Time: Start: 1155
 Sample Analysis: 1, 4 Dioxane & PFAS Finish: _____

Purge Data										
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals.)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
1125	0.4	Initial	7.09	0.616	11.3	0.00	19.45	0.3	-98	Well Headspace PID =
1130		2	7.08	0.620	1.2	0.00	19.54	0.3	-101	
1135		4	7.08	0.622	0.0	0.00	19.47	0.3	-103	
1140		6	7.09	0.623	0.0	0.00	19.36	0.3	-105	
1145		8	7.09	0.623	0.0	0.00	19.23	0.3	-107	
1150		10	7.09	0.624	0.0	0.00	19.23	0.3	-107	

MS/MSD

Monitoring Well Sample Data Form

Project: Glen Cove PFAS SamplingWell ID: GCMW-145-RSample Date: 9-25-18Total Well Depth
(from top of casing): 18.40'Depth to Water
(from top of casing): 10.60'Well Diameter: 3/4" 1" 2" 4"Pump Intake Depth
(Mid-Point of Screen Zone): _____Sampling Crew: Craig HayesStart: 0755Purge Time: Finish: 0825Purging Method: Peristaltic PumpStart: 0830Sampling Method: Low Flow

Sample Time: Finish: _____

Sample Analysis: 1, 4 Dioxane & PFAS

*3 well volumes 3.81 gallons

Purge Data										
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
0800	0.4	Initial	6.62	0.680	0.0	9.92	17.98	0.3	240	Well Headspace PID =
0805		21.5	6.57	0.664	291	8.95	17.67	0.3	247	
0810		42	6.54	0.672	281	8.10	17.62	0.3	255	COLORLESS
0815		83	6.53	0.665	264	7.68	17.55	0.3	260	ODORLESS
0820		84	6.53	0.676	292	7.47	17.59	0.3	264	
0825		10	6.53	0.646	272	7.31	17.46	0.3	265	

* Removed Tubing

Duplicate

MW-XX-092518

Monitoring Well Sample Data Form

Project: Glen Cove PFAS Sampling

Well ID: PZ-06

Sample Date: 9-25-18

Total Well Depth
(from top of casing): 16.10'

Depth to Water
(from top of casing): 6.00'

Well Diameter: 3/4" 1" 2" 4"

Pump Intake Depth
(Mid-Point of Screen Zone):

Sampling Crew: Craig Hayes

Start: 0900

Purge Time: 0935

Purging Method: Peristaltic Pump

Start: 0940

Sampling Method: Low Flow

Sample Time:

Finish:

Sample Analysis: 1, 4 Dioxane & PFAS

*3well Volumes = 4.95gallons

Purge Data										
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals.)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
0905	0.4	Initial 1	6.39	0.271	27.2	0.97	16.91	0.1	141	Well Headspace PID =
0910		22	6.36	0.269	22.7	0.45	16.90	0.1	147	
0915		43	6.36	0.271	14.5	0.00	16.87	0.1	169	COLORLESS
0920		63.5	6.36	0.270	15.1	0.00	16.87	0.1	180	ODORLESS
0925		84.5	6.35	0.270	13.4	0.00	16.89	0.1	188	
0930		104.75	6.34	0.270	13.2	0.00	16.92	0.1	192	
0935		5	6.34	0.269	13.1	0.00	16.91	0.1	197	

*Removed Tubing

Monitoring Well Sample Data Form

Project: Glen Cove PFAS Sampling

Well ID: GCRW-03

Sample Date: 9-25-18

Total Well Depth
(from top of casing): 27.00'

Depth to Water
(from top of casing): 10.02'

Well Diameter: $\frac{3}{4}$ " 1" 2" 3" 4"

Pump Intake Depth
(Mid-Point of Screen Zone): _____

Sampling Crew: Craig Hayes

Start: 1040

Purge Time: _____

Purging Method: Peristaltic Pump

Start: _____

Sampling Method: Low Flow

Sample Time: _____

Sample Analysis: 1, 4 Dioxane & PFAS

*3 Well Volumes = 18.69 gallons

[illegible]

* Well went dry after 8 gallons * Removed Tubing
* Sample @ 1130

MS/MSD

Monitoring Well Sample Data Form

Project: Greenpoint PFAS-Sampling

Well ID: GPEC-MW-11

Sample Date: 10-1-18

Total Well Depth (from top of casing): 49.3'

Depth to Water (from top of casing): 10.5'

Well Diameter: 3/4" 1" 2" 4"

Pump Intake Depth (Mid-Point of Screen Zone): _____

Sampling Crew: Craig Hayes

Start: 820

Purge Time: Finish: 925

Purging Method: Peristaltic Pump

Start: 930

Sampling Method: Low Flow

Sample Time: Finish: _____

Sample Analysis: 1, 4 Dioxane & PFAS

Purge Data										
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals.)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Celsius)	Salinity (%)	ORP (mV)	Comments/Observations
825	0.4	Initial	7.02	0.182	196	4.61	16.61	0.1	213	Well Headspace PID =
830		2	7.32	0.195	94.2	2.68	16.06	0.1	221	
835		4	7.33	0.241	131	1.82	15.96	0.1	214	
840		6	7.30	0.281	73.7	1.30	15.89	0.1	206	
845		8	7.26	0.319	57.0	0.97	15.83	0.2	197	
850		10	7.21	0.374	42.7	0.60	15.81	0.2	185	
855		12	7.17	0.411	42.8	0.49	15.78	0.2	173	
900		14	7.11	0.462	41.9	0.33	15.69	0.2	160	
905		16	7.06	0.516	26.7	0.19	15.68	0.2	150	
910		18	7.01	0.596	25.2	0.06	15.66	0.2	142	
920		20	6.97	0.643	25.6	0.00	15.65	0.2	138	
925		22	6.93	0.693	23.4	0.00	15.66	0.2	134	

Duplicate
mw-xx-100118

Sample Date: 10-1-18

41.0'

Depth to Water
(from top of casing): 4.9'

3/4"

Craig Hayes

Peristaltic Pump

Low Flow

1, 4 Dioxane & PFAS

Pump Intake Depth
(Mid-Point of Screen Zone):

Start:

Purge Time:

Finish:

Sample Time:

Finish.

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Project:

Well ID:

~~SCC~~

Sample Date: 10-1-18

**Total Well Depth
(from top of casing):**

50.0

Well Diameter:

3/4"

1"

2

4'

Sampling Crew:

Craig Hayes

Purging Method:

Peristaltic Pump

Sampling Method:

Low Flow

Sample Analysis:

1, 4 Dioxane & PFAS

Depth to Water
(from top of casing):

18.9

Pump Intake Depth
(Mid-Point of Screen Zone):

Start:

1405

Purge Time:

Finish.

1435

Start

1440

Sample Times:

Finish

FB-1400

MS/MSD

Monitoring Well Sample Data Form

Project: Inwood-PFAS Sampling

Well ID: GW-8

Sample Date: 10-23-18

Total Well Depth
(from top of casing); 20.0'

Depth to Water
(from top of casing): 12.5'

Well Diameter: 3/4" 1" 2" 4"

**Pump Intake Depth
(Mid-Point of Screen Zone):**

Sampling Crew: Craig Hayes

Start: 0810

Purge Time:

Finish: 0910

Purging Method: Peristaltic Pump

Start: 0915

Sampling Method: Low Flow

Sample Time:

Finish:

Sample Analysis:

PFAS / 1,4 Dioxane

3 well volumes - 14.7 gallons

[illegible]

* Removed Tubing

FB-102318 @ 0930

Monitoring Well Sample Data Form

Sample Date: 10-23-18

Depth to Water
(from top of casing): 8.001

Pump Intake Depth
(Mid-Point of Screen Zone):

Start: 1030

Purge Time: _____
Finish: 11:00

Start: 1105

Sample Time:

Finish:

Well volumes - 3.18 gallons

[illegible]

*Removed Tubing

Monitoring Well Sample Data Form

Project: Inwood - PFAS Sampling

Well ID: MW-52I

Sample Date: 10-23-18

Total Well Depth (from top of casing): 24.5'

Depth to Water
(from top of casing): 5.5'

Well Diameter: 3/4" 1" 2" 4"

Pump Intake Depth
(Mid-Point of Screen Zone):

Sampling Crew: Craig Hayes

Start: 1155

Purge Time:

Finish: 1240

Purging Method: Peristaltic Pump

Start: 1245

Sampling Method: Low Flow

Sample Time:

Finish:

Sample Analysis: PFAS / 1,4 Dioxane

3 well volumes - 9.30 gallons

[illegible]

* Removed Tubing

Project: <u>Kings County - PFAS Sampling</u>		Well ID: <u>KC-MW-09</u>	Sample Date: <u>10-5-18</u>
Total Well Depth (from top of casing): <u>15.20'</u>		Depth to Water (from top of casing): <u>9.10'</u>	
Well Diameter:	<u>3/4"</u> <u>1"</u> <u>2"</u> <u>4"</u>	Pump Intake Depth (Mid-Point of Screen Zone): _____	
Sampling Crew:	<u>Craig Hayes</u>	Purge Time:	Start: <u>1020</u> Finish: <u>1050</u>
Purging Method:	<u>Peristaltic Pump</u>	Sample Time:	Start: <u>1055</u> Finish: _____
Sampling Method:	<u>Low Flow</u>		
Sample Analysis:	<u>1, 4 Dioxane & PFAS</u>		

[illegible]

Monitoring Well Sample Data Form

Project: Emerging Contaminants - Kings Well ID: KC-MW-05
County former MGP

Sample Date: 10/5/2018

Total Well Depth
 (from top of casing): ~~0000~~ 17.92'

Depth to Water
 (from top of casing): ~~0000~~ 6.67'

Well Diameter: 3/4" 1" 2" 4"

Pump Intake Depth
 (Mid-Point of Screen Zone): _____

Sampling Crew: ~~Craig Hayes~~ m. fannon

Purge Time: Start: 1053

Finish: 1125

Purging Method: Peristaltic Pump

Sample Time: Start: 1125

Sampling Method: Low Flow

Finish: 1135

Sample Analysis: 1, 4 Dioxane & PFAS

✓ Purge Data ✓										
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals.)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
1055	0.4	Initial	6.70	6.46	8.8	6.00	18.49		-90	Well Headspace PID =
1100		2	6.23	6.36	7.6	0.00	18.81		-71	NLO
1105		4	6.21	5.59	14.8	0.00	18.91		-88	
1110		1g	6.21	5.21	14.6	0.00	19.11		-98	
1115		8	6.18	5.25	20.2	0.00	19.31		-106	
1120		10	6.15	5.29	20.4	0.00	19.47		-113	
1125		2.25g	6.14	5.29	19.7	0.00	19.58		-116	Collected Sample at 1125
										Dup-100518-2 at 1135
										Screen on water in
										purge bucket

Project: Kings County - PFAS Sampling

XC-MW-01

Sample Date: 10-5-18

32.50'

27.55

A number line from 0 to 5. Tick marks are present at $\frac{3}{4}$, 1, 2, and 4. The segment between 1 and 2 is labeled "1 inch", and the segment between 2 and 4 is labeled "2 inches".

Craig Hayes

Peristaltic Pump

Low Flow

1, 4 Dioxane & PFAS

(Mid-Point of Screen Zone):

Start: 1/20

Finish: 1200

Start: 1205

Finish:

Purge Data

* Water is clear ~~see~~

mis/MSD

Sample Date: 9-25-18

12.28'

Depth to Water
(from top of casing): 4.80'

3/4"

1"

2"

4"

Craig Hayes

Pump Intake Depth
(Mid-Point of Screen Zone):

Start: 1355

Finish: 1425

Peristaltic Pump

Start: 1430

Low Flow

Finish:

1, 4 Dioxane & PFAS

[illegible]

* Barge Water Stowed in existing drums on-site

Duplicate
MW-XX-092518

Patchogue PFAS Sampling

MM-575

Sample Date: 9-25-18

12.50'

3/4"

1"

2"

4"

Craig Hayes

Peristaltic Pump

Low Flow

1, 4 Dioxane & PFAS

4.31

Start:

1450

Finish:

1620

Start:

1528

Finish:

[illegible]

* Barge water stored in existing drum on site

Monitoring Well Sample Data Form

Project: Patchogue PFAS Sampling

Well ID: MW-1

Sample Date: 9-25-18

Total Well Depth
(from top of casing): 15.50'

Depth to Water
(from top of casing): 5.75'

Well Diameter: 3/4" 1" 2" 4"

Pump Intake Depth
(Mid-Point of Screen Zone): _____

Sampling Crew: Craig Hayes

Purge Time: Start: 1540

Finish: 1615

Purging Method: Peristaltic Pump

Start: 1620

Sampling Method: Low Flow

Sample Time:

Finish: _____

Sample Analysis: 1, 4 Dioxane & PFAS

Purge Data										
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals.)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
1545	0.4	Initial	7.09	2.13	37.6	0.28	21.32	1.1	-40	Well Headspace PID =
1550		2	7.07	2.18	18.5	0.00	21.35	1.1	-44	
1555		4	7.03	2.36	16.3	0.00	21.28	1.2	-46	Colorless to Brown
1600		6	7.01	2.47	15.2	0.00	21.28	1.3	-47	Slight odor
1605		8	7.00	2.51	11.1	0.00	21.22	1.3	-47	
1610		10	6.99	2.51	12.1	0.00	21.04	1.3	-48	
1615		12	6.99	2.50	11.1	0.00	20.92	1.3	-48	

Glen Cove - 1745
Patchogue - 1755

MS/MSD

Monitoring Well Sample Data Form

Project: Peoples - PFAS Sampling

Well ID: PWMW-01

Sample Date: 9-26-18

Total Well Depth
(from top of casing): 18.65'

Depth to Water
(from top of casing): 4.83'

Well Diameter: 3/4" 1" 2" 4"

Pump Intake Depth
(Mid-Point of Screen Zone): _____

Sampling Crew: Craig Hayes

Purge Time: Start: 820

Finish: 855

Purging Method: Peristaltic Pump

Sample Time: Start: 900

Finish: _____

Sampling Method: Low Flow

Sample Analysis: 1, 4 Dioxane & PFAS

Purge Data										
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals.)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
825	0.4	Initial	6.58	0.827	75.2	3.23	18.42	0.4	227	Well Headspace PID =
830		2	6.66	0.764	52.6	2.97	18.46	0.4	218	
835		4	6.69	0.753	29.6	2.30	18.39	0.4	210	
840		6	6.71	0.749	8.7	2.16	18.53	0.4	205	
845		8	6.72	0.743	0.0	1.95	18.56	0.4	198	
850		10	6.73	0.739	0.0	1.94	18.60	0.4	195	
855		12	6.73	0.738	0.0	1.91	18.62	0.4	194	

Monitoring Well Sample Data Form

Duplicate
MW-XX-092618

Project: Peoples-PFAS Sampling Well ID: MW-11 Sample Date: 9-26-18

Total Well Depth (from top of casing): 17.6' Depth to Water (from top of casing): 8.00'

Well Diameter: 3/4" 1" 2" 4" Pump Intake Depth (Mid-Point of Screen Zone): _____

Sampling Crew: Craig Hayes Start: 0930

Purging Method: Peristaltic Pump Purge Time: Finish: 1000

Sampling Method: Low Flow Start: 1005

Sample Analysis: 1, 4 Dioxane & PFAS Sample Time: Finish: _____

Purge Data										
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals.)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
935	0.4	Initial	7.07	1.77	0.7	0.77	18.26	0.9	10	Well Headspace PID =
940		2	7.07	1.76	0.0	0.11	18.48	0.9	-2	
945		4	7.08	1.78	0.0	0.00	18.16	0.9	-18	Colorless
950		6	7.14	1.68	0.0	0.00	18.29	0.8	-47	Some Odor
955		8	7.23	1.56	0.0	0.00	18.27	0.8	-69	
1000		10	7.24	1.48	0.0	0.00	18.12	0.8	-76	

Monitoring Well Sample Data Form

Project: Peoples - PFAS Sampling

Well ID: MW-9

Sample Date: 9-26-18

Total Well Depth
(from top of casing): 16.60'

Depth to Water
(from top of casing): 6.50'

Well Diameter: 3/4" 1" 2" 4"

Pump Intake Depth
(Mid-Point of Screen Zone):

Sampling Crew: Craig Hayes

Start: 1040

Purge Time:

Finish: 1110

Purging Method: Peristaltic Pump

Start: 1115

Sampling Method: Low Flow

Sample Time:

Finish:

Sample Analysis: 1, 4 Dioxane & PFAS

[illegible]

Monitoring Well Sample Data Form

Project:

Well ID:

Sample Date:

**Total Well Depth
(from top of casing):**

13-15'

Depth to Water
(from top of casing):

5.20

Well Diameter:

Pump Intake Depth
(Mid-Point of Screen Zone):

Sampling Crew:

Craig Hayes

Start: 1200

Purge Time:

Finish: 12:30

Purging Method:

Peristaltic Pump

Start: 12:30

Sampling Method:

Low Flow

Sample Time:

Finish: 0.90

Sample Analysis:

1, 4 Dioxane & PFAS

3 well volumes = ~~0.32~~ gallons

[illegible]

FB@1240

*Removed Tubing

Duplicate
NW-XX-092818

Rockaway-PFIAs Sampling

RW-05A

9-28-18

27.00'

7.00

3/4"

1"

2"

④

Craig Hayes

(Mid-Point of Screen Zone):

Start:

1049

Finish:

1115

Peristaltic Pump

Start:

1120

Low Flow

Finish.

1, 4 Dioxane & PFAS

Swell Volumes = 39.18 gallons

Purge Data

* Only purged well volume

* Removed Tubing

~~MS/MSD~~

Sample Date: 9-28-18

Depth to Water (from top of casing): 9.00'

Pump Intake Depth
(Mid-Point of Screen Zone): _____

Start: 0950

Purge Time: _____
Finish: 1020

Start: 10²⁵

Sample Time: _____
Finish: _____

*3 well volumes = 3.66 gallons

[illegible]

* Removed Tubing

MS/MSD

Sample Date: 9-27-18

42.5'

Depth to Water
(from top of casing): 2.00'

4"

Craig Hayes

Pump Intake Depth
(Mid-Point of Screen Zone):

Start: 11:55

Finish: 1225

Peristaltic Pump

Start: 1230

Low Flow

Finish:

1, 4 Dioxane & PFAS

[illegible]

Monitoring Well Sample Data Form

Project: Sag Harbor - PFAS Sampling

Well ID: SHMW-13I

Sample Date: 9-27-18

**Total Well Depth
(from top of casing):**

46.5'

Depth to Water
(from top of casing):

0.951

Well Diameter:

$\frac{3}{4}''$ $1''$ $2''$ $4''$

Sampling Crew:

Craig Hayes

Purging Method:

Peristaltic Pump

Sampling Method:

Low Flow

Sample Analysis:

1, 4 Dioxane & PFAS

Pump Intake Depth

(Mid-Point of Screen Zone):

Start:

1300

Purge Time:

Finish:

1330

Start:

1335

Sample Time:

Finish:

[illegible]

Monitoring Well Sample Data Form

Project: Sag Harbor - PFAS Sampling

Well ID: SH MW-03I

Sample Date: 9-27-18

Total Well Depth
(from top of casing): 45.0'

Depth to Water
(from top of casing): 1.58'

Well Diameter: 3/4" 1" 2" 4"

Pump Intake Depth
(Mid-Point of Screen Zone): _____

Sampling Crew: Craig Hayes

Start: 1405

Purge Time: Finish: 1440

Purging Method: Peristaltic Pump

Start: 1445

Sampling Method: Low Flow

Sample Time: Finish: _____

Sample Analysis: 1, 4 Dioxane & PFAS

Purge Data										
Sample Time	Flow Rate (lpm/gpm)	Volume Purged (liters/gals.)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
1410	0.4	Initial	6.47	0.052	63.2	3.31	18.10	0.0	185	Well Headspace PID =
1415		2	6.26	0.052	39.2	1.02	19.03	0.0	201	
1420		4	6.28	0.179	36.9	0.32	18.89	0.1	198	
1425		6	6.28	0.185	15.1	0.09	18.79	0.1	197	
1430		8	6.27	0.192	3.7	0.00	18.61	0.1	199	
1435		10	6.27	0.194	0.0	0.00	18.50	0.1	201	
1440		12	6.26	0.197	0.0	0.00	18.43	0.1	202	

* Grab Bolt Cutters + Lock

MS/MSD
+
DUP-100318-2

Sample Date: 10-3-18

Depth to Water
(from top of casing): 10.00'

Pump Intake Depth
(Mid-Point of Screen Zone):

Start: 1115

Purge Time: _____
Finish: 1145

Start: 1150

Sample Time: _____
Finish: _____

[illegible]

FB @ 1110

Project: Skillman-PPAS Sampling Well ID: SSMW-05 Sample Date: 10-3-18

Total Well Depth
(from top of casing): 22.4'

Well Diameter: 3/4" 1" (2") 4"

Sampling Crew: Craig Hayes

Purging Method: Peristaltic Pump

Sampling Method: Low Flow

Sample Analysis: 1, 4 Dioxane & PFAS

Depth to Water
(from top of casing): 15.5'

Pump Intake Depth
(Mid-Point of Screen Zone): _____

Purge Time: Start: 1255
Finish: _____

Sample Time: Start: 1325
Finish: _____

[illegible]

* Well went dry, waited for recharge + take samples @ 1325

Monitoring Well Sample Data Form

MS/MSD
Dup-100818-1Project: WY the - PFAS SamplingWell ID: WA-MW-04Sample Date: 10-3-18Total Well Depth
(from top of casing): 19.3'Depth to Water
(from top of casing): 10.5'Well Diameter: 3/4" 1" 2" 4"Sampling Crew: Craig HayesPump Intake Depth
(Mid-Point of Screen Zone): _____Purging Method: Peristaltic PumpPurge Time: Start: 0855Sampling Method: Low FlowFinish: 0925Sample Analysis: 1, 4 Dioxane & PFASSample Time: Start: 0930

Finish: _____

Purge Data										
Sample Time	Flow Rate (gpm/gpm)	Volume Purged (liters/gals.)	pH (std. Units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temperature (Cel.)	Salinity (%)	ORP (mV)	Comments/Observations
0900	0.4	Initial	6.90	2.64	156	0.41	18.97	1.4	-105	Well Headspace PID =
0905		2	6.88	2.63	32.5	0.09	19.11	1.4	-103	
0910		4	6.86	2.54	6.7	0.00	19.26	1.3	-102	Colorless
0915		6	6.84	2.53	0.0	0.00	19.30	1.3	-102	Slight odor
0920		8	6.84	2.54	0.0	0.00	19.31	1.3	-101	
0925		10	6.83	2.55	0.0	0.00	19.29	1.3	-99	

Project:	<u>Wythe - PFAS Sampling</u>	Well ID:	<u>WA-MW-01</u>	Sample Date:	<u>10-3-18</u>
Total Well Depth (from top of casing):	<u>18.48'</u>		Depth to Water (from top of casing):	<u>9.80'</u>	
Well Diameter:	<u>3/4"</u>	<u>1"</u>	<u>(2")</u>	<u>4"</u>	
Sampling Crew:	<u>Craig Hayes</u>		Pump Intake Depth (Mid-Point of Screen Zone):		
Purging Method:	<u>Peristaltic Pump</u>		Purge Time:	Start: <u>0955</u>	
Sampling Method:	<u>Low Flow</u>			Finish: <u>1025</u>	
Sample Analysis:	<u>1, 4 Dioxane & PFAS</u>		Sample Time:	Start: <u>1030</u>	
				Finish:	

C:\Users\chayes\Documents\Cop of Att-E1-GW-SamplingLog.xls

Appendix B

Laboratory Data Usability Summary Report (Electronic Only)

DRAFT

Site: Long Island Emerging Contaminants, Bayridge
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-166671
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 15, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
MW-112	460-166671-01	PFAS, 1,4-Dioxane
MW-105	460-166671-02	PFAS, 1,4-Dioxane
DUP-101018	460-166671-03	PFAS, 1,4-Dioxane
FB-101018	460-166671-04	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: FB-101018
Field Duplicate pair: MW-105/DUP-101018

The above-listed aqueous samples and field blank sample were collected on October 10, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-Dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatile Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

1,4-Dioxane and PFAS

Analytes were detected in the associated laboratory method and field blank samples. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
1,4-Dioxane				
1,4-Dioxane	FB-101018: All samples	0.12 ug/L	1.2 ug/L	Qualify the results for 1,4-dioxane in samples MW-112, MW-105, and DUP-101018 as nondetect (U) at the RL.
PFAS				
Perfluoroundecanoic acid (PFUnA)	Method MB 200-135487: All samples	0.319 ng/L	3.19 ng/L	Qualify the results for Perfluoroundecanoic acid (PFUnA) in samples MW-112, MW-105, and DUP-101018, and FB-101018 as nondetect (U) at the RL.
Perfluorobutanoic acid (PFBA)	FB-101018: All samples	0.96 ng/L	9.6 ng/L	Validation actions were not required.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
MW-112	13C4 PFBA	16	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA) and 6:2 FTS in sample MW-112.
	M2-6:2 FTS	351		Validation action was not required as the result for 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.
	M2-8:2 FTS	190		
MW-105	M2-6:2 FTS	266	25-150	Estimate (J) the positive result for 6:2 FTS in sample MW-105.
DUP-101018	M2-6:2 FTS	261	25-150	Estimate (J) the positive result for 6:2 FTS in sample DUP-101018.
FB-101018	M2-6:2 FTS	153	25-150	Validation action was not required as the result for 6:2 FTS was not detected in this sample and therefore not affected by the high recovery.

It should be noted that IDA recoveries outside of control limits generally have a minimal effect on the data quality as the results are quantitated by isotope dilution and are corrected accordingly. However, professional judgment was taken to qualify affected compound results for associated isotope dilution analytes recovered outside of the recommended control limits.

MS/MSD Results

MS/MSD analyses were performed on sample MW-105 for 1,4-dioxane and PFAS. Recovery and precision criteria were met.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples MW-105 and DUP-101018 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria.

Analyte	MW-105 (ng/L)	DUP-101018 (ng/L)	RPD (%)
Perfluorobutanoic acid (PFBA)	11.5	11.7	1.7
Perfluoropentanoic (PFPeA)	12.0	11.9	0.8
Perfluorohexanoic acid (PFHxA)	12.8	12.8	0
Perfluoroheptanoic acid (PFHpA)	15.6	14.3	8.7

Analyte	MW-105 (ng/L)	DUP-101018 (ng/L)	RPD (%)
Perfluorooctanoic acid (PFOA)	43.4	41.6	4.2
Perfluorononanoic acid (PFNA)	1.27 J	1.13 J	11.7
Perfluorobutanesulfonic acid (PFBS)	4.09	5.24	24.7
Perfluorohexanesulfonic acid (PFHxS)	2.38	2.88	19.0
Perfluorooctanesulfonic acid (PFOS)	6.70	6.95	3.7
6:2 FTS	7.15 J	6.82 J	4.7
NC – Not calculable Criteria: When both results are ≥ 5 x the RL, RPDs must be $< 30\%$. When results are < 5 x the QL, the absolute difference between the original and field duplicate results must be $< \text{RL}$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

The following table lists the sample dilutions which were performed and the results to be reported.

Sample	PFAS Analysis Reported
MW-112	A 2-fold dilution was performed for Perfluorohexanesulfonic acid (PFHxS) due to sample matrix. All other results were reported from the undiluted analysis.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Bay Ridge-PFAS-1803556-1.18

TestAmerica Job ID: 460-166671-1

Client Sample ID: MW-112

Date Collected: 10/10/18 12:25

Date Received: 10/11/18 19:30

Lab Sample ID: 460-166671-1

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.15	J	0.20	0.016	ug/L		10/13/18 10:08	10/13/18 19:19	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	34		10 - 150				10/13/18 10:08	10/13/18 19:19	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	100	J	1.62	0.33	ng/L		10/19/18 11:40	10/21/18 22:21	1
Perfluoropentanoic acid (PFPeA)	16.6		1.62	0.61	ng/L		10/19/18 11:40	10/21/18 22:21	1
Perfluorohexanoic acid (PFHxA)	28.3		1.62	0.19	ng/L		10/19/18 11:40	10/21/18 22:21	1
Perfluoroheptanoic acid (PFHpA)	16.8		1.62	0.26	ng/L		10/19/18 11:40	10/21/18 22:21	1
Perfluorooctanoic acid (PFOA)	53.9		1.62	0.26	ng/L		10/19/18 11:40	10/21/18 22:21	1
Perfluorononanoic acid (PFNA)	0.89	J	1.62	0.31	ng/L		10/19/18 11:40	10/21/18 22:21	1
Perfluorodecanoic acid (PFDA)	1.62	U	1.62	0.31	ng/L		10/19/18 11:40	10/21/18 22:21	1
Perfluoroundecanoic acid (PFUnA)	0.40	J	1.62	0.20	ng/L		10/19/18 11:40	10/21/18 22:21	1
Perfluorododecanoic acid (PFDoA)	1.62	U	1.62	0.28	ng/L		10/19/18 11:40	10/21/18 22:21	1
Perfluorotridecanoic acid (PFTriA)	1.62	U	1.62	0.19	ng/L		10/19/18 11:40	10/21/18 22:21	1
Perfluorotetradecanoic acid (PFTeA)	1.62	U	1.62	0.36	ng/L		10/19/18 11:40	10/21/18 22:21	1
Perfluorobutanesulfonic acid (PFBS)	4.09		1.62	0.36	ng/L		10/19/18 11:40	10/21/18 22:21	1
Perfluorohexanesulfonic acid (PFHxS)	6.06		3.24	0.42	ng/L		10/19/18 11:40	10/22/18 18:51	2
Perfluoroheptanesulfonic Acid (PFHpS)	1.62	U	1.62	0.66	ng/L		10/19/18 11:40	10/21/18 22:21	1
Perfluorooctanesulfonic acid (PFOS)	2.56		1.62	0.62	ng/L		10/19/18 11:40	10/21/18 22:21	1
Perfluorodecanesulfonic acid (PFDS)	1.62	U	1.62	0.43	ng/L		10/19/18 11:40	10/21/18 22:21	1
Perfluorooctanesulfonamide (FOSA)	1.62	U	1.62	0.45	ng/L		10/19/18 11:40	10/21/18 22:21	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.2	U	16.2	0.36	ng/L		10/19/18 11:40	10/21/18 22:21	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.2	U	16.2	0.57	ng/L		10/19/18 11:40	10/21/18 22:21	1
6:2 FTS	9.50	J	16.2	0.81	ng/L		10/19/18 11:40	10/21/18 22:21	1
8:2 FTS	16.2	U	16.2	0.45	ng/L		10/19/18 11:40	10/21/18 22:21	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	16	*	25 - 150				10/19/18 11:40	10/21/18 22:21	1
13C5-PFPeA DNU	28		25 - 150				10/19/18 11:40	10/21/18 22:21	1
13C2 PFHxA	41		25 - 150				10/19/18 11:40	10/21/18 22:21	1
13C4 PFHpA	60		25 - 150				10/19/18 11:40	10/21/18 22:21	1
13C4 PFOA	93		25 - 150				10/19/18 11:40	10/21/18 22:21	1
13C5 PFNA	100		25 - 150				10/19/18 11:40	10/21/18 22:21	1
13C2 PFDA	94		25 - 150				10/19/18 11:40	10/21/18 22:21	1
13C2 PFUnA	96		25 - 150				10/19/18 11:40	10/21/18 22:21	1
13C2 PFDoA	97		25 - 150				10/19/18 11:40	10/21/18 22:21	1
13C2 PFTeDA	101		25 - 150				10/19/18 11:40	10/21/18 22:21	1
13C3 PFBS	58		25 - 150				10/19/18 11:40	10/21/18 22:21	1
18O2 PFHxS	83		25 - 150				10/19/18 11:40	10/22/18 18:51	2
13C4 PFOS	89		25 - 150				10/19/18 11:40	10/21/18 22:21	1
13C8 FOSA	40		25 - 150				10/19/18 11:40	10/21/18 22:21	1
d3-NMeFOSAA	75		25 - 150				10/19/18 11:40	10/21/18 22:21	1
d5-NEtFOSAA	91		25 - 150				10/19/18 11:40	10/21/18 22:21	1

TestAmerica Edison

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11/15/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Bay Ridge-PFAS-1803556-1.18

TestAmerica Job ID: 460-166671-1

Client Sample ID: MW-112

Date Collected: 10/10/18 12:25

Date Received: 10/11/18 19:30

Lab Sample ID: 460-166671-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-6:2 FTS	351	*	25 - 150	10/19/18 11:40	10/21/18 22:21	1
M2-8:2 FTS	190	*	25 - 150	10/19/18 11:40	10/21/18 22:21	1

Client Sample ID: MW-105

Date Collected: 10/10/18 10:00

Date Received: 10/11/18 19:30

Lab Sample ID: 460-166671-2

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

GC/MS SIM / Isotope Dilution									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.11 J 0.20 U	*	0.20	0.016	ug/L		10/13/18 10:08	10/13/18 19:02	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	38		10 - 150				10/13/18 10:08	10/13/18 19:02	

Method: 537 (modified) - Fluorinated Alkyl Substances

Perfluorinated Alkyl Substances									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	11.5		1.83	0.37	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluoropentanoic acid (PFPeA)	12.0		1.83	0.68	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluorohexanoic acid (PFHxA)	12.8		1.83	0.22	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluoroheptanoic acid (PFHpA)	15.6		1.83	0.29	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluorooctanoic acid (PFOA)	43.4		1.83	0.29	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluorononanoic acid (PFNA)	1.27 J		1.83	0.35	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluorodecanoic acid (PFDA)	1.83 U		1.83	0.35	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluoroundecanoic acid (PFUnA)	0.36 J 1.83 U		1.83	0.23	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluorododecanoic acid (PFDoA)	1.83 U		1.83	0.32	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluorotridecanoic acid (PFTriA)	1.83 U		1.83	0.22	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluorotetradecanoic acid (PFTeA)	1.83 U		1.83	0.41	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluorobutanesulfonic acid (PFBS)	4.09		1.83	0.40	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluorohexanesulfonic acid (PFHxS)	2.38		1.83	0.24	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.83 U		1.83	0.75	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluorooctanesulfonic acid (PFOS)	6.70		1.83	0.69	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluorodecanesulfonic acid (PFDS)	1.83 U		1.83	0.48	ng/L		10/19/18 11:40	10/21/18 22:37	1
Perfluorooctanesulfonamide (FOSA)	1.83 U		1.83	0.51	ng/L		10/19/18 11:40	10/21/18 22:37	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	18.3 U		18.3	0.41	ng/L		10/19/18 11:40	10/21/18 22:37	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	18.3 U		18.3	0.64	ng/L		10/19/18 11:40	10/21/18 22:37	1
6:2 FTS	7.15 J		18.3	0.91	ng/L		10/19/18 11:40	10/21/18 22:37	1
8:2 FTS	18.3 U		18.3	0.51	ng/L		10/19/18 11:40	10/21/18 22:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	32		25 - 150				10/19/18 11:40	10/21/18 22:37	1
13C5-PFPeA DNU	60		25 - 150				10/19/18 11:40	10/21/18 22:37	1
13C2 PFHxA	66		25 - 150				10/19/18 11:40	10/21/18 22:37	1
13C4 PFHpA	78		25 - 150				10/19/18 11:40	10/21/18 22:37	1
13C4 PFOA	92		25 - 150				10/19/18 11:40	10/21/18 22:37	1
13C5 PFNA	100		25 - 150				10/19/18 11:40	10/21/18 22:37	1
13C2 PFDA	106		25 - 150				10/19/18 11:40	10/21/18 22:37	1

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Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Bay Ridge-PFAS-1803556-1.18

TestAmerica Job ID: 460-166671-1

Client Sample ID: MW-105

Date Collected: 10/10/18 10:00

Date Received: 10/11/18 19:30

Lab Sample ID: 460-166671-2

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
¹³ C2 PFUnA	112		25 - 150	10/19/18 11:40	10/21/18 22:37	1
¹³ C2 PFDoA	128		25 - 150	10/19/18 11:40	10/21/18 22:37	1
¹³ C2 PFTeDA	113		25 - 150	10/19/18 11:40	10/21/18 22:37	1
¹³ C3 PFBS	73		25 - 150	10/19/18 11:40	10/21/18 22:37	1
¹⁸ O2 PFHxS	95		25 - 150	10/19/18 11:40	10/21/18 22:37	1
¹³ C4 PFOS	104		25 - 150	10/19/18 11:40	10/21/18 22:37	1
¹³ C8 FOSA	54		25 - 150	10/19/18 11:40	10/21/18 22:37	1
d3-NMeFOSAA	85		25 - 150	10/19/18 11:40	10/21/18 22:37	1
d5-NEtFOSAA	99		25 - 150	10/19/18 11:40	10/21/18 22:37	1
M2-6:2 FTS	266	*	25 - 150	10/19/18 11:40	10/21/18 22:37	1
M2-8:2 FTS	113		25 - 150	10/19/18 11:40	10/21/18 22:37	1

Client Sample ID: DUP-101018

Date Collected: 10/10/18 00:00

Date Received: 10/11/18 19:30

Lab Sample ID: 460-166671-3

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.11	J	0.20	0.016	ug/L		10/13/18 10:08	10/13/18 19:54	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	33		10 - 150				10/13/18 10:08	10/13/18 19:54	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	11.7		1.69	0.35	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluoropentanoic acid (PFPeA)	11.9		1.69	0.63	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluorohexanoic acid (PFHxA)	12.8		1.69	0.20	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluoroheptanoic acid (PFHpA)	14.3		1.69	0.27	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluorooctanoic acid (PFOA)	41.6		1.69	0.27	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluorononanoic acid (PFNA)	1.13	J	1.69	0.32	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluorodecanoic acid (PFDA)	1.69	U	1.69	0.32	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluoroundecanoic acid (PFUnA)	0.30	J	1.69	0.21	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluorododecanoic acid (PFDoA)	1.69	U	1.69	0.30	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluorotridecanoic acid (PFTriA)	1.69	U	1.69	0.20	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluorotetradecanoic acid (PFTeA)	1.69	U	1.69	0.38	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluorobutanesulfonic acid (PFBS)	5.24		1.69	0.37	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluorohexanesulfonic acid (PFHxS)	2.88		1.69	0.22	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.69	U	1.69	0.69	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluorooctanesulfonic acid (PFOS)	6.95		1.69	0.64	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluorodecanesulfonic acid (PFDS)	1.69	U	1.69	0.45	ng/L		10/19/18 11:40	10/21/18 23:41	1
Perfluorooctanesulfonamide (FOSA)	1.69	U	1.69	0.47	ng/L		10/19/18 11:40	10/21/18 23:41	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.9	U	16.9	0.38	ng/L		10/19/18 11:40	10/21/18 23:41	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.9	U	16.9	0.59	ng/L		10/19/18 11:40	10/21/18 23:41	1
6:2 FTS	6.82	J	16.9	0.84	ng/L		10/19/18 11:40	10/21/18 23:41	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Bay Ridge-PFAS-1803556-1.18

TestAmerica Job ID: 460-166671-1

Client Sample ID: DUP-101018

Lab Sample ID: 460-166671-3

Date Collected: 10/10/18 00:00

Matrix: Water

Date Received: 10/11/18 19:30

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
8:2 FTS	16.9	U	16.9	0.47	ng/L		10/19/18 11:40	10/21/18 23:41	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	37		25 - 150				10/19/18 11:40	10/21/18 23:41	1
13C5-PFPeA DNU	62		25 - 150				10/19/18 11:40	10/21/18 23:41	1
13C2 PFHxA	67		25 - 150				10/19/18 11:40	10/21/18 23:41	1
13C4 PFHpA	83		25 - 150				10/19/18 11:40	10/21/18 23:41	1
13C4 PFOA	94		25 - 150				10/19/18 11:40	10/21/18 23:41	1
13C5 PFNA	103		25 - 150				10/19/18 11:40	10/21/18 23:41	1
13C2 PFDA	100		25 - 150				10/19/18 11:40	10/21/18 23:41	1
13C2 PFUnA	100		25 - 150				10/19/18 11:40	10/21/18 23:41	1
13C2 PFDoA	111		25 - 150				10/19/18 11:40	10/21/18 23:41	1
13C2 PFTeDA	95		25 - 150				10/19/18 11:40	10/21/18 23:41	1
13C3 PFBS	76		25 - 150				10/19/18 11:40	10/21/18 23:41	1
18O2 PFHxS	98		25 - 150				10/19/18 11:40	10/21/18 23:41	1
13C4 PFOS	101		25 - 150				10/19/18 11:40	10/21/18 23:41	1
13C8 FOSA	63		25 - 150				10/19/18 11:40	10/21/18 23:41	1
d3-NMeFOSAA	89		25 - 150				10/19/18 11:40	10/21/18 23:41	1
d5-NEtFOSAA	93		25 - 150				10/19/18 11:40	10/21/18 23:41	1
M2-6:2 FTS	261 *		25 - 150				10/19/18 11:40	10/21/18 23:41	1
M2-8:2 FTS	107		25 - 150				10/19/18 11:40	10/21/18 23:41	1

Client Sample ID: FB-101018

Date Collected: 10/10/18 09:05

Lab Sample ID: 460-166671-4

Date Received: 10/11/18 19:30

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.12	J -	0.20	0.016	ug/L		10/13/18 10:08	10/13/18 20:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	39		10 - 150				10/13/18 10:08	10/13/18 20:11	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.96	J -	1.66	0.34	ng/L		10/19/18 11:40	10/21/18 23:56	1
Perfluoropentanoic acid (PFPeA)	1.66	U	1.66	0.62	ng/L		10/19/18 11:40	10/21/18 23:56	1
Perfluorohexanoic acid (PFHxA)	1.66	U	1.66	0.20	ng/L		10/19/18 11:40	10/21/18 23:56	1
Perfluoroheptanoic acid (PFHpA)	1.66	U	1.66	0.27	ng/L		10/19/18 11:40	10/21/18 23:56	1
Perfluorooctanoic acid (PFOA)	1.66	U	1.66	0.27	ng/L		10/19/18 11:40	10/21/18 23:56	1
Perfluorononanoic acid (PFNA)	1.66	U	1.66	0.32	ng/L		10/19/18 11:40	10/21/18 23:56	1
Perfluorodecanoic acid (PFDA)	1.66	U	1.66	0.32	ng/L		10/19/18 11:40	10/21/18 23:56	1
Perfluoroundecanoic acid (PFUnA)	0.26	J B	1.66	0.21	ng/L		10/19/18 11:40	10/21/18 23:56	1
Perfluorododecanoic acid (PFDoA)	1.66	U	1.66	0.29	ng/L		10/19/18 11:40	10/21/18 23:56	1
Perfluorotridecanoic acid (PFTriA)	1.66	U	1.66	0.20	ng/L		10/19/18 11:40	10/21/18 23:56	1
Perfluorotetradecanoic acid (PFTeA)	1.66	U	1.66	0.37	ng/L		10/19/18 11:40	10/21/18 23:56	1
Perfluorobutanesulfonic acid (PFBS)	1.66	U	1.66	0.37	ng/L		10/19/18 11:40	10/21/18 23:56	1
Perfluorohexanesulfonic acid (PFHxS)	1.66	U	1.66	0.22	ng/L		10/19/18 11:40	10/21/18 23:56	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.66	U	1.66	0.68	ng/L		10/19/18 11:40	10/21/18 23:56	1
Perfluorooctanesulfonic acid (PFOS)	1.66	U	1.66	0.63	ng/L		10/19/18 11:40	10/21/18 23:56	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Bay Ridge-PFAS-1803556-1.18

TestAmerica Job ID: 460-166671-1

Client Sample ID: FB-101018

Lab Sample ID: 460-166671-4

Date Collected: 10/10/18 09:05

Matrix: Water

Date Received: 10/11/18 19:30

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanesulfonic acid (PFDS)	1.66	U	1.66	0.44	ng/L		10/19/18 11:40	10/21/18 23:56	1
Perfluorooctanesulfonamide (FOSA)	1.66	U	1.66	0.47	ng/L		10/19/18 11:40	10/21/18 23:56	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.6	U	16.6	0.37	ng/L		10/19/18 11:40	10/21/18 23:56	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.6	U	16.6	0.58	ng/L		10/19/18 11:40	10/21/18 23:56	1
6:2 FTS	16.6	U	16.6	0.83	ng/L		10/19/18 11:40	10/21/18 23:56	1
8:2 FTS	16.6	U	16.6	0.47	ng/L		10/19/18 11:40	10/21/18 23:56	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	84		25 - 150				10/19/18 11:40	10/21/18 23:56	1
13C5-PFPeA DNU	112		25 - 150				10/19/18 11:40	10/21/18 23:56	1
13C2 PFHxA	111		25 - 150				10/19/18 11:40	10/21/18 23:56	1
13C4 PFHpA	92		25 - 150				10/19/18 11:40	10/21/18 23:56	1
13C4 PFOA	98		25 - 150				10/19/18 11:40	10/21/18 23:56	1
13C5 PFNA	95		25 - 150				10/19/18 11:40	10/21/18 23:56	1
13C2 PFDA	95		25 - 150				10/19/18 11:40	10/21/18 23:56	1
13C2 PFUnA	97		25 - 150				10/19/18 11:40	10/21/18 23:56	1
13C2 PFDoA	95		25 - 150				10/19/18 11:40	10/21/18 23:56	1
13C2 PFTeDA	89		25 - 150				10/19/18 11:40	10/21/18 23:56	1
13C3 PFBS	99		25 - 150				10/19/18 11:40	10/21/18 23:56	1
18O2 PFHxS	94		25 - 150				10/19/18 11:40	10/21/18 23:56	1
13C4 PFOS	100		25 - 150				10/19/18 11:40	10/21/18 23:56	1
13C8 FOSA	63		25 - 150				10/19/18 11:40	10/21/18 23:56	1
d3-NMeFOSAA	82		25 - 150				10/19/18 11:40	10/21/18 23:56	1
d5-NEtFOSAA	90		25 - 150				10/19/18 11:40	10/21/18 23:56	1
M2-6:2 FTS	153 *		25 - 150				10/19/18 11:40	10/21/18 23:56	1
M2-8:2 FTS	82		25 - 150				10/19/18 11:40	10/21/18 23:56	1

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TestAmerica

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160-166671 Chain of Custody

Site: Long Island Emerging Contaminants, Bayshore
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-165435
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 1, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
BB-MW-41I	460-165435-01	PFAS, 1,4-Dioxane
MW-29S	460-165435-02	PFAS, 1,4-Dioxane
MW-09I	460-165435-03	PFAS, 1,4-Dioxane
OU2-MW-57I	460-165435-04	PFAS, 1,4-Dioxane
OU3-MW-11S	460-165435-05	PFAS, 1,4-Dioxane
MW-XX-092418	460-165435-06	PFAS, 1,4-Dioxane
Fieldblank-092418	460-165435-07	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: Fieldblank-092418
Field Duplicate pair: MW-29S/MW-XX-092418

The above-listed aqueous samples and field blank sample were collected on September 24, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatile Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

Analytes were detected in the associated laboratory method blank sample. Contaminants were not detected in the associated field blank sample. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
Perfluorohexanesulfonic acid (PFHxS)	Method MB 200-134717: All samples	0.348 ng/L	3.48 ng/L	Qualify the result for PFHxS in samples MW-29S, OU3-MW-11S, and MW-XX-092418 as nondetect (U) at the RL. Qualify the result for PFHxS in sample BB-MW-41I as estimated (J); High bias.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
BB-MW-41I	M2-6:2 FTS	156	25-150	Validation action was not required as the result for 6:2 FTS was not detected in this sample and therefore not affected by the high recovery.
MW-29S	13C4 PFBA	24	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA) and 6:2 FTS in sample MW-29S.
	M2-6:2 FTS	233		Validation action was not required as the result for 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.
	M2-8:2 FTS	190		
OU2-MW-57I	d3-NMeFOSAA	152	25-150	Validation action was not required as the results for NMeFOSAA, NEtFOSAA, 6:2 FTS and 8:2 FTS were not detected in this sample and therefore not affected by the high recoveries.
	d5-NEtFOSAA	154		
	M2-6:2 FTS	258		
	M2-8:2 FTS	232		
OU3-MW-11S	13C4 PFBA	19	24-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA), Perfluoroundecanoic acid (PFUnA), and 6:2 FTS in sample OU3-MW-11S.
	13C2 PFUnA	154		
	M2-6:2 FTS	319		
	d3-NMeFOSAA	163	25-150	Validation action was not required as the results for NMeFOSAA, NEtFOSAA, and 8:2 FTS were not detected in this sample and therefore not affected by the high recoveries.
	d5-NEtFOSAA	181		
	M2-8:2 FTS	298		
MW-XX-092418	13C4 PFBA	24	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA) and 6:2 FTS in sample MW-XX-092418.
	M2-6:2 FTS	220		Validation action was not required as the result for 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.
	M2-8:2 FTS	189		

It should be noted that IDA recoveries outside of control limits generally have a minimal effect on the data quality as the results are quantitated by isotope dilution and are corrected accordingly. However, professional judgment was taken to qualify affected compound results for associated isotope dilution analytes recovered outside of the recommended control limits.

MS/MSD Results

MS/MSD analyses were performed on sample BB-MW-41I for 1,4-dioxane and PFAS. Recovery and precision criteria were met.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples MW-29S and MW-XX-092418 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria.

Analyte	MW-29S (ug/L)	MW-XX-092418 (ug/L)	RPD (%)
Perfluorobutanoic acid (PFBA)	12.8	12.8	0
Perfluoropentanoic (PFPeA)	2.80	4.23	40.7, Within the RL
Perfluorohexanoic acid (PFHxA)	3.81	3.36	12.6
Perfluoroheptanoic acid (PFHpA)	4.20	4.00	4.9
Perfluorooctanoic acid (PFOA)	17.0	18.7	9.5
Perfluorononanoic acid (PFNA)	1.41 J	1.46 J	3.5
Perfluorobutanesulfonic acid (PFBS)	2.41	2.22	8.2
Perfluorooctanesulfonic acid (PFOS)	5.99	6.44	7.2
6:2 FTS	2.69 J	1.98 J	30.4, Within the RL
NC – Not calculable			
Criteria: When both results are ≥ 5 x the RL, RPDs must be $< 30\%$.			
When results are < 5 x the QL, the absolute difference between the original and field duplicate results must be $< RL$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Bayshore-PFAS-1803556-1.1

TestAmerica Job ID: 460-165435-1

Client Sample ID: BB-MW-411

Lab Sample ID: 460-165435-1

Date Collected: 09/24/18 12:05

Matrix: Water

Date Received: 09/25/18 19:00

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/27/18 08:42	09/27/18 14:53	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	37		10 - 150				09/27/18 08:42	09/27/18 14:53	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	4.20		1.74	0.36	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluoropentanoic acid (PFPeA)	4.59		1.74	0.65	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluorohexanoic acid (PFHxA)	5.26		1.74	0.21	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluoroheptanoic acid (PFHpA)	5.27		1.74	0.28	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluorooctanoic acid (PFOA)	18.4		1.74	0.28	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluorononanoic acid (PFNA)	1.96		1.74	0.33	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluorodecanoic acid (PFDA)	1.74	U	1.74	0.33	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluoroundecanoic acid (PFUnA)	1.74	U	1.74	0.22	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluorododecanoic acid (PFDoA)	1.74	U	1.74	0.30	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluorotridecanoic acid (PFTriA)	1.74	U	1.74	0.21	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluorotetradecanoic acid (PFTeA)	1.74	U	1.74	0.38	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluorobutanesulfonic acid (PFBS)	4.84		1.74	0.38	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluorohexanesulfonic acid (PFHxS)	2.64	B J	1.74	0.23	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluoroheptanesulfonic acid (PFHpS)	1.74	U	1.74	0.71	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluorooctanesulfonic acid (PFOS)	30.9		1.74	0.66	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluorodecanesulfonic acid (PFDS)	1.74	U	1.74	0.46	ng/L		10/02/18 09:07	10/03/18 14:19	1
Perfluorooctanesulfonamide (FOSA)	1.74	U	1.74	0.49	ng/L		10/02/18 09:07	10/03/18 14:19	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.47	J	17.4	0.39	ng/L		10/02/18 09:07	10/03/18 14:19	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.4	U	17.4	0.61	ng/L		10/02/18 09:07	10/03/18 14:19	1
6:2 FTS	17.4	U	17.4	0.87	ng/L		10/02/18 09:07	10/03/18 14:19	1
8:2 FTS	17.4	U	17.4	0.49	ng/L		10/02/18 09:07	10/03/18 14:19	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	34		25 - 150				10/02/18 09:07	10/03/18 14:19	1
13C5 PFPeA	66		25 - 150				10/02/18 09:07	10/03/18 14:19	1
13C2 PFHxA	83		25 - 150				10/02/18 09:07	10/03/18 14:19	1
13C4 PFHpA	89		25 - 150				10/02/18 09:07	10/03/18 14:19	1
13C4 PFOA	107		25 - 150				10/02/18 09:07	10/03/18 14:19	1
13C5 PFNA	107		25 - 150				10/02/18 09:07	10/03/18 14:19	1
13C2 PFDA	103		25 - 150				10/02/18 09:07	10/03/18 14:19	1
13C2 PFUnA	104		25 - 150				10/02/18 09:07	10/03/18 14:19	1
13C2 PFDoA	87		25 - 150				10/02/18 09:07	10/03/18 14:19	1
13C2 PFTeA	87		25 - 150				10/02/18 09:07	10/03/18 14:19	1
13C3 PFBS	88		25 - 150				10/02/18 09:07	10/03/18 14:19	1
18O2 PFHxS	117		25 - 150				10/02/18 09:07	10/03/18 14:19	1
13C4 PFOS	120		25 - 150				10/02/18 09:07	10/03/18 14:19	1
13C8 FOSA	104		25 - 150				10/02/18 09:07	10/03/18 14:19	1
d3-NMeFOSAA	124		25 - 150				10/02/18 09:07	10/03/18 14:19	1
d5-NEtFOSAA	123		25 - 150				10/02/18 09:07	10/03/18 14:19	1

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10/29/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Bayshore-PFAS-1803556-1.1

TestAmerica Job ID: 460-165435-1

Client Sample ID: BB-MW-411

Date Collected: 09/24/18 12:05

Date Received: 09/25/18 19:00

Lab Sample ID: 460-165435-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-6:2 FTS	156	*	25 - 150	10/02/18 09:07	10/03/18 14:19	1
M2-8:2 FTS	145		25 - 150	10/02/18 09:07	10/03/18 14:19	1

Client Sample ID: MW-29S

Date Collected: 09/24/18 14:25

Date Received: 09/25/18 19:00

Lab Sample ID: 460-165435-2

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

GC/MS SIM / Isotope Dilution									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/27/18 08:42	09/27/18 15:10	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	41		10 - 150				09/27/18 08:42	09/27/18 15:10	

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	12.8	J	1.85	0.38	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluoropentanoic acid (PFPeA)	2.80		1.85	0.69	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluorohexanoic acid (PFHxA)	3.81		1.85	0.22	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluoroheptanoic acid (PFHpA)	4.20		1.85	0.30	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluorooctanoic acid (PFOA)	17.0		1.85	0.30	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluorononanoic acid (PFNA)	1.41	J	1.85	0.35	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluorodecanoic acid (PFDA)	1.85	U	1.85	0.35	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluoroundecanoic acid (PFUnA)	1.85	U	1.85	0.23	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluorododecanoic acid (PFDoA)	1.85	U	1.85	0.32	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluorotridecanoic acid (PFTriA)	1.85	U	1.85	0.22	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluorotetradecanoic acid (PFTeA)	1.85	U	1.85	0.42	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluorobutanesulfonic acid (PFBS)	2.41		1.85	0.41	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluorohexanesulfonic acid (PFHxS)	1.50	J-B	1.85	0.24	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.85	U	1.85	0.76	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluorooctanesulfonic acid (PFOS)	5.99		1.85	0.70	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluorodecanesulfonic acid (PFDS)	1.85	U	1.85	0.49	ng/L		10/02/18 09:07	10/03/18 15:07	1
Perfluorooctanesulfonamide (FOSA)	1.85	U	1.85	0.52	ng/L		10/02/18 09:07	10/03/18 15:07	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	18.5	U	18.5	0.42	ng/L		10/02/18 09:07	10/03/18 15:07	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	18.5	U	18.5	0.65	ng/L		10/02/18 09:07	10/03/18 15:07	1
6:2 FTS	2.69	J	18.5	0.93	ng/L		10/02/18 09:07	10/03/18 15:07	1
8:2 FTS	18.5	U	18.5	0.52	ng/L		10/02/18 09:07	10/03/18 15:07	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	24	*	25 - 150				10/02/18 09:07	10/03/18 15:07	1
13C5 PFPeA	46		25 - 150				10/02/18 09:07	10/03/18 15:07	1
13C2 PFHxA	73		25 - 150				10/02/18 09:07	10/03/18 15:07	1
13C4 PFHpA	89		25 - 150				10/02/18 09:07	10/03/18 15:07	1
13C4 PFOA	111		25 - 150				10/02/18 09:07	10/03/18 15:07	1
13C5 PFNA	124		25 - 150				10/02/18 09:07	10/03/18 15:07	1
13C2 PFDA	122		25 - 150				10/02/18 09:07	10/03/18 15:07	1
13C2 PFUnA	128		25 - 150				10/02/18 09:07	10/03/18 15:07	1

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Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Bayshore-PFAS-1803556-1.1

TestAmerica Job ID: 460-165435-1

Client Sample ID: MW-29S

Date Collected: 09/24/18 14:25

Date Received: 09/25/18 19:00

Lab Sample ID: 460-165435-2

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	115		25 - 150	10/02/18 09:07	10/03/18 15:07	1
13C2 PFTeDA	100		25 - 150	10/02/18 09:07	10/03/18 15:07	1
13C3 PFBS	58		25 - 150	10/02/18 09:07	10/03/18 15:07	1
18O2 PFHxS	110		25 - 150	10/02/18 09:07	10/03/18 15:07	1
13C4 PFOS	128		25 - 150	10/02/18 09:07	10/03/18 15:07	1
13C8 FOSA	113		25 - 150	10/02/18 09:07	10/03/18 15:07	1
d3-NMeFOSAA	141		25 - 150	10/02/18 09:07	10/03/18 15:07	1
d5-NEtFOSAA	148		25 - 150	10/02/18 09:07	10/03/18 15:07	1
M2-6:2 FTS	233 *		25 - 150	10/02/18 09:07	10/03/18 15:07	1
M2-8:2 FTS	190 *		25 - 150	10/02/18 09:07	10/03/18 15:07	1

Client Sample ID: MW-09I

Date Collected: 09/24/18 15:05

Date Received: 09/25/18 19:00

Lab Sample ID: 460-165435-3

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Semi-volatile Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/27/18 08:42	09/27/18 15:27	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	38		10 - 150				09/27/18 08:42	09/27/18 15:27	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	2.09		1.71	0.35	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluoropentanoic acid (PFPeA)	4.43		1.71	0.64	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluorohexanoic acid (PFHxA)	5.04		1.71	0.21	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluoroheptanoic acid (PFHpA)	4.70		1.71	0.27	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluorooctanoic acid (PFOA)	14.8		1.71	0.27	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluorononanoic acid (PFNA)	1.27 J		1.71	0.32	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluorodecanoic acid (PFDA)	1.71 U		1.71	0.32	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluoroundecanoic acid (PFUnA)	1.71 U		1.71	0.21	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluorododecanoic acid (PFDoA)	1.71 U		1.71	0.30	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluorotridecanoic acid (PFTriA)	1.71 U		1.71	0.21	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluorotetradecanoic acid (PFTeA)	1.71 U		1.71	0.38	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluorobutanesulfonic acid (PFBS)	4.39		1.71	0.38	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluorohexanesulfonic acid (PFHxS)	5.30 B		1.71	0.22	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.71 U		1.71	0.70	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluorooctanesulfonic acid (PFOS)	13.6		1.71	0.65	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluorodecanesulfonic acid (PFDS)	1.71 U		1.71	0.45	ng/L		10/02/18 09:07	10/03/18 15:23	1
Perfluorooctanesulfonamide (FOSA)	1.71 U		1.71	0.48	ng/L		10/02/18 09:07	10/03/18 15:23	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.1 U		17.1	0.38	ng/L		10/02/18 09:07	10/03/18 15:23	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.1 U		17.1	0.60	ng/L		10/02/18 09:07	10/03/18 15:23	1
6:2 FTS	17.1 U		17.1	0.85	ng/L		10/02/18 09:07	10/03/18 15:23	1
8:2 FTS	17.1 U		17.1	0.48	ng/L		10/02/18 09:07	10/03/18 15:23	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Bayshore-PFAS-1803556-1.1

TestAmerica Job ID: 460-165435-1

Client Sample ID: MW-091

Date Collected: 09/24/18 15:05

Date Received: 09/25/18 19:00

Lab Sample ID: 460-165435-3

Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	49		25 - 150	10/02/18 09:07	10/03/18 15:23	1
13C5 PFPeA	75		25 - 150	10/02/18 09:07	10/03/18 15:23	1
13C2 PFHxA	98		25 - 150	10/02/18 09:07	10/03/18 15:23	1
13C4 PFHpA	98		25 - 150	10/02/18 09:07	10/03/18 15:23	1
13C4 PFOA	103		25 - 150	10/02/18 09:07	10/03/18 15:23	1
13C5 PFNA	106		25 - 150	10/02/18 09:07	10/03/18 15:23	1
13C2 PFDA	108		25 - 150	10/02/18 09:07	10/03/18 15:23	1
13C2 PFUnA	114		25 - 150	10/02/18 09:07	10/03/18 15:23	1
13C2 PFDoA	98		25 - 150	10/02/18 09:07	10/03/18 15:23	1
13C2 PFTeDA	90		25 - 150	10/02/18 09:07	10/03/18 15:23	1
13C3 PFBS	97		25 - 150	10/02/18 09:07	10/03/18 15:23	1
18O2 PFHxS	113		25 - 150	10/02/18 09:07	10/03/18 15:23	1
13C4 PFOS	120		25 - 150	10/02/18 09:07	10/03/18 15:23	1
13C8 FOSA	100		25 - 150	10/02/18 09:07	10/03/18 15:23	1
d3-NMeFOSAA	120		25 - 150	10/02/18 09:07	10/03/18 15:23	1
d5-NEtFOSAA	139		25 - 150	10/02/18 09:07	10/03/18 15:23	1
M2-6:2 FTS	140		25 - 150	10/02/18 09:07	10/03/18 15:23	1
M2-8:2 FTS	139		25 - 150	10/02/18 09:07	10/03/18 15:23	1

Client Sample ID: OU2-MW-571

Date Collected: 09/24/18 16:05

Date Received: 09/25/18 19:00

Lab Sample ID: 460-165435-4

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Semiquantitative Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/27/18 08:42	09/27/18 15:45	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	40		10 - 150				09/27/18 08:42	09/27/18 15:45	

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	30.9		1.79	0.37	ng/L		10/02/18 09:07	10/03/18 15:39	1
Perfluoropentanoic acid (PFPeA)	8.56		1.79	0.67	ng/L		10/02/18 09:07	10/03/18 15:39	1
Perfluorohexanoic acid (PFHxA)	4.15		1.79	0.21	ng/L		10/02/18 09:07	10/03/18 15:39	1
Perfluoroheptanoic acid (PFHpA)	4.86		1.79	0.29	ng/L		10/02/18 09:07	10/03/18 15:39	1
Perfluorooctanoic acid (PFOA)	15.0		1.79	0.29	ng/L		10/02/18 09:07	10/03/18 15:39	1
Perfluorononanoic acid (PFNA)	1.54 J		1.79	0.34	ng/L		10/02/18 09:07	10/03/18 15:39	1
Perfluorodecanoic acid (PFDA)	0.46 J		1.79	0.34	ng/L		10/02/18 09:07	10/03/18 15:39	1
Perfluoroundecanoic acid (PFUnA)	0.53 J		1.79	0.22	ng/L		10/02/18 09:07	10/03/18 15:39	1
Perfluorododecanoic acid (PFDoA)	1.79 U		1.79	0.31	ng/L		10/02/18 09:07	10/03/18 15:39	1
Perfluorotridecanoic acid (PFTriA)	1.79 U		1.79	0.21	ng/L		10/02/18 09:07	10/03/18 15:39	1
Perfluorotetradecanoic acid (PFTeA)	1.79 U		1.79	0.40	ng/L		10/02/18 09:07	10/03/18 15:39	1
Perfluorobutanesulfonic acid (PFBS)	4.61		1.79	0.39	ng/L		10/02/18 09:07	10/03/18 15:39	1
Perfluorohexanesulfonic acid (PFHxS)	8.17 B		1.79	0.23	ng/L		10/02/18 09:07	10/03/18 15:39	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.79 U		1.79	0.73	ng/L		10/02/18 09:07	10/03/18 15:39	1
Perfluorooctanesulfonic acid (PFOS)	26.2		1.79	0.68	ng/L		10/02/18 09:07	10/03/18 15:39	1
Perfluorodecanesulfonic acid (PFDS)	1.79 U		1.79	0.47	ng/L		10/02/18 09:07	10/03/18 15:39	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Bayshore-PFAS-1803556-1.1

TestAmerica Job ID: 460-165435-1

Client Sample ID: OU2-MW-57I

Date Collected: 09/24/18 16:05

Date Received: 09/25/18 19:00

Lab Sample ID: 460-165435-4

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonamide (FOSA)	1.79	U	1.79	0.50	ng/L		10/02/18 09:07	10/03/18 15:39	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.9	U	17.9	0.40	ng/L		10/02/18 09:07	10/03/18 15:39	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.9	U	17.9	0.63	ng/L		10/02/18 09:07	10/03/18 15:39	1
6:2 FTS	17.9	U	17.9	0.89	ng/L		10/02/18 09:07	10/03/18 15:39	1
8:2 FTS	17.9	U	17.9	0.50	ng/L		10/02/18 09:07	10/03/18 15:39	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	29		25 - 150				10/02/18 09:07	10/03/18 15:39	1
13C5 PFPeA	50		25 - 150				10/02/18 09:07	10/03/18 15:39	1
13C2 PFHxA	78		25 - 150				10/02/18 09:07	10/03/18 15:39	1
13C4 PFHpA	87		25 - 150				10/02/18 09:07	10/03/18 15:39	1
13C4 PFOA	115		25 - 150				10/02/18 09:07	10/03/18 15:39	1
13C5 PFNA	134		25 - 150				10/02/18 09:07	10/03/18 15:39	1
13C2 PFDA	125		25 - 150				10/02/18 09:07	10/03/18 15:39	1
13C2 PFUnA	128		25 - 150				10/02/18 09:07	10/03/18 15:39	1
13C2 PFDoA	103		25 - 150				10/02/18 09:07	10/03/18 15:39	1
13C2 PFTeDA	83		25 - 150				10/02/18 09:07	10/03/18 15:39	1
13C3 PFBS	79		25 - 150				10/02/18 09:07	10/03/18 15:39	1
18O2 PFHxS	104		25 - 150				10/02/18 09:07	10/03/18 15:39	1
13C4 PFOS	118		25 - 150				10/02/18 09:07	10/03/18 15:39	1
13C8 FOSA	105		25 - 150				10/02/18 09:07	10/03/18 15:39	1
d3-NMeFOSAA	152	*	25 - 150				10/02/18 09:07	10/03/18 15:39	1
d5-NEtFOSAA	154	*	25 - 150				10/02/18 09:07	10/03/18 15:39	1
M2-6:2 FTS	258	*	25 - 150				10/02/18 09:07	10/03/18 15:39	1
M2-8:2 FTS	232	*	25 - 150				10/02/18 09:07	10/03/18 15:39	1

Client Sample ID: OU3-MW-11S

Date Collected: 09/24/18 17:20

Date Received: 09/25/18 19:00

Lab Sample ID: 460-165435-5

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/27/18 08:42	09/27/18 16:02	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	35		10 - 150				09/27/18 08:42	09/27/18 16:02	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	23.2	J	1.81	0.37	ng/L		10/02/18 09:07	10/03/18 15:55	1
Perfluoropentanoic acid (PFPeA)	4.30		1.81	0.68	ng/L		10/02/18 09:07	10/03/18 15:55	1
Perfluorohexanoic acid (PFHxA)	7.68		1.81	0.22	ng/L		10/02/18 09:07	10/03/18 15:55	1
Perfluoroheptanoic acid (PFHpA)	4.99		1.81	0.29	ng/L		10/02/18 09:07	10/03/18 15:55	1
Perfluorooctanoic acid (PFOA)	13.2		1.81	0.29	ng/L		10/02/18 09:07	10/03/18 15:55	1
Perfluorononanoic acid (PFNA)	3.11		1.81	0.34	ng/L		10/02/18 09:07	10/03/18 15:55	1
Perfluorodecanoic acid (PFDA)	1.91		1.81	0.34	ng/L		10/02/18 09:07	10/03/18 15:55	1
Perfluoroundecanoic acid (PFUnA)	1.02	J	1.81	0.23	ng/L		10/02/18 09:07	10/03/18 15:55	1
Perfluorododecanoic acid (PFDoA)	1.81	U	1.81	0.32	ng/L		10/02/18 09:07	10/03/18 15:55	1
Perfluorotridecanoic acid (PFTriA)	1.81	U	1.81	0.22	ng/L		10/02/18 09:07	10/03/18 15:55	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Bayshore-PFAS-1803556-1.1

TestAmerica Job ID: 460-165435-1

Client Sample ID: OU3-MW-11S

Date Collected: 09/24/18 17:20

Date Received: 09/25/18 19:00

Lab Sample ID: 460-165435-5

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorotetradecanoic acid (PFTeA)	1.81	U	1.81	0.41	ng/L		10/02/18 09:07	10/03/18 15:55	1
Perfluorobutanesulfonic acid (PFBS)	5.48		1.81	0.40	ng/L		10/02/18 09:07	10/03/18 15:55	1
Perfluorohexanesulfonic acid (PFHxS)	1.67 1.81	JB U	1.81	0.24	ng/L		10/02/18 09:07	10/03/18 15:55	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.81	U	1.81	0.74	ng/L		10/02/18 09:07	10/03/18 15:55	1
Perfluorooctanesulfonic acid (PFOS)	18.7		1.81	0.69	ng/L		10/02/18 09:07	10/03/18 15:55	1
Perfluorodecanesulfonic acid (PFDS)	0.91	J	1.81	0.48	ng/L		10/02/18 09:07	10/03/18 15:55	1
Perfluorooctanesulfonamide (FOSA)	1.81	U	1.81	0.51	ng/L		10/02/18 09:07	10/03/18 15:55	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	18.1	U	18.1	0.41	ng/L		10/02/18 09:07	10/03/18 15:55	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	18.1	U	18.1	0.63	ng/L		10/02/18 09:07	10/03/18 15:55	1
6:2 FTS	1.46	J	18.1	0.90	ng/L		10/02/18 09:07	10/03/18 15:55	1
8:2 FTS	18.1	U	18.1	0.51	ng/L		10/02/18 09:07	10/03/18 15:55	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	19	*	25 - 150	10/02/18 09:07	10/03/18 15:55	1
13C5 PFPeA	43		25 - 150	10/02/18 09:07	10/03/18 15:55	1
13C2 PFHxA	60		25 - 150	10/02/18 09:07	10/03/18 15:55	1
13C4 PFHpA	78		25 - 150	10/02/18 09:07	10/03/18 15:55	1
13C4 PFOA	111		25 - 150	10/02/18 09:07	10/03/18 15:55	1
13C5 PFNA	131		25 - 150	10/02/18 09:07	10/03/18 15:55	1
13C2 PFDA	135		25 - 150	10/02/18 09:07	10/03/18 15:55	1
13C2 PFUnA	154	*	25 - 150	10/02/18 09:07	10/03/18 15:55	1
13C2 PFDoA	128		25 - 150	10/02/18 09:07	10/03/18 15:55	1
13C2 PFTeDA	107		25 - 150	10/02/18 09:07	10/03/18 15:55	1
13C3 PFBS	64		25 - 150	10/02/18 09:07	10/03/18 15:55	1
18O2 PFHxS	106		25 - 150	10/02/18 09:07	10/03/18 15:55	1
13C4 PFOS	144		25 - 150	10/02/18 09:07	10/03/18 15:55	1
13C8 FOSA	111		25 - 150	10/02/18 09:07	10/03/18 15:55	1
d3-NMeFOSAA	163	*	25 - 150	10/02/18 09:07	10/03/18 15:55	1
d5-NEtFOSAA	181	*	25 - 150	10/02/18 09:07	10/03/18 15:55	1
M2-6:2 FTS	319	*	25 - 150	10/02/18 09:07	10/03/18 15:55	1
M2-8:2 FTS	298	*	25 - 150	10/02/18 09:07	10/03/18 15:55	1

Client Sample ID: MW-XX-092418

Date Collected: 09/24/18 14:00

Date Received: 09/25/18 19:00

Lab Sample ID: 460-165435-6

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

ANALYST: 02105 SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/27/18 08:42	09/27/18 16:19	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	38		10 - 150				09/27/18 08:42	09/27/18 16:19	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	12.8	J	1.96	0.40	ng/L		10/02/18 09:07	10/03/18 16:26	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Bayshore-PFAS-1803556-1.1

TestAmerica Job ID: 460-165435-1

Client Sample ID: MW-XX-092418

Date Collected: 09/24/18 14:00

Date Received: 09/25/18 19:00

Lab Sample ID: 460-165435-6

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanoic acid (PFPeA)	4.23		1.96	0.73	ng/L		10/02/18 09:07	10/03/18 16:26	1
Perfluorohexanoic acid (PFHxA)	3.36		1.96	0.23	ng/L		10/02/18 09:07	10/03/18 16:26	1
Perfluoroheptanoic acid (PFHpA)	4.00		1.96	0.31	ng/L		10/02/18 09:07	10/03/18 16:26	1
Perfluorooctanoic acid (PFOA)	18.7		1.96	0.31	ng/L		10/02/18 09:07	10/03/18 16:26	1
Perfluorononanoic acid (PFNA)	1.46 J		1.96	0.37	ng/L		10/02/18 09:07	10/03/18 16:26	1
Perfluorodecanoic acid (PFDA)	1.96 U		1.96	0.37	ng/L		10/02/18 09:07	10/03/18 16:26	1
Perfluoroundecanoic acid (PFUnA)	1.96 U		1.96	0.24	ng/L		10/02/18 09:07	10/03/18 16:26	1
Perfluorododecanoic acid (PFDoA)	1.96 U		1.96	0.34	ng/L		10/02/18 09:07	10/03/18 16:26	1
Perfluorotridecanoic acid (PFTriA)	1.96 U		1.96	0.23	ng/L		10/02/18 09:07	10/03/18 16:26	1
Perfluorotetradecanoic acid (PFTeA)	1.96 U		1.96	0.44	ng/L		10/02/18 09:07	10/03/18 16:26	1
Perfluorobutanesulfonic acid (PFBS)	2.22		1.96	0.43	ng/L		10/02/18 09:07	10/03/18 16:26	1
Perfluorohexanesulfonic acid (PFHxS)	1.26 J 1.96 U		1.96	0.25	ng/L		10/02/18 09:07	10/03/18 16:26	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.96 U		1.96	0.80	ng/L		10/02/18 09:07	10/03/18 16:26	1
Perfluorooctanesulfonic acid (PFOS)	6.44		1.96	0.74	ng/L		10/02/18 09:07	10/03/18 16:26	1
Perfluorodecanesulfonic acid (PFDS)	1.96 U		1.96	0.52	ng/L		10/02/18 09:07	10/03/18 16:26	1
Perfluorooctanesulfonamide (FOSA)	1.96 U		1.96	0.55	ng/L		10/02/18 09:07	10/03/18 16:26	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	19.6 U		19.6	0.44	ng/L		10/02/18 09:07	10/03/18 16:26	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	19.6 U		19.6	0.68	ng/L		10/02/18 09:07	10/03/18 16:26	1
6:2 FTS	1.98 J		19.6	0.98	ng/L		10/02/18 09:07	10/03/18 16:26	1
8:2 FTS	19.6 U		19.6	0.55	ng/L		10/02/18 09:07	10/03/18 16:26	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	24		25 - 150				10/02/18 09:07	10/03/18 16:26	1
13C5 PFPeA	40		25 - 150				10/02/18 09:07	10/03/18 16:26	1
13C2 PFHxA	73		25 - 150				10/02/18 09:07	10/03/18 16:26	1
13C4 PFHpA	84		25 - 150				10/02/18 09:07	10/03/18 16:26	1
13C4 PFOA	105		25 - 150				10/02/18 09:07	10/03/18 16:26	1
13C5 PFNA	125		25 - 150				10/02/18 09:07	10/03/18 16:26	1
13C2 PFDA	118		25 - 150				10/02/18 09:07	10/03/18 16:26	1
13C2 PFUnA	127		25 - 150				10/02/18 09:07	10/03/18 16:26	1
13C2 PFDoA	114		25 - 150				10/02/18 09:07	10/03/18 16:26	1
13C2 PFTeA	102		25 - 150				10/02/18 09:07	10/03/18 16:26	1
13C3 PFBS	58		25 - 150				10/02/18 09:07	10/03/18 16:26	1
18O2 PFHxS	108		25 - 150				10/02/18 09:07	10/03/18 16:26	1
13C4 PFOS	131		25 - 150				10/02/18 09:07	10/03/18 16:26	1
13C8 FOSA	110		25 - 150				10/02/18 09:07	10/03/18 16:26	1
d3-NMeFOSAA	149		25 - 150				10/02/18 09:07	10/03/18 16:26	1
d5-NEtFOSAA	149		25 - 150				10/02/18 09:07	10/03/18 16:26	1
M2-6:2 FTS	220	*	25 - 150				10/02/18 09:07	10/03/18 16:26	1
M2-8:2 FTS	189	*	25 - 150				10/02/18 09:07	10/03/18 16:26	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Bayshore-PFAS-1803556-1.1

TestAmerica Job ID: 460-165435-1

Client Sample ID: Fieldblank-092418

Date Collected: 09/24/18 15:50

Date Received: 09/25/18 19:00

Lab Sample ID: 460-165435-7

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/27/18 08:42	09/27/18 16:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	39		10 - 150				09/27/18 08:42	09/27/18 16:37	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	2.04	U	2.04	0.42	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluoropentanoic acid (PFPeA)	2.04	U	2.04	0.76	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluorohexanoic acid (PFHxA)	2.04	U	2.04	0.24	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluoroheptanoic acid (PFHpA)	2.04	U	2.04	0.33	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluorooctanoic acid (PFOA)	2.04	U	2.04	0.33	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluorononanoic acid (PFNA)	2.04	U	2.04	0.39	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluorodecanoic acid (PFDA)	2.04	U	2.04	0.39	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluoroundecanoic acid (PFUnA)	2.04	U	2.04	0.25	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluorododecanoic acid (PFDoA)	2.04	U	2.04	0.36	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluorotridecanoic acid (PFTriA)	2.04	U	2.04	0.24	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluorotetradecanoic acid (PFTeA)	2.04	U	2.04	0.46	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluorobutanesulfonic acid (PFBS)	2.04	U	2.04	0.45	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluorohexanesulfonic acid (PFHxS)	2.04	U	2.04	0.26	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluoroheptanesulfonic Acid (PFHpS)	2.04	U	2.04	0.84	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluorooctanesulfonic acid (PFOS)	2.04	U	2.04	0.77	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluorodecanesulfonic acid (PFDS)	2.04	U	2.04	0.54	ng/L		10/02/18 09:07	10/03/18 16:42	1
Perfluorooctanesulfonamide (FOSA)	2.04	U	2.04	0.57	ng/L		10/02/18 09:07	10/03/18 16:42	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	20.4	U	20.4	0.46	ng/L		10/02/18 09:07	10/03/18 16:42	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	20.4	U	20.4	0.71	ng/L		10/02/18 09:07	10/03/18 16:42	1
6:2 FTS	20.4	U	20.4	1.02	ng/L		10/02/18 09:07	10/03/18 16:42	1
8:2 FTS	20.4	U	20.4	0.57	ng/L		10/02/18 09:07	10/03/18 16:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	50		25 - 150				10/02/18 09:07	10/03/18 16:42	1
13C5 PFPeA	96		25 - 150				10/02/18 09:07	10/03/18 16:42	1
13C2 PFHxA	118		25 - 150				10/02/18 09:07	10/03/18 16:42	1
13C4 PFHpA	101		25 - 150				10/02/18 09:07	10/03/18 16:42	1
13C4 PFOA	107		25 - 150				10/02/18 09:07	10/03/18 16:42	1
13C5 PFNA	109		25 - 150				10/02/18 09:07	10/03/18 16:42	1
13C2 PFDA	111		25 - 150				10/02/18 09:07	10/03/18 16:42	1
13C2 PFUnA	119		25 - 150				10/02/18 09:07	10/03/18 16:42	1
13C2 PFDoA	94		25 - 150				10/02/18 09:07	10/03/18 16:42	1
13C2 PFTeDA	85		25 - 150				10/02/18 09:07	10/03/18 16:42	1
13C3 PFBS	96		25 - 150				10/02/18 09:07	10/03/18 16:42	1
18O2 PFHxS	113		25 - 150				10/02/18 09:07	10/03/18 16:42	1
13C4 PFOS	117		25 - 150				10/02/18 09:07	10/03/18 16:42	1
13C8 FOSA	90		25 - 150				10/02/18 09:07	10/03/18 16:42	1
d3-NMeFOSAA	140		25 - 150				10/02/18 09:07	10/03/18 16:42	1
d5-NEtFOSAA	135		25 - 150				10/02/18 09:07	10/03/18 16:42	1
M2-6:2 FTS	101		25 - 150				10/02/18 09:07	10/03/18 16:42	1
M2-8:2 FTS	124		25 - 150				10/02/18 09:07	10/03/18 16:42	1

TestAmerica Edison

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

CHAIN OF CUSTODY / ANALYSIS REQUEST

NYSC
460501

777 New Durham Road
Edison, New Jersey 08817
Phone: (732) 549-3900 Fax: (732) 549-3679

Page 1 of 1

10/15/2018

Name (for report and invoice) <u>Melissa Felter</u>		Samplers Name (Printed) <u>Craig Hayes / Machine</u>		Site/Project Identification <u>Emerging contaminants - Long Island / NYC</u>	
Company <u>GEI Consultants, Inc.</u>		P. O. # <u>1803556-1.1</u>		State (Location of site): NJ: ☐ NY: ☒ Other: ☐	
Address <u>455 Winding Brook Dr.</u>		Analysis Turnaround Time Standard ☒ Rush Charges Authorized For: 2 Week ☐ 1 Week ☐ Other ☐		Regulatory Program: ☐ DKQP: ☐	
City <u>Glassonbury</u> State <u>CT</u>		Phone <u>860 368 5300</u> Fax <u>860 808 9717</u>		LAB USE ONLY Project No: Job No: <u>165435</u> Sample Numbers	
Sample Identification	Date	Time	Matrix	No. of Cont.	
BB-MW-41I*	9/24/18	1205	GW	12	X X
mw-29s	9/24/18	1425	GW	4	X X
mw-09i	9/24/18	1505	GW	4	X X
0u2-mw-57+	9/24/18	1605	GW	4	X X
0u3-mw-11s	9/24/18	1720	GW	4	X X
mw-xv-092418	9/24/18	1400	GW	4	X X
Fredbank-092418	9/24/18	1550	GW	4	X X
Preservation Used: 1 = ICE, 2 = HCl, 3 = H ₂ SO ₄ , 4 = HNO ₃ , 5 = NaOH 6 = Other _____, 7 = Other _____					
Soil: _____ Water: _____					

**SUB
Work**



460-165435 Chain of Custody

Special Instructions perform ms/msp on BB-mw-41I
Edison lab-log in both tests into one login and ship PPHS

Relinquished by <u>Mike Quinn</u>	Company <u>GEI</u>	Date / Time <u>9/25/18 12:10</u>	Received by <u>[Signature]</u>	Company <u>J. A</u>
Relinquished by <u>[Signature]</u>	Company <u>J. A</u>	Date / Time <u>9/25/18 19:00</u>	Received by <u>[Signature]</u>	Company <u>TAEdi</u>
Relinquished by	Company	Date / Time	Received by	Company
Relinquished by	Company	Date / Time	Received by	Company

Laboratory Certifications: New Jersey (12028), New York (11452), Pennsylvania (68-522), Connecticut (PH-0200), Rhode Island (132).

Massachusetts (M-NJ312), North Carolina (No. 578)

TAL - 0016 (0715)

3. 413-7 3. 7 13.7 IN# 9

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Site: Long Island Emerging Contaminants, Clifton
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-166243
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 6, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
RW-210I	460-166243-01	PFAS, 1,4-Dioxane
RW-202S	460-166243-02	PFAS, 1,4-Dioxane
RW-23S	460-166243-03	PFAS, 1,4-Dioxane
DUP-100218	460-166243-04	PFAS, 1,4-Dioxane
FB-100218	460-166243-05	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: FB-100218
Field Duplicate pair: RW-202S/DUP-100218

The above-listed aqueous samples and field blank sample were collected on October 2, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-Dioxane by 1,4-dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatiles Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

Analytes were not detected in the associated laboratory method blank samples and field blank sample.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
RW-210I	M2-6:2 FTS	255	25-150	Validation action was not required as 6:2 FTS was not detected in this sample and therefore not affected by the high recoveries.
RW-202S	M2-6:2 FTS	428	25-150	Validation action was not required as 6:2 FTS, 8:2 FTS, Perfluorodecanoic acid (PFDoA), and Perfluorotetradecanoic acid (PFTeA) were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	212		
	13C2 PFDoA	165		
	13C2 PFTeDA	156		
RW-23	M2-6:2 FTS	260	25-150	Validation action was not required as 6:2 FTS and 8:2 FTS were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	155		
DUP-100218	M2-6:2 FTS	231	25-150	Validation action was not required as 6:2 FTS and 8:2 FTS were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	194		
FB-100218	13C5-PFPeA	152	25-150	Validation action was not required as Perfluoropentanoic acid (PFPeA) and 6:2 FTS were not detected in this sample and therefore not affected by the high recoveries.
	M2-6:2 FTS	258		

It should be noted that IDA recoveries outside of control limits generally have a minimal effect on

the data quality as the results are quantitated by isotope dilution and are corrected accordingly. However, professional judgment was taken to qualify affected compound results for associated isotope dilution analytes recovered outside of the recommended control limits.

MS/MSD Results

MS/MSD analyses were performed on sample RW-23 for 1,4-dioxane and PFAS. Recovery and precision criteria were met.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples RW-202S and DUP-100218 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria.

Analyte	RW-202S (ug/L)	DUP-100218 (ug/L)	RPD (%)
Perfluorobutanoic acid (PFBA)	31.3	28.8	8.3
Perfluoropentanoic (PFPeA)	7.59	8.16	7.2
Perfluorohexanoic acid (PFHxA)	1.68 U	0.54 J	NC, Within the RL
Perfluoroheptanoic acid (PFHpA)	1.68 U	0.43 J	NC, Within the RL
Perfluorooctanoic acid (PFOA)	1.58 J	2.40	41.2, Within the RL
Perfluoroundecanoic acid (PFUnA)	1.68 U	0.27 J	NC, Within the RL
Perfluorobutanesulfonic acid (PFBS)	1.68 U	1.43 J	NC, Within the RL
NC – Not calculable			
Criteria: When both results are ≥ 5 x the RL, RPDs must be $< 30\%$.			
When results are < 5 x the QL, the absolute difference between the original and field duplicate results must be $< \text{RL}$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

Dilutions were not required.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DRAFT

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Clifton-PFAS-1803556-1.14

TestAmerica Job ID: 460-166243-1

Client Sample ID: RW-210I

Date Collected: 10/02/18 15:40

Date Received: 10/03/18 18:40

Lab Sample ID: 460-166243-1

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/08/18 18:48	10/09/18 07:23	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	45		10 - 150				10/08/18 18:48	10/09/18 07:23	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.77	U	1.77	0.36	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluoropentanoic acid (PFPeA)	1.77	U	1.77	0.66	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluorohexanoic acid (PFHxA)	1.77	U	1.77	0.21	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluoroheptanoic acid (PFHpA)	1.77	U	1.77	0.28	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluorooctanoic acid (PFOA)	1.77	U	1.77	0.28	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluorononanoic acid (PFNA)	1.77	U	1.77	0.34	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluorodecanoic acid (PFDA)	1.77	U	1.77	0.34	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluoroundecanoic acid (PFUnA)	0.23	J	1.77	0.22	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluorododecanoic acid (PFDoA)	1.77	U	1.77	0.31	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluorotridecanoic acid (PFTriA)	1.77	U	1.77	0.21	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluorotetradecanoic acid (PFTeA)	1.77	U	1.77	0.40	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluorobutanesulfonic acid (PFBS)	0.39	J	1.77	0.39	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluorohexanesulfonic acid (PFHxS)	1.77	U	1.77	0.23	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.77	U	1.77	0.72	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluorooctanesulfonic acid (PFOS)	1.77	U	1.77	0.67	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluorodecanesulfonic acid (PFDS)	1.77	U	1.77	0.47	ng/L		10/11/18 09:45	10/17/18 18:06	1
Perfluorooctanesulfonamide (FOSA)	1.77	U	1.77	0.50	ng/L		10/11/18 09:45	10/17/18 18:06	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.7	U	17.7	0.40	ng/L		10/11/18 09:45	10/17/18 18:06	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.7	U	17.7	0.62	ng/L		10/11/18 09:45	10/17/18 18:06	1
6:2 FTS	17.7	U	17.7	0.88	ng/L		10/11/18 09:45	10/17/18 18:06	1
8:2 FTS	17.7	U	17.7	0.50	ng/L		10/11/18 09:45	10/17/18 18:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	73		25 - 150				10/11/18 09:45	10/17/18 18:06	1
13C5-PFPeA DNU	105		25 - 150				10/11/18 09:45	10/17/18 18:06	1
13C2 PFHxA	97		25 - 150				10/11/18 09:45	10/17/18 18:06	1
13C4 PFHpA	101		25 - 150				10/11/18 09:45	10/17/18 18:06	1
13C4 PFOA	102		25 - 150				10/11/18 09:45	10/17/18 18:06	1
13C5 PFNA	117		25 - 150				10/11/18 09:45	10/17/18 18:06	1
13C2 PFDA	106		25 - 150				10/11/18 09:45	10/17/18 18:06	1
13C2 PFUnA	107		25 - 150				10/11/18 09:45	10/17/18 18:06	1
13C2 PFDoA	96		25 - 150				10/11/18 09:45	10/17/18 18:06	1
13C2 PFTeA	104		25 - 150				10/11/18 09:45	10/17/18 18:06	1
13C3 PFBS	97		25 - 150				10/11/18 09:45	10/17/18 18:06	1
18O2 PFHxS	99		25 - 150				10/11/18 09:45	10/17/18 18:06	1
13C4 PFOS	99		25 - 150				10/11/18 09:45	10/17/18 18:06	1
13C8 FOSA	72		25 - 150				10/11/18 09:45	10/17/18 18:06	1
d3-NMeFOSAA	80		25 - 150				10/11/18 09:45	10/17/18 18:06	1
d5-NEtFOSAA	96		25 - 150				10/11/18 09:45	10/17/18 18:06	1
M2-6:2 FTS	255 *		25 - 150				10/11/18 09:45	10/17/18 18:06	1

TestAmerica Edison

Am
11/5/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Clifton-PFAS-1803556-1.14

TestAmerica Job ID: 460-166243-1

Client Sample ID: RW-210I

Date Collected: 10/02/18 15:40

Date Received: 10/03/18 18:40

Lab Sample ID: 460-166243-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-8:2 FTS	143		25 - 150	10/11/18 09:45	10/17/18 18:06	1

Client Sample ID: RW-202S

Date Collected: 10/02/18 13:00

Date Received: 10/03/18 18:40

Lab Sample ID: 460-166243-2

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

1,4-Dioxane (GC/MS-TOF, Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/08/18 18:48	10/09/18 07:40	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	48		10 - 150				10/08/18 18:48	10/09/18 07:40	

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	31.3		1.68	0.34	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluoropentanoic acid (PFPeA)	7.59		1.68	0.63	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluorohexanoic acid (PFHxA)	1.68	U	1.68	0.20	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluoroheptanoic acid (PFHpA)	1.68	U	1.68	0.27	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluorooctanoic acid (PFOA)	1.58	J	1.68	0.27	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluorononanoic acid (PFNA)	1.68	U	1.68	0.32	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluorodecanoic acid (PFDA)	1.68	U	1.68	0.32	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluoroundecanoic acid (PFUnA)	1.68	U	1.68	0.21	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluorododecanoic acid (PFDoA)	1.68	U	1.68	0.29	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluorotridecanoic acid (PFTriA)	1.68	U	1.68	0.20	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluorotetradecanoic acid (PFTeA)	1.68	U	1.68	0.38	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluorobutanesulfonic acid (PFBS)	1.68	U	1.68	0.37	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluorohexanesulfonic acid (PFHxS)	1.68	U	1.68	0.22	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.68	U	1.68	0.69	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluorooctanesulfonic acid (PFOS)	1.68	U	1.68	0.64	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluorodecanesulfonic acid (PFDS)	1.68	U	1.68	0.44	ng/L		10/11/18 09:45	10/16/18 05:58	1
Perfluorooctanesulfonamide (FOSA)	1.68	U	1.68	0.47	ng/L		10/11/18 09:45	10/16/18 05:58	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.8	U	16.8	0.38	ng/L		10/11/18 09:45	10/16/18 05:58	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.8	U	16.8	0.59	ng/L		10/11/18 09:45	10/16/18 05:58	1
6:2 FTS	16.8	U	16.8	0.84	ng/L		10/11/18 09:45	10/16/18 05:58	1
8:2 FTS	16.8	U	16.8	0.47	ng/L		10/11/18 09:45	10/16/18 05:58	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	27		25 - 150				10/11/18 09:45	10/16/18 05:58	1
13C5-PFPeA DNU	68		25 - 150				10/11/18 09:45	10/16/18 05:58	1
13C2 PFHxA	77		25 - 150				10/11/18 09:45	10/16/18 05:58	1
13C4 PFHpA	89		25 - 150				10/11/18 09:45	10/16/18 05:58	1
13C4 PFOA	105		25 - 150				10/11/18 09:45	10/16/18 05:58	1
13C5 PFNA	141		25 - 150				10/11/18 09:45	10/16/18 05:58	1
13C2 PFDA	141		25 - 150				10/11/18 09:45	10/16/18 05:58	1
13C2 PFUnA	146		25 - 150				10/11/18 09:45	10/16/18 05:58	1
13C2 PFDoA	165 *		25 - 150				10/11/18 09:45	10/16/18 05:58	1
13C2 PFTeDA	156 *		25 - 150				10/11/18 09:45	10/16/18 05:58	1
13C3 PFBS	89		25 - 150				10/11/18 09:45	10/16/18 05:58	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Clifton-PFAS-1803556-1.14

TestAmerica Job ID: 460-166243-1

Client Sample ID: RW-202S

Date Collected: 10/02/18 13:00

Date Received: 10/03/18 18:40

Lab Sample ID: 460-166243-2

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	108		25 - 150	10/11/18 09:45	10/16/18 05:58	1
13C4 PFOS	133		25 - 150	10/11/18 09:45	10/16/18 05:58	1
13C8 FOSA	99		25 - 150	10/11/18 09:45	10/16/18 05:58	1
d3-NMeFOSAA	125		25 - 150	10/11/18 09:45	10/16/18 05:58	1
d5-NEtFOSAA	132		25 - 150	10/11/18 09:45	10/16/18 05:58	1
M2-6:2 FTS	428 *		25 - 150	10/11/18 09:45	10/16/18 05:58	1
M2-8:2 FTS	212 *		25 - 150	10/11/18 09:45	10/16/18 05:58	1

Client Sample ID: RW-23

Date Collected: 10/02/18 09:40

Date Received: 10/03/18 18:40

Lab Sample ID: 460-166243-3

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

1,4-Dioxane-d8 Isotope Dilution									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/08/18 18:48	10/09/18 07:58	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	46		10 - 150				10/08/18 18:48	10/09/18 07:58	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	15.3		1.75	0.36	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluoropentanoic acid (PFPeA)	19.0		1.75	0.66	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluorohexanoic acid (PFHxA)	16.5		1.75	0.21	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluoroheptanoic acid (PFHpA)	17.3		1.75	0.28	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluorooctanoic acid (PFOA)	95.7		1.75	0.28	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluorononanoic acid (PFNA)	4.32		1.75	0.33	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluorodecanoic acid (PFDA)	2.06		1.75	0.33	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluoroundecanoic acid (PFUnA)	0.27 J		1.75	0.22	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluorododecanoic acid (PFDoA)	1.75 U		1.75	0.31	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluorotridecanoic acid (PFTriA)	1.75 U		1.75	0.21	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluorotetradecanoic acid (PFTeA)	1.75 U		1.75	0.39	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluorobutanesulfonic acid (PFBS)	14.3		1.75	0.39	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluorohexanesulfonic acid (PFHxS)	2.38		1.75	0.23	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.75 U		1.75	0.72	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluorooctanesulfonic acid (PFOS)	21.3		1.75	0.67	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluorodecanesulfonic acid (PFDS)	1.75 U		1.75	0.46	ng/L		10/11/18 09:45	10/17/18 18:22	1
Perfluorooctanesulfonamide (FOSA)	1.75 U		1.75	0.49	ng/L		10/11/18 09:45	10/17/18 18:22	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.5 U		17.5	0.39	ng/L		10/11/18 09:45	10/17/18 18:22	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.5 U		17.5	0.61	ng/L		10/11/18 09:45	10/17/18 18:22	1
6:2 FTS	17.5 U		17.5	0.88	ng/L		10/11/18 09:45	10/17/18 18:22	1
8:2 FTS	17.5 U		17.5	0.49	ng/L		10/11/18 09:45	10/17/18 18:22	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	36		25 - 150				10/11/18 09:45	10/17/18 18:22	1
13C5-PFPeA DNU	58		25 - 150				10/11/18 09:45	10/17/18 18:22	1

TestAmerica Edison

10/18/2018

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Clifton-PFAS-1803556-1.14

TestAmerica Job ID: 460-166243-1

Client Sample ID: RW-23

Date Collected: 10/02/18 09:40

Date Received: 10/03/18 18:40

Lab Sample ID: 460-166243-3

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	68		25 - 150	10/11/18 09:45	10/17/18 18:22	1
13C4 PFHpA	91		25 - 150	10/11/18 09:45	10/17/18 18:22	1
13C4 PFOA	105		25 - 150	10/11/18 09:45	10/17/18 18:22	1
13C5 PFNA	119		25 - 150	10/11/18 09:45	10/17/18 18:22	1
13C2 PFDA	116		25 - 150	10/11/18 09:45	10/17/18 18:22	1
13C2 PFUnA	119		25 - 150	10/11/18 09:45	10/17/18 18:22	1
13C2 PFDoA	118		25 - 150	10/11/18 09:45	10/17/18 18:22	1
13C2 PFTeDA	123		25 - 150	10/11/18 09:45	10/17/18 18:22	1
13C3 PFBS	76		25 - 150	10/11/18 09:45	10/17/18 18:22	1
18O2 PFHxS	104		25 - 150	10/11/18 09:45	10/17/18 18:22	1
13C4 PFOS	111		25 - 150	10/11/18 09:45	10/17/18 18:22	1
13C8 FOSA	73		25 - 150	10/11/18 09:45	10/17/18 18:22	1
d3-NMeFOSAA	96		25 - 150	10/11/18 09:45	10/17/18 18:22	1
d5-NEtFOSAA	107		25 - 150	10/11/18 09:45	10/17/18 18:22	1
M2-6:2 FTS	260 *		25 - 150	10/11/18 09:45	10/17/18 18:22	1
M2-8:2 FTS	155 *		25 - 150	10/11/18 09:45	10/17/18 18:22	1

Client Sample ID: DUP-100218

Date Collected: 10/02/18 00:00

Date Received: 10/03/18 18:40

Lab Sample ID: 460-166243-4

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/08/18 18:48	10/09/18 08:15	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	48		10 - 150				10/08/18 18:48	10/09/18 08:15	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	28.8		1.78	0.36	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluoropentanoic acid (PFPeA)	8.16		1.78	0.67	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluorohexanoic acid (PFHxA)	0.54 J		1.78	0.21	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluoroheptanoic acid (PFHpA)	0.43 J		1.78	0.28	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluorooctanoic acid (PFOA)	2.40		1.78	0.28	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluorononanoic acid (PFNA)	1.78 U		1.78	0.34	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluorodecanoic acid (PFDA)	1.78 U		1.78	0.34	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluoroundecanoic acid (PFUnA)	0.27 J		1.78	0.22	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluorododecanoic acid (PFDoA)	1.78 U		1.78	0.31	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluorotridecanoic acid (PFTriA)	1.78 U		1.78	0.21	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluorotetradecanoic acid (PFTeA)	1.78 U		1.78	0.40	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluorobutanesulfonic acid (PFBS)	1.43 J		1.78	0.39	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluorohexanesulfonic acid (PFHxS)	1.78 U		1.78	0.23	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.78 U		1.78	0.73	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluorooctanesulfonic acid (PFOS)	1.78 U		1.78	0.68	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluorodecanesulfonic acid (PFDS)	1.78 U		1.78	0.47	ng/L		10/11/18 09:45	10/17/18 19:10	1
Perfluorooctanesulfonamide (FOSA)	1.78 U		1.78	0.50	ng/L		10/11/18 09:45	10/17/18 19:10	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.8 U		17.8	0.40	ng/L		10/11/18 09:45	10/17/18 19:10	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Clifton-PFAS-1803556-1.14

TestAmerica Job ID: 460-166243-1

Client Sample ID: DUP-100218

Lab Sample ID: 460-166243-4

Date Collected: 10/02/18 00:00

Matrix: Water

Date Received: 10/03/18 18:40

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctanesulfonamidoacetic acid (NETFOSAA)	17.8	U	17.8	0.62	ng/L		10/11/18 09:45	10/17/18 19:10	1
6:2 FTS	17.8	U	17.8	0.89	ng/L		10/11/18 09:45	10/17/18 19:10	1
8:2 FTS	17.8	U	17.8	0.50	ng/L		10/11/18 09:45	10/17/18 19:10	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	31		25 - 150				10/11/18 09:45	10/17/18 19:10	1
13C5-PFPeA DNU	49		25 - 150				10/11/18 09:45	10/17/18 19:10	1
13C2 PFHxA	62		25 - 150				10/11/18 09:45	10/17/18 19:10	1
13C4 PFHpA	85		25 - 150				10/11/18 09:45	10/17/18 19:10	1
13C4 PFOA	103		25 - 150				10/11/18 09:45	10/17/18 19:10	1
13C5 PFNA	125		25 - 150				10/11/18 09:45	10/17/18 19:10	1
13C2 PFDA	124		25 - 150				10/11/18 09:45	10/17/18 19:10	1
13C2 PFUnA	136		25 - 150				10/11/18 09:45	10/17/18 19:10	1
13C2 PFDoA	142		25 - 150				10/11/18 09:45	10/17/18 19:10	1
13C2 PFTeDA	143		25 - 150				10/11/18 09:45	10/17/18 19:10	1
13C3 PFBS	75		25 - 150				10/11/18 09:45	10/17/18 19:10	1
18O2 PFHxS	100		25 - 150				10/11/18 09:45	10/17/18 19:10	1
13C4 PFOS	114		25 - 150				10/11/18 09:45	10/17/18 19:10	1
13C8 FOSA	93		25 - 150				10/11/18 09:45	10/17/18 19:10	1
d3-NMeFOSAA	110		25 - 150				10/11/18 09:45	10/17/18 19:10	1
d5-NetFOSAA	126		25 - 150				10/11/18 09:45	10/17/18 19:10	1
M2-6:2 FTS	231	*	25 - 150				10/11/18 09:45	10/17/18 19:10	1
M2-8:2 FTS	194	*	25 - 150				10/11/18 09:45	10/17/18 19:10	1

Client Sample ID: FB-100218

Lab Sample ID: 460-166243-5

Date Collected: 10/02/18 09:50

Matrix: Water

Date Received: 10/03/18 18:40

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/08/18 18:48	10/09/18 08:32	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	45		10 - 150				10/08/18 18:48	10/09/18 08:32	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.70	U	1.70	0.35	ng/L		10/11/18 09:45	10/16/18 05:42	1
Perfluoropentanoic acid (PFPeA)	1.70	U	1.70	0.64	ng/L		10/11/18 09:45	10/16/18 05:42	1
Perfluorohexanoic acid (PFHxA)	1.70	U	1.70	0.20	ng/L		10/11/18 09:45	10/16/18 05:42	1
Perfluoroheptanoic acid (PFHpA)	1.70	U	1.70	0.27	ng/L		10/11/18 09:45	10/16/18 05:42	1
Perfluorooctanoic acid (PFOA)	1.70	U	1.70	0.27	ng/L		10/11/18 09:45	10/16/18 05:42	1
Perfluorononanoic acid (PFNA)	1.70	U	1.70	0.32	ng/L		10/11/18 09:45	10/16/18 05:42	1
Perfluorodecanoic acid (PFDA)	1.70	U	1.70	0.32	ng/L		10/11/18 09:45	10/16/18 05:42	1
Perfluoroundecanoic acid (PFUnA)	1.70	U	1.70	0.21	ng/L		10/11/18 09:45	10/16/18 05:42	1
Perfluorododecanoic acid (PFDoA)	1.70	U	1.70	0.30	ng/L		10/11/18 09:45	10/16/18 05:42	1
Perfluorotridecanoic acid (PFTriA)	1.70	U	1.70	0.20	ng/L		10/11/18 09:45	10/16/18 05:42	1
Perfluorotetradecanoic acid (PFTeA)	1.70	U	1.70	0.38	ng/L		10/11/18 09:45	10/16/18 05:42	1
Perfluorobutanesulfonic acid (PFBS)	1.70	U	1.70	0.37	ng/L		10/11/18 09:45	10/16/18 05:42	1
Perfluorohexanesulfonic acid (PFHxS)	1.70	U	1.70	0.22	ng/L		10/11/18 09:45	10/16/18 05:42	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Clifton-PFAS-1803556-1.14

TestAmerica Job ID: 460-166243-1

Client Sample ID: FB-100218

Lab Sample ID: 460-166243-5

Date Collected: 10/02/18 09:50

Matrix: Water

Date Received: 10/03/18 18:40

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanesulfonic Acid (PFHpS)	1.70	U	1.70	0.70	ng/L		10/11/18 09:45	10/16/18 05:42	1
Perfluorooctanesulfonic acid (PFOS)	1.70	U	1.70	0.64	ng/L		10/11/18 09:45	10/16/18 05:42	1
Perfluorodecanesulfonic acid (PFDS)	1.70	U	1.70	0.45	ng/L		10/11/18 09:45	10/16/18 05:42	1
Perfluorooctanesulfonamide (FOSA)	1.70	U	1.70	0.47	ng/L		10/11/18 09:45	10/16/18 05:42	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.0	U	17.0	0.38	ng/L		10/11/18 09:45	10/16/18 05:42	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.0	U	17.0	0.59	ng/L		10/11/18 09:45	10/16/18 05:42	1
6:2 FTS	17.0	U	17.0	0.85	ng/L		10/11/18 09:45	10/16/18 05:42	1
8:2 FTS	17.0	U	17.0	0.47	ng/L		10/11/18 09:45	10/16/18 05:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	95		25 - 150				10/11/18 09:45	10/16/18 05:42	1
13C5-PFPeA DNU	152 *		25 - 150				10/11/18 09:45	10/16/18 05:42	1
13C2 PFHxA	127		25 - 150				10/11/18 09:45	10/16/18 05:42	1
13C4 PFHpA	100		25 - 150				10/11/18 09:45	10/16/18 05:42	1
13C4 PFOA	107		25 - 150				10/11/18 09:45	10/16/18 05:42	1
13C5 PFNA	118		25 - 150				10/11/18 09:45	10/16/18 05:42	1
13C2 PFDA	109		25 - 150				10/11/18 09:45	10/16/18 05:42	1
13C2 PFUnA	105		25 - 150				10/11/18 09:45	10/16/18 05:42	1
13C2 PFDoA	106		25 - 150				10/11/18 09:45	10/16/18 05:42	1
13C2 PFTeDA	102		25 - 150				10/11/18 09:45	10/16/18 05:42	1
13C3 PFBS	124		25 - 150				10/11/18 09:45	10/16/18 05:42	1
18O2 PFHxS	102		25 - 150				10/11/18 09:45	10/16/18 05:42	1
13C4 PFOS	120		25 - 150				10/11/18 09:45	10/16/18 05:42	1
13C8 FOSA	70		25 - 150				10/11/18 09:45	10/16/18 05:42	1
d3-NMeFOSAA	82		25 - 150				10/11/18 09:45	10/16/18 05:42	1
d5-NEtFOSAA	91		25 - 150				10/11/18 09:45	10/16/18 05:42	1
M2-6:2 FTS	258 *		25 - 150				10/11/18 09:45	10/16/18 05:42	1
M2-8:2 FTS	115		25 - 150				10/11/18 09:45	10/16/18 05:42	1

Company: GEI Consultants, Inc.					Analysis Requested										Job #:									
Address: 455 Winding Brook Drive Suite 201					Due Date Requested:					SUB Work					Prespr A - HCL B - NaC C - Zn / D - Nitr E - Nah F - MeC G - Amv H - As I - Ice J - DI V K - ED1 L - EDA Other:									
City: Glastonbury					TAT Requested (days): 10 days																			
State, Zip: CT, 06033																								
Phone: 860-368-5300(Tel) 860-608-9717(Fax)					PO #: 1803556-1.14																			
Email: mfeiler@geiconsultants.com					WO #:																			
Project Name: Emerging Contaminants - Long Island/NYC					Project #: 46027288																			
Site/Project Description: Clifton-PFAS-1803556-1.14					SSOW#:																			
Sample Identification					Sample Date		Sample Time		Sample Type (C=Comp, G=grab)		MSGLA (W=water, S=solid, O=seawater, BT=Tissue, A=Air)		Field Filled Sample (Yes or No)		PFC_IDA - PFAS, Standard List (21 Analytes)		B2700_SIM_MS_ID (1,4-Dioxane)		Total Number of containers					
									Preservation Code:															
RW-210-I					10/2/18		1540		G		Water		N		N				4					
RW-202S					10/2/18		1300		G		Water		N		N				4					
RW-23					10/2/18		0940		G		Water		N		N				12 MS					
DUP-100218					10/2/18		/		G		Water		N		N				4					
FB-100218					10/2/18		0950		G		Water		N		N				4					
Possible Hazard Identification					Sample Disposal (A fee may be assessed if samples are retained for)																			
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological					☐ Return To Client ☒ Disposal By Lab ☐ Archive For																			
Deliverable Requested: I, II, III, IV, Other (specify) NY Cat B					Special Instructions/QC Requirements: Edison lab - log in both tests Int																			
Empty Kit Relinquished by:					Date:					Time:					Method of Shipment:									
Relinquished by: <i>Mwe</i>					Date/Time: 10/3/18 18:40					Company: <i>T-12</i>					Received by: <i>[Signature]</i>					Date/Time: 10/3/18				
Relinquished by: <i>[Signature]</i>					Date/Time: 10/3/18 18:40					Company: <i>T-12</i>					Received by: <i>[Signature]</i>					Date/Time: 10/3/18				
Relinquished by:					Date/Time:					Company:					Received by:					Date/Time:				
Custody Seals Intact: ☒ Yes ☐ No					Custody Seal No.:					Cooler Temperature(s) °C and Other Remarks:														

20 / 20

3.2 / 3.2

LRHP

Site: Long Island Emerging Contaminants, Equity
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-166801
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 15, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
MW-6B	460-166801-01	PFAS, 1,4-Dioxane
MW-8B	460-166801-02	PFAS, 1,4-Dioxane
MW-11B	460-166801-03	PFAS, 1,4-Dioxane
DUP-100118-1*	460-166801-04	PFAS, 1,4-Dioxane
FB-100118*	460-166801-05	PFAS, 1,4-Dioxane

* Collection date 10/12/18

Associated QC Samples:

Field Blank: FB-100118-1
Field Duplicate pair: MW-8B/DUP-100118

The above-listed aqueous samples and field blank sample were collected on October 12, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-Dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatile Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

1,4-Dioxane and PFAS

Analytes were detected in the associated laboratory method and field blank samples. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
1,4-Dioxane				
1,4-Dioxane	FB-100118-1: All samples	0.12 ug/L	1.2 ug/L	Qualify the results for 1,4-dioxane in samples MW-6B, MW-8B, MW-11B, and DUP-100118-1 as estimated (J); High bias.
PFAS				
Perfluoroundecanoic acid (PFUnA)	Method MB 200- 135602: All samples	0.368 ng/L	3.68 ng/L	Qualify the results for PFUnA in samples MW-8B, MW-11B, DUP-100118-1, and FB-100118-1 as nondetect (U) at the RL.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
MW-6B	13C4 PFBA	16	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA) and 6:2 FTS in sample MW-6B.
	M2-6:2 FTS	164		
MW-8B	13C4 PFBA	13	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA), Perfluoropentanoic acid (PFPeA), Perfluorohexanoic Acid (PFHxA), 6:2 FTS, and N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA) in sample MW-8B.
	13C5 PFPeA	18		
	13C2 PFHxA	24		
	M2-6:2 FTS	290		
	d5-NEtFOSAA	172		
	M2-8:2 FTS	281		Validation action was not required as the result for 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.
MW-11B	13C4 PFBA	14	25-150	Estimate (J) the positive result for Perfluorobutanoic acid (PFBA) in sample MW-11B.
	M2-6:2 FTS	205		Validation action was not required as the results for 6:2 FTS and 8:2 FTS were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	194		
DUP-100118-1	13C4 PFBA	13	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA), Perfluoropentanoic acid (PFPeA), and N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA) in sample DUP-100118-1.
	13C5 PFPeA	20		
	M2-6:2 FTS	279		
	M2-8:2 FTS	269		
	d5-NEtFOSAA	163		Validation action was not required as the results for 8:2 FTS and NEtFOSAA were not detected in this sample and therefore not affected by the high recoveries.

It should be noted that IDA recoveries outside of control limits generally have a minimal effect on the data quality as the results are quantitated by isotope dilution and are corrected accordingly. However, professional judgment was taken to qualify affected compound results for associated isotope dilution analytes recovered outside of the recommended control limits.

MS/MSD Results

MS/MSD analyses were performed on sample MW-6B for 1,4-dioxane and PFAS. Recovery and precision criteria were met.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples MW-8B and DUP-100118-1 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria.

Analyte	MW-8B (ng/L)	DUP-100118-1 (ng/L)	RPD (%)
1,4-Dioxane	0.43	0.53	20.8
Perfluorobutanoic acid (PFBA)	238	242	1.7
Perfluoropentanoic acid (PFPeA)	130	124	4.7
Perfluorohexanoic acid (PFHxA)	78.4	75.6	3.6
Perfluoroheptanoic acid (PFHpA)	54.0	45.8	16.4
Perfluorooctanoic acid (PFOA)	105	118	11.7
Perfluorononanoic acid (PFNA)	6.92	6.37	8.3
Perfluorodecanoic acid (PFDA)	1.47 J	1.22 J	18.6
Perfluorobutanesulfonic acid (PFBS)	9.03	11.5	24.1
Perfluorohexanesulfonic acid (PFHxS)	20.2	18.7	7.7
Perfluoroheptanesulfonic Acid (PFHpS)	0.97 J	0.86 J	12.0
Perfluorooctanesulfonic acid (PFOS)	41.6	42.2	1.4
Perfluorooctanesulfonamide (FOSA)	0.52 J	1.62 U	NC, Within the RL
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.75 J	16.2 U	NC, Within the RL
6:2 FTS	3.97 J	4.10 J	3.2
NC – Not calculable Criteria: When both results are ≥ 5 x the RL, RPDs must be $< 30\%$. When results are < 5 x the QL, the absolute difference between the original and field duplicate results must be $< \text{RL}$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

The following table lists the sample dilutions which were performed and the results to be reported.

Sample	PFAS Analysis Reported
MW-8B	A 10-fold dilution was performed for Perfluoroheptanoic acid (PFHpA), Perfluorooctanoic acid (PFOA), and Perfluorohexanesulfonic acid (PFHxS) to reduce sample matrix effect. All other results were reported from the undiluted analysis.
MW-11B	A 5-fold dilution was performed for Perfluoroheptanoic acid (PFHpA), Perfluorooctanoic acid (PFOA), and Perfluorohexanesulfonic acid (PFHxS) to reduce sample matrix effect. All other results were reported from the undiluted analysis.

Sample	PFAS Analysis Reported
DUP-100118-1	A 10-fold dilution was performed for Perfluoroheptanoic acid (PFHpA), Perfluorooctanoic acid (PFOA), and Perfluorohexanesulfonic acid (PFHxS) to reduce sample matrix effect. All other results were reported from the undiluted analysis.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DRAFT

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Equity-PFAS-1803556-1.8

TestAmerica Job ID: 460-166801-1

Client Sample ID: MW-6B

Lab Sample ID: 460-166801-1

Date Collected: 10/12/18 08:10

Matrix: Water

Date Received: 10/12/18 20:00

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.73	J	0.20	0.016	ug/L		10/14/18 09:11	10/14/18 23:07	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	34		10 - 150				10/14/18 09:11	10/14/18 23:07	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	21.8	J	1.62	0.33	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluoropentanoic acid (PFPeA)	7.63		1.62	0.61	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluorohexanoic acid (PFHxA)	2.91		1.62	0.19	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluoroheptanoic acid (PFHpA)	3.48		1.62	0.26	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluorooctanoic acid (PFOA)	11.8		1.62	0.26	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluorononanoic acid (PFNA)	1.62	U	1.62	0.31	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluorodecanoic acid (PFDA)	1.62	U	1.62	0.31	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluoroundecanoic acid (PFUnA)	1.62	U	1.62	0.20	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluorododecanoic acid (PFDoA)	1.62	U	1.62	0.28	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluorotridecanoic acid (PFTriA)	1.62	U	1.62	0.19	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluorotetradecanoic acid (PFTeA)	1.62	U	1.62	0.36	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluorobutanesulfonic acid (PFBS)	1.62	U	1.62	0.36	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluorohexanesulfonic acid (PFHxS)	1.43	J	1.62	0.21	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.62	U	1.62	0.66	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluorooctanesulfonic acid (PFOS)	1.62	U	1.62	0.61	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluorodecanesulfonic acid (PFDS)	1.62	U	1.62	0.43	ng/L		10/22/18 13:00	10/24/18 00:16	1
Perfluorooctanesulfonamide (FOSA)	1.62	U	1.62	0.45	ng/L		10/22/18 13:00	10/24/18 00:16	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.2	U	16.2	0.36	ng/L		10/22/18 13:00	10/24/18 00:16	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.2	U	16.2	0.57	ng/L		10/22/18 13:00	10/24/18 00:16	1
6:2 FTS	40.5	J	16.2	0.81	ng/L		10/22/18 13:00	10/24/18 00:16	1
8:2 FTS	16.2	U	16.2	0.45	ng/L		10/22/18 13:00	10/24/18 00:16	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	16	*	25 - 150				10/22/18 13:00	10/24/18 00:16	1
13C5-PFPeA DNU	28		25 - 150				10/22/18 13:00	10/24/18 00:16	1
13C2 PFHxA	42		25 - 150				10/22/18 13:00	10/24/18 00:16	1
13C4 PFHpA	70		25 - 150				10/22/18 13:00	10/24/18 00:16	1
13C4 PFOA	89		25 - 150				10/22/18 13:00	10/24/18 00:16	1
13C5 PFNA	107		25 - 150				10/22/18 13:00	10/24/18 00:16	1
13C2 PFDA	114		25 - 150				10/22/18 13:00	10/24/18 00:16	1
13C2 PFUnA	124		25 - 150				10/22/18 13:00	10/24/18 00:16	1
13C2 PFDoA	122		25 - 150				10/22/18 13:00	10/24/18 00:16	1
13C2 PFTeDA	111		25 - 150				10/22/18 13:00	10/24/18 00:16	1
13C3 PFBS	76		25 - 150				10/22/18 13:00	10/24/18 00:16	1
18O2 PFHxS	95		25 - 150				10/22/18 13:00	10/24/18 00:16	1
13C4 PFOS	120		25 - 150				10/22/18 13:00	10/24/18 00:16	1
13C8 FOSA	75		25 - 150				10/22/18 13:00	10/24/18 00:16	1
d3-NMeFOSAA	103		25 - 150				10/22/18 13:00	10/24/18 00:16	1
d5-NEtFOSAA	121		25 - 150				10/22/18 13:00	10/24/18 00:16	1
M2-6:2 FTS	164	*	25 - 150				10/22/18 13:00	10/24/18 00:16	1
M2-8:2 FTS	134		25 - 150				10/22/18 13:00	10/24/18 00:16	1

TestAmerica Edison

Don
4/13/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Equity-PFAS-1803556-1.8

TestAmerica Job ID: 460-166801-1

Client Sample ID: MW-8B

Date Collected: 10/12/18 10:25

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166801-2

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.43	J.	0.20	0.016	ug/L		10/14/18 09:11	10/14/18 23:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	41		10 - 150				10/14/18 09:11	10/14/18 23:42	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	238	J.	1.66	0.34	ng/L		10/22/18 13:00	10/24/18 01:19	1
Perfluoropentanoic acid (PFPeA)	130	J.	1.66	0.62	ng/L		10/22/18 13:00	10/24/18 01:19	1
Perfluorohexanoic acid (PFHxA)	78.4	J.	1.66	0.20	ng/L		10/22/18 13:00	10/24/18 01:19	1
Perfluoroheptanoic acid (PFHpA)	54.0		16.6	2.66	ng/L		10/22/18 13:00	10/24/18 14:55	10
Perfluorooctanoic acid (PFOA)	105		16.6	2.66	ng/L		10/22/18 13:00	10/24/18 14:55	10
Perfluorononanoic acid (PFNA)	6.92		1.66	0.32	ng/L		10/22/18 13:00	10/24/18 01:19	1
Perfluorodecanoic acid (PFDA)	1.47	J.	1.66	0.32	ng/L		10/22/18 13:00	10/24/18 01:19	1
Perfluoroundecanoic acid (PFUnA)	-0.28	J-B 1.166 U.	1.66	0.21	ng/L		10/22/18 13:00	10/24/18 01:19	1
Perfluorododecanoic acid (PFDoA)	1.66	U	1.66	0.29	ng/L		10/22/18 13:00	10/24/18 01:19	1
Perfluorotridecanoic acid (PFTriA)	1.66	U	1.66	0.20	ng/L		10/22/18 13:00	10/24/18 01:19	1
Perfluorotetradecanoic acid (PFTeA)	1.66	U	1.66	0.37	ng/L		10/22/18 13:00	10/24/18 01:19	1
Perfluorobutanesulfonic acid (PFBS)	9.03		1.66	0.37	ng/L		10/22/18 13:00	10/24/18 01:19	1
Perfluorohexanesulfonic acid (PFHxS)	20.2		16.6	2.16	ng/L		10/22/18 13:00	10/24/18 14:55	10
Perfluoroheptanesulfonic Acid (PFHpS)	0.97	J.	1.66	0.68	ng/L		10/22/18 13:00	10/24/18 01:19	1
Perfluorooctanesulfonic acid (PFOS)	41.6		1.66	0.63	ng/L		10/22/18 13:00	10/24/18 01:19	1
Perfluorodecanesulfonic acid (PFDS)	1.66	U	1.66	0.44	ng/L		10/22/18 13:00	10/24/18 01:19	1
Perfluorooctanesulfonamide (FOSA)	0.52	J.	1.66	0.46	ng/L		10/22/18 13:00	10/24/18 01:19	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.6	U	16.6	0.37	ng/L		10/22/18 13:00	10/24/18 01:19	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.75	J.	16.6	0.58	ng/L		10/22/18 13:00	10/24/18 01:19	1
6:2 FTS	3.97	J.	16.6	0.83	ng/L		10/22/18 13:00	10/24/18 01:19	1
8:2 FTS	16.6	U	16.6	0.46	ng/L		10/22/18 13:00	10/24/18 01:19	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	13	*	25 - 150				10/22/18 13:00	10/24/18 01:19	1
13C5-PFPeA DNU	18	*	25 - 150				10/22/18 13:00	10/24/18 01:19	1
13C2 PFHxA	24	*	25 - 150				10/22/18 13:00	10/24/18 01:19	1
13C4 PFHpA	68		25 - 150				10/22/18 13:00	10/24/18 14:55	10
13C4 PFOA	99		25 - 150				10/22/18 13:00	10/24/18 14:55	10
13C5 PFNA	107		25 - 150				10/22/18 13:00	10/24/18 01:19	1
13C2 PFDA	127		25 - 150				10/22/18 13:00	10/24/18 01:19	1
13C2 PFUnA	147		25 - 150				10/22/18 13:00	10/24/18 01:19	1
13C2 PFDoA	124		25 - 150				10/22/18 13:00	10/24/18 01:19	1
13C2 PFTeDA	138		25 - 150				10/22/18 13:00	10/24/18 01:19	1
13C3 PFBS	82		25 - 150				10/22/18 13:00	10/24/18 01:19	1
18O2 PFHxS	77		25 - 150				10/22/18 13:00	10/24/18 14:55	10
13C4 PFOS	141		25 - 150				10/22/18 13:00	10/24/18 01:19	1
13C8 FOSA	87		25 - 150				10/22/18 13:00	10/24/18 01:19	1
d3-NMeFOSAA	122		25 - 150				10/22/18 13:00	10/24/18 01:19	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Equity-PFAS-1803556-1.8

TestAmerica Job ID: 460-166801-1

Client Sample ID: MW-8B

Date Collected: 10/12/18 10:25

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166801-2

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
d5-NEIFOSAA	172	*	25 - 150	10/22/18 13:00	10/24/18 01:19	1
M2-6:2 FTS	290	*	25 - 150	10/22/18 13:00	10/24/18 01:19	1
M2-8:2 FTS	281	*	25 - 150	10/22/18 13:00	10/24/18 01:19	1

Client Sample ID: MW-11B

Date Collected: 10/12/18 11:55

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166801-3

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Semi-volatile Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	1.1	J	0.20	0.016	ug/L		10/14/18 09:11	10/14/18 23:59	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	40		10 - 150				10/14/18 09:11	10/14/18 23:59	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	17.2	J	1.60	0.33	ng/L		10/22/18 13:00	10/24/18 15:11	1
Perfluoropentanoic acid (PFPeA)	71.0		1.60	0.60	ng/L		10/22/18 13:00	10/24/18 15:11	1
Perfluorohexanoic acid (PFHxA)	8.24		1.60	0.19	ng/L		10/22/18 13:00	10/24/18 15:11	1
Perfluoroheptanoic acid (PFHpA)	3.10	J	8.00	1.28	ng/L		10/22/18 13:00	10/24/18 01:35	5
Perfluorooctanoic acid (PFOA)	7.69	J	8.00	1.28	ng/L		10/22/18 13:00	10/24/18 01:35	5
Perfluorononanoic acid (PFNA)	0.35	J	1.60	0.30	ng/L		10/22/18 13:00	10/24/18 15:11	1
Perfluorodecanoic acid (PFDA)	1.60	U	1.60	0.30	ng/L		10/22/18 13:00	10/24/18 15:11	1
Perfluoroundecanoic acid (PFUnA)	0.40	J-B	1.60	0.20	ng/L		10/22/18 13:00	10/24/18 15:11	1
Perfluorododecanoic acid (PFDoA)	1.60	U	1.60	0.28	ng/L		10/22/18 13:00	10/24/18 15:11	1
Perfluorotridecanoic acid (PFTriA)	1.60	U	1.60	0.19	ng/L		10/22/18 13:00	10/24/18 15:11	1
Perfluorotetradecanoic acid (PFTeA)	1.60	U	1.60	0.36	ng/L		10/22/18 13:00	10/24/18 15:11	1
Perfluorobutanesulfonic acid (PFBS)	16.7		1.60	0.35	ng/L		10/22/18 13:00	10/24/18 15:11	1
Perfluorohexanesulfonic acid (PFHxS)	2.80	J	8.00	1.04	ng/L		10/22/18 13:00	10/24/18 01:35	5
Perfluoroheptanesulfonic Acid (PFHpS)	1.60	U	1.60	0.66	ng/L		10/22/18 13:00	10/24/18 15:11	1
Perfluorooctanesulfonic acid (PFOS)	1.60	U	1.60	0.61	ng/L		10/22/18 13:00	10/24/18 15:11	1
Perfluorodecanesulfonic acid (PFDS)	1.60	U	1.60	0.42	ng/L		10/22/18 13:00	10/24/18 15:11	1
Perfluorooctanesulfonamide (FOSA)	1.60	U	1.60	0.45	ng/L		10/22/18 13:00	10/24/18 15:11	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.0	U	16.0	0.36	ng/L		10/22/18 13:00	10/24/18 15:11	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.0	U	16.0	0.56	ng/L		10/22/18 13:00	10/24/18 15:11	1
6:2 FTS	16.0	U	16.0	0.80	ng/L		10/22/18 13:00	10/24/18 15:11	1
8:2 FTS	16.0	U	16.0	0.45	ng/L		10/22/18 13:00	10/24/18 15:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	14	*	25 - 150				10/22/18 13:00	10/24/18 15:11	1
13C5-PFPeA DNU	25		25 - 150				10/22/18 13:00	10/24/18 15:11	1
13C2 PFHxA	30		25 - 150				10/22/18 13:00	10/24/18 15:11	1
13C4 PFHpA	70		25 - 150				10/22/18 13:00	10/24/18 01:35	5
13C4 PFOA	78		25 - 150				10/22/18 13:00	10/24/18 01:35	5
13C5 PFNA	103		25 - 150				10/22/18 13:00	10/24/18 15:11	1
13C2 PFDA	116		25 - 150				10/22/18 13:00	10/24/18 15:11	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Equity-PFAS-1803556-1.8

TestAmerica Job ID: 460-166801-1

Client Sample ID: MW-11B

Date Collected: 10/12/18 11:55

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166801-3

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	131		25 - 150	10/22/18 13:00	10/24/18 15:11	1
13C2 PFDoA	123		25 - 150	10/22/18 13:00	10/24/18 15:11	1
13C2 PFTeDA	128		25 - 150	10/22/18 13:00	10/24/18 15:11	1
13C3 PFBS	70		25 - 150	10/22/18 13:00	10/24/18 15:11	1
18O2 PFHxS	88		25 - 150	10/22/18 13:00	10/24/18 01:35	5
13C4 PFOS	115		25 - 150	10/22/18 13:00	10/24/18 15:11	1
13C8 FOSA	94		25 - 150	10/22/18 13:00	10/24/18 15:11	1
d3-NMeFOSAA	124		25 - 150	10/22/18 13:00	10/24/18 15:11	1
d5-NEtFOSAA	136		25 - 150	10/22/18 13:00	10/24/18 15:11	1
M2-6:2 FTS	205 *		25 - 150	10/22/18 13:00	10/24/18 15:11	1
M2-8:2 FTS	194 *		25 - 150	10/22/18 13:00	10/24/18 15:11	1

Client Sample ID: DUP-100118-1

Date Collected: 10/12/18 00:00

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166801-4

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.53	J	0.20	0.016	ug/L		10/14/18 09:11	10/15/18 00:17	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	27		10 - 150				10/14/18 09:11	10/15/18 00:17	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	242	J	1.62	0.33	ng/L		10/22/18 13:00	10/24/18 01:51	1
Perfluoropentanoic acid (PFPeA)	124	J	1.62	0.61	ng/L		10/22/18 13:00	10/24/18 01:51	1
Perfluorohexanoic acid (PFHxA)	75.6		1.62	0.19	ng/L		10/22/18 13:00	10/24/18 01:51	1
Perfluoroheptanoic acid (PFHpA)	45.8		16.2	2.59	ng/L		10/22/18 13:00	10/24/18 15:27	10
Perfluorooctanoic acid (PFOA)	118		16.2	2.59	ng/L		10/22/18 13:00	10/24/18 15:27	10
Perfluorononanoic acid (PFNA)	6.37		1.62	0.31	ng/L		10/22/18 13:00	10/24/18 01:51	1
Perfluorodecanoic acid (PFDA)	1.22	J	1.62	0.31	ng/L		10/22/18 13:00	10/24/18 01:51	1
Perfluoroundecanoic acid (PFUnA)	0.43	J B	1.62	0.20	ng/L		10/22/18 13:00	10/24/18 01:51	1
Perfluorododecanoic acid (PFDoA)	1.62	U	1.62	0.28	ng/L		10/22/18 13:00	10/24/18 01:51	1
Perfluorotridecanoic acid (PFTriA)	1.62	U	1.62	0.19	ng/L		10/22/18 13:00	10/24/18 01:51	1
Perfluorotetradecanoic acid (PFTeA)	1.62	U	1.62	0.36	ng/L		10/22/18 13:00	10/24/18 01:51	1
Perfluorobutanesulfonic acid (PFBS)	11.5		1.62	0.36	ng/L		10/22/18 13:00	10/24/18 01:51	1
Perfluorohexanesulfonic acid (PFHxS)	18.7		16.2	2.10	ng/L		10/22/18 13:00	10/24/18 15:27	10
Perfluoroheptanesulfonic Acid (PFHpS)	0.86	J	1.62	0.66	ng/L		10/22/18 13:00	10/24/18 01:51	1
Perfluorooctanesulfonic acid (PFOS)	42.2		1.62	0.61	ng/L		10/22/18 13:00	10/24/18 01:51	1
Perfluorodecanesulfonic acid (PFDS)	1.62	U	1.62	0.43	ng/L		10/22/18 13:00	10/24/18 01:51	1
Perfluorooctanesulfonamide (FOSA)	1.62	U	1.62	0.45	ng/L		10/22/18 13:00	10/24/18 01:51	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.2	U	16.2	0.36	ng/L		10/22/18 13:00	10/24/18 01:51	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.2	U	16.2	0.57	ng/L		10/22/18 13:00	10/24/18 01:51	1
6:2 FTS	4.10	J	16.2	0.81	ng/L		10/22/18 13:00	10/24/18 01:51	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Equity-PFAS-1803556-1.8

TestAmerica Job ID: 460-166801-1

Client Sample ID: DUP-100118-1

Date Collected: 10/12/18 00:00

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166801-4

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
8:2 FTS	16.2	U	16.2	0.45	ng/L		10/22/18 13:00	10/24/18 01:51	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	13	*	25 - 150				10/22/18 13:00	10/24/18 01:51	1
13C5-PFPeA DNU	20	*	25 - 150				10/22/18 13:00	10/24/18 01:51	1
13C2 PFHxA	26		25 - 150				10/22/18 13:00	10/24/18 01:51	1
13C4 PFHpA	78		25 - 150				10/22/18 13:00	10/24/18 15:27	10
13C4 PFOA	90		25 - 150				10/22/18 13:00	10/24/18 15:27	10
13C5 PFNA	114		25 - 150				10/22/18 13:00	10/24/18 01:51	1
13C2 PFDA	129		25 - 150				10/22/18 13:00	10/24/18 01:51	1
13C2 PFUnA	141		25 - 150				10/22/18 13:00	10/24/18 01:51	1
13C2 PFDoA	126		25 - 150				10/22/18 13:00	10/24/18 01:51	1
13C2 PFTeDA	135		25 - 150				10/22/18 13:00	10/24/18 01:51	1
13C3 PFBS	76		25 - 150				10/22/18 13:00	10/24/18 01:51	1
18O2 PFHxS	89		25 - 150				10/22/18 13:00	10/24/18 15:27	10
13C4 PFOS	141		25 - 150				10/22/18 13:00	10/24/18 01:51	1
13C8 FOSA	88		25 - 150				10/22/18 13:00	10/24/18 01:51	1
d3-NMeFOSAA	123		25 - 150				10/22/18 13:00	10/24/18 01:51	1
d5-NEtFOSAA	163	*	25 - 150				10/22/18 13:00	10/24/18 01:51	1
M2-6:2 FTS	279	*	25 - 150				10/22/18 13:00	10/24/18 01:51	1
M2-8:2 FTS	269	*	25 - 150				10/22/18 13:00	10/24/18 01:51	1

Client Sample ID: FB-100118-1

Date Collected: 10/12/18 08:40

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166801-5

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.12	J	0.20	0.016	ug/L		10/14/18 09:11	10/15/18 00:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	40		10 - 150				10/14/18 09:11	10/15/18 00:34	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.65	U	1.65	0.34	ng/L		10/22/18 13:00	10/24/18 02:07	1
Perfluoropentanoic acid (PFPeA)	1.65	U	1.65	0.62	ng/L		10/22/18 13:00	10/24/18 02:07	1
Perfluorohexanoic acid (PFHxA)	1.65	U	1.65	0.20	ng/L		10/22/18 13:00	10/24/18 02:07	1
Perfluoroheptanoic acid (PFHpA)	1.65	U	1.65	0.26	ng/L		10/22/18 13:00	10/24/18 02:07	1
Perfluorooctanoic acid (PFOA)	1.65	U	1.65	0.26	ng/L		10/22/18 13:00	10/24/18 02:07	1
Perfluorononanoic acid (PFNA)	1.65	U	1.65	0.31	ng/L		10/22/18 13:00	10/24/18 02:07	1
Perfluorodecanoic acid (PFDA)	1.65	U	1.65	0.31	ng/L		10/22/18 13:00	10/24/18 02:07	1
Perfluoroundecanoic acid (PFUnA)	0.30 J-B 1.65U		1.65	0.21	ng/L		10/22/18 13:00	10/24/18 02:07	1
Perfluorododecanoic acid (PFDoA)	1.65	U	1.65	0.29	ng/L		10/22/18 13:00	10/24/18 02:07	1
Perfluorotridecanoic acid (PFTriA)	1.65	U	1.65	0.20	ng/L		10/22/18 13:00	10/24/18 02:07	1
Perfluorotetradecanoic acid (PFTeA)	1.65	U	1.65	0.37	ng/L		10/22/18 13:00	10/24/18 02:07	1
Perfluorobutanesulfonic acid (PFBS)	1.65	U	1.65	0.36	ng/L		10/22/18 13:00	10/24/18 02:07	1
Perfluorohexanesulfonic acid (PFHxS)	1.65	U	1.65	0.21	ng/L		10/22/18 13:00	10/24/18 02:07	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.65	U	1.65	0.68	ng/L		10/22/18 13:00	10/24/18 02:07	1
Perfluorooctanesulfonic acid (PFOS)	1.65	U	1.65	0.63	ng/L		10/22/18 13:00	10/24/18 02:07	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Equity-PFAS-1803556-1.8

TestAmerica Job ID: 460-166801-1

Client Sample ID: FB-100118-1

Date Collected: 10/12/18 08:40

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166801-5

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanesulfonic acid (PFDS)	1.65	U	1.65	0.44	ng/L		10/22/18 13:00	10/24/18 02:07	1
Perfluorooctanesulfonamide (FOSA)	1.65	U	1.65	0.46	ng/L		10/22/18 13:00	10/24/18 02:07	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.5	U	16.5	0.37	ng/L		10/22/18 13:00	10/24/18 02:07	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.5	U	16.5	0.58	ng/L		10/22/18 13:00	10/24/18 02:07	1
6:2 FTS	16.5	U	16.5	0.83	ng/L		10/22/18 13:00	10/24/18 02:07	1
8:2 FTS	16.5	U	16.5	0.46	ng/L		10/22/18 13:00	10/24/18 02:07	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	75		25 - 150				10/22/18 13:00	10/24/18 02:07	1
13C5-PFPeA DNU	79		25 - 150				10/22/18 13:00	10/24/18 02:07	1
13C2 PFHxA	86		25 - 150				10/22/18 13:00	10/24/18 02:07	1
13C4 PFHpA	78		25 - 150				10/22/18 13:00	10/24/18 02:07	1
13C4 PFOA	86		25 - 150				10/22/18 13:00	10/24/18 02:07	1
13C5 PFNA	86		25 - 150				10/22/18 13:00	10/24/18 02:07	1
13C2 PFDA	94		25 - 150				10/22/18 13:00	10/24/18 02:07	1
13C2 PFUnA	89		25 - 150				10/22/18 13:00	10/24/18 02:07	1
13C2 PFDoA	82		25 - 150				10/22/18 13:00	10/24/18 02:07	1
13C2 PFTeDA	94		25 - 150				10/22/18 13:00	10/24/18 02:07	1
13C3 PFBS	93		25 - 150				10/22/18 13:00	10/24/18 02:07	1
18O2 PFHxS	96		25 - 150				10/22/18 13:00	10/24/18 02:07	1
13C4 PFOS	106		25 - 150				10/22/18 13:00	10/24/18 02:07	1
13C8 FOSA	52		25 - 150				10/22/18 13:00	10/24/18 02:07	1
d3-NMeFOSAA	75		25 - 150				10/22/18 13:00	10/24/18 02:07	1
d5-NEtFOSAA	84		25 - 150				10/22/18 13:00	10/24/18 02:07	1
M2-6:2 FTS	99		25 - 150				10/22/18 13:00	10/24/18 02:07	1
M2-8:2 FTS	88		25 - 150				10/22/18 13:00	10/24/18 02:07	1

TestAmerica Edison

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Ver: 08/04/2016

Site: Long Island Emerging Contaminants, Far Rockaway
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-166349
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 15, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
MW-116D	460-166349-01	PFAS, 1,4-Dioxane
MW-118DR	460-166349-02	PFAS, 1,4-Dioxane
MW-119D	460-166349-03	PFAS, 1,4-Dioxane
DUP-100418	460-166349-04	PFAS, 1,4-Dioxane
FB-1004118*	460-166349-05	PFAS, 1,4-Dioxane

* Collection date 10/04/18

Associated QC Samples:

Field Blank: FB-1004118
Field Duplicate pair: MW-119D/DUP-100418

The above-listed aqueous samples and field blank sample were collected on October 4, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-Dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatile Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

1,4-Dioxane and PFAS

Analytes were detected in the associated laboratory method and field blank samples. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
1,4-Dioxane				
1,4-Dioxane	FB-100418: All samples	0.14 ug/L	1.4 ug/L	Validation actions were not required.
PFAS				
Perfluorooctanoic acid (PFOA)	Method MB 200- 135439: All samples	0.321 ng/L	3.21 ng/L	Qualify the result for Perfluorooctanoic acid (PFOA) in sample FB-1004118 as nondetect (U) at the RL.
Perfluoroundecanoic acid (PFUnA)		0.301 ng/L	3.01 ng/L	Qualify the results for Perfluoroundecanoic acid (PFUnA) in samples MW-116D, MW-119D, DUP-100418, and FB-1004118 as nondetect (U) at the RL.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method

recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
MW-116D	M2-6:2 FTS	194	25-150	Estimate (J) the positive result for 6:2 FTS in sample MW-116D.
MW-118DR	M2-6:2 FTS	216	25-150	Validation actions were not required as the results for 6:2 FTS were not detected in these samples and therefore not affected by the high recoveries.
MW-119D		236		
DUP-100418		215		
FB-1004118		171		

It should be noted that IDA recoveries outside of control limits generally have a minimal effect on the data quality as the results are quantitated by isotope dilution and are corrected accordingly. However, professional judgment was taken to qualify affected compound results for associated isotope dilution analytes recovered outside of the recommended control limits.

MS/MSD Results

MS/MSD analyses were performed on sample MW-118DR for 1,4-dioxane and PFAS. Recovery and precision criteria were met.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples MW-119D and DUP-100418 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria.

Analyte	MW-119D (ng/L)	DUP-100418 (ng/L)	RPD (%)
Perfluorobutanoic acid (PFBA)	8.75	9.02	3.0
Perfluoropentanoic (PFPeA)	10.0	9.60	4.1
Perfluorohexanoic acid (PFHxA)	10.7	10.6	0.9
Perfluoroheptanoic acid (PFHpA)	9.58	9.80	2.3
Perfluorooctanoic acid (PFOA)	29.2	30.6	4.7
Perfluorononanoic acid (PFNA)	1.71	1.48 J	14.4

Analyte	MW-119D (ng/L)	DUP-100418 (ng/L)	RPD (%)
Perfluorodecanoic acid (PFDA)	0.41 J	0.35 J	15.8
Perfluorobutanesulfonic acid (PFBS)	2.20	2.39	8.3
Perfluorohexanesulfonic acid(PFHxS)	17.1	17.6	2.9
Perfluoroheptanesulfonic Acid (PFHpS)	1.60 J	1.83	13.4
Perfluorooctanesulfonic acid (PFOS)	48.0	46.5	3.2
NC – Not calculable			
Criteria: When both results are ≥ 5 x the RL, RPDs must be $< 30\%$.			
When results are < 5 x the QL, the absolute difference between the original and field duplicate results must be $< \text{RL}$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

Dilutions were not required.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Far Rockaway-PFAS-1803556-1.7

TestAmerica Job ID: 460-166349-1

Client Sample ID: MW-116D

Lab Sample ID: 460-166349-1

Date Collected: 10/04/18 14:10

Matrix: Water

Date Received: 10/05/18 18:30

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/09/18 20:13	10/10/18 13:14	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	48		10 - 150				10/09/18 20:13	10/10/18 13:14	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	8.02		1.74	0.36	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluoropentanoic acid (PFPeA)	15.1		1.74	0.65	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluorohexanoic acid (PFHxA)	16.1		1.74	0.21	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluoroheptanoic acid (PFHpA)	11.8		1.74	0.28	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluorooctanoic acid (PFOA)	33.6	B	1.74	0.28	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluorononanoic acid (PFNA)	1.21	J	1.74	0.33	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluorodecanoic acid (PFDA)	1.74	U	1.74	0.33	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluoroundecanoic acid (PFUnA)	0.24	J-B	1.74	0.22	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluorododecanoic acid (PFDoA)	1.74	U	1.74	0.30	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluorotridecanoic acid (PFTriA)	1.74	U	1.74	0.21	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluorotetradecanoic acid (PFTeA)	1.74	U	1.74	0.39	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluorobutanesulfonic acid (PFBS)	2.80		1.74	0.38	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluorohexanesulfonic acid (PFHxS)	14.8		1.74	0.23	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.33	J	1.74	0.71	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluorooctanesulfonic acid (PFOS)	40.4		1.74	0.66	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluorodecanesulfonic acid (PFDS)	1.74	U	1.74	0.46	ng/L		10/18/18 13:58	10/21/18 13:51	1
Perfluorooctanesulfonamide (FOSA)	1.74	U	1.74	0.49	ng/L		10/18/18 13:58	10/21/18 13:51	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.4	U	17.4	0.39	ng/L		10/18/18 13:58	10/21/18 13:51	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.4	U	17.4	0.61	ng/L		10/18/18 13:58	10/21/18 13:51	1
6:2 FTS	1.09	J	17.4	0.87	ng/L		10/18/18 13:58	10/21/18 13:51	1
8:2 FTS	17.4	U	17.4	0.49	ng/L		10/18/18 13:58	10/21/18 13:51	1

Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	50		25 - 150				10/18/18 13:58	10/21/18 13:51	1
13C5-PFPeA DNU	77		25 - 150				10/18/18 13:58	10/21/18 13:51	1
13C2 PFHxA	72		25 - 150				10/18/18 13:58	10/21/18 13:51	1
13C4 PFHpA	74		25 - 150				10/18/18 13:58	10/21/18 13:51	1
13C4 PFOA	84		25 - 150				10/18/18 13:58	10/21/18 13:51	1
13C5 PFNA	83		25 - 150				10/18/18 13:58	10/21/18 13:51	1
13C2 PFDA	89		25 - 150				10/18/18 13:58	10/21/18 13:51	1
13C2 PFUnA	96		25 - 150				10/18/18 13:58	10/21/18 13:51	1
13C2 PFDoA	99		25 - 150				10/18/18 13:58	10/21/18 13:51	1
13C2 PFTeA	96		25 - 150				10/18/18 13:58	10/21/18 13:51	1
13C3 PFBS	108		25 - 150				10/18/18 13:58	10/21/18 13:51	1
18O2 PFHxS	114		25 - 150				10/18/18 13:58	10/21/18 13:51	1
13C4 PFOS	113		25 - 150				10/18/18 13:58	10/21/18 13:51	1
13C8 FOSA	61		25 - 150				10/18/18 13:58	10/21/18 13:51	1
d3-NMeFOSAA	84		25 - 150				10/18/18 13:58	10/21/18 13:51	1
d5-NEtFOSAA	91		25 - 150				10/18/18 13:58	10/21/18 13:51	1

TestAmerica Edison

Jan 11/13/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Far Rockaway-PFAS-1803556-1.7

TestAmerica Job ID: 460-166349-1

Client Sample ID: MW-116D

Lab Sample ID: 460-166349-1

Date Collected: 10/04/18 14:10

Matrix: Water

Date Received: 10/05/18 18:30

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-6:2 FTS	194	*	25 - 150	10/18/18 13:58	10/21/18 13:51	1
M2-8:2 FTS	123		25 - 150	10/18/18 13:58	10/21/18 13:51	1

Client Sample ID: MW-118DR

Lab Sample ID: 460-166349-2

Date Collected: 10/04/18 10:15

Matrix: Water

Date Received: 10/05/18 18:30

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/09/18 20:13	10/10/18 13:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	52		10 - 150				10/09/18 20:13	10/10/18 13:31	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	9.01		1.72	0.35	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluoropentanoic acid (PFPeA)	14.0		1.72	0.65	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluorohexanoic acid (PFHxA)	15.8		1.72	0.21	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluoroheptanoic acid (PFHpA)	14.5		1.72	0.28	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluorooctanoic acid (PFOA)	40.5	B	1.72	0.28	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluorononanoic acid (PFNA)	1.94		1.72	0.33	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluorodecanoic acid (PFDA)	0.33	J	1.72	0.33	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluoroundecanoic acid (PFUnA)	1.72	U	1.72	0.22	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluorododecanoic acid (PFDoA)	1.72	U	1.72	0.30	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluorotridecanoic acid (PFTriA)	1.72	U	1.72	0.21	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluorotetradecanoic acid (PFTeA)	1.72	U	1.72	0.39	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluorobutanesulfonic acid (PFBS)	3.34		1.72	0.38	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluorohexanesulfonic acid (PFHxS)	22.5		1.72	0.22	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluoroheptanesulfonic Acid (PFHpS)	2.07		1.72	0.71	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluorooctanesulfonic acid (PFOS)	125		1.72	0.65	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluorodecanesulfonic acid (PFDS)	1.72	U	1.72	0.46	ng/L		10/18/18 13:58	10/21/18 14:07	1
Perfluorooctanesulfonamide (FOSA)	1.72	U	1.72	0.48	ng/L		10/18/18 13:58	10/21/18 14:07	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.2	U	17.2	0.39	ng/L		10/18/18 13:58	10/21/18 14:07	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.2	U	17.2	0.60	ng/L		10/18/18 13:58	10/21/18 14:07	1
6:2 FTS	17.2	U	17.2	0.86	ng/L		10/18/18 13:58	10/21/18 14:07	1
8:2 FTS	17.2	U	17.2	0.48	ng/L		10/18/18 13:58	10/21/18 14:07	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	44		25 - 150				10/18/18 13:58	10/21/18 14:07	1
13C5-PFPeA DNU	73		25 - 150				10/18/18 13:58	10/21/18 14:07	1
13C2 PFHxA	71		25 - 150				10/18/18 13:58	10/21/18 14:07	1
13C4 PFHpA	82		25 - 150				10/18/18 13:58	10/21/18 14:07	1
13C4 PFOA	96		25 - 150				10/18/18 13:58	10/21/18 14:07	1
13C5 PFNA	92		25 - 150				10/18/18 13:58	10/21/18 14:07	1
13C2 PFDA	105		25 - 150				10/18/18 13:58	10/21/18 14:07	1
13C2 PFUnA	108		25 - 150				10/18/18 13:58	10/21/18 14:07	1

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Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Far Rockaway-PFAS-1803556-1.7

TestAmerica Job ID: 460-166349-1

Client Sample ID: MW-118DR

Lab Sample ID: 460-166349-2

Date Collected: 10/04/18 10:15

Matrix: Water

Date Received: 10/05/18 18:30

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	108		25 - 150	10/18/18 13:58	10/21/18 14:07	1
13C2 PFTeDA	101		25 - 150	10/18/18 13:58	10/21/18 14:07	1
13C3 PFBS	102		25 - 150	10/18/18 13:58	10/21/18 14:07	1
18O2 PFHxS	115		25 - 150	10/18/18 13:58	10/21/18 14:07	1
13C4 PFOS	116		25 - 150	10/18/18 13:58	10/21/18 14:07	1
13C8 FOSA	54		25 - 150	10/18/18 13:58	10/21/18 14:07	1
d3-NMeFOSAA	91		25 - 150	10/18/18 13:58	10/21/18 14:07	1
d5-NEtFOSAA	97		25 - 150	10/18/18 13:58	10/21/18 14:07	1
M2-6:2 FTS	216		25 - 150	10/18/18 13:58	10/21/18 14:07	1
M2-8:2 FTS	125		25 - 150	10/18/18 13:58	10/21/18 14:07	1

Client Sample ID: MW-119D

Lab Sample ID: 460-166349-3

Date Collected: 10/04/18 12:20

Matrix: Water

Date Received: 10/05/18 18:30

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Non-Halogenated Organic Compounds (GC/MS - Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/09/18 20:13	10/10/18 14:23	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	50		10 - 150				10/09/18 20:13	10/10/18 14:23	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	8.75		1.63	0.33	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluoropentanoic acid (PFPeA)	10.0		1.63	0.61	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluorohexanoic acid (PFHxA)	10.7		1.63	0.20	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluoroheptanoic acid (PFHpA)	9.58		1.63	0.26	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluorooctanoic acid (PFOA)	29.2	B	1.63	0.26	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluorononanoic acid (PFNA)	1.71		1.63	0.31	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluorodecanoic acid (PFDA)	0.41	J	1.63	0.31	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluoroundecanoic acid (PFUnA)	0.57	J-B	1.63	0.20	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluorododecanoic acid (PFDoA)	1.63	U	1.63	0.29	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluorotridecanoic acid (PFTriA)	1.63	U	1.63	0.20	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluorotetradecanoic acid (PFTeA)	1.63	U	1.63	0.37	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluorobutanesulfonic acid (PFBS)	2.20		1.63	0.36	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluorohexanesulfonic acid (PFHxS)	17.1		1.63	0.21	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.60	J	1.63	0.67	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluorooctanesulfonic acid (PFOS)	48.0		1.63	0.62	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluorodecanesulfonic acid (PFDS)	1.63	U	1.63	0.43	ng/L		10/18/18 13:58	10/21/18 14:55	1
Perfluorooctanesulfonamide (FOSA)	1.63	U	1.63	0.46	ng/L		10/18/18 13:58	10/21/18 14:55	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.3	U	16.3	0.37	ng/L		10/18/18 13:58	10/21/18 14:55	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.3	U	16.3	0.57	ng/L		10/18/18 13:58	10/21/18 14:55	1
6:2 FTS	16.3	U	16.3	0.82	ng/L		10/18/18 13:58	10/21/18 14:55	1
8:2 FTS	16.3	U	16.3	0.46	ng/L		10/18/18 13:58	10/21/18 14:55	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Far Rockaway-PFAS-1803556-1.7

TestAmerica Job ID: 460-166349-1

Client Sample ID: MW-119D

Date Collected: 10/04/18 12:20

Date Received: 10/05/18 18:30

Lab Sample ID: 460-166349-3

Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	47		25 - 150	10/18/18 13:58	10/21/18 14:55	1
13C5-PFPeA DNU	75		25 - 150	10/18/18 13:58	10/21/18 14:55	1
13C2 PFHxA	72		25 - 150	10/18/18 13:58	10/21/18 14:55	1
13C4 PFHpA	79		25 - 150	10/18/18 13:58	10/21/18 14:55	1
13C4 PFOA	85		25 - 150	10/18/18 13:58	10/21/18 14:55	1
13C5 PFNA	86		25 - 150	10/18/18 13:58	10/21/18 14:55	1
13C2 PFDA	88		25 - 150	10/18/18 13:58	10/21/18 14:55	1
13C2 PFUnA	90		25 - 150	10/18/18 13:58	10/21/18 14:55	1
13C2 PFDoA	85		25 - 150	10/18/18 13:58	10/21/18 14:55	1
13C2 PFTeDA	92		25 - 150	10/18/18 13:58	10/21/18 14:55	1
13C3 PFBS	105		25 - 150	10/18/18 13:58	10/21/18 14:55	1
18O2 PFHxS	113		25 - 150	10/18/18 13:58	10/21/18 14:55	1
13C4 PFOS	106		25 - 150	10/18/18 13:58	10/21/18 14:55	1
13C8 FOSA	62		25 - 150	10/18/18 13:58	10/21/18 14:55	1
d3-NMeFOSAA	75		25 - 150	10/18/18 13:58	10/21/18 14:55	1
d5-NEtFOSAA	83		25 - 150	10/18/18 13:58	10/21/18 14:55	1
M2-6:2 FTS	236		25 - 150	10/18/18 13:58	10/21/18 14:55	1
M2-8:2 FTS	117		25 - 150	10/18/18 13:58	10/21/18 14:55	1

Client Sample ID: DUP-100418

Date Collected: 10/04/18 00:00

Date Received: 10/05/18 18:30

Lab Sample ID: 460-166349-4

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/09/18 20:13	10/10/18 14:41	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	48		10 - 150				10/09/18 20:13	10/10/18 14:41	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	9.02		1.65	0.34	ng/L		10/18/18 13:58	10/21/18 15:11	1
Perfluoropentanoic acid (PFPeA)	9.60		1.65	0.62	ng/L		10/18/18 13:58	10/21/18 15:11	1
Perfluorohexanoic acid (PFHxA)	10.6		1.65	0.20	ng/L		10/18/18 13:58	10/21/18 15:11	1
Perfluoroheptanoic acid (PFHpA)	9.80		1.65	0.26	ng/L		10/18/18 13:58	10/21/18 15:11	1
Perfluorooctanoic acid (PFOA)	30.6	B	1.65	0.26	ng/L		10/18/18 13:58	10/21/18 15:11	1
Perfluorononanoic acid (PFNA)	1.48	J	1.65	0.31	ng/L		10/18/18 13:58	10/21/18 15:11	1
Perfluorodecanoic acid (PFDA)	0.35	J	1.65	0.31	ng/L		10/18/18 13:58	10/21/18 15:11	1
Perfluoroundecanoic acid (PFUnA)	0.44	J B	1.65	0.21	ng/L		10/18/18 13:58	10/21/18 15:11	1
Perfluorododecanoic acid (PFDoA)	1.65	U	1.65	0.29	ng/L		10/18/18 13:58	10/21/18 15:11	1
Perfluorotridecanoic acid (PFTriA)	1.65	U	1.65	0.20	ng/L		10/18/18 13:58	10/21/18 15:11	1
Perfluorotetradecanoic acid (PFTeA)	1.65	U	1.65	0.37	ng/L		10/18/18 13:58	10/21/18 15:11	1
Perfluorobutanesulfonic acid (PFBS)	2.39		1.65	0.36	ng/L		10/18/18 13:58	10/21/18 15:11	1
Perfluorohexanesulfonic acid (PFHxS)	17.6		1.65	0.21	ng/L		10/18/18 13:58	10/21/18 15:11	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.83		1.65	0.68	ng/L		10/18/18 13:58	10/21/18 15:11	1
Perfluorooctanesulfonic acid (PFOS)	46.5		1.65	0.63	ng/L		10/18/18 13:58	10/21/18 15:11	1
Perfluorodecanesulfonic acid (PFDS)	1.05	U	1.65	0.44	ng/L		10/18/18 13:58	10/21/18 15:11	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Far Rockaway-PFAS-1803556-1.7

TestAmerica Job ID: 460-166349-1

Client Sample ID: DUP-100418

Lab Sample ID: 460-166349-4

Date Collected: 10/04/18 00:00

Matrix: Water

Date Received: 10/05/18 18:30

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonamide (FOSA)	1.65	U	1.65	0.46	ng/L		10/18/18 13:58	10/21/18 15:11	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.5	U	16.5	0.37	ng/L		10/18/18 13:58	10/21/18 15:11	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.5	U	16.5	0.58	ng/L		10/18/18 13:58	10/21/18 15:11	1
6:2 FTS	16.5	U	16.5	0.82	ng/L		10/18/18 13:58	10/21/18 15:11	1
8:2 FTS	16.5	U	16.5	0.46	ng/L		10/18/18 13:58	10/21/18 15:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	44		25 - 150				10/18/18 13:58	10/21/18 15:11	1
13C5-PFPeA DNU	71		25 - 150				10/18/18 13:58	10/21/18 15:11	1
13C2 PFHxA	70		25 - 150				10/18/18 13:58	10/21/18 15:11	1
13C4 PFHpA	78		25 - 150				10/18/18 13:58	10/21/18 15:11	1
13C4 PFOA	85		25 - 150				10/18/18 13:58	10/21/18 15:11	1
13C5 PFNA	87		25 - 150				10/18/18 13:58	10/21/18 15:11	1
13C2 PFDA	89		25 - 150				10/18/18 13:58	10/21/18 15:11	1
13C2 PFUnA	95		25 - 150				10/18/18 13:58	10/21/18 15:11	1
13C2 PFDaA	97		25 - 150				10/18/18 13:58	10/21/18 15:11	1
13C2 PFTeDA	94		25 - 150				10/18/18 13:58	10/21/18 15:11	1
13C3 PFBS	95		25 - 150				10/18/18 13:58	10/21/18 15:11	1
18O2 PFHxS	106		25 - 150				10/18/18 13:58	10/21/18 15:11	1
13C4 PFOS	101		25 - 150				10/18/18 13:58	10/21/18 15:11	1
13C8 FOSA	50		25 - 150				10/18/18 13:58	10/21/18 15:11	1
d3-NMeFOSAA	80		25 - 150				10/18/18 13:58	10/21/18 15:11	1
d5-NEtFOSAA	81		25 - 150				10/18/18 13:58	10/21/18 15:11	1
M2-6:2 FTS	215		25 - 150				10/18/18 13:58	10/21/18 15:11	1
M2-8:2 FTS	110		25 - 150				10/18/18 13:58	10/21/18 15:11	1

Client Sample ID: FB-1004118

Lab Sample ID: 460-166349-5

Date Collected: 10/04/18 12:30

Matrix: Water

Date Received: 10/05/18 18:30

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.14	J	0.21	0.017	ug/L		10/09/18 20:13	10/10/18 14:58	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	48		10 - 150				10/09/18 20:13	10/10/18 14:58	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.61	U	1.61	0.33	ng/L		10/18/18 13:58	10/21/18 15:26	1
Perfluoropentanoic acid (PFPeA)	1.61	U	1.61	0.60	ng/L		10/18/18 13:58	10/21/18 15:26	1
Perfluorohexanoic acid (PFHxA)	1.61	U	1.61	0.19	ng/L		10/18/18 13:58	10/21/18 15:26	1
Perfluoroheptanoic acid (PFHpA)	1.61	U	1.61	0.26	ng/L		10/18/18 13:58	10/21/18 15:26	1
Perfluorooctanoic acid (PFOA)	0.28 J-B 1.61 U		1.61	0.26	ng/L		10/18/18 13:58	10/21/18 15:26	1
Perfluorononanoic acid (PFNA)	1.61	U	1.61	0.31	ng/L		10/18/18 13:58	10/21/18 15:26	1
Perfluorodecanoic acid (PFDA)	1.61	U	1.61	0.31	ng/L		10/18/18 13:58	10/21/18 15:26	1
Perfluoroundecanoic acid (PFUnA)	0.29 J-B 1.61 U		1.61	0.20	ng/L		10/18/18 13:58	10/21/18 15:26	1
Perfluorododecanoic acid (PFDaA)	1.61	U	1.61	0.28	ng/L		10/18/18 13:58	10/21/18 15:26	1
Perfluorotridecanoic acid (PFTriA)	1.61	U	1.61	0.19	ng/L		10/18/18 13:58	10/21/18 15:26	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Far Rockaway-PFAS-1803556-1.7

TestAmerica Job ID: 460-166349-1

Client Sample ID: FB-1004118

Lab Sample ID: 460-166349-5

Date Collected: 10/04/18 12:30

Matrix: Water

Date Received: 10/05/18 18:30

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorotetradecanoic acid (PFTeA)	1.61	U	1.61	0.36	ng/L		10/18/18 13:58	10/21/18 15:26	1
Perfluorobutanesulfonic acid (PFBS)	1.61	U	1.61	0.35	ng/L		10/18/18 13:58	10/21/18 15:26	1
Perfluorohexanesulfonic acid (PFHxS)	1.61	U	1.61	0.21	ng/L		10/18/18 13:58	10/21/18 15:26	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.61	U	1.61	0.66	ng/L		10/18/18 13:58	10/21/18 15:26	1
Perfluorooctanesulfonic acid (PFOS)	1.61	U	1.61	0.61	ng/L		10/18/18 13:58	10/21/18 15:26	1
Perfluorodecanesulfonic acid (PFDS)	1.61	U	1.61	0.43	ng/L		10/18/18 13:58	10/21/18 15:26	1
Perfluorooctanesulfonamide (FOSA)	1.61	U	1.61	0.45	ng/L		10/18/18 13:58	10/21/18 15:26	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.1	U	16.1	0.36	ng/L		10/18/18 13:58	10/21/18 15:26	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.1	U	16.1	0.56	ng/L		10/18/18 13:58	10/21/18 15:26	1
6:2 FTS	16.1	U	16.1	0.81	ng/L		10/18/18 13:58	10/21/18 15:26	1
8:2 FTS	16.1	U	16.1	0.45	ng/L		10/18/18 13:58	10/21/18 15:26	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	85		25 - 150				10/18/18 13:58	10/21/18 15:26	1
13C5-PFPeA DNU	111		25 - 150				10/18/18 13:58	10/21/18 15:26	1
13C2 PFHxA	107		25 - 150				10/18/18 13:58	10/21/18 15:26	1
13C4 PFHpA	93		25 - 150				10/18/18 13:58	10/21/18 15:26	1
13C4 PFOA	97		25 - 150				10/18/18 13:58	10/21/18 15:26	1
13C5 PFNA	99		25 - 150				10/18/18 13:58	10/21/18 15:26	1
13C2 PFDA	98		25 - 150				10/18/18 13:58	10/21/18 15:26	1
13C2 PFUnA	97		25 - 150				10/18/18 13:58	10/21/18 15:26	1
13C2 PFDoA	93		25 - 150				10/18/18 13:58	10/21/18 15:26	1
13C2 PFTeDA	89		25 - 150				10/18/18 13:58	10/21/18 15:26	1
13C3 PFBS	107		25 - 150				10/18/18 13:58	10/21/18 15:26	1
18O2 PFHxS	97		25 - 150				10/18/18 13:58	10/21/18 15:26	1
13C4 PFOS	103		25 - 150				10/18/18 13:58	10/21/18 15:26	1
13C8 FOSA	60		25 - 150				10/18/18 13:58	10/21/18 15:26	1
d3-NMeFOSAA	81		25 - 150				10/18/18 13:58	10/21/18 15:26	1
d5-NEtFOSAA	91		25 - 150				10/18/18 13:58	10/21/18 15:26	1
M2-6:2 FTS	171		25 - 150				10/18/18 13:58	10/21/18 15:26	1
M2-8:2 FTS	104		25 - 150				10/18/18 13:58	10/21/18 15:26	1

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$$2.2 / 3.2 \quad 3.2 / 3.2 + 12 \neq 9$$

Ver: 08/04/2016

Site: Long Island Emerging Contaminants, Flatbush
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-166699
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 15, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
MW-2	460-166699-01	PFAS, 1,4-Dioxane
MW-4	460-166699-02	PFAS, 1,4-Dioxane
MW-7	460-166699-03	PFAS, 1,4-Dioxane
DUP-100918	460-166699-04	PFAS, 1,4-Dioxane
FB-100918	460-166699-05	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: FB-100918
Field Duplicate pair: MW-7/DUP-100918

The above-listed aqueous samples and field blank sample were collected on October 9, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-Dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatile Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

1,4-Dioxane and PFAS

Analytes were detected in the associated laboratory method and field blank samples. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
1,4-Dioxane				
1,4-Dioxane	FB-100918: All samples	0.12 ug/L	1.2 ug/L	Qualify the results for 1,4-dioxane in samples MW-2 and MW-4 as nondetect (U) at the RL.
PFAS				
Perfluoroundecanoic acid (PFUnA)	Method MB 200- 135487: All samples	0.319 ng/L	3.19 ng/L	Qualify the results for Perfluoroundecanoic acid (PFUnA) in samples MW-2, MW-4, MW-7, DUP-100918, and FB-100918 as nondetect (U) at the RL.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
MW-2	M2-6:2 FTS	210	25-150	Estimate (J) the positive result for 6:2 FTS in sample MW-2.
MW-4	M2-6:2 FTS	339	25-150	Estimate (J) the positive result for 6:2 FTS in sample MW-4.
	M2-8:2 FTS	224		Validation action was not required as the result for 8:2 FTS was not detected in sample MW-4 and therefore not affected by the high recovery.
MW-7	M2-6:2 FTS	320	25-150	Estimate (J) the positive result for 6:2 FTS in sample MW-7.
DUP-100918	M2-6:2 FTS	220	25-150	Estimate (J) the positive result for 6:2 FTS in sample DUP-100918.
FB-100918	M2-6:2 FTS	163	25-150	Validation actions were not required as the result for 6:2 FTS was not detected in this sample and therefore not affected by the high recovery.

It should be noted that IDA recoveries outside of control limits generally have a minimal effect on the data quality as the results are quantitated by isotope dilution and are corrected accordingly. However, professional judgment was taken to qualify affected compound results for associated isotope dilution analytes recovered outside of the recommended control limits.

MS/MSD Results

MS/MSD analyses were performed on sample MW-2 for 1,4-dioxane and PFAS. Recovery and precision criteria were met.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples MW-7 and DUP-100918 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria.

Analyte	MW-7 (ng/L)	DUP-100918 (ng/L)	RPD (%)
Perfluorobutanoic acid (PFBA)	5.70	6.78	17.3
Perfluoropentanoic (PFPeA)	10.2	10.3	1.0
Perfluorohexanoic acid (PFHxA)	10.1	9.61	5.0

Analyte	MW-7 (ng/L)	DUP-100918 (ng/L)	RPD (%)
Perfluoroheptanoic acid (PFHpA)	9.36	9.09	2.9
Perfluorooctanoic acid (PFOA)	57.3	57.9	1.0
Perfluorononanoic acid (PFNA)	4.06	3.83	5.8
Perfluorodecanoic acid (PFDA)	1.49 J	1.49 J	0
Perfluorobutanesulfonic acid (PFBS)	3.06	3.36	9.3
Perfluorohexanesulfonic acid (PFHxS)	5.55	5.13	7.9
Perfluorooctanesulfonic acid (PFOS)	31.6	32.2	1.9
Perfluorodecanesulfonic acid (PFDS)	0.57 J	0.97 J	51.9, Within the RL
6:2 FTS	7.74 J	7.13 J	8.2
NC – Not calculable			
Criteria: When both results are ≥ 5 x the RL, RPDs must be $< 30\%$.			
When results are < 5 x the QL, the absolute difference between the original and field duplicate results must be $< RL$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

Dilutions were not required.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Flatbush-PFAS-1803556-1.17

TestAmerica Job ID: 460-166699-1

Client Sample ID: MW-2

Lab Sample ID: 460-166699-1

Date Collected: 10/09/18 11:20

Matrix: Water

Date Received: 10/10/18 18:40

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.087 J	0.20 U	0.20	0.016	ug/L		10/13/18 10:08	10/13/18 19:36	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	34		10 - 150				10/13/18 10:08	10/13/18 19:36	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	10.7		1.68	0.35	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluoropentanoic acid (PFPeA)	15.2		1.68	0.63	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluorohexanoic acid (PFHxA)	13.0		1.68	0.20	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluoroheptanoic acid (PFHpA)	11.8		1.68	0.27	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluorooctanoic acid (PFOA)	65.7		1.68	0.27	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluorononanoic acid (PFNA)	3.01		1.68	0.32	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluorodecanoic acid (PFDA)	0.74 J		1.68	0.32	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluoroundecanoic acid (PFUnA)	0.62 J-B	1.68 U	1.68	0.21	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluorododecanoic acid (PFDoA)	1.68 U		1.68	0.29	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluorotridecanoic acid (PFTriA)	0.22 J		1.68	0.20	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluorotetradecanoic acid (PFTeA)	1.68 U		1.68	0.38	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluorobutanesulfonic acid (PFBS)	2.93		1.68	0.37	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluorohexanesulfonic acid (PFHxS)	3.58		1.68	0.22	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluoroheptanesulfonic Acid (PFHpS)	0.99 J		1.68	0.69	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluorooctanesulfonic acid (PFOS)	37.1		1.68	0.64	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluorodecanesulfonic acid (PFDS)	1.68 U		1.68	0.45	ng/L		10/19/18 11:40	10/21/18 20:29	1
Perfluorooctanesulfonamide (FOSA)	1.68 U		1.68	0.47	ng/L		10/19/18 11:40	10/21/18 20:29	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.8 U		16.8	0.38	ng/L		10/19/18 11:40	10/21/18 20:29	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.8 U		16.8	0.59	ng/L		10/19/18 11:40	10/21/18 20:29	1
6:2 FTS	47.3 J		16.8	0.84	ng/L		10/19/18 11:40	10/21/18 20:29	1
8:2 FTS	16.8 U		16.8	0.47	ng/L		10/19/18 11:40	10/21/18 20:29	1

Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	52		25 - 150				10/19/18 11:40	10/21/18 20:29	1
13C5-PFPeA DNU	76		25 - 150				10/19/18 11:40	10/21/18 20:29	1
13C2 PFHxA	80		25 - 150				10/19/18 11:40	10/21/18 20:29	1
13C4 PFHpA	80		25 - 150				10/19/18 11:40	10/21/18 20:29	1
13C4 PFOA	88		25 - 150				10/19/18 11:40	10/21/18 20:29	1
13C5 PFNA	91		25 - 150				10/19/18 11:40	10/21/18 20:29	1
13C2 PFDA	95		25 - 150				10/19/18 11:40	10/21/18 20:29	1
13C2 PFUnA	106		25 - 150				10/19/18 11:40	10/21/18 20:29	1
13C2 PFDoA	111		25 - 150				10/19/18 11:40	10/21/18 20:29	1
13C2 PFTeA	95		25 - 150				10/19/18 11:40	10/21/18 20:29	1
13C3 PFBS	93		25 - 150				10/19/18 11:40	10/21/18 20:29	1
18O2 PFHxS	98		25 - 150				10/19/18 11:40	10/21/18 20:29	1
13C4 PFOS	94		25 - 150				10/19/18 11:40	10/21/18 20:29	1
13C8 FOSA	51		25 - 150				10/19/18 11:40	10/21/18 20:29	1
d3-NMeFOSAA	79		25 - 150				10/19/18 11:40	10/21/18 20:29	1

TestAmerica Edison

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11/16/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Flatbush-PFAS-1803556-1.17

TestAmerica Job ID: 460-166699-1

Client Sample ID: MW-2

Lab Sample ID: 460-166699-1

Date Collected: 10/09/18 11:20

Matrix: Water

Date Received: 10/10/18 18:40

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
d5-NEtFOSAA	89		25 - 150	10/19/18 11:40	10/21/18 20:29	1
M2-6:2 FTS	210	*	25 - 150	10/19/18 11:40	10/21/18 20:29	1
M2-8:2 FTS	109		25 - 150	10/19/18 11:40	10/21/18 20:29	1

Client Sample ID: MW-4

Lab Sample ID: 460-166699-2

Date Collected: 10/09/18 14:25

Matrix: Water

Date Received: 10/10/18 18:40

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.083	J	0.20	0.016	ug/L		10/13/18 10:08	10/13/18 21:03	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	37		10 - 150				10/13/18 10:08	10/13/18 21:03	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	22.4		1.62	0.33	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluoropentanoic acid (PFPeA)	5.00		1.62	0.61	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluorohexanoic acid (PFHxA)	5.04		1.62	0.19	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluoroheptanoic acid (PFHpA)	7.16		1.62	0.26	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluorooctanoic acid (PFOA)	53.5		1.62	0.26	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluorononanoic acid (PFNA)	1.31 J		1.62	0.31	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluorodecanoic acid (PFDA)	1.62 U		1.62	0.31	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluoroundecanoic acid (PFUnA)	0.35 J B	1.62 U	1.62	0.20	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluorododecanoic acid (PFDoA)	1.62 U		1.62	0.28	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluorotridecanoic acid (PFTriA)	1.62 U		1.62	0.19	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluorotetradecanoic acid (PFTeA)	1.62 U		1.62	0.37	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluorobutanesulfonic acid (PFBS)	3.38		1.62	0.36	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluorohexanesulfonic acid (PFHxS)	2.54		1.62	0.21	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.62 U		1.62	0.67	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluorooctanesulfonic acid (PFOS)	23.4		1.62	0.62	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluorodecanesulfonic acid (PFDS)	1.62 U		1.62	0.43	ng/L		10/19/18 11:40	10/21/18 21:17	1
Perfluorooctanesulfonamide (FOSA)	1.62 U		1.62	0.45	ng/L		10/19/18 11:40	10/21/18 21:17	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.2 U		16.2	0.37	ng/L		10/19/18 11:40	10/21/18 21:17	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.2 U		16.2	0.57	ng/L		10/19/18 11:40	10/21/18 21:17	1
6:2 FTS	15.8 J		16.2	0.81	ng/L		10/19/18 11:40	10/21/18 21:17	1
8:2 FTS	16.2 U		16.2	0.45	ng/L		10/19/18 11:40	10/21/18 21:17	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	39		25 - 150				10/19/18 11:40	10/21/18 21:17	1
13C5-PFPeA DNU	60		25 - 150				10/19/18 11:40	10/21/18 21:17	1
13C2 PFHxA	59		25 - 150				10/19/18 11:40	10/21/18 21:17	1
13C4 PFHpA	69		25 - 150				10/19/18 11:40	10/21/18 21:17	1
13C4 PFOA	88		25 - 150				10/19/18 11:40	10/21/18 21:17	1
13C5 PFNA	105		25 - 150				10/19/18 11:40	10/21/18 21:17	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Flatbush-PFAS-1803556-1.17

TestAmerica Job ID: 460-166699-1

Client Sample ID: MW-4

Date Collected: 10/09/18 14:25

Date Received: 10/10/18 18:40

Lab Sample ID: 460-166699-2

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDA	105		25 - 150	10/19/18 11:40	10/21/18 21:17	1
13C2 PFUnA	115		25 - 150	10/19/18 11:40	10/21/18 21:17	1
13C2 PFDoA	117		25 - 150	10/19/18 11:40	10/21/18 21:17	1
13C2 PFTeDA	113		25 - 150	10/19/18 11:40	10/21/18 21:17	1
13C3 PFBS	70		25 - 150	10/19/18 11:40	10/21/18 21:17	1
18O2 PFHxS	85		25 - 150	10/19/18 11:40	10/21/18 21:17	1
13C4 PFOS	87		25 - 150	10/19/18 11:40	10/21/18 21:17	1
13C8 FOSA	48		25 - 150	10/19/18 11:40	10/21/18 21:17	1
d3-NMeFOSAA	90		25 - 150	10/19/18 11:40	10/21/18 21:17	1
d5-NEtFOSAA	109		25 - 150	10/19/18 11:40	10/21/18 21:17	1
M2-6:2 FTS	339 *		25 - 150	10/19/18 11:40	10/21/18 21:17	1
M2-8:2 FTS	224 *		25 - 150	10/19/18 11:40	10/21/18 21:17	1

Client Sample ID: MW-7

Date Collected: 10/09/18 13:10

Date Received: 10/10/18 18:40

Lab Sample ID: 460-166699-3

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/13/18 10:08	10/13/18 21:20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	41		10 - 150				10/13/18 10:08	10/13/18 21:20	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	5.70		1.62	0.33	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluoropentanoic acid (PFPeA)	10.2		1.62	0.61	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluorohexanoic acid (PFHxA)	10.1		1.62	0.19	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluoroheptanoic acid (PFHpA)	9.36		1.62	0.26	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluorooctanoic acid (PFOA)	57.3		1.62	0.26	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluorononanoic acid (PFNA)	4.06		1.62	0.31	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluorodecanoic acid (PFDA)	1.49 J *		1.62	0.31	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluoroundecanoic acid (PFUnA)	0.53 J B 1.62 U.		1.62	0.20	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluorododecanoic acid (PFDoA)	1.62 U		1.62	0.28	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluorotridecanoic acid (PFTriA)	1.62 U		1.62	0.19	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluorotetradecanoic acid (PFTeA)	1.62 U		1.62	0.36	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluorobutanesulfonic acid (PFBS)	3.06		1.62	0.36	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluorohexanesulfonic acid (PFHxS)	5.55		1.62	0.21	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.62 U		1.62	0.66	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluorooctanesulfonic acid (PFOS)	31.6		1.62	0.61	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluorodecanesulfonic acid (PFDS)	0.57 J *		1.62	0.43	ng/L		10/19/18 11:40	10/21/18 21:33	1
Perfluorooctanesulfonamide (FOSA)	1.62 U		1.62	0.45	ng/L		10/19/18 11:40	10/21/18 21:33	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.2 U		16.2	0.36	ng/L		10/19/18 11:40	10/21/18 21:33	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.2 U		16.2	0.57	ng/L		10/19/18 11:40	10/21/18 21:33	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Flatbush-PFAS-1803556-1.17

TestAmerica Job ID: 460-166699-1

Client Sample ID: MW-7

Date Collected: 10/09/18 13:10

Date Received: 10/10/18 18:40

Lab Sample ID: 460-166699-3

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
6:2 FTS	7.74	J	16.2	0.81	ng/L	-	10/19/18 11:40	10/21/18 21:33	1
8:2 FTS	16.2	U	16.2	0.45	ng/L	-	10/19/18 11:40	10/21/18 21:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	35		25 - 150				10/19/18 11:40	10/21/18 21:33	1
13C5-PFPeA DNU	59		25 - 150				10/19/18 11:40	10/21/18 21:33	1
13C2 PFHxA	65		25 - 150				10/19/18 11:40	10/21/18 21:33	1
13C4 PFHpA	75		25 - 150				10/19/18 11:40	10/21/18 21:33	1
13C4 PFOA	85		25 - 150				10/19/18 11:40	10/21/18 21:33	1
13C5 PFNA	94		25 - 150				10/19/18 11:40	10/21/18 21:33	1
13C2 PFDA	100		25 - 150				10/19/18 11:40	10/21/18 21:33	1
13C2 PFUnA	102		25 - 150				10/19/18 11:40	10/21/18 21:33	1
13C2 PFDoA	96		25 - 150				10/19/18 11:40	10/21/18 21:33	1
13C2 PFTeDA	108		25 - 150				10/19/18 11:40	10/21/18 21:33	1
13C3 PFBS	72		25 - 150				10/19/18 11:40	10/21/18 21:33	1
18O2 PFHxS	92		25 - 150				10/19/18 11:40	10/21/18 21:33	1
13C4 PFOS	98		25 - 150				10/19/18 11:40	10/21/18 21:33	1
13C8 FOSA	39		25 - 150				10/19/18 11:40	10/21/18 21:33	1
d3-NMeFOSAA	70		25 - 150				10/19/18 11:40	10/21/18 21:33	1
d5-NEtFOSAA	95		25 - 150				10/19/18 11:40	10/21/18 21:33	1
M2-6:2 FTS	320 *		25 - 150				10/19/18 11:40	10/21/18 21:33	1
M2-8:2 FTS	129		25 - 150				10/19/18 11:40	10/21/18 21:33	1

Client Sample ID: DUP-100918

Date Collected: 10/09/18 00:00

Date Received: 10/10/18 18:40

Lab Sample ID: 460-166699-4

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L	-	10/13/18 10:08	10/13/18 21:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	39		10 - 150				10/13/18 10:08	10/13/18 21:37	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	6.78		1.61	0.33	ng/L	-	10/19/18 11:40	10/21/18 21:49	1
Perfluoropentanoic acid (PFPeA)	10.3		1.61	0.60	ng/L	-	10/19/18 11:40	10/21/18 21:49	1
Perfluorohexanoic acid (PFHxA)	9.61		1.61	0.19	ng/L	-	10/19/18 11:40	10/21/18 21:49	1
Perfluoroheptanoic acid (PFHpA)	9.09		1.61	0.26	ng/L	-	10/19/18 11:40	10/21/18 21:49	1
Perfluorooctanoic acid (PFOA)	57.9		1.61	0.26	ng/L	-	10/19/18 11:40	10/21/18 21:49	1
Perfluorononanoic acid (PFNA)	3.83		1.61	0.31	ng/L	-	10/19/18 11:40	10/21/18 21:49	1
Perfluorodecanoic acid (PFDA)	1.49	J	1.61	0.31	ng/L	-	10/19/18 11:40	10/21/18 21:49	1
Perfluoroundecanoic acid (PFUnA)	0.38 J-B 1.61 U		1.61	0.20	ng/L	-	10/19/18 11:40	10/21/18 21:49	1
Perfluorododecanoic acid (PFDoA)	1.61	U	1.61	0.28	ng/L	-	10/19/18 11:40	10/21/18 21:49	1
Perfluorotridecanoic acid (PFTriA)	1.61	U	1.61	0.19	ng/L	-	10/19/18 11:40	10/21/18 21:49	1
Perfluorotetradecanoic acid (PFTeA)	1.61	U	1.61	0.36	ng/L	-	10/19/18 11:40	10/21/18 21:49	1
Perfluorobutanesulfonic acid (PFBS)	3.36		1.61	0.35	ng/L	-	10/19/18 11:40	10/21/18 21:49	1
Perfluorohexanesulfonic acid (PFHxS)	5.13		1.61	0.21	ng/L	-	10/19/18 11:40	10/21/18 21:49	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Flatbush-PFAS-1803556-1.17

TestAmerica Job ID: 460-166699-1

Client Sample ID: DUP-100918

Lab Sample ID: 460-166699-4

Date Collected: 10/09/18 00:00

Matrix: Water

Date Received: 10/10/18 18:40

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanesulfonic Acid (PFHpS)	1.61	U	1.61	0.66	ng/L		10/19/18 11:40	10/21/18 21:49	1
Perfluorooctanesulfonic acid (PFOS)	32.2		1.61	0.61	ng/L		10/19/18 11:40	10/21/18 21:49	1
Perfluorodecanesulfonic acid (PFDS)	0.97	J	1.61	0.43	ng/L		10/19/18 11:40	10/21/18 21:49	1
Perfluorooctanesulfonamide (FOSA)	1.61	U	1.61	0.45	ng/L		10/19/18 11:40	10/21/18 21:49	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.1	U	16.1	0.36	ng/L		10/19/18 11:40	10/21/18 21:49	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.1	U	16.1	0.56	ng/L		10/19/18 11:40	10/21/18 21:49	1
6:2 FTS	7.13	J	16.1	0.81	ng/L		10/19/18 11:40	10/21/18 21:49	1
8:2 FTS	16.1	U	16.1	0.45	ng/L		10/19/18 11:40	10/21/18 21:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	34		25 - 150				10/19/18 11:40	10/21/18 21:49	1
13C5-PFPeA DNU	59		25 - 150				10/19/18 11:40	10/21/18 21:49	1
13C2 PFHxA	65		25 - 150				10/19/18 11:40	10/21/18 21:49	1
13C4 PFHpA	76		25 - 150				10/19/18 11:40	10/21/18 21:49	1
13C4 PFOA	84		25 - 150				10/19/18 11:40	10/21/18 21:49	1
13C5 PFNA	89		25 - 150				10/19/18 11:40	10/21/18 21:49	1
13C2 PFDA	89		25 - 150				10/19/18 11:40	10/21/18 21:49	1
13C2 PFUnA	97		25 - 150				10/19/18 11:40	10/21/18 21:49	1
13C2 PFDoA	98		25 - 150				10/19/18 11:40	10/21/18 21:49	1
13C2 PFTeDA	92		25 - 150				10/19/18 11:40	10/21/18 21:49	1
13C3 PFBS	71		25 - 150				10/19/18 11:40	10/21/18 21:49	1
18O2 PFHxS	94		25 - 150				10/19/18 11:40	10/21/18 21:49	1
13C4 PFOS	95		25 - 150				10/19/18 11:40	10/21/18 21:49	1
13C8 FOSA	63		25 - 150				10/19/18 11:40	10/21/18 21:49	1
d3-NMeFOSAA	80		25 - 150				10/19/18 11:40	10/21/18 21:49	1
d5-NEtFOSAA	88		25 - 150				10/19/18 11:40	10/21/18 21:49	1
M2-6:2 FTS	220		25 - 150				10/19/18 11:40	10/21/18 21:49	1
M2-8:2 FTS	97		25 - 150				10/19/18 11:40	10/21/18 21:49	1

Client Sample ID: FB-100918

Lab Sample ID: 460-166699-5

Date Collected: 10/09/18 14:30

Matrix: Water

Date Received: 10/10/18 18:40

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.12	J	0.20	0.016	ug/L		10/13/18 10:08	10/13/18 21:55	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	39		10 - 150				10/13/18 10:08	10/13/18 21:55	1

Method: 537 (modified) - Fluorinated Alkyl Substances									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.76	U	1.76	0.36	ng/L		10/19/18 11:40	10/21/18 22:05	1
Perfluoropentanoic acid (PFPeA)	1.76	U	1.76	0.66	ng/L		10/19/18 11:40	10/21/18 22:05	1
Perfluorohexanoic acid (PFHxA)	1.76	U	1.76	0.21	ng/L		10/19/18 11:40	10/21/18 22:05	1
Perfluoroheptanoic acid (PFHpA)	1.76	U	1.76	0.28	ng/L		10/19/18 11:40	10/21/18 22:05	1
Perfluorooctanoic acid (PFOA)	1.76	U	1.76	0.28	ng/L		10/19/18 11:40	10/21/18 22:05	1
Perfluorononanoic acid (PFNA)	1.76	U	1.76	0.33	ng/L		10/19/18 11:40	10/21/18 22:05	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Flatbush-PFAS-1803556-1.17

TestAmerica Job ID: 460-166699-1

Client Sample ID: FB-100918

Lab Sample ID: 460-166699-5

Date Collected: 10/09/18 14:30

Matrix: Water

Date Received: 10/10/18 18:40

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanoic acid (PFDA)	1.76	U	1.76	0.33	ng/L		10/19/18 11:40	10/21/18 22:05	1
Perfluoroundecanoic acid (PFUnA)	0.36 J-B 1.76 U		1.76	0.22	ng/L		10/19/18 11:40	10/21/18 22:05	1
Perfluorododecanoic acid (PFDoA)	1.76	U	1.76	0.31	ng/L		10/19/18 11:40	10/21/18 22:05	1
Perfluorotridecanoic acid (PFTriA)	1.76	U	1.76	0.21	ng/L		10/19/18 11:40	10/21/18 22:05	1
Perfluorotetradecanoic acid (PFTeA)	1.76	U	1.76	0.40	ng/L		10/19/18 11:40	10/21/18 22:05	1
Perfluorobutanesulfonic acid (PFBS)	1.76	U	1.76	0.39	ng/L		10/19/18 11:40	10/21/18 22:05	1
Perfluorohexanesulfonic acid (PFHxS)	1.76	U	1.76	0.23	ng/L		10/19/18 11:40	10/21/18 22:05	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.76	U	1.76	0.72	ng/L		10/19/18 11:40	10/21/18 22:05	1
Perfluorooctanesulfonic acid (PFOS)	1.76	U	1.76	0.67	ng/L		10/19/18 11:40	10/21/18 22:05	1
Perfluorodecanesulfonic acid (PFDS)	1.76	U	1.76	0.47	ng/L		10/19/18 11:40	10/21/18 22:05	1
Perfluorooctanesulfonamide (FOSA)	1.76	U	1.76	0.49	ng/L		10/19/18 11:40	10/21/18 22:05	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.6	U	17.6	0.40	ng/L		10/19/18 11:40	10/21/18 22:05	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.6	U	17.6	0.62	ng/L		10/19/18 11:40	10/21/18 22:05	1
6:2 FTS	17.6	U	17.6	0.88	ng/L		10/19/18 11:40	10/21/18 22:05	1
8:2 FTS	17.6	U	17.6	0.49	ng/L		10/19/18 11:40	10/21/18 22:05	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	85		25 - 150	10/19/18 11:40	10/21/18 22:05	1
13C5-PFPeA DNU	106		25 - 150	10/19/18 11:40	10/21/18 22:05	1
13C2 PFHxA	111		25 - 150	10/19/18 11:40	10/21/18 22:05	1
13C4 PFHpA	91		25 - 150	10/19/18 11:40	10/21/18 22:05	1
13C4 PFOA	97		25 - 150	10/19/18 11:40	10/21/18 22:05	1
13C5 PFNA	95		25 - 150	10/19/18 11:40	10/21/18 22:05	1
13C2 PFDA	97		25 - 150	10/19/18 11:40	10/21/18 22:05	1
13C2 PFUnA	95		25 - 150	10/19/18 11:40	10/21/18 22:05	1
13C2 PFDoA	94		25 - 150	10/19/18 11:40	10/21/18 22:05	1
13C2 PFTeA	89		25 - 150	10/19/18 11:40	10/21/18 22:05	1
13C3 PFBS	94		25 - 150	10/19/18 11:40	10/21/18 22:05	1
18O2 PFHxS	90		25 - 150	10/19/18 11:40	10/21/18 22:05	1
13C4 PFOS	96		25 - 150	10/19/18 11:40	10/21/18 22:05	1
13C8 FOSA	56		25 - 150	10/19/18 11:40	10/21/18 22:05	1
d3-NMeFOSAA	84		25 - 150	10/19/18 11:40	10/21/18 22:05	1
d5-NEtFOSAA	88		25 - 150	10/19/18 11:40	10/21/18 22:05	1
M2-6:2 FTS	163		25 - 150	10/19/18 11:40	10/21/18 22:05	1
M2-8:2 FTS	89		25 - 150	10/19/18 11:40	10/21/18 22:05	1

TestAmerica Edison

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Site: Long Island Emerging Contaminants, Coney Island
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-166356
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 15, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
MW-18	460-166356-01	PFAS, 1,4-Dioxane
MW-2	460-166356-02	PFAS, 1,4-Dioxane
MW-16	460-166356-03	PFAS, 1,4-Dioxane
DUP-100518-1	460-166356-04	PFAS, 1,4-Dioxane
FB-100518-1	460-166356-05	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: FB-100518-1
Field Duplicate pair: MW-18/DUP-100518-1

The above-listed aqueous samples and field blank sample were collected on October 5, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-Dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatile Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

Analytes were detected in the associated laboratory method blank sample. Contaminants were not detected in the associated field blank sample after application of laboratory blank contamination actions. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
Perfluorooctanoic acid (PFOA)	Method MB 200-135439: All samples	0.321 ng/L	3.21 ng/L	Validation actions were not required.
Perfluoroundecanoic acid (PFUnA)		0.301 ng/L	3.01 ng/L	Qualify the result for Perfluoroundecanoic acid (PFUnA) in samples MW-18, DUP-100518-1, and FB-100518-1 as nondetect (U) at the RL.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
MW-16	M2-6:2 FTS	386	25-150	Validation action was not required as the results for 6:2 FTS, 8:2 FTS, PFDA, and PFUnA were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	260		
	13C2 PFDA	151		
	13C2 PFUnA	183		
	D5-NEtFOSAA	208		Estimate (J) the positive result for N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA) in sample MW-16.
MW-18	13C4 PFBA	16	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA) and N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA) in sample MW-18.
	D5-NetFOSAA	201		
	M2-6:2 FTS	480		Validation action was not required as the results for 6:2 FTS, 8:2 FTS, PFDoA, PFTriA, PFTeDA, and PFUnA were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	310		
	13C2 PFUnA	159		
	13C2 PFDoA	156		
	13C2 PFTeDA	168		
DUP-100518-1	13C4 PFBA	17	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA), Perfluoropentanoic acid (PFPeA), and N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA) in sample DUP-100518-1.
	D5-NetFOSAA	198		
	13C5 PFPeA	22		Validation action was not required as the results for 6:2 FTS, 8:2 FTS, PFDoA, PFTriA, PFTeDA, and PFUnA were not detected in this sample and therefore not affected by the high recoveries.
	M2-6:2 FTS	420		
	M2-8:2 FTS	320		
	13C2 PFUnA	166		
	13C2 PFDoA	163		
	13C2 PFTeDA	175		

It should be noted that IDA recoveries outside of control limits generally have a minimal effect on the data quality as the results are quantitated by isotope dilution and are corrected accordingly. However, professional judgment was taken to qualify affected compound results for associated isotope dilution analytes recovered outside of the recommended control limits.

MS/MSD Results

MS/MSD analyses were performed on sample MW-16 for 1,4-dioxane and PFAS. Recovery criteria were met for analytes which were detected at levels less than four times the matrix spike. Precision criteria were met.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples MW-18 and DUP-100518-1 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria.

Analyte	MW-18 (ng/L)	DUP-100518-1 (ng/L)	RPD (%)
1,4-Dioxane	0.092 J	0.095 J	3.2
Perfluorobutanoic acid (PFBA)	97.3	80.0	19.5
Perfluoropentanoic (PFPeA)	28.9	36.1	22.2
Perfluorohexanoic acid (PFHxA)	11.0	12.0	8.7
Perfluoroheptanoic acid (PFHpA)	15.2	16.1	5.8
Perfluorooctanoic acid (PFOA)	107	97.4	9.4
Perfluorononanoic acid (PFNA)	2.60	2.59	0.4
Perfluorodecanoic acid (PFDA)	0.43 J	0.58 J	29.7
Perfluorobutanesulfonic acid (PFBS)	6.66	6.18	7.5
Perfluorohexanesulfonic acid (PFHxS)	12.9	11.1	15.0
Perfluoroheptanesulfonic Acid (PFHpS)	1.27 J	1.54 J	19.2
Perfluorooctanesulfonic acid (PFOS)	87.3	88.0	0.8
Perfluorooctanesulfonamide (FOSA)	2.67	2.81	5.1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	4.11 J	3.72 J	10.0
NC – Not calculable			
Criteria: When both results are $\geq 5x$ the RL, RPDs must be $< 30\%$.			
When results are $< 5x$ the QL, the absolute difference between the original and field duplicate results must be $< RL$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

The following table lists the sample dilutions which were performed and the results to be reported.

Sample	PFAS Analysis Reported
MW-18	A 3-fold dilution was performed for Perfluoroheptanoic acid (PFHpA), Perfluorooctanoic acid (PFOA), and Perfluorohexanesulfonic acid (PFHxS) due to sample matrix. All other results were reported from the undiluted analysis.
MW-2	A 5-fold dilution was performed due to sample matrix. RLs were elevated in this sample.

Sample	PFAS Analysis Reported
MW-16	A 10-fold dilution was performed for Perfluoropentanoic acid (PFPeA), Perfluoroheptanoic acid (PFHpA), Perfluorooctanoic acid (PFOA), and Perfluorohexanesulfonic acid (PFHxS). All other results were reported from the 5-fold dilution analysis. RLs were elevated in this sample.
DUP-100518-1	A 3-fold dilution was performed for Perfluoroheptanoic acid (PFHpA), Perfluorooctanoic acid (PFOA), and Perfluorohexanesulfonic acid (PFHxS) due to sample matrix. All other results were reported from the undiluted analysis.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DRAFT

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Coney Is-PFAS-1803556-1.10

TestAmerica Job ID: 460-166356-1

Client Sample ID: MW-18

Date Collected: 10/05/18 08:10

Date Received: 10/05/18 18:00

Lab Sample ID: 460-166356-1

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.092	J	0.20	0.016	ug/L		10/09/18 20:13	10/10/18 15:15	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	48		10 - 150				10/09/18 20:13	10/10/18 15:15	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	97.3	J	1.94	0.40	ng/L		10/18/18 13:58	10/21/18 15:42	1
Perfluoropentanoic acid (PFPeA)	28.9		1.94	0.73	ng/L		10/18/18 13:58	10/21/18 15:42	1
Perfluorohexanoic acid (PFHxA)	11.0		1.94	0.23	ng/L		10/18/18 13:58	10/21/18 15:42	1
Perfluoroheptanoic acid (PFHpA)	15.2		5.82	0.93	ng/L		10/18/18 13:58	10/22/18 14:20	3
Perfluorooctanoic acid (PFOA)	107	B	5.82	0.93	ng/L		10/18/18 13:58	10/22/18 14:20	3
Perfluorononanoic acid (PFNA)	2.60		1.94	0.37	ng/L		10/18/18 13:58	10/21/18 15:42	1
Perfluorodecanoic acid (PFDA)	0.43	J	1.94	0.37	ng/L		10/18/18 13:58	10/21/18 15:42	1
Perfluoroundecanoic acid (PFUnA)	0.34	J-B	1.94	0.24	ng/L		10/18/18 13:58	10/21/18 15:42	1
Perfluorododecanoic acid (PFDoA)	1.94	U	1.94	0.34	ng/L		10/18/18 13:58	10/21/18 15:42	1
Perfluorotridecanoic acid (PFTriA)	1.94	U	1.94	0.23	ng/L		10/18/18 13:58	10/21/18 15:42	1
Perfluorotetradecanoic acid (PFTeA)	1.94	U	1.94	0.44	ng/L		10/18/18 13:58	10/21/18 15:42	1
Perfluorobutanesulfonic acid (PFBS)	6.66		1.94	0.43	ng/L		10/18/18 13:58	10/21/18 15:42	1
Perfluorohexanesulfonic acid (PFHxS)	12.9		5.82	0.76	ng/L		10/18/18 13:58	10/22/18 14:20	3
Perfluoroheptanesulfonic Acid (PFHpS)	1.27	J	1.94	0.80	ng/L		10/18/18 13:58	10/21/18 15:42	1
Perfluorooctanesulfonic acid (PFOS)	87.3		1.94	0.74	ng/L		10/18/18 13:58	10/21/18 15:42	1
Perfluorodecanesulfonic acid (PFDS)	1.94	U	1.94	0.51	ng/L		10/18/18 13:58	10/21/18 15:42	1
Perfluorooctanesulfonamide (FOSA)	2.67		1.94	0.54	ng/L		10/18/18 13:58	10/21/18 15:42	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	19.4	U	19.4	0.44	ng/L		10/18/18 13:58	10/21/18 15:42	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	4.11	J	19.4	0.68	ng/L		10/18/18 13:58	10/21/18 15:42	1
6:2 FTS	19.4	U	19.4	0.97	ng/L		10/18/18 13:58	10/21/18 15:42	1
8:2 FTS	19.4	U	19.4	0.54	ng/L		10/18/18 13:58	10/21/18 15:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	16	*	25 - 150				10/18/18 13:58	10/21/18 15:42	1
13C5-PFPeA DNU	31		25 - 150				10/18/18 13:58	10/21/18 15:42	1
13C2 PFHxA	41		25 - 150				10/18/18 13:58	10/21/18 15:42	1
13C4 PFHpA	69		25 - 150				10/18/18 13:58	10/22/18 14:20	3
13C4 PFOA	88		25 - 150				10/18/18 13:58	10/22/18 14:20	3
13C5 PFNA	122		25 - 150				10/18/18 13:58	10/21/18 15:42	1
13C2 PFDA	142		25 - 150				10/18/18 13:58	10/21/18 15:42	1
13C2 PFUnA	159	*	25 - 150				10/18/18 13:58	10/21/18 15:42	1
13C2 PFDoA	156	*	25 - 150				10/18/18 13:58	10/21/18 15:42	1
13C2 PFTeA	168	*	25 - 150				10/18/18 13:58	10/21/18 15:42	1
13C3 PFBS	73		25 - 150				10/18/18 13:58	10/21/18 15:42	1
18O2 PFHxS	89		25 - 150				10/18/18 13:58	10/22/18 14:20	3
13C4 PFOS	145		25 - 150				10/18/18 13:58	10/21/18 15:42	1
13C8 FOSA	102		25 - 150				10/18/18 13:58	10/21/18 15:42	1
d3-NMeFOSAA	146		25 - 150				10/18/18 13:58	10/21/18 15:42	1

TestAmerica Edison

Jan 11/13/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Coney Is-PFAS-1803556-1.10

TestAmerica Job ID: 460-166356-1

Client Sample ID: MW-18

Date Collected: 10/05/18 08:10

Date Received: 10/05/18 18:00

Lab Sample ID: 460-166356-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
d5-NEtFOSAA	201	*	25 - 150	10/18/18 13:58	10/21/18 15:42	1
M2-6:2 FTS	480	*	25 - 150	10/18/18 13:58	10/21/18 15:42	1
M2-8:2 FTS	310	*	25 - 150	10/18/18 13:58	10/21/18 15:42	1

Client Sample ID: MW-2

Date Collected: 10/05/18 09:00

Date Received: 10/05/18 18:00

Lab Sample ID: 460-166356-2

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Semiquantitative Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.63		0.21	0.017	ug/L		10/09/18 20:13	10/10/18 15:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	51		10 - 150				10/09/18 20:13	10/10/18 15:33	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Perfluorinated Alkyl Substances									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	51.6		8.56	1.76	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluoropentanoic acid (PFPeA)	56.5		8.56	3.21	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluorohexanoic acid (PFHxA)	43.5		8.56	1.03	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluoroheptanoic acid (PFHpA)	22.8		8.56	1.37	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluorooctanoic acid (PFOA)	137	B	8.56	1.37	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluorononanoic acid (PFNA)	11.6		8.56	1.63	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluorodecanoic acid (PFDA)	8.56	U	8.56	1.63	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluoroundecanoic acid (PFUnA)	8.56	U	8.56	1.07	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluorododecanoic acid (PFDoA)	8.56	U	8.56	1.50	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluorotridecanoic acid (PFTriA)	8.56	U	8.56	1.03	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluorotetradecanoic acid (PFTeA)	8.56	U	8.56	1.93	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluorobutanesulfonic acid (PFBS)	7.33	J	8.56	1.88	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluorohexanesulfonic acid (PFHxS)	18.9		8.56	1.11	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluoroheptanesulfonic Acid (PFHpS)	8.56	U	8.56	3.51	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluorooctanesulfonic acid (PFOS)	45.6		8.56	3.25	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluorodecanesulfonic acid (PFDS)	8.56	U	8.56	2.27	ng/L		10/18/18 13:58	10/22/18 14:36	5
Perfluorooctanesulfonamide (FOSA)	8.56	U	8.56	2.40	ng/L		10/18/18 13:58	10/22/18 14:36	5
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	85.6	U	85.6	1.93	ng/L		10/18/18 13:58	10/22/18 14:36	5
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	85.6	U	85.6	3.00	ng/L		10/18/18 13:58	10/22/18 14:36	5
6:2 FTS	85.6	U	85.6	4.28	ng/L		10/18/18 13:58	10/22/18 14:36	5
8:2 FTS	85.6	U	85.6	2.40	ng/L		10/18/18 13:58	10/22/18 14:36	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	25		25 - 150				10/18/18 13:58	10/22/18 14:36	5
13C5-PFPeA DNU	66		25 - 150				10/18/18 13:58	10/22/18 14:36	5
13C2 PFHxA	47		25 - 150				10/18/18 13:58	10/22/18 14:36	5
13C4 PFHpA	78		25 - 150				10/18/18 13:58	10/22/18 14:36	5
13C4 PFOA	99		25 - 150				10/18/18 13:58	10/22/18 14:36	5
13C5 PFNA	104		25 - 150				10/18/18 13:58	10/22/18 14:36	5
13C2 PFDA	119		25 - 150				10/18/18 13:58	10/22/18 14:36	5

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Coney Is-PFAS-1803556-1.10

TestAmerica Job ID: 460-166356-1

Client Sample ID: MW-2

Date Collected: 10/05/18 09:00

Date Received: 10/05/18 18:00

Lab Sample ID: 460-166356-2

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	114		25 - 150	10/18/18 13:58	10/22/18 14:36	5
13C2 PFDoA	97		25 - 150	10/18/18 13:58	10/22/18 14:36	5
13C2 PFTeDA	97		25 - 150	10/18/18 13:58	10/22/18 14:36	5
13C3 PFBS	72		25 - 150	10/18/18 13:58	10/22/18 14:36	5
18O2 PFHxS	88		25 - 150	10/18/18 13:58	10/22/18 14:36	5
13C4 PFOS	86		25 - 150	10/18/18 13:58	10/22/18 14:36	5
13C8 FOSA	72		25 - 150	10/18/18 13:58	10/22/18 14:36	5
d3-NMeFOSAA	89		25 - 150	10/18/18 13:58	10/22/18 14:36	5
d5-NEtFOSAA	124		25 - 150	10/18/18 13:58	10/22/18 14:36	5
M2-6:2 FTS	235 *		25 - 150	10/18/18 13:58	10/22/18 14:36	5
M2-8:2 FTS	125		25 - 150	10/18/18 13:58	10/22/18 14:36	5

Client Sample ID: MW-16

Date Collected: 10/05/18 08:05

Date Received: 10/05/18 18:00

Lab Sample ID: 460-166356-3

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.24		0.20	0.016	ug/L		10/09/18 20:13	10/10/18 15:50	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	48		10 - 150				10/09/18 20:13	10/10/18 15:50	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	276		8.52	1.75	ng/L		10/18/18 13:58	10/22/18 15:56	5
Perfluoropentanoic acid (PFPeA)	68.5		17.0	6.39	ng/L		10/18/18 13:58	10/22/18 14:52	10
Perfluorohexanoic acid (PFHxA)	44.0		8.52	1.02	ng/L		10/18/18 13:58	10/22/18 15:56	5
Perfluoroheptanoic acid (PFHpA)	50.9		17.0	2.73	ng/L		10/18/18 13:58	10/22/18 14:52	10
Perfluorooctanoic acid (PFOA)	487		17.0	2.73	ng/L		10/18/18 13:58	10/22/18 14:52	10
Perfluorononanoic acid (PFNA)	11.7		8.52	1.62	ng/L		10/18/18 13:58	10/22/18 15:56	5
Perfluorodecanoic acid (PFDA)	8.52 U		8.52	1.62	ng/L		10/18/18 13:58	10/22/18 15:56	5
Perfluoroundecanoic acid (PFUnA)	8.52 U		8.52	1.07	ng/L		10/18/18 13:58	10/22/18 15:56	5
Perfluorododecanoic acid (PFDoA)	8.52 U		8.52	1.49	ng/L		10/18/18 13:58	10/22/18 15:56	5
Perfluorotridecanoic acid (PFTriA)	8.52 U		8.52	1.02	ng/L		10/18/18 13:58	10/22/18 15:56	5
Perfluorotetradecanoic acid (PFTeA)	8.52 U		8.52	1.92	ng/L		10/18/18 13:58	10/22/18 15:56	5
Perfluorobutanesulfonic acid (PFBS)	27.5		8.52	1.87	ng/L		10/18/18 13:58	10/22/18 15:56	5
Perfluorohexanesulfonic acid (PFHxS)	181		17.0	2.22	ng/L		10/18/18 13:58	10/22/18 14:52	10
Perfluoroheptanesulfonic Acid (PFHpS)	33.4		8.52	3.49	ng/L		10/18/18 13:58	10/22/18 15:56	5
Perfluorooctanesulfonic acid (PFOS)	898		8.52	3.24	ng/L		10/18/18 13:58	10/22/18 15:56	5
Perfluorodecanesulfonic acid (PFDS)	8.52 U		8.52	2.26	ng/L		10/18/18 13:58	10/22/18 15:56	5
Perfluorooctanesulfonamide (FOSA)	8.52 U		8.52	2.39	ng/L		10/18/18 13:58	10/22/18 15:56	5
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	85.2 U		85.2	1.92	ng/L		10/18/18 13:58	10/22/18 15:56	5
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	5.29 J		85.2	2.98	ng/L		10/18/18 13:58	10/22/18 15:56	5
6:2 FTS	85.2 U		85.2	4.26	ng/L		10/18/18 13:58	10/22/18 15:56	5
8:2 FTS	85.2 U		85.2	2.39	ng/L		10/18/18 13:58	10/22/18 15:56	5

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Coney Is-PFAS-1803556-1.10

TestAmerica Job ID: 460-166356-1

Client Sample ID: MW-16

Date Collected: 10/05/18 08:05

Date Received: 10/05/18 18:00

Lab Sample ID: 460-166356-3

Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	28		25 - 150	10/18/18 13:58	10/22/18 15:56	5
13C5-PFPeA DNU	54		25 - 150	10/18/18 13:58	10/22/18 14:52	10
13C2 PFHxA	51		25 - 150	10/18/18 13:58	10/22/18 15:56	5
13C4 PFHpA	68		25 - 150	10/18/18 13:58	10/22/18 14:52	10
13C5 PFNA	85		25 - 150	10/18/18 13:58	10/22/18 14:52	10
13C2 PFDA	136		25 - 150	10/18/18 13:58	10/22/18 15:56	5
13C2 PFUnA	151 *		25 - 150	10/18/18 13:58	10/22/18 15:56	5
13C2 PFDoA	183 *		25 - 150	10/18/18 13:58	10/22/18 15:56	5
13C2 PFTeDA	146		25 - 150	10/18/18 13:58	10/22/18 15:56	5
13C3 PFBS	146		25 - 150	10/18/18 13:58	10/22/18 15:56	5
18O2 PFHxS	114		25 - 150	10/18/18 13:58	10/22/18 15:56	5
13C4 PFOS	83		25 - 150	10/18/18 13:58	10/22/18 14:52	10
13C8 FOSA	143		25 - 150	10/18/18 13:58	10/22/18 15:56	5
d3-NMeFOSAA	88		25 - 150	10/18/18 13:58	10/22/18 15:56	5
d5-NEtFOSAA	135		25 - 150	10/18/18 13:58	10/22/18 15:56	5
M2-6:2 FTS	208 *		25 - 150	10/18/18 13:58	10/22/18 15:56	5
M2-8:2 FTS	386 *		25 - 150	10/18/18 13:58	10/22/18 15:56	5
M2-8:2 FTS	260 *		25 - 150	10/18/18 13:58	10/22/18 15:56	5

Client Sample ID: DUP-100518-1

Date Collected: 10/05/18 00:00

Date Received: 10/05/18 18:00

Lab Sample ID: 460-166356-4

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.095	J	0.20	0.016	ug/L		10/09/18 20:13	10/10/18 16:42	1
Isotope Dilution	%Recovery	Qualifier	Limits						
1,4-Dioxane-d8	54		10 - 150						
				</					

Method: 537 (modified) - Fluorinated Alkyl Substances									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	80.0	J	1.94	0.40	ng/L		10/18/18 13:58	10/21/18 17:18	1
Perfluoropentanoic acid (PFPeA)	36.1	J	1.94	0.73	ng/L		10/18/18 13:58	10/21/18 17:18	1
Perfluorohexanoic acid (PFHxA)	12.0		1.94	0.23	ng/L		10/18/18 13:58	10/21/18 17:18	1
Perfluoroheptanoic acid (PFHpA)	16.1		5.83	0.93	ng/L		10/18/18 13:58	10/22/18 15:40	3
Perfluorooctanoic acid (PFOA)	97.4	B	5.83	0.93	ng/L		10/18/18 13:58	10/22/18 15:40	3
Perfluorononanoic acid (PFNA)	2.59		1.94	0.37	ng/L		10/18/18 13:58	10/21/18 17:18	1
Perfluorodecanoic acid (PFDA)	0.58	J	1.94	0.37	ng/L		10/18/18 13:58	10/21/18 17:18	1
Perfluoroundecanoic acid (PFUnA)	0.45	J B	1.94	0.24	ng/L		10/18/18 13:58	10/21/18 17:18	1
Perfluorododecanoic acid (PFDoA)	1.94	U	1.94	0.34	ng/L		10/18/18 13:58	10/21/18 17:18	1
Perfluorotridecanoic acid (PFTriA)	1.94	U	1.94	0.23	ng/L		10/18/18 13:58	10/21/18 17:18	1
Perfluorotetradecanoic acid (PFTeA)	1.94	U	1.94	0.44	ng/L		10/18/18 13:58	10/21/18 17:18	1
Perfluorobutanesulfonic acid (PFBS)	6.18		1.94	0.43	ng/L		10/18/18 13:58	10/21/18 17:18	1
Perfluorohexanesulfonic acid (PFHxS)	11.1		5.83	0.76	ng/L		10/18/18 13:58	10/22/18 15:40	3
Perfluoroheptanesulfonic Acid (PFHpS)	1.54	J	1.94	0.80	ng/L		10/18/18 13:58	10/21/18 17:18	1
Perfluorooctanesulfonic acid (PFOS)	88.0		1.94	0.74	ng/L		10/18/18 13:58	10/21/18 17:18	1
Perfluorodecanesulfonic acid (PFDS)	1.94	U	1.94	0.52	ng/L		10/18/18 13:58	10/21/18 17:18	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Coney Is-PFAS-1803556-1.10

TestAmerica Job ID: 460-166356-1

Client Sample ID: DUP-100518-1

Date Collected: 10/05/18 00:00

Date Received: 10/05/18 18:00

Lab Sample ID: 460-166356-4

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonamide (FOSA)	2.81		1.94	0.54	ng/L		10/18/18 13:58	10/21/18 17:18	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	19.4	U	19.4	0.44	ng/L		10/18/18 13:58	10/21/18 17:18	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	3.72	J	19.4	0.68	ng/L		10/18/18 13:58	10/21/18 17:18	1
6:2 FTS	19.4	U	19.4	0.97	ng/L		10/18/18 13:58	10/21/18 17:18	1
8:2 FTS	19.4	U	19.4	0.54	ng/L		10/18/18 13:58	10/21/18 17:18	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	17	*	25 - 150				10/18/18 13:58	10/21/18 17:18	1
13C5-PFPeA DNU	22	*	25 - 150				10/18/18 13:58	10/21/18 17:18	1
13C2 PFHxA	37		25 - 150				10/18/18 13:58	10/21/18 17:18	1
13C4 PFHpA	67		25 - 150				10/18/18 13:58	10/22/18 15:40	3
13C4 PFOA	97		25 - 150				10/18/18 13:58	10/22/18 15:40	3
13C5 PFNA	122		25 - 150				10/18/18 13:58	10/21/18 17:18	1
13C2 PFDA	149		25 - 150				10/18/18 13:58	10/21/18 17:18	1
13C2 PFUnA	166	*	25 - 150				10/18/18 13:58	10/21/18 17:18	1
13C2 PFDoA	163	*	25 - 150				10/18/18 13:58	10/21/18 17:18	1
13C2 PFTeDA	175	*	25 - 150				10/18/18 13:58	10/21/18 17:18	1
13C3 PFBS	82		25 - 150				10/18/18 13:58	10/21/18 17:18	1
18O2 PFHxS	85		25 - 150				10/18/18 13:58	10/22/18 15:40	3
13C4 PFOS	141		25 - 150				10/18/18 13:58	10/21/18 17:18	1
13C8 FOSA	94		25 - 150				10/18/18 13:58	10/21/18 17:18	1
d3-NMeFOSAA	142		25 - 150				10/18/18 13:58	10/21/18 17:18	1
d5-NEtFOSAA	198	*	25 - 150				10/18/18 13:58	10/21/18 17:18	1
M2-6:2 FTS	420	*	25 - 150				10/18/18 13:58	10/21/18 17:18	1
M2-8:2 FTS	320	*	25 - 150				10/18/18 13:58	10/21/18 17:18	1

Client Sample ID: FB-100518-1

Date Collected: 10/05/18 07:25

Date Received: 10/05/18 18:00

Lab Sample ID: 460-166356-5

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/09/18 20:13	10/10/18 17:00	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	51		10 - 150				10/09/18 20:13	10/10/18 17:00	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.60	U	1.60	0.33	ng/L		10/18/18 13:58	10/21/18 17:34	1
Perfluoropentanoic acid (PFPeA)	1.60	U	1.60	0.60	ng/L		10/18/18 13:58	10/21/18 17:34	1
Perfluorohexanoic acid (PFHxA)	1.60	U	1.60	0.19	ng/L		10/18/18 13:58	10/21/18 17:34	1
Perfluoroheptanoic acid (PFHpA)	1.60	U	1.60	0.26	ng/L		10/18/18 13:58	10/21/18 17:34	1
Perfluorooctanoic acid (PFOA)	1.60	U	1.60	0.26	ng/L		10/18/18 13:58	10/21/18 17:34	1
Perfluorononanoic acid (PFNA)	1.60	U	1.60	0.30	ng/L		10/18/18 13:58	10/21/18 17:34	1
Perfluorodecanoic acid (PFDA)	1.60	U	1.60	0.30	ng/L		10/18/18 13:58	10/21/18 17:34	1
Perfluoroundecanoic acid (PFUnA)	0.22	J-B	1.60	0.20	ng/L		10/18/18 13:58	10/21/18 17:34	1
Perfluorododecanoic acid (PFDoA)	1.60	U	1.60	0.28	ng/L		10/18/18 13:58	10/21/18 17:34	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Coney Is-PFAS-1803556-1.10

TestAmerica Job ID: 460-166356-1

Client Sample ID: FB-100518-1

Date Collected: 10/05/18 07:25

Date Received: 10/05/18 18:00

Lab Sample ID: 460-166356-5

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorotridecanoic acid (PFTriA)	1.60	U	1.60	0.19	ng/L		10/18/18 13:58	10/21/18 17:34	1
Perfluorotetradecanoic acid (PFTeA)	1.60	U	1.60	0.36	ng/L		10/18/18 13:58	10/21/18 17:34	1
Perfluorobutanesulfonic acid (PFBS)	1.60	U	1.60	0.35	ng/L		10/18/18 13:58	10/21/18 17:34	1
Perfluorohexanesulfonic acid (PFHxS)	1.60	U	1.60	0.21	ng/L		10/18/18 13:58	10/21/18 17:34	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.60	U	1.60	0.66	ng/L		10/18/18 13:58	10/21/18 17:34	1
Perfluorooctanesulfonic acid (PFOS)	1.60	U	1.60	0.61	ng/L		10/18/18 13:58	10/21/18 17:34	1
Perfluorodecanesulfonic acid (PFDS)	1.60	U	1.60	0.42	ng/L		10/18/18 13:58	10/21/18 17:34	1
Perfluorooctanesulfonamide (FOSA)	1.60	U	1.60	0.45	ng/L		10/18/18 13:58	10/21/18 17:34	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.0	U	16.0	0.36	ng/L		10/18/18 13:58	10/21/18 17:34	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.0	U	16.0	0.56	ng/L		10/18/18 13:58	10/21/18 17:34	1
6:2 FTS	16.0	U	16.0	0.80	ng/L		10/18/18 13:58	10/21/18 17:34	1
8:2 FTS	16.0	U	16.0	0.45	ng/L		10/18/18 13:58	10/21/18 17:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	83		25 - 150				10/18/18 13:58	10/21/18 17:34	1
13C5-PFPeA DNU	108		25 - 150				10/18/18 13:58	10/21/18 17:34	1
13C2 PFHxA	108		25 - 150				10/18/18 13:58	10/21/18 17:34	1
13C4 PFHpA	97		25 - 150				10/18/18 13:58	10/21/18 17:34	1
13C4 PFOA	102		25 - 150				10/18/18 13:58	10/21/18 17:34	1
13C5 PFNA	99		25 - 150				10/18/18 13:58	10/21/18 17:34	1
13C2 PFDA	99		25 - 150				10/18/18 13:58	10/21/18 17:34	1
13C2 PFUnA	103		25 - 150				10/18/18 13:58	10/21/18 17:34	1
13C2 PFDoA	101		25 - 150				10/18/18 13:58	10/21/18 17:34	1
13C2 PFTeDA	91		25 - 150				10/18/18 13:58	10/21/18 17:34	1
13C3 PFBS	96		25 - 150				10/18/18 13:58	10/21/18 17:34	1
18O2 PFHxS	100		25 - 150				10/18/18 13:58	10/21/18 17:34	1
13C4 PFOS	106		25 - 150				10/18/18 13:58	10/21/18 17:34	1
13C8 FOSA	56		25 - 150				10/18/18 13:58	10/21/18 17:34	1
d3-NMeFOSAA	86		25 - 150				10/18/18 13:58	10/21/18 17:34	1
d5-NEtFOSAA	93		25 - 150				10/18/18 13:58	10/21/18 17:34	1
M2-6:2 FTS	158 *		25 - 150				10/18/18 13:58	10/21/18 17:34	1
M2-8:2 FTS	99		25 - 150				10/18/18 13:58	10/21/18 17:34	1

TestAmerica Edison

777 New Durham Road
Edison, NJ 08817
Phone (732) 549-3900 Fax (732) 549-3679

Chain of Custody Record

NYSC
460501

TestAmerica

THE STANDARD ENVIRONMENTAL TESTING

Client Information		Sampler: Craig Hayes		Lab PM: Haas, Melissa		Carrier Tracking No(s):		COC No:	
Client Contact: Melissa Felter		Phone: 516-263-7391		E-Mail: melissa.haas@testamericainc.com				Page: Page 1 of 1	
Company: GEI Consultants, Inc.								Job #: 166356	
Address: 455 Winding Brook Drive Suite 201		Due Date Requested:		Analysis Requested				Preservation Codes:	
City: Glastonbury		TAT Requested (days): 10 days						A - HCL M - Hexane	
State, Zip: CT, 06033								B - NaOH N - None	
Phone: 860-368-5300(Tel) 860-608-9717(Fax)		PO #: 1803556-1.10						C - Zn Acetate O - AsNaO2	
Email: mfelter@geiconsultants.com		WO #:						D - Nitric Acid P - Na2SO4	
Project Name: Emerging Contaminants - Long Island/NYC		Project #: 46027288						E - NaHSO4 Q - Na2SO3	
Site/Project Description: Conay Is-PFAS-1803556-1.10		SSOW#:						F - MeOH R - Na2S2O3	
								G - Amchlor S - H2SO4	
								H - Ascorbic Acid T - TSP Dodecylhydrate	
								I - Ice U - Acetone	
								J - DI Water V - MCAA	
								K - EDTA W - pH 4-5	
								L - EDA Z - other (specify)	
								Other:	
								Special Instructions/Note:	
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=Water, S=solid, G=grab, ST=Trace, A=Air)	Field Filtered Sample (Yes or No)	PFC IDA - PFAS, Standard List (21 Anal/tes)	32700, SIM, MS, ID (1,4 Dioxane)	Total Number of containers
MW-18	10/5/18	0810	G	Water	N	N			4
MW-2	10/5/18	0900	G	Water	N	N			4
MW-16	10/5/18	0805	G	Water	N	N			12 MS/MSD
DUP-100518-1	10/5/18		G	Water	N	N			4
FB-100518-1	10/5/18	0725	G	Water	N	N			4
 460-166356 Chain of Custody									
Possible Hazard Identification					Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)				
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological					☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months				
Deliverable Requested: I, II, III, IV, Other (specify) NY Cat B					Special Instructions/QC Requirements: Edison lab - log in both tests into one login and ship PFAS				
Empty Kit Relinquished by:					Method of Shipment:				
Relinquished by: Craig Hayes		Date/Time: 10/5/18 13:15		Company: GEI		Received by: [Signature]		Date/Time: 10/5/18 13:15	
Relinquished by: [Signature]		Date/Time: 10/5/18 12:00		Company: T-A		Received by: [Signature]		Date/Time: 10/6/18 18:00	
Relinquished by: [Signature]		Date/Time:		Company:		Received by:		Date/Time:	
Custody Seals Intact: ☒ Yes ☐ No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:					

3.01 3.0 3.2 122 ERT 7

Site: Long Island Emerging Contaminants, Fulton
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-166804
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 15, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
FW-MW-19	460-166804-01	PFAS, 1,4-Dioxane
FW-MW-5R	460-166804-02	PFAS, 1,4-Dioxane
FW-MW-04	460-166804-03	PFAS, 1,4-Dioxane
FW-MW-17	460-166804-04	PFAS, 1,4-Dioxane
DUP-101118	460-166804-05	PFAS, 1,4-Dioxane
FB-101118	460-166804-06	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: FB-101118
Field Duplicate pair: FW-MW-19/DUP-101118

The above-listed aqueous samples and field blank sample were collected on October 11, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-Dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatile Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

1,4-Dioxane and PFAS

Analytes were detected in the associated laboratory method and field blank samples. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
1,4-Dioxane				
1,4-Dioxane	FB-101118: All samples	0.11 ug/L	1.1 ug/L	Qualify the results for 1,4-dioxane in samples FW-MW-19, FW-MW-5R, and DUP-101118 as nondetect (U) at the RL.
PFAS				
Perfluoroundecanoic acid (PFUnA)	Method MB 200-135487: All samples	0.319 ng/L	3.19 ng/L	Qualify the results for Perfluoroundecanoic acid (PFUnA) in samples FW-MW-19, FW-MW-5R, FW-MW-04, FW-MW-17, and DUP-101118 as nondetect (U) at the RL.
Perfluorooctanoic acid (PFOA)	FB-101118: All samples	0.41 ng/L	4.1 ng/L	Validation actions were not required.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
FW-MW-17	13C4 PFBA	20	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA) and 6:2 FTS in sample FW-MW-17.
	M2-6:2 FTS	395		Validation action was not required as the results for 8:2 FTS, NETFOSAA, PFDoA, PFTrIA, PFTeDA, and PFUnA were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	311		
	D5-NetFOSAA	196		
	13C2 PFUnA	165		
	13C2 PFDoA	183		
	13C2 PFTeDA	175		
FW-MW-19	M2-6:2 FTS	253	25-150	Estimate (J) the positive results for 6:2 FTS, Perfluorododecanoic acid (PFDoA), and Perfluorotridecanoic acid (PFTrIA) in sample FW-MW-19.
	13C2 PFDoA	156		Validation action was not required as the results for 8:2 FTS and PFTeA were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	186		
	13C2 PFTeDA	156		
FW-MW-5R	M2-6:2 FTS	296	25-150	Estimate (J) the positive result for 6:2 FTS in sample FW-MW-5R.
FW-MW-04	13C4 PFBA	17	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA) and 6:2 FTS in sample FW-MW-04.
	M2-6:2 FTS	308		Validation action was not required as the result for 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.
	M2-8:2 FTS	183		
DUP-101118	13C4 PFBA	23	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA) and 6:2 FTS in sample DUP-101118.
	M2-6:2 FTS	267		Validation action was not required as the results for 8:2 FTS and PFTeA were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	184		
	13C2 PFTeDA	151		

It should be noted that IDA recoveries outside of control limits generally have a minimal effect on the data quality as the results are quantitated by isotope dilution and are corrected accordingly. However, professional judgment was taken to qualify affected compound results for associated isotope dilution analytes recovered outside of the recommended control limits.

MS/MSD Results

MS/MSD analyses were performed on sample FW-MW-17 for 1,4-dioxane and PFAS. Recovery criteria were met for analytes which were detected at levels less than four times the matrix spike. Precision criteria were met.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples FW-MW-19 and DUP-101118 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria except for Perfluorobutanesulfonic acid (PFBS). The positive results for Perfluorobutanesulfonic acid in samples FW-MW-19 and DUP-101118 were qualified as estimated (J). The direction of bias cannot be determined from this nonconformance.

Analyte	FW-MW-19 (ng/L)	DUP-101118 (ng/L)	RPD (%)
Perfluorobutanoic acid (PFBA)	52.0	53.7	3.2
Perfluoropentanoic acid (PFPeA)	80.4	71.8	11.3
Perfluorohexanoic acid (PFHxA)	106	100	5.8
Perfluoroheptanoic acid (PFHpA)	292	261	11.2
Perfluorooctanoic acid (PFOA)	115	103	11.0
Perfluorononanoic acid (PFNA)	8.62	8.07	6.6
Perfluorodecanoic acid (PFDA)	0.49 J	0.32 J	42.0, Within the RL
Perfluorododecanoic acid (PFDoA)	0.38 J	1.62 U	NC, Within the RL
Perfluorotridecanoic acid (PFTriA)	0.21 J	1.62 U	NC, Within the RL
Perfluorobutanesulfonic acid (PFBS)	2.03	4.00	65.3
Perfluorohexanesulfonic acid (PFHxS)	1.46 J	1.89	25.7
Perfluorooctanesulfonic acid (PFOS)	6.92	6.79	1.9
Perfluorodecanesulfonic acid (PFDS)	0.58 J	1.62 U	NC, Within the RL
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.39 J	16.2 U	NC, Within the RL
6:2 FTS	4.41 J	6.92 J	44.3, Within the RL
NC – Not calculable			
Criteria: When both results are $\geq 5 \times$ the RL, RPDs must be $< 30\%$.			
When results are $< 5 \times$ the QL, the absolute difference between the original and field duplicate results must be $< \text{RL}$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

The following table lists the sample dilutions which were performed and the results to be reported.

Sample	PFAS Analysis Reported
FW-MW-17	A 5-fold dilution was performed for Perfluoroheptanoic acid (PFHpA) and Perfluorohexanesulfonic acid (PFHxS) to reduce matrix effect. All other results were reported from the undiluted analysis.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DRAFT

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Fulton-PFAS-1803556-1.16

TestAmerica Job ID: 460-166804-1

Client Sample ID: FW-MW-19

Lab Sample ID: 460-166804-1

Date Collected: 10/11/18 10:15

Matrix: Water

Date Received: 10/12/18 20:00

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.17	J 0.20U	0.20	0.016	ug/L		10/14/18 09:11	10/15/18 00:51	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	38		10 - 150				10/14/18 09:11	10/15/18 00:51	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	52.0		1.62	0.33	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluoropentanoic acid (PFPeA)	80.4		1.62	0.61	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluorohexanoic acid (PFHxA)	106		1.62	0.19	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluoroheptanoic acid (PFHpA)	292		1.62	0.26	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluorooctanoic acid (PFOA)	115		1.62	0.26	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluorononanoic acid (PFNA)	8.62		1.62	0.31	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluorodecanoic acid (PFDA)	0.49	J	1.62	0.31	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluoroundecanoic acid (PFUnA)	0.61	J 1.62U	1.62	0.20	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluorododecanoic acid (PFDoA)	0.38	J	1.62	0.28	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluorotridecanoic acid (PFTrIA)	0.21	J	1.62	0.19	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluorotetradecanoic acid (PFTeA)	1.62	U	1.62	0.37	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluorobutanesulfonic acid (PFBS)	2.03	J	1.62	0.36	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluorohexanesulfonic acid (PFHxS)	1.46	J	1.62	0.21	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.62	U	1.62	0.67	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluorooctanesulfonic acid (PFOS)	6.92		1.62	0.62	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluorodecanesulfonic acid (PFDS)	0.58	J	1.62	0.43	ng/L		10/19/18 11:40	10/22/18 00:12	1
Perfluorooctanesulfonamide (FOSA)	1.62	U	1.62	0.45	ng/L		10/19/18 11:40	10/22/18 00:12	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.39	J	16.2	0.37	ng/L		10/19/18 11:40	10/22/18 00:12	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.2	U	16.2	0.57	ng/L		10/19/18 11:40	10/22/18 00:12	1
6:2 FTS	4.41	J	16.2	0.81	ng/L		10/19/18 11:40	10/22/18 00:12	1
8:2 FTS	16.2	U	16.2	0.45	ng/L		10/19/18 11:40	10/22/18 00:12	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	26		25 - 150				10/19/18 11:40	10/22/18 00:12	1
13C5-PFPeA DNU	48		25 - 150				10/19/18 11:40	10/22/18 00:12	1
13C2 PFHxA	59		25 - 150				10/19/18 11:40	10/22/18 00:12	1
13C4 PFHpA	74		25 - 150				10/19/18 11:40	10/22/18 00:12	1
13C4 PFOA	95		25 - 150				10/19/18 11:40	10/22/18 00:12	1
13C5 PFNA	125		25 - 150				10/19/18 11:40	10/22/18 00:12	1
13C2 PFDA	129		25 - 150				10/19/18 11:40	10/22/18 00:12	1
13C2 PFUnA	144		25 - 150				10/19/18 11:40	10/22/18 00:12	1
13C2 PFDoA	156	*	25 - 150				10/19/18 11:40	10/22/18 00:12	1
13C2 PFTeDA	156	*	25 - 150				10/19/18 11:40	10/22/18 00:12	1
13C3 PFBS	76		25 - 150				10/19/18 11:40	10/22/18 00:12	1
18O2 PFHxS	96		25 - 150				10/19/18 11:40	10/22/18 00:12	1
13C4 PFOS	128		25 - 150				10/19/18 11:40	10/22/18 00:12	1

TestAmerica Edison

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11/19/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Fulton-PFAS-1803556-1.16

TestAmerica Job ID: 460-166804-1

Client Sample ID: FW-MW-19

Date Collected: 10/11/18 10:15

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166804-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
¹³ C8 FOSA	79		25 - 150	10/19/18 11:40	10/22/18 00:12	1
d3-NMeFOSAA	106		25 - 150	10/19/18 11:40	10/22/18 00:12	1
d5-NEtFOSAA	139		25 - 150	10/19/18 11:40	10/22/18 00:12	1
M2-6:2 FTS	253	*	25 - 150	10/19/18 11:40	10/22/18 00:12	1
M2-8:2 FTS	186	*	25 - 150	10/19/18 11:40	10/22/18 00:12	1

Client Sample ID: FW-MW-5R

Date Collected: 10/11/18 11:55

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166804-2

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.15 0.20 U		0.20	0.016	ug/L		10/14/18 09:11	10/15/18 01:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	38		10 - 150				10/14/18 09:11	10/15/18 01:08	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	13.0		1.60	0.33	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluoropentanoic acid (PFPeA)	3.33		1.60	0.60	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluorohexanoic acid (PFHxA)	3.41		1.60	0.19	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluoroheptanoic acid (PFHpA)	4.76		1.60	0.26	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluorooctanoic acid (PFOA)	36.9		1.60	0.26	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluorononanoic acid (PFNA)	0.43 J		1.60	0.30	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluorodecanoic acid (PFDA)	1.60 U		1.60	0.30	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluoroundecanoic acid (PFUnA)	0.27 J B 1.60 U		1.60	0.20	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluorododecanoic acid (PFDoA)	1.60 U		1.60	0.28	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluorotridecanoic acid (PFTriA)	1.60 U		1.60	0.19	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluorotetradecanoic acid (PFTeA)	1.60 U		1.60	0.36	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluorobutanesulfonic acid (PFBS)	2.33		1.60	0.35	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluorohexanesulfonic acid (PFHxS)	0.36 J		1.60	0.21	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.60 U		1.60	0.66	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluorooctanesulfonic acid (PFOS)	1.60 U		1.60	0.61	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluorodecanesulfonic acid (PFDS)	1.60 U		1.60	0.42	ng/L		10/19/18 11:40	10/22/18 00:28	1
Perfluorooctanesulfonamide (FOSA)	1.60 U		1.60	0.45	ng/L		10/19/18 11:40	10/22/18 00:28	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.0 U		16.0	0.36	ng/L		10/19/18 11:40	10/22/18 00:28	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.0 U		16.0	0.56	ng/L		10/19/18 11:40	10/22/18 00:28	1
6:2 FTS	1.15 J		16.0	0.80	ng/L		10/19/18 11:40	10/22/18 00:28	1
8:2 FTS	16.0 U		16.0	0.45	ng/L		10/19/18 11:40	10/22/18 00:28	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
¹³ C4 PFBA	28		25 - 150	10/19/18 11:40	10/22/18 00:28	1
¹³ C5-PFPeA DNU	55		25 - 150	10/19/18 11:40	10/22/18 00:28	1
¹³ C2 PFHxA	60		25 - 150	10/19/18 11:40	10/22/18 00:28	1
¹³ C4 PFHpA	75		25 - 150	10/19/18 11:40	10/22/18 00:28	1
¹³ C4 PFOA	91		25 - 150	10/19/18 11:40	10/22/18 00:28	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Fulton-PFAS-1803556-1.16

TestAmerica Job ID: 460-166804-1

Client Sample ID: FW-MW-5R

Lab Sample ID: 460-166804-2

Date Collected: 10/11/18 11:55

Matrix: Water

Date Received: 10/12/18 20:00

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	110		25 - 150	10/19/18 11:40	10/22/18 00:28	1
13C2 PFDA	110		25 - 150	10/19/18 11:40	10/22/18 00:28	1
13C2 PFUnA	111		25 - 150	10/19/18 11:40	10/22/18 00:28	1
13C2 PFDoA	114		25 - 150	10/19/18 11:40	10/22/18 00:28	1
13C2 PFTeDA	115		25 - 150	10/19/18 11:40	10/22/18 00:28	1
13C3 PFBS	71		25 - 150	10/19/18 11:40	10/22/18 00:28	1
18O2 PFHxS	91		25 - 150	10/19/18 11:40	10/22/18 00:28	1
13C4 PFOS	102		25 - 150	10/19/18 11:40	10/22/18 00:28	1
13C8 FOSA	54		25 - 150	10/19/18 11:40	10/22/18 00:28	1
d3-NMeFOSAA	87		25 - 150	10/19/18 11:40	10/22/18 00:28	1
d5-NEtFOSAA	104		25 - 150	10/19/18 11:40	10/22/18 00:28	1
M2-6:2 FTS	296		25 - 150	10/19/18 11:40	10/22/18 00:28	1
M2-8:2 FTS	139		25 - 150	10/19/18 11:40	10/22/18 00:28	1

Client Sample ID: FW-MW-04

Lab Sample ID: 460-166804-3

Date Collected: 10/11/18 11:05

Matrix: Water

Date Received: 10/12/18 20:00

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/14/18 09:11	10/15/18 01:26	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	41		10 - 150				10/14/18 09:11	10/15/18 01:26	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	36.1	J	1.61	0.33	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluoropentanoic acid (PFPeA)	21.2		1.61	0.60	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluorohexanoic acid (PFHxA)	11.3		1.61	0.19	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluoroheptanoic acid (PFHpA)	12.3		1.61	0.26	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluorooctanoic acid (PFOA)	135		1.61	0.26	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluorononanoic acid (PFNA)	2.82		1.61	0.31	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluorodecanoic acid (PFDA)	1.61	U	1.61	0.31	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluoroundecanoic acid (PFUnA)	0.22	J B	1.61	0.20	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluorododecanoic acid (PFDoA)	1.61	U	1.61	0.28	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluorotridecanoic acid (PFTriA)	1.61	U	1.61	0.19	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluorotetradecanoic acid (PFTeA)	1.61	U	1.61	0.36	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluorobutanesulfonic acid (PFBS)	9.44		1.61	0.35	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluorohexanesulfonic acid (PFHxS)	2.99		1.61	0.21	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.12	J	1.61	0.66	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluorooctanesulfonic acid (PFOS)	34.8		1.61	0.61	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluorodecanesulfonic acid (PFDS)	1.61	U	1.61	0.43	ng/L		10/19/18 11:40	10/22/18 00:44	1
Perfluorooctanesulfonamide (FOSA)	1.61	U	1.61	0.45	ng/L		10/19/18 11:40	10/22/18 00:44	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.1	U	16.1	0.36	ng/L		10/19/18 11:40	10/22/18 00:44	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Fulton-PFAS-1803556-1.16

TestAmerica Job ID: 460-166804-1

Client Sample ID: FW-MW-04

Date Collected: 10/11/18 11:05

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166804-3

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.1	U	16.1	0.56	ng/L		10/19/18 11:40	10/22/18 00:44	1
6:2 FTS	3.35	J	16.1	0.81	ng/L		10/19/18 11:40	10/22/18 00:44	1
8:2 FTS	16.1	U	16.1	0.45	ng/L		10/19/18 11:40	10/22/18 00:44	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	17	*	25 - 150				10/19/18 11:40	10/22/18 00:44	1
13C5-PFPeA DNU	34		25 - 150				10/19/18 11:40	10/22/18 00:44	1
13C2 PFHxA	43		25 - 150				10/19/18 11:40	10/22/18 00:44	1
13C4 PFHpA	69		25 - 150				10/19/18 11:40	10/22/18 00:44	1
13C4 PFOA	93		25 - 150				10/19/18 11:40	10/22/18 00:44	1
13C5 PFNA	114		25 - 150				10/19/18 11:40	10/22/18 00:44	1
13C2 PFDA	131		25 - 150				10/19/18 11:40	10/22/18 00:44	1
13C2 PFUnA	128		25 - 150				10/19/18 11:40	10/22/18 00:44	1
13C2 PFDoA	137		25 - 150				10/19/18 11:40	10/22/18 00:44	1
13C2 PFTeDA	125		25 - 150				10/19/18 11:40	10/22/18 00:44	1
13C3 PFBS	81		25 - 150				10/19/18 11:40	10/22/18 00:44	1
18O2 PFHxS	102		25 - 150				10/19/18 11:40	10/22/18 00:44	1
13C4 PFOS	118		25 - 150				10/19/18 11:40	10/22/18 00:44	1
13C8 FOSA	73		25 - 150				10/19/18 11:40	10/22/18 00:44	1
d3-NMeFOSAA	108		25 - 150				10/19/18 11:40	10/22/18 00:44	1
d5-NEtFOSAA	122		25 - 150				10/19/18 11:40	10/22/18 00:44	1
M2-6:2 FTS	308	*	25 - 150				10/19/18 11:40	10/22/18 00:44	1
M2-8:2 FTS	183	*	25 - 150				10/19/18 11:40	10/22/18 00:44	1

Client Sample ID: FW-MW-17

Date Collected: 10/11/18 09:00

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166804-4

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/14/18 09:11	10/14/18 23:25	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	39		10 - 150				10/14/18 09:11	10/14/18 23:25	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	83.9	J	1.61	0.33	ng/L		10/19/18 11:40	10/22/18 01:00	1
Perfluoropentanoic acid (PFPeA)	53.1		1.61	0.60	ng/L		10/19/18 11:40	10/22/18 01:00	1
Perfluorohexanoic acid (PFHxA)	31.2		1.61	0.19	ng/L		10/19/18 11:40	10/22/18 01:00	1
Perfluoroheptanoic acid (PFHpA)	49.5		8.06	1.29	ng/L		10/19/18 11:40	10/22/18 19:07	5
Perfluorooctanoic acid (PFOA)	221		1.61	0.26	ng/L		10/19/18 11:40	10/22/18 01:00	1
Perfluorononanoic acid (PFNA)	4.60		1.61	0.31	ng/L		10/19/18 11:40	10/22/18 01:00	1
Perfluorodecanoic acid (PFDA)	0.43	J	1.61	0.31	ng/L		10/19/18 11:40	10/22/18 01:00	1
Perfluoroundecanoic acid (PFUnA)	0.28	J B	1.61	0.20	ng/L		10/19/18 11:40	10/22/18 01:00	1
Perfluorododecanoic acid (PFDoA)	1.61	U	1.61	0.28	ng/L		10/19/18 11:40	10/22/18 01:00	1
Perfluorotridecanoic acid (PFTriA)	1.61	U	1.61	0.19	ng/L		10/19/18 11:40	10/22/18 01:00	1
Perfluorotetradecanoic acid (PFTeA)	1.61	U	1.61	0.36	ng/L		10/19/18 11:40	10/22/18 01:00	1
Perfluorobutanesulfonic acid (PFBS)	10.7		1.61	0.35	ng/L		10/19/18 11:40	10/22/18 01:00	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Fulton-PFAS-1803556-1.16

TestAmerica Job ID: 460-166804-1

Client Sample ID: FW-MW-17

Date Collected: 10/11/18 09:00

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166804-4

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	1.16	J	8.06	1.05	ng/L	-	10/19/18 11:40	10/22/18 19:07	5
Perfluoroheptanesulfonic Acid (PFHpS)	1.61	U	1.61	0.66	ng/L	-	10/19/18 11:40	10/22/18 01:00	1
Perfluorooctanesulfonic acid (PFOS)	13.3		1.61	0.61	ng/L	-	10/19/18 11:40	10/22/18 01:00	1
Perfluorodecanesulfonic acid (PFDS)	1.61	U	1.61	0.43	ng/L	-	10/19/18 11:40	10/22/18 01:00	1
Perfluorooctanesulfonamide (FOSA)	1.61	U	1.61	0.45	ng/L	-	10/19/18 11:40	10/22/18 01:00	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.1	U	16.1	0.36	ng/L	-	10/19/18 11:40	10/22/18 01:00	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.1	U	16.1	0.56	ng/L	-	10/19/18 11:40	10/22/18 01:00	1
6:2 FTS	11.0	J	16.1	0.81	ng/L	-	10/19/18 11:40	10/22/18 01:00	1
8:2 FTS	16.1	U	16.1	0.45	ng/L	-	10/19/18 11:40	10/22/18 01:00	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	20		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1
13C5-PFPeA DNU	29		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1
13C2 PFHxA	34		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1
13C4 PFHpA	78		25 - 150			-	10/19/18 11:40	10/22/18 19:07	5
13C4 PFOA	94		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1
13C5 PFNA	130		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1
13C2 PFDA	146		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1
13C2 PFUnA	165		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1
13C2 PFDoA	183		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1
13C2 PFTeDA	175		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1
13C3 PFBS	60		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1
18O2 PFHxS	86		25 - 150			-	10/19/18 11:40	10/22/18 19:07	5
13C4 PFOS	139		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1
13C8 FOSA	94		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1
d3-NMeFOSAA	135		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1
d5-NEtFOSAA	196		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1
M2-6:2 FTS	395		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1
M2-8:2 FTS	311		25 - 150			-	10/19/18 11:40	10/22/18 01:00	1

Client Sample ID: DUP-101118

Date Collected: 10/11/18 00:00

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166804-5

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.15	J	0.20	0.016	ug/L	-	10/14/18 09:11	10/15/18 01:43	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	41		10 - 150			-	10/14/18 09:11	10/15/18 01:43	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	53.7	J	1.62	0.33	ng/L	-	10/19/18 11:40	10/22/18 01:48	1
Perfluoropentanoic acid (PFPeA)	71.8		1.62	0.61	ng/L	-	10/19/18 11:40	10/22/18 01:48	1
Perfluorohexanoic acid (PFHxA)	100		1.62	0.19	ng/L	-	10/19/18 11:40	10/22/18 01:48	1
Perfluoroheptanoic acid (PFHpA)	261		1.62	0.26	ng/L	-	10/19/18 11:40	10/22/18 01:48	1
Perfluorooctanoic acid (PFOA)	103		1.62	0.26	ng/L	-	10/19/18 11:40	10/22/18 01:48	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Fulton-PFAS-1803556-1.16

TestAmerica Job ID: 460-166804-1

Client Sample ID: DUP-101118

Date Collected: 10/11/18 00:00

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166804-5

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	8.07		1.62	0.31	ng/L		10/19/18 11:40	10/22/18 01:48	1
Perfluorodecanoic acid (PFDA)	0.32	J	1.62	0.31	ng/L		10/19/18 11:40	10/22/18 01:48	1
Perfluoroundecanoic acid (PFUnA)	0.37	J-B 1.62 U	1.62	0.20	ng/L		10/19/18 11:40	10/22/18 01:48	1
Perfluorododecanoic acid (PFDoA)	1.62	U	1.62	0.28	ng/L		10/19/18 11:40	10/22/18 01:48	1
Perfluorotridecanoic acid (PFTriA)	1.62	U	1.62	0.19	ng/L		10/19/18 11:40	10/22/18 01:48	1
Perfluorotetradecanoic acid (PFTeA)	1.62	U	1.62	0.37	ng/L		10/19/18 11:40	10/22/18 01:48	1
Perfluorobutanesulfonic acid (PFBS)	4.00	J	1.62	0.36	ng/L		10/19/18 11:40	10/22/18 01:48	1
Perfluorohexanesulfonic acid (PFHxS)	1.89		1.62	0.21	ng/L		10/19/18 11:40	10/22/18 01:48	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.62	U	1.62	0.67	ng/L		10/19/18 11:40	10/22/18 01:48	1
Perfluorooctanesulfonic acid (PFOS)	6.79		1.62	0.62	ng/L		10/19/18 11:40	10/22/18 01:48	1
Perfluorodecanesulfonic acid (PFDS)	1.62	U	1.62	0.43	ng/L		10/19/18 11:40	10/22/18 01:48	1
Perfluorooctanesulfonamide (FOSA)	1.62	U	1.62	0.45	ng/L		10/19/18 11:40	10/22/18 01:48	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.2	U	16.2	0.37	ng/L		10/19/18 11:40	10/22/18 01:48	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.2	U	16.2	0.57	ng/L		10/19/18 11:40	10/22/18 01:48	1
6:2 FTS	6.92	J	16.2	0.81	ng/L		10/19/18 11:40	10/22/18 01:48	1
8:2 FTS	16.2	U	16.2	0.45	ng/L		10/19/18 11:40	10/22/18 01:48	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	23	*	25 - 150				10/19/18 11:40	10/22/18 01:48	1
13C5-PFPeA DNU	46		25 - 150				10/19/18 11:40	10/22/18 01:48	1
13C2 PFHxA	55		25 - 150				10/19/18 11:40	10/22/18 01:48	1
13C4 PFHpA	74		25 - 150				10/19/18 11:40	10/22/18 01:48	1
13C4 PFOA	97		25 - 150				10/19/18 11:40	10/22/18 01:48	1
13C5 PFNA	126		25 - 150				10/19/18 11:40	10/22/18 01:48	1
13C2 PFDA	134		25 - 150				10/19/18 11:40	10/22/18 01:48	1
13C2 PFUnA	145		25 - 150				10/19/18 11:40	10/22/18 01:48	1
13C2 PFDoA	145		25 - 150				10/19/18 11:40	10/22/18 01:48	1
13C2 PFTeDA	151	*	25 - 150				10/19/18 11:40	10/22/18 01:48	1
13C3 PFBS	74		25 - 150				10/19/18 11:40	10/22/18 01:48	1
18O2 PFHxS	101		25 - 150				10/19/18 11:40	10/22/18 01:48	1
13C4 PFOS	125		25 - 150				10/19/18 11:40	10/22/18 01:48	1
13C8 FOSA	76		25 - 150				10/19/18 11:40	10/22/18 01:48	1
d3-NMeFOSAA	97		25 - 150				10/19/18 11:40	10/22/18 01:48	1
d5-NEtFOSAA	136		25 - 150				10/19/18 11:40	10/22/18 01:48	1
M2-6:2 FTS	267	*	25 - 150				10/19/18 11:40	10/22/18 01:48	1
M2-8:2 FTS	184	*	25 - 150				10/19/18 11:40	10/22/18 01:48	1

Client Sample ID: FB-101118

Date Collected: 10/11/18 11:15

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166804-6

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.11	J	0.20	0.016	ug/L		10/14/18 09:11	10/15/18 02:00	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Fulton-PFAS-1803556-1.16

TestAmerica Job ID: 460-166804-1

Client Sample ID: FB-101118

Date Collected: 10/11/18 11:15

Date Received: 10/12/18 20:00

Lab Sample ID: 460-166804-6

Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	33		10 - 150	10/14/18 09:11	10/15/18 02:00	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.81	U	1.81	0.37	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluoropentanoic acid (PFPeA)	1.81	U	1.81	0.68	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluorohexanoic acid (PFHxA)	1.81	U	1.81	0.22	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluoroheptanoic acid (PFHpA)	1.81	U	1.81	0.29	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluorooctanoic acid (PFOA)	0.41	J	1.81	0.29	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluorononanoic acid (PFNA)	1.81	U	1.81	0.34	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluorodecanoic acid (PFDA)	1.81	U	1.81	0.34	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluoroundecanoic acid (PFUnA)	1.81	U	1.81	0.23	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluorododecanoic acid (PFDoA)	1.81	U	1.81	0.32	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluorotridecanoic acid (PFTriA)	1.81	U	1.81	0.22	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluorotetradecanoic acid (PFTeA)	1.81	U	1.81	0.41	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluorobutanesulfonic acid (PFBS)	1.81	U	1.81	0.40	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluorohexanesulfonic acid (PFHxS)	1.81	U	1.81	0.24	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.81	U	1.81	0.74	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluorooctanesulfonic acid (PFOS)	1.81	U	1.81	0.69	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluorodecanesulfonic acid (PFDS)	1.81	U	1.81	0.48	ng/L		10/19/18 11:40	10/22/18 02:04	1
Perfluorooctanesulfonamide (FOSA)	1.81	U	1.81	0.51	ng/L		10/19/18 11:40	10/22/18 02:04	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	18.1	U	18.1	0.41	ng/L		10/19/18 11:40	10/22/18 02:04	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	18.1	U	18.1	0.63	ng/L		10/19/18 11:40	10/22/18 02:04	1
6:2 FTS	18.1	U	18.1	0.91	ng/L		10/19/18 11:40	10/22/18 02:04	1
8:2 FTS	18.1	U	18.1	0.51	ng/L		10/19/18 11:40	10/22/18 02:04	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	86		25 - 150	10/19/18 11:40	10/22/18 02:04	1
13C5-PFPeA DNU	120		25 - 150	10/19/18 11:40	10/22/18 02:04	1
13C2 PFHxA	108		25 - 150	10/19/18 11:40	10/22/18 02:04	1
13C4 PFHpA	90		25 - 150	10/19/18 11:40	10/22/18 02:04	1
13C4 PFOA	93		25 - 150	10/19/18 11:40	10/22/18 02:04	1
13C5 PFNA	95		25 - 150	10/19/18 11:40	10/22/18 02:04	1
13C2 PFDA	98		25 - 150	10/19/18 11:40	10/22/18 02:04	1
13C2 PFUnA	93		25 - 150	10/19/18 11:40	10/22/18 02:04	1
13C2 PFDoA	94		25 - 150	10/19/18 11:40	10/22/18 02:04	1
13C2 PFTeDA	89		25 - 150	10/19/18 11:40	10/22/18 02:04	1
13C3 PFBS	103		25 - 150	10/19/18 11:40	10/22/18 02:04	1
18O2 PFHxS	96		25 - 150	10/19/18 11:40	10/22/18 02:04	1
13C4 PFOS	97		25 - 150	10/19/18 11:40	10/22/18 02:04	1
13C8 FOSA	60		25 - 150	10/19/18 11:40	10/22/18 02:04	1
d3-NMeFOSAA	81		25 - 150	10/19/18 11:40	10/22/18 02:04	1
d5-NEtFOSAA	89		25 - 150	10/19/18 11:40	10/22/18 02:04	1
M2-6:2 FTS	144		25 - 150	10/19/18 11:40	10/22/18 02:04	1
M2-8:2 FTS	91		25 - 150	10/19/18 11:40	10/22/18 02:04	1

TestAmerica Edison

TestAmerica Edison

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Chain of Custody Record

NYSC
460501

TestAmerica
THE FINDER IN ENVIRONMENTAL TESTING

Client Information		Sampler: Craig Hayes		Lab PM: Haas, Melissa		Carrier Tracking No(s):		COC No:													
Client Contact: Melissa Feller		Phone: 516-263-7391		E-Mail: melissa.haas@testamericainc.com				Page: Page 1 of 1													
Company: GEI Consultants, Inc.								Job #: 166804													
Address: 455 Winding Brook Drive Suite 201		Due Date Requested:		Analysis Requested SUB Work																	
City: Glastonbury		TAT Requested (days): 10 days																			
State, Zip: CT, 06033																					
Phone: 860-368-5300(Tel) 860-608-9717(Fax)		PO #: 1803556-1.16																			
Email: mfeller@geiconsultants.com		WO #:																			
Project Name: Emerging Contaminants - Long Island/NYC		Project #: 46027288																			
Site/Project Description: Fulton-PFAS-1803556-1.16		SSOW#:																			
Sample Identification		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)		Matrix (W=Water, S=Soil, O=Organic, ST=Trace, A=Air)		Field Filled Sample (Yes or No)		Perform MS/MSD (Yes or No)		PFC, IDA, PFAS, Standard List (21 Analytes)		62700, SW, MS, ID (1, 4-Dioxane)		Total Number of Containers		Special Instructions/Note:	
						Preservation Code:															
1		FW-MW-19		10/11/18 1015		G		Water		N		N		N		N		4			
2		FW-MW-5R		10/11/18 1155		G		Water		N		N		N		N		4			
3		FW-MW-04		10/11/18 1105		G		Water		N		N		N		N		4			
4		FW-MW-17		10/11/18 0900		G		Water		N		N		N		N		4			
5		DUP-101118		10/11/18		G		Water		N		N		N		N		4		MS/MSD	
6		FB-101118		10/11/18 1115		G		Water		N		N		N		N		4			

Site: Long Island Emerging Contaminants, Glen Cove
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-165577
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 1, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
GCMW-14S-R	460-165577-01	PFAS, 1,4-Dioxane
PZ-06	460-165577-02	PFAS, 1,4-Dioxane
GCRW-03	460-165577-03	PFAS, 1,4-Dioxane
MW-XX-092518	460-165577-04	PFAS, 1,4-Dioxane
FB-092518	460-165577-05	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: Fieldblank-092518
Field Duplicate pair: PZ-06/MW-XX-092518

The above-listed aqueous samples and field blank sample were collected on September 25, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatile Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

Analytes were detected in the associated laboratory method blank sample. Contaminants were detected in the associated field blank sample after application of laboratory blank contamination actions. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
Perfluorobutanoic acid (PFBA)	Method MB 200-134832: All samples	0.881 ng/L	8.81 ng/L	Qualify the result for PFBA in sample FB-092518 as nondetect (U) at the RL. Qualify the result for PFBA in samples GCMW-14S-R, PZ-06, GCRW-03, and MW-XX-092518 as estimated (J); High bias.
Perfluorohexanoic acid (PFHxA)		0.407 ng/L	4.07 ng/L	Qualify the results for PFHxA in sample FB-092518 as nondetect (U) at the RL. Qualify the result for PFHxA in samples PZ-06, GCRW-03, and MW-XX-092518 as estimated (J); High bias.
Perfluorobutanesulfonic acid (PFBS)		1.178 ng/L	11.78 ng/L	Qualify the result for PFBS in samples GCRW-03 and FB-092518 as nondetect (U) at the RL. Qualify the results for PFBS in samples GCMW-14S-R, PZ-06, and MW-XX-092518 as estimated (J); High bias.
Perfluorohexanesulfonic acid (PFHxS)		0.559 ng/L	5.59 ng/L	Qualify the result for PFHxS in samples GCRW-03 and FB-092518 as nondetect (U) at the RL. Qualify the result for PFHxS in sample GCMW-14S-R as estimated (J); High bias.
Perfluorooctanesulfonic acid (PFOS)		1.143 ng/L	11.43 ng/L	Qualify the result for PFOS in sample FB-092518 as nondetect (U) at the RL. Qualify the result for PFOS in samples GCMW-14S-R, PZ-06, GCRW-03, and MW-XX-092518 as estimated (J); High bias.
Perfluoroundecanoic Acid (PFUnA)	FB-092518: All samples	0.40 ng/L	4.0 ng/L	Qualify the result for PFUnA in samples PZ-06 and GCRW-03 as nondetect (U) at the RL.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
Perfluorotridecanoic Acid (PFTriA)		0.46 ng/L	4.6 ng/L	Qualify the result for PFTriA in sample GCRW-03 as nondetect (U) at the RL.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
GCRW-03	M2-6:2 FTS	190	25-150	Validation action was not required as the results for 6:2 FTS and 8:2 FTS were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	169		
MW-XX-092518	M2-6:2 FTS	186	25-150	Estimate (J) the positive result for 6:2 FTS in sample MW-XX-092518.
	M2-8:2 FTS	155		Validation action was not required as the result for 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.
PZ-06	M2-6:2 FTS	173	25-150	Estimate (J) the positive result for 6:2 FTS in sample PZ-06.

MS/MSD Results

MS/MSD analyses were performed on sample GCMW-14S-R for 1,4-dioxane and PFAS. Recovery and precision criteria were met.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples PZ-06 and MW-XX-092518 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria.

Analyte	PZ-06 (ug/L)	MW-XX-092518 (ug/L)	RPD (%)
Perfluorobutanoic acid (PFBA)	3.33	3.41	2.4
Perfluoropentanoic (PFPeA)	3.66	3.02	19.2
Perfluorohexanoic acid (PFHxA)	2.62	1.90	31.9, Within the RL
Perfluoroheptanoic acid (PFHpA)	2.30	2.41	4.7
Perfluorooctanoic acid (PFOA)	11.3	12.4	9.3
Perfluorononanoic acid (PFNA)	1.08 J	1.19 J	9.7
Perfluorobutanesulfonic acid (PFBS)	3.10	2.43	24.2
Perfluorohexanesulfonic acid (PFHxS)	6.24	6.32	1.3
Perfluoroheptanesulfonic Acid (PFHpS)	0.87 J	0.85 J	2.3
Perfluorooctanesulfonic acid (PFOS)	9.67	8.52	12.6
Perfluorodecanesulfonic acid (PFDS)	1.76 U	0.48 J	NC, Within the RL
6:2 FTS	4.64 J	5.08 J	9.1
NC – Not calculable			
Criteria: When both results are ≥ 5 x the RL, RPDs must be $< 30\%$.			
When results are < 5 x the QL, the absolute difference between the original and field duplicate results must be $< RL$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Glen Cove-PFAS-1803556-1.2

TestAmerica Job ID: 460-165577-1

Client Sample ID: GCMW-14S-R

Lab Sample ID: 460-165577-1

Date Collected: 09/25/18 08:30

Matrix: Water

Date Received: 09/26/18 19:30

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/29/18 06:51	09/29/18 18:18	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	70		10 - 150				09/29/18 06:51	09/29/18 18:18	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	5.33	J	1.77	0.36	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluoropentanoic acid (PFPeA)	7.41		1.77	0.66	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluorohexanoic acid (PFHxA)	8.06	J	1.77	0.21	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluoroheptanoic acid (PFHpA)	6.83		1.77	0.28	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluorooctanoic acid (PFOA)	17.4		1.77	0.28	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluorononanoic acid (PFNA)	0.92	J	1.77	0.34	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluorodecanoic acid (PFDA)	1.77	U	1.77	0.34	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluoroundecanoic acid (PFUnA)	1.77	U	1.77	0.22	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluorododecanoic acid (PFDoA)	1.77	U	1.77	0.31	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluorotridecanoic acid (PFTriA)	1.77	U	1.77	0.21	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluorotetradecanoic acid (PFTeA)	1.77	U	1.77	0.40	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluorobutanesulfonic acid (PFBS)	9.38	J	1.77	0.39	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluorohexanesulfonic acid (PFHxS)	2.87	J	1.77	0.23	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluoroheptanesulfonic Acid (PFHpS)	0.72	J	1.77	0.72	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluorooctanesulfonic acid (PFOS)	6.14	J	1.77	0.67	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluorodecanesulfonic acid (PFDS)	1.77	U	1.77	0.47	ng/L		10/04/18 14:05	10/12/18 03:51	1
Perfluorooctanesulfonamide (FOSA)	1.77	U	1.77	0.49	ng/L		10/04/18 14:05	10/12/18 03:51	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.7	U	17.7	0.40	ng/L		10/04/18 14:05	10/12/18 03:51	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.7	U	17.7	0.62	ng/L		10/04/18 14:05	10/12/18 03:51	1
6:2 FTS	1.31	J	17.7	0.88	ng/L		10/04/18 14:05	10/12/18 03:51	1
8:2 FTS	17.7	U	17.7	0.49	ng/L		10/04/18 14:05	10/12/18 03:51	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	63		25 - 150				10/04/18 14:05	10/12/18 03:51	1
13C5-PFPeA DNU	57		25 - 150				10/04/18 14:05	10/12/18 03:51	1
13C2 PFHxA	98		25 - 150				10/04/18 14:05	10/12/18 03:51	1
13C4 PFHpA	88		25 - 150				10/04/18 14:05	10/12/18 03:51	1
13C4 PFOA	93		25 - 150				10/04/18 14:05	10/12/18 03:51	1
13C5 PFNA	101		25 - 150				10/04/18 14:05	10/12/18 03:51	1
13C2 PFDA	78		25 - 150				10/04/18 14:05	10/12/18 03:51	1
13C2 PFUnA	83		25 - 150				10/04/18 14:05	10/12/18 03:51	1
13C2 PFDoA	87		25 - 150				10/04/18 14:05	10/12/18 03:51	1
13C2 PFTeDA	62		25 - 150				10/04/18 14:05	10/12/18 03:51	1
13C3 PFBS	93		25 - 150				10/04/18 14:05	10/12/18 03:51	1
18O2 PFHxS	115		25 - 150				10/04/18 14:05	10/12/18 03:51	1
13C4 PFOS	120		25 - 150				10/04/18 14:05	10/12/18 03:51	1
13C8 FOSA	81		25 - 150				10/04/18 14:05	10/12/18 03:51	1
d3-NMeFOSAA	67		25 - 150				10/04/18 14:05	10/12/18 03:51	1
d5-NEtFOSAA	73		25 - 150				10/04/18 14:05	10/12/18 03:51	1

TestAmerica Edison

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10/29/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Glen Cove-PFAS-1803556-1.2

TestAmerica Job ID: 460-165577-1

Client Sample ID: GCMW-14S-R

Date Collected: 09/25/18 08:30

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165577-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-6:2 FTS	137		25 - 150	10/04/18 14:05	10/12/18 03:51	1
M2-8:2 FTS	120		25 - 150	10/04/18 14:05	10/12/18 03:51	1

Client Sample ID: PZ-06

Date Collected: 09/25/18 09:40

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165577-2

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Non-Volatile Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/29/18 06:51	09/29/18 20:20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	34		10 - 150				09/29/18 06:51	09/29/18 20:20	

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	3.33	J	1.76	0.36	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluoropentanoic acid (PFPeA)	3.66		1.76	0.68	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluorohexanoic acid (PFHxA)	2.62	J	1.76	0.21	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluoroheptanoic acid (PFHpA)	2.30		1.76	0.28	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluorooctanoic acid (PFOA)	11.3		1.76	0.28	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluorononanoic acid (PFNA)	1.08	J	1.76	0.33	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluorodecanoic acid (PFDA)	1.76	U	1.76	0.33	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluoroundecanoic acid (PFUnA)	0.23	J	1.76	0.22	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluorododecanoic acid (PFDoA)	1.76	U	1.76	0.31	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluorotridecanoic acid (PFTriA)	1.76	U	1.76	0.21	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluorotetradecanoic acid (PFTeA)	1.76	U	1.76	0.40	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluorobutanesulfonic acid (PFBS)	3.10	J	1.76	0.39	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluorohexanesulfonic acid (PFHxS)	6.24	J	1.76	0.23	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluoroheptanesulfonic Acid (PFHpS)	0.87	J	1.76	0.72	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluorooctanesulfonic acid (PFOS)	9.67	J	1.76	0.67	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluorodecanesulfonic acid (PFDS)	1.76	U	1.76	0.47	ng/L		10/04/18 14:05	10/12/18 04:38	1
Perfluorooctanesulfonamide (FOSA)	1.76	U	1.76	0.49	ng/L		10/04/18 14:05	10/12/18 04:38	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.6	U	17.6	0.40	ng/L		10/04/18 14:05	10/12/18 04:38	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.6	U	17.6	0.61	ng/L		10/04/18 14:05	10/12/18 04:38	1
6:2 FTS	4.64	J	17.6	0.88	ng/L		10/04/18 14:05	10/12/18 04:38	1
8:2 FTS	17.6	U	17.6	0.49	ng/L		10/04/18 14:05	10/12/18 04:38	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	50		25 - 150				10/04/18 14:05	10/12/18 04:38	1
13C5-PFPeA DNU	50		25 - 150				10/04/18 14:05	10/12/18 04:38	1
13C2 PFHxA	86		25 - 150				10/04/18 14:05	10/12/18 04:38	1
13C4 PFHpA	92		25 - 150				10/04/18 14:05	10/12/18 04:38	1
13C4 PFOA	106		25 - 150				10/04/18 14:05	10/12/18 04:38	1
13C5 PFNA	133		25 - 150				10/04/18 14:05	10/12/18 04:38	1
13C2 PFDA	98		25 - 150				10/04/18 14:05	10/12/18 04:38	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Glen Cove-PFAS-1803556-1.2

TestAmerica Job ID: 460-165577-1

Client Sample ID: PZ-06

Date Collected: 09/25/18 09:40

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165577-2

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	112		25 - 150	10/04/18 14:05	10/12/18 04:38	1
13C2 PFDoA	111		25 - 150	10/04/18 14:05	10/12/18 04:38	1
13C2 PFTeDA	83		25 - 150	10/04/18 14:05	10/12/18 04:38	1
13C3 PFBS	84		25 - 150	10/04/18 14:05	10/12/18 04:38	1
18O2 PFHxS	122		25 - 150	10/04/18 14:05	10/12/18 04:38	1
13C4 PFOS	140		25 - 150	10/04/18 14:05	10/12/18 04:38	1
13C8 FOSA	89		25 - 150	10/04/18 14:05	10/12/18 04:38	1
d3-NMeFOSAA	96		25 - 150	10/04/18 14:05	10/12/18 04:38	1
d5-NEtFOSAA	94		25 - 150	10/04/18 14:05	10/12/18 04:38	1
M2-6:2 FTS	173 *		25 - 150	10/04/18 14:05	10/12/18 04:38	1
M2-8:2 FTS	143		25 - 150	10/04/18 14:05	10/12/18 04:38	1

Client Sample ID: GCRW-03

Date Collected: 09/25/18 11:30

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165577-3

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Semiquantitative Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/29/18 06:51	09/29/18 20:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	41		10 - 150				09/29/18 06:51	09/29/18 20:37	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	4.98	B J	1.83	0.37	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluoropentanoic acid (PFPeA)	4.22		1.83	0.69	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluorohexanoic acid (PFHxA)	2.75	B J	1.83	0.22	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluoroheptanoic acid (PFHpA)	2.14		1.83	0.29	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluorooctanoic acid (PFOA)	2.38		1.83	0.29	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluorononanoic acid (PFNA)	1.32	J	1.83	0.35	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluorodecanoic acid (PFDA)	1.92		1.83	0.35	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluoroundecanoic acid (PFUnA)	1.06	J	1.83	0.23	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluorododecanoic acid (PFDoA)	0.52	J	1.83	0.32	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluorotridecanoic acid (PFTriA)	0.23	J	1.83	0.22	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluorotetradecanoic acid (PFTeA)	1.83	U	1.83	0.41	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluorobutanesulfonic acid (PFBS)	1.48	J B	1.83	0.40	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluorohexanesulfonic acid (PFHxS)	0.58	J B	1.83	0.24	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluoroheptanesulfonic Acid (PFHpS)	0.86	J	1.83	0.75	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluorooctanesulfonic acid (PFOS)	3.17	B J	1.83	0.69	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluorodecanesulfonic acid (PFDS)	0.48	J	1.83	0.48	ng/L		10/04/18 14:05	10/12/18 05:10	1
Perfluorooctanesulfonamide (FOSA)	1.83	U	1.83	0.51	ng/L		10/04/18 14:05	10/12/18 05:10	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	18.3	U	18.3	0.41	ng/L		10/04/18 14:05	10/12/18 05:10	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Glen Cove-PFAS-1803556-1.2

TestAmerica Job ID: 460-165577-1

Client Sample ID: GCRW-03

Date Collected: 09/25/18 11:30

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165577-3

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	18.3	U	18.3	0.64	ng/L		10/04/18 14:05	10/12/18 05:10	1
6:2 FTS	18.3	U	18.3	0.91	ng/L		10/04/18 14:05	10/12/18 05:10	1
8:2 FTS	18.3	U	18.3	0.51	ng/L		10/04/18 14:05	10/12/18 05:10	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
¹³ C4 PFBA	64		25 - 150				10/04/18 14:05	10/12/18 05:10	1
¹³ C5-PFPeA DNU	62		25 - 150				10/04/18 14:05	10/12/18 05:10	1
¹³ C2 PFHxA	110		25 - 150				10/04/18 14:05	10/12/18 05:10	1
¹³ C4 PFHpA	96		25 - 150				10/04/18 14:05	10/12/18 05:10	1
¹³ C4 PFOA	105		25 - 150				10/04/18 14:05	10/12/18 05:10	1
¹³ C5 PFNA	132		25 - 150				10/04/18 14:05	10/12/18 05:10	1
¹³ C2 PFDA	94		25 - 150				10/04/18 14:05	10/12/18 05:10	1
¹³ C2 PFUnA	111		25 - 150				10/04/18 14:05	10/12/18 05:10	1
¹³ C2 PFDoA	98		25 - 150				10/04/18 14:05	10/12/18 05:10	1
¹³ C2 PFTeDA	78		25 - 150				10/04/18 14:05	10/12/18 05:10	1
¹³ C3 PFBS	118		25 - 150				10/04/18 14:05	10/12/18 05:10	1
¹⁸ O2 PFHxS	138		25 - 150				10/04/18 14:05	10/12/18 05:10	1
¹³ C4 PFOS	137		25 - 150				10/04/18 14:05	10/12/18 05:10	1
¹³ C8 FOSA	113		25 - 150				10/04/18 14:05	10/12/18 05:10	1
d3-NMeFOSAA	98		25 - 150				10/04/18 14:05	10/12/18 05:10	1
d5-NEtFOSAA	107		25 - 150				10/04/18 14:05	10/12/18 05:10	1
M2-6:2 FTS	190 *		25 - 150				10/04/18 14:05	10/12/18 05:10	1
M2-8:2 FTS	169 *		25 - 150				10/04/18 14:05	10/12/18 05:10	1

Client Sample ID: MW-XX-092518

Date Collected: 09/25/18 00:00

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165577-4

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/29/18 06:51	09/29/18 20:54	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	35		10 - 150				09/29/18 06:51	09/29/18 20:54	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	3.41	B J-	1.70	0.35	ng/L		10/04/18 14:05	10/12/18 05:26	1
Perfluoropentanoic acid (PFPeA)	3.02	B J-	1.70	0.64	ng/L		10/04/18 14:05	10/12/18 05:26	1
Perfluorohexanoic acid (PFHxA)	1.90	B J-	1.70	0.20	ng/L		10/04/18 14:05	10/12/18 05:26	1
Perfluoroheptanoic acid (PFHpA)	2.41		1.70	0.27	ng/L		10/04/18 14:05	10/12/18 05:26	1
Perfluorooctanoic acid (PFOA)	12.4		1.70	0.27	ng/L		10/04/18 14:05	10/12/18 05:26	1
Perfluorononanoic acid (PFNA)	1.19	J-	1.70	0.32	ng/L		10/04/18 14:05	10/12/18 05:26	1
Perfluorodecanoic acid (PFDA)	1.70	U	1.70	0.32	ng/L		10/04/18 14:05	10/12/18 05:26	1
Perfluoroundecanoic acid (PFUnA)	1.70	U	1.70	0.21	ng/L		10/04/18 14:05	10/12/18 05:26	1
Perfluorododecanoic acid (PFDoA)	1.70	U	1.70	0.30	ng/L		10/04/18 14:05	10/12/18 05:26	1
Perfluorotridecanoic acid (PFTriA)	1.70	U	1.70	0.20	ng/L		10/04/18 14:05	10/12/18 05:26	1
Perfluorotetradecanoic acid (PFTeA)	1.70	U	1.70	0.38	ng/L		10/04/18 14:05	10/12/18 05:26	1
Perfluorobutanesulfonic acid (PFBS)	2.43	B J-	1.70	0.37	ng/L		10/04/18 14:05	10/12/18 05:26	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Glen Cove-PFAS-1803556-1.2

TestAmerica Job ID: 460-165577-1

Client Sample ID: MW-XX-092518

Date Collected: 09/25/18 00:00

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165577-4

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	6.32	J	1.70	0.22	ng/L		10/04/18 14:05	10/12/18 05:26	1
Perfluoroheptanesulfonic Acid (PFHpS)	0.85	J	1.70	0.70	ng/L		10/04/18 14:05	10/12/18 05:26	1
Perfluorooctanesulfonic acid (PFOS)	8.52	J	1.70	0.64	ng/L		10/04/18 14:05	10/12/18 05:26	1
Perfluorodecanesulfonic acid (PFDS)	0.48	J	1.70	0.45	ng/L		10/04/18 14:05	10/12/18 05:26	1
Perfluorooctanesulfonamide (FOSA)	1.70	U	1.70	0.48	ng/L		10/04/18 14:05	10/12/18 05:26	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.0	U	17.0	0.38	ng/L		10/04/18 14:05	10/12/18 05:26	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.0	U	17.0	0.59	ng/L		10/04/18 14:05	10/12/18 05:26	1
6:2 FTS	5.08	J	17.0	0.85	ng/L		10/04/18 14:05	10/12/18 05:26	1
8:2 FTS	17.0	U	17.0	0.48	ng/L		10/04/18 14:05	10/12/18 05:26	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	51		25 - 150	10/04/18 14:05	10/12/18 05:26	1
13C5-PFPeA DNU	45		25 - 150	10/04/18 14:05	10/12/18 05:26	1
13C2 PFHxA	84		25 - 150	10/04/18 14:05	10/12/18 05:26	1
13C4 PFHpA	84		25 - 150	10/04/18 14:05	10/12/18 05:26	1
13C4 PFOA	100		25 - 150	10/04/18 14:05	10/12/18 05:26	1
13C5 PFNA	126		25 - 150	10/04/18 14:05	10/12/18 05:26	1
13C2 PFDA	91		25 - 150	10/04/18 14:05	10/12/18 05:26	1
13C2 PFUnA	104		25 - 150	10/04/18 14:05	10/12/18 05:26	1
13C2 PFDoA	102		25 - 150	10/04/18 14:05	10/12/18 05:26	1
13C2 PFTeDA	75		25 - 150	10/04/18 14:05	10/12/18 05:26	1
13C3 PFBS	85		25 - 150	10/04/18 14:05	10/12/18 05:26	1
18O2 PFHxS	115		25 - 150	10/04/18 14:05	10/12/18 05:26	1
13C4 PFOS	138		25 - 150	10/04/18 14:05	10/12/18 05:26	1
13C8 FOSA	103		25 - 150	10/04/18 14:05	10/12/18 05:26	1
d3-NMeFOSAA	80		25 - 150	10/04/18 14:05	10/12/18 05:26	1
d5-NEtFOSAA	89		25 - 150	10/04/18 14:05	10/12/18 05:26	1
M2-6:2 FTS	186		25 - 150	10/04/18 14:05	10/12/18 05:26	1
M2-8:2 FTS	155		25 - 150	10/04/18 14:05	10/12/18 05:26	1

Client Sample ID: FB-092518

Date Collected: 09/25/18 17:55

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165577-5

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte				SIM / Isotope Dilution	
Result	Qualifier	RL	MDL	Unit	D
1,4-Dioxane	0.20 U	0.20	0.016	ug/L	
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed
1,4-Dioxane-d8	35		10 - 150	09/29/18 06:51	09/29/18 21:12

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.54	J	1.75	0.36	ng/L		10/04/18 14:05	10/12/18 05:42	1
Perfluoropentanoic acid (PFPeA)	1.75	U	1.75	0.65	ng/L		10/04/18 14:05	10/12/18 05:42	1
Perfluorohexanoic acid (PFHxA)	0.32	J	1.75	0.21	ng/L		10/04/18 14:05	10/12/18 05:42	1
Perfluoroheptanoic acid (PFHpA)	1.75	U	1.75	0.28	ng/L		10/04/18 14:05	10/12/18 05:42	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Glen Cove-PFAS-1803556-1.2

TestAmerica Job ID: 460-165577-1

Client Sample ID: FB-092518

Date Collected: 09/25/18 17:55

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165577-5

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.75	U	1.75	0.28	ng/L		10/04/18 14:05	10/12/18 05:42	1
Perfluorononanoic acid (PFNA)	1.75	U	1.75	0.33	ng/L		10/04/18 14:05	10/12/18 05:42	1
Perfluorodecanoic acid (PFDA)	1.75	U	1.75	0.33	ng/L		10/04/18 14:05	10/12/18 05:42	1
Perfluoroundecanoic acid (PFUnA)	0.40	J	1.75	0.22	ng/L		10/04/18 14:05	10/12/18 05:42	1
Perfluorododecanoic acid (PFDoA)	1.75	U	1.75	0.31	ng/L		10/04/18 14:05	10/12/18 05:42	1
Perfluorotridecanoic acid (PFTriA)	0.46	J	1.75	0.21	ng/L		10/04/18 14:05	10/12/18 05:42	1
Perfluorotetradecanoic acid (PFTeA)	1.75	U	1.75	0.39	ng/L		10/04/18 14:05	10/12/18 05:42	1
Perfluorobutanesulfonic acid (PFBS)	1.10 JB	1.75 U	1.75	0.38	ng/L		10/04/18 14:05	10/12/18 05:42	1
Perfluorohexanesulfonic acid (PFHxS)	0.32 JB	1.75 U	1.75	0.23	ng/L		10/04/18 14:05	10/12/18 05:42	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.75	U	1.75	0.72	ng/L		10/04/18 14:05	10/12/18 05:42	1
Perfluorooctanesulfonic acid (PFOS)	0.66 JB	1.75 U	1.75	0.66	ng/L		10/04/18 14:05	10/12/18 05:42	1
Perfluorodecanesulfonic acid (PFDS)	1.75	U	1.75	0.46	ng/L		10/04/18 14:05	10/12/18 05:42	1
Perfluorooctanesulfonamide (FOSA)	1.75	U	1.75	0.49	ng/L		10/04/18 14:05	10/12/18 05:42	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.5	U	17.5	0.39	ng/L		10/04/18 14:05	10/12/18 05:42	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.5	U	17.5	0.61	ng/L		10/04/18 14:05	10/12/18 05:42	1
6:2 FTS	17.5	U	17.5	0.87	ng/L		10/04/18 14:05	10/12/18 05:42	1
8:2 FTS	17.5	U	17.5	0.49	ng/L		10/04/18 14:05	10/12/18 05:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	142		25 - 150				10/04/18 14:05	10/12/18 05:42	1
13C5-PFPeA DNU	76		25 - 150				10/04/18 14:05	10/12/18 05:42	1
13C2 PFHxA	149		25 - 150				10/04/18 14:05	10/12/18 05:42	1
13C4 PFHpA	101		25 - 150				10/04/18 14:05	10/12/18 05:42	1
13C4 PFOA	111		25 - 150				10/04/18 14:05	10/12/18 05:42	1
13C5 PFNA	126		25 - 150				10/04/18 14:05	10/12/18 05:42	1
13C2 PFDA	93		25 - 150				10/04/18 14:05	10/12/18 05:42	1
13C2 PFUnA	106		25 - 150				10/04/18 14:05	10/12/18 05:42	1
13C2 PFDoA	100		25 - 150				10/04/18 14:05	10/12/18 05:42	1
13C2 PFTeDA	76		25 - 150				10/04/18 14:05	10/12/18 05:42	1
13C3 PFBS	119		25 - 150				10/04/18 14:05	10/12/18 05:42	1
18O2 PFHxS	126		25 - 150				10/04/18 14:05	10/12/18 05:42	1
13C4 PFOS	141		25 - 150				10/04/18 14:05	10/12/18 05:42	1
13C8 FOSA	80		25 - 150				10/04/18 14:05	10/12/18 05:42	1
d3-NMeFOSAA	89		25 - 150				10/04/18 14:05	10/12/18 05:42	1
d5-NEtFOSAA	88		25 - 150				10/04/18 14:05	10/12/18 05:42	1
M2-6:2 FTS	104		25 - 150				10/04/18 14:05	10/12/18 05:42	1
M2-8:2 FTS	110		25 - 150				10/04/18 14:05	10/12/18 05:42	1

TestAmerica Edison

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Chain of Custody Record

NYSC

460507

TestAmerica

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 Project Name:
Emerging Contaminants - Long Island/NYC

 Site/Project Description:
Glen Cove PFAS-1803556-1.2

 Sampler: **Craig Hayes**

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 Lab PM:
Haas, Melissa

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Carrier Tracking No(s):

 COC No:
460-103130-65854.1

 Page:
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 Job #: **165577**
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=Other, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)
GCMW-145-A	9-25-18 0830	G	Water	X
PZ-06	9-25-18 0940	G	Water	X
GCRW-03	9-25-18 1130	G	Water	X
MW-XX-092518	9-25-18	G	Water	X
FB-092518	9-25-18 1755	G	Water	X
			Water	
			Water	
			Water	
			Water	
			Water	
			Water	

Preservation Code:

N N

Special Instructions/Note:

12 MS/MSD

4 2

4 3

4 4

4 5

**SUB
Work**
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

Special Instructions/QC Requirements: Edison lab -log in both tests into one login and ship PFAS

Empty Kit Relinquished by:

Date:

Time:

Method of Shipment:

 Relinquished by: **Matt Lind**

 Date/Time: **9/26/18 12:10**

 Company: **GEI**

 Received by: **DS**

 Date/Time: **9/26/18 12:11**

 Company: **TA**

Relinquished by:

 Date/Time: **9/26/18 12:30**

 Company: **TA**

 Received by: **Van Hime**

 Date/Time: **9/26/18 12:30**

 Company: **TA**

Relinquished by:

Date/Time:

Company:

Received by:

Date/Time:

Company:

Custody Seals Intact:

Δ Yes Δ No

Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

2.11 3.5 4.01 4.0 10.4

Site: Long Island Emerging Contaminants, Greenpoint
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-165952
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 1, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
GPEC-220I	460-165952-01	PFAS, 1,4-Dioxane
GPEC-MW-11	460-165952-02	PFAS, 1,4-Dioxane
GPEC-MW-3S	460-165952-03	PFAS, 1,4-Dioxane
DUP-100118-2	460-165952-04	PFAS, 1,4-Dioxane
FB-100118-2	460-165952-05	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: FB-100118-2
Field Duplicate pair: GPEC-MW-3S/DUP-100118-2

The above-listed aqueous samples and field blank sample were collected on October 1, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatile Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

Analytes were detected in the associated laboratory method blank sample. Contaminants were not detected in the associated field blank sample after application of laboratory blank contamination actions. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
Perfluorobutanoic acid (PFBA)	Method MB 200- 134946: All samples	1.22 ng/L	12.2 ng/L	Qualify the result for PFBA in sample FB-100118-2 as nondetect (U) at the RL. Qualify the result for PFBA in samples GPEC-MW-3S and DUP-100118-2 as estimated (J); High bias.
Perfluorooctanoic acid (PFOA)		0.392 ng/L	3.92 ng/L	Validation actions were not required.
Perfluorohexanesulfonic acid (PFHxS)		0.356 ng/L	3.56 ng/L	Qualify the result for PFHxS in samples GPEC-MW-11, GPEC-MW-3S, DUP-100118-2, and FB-100118-2 as nondetect (U) at the RL.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
GPEC-220I	M2-6:2 FTS	165	25-150	Validation action was not required as the result for 6:2 FTS was not detected in this sample and therefore not affected by the high recovery.
GPEC-MW-11	M2-6:2 FTS	172	25-150	Validation action was not required as the results for 6:2 FTS and 8:2 FTS were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	168		
GPEC-MW-3S	M2-6:2 FTS	161	25-150	Validation action was not required as the results for 6:2 FTS and 8:2 FTS were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	162		
DUP-100118-2	M2-8:2 FTS	157	25-150	Validation action was not required as the result for 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.

MS/MSD Results

MS/MSD analyses were performed on sample GPEC-MW-11 for 1,4-dioxane and PFAS. Recovery and precision criteria were met.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples GPEC-MW-3S and DUP-100118-2 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria.

Analyte	GPEC-MW-03S (ug/L)	DUP-100118-2 (ug/L)	RPD (%)
Perfluorobutanoic acid (PFBA)	9.82	9.90	0.8
Perfluoropentanoic acid (PFPeA)	3.66	3.76	2.7
Perfluorohexanoic acid (PFHxA)	1.04 J	1.57 J	40.6, Within the RL
Perfluoroheptanoic acid (PFHpA)	2.01	1.90	5.6
Perfluorooctanoic acid (PFOA)	29.4	29.4	0
Perfluorononanoic acid (PFNA)	1.90	2.35	21.2
Perfluorodecanoic acid (PFDA)	2.11	2.08	1.4
Perfluoroundecanoic acid (PFUnA)	0.55 J	0.32 J	52.9, Within the RL
Perfluorobutanesulfonic acid (PFBS)	1.30 J	1.08 J	18.5
Perfluorooctanesulfonic acid (PFOS)	11.0	10.5	4.7

Analyte	GPEC-MW-03S (ug/L)	DUP-100118-2 (ug/L)	RPD (%)
NC – Not calculable			
Criteria: When both results are ≥ 5 x the RL, RPDs must be $< 30\%$.			
When results are < 5 x the QL, the absolute difference between the original and field duplicate results must be $< \text{RL}$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DRAFT

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Greenpoint-PFAS-1803556-1.9

TestAmerica Job ID: 460-165952-1

Client Sample ID: GPEC-2201

Lab Sample ID: 460-165952-1

Date Collected: 10/01/18 14:40

Matrix: Water

Date Received: 10/02/18 18:00

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/04/18 06:40	10/04/18 14:50	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	34		10 - 150				10/04/18 06:40	10/04/18 14:50	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	17.8	B	1.76	0.36	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluoropentanoic acid (PFPeA)	19.6		1.76	0.66	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluorohexanoic acid (PFHxA)	17.0		1.76	0.21	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluoroheptanoic acid (PFHpA)	14.9		1.76	0.28	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluorooctanoic acid (PFOA)	97.5	B	1.76	0.28	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluorononanoic acid (PFNA)	2.50		1.76	0.33	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluorodecanoic acid (PFDA)	0.34	J	1.76	0.33	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluoroundecanoic acid (PFUnA)	0.26	J	1.76	0.22	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluorododecanoic acid (PFDoA)	1.76	U	1.76	0.31	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluorotridecanoic acid (PFTriA)	1.76	U	1.76	0.21	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluorotetradecanoic acid (PFTeA)	1.76	U	1.76	0.40	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluorobutanesulfonic acid (PFBS)	5.18		1.76	0.39	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluorohexanesulfonic acid (PFHxS)	22.4	B	1.76	0.23	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluoroheptanesulfonic Acid (PFHpS)	0.79	J	1.76	0.72	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluorooctanesulfonic acid (PFOS)	57.9		1.76	0.67	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluorodecanesulfonic acid (PFDS)	1.76	U	1.76	0.47	ng/L		10/08/18 09:18	10/13/18 07:16	1
Perfluorooctanesulfonamide (FOSA)	1.76	U	1.76	0.49	ng/L		10/08/18 09:18	10/13/18 07:16	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.6	U	17.6	0.40	ng/L		10/08/18 09:18	10/13/18 07:16	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.6	U	17.6	0.62	ng/L		10/08/18 09:18	10/13/18 07:16	1
6:2 FTS	17.6	U	17.6	0.88	ng/L		10/08/18 09:18	10/13/18 07:16	1
8:2 FTS	17.6	U	17.6	0.49	ng/L		10/08/18 09:18	10/13/18 07:16	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	33		25 - 150				10/08/18 09:18	10/13/18 07:16	1
13C5-PFPeA DNU	49		25 - 150				10/08/18 09:18	10/13/18 07:16	1
13C2 PFHxA	57		25 - 150				10/08/18 09:18	10/13/18 07:16	1
13C4 PFHpA	84		25 - 150				10/08/18 09:18	10/13/18 07:16	1
13C4 PFOA	98		25 - 150				10/08/18 09:18	10/13/18 07:16	1
13C5 PFNA	102		25 - 150				10/08/18 09:18	10/13/18 07:16	1
13C2 PFDA	107		25 - 150				10/08/18 09:18	10/13/18 07:16	1
13C2 PFUnA	108		25 - 150				10/08/18 09:18	10/13/18 07:16	1
13C2 PFDoA	99		25 - 150				10/08/18 09:18	10/13/18 07:16	1
13C2 PFTeA	74		25 - 150				10/08/18 09:18	10/13/18 07:16	1
13C3 PFBS	68		25 - 150				10/08/18 09:18	10/13/18 07:16	1
18O2 PFHxS	79		25 - 150				10/08/18 09:18	10/13/18 07:16	1
13C4 PFOS	75		25 - 150				10/08/18 09:18	10/13/18 07:16	1
13C8 FOSA	52		25 - 150				10/08/18 09:18	10/13/18 07:16	1
d3-NMeFOSAA	81		25 - 150				10/08/18 09:18	10/13/18 07:16	1
d5-NEtFOSAA	97		25 - 150				10/08/18 09:18	10/13/18 07:16	1

TestAmerica Edison

Am
10/29/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Greenpoint-PFAS-1803556-1.9

TestAmerica Job ID: 460-165952-1

Client Sample ID: GPEC-220I

Date Collected: 10/01/18 14:40

Date Received: 10/02/18 18:00

Lab Sample ID: 460-165952-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-6:2 FTS	165	*	25 - 150	10/08/18 09:18	10/13/18 07:16	1
M2-8:2 FTS	137		25 - 150	10/08/18 09:18	10/13/18 07:16	1

Client Sample ID: GPEC-MW-11

Date Collected: 10/01/18 09:30

Date Received: 10/02/18 18:00

Lab Sample ID: 460-165952-2

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte 01705 SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/04/18 06:40	10/04/18 14:32	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	38		10 - 150				10/04/18 06:40	10/04/18 14:32	

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	19.1	B	1.78	0.36	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluoropentanoic acid (PFPeA)	3.03		1.78	0.67	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluorohexanoic acid (PFHxA)	5.31		1.78	0.21	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluoroheptanoic acid (PFHpA)	6.56		1.78	0.28	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluorooctanoic acid (PFOA)	8.54	B	1.78	0.28	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluorononanoic acid (PFNA)	1.01	J	1.78	0.34	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluorodecanoic acid (PFDA)	1.31	J	1.78	0.34	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluoroundecanoic acid (PFUnA)	1.14	J	1.78	0.22	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluorododecanoic acid (PFDoA)	1.78	U	1.78	0.31	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluorotridecanoic acid (PFTriA)	0.34	J	1.78	0.21	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluorotetradecanoic acid (PFTeA)	1.78	U	1.78	0.40	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluorobutanesulfonic acid (PFBS)	2.11		1.78	0.39	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluorohexanesulfonic acid (PFHxS)	0.50	J-B	1.78	0.23	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.78	U	1.78	0.73	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluorooctanesulfonic acid (PFOS)	3.10		1.78	0.67	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluorodecanesulfonic acid (PFDS)	1.78	U	1.78	0.47	ng/L		10/08/18 09:18	10/13/18 07:32	1
Perfluorooctanesulfonamide (FOSA)	1.78	U	1.78	0.50	ng/L		10/08/18 09:18	10/13/18 07:32	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.8	U	17.8	0.40	ng/L		10/08/18 09:18	10/13/18 07:32	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.8	U	17.8	0.62	ng/L		10/08/18 09:18	10/13/18 07:32	1
6:2 FTS	17.8	U	17.8	0.89	ng/L		10/08/18 09:18	10/13/18 07:32	1
8:2 FTS	17.8	U	17.8	0.50	ng/L		10/08/18 09:18	10/13/18 07:32	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	29		25 - 150				10/08/18 09:18	10/13/18 07:32	1
13C5-PFPeA DNU	43		25 - 150				10/08/18 09:18	10/13/18 07:32	1
13C2 PFHxA	51		25 - 150				10/08/18 09:18	10/13/18 07:32	1
13C4 PFHpA	75		25 - 150				10/08/18 09:18	10/13/18 07:32	1
13C4 PFOA	91		25 - 150				10/08/18 09:18	10/13/18 07:32	1
13C5 PFNA	101		25 - 150				10/08/18 09:18	10/13/18 07:32	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Greenpoint-PFAS-1803556-1.9

TestAmerica Job ID: 460-165952-1

Client Sample ID: GPEC-MW-11

Lab Sample ID: 460-165952-2

Date Collected: 10/01/18 09:30

Matrix: Water

Date Received: 10/02/18 18:00

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDA	102		25 - 150	10/08/18 09:18	10/13/18 07:32	1
13C2 PFUnA	113		25 - 150	10/08/18 09:18	10/13/18 07:32	1
13C2 PFDoA	101		25 - 150	10/08/18 09:18	10/13/18 07:32	1
13C2 PFTeDA	108		25 - 150	10/08/18 09:18	10/13/18 07:32	1
13C3 PFBS	58		25 - 150	10/08/18 09:18	10/13/18 07:32	1
18O2 PFHxS	77		25 - 150	10/08/18 09:18	10/13/18 07:32	1
13C4 PFOS	73		25 - 150	10/08/18 09:18	10/13/18 07:32	1
13C8 FOSA	52		25 - 150	10/08/18 09:18	10/13/18 07:32	1
d3-NMeFOSAA	80		25 - 150	10/08/18 09:18	10/13/18 07:32	1
d5-NEtFOSAA	101		25 - 150	10/08/18 09:18	10/13/18 07:32	1
M2-6:2 FTS	172 *		25 - 150	10/08/18 09:18	10/13/18 07:32	1
M2-8:2 FTS	168 *		25 - 150	10/08/18 09:18	10/13/18 07:32	1

Client Sample ID: GPEC-MW-3S

Lab Sample ID: 460-165952-3

Date Collected: 10/01/18 13:10

Matrix: Water

Date Received: 10/02/18 18:00

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/04/18 06:40	10/04/18 15:07	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	39		10 - 150				10/04/18 06:40	10/04/18 15:07	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	9.82	J	1.76	0.36	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluoropentanoic acid (PFPeA)	3.66		1.76	0.66	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluorohexanoic acid (PFHxA)	1.04	J	1.76	0.21	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluoroheptanoic acid (PFHpA)	2.01		1.76	0.28	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluorooctanoic acid (PFOA)	29.4	B	1.76	0.28	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluorononanoic acid (PFNA)	1.90		1.76	0.33	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluorodecanoic acid (PFDA)	2.11		1.76	0.33	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluoroundecanoic acid (PFUnA)	0.55	J	1.76	0.22	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluorododecanoic acid (PFDoA)	1.76	U	1.76	0.31	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluorotridecanoic acid (PFTriA)	1.76	U	1.76	0.21	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluorotetradecanoic acid (PFTeA)	1.76	U	1.76	0.40	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluorobutanesulfonic acid (PFBS)	1.30	J	1.76	0.39	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluorohexanesulfonic acid (PFHxS)	1.07	J B	1.76	0.23	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.76	U	1.76	0.72	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluorooctanesulfonic acid (PFOS)	11.0		1.76	0.67	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluorodecanesulfonic acid (PFDS)	1.76	U	1.76	0.47	ng/L		10/08/18 09:18	10/13/18 08:20	1
Perfluorooctanesulfonamide (FOSA)	1.76	U	1.76	0.49	ng/L		10/08/18 09:18	10/13/18 08:20	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.6	U	17.6	0.40	ng/L		10/08/18 09:18	10/13/18 08:20	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.6	U	17.6	0.61	ng/L		10/08/18 09:18	10/13/18 08:20	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Greenpoint-PFAS-1803556-1.9

TestAmerica Job ID: 460-165952-1

Client Sample ID: GPEC-MW-3S

Date Collected: 10/01/18 13:10

Date Received: 10/02/18 18:00

Lab Sample ID: 460-165952-3

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
6:2 FTS	17.6	U	17.6	0.88	ng/L		10/08/18 09:18	10/13/18 08:20	1
8:2 FTS	17.6	U	17.6	0.49	ng/L		10/08/18 09:18	10/13/18 08:20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	37		25 - 150				10/08/18 09:18	10/13/18 08:20	1
13C5-PFPeA DNU	46		25 - 150				10/08/18 09:18	10/13/18 08:20	1
13C2 PFHxA	26		25 - 150				10/08/18 09:18	10/13/18 08:20	1
13C4 PFHpA	79		25 - 150				10/08/18 09:18	10/13/18 08:20	1
13C4 PFOA	96		25 - 150				10/08/18 09:18	10/13/18 08:20	1
13C5 PFNA	107		25 - 150				10/08/18 09:18	10/13/18 08:20	1
13C2 PFDA	104		25 - 150				10/08/18 09:18	10/13/18 08:20	1
13C2 PFUnA	110		25 - 150				10/08/18 09:18	10/13/18 08:20	1
13C2 PFDoA	95		25 - 150				10/08/18 09:18	10/13/18 08:20	1
13C2 PFTeDA	111		25 - 150				10/08/18 09:18	10/13/18 08:20	1
13C3 PFBS	65		25 - 150				10/08/18 09:18	10/13/18 08:20	1
18O2 PFHxS	79		25 - 150				10/08/18 09:18	10/13/18 08:20	1
13C4 PFOS	79		25 - 150				10/08/18 09:18	10/13/18 08:20	1
13C8 FOSA	57		25 - 150				10/08/18 09:18	10/13/18 08:20	1
d3-NMeFOSAA	81		25 - 150				10/08/18 09:18	10/13/18 08:20	1
d5-NEtFOSAA	97		25 - 150				10/08/18 09:18	10/13/18 08:20	1
M2-6:2 FTS	161	*	25 - 150				10/08/18 09:18	10/13/18 08:20	1
M2-8:2 FTS	162	*	25 - 150				10/08/18 09:18	10/13/18 08:20	1

Client Sample ID: DUP-100118-2

Date Collected: 10/01/18 00:00

Date Received: 10/02/18 18:00

Lab Sample ID: 460-165952-4

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/04/18 06:40	10/04/18 15:24	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	38		10 - 150				10/04/18 06:40	10/04/18 15:24	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	9.90	J	1.74	0.36	ng/L		10/08/18 09:18	10/13/18 08:36	1
Perfluoropentanoic acid (PFPeA)	3.76		1.74	0.65	ng/L		10/08/18 09:18	10/13/18 08:36	1
Perfluorohexanoic acid (PFHxA)	1.57	J	1.74	0.21	ng/L		10/08/18 09:18	10/13/18 08:36	1
Perfluoroheptanoic acid (PFHpA)	1.90		1.74	0.28	ng/L		10/08/18 09:18	10/13/18 08:36	1
Perfluorooctanoic acid (PFOA)	29.4	J	1.74	0.28	ng/L		10/08/18 09:18	10/13/18 08:36	1
Perfluorononanoic acid (PFNA)	2.35		1.74	0.33	ng/L		10/08/18 09:18	10/13/18 08:36	1
Perfluorodecanoic acid (PFDA)	2.08		1.74	0.33	ng/L		10/08/18 09:18	10/13/18 08:36	1
Perfluoroundecanoic acid (PFUnA)	0.32	J	1.74	0.22	ng/L		10/08/18 09:18	10/13/18 08:36	1
Perfluorododecanoic acid (PFDoA)	1.74	U	1.74	0.31	ng/L		10/08/18 09:18	10/13/18 08:36	1
Perfluorotridecanoic acid (PFTriA)	1.74	U	1.74	0.21	ng/L		10/08/18 09:18	10/13/18 08:36	1
Perfluorotetradecanoic acid (PFTeA)	1.74	U	1.74	0.39	ng/L		10/08/18 09:18	10/13/18 08:36	1
Perfluorobutanesulfonic acid (PFBS)	1.08	J	1.74	0.38	ng/L		10/08/18 09:18	10/13/18 08:36	1
Perfluorohexanesulfonic acid (PFHxS)	1.08	J	1.74	0.23	ng/L		10/08/18 09:18	10/13/18 08:36	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Greenpoint-PFAS-1803556-1.9

TestAmerica Job ID: 460-165952-1

Client Sample ID: DUP-100118-2

Lab Sample ID: 460-165952-4

Date Collected: 10/01/18 00:00

Matrix: Water

Date Received: 10/02/18 18:00

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanesulfonic Acid (PFHpS)	1.74	U	1.74	0.71	ng/L		10/08/18 09:18	10/13/18 08:36	1
Perfluorooctanesulfonic acid (PFOS)	10.5		1.74	0.66	ng/L		10/08/18 09:18	10/13/18 08:36	1
Perfluorodecanesulfonic acid (PFDS)	1.74	U	1.74	0.46	ng/L		10/08/18 09:18	10/13/18 08:36	1
Perfluorooctanesulfonamide (FOSA)	1.74	U	1.74	0.49	ng/L		10/08/18 09:18	10/13/18 08:36	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.4	U	17.4	0.39	ng/L		10/08/18 09:18	10/13/18 08:36	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.4	U	17.4	0.61	ng/L		10/08/18 09:18	10/13/18 08:36	1
6:2 FTS	17.4	U	17.4	0.87	ng/L		10/08/18 09:18	10/13/18 08:36	1
8:2 FTS	17.4	U	17.4	0.49	ng/L		10/08/18 09:18	10/13/18 08:36	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	31		25 - 150				10/08/18 09:18	10/13/18 08:36	1
13C5-PFPeA DNU	44		25 - 150				10/08/18 09:18	10/13/18 08:36	1
13C2 PFHxA	25		25 - 150				10/08/18 09:18	10/13/18 08:36	1
13C4 PFHpA	72		25 - 150				10/08/18 09:18	10/13/18 08:36	1
13C4 PFOA	91		25 - 150				10/08/18 09:18	10/13/18 08:36	1
13C5 PFNA	96		25 - 150				10/08/18 09:18	10/13/18 08:36	1
13C2 PFDA	105		25 - 150				10/08/18 09:18	10/13/18 08:36	1
13C2 PFUnA	102		25 - 150				10/08/18 09:18	10/13/18 08:36	1
13C2 PFDoA	96		25 - 150				10/08/18 09:18	10/13/18 08:36	1
13C2 PFTeDA	71		25 - 150				10/08/18 09:18	10/13/18 08:36	1
13C3 PFBS	56		25 - 150				10/08/18 09:18	10/13/18 08:36	1
18O2 PFHxS	66		25 - 150				10/08/18 09:18	10/13/18 08:36	1
13C4 PFOS	72		25 - 150				10/08/18 09:18	10/13/18 08:36	1
13C8 FOSA	53		25 - 150				10/08/18 09:18	10/13/18 08:36	1
d3-NMeFOSAA	77		25 - 150				10/08/18 09:18	10/13/18 08:36	1
d5-NEtFOSAA	93		25 - 150				10/08/18 09:18	10/13/18 08:36	1
M2-6:2 FTS	141		25 - 150				10/08/18 09:18	10/13/18 08:36	1
M2-8:2 FTS	157 *		25 - 150				10/08/18 09:18	10/13/18 08:36	1

Client Sample ID: FB-100118-2

Lab Sample ID: 460-165952-5

Date Collected: 10/01/18 14:00

Matrix: Water

Date Received: 10/02/18 18:00

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/04/18 06:40	10/04/18 15:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	39		10 - 150				10/04/18 06:40	10/04/18 15:42	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.37 JB 1.63 U		1.63	0.33	ng/L		10/08/18 09:18	10/13/18 08:52	1
Perfluoropentanoic acid (PFPeA)	1.63	U	1.63	0.61	ng/L		10/08/18 09:18	10/13/18 08:52	1
Perfluorohexanoic acid (PFHxA)	1.63	U	1.63	0.20	ng/L		10/08/18 09:18	10/13/18 08:52	1
Perfluoroheptanoic acid (PFHpA)	1.63	U	1.63	0.26	ng/L		10/08/18 09:18	10/13/18 08:52	1
Perfluorooctanoic acid (PFOA)	1.63	U	1.63	0.26	ng/L		10/08/18 09:18	10/13/18 08:52	1
Perfluorononanoic acid (PFNA)	1.63	U	1.63	0.31	ng/L		10/08/18 09:18	10/13/18 08:52	1

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Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Greenpoint-PFAS-1803556-1.9

TestAmerica Job ID: 460-165952-1

Client Sample ID: FB-100118-2

Date Collected: 10/01/18 14:00

Date Received: 10/02/18 18:00

Lab Sample ID: 460-165952-5

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanoic acid (PFDA)	1.63	U	1.63	0.31	ng/L		10/08/18 09:18	10/13/18 08:52	1
Perfluoroundecanoic acid (PFUnA)	1.63	U	1.63	0.20	ng/L		10/08/18 09:18	10/13/18 08:52	1
Perfluorododecanoic acid (PFDoA)	1.63	U	1.63	0.28	ng/L		10/08/18 09:18	10/13/18 08:52	1
Perfluorotridecanoic acid (PFTriA)	1.63	U	1.63	0.20	ng/L		10/08/18 09:18	10/13/18 08:52	1
Perfluorotetradecanoic acid (PFTeA)	1.63	U	1.63	0.37	ng/L		10/08/18 09:18	10/13/18 08:52	1
Perfluorobutanesulfonic acid (PFBS)	1.63	U	1.63	0.36	ng/L		10/08/18 09:18	10/13/18 08:52	1
Perfluorohexanesulfonic acid (PFHxS)	0.25 1.63	JB U	1.63	0.21	ng/L		10/08/18 09:18	10/13/18 08:52	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.63	U	1.63	0.67	ng/L		10/08/18 09:18	10/13/18 08:52	1
Perfluorooctanesulfonic acid (PFOS)	1.63	U	1.63	0.62	ng/L		10/08/18 09:18	10/13/18 08:52	1
Perfluorodecanesulfonic acid (PFDS)	1.63	U	1.63	0.43	ng/L		10/08/18 09:18	10/13/18 08:52	1
Perfluorooctanesulfonamide (FOSA)	1.63	U	1.63	0.46	ng/L		10/08/18 09:18	10/13/18 08:52	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.3	U	16.3	0.37	ng/L		10/08/18 09:18	10/13/18 08:52	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.3	U	16.3	0.57	ng/L		10/08/18 09:18	10/13/18 08:52	1
6:2 FTS	16.3	U	16.3	0.81	ng/L		10/08/18 09:18	10/13/18 08:52	1
8:2 FTS	16.3	U	16.3	0.46	ng/L		10/08/18 09:18	10/13/18 08:52	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	69		25 - 150				10/08/18 09:18	10/13/18 08:52	1
13C5-PFPeA DNU	70		25 - 150				10/08/18 09:18	10/13/18 08:52	1
13C2 PFHxA	82		25 - 150				10/08/18 09:18	10/13/18 08:52	1
13C4 PFHpA	89		25 - 150				10/08/18 09:18	10/13/18 08:52	1
13C4 PFOA	95		25 - 150				10/08/18 09:18	10/13/18 08:52	1
13C5 PFNA	89		25 - 150				10/08/18 09:18	10/13/18 08:52	1
13C2 PFDA	92		25 - 150				10/08/18 09:18	10/13/18 08:52	1
13C2 PFUnA	95		25 - 150				10/08/18 09:18	10/13/18 08:52	1
13C2 PFDoA	88		25 - 150				10/08/18 09:18	10/13/18 08:52	1
13C2 PFTeDA	85		25 - 150				10/08/18 09:18	10/13/18 08:52	1
13C3 PFBS	70		25 - 150				10/08/18 09:18	10/13/18 08:52	1
18O2 PFHxS	68		25 - 150				10/08/18 09:18	10/13/18 08:52	1
13C4 PFOS	65		25 - 150				10/08/18 09:18	10/13/18 08:52	1
13C8 FOSA	43		25 - 150				10/08/18 09:18	10/13/18 08:52	1
d3-NMeFOSAA	72		25 - 150				10/08/18 09:18	10/13/18 08:52	1
d5-NEtFOSAA	87		25 - 150				10/08/18 09:18	10/13/18 08:52	1
M2-6:2 FTS	85		25 - 150				10/08/18 09:18	10/13/18 08:52	1
M2-8:2 FTS	101		25 - 150				10/08/18 09:18	10/13/18 08:52	1

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Site: Long Island Emerging Contaminants, Inwood
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-167680
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 16, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
GW-8	460-167680-01	PFAS, 1,4-Dioxane
MW-16S	460-167680-02	PFAS, 1,4-Dioxane
MW-52I	460-167680-03	PFAS, 1,4-Dioxane
FB-102318	460-167680-04	PFAS, 1,4-Dioxane
DUP-102318	460-167680-03	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: FB-102318
Field Duplicate pair: MW-16S/DUP-102318

The above-listed aqueous samples and field blank sample were collected on October 23, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-Dioxane by 1,4-dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatiles Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

1,4-Dioxane

All initial and continuing calibration criteria were met.

PFAS

Compounds that did not meet criteria in the calibrations are summarized in the following table.

Instrument/ Calibration Standard	Compound	Calibration Exceedance	Validation Qualifier
LC410 Low Level CCVL 11/02 13:19	8:2 FTS	-50.3 %D	Estimate (UJ) nondetect results for 8:2 FTS in samples GW-8, MW-16S, MW-52I, FB-102318, and DUP-102318; Low bias.
Associated samples: GW-8, MW-16S, MW-52I, FB-102318, DUP-102318			

Low level Continuing Calibration Verification (CCVL) percent recovery (%R) > 50%D; professional judgment was taken to estimate results less than the affected range of five times the reporting limit (RL) dependent on the recovery.

Blanks

PFAS

Analytes were not detected in the associated laboratory method sample and field blank.

1,4-Dioxane

1,4-Dioxane was not detected in the associated method blank sample. 1,4-Dioxane was detected in the associated field blank sample. The following table summarizes the contamination and validation actions taken.

Inwood, 1803556-1.5

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
1,4-Dioxane	FB-102318: All samples	0.12 ug/L	1.2 ug/L	Qualify the result for 1,4-dioxane in sample MW-52I as nondetect (U) at the RL. Qualify the result for 1,4-dioxane as estimated (J) in sample GW-8; High bias.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
GW-8	13C4 PFBA	14	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA) and Perfluoropentanoic acid (PFPeA) in sample GW-8.
	13C5-PFPeA	21		
MW-52I	13C4 PFBA	20	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA) and 6:2 FTS in sample MW-52I.
	M2-6:2 FTS	163		
	M2-8:2 FTS	180		Validation action was not required as the result for 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.

It should be noted that IDA recoveries outside of control limits generally have a minimal effect on the data quality as the results are quantitated by isotope dilution and are corrected accordingly. However, professional judgment was taken to qualify affected compound results for associated isotope dilution analytes recovered outside of the recommended control limits.

MS/MSD Results

MS/MSD analyses were performed on sample GW-8 for 1,4-dioxane and PFAS. Recovery and precision criteria were met.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples MW-16S and DUP-102318 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria.

Analyte	MW-16S (ng/L)	DUP-102318 (ng/L)	RPD (%)
Perfluorobutanoic acid (PFBA)	21.4	23.3	8.5
Perfluoropentanoic (PFPeA)	9.61	10.4	7.9
Perfluorohexanoic acid (PFHxA)	1.90	2.24	16.4
Perfluoroheptanoic acid (PFHpA)	0.78 J	0.76 J	2.6
Perfluorooctanoic acid (PFOA)	2.81	2.73	2.9
Perfluoroundecanoic acid (PFUnA)	0.26 J	1.64 U	NC, Not within the RL
Perfluorobutanesulfonic acid (PFBS)	0.45 J	0.60 J	28.6
NC – Not calculable			
Criteria: When both results are ≥ 5 x the RL, RPDs must be $< 30\%$.			
When results are < 5 x the QL, the absolute difference between the original and field duplicate results must be $< RL$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

Dilutions were not required.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Inwood-PFAS-1803556-1.5

TestAmerica Job ID: 460-167680-1

Client Sample ID: GW-8

Lab Sample ID: 460-167680-1

Date Collected: 10/23/18 09:15

Matrix: Water

Date Received: 10/24/18 20:00

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.49	J	0.20	0.016	ug/L		10/26/18 13:28	10/26/18 22:03	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	42		10 - 150				10/26/18 13:28	10/26/18 22:03	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	20.9	J	1.66	0.34	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluoropentanoic acid (PFPeA)	40.3	J	1.66	0.62	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluorohexanoic acid (PFHxA)	6.58		1.66	0.20	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluoroheptanoic acid (PFHpA)	9.84		1.66	0.26	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluorooctanoic acid (PFOA)	48.3		1.66	0.26	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluorononanoic acid (PFNA)	0.31	J	1.66	0.31	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluorodecanoic acid (PFDA)	1.66	U	1.66	0.31	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluoroundecanoic acid (PFUnA)	0.23	J	1.66	0.21	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluorododecanoic acid (PFDoA)	1.66	U	1.66	0.29	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluorotridecanoic acid (PFTriA)	1.66	U	1.66	0.20	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluorotetradecanoic acid (PFTeA)	1.66	U	1.66	0.37	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluorobutanesulfonic acid (PFBS)	8.79		1.66	0.36	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluorohexanesulfonic acid (PFHxS)	1.74		1.66	0.22	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.66	U	1.66	0.68	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluorooctanesulfonic acid (PFOS)	1.98		1.66	0.63	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluorodecanesulfonic acid (PFDS)	1.66	U	1.66	0.44	ng/L		11/02/18 09:15	11/03/18 01:47	1
Perfluorooctanesulfonamide (FOSA)	1.66	U	1.66	0.46	ng/L		11/02/18 09:15	11/03/18 01:47	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.6	U	16.6	0.37	ng/L		11/02/18 09:15	11/03/18 01:47	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.6	U	16.6	0.58	ng/L		11/02/18 09:15	11/03/18 01:47	1
6:2 FTS	16.6	U	16.6	0.83	ng/L		11/02/18 09:15	11/03/18 01:47	1
8:2 FTS	16.6	U J	16.6	0.46	ng/L		11/02/18 09:15	11/03/18 01:47	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	14	*	25 - 150				11/02/18 09:15	11/03/18 01:47	1
13C5-PFPeA DNU	21	*	25 - 150				11/02/18 09:15	11/03/18 01:47	1
13C2 PFHxA	29		25 - 150				11/02/18 09:15	11/03/18 01:47	1
13C4 PFHpA	62		25 - 150				11/02/18 09:15	11/03/18 01:47	1
13C4 PFOA	76		25 - 150				11/02/18 09:15	11/03/18 01:47	1
13C5 PFNA	92		25 - 150				11/02/18 09:15	11/03/18 01:47	1
13C2 PFDA	95		25 - 150				11/02/18 09:15	11/03/18 01:47	1
13C2 PFUnA	90		25 - 150				11/02/18 09:15	11/03/18 01:47	1
13C2 PFDoA	79		25 - 150				11/02/18 09:15	11/03/18 01:47	1
13C2 PFTeA	79		25 - 150				11/02/18 09:15	11/03/18 01:47	1
13C3 PFBS	66		25 - 150				11/02/18 09:15	11/03/18 01:47	1
18O2 PFHxS	83		25 - 150				11/02/18 09:15	11/03/18 01:47	1
13C4 PFOS	87		25 - 150				11/02/18 09:15	11/03/18 01:47	1
13C8 FOSA	69		25 - 150				11/02/18 09:15	11/03/18 01:47	1
d3-NMeFOSAA	82		25 - 150				11/02/18 09:15	11/03/18 01:47	1
d5-NEtFOSAA	85		25 - 150				11/02/18 09:15	11/03/18 01:47	1

TestAmerica Edison

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11/15/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Inwood-PFAS-1803556-1.5

TestAmerica Job ID: 460-167680-1

Client Sample ID: GW-8

Lab Sample ID: 460-167680-1

Date Collected: 10/23/18 09:15

Matrix: Water

Date Received: 10/24/18 20:00

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-6:2 FTS	143		25 - 150	11/02/18 09:15	11/03/18 01:47	1
M2-8:2 FTS	122		25 - 150	11/02/18 09:15	11/03/18 01:47	1

Client Sample ID: MW-16S

Lab Sample ID: 460-167680-2

Date Collected: 10/23/18 11:05

Matrix: Water

Date Received: 10/24/18 20:00

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/26/18 13:28	10/26/18 22:19	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	47		10 - 150				10/26/18 13:28	10/26/18 22:19	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	21.4		1.64	0.34	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluoropentanoic acid (PFPeA)	9.61		1.64	0.62	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluorohexanoic acid (PFHxA)	1.90		1.64	0.20	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluoroheptanoic acid (PFHpA)	0.78	J	1.64	0.26	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluorooctanoic acid (PFOA)	2.81		1.64	0.26	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluorononanoic acid (PFNA)	1.64	U	1.64	0.31	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluorodecanoic acid (PFDA)	1.64	U	1.64	0.31	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluoroundecanoic acid (PFUnA)	0.26	J	1.64	0.21	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluorododecanoic acid (PFDoA)	1.64	U	1.64	0.29	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluorotridecanoic acid (PFTriA)	1.64	U	1.64	0.20	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluorotetradecanoic acid (PFTeA)	1.64	U	1.64	0.37	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluorobutanesulfonic acid (PFBS)	0.45	J	1.64	0.36	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluorohexanesulfonic acid (PFHxS)	1.64	U	1.64	0.21	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.64	U	1.64	0.67	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluorooctanesulfonic acid (PFOS)	1.64	U	1.64	0.62	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluorodecanesulfonic acid (PFDS)	1.64	U	1.64	0.44	ng/L		11/02/18 09:15	11/03/18 02:34	1
Perfluorooctanesulfonamide (FOSA)	1.64	U	1.64	0.46	ng/L		11/02/18 09:15	11/03/18 02:34	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.4	U	16.4	0.37	ng/L		11/02/18 09:15	11/03/18 02:34	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.4	U	16.4	0.58	ng/L		11/02/18 09:15	11/03/18 02:34	1
6:2 FTS	16.4	U	16.4	0.82	ng/L		11/02/18 09:15	11/03/18 02:34	1
8:2 FTS	16.4	U J-	16.4	0.46	ng/L		11/02/18 09:15	11/03/18 02:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	42		25 - 150				11/02/18 09:15	11/03/18 02:34	1
13C5-PFPeA DNU	50		25 - 150				11/02/18 09:15	11/03/18 02:34	1
13C2 PFHxA	53		25 - 150				11/02/18 09:15	11/03/18 02:34	1
13C4 PFHpA	66		25 - 150				11/02/18 09:15	11/03/18 02:34	1
13C4 PFOA	71		25 - 150				11/02/18 09:15	11/03/18 02:34	1
13C5 PFNA	68		25 - 150				11/02/18 09:15	11/03/18 02:34	1
13C2 PFDA	70		25 - 150				11/02/18 09:15	11/03/18 02:34	1
13C2 PFUnA	65		25 - 150				11/02/18 09:15	11/03/18 02:34	1
13C2 PFDoA	62		25 - 150				11/02/18 09:15	11/03/18 02:34	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Inwood-PFAS-1803556-1.5

TestAmerica Job ID: 460-167680-1

Client Sample ID: MW-16S

Lab Sample ID: 460-167680-2

Date Collected: 10/23/18 11:05

Matrix: Water

Date Received: 10/24/18 20:00

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFTeDA	70		25 - 150	11/02/18 09:15	11/03/18 02:34	1
13C3 PFBS	84		25 - 150	11/02/18 09:15	11/03/18 02:34	1
18O2 PFHxS	79		25 - 150	11/02/18 09:15	11/03/18 02:34	1
13C4 PFOS	71		25 - 150	11/02/18 09:15	11/03/18 02:34	1
13C8 FOSA	49		25 - 150	11/02/18 09:15	11/03/18 02:34	1
d3-NMeFOSAA	58		25 - 150	11/02/18 09:15	11/03/18 02:34	1
d5-NEtFOSAA	73		25 - 150	11/02/18 09:15	11/03/18 02:34	1
M2-6:2 FTS	79		25 - 150	11/02/18 09:15	11/03/18 02:34	1
M2-8:2 FTS	74		25 - 150	11/02/18 09:15	11/03/18 02:34	1

Client Sample ID: MW-52I

Lab Sample ID: 460-167680-3

Date Collected: 10/23/18 12:45

Matrix: Water

Date Received: 10/24/18 20:00

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

GC/MS - Semi-quantitative Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.15 J	0.20 U	0.20	0.016	ug/L		10/26/18 13:28	10/26/18 22:36	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	44		10 - 150				10/26/18 13:28	10/26/18 22:36	

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	42.3	J	1.68	0.34	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluoropentanoic acid (PFPeA)	21.1		1.68	0.63	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluorohexanoic acid (PFHxA)	18.4		1.68	0.20	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluoroheptanoic acid (PFHpA)	13.1		1.68	0.27	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluorooctanoic acid (PFOA)	38.1		1.68	0.27	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluorononanoic acid (PFNA)	5.08		1.68	0.32	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluorodecanoic acid (PFDA)	1.38	J	1.68	0.32	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluoroundecanoic acid (PFUnA)	0.59	J	1.68	0.21	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluorododecanoic acid (PFDoA)	1.68	U	1.68	0.29	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluorotridecanoic acid (PFTriA)	1.68	U	1.68	0.20	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluorotetradecanoic acid (PFTeA)	1.68	U	1.68	0.38	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluorobutanesulfonic acid (PFBS)	11.4		1.68	0.37	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluorohexanesulfonic acid (PFHxS)	8.78		1.68	0.22	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.29	J	1.68	0.69	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluorooctanesulfonic acid (PFOS)	74.2		1.68	0.64	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluorodecanesulfonic acid (PFDS)	1.68	U	1.68	0.44	ng/L		11/02/18 09:15	11/03/18 02:50	1
Perfluorooctanesulfonamide (FOSA)	1.68	U	1.68	0.47	ng/L		11/02/18 09:15	11/03/18 02:50	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.8	U	16.8	0.38	ng/L		11/02/18 09:15	11/03/18 02:50	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.8	U	16.8	0.59	ng/L		11/02/18 09:15	11/03/18 02:50	1
6:2 FTS	1.96	J	16.8	0.84	ng/L		11/02/18 09:15	11/03/18 02:50	1
8:2 FTS	16.8	U J	16.8	0.47	ng/L		11/02/18 09:15	11/03/18 02:50	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Inwood-PFAS-1803556-1.5

TestAmerica Job ID: 460-167680-1

Client Sample ID: MW-52I

Lab Sample ID: 460-167680-3

Date Collected: 10/23/18 12:45

Matrix: Water

Date Received: 10/24/18 20:00

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	20		25 - 150	11/02/18 09:15	11/03/18 02:50	1
13C5-PFPeA DNU	28		25 - 150	11/02/18 09:15	11/03/18 02:50	1
13C2 PFHxA	35		25 - 150	11/02/18 09:15	11/03/18 02:50	1
13C4 PFHpA	59		25 - 150	11/02/18 09:15	11/03/18 02:50	1
13C4 PFOA	79		25 - 150	11/02/18 09:15	11/03/18 02:50	1
13C5 PFNA	85		25 - 150	11/02/18 09:15	11/03/18 02:50	1
13C2 PFDA	98		25 - 150	11/02/18 09:15	11/03/18 02:50	1
13C2 PFUnA	103		25 - 150	11/02/18 09:15	11/03/18 02:50	1
13C2 PFDoA	99		25 - 150	11/02/18 09:15	11/03/18 02:50	1
13C2 PFTeDA	96		25 - 150	11/02/18 09:15	11/03/18 02:50	1
13C3 PFBS	67		25 - 150	11/02/18 09:15	11/03/18 02:50	1
18O2 PFHxS	96		25 - 150	11/02/18 09:15	11/03/18 02:50	1
13C4 PFOS	100		25 - 150	11/02/18 09:15	11/03/18 02:50	1
13C8 FOSA	53		25 - 150	11/02/18 09:15	11/03/18 02:50	1
d3-NMeFOSAA	82		25 - 150	11/02/18 09:15	11/03/18 02:50	1
d5-NetFOSAA	104		25 - 150	11/02/18 09:15	11/03/18 02:50	1
M2-6:2 FTS	163		25 - 150	11/02/18 09:15	11/03/18 02:50	1
M2-8:2 FTS	180		25 - 150	11/02/18 09:15	11/03/18 02:50	1

Client Sample ID: FB-102318

Lab Sample ID: 460-167680-4

Date Collected: 10/23/18 09:30

Matrix: Water

Date Received: 10/24/18 20:00

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.12	J	0.20	0.016	ug/L		10/26/18 13:28	10/26/18 22:53	1
Isotope Dilution	%Recovery	Qualifier	Limits						
1,4-Dioxane-d8	40		10 - 150						
				</					

Method: 537 (modified) - Fluorinated Alkyl Substances									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.77	U	1.77	0.36	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluoropentanoic acid (PFPeA)	1.77	U	1.77	0.67	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluorohexanoic acid (PFHxA)	1.77	U	1.77	0.21	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluoroheptanoic acid (PFHpA)	1.77	U	1.77	0.28	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluorooctanoic acid (PFOA)	1.77	U	1.77	0.28	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluorononanoic acid (PFNA)	1.77	U	1.77	0.34	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluorodecanoic acid (PFDA)	1.77	U	1.77	0.34	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluoroundecanoic acid (PFUnA)	1.77	U	1.77	0.22	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluorododecanoic acid (PFDoA)	1.77	U	1.77	0.31	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluorotridecanoic acid (PFTriA)	1.77	U	1.77	0.21	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluorotetradecanoic acid (PFTeA)	1.77	U	1.77	0.40	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluorobutanesulfonic acid (PFBS)	1.77	U	1.77	0.39	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluorohexanesulfonic acid (PFHxS)	1.77	U	1.77	0.23	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.77	U	1.77	0.73	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluorooctanesulfonic acid (PFOS)	1.77	U	1.77	0.67	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluorodecanesulfonic acid (PFDS)	1.77	U	1.77	0.47	ng/L		11/02/18 09:15	11/03/18 03:06	1
Perfluorooctanesulfonamide (FOSA)	1.77	U	1.77	0.50	ng/L		11/02/18 09:15	11/03/18 03:06	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.7	U	17.7	0.40	ng/L		11/02/18 09:15	11/03/18 03:06	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Inwood-PFAS-1803556-1.5

TestAmerica Job ID: 460-167680-1

Client Sample ID: FB-102318

Date Collected: 10/23/18 09:30

Date Received: 10/24/18 20:00

Lab Sample ID: 460-167680-4

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.7	U	17.7	0.62	ng/L		11/02/18 09:15	11/03/18 03:06	1
6:2 FTS	17.7	U	17.7	0.89	ng/L		11/02/18 09:15	11/03/18 03:06	1
8:2 FTS	17.7	U J	17.7	0.50	ng/L		11/02/18 09:15	11/03/18 03:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	74		25 - 150				11/02/18 09:15	11/03/18 03:06	1
13C5-PFPeA DNU	72		25 - 150				11/02/18 09:15	11/03/18 03:06	1
13C2 PFHxA	73		25 - 150				11/02/18 09:15	11/03/18 03:06	1
13C4 PFHpA	84		25 - 150				11/02/18 09:15	11/03/18 03:06	1
13C4 PFOA	84		25 - 150				11/02/18 09:15	11/03/18 03:06	1
13C5 PFNA	84		25 - 150				11/02/18 09:15	11/03/18 03:06	1
13C2 PFDA	87		25 - 150				11/02/18 09:15	11/03/18 03:06	1
13C2 PFUnA	88		25 - 150				11/02/18 09:15	11/03/18 03:06	1
13C2 PFDoA	74		25 - 150				11/02/18 09:15	11/03/18 03:06	1
13C2 PFTeDA	73		25 - 150				11/02/18 09:15	11/03/18 03:06	1
13C3 PFBS	93		25 - 150				11/02/18 09:15	11/03/18 03:06	1
18O2 PFHxS	90		25 - 150				11/02/18 09:15	11/03/18 03:06	1
13C4 PFOS	88		25 - 150				11/02/18 09:15	11/03/18 03:06	1
13C8 FOSA	49		25 - 150				11/02/18 09:15	11/03/18 03:06	1
d3-NMeFOSAA	77		25 - 150				11/02/18 09:15	11/03/18 03:06	1
d5-NEtFOSAA	86		25 - 150				11/02/18 09:15	11/03/18 03:06	1
M2-6:2 FTS	75		25 - 150				11/02/18 09:15	11/03/18 03:06	1
M2-8:2 FTS	89		25 - 150				11/02/18 09:15	11/03/18 03:06	1

Client Sample ID: DUP-102318

Date Collected: 10/23/18 00:00

Date Received: 10/24/18 20:00

Lab Sample ID: 460-167680-5

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/26/18 13:28	10/26/18 23:09	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	46		10 - 150				10/26/18 13:28	10/26/18 23:09	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	23.3		1.64	0.34	ng/L		11/02/18 09:15	11/03/18 03:22	1
Perfluoropentanoic acid (PFPeA)	10.4		1.64	0.62	ng/L		11/02/18 09:15	11/03/18 03:22	1
Perfluorohexanoic acid (PFHxA)	2.24		1.64	0.20	ng/L		11/02/18 09:15	11/03/18 03:22	1
Perfluoroheptanoic acid (PFHpA)	0.76 J		1.64	0.26	ng/L		11/02/18 09:15	11/03/18 03:22	1
Perfluorooctanoic acid (PFOA)	2.73		1.64	0.26	ng/L		11/02/18 09:15	11/03/18 03:22	1
Perfluorononanoic acid (PFNA)	1.64 U		1.64	0.31	ng/L		11/02/18 09:15	11/03/18 03:22	1
Perfluorodecanoic acid (PFDA)	1.64 U		1.64	0.31	ng/L		11/02/18 09:15	11/03/18 03:22	1
Perfluoroundecanoic acid (PFUnA)	1.64 U		1.64	0.21	ng/L		11/02/18 09:15	11/03/18 03:22	1
Perfluorododecanoic acid (PFDoA)	1.64 U		1.64	0.29	ng/L		11/02/18 09:15	11/03/18 03:22	1
Perfluorotridecanoic acid (PFTriA)	1.64 U		1.64	0.20	ng/L		11/02/18 09:15	11/03/18 03:22	1
Perfluorotetradecanoic acid (PFTeA)	1.64 U		1.64	0.37	ng/L		11/02/18 09:15	11/03/18 03:22	1
Perfluorobutanesulfonic acid (PFBS)	0.60 J		1.64	0.36	ng/L		11/02/18 09:15	11/03/18 03:22	1
Perfluorohexanesulfonic acid (PFHxS)	1.64 U		1.64	0.21	ng/L		11/02/18 09:15	11/03/18 03:22	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Inwood-PFAS-1803556-1.5

TestAmerica Job ID: 460-167680-1

Client Sample ID: DUP-102318

Lab Sample ID: 460-167680-5

Date Collected: 10/23/18 00:00

Matrix: Water

Date Received: 10/24/18 20:00

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanesulfonic Acid (PFHpS)	1.64	U	1.64	0.67	ng/L		11/02/18 09:15	11/03/18 03:22	1
Perfluorooctanesulfonic acid (PFOS)	1.64	U	1.64	0.62	ng/L		11/02/18 09:15	11/03/18 03:22	1
Perfluorodecanesulfonic acid (PFDS)	1.64	U	1.64	0.44	ng/L		11/02/18 09:15	11/03/18 03:22	1
Perfluorooctanesulfonamide (FOSA)	1.64	U	1.64	0.46	ng/L		11/02/18 09:15	11/03/18 03:22	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.4	U	16.4	0.37	ng/L		11/02/18 09:15	11/03/18 03:22	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.4	U	16.4	0.58	ng/L		11/02/18 09:15	11/03/18 03:22	1
6:2 FTS	16.4	U	16.4	0.82	ng/L		11/02/18 09:15	11/03/18 03:22	1
8:2 FTS	16.4	U J	16.4	0.46	ng/L		11/02/18 09:15	11/03/18 03:22	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	41		25 - 150				11/02/18 09:15	11/03/18 03:22	1
13C5-PFPeA DNU	51		25 - 150				11/02/18 09:15	11/03/18 03:22	1
13C2 PFHxA	49		25 - 150				11/02/18 09:15	11/03/18 03:22	1
13C4 PFHpA	68		25 - 150				11/02/18 09:15	11/03/18 03:22	1
13C4 PFOA	73		25 - 150				11/02/18 09:15	11/03/18 03:22	1
13C5 PFNA	71		25 - 150				11/02/18 09:15	11/03/18 03:22	1
13C2 PFDA	69		25 - 150				11/02/18 09:15	11/03/18 03:22	1
13C2 PFUnA	69		25 - 150				11/02/18 09:15	11/03/18 03:22	1
13C2 PFDoA	62		25 - 150				11/02/18 09:15	11/03/18 03:22	1
13C2 PFTeDA	65		25 - 150				11/02/18 09:15	11/03/18 03:22	1
13C3 PFBS	78		25 - 150				11/02/18 09:15	11/03/18 03:22	1
18O2 PFHxS	84		25 - 150				11/02/18 09:15	11/03/18 03:22	1
13C4 PFOS	74		25 - 150				11/02/18 09:15	11/03/18 03:22	1
13C8 FOSA	46		25 - 150				11/02/18 09:15	11/03/18 03:22	1
d3-NMeFOSAA	65		25 - 150				11/02/18 09:15	11/03/18 03:22	1
d5-NEtFOSAA	70		25 - 150				11/02/18 09:15	11/03/18 03:22	1
M2-6:2 FTS	78		25 - 150				11/02/18 09:15	11/03/18 03:22	1
M2-8:2 FTS	75		25 - 150				11/02/18 09:15	11/03/18 03:22	1

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Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

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Ver: 08/04/2016

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21/07/2011

Site: Long Island Emerging Contaminants, Kings County
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-166359
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 15, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
KC-MW-01	460-166359-01	PFAS, 1,4-Dioxane
KC-MW-05	460-166359-02	PFAS, 1,4-Dioxane
KC-MW-09	460-166359-03	PFAS, 1,4-Dioxane
DUP-100518-2	460-166359-04	PFAS, 1,4-Dioxane
FB-100518-2	460-166359-05	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: FB-100518-2
Field Duplicate pair: KC-MW-05/DUP-100518-2

The above-listed aqueous samples and field blank sample were collected on October 5, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-Dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatile Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

1,4-Dioxane and PFAS

Analytes were detected in the associated laboratory method and field blank samples. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
1,4-Dioxane				
1,4-Dioxane	FB-100518-2: All samples	0.13 ug/L	1.3 ug/L	Qualify the results for 1,4-dioxane in samples KC-MW-05, KC-MW-09, and DUP-100518-2 as nondetect (U) at the RL. Qualify the positive result for 1,4-dioxane in sample KC-MW-01 as estimated (J); High bias.
PFAS				
Perfluorooctanoic acid (PFOA)	Method MB 200- 135439: All samples	0.321 ng/L	3.21 ng/L	Qualify the result for Perfluorooctanoic acid (PFOA) in sample FB-100518-2 as nondetect (U) at the RL.
Perfluoroundecanoic acid (PFUnA)		0.301 ng/L	3.01 ng/L	Qualify the result for Perfluoroundecanoic acid (PFUnA) in sample KC-MW-09 as nondetect (U) at the RL.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method

recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
KC-MW-01	M2-6:2 FTS	253	25-150	Estimate (J) the positive result for 6:2 FTS in sample KC-MW-01.
KC-MW-09	M2-6:2 FTS	308	25-150	Estimate (J) the positive result for 6:2 FTS in sample KC-MW-09.
	M2-8:2 FTS	203		Validation action was not required as the result for 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.
FB-100518-2	M2-6:2 FTS	153	25-150	Validation action was not required as the result for 6:2 FTS was not detected in this sample and therefore not affected by the high recovery.
DUP-100518-2 (10-fold dilution)	13C4 PFBA	17	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA) and 6:2 FTS in sample DUP-100518-2.
	M2-6:2 FTS	205		
	M2-8:2 FTS	166		Validation action was not required as the result for 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.
KC-MW-05 (10-fold dilution)	M2-6:2 FTS	302	25-150	Estimate (J) the positive result for 6:2 FTS in sample KC-MW-05.
	M2-8:2 FTS	178		Validation action was not required as the result for 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.

It should be noted that IDA recoveries outside of control limits generally have a minimal effect on the data quality as the results are quantitated by isotope dilution and are corrected accordingly. However, professional judgment was taken to qualify affected compound results for associated isotope dilution analytes recovered outside of the recommended control limits.

MS/MSD Results

MS/MSD analyses were performed on sample KC-MW-09 for 1,4-dioxane and PFAS. Recovery and precision criteria were met.

LCS Results

All criteria were met.

Internal Standards

1,4-Dioxane

All criteria were met.

PFAS

The following table lists the internal standards recovered outside of control limits and the resulting actions.

Sample	Internal Standard	Recovery (%)	Control Limits (%)	Validation Actions
KC-MW-05 (25-fold dilution)	13C2 PFOA	184	50-150	Estimate (J) the positive results reported from the 25-fold dilution analysis of sample KC-MW-05: Perfluorobutanoic acid (PFBA), Perfluoroheptanoic acid (PFHpA), and Perfluorooctanoic acid (PFOA).
DUP-100518-2 (25-fold dilution)	13C2 PFOA	165	50-150	Estimate (J) the positive results reported from the 25-fold dilution analysis of sample DUP-100518-2: Perfluoroheptanoic acid (PFHpA) and Perfluorooctanoic acid (PFOA) in sample DUP-100518-2.

Field Duplicate Results

Samples KC-MW-05 and DUP-100518-2 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria.

Analyte	KC-MW-05 (ng/L)	DUP-100518-2 (ng/L)	RPD (%)
Perfluorobutanoic acid (PFBA)	2940	3210	8.8
Perfluoropentanoic (PFPeA)	243	221	9.5
Perfluorohexanoic acid (PFHxA)	19.6 U	11.1 J	NC, Within the RL
Perfluoroheptanoic acid (PFHpA)	33.2 J	28.1 J	16.6
Perfluorooctanoic acid (PFOA)	155	154	0.6
Perfluorononanoic acid (PFNA)	34.1	30.1	12.5
Perfluorobutanesulfonic acid (PFBS)	93.7	96.9	3.4
6:2 FTS	21.8 J	32.0 J	37.9, Within the RL
NC – Not calculable Criteria: When both results are $\geq 5x$ the RL, RPDs must be $< 30\%$. When results are $< 5x$ the QL, the absolute difference between the original and field duplicate results must be $< RL$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

The following table lists the sample dilutions which were performed and the results to be reported.

Sample	PFAS Analysis Reported
KC-MW-05	A 25-fold dilution was performed for Perfluorobutanoic acid (PFBA), Perfluoroheptanoic acid (PFHpA), and Perfluorooctanoic acid (PFOA) due to sample matrix. All other results were reported from the 10-fold dilution analysis. RLs were elevated in this sample.
DUP-100518-2	A 25-fold dilution was performed for Perfluoroheptanoic acid (PFHpA) and Perfluorooctanoic acid (PFOA) due to sample matrix. All other results were reported from the 10-fold dilution analysis. RLs were elevated in this sample.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DRAFT

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Kings Co-PFAS-1803556-1.11

TestAmerica Job ID: 460-166359-1

Client Sample ID: KC-MW-01

Lab Sample ID: 460-166359-1

Date Collected: 10/05/18 12:05

Matrix: Water

Date Received: 10/05/18 16:24

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.57	J	0.20	0.016	ug/L		10/09/18 20:13	10/10/18 11:12	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	44		10 - 150				10/09/18 20:13	10/10/18 11:12	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	10.9		1.67	0.34	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluoropentanoic acid (PFPeA)	15.9		1.67	0.62	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluorohexanoic acid (PFHxA)	18.3		1.67	0.20	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluoroheptanoic acid (PFHpA)	25.2		1.67	0.27	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluorooctanoic acid (PFOA)	86.7	B	1.67	0.27	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluorononanoic acid (PFNA)	2.90		1.67	0.32	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluorodecanoic acid (PFDA)	1.67	U	1.67	0.32	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluoroundecanoic acid (PFUnA)	1.67	U	1.67	0.21	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluorododecanoic acid (PFDoA)	1.67	U	1.67	0.29	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluorotridecanoic acid (PFTriA)	1.67	U	1.67	0.20	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluorotetradecanoic acid (PFTeA)	1.67	U	1.67	0.37	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluorobutanesulfonic acid (PFBS)	2.74		1.67	0.37	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluorohexanesulfonic acid (PFHxS)	2.44		1.67	0.22	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.67	U	1.67	0.68	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluorooctanesulfonic acid (PFOS)	5.52		1.67	0.63	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluorodecanesulfonic acid (PFDS)	1.67	U	1.67	0.44	ng/L		10/18/18 13:58	10/21/18 17:50	1
Perfluorooctanesulfonamide (FOSA)	1.67	U	1.67	0.47	ng/L		10/18/18 13:58	10/21/18 17:50	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.7	U	16.7	0.37	ng/L		10/18/18 13:58	10/21/18 17:50	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.7	U	16.7	0.58	ng/L		10/18/18 13:58	10/21/18 17:50	1
6:2 FTS	1.08	J	16.7	0.83	ng/L		10/18/18 13:58	10/21/18 17:50	1
8:2 FTS	16.7	U	16.7	0.47	ng/L		10/18/18 13:58	10/21/18 17:50	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	41		25 - 150				10/18/18 13:58	10/21/18 17:50	1
13C5-PFPeA DNU	64		25 - 150				10/18/18 13:58	10/21/18 17:50	1
13C2 PFHxA	68		25 - 150				10/18/18 13:58	10/21/18 17:50	1
13C4 PFHpA	83		25 - 150				10/18/18 13:58	10/21/18 17:50	1
13C4 PFOA	95		25 - 150				10/18/18 13:58	10/21/18 17:50	1
13C5 PFNA	105		25 - 150				10/18/18 13:58	10/21/18 17:50	1
13C2 PFDA	102		25 - 150				10/18/18 13:58	10/21/18 17:50	1
13C2 PFUnA	96		25 - 150				10/18/18 13:58	10/21/18 17:50	1
13C2 PFDoA	100		25 - 150				10/18/18 13:58	10/21/18 17:50	1
13C2 PFTeA	94		25 - 150				10/18/18 13:58	10/21/18 17:50	1
13C3 PFBS	81		25 - 150				10/18/18 13:58	10/21/18 17:50	1
18O2 PFHxS	102		25 - 150				10/18/18 13:58	10/21/18 17:50	1
13C4 PFOS	112		25 - 150				10/18/18 13:58	10/21/18 17:50	1
13C8 FOSA	68		25 - 150				10/18/18 13:58	10/21/18 17:50	1
d3-NMeFOSAA	80		25 - 150				10/18/18 13:58	10/21/18 17:50	1
d5-NEtFOSAA	84		25 - 150				10/18/18 13:58	10/21/18 17:50	1

TestAmerica Edison

dam
11/13/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Kings Co-PFAS-1803556-1.11

TestAmerica Job ID: 460-166359-1

Client Sample ID: KC-MW-01

Date Collected: 10/05/18 12:05

Date Received: 10/05/18 16:24

Lab Sample ID: 460-166359-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-6:2 FTS	253	J	25 - 150	10/18/18 13:58	10/21/18 17:50	1
M2-8:2 FTS	125		25 - 150	10/18/18 13:58	10/21/18 17:50	1

Client Sample ID: KC-MW-05

Date Collected: 10/05/18 11:25

Date Received: 10/05/18 16:24

Lab Sample ID: 460-166359-2

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	-0.10	J	0.20	0.016	ug/L		10/09/18 20:13	10/10/18 11:29	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	51		10 - 150				10/09/18 20:13	10/10/18 11:29	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	2940	J	49.0	10.0	ng/L		10/18/18 13:58	10/22/18 18:19	25
Perfluoropentanoic acid (PFPeA)	243		19.6	7.35	ng/L		10/18/18 13:58	10/22/18 17:00	10
Perfluorohexanoic acid (PFHxA)	19.6	U	19.6	2.35	ng/L		10/18/18 13:58	10/22/18 17:00	10
Perfluoroheptanoic acid (PFHpA)	33.2	J	49.0	7.84	ng/L		10/18/18 13:58	10/22/18 18:19	25
Perfluorooctanoic acid (PFOA)	155	J	49.0	7.84	ng/L		10/18/18 13:58	10/22/18 18:19	25
Perfluorononanoic acid (PFNA)	34.1		19.6	3.73	ng/L		10/18/18 13:58	10/22/18 17:00	10
Perfluorodecanoic acid (PFDA)	19.6	U	19.6	3.73	ng/L		10/18/18 13:58	10/22/18 17:00	10
Perfluoroundecanoic acid (PFUnA)	19.6	U	19.6	2.45	ng/L		10/18/18 13:58	10/22/18 17:00	10
Perfluorododecanoic acid (PFDoA)	19.6	U	19.6	3.43	ng/L		10/18/18 13:58	10/22/18 17:00	10
Perfluorotridecanoic acid (PFTriA)	19.6	U	19.6	2.35	ng/L		10/18/18 13:58	10/22/18 17:00	10
Perfluorotetradecanoic acid (PFTeA)	19.6	U	19.6	4.41	ng/L		10/18/18 13:58	10/22/18 17:00	10
Perfluorobutanesulfonic acid (PFBS)	93.7		19.6	4.31	ng/L		10/18/18 13:58	10/22/18 17:00	10
Perfluorohexanesulfonic acid (PFHxS)	19.6	U	19.6	2.55	ng/L		10/18/18 13:58	10/22/18 17:00	10
Perfluoroheptanesulfonic Acid (PFHpS)	19.6	U	19.6	8.04	ng/L		10/18/18 13:58	10/22/18 17:00	10
Perfluorooctanesulfonic acid (PFOS)	19.6	U	19.6	7.45	ng/L		10/18/18 13:58	10/22/18 17:00	10
Perfluorodecanesulfonic acid (PFDS)	19.6	U	19.6	5.20	ng/L		10/18/18 13:58	10/22/18 17:00	10
Perfluorooctanesulfonamide (FOSA)	19.6	U	19.6	5.49	ng/L		10/18/18 13:58	10/22/18 17:00	10
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	196	U	196	4.41	ng/L		10/18/18 13:58	10/22/18 17:00	10
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	196	U	196	6.86	ng/L		10/18/18 13:58	10/22/18 17:00	10
6:2 FTS	21.8	J	196	9.80	ng/L		10/18/18 13:58	10/22/18 17:00	10
8:2 FTS	196	U	196	5.49	ng/L		10/18/18 13:58	10/22/18 17:00	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	27		25 - 150				10/18/18 13:58	10/22/18 18:19	25
13C5-PFPeA DNU	42		25 - 150				10/18/18 13:58	10/22/18 17:00	10
13C2 PFHxA	39		25 - 150				10/18/18 13:58	10/22/18 17:00	10
13C4 PFHpA	67		25 - 150				10/18/18 13:58	10/22/18 18:19	25
13C4 PFOA	97		25 - 150				10/18/18 13:58	10/22/18 18:19	25
13C5 PFNA	118		25 - 150				10/18/18 13:58	10/22/18 17:00	10
13C2 PFDA	127		25 - 150				10/18/18 13:58	10/22/18 17:00	10
13C2 PFUnA	144		25 - 150				10/18/18 13:58	10/22/18 17:00	10
13C2 PFDoA	145		25 - 150				10/18/18 13:58	10/22/18 17:00	10

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Kings Co-PFAS-1803556-1.11

TestAmerica Job ID: 460-166359-1

Client Sample ID: KC-MW-05

Lab Sample ID: 460-166359-2

Date Collected: 10/05/18 11:25

Matrix: Water

Date Received: 10/05/18 16:24

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFTeDA	120		25 - 150	10/18/18 13:58	10/22/18 17:00	10
13C3 PFBS	95		25 - 150	10/18/18 13:58	10/22/18 17:00	10
18O2 PFHxS	99		25 - 150	10/18/18 13:58	10/22/18 17:00	10
13C4 PFOS	109		25 - 150	10/18/18 13:58	10/22/18 17:00	10
13C8 FOSA	86		25 - 150	10/18/18 13:58	10/22/18 17:00	10
d3-NMeFOSAA	138		25 - 150	10/18/18 13:58	10/22/18 17:00	10
d5-NEtFOSAA	148		25 - 150	10/18/18 13:58	10/22/18 17:00	10
M2-6:2 FTS	302 *		25 - 150	10/18/18 13:58	10/22/18 17:00	10
M2-8:2 FTS	178 *		25 - 150	10/18/18 13:58	10/22/18 17:00	10

Client Sample ID: KC-MW-09

Lab Sample ID: 460-166359-3

Date Collected: 10/05/18 10:55

Matrix: Water

Date Received: 10/05/18 16:24

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.15 J	0.20 U	0.20	0.016	ug/L		10/09/18 20:13	10/10/18 11:47	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	52		10 - 150				10/09/18 20:13	10/10/18 11:47	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	28.3		1.61	0.33	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluoropentanoic acid (PFPeA)	19.5		1.61	0.61	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluorohexanoic acid (PFHxA)	7.90		1.61	0.19	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluoroheptanoic acid (PFHpA)	9.91		1.61	0.26	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluorooctanoic acid (PFOA)	44.7 B		1.61	0.26	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluorononanoic acid (PFNA)	5.43		1.61	0.31	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluorodecanoic acid (PFDA)	0.54 J		1.61	0.31	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluoroundecanoic acid (PFUnA)	0.25 J B	1.61 U	1.61	0.20	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluorododecanoic acid (PFDoA)	1.61 U		1.61	0.28	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluorotridecanoic acid (PFTriA)	1.61 U		1.61	0.19	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluorotetradecanoic acid (PFTeA)	1.61 U		1.61	0.36	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluorobutanesulfonic acid (PFBS)	2.41		1.61	0.36	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluorohexanesulfonic acid (PFHxS)	1.50 J		1.61	0.21	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.61 U		1.61	0.66	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluorooctanesulfonic acid (PFOS)	6.00		1.61	0.61	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluorodecanesulfonic acid (PFDS)	1.61 U		1.61	0.43	ng/L		10/18/18 13:58	10/21/18 18:22	1
Perfluorooctanesulfonamide (FOSA)	1.61 U		1.61	0.45	ng/L		10/18/18 13:58	10/21/18 18:22	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.1 U		16.1	0.36	ng/L		10/18/18 13:58	10/21/18 18:22	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.1 U		16.1	0.57	ng/L		10/18/18 13:58	10/21/18 18:22	1
6:2 FTS	2.36 J		16.1	0.81	ng/L		10/18/18 13:58	10/21/18 18:22	1
8:2 FTS	16.1 U		16.1	0.45	ng/L		10/18/18 13:58	10/21/18 18:22	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Kings Co-PFAS-1803556-1.11

TestAmerica Job ID: 460-166359-1

Client Sample ID: KC-MW-09

Date Collected: 10/05/18 10:55

Date Received: 10/05/18 16:24

Lab Sample ID: 460-166359-3

Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	27		25 - 150	10/18/18 13:58	10/21/18 18:22	1
13C5-PFPeA DNU	41		25 - 150	10/18/18 13:58	10/21/18 18:22	1
13C2 PFHxA	53		25 - 150	10/18/18 13:58	10/21/18 18:22	1
13C4 PFHpA	71		25 - 150	10/18/18 13:58	10/21/18 18:22	1
13C4 PFOA	98		25 - 150	10/18/18 13:58	10/21/18 18:22	1
13C5 PFNA	111		25 - 150	10/18/18 13:58	10/21/18 18:22	1
13C2 PFDA	116		25 - 150	10/18/18 13:58	10/21/18 18:22	1
13C2 PFUnA	126		25 - 150	10/18/18 13:58	10/21/18 18:22	1
13C2 PFDaA	130		25 - 150	10/18/18 13:58	10/21/18 18:22	1
13C2 PFTeDA	124		25 - 150	10/18/18 13:58	10/21/18 18:22	1
13C3 PFBS	82		25 - 150	10/18/18 13:58	10/21/18 18:22	1
18O2 PFHxS	103		25 - 150	10/18/18 13:58	10/21/18 18:22	1
13C4 PFOS	115		25 - 150	10/18/18 13:58	10/21/18 18:22	1
13C8 FOSA	69		25 - 150	10/18/18 13:58	10/21/18 18:22	1
d3-NMeFOSAA	108		25 - 150	10/18/18 13:58	10/21/18 18:22	1
d5-NEtFOSAA	141		25 - 150	10/18/18 13:58	10/21/18 18:22	1
M2-6:2 FTS	308 *		25 - 150	10/18/18 13:58	10/21/18 18:22	1
M2-8:2 FTS	203 *		25 - 150	10/18/18 13:58	10/21/18 18:22	1

Client Sample ID: DUP-100518-2

Date Collected: 10/05/18 00:00

Date Received: 10/05/18 16:24

Lab Sample ID: 460-166359-4

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.11	J 0.20 U	0.20	0.016	ug/L		10/09/18 20:13	10/10/18 12:39	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	49		10 - 150				10/09/18 20:13	10/10/18 12:39	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	3210	J	19.2	3.94	ng/L		10/18/18 13:58	10/22/18 18:04	10
Perfluoropentanoic acid (PFPeA)	221		19.2	7.21	ng/L		10/18/18 13:58	10/22/18 18:04	10
Perfluorohexanoic acid (PFHxA)	11.1	J	19.2	2.31	ng/L		10/18/18 13:58	10/22/18 18:04	10
Perfluoroheptanoic acid (PFHpA)	28.1	J	48.1	7.69	ng/L		10/18/18 13:58	10/22/18 18:35	25
Perfluorooctanoic acid (PFOA)	154	B J	48.1	7.69	ng/L		10/18/18 13:58	10/22/18 18:35	25
Perfluorononanoic acid (PFNA)	30.1		19.2	3.65	ng/L		10/18/18 13:58	10/22/18 18:04	10
Perfluorodecanoic acid (PFDA)	19.2	U	19.2	3.65	ng/L		10/18/18 13:58	10/22/18 18:04	10
Perfluoroundecanoic acid (PFUnA)	19.2	U	19.2	2.40	ng/L		10/18/18 13:58	10/22/18 18:04	10
Perfluorododecanoic acid (PFDaA)	19.2	U	19.2	3.36	ng/L		10/18/18 13:58	10/22/18 18:04	10
Perfluorotridecanoic acid (PFTriA)	19.2	U	19.2	2.31	ng/L		10/18/18 13:58	10/22/18 18:04	10
Perfluorotetradecanoic acid (PFTeA)	19.2	U	19.2	4.33	ng/L		10/18/18 13:58	10/22/18 18:04	10
Perfluorobutanesulfonic acid (PFBS)	96.9		19.2	4.23	ng/L		10/18/18 13:58	10/22/18 18:04	10
Perfluorohexanesulfonic acid (PFHxS)	19.2	U	19.2	2.50	ng/L		10/18/18 13:58	10/22/18 18:04	10
Perfluoroheptanesulfonic Acid (PFHpS)	19.2	U	19.2	7.88	ng/L		10/18/18 13:58	10/22/18 18:04	10
Perfluorooctanesulfonic acid (PFOS)	19.2	U	19.2	7.30	ng/L		10/18/18 13:58	10/22/18 18:04	10
Perfluorodecanesulfonic acid (PFDS)	19.2	U	19.2	5.09	ng/L		10/18/18 13:58	10/22/18 18:04	10
Perfluorooctanesulfonamide (FOSA)	19.2	U	19.2	5.38	ng/L		10/18/18 13:58	10/22/18 18:04	10

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Kings Co-PFAS-1803556-1.11

TestAmerica Job ID: 460-166359-1

Client Sample ID: DUP-100518-2

Lab Sample ID: 460-166359-4

Date Collected: 10/05/18 00:00

Matrix: Water

Date Received: 10/05/18 16:24

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	192	U	192	4.33	ng/L		10/18/18 13:58	10/22/18 18:04	10
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	192	U	192	6.73	ng/L		10/18/18 13:58	10/22/18 18:04	10
6:2 FTS	32.0	J	192	9.61	ng/L		10/18/18 13:58	10/22/18 18:04	10
8:2 FTS	192	U	192	5.38	ng/L		10/18/18 13:58	10/22/18 18:04	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	17	*	25 - 150				10/18/18 13:58	10/22/18 18:04	10
13C5-PFPeA DNU	50		25 - 150				10/18/18 13:58	10/22/18 18:04	10
13C2 PFHxA	36		25 - 150				10/18/18 13:58	10/22/18 18:04	10
13C4 PFHpA	63		25 - 150				10/18/18 13:58	10/22/18 18:35	25
13C4 PFOA	86		25 - 150				10/18/18 13:58	10/22/18 18:35	25
13C5 PFNA	122		25 - 150				10/18/18 13:58	10/22/18 18:04	10
13C2 PFDA	124		25 - 150				10/18/18 13:58	10/22/18 18:04	10
13C2 PFUnA	128		25 - 150				10/18/18 13:58	10/22/18 18:04	10
13C2 PFDoA	117		25 - 150				10/18/18 13:58	10/22/18 18:04	10
13C2 PFTeDA	104		25 - 150				10/18/18 13:58	10/22/18 18:04	10
13C3 PFBS	88		25 - 150				10/18/18 13:58	10/22/18 18:04	10
18O2 PFHxS	89		25 - 150				10/18/18 13:58	10/22/18 18:04	10
13C4 PFOS	121		25 - 150				10/18/18 13:58	10/22/18 18:04	10
13C8 FOSA	91		25 - 150				10/18/18 13:58	10/22/18 18:04	10
d3-NMeFOSAA	107		25 - 150				10/18/18 13:58	10/22/18 18:04	10
d5-NEtFOSAA	134		25 - 150				10/18/18 13:58	10/22/18 18:04	10
M2-6:2 FTS	205	*	25 - 150				10/18/18 13:58	10/22/18 18:04	10
M2-8:2 FTS	166	*	25 - 150				10/18/18 13:58	10/22/18 18:04	10

Client Sample ID: FB-100518-2

Lab Sample ID: 460-166359-5

Date Collected: 10/05/18 11:15

Matrix: Water

Date Received: 10/05/18 16:24

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.13	J	0.20	0.016	ug/L		10/09/18 20:13	10/10/18 12:56	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	40		10 - 150				10/09/18 20:13	10/10/18 12:56	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.64	U	1.64	0.34	ng/L		10/18/18 13:58	10/21/18 19:26	1
Perfluoropentanoic acid (PFPeA)	1.64	U	1.64	0.61	ng/L		10/18/18 13:58	10/21/18 19:26	1
Perfluorohexanoic acid (PFHxA)	1.64	U	1.64	0.20	ng/L		10/18/18 13:58	10/21/18 19:26	1
Perfluoroheptanoic acid (PFHpA)	1.64	U	1.64	0.26	ng/L		10/18/18 13:58	10/21/18 19:26	1
Perfluorooctanoic acid (PFOA)	0.33	J-B	1.64	0.26	ng/L		10/18/18 13:58	10/21/18 19:26	1
Perfluorononanoic acid (PFNA)	1.64	U	1.64	0.31	ng/L		10/18/18 13:58	10/21/18 19:26	1
Perfluorodecanoic acid (PFDA)	1.64	U	1.64	0.31	ng/L		10/18/18 13:58	10/21/18 19:26	1
Perfluoroundecanoic acid (PFUnA)	1.64	U	1.64	0.20	ng/L		10/18/18 13:58	10/21/18 19:26	1
Perfluorododecanoic acid (PFDoA)	1.64	U	1.64	0.29	ng/L		10/18/18 13:58	10/21/18 19:26	1
Perfluorotridecanoic acid (PFTriA)	1.64	U	1.64	0.20	ng/L		10/18/18 13:58	10/21/18 19:26	1
Perfluorotetradecanoic acid (PFTeA)	1.64	U	1.64	0.37	ng/L		10/18/18 13:58	10/21/18 19:26	1
Perfluorobutanesulfonic acid (PFBS)	1.64	U	1.64	0.36	ng/L		10/18/18 13:58	10/21/18 19:26	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Kings Co-PFAS-1803556-1.11

TestAmerica Job ID: 460-166359-1

Client Sample ID: FB-100518-2

Lab Sample ID: 460-166359-5

Date Collected: 10/05/18 11:15

Matrix: Water

Date Received: 10/05/18 16:24

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	1.64	U	1.64	0.21	ng/L		10/18/18 13:58	10/21/18 19:26	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.64	U	1.64	0.67	ng/L		10/18/18 13:58	10/21/18 19:26	1
Perfluorooctanesulfonic acid (PFOS)	1.64	U	1.64	0.62	ng/L		10/18/18 13:58	10/21/18 19:26	1
Perfluorodecanesulfonic acid (PFDS)	1.64	U	1.64	0.43	ng/L		10/18/18 13:58	10/21/18 19:26	1
Perfluorooctanesulfonamide (FOSA)	1.64	U	1.64	0.46	ng/L		10/18/18 13:58	10/21/18 19:26	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.4	U	16.4	0.37	ng/L		10/18/18 13:58	10/21/18 19:26	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.4	U	16.4	0.57	ng/L		10/18/18 13:58	10/21/18 19:26	1
6:2 FTS	16.4	U	16.4	0.82	ng/L		10/18/18 13:58	10/21/18 19:26	1
8:2 FTS	16.4	U	16.4	0.46	ng/L		10/18/18 13:58	10/21/18 19:26	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	77		25 - 150				10/18/18 13:58	10/21/18 19:26	1
13C5-PFPeA DNU	108		25 - 150				10/18/18 13:58	10/21/18 19:26	1
13C2 PFHxA	106		25 - 150				10/18/18 13:58	10/21/18 19:26	1
13C4 PFHpA	88		25 - 150				10/18/18 13:58	10/21/18 19:26	1
13C4 PFOA	94		25 - 150				10/18/18 13:58	10/21/18 19:26	1
13C5 PFNA	98		25 - 150				10/18/18 13:58	10/21/18 19:26	1
13C2 PFDA	98		25 - 150				10/18/18 13:58	10/21/18 19:26	1
13C2 PFUnA	100		25 - 150				10/18/18 13:58	10/21/18 19:26	1
13C2 PFDaA	101		25 - 150				10/18/18 13:58	10/21/18 19:26	1
13C2 PFTeDA	98		25 - 150				10/18/18 13:58	10/21/18 19:26	1
13C3 PFBS	100		25 - 150				10/18/18 13:58	10/21/18 19:26	1
18O2 PFHxS	92		25 - 150				10/18/18 13:58	10/21/18 19:26	1
13C4 PFOS	96		25 - 150				10/18/18 13:58	10/21/18 19:26	1
13C8 FOSA	71		25 - 150				10/18/18 13:58	10/21/18 19:26	1
d3-NMeFOSAA	79		25 - 150				10/18/18 13:58	10/21/18 19:26	1
d5-NEtFOSAA	90		25 - 150				10/18/18 13:58	10/21/18 19:26	1
M2-6:2 FTS	153		25 - 150				10/18/18 13:58	10/21/18 19:26	1
M2-8:2 FTS	98		25 - 150				10/18/18 13:58	10/21/18 19:26	1

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2018-07-01

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Site: Long Island Emerging Contaminants, Patchogue
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-165575
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 1, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
MW-4S	460-165575-01	PFAS, 1,4-Dioxane
MW-7S	460-165575-02	PFAS, 1,4-Dioxane
MW-1	460-165575-03	PFAS, 1,4-Dioxane
MW-XX-092518	460-165575-04	PFAS, 1,4-Dioxane
FB-092518	460-165575-05	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: Fieldblank-092518
Field Duplicate pair: MW-7S/MW-XX-092518

The above-listed aqueous samples and field blank sample were collected on September 25, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-Dioxane by 1,4-dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatiles Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

Analytes were detected in the associated laboratory method blank sample. Contaminants were not detected in the associated field blank sample after application of laboratory blank contamination actions. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
Perfluorobutanoic acid (PFBA)	Method MB 200-134832: All samples	0.881 ng/L	8.81 ng/L	Qualify the result for PFBA in sample FB-092518 as nondetect (U) at the RL. Qualify the results for PFBA in samples MW-4S and MW-XX-092518 as estimated (J); High bias.
Perfluorohexanoic acid (PFHxA)		0.407 ng/L	4.07 ng/L	Qualify the result for PFHxA in sample FB-092518 as nondetect (U) at the RL. Qualify the result for PFHxA in sample MW-4S as estimated (J); High bias.
Perfluorobutanesulfonic acid (PFBS)		1.178 ng/L	11.78 ng/L	Qualify the result for PFBS in sample FB-092518 as nondetect (U) at the RL. Qualify the result for PFBS in sample MW-1 as estimated (J); High bias.
Perfluorohexanesulfonic acid (PFHxS)		0.559 ng/L	5.59 ng/L	Qualify the result for PFHxS in samples MW-1 and FB-092518 as nondetect (U) at the RL.
Perfluorooctanesulfonic acid (PFOS)		1.143 ng/L	11.43 ng/L	Qualify the result for PFOS in sample FB-092518 as nondetect (U) at the RL.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
MW-4S	M2-6:2 FTS	215	25-150	Validation action was not required as the results for 6:2 FTS and 8:2 FTS were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	175		
MW-7S	M2-6:2 FTS	307	25-150	Validation action was not required as the results for 6:2 FTS, 8:2 FTS, and Perfluorotetradecanoic acid (PFTeA) were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	267		
	13C2 PFTeDA	155		
MW-1	13C5-PFPeA	24	25-150	Estimate (J) the positive results for Perfluoropentanoic acid (PFPeA), 6:2 FTS, Perfluorooctanesulfonic acid (PFOS) in sample MW-1.
	M2-6:2 FTS	321		
	PFOS	161		Validation action was not required as the result for 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.
	M2-8:2 FTS	345		
MW-XX-092518	M2-6:2 FTS	330	25-150	Estimate (J) the positive result for 6:2 FTS in sample MW-XX-092518.
	M2-8:2 FTS	296		Validation action was not required as the results for 8:2 FTS and Perfluorotetradecanoic acid (PFTeA) were not detected in this sample and therefore not affected by the high recoveries.
	13C2 PFTeDA	177		

It should be noted that IDA recoveries outside of control limits generally have a minimal effect on the data quality as the results are quantitated by isotope dilution and are corrected accordingly. However, professional judgment was taken to qualify affected compound results for associated isotope dilution analytes recovered outside of the recommended control limits.

MS/MSD Results

MS/MSD analyses were performed on sample MW-4S for 1,4-dioxane and PFAS. Recovery and precision criteria were met.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples MW-7S and MW-XX-092518 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria except for Perfluoropentanoic acid (PFPeA) and Perfluorooctanesulfonic acid (PFOS). The positive results for Perfluoropentanoic acid and Perfluorooctanesulfonic acid in samples MW-7S and MW-XX-092518 were qualified as estimated (J). The direction of bias cannot be determined from this nonconformance.

Analyte	MW-7S (ug/L)	MW-XX-092518 (ug/L)	RPD (%)
Perfluorobutanoic acid (PFBA)	8.82	7.44	17.0
Perfluoropentanoic (PFPeA)	5.12	8.88	53.7
Perfluorohexanoic acid (PFHxA)	9.05	9.89	8.9
Perfluoroheptanoic acid (PFHpA)	6.96	6.08	13.5
Perfluorooctanoic acid (PFOA)	16.7	17.2	3.0
Perfluorononanoic acid (PFNA)	1.13 J	1.34 J	17.0
Perfluorodecanoic acid (PFDA)	0.72 J	0.81 J	11.8
Perfluorobutanesulfonic acid (PFBS)	20.8	21.0	1.0
Perfluorohexanesulfonic acid (PFHxS)	44.6	41.0	8.4
Perfluoroheptanesulfonic Acid (PFHpS)	11.7	14.6	22.1
Perfluorooctanesulfonic acid (PFOS)	1630	1170	32.9
Perfluorooctanesulfonamide (FOSA)	1.79 U	0.83 J	NC, Within the RL
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	7.76 J	7.59 J	2.2
6:2 FTS	17.9 U	1.03 J	NC, Within the RL
NC – Not calculable			
Criteria: When both results are ≥ 5 x the RL, RPDs must be $< 30\%$.			
When results are < 5 x the QL, the absolute difference between the original and field duplicate results must be $< RL$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

The following table lists the sample dilutions which were performed and the results to be reported.

Sample	PFAS Analysis Reported
MW-7S	A 10-fold dilution was performed for Perfluorooctanesulfonic acid (PFOS) due to high analyte level. All other results were reported from the undiluted analysis.
MW-XX-092518	A 10-fold dilution was performed for Perfluorooctanesulfonic acid (PFOS) due to high analyte level. All other results were reported from the undiluted analysis.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DRAFT

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Patchogue-PFAS-1803556-1.3

TestAmerica Job ID: 460-165575-1

Client Sample ID: MW-4S

Date Collected: 09/25/18 14:30

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165575-1

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/29/18 06:51	09/29/18 17:27	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	71		10 - 150				09/29/18 06:51	09/29/18 17:27	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	3.73	B J	1.76	0.36	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluoropentanoic acid (PFPeA)	3.88		1.76	0.66	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluorohexanoic acid (PFHxA)	2.96	B J	1.76	0.21	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluoroheptanoic acid (PFHpA)	3.67		1.76	0.28	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluorooctanoic acid (PFOA)	12.5		1.76	0.28	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluorononanoic acid (PFNA)	0.75	J	1.76	0.33	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluorodecanoic acid (PFDA)	0.56	J	1.76	0.33	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluoroundecanoic acid (PFUnA)	0.27	J	1.76	0.22	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluorododecanoic acid (PFDoA)	0.32	J	1.76	0.31	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluorotridecanoic acid (PFTriA)	0.27	J	1.76	0.21	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluorotetradecanoic acid (PFTeA)	1.76	U	1.76	0.40	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluorobutanesulfonic acid (PFBS)	18.0	B	1.76	0.39	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluorohexanesulfonic acid (PFHxS)	22.2	B	1.76	0.23	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluoroheptanesulfonic Acid (PFHpS)	2.82		1.76	0.72	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluorooctanesulfonic acid (PFOS)	91.8	B	1.76	0.67	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluorodecanesulfonic acid (PFDS)	0.47	J	1.76	0.47	ng/L		10/04/18 14:05	10/12/18 02:00	1
Perfluorooctanesulfonamide (FOSA)	1.76	U	1.76	0.49	ng/L		10/04/18 14:05	10/12/18 02:00	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.6	U	17.6	0.40	ng/L		10/04/18 14:05	10/12/18 02:00	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.6	U	17.6	0.62	ng/L		10/04/18 14:05	10/12/18 02:00	1
6:2 FTS	17.6	U	17.6	0.88	ng/L		10/04/18 14:05	10/12/18 02:00	1
8:2 FTS	17.6	U	17.6	0.49	ng/L		10/04/18 14:05	10/12/18 02:00	1

Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	40		25 - 150				10/04/18 14:05	10/12/18 02:00	1
13C5-PFPeA DNU	54		25 - 150				10/04/18 14:05	10/12/18 02:00	1
13C2 PFHxA	78		25 - 150				10/04/18 14:05	10/12/18 02:00	1
13C4 PFHpA	87		25 - 150				10/04/18 14:05	10/12/18 02:00	1
13C4 PFOA	109		25 - 150				10/04/18 14:05	10/12/18 02:00	1
13C5 PFNA	117		25 - 150				10/04/18 14:05	10/12/18 02:00	1
13C2 PFDA	107		25 - 150				10/04/18 14:05	10/12/18 02:00	1
13C2 PFUnA	120		25 - 150				10/04/18 14:05	10/12/18 02:00	1
13C2 PFDoA	113		25 - 150				10/04/18 14:05	10/12/18 02:00	1
13C2 PFTeA	100		25 - 150				10/04/18 14:05	10/12/18 02:00	1
13C3 PFBS	71		25 - 150				10/04/18 14:05	10/12/18 02:00	1
18O2 PFHxS	109		25 - 150				10/04/18 14:05	10/12/18 02:00	1
13C4 PFOS	116		25 - 150				10/04/18 14:05	10/12/18 02:00	1

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10/29/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Patchogue-PFAS-1803556-1.3

TestAmerica Job ID: 460-165575-1

Client Sample ID: MW-4S

Date Collected: 09/25/18 14:30

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165575-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	75		25 - 150	10/04/18 14:05	10/12/18 02:00	1
d3-NMeFOSAA	101		25 - 150	10/04/18 14:05	10/12/18 02:00	1
d5-NEtFOSAA	111		25 - 150	10/04/18 14:05	10/12/18 02:00	1
M2-6:2 FTS	215 *		25 - 150	10/04/18 14:05	10/12/18 02:00	1
M2-8:2 FTS	175 *		25 - 150	10/04/18 14:05	10/12/18 02:00	1

Client Sample ID: MW-7S

Date Collected: 09/25/18 15:25

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165575-2

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Sample 12 - Semi-volatile Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/29/18 06:51	09/29/18 19:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	40		10 - 150				09/29/18 06:51	09/29/18 19:11	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	8.82	B	1.79	0.37	ng/L		10/04/18 14:05	10/12/18 07:50	1
Perfluoropentanoic acid (PFPeA)	5.12	J	1.79	0.67	ng/L		10/04/18 14:05	10/12/18 07:50	1
Perfluorohexanoic acid (PFHxA)	9.05	B	1.79	0.22	ng/L		10/04/18 14:05	10/12/18 07:50	1
Perfluoroheptanoic acid (PFHpA)	6.96		1.79	0.29	ng/L		10/04/18 14:05	10/12/18 07:50	1
Perfluorooctanoic acid (PFOA)	16.7		1.79	0.29	ng/L		10/04/18 14:05	10/12/18 07:50	1
Perfluorononanoic acid (PFNA)	1.13	J	1.79	0.34	ng/L		10/04/18 14:05	10/12/18 07:50	1
Perfluorodecanoic acid (PFDA)	0.72	J	1.79	0.34	ng/L		10/04/18 14:05	10/12/18 07:50	1
Perfluoroundecanoic acid (PFUnA)	1.79	U	1.79	0.22	ng/L		10/04/18 14:05	10/12/18 07:50	1
Perfluorododecanoic acid (PFDoA)	1.79	U	1.79	0.31	ng/L		10/04/18 14:05	10/12/18 07:50	1
Perfluorotridecanoic acid (PFTriA)	1.79	U	1.79	0.22	ng/L		10/04/18 14:05	10/12/18 07:50	1
Perfluorotetradecanoic acid (PFTeA)	1.79	U	1.79	0.40	ng/L		10/04/18 14:05	10/12/18 07:50	1
Perfluorobutanesulfonic acid (PFBS)	20.8	B	1.79	0.39	ng/L		10/04/18 14:05	10/12/18 07:50	1
Perfluorohexanesulfonic acid (PFHxS)	44.6	B	1.79	0.23	ng/L		10/04/18 14:05	10/12/18 07:50	1
Perfluoroheptanesulfonic Acid (PFHpS)	11.7		1.79	0.74	ng/L		10/04/18 14:05	10/12/18 07:50	1
Perfluorooctanesulfonic acid (PFOS)	1630	B J	17.9	6.82	ng/L		10/04/18 14:05	10/12/18 02:47	10
Perfluorodecanesulfonic acid (PFDS)	1.79	U	1.79	0.48	ng/L		10/04/18 14:05	10/12/18 07:50	1
Perfluorooctanesulfonamide (FOSA)	1.79	U	1.79	0.50	ng/L		10/04/18 14:05	10/12/18 07:50	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.9	U	17.9	0.40	ng/L		10/04/18 14:05	10/12/18 07:50	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	7.76	J	17.9	0.63	ng/L		10/04/18 14:05	10/12/18 07:50	1
6:2 FTS	17.9	U	17.9	0.90	ng/L		10/04/18 14:05	10/12/18 07:50	1
8:2 FTS	17.9	U	17.9	0.50	ng/L		10/04/18 14:05	10/12/18 07:50	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	40		25 - 150				10/04/18 14:05	10/12/18 07:50	1
13C5-PFPeA DNU	36		25 - 150				10/04/18 14:05	10/12/18 07:50	1
13C2 PFHxA	84		25 - 150				10/04/18 14:05	10/12/18 07:50	1
13C4 PFHpA	87		25 - 150				10/04/18 14:05	10/12/18 07:50	1
13C4 PFOA	112		25 - 150				10/04/18 14:05	10/12/18 07:50	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Patchogue-PFAS-1803556-1.3

TestAmerica Job ID: 460-165575-1

Client Sample ID: MW-7S

Date Collected: 09/25/18 15:25

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165575-2

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	103		25 - 150	10/04/18 14:05	10/12/18 07:50	1
13C2 PFDA	115		25 - 150	10/04/18 14:05	10/12/18 07:50	1
13C2 PFUnA	134		25 - 150	10/04/18 14:05	10/12/18 07:50	1
13C2 PFDoA	136		25 - 150	10/04/18 14:05	10/12/18 07:50	1
13C2 PFTeDA	155 *		25 - 150	10/04/18 14:05	10/12/18 07:50	1
13C3 PFBS	79		25 - 150	10/04/18 14:05	10/12/18 07:50	1
18O2 PFHxS	128		25 - 150	10/04/18 14:05	10/12/18 07:50	1
13C4 PFOS	80		25 - 150	10/04/18 14:05	10/12/18 07:50	1
13C8 FOSA	76		25 - 150	10/04/18 14:05	10/12/18 02:47	10
d3-NMeFOSAA	108		25 - 150	10/04/18 14:05	10/12/18 07:50	1
d5-NEtFOSAA	121		25 - 150	10/04/18 14:05	10/12/18 07:50	1
M2-6:2 FTS	307 *		25 - 150	10/04/18 14:05	10/12/18 07:50	1
M2-8:2 FTS	267 *		25 - 150	10/04/18 14:05	10/12/18 07:50	1

Client Sample ID: MW-1

Date Collected: 09/25/18 16:20

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165575-3

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/29/18 06:51	09/29/18 19:28	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	35		10 - 150				09/29/18 06:51	09/29/18 19:28	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	25.0	B	1.74	0.36	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluoropentanoic acid (PFPeA)	3.48	J	1.74	0.65	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluorohexanoic acid (PFHxA)	6.37	B	1.74	0.21	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluoroheptanoic acid (PFHpA)	2.86		1.74	0.28	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluorooctanoic acid (PFOA)	4.09		1.74	0.28	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluorononanoic acid (PFNA)	2.48		1.74	0.33	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluorodecanoic acid (PFDA)	2.05		1.74	0.33	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluoroundecanoic acid (PFUnA)	0.75	J	1.74	0.22	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluorododecanoic acid (PFDoA)	1.74	U	1.74	0.31	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluorotridecanoic acid (PFTriA)	1.74	U	1.74	0.21	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluorotetradecanoic acid (PFTeA)	1.74	U	1.74	0.39	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluorobutanesulfonic acid (PFBS)	9.02	B J	1.74	0.38	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluorohexanesulfonic acid (PFHxS)	1.10	B 1.74 U	1.74	0.23	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.74	U	1.74	0.72	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluorooctanesulfonic acid (PFOS)	13.3	B J	1.74	0.66	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluorodecanesulfonic acid (PFDS)	1.74	U	1.74	0.46	ng/L		10/04/18 14:05	10/12/18 03:03	1
Perfluorooctanesulfonamide (FOSA)	0.74	J	1.74	0.49	ng/L		10/04/18 14:05	10/12/18 03:03	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.4	U	17.4	0.39	ng/L		10/04/18 14:05	10/12/18 03:03	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Patchogue-PFAS-1803556-1.3

TestAmerica Job ID: 460-165575-1

Client Sample ID: MW-1

Date Collected: 09/25/18 16:20

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165575-3

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctanesulfonamidoacetic acid (NETFOSAA)	2.21	J	17.4	0.61	ng/L		10/04/18 14:05	10/12/18 03:03	1
6:2 FTS	0.99	J	17.4	0.87	ng/L		10/04/18 14:05	10/12/18 03:03	1
8:2 FTS	17.4	U	17.4	0.49	ng/L		10/04/18 14:05	10/12/18 03:03	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
¹³ C4 PFBA	33		25 - 150				10/04/18 14:05	10/12/18 03:03	1
¹³ C5-PFPeA DNU	24	*	25 - 150				10/04/18 14:05	10/12/18 03:03	1
¹³ C2 PFHxA	52		25 - 150				10/04/18 14:05	10/12/18 03:03	1
¹³ C4 PFHpA	72		25 - 150				10/04/18 14:05	10/12/18 03:03	1
¹³ C4 PFOA	105		25 - 150				10/04/18 14:05	10/12/18 03:03	1
¹³ C5 PFNA	138		25 - 150				10/04/18 14:05	10/12/18 03:03	1
¹³ C2 PFDA	116		25 - 150				10/04/18 14:05	10/12/18 03:03	1
¹³ C2 PFUnA	140		25 - 150				10/04/18 14:05	10/12/18 03:03	1
¹³ C2 PFDoA	133		25 - 150				10/04/18 14:05	10/12/18 03:03	1
¹³ C2 PFTeDA	113		25 - 150				10/04/18 14:05	10/12/18 03:03	1
¹³ C3 PFBS	93		25 - 150				10/04/18 14:05	10/12/18 03:03	1
¹⁸ O2 PFHxS	131		25 - 150				10/04/18 14:05	10/12/18 03:03	1
¹³ C4 PFOS	161	*	25 - 150				10/04/18 14:05	10/12/18 03:03	1
¹³ C8 FOSA	94		25 - 150				10/04/18 14:05	10/12/18 03:03	1
d3-NMeFOSAA	116		25 - 150				10/04/18 14:05	10/12/18 03:03	1
d5-NETFOSAA	132		25 - 150				10/04/18 14:05	10/12/18 03:03	1
M2-6:2 FTS	321	*	25 - 150				10/04/18 14:05	10/12/18 03:03	1
M2-8:2 FTS	345	*	25 - 150				10/04/18 14:05	10/12/18 03:03	1

Client Sample ID: MW-XX-092518

Date Collected: 09/25/18 00:00

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165575-4

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/29/18 06:51	09/29/18 19:45	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	34		10 - 150				09/29/18 06:51	09/29/18 19:45	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	7.44	B J	1.80	0.37	ng/L		10/04/18 14:05	10/12/18 08:05	1
Perfluoropentanoic acid (PFPeA)	8.88	J	1.80	0.67	ng/L		10/04/18 14:05	10/12/18 08:05	1
Perfluorohexanoic acid (PFHxA)	9.89	B	1.80	0.22	ng/L		10/04/18 14:05	10/12/18 08:05	1
Perfluoroheptanoic acid (PFHpA)	6.08		1.80	0.29	ng/L		10/04/18 14:05	10/12/18 08:05	1
Perfluorooctanoic acid (PFOA)	17.2		1.80	0.29	ng/L		10/04/18 14:05	10/12/18 08:05	1
Perfluorononanoic acid (PFNA)	1.34	J	1.80	0.34	ng/L		10/04/18 14:05	10/12/18 08:05	1
Perfluorodecanoic acid (PFDA)	0.81	J	1.80	0.34	ng/L		10/04/18 14:05	10/12/18 08:05	1
Perfluoroundecanoic acid (PFUnA)	1.80	U	1.80	0.22	ng/L		10/04/18 14:05	10/12/18 08:05	1
Perfluorododecanoic acid (PFDoA)	1.80	U	1.80	0.31	ng/L		10/04/18 14:05	10/12/18 08:05	1
Perfluorotridecanoic acid (PFTriA)	1.80	U	1.80	0.22	ng/L		10/04/18 14:05	10/12/18 08:05	1
Perfluorotetradecanoic acid (PFTeA)	1.80	U	1.80	0.40	ng/L		10/04/18 14:05	10/12/18 08:05	1
Perfluorobutanesulfonic acid (PFBS)	21.0	B	1.80	0.39	ng/L		10/04/18 14:05	10/12/18 08:05	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Patchogue-PFAS-1803556-1.3

TestAmerica Job ID: 460-165575-1

Client Sample ID: MW-XX-092518

Date Collected: 09/25/18 00:00

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165575-4

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	41.0	B	1.80	0.23	ng/L		10/04/18 14:05	10/12/18 08:05	1
Perfluoroheptanesulfonic Acid (PFHpS)	14.6		1.80	0.74	ng/L		10/04/18 14:05	10/12/18 08:05	1
Perfluorooctanesulfonic acid (PFOS)	1170	B J	18.0	6.82	ng/L		10/04/18 14:05	10/12/18 03:19	10
Perfluorodecanesulfonic acid (PFDS)	1.80	U	1.80	0.48	ng/L		10/04/18 14:05	10/12/18 08:05	1
Perfluorooctanesulfonamide (FOSA)	0.83	J	1.80	0.50	ng/L		10/04/18 14:05	10/12/18 08:05	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	18.0	U	18.0	0.40	ng/L		10/04/18 14:05	10/12/18 08:05	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	7.59	J	18.0	0.63	ng/L		10/04/18 14:05	10/12/18 08:05	1
6:2 FTS	1.03	J	18.0	0.90	ng/L		10/04/18 14:05	10/12/18 08:05	1
8:2 FTS	18.0	U	18.0	0.50	ng/L		10/04/18 14:05	10/12/18 08:05	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	39		25 - 150	10/04/18 14:05	10/12/18 08:05	1
13C5-PFPeA DNU	38		25 - 150	10/04/18 14:05	10/12/18 08:05	1
13C2 PFHxA	80		25 - 150	10/04/18 14:05	10/12/18 08:05	1
13C4 PFHpA	84		25 - 150	10/04/18 14:05	10/12/18 08:05	1
13C4 PFOA	107		25 - 150	10/04/18 14:05	10/12/18 08:05	1
13C5 PFNA	105		25 - 150	10/04/18 14:05	10/12/18 08:05	1
13C2 PFDA	116		25 - 150	10/04/18 14:05	10/12/18 08:05	1
13C2 PFUnA	132		25 - 150	10/04/18 14:05	10/12/18 08:05	1
13C2 PFDoA	145		25 - 150	10/04/18 14:05	10/12/18 08:05	1
13C2 PFTeDA	177		25 - 150	10/04/18 14:05	10/12/18 08:05	1
13C3 PFBS	84		25 - 150	10/04/18 14:05	10/12/18 08:05	1
18O2 PFHxS	133		25 - 150	10/04/18 14:05	10/12/18 08:05	1
13C4 PFOS	128		25 - 150	10/04/18 14:05	10/12/18 08:05	1
13C8 FOSA	98		25 - 150	10/04/18 14:05	10/12/18 03:19	10
d3-NMeFOSAA	114		25 - 150	10/04/18 14:05	10/12/18 08:05	1
d5-NEtFOSAA	130		25 - 150	10/04/18 14:05	10/12/18 08:05	1
M2-6:2 FTS	330		25 - 150	10/04/18 14:05	10/12/18 08:05	1
M2-8:2 FTS	296		25 - 150	10/04/18 14:05	10/12/18 08:05	1

Client Sample ID: FB-092518

Date Collected: 09/25/18 17:55

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165575-5

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Non-Halogenated Aromatic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		09/29/18 06:51	09/29/18 20:02	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	37		10 - 150				09/29/18 06:51	09/29/18 20:02	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.45	J B	1.72	0.35	ng/L		10/04/18 14:05	10/12/18 03:35	1
Perfluoropentanoic acid (PFPeA)	1.72	U	1.72	0.64	ng/L		10/04/18 14:05	10/12/18 03:35	1
Perfluorohexanoic acid (PFHxA)	0.31	J B	1.72	0.21	ng/L		10/04/18 14:05	10/12/18 03:35	1
Perfluoroheptanoic acid (PFHpA)	1.72	U	1.72	0.27	ng/L		10/04/18 14:05	10/12/18 03:35	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Patchogue-PFAS-1803556-1.3

TestAmerica Job ID: 460-165575-1

Client Sample ID: FB-092518

Date Collected: 09/25/18 17:55

Date Received: 09/26/18 19:30

Lab Sample ID: 460-165575-5

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.72	U	1.72	0.27	ng/L		10/04/18 14:05	10/12/18 03:35	1
Perfluorononanoic acid (PFNA)	1.72	U	1.72	0.33	ng/L		10/04/18 14:05	10/12/18 03:35	1
Perfluorodecanoic acid (PFDA)	1.72	U	1.72	0.33	ng/L		10/04/18 14:05	10/12/18 03:35	1
Perfluoroundecanoic acid (PFUnA)	1.72	U	1.72	0.21	ng/L		10/04/18 14:05	10/12/18 03:35	1
Perfluorododecanoic acid (PFDoA)	1.72	U	1.72	0.30	ng/L		10/04/18 14:05	10/12/18 03:35	1
Perfluorotridecanoic acid (PFTriA)	1.72	U	1.72	0.21	ng/L		10/04/18 14:05	10/12/18 03:35	1
Perfluorotetradecanoic acid (PFTeA)	1.72	U	1.72	0.39	ng/L		10/04/18 14:05	10/12/18 03:35	1
Perfluorobutanesulfonic acid (PFBS)	1.04 JB	1.72 U	1.72	0.38	ng/L		10/04/18 14:05	10/12/18 03:35	1
Perfluorohexanesulfonic acid (PFHxS)	0.25 JB	1.72 U	1.72	0.22	ng/L		10/04/18 14:05	10/12/18 03:35	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.72	U	1.72	0.70	ng/L		10/04/18 14:05	10/12/18 03:35	1
Perfluorooctanesulfonic acid (PFOS)	0.99 JB	1.72 U	1.72	0.65	ng/L		10/04/18 14:05	10/12/18 03:35	1
Perfluorodecanesulfonic acid (PFDS)	1.72	U	1.72	0.46	ng/L		10/04/18 14:05	10/12/18 03:35	1
Perfluorooctanesulfonamide (FOSA)	1.72	U	1.72	0.48	ng/L		10/04/18 14:05	10/12/18 03:35	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.2	U	17.2	0.39	ng/L		10/04/18 14:05	10/12/18 03:35	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.2	U	17.2	0.60	ng/L		10/04/18 14:05	10/12/18 03:35	1
6:2 FTS	17.2	U	17.2	0.86	ng/L		10/04/18 14:05	10/12/18 03:35	1
8:2 FTS	17.2	U	17.2	0.48	ng/L		10/04/18 14:05	10/12/18 03:35	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	140		25 - 150				10/04/18 14:05	10/12/18 03:35	1
13C5-PFPeA DNU	91		25 - 150				10/04/18 14:05	10/12/18 03:35	1
13C2 PFHxA	142		25 - 150				10/04/18 14:05	10/12/18 03:35	1
13C4 PFHpA	105		25 - 150				10/04/18 14:05	10/12/18 03:35	1
13C4 PFOA	115		25 - 150				10/04/18 14:05	10/12/18 03:35	1
13C5 PFNA	123		25 - 150				10/04/18 14:05	10/12/18 03:35	1
13C2 PFDA	94		25 - 150				10/04/18 14:05	10/12/18 03:35	1
13C2 PFUnA	106		25 - 150				10/04/18 14:05	10/12/18 03:35	1
13C2 PFDoA	99		25 - 150				10/04/18 14:05	10/12/18 03:35	1
13C2 PFTeDA	73		25 - 150				10/04/18 14:05	10/12/18 03:35	1
13C3 PFBS	120		25 - 150				10/04/18 14:05	10/12/18 03:35	1
18O2 PFHxS	123		25 - 150				10/04/18 14:05	10/12/18 03:35	1
13C4 PFOS	136		25 - 150				10/04/18 14:05	10/12/18 03:35	1
13C8 FOSA	86		25 - 150				10/04/18 14:05	10/12/18 03:35	1
d3-NMeFOSAA	86		25 - 150				10/04/18 14:05	10/12/18 03:35	1
d5-NEtFOSAA	97		25 - 150				10/04/18 14:05	10/12/18 03:35	1
M2-6:2 FTS	105		25 - 150				10/04/18 14:05	10/12/18 03:35	1
M2-8:2 FTS	111		25 - 150				10/04/18 14:05	10/12/18 03:35	1

TestAmerica Edison

Company: GEI Consultants, Inc. Address: 455 Winding Brook Drive Suite 201 City: Glastonbury State, Zip: CT, 06033 Phone: 860-368-5300(Tel) 860-806-9717(Fax) Email: mfeiler@geiconsultants.com Project Name: Emerging Contaminants - Long Island/NYC Site/Project Description: Patchogue PFAS-1803556-1.3				Due Date Requested: TAT Requested (days): 10 days PO#: 1803556-1.3 WO#: Project #: 48027288 SSOW#: Field Filtered Sample (Yes or No) Yes ☒ No ☐		Analysis Requested Preservation: A - HCL B - NaOH C - Zn Acet D - Nitric Ac SU Work Total Number of containers: 12 MS 4 2 4 3 4 4 4 5																		
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Water, Solid, Other/OT, ST=Trace, Air)	Preservation Code:	Field Filtered Sample (Yes or No)	PFAS IDA - PFAS, Standard List (21 Analytes)	2790 SHM MS ID (1,4-Dioxane)																
MW-4S	9-25-18	1430	G	Water		X	X																	
MW-7S	9-25-18	1525	G	Water		X	X																	
MW-1	9-25-18	1620	G	Water		X	X																	
MW-XX-092518	9-25-18		G	Water		X	X																	
FB-092518	9-25-18	1755	G	Water		X	X																	
				Water																				
				Water																				
				Water																				
				Water																				
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				Water																				
				Water																				
				Water																				
				Water																				
Possible Hazard Identification ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological					Sample Disposal (A fee may be assessed... samples are retained longer than) ☐ Return To Client ☐ Disposal By Lab ☐ Archive For																			
Deliverable Requested: I, II, III, IV, Other (specify) NY Cat B					Special Instructions/QC Requirements: Edison lab -log in both tests into on																			
Empty Kit Relinquished by:					Date:					Time:					Method of Shipment:									
Relinquished by: <i>Matt Lomb</i>					Date/Time: 9/26/18 1210					Company: <i>GEI</i>					Received by: <i>PS</i>					Date/Time: 9/26/18 1210				
Relinquished by:					Date/Time: 9/26/18 19:30					Company: <i>GEI</i>					Received by: <i>PS</i>					Date/Time: 9/26/18 19:30				
Relinquished by:					Date/Time:					Company:					Received by:					Date/Time:				
Custody Seals Intact: Δ Yes Δ No					Custody Seal No.:					Cooler Temperature(s) °C and Other Remarks:														

2.5/2.15 4.0/4.0 IAWP

Site: Long Island Emerging Contaminants, Peoples
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-165639
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 1, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
PWMW-01	460-165639-01	PFAS, 1,4-Dioxane
MW-11	460-165639-02	PFAS, 1,4-Dioxane
MW-9	460-165639-03	PFAS, 1,4-Dioxane
MW-XX-092618	460-165639-04	PFAS, 1,4-Dioxane
FB-092618	460-165639-05	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: Fieldblank-092618
Field Duplicate pair: MW-11/MW-XX-092618

The above-listed aqueous samples and field blank sample were collected on September 26, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatile Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

Analytes were detected in the associated laboratory method blank sample. Contaminants were not detected in the associated field blank sample after application of laboratory blank contamination actions. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
Perfluorobutanoic acid (PFBA)	Method MB 200-134832: All samples	0.881 ng/L	8.81 ng/L	Qualify the result for PFBA in samples MW-9 and FB-092618 as nondetect (U) at the RL. Qualify the result for PFBA in sample PWMW-01 as estimated (J); High bias.
Perfluorohexanoic acid (PFHxA)		0.407 ng/L	4.07 ng/L	Qualify the result for PFHxA in sample FB-092618 as nondetect (U) at the RL. Qualify the result for PFHxA in sample MW-9 as estimated (J); High bias.
Perfluorobutanesulfonic acid (PFBS)		1.178 ng/L	11.78 ng/L	Qualify the result for PFBS in sample FB-092618 as nondetect (U) at the RL. Qualify the result for PFBS in samples PWMW-01, MW-11, MW-9, and MW-XX-092618 as estimated (J); High bias.
Perfluorohexanesulfonic acid (PFHxS)		0.559 ng/L	5.59 ng/L	Qualify the result for PFHxS in samples MW-11, MW-9, MW-XX-092618, and FB-092618 as nondetect (U) at the RL. Qualify the result for PFHxS in sample PWMW-01 as estimated (J); High bias.
Perfluorooctanesulfonic acid (PFOS)		1.143 ng/L	11.43 ng/L	Qualify the result for PFOS in samples MW-11, MW-9, and MW-XX-092618 as estimated (J); High bias.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is ≥ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and $< 10x$ Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or $> 10x$ Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
PWMW-01	M2-6:2 FTS	172	25-150	Validation action was not required as the result for 6:2 FTS was not detected in this sample and therefore not affected by the high recovery.
MW-11	M2-6:2 FTS	280	25-150	Validation action was not required as the results for 6:2 FTS and 8:2 FTS were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	236		
MW-9	M2-6:2 FTS	183	25-150	Estimate (J) the positive result for 6:2 FTS in sample MW-9.
	M2-8:2 FTS	191		Validation action was not required as the result for 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.
MW-XX-092618	13C5 PFNA	157	25-150	Estimate (J) the positive result for Perfluorononanoic acid (PFNA) in sample MW-XX-092618.
	M2-6:2 FTS	286		Validation action was not required as the results for 6:2 FTS and 8:2 FTS were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	257		
FB-092618	PFBA	178	25-150	Validation action was not required as the result for PFBA was not detected in this sample and therefore not affected by the high recovery.

It should be noted that IDA recoveries outside of control limits generally have a minimal effect on the data quality as the results are quantitated by isotope dilution and are corrected accordingly. However, professional judgment was taken to qualify affected compound results for associated isotope dilution analytes recovered outside of the recommended control limits.

MS/MSD Results

MS/MSD analyses were performed on sample PWMW-01 for 1,4-dioxane and PFAS. Recovery and precision criteria were met.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples MW-11 and MW-XX-092618 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria.

Analyte	MW-11 (ug/L)	MW-XX-092618 (ug/L)	RPD (%)
Perfluorobutanoic acid (PFBA)	14.0	14.1	0.7
Perfluoropentanoic (PFPeA)	12.8	15.6	19.7
Perfluorohexanoic acid (PFHxA)	5.85	6.66	13.0
Perfluoroheptanoic acid (PFHpA)	4.12	4.26	3.3
Perfluorooctanoic acid (PFOA)	38.4	38.1	0.8
Perfluorononanoic acid (PFNA)	1.32 J	1.17 J	12.0
Perfluoroundecanoic acid (PFUnA)	0.23 J	1.76 U	NC, Within the RL
Perfluorobutanesulfonic acid (PFBS)	11.0	9.87	10.8
Perfluoroheptanesulfonic Acid (PFHpS)	1.75 U	1.15 J	NC, Within the RL
Perfluorooctanesulfonic acid (PFOS)	3.14	2.39	27.1
NC – Not calculable			
Criteria: When both results are ≥ 5 x the RL, RPDs must be $< 30\%$.			
When results are < 5 x the QL, the absolute difference between the original and field duplicate results must be $< RL$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Peoples - PFAS - 1803556-1.20

TestAmerica Job ID: 460-165639-1

Client Sample ID: PWMW-01

Lab Sample ID: 460-165639-1

Date Collected: 09/26/18 09:00

Matrix: Water

Date Received: 09/27/18 20:00

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/01/18 11:31	10/02/18 09:44	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	36		10 - 150				10/01/18 11:31	10/02/18 09:44	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	4.14	B J	1.72	0.35	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluoropentanoic acid (PFPeA)	15.9		1.72	0.65	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluorohexanoic acid (PFHxA)	8.65	B	1.72	0.21	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluoroheptanoic acid (PFHpA)	8.92		1.72	0.28	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluorooctanoic acid (PFOA)	42.6		1.72	0.28	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluorononanoic acid (PFNA)	1.54	J	1.72	0.33	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluorodecanoic acid (PFDA)	1.72	U	1.72	0.33	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluoroundecanoic acid (PFUnA)	1.72	U	1.72	0.22	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluorododecanoic acid (PFDoA)	1.72	U	1.72	0.30	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluorotridecanoic acid (PFTriA)	1.72	U	1.72	0.21	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluorotetradecanoic acid (PFTeA)	1.72	U	1.72	0.39	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluorobutanesulfonic acid (PFBS)	4.70	B J	1.72	0.38	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluorohexanesulfonic acid (PFHxS)	2.27	B J	1.72	0.22	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.72	U	1.72	0.71	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluorooctanesulfonic acid (PFOS)	20.4	B	1.72	0.65	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluorodecanesulfonic acid (PFDS)	1.72	U	1.72	0.46	ng/L		10/04/18 14:05	10/12/18 05:58	1
Perfluorooctanesulfonamide (FOSA)	1.72	U	1.72	0.48	ng/L		10/04/18 14:05	10/12/18 05:58	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.2	U	17.2	0.39	ng/L		10/04/18 14:05	10/12/18 05:58	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.2	U	17.2	0.60	ng/L		10/04/18 14:05	10/12/18 05:58	1
6:2 FTS	17.2	U	17.2	0.86	ng/L		10/04/18 14:05	10/12/18 05:58	1
8:2 FTS	17.2	U	17.2	0.48	ng/L		10/04/18 14:05	10/12/18 05:58	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	76		25 - 150				10/04/18 14:05	10/12/18 05:58	1
13C5-PFPeA DNU	55		25 - 150				10/04/18 14:05	10/12/18 05:58	1
13C2 PFHxA	104		25 - 150				10/04/18 14:05	10/12/18 05:58	1
13C4 PFHpA	92		25 - 150				10/04/18 14:05	10/12/18 05:58	1
13C4 PFOA	104		25 - 150				10/04/18 14:05	10/12/18 05:58	1
13C5 PFNA	120		25 - 150				10/04/18 14:05	10/12/18 05:58	1
13C2 PFDA	90		25 - 150				10/04/18 14:05	10/12/18 05:58	1
13C2 PFUnA	106		25 - 150				10/04/18 14:05	10/12/18 05:58	1
13C2 PFDoA	107		25 - 150				10/04/18 14:05	10/12/18 05:58	1
13C2 PFTeDA	74		25 - 150				10/04/18 14:05	10/12/18 05:58	1
13C3 PFBS	99		25 - 150				10/04/18 14:05	10/12/18 05:58	1
18O2 PFHxS	132		25 - 150				10/04/18 14:05	10/12/18 05:58	1
13C4 PFOS	143		25 - 150				10/04/18 14:05	10/12/18 05:58	1
13C8 FOSA	119		25 - 150				10/04/18 14:05	10/12/18 05:58	1
d3-NMeFOSAA	91		25 - 150				10/04/18 14:05	10/12/18 05:58	1
d5-NEtFOSAA	91		25 - 150				10/04/18 14:05	10/12/18 05:58	1

TestAmerica Edison

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10/29/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Peoples - PFAS - 1803556-1.20

TestAmerica Job ID: 460-165639-1

Client Sample ID: PWMW-01

Date Collected: 09/26/18 09:00

Date Received: 09/27/18 20:00

Lab Sample ID: 460-165639-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-6:2 FTS	172	*	25 - 150	10/04/18 14:05	10/12/18 05:58	1
M2-8:2 FTS	141		25 - 150	10/04/18 14:05	10/12/18 05:58	1

Client Sample ID: MW-11

Date Collected: 09/26/18 10:05

Date Received: 09/27/18 20:00

Lab Sample ID: 460-165639-2

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Sample 12 - 1,4-Dioxane									
1,4-Dioxane									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/01/18 11:31	10/02/18 10:02	1
Isotope Dilution									
	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	36		10 - 150				10/01/18 11:31	10/02/18 10:02	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	14.0	B	1.75	0.36	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluoropentanoic acid (PFPeA)	12.8		1.75	0.66	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluorohexanoic acid (PFHxA)	5.85	B	1.75	0.21	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluoroheptanoic acid (PFHpA)	4.12		1.75	0.28	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluorooctanoic acid (PFOA)	38.4		1.75	0.28	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluorononanoic acid (PFNA)	1.32	J	1.75	0.33	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluorodecanoic acid (PFDA)	1.75	U	1.75	0.33	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluoroundecanoic acid (PFUnA)	0.23	J	1.75	0.22	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluorododecanoic acid (PFDoA)	1.75	U	1.75	0.31	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluorotridecanoic acid (PFTriA)	1.75	U	1.75	0.21	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluorotetradecanoic acid (PFTeA)	1.75	U	1.75	0.39	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluorobutanesulfonic acid (PFBS)	11.0	B J	1.75	0.39	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluorohexanesulfonic acid (PFHxS)	0.93	J B	1.75	0.23	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.75	U	1.75	0.72	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluorooctanesulfonic acid (PFOS)	3.14	B J	1.75	0.67	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluorodecanesulfonic acid (PFDS)	1.75	U	1.75	0.46	ng/L		10/04/18 14:05	10/12/18 06:46	1
Perfluorooctanesulfonamide (FOSA)	1.75	U	1.75	0.49	ng/L		10/04/18 14:05	10/12/18 06:46	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.5	U	17.5	0.39	ng/L		10/04/18 14:05	10/12/18 06:46	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.5	U	17.5	0.61	ng/L		10/04/18 14:05	10/12/18 06:46	1
6:2 FTS	17.5	U	17.5	0.88	ng/L		10/04/18 14:05	10/12/18 06:46	1
8:2 FTS	17.5	U	17.5	0.49	ng/L		10/04/18 14:05	10/12/18 06:46	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	28		25 - 150				10/04/18 14:05	10/12/18 06:46	1
13C5-PFPeA DNU	37		25 - 150				10/04/18 14:05	10/12/18 06:46	1
13C2 PFHxA	102		25 - 150				10/04/18 14:05	10/12/18 06:46	1
13C4 PFHpA	78		25 - 150				10/04/18 14:05	10/12/18 06:46	1
13C4 PFOA	112		25 - 150				10/04/18 14:05	10/12/18 06:46	1
13C5 PFNA	142		25 - 150				10/04/18 14:05	10/12/18 06:46	1
13C2 PFDA	99		25 - 150				10/04/18 14:05	10/12/18 06:46	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Peoples - PFAS - 1803556-1.20

TestAmerica Job ID: 460-165639-1

Client Sample ID: MW-11

Date Collected: 09/26/18 10:05

Date Received: 09/27/18 20:00

Lab Sample ID: 460-165639-2

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	103		25 - 150	10/04/18 14:05	10/12/18 06:46	1
13C2 PFDoA	97		25 - 150	10/04/18 14:05	10/12/18 06:46	1
13C2 PFTeDA	103		25 - 150	10/04/18 14:05	10/12/18 06:46	1
13C3 PFBS	73		25 - 150	10/04/18 14:05	10/12/18 06:46	1
18O2 PFHxS	97		25 - 150	10/04/18 14:05	10/12/18 06:46	1
13C4 PFOS	117		25 - 150	10/04/18 14:05	10/12/18 06:46	1
13C8 FOSA	58		25 - 150	10/04/18 14:05	10/12/18 06:46	1
d3-NMeFOSAA	95		25 - 150	10/04/18 14:05	10/12/18 06:46	1
d5-NEtFOSAA	98		25 - 150	10/04/18 14:05	10/12/18 06:46	1
M2-6:2 FTS	280 *		25 - 150	10/04/18 14:05	10/12/18 06:46	1
M2-8:2 FTS	236 *		25 - 150	10/04/18 14:05	10/12/18 06:46	1

Client Sample ID: MW-9

Date Collected: 09/26/18 11:15

Date Received: 09/27/18 20:00

Lab Sample ID: 460-165639-3

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

ANALYTE: 02705 CHN.D - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/01/18 11:31	10/02/18 10:19	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	36		10 - 150				10/01/18 11:31	10/02/18 10:19	

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.30 JB 1.73 U		1.73	0.35	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluoropentanoic acid (PFPeA)	3.78		1.73	0.65	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluorohexanoic acid (PFHxA)	3.44 B J		1.73	0.21	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluoroheptanoic acid (PFHpA)	2.20		1.73	0.28	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluorooctanoic acid (PFOA)	7.15		1.73	0.28	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluorononanoic acid (PFNA)	0.84 J		1.73	0.33	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluorodecanoic acid (PFDA)	1.84		1.73	0.33	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluoroundecanoic acid (PFUnA)	1.83		1.73	0.22	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluorododecanoic acid (PFDoA)	1.96		1.73	0.30	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluorotridecanoic acid (PFTriA)	2.70		1.73	0.21	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluorotetradecanoic acid (PFTeA)	0.94 J		1.73	0.39	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluorobutanesulfonic acid (PFBS)	2.90 B J		1.73	0.38	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluorohexanesulfonic acid (PFHxS)	1.32 JB 1.73 U		1.73	0.22	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.73 U		1.73	0.71	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluorooctanesulfonic acid (PFOS)	10.6 B J		1.73	0.66	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluorodecanesulfonic acid (PFDS)	3.81		1.73	0.46	ng/L		10/04/18 14:05	10/12/18 07:02	1
Perfluorooctanesulfonamide (FOSA)	1.43 J		1.73	0.48	ng/L		10/04/18 14:05	10/12/18 07:02	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Peoples - PFAS - 1803556-1.20

TestAmerica Job ID: 460-165639-1

Client Sample ID: MW-9

Date Collected: 09/26/18 11:15

Date Received: 09/27/18 20:00

Lab Sample ID: 460-165639-3

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.3	U	17.3	0.39	ng/L		10/04/18 14:05	10/12/18 07:02	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.3	U	17.3	0.61	ng/L		10/04/18 14:05	10/12/18 07:02	1
6:2 FTS	2.65	J	17.3	0.87	ng/L		10/04/18 14:05	10/12/18 07:02	1
8:2 FTS	17.3	U	17.3	0.48	ng/L		10/04/18 14:05	10/12/18 07:02	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	43		25 - 150				10/04/18 14:05	10/12/18 07:02	1
13C5-PFPeA DNU	45		25 - 150				10/04/18 14:05	10/12/18 07:02	1
13C2 PFHxA	102		25 - 150				10/04/18 14:05	10/12/18 07:02	1
13C4 PFHpA	88		25 - 150				10/04/18 14:05	10/12/18 07:02	1
13C4 PFOA	109		25 - 150				10/04/18 14:05	10/12/18 07:02	1
13C5 PFNA	127		25 - 150				10/04/18 14:05	10/12/18 07:02	1
13C2 PFDA	71		25 - 150				10/04/18 14:05	10/12/18 07:02	1
13C2 PFUnA	99		25 - 150				10/04/18 14:05	10/12/18 07:02	1
13C2 PFDoA	92		25 - 150				10/04/18 14:05	10/12/18 07:02	1
13C2 PFTeDA	96		25 - 150				10/04/18 14:05	10/12/18 07:02	1
13C3 PFBS	76		25 - 150				10/04/18 14:05	10/12/18 07:02	1
18O2 PFHxS	113		25 - 150				10/04/18 14:05	10/12/18 07:02	1
13C4 PFOS	125		25 - 150				10/04/18 14:05	10/12/18 07:02	1
13C8 FOSA	63		25 - 150				10/04/18 14:05	10/12/18 07:02	1
d3-NMeFOSAA	82		25 - 150				10/04/18 14:05	10/12/18 07:02	1
d5-NEtFOSAA	85		25 - 150				10/04/18 14:05	10/12/18 07:02	1
M2-6:2 FTS	183	*	25 - 150				10/04/18 14:05	10/12/18 07:02	1
M2-8:2 FTS	191	*	25 - 150				10/04/18 14:05	10/12/18 07:02	1

Client Sample ID: MW-XX-092618

Date Collected: 09/26/18 00:00

Date Received: 09/27/18 20:00

Lab Sample ID: 460-165639-4

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/01/18 11:31	10/02/18 10:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	38		10 - 150				10/01/18 11:31	10/02/18 10:37	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	14.1	B	1.76	0.36	ng/L		10/04/18 14:05	10/12/18 07:18	1
Perfluoropentanoic acid (PFPeA)	15.6		1.76	0.66	ng/L		10/04/18 14:05	10/12/18 07:18	1
Perfluorohexanoic acid (PFHxA)	6.66	B	1.76	0.21	ng/L		10/04/18 14:05	10/12/18 07:18	1
Perfluoroheptanoic acid (PFHpA)	4.26		1.76	0.28	ng/L		10/04/18 14:05	10/12/18 07:18	1
Perfluorooctanoic acid (PFOA)	38.1		1.76	0.28	ng/L		10/04/18 14:05	10/12/18 07:18	1
Perfluorononanoic acid (PFNA)	1.17	J	1.76	0.34	ng/L		10/04/18 14:05	10/12/18 07:18	1
Perfluorodecanoic acid (PFDA)	1.76	U	1.76	0.34	ng/L		10/04/18 14:05	10/12/18 07:18	1
Perfluoroundecanoic acid (PFUnA)	1.76	U	1.76	0.22	ng/L		10/04/18 14:05	10/12/18 07:18	1
Perfluorododecanoic acid (PFDoA)	1.76	U	1.76	0.31	ng/L		10/04/18 14:05	10/12/18 07:18	1
Perfluorotridecanoic acid (PFTriA)	1.76	U	1.76	0.21	ng/L		10/04/18 14:05	10/12/18 07:18	1
Perfluorotetradecanoic acid (PFTeA)	1.76	U	1.76	0.40	ng/L		10/04/18 14:05	10/12/18 07:18	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Peoples - PFAS - 1803556-1.20

TestAmerica Job ID: 460-165639-1

Client Sample ID: MW-XX-092618

Date Collected: 09/26/18 00:00

Date Received: 09/27/18 20:00

Lab Sample ID: 460-165639-4

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	9.87	B J	1.76	0.39	ng/L		10/04/18 14:05	10/12/18 07:18	1
Perfluorohexanesulfonic acid (PFHxS)	1.23 J B	1.76 U	1.76	0.23	ng/L		10/04/18 14:05	10/12/18 07:18	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.15	J	1.76	0.72	ng/L		10/04/18 14:05	10/12/18 07:18	1
Perfluorooctanesulfonic acid (PFOS)	2.39	B J	1.76	0.67	ng/L		10/04/18 14:05	10/12/18 07:18	1
Perfluorodecanesulfonic acid (PFDS)	1.76	U	1.76	0.47	ng/L		10/04/18 14:05	10/12/18 07:18	1
Perfluorooctanesulfonamide (FOSA)	1.76	U	1.76	0.49	ng/L		10/04/18 14:05	10/12/18 07:18	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.6	U	17.6	0.40	ng/L		10/04/18 14:05	10/12/18 07:18	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.6	U	17.6	0.62	ng/L		10/04/18 14:05	10/12/18 07:18	1
6:2 FTS	17.6	U	17.6	0.88	ng/L		10/04/18 14:05	10/12/18 07:18	1
8:2 FTS	17.6	U	17.6	0.49	ng/L		10/04/18 14:05	10/12/18 07:18	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	28		25 - 150	10/04/18 14:05	10/12/18 07:18	1
13C5-PFPeA DNU	33		25 - 150	10/04/18 14:05	10/12/18 07:18	1
13C2 PFHxA	99		25 - 150	10/04/18 14:05	10/12/18 07:18	1
13C4 PFHpA	78		25 - 150	10/04/18 14:05	10/12/18 07:18	1
13C4 PFOA	112		25 - 150	10/04/18 14:05	10/12/18 07:18	1
13C5 PFNA	157 *		25 - 150	10/04/18 14:05	10/12/18 07:18	1
13C2 PFDA	99		25 - 150	10/04/18 14:05	10/12/18 07:18	1
13C2 PFUnA	103		25 - 150	10/04/18 14:05	10/12/18 07:18	1
13C2 PFDoA	101		25 - 150	10/04/18 14:05	10/12/18 07:18	1
13C2 PFTeDA	102		25 - 150	10/04/18 14:05	10/12/18 07:18	1
13C3 PFBS	81		25 - 150	10/04/18 14:05	10/12/18 07:18	1
18O2 PFHxS	99		25 - 150	10/04/18 14:05	10/12/18 07:18	1
13C4 PFOS	122		25 - 150	10/04/18 14:05	10/12/18 07:18	1
13C8 FOSA	49		25 - 150	10/04/18 14:05	10/12/18 07:18	1
d3-NMeFOSAA	95		25 - 150	10/04/18 14:05	10/12/18 07:18	1
d5-NEtFOSAA	92		25 - 150	10/04/18 14:05	10/12/18 07:18	1
M2-6:2 FTS	286 *		25 - 150	10/04/18 14:05	10/12/18 07:18	1
M2-8:2 FTS	257 *		25 - 150	10/04/18 14:05	10/12/18 07:18	1

Client Sample ID: FB-092618

Date Collected: 09/26/18 11:25

Date Received: 09/27/18 20:00

Lab Sample ID: 460-165639-5

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

1,4-Dioxane Compounds (Sigma 5000 Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/01/18 11:31	10/02/18 10:54	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	38		10 - 150				10/01/18 11:31	10/02/18 10:54	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.45 J B	1.69 U	1.69	0.35	ng/L		10/04/18 14:05	10/12/18 07:34	1
Perfluoropentanoic acid (PFPeA)	1.69	U	1.69	0.63	ng/L		10/04/18 14:05	10/12/18 07:34	1
Perfluorohexanoic acid (PFHxA)	0.31 J B	1.69 U	1.69	0.20	ng/L		10/04/18 14:05	10/12/18 07:34	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Peoples - PFAS - 1803556-1.20

TestAmerica Job ID: 460-165639-1

Client Sample ID: FB-092618

Date Collected: 09/26/18 11:25

Date Received: 09/27/18 20:00

Lab Sample ID: 460-165639-5

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	1.69	U	1.69	0.27	ng/L		10/04/18 14:05	10/12/18 07:34	1
Perfluorooctanoic acid (PFOA)	1.69	U	1.69	0.27	ng/L		10/04/18 14:05	10/12/18 07:34	1
Perfluorononanoic acid (PFNA)	1.69	U	1.69	0.32	ng/L		10/04/18 14:05	10/12/18 07:34	1
Perfluorodecanoic acid (PFDA)	1.69	U	1.69	0.32	ng/L		10/04/18 14:05	10/12/18 07:34	1
Perfluoroundecanoic acid (PFUnA)	1.69	U	1.69	0.21	ng/L		10/04/18 14:05	10/12/18 07:34	1
Perfluorododecanoic acid (PFDoA)	1.69	U	1.69	0.30	ng/L		10/04/18 14:05	10/12/18 07:34	1
Perfluorotridecanoic acid (PFTriA)	1.69	U	1.69	0.20	ng/L		10/04/18 14:05	10/12/18 07:34	1
Perfluorotetradecanoic acid (PFTeA)	1.69	U	1.69	0.38	ng/L		10/04/18 14:05	10/12/18 07:34	1
Perfluorobutanesulfonic acid (PFBS)	1.08 1.69U	J B	1.69	0.37	ng/L		10/04/18 14:05	10/12/18 07:34	1
Perfluorohexanesulfonic acid (PFHxS)	0.45 1.69U	J B	1.69	0.22	ng/L		10/04/18 14:05	10/12/18 07:34	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.69	U	1.69	0.69	ng/L		10/04/18 14:05	10/12/18 07:34	1
Perfluorooctanesulfonic acid (PFOS)	1.69	U	1.69	0.64	ng/L		10/04/18 14:05	10/12/18 07:34	1
Perfluorodecanesulfonic acid (PFDS)	1.69	U	1.69	0.45	ng/L		10/04/18 14:05	10/12/18 07:34	1
Perfluorooctanesulfonamide (FOSA)	1.69	U	1.69	0.47	ng/L		10/04/18 14:05	10/12/18 07:34	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.9	U	16.9	0.38	ng/L		10/04/18 14:05	10/12/18 07:34	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.9	U	16.9	0.59	ng/L		10/04/18 14:05	10/12/18 07:34	1
6:2 FTS	16.9	U	16.9	0.85	ng/L		10/04/18 14:05	10/12/18 07:34	1
8:2 FTS	16.9	U	16.9	0.47	ng/L		10/04/18 14:05	10/12/18 07:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	178	*	25 - 150				10/04/18 14:05	10/12/18 07:34	1
13C5-PFPeA DNU	92		25 - 150				10/04/18 14:05	10/12/18 07:34	1
13C2 PFHxA	148		25 - 150				10/04/18 14:05	10/12/18 07:34	1
13C4 PFHpA	101		25 - 150				10/04/18 14:05	10/12/18 07:34	1
13C4 PFOA	115		25 - 150				10/04/18 14:05	10/12/18 07:34	1
13C5 PFNA	125		25 - 150				10/04/18 14:05	10/12/18 07:34	1
13C2 PFDA	94		25 - 150				10/04/18 14:05	10/12/18 07:34	1
13C2 PFUnA	108		25 - 150				10/04/18 14:05	10/12/18 07:34	1
13C2 PFDoA	109		25 - 150				10/04/18 14:05	10/12/18 07:34	1
13C2 PFTeDA	80		25 - 150				10/04/18 14:05	10/12/18 07:34	1
13C3 PFBS	123		25 - 150				10/04/18 14:05	10/12/18 07:34	1
18O2 PFHxS	115		25 - 150				10/04/18 14:05	10/12/18 07:34	1
13C4 PFOS	132		25 - 150				10/04/18 14:05	10/12/18 07:34	1
13C8 FOSA	99		25 - 150				10/04/18 14:05	10/12/18 07:34	1
d3-NMeFOSAA	87		25 - 150				10/04/18 14:05	10/12/18 07:34	1
d5-NEtFOSAA	96		25 - 150				10/04/18 14:05	10/12/18 07:34	1
M2-6:2 FTS	121		25 - 150				10/04/18 14:05	10/12/18 07:34	1
M2-8:2 FTS	121		25 - 150				10/04/18 14:05	10/12/18 07:34	1

TestAmerica Edison

Cooler Temperature(s) °C and Other Remarks

3.2 / 3.2 2.9 / 3.8 NO

Site: Long Island Emerging Contaminants, Rockaway
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-165833
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 1, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
MW-02S	460-165833-01	PFAS, 1,4-Dioxane
RW-05A	460-165833-02	PFAS, 1,4-Dioxane
MW-26S	460-165833-03	PFAS, 1,4-Dioxane
MW-XX-092818	460-165833-04	PFAS, 1,4-Dioxane
FB-092818	460-165833-05	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: FB-092818
Field Duplicate pair: RW-05A/MW-XX-092818

The above-listed aqueous samples and field blank sample were collected on September 28, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatile Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Field Duplicate Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

Analytes were detected in the associated laboratory method blank sample. Contaminants were not detected in the associated field blank sample after application of laboratory blank contamination actions. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
Perfluorobutanoic acid (PFBA)	Method MB 200-134946: All samples	1.22 ng/L	12.2 ng/L	Qualify the result for PFBA in sample FB-092818 as nondetect (U) at the RL.
Perfluorooctanoic acid (PFOA)		0.392 ng/L	3.92 ng/L	Validation actions were not required.
Perfluorohexanesulfonic acid (PFHxS)		0.356 ng/L	3.56 ng/L	Qualify the result for PFHxS in sample RW-05A as nondetect (U) at the RL. Qualify the result for PFHxS in sample MW-26S as estimated (J); High bias.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
MW-02S	13C4-PFBA	16	25-150	Estimate (J) the positive result for Perfluorobutanoic acid (PFBA) in sample MW-02S.
	M2-6:2 FTS	209		Validation action was not required as the results for 6:2 FTS and 8:2 FTS were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	245		
RW-05A	13C4-PFBA	22	25-150	Estimate (J) the positive result for Perfluorobutanoic acid (PFBA) in sample RW-05A.
	M2-6:2 FTS	180		Validation action was not required as the results for 6:2 FTS and 8:2 FTS were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	204		
MW-XX-092818	13C4-PFBA	20	25-150	Estimate (J) the positive result for Perfluorobutanoic acid (PFBA) in sample MW-XX-092818.
	M2-6:2 FTS	191		Validation action was not required as the results for 6:2 FTS and 8:2 FTS were not detected in this sample and therefore not affected by the high recoveries.
	M2-8:2 FTS	200		

It should be noted that IDA recoveries outside of control limits generally have a minimal effect on the data quality as the results are quantitated by isotope dilution and are corrected accordingly. However, professional judgment was taken to qualify affected compound results for associated isotope dilution analytes recovered outside of the recommended control limits.

MS/MSD Results

MS/MSD analyses were performed on sample MW-02S. Recovery and precision criteria were met for 1,4-dioxane. Perfluorooctanesulfonic acid (PFOS) (267%) was recovered above the control limits of 40-160 in the MS. The positive result for Perfluorooctanesulfonic acid was qualified as estimated (J) in sample MW-02S and may be biased high.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples RW-05A and MW-XX-092818 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria except for Perfluorohexanoic acid (PFHxA) and Perfluorobutanesulfonic acid (PFBS). The positive results for Perfluorohexanoic acid (PFHxA)

and Perfluorobutanesulfonic acid (PFBS) in samples RW-05A and MW-XX-092818 were qualified as estimated (J). The direction of the bias cannot be determined from this nonconformance.

Analyte	RW-05A (ug/L)	MW-XX-092818 (ug/L)	RPD (%)
Perfluorobutanoic acid (PFBA)	148	115	25.1
Perfluoropentanoic acid (PFPeA)	12.7	16.8	27.8
Perfluorohexanoic acid (PFHxA)	7.39	3.90	61.8
Perfluoroheptanoic acid (PFHpA)	4.68 J	3.74	22.3
Perfluorooctanoic acid (PFOA)	15.5	17.5	12.1
Perfluorononanoic acid (PFNA)	1.53 J	1.28 J	17.8
Perfluorodecanoic acid (PFDA)	0.65 J	0.72 J	10.2
Perfluoroundecanoic acid (PFUnA)	0.39 J	0.39 J	0
Perfluorobutanesulfonic acid (PFBS)	2.57	6.25	83.4
Perfluorohexanesulfonic acid (PFHxS)	4.23 JB	3.82	10.2
Perfluorooctanesulfonic acid (PFOS)	8.99	9.15	1.8
NC – Not calculable Criteria: When both results are ≥ 5 x the RL, RPDs must be $< 30\%$. When results are < 5 x the QL, the absolute difference between the original and field duplicate results must be $< RL$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

The following table lists the sample dilutions which were performed and the results to be reported.

Sample	PFAS Analysis Reported
MW-02S	A 5-fold dilution was performed for Perfluorohexanesulfonic acid (PFHxS), Perfluoroheptanoic acid (PFHpA), and Perfluorooctanoic acid (PFOA) due to sample matrix. All other results were reported from the undiluted analysis. Reporting limits were not adversely affected as the diluted results were detected.
RW-05A	A 5-fold dilution was performed for Perfluorohexanesulfonic acid (PFHxS), Perfluoroheptanoic acid (PFHpA), and Perfluorooctanoic acid (PFOA) due to sample matrix. All other results were reported from the undiluted analysis. Reporting limits were not adversely affected as the diluted results were detected.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Rockaway - PFAS - 1803556-1.6

TestAmerica Job ID: 460-165833-1

Client Sample ID: MW-02S

Date Collected: 09/28/18 10:25

Date Received: 10/01/18 18:40

Lab Sample ID: 460-165833-1

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/03/18 16:49	10/03/18 22:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	48		10 - 150				10/03/18 16:49	10/03/18 22:33	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	77.0	B J	1.72	0.35	ng/L		10/08/18 09:18	10/13/18 05:08	1
Perfluoropentanoic acid (PFPeA)	25.2		1.72	0.64	ng/L		10/08/18 09:18	10/13/18 05:08	1
Perfluorohexanoic acid (PFHxA)	20.0		1.72	0.21	ng/L		10/08/18 09:18	10/13/18 05:08	1
Perfluoroheptanoic acid (PFHpA)	11.5		8.60	1.38	ng/L		10/08/18 09:18	10/13/18 17:29	5
Perfluorooctanoic acid (PFOA)	51.9	B	8.60	1.38	ng/L		10/08/18 09:18	10/13/18 17:29	5
Perfluorononanoic acid (PFNA)	10.7		1.72	0.33	ng/L		10/08/18 09:18	10/13/18 05:08	1
Perfluorodecanoic acid (PFDA)	4.18		1.72	0.33	ng/L		10/08/18 09:18	10/13/18 05:08	1
Perfluoroundecanoic acid (PFUnA)	0.90	J	1.72	0.21	ng/L		10/08/18 09:18	10/13/18 05:08	1
Perfluorododecanoic acid (PFDoA)	1.72	U	1.72	0.30	ng/L		10/08/18 09:18	10/13/18 05:08	1
Perfluorotridecanoic acid (PFTriA)	1.72	U	1.72	0.21	ng/L		10/08/18 09:18	10/13/18 05:08	1
Perfluorotetradecanoic acid (PFTeA)	1.72	U	1.72	0.39	ng/L		10/08/18 09:18	10/13/18 05:08	1
Perfluorobutanesulfonic acid (PFBS)	11.5		1.72	0.38	ng/L		10/08/18 09:18	10/13/18 05:08	1
Perfluorohexanesulfonic acid (PFHxS)	22.5	B	8.60	1.12	ng/L		10/08/18 09:18	10/13/18 17:29	5
Perfluoroheptanesulfonic Acid (PFHpS)	2.15		1.72	0.70	ng/L		10/08/18 09:18	10/13/18 05:08	1
Perfluorooctanesulfonic acid (PFOS)	122	J	1.72	0.65	ng/L		10/08/18 09:18	10/13/18 05:08	1
Perfluorodecanesulfonic acid (PFDS)	0.96	J	1.72	0.46	ng/L		10/08/18 09:18	10/13/18 05:08	1
Perfluorooctanesulfonamide (FOSA)	0.57	J	1.72	0.48	ng/L		10/08/18 09:18	10/13/18 05:08	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.2	U	17.2	0.39	ng/L		10/08/18 09:18	10/13/18 05:08	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.2	U	17.2	0.60	ng/L		10/08/18 09:18	10/13/18 05:08	1
6:2 FTS	17.2	U	17.2	0.86	ng/L		10/08/18 09:18	10/13/18 05:08	1
8:2 FTS	17.2	U	17.2	0.48	ng/L		10/08/18 09:18	10/13/18 05:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	16	*	25 - 150				10/08/18 09:18	10/13/18 05:08	1
13C5-PFPeA DNU	30		25 - 150				10/08/18 09:18	10/13/18 05:08	1
13C2 PFHxA	34		25 - 150				10/08/18 09:18	10/13/18 05:08	1
13C4 PFHpA	85		25 - 150				10/08/18 09:18	10/13/18 17:29	5
13C4 PFOA	101		25 - 150				10/08/18 09:18	10/13/18 17:29	5
13C5 PFNA	102		25 - 150				10/08/18 09:18	10/13/18 05:08	1
13C2 PFDA	120		25 - 150				10/08/18 09:18	10/13/18 05:08	1
13C2 PFUnA	143		25 - 150				10/08/18 09:18	10/13/18 05:08	1
13C2 PFDoA	132		25 - 150				10/08/18 09:18	10/13/18 05:08	1
13C2 PFTeA	100		25 - 150				10/08/18 09:18	10/13/18 05:08	1
13C3 PFBS	54		25 - 150				10/08/18 09:18	10/13/18 05:08	1
18O2 PFHxS	87		25 - 150				10/08/18 09:18	10/13/18 17:29	5
13C4 PFOS	82		25 - 150				10/08/18 09:18	10/13/18 05:08	1
13C8 FOSA	60		25 - 150				10/08/18 09:18	10/13/18 05:08	1

TestAmerica Edison

10/15/2018
10/24/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Rockaway - PFAS - 1803556-1.6

TestAmerica Job ID: 460-165833-1

Client Sample ID: MW-02S

Date Collected: 09/28/18 10:25

Date Received: 10/01/18 18:40

Lab Sample ID: 460-165833-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
d3-NMeFOSAA	112		25 - 150	10/08/18 09:18	10/13/18 05:08	1
d5-NEtFOSAA	149		25 - 150	10/08/18 09:18	10/13/18 05:08	1
M2-6:2 FTS	209 *		25 - 150	10/08/18 09:18	10/13/18 05:08	1
M2-8:2 FTS	245 *		25 - 150	10/08/18 09:18	10/13/18 05:08	1

Client Sample ID: RW-05A

Date Collected: 09/28/18 11:20

Date Received: 10/01/18 18:40

Lab Sample ID: 460-165833-2

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Semi-volatile Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/03/18 16:49	10/03/18 23:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	50		10 - 150				10/03/18 16:49	10/03/18 23:08	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	148	J.	1.76	0.36	ng/L		10/08/18 09:18	10/13/18 06:12	1
Perfluoropentanoic acid (PFPeA)	12.7		1.76	0.66	ng/L		10/08/18 09:18	10/13/18 06:12	1
Perfluorohexanoic acid (PFHxA)	7.39	J.	1.76	0.21	ng/L		10/08/18 09:18	10/13/18 06:12	1
Perfluoroheptanoic acid (PFHpA)	4.68	J.	8.80	1.41	ng/L		10/08/18 09:18	10/13/18 18:17	5
Perfluorooctanoic acid (PFOA)	15.5	J.	8.80	1.41	ng/L		10/08/18 09:18	10/13/18 18:17	5
Perfluorononanoic acid (PFNA)	1.53	J.	1.76	0.33	ng/L		10/08/18 09:18	10/13/18 06:12	1
Perfluorodecanoic acid (PFDA)	0.65	J.	1.76	0.33	ng/L		10/08/18 09:18	10/13/18 06:12	1
Perfluoroundecanoic acid (PFUnA)	0.39	J.	1.76	0.22	ng/L		10/08/18 09:18	10/13/18 06:12	1
Perfluorododecanoic acid (PFDoA)	1.76	U	1.76	0.31	ng/L		10/08/18 09:18	10/13/18 06:12	1
Perfluorotridecanoic acid (PFTriA)	1.76	U	1.76	0.21	ng/L		10/08/18 09:18	10/13/18 06:12	1
Perfluorotetradecanoic acid (PFTeA)	1.76	U	1.76	0.40	ng/L		10/08/18 09:18	10/13/18 06:12	1
Perfluorobutanesulfonic acid (PFBS)	2.57	J.	1.76	0.39	ng/L		10/08/18 09:18	10/13/18 06:12	1
Perfluorohexanesulfonic acid (PFHxS)	4.23	J.B	8.80	1.14	ng/L		10/08/18 09:18	10/13/18 18:17	5
Perfluoroheptanesulfonic Acid (PFHpS)	1.76	U	1.76	0.72	ng/L		10/08/18 09:18	10/13/18 06:12	1
Perfluorooctanesulfonic acid (PFOS)	8.99		1.76	0.67	ng/L		10/08/18 09:18	10/13/18 06:12	1
Perfluorodecanesulfonic acid (PFDS)	1.76	U	1.76	0.47	ng/L		10/08/18 09:18	10/13/18 06:12	1
Perfluorooctanesulfonamide (FOSA)	1.76	U	1.76	0.49	ng/L		10/08/18 09:18	10/13/18 06:12	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.6	U	17.6	0.40	ng/L		10/08/18 09:18	10/13/18 06:12	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.6	U	17.6	0.62	ng/L		10/08/18 09:18	10/13/18 06:12	1
6:2 FTS	17.6	U	17.6	0.88	ng/L		10/08/18 09:18	10/13/18 06:12	1
8:2 FTS	17.6	U	17.6	0.49	ng/L		10/08/18 09:18	10/13/18 06:12	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	22	*	25 - 150				10/08/18 09:18	10/13/18 06:12	1
13C5-PFPeA DNU	38		25 - 150				10/08/18 09:18	10/13/18 06:12	1
13C2 PFHxA	45		25 - 150				10/08/18 09:18	10/13/18 06:12	1
13C4 PFHpA	83		25 - 150				10/08/18 09:18	10/13/18 18:17	5
13C4 PFOA	103		25 - 150				10/08/18 09:18	10/13/18 18:17	5

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Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Rockaway - PFAS - 1803556-1.6

TestAmerica Job ID: 460-165833-1

Client Sample ID: RW-05A

Date Collected: 09/28/18 11:20

Date Received: 10/01/18 18:40

Lab Sample ID: 460-165833-2

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	105		25 - 150	10/08/18 09:18	10/13/18 06:12	1
13C2 PFDA	110		25 - 150	10/08/18 09:18	10/13/18 06:12	1
13C2 PFUnA	120		25 - 150	10/08/18 09:18	10/13/18 06:12	1
13C2 PFDoA	103		25 - 150	10/08/18 09:18	10/13/18 06:12	1
13C2 PFTeDA	69		25 - 150	10/08/18 09:18	10/13/18 06:12	1
13C3 PFBS	63		25 - 150	10/08/18 09:18	10/13/18 06:12	1
18O2 PFHxS	87		25 - 150	10/08/18 09:18	10/13/18 06:12	1
13C4 PFOS	81		25 - 150	10/08/18 09:18	10/13/18 18:17	5
13C8 FOSA	45		25 - 150	10/08/18 09:18	10/13/18 06:12	1
d3-NMeFOSAA	100		25 - 150	10/08/18 09:18	10/13/18 06:12	1
d5-NEtFOSAA	125		25 - 150	10/08/18 09:18	10/13/18 06:12	1
M2-6:2 FTS	180 *		25 - 150	10/08/18 09:18	10/13/18 06:12	1
M2-8:2 FTS	204 *		25 - 150	10/08/18 09:18	10/13/18 06:12	1

Client Sample ID: MW-26S

Date Collected: 09/28/18 12:35

Date Received: 10/01/18 18:40

Lab Sample ID: 460-165833-3

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Semiquantitative Organic Compounds (GC/MS SIM / Isotope Dilution)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/03/18 16:49	10/03/18 23:25	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	44		10 - 150				10/03/18 16:49	10/03/18 23:25	

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	24.4	B	1.76	0.36	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluoropentanoic acid (PFPeA)	6.58		1.76	0.66	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluorohexanoic acid (PFHxA)	4.82		1.76	0.21	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluoroheptanoic acid (PFHpA)	3.79		1.76	0.28	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluorooctanoic acid (PFOA)	18.1	B	1.76	0.28	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluorononanoic acid (PFNA)	1.08	J	1.76	0.33	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluorodecanoic acid (PFDA)	1.76	U	1.76	0.33	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluoroundecanoic acid (PFUnA)	0.23	J	1.76	0.22	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluorododecanoic acid (PFDoA)	1.76	U	1.76	0.31	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluorotridecanoic acid (PFTriA)	1.76	U	1.76	0.21	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluorotetradecanoic acid (PFTeA)	1.76	U	1.76	0.40	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluorobutanesulfonic acid (PFBS)	3.76		1.76	0.39	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluorohexanesulfonic acid (PFHxS)	2.48	B J	1.76	0.23	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.76	U	1.76	0.72	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluorooctanesulfonic acid (PFOS)	13.6		1.76	0.67	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluorodecanesulfonic acid (PFDS)	1.76	U	1.76	0.47	ng/L		10/08/18 09:18	10/13/18 06:28	1
Perfluorooctanesulfonamide (FOSA)	1.76	U	1.76	0.49	ng/L		10/08/18 09:18	10/13/18 06:28	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.6	U	17.6	0.40	ng/L		10/08/18 09:18	10/13/18 06:28	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Rockaway - PFAS - 1803556-1.6

TestAmerica Job ID: 460-165833-1

Client Sample ID: MW-26S

Date Collected: 09/28/18 12:35

Date Received: 10/01/18 18:40

Lab Sample ID: 460-165833-3

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.6	U	17.6	0.62	ng/L		10/08/18 09:18	10/13/18 06:28	1
6:2 FTS	17.6	U	17.6	0.88	ng/L		10/08/18 09:18	10/13/18 06:28	1
8:2 FTS	17.6	U	17.6	0.49	ng/L		10/08/18 09:18	10/13/18 06:28	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	28		25 - 150				10/08/18 09:18	10/13/18 06:28	1
13C5-PFPeA DNU	40		25 - 150				10/08/18 09:18	10/13/18 06:28	1
13C2 PFHxA	53		25 - 150				10/08/18 09:18	10/13/18 06:28	1
13C4 PFHpA	78		25 - 150				10/08/18 09:18	10/13/18 06:28	1
13C4 PFOA	94		25 - 150				10/08/18 09:18	10/13/18 06:28	1
13C5 PFNA	97		25 - 150				10/08/18 09:18	10/13/18 06:28	1
13C2 PFDA	103		25 - 150				10/08/18 09:18	10/13/18 06:28	1
13C2 PFUnA	108		25 - 150				10/08/18 09:18	10/13/18 06:28	1
13C2 PFDoA	103		25 - 150				10/08/18 09:18	10/13/18 06:28	1
13C2 PFTeDA	73		25 - 150				10/08/18 09:18	10/13/18 06:28	1
13C3 PFBS	49		25 - 150				10/08/18 09:18	10/13/18 06:28	1
18O2 PFHxS	65		25 - 150				10/08/18 09:18	10/13/18 06:28	1
13C4 PFOS	63		25 - 150				10/08/18 09:18	10/13/18 06:28	1
13C8 FOSA	51		25 - 150				10/08/18 09:18	10/13/18 06:28	1
d3-NMeFOSAA	80		25 - 150				10/08/18 09:18	10/13/18 06:28	1
d5-NEtFOSAA	97		25 - 150				10/08/18 09:18	10/13/18 06:28	1
M2-6:2 FTS	141		25 - 150				10/08/18 09:18	10/13/18 06:28	1
M2-8:2 FTS	135		25 - 150				10/08/18 09:18	10/13/18 06:28	1

Client Sample ID: MW-XX-092818

Date Collected: 09/28/18 00:00

Date Received: 10/01/18 18:40

Lab Sample ID: 460-165833-4

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/03/18 16:49	10/03/18 23:43	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	40		10 - 150				10/03/18 16:49	10/03/18 23:43	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	115	J.	1.75	0.36	ng/L		10/08/18 09:18	10/13/18 06:44	1
Perfluoropentanoic acid (PFPeA)	16.8	J.	1.75	0.66	ng/L		10/08/18 09:18	10/13/18 06:44	1
Perfluorohexanoic acid (PFHxA)	3.90	J.	1.75	0.21	ng/L		10/08/18 09:18	10/13/18 06:44	1
Perfluoroheptanoic acid (PFHpA)	3.74	J.	1.75	0.28	ng/L		10/08/18 09:18	10/13/18 06:44	1
Perfluorooctanoic acid (PFOA)	17.5	J.	1.75	0.28	ng/L		10/08/18 09:18	10/13/18 06:44	1
Perfluorononanoic acid (PFNA)	1.28	J.	1.75	0.33	ng/L		10/08/18 09:18	10/13/18 06:44	1
Perfluorodecanoic acid (PFDA)	0.72	J.	1.75	0.33	ng/L		10/08/18 09:18	10/13/18 06:44	1
Perfluoroundecanoic acid (PFUnA)	0.39	J.	1.75	0.22	ng/L		10/08/18 09:18	10/13/18 06:44	1
Perfluorododecanoic acid (PFDoA)	1.75	U	1.75	0.31	ng/L		10/08/18 09:18	10/13/18 06:44	1
Perfluorotridecanoic acid (PFTriA)	1.75	U	1.75	0.21	ng/L		10/08/18 09:18	10/13/18 06:44	1
Perfluorotetradecanoic acid (PFTeA)	1.75	U	1.75	0.39	ng/L		10/08/18 09:18	10/13/18 06:44	1
Perfluorobutanesulfonic acid (PFBS)	6.25	J.	1.75	0.39	ng/L		10/08/18 09:18	10/13/18 06:44	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Rockaway - PFAS - 1803556-1.6

TestAmerica Job ID: 460-165833-1

Client Sample ID: MW-XX-092818

Date Collected: 09/28/18 00:00

Date Received: 10/01/18 18:40

Lab Sample ID: 460-165833-4

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	3.82	B	1.75	0.23	ng/L		10/08/18 09:18	10/13/18 06:44	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.75	U	1.75	0.72	ng/L		10/08/18 09:18	10/13/18 06:44	1
Perfluorooctanesulfonic acid (PFOS)	9.15		1.75	0.67	ng/L		10/08/18 09:18	10/13/18 06:44	1
Perfluorodecanesulfonic acid (PFDS)	1.75	U	1.75	0.46	ng/L		10/08/18 09:18	10/13/18 06:44	1
Perfluorooctanesulfonamide (FOSA)	1.75	U	1.75	0.49	ng/L		10/08/18 09:18	10/13/18 06:44	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.5	U	17.5	0.39	ng/L		10/08/18 09:18	10/13/18 06:44	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.5	U	17.5	0.61	ng/L		10/08/18 09:18	10/13/18 06:44	1
6:2 FTS	17.5	U	17.5	0.88	ng/L		10/08/18 09:18	10/13/18 06:44	1
8:2 FTS	17.5	U	17.5	0.49	ng/L		10/08/18 09:18	10/13/18 06:44	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	20	*	25 - 150				10/08/18 09:18	10/13/18 06:44	1
13C5-PFPeA DNU	29		25 - 150				10/08/18 09:18	10/13/18 06:44	1
13C2 PFHxA	40		25 - 150				10/08/18 09:18	10/13/18 06:44	1
13C4 PFHpA	70		25 - 150				10/08/18 09:18	10/13/18 06:44	1
13C4 PFOA	94		25 - 150				10/08/18 09:18	10/13/18 06:44	1
13C5 PFNA	107		25 - 150				10/08/18 09:18	10/13/18 06:44	1
13C2 PFDA	114		25 - 150				10/08/18 09:18	10/13/18 06:44	1
13C2 PFUnA	115		25 - 150				10/08/18 09:18	10/13/18 06:44	1
13C2 PFDoA	105		25 - 150				10/08/18 09:18	10/13/18 06:44	1
13C2 PFTeDA	70		25 - 150				10/08/18 09:18	10/13/18 06:44	1
13C3 PFBS	56		25 - 150				10/08/18 09:18	10/13/18 06:44	1
18O2 PFHxS	68		25 - 150				10/08/18 09:18	10/13/18 06:44	1
13C4 PFOS	73		25 - 150				10/08/18 09:18	10/13/18 06:44	1
13C8 FOSA	49		25 - 150				10/08/18 09:18	10/13/18 06:44	1
d3-NMeFOSAA	107		25 - 150				10/08/18 09:18	10/13/18 06:44	1
d5-NEtFOSAA	131		25 - 150				10/08/18 09:18	10/13/18 06:44	1
M2-6:2 FTS	191	*	25 - 150				10/08/18 09:18	10/13/18 06:44	1
M2-8:2 FTS	200	*	25 - 150				10/08/18 09:18	10/13/18 06:44	1

Client Sample ID: FB-092818

Date Collected: 09/28/18 12:40

Date Received: 10/01/18 18:40

Lab Sample ID: 460-165833-5

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.20	U	0.20	0.016	ug/L		10/03/18 16:49	10/04/18 00:00	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	42		10 - 150				10/03/18 16:49	10/04/18 00:00	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.57	J-B	1.76	0.36	ng/L		10/08/18 09:18	10/13/18 07:00	1
Perfluoropentanoic acid (PFPeA)	1.76	U	1.76	0.66	ng/L		10/08/18 09:18	10/13/18 07:00	1
Perfluorohexanoic acid (PFHxA)	1.76	U	1.76	0.21	ng/L		10/08/18 09:18	10/13/18 07:00	1
Perfluoroheptanoic acid (PFHpA)	1.76	U	1.76	0.28	ng/L		10/08/18 09:18	10/13/18 07:00	1
Perfluorooctanoic acid (PFOA)	1.76	U	1.76	0.28	ng/L		10/08/18 09:18	10/13/18 07:00	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Rockaway - PFAS - 1803556-1.6

TestAmerica Job ID: 460-165833-1

Client Sample ID: FB-092818

Date Collected: 09/28/18 12:40

Date Received: 10/01/18 18:40

Lab Sample ID: 460-165833-5

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	1.76	U	1.76	0.33	ng/L		10/08/18 09:18	10/13/18 07:00	1
Perfluorodecanoic acid (PFDA)	1.76	U	1.76	0.33	ng/L		10/08/18 09:18	10/13/18 07:00	1
Perfluoroundecanoic acid (PFUnA)	1.76	U	1.76	0.22	ng/L		10/08/18 09:18	10/13/18 07:00	1
Perfluorododecanoic acid (PFDoA)	1.76	U	1.76	0.31	ng/L		10/08/18 09:18	10/13/18 07:00	1
Perfluorotridecanoic acid (PFTriA)	1.76	U	1.76	0.21	ng/L		10/08/18 09:18	10/13/18 07:00	1
Perfluorotetradecanoic acid (PFTeA)	1.76	U	1.76	0.40	ng/L		10/08/18 09:18	10/13/18 07:00	1
Perfluorobutanesulfonic acid (PFBS)	1.76	U	1.76	0.39	ng/L		10/08/18 09:18	10/13/18 07:00	1
Perfluorohexanesulfonic acid (PFHxS)	1.76	U	1.76	0.23	ng/L		10/08/18 09:18	10/13/18 07:00	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.76	U	1.76	0.72	ng/L		10/08/18 09:18	10/13/18 07:00	1
Perfluorooctanesulfonic acid (PFOS)	1.76	U	1.76	0.67	ng/L		10/08/18 09:18	10/13/18 07:00	1
Perfluorodecanesulfonic acid (PFDS)	1.76	U	1.76	0.47	ng/L		10/08/18 09:18	10/13/18 07:00	1
Perfluorooctanesulfonamide (FOSA)	1.76	U	1.76	0.49	ng/L		10/08/18 09:18	10/13/18 07:00	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.6	U	17.6	0.40	ng/L		10/08/18 09:18	10/13/18 07:00	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.6	U	17.6	0.62	ng/L		10/08/18 09:18	10/13/18 07:00	1
6:2 FTS	17.6	U	17.6	0.88	ng/L		10/08/18 09:18	10/13/18 07:00	1
8:2 FTS	17.6	U	17.6	0.49	ng/L		10/08/18 09:18	10/13/18 07:00	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	80		25 - 150				10/08/18 09:18	10/13/18 07:00	1
13C5-PFPeA DNU	92		25 - 150				10/08/18 09:18	10/13/18 07:00	1
13C2 PFHxA	96		25 - 150				10/08/18 09:18	10/13/18 07:00	1
13C4 PFHpA	94		25 - 150				10/08/18 09:18	10/13/18 07:00	1
13C4 PFOA	101		25 - 150				10/08/18 09:18	10/13/18 07:00	1
13C5 PFNA	98		25 - 150				10/08/18 09:18	10/13/18 07:00	1
13C2 PFDA	102		25 - 150				10/08/18 09:18	10/13/18 07:00	1
13C2 PFUnA	109		25 - 150				10/08/18 09:18	10/13/18 07:00	1
13C2 PFDoA	95		25 - 150				10/08/18 09:18	10/13/18 07:00	1
13C2 PFTeDA	65		25 - 150				10/08/18 09:18	10/13/18 07:00	1
13C3 PFBS	71		25 - 150				10/08/18 09:18	10/13/18 07:00	1
18O2 PFHxS	80		25 - 150				10/08/18 09:18	10/13/18 07:00	1
13C4 PFOS	77		25 - 150				10/08/18 09:18	10/13/18 07:00	1
13C8 FOSA	49		25 - 150				10/08/18 09:18	10/13/18 07:00	1
d3-NMeFOSAA	74		25 - 150				10/08/18 09:18	10/13/18 07:00	1
d5-NEtFOSAA	91		25 - 150				10/08/18 09:18	10/13/18 07:00	1
M2-6:2 FTS	105		25 - 150				10/08/18 09:18	10/13/18 07:00	1
M2-8:2 FTS	109		25 - 150				10/08/18 09:18	10/13/18 07:00	1

Site: Long Island Emerging Contaminants, Sag Harbor
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-165735
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 1, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
SHMW-01IR	460-165735-01	PFAS, 1,4-Dioxane
SHMW-13I	460-165735-02	PFAS, 1,4-Dioxane
SHMW-03I	460-165735-03	PFAS, 1,4-Dioxane
MW-XX-092718	460-165735-04	PFAS, 1,4-Dioxane
FB-092718	460-165735-05	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: FB-092718
Field Duplicate pair: SHMW-13I/MW-XX-092718

The above-listed aqueous samples and field blank sample were collected on September 27, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-Dioxane by 1,4-dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatile Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

Analytes were detected in the associated laboratory method blank sample. Contaminants were detected in the associated field blank sample after application of laboratory blank contamination actions. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
Perfluorobutanoic acid (PFBA)	Method MB 200-134946: All samples	1.22 ng/L	12.2 ng/L	Qualify the result for PFBA in sample FB-092718 as nondetect (U) at the RL. Qualify the results for PFBA in samples SHMW-01IR, SHMW-13I, SHMW-03I, and MW-XX-092718 as estimated (J); High bias.
Perfluorooctanoic acid (PFOA)		0.392 ng/L	3.92 ng/L	Validation actions were not required.
Perfluorohexanesulfonic acid (PFHxS)		0.356 ng/L	3.56 ng/L	Qualify the result for PFHxS in sample FB-092718 as nondetect (U) at the RL.
Perfluoroundecanoic acid (PFUnA)	FB-092718: All samples	0.29 ng/L	2.90 ng/L	Qualify the result for PFUnA in samples SHMW-01IR and SHMW-13I as nondetect (U) at the RL.
Perfluorobutanesulfonic acid (PFBS)		0.41 ng/L	4.1 ng/L	Qualify the results for PFBS in samples SHMW-01IR and SHMW-03I as nondetect (U) at the RL. Qualify the results for PFBS in sample MW-XX-092718 as estimated (J); High bias.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
SHMW-03I	M2-6:2 FTS	170	25-150	Validation action was not required as the result for 6:2 FTS was not detected in this sample and therefore not affected by the high recovery.

MS/MSD Results

MS/MSD analyses were performed on sample SHMW-01IR for 1,4-dioxane and PFAS. Recovery and precision criteria were met.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples SHMW-13I and MW-XX-092718 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria.

Analyte	SHMW-13I (ug/L)	MW-XX-092718 (ug/L)	RPD (%)
Perfluorobutanoic acid (PFBA)	6.37	5.92	0.6
Perfluoropentanoic acid (PFPeA)	6.44	5.99	7.2
Perfluorohexanoic acid (PFHxA)	5.03	4.53	10.5
Perfluoroheptanoic acid (PFHpA)	3.23	3.81	16.5
Perfluorooctanoic acid (PFOA)	10.3	10.8	4.7
Perfluorodecanoic acid (PFDA)	0.40 J	1.77 U	NC, Within the RL
Perfluorobutanesulfonic acid (PFBS)	4.28	2.85	40.1, Within the RL
Perfluorohexanesulfonic acid (PFHxS)	4.76	4.08	15.4
Perfluoroheptanesulfonic Acid (PFHpS)	0.80 J	0.76 J	5.1
Perfluorooctanesulfonic acid (PFOS)	9.90	9.61	3.0
NC – Not calculable			
Criteria: When both results are $\geq 5x$ the RL, RPDs must be $< 30\%$.			
When results are $< 5x$ the QL, the absolute difference between the original and field duplicate results must be $< RL$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DRAFT

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

TestAmerica Job ID: 460-165735-1

nt: GEI Consultants, Inc.
Project/Site: Sag Harbor - PFAS - 1803556-1.4

Client Sample ID: SHMW-011R

Lab Sample ID: 460-165735-1

Date Collected: 09/27/18 12:30

Matrix: Water

Date Received: 09/28/18 20:00

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/01/18 11:31	10/02/18 11:46	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	39		10 - 150				10/01/18 11:31	10/02/18 11:46	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	6.01	B J	1.67	0.34	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluoropentanoic acid (PFPeA)	2.70		1.67	0.63	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluorohexanoic acid (PFHxA)	2.20		1.67	0.20	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluoroheptanoic acid (PFHpA)	2.60		1.67	0.27	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluorooctanoic acid (PFOA)	10.3	B	1.67	0.27	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluorononanoic acid (PFNA)	4.29		1.67	0.32	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluorodecanoic acid (PFDA)	1.67	U	1.67	0.32	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluoroundecanoic acid (PFUnA)	0.36	J	1.67	0.21	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluorododecanoic acid (PFDoA)	1.67	U	1.67	0.29	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluorotridecanoic acid (PFTriA)	1.67	U	1.67	0.20	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluorotetradecanoic acid (PFTeA)	1.67	U	1.67	0.38	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluorobutanesulfonic acid (PFBS)	1.16	J	1.67	0.37	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluorohexanesulfonic acid (PFHxS)	4.79	B	1.67	0.22	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluoroheptanesulfonic Acid (PFHpS)	0.75	J	1.67	0.69	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluorooctanesulfonic acid (PFOS)	10.7		1.67	0.64	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluorodecanesulfonic acid (PFDS)	1.67	U	1.67	0.44	ng/L		10/08/18 09:18	10/13/18 03:17	1
Perfluorooctanesulfonamide (FOSA)	1.67	U	1.67	0.47	ng/L		10/08/18 09:18	10/13/18 03:17	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	16.7	U	16.7	0.38	ng/L		10/08/18 09:18	10/13/18 03:17	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	16.7	U	16.7	0.59	ng/L		10/08/18 09:18	10/13/18 03:17	1
6:2 FTS	16.7	U	16.7	0.84	ng/L		10/08/18 09:18	10/13/18 03:17	1
8:2 FTS	16.7	U	16.7	0.47	ng/L		10/08/18 09:18	10/13/18 03:17	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	44		25 - 150				10/08/18 09:18	10/13/18 03:17	1
13C5-PFPeA DNU	63		25 - 150				10/08/18 09:18	10/13/18 03:17	1
13C2 PFHxA	71		25 - 150				10/08/18 09:18	10/13/18 03:17	1
13C4 PFHpA	84		25 - 150				10/08/18 09:18	10/13/18 03:17	1
13C4 PFOA	92		25 - 150				10/08/18 09:18	10/13/18 03:17	1
13C5 PFNA	96		25 - 150				10/08/18 09:18	10/13/18 03:17	1
13C2 PFDA	93		25 - 150				10/08/18 09:18	10/13/18 03:17	1
13C2 PFUnA	97		25 - 150				10/08/18 09:18	10/13/18 03:17	1
13C2 PFDoA	94		25 - 150				10/08/18 09:18	10/13/18 03:17	1
13C2 PFTeDA	68		25 - 150				10/08/18 09:18	10/13/18 03:17	1
13C3 PFBS	72		25 - 150				10/08/18 09:18	10/13/18 03:17	1
18O2 PFHxS	80		25 - 150				10/08/18 09:18	10/13/18 03:17	1
13C4 PFOS	79		25 - 150				10/08/18 09:18	10/13/18 03:17	1
13C8 FOSA	51		25 - 150				10/08/18 09:18	10/13/18 03:17	1
d3-NMeFOSAA	70		25 - 150				10/08/18 09:18	10/13/18 03:17	1
d5-NEtFOSAA	90		25 - 150				10/08/18 09:18	10/13/18 03:17	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Sag Harbor - PFAS - 1803556-1.4

TestAmerica Job ID: 460-165735-1

Client Sample ID: SHMW-01IR

Date Collected: 09/27/18 12:30

Date Received: 09/28/18 20:00

Lab Sample ID: 460-165735-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits
M2-6:2 FTS	130		25 - 150
M2-8:2 FTS	118		25 - 150

Prepared	Analyzed	Dil Fac
10/08/18 09:18	10/13/18 03:17	1
10/08/18 09:18	10/13/18 03:17	1

Client Sample ID: SHMW-13I

Date Collected: 09/27/18 13:35

Date Received: 09/28/18 20:00

Lab Sample ID: 460-165735-2

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/01/18 11:31	10/02/18 12:03	1

Isotope Dilution	%Recovery	Qualifier	Limits
1,4-Dioxane-d8	34		10 - 150

Prepared	Analyzed	Dil Fac
10/01/18 11:31	10/02/18 12:03	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	6.37	J	1.74	0.36	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluoropentanoic acid (PFPeA)	6.44		1.74	0.65	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluorohexanoic acid (PFHxA)	5.03		1.74	0.21	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluoroheptanoic acid (PFHpA)	3.23		1.74	0.28	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluorooctanoic acid (PFOA)	10.3	B	1.74	0.28	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluorononanoic acid (PFNA)	1.74	U	1.74	0.33	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluorodecanoic acid (PFDA)	0.40	J	1.74	0.33	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluoroundecanoic acid (PFUnA)	0.25	J	1.74	0.22	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluorododecanoic acid (PFDoA)	1.74	U	1.74	0.31	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluorotridecanoic acid (PFTriA)	1.74	U	1.74	0.21	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluorotetradecanoic acid (PFTeA)	1.74	U	1.74	0.39	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluorobutanesulfonic acid (PFBS)	4.28		1.74	0.38	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluorohexanesulfonic acid (PFHxS)	4.76	B	1.74	0.23	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluoroheptanesulfonic Acid (PFHpS)	0.80	J	1.74	0.72	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluorooctanesulfonic acid (PFOS)	9.90		1.74	0.66	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluorodecanesulfonic acid (PFDS)	1.74	U	1.74	0.46	ng/L		10/08/18 09:18	10/13/18 04:05	1
Perfluorooctanesulfonamide (FOSA)	1.74	U	1.74	0.49	ng/L		10/08/18 09:18	10/13/18 04:05	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.4	U	17.4	0.39	ng/L		10/08/18 09:18	10/13/18 04:05	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.4	U	17.4	0.61	ng/L		10/08/18 09:18	10/13/18 04:05	1
6:2 FTS	17.4	U	17.4	0.87	ng/L		10/08/18 09:18	10/13/18 04:05	1
8:2 FTS	17.4	U	17.4	0.49	ng/L		10/08/18 09:18	10/13/18 04:05	1

Isotope Dilution	%Recovery	Qualifier	Limits
13C4 PFBA	35		25 - 150
13C5-PFPeA DNU	47		25 - 150
13C2 PFHxA	59		25 - 150
13C4 PFHpA	80		25 - 150
13C4 PFOA	88		25 - 150
13C5 PFNA	87		25 - 150
13C2 PFDA	85		25 - 150

Prepared	Analyzed	Dil Fac
10/08/18 09:18	10/13/18 04:05	1
10/08/18 09:18	10/13/18 04:05	1
10/08/18 09:18	10/13/18 04:05	1
10/08/18 09:18	10/13/18 04:05	1
10/08/18 09:18	10/13/18 04:05	1
10/08/18 09:18	10/13/18 04:05	1
10/08/18 09:18	10/13/18 04:05	1
10/08/18 09:18	10/13/18 04:05	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Sag Harbor - PFAS - 1803556-1.4

TestAmerica Job ID: 460-165735-1

Client Sample ID: SHMW-131

Date Collected: 09/27/18 13:35

Date Received: 09/28/18 20:00

Lab Sample ID: 460-165735-2

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	90		25 - 150	10/08/18 09:18	10/13/18 04:05	1
13C2 PFDoA	83		25 - 150	10/08/18 09:18	10/13/18 04:05	1
13C2 PFTeDA	62		25 - 150	10/08/18 09:18	10/13/18 04:05	1
13C3 PFBS	67		25 - 150	10/08/18 09:18	10/13/18 04:05	1
18O2 PFHxS	77		25 - 150	10/08/18 09:18	10/13/18 04:05	1
13C4 PFOS	72		25 - 150	10/08/18 09:18	10/13/18 04:05	1
13C8 FOSA	52		25 - 150	10/08/18 09:18	10/13/18 04:05	1
d3-NMeFOSAA	69		25 - 150	10/08/18 09:18	10/13/18 04:05	1
d5-NEtFOSAA	83		25 - 150	10/08/18 09:18	10/13/18 04:05	1
M2-6:2 FTS	113		25 - 150	10/08/18 09:18	10/13/18 04:05	1
M2-8:2 FTS	119		25 - 150	10/08/18 09:18	10/13/18 04:05	1

Client Sample ID: SHMW-031

Date Collected: 09/27/18 14:45

Date Received: 09/28/18 20:00

Lab Sample ID: 460-165735-3

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

GC/MS SIM / Isotope Dilution									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/01/18 11:31	10/02/18 12:21	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	34		10 - 150				10/01/18 11:31	10/02/18 12:21	

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	3.58	B J	1.71	0.35	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluoropentanoic acid (PFPeA)	2.44		1.71	0.64	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluorohexanoic acid (PFHxA)	2.03		1.71	0.21	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluoroheptanoic acid (PFHpA)	1.81		1.71	0.27	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluorooctanoic acid (PFOA)	7.41	B	1.71	0.27	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluorononanoic acid (PFNA)	1.71	U	1.71	0.33	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluorodecanoic acid (PFDA)	1.71	U	1.71	0.33	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluoroundecanoic acid (PFUnA)	1.71	U	1.71	0.21	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluorododecanoic acid (PFDoA)	1.71	U	1.71	0.30	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluorotridecanoic acid (PFTriA)	1.71	U	1.71	0.21	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluorotetradecanoic acid (PFTeA)	1.71	U	1.71	0.39	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluorobutanesulfonic acid (PFBS)	1.52	J	1.71	0.38	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluorohexanesulfonic acid (PFHxS)	4.69	B	1.71	0.22	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.71	U	1.71	0.70	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluorooctanesulfonic acid (PFOS)	8.99		1.71	0.65	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluorodecanesulfonic acid (PFDS)	1.71	U	1.71	0.45	ng/L		10/08/18 09:18	10/13/18 04:21	1
Perfluorooctanesulfonamide (FOSA)	1.71	U	1.71	0.48	ng/L		10/08/18 09:18	10/13/18 04:21	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.1	U	17.1	0.39	ng/L		10/08/18 09:18	10/13/18 04:21	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.1	U	17.1	0.60	ng/L		10/08/18 09:18	10/13/18 04:21	1
6:2 FTS	17.1	U	17.1	0.86	ng/L		10/08/18 09:18	10/13/18 04:21	1
8:2 FTS	17.1	U	17.1	0.48	ng/L		10/08/18 09:18	10/13/18 04:21	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Sag Harbor - PFAS - 1803556-1.4

TestAmerica Job ID: 460-165735-1

Client Sample ID: SHMW-031

Date Collected: 09/27/18 14:45

Date Received: 09/28/18 20:00

Lab Sample ID: 460-165735-3

Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	50		25 - 150	10/08/18 09:18	10/13/18 04:21	1
13C5-PFPeA DNU	64		25 - 150	10/08/18 09:18	10/13/18 04:21	1
13C2 PFHxA	67		25 - 150	10/08/18 09:18	10/13/18 04:21	1
13C4 PFHpA	80		25 - 150	10/08/18 09:18	10/13/18 04:21	1
13C4 PFOA	90		25 - 150	10/08/18 09:18	10/13/18 04:21	1
13C5 PFNA	89		25 - 150	10/08/18 09:18	10/13/18 04:21	1
13C2 PFDA	91		25 - 150	10/08/18 09:18	10/13/18 04:21	1
13C2 PFUnA	96		25 - 150	10/08/18 09:18	10/13/18 04:21	1
13C2 PFDoA	86		25 - 150	10/08/18 09:18	10/13/18 04:21	1
13C2 PFTeDA	92		25 - 150	10/08/18 09:18	10/13/18 04:21	1
13C3 PFBS	86		25 - 150	10/08/18 09:18	10/13/18 04:21	1
18O2 PFHxS	94		25 - 150	10/08/18 09:18	10/13/18 04:21	1
13C4 PFOS	96		25 - 150	10/08/18 09:18	10/13/18 04:21	1
13C8 FOSA	56		25 - 150	10/08/18 09:18	10/13/18 04:21	1
d3-NMeFOSAA	73		25 - 150	10/08/18 09:18	10/13/18 04:21	1
d5-NeFOSAA	85		25 - 150	10/08/18 09:18	10/13/18 04:21	1
M2-6:2 FTS	170 *		25 - 150	10/08/18 09:18	10/13/18 04:21	1
M2-8:2 FTS	148		25 - 150	10/08/18 09:18	10/13/18 04:21	1

Client Sample ID: MW-XX-092718

Date Collected: 09/27/18 00:00

Date Received: 09/28/18 20:00

Lab Sample ID: 460-165735-4

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/01/18 11:31	10/02/18 12:38	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	34		10 - 150				10/01/18 11:31	10/02/18 12:38	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	5.92	B J	1.77	0.36	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluoropentanoic acid (PFPeA)	5.99		1.77	0.66	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluorohexanoic acid (PFHxA)	4.53		1.77	0.21	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluoroheptanoic acid (PFHpA)	3.81		1.77	0.28	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluorooctanoic acid (PFOA)	10.8	B	1.77	0.28	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluorononanoic acid (PFNA)	1.77	U	1.77	0.34	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluorodecanoic acid (PFDA)	1.77	U	1.77	0.34	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluoroundecanoic acid (PFUnA)	1.77	U	1.77	0.22	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluorododecanoic acid (PFDoA)	1.77	U	1.77	0.31	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluorotridecanoic acid (PFTriA)	1.77	U	1.77	0.21	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluorotetradecanoic acid (PFTeA)	1.77	U	1.77	0.40	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluorobutanesulfonic acid (PFBS)	2.85	J	1.77	0.39	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluorohexanesulfonic acid (PFHxS)	4.08	B	1.77	0.23	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluoroheptanesulfonic Acid (PFHpS)	0.76	J	1.77	0.72	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluorooctanesulfonic acid (PFOS)	9.61		1.77	0.67	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluorodecanesulfonic acid (PFDS)	1.77	U	1.77	0.47	ng/L		10/08/18 09:18	10/13/18 04:37	1
Perfluorooctanesulfonamide (FOSA)	1.77	U	1.77	0.49	ng/L		10/08/18 09:18	10/13/18 04:37	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Sag Harbor - PFAS - 1803556-1.4

TestAmerica Job ID: 460-165735-1

Client Sample ID: MW-XX-092718

Date Collected: 09/27/18 00:00

Date Received: 09/28/18 20:00

Lab Sample ID: 460-165735-4

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.7	U	17.7	0.40	ng/L		10/08/18 09:18	10/13/18 04:37	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.7	U	17.7	0.62	ng/L		10/08/18 09:18	10/13/18 04:37	1
6:2 FTS	17.7	U	17.7	0.88	ng/L		10/08/18 09:18	10/13/18 04:37	1
8:2 FTS	17.7	U	17.7	0.49	ng/L		10/08/18 09:18	10/13/18 04:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	41		25 - 150				10/08/18 09:18	10/13/18 04:37	1
13C5-PFPeA DNU	56		25 - 150				10/08/18 09:18	10/13/18 04:37	1
13C2 PFHxA	63		25 - 150				10/08/18 09:18	10/13/18 04:37	1
13C4 PFHpA	82		25 - 150				10/08/18 09:18	10/13/18 04:37	1
13C4 PFOA	87		25 - 150				10/08/18 09:18	10/13/18 04:37	1
13C5 PFNA	86		25 - 150				10/08/18 09:18	10/13/18 04:37	1
13C2 PFDA	89		25 - 150				10/08/18 09:18	10/13/18 04:37	1
13C2 PFUnA	96		25 - 150				10/08/18 09:18	10/13/18 04:37	1
13C2 PFDoA	88		25 - 150				10/08/18 09:18	10/13/18 04:37	1
13C2 PFTeDA	96		25 - 150				10/08/18 09:18	10/13/18 04:37	1
13C3 PFBS	76		25 - 150				10/08/18 09:18	10/13/18 04:37	1
18O2 PFHxS	88		25 - 150				10/08/18 09:18	10/13/18 04:37	1
13C4 PFOS	79		25 - 150				10/08/18 09:18	10/13/18 04:37	1
13C8 FOSA	59		25 - 150				10/08/18 09:18	10/13/18 04:37	1
d3-NMeFOSAA	77		25 - 150				10/08/18 09:18	10/13/18 04:37	1
d5-NEtFOSAA	83		25 - 150				10/08/18 09:18	10/13/18 04:37	1
M2-6:2 FTS	124		25 - 150				10/08/18 09:18	10/13/18 04:37	1
M2-8:2 FTS	123		25 - 150				10/08/18 09:18	10/13/18 04:37	1

Client Sample ID: FB-092718

Date Collected: 09/27/18 14:30

Date Received: 09/28/18 20:00

Lab Sample ID: 460-165735-5

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/01/18 11:31	10/02/18 12:55	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	39		10 - 150				10/01/18 11:31	10/02/18 12:55	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.38	J-B	1.75	0.36	ng/L		10/08/18 09:18	10/13/18 04:52	1
Perfluoropentanoic acid (PFPeA)	1.75	U	1.75	0.66	ng/L		10/08/18 09:18	10/13/18 04:52	1
Perfluorohexanoic acid (PFHxA)	1.75	U	1.75	0.21	ng/L		10/08/18 09:18	10/13/18 04:52	1
Perfluoroheptanoic acid (PFHpA)	1.75	U	1.75	0.28	ng/L		10/08/18 09:18	10/13/18 04:52	1
Perfluorooctanoic acid (PFOA)	1.75	U	1.75	0.28	ng/L		10/08/18 09:18	10/13/18 04:52	1
Perfluorononanoic acid (PFNA)	1.75	U	1.75	0.33	ng/L		10/08/18 09:18	10/13/18 04:52	1
Perfluorodecanoic acid (PFDA)	1.75	U	1.75	0.33	ng/L		10/08/18 09:18	10/13/18 04:52	1
Perfluoroundecanoic acid (PFUnA)	0.29	J	1.75	0.22	ng/L		10/08/18 09:18	10/13/18 04:52	1
Perfluorododecanoic acid (PFDoA)	1.75	U	1.75	0.31	ng/L		10/08/18 09:18	10/13/18 04:52	1
Perfluorotridecanoic acid (PFTriA)	1.75	U	1.75	0.21	ng/L		10/08/18 09:18	10/13/18 04:52	1
Perfluorotetradecanoic acid (PFTeA)	1.75	U	1.75	0.39	ng/L		10/08/18 09:18	10/13/18 04:52	1

TestAmerica Edison

10/15/2018

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Sag Harbor - PFAS - 1803556-1.4

TestAmerica Job ID: 460-165735-1

Client Sample ID: FB-092718

Date Collected: 09/27/18 14:30

Date Received: 09/28/18 20:00

Lab Sample ID: 460-165735-5

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.41	J	1.75	0.39	ng/L		10/08/18 09:18	10/13/18 04:52	1
Perfluorohexanesulfonic acid (PFHxS)	0.25 JB 1.75 U		1.75	0.23	ng/L		10/08/18 09:18	10/13/18 04:52	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.75	U	1.75	0.72	ng/L		10/08/18 09:18	10/13/18 04:52	1
Perfluorooctanesulfonic acid (PFOS)	1.75	U	1.75	0.67	ng/L		10/08/18 09:18	10/13/18 04:52	1
Perfluorodecanesulfonic acid (PFDS)	1.75	U	1.75	0.46	ng/L		10/08/18 09:18	10/13/18 04:52	1
Perfluorooctanesulfonamide (FOSA)	1.75	U	1.75	0.49	ng/L		10/08/18 09:18	10/13/18 04:52	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.5	U	17.5	0.39	ng/L		10/08/18 09:18	10/13/18 04:52	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.5	U	17.5	0.61	ng/L		10/08/18 09:18	10/13/18 04:52	1
6:2 FTS	17.5	U	17.5	0.88	ng/L		10/08/18 09:18	10/13/18 04:52	1
8:2 FTS	17.5	U	17.5	0.49	ng/L		10/08/18 09:18	10/13/18 04:52	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	71		25 - 150				10/08/18 09:18	10/13/18 04:52	1
13C5-PFPeA DNU	80		25 - 150				10/08/18 09:18	10/13/18 04:52	1
13C2 PFHxA	85		25 - 150				10/08/18 09:18	10/13/18 04:52	1
13C4 PFHpA	91		25 - 150				10/08/18 09:18	10/13/18 04:52	1
13C4 PFOA	101		25 - 150				10/08/18 09:18	10/13/18 04:52	1
13C5 PFNA	97		25 - 150				10/08/18 09:18	10/13/18 04:52	1
13C2 PFDA	97		25 - 150				10/08/18 09:18	10/13/18 04:52	1
13C2 PFUnA	97		25 - 150				10/08/18 09:18	10/13/18 04:52	1
13C2 PFDoA	89		25 - 150				10/08/18 09:18	10/13/18 04:52	1
13C2 PFTeDA	63		25 - 150				10/08/18 09:18	10/13/18 04:52	1
13C3 PFBS	74		25 - 150				10/08/18 09:18	10/13/18 04:52	1
18O2 PFHxS	78		25 - 150				10/08/18 09:18	10/13/18 04:52	1
13C4 PFOS	64		25 - 150				10/08/18 09:18	10/13/18 04:52	1
13C8 FOSA	46		25 - 150				10/08/18 09:18	10/13/18 04:52	1
d3-NMeFOSAA	67		25 - 150				10/08/18 09:18	10/13/18 04:52	1
d5-NEtFOSAA	90		25 - 150				10/08/18 09:18	10/13/18 04:52	1
M2-6:2 FTS	99		25 - 150				10/08/18 09:18	10/13/18 04:52	1
M2-8:2 FTS	110		25 - 150				10/08/18 09:18	10/13/18 04:52	1

Company: GEI Consultants, Inc.					Analysis Requested				
Address: 455 Winding Brook Drive, Suite 201					Due Date Requested:				
City: Glastonbury					TAT Requested (days): 10 days				
State, Zip: CT, 06033					PO #: 1803556-1.4				
Phone: 860-368-5300(Tel) 860-808-9717(Fax)					WO #:				
Email: mfeiler@geiconsultants.com					Project #: 46027288				
Project Name: Emerging Contaminants - Long Island/NYC					SSOW#:				
Site/Project Description: Sag Harbor - PFAS - 1803556-1.4					Field Filtered Sample (Yes or No)				
					PFC_IDA - PFAS, Standard List (21 Analytes)				
					82700_SIM_MS_ID (1,4-Dioxane)				
Sample Identification					Total Number of Containers				
Sample Date		Sample Time		Sample Type (C=Comp, G=grab)		Matrix (W=Water, S=solid, O=soil/sediment, BT=biota, A=air)		Preservation Code:	
SHMW-01IR		9-27-18 1230		G		Water		X X	
SHMW-13I		9-27-18 1335		G		Water		X X	
SHMW-03I		9-27-18 1445		G		Water		X X	
MW-XX-092718		9-27-18		G		Water		X X	
FB-092718		9-27-18 1430		G		Water		X X	
						Water			
						Water			
						Water			
						Water			
						Water			
						Water			
						Water			
						Water			
Possible Hazard Identification ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological					Sample Disposal (A fee may be assessed if samples are retained long) ☐ Return To Client ☐ Disposal By Lab ☐ Archive For				
Deliverable Requested: I, II, III, IV, Other (specify) NY Cat B					Special Instructions/QC Requirements: Edison lab -log in both tests into				
Empty Kit Relinquished by:					Date:				
Relinquished by: <i>[Signature]</i>					Time:				
Relinquished by: <i>[Signature]</i>					Method of Shipment:				
Relinquished by: <i>[Signature]</i>					Received by: <i>[Signature]</i>				
Relinquished by: <i>[Signature]</i>					Received by: <i>[Signature]</i>				
Relinquished by: <i>[Signature]</i>					Received by: <i>[Signature]</i>				
Custody Seals Intact: ☒ Yes ☐ No					Cooler Temperature(s) °C and Other Remarks:				

2.8 / 2.8 3.0 / 3.0 5/12/9

Site: Long Island Emerging Contaminants, Skillman
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-166276
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 6, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
SSMW-03	460-166276-01	PFAS, 1,4-Dioxane
SSMW-05	460-166276-02	PFAS, 1,4-Dioxane
DUP-100318-2	460-166276-03	PFAS, 1,4-Dioxane
FB-100318-2	460-166276-04	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: FB-100318-2
Field Duplicate pair: SSMW-03/DUP-100318-2

The above-listed aqueous samples and field blank sample were collected on October 3, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-Dioxane by 1,4-dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatle Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

Analytes were not detected in the associated laboratory method blank samples. 1,4-Dioxane was detected in the associated field blank sample. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
1,4-Dioxane	FB-100318-2: All samples	0.10 ug/L	1.0 ug/L	Qualify the result for 1,4-Dioxane in sample SSMW-05 as estimated (J); High bias.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
SSMW-03	M2-6:2 FTS	495	25-150	Estimate (J) the positive result for 6:2 FTS in sample SSMW-03.
	M2-8:2 FTS	249		Validation action was not required as 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.
SSMW-05	M2-6:2 FTS	522	25-150	Estimate (J) the positive results for 6:2 FTS, Perfluorooctanesulfonic acid (PFOS), and
	13C4 PFOS	168		

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
	13C2 PFUnA	161		Perfluoroundecanoic acid (PFUnA) in sample SSMW-05.
	M2-8:2 FTS	304		Validation action was not required as 8:2 FTS, Perfluorododecanoic acid, and Perfluorotetradecanoic acid were not detected in this sample and therefore not affected by the high recovery.
	13C2 PFDoA	167		
	13C2 PFTeDA	162		
DUP-100318-2	PFBA	23	25-150	Estimate (J) the positive results for Perfluorobutanoic acid and 6:2 FTS in sample DUP-100318-2.
	M2-6:2 FTS	429		Validation action was not required as 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.
	M2-8:2 FTS	181		
FB-100318-2	M2-6:2 FTS	251	25-150	Validation action was not required as 6:2 FTS was not detected in this sample and therefore not affected by the high recoveries.

It should be noted that IDA recoveries outside of control limits generally have a minimal effect on the data quality as the results are quantitated by isotope dilution and are corrected accordingly. However, professional judgment was taken to qualify affected compound results for associated isotope dilution analytes recovered outside of the recommended control limits.

MS/MSD Results

MS/MSD analyses were performed on sample SSMW-03 for 1,4-dioxane and PFAS. Recovery and precision criteria were met in the 1,4-dioxane analysis. The recoveries for Perfluoropentanoic acid (35%, 29%) were below the control limits of 40-160 in the MS/MSD. The positive result for Perfluoropentanoic acid (PFPeA) in sample SSMW-03 was qualified as estimated (J) and may be biased low.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples SSMW-03 and DUP-100318-2 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria.

Analyte	SSMW-03 (ug/L)	DUP-100318-2 (ug/L)	RPD (%)
Perfluorobutanoic acid (PFBA)	48.5	55.9	14.2
Perfluoropentanoic acid (PFPeA)	69.3	61.4	12.1
Perfluorohexanoic acid (PFHxA)	73.3	73.9	0.8
Perfluoroheptanoic acid (PFHpA)	44.6	43.4	2.7
Perfluorooctanoic acid (PFOA)	106	92.1	14.0
Perfluorononanoic acid (PFNA)	6.55	5.67	14.4
Perfluorodecanoic acid (PFDA)	0.70 J	0.83 J	17.0
Perfluoroundecanoic acid (PFUnA)	0.28 J	0.29 J	3.5
Perfluorobutanesulfonic acid (PFBS)	10.8	9.81	9.6
Perfluorohexanesulfonic acid (PFHxS)	3.91	3.34	15.7
Perfluoroheptanesulfonic Acid (PFHpS)	1.55 J	1.07 J	36.6, Within the RL
Perfluorooctanesulfonic acid (PFOS)	42.4	40.8	3.8
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.45 J	17.4 U	NC, Within the RL
6:2 FTS	3.41 J	1.63 J	70.6, Within the RL
NC – Not calculable Criteria: When both results are $\geq 5x$ the RL, RPDs must be $< 30\%$. When results are $< 5x$ the QL, the absolute difference between the original and field duplicate results must be $< RL$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

Dilutions were not required.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

TestAmerica Job ID: 460-166276-1

Client: GEI Consultants, Inc.
Project/Site: Skillman-PFAS-1803556-1.12

Client Sample ID: SSMW-03

Date Collected: 10/03/18 11:50

Date Received: 10/04/18 19:30

Lab Sample ID: 460-166276-1

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/08/18 18:48	10/09/18 09:24	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	42		10 - 150				10/08/18 18:48	10/09/18 09:24	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	48.5		1.76	0.36	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluoropentanoic acid (PFPeA)	69.3	J	1.76	0.66	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluorohexanoic acid (PFHxA)	73.3		1.76	0.21	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluoroheptanoic acid (PFHpA)	44.6		1.76	0.28	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluorooctanoic acid (PFOA)	106		1.76	0.28	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluorononanoic acid (PFNA)	6.55		1.76	0.34	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluorodecanoic acid (PFDA)	0.70	J	1.76	0.34	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluoroundecanoic acid (PFUnA)	0.28	J	1.76	0.22	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluorododecanoic acid (PFDoA)	1.76	U	1.76	0.31	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluorotridecanoic acid (PFTriA)	1.76	U	1.76	0.21	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluorotetradecanoic acid (PFTeA)	1.76	U	1.76	0.40	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluorobutanesulfonic acid (PFBS)	10.8		1.76	0.39	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluorohexanesulfonic acid (PFHxS)	3.91		1.76	0.23	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.55	J	1.76	0.72	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluorooctanesulfonic acid (PFOS)	42.4		1.76	0.67	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluorodecanesulfonic acid (PFDS)	1.76	U	1.76	0.47	ng/L		10/11/18 09:45	10/16/18 06:14	1
Perfluorooctanesulfonamide (FOSA)	1.76	U	1.76	0.49	ng/L		10/11/18 09:45	10/16/18 06:14	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.45	J	17.6	0.40	ng/L		10/11/18 09:45	10/16/18 06:14	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.6	U	17.6	0.62	ng/L		10/11/18 09:45	10/16/18 06:14	1
6:2 FTS	3.41	J	17.6	0.88	ng/L		10/11/18 09:45	10/16/18 06:14	1
8:2 FTS	17.6	U	17.6	0.49	ng/L		10/11/18 09:45	10/16/18 06:14	1

Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	26		25 - 150				10/11/18 09:45	10/16/18 06:14	1
13C5-PFPeA DNU	55		25 - 150				10/11/18 09:45	10/16/18 06:14	1
13C2 PFHxA	65		25 - 150				10/11/18 09:45	10/16/18 06:14	1
13C4 PFHpA	77		25 - 150				10/11/18 09:45	10/16/18 06:14	1
13C4 PFOA	108		25 - 150				10/11/18 09:45	10/16/18 06:14	1
13C5 PFNA	132		25 - 150				10/11/18 09:45	10/16/18 06:14	1
13C2 PFDA	137		25 - 150				10/11/18 09:45	10/16/18 06:14	1
13C2 PFUnA	140		25 - 150				10/11/18 09:45	10/16/18 06:14	1
13C2 PFDoA	144		25 - 150				10/11/18 09:45	10/16/18 06:14	1
13C2 PFTeA	137		25 - 150				10/11/18 09:45	10/16/18 06:14	1
13C3 PFBS	74		25 - 150				10/11/18 09:45	10/16/18 06:14	1
18O2 PFHxS	107		25 - 150				10/11/18 09:45	10/16/18 06:14	1
13C4 PFOS	138		25 - 150				10/11/18 09:45	10/16/18 06:14	1
13C8 FOSA	95		25 - 150				10/11/18 09:45	10/16/18 06:14	1
d3-NMeFOSAA	108		25 - 150				10/11/18 09:45	10/16/18 06:14	1
d5-NEtFOSAA	125		25 - 150				10/11/18 09:45	10/16/18 06:14	1

TestAmerica Edison

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11/5/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Skillman-PFAS-1803556-1.12

TestAmerica Job ID: 460-166276-1

Client Sample ID: SSMW-03

Date Collected: 10/03/18 11:50

Date Received: 10/04/18 19:30

Lab Sample ID: 460-166276-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-6:2 FTS	495	*	25 - 150	10/11/18 09:45	10/16/18 06:14	1
M2-8:2 FTS	249	*	25 - 150	10/11/18 09:45	10/16/18 06:14	1

Client Sample ID: SSMW-05

Date Collected: 10/03/18 13:25

Date Received: 10/04/18 19:30

Lab Sample ID: 460-166276-2

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.42	J	0.21	0.017	ug/L		10/08/18 18:48	10/09/18 09:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	47		10 - 150				10/08/18 18:48	10/09/18 09:42	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	83.8		1.78	0.36	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluoropentanoic acid (PFPeA)	164		1.78	0.67	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluorohexanoic acid (PFHxA)	208		1.78	0.21	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluoroheptanoic acid (PFHpA)	91.0		1.78	0.28	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluorooctanoic acid (PFOA)	180		1.78	0.28	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluorononanoic acid (PFNA)	8.05		1.78	0.34	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluorodecanoic acid (PFDA)	5.36		1.78	0.34	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluoroundecanoic acid (PFUnA)	0.36	J	1.78	0.22	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluorododecanoic acid (PFDoA)	1.78	U	1.78	0.31	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluorotridecanoic acid (PFTriA)	1.78	U	1.78	0.21	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluorotetradecanoic acid (PFTeA)	1.78	U	1.78	0.40	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluorobutanesulfonic acid (PFBS)	14.7		1.78	0.39	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluorohexanesulfonic acid (PFHxS)	9.72		1.78	0.23	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.05	J	1.78	0.73	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluorooctanesulfonic acid (PFOS)	44.7	J	1.78	0.68	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluorodecanesulfonic acid (PFDS)	1.78	U	1.78	0.47	ng/L		10/11/18 09:45	10/16/18 07:01	1
Perfluorooctanesulfonamide (FOSA)	1.02	J	1.78	0.50	ng/L		10/11/18 09:45	10/16/18 07:01	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.8	U	17.8	0.40	ng/L		10/11/18 09:45	10/16/18 07:01	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.8	U	17.8	0.62	ng/L		10/11/18 09:45	10/16/18 07:01	1
6:2 FTS	5.02	J	17.8	0.89	ng/L		10/11/18 09:45	10/16/18 07:01	1
8:2 FTS	17.8	U	17.8	0.50	ng/L		10/11/18 09:45	10/16/18 07:01	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	28		25 - 150				10/11/18 09:45	10/16/18 07:01	1
13C5-PFPeA DNU	56		25 - 150				10/11/18 09:45	10/16/18 07:01	1
13C2 PFHxA	62		25 - 150				10/11/18 09:45	10/16/18 07:01	1
13C4 PFHpA	79		25 - 150				10/11/18 09:45	10/16/18 07:01	1
13C4 PFOA	108		25 - 150				10/11/18 09:45	10/16/18 07:01	1
13C5 PFNA	135		25 - 150				10/11/18 09:45	10/16/18 07:01	1

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Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Skillman-PFAS-1803556-1.12

TestAmerica Job ID: 460-166276-1

Client Sample ID: SSMW-05

Date Collected: 10/03/18 13:25

Date Received: 10/04/18 19:30

Lab Sample ID: 460-166276-2

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDA	142		25 - 150	10/11/18 09:45	10/16/18 07:01	1
13C2 PFUnA	161 *		25 - 150	10/11/18 09:45	10/16/18 07:01	1
13C2 PFDoA	167 *		25 - 150	10/11/18 09:45	10/16/18 07:01	1
13C2 PFTeDA	162 *		25 - 150	10/11/18 09:45	10/16/18 07:01	1
13C3 PFBS	94		25 - 150	10/11/18 09:45	10/16/18 07:01	1
18O2 PFHxS	118		25 - 150	10/11/18 09:45	10/16/18 07:01	1
13C4 PFOS	168 *		25 - 150	10/11/18 09:45	10/16/18 07:01	1
13C8 FOSA	114		25 - 150	10/11/18 09:45	10/16/18 07:01	1
d3-NMeFOSAA	109		25 - 150	10/11/18 09:45	10/16/18 07:01	1
d5-NEtFOSAA	131		25 - 150	10/11/18 09:45	10/16/18 07:01	1
M2-6:2 FTS	522 *		25 - 150	10/11/18 09:45	10/16/18 07:01	1
M2-8:2 FTS	304 *		25 - 150	10/11/18 09:45	10/16/18 07:01	1

Client Sample ID: DUP-100318-2

Date Collected: 10/03/18 00:00

Date Received: 10/04/18 19:30

Lab Sample ID: 460-166276-3

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/08/18 18:48	10/09/18 09:59	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	47		10 - 150				10/08/18 18:48	10/09/18 09:59	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	55.9	J	1.74	0.36	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluoropentanoic acid (PFPeA)	61.4		1.74	0.65	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluorohexanoic acid (PFHxA)	73.9		1.74	0.21	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluoroheptanoic acid (PFHpA)	43.4		1.74	0.28	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluorooctanoic acid (PFOA)	92.1		1.74	0.28	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluorononanoic acid (PFNA)	5.67		1.74	0.33	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluorodecanoic acid (PFDA)	0.83	J	1.74	0.33	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluoroundecanoic acid (PFUnA)	0.29	J	1.74	0.22	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluorododecanoic acid (PFDoA)	1.74	U	1.74	0.30	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluorotridecanoic acid (PFTrA)	1.74	U	1.74	0.21	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluorotetradecanoic acid (PFTeA)	1.74	U	1.74	0.39	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluorobutanesulfonic acid (PFBS)	9.81		1.74	0.38	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluorohexanesulfonic acid (PFHxS)	3.34		1.74	0.23	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.07	J	1.74	0.71	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluorooctanesulfonic acid (PFOS)	40.8		1.74	0.66	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluorodecanesulfonic acid (PFDS)	1.74	U	1.74	0.46	ng/L		10/11/18 09:45	10/16/18 07:17	1
Perfluorooctanesulfonamide (FOSA)	1.74	U	1.74	0.49	ng/L		10/11/18 09:45	10/16/18 07:17	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.4	U	17.4	0.39	ng/L		10/11/18 09:45	10/16/18 07:17	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.4	U	17.4	0.61	ng/L		10/11/18 09:45	10/16/18 07:17	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Skillman-PFAS-1803556-1.12

TestAmerica Job ID: 460-166276-1

Client Sample ID: DUP-100318-2

Date Collected: 10/03/18 00:00

Date Received: 10/04/18 19:30

Lab Sample ID: 460-166276-3

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
6:2 FTS	1.63	J	17.4	0.87	ng/L		10/11/18 09:45	10/16/18 07:17	1
8:2 FTS	17.4	U	17.4	0.49	ng/L		10/11/18 09:45	10/16/18 07:17	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	23	*	25 - 150				10/11/18 09:45	10/16/18 07:17	1
13C5-PFPeA DNU	57		25 - 150				10/11/18 09:45	10/16/18 07:17	1
13C2 PFHxA	54		25 - 150				10/11/18 09:45	10/16/18 07:17	1
13C4 PFHpA	68		25 - 150				10/11/18 09:45	10/16/18 07:17	1
13C4 PFOA	99		25 - 150				10/11/18 09:45	10/16/18 07:17	1
13C5 PFNA	111		25 - 150				10/11/18 09:45	10/16/18 07:17	1
13C2 PFDA	107		25 - 150				10/11/18 09:45	10/16/18 07:17	1
13C2 PFUnA	119		25 - 150				10/11/18 09:45	10/16/18 07:17	1
13C2 PFDoA	128		25 - 150				10/11/18 09:45	10/16/18 07:17	1
13C2 PFTeDA	118		25 - 150				10/11/18 09:45	10/16/18 07:17	1
13C3 PFBS	68		25 - 150				10/11/18 09:45	10/16/18 07:17	1
18O2 PFHxS	101		25 - 150				10/11/18 09:45	10/16/18 07:17	1
13C4 PFOS	124		25 - 150				10/11/18 09:45	10/16/18 07:17	1
13C8 FOSA	90		25 - 150				10/11/18 09:45	10/16/18 07:17	1
d3-NMeFOSAA	90		25 - 150				10/11/18 09:45	10/16/18 07:17	1
d5-NEtFOSAA	101		25 - 150				10/11/18 09:45	10/16/18 07:17	1
M2-6:2 FTS	429	*	25 - 150				10/11/18 09:45	10/16/18 07:17	1
M2-8:2 FTS	181	*	25 - 150				10/11/18 09:45	10/16/18 07:17	1

Client Sample ID: FB-100318-2

Date Collected: 10/03/18 11:10

Date Received: 10/04/18 19:30

Lab Sample ID: 460-166276-4

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.10	J	0.21	0.017	ug/L		10/08/18 18:48	10/09/18 10:16	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	48		10 - 150				10/08/18 18:48	10/09/18 10:16	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.72	U	1.72	0.35	ng/L		10/11/18 09:45	10/16/18 07:33	1
Perfluoropentanoic acid (PFPeA)	1.72	U	1.72	0.65	ng/L		10/11/18 09:45	10/16/18 07:33	1
Perfluorohexanoic acid (PFHxA)	1.72	U	1.72	0.21	ng/L		10/11/18 09:45	10/16/18 07:33	1
Perfluoroheptanoic acid (PFHpA)	1.72	U	1.72	0.28	ng/L		10/11/18 09:45	10/16/18 07:33	1
Perfluorooctanoic acid (PFOA)	1.72	U	1.72	0.28	ng/L		10/11/18 09:45	10/16/18 07:33	1
Perfluorononanoic acid (PFNA)	1.72	U	1.72	0.33	ng/L		10/11/18 09:45	10/16/18 07:33	1
Perfluorodecanoic acid (PFDA)	1.72	U	1.72	0.33	ng/L		10/11/18 09:45	10/16/18 07:33	1
Perfluoroundecanoic acid (PFUnA)	1.72	U	1.72	0.22	ng/L		10/11/18 09:45	10/16/18 07:33	1
Perfluorododecanoic acid (PFDoA)	1.72	U	1.72	0.30	ng/L		10/11/18 09:45	10/16/18 07:33	1
Perfluorotridecanoic acid (PFTriA)	1.72	U	1.72	0.21	ng/L		10/11/18 09:45	10/16/18 07:33	1
Perfluorotetradecanoic acid (PFTeA)	1.72	U	1.72	0.39	ng/L		10/11/18 09:45	10/16/18 07:33	1
Perfluorobutanesulfonic acid (PFBS)	1.72	U	1.72	0.38	ng/L		10/11/18 09:45	10/16/18 07:33	1
Perfluorohexanesulfonic acid (PFHxS)	1.72	U	1.72	0.22	ng/L		10/11/18 09:45	10/16/18 07:33	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.72	U	1.72	0.71	ng/L		10/11/18 09:45	10/16/18 07:33	1
Perfluorooctanesulfonic acid (PFOS)	1.72	U	1.72	0.65	ng/L		10/11/18 09:45	10/16/18 07:33	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Skillman-PFAS-1803556-1.12

TestAmerica Job ID: 460-166276-1

Client Sample ID: FB-100318-2

Date Collected: 10/03/18 11:10

Date Received: 10/04/18 19:30

Lab Sample ID: 460-166276-4

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanesulfonic acid (PFDS)	1.72	U	1.72	0.46	ng/L		10/11/18 09:45	10/16/18 07:33	1
Perfluorooctanesulfonamide (FOSA)	1.72	U	1.72	0.48	ng/L		10/11/18 09:45	10/16/18 07:33	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.2	U	17.2	0.39	ng/L		10/11/18 09:45	10/16/18 07:33	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.2	U	17.2	0.60	ng/L		10/11/18 09:45	10/16/18 07:33	1
6:2 FTS	17.2	U	17.2	0.86	ng/L		10/11/18 09:45	10/16/18 07:33	1
8:2 FTS	17.2	U	17.2	0.48	ng/L		10/11/18 09:45	10/16/18 07:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	81		25 - 150				10/11/18 09:45	10/16/18 07:33	1
13C5-PFPeA DNU	138		25 - 150				10/11/18 09:45	10/16/18 07:33	1
13C2 PFHxA	118		25 - 150				10/11/18 09:45	10/16/18 07:33	1
13C4 PFHpA	96		25 - 150				10/11/18 09:45	10/16/18 07:33	1
13C4 PFOA	106		25 - 150				10/11/18 09:45	10/16/18 07:33	1
13C5 PFNA	107		25 - 150				10/11/18 09:45	10/16/18 07:33	1
13C2 PFDA	106		25 - 150				10/11/18 09:45	10/16/18 07:33	1
13C2 PFUnA	114		25 - 150				10/11/18 09:45	10/16/18 07:33	1
13C2 PFDoA	116		25 - 150				10/11/18 09:45	10/16/18 07:33	1
13C2 PFTeDA	111		25 - 150				10/11/18 09:45	10/16/18 07:33	1
13C3 PFBS	117		25 - 150				10/11/18 09:45	10/16/18 07:33	1
18O2 PFHxS	97		25 - 150				10/11/18 09:45	10/16/18 07:33	1
13C4 PFOS	122		25 - 150				10/11/18 09:45	10/16/18 07:33	1
13C8 FOSA	76		25 - 150				10/11/18 09:45	10/16/18 07:33	1
d3-NMeFOSAA	84		25 - 150				10/11/18 09:45	10/16/18 07:33	1
d5-NEtFOSAA	92		25 - 150				10/11/18 09:45	10/16/18 07:33	1
M2-6:2 FTS	251		25 - 150				10/11/18 09:45	10/16/18 07:33	1
M2-8:2 FTS	110		25 - 150				10/11/18 09:45	10/16/18 07:33	1

GEI Consultants, Inc.

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455 Winding Brook Drive Suite 201

City:

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State, Zip:

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Phone:

860-368-5300(Tel) 860-808-9717(Fax)

Email:

mfelter@geiconsultants.com

Project Name:

Emerging Contaminants - Long Island/NYC

Site/Project Description:

Skullman-PFAS-1803556-1.12

Due Date Requested:

TAT Requested (days):

10 days

PO #:

1803556-1.12

WO #:

Project #:

46027288

SSQW#:

Analysis Requested

Sample Identification

Sample Date

Sample Time

Sample Type
(C=comp, G=grab)Matrix
(W=water, S=solid, D=dry solid, BT=tissue, A=air)

Preservation Code:

Field Filtered Sample (Yes or No)

Pre-Filtered Sample (Yes or No)

PFAS, PAH, Standard List (21 Analytes)

227/00, SIM, MS, ID (1,4-Dioxane)

Total Number of containers

Preservative

A - HCL
B - NaCl
C - Zn /
D - NH₄
E - NaH
F - MeOH
G - AmO
H - Ascor
I - Ice
J - DI W
K - EDTA
L - EDA

Other:

SSMW-03

10/3/18

1150

G

Water

N

N

12

SSMW-05

10/3/18

1325

G

Water

N

N

4

DUP-100318-2

10/3/18

—

G

Water

N

N

4

FB-100318-2

10/3/18

1110

G

Water

N

N

4

Possible Hazard Identification

☒ Non-Hazard☐ Flammable☐ Skin Irritant☐ Poison B☐ Unknown☐ Radiological

Deliverable Requested: I, II, III, IV, Other (specify) NY Cat B

Sample Disposal (A fee may be assessed if samples are retained long)

☐ Return To Client☒ Disposal By Lab☐ Archive For

Special Instructions/QC Requirements: Edison lab - log in both tests into

Empty Kit Relinquished by:

Date:

Time:

Method of Shipment:

Relinquished by:

Date/Time:

Company:

Received by:

Date/Time:

Relinquished by:

Date/Time:

Company:

Received by:

Date/Time:

Relinquished by:

Date/Time:

Company:

Received by:

Date/Time:

Custody Seals Intact:

Δ Yes Δ No

Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

2.11 2.05 2.7/2.2 1.249

Site: Long Island Emerging Contaminants, Wythe
Laboratory: Test America, Burlington, VT and Edison, NJ
Report No.: 460-166275
Reviewer: Lorie MacKinnon/GEI Consultants
Date: November 6, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
WA-MW-04	460-166275-01	PFAS, 1,4-Dioxane
WA-MW-01	460-166275-02	PFAS, 1,4-Dioxane
DUP-100318-1	460-166275-03	PFAS, 1,4-Dioxane
FB-100318-1	460-166275-04	PFAS, 1,4-Dioxane

Associated QC Samples:

Field Blank: FB-100318-1
Field Duplicate pair: WA-MW-04/DUP-100318-1

The above-listed aqueous samples and field blank sample were collected on October 3, 2018 and were analyzed for perfluorinated alkyl substances (PFAS) by modified Method 537 and 1,4-Dioxane by 1,4-dioxane by SW-846 method 8270D selective ion monitoring (SIM) Isotope dilution. The data validation was performed based on the USEPA Region 2 SOP HW-35 (Revision 2) *Semivolatiles Data Validation* (March 2013), modified for the methods referenced and professional and technical judgment.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Initial and Continuing Calibrations
- Blanks
- Isotope Dilution Analyte (IDA) Recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits
- Sample Quantitation and Compound Identification

In general, the data appear usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was found to be complete as received by the laboratory.

Holding Times and Sample Preservation

All criteria were met.

Initial and Continuing Calibrations

All initial and continuing calibration criteria were met.

Blanks

Analytes were not detected in the associated laboratory method blank samples. 1,4-Dioxane was detected in the associated field blank sample. The following table summarizes the contamination and validation actions taken.

Analyte	Blank ID/ Associated Samples	Concentration Detected	10x Action Level	Validation Actions
1,4-Dioxane	FB-100318-1: All samples	0.11 ug/L	1.1 ug/L	Qualify the results for 1,4-dioxane in samples WA-MW-04 and DUP-100318-1 as estimated (J); High bias.

Blank Actions:

If the sample result is < RL; report the result as nondetect (U) at the reporting limit (RL).

If the sample result is $\geq$ RL and < blank contamination detected; report the result as nondetect (U) at the reported value.

If the sample result is $\geq$ RL and < 10x Action Level; professional judgment was taken to report the sample result as estimated (J); biased high.

If the sample result is nondetect or > 10x Action Level; validation action is not required.

Isotope Dilution Analyte (IDA) Recoveries

The following tables lists the isotope dilution analytes recovered outside of the method recommended control limits and validation actions taken.

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
WA-MW-04	PFBA	22	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA) and 6:2 FTS in sample WA-MW-04.
	M2-6:2 FTS	462		
	M2-8:2 FTS	201		Validation action was not required as 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.
WA-MW-01	PFBA	16	25-150	Estimate (J) the positive results for Perfluorobutanoic acid

Sample	IDA	Recovery (%)	Control Limits (%)	Validation Actions
	M2-6:2 FTS	538		(PFBA), 6:2 FTS, and Perfluoroundecanoic acid in sample WA-MW-01.
	13C2 PFUnA	158		
	M2-8:2 FTS	336		Validation action was not required as 8:2 FTS, N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA), Perfluorodecanoic acid (PFDoA), and Perfluorotetradecanoic acid (PFTeA) were not detected in this sample and therefore not affected by the high recoveries.
	D5-NEtFOSAA	155		
	13C2 PFDoA	158		
	13C2 PFTeDA	169		
DUP-100318-1	PFBA	19	25-150	Estimate (J) the positive results for Perfluorobutanoic acid (PFBA) and 6:2 FTS in sample DUP-100318-1.
	M2-6:2 FTS	421		
	M2-8:2 FTS	185		Validation action was not required as 8:2 FTS was not detected in this sample and therefore not affected by the high recovery.
FB-100318-1	M2-6:2 FTS	237	25-150	Validation action was not required as 6:2 FTS was not detected in this sample and therefore not affected by the high recovery.

It should be noted that IDA recoveries outside of control limits generally have a minimal effect on the data quality as the results are quantitated by isotope dilution and are corrected accordingly. However, professional judgment was taken to qualify affected compound results for associated isotope dilution analytes recovered outside of the recommended control limits.

MS/MSD Results

MS/MSD analyses were performed on sample WA-MW-04 for 1,4-dioxane and PFAS. Recovery and precision criteria were met in the 1,4-dioxane analysis. The recovery for Perfluorobutanoic acid (334%) was above the control limits of 40-160 in the MSD. The positive result for Perfluorobutanoic acid (PFBA) in sample WA-MW-04 was qualified as estimated (J) and may be biased high.

LCS Results

All criteria were met.

Internal Standards

All criteria were met.

Field Duplicate Results

Samples WA-MW-04 and DUP-100318-1 were submitted as the field duplicate pair with this sample group. The following table summarizes the RPDs of the detected analytes, which were within the acceptance criteria.

Analyte	WA-MW-04 (ug/L)	DUP-100318-1 (ug/L)	RPD (%)
1,4-Dioxane	0.55	0.55	0
Perfluorobutanoic acid (PFBA)	46.8	56.9	19.5
Perfluoropentanoic acid (PFPeA)	21.8	19.1	13.2
Perfluorohexanoic acid (PFHxA)	17.2	19.0	9.9
Perfluoroheptanoic acid (PFHpA)	15.9	18.5	15.1
Perfluorooctanoic acid (PFOA)	65.9	69.8	5.7
Perfluorononanoic acid (PFNA)	1.24 J	1.61 J	26.0
Perfluoroundecanoic acid (PFUnA)	0.37 J	1.77 U	NC, Within the RL
Perfluorobutanesulfonic acid (PFBS)	7.15	8.50	17.3
Perfluorohexanesulfonic acid (PFHxS)	1.96	2.31	16.4
Perfluoroheptanesulfonic Acid (PFHpS)	1.80 U	0.78 J	NC, Within the RL
Perfluorooctanesulfonic acid (PFOS)	3.39	3.92	14.5
6:2 FTS	2.08 J	2.07 J	0.5
NC – Not calculable Criteria: When both results are $\geq 5x$ the RL, RPDs must be $< 30\%$. When results are $< 5x$ the QL, the absolute difference between the original and field duplicate results must be $< RL$			

Quantitation Limits

Results were reported which were below the reporting limit (RL)/quantitation limit (QL) and above the method detection limit (MDL). These results were qualified as estimated (J) by the laboratory.

Dilutions were not required.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

- U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.
- J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified “J” data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The ‘J’ data may be biased high or low or the direction of the bias may be indeterminable.
- UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified “UJ” data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The ‘UJ’ data may be biased low.
- JN - The analysis indicates the presence of a compound that has been “tentatively identified” (N) and the associated numerical value represents its approximate (J) concentration.
- R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Client Sample Results

nt: GEI Consultants, Inc.
Project/Site: Wythe-PFAS-1803556-1.13

TestAmerica Job ID: 460-166275-1

Client Sample ID: WA-MW-04

Date Collected: 10/03/18 09:30

Date Received: 10/04/18 19:20

Lab Sample ID: 460-166275-1

Matrix: Water

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.55	J	0.21	0.017	ug/L		10/08/18 18:48	10/09/18 11:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	50		10 - 150				10/08/18 18:48	10/09/18 11:08	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	46.8	J	1.80	0.37	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluoropentanoic acid (PFPeA)	21.8		1.80	0.68	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluorohexanoic acid (PFHxA)	17.2		1.80	0.22	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluoroheptanoic acid (PFHpA)	15.9		1.80	0.29	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluorooctanoic acid (PFOA)	65.9		1.80	0.29	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluorononanoic acid (PFNA)	1.24	J	1.80	0.34	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluorodecanoic acid (PFDA)	1.80	U	1.80	0.34	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluoroundecanoic acid (PFUnA)	0.37	J	1.80	0.23	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluorododecanoic acid (PFDoA)	1.80	U	1.80	0.32	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluorotridecanoic acid (PFTriA)	1.80	U	1.80	0.22	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluorotetradecanoic acid (PFTeA)	1.80	U	1.80	0.41	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluorobutanesulfonic acid (PFBS)	7.15		1.80	0.40	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluorohexanesulfonic acid (PFHxS)	1.96		1.80	0.23	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.80	U	1.80	0.74	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluorooctanesulfonic acid (PFOS)	3.39		1.80	0.68	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluorodecanesulfonic acid (PFDS)	1.80	U	1.80	0.48	ng/L		10/11/18 09:45	10/16/18 07:49	1
Perfluorooctanesulfonamide (FOSA)	1.80	U	1.80	0.50	ng/L		10/11/18 09:45	10/16/18 07:49	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	18.0	U	18.0	0.41	ng/L		10/11/18 09:45	10/16/18 07:49	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	18.0	U	18.0	0.63	ng/L		10/11/18 09:45	10/16/18 07:49	1
6:2 FTS	2.08	J	18.0	0.90	ng/L		10/11/18 09:45	10/16/18 07:49	1
8:2 FTS	18.0	U	18.0	0.50	ng/L		10/11/18 09:45	10/16/18 07:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	22	*	25 - 150				10/11/18 09:45	10/16/18 07:49	1
13C5-PFPeA DNU	51		25 - 150				10/11/18 09:45	10/16/18 07:49	1
13C2 PFHxA	68		25 - 150				10/11/18 09:45	10/16/18 07:49	1
13C4 PFHpA	75		25 - 150				10/11/18 09:45	10/16/18 07:49	1
13C4 PFOA	98		25 - 150				10/11/18 09:45	10/16/18 07:49	1
13C5 PFNA	126		25 - 150				10/11/18 09:45	10/16/18 07:49	1
13C2 PFDA	122		25 - 150				10/11/18 09:45	10/16/18 07:49	1
13C2 PFUnA	126		25 - 150				10/11/18 09:45	10/16/18 07:49	1
13C2 PFDoA	144		25 - 150				10/11/18 09:45	10/16/18 07:49	1
13C2 PFTeDA	130		25 - 150				10/11/18 09:45	10/16/18 07:49	1
13C3 PFBS	80		25 - 150				10/11/18 09:45	10/16/18 07:49	1
18O2 PFHxS	107		25 - 150				10/11/18 09:45	10/16/18 07:49	1
13C4 PFOS	132		25 - 150				10/11/18 09:45	10/16/18 07:49	1
13C8 FOSA	83		25 - 150				10/11/18 09:45	10/16/18 07:49	1
d3-NMeFOSAA	98		25 - 150				10/11/18 09:45	10/16/18 07:49	1
d5-NEtFOSAA	113		25 - 150				10/11/18 09:45	10/16/18 07:49	1

TestAmerica Edison

dam
11/5/18

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Wythe-PFAS-1803556-1.13

TestAmerica Job ID: 460-166275-1

Client Sample ID: WA-MW-04

Lab Sample ID: 460-166275-1

Date Collected: 10/03/18 09:30

Matrix: Water

Date Received: 10/04/18 19:20

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-6:2 FTS	462	*	25 - 150	10/11/18 09:45	10/16/18 07:49	1
M2-8:2 FTS	201	*	25 - 150	10/11/18 09:45	10/16/18 07:49	1

Client Sample ID: WA-MW-01

Lab Sample ID: 460-166275-2

Date Collected: 10/03/18 10:30

Matrix: Water

Date Received: 10/04/18 19:20

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.21	U	0.21	0.017	ug/L		10/08/18 18:48	10/09/18 11:26	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	46		10 - 150				10/08/18 18:48	10/09/18 11:26	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	177	J -	1.77	0.36	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluoropentanoic acid (PFPeA)	149		1.77	0.66	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluorohexanoic acid (PFHxA)	272		1.77	0.21	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluoroheptanoic acid (PFHpA)	30.6		1.77	0.28	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluorooctanoic acid (PFOA)	23.1		1.77	0.28	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluorononanoic acid (PFNA)	2.68		1.77	0.34	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluorodecanoic acid (PFDA)	1.77	U	1.77	0.34	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluoroundecanoic acid (PFUnA)	0.22	J -	1.77	0.22	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluorododecanoic acid (PFDoA)	1.77	U	1.77	0.31	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluorotridecanoic acid (PFTriA)	1.77	U	1.77	0.21	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluorotetradecanoic acid (PFTeA)	1.77	U	1.77	0.40	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluorobutanesulfonic acid (PFBS)	7.11		1.77	0.39	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluorohexanesulfonic acid (PFHxS)	0.58	J -	1.77	0.23	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.77	U	1.77	0.72	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluorooctanesulfonic acid (PFOS)	15.4		1.77	0.67	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluorodecanesulfonic acid (PFDS)	1.77	U	1.77	0.47	ng/L		10/11/18 09:45	10/16/18 08:36	1
Perfluorooctanesulfonamide (FOSA)	1.77	U	1.77	0.49	ng/L		10/11/18 09:45	10/16/18 08:36	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.7	U	17.7	0.40	ng/L		10/11/18 09:45	10/16/18 08:36	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.7	U	17.7	0.62	ng/L		10/11/18 09:45	10/16/18 08:36	1
6:2 FTS	1.08	J -	17.7	0.88	ng/L		10/11/18 09:45	10/16/18 08:36	1
8:2 FTS	17.7	U	17.7	0.49	ng/L		10/11/18 09:45	10/16/18 08:36	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	16	*	25 - 150				10/11/18 09:45	10/16/18 08:36	1
13C5-PFPeA DNU	38		25 - 150				10/11/18 09:45	10/16/18 08:36	1
13C2 PFHxA	45		25 - 150				10/11/18 09:45	10/16/18 08:36	1
13C4 PFHpA	62		25 - 150				10/11/18 09:45	10/16/18 08:36	1
13C4 PFOA	93		25 - 150				10/11/18 09:45	10/16/18 08:36	1
13C5 PFNA	124		25 - 150				10/11/18 09:45	10/16/18 08:36	1
13C2 PFDA	135		25 - 150				10/11/18 09:45	10/16/18 08:36	1

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Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Wythe-PFAS-1803556-1.13

TestAmerica Job ID: 460-166275-1

Client Sample ID: WA-MW-01

Lab Sample ID: 460-166275-2

Date Collected: 10/03/18 10:30

Matrix: Water

Date Received: 10/04/18 19:20

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	158	*	25 - 150	10/11/18 09:45	10/16/18 08:36	1
13C2 PFDoA	158	*	25 - 150	10/11/18 09:45	10/16/18 08:36	1
13C2 PFTeDA	169	*	25 - 150	10/11/18 09:45	10/16/18 08:36	1
13C3 PFBS	89		25 - 150	10/11/18 09:45	10/16/18 08:36	1
18O2 PFHxS	102		25 - 150	10/11/18 09:45	10/16/18 08:36	1
13C4 PFOS	126		25 - 150	10/11/18 09:45	10/16/18 08:36	1
13C8 FOSA	95		25 - 150	10/11/18 09:45	10/16/18 08:36	1
d3-NMeFOSAA	137		25 - 150	10/11/18 09:45	10/16/18 08:36	1
d5-NEtFOSAA	155	*	25 - 150	10/11/18 09:45	10/16/18 08:36	1
M2-6:2 FTS	538	*	25 - 150	10/11/18 09:45	10/16/18 08:36	1
M2-8:2 FTS	336	*	25 - 150	10/11/18 09:45	10/16/18 08:36	1

Client Sample ID: DUP-100318-1

Lab Sample ID: 460-166275-3

Date Collected: 10/03/18 00:00

Matrix: Water

Date Received: 10/04/18 19:20

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.55	J	0.21	0.017	ug/L		10/08/18 18:48	10/09/18 11:43	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	46		10 - 150				10/08/18 18:48	10/09/18 11:43	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	56.9	J	1.77	0.36	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluoropentanoic acid (PFPeA)	19.1		1.77	0.66	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluorohexanoic acid (PFHxA)	19.0		1.77	0.21	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluoroheptanoic acid (PFHpA)	18.5		1.77	0.28	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluorooctanoic acid (PFOA)	69.8		1.77	0.28	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluorononanoic acid (PFNA)	1.61	J	1.77	0.34	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluorodecanoic acid (PFDA)	1.77	U	1.77	0.34	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluoroundecanoic acid (PFUnA)	1.77	U	1.77	0.22	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluorododecanoic acid (PFDoA)	1.77	U	1.77	0.31	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluorotridecanoic acid (PFTriA)	1.77	U	1.77	0.21	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluorotetradecanoic acid (PFTeA)	1.77	U	1.77	0.40	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluorobutanesulfonic acid (PFBS)	8.50		1.77	0.39	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluorohexanesulfonic acid (PFHxS)	2.31		1.77	0.23	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluoroheptanesulfonic Acid (PFHpS)	0.78	J	1.77	0.72	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluorooctanesulfonic acid (PFOS)	3.92		1.77	0.67	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluorodecanesulfonic acid (PFDS)	1.77	U	1.77	0.47	ng/L		10/11/18 09:45	10/16/18 08:52	1
Perfluorooctanesulfonamide (FOSA)	1.77	U	1.77	0.49	ng/L		10/11/18 09:45	10/16/18 08:52	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.7	U	17.7	0.40	ng/L		10/11/18 09:45	10/16/18 08:52	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.7	U	17.7	0.62	ng/L		10/11/18 09:45	10/16/18 08:52	1
6:2 FTS	2.07	J	17.7	0.88	ng/L		10/11/18 09:45	10/16/18 08:52	1
8:2 FTS	17.7	U	17.7	0.49	ng/L		10/11/18 09:45	10/16/18 08:52	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Wythe-PFAS-1803556-1.13

TestAmerica Job ID: 460-166275-1

Client Sample ID: DUP-100318-1

Lab Sample ID: 460-166275-3

Date Collected: 10/03/18 00:00

Matrix: Water

Date Received: 10/04/18 19:20

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	19	*	25 - 150	10/11/18 09:45	10/16/18 08:52	1
13C5-PFPeA DNU	54		25 - 150	10/11/18 09:45	10/16/18 08:52	1
13C2 PFHxA	59		25 - 150	10/11/18 09:45	10/16/18 08:52	1
13C4 PFHpA	67		25 - 150	10/11/18 09:45	10/16/18 08:52	1
13C4 PFOA	93		25 - 150	10/11/18 09:45	10/16/18 08:52	1
13C5 PFNA	118		25 - 150	10/11/18 09:45	10/16/18 08:52	1
13C2 PFDA	107		25 - 150	10/11/18 09:45	10/16/18 08:52	1
13C2 PFUnA	119		25 - 150	10/11/18 09:45	10/16/18 08:52	1
13C2 PFDoA	132		25 - 150	10/11/18 09:45	10/16/18 08:52	1
13C2 PFTeDA	116		25 - 150	10/11/18 09:45	10/16/18 08:52	1
13C3 PFBS	65		25 - 150	10/11/18 09:45	10/16/18 08:52	1
18O2 PFHxS	93		25 - 150	10/11/18 09:45	10/16/18 08:52	1
13C4 PFOS	121		25 - 150	10/11/18 09:45	10/16/18 08:52	1
13C8 FOSA	73		25 - 150	10/11/18 09:45	10/16/18 08:52	1
d3-NMeFOSAA	94		25 - 150	10/11/18 09:45	10/16/18 08:52	1
d5-NEtFOSAA	102		25 - 150	10/11/18 09:45	10/16/18 08:52	1
M2-6:2 FTS	421	*	25 - 150	10/11/18 09:45	10/16/18 08:52	1
M2-8:2 FTS	185	*	25 - 150	10/11/18 09:45	10/16/18 08:52	1

Client Sample ID: FB-100318-1

Lab Sample ID: 460-166275-4

Date Collected: 10/03/18 08:50

Matrix: Water

Date Received: 10/04/18 19:20

Method: 8270D SIM ID - Semivolatile Organic Compounds (GC/MS SIM / Isotope Dilution)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.11	J	0.21	0.017	ug/L		10/08/18 18:48	10/09/18 12:00	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,4-Dioxane-d8	45		10 - 150				10/08/18 18:48	10/09/18 12:00	1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.70	U	1.70	0.35	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluoropentanoic acid (PFPeA)	1.70	U	1.70	0.64	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluorohexanoic acid (PFHxA)	1.70	U	1.70	0.20	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluoroheptanoic acid (PFHpA)	1.70	U	1.70	0.27	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluorooctanoic acid (PFOA)	1.70	U	1.70	0.27	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluorononanoic acid (PFNA)	1.70	U	1.70	0.32	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluorodecanoic acid (PFDA)	1.70	U	1.70	0.32	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluoroundecanoic acid (PFUnA)	1.70	U	1.70	0.21	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluorododecanoic acid (PFDoA)	1.70	U	1.70	0.30	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluorotridecanoic acid (PFTriA)	1.70	U	1.70	0.20	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluorotetradecanoic acid (PFTeA)	1.70	U	1.70	0.38	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluorobutanesulfonic acid (PFBS)	1.70	U	1.70	0.37	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluorohexanesulfonic acid (PFHxS)	1.70	U	1.70	0.22	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.70	U	1.70	0.70	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluorooctanesulfonic acid (PFOS)	1.70	U	1.70	0.65	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluorodecanesulfonic acid (PFDS)	1.70	U	1.70	0.45	ng/L		10/11/18 09:45	10/16/18 09:08	1
Perfluorooctanesulfonamide (FOSA)	1.70	U	1.70	0.48	ng/L		10/11/18 09:45	10/16/18 09:08	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	17.0	U	17.0	0.38	ng/L		10/11/18 09:45	10/16/18 09:08	1

TestAmerica Edison

Client Sample Results

Client: GEI Consultants, Inc.
Project/Site: Wythe-PFAS-1803556-1.13

TestAmerica Job ID: 460-166275-1

Client Sample ID: FB-100318-1

Lab Sample ID: 460-166275-4

Date Collected: 10/03/18 08:50

Matrix: Water

Date Received: 10/04/18 19:20

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	17.0	U	17.0	0.60	ng/L		10/11/18 09:45	10/16/18 09:08	1
6:2 FTS	17.0	U	17.0	0.85	ng/L		10/11/18 09:45	10/16/18 09:08	1
8:2 FTS	17.0	U	17.0	0.48	ng/L		10/11/18 09:45	10/16/18 09:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	78		25 - 150				10/11/18 09:45	10/16/18 09:08	1
13C5-PFPeA DNU	130		25 - 150				10/11/18 09:45	10/16/18 09:08	1
13C2 PFHxA	117		25 - 150				10/11/18 09:45	10/16/18 09:08	1
13C4 PFHpA	90		25 - 150				10/11/18 09:45	10/16/18 09:08	1
13C4 PFOA	101		25 - 150				10/11/18 09:45	10/16/18 09:08	1
13C5 PFNA	102		25 - 150				10/11/18 09:45	10/16/18 09:08	1
13C2 PFDA	96		25 - 150				10/11/18 09:45	10/16/18 09:08	1
13C2 PFUnA	104		25 - 150				10/11/18 09:45	10/16/18 09:08	1
13C2 PFDoA	105		25 - 150				10/11/18 09:45	10/16/18 09:08	1
13C2 PFTeDA	101		25 - 150				10/11/18 09:45	10/16/18 09:08	1
13C3 PFBS	107		25 - 150				10/11/18 09:45	10/16/18 09:08	1
18O2 PFHxS	95		25 - 150				10/11/18 09:45	10/16/18 09:08	1
13C4 PFOS	105		25 - 150				10/11/18 09:45	10/16/18 09:08	1
13C8 FOSA	68		25 - 150				10/11/18 09:45	10/16/18 09:08	1
d3-NMeFOSAA	85		25 - 150				10/11/18 09:45	10/16/18 09:08	1
d5-NEtFOSAA	88		25 - 150				10/11/18 09:45	10/16/18 09:08	1
M2-6:2 FTS	237 *		25 - 150				10/11/18 09:45	10/16/18 09:08	1
M2-8:2 FTS	104		25 - 150				10/11/18 09:45	10/16/18 09:08	1

TestAmerica Edison

TestAmerica

THE LEADER IN THE ENVIRONMENTAL FIELD

[illegible]

2.51 2.5 2.7/2.7 IN#9

Ver: 08/04/2016

10/18/2018

460-166275 Chain of Custody

September 4, 2018

Mr. George W. Heitzman
Assistant Director
Division of Environmental Remediation
625 Broadway, 11th Floor
Albany, NY 12233-7010

**RE: Emerging Contaminant Groundwater Sampling Work Plan
National Grid Downstate and Upstate New York MGP Sites**

Dear Mr. Heitzman:

GEI Consultants, Inc., P.C. (GEI) prepared this Emerging Contaminant Groundwater Sampling Work Plan (Work Plan) on behalf of National Grid for their downstate and upstate former Manufactured Gas Plant (MGP) sites as required by the New York State Department of Environmental Conservation (NYSDEC) in letters dated May 30, 2018. This workplan has been revised based on NYSDEC comments provided in a letter dated August 20, 2018. Upstate New York Sites that were listed as missing in the August 20, 2018 letter will be submitted under a separate cover and reference this work plan.

This Work Plan provides the means and methods for sampling groundwater and analyzing for 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS) and reporting in accordance with the requirements provided in the NYSDEC May 30, 2018 letters. The rationale for selecting monitoring wells for sampling, the location of the wells proposed for sampling at each of the sites and the sampling schedule are also provided.

1.0 Introduction

PFAS and 1,4-dioxane have historically not been evaluated at remediation sites. This sampling initiative is being undertaken as a result of these “emerging contaminants” having been found in a number of drinking water supplies in New York. Accordingly, the NYSDEC is requiring that site groundwater is tested for these chemicals. An overview of emerging contaminants is provided in Section 2 and the scope of work is provided in Section 3.

2.0 Overview

PFAS are emerging contaminants that have recently become a target of concern for NYSDEC and other regulatory agencies due to their ubiquitous presence in the environment, persistence, and bio accumulative properties. PFAS are a large group of highly soluble man-made chemicals that have been widely used since the 1940s to make fluoropolymer coatings and everyday products more resistant to stains, grease, heat, and water (EPA, 2018a and 2018b). Fluoropolymer coatings are blends of resins and lubricants used in products such as water-repellent clothing, furniture, adhesives, paint and varnish, food packaging, heat-resistant

non-stick cooking surfaces and insulation of electrical wires (NYSDEC, 2018). Although the use of perfluorooctanoic acid (PFOA) is being phased out, the chemical is still used to make household and commercial products that resist heat and repel stains. Perfluorooctane sulfonic acid (PFOS) is used in fire-fighting foam and is a newly listed hazardous substance (as is PFOA). Since PFAS were not manufactured prior to the 1940s, it is unlikely that these chemicals were used at MGP sites.

PFAS are highly soluble, stable, and have low volatility. They are dispersed by air emissions into the atmosphere or deposited directly to surface water or the land surface. PFAS present in unsaturated soils leach downward through the subsurface with precipitation and are transported via groundwater flow.

1,4-Dioxane is used primarily as a solvent in paints, varnishes, lacquers, cosmetics, deodorants, cleaning and detergent preparations, and in scintillating fluids. 1,4-Dioxane often has been used with chlorinated solvents, particularly 1,1,1-trichloroethane (TCA), as a stabilizer and corrosion inhibitor (EPA, 2018c). Commercial production of 1,4-dioxane in the United States was first reported in 1951 (NCI, 1985). Since 1,4-dioxane was not manufactured prior to 1951, it is unlikely that this chemical was used at MGP sites.

3.0 Scope of Work

This Work Plan provides the sample location selection, sample collection, and reporting procedures. Activities performed under this work plan will follow the:

- Quality Assurance Project Plan (QAPP) – Attachment A, and
- Field Sampling Plan (FSP) – Attachment B.

3.1 Sample Locations

As described in Section 2, if present, emerging contaminants will be dissolved and traveling with groundwater. A review of groundwater conditions at each site has been completed and monitoring wells representative of groundwater at each site have been selected for sampling using the following rationale:

- One or two upgradient wells located closest to the upgradient site boundary;
- One or two on-site wells in a central location in an area of lowest MGP site impacts;
- One or two downgradient well located closest to the downgradient site boundary;
- No monitoring wells will be sampled in areas of the site that contain MGP source material due to the low detection limits required for the emerging contaminant analysis and the emerging contaminants are not associated with MGP impacts; and
- Wells screened across the shallow or intermediate aquifer zones because priority is given to wells screened across zones of low MGP impacts and hydraulically representative of site conditions based on groundwater flow gradients.

Tables and figures identifying the wells selected for sampling at each site are provided in Attachment C for the downstate sites and Attachment D for the upstate sites.

3.2 Waiver Request

The May 30, 2018 NYSDEC letter provides guidance for when sampling for emerging contaminants may be waived. Language from the guidance document is as follows:

If sampling is not feasible (e.g., the site no longer has any monitoring wells in place), sampling may be waived on a site-specific basis after first considering potential sources of these chemicals and whether there are water supplies nearby.

While assessing the rationale at each site for sampling it was determined that six downstate sites qualify for a sampling waiver because they do not have permanent monitoring wells and therefore, groundwater sampling is not feasible:

- Belmont Station
- Brooklyn Gas Light
- Dangman Park
- Front St. Station
- Plymouth Station
- Scholes St. Station

Furthermore, these sites are not near public water supplies. Therefore, these sites will not be included in the sampling work plan. Waivers for these six sites were approved in the August 20, 2018 letter.

3.3 Sample Collection

Groundwater samples will be collected from selected wells at each of the MGP sites using low flow methods according to the FSP (Attachment B). A peristaltic pump will be used with high density polyethylene (HDPE) and silicone tubing to collect each groundwater sample. If the depth to water is deeper than can be sampled with a peristaltic pump, an inertial pump will be used. Sampling equipment components and sample containers will 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. Each groundwater sample will be placed in laboratory-provided, pre-cleaned 500-ml HDPE or polypropylene bottles for PFAS and 500-ml amber glass bottles for 1,4-dioxane.

Equipment will be decontaminated using detergent and a clean water rinse. All clothing worn by sampling personnel must have been laundered multiple times and must not contain waterproofed material. The sampler must wear nitrile gloves while filling and sealing the sample bottles. Pre-cleaned sample bottles with closures, coolers, ice, sample labels and a chain of custody form will be provided by the laboratory. No waterproof notebooks, food, drinks, or plumbers thread seal tape will be used during sample collection.

3.4 Laboratory Procedures

Each groundwater sample will be analyzed for the full PFAS Target Analyte List provided in the NYSDEC May 30, 2018 letter by Modified United States Environmental Protection Agency (EPA) Method 537 and 1,4-dioxane by EPA Method SIM 8270D. As required by NYSDEC, the

reporting limit for PFAS will not exceed 2 ng/l (ppt) and the method detection limit (MDL) for 1,4-dioxane will not exceed 0.35 µg/l (ppb).

QA/QC samples will include one blind duplicate sample, one matrix spike/matrix spike duplicate (MS/MSD) sample, and one equipment blank sample at each site per 20 samples collected. At a minimum, one equipment blank sample will be collected each day at each site.

The samples will be analyzed by a NYSDOH environmental lab approval program (ELAP) laboratory certified for PFOA and PFOS in drinking water by EPA Method 537 selected from the list presented in the NYSDEC May 30, 2018 letter. Analytical results will be provided in a full New York State Category B data deliverable format. The data will be validated in accordance with New York State Analytical Service Protocols, and a data usability summary report (DUSR) will be prepared documenting the adequacy of the analytical data obtained from the laboratory and discussing any quality control non-compliance issues or limitations on the use of the data.

3.5 Waste Management

Investigation derived waste (IDW) generated during the field program will be disposed of by National Grid. Liquids will be temporarily stored on site in new New York State Department of Transportation (NYSDOT)-approved 55-gallon steel drums. Solid IDW will be segregated in trash bags and stored in NYSDOT-approved 55-gallon sealed steel drums. IDW will be removed from each site following sampling activities. National Grid will be the listed generator of the waste.

3.6 Data Interpretation and Reporting

National Grid will submit the emerging contaminant data to NYSDEC within 90 days of completing the sampling. The following information will be provided:

- Description of groundwater sampling activities;
- A figure showing water supply wells within a ½ mile radius;
- A figure showing the general groundwater flow direction;
- Validated analytical data compared to screening levels provided in the August 20, 2018 letter;
- Category B laboratory reports;
- DUSRs; and
- Observations and interpretation of the analytical results.

National Grid will also submit electronic data as described at:
<https://www.dec.ny.gov/chemical/62440.html>.

3.7 Schedule

Sampling will be conducted following NYSDEC approval of the work plan. The schedule for each site will depend on property access.

Mr. George W. Heitzman
New York State Department of Environmental Protection
September 4, 2018
Page 5

If you have any questions or comments, please contact me at (516) 545-2586.

Sincerely,



Kathleen F. Slimon, P.E. for:

William J. Ryan
Manager – DNY MGP Program

cc: B. Stearns, National Grid
T. Leissing, National Grid

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References

EPA 2018a Contaminated Site Clean-Up Information, Per- and Polyfluoroalkyl Substances (PFASs) retrieved from [https://clu-in.org/contaminantfocus/default.focus/sec/Per-and_Polyfluoroalkyl_Substances_\(PFASs\)/cat/Overview/](https://clu-in.org/contaminantfocus/default.focus/sec/Per-and_Polyfluoroalkyl_Substances_(PFASs)/cat/Overview/)

EPA 2018b Research on Per- and Polyfluoroalkyl Substances (PFAS) retrieved from <https://www.epa.gov/chemical-research/research-and-polyfluoroalkyl-substances-pfas>

EPA 2018c Contaminated Site Clean-Up Information, 1,4-Dioxane retrieved from <https://clu-in.org/contaminantfocus/default.focus/sec/1,4-Dioxane/cat/Overview/>

NYSDEC 2018 Per- and Polyfluoroalkyl Substances (PFAS) retrieved from <https://www.dec.ny.gov/chemical/108831.html>

NCI. 1985. Monograph on Human Exposure to Chemicals in the Workplace: 1,4-Dioxane. Technical Report No. 86-131414. Bethesda, MD: Department of Health and Human Services. 31 pp

ATTACHMENT A

Quality Assurance Project Plan



Consulting
Engineers and
Scientists

Quality Assurance Project Plan Emerging Contaminant Sampling

Manufactured Gas Plant Sites
New York

Prepared For:

National Grid
175 Old Country Road
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And

National Grid
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Submitted by:

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September 2018
Project 1802728

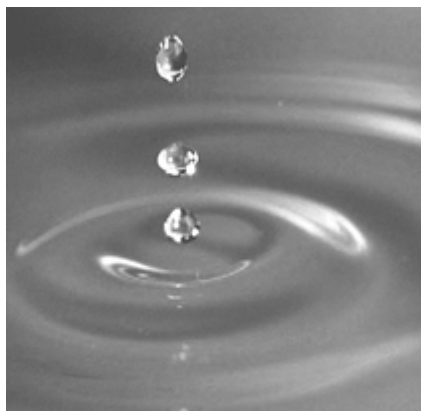


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Abbreviations and Acronyms

%R	Percent Recovery
ASP	Analytical Service Protocol
CAS	Chemical Abstract Service
CLP	Contract Laboratory Protocol
COC	Chain Of Custody
DQO	Data Quality Objective
DO	Dissolved Oxygen
DUSR	Data Usability Summary Report
ELAP	Environmental Laboratory Approval Program
EPA	United States Environmental Protection Agency
FSP	Field Sampling Plan
GC/MS	Gas Chromatography/Mass Spectroscopy
GEI	GEI Consultants, Inc., P.C.
LCS	Laboratory Control Sample
MDL	Method Detection Limit
MGP	Manufactured Gas Plant
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NAPL	Non-Aqueous Phase Liquids
NYSDEC	New York State Department of Environmental Conservation
PAH	Polycyclic Aromatic Hydrocarbon
PFAS	Per- and polyfluoroalkyl substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PM	Project Manager
PQL	Practical Quantification Limit
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RL	Reporting Limit
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SD	Standard Deviation
SOP	Standard Operating Procedures
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
TIC	Tentatively Identified Compounds
USDOT	United States Department of Transportation
VOC	Volatile Organic Compound

MEASUREMENTS

µg /L	micrograms per liter
µg /m ³	micrograms per cubic meter

Quality Assurance Glossary

“Alteration” means altering a sample collected for analysis in any way other than by adding a preservative, such as nitric acid to lower pH. Examples of alteration include, but are not limited to: filtering, settling and decanting, centrifuging and decanting and acid extracting.

“Analytical Services Protocol” or “ASP” means the New York State Department of Environmental Conservation (NYSDEC’s) compendium of approved United States Environmental Protection Agency (EPA) and NYSDEC laboratory methods for sample preparation and analysis and data handling procedures.

“Correlation Sample” means a sample taken, when using a field-testing technology, to be analyzed by an ELAP-certified laboratory to determine the correlation between the laboratory and field analytical results.

“Confirmatory Sample” means a sample taken after remedial action is expected to be complete to verify that the cleanup requirements have been met. This term has the same meaning as “post remediation sample.”

“Contract laboratory program” or “CLP” means a program of chemical analytical services developed by the EPA to support CERCLA.

“Data Usability Summary Report, (DUSR)” is a document that provides a thorough evaluation of the analytical data to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and use.

“Effective solubility” means the theoretical aqueous solubility of an organic constituent in groundwater that is in chemical equilibrium with a separate phase mixed product (product containing several organic chemicals). The effective solubility of a particular organic chemical can be estimated by multiplying its mole fraction in the product mixture by its pure phase solubility.

“Environmental Laboratory Accreditation Program” or “ELAP” means a program conducted by the New York State Department of Health, which certifies environmental laboratories through on-site inspections and evaluation of principles of credentials and proficiency testing.

“Filtration” means the filtering of a groundwater or surface water sample, collected for metals analysis, at the time of collection and prior to preservation. Filtering includes, but is

not limited to, the use of any membrane, fabric, paper or other filter medium, irrespective of pore size, to remove particulates from suspension.

“Final delineation sample” means a sample taken as an endpoint sample, used to make a decision regarding the extent of contamination at a site, which is to be analyzed by an ELAP-certified laboratory.

“Intermediate Sample” means a sample taken during the investigation process that will be followed by another sampling event to confirm that remediation was successful or to confirm that the extent of contamination has been defined to below a level of concern.

“Method detection limit” or “MDL” means the minimum concentration of a substance that can be measured and reported with a 99-percent confidence that the analyte concentration is greater than zero and is determined from the analysis of a sample in a given matrix containing the analyte.

“Minimum reporting limit” means the lowest concentration at which an analyte can be detected and which can be reported with a reasonable degree of accuracy. It is the lowest concentration that can be measured, a lab-specific number, developed from minimum detection limits, and is also referred to as the practical quantitation limit (PQL).

“Non-targeted compound” means a compound detected in a sample using a specific analytical method that is not a targeted compound, a surrogate compound, a system monitoring compound or an internal standard compound.

“Nephelometric Turbidity Unit” or “NTU” is the unit by which turbidity in a sample is measured.

“Practical quantitation level” or “PQL” means the lowest quantitation level of a given analyte that can be reliably achieved among laboratories within the specified limits of precision and accuracy of a given analytical method during routine laboratory operating conditions.

“Preservation” means preventing the degradation of a sample due to precipitation, biological action, or other physical/chemical processes between the time of sample collection and analysis. The most common examples involve refrigeration at 4 degrees Celsius and lowering sample pH by the addition of acid to keep dissolved metals in solution or to reduce the biodegradation of dissolved organic analytes.

“PAH” means polycyclic aromatic hydrocarbon as defined by EPA Method 8270.

“Quality assurance” or “QA” means the total integrated program for assuring the reliability of monitoring and measurement data, which includes a system for integrating the quality planning, quality assessment and quality improvement efforts to meet data end-use requirements.

“Quality assurance project plan” or “QAPP” means a document, which presents in specific terms the policies, organization, objectives, functional activities, and specific quality assurance/quality control activities designed to achieve the data quality goals or objectives of a specific project or operation.

“Quality control” or “QC” means the routine application of procedures for attaining prescribed standards of performance in the monitoring and measurement process.

“Semivolatile organic compound” or “SVOC” means compounds amenable to analysis by extraction of the sample with an organic solvent. For the purposes of this section, semivolatiles are those target compound list compounds identified in the statement of work in the current version of the 2005 ASP.

“Target analyte list” or “TAL” means the list of inorganic compounds/elements designated for analysis as contained in the version of the EPA Contract Laboratory Program Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration in effect as of the date on which the laboratory is performing the analysis. For the purpose of this chapter, a Target Analyte List scan means the analysis of a sample for Target Analyte List compounds/elements.

“Targeted compound” means a hazardous substance, hazardous waste, or pollutant for which a specific analytical method is designed to detect that potential contaminant both qualitatively and quantitatively.

“Target compound list plus 30” or “TCL+30” means the list of organic compounds designated for analysis (TCL) as contained in the version of the EPA “Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration” in effect as of the date on which the laboratory is performing the analysis, and up to 30 non-targeted organic compounds (plus 30) as detected by gas chromatography/mass spectroscopy (GC/MS) analysis. For the purposes of this chapter, a TCL+30 scan means the analysis of a sample for TCL compounds and up to 10 non-targeted volatile organic compounds and up to 20 non-targeted SVOCs using GC/MS analytical methods. Non-targeted compound criteria should be pursuant to the version of the EPA “Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration” in effect as of the date on which the laboratory is performing the analysis.

“Tentatively identified compound or TIC” means a chemical compound that is not on the target compound list but is detected in a sample analyzed by a GC/MS analytical method. TICs are only possible with methods using mass spectrometry as the detection technique. The compound is tentatively identified using a mass spectral instrumental electronic library search and the concentration of the compound estimated.

“Unknown compound” means a non-targeted compound which cannot be tentatively identified. Based on the analytical method used, the estimated concentration of the unknown compound may or may not be determined.

“Volatile organics” or “VOC” means organic compounds amenable to analysis by the purge and trap technique. For the purposes of this chapter, analysis of VOCs means the analysis of a sample for either those priority pollutants listed as amenable for analysis using EPA method 8260B or those target compounds identified as volatiles in the version of the EPA “Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration” in effect as of the date on which the laboratory is performing the analysis.

“Waste oil” means used and/or reprocessed engine lubricating oil and/or any other used oil, including but not limited to: fuel oil, engine oil, gear oil, cutting oil, transmission fluid, oil storage tank residue, animal oil, and vegetable oil, which has not subsequently been refined.

“Well development” means the application of energy to a newly installed well to establish a good hydraulic connection between the well and the surrounding formation. During development, fine-grained formation material that may have infiltrated the sand pack and/or well during installation is removed, allowing water from the formation to enter the well without becoming turbid and unrepresentative of groundwater in the formation.

1. Purpose

GEI Consultants, Inc., P.C. (GEI) has prepared this Quality Assurance Project Plan (QAPP) to address sampling for emerging contaminants at National Grid's manufactured gas plant (MGP) sites. The QAPP is a companion document to the *Emerging Contaminant Sampling Work Plan* dated September 2018 (Work Plan). The QAPP presents the project scope and goals, organization, objectives, sample handling procedures and quality assurance/quality control (QA/QC) procedures.

Furthermore, this QAPP identifies project responsibilities, prescribes guidance and specifications to make certain that:

- Samples are identified and controlled through sample tracking systems and chain-of-custody (COC) protocols
- Field and laboratory analytical results are valid and usable by adherence to established protocols and procedures
- Laboratory data are validated, as necessary, so they can be applied to developing a conceptual understanding of the nature and extent of contamination of groundwater
- All aspects of investigation, from field to laboratory, are documented to provide data that are technically sound and legally defensible

The requirements of this QAPP apply to all contractor activities as appropriate for their respective tasks.

This QAPP was prepared based upon guidance provided by the United States Environmental Protection Agency (EPA) and New York State Department of Environmental Conservation (NYSDEC) including:

- *DER-10, Technical Guidance for Site Investigation and Remediation*. NYSDEC. May 3, 2010;
- *Analytical Service Protocol*, NYSDEC. July 2005;
- *US EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations (EPA QA/R-5, March 2001); and*
- *Guidance for Quality Assurance Project Plans (EPA QA/G-5, December 2002).*

2. Project Goals and Objectives

Per- and polyfluoroalkyl substances (PFAS) have historically not been evaluated at remediation sites, and 1,4-dioxane has not been evaluated at the levels that are now thought to represent a health concern. This initiative is being undertaken as a result of these “emerging contaminants” having been found in a number of drinking water supplies in New York. Accordingly, the NYSDEC is requiring that site groundwater is tested for these chemicals.

3. Project Organization and Responsibility

The consultant is responsible for the implementation of the scope of work, and associated performance monitoring tasks including the supervision of contractors, field activities, and the evaluation and interpretation of data. The consultant will perform the sampling activities and coordinate submittal of samples to testing laboratories.

The primary responsibilities of each of these personnel are described in the following table.

Key Project Personnel and Responsibilities	
Position	Areas of Responsibilities
In-House Consultant	• Provide strategic guidance of project activities • Client contact regarding strategic issues • Review of project deliverables
Program Manager	• Overall program oversight • Project management • Project schedule • Client contact regarding project-related issues • Personnel and resource management • Review of project submittals • Budgeting
Project Manager	• Client contact regarding project related issues • Coordination of contractors • Technical development and implementation of Work Plan and Field Sampling Plan • Personnel and resource management • Preparation and review of project submittals • Preparation of project submittals • Budgeting
Field Team Leader	• Client contact regarding project related issues on day to day basis as part of field operations • Coordination of contractors • Implementation of Site Management Plan, Work Plan and Field Sampling Plan • Personnel and resource management • Preparation of project submittals
Data Validators	• Perform data validation activities • Prepare data usability summary reports • Evaluate data with regards to quality objectives
Quality Assurance Officer/Data Manager	• Manage raw data from the laboratory • Maintain copies of COCs in the project file • QA/QC for sampling, validation and laboratory performance

The selected laboratory will be Environmental Laboratory Approval Program (ELAP)-certified in New York State for Perfluorooctanoic acid (PFOA) and Perfluorooctanesulfonic acid (PFOS) in water by Modified EPA Method 537. Analytical chemistry parameters for groundwater samples include:

- 1,4-Dioxane according to EPA Method 8270D SIM
- Target Analyte List (TAL) PFAS according to Modified EPA Method 537

Table 1 provides a summary of quality assurance samples, holding times and analysis for each media. The PFAS Target Analyte List is shown below.

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonates	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluoroalkyl carboxylates	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUA/PFUdA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTriA/PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTA/PFTeDA	376-06-7
Fluorinated Telomer Sulfonates	6:2 Fluorotelomer sulfonate	6:2 FTS	27619-97-2
	8:2 Fluorotelomer sulfonate	8:2 FTS	39108-34-4
Perfluorooctane-sulfonamides	Perfluorooctanesulfonamide	FOSA	754-91-6
Perfluorooctane-sulfonamidoacetic acids	N-methyl perfluorooctanesulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethyl perfluorooctanesulfonamidoacetic acid	N-EtFOSAA	2991-50-6

4. Quality Assurance Objectives

This section establishes the QA objectives for measurements that are critical to the project. The QA objectives are developed for relevant data quality indicators. These indicators include the method detection limit (MDL), reporting limit (RL), precision, accuracy, completeness, representativeness, and comparability. The data quality objectives (DQOs) are based on project requirements and ensure: (1) that the data generated during the project are of known quality, and (2) that the quality is acceptable to achieve the project's technical objectives.

Quantitation Limits are laboratory-specific and reflect those values achievable by the laboratory performing the analyses. However, in order to ensure that the analytical methodologies are capable of achieving the DQOs, measurement performance criteria have been set for the analytical measurements in terms of accuracy, precision, and completeness. The analytical methods to be used at this site will provide a level of data quality and can be used to evaluate potential impacts to groundwater at the former MGP site, compared to New York State Standards, Criteria and Guidance values, and for purposes of risk assessment.

The overall QA objective is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting, which will provide results that are scientifically valid and the levels of which are sufficient to meet DQOs. Specific procedures for sampling, chain of custody, laboratory instruments calibration, laboratory analysis, reporting of data, internal quality control, and corrective action are described in other sections of the QAPP and the Field Sampling Plan (FSP).

The data quality indicators are presented in subsections 4.1 through 4.6. Procedures to assess the data quality indicators are given below in Section 13.

Table 2 provides the RLs, MDLs and the DQOs for groundwater samples. The DQOs for groundwater samples for this project include minimum RLs specified within the NYSDECs May 30, 2018 letter.

Table 3 provides the precision and accuracy DQOs for water samples.

4.1 Required Quantification Limit

The required quantification limit is the quantitative analytical level for individual analytes needed to make decisions relative to the objectives of the project. Quantitative limits may be expressed as the MDL or some quantitative level defined in terms relative to the program. It should be noted that there is some ambiguity in the definitions and use of terms that define

quantification limits. The MDL presented herein is a well-defined and accepted entity, although attainable only under ideal laboratory conditions.

Method Detection Limit: The MDL is the minimum concentration of a substance that can be measured and reported with 99-percent confidence that the analyte concentration is greater than zero. The MDL is determined from analysis of a sample in a given matrix-type containing the analyte.

Practical Quantitation Limit: The practical quantitation limit (PQL) [also referred to as the reporting limit (RL)] is the concentration in the sample that corresponds to the lowest concentration standard of the calibration curve.

Table 2 provides the reporting limits and the DQOs for groundwater samples as specified in NYSDEC’s May 30, 2018 letter.

4.2 Accuracy

Accuracy is the closeness of agreement between an observed value and an accepted reference value. The difference between the observed value and the reference value includes components of both systematic error (bias) and random error.

Accuracy in the field is assessed through the adherence to all field instrument calibration procedures, sample handling, preservation, and holding time requirements, and through the collection of equipment blanks prior to the collection of samples for each type of equipment being used (e.g., sample liners, drilling shoe, or stainless-steel sampling implements).

The laboratory will assess the overall accuracy of their instruments and analytical methods (independent of sample or matrix effects) through the measurement of “standards,” materials of accepted reference value. Accuracy will vary from analysis to analysis because of individual sample and matrix effects. In an individual analysis, accuracy will be measured in terms of blank results, the percent recovery (%R) of surrogate compounds in organic analyses, or %R of spiked compounds in matrix spikes (MSs), matrix spike duplicates (MSDs) and/or laboratory control samples (LCSs). This gives an indication of expected recovery for analytes tending to behave chemically like the spiked or surrogate compounds. The laboratory accuracy will be evaluated in accordance with laboratory quality assurance plan and standard operating procedures.

4.3 Precision

Precision is the agreement among a set of replicate measurements without consideration of the “true” or accurate value: i.e., variability between measurements of the same material for the same analyte. In environmental sampling, precision is the result of field sampling and

analytical factors. Precision in the laboratory is easier to measure and control than precision in the field. Replicate laboratory analyses of the same sample provide information on analytical precision; replicate field samples provide data on overall measurement precision. The difference between the overall measurement precision and the analytical precision is attributed to sampling precision. Precision is measured in a variety of ways including statistically, such as calculating variance or standard deviation. The difference between the overall measurement precision and the analytical precision is attributed to sampling precision.

Precision in the field is assessed through the collection and measurement of field duplicates. Field duplicates will be collected at a frequency of one per twenty samples per matrix per analytical parameter, with the exception of the waste characterization parameters. Precision will be measured through the calculation of relative percent differences (RPDs) as described below in subsection 13.2. The resulting information will be used to assess sampling and analytical variability. Duplicate samples are described below in subsection 5.1.2. **Table 1** summarizes the number of duplicates per media sampled.

Precision in the laboratory is assessed through the calculation of RPD for duplicate samples. For organic analyses, laboratory precision will be assessed through the analysis of MS/MSD samples and field duplicates. MS/MSD samples or matrix duplicate pairs will be performed at a frequency of one per twenty primary samples per matrix. Duplicate samples are described below in subsection 5.1.2. **Table 1** summarizes the number of duplicates per media sampled.

4.4 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. “Normal conditions” are defined as the conditions expected if the sampling plan was implemented as planned. The objective for completeness is a sufficient amount of valid data to achieve a predetermined statistical level of confidence. Critical samples must be identified and plans must be formulated to secure requisite valid data for these samples.

Field completeness is a measure of the amount of (1) valid measurements obtained from all the measurements taken in the project, and (2) valid samples collected. The field completeness objective is greater than 90-percent.

Laboratory completeness is a measure of the amount of valid measurements obtained from all valid samples submitted to the laboratory. The laboratory completeness objective is greater than 95-percent.

4.5 Representativeness

Representativeness is a qualitative parameter that expresses the degree to which data accurately and precisely represents either a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. To ensure representativeness, the sampling locations have been selected to provide coverage over a wide area and to highlight potential trends in the data.

Representativeness is dependent upon the proper design of the sampling program and will be satisfied by ensuring that work plans are followed and that proper sampling, sample handling, and sample preservation techniques are used.

Representativeness in the laboratory is ensured by using the proper analytical procedures, appropriate methods, and meeting sample-holding times.

4.6 Comparability

Comparability is a qualitative parameter that expresses the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the work plan is followed and that proper sampling techniques are used. Maximization of comparability with previous data sets is expected because the sampling design and field protocols are consistent with those previously used.

Comparability is dependent on the use of recognized EPA or equivalent analytical methods and the reporting of data in standardized units. To facilitate data comparison, the data-reporting format as presented below will be used:

- Conventions (units reported as): for liquids (weight/unit volume [i.e., micrograms per liter ($\mu\text{g/L}$)]); for air (weight/unit volume [i.e., micrograms per cubic meter ($\mu\text{g/m}^3$)]);
- Use common chemical name with corresponding chemical abstract system (Chemical Abstracts Service [CAS]) code.

5. Sampling Plan

Environmental sampling will include groundwater sampling. Groundwater samples will be collected utilizing low-flow sampling methods with peristaltic pumps. Sampling methods and procedures are presented in the FSP.

5.1 Sample Type, Location, and Frequency

5.1.1 Groundwater samples

Groundwater samples will be collected and submitted for laboratory analysis in accordance with the Work Plan. Water quality parameters including temperature, pH, turbidity, salinity, dissolved oxygen (DO) oxidation reduction potential, and specific conductance, will be collected prior to laboratory analysis. Groundwater samples will be analyzed for 1,4-Dioxane according to EPA Method 8270D SIM and TAL PFAS according to Modified EPA Method 537.

5.1.2 Field QC Sample Collection

Field QC samples are used to monitor the reproducibility and representativeness of field sampling activities. The field QC samples are handled, transported and analyzed in the same manner as the associated field samples. Field QC samples will include equipment blanks, field duplicates, and MS/MSDs. The quantity, field QC sample type, and analysis is detailed in **Table 1**.

Equipment Blank Samples are used to monitor the adequacy of decontamination procedures and possible sources of contamination such as potential laboratory methodologies.

Equipment blanks will consist of laboratory-supplied, distilled or de-ionized water and will be used to check for potential contamination of the equipment which may cause sample contamination. Equipment blanks will be collected by routing the distilled water through a decontaminated piece of sampling equipment or disposable sampling equipment into laboratory supplied bottles. Non-dedicated field equipment will be decontaminated as specified below in subsection 4.3. Equipment blanks will be submitted to the laboratory at a frequency of one per day per parameter.

Field Duplicate Samples, also referred to as blind duplicate samples, are two samples that are submitted from the same interval using the same sample procedures. Field duplicates will be used to assess the sampling and analytical reproducibility. Both samples are collected utilizing the same methods and are submitted for the same laboratory analysis; however,

different sample identification numbers are used. Field duplicates will be submitted at a frequency of one-per-20 samples for all matrices and all parameters.

MS/MSD Samples are two additional aliquots of the same sample submitted for the same parameters as the original sample. However, the additional aliquots are spiked with the compounds of concern. Matrix spikes provide information about the effect of the sample matrix on the measurement methodology. MS/MSDs will be submitted at a frequency of one-per-20 investigative samples per matrix for organic parameters.

Refer to **Table 1** for a summary of QC sample preservation and container requirements.

5.2 Sample Preservation and Containerization

The analytical laboratory will supply the sample containers for the chemical samples. These containers will be cleaned by the manufacturer to meet or exceed all analyte specifications established in the latest EPA's Specifications and Guidance for Contaminant-Free Sample Containers. Certificates of analysis are provided with each bottle lot and maintained on file to document conformance to EPA specifications. The containers will be pre-preserved, where appropriate. Sample preservation and containerization details are outlined in **Table 1**.

5.3 Equipment Decontamination

All non-dedicated sampling equipment shall be cleaned between each use in the following manner:

- Wash and scrub with Alconox (or non-phosphate soap) and water mixture
- Tap water rinse
- Decontamination fluids will be containerized into United States Department of Transportation (USDOT)/UN-approved 55-gallon drums or containment vessels and will be characterized and disposed of by National Grid at an approved disposal facility.

6. Documentation and COC

6.1 Sample Collection Documentation

6.1.1 Field Notes

Field notes documenting field activities will be maintained daily field sampling sheets in general accordance with the FSP. No erasures or obliterations of field notes will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark, which is signed and dated by the sampler. The correction shall be written adjacent to the error.

Field sampling sheets will be reviewed at regular intervals by the field team leader, site manager and project manager for completeness and representativeness. When necessary, field sampling sheets will be supported by daily activity reports.

6.1.2 COC Records

Sample custody is discussed in detail below in subsection 6.2. COC records are initiated by the samplers in the field. The field portion of the custody documentation should include:

- The project name
- The project number
- Signature(s) of sampler (s) responsible for sample custody
- Sample Name/ID number
- Date and time of collection
- Whether the sample is grab or composite
- Names of individuals involved in sampling
- Required analytical methods
- Air bill or other shipping number (if applicable)

On a regular basis (daily or on such a basis that all holding times will be met), samples will be transferred to the custody of the respective laboratories, via third-party commercial carriers or via laboratory courier service. Sample packaging and shipping procedures, and field COC procedures are described below in subsection 6.2.1 of this Plan. Sample receipt and log-in procedures at the laboratory are described below in subsection 6.2.2 of this Plan.

6.1.3 Sample Labeling

Each sample will be labeled with an adhesive label using indelible ink. The label should include the date and time of collection, sampler's initials, tests to be performed, preservative (if applicable), and a unique identification. The following identification scheme will be used:

PRIMARY SAMPLE TYPES	QA/QC SAMPLE TYPES
<u>GROUNDWATER SAMPLES</u> Monitoring Well-ID	<u>EQUIPMENT BLANKS</u> SAMPLE-ID – [DATE] <u>MATRIX SPIKE/DUP</u> SAMPLE [ID] [DEPTH] [EITHER MS OR MSD] <u>BLIND DUPLICATES</u> SAMPLE-ID[XX][DATE]

This sample label contains the authoritative information for the sample. Inconsistencies with other documents will be settled in favor of the vial or container label unless otherwise corrected in writing from the field personnel collecting samples or the Data Manager and/or the Project QA Officer.

6.1.4 Sample Handling

Samples will be handled in general accordance with the FSP.

6.2 Sample Custody

The COC provides a record of the custody of any environmental field sample from the time of collection to the delivery to the laboratory. Custody is one of several factors that are necessary for the admissibility of environmental data as evidence in a court of law. Custody procedures help to satisfy the two major requirements for admissibility: relevance and authenticity. Sample custody is addressed in three parts: field sample collection, laboratory analysis, and final evidence files.

A sample is considered to be under a person's custody if:

- The item is in the actual possession of a person
- The item is in the view of the person after being in actual possession of the person
- The item was in the actual physical possession of the person but is locked up to prevent tampering
- The item is in a designated and identified secure area

6.2.1 Field Custody Procedures

Samples will be collected following the sampling procedures indicated in the FSP. A summary of samples and collection methods are provided above in Section 5 of this QAPP.

Documentation of sample collection is described above in subsection 6.1. Sample COC and packaging procedures are summarized below. These procedures will ensure that the samples will arrive at the laboratory with the COC intact.

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or dispatched properly. Field procedures have been designed such that as few people as possible will handle the samples.
- All bottles will be identified by the use of sample labels with sample numbers, sampling locations, date/time of collection, and type of analysis. The sample naming system is presented above in subsection 6.1.3.
- Sample labels will be completed for each sample using waterproof ink.
- Samples will be accompanied by a completed COC form. The sample numbers and locations will be listed on the COC form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of samples from the sampler to another person, to a mobile laboratory, and to the laboratory facility.
- All shipments will be accompanied by the COC record identifying the contents. The original record will accompany the shipment, and copies will be retained by the sampler and provided to the data manager and placed in the project files.
- Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in and secured to the inside top of each sample box or cooler. Shipping containers will be secured with strapping tape and custody seals for shipment to the laboratory. The custody seals will be attached to the cooler and covered with clear plastic tape after being signed by field personnel.
- If the samples are sent by common carrier, the air bill will be used. Air bills will be retained as part of the permanent documentation. Commercial carriers are not required to sign off on the custody forms since the custody forms will be sealed inside the sample cooler and the custody seals will remain intact.
- Samples remain in the custody of the sampler until transfer of custody is completed. This consists of delivery of samples to the laboratory sample custodian, and signature of the laboratory sample custodian on COC document as receiving the samples and signature of sampler as relinquishing samples.

6.2.2 Laboratory Custody Procedures

After accepting custody of the shipping containers, the laboratory will document the receipt of the shipping containers by signing the COC record. The laboratory will:

- Examine the shipping containers to verify that the custody tape is intact
- Examine all sample containers for damage

- Determine if the temperature required for the requested testing program has been maintained during shipment and document the temperature on the COC records
- Compare samples received against those listed on the COC
- Verify that sample holding times have not been exceeded
- Examine all shipping records for accuracy and completeness
- Determine sample pH (if applicable) and record on COC forms
- Sign and date the COC immediately (if shipment is accepted) and attach the air bill
- Note any problems associated with the coolers and/or samples on the cooler receipt form and notify the laboratory project manager, who will be responsible for contacting the GEI data manager
- Attach laboratory sample container labels with unique laboratory identification and test
- Place the samples in the proper laboratory storage.

Following receipt, samples will be logged in according to the following procedure:

- The samples will be entered into the laboratory tracking system. At a minimum, the following information will be entered: project name or identification, unique sample numbers (both client and internal laboratory), type of sample, required tests, date and time of laboratory receipt of samples, and field ID provided by field personnel.
- The completed COC, air bills, and any additional documentation will be placed in the project file.

7. Calibration Procedure

7.1 Field Instruments

Field instruments will be calibrated according to the manufacturer's specifications. Water quality meters will be calibrated with known reference solutions. All calibration procedures performed will be documented on the field sampling sheets and will include the date/time of calibration, name of person performing the calibration, reference standard used, and the readings.

7.2 Laboratory Instruments

Calibration procedures for a specific laboratory instrument will consist of initial calibrations, initial calibration verifications, and/or continuing calibration verification. Detailed descriptions of the calibration procedures for a specific laboratory instrument are included in the laboratory's quality assurance plan, which describe the calibration procedures, their frequency, acceptance criteria, and the conditions that will require recalibration.

8. Sample Preparation and Procedures

Analytical samples will be collected in general accordance with the FSP and as specified in a job-specific Work Plan. Groundwater samples will be analyzed for 1,4-Dioxane according to EPA Method 8270D SIM and TAL PFAS according to Modified EPA Method 537.

Analytical samples will be collected into laboratory-preserved sample containers and will be preserved as indicated in **Table 1**.

9. Data Reduction, Validation, and Reporting

Appropriate QC measures will be used to ensure the generation of reliable data from sampling and analysis activities. Proper collection and organization of accurate information followed by clear and concise reporting of the data is a primary goal in this project. Complete data packages suitable for data validation to support the generation of a Data Usability Summary Report (DUSR) according to NYSDEC requirements will be provided by the analytical laboratory. Complete data packages suitable for data validation to support the generation of a DUSR according to NYSDEC requirements will be provided by the project data validator.

9.1 Field Data Evaluation

Measurements and sample collection information will be transcribed directly onto standardized forms. If errors are made, results will be legibly crossed out, initialed and dated by the person recording the data, and corrected in a space adjacent to the original (erroneous) entry. Reviews of the field records by the field team leader, site manager, and project manager will ensure that:

- Standardized forms have been filled out completely and that the information recorded accurately reflects the activities that were performed.
- Records are legible and in accordance with good record keeping procedures, i.e., entries are signed and dated, data are not obliterated, changes are initialed, dated, and explained.
- Sample collection, handling, preservation, and storage procedures were conducted in accordance with the protocols described in the FSP and Work Plan, and that any deviations were documented and approved by the appropriate personnel.

9.2 Analytical Data Validation

An independent validation of the analytical data will be completed. Project-specific procedures will be used to validate analytical laboratory data. The basis for the validation will be the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review (January 2005) and the USEPA CLP National Functional Guidelines for Inorganic Data Review (October 2004), modified to accommodate the criteria in the analytical methods used in this program, and Region II Standard Operating Procedures (SOPs) for CLP Organic Data review (Revision 11, June 1996) and Evaluation of Metals for the CLP Program (Revision 11, January 1992). Critical functions for determining the validity of generated data are: (1) strict adherence to the analytical methods, (2) assurance that the instrumentation employed was operated in accordance with defined operating

procedures, (3) assurance that quality parameters built into the analytical procedures have been adhered to, and (4) confirmation that the DQOs have been met.

Table 2 highlights the QC criteria and holding time requirements for all analyses conducted under this program. These criteria will be used to evaluate and qualify the data during validation.

Laboratory deliverables will consist of an original hard copy data package that is in general accordance with NYSDEC Analytical Service Protocol (ASP) Category B data deliverable requirements. Data validation is required for all data.

Data validation will be completed by the consultants' data validators or qualified contracted personnel. Validation will include all technical holding times, as well as QC sample results (blanks, surrogate spikes, laboratory duplicates, MS/MSDs, and LCSs), tunes, internal standards, calibrations, target compound identification, and results calculations.

For all analyses, the laboratory will report results which are between the laboratory's RL and the MDL; these results will be qualified as estimated (J) by the laboratory.

The overall completeness of the data package will also be evaluated by the data validator. Completeness checks will be administered on all data to determine whether full data deliverables were provided. The reviewer will determine whether all required items are present and request copies of missing deliverables.

Upon completion of the validation, a report will be prepared. This report will summarize the samples reviewed, elements reviewed, any nonconformance with the established criteria, and validation actions. Data qualifiers will be consistent with EPA National Functional Guidelines. This report will be in a format consistent with NYSDEC's DUSR.

9.3 Analytical Data Deliverable

Laboratory deliverables will consist of an original hard copy data package that is in general accordance with NYSDEC ASP Category B data deliverable requirements.

10. Internal Quality Control

Laboratory and field quality internal control checks will be used to ensure the data quality objectives are achieved. At a minimum, this will include:

- MS and/or MS/MSDs samples
- Matrix duplicate analyses
- Laboratory control spike samples
- Instrument calibrations
- Instrument tunes for semivolatile organic compound (SVOC) 8270D analyses
- Method and/or instrument blanks
- Surrogate spikes for organic analyses
- Internal standard spikes for SVOC 8270D analyses
- Detection limit determination and confirmation by analysis of low-level calibration standard

Field quality control samples will include:

- Equipment blanks as outlined in **Table 1**
- Field duplicate samples as outlined in **Table 1**
- MS/MSDs as outlined in **Table 1**

11. Performance and System Audits

Audits are an independent means of: 1) evaluating the operation or capability of a measurement system, and 2) documenting the use of QC procedures designed to generate data of known and acceptable quality.

Field audits may be completed to assess sample collection protocols, determine the integrity of COC procedures, and evaluate sample documentation and data handling procedures. Field audits may be scheduled by the QA officer, Project Manager (PM), site manager or in-house consultant, at their discretion. Written records of audits and any recommendations for corrective action will be submitted to the PM.

The QA officer is the interface between management and project activities in matters of project quality. The QA officer will review the implementation of the QAPP. Reviews will be conducted at the completion of field activities and will include the results of any audits and an evaluation of the data quality.

12. Preventative Maintenance

Preventative maintenance will be performed on field equipment in accordance with the manufacturer's recommendations. Preventative maintenance to field equipment will be provided by equipment vendors.

Laboratory equipment calibration and maintenance procedures are specified in Test America's laboratory quality manual.

13. Specific Procedures to Assess Data Quality Indicators

QC analyses conducted as a part of the testing program will provide a quantitative quality assessment of the data generated and their adherence to the data quality indicators. The data quality indicators ensure that the quality assurance objectives for the project are met.

13.1 Detection Limits

13.1.1 Method Detection Limit

The MDL is defined as follows for all measurements:

$$\text{MDL} = (t[n-1, 1-\alpha=0.99]) \times (s)$$

where: s = standard deviation of the replicate analysis,
 $t(n-1, 1-\alpha=0.99)$ = student's t -value for a one-sided, 99-percent confidence level and a standard deviation estimate with $n-1$ degrees of freedom

The MDLs calculated by the laboratory are determined under ideal conditions. MDLs for environmental samples are dependent on the sample aliquot, the matrix, the concentration of analyte, and interference present in the matrix, the percent of moisture, dilution factor, etc. The MDL for each sample analysis will be adjusted accordingly.

13.1.2 Reporting Limit

The RL is the concentration of an analyte in the sample that corresponds to the lowest concentration standard of the calibration curve. As with the MDLs, the RLs are dependent on the sample aliquot, the final sample volume, the percent of moisture, dilution factor, etc.

The RL is determined as follows:

$$PQL = \frac{\text{Lowest conc. std (ng)}}{\text{Volume injected (uL)}} \times \frac{\text{Sample aliquot (mL or g)}}{\text{Final volume (mL)}} \times DF \times \frac{100}{(100 - PM)}$$

where:

DF = dilution factor, including all dilutions or lost samples not accounted for in a sample aliquot/final volume ratio

%M = percent moisture for solid samples

13.2 Precision

Variability will be expressed in terms of the RPD when only two data points exist. The RPD is calculated as:

$$RPD = \frac{(\text{Larger Value} - \text{Smaller Value})}{[(\text{Larger Value} + \text{Smaller Value})/2]} \times 100\%$$

For data sets greater than two points, the percent relative standard deviation (percent Relative Standard Deviation [RSD]) is used as the precision measurement. It is defined by the equation:

$$\text{Percent RSD} = \frac{\text{Standard Deviation}}{\text{Mean}} \times 100\%$$

Standard deviation (SD) is calculated as follows:

$$SD = \sqrt{\sum_{i=1}^n \frac{(y_i - \bar{y})^2}{n - 1}}$$

where: SD = standard deviation

y_i = measured value of the ith replicate

y = mean of replicate measurements

n = number of replicates

For measurements such as pH, where the absolute variation is more appropriate, precision is usually reported as the absolute range (D) of duplicate measurements:

$$D = | \text{first measurement} - \text{second measurement} |$$

or as the absolute standard deviation previously given. RPD, %RSD, and D are independent of the error of the analyses and reflect only the degree to which the measurements agree with each other, not the degree to which they agree with the true value for the parameter measured.

13.3 Accuracy

Accuracy is related to the bias in a measurement system. Accuracy describes the degree of agreement of a measurement with a true value. Accuracy will be expressed as percent recovery for each matrix spike analyte by using the following equation:

$$\% \text{ Recovery} = \frac{C_{ss} - C_{us}}{C_{sa}} \times 100\%$$

where: C_{ss} = measured concentration in spiked sample
 C_{us} = measured concentration in unspiked sample
 C_{sa} = known concentration added to the sample

Accuracy for a measurement such as pH is expressed as bias in the analysis of a standard reference sample according to the equation:

$$\text{Bias} = \text{pH}_m - \text{pH}_t$$

where: pH_m = measured pH
 pH_t = the true pH of the standard reference sample

13.4 Completeness

Data completeness is a measure of the amount of usable data resulting from a measurement effort. For this program, completeness will be defined as the percentage of valid data obtained compared to the total number of measurements necessary to achieve our required statistical level of confidence for each test. The confidence level is based on the total number of samples.

Data completeness is calculated as:

$$\text{Completeness} = \frac{\text{Number of valid data points}}{\text{Number of data points necessary for confidence level}} \times 100\%$$

The completeness goal is to generate a sufficient amount of valid data. It is anticipated that 95-percent of the data will be complete. Data validation criteria discussed in Section 10 of this QAPP will be used to determine data completeness. Any data deficiencies and their effect on project goals will be evaluated in the DUSR.

13.5 Representativeness

Representativeness is a qualitative statement that expresses the extent to which the sample accurately and precisely represents the characteristics of interest of the study.

Representativeness is primarily concerned with the proper design of the sampling program and is best ensured by proper selection of sampling locations and the taking of a sufficient number of samples. It is addressed by describing the sampling techniques, the matrices sampled, and the rationale for the selection of sampling locations, which are discussed in the FSP and job-specific Work Plan.

13.6 Comparability

Comparability is a qualitative parameter expressing the confidence that one set of data can be compared to another. Comparability is possible only when standardized sampling and analytical procedures are used.

14. Corrective Action

If unacceptable conditions are identified as a result of audits or are observed during field sampling and analysis, the PM, Field Team Leader, and QA officer will document the condition and initiate corrective procedures. The specific condition or problem will be identified, its cause will be determined, and appropriate action will be implemented.

The entire sampling program will be under the direction of the PM and QA officer. The emphasis in this program is on preventing problems by identifying potential errors, discrepancies, and gaps in the data collection and the laboratory analysis and interpretation process. Any problems identified will be promptly resolved. Likewise, follow-up corrective action is always an option in the event that preventative corrective actions are not effective.

The acceptance limits for the sampling and analyses to be conducted in this program will be those stated in the method or defined by other means in the Work Plan and FSP. Corrective actions are likely to be immediate in nature and most often will be implemented by the contracted laboratory analyst or the PM. The corrective action will usually involve recalculation, reanalysis, or repeating a sample run.

14.1 Immediate Corrective Action

Corrective action in the field may be needed when the sample requirements are changed (i.e., more/less samples, sampling locations other than those specified in the Work Plan), or when sampling procedures and/or field analytical procedures require modification, etc. due to unexpected conditions. The field team may identify the need for corrective action. The Field Team Leader, Site Manager, and PM will approve the corrective action and notify the QA officer. The PM and QA officer will approve the corrective measure. The Field Team Leader and Project Manager will ensure that the corrective measure is implemented by the field team.

Corrective actions will be implemented and documented in the field record book. Documentation will include:

- A description of the circumstances that initiated the corrective action
- The action taken in response
- The final resolution
- Any necessary approvals

Corrective action in the laboratory will be completed in accordance with the quality assurance procedures. Any corrective actions completed by the laboratory will be documented in both the laboratory's corrective action files, and the narrative data report sent from the laboratory to the PM. If the corrective action does not rectify the situation, the laboratory will contact the PM, who will determine the action to be taken and inform the appropriate personnel.

If potential problems are not solved as an immediate corrective action, the contractor will apply formalized long-term corrective action if necessary.

Tables

Table 1. Analytical Methods/Quality Assurance Summary Table
MGP Sites
New York

Media	Number of Primary Samples	QA/QC Samples			Total Number of Samples	Analytical Parameters	Method	Preservative	Holding Time	Container
		Equipment Blank	Duplicate	MS/MSD						
Ground Water	TBD	1/20, at least daily	1/20	1/20	TBD	1,4-Dioxane	8270D SIM	Cool to 4°C	7 days	(1) 500 mL amber glass bottle
	TBD	1/20, at least daily	1/20	1/20	TBD	PFAS	Modified 537	Cool to 4°C	14 days	(2) 500 mL HDPE or polypropylene bottles, no bottle cap liners

Notes:

Waste Characterization disposal sample analysis will meet the requirements of the selected disposal facility.

TBD - To Be Determined

PFAS - Per- and Polyfluoroalkyl Substances

SIM - Selective Ion Monitoring

TAL - Target Analyte List

°C- Degrees Celsius

oz. - ounce

mL - Milliliter

**Table 2. Chemical Parameters, Reporting Limits and Data Quality Objectives for Groundwater Samples
MGP Sites
New York**

CAS Number	Analyte	DQO's	RL ²	MDL ²
Per- and Polyfluoroalkyl Substances Method 537 (ng/L)				
375-73-5	Perfluorobutanesulfonic acid	2	≤ 2	TBD
355-46-4	Perfluorohexanesulfonic acid	2	≤ 2	TBD
375-92-8	Perfluoroheptanesulfonic acid	2	≤ 2	TBD
1763-23-1	Perfluorooctanesulfonic acid	2	≤ 2	TBD
335-77-3	Perfluorodecanesulfonic acid	2	≤ 2	TBD
375-22-4	Perfluorobutanoic acid	2	≤ 2	TBD
2706-90-3	Perfluoropentanoic acid	2	≤ 2	TBD
307-24-4	Perfluorohexanoic acid	2	≤ 2	TBD
375-85-9	Perfluoroheptanoic acid	2	≤ 2	TBD
335-67-1	Perfluorooctanoic acid	2	≤ 2	TBD
375-95-1	Perfluorononanoic acid	2	≤ 2	TBD
335-76-2	Perfluorodecanoic acid	2	≤ 2	TBD
2058-94-8	Perfluoroundecanoic acid	2	≤ 2	TBD
307-55-1	Perfluorododecanoic acid	2	≤ 2	TBD
72629-94-8	Perfluorotridecanoic acid	2	≤ 2	TBD
376-06-7	Perfluorotetradecanoic acid	2	≤ 2	TBD
27619-97-2	6:2 Fluorotelomer sulfonate	2	≤ 2	TBD
39108-34-4	8:2 Fluorotelomer sulfonate	2	≤ 2	TBD
754-91-6	Perfluorooctanesulfonamide	2	≤ 2	TBD
2355-31-9	N-methyl perfluorooctanesulfonamidoacetic acid	2	≤ 2	TBD
2991-50-6	N-ethyl perfluorooctanesulfonamidoacetic acid	2	≤ 2	TBD
Semivolatile Organic Compounds (ug/L) via Method 8270D SIM				
123-91-1	1,4-Dioxane	0.35	TBD	≤ 0.35

Notes:

ug/L - milligrams per Liter

ng/L - nanograms per Liter

RL - Reporting Limit

MDL - Method Detection Limit

DQO - Data Quality Objectives

1 - DQOs are based on NYSDECs letter dated May 30, 2018.

2 - RLs and MDLs will be based on the selected laboratory's Reporting Limits and Method Detection limits.

Table 3. Quality Control Limits Precision and Accuracy for Groundwater Samples
MGP Sites
New York

Analytical	Analytical Method	MS/MSD Compound	MS/MSD % Recovery			LCS % Recovery		Surrogate	Surrogate % Recovery	
			Low	High	RPD	Low	High		Low	High
SVOCs	8270D SIM	1,4-Dioxane	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
PFAS	Modified 537	Perfluorobutanesulfonic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 538	Perfluorohexanesulfonic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 539	Perfluoroheptanesulfonic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 540	Perfluorooctanesulfonic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 541	Perfluorodecanesulfonic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 542	Perfluorobutanoic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 543	Perfluoropentanoic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 544	Perfluorohexanoic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 545	Perfluoroheptanoic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 546	Perfluorooctanoic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 547	Perfluorononanoic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 548	Perfluorodecanoic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 549	Perfluoroundecanoic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 550	Perfluorododecanoic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 551	Perfluorotridecanoic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 552	Perfluorotetradecanoic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 553	6:2 Fluorotelomer sulfonate	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 554	8:2 Fluorotelomer sulfonate	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 555	Perfluorooctanesulfonamide	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 556	N-methyl perfluorooctanesulfonamidoacetic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Modified 557	N-ethyl perfluorooctanesulfonamidoacetic acid	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Notes:

TBD - To Be Determined
MS - Matrix Spike
MSD - Matrix Spike Duplicate
LCS - Laboratory Control Sample
(a) Matrix spike only
(b) Laboratory duplicate RPD
NA - Not Applicable
SVOCs - semivolatile organic compounds
RPD - Relative Percent Difference

ATTACHMENT B

Field Sampling Plan



Consulting
Engineers and
Scientists

Field Sampling Plan Emerging Contaminant Sampling

Manufactured Gas Plant Sites
New York

Prepared For:

National Grid
175 Old Country Road
Hicksville, NY 11801

And

National Grid
300 Erie Blvd. West
Syracuse, NY 13202

Submitted by:

GEI Consultants, Inc.
455 Winding Brook Drive
Glastonbury, CT 06033
860.368.5300

September 2018
Project 1802631

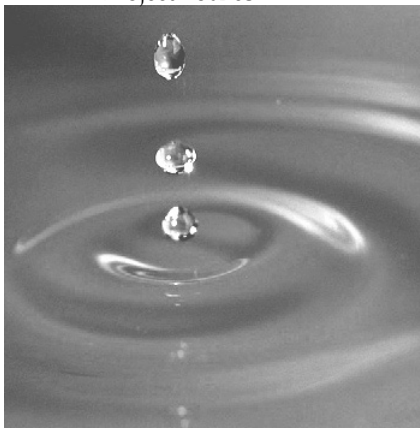


Table of Contents

Section 1 – Groundwater Sampling Activities (GW)

GW-015 Groundwater Sampling for PFAS (June 2018)

H:\WPROC\Project\NationalGrid\PFAS Sampling\Work Plan\September 2018\Attachment B - FSP\Emerging Contaminant Sampling FSP.doc

STANDARD OPERATING PROCEDURE

GW-015 Groundwater Sampling for PFAS

1. Objective

This Standard Operating Procedure (SOP) was developed to describe the methods for screening for poly and perfluoroalkyl substances (PFAS) in groundwater. Given the extremely low detection limits associated with PFAS analysis and the many potential sources of trace levels of PFAS, field personnel will follow the protocols described in this SOP to minimize the potential for false detections of PFAS. Specific precautions to be taken during field sampling are discussed in detail below.

2. Execution

- Materials acceptable for sampling include: stainless steel, high density polyethylene (HDPE), PVC, silicone, acetate and polypropylene. Grundfos pumps and bladder pumps are known to contain PFAS materials and will not be used to collect groundwater samples.
- Decontamination will include two steps; detergent and a clean water rinse.
- Place plastic sheeting adjacent to the monitoring well for use as a clean work area. Prevent sampling equipment from contacting the ground or other surface that could compromise sample integrity.
- Prior to collection of samples, field personnel must wash their hands and don a new set of nitrile gloves. Gloved hands must not be used to subsequently handle papers, pens, clothes, etc., prior to the collection of PFAS samples.
- The PFAS samples bottle caps must remain on the bottle until immediately prior to sample collection and the bottle immediately sealed after sample collection. This will minimize potential loss of PFAS, through volatilization. The bottle cap must remain in the other hand of the sampler, until replaced on the bottle. PFAS sample bottles will not be rinsed during sampling.
- Samples should be collected from the sample tubing directly into pre-labelled water sample containers – HDPE bottles fitted with an HDPE lined screw cap only.
- Do not filter samples.
- Collect the groundwater sample (up to the brim leaving no head-space) from the tubing into the pre-labelled 500 mL HDPE bottles and tightly screw on the HDPE lined cap (snug, but not too tight).
- Container labels will be completed using pen/pencil (i.e. NO MARKERS) after the caps have been placed back on each bottle.
- During PFAS sampling, water turbulence should be minimized to avoid potential volatilization from aqueous solution; this could include: adjusting discharge rates prior to sampling and inclining the sample bottle neck,

during filling of the bottle. Ensure the rim of the bottle does not come into direct contact with the equipment or tubing.

- Groundwater samples will be collected in pre-labelled, laboratory-supplied "PFAS free" HDPE sample bottles.
- Labelling information and time of sampling should be recorded on the Field Reports. Avoid using markers. All sampling materials should be treated as single use and disposed following completion of sampling at each monitoring well.
- Keep samples as dry as possible. Ensure that sample bottles are securely closed.
- Samples should be placed in coolers and kept at a cool temperature until transportation to the lab. Samples must be kept at between 0–4 °C in an insulated, durable transport container.

3. Limitations/Preparation

- Packaged food:
 - Field personnel should avoid the use of paper bags and should not bring food onsite in any paper packaging (i.e., do not bring any fast food to the site that uses any form of paper wrapping such as sandwiches, coffee in paper cups, etc.).
 - Avoid products such as aluminum foil, coated papers, and coated textiles onsite.
 - Avoid foods that have been fried on a frying pan onsite as the Teflon coating on most frying surfaces is made of a fluorinated coating and could represent a potential source of PFAS.
 - Snacks and meals (lunch) are not to be eaten in the field vehicle or in the immediate vicinity of sampling activities (i.e., within 30 feet). When field personnel require a break to eat or drink, they should remove their gloves and coveralls and move to an appropriate location (preferably downwind). When finished, field personnel should then tidy up and put their coveralls and gloves back on prior to returning to the work area.
- Field Gear:
 - Water resistant, water proof or stain-treated clothing will not be worn during the field program.
 - Field clothing to be worn on site should be restricted to natural fibers (preferably cotton) and not synthetic.
 - Field clothing should be laundered with minimal use of soap (multiple washings since purchase), no fabric softener or scented products and after they have been cleaned, the clothing should be rinsed again with water only before drying (no fabric softener, etc.).
 - Preferably, field gear should be cotton construction, old and well laundered. New cotton clothing may contain PFAS related treatments. The use of new clothing while sampling or sample

handling shall be avoided. Gore-Tex™ consists of a PFAS membrane. Gore-Tex™ clothing shall not be worn during the sampling program.

- Avoid plastic coating or glue materials. Waterproof field books are not to be used. Field reports should be on loose paper on masonite or aluminum clip boards (i.e. plastic clip boards, binders or spiral hard cover notebooks are not acceptable) using a pencil. Sharpies should not be used.
- Most safety footwear are made from leather and synthetic fibers that have been treated to provide some degree of waterproofing/increased durability and represent a source of trace PFAS. For the health and safety of field personnel, the protection for footwear must be maintained. As such, contact with safety footwear will take place after field personnel remove themselves from immediate vicinity of the sample port (i.e. 30 feet).
- Disposable nitrile gloves must be worn at all times. Further, a new pair of nitrile gloves shall be donned prior to the following activities at each sample location:
 - Decontamination of re-usable sampling equipment;
 - Prior to contact with sample bottles;
 - Insertion of anything into the monitoring well (e.g. HDPE tubing);
 - Handling of any QA/QC samples including equipment blanks; and
 - After the handling of any non-dedicated sampling equipment, contact with non-decontaminated surfaces, or when judged necessary by field personnel.
- Field vehicle:
 - The field vehicle seats may be treated with stain resistant products by the manufacturer. The seats of the vehicle shall be covered with a well laundered cotton blanket for the duration of the field program in order to avoid direct contact between field clothing and the seats of the vehicle.
- Personnel Hygiene:
 - Field personnel will not use shampoo, conditioner, body gel, cosmetic or hand cream as part of their personal cleaning/showering routine on the day of a sampling event, as these products may contain surfactants and represent a potential source of PFAS. It is strongly recommended that field personnel shower as per normal routine the night before and then rinse with water only on the morning of sampling event. Use of bar soap is considered acceptable, although soap containing moisturizing lotions should be avoided.

- Moisturizers, cosmetics and dental floss may contain PFAS and shall not be used throughout the duration of the field program, either on or off-site. Sunscreen and insect repellent also cannot be used.
- For washroom breaks, field personnel will remove themselves from the immediate vicinity of the sampling location (i.e., 30 feet) and then remove gloves and overalls. Field personnel should wash as normal with extra time for rinsing with water after soap use. When finished washing, the use of air dryer is preferred and the use of paper towel for drying is to be avoided (if possible).
- Visitors:
 - Visitors to the site are asked to remain at least 30 feet from sampling areas.

4. Contacts

Melissa Felter

ATTACHMENT C

Proposed Sampling Locations Emerging Contaminant Sampling Downstate New York Sites

Summary of Downstate Sites
Wells Selected for Emerging Contaminant Groundwater Sampling

Site Name	Recommended Wells	Screened Interval (ft)	Depth to Water (ft)	Rationale	Notes
Babylon MGP	MW-1	8 - 18	7.09	on site upgradient	Pending Access
	MW-2	8 - 18	7.92	on site	
	MW-3	8 - 18	8.57	on site downgradient	
Bay Ridge A Station	MW-112	68 - 78	71.53	on site upgradient	No wells on Holder Station A, wells listed are at Holder Station B. Sampling methods to be evaluated. Peristaltic pumps can't be used.
	NA	NA	NA	NA	
	MW-105	73 - 83	77.38	Downgradient	
Bayshore MGP	MW-09I	30 - 40	~5	Upgradient	
	BBMW-41I	25 - 30	~5	on site	
	MW-29S	5 - 10	~5	Upgradient	
	OU3MW-11S	2 - 12	~5	on site downgradient	
	OU2MW-57I	20 - 30	~5	Downgradient	
Belmont Station	Sampling Waiver Approved				
Brooklyn Gas Light	Sampling Waiver Approved				
Citizens MGP - Carroll Garden	CGMW-01S	28 - 38	28.03	on site upgradient	Most intermediate wells have NAPL or were abandoned, so shallow wells were selected.
	CGMW-36	4 - 14	10.66	on site	
	CGMW-06S	10 - 20	6.34	Downgradient	
Clifton MGP - Staten Island	RW-210S	15 - 25	~5	on site upgradient	
	RW-202S	10 - 20	~5	on site	
	RW-23	3 - 13	~5	on site downgradient Edgewater Plaza	
Dangman Park MGP	Sampling Waiver Approved				
Equity Works	MW-6B	30 - 40	11.48	Upgradient	
	MW-8B	30 - 40	11.98	on site	
	MW-11B	33 - 43	10.48	Downgradient	
Far Rockaway MGP	MW-116D	29.9 - 39.9	6.98	Upgradient	
	MW-118DR	29 - 39	5.47	Near site	
	MW-119D	26.5 - 36.5	3.83	Downgradient	
Flatbush Station A&B	MW-2	47 - 57	46.08	on site upgradient	Sampling methods to be evaluated. Peristaltic pumps can't be used.
	MW-4	47 - 57	47.43	on site	
	MW-7	47 - 57	49.17	on site downgradient	
Former Brooklyn Borough Gas Works (Coney Island)	MW-18	10 - 21	13.21	on site upgradient	
	MW-2	9 - 22	10.5	on site	
	MW-16	9 - 21	14.88	on site downgradient	
Front St. Station	Sampling Waiver Approved				
Fulton Works	FW-MW-19	5 - 15	6.33	Upgradient	
	FW-MW-5R	10 - 20	13.45	on site	
	FW-MW-4R	6 - 16	6.55	Downgradient	
	FW-MW-17	8 - 18	6.75	Downgradient	

Summary of Downstate Sites
Wells Selected for Emerging Contaminant Groundwater Sampling

Site Name	Recommended Wells	Screened Interval (ft)	Depth to Water (ft)	Rationale	Notes
Glen Cove MGP	PZ06	7 - 17	5.03	on site upgradient	
	GCRW03	15 - 25	10.41	on site	
	GCMW14S-R	10 - 20	9.83	on site downgradient	
Greenpoint MGP - Energy Center	MW-220I	40 - 50	22.92	on site upgradient	
	MW-11	33 - 48	15.01	on site	
	GPEC-MW-3S	25 - 40	9.1	on site downgradient	
Inwood Holder	MW-52S	1 - 11	1.86	on site upgradient	
	MW-19S	2 - 9	6.1	on site	
	GW-8*	1 - 11	12.4	on site downgradient	
Jamaica Gas Light MGP	MW-6	21 - 31	~24.5	on site upgradient	Pending Access
	MW-3	20 - 30	~24.5	on site	
	MW-2	17 - 27	~20	on site downgradient	
Kings County Works	KC-MW-01	22 -32	~23	Upgradient	
	KC-MW-04	4 - 14	~10	on site	
	KC-MW-09	5 - 15	NA	Downgradient	
Metropolitan MGP	MW-1I	30 - 40	7.24	Upgradient	Intermediate wells selected because of downward gradients except near Canal Pending Access
	MW-7I	30 - 40	7.33	on site	
	MW-6I	30 - 40	7.66	Downgradient	
Patchogue MGP	MW-1	7 - 12	5.81	on site upgradient	
	MW-7S	4 - 9	4.52	on site	
	MW-4S	5 - 10	5.07	on site downgradient	
Peoples Works	PWMW-01	8 - 18	7.18	on site upgradient	
	MW-11	6 - 16	~9.5	on site	
	MW-9	5 - 15	~8	on site downgradient	
Plymouth Station	Sampling Waiver Approved				
Rockaway Park MGP	MW-26S	3 - 13	5.91	Upgradient	
	RW-05A	10 - 20	9.01	on site	
	MW-02S	5 - 15	NA	Downgradient	
Sag Harbor MGP	SHMW-13I	35 - 45	1.46	Upgradient	
	SHMW-01I	35 - 45	2.4	on site	
	SHMW-03I	35 - 45	2.05	Downgradient	
Scholes St. Station	Sampling Waiver Approved				
Skillman St. Station	SSMW-03	12 - 22	9.72	Upgradient	Only 7 wells, none on site
	SSMW-05	11 - 21	16.07	Downgradient	
	NA	NA	NA	NA	
Union Station Holder	US-MW-01S	25 - 35	26.1	on site upgradient	Pending Access. Sampling methods to be evaluated. Peristaltic pumps can't be used.
	US-MW-04S	27 - 37	28.37	on site	
	US-MW-09S	30 - 40	29.9	Downgradient	
Williamsburg Works	WW-MW-03	4 - 14	5.84	Upgradient	All on site wells were abandoned for the IRM.
	WW-MW-06 ⁺	0.3 - 10.3	3.65	Near site	
	WW-MW-14	4 - 14	1.22	Downgradient	
Wythe Ave. Station	WA-MW-04	9 - 19	10.02	Upgradient	
	WA-MW-05	10 - 20	No data yet	Downgradient	Unsure of concentrations, not sampled yet. Has potential for high dissolved concentrations.
	NA	NA	NA	NA	Only 6 wells, none on site.

* - If GW-8 is dry, or does not have enough water to sample, GW-7 will be sampled.

⁺ - If WW-MW-06 cannot be located, WW-MW-08 will be sampled. If WW-MW-08 cannot be located, WW-MW-12 will be sampled.



SOURCES:

1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. FIGURE 2-3, GROUNDWATER CONTOUR MAP, BABYLON FORMER MGP SITE, WEST BABYLON, NEW YORK. PREPARED BY AECOM, DATE: 6/19/18.

Emerging Contaminant Sampling Work Plan
National Grid New York Former MGP Sites

nationalgrid



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GROUNDWATER SAMPLE
LOCATIONS -
BABYLON MGP SITE

September 2018

Fig. 1



SOURCES:

1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. FIGURE 2: LOCATION OF MONITORING WELLS, FORMER BAY RIDGE HOLDER STATION A & B SITE, OPERABLE UNIT 2, PREPARED BY AECOM, DATE: 12/30/15.
3. FIGURE 1-6: GROUNDWATER CONTOURS, PREPARED BY AECOM, DATE: 9/26/14 (GROUNDWATER CONTOURS DATED 10/10/13).

0 80 160
SCALE: 1" = 80'

Emerging Contaminant Sampling Work Plan
National Grid New York Former MGP Sites

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GROUNDWATER SAMPLE
LOCATIONS -
BAY RIDGE HOLDER
STATIONS A & B

September 2018

Fig. 2



SOURCE:

1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. FIG. 8 SHALLOW GROUNDWATER CONTOUR MAP, PREPARED BY GEI CONSULTANTS, INC., DATE: SEPTEMBER 2017.



Emerging Contaminant Sampling Work Plan
National Grid New York Former MGP Sites

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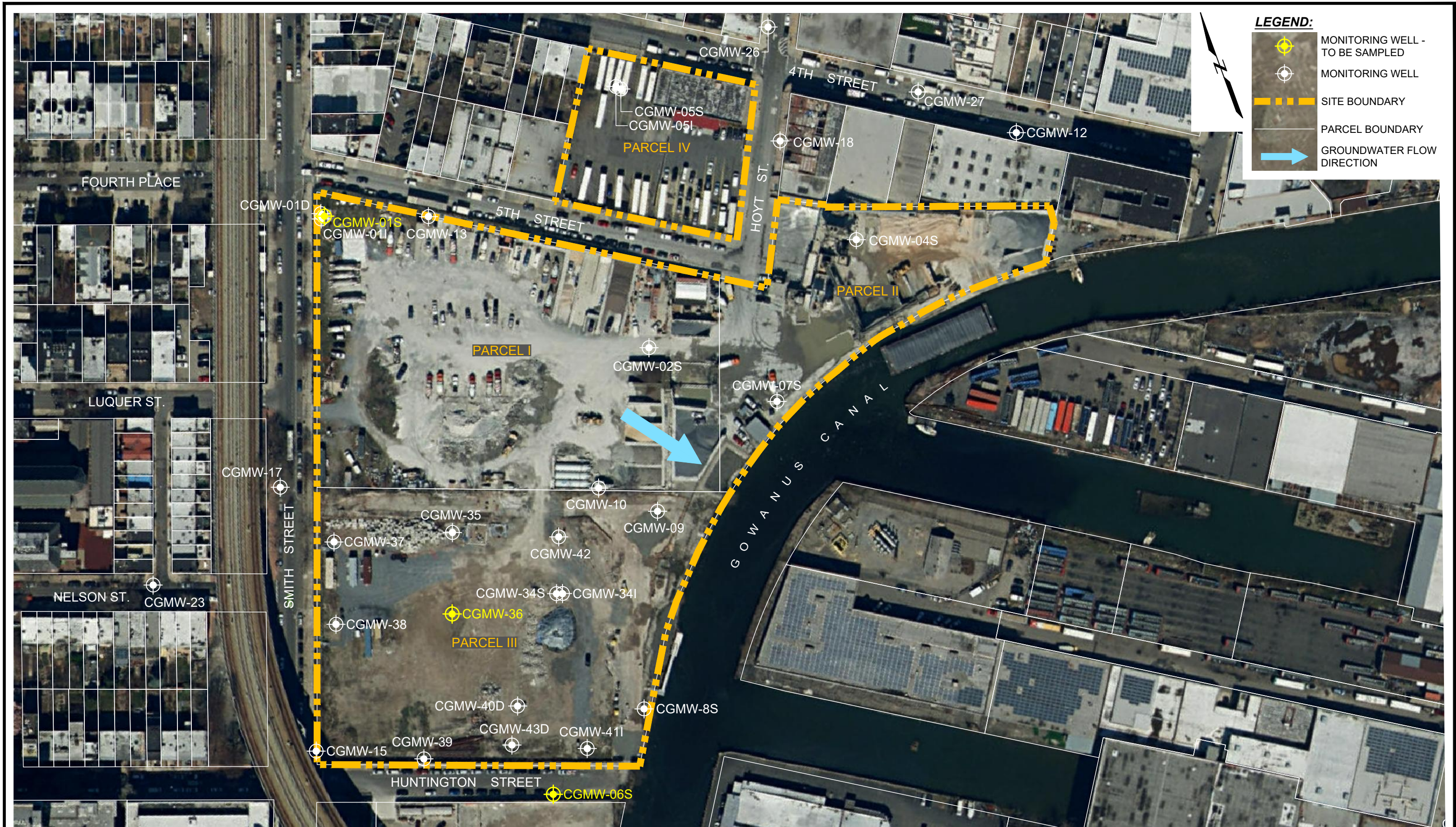


Project 1802728

GROUNDWATER SAMPLE
LOCATIONS -
BAY SHORE MGP SITE

September 2018

Fig. 3



SOURCES:

1. AERIAL IMAGERY DATE: 03/29/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. DATA REPORT, PLATE 8: LOW-TIDE SHALLOW GROUNDWATER CONTOURS AND HISTORIC DISSOLVED PHASE GROUNDWATER ANALYTICAL SUMMARY (ug/L) - APRIL 28, 2010, PREPARED BY GEI, DATE: OCTOBER 2011.

0 120 240

SCALE: 1" = 120'

Emerging Contaminant Sampling Work Plan
National Grid New York Former MGP Sites

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GROUNDWATER SAMPLE
LOCATIONS -
CITIZENS MGP - CARROLL
GARDENS SITE

September 2018

Fig. 4



SOURCES:

1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. INTERIM STATUS REPORT, FIGURE 2: SITE LAYOUT, PREPARED BY AECOM, DATE: 01/23/15.
3. SITE MANAGEMENT PLAN, FIGURE 1-5: GROUNDWATER CONTOURS AND ANALYTICAL RESULTS, PREPARED BY AECOM, DATE: 1/31/14.

0 120 240

SCALE: 1" = 120'

Emerging Contaminant Sampling Work Plan
National Grid New York Former MGP Sites

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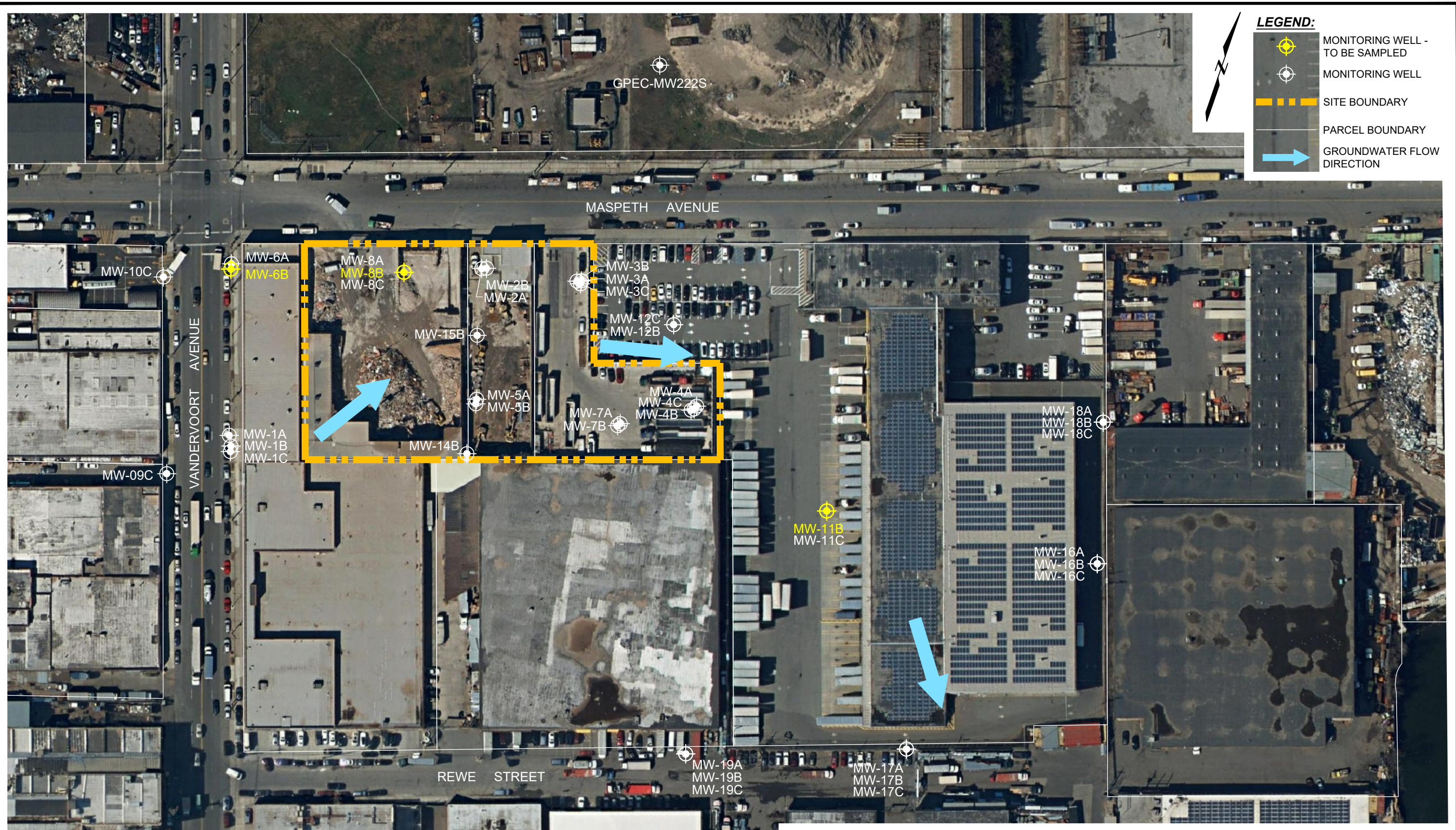
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GROUNDWATER SAMPLE
LOCATIONS -
CLIFTON MGP SITE

September 2018

Fig. 5



LEGEND:

- MONITORING WELL - TO BE SAMPLED
- MONITORING WELL
- SITE BOUNDARY
- PARCEL BOUNDARY
- GROUNDWATER FLOW DIRECTION

SOURCES:

1. AERIAL IMAGERY DATE: 03/29/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. REMEDIAL INVESTIGATION REPORT FIGURES, PREPARED BY AECOM, DATE: 3/20/2016 (GROUNDWATER FLOW DATE 12/4/15).



Emerging Contaminant Sampling Work Plan
National Grid New York Former MGP Sites

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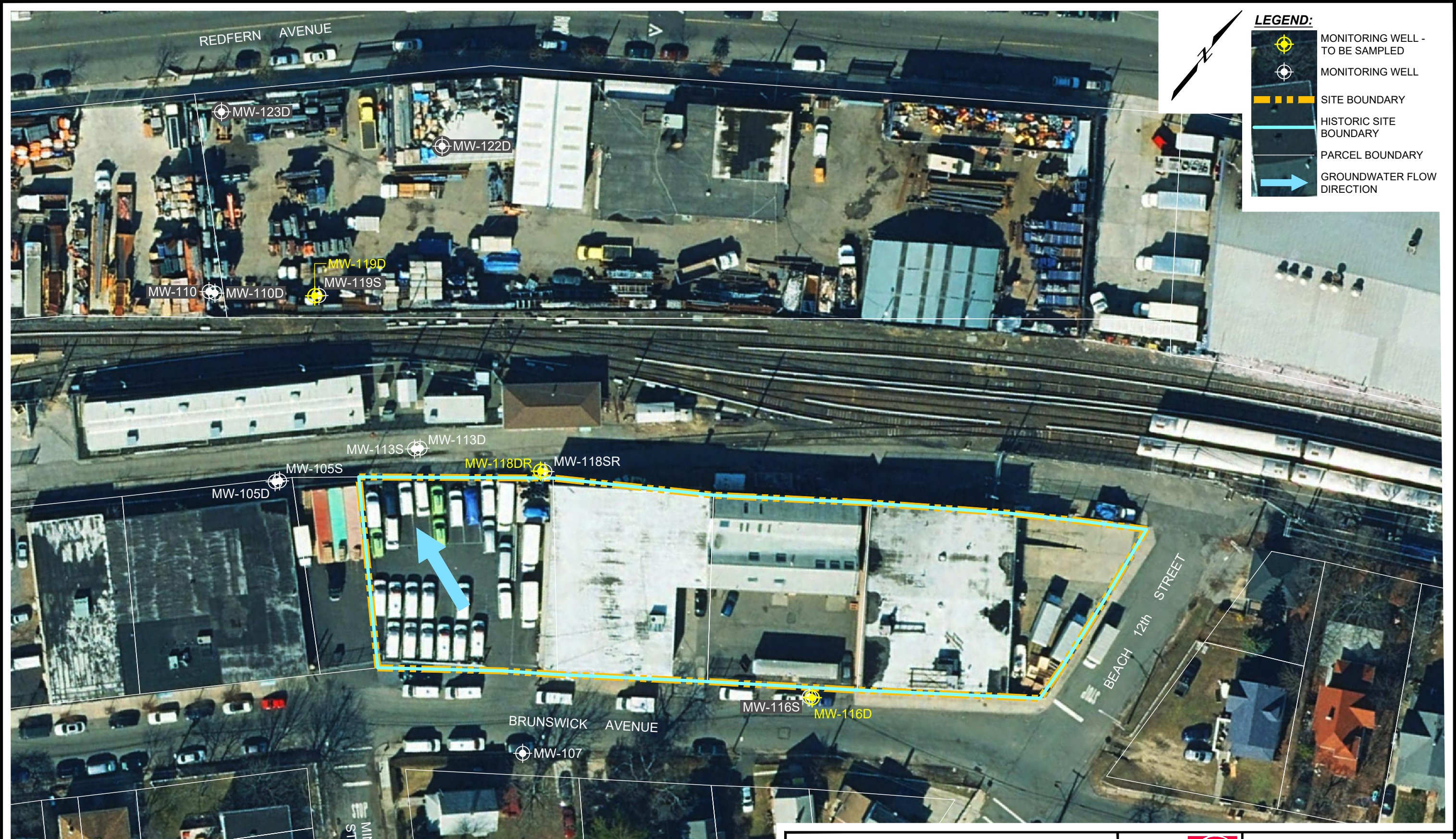


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GROUNDWATER SAMPLE
LOCATIONS -
EQUITY WORKS MGP SITE

September 2018

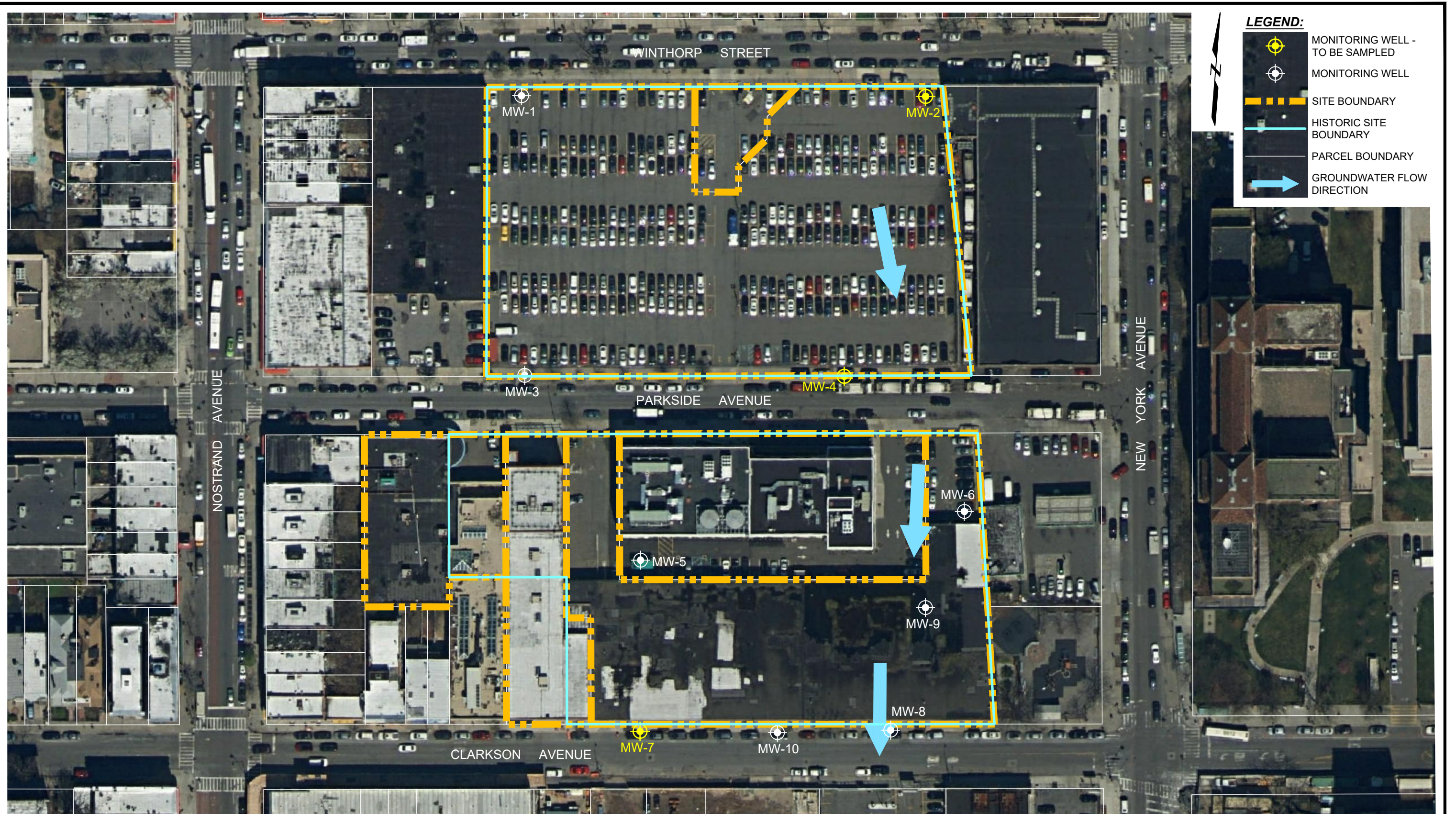
Fig. 6



LEGEND:

- MONITORING WELL - TO BE SAMPLED
- MONITORING WELL
- SITE BOUNDARY
- HISTORIC SITE BOUNDARY
- PARCEL BOUNDARY
- GROUNDWATER FLOW DIRECTION

SOURCE: 1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE. 2. FINAL ENGINEERING REPORT, FIGURE 4-6: GROUNDWATER MONITORING NETWORK, PREPARED BY AECOM, DATE: 1/24/15.		Emerging Contaminant Sampling Work Plan National Grid New York Former MGP Sites		GROUNDWATER SAMPLE LOCATIONS - FAR ROCKAWAY MGP SITE
				Project 1802728 September 2018



SOURCES:

1. AERIAL IMAGERY DATE: 03/29/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. SITE MANAGEMENT PLAN, FIGURE 1-7: GROUNDWATER ELEVATION CONTOUR MAP, PREPARED BY AECOM, DATE: 01/10/12 (GROUNDWATER CONTOURS DATED 7/28/2011).

Emerging Contaminant Sampling Work Plan
National Grid New York Former MGP Sites

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Project 1802728

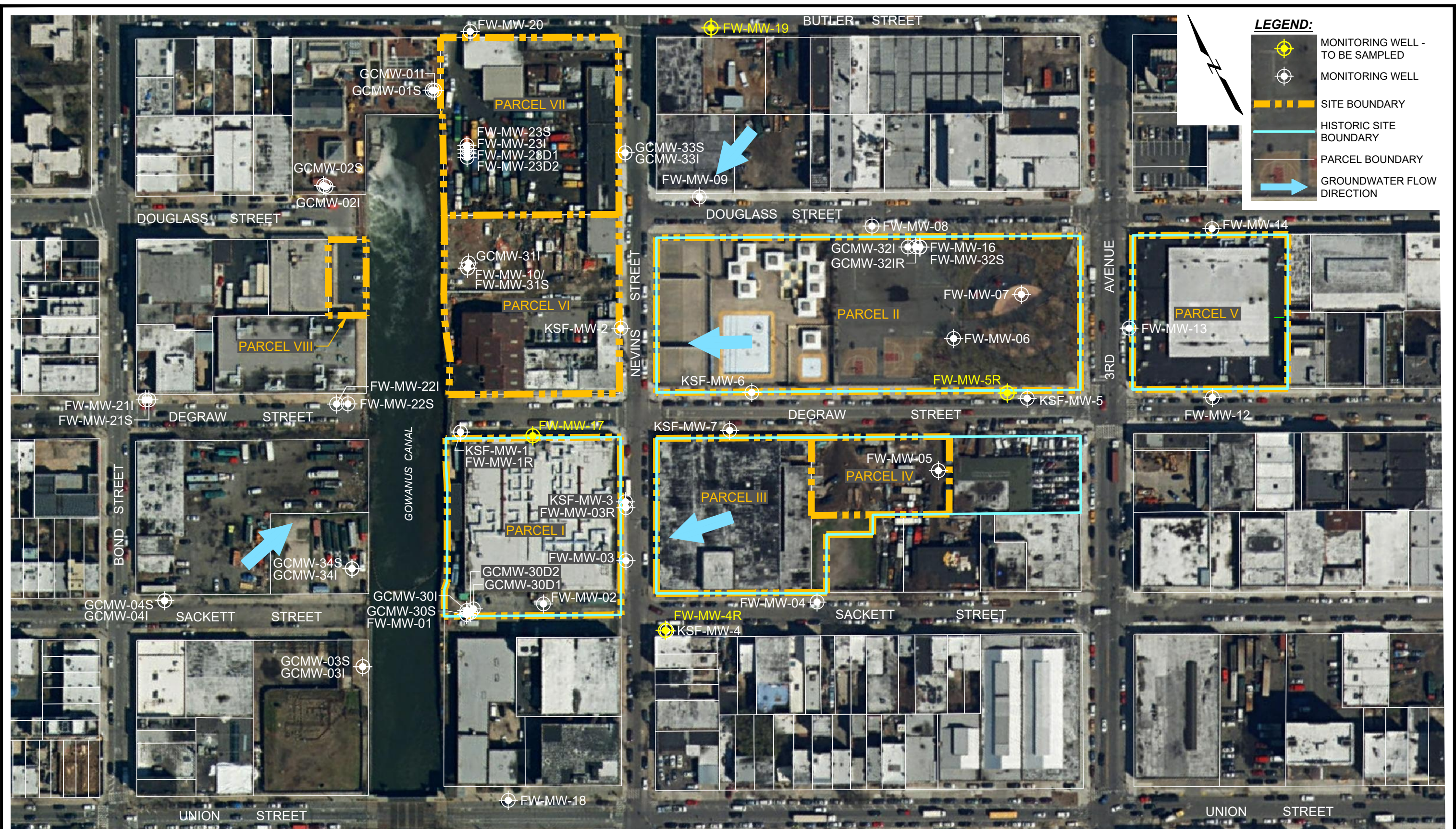
GROUNDWATER SAMPLE
LOCATIONS -
FLATBUSH STATIONS A & B SITE

September 2018

Fig. 8



SOURCE: 1. AERIAL IMAGERY DATE: 05/29/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE. 2. FIGURES 2 & 4 FROM <i>PERIODIC REVIEW REPORT</i>, PREPARED BY ARCADIS, DATE: JANUARY 31 2014 (GROUNDWATER CONTOURS FROM 9/21/16).	0 120 240 SCALE: 1" = 120'	Emerging Contaminant Sampling Work Plan National Grid New York Former MGP Sites nationalgrid	GEI Consultants Project 1802728	GROUNDWATER SAMPLE LOCATIONS - FORMER BROOKLYN BOROUGH GAS WORKS (CONEY ISLAND) MGP SITE September 2018 Fig. 9
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SOURCES: 1. AERIAL IMAGERY DATE: 03/29/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE. 2. REMEDIAL INVESTIGATION REPORT, FIGURE 14: SHALLOW GROUNDWATER CONTOURS AT HIGH TIDE AND DISSOLVED-PHASE GROUNDWATER ANALYTICAL SUMMARY - MAY 19, 2011, PREPARED BY GEI, DATE: JULY 2012.	Emerging Contaminant Sampling Work Plan National Grid New York Former MGP Sites nationalgrid	GEI Consultants Project 1802728 September 2018 GROUNDWATER SAMPLE LOCATIONS - FULTON WORKS MGP SITE Fig. 10
---	---	--



SOURCE: 1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE. 2. FIGURES FROM GROUNDWATER MONITORING REPORT - JUNE 2018 (Q2), PREPARED BY GEI CONSULTANTS, INC., DATE: AUGUST 2018.	0 150 30 SCALE: 1" = 150'	Emerging Contaminant Sampling Work Plan National Grid New York Former MGP Sites nationalgrid	GEI Consultants Project 1802728	GROUNDWATER SAMPLE LOCATIONS - GLEN COVE MGP SITE September 2018 Fig. 11
--	---	---	--	---



SOURCE:

1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER
ACCESSSED VIA ARCGIS ONLINE.
2. FIGURE 4-3: SHALLOW GROUNDWATER ELEVATION CONTOUR MAP, PREPARED
BY AECOM, DATE: 9/30/13 (GROUNDWATER CONTOURS DATED 10/18/12).
3. SITE CHARACTERIZATION WORK PLAN, FIGURE 2: PROPOSED SAMPLE
LOCATIONS, PREPARED BY GEI CONSULTANTS, INC., DATE: JULY 2007.

Emerging Contaminant Sampling Work Plan
National Grid New York Former MGP Sites

nationalgrid

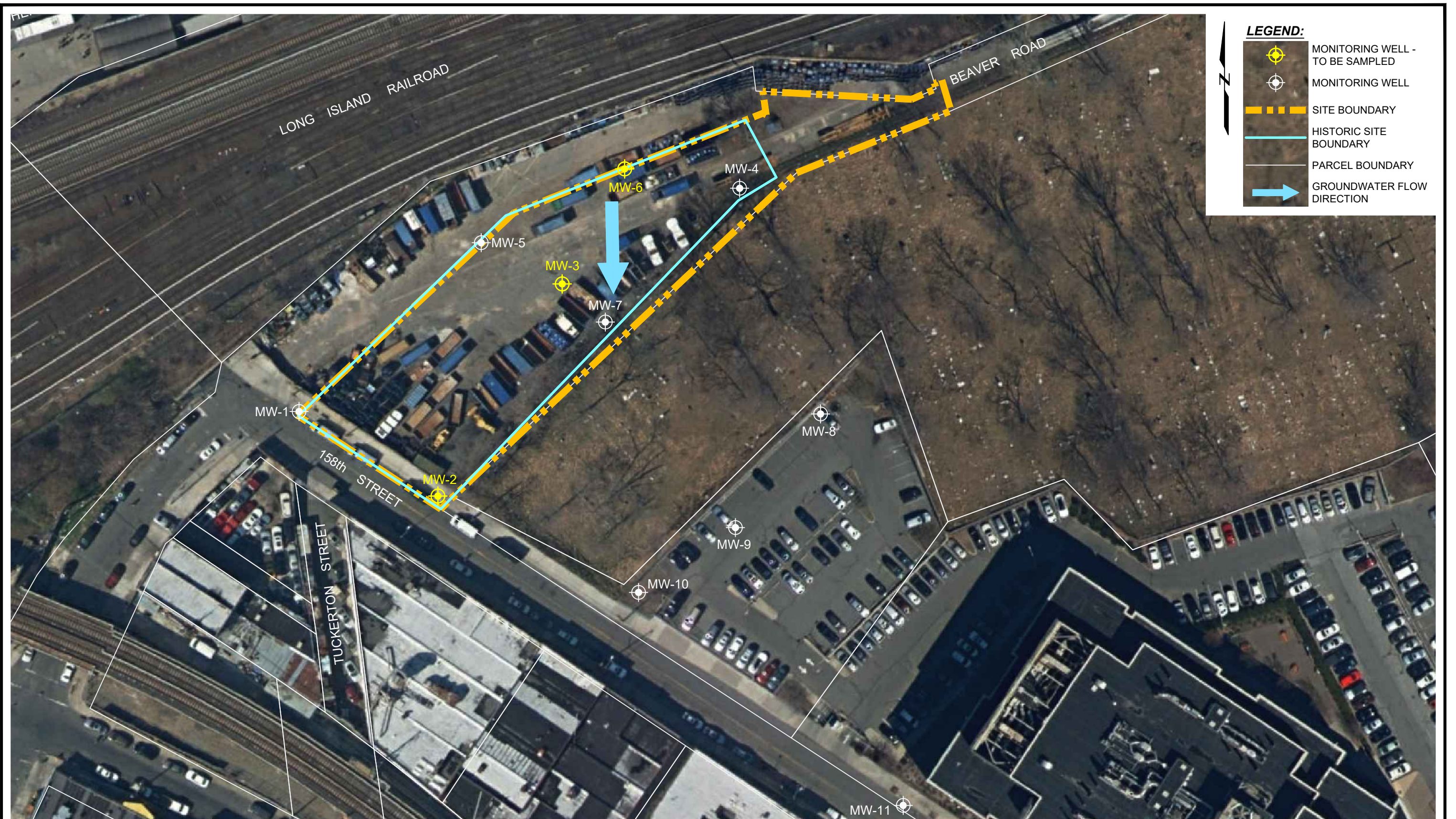
GEI Consultants

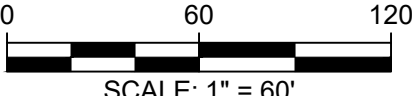
Project 1802728

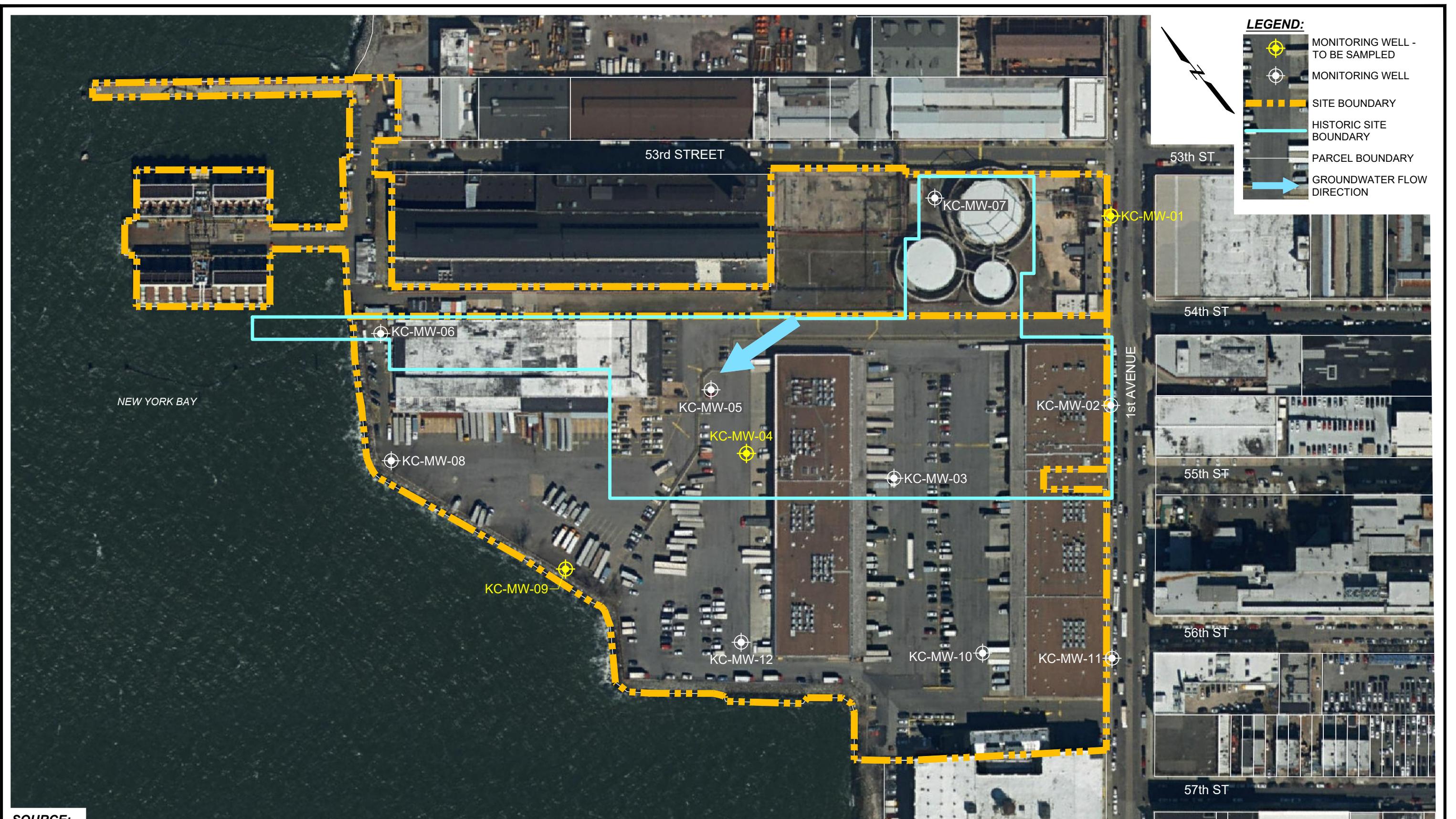
GROUNDWATER SAMPLE
LOCATIONS -
INWOOD HOLDER SITE

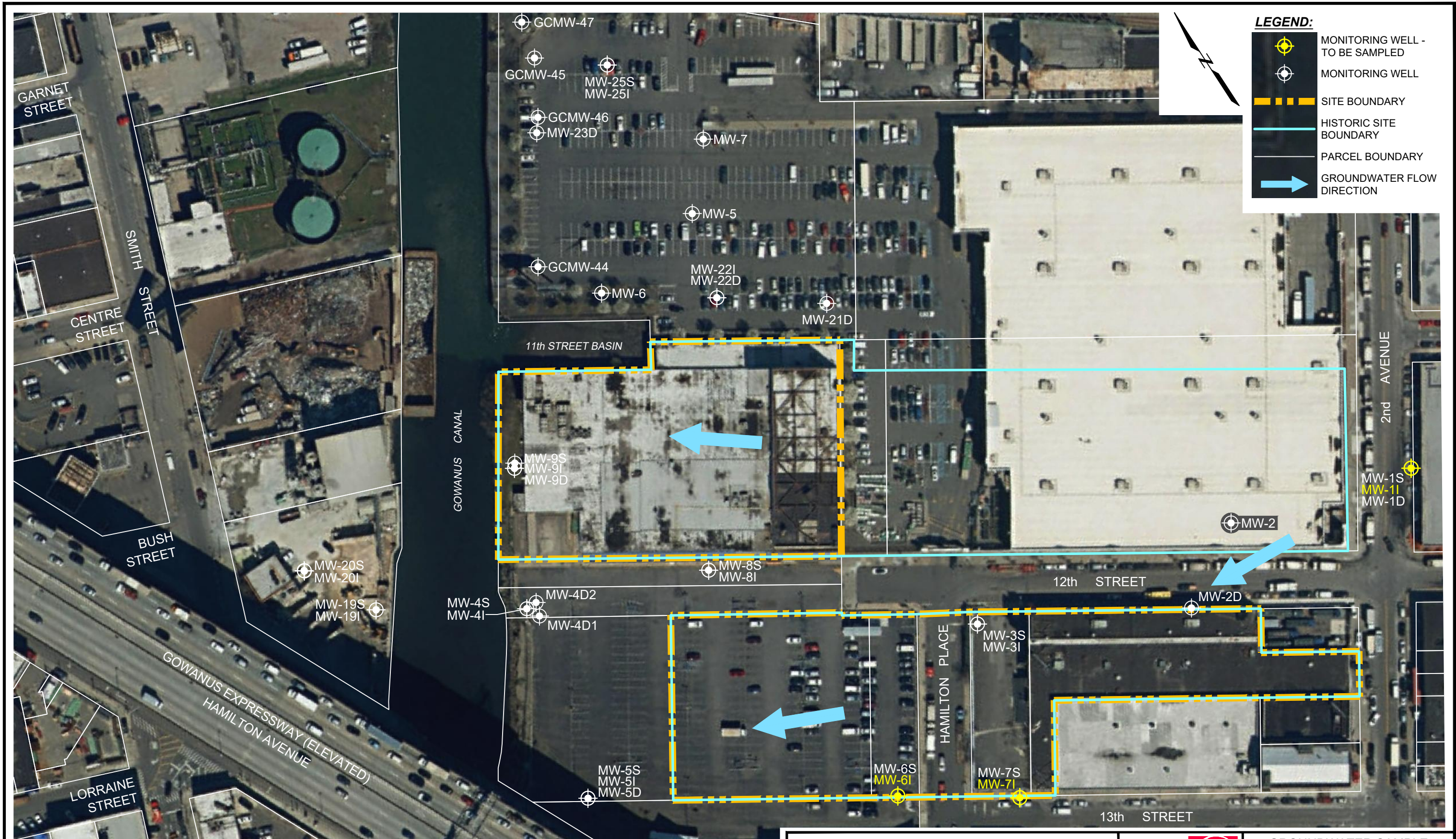
September 2018

Fig. 13



SOURCE: 1. AERIAL IMAGERY DATE: 03/29/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE. 2. REMEDIAL INVESTIGATION REPORT, FIGURE 4-5: GROUNDWATER ELEVATION CONTOUR MAP - DECEMBER 9, 2013, PREPARED BY AECOM, DATE 4/1/14.		Emerging Contaminant Sampling Work Plan National Grid New York Former MGP Sites			GROUNDWATER SAMPLE LOCATIONS - JAMAICA GAS AND LIGHT MGP SITE
					





LEGEND:

- MONITORING WELL - TO BE SAMPLED
- MONITORING WELL
- SITE BOUNDARY
- HISTORIC SITE BOUNDARY
- PARCEL BOUNDARY
- GROUNDWATER FLOW DIRECTION

SOURCES:

- AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
- REMEDIAL INVESTIGATION REPORT FIGURES PREPARED BY AECOM, DATE: 7/21/14 (LOW TIDE GROUNDWATER CONTOURS DATED 3/15/12).

0 100 200

SCALE: 1" = 100'

Emerging Contaminant Sampling Work Plan
National Grid New York Former MGP Sites

nationalgrid

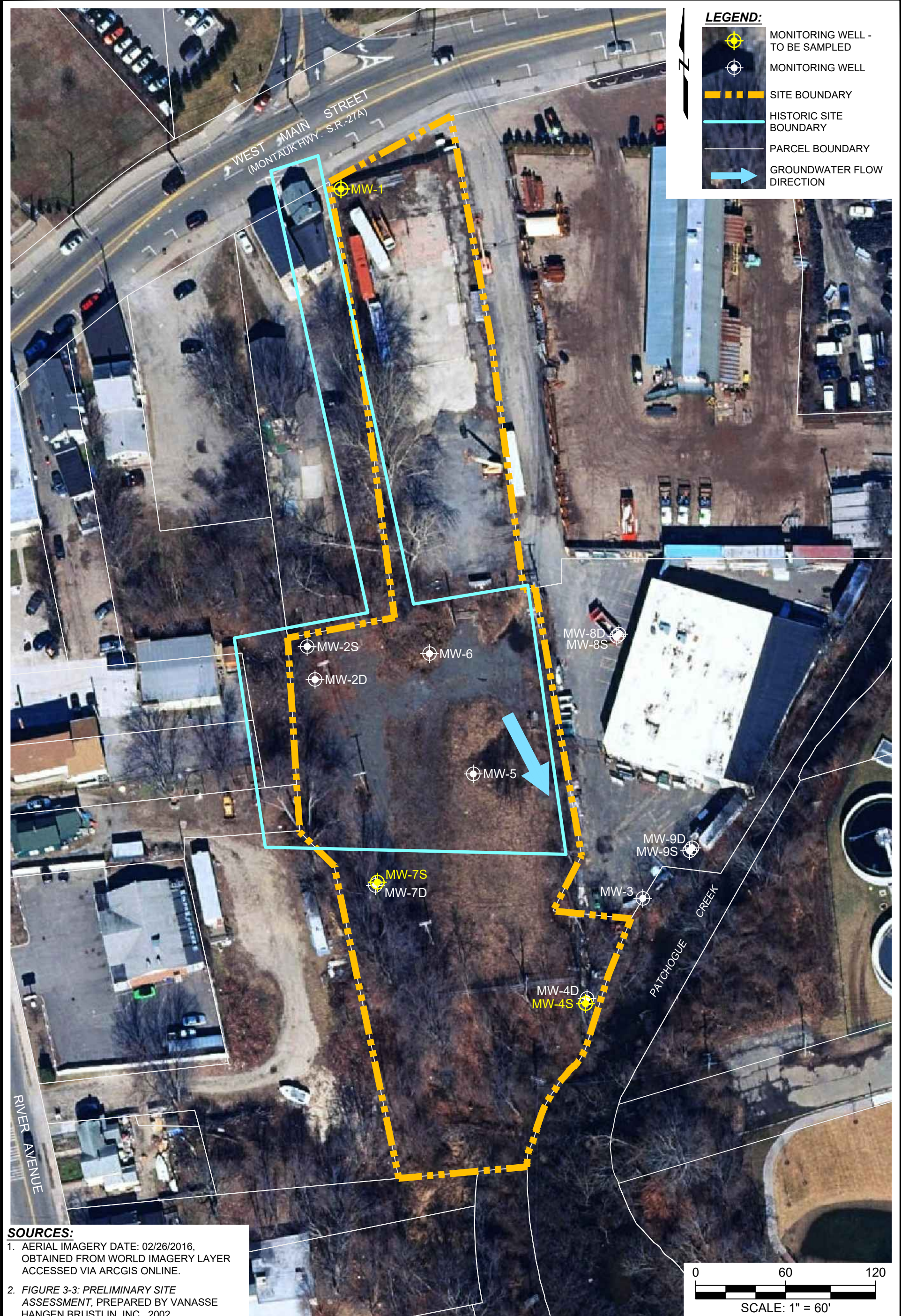
GEI Consultants

Project 1802728

GROUNDWATER SAMPLE LOCATIONS - METROPOLITAN WORKS MGP SITE

September 2018

Fig. 16



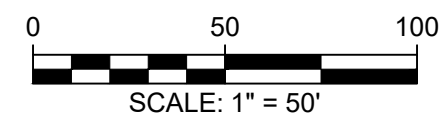
- SOURCES:**
- 1. AERIAL IMAGERY DATE: 02/26/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
 - 2. FIGURE 3-3: PRELIMINARY SITE ASSESSMENT, PREPARED BY VANASSE HANGEN BRUSTLIN, INC., 2002.
 - 3. FIGURE 2-4: MONITORING WELL LOCATIONS, PREPARED BY TETRA TECH EC, INC.
 - 4. FIGURE 1: WATER TABLE ELEVATION CONTOUR MAP - DECEMBER 27, 2016, PREPARED BY BROWN AND CALDWELL, DATE: 3/13/17.

Emerging Contaminant Sampling Work Plan National Grid New York Former MGP Sites		GROUNDWATER SAMPLE LOCATIONS - PATCHOGUE MGP SITE
	Project 1802728	
	September 2018	Fig. 17



SOURCES:

1. AERIAL IMAGERY DATE: 03/29/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. FIGURE 12: MONITORING WELL LOCATIONS, GROUNDWATER ELEVATIONS AND ANALYTICAL RESULTS, PREPARED BY TETRA TECH INC., DATE: 8/3/17.



Emerging Contaminant Sampling Work Plan
National Grid New York Former MGP Sites

nationalgrid



Project 1802728

GROUNDWATER SAMPLE
LOCATIONS -
PEOPLES WORKS MGP SITE

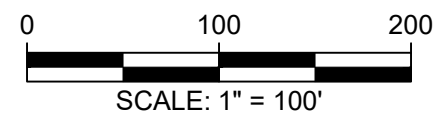
September 2018

Fig. 18



SOURCE:

1. AERIAL IMAGERY DATE: 05/29/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. GROUNDWATER MONITORING REPORT FIGURES, PREPARED BY GEI CONSULTANTS, INC., DATE: APRIL 2018 (GROUNDWATER CONTOURS DATED 12/2017).



Emerging Contaminant Sampling Work Plan
National Grid New York Former MGP Sites

nationalgrid

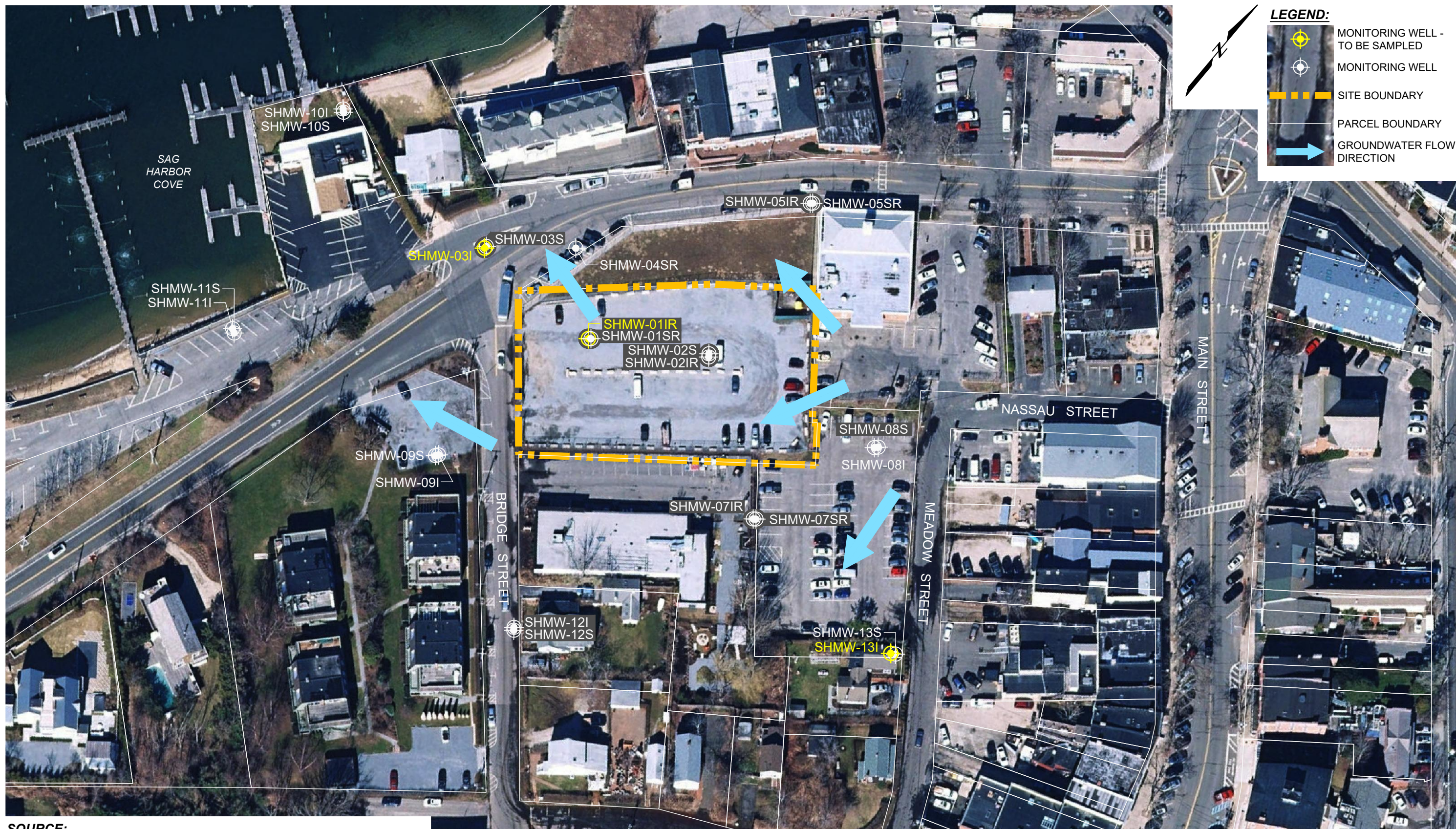


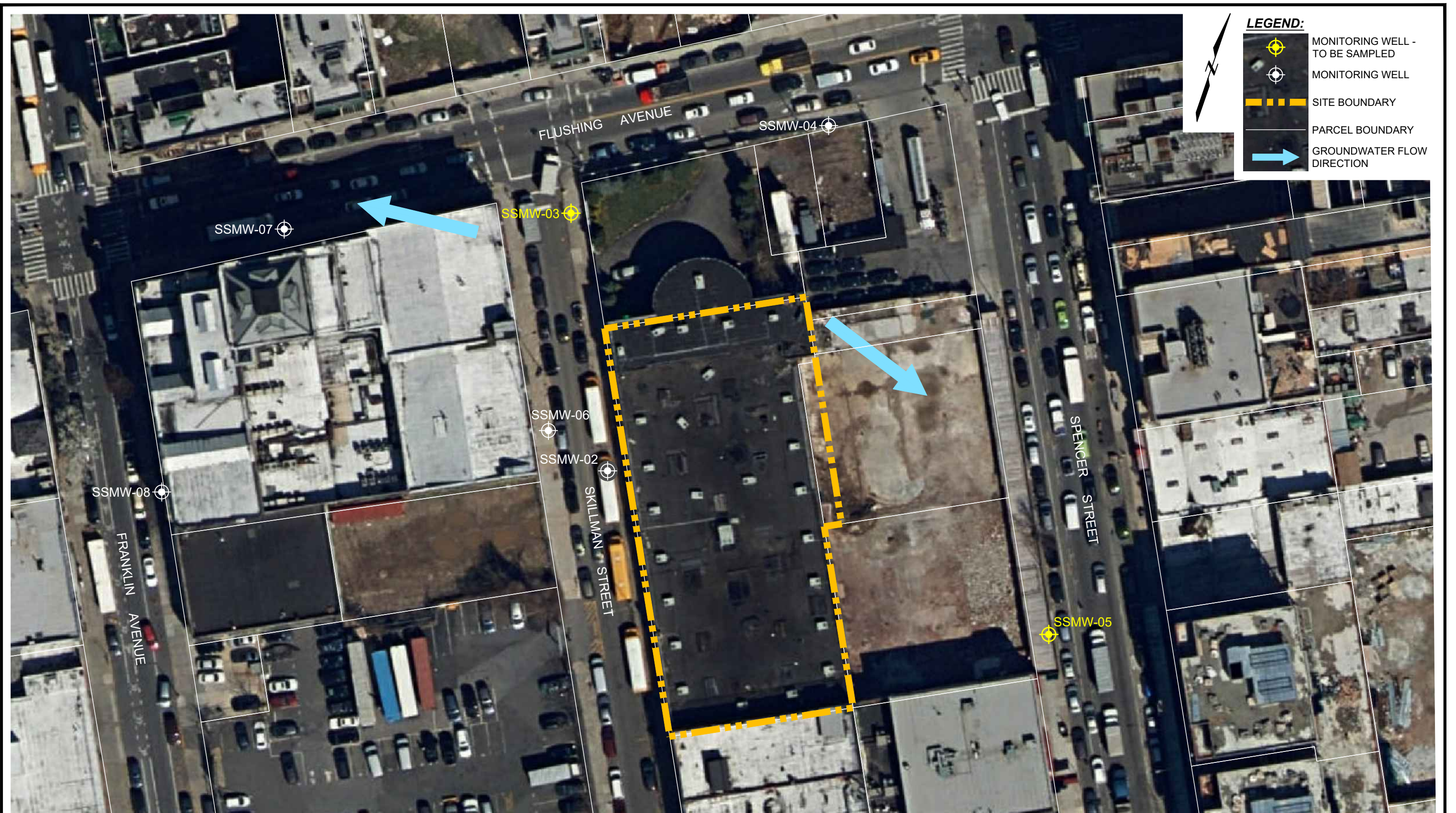
Project 1802728

GROUNDWATER SAMPLE
LOCATIONS -
ROCKAWAY PARK MGP SITE

September 2018

Fig. 19





Emerging Contaminant Sampling Work Plan
National Grid New York Former MGP Sites

nationalgrid

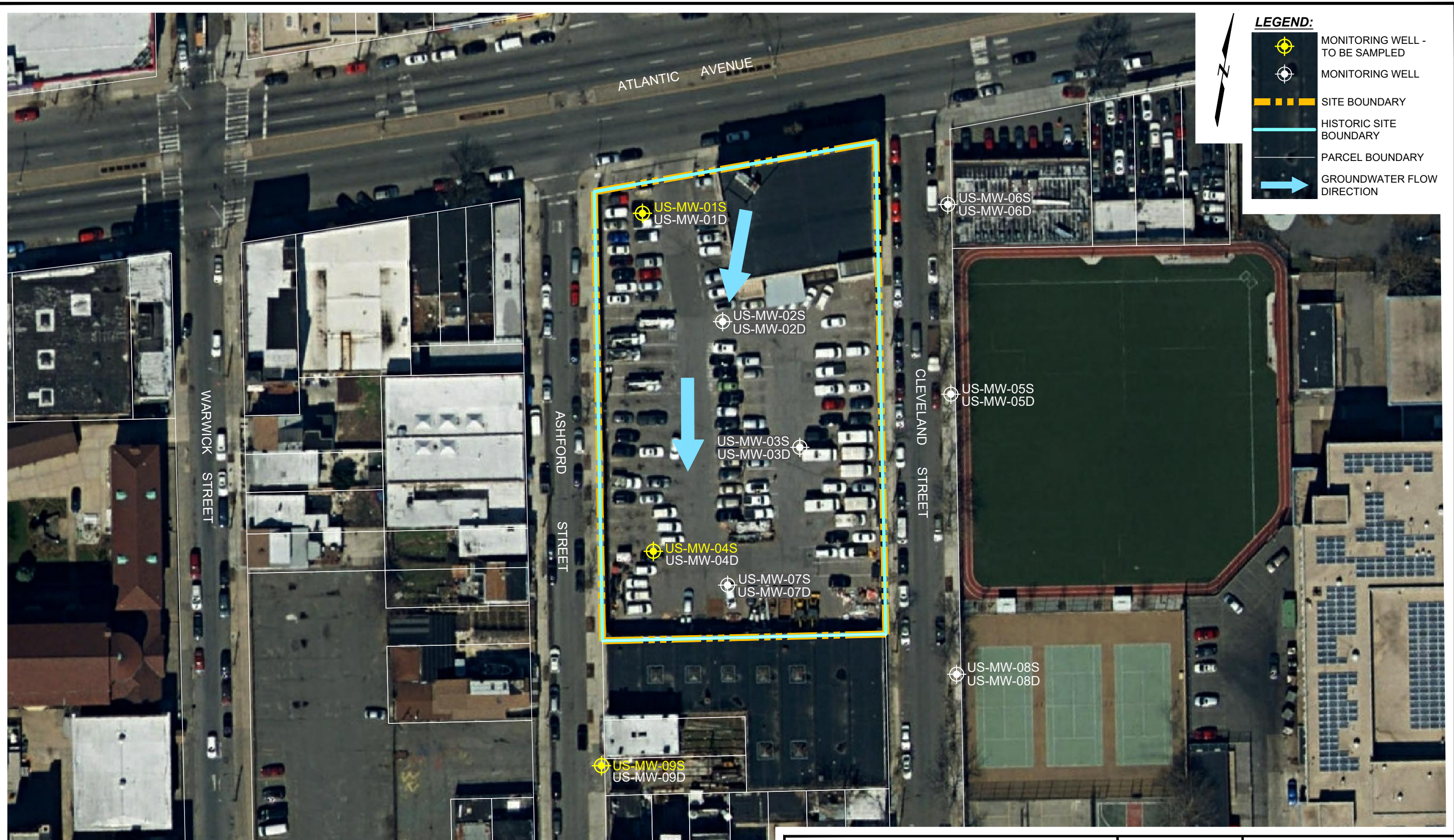


Project 1802728

GROUNDWATER SAMPLE
LOCATIONS -
SKILLMAN ST. STATION SITE

September 2018

Fig. 21



SOURCE:
1. AERIAL IMAGERY DATE: 03/96/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. FIGURES FROM DRAFT SITE CHARACTERIZATION REPORT, PREPARED BY GEI CONSULTANTS, INC., DATE: DECEMBER 2016.



Emerging Contaminant Sampling Work Plan
National Grid New York Former MGP Sites

nationalgrid



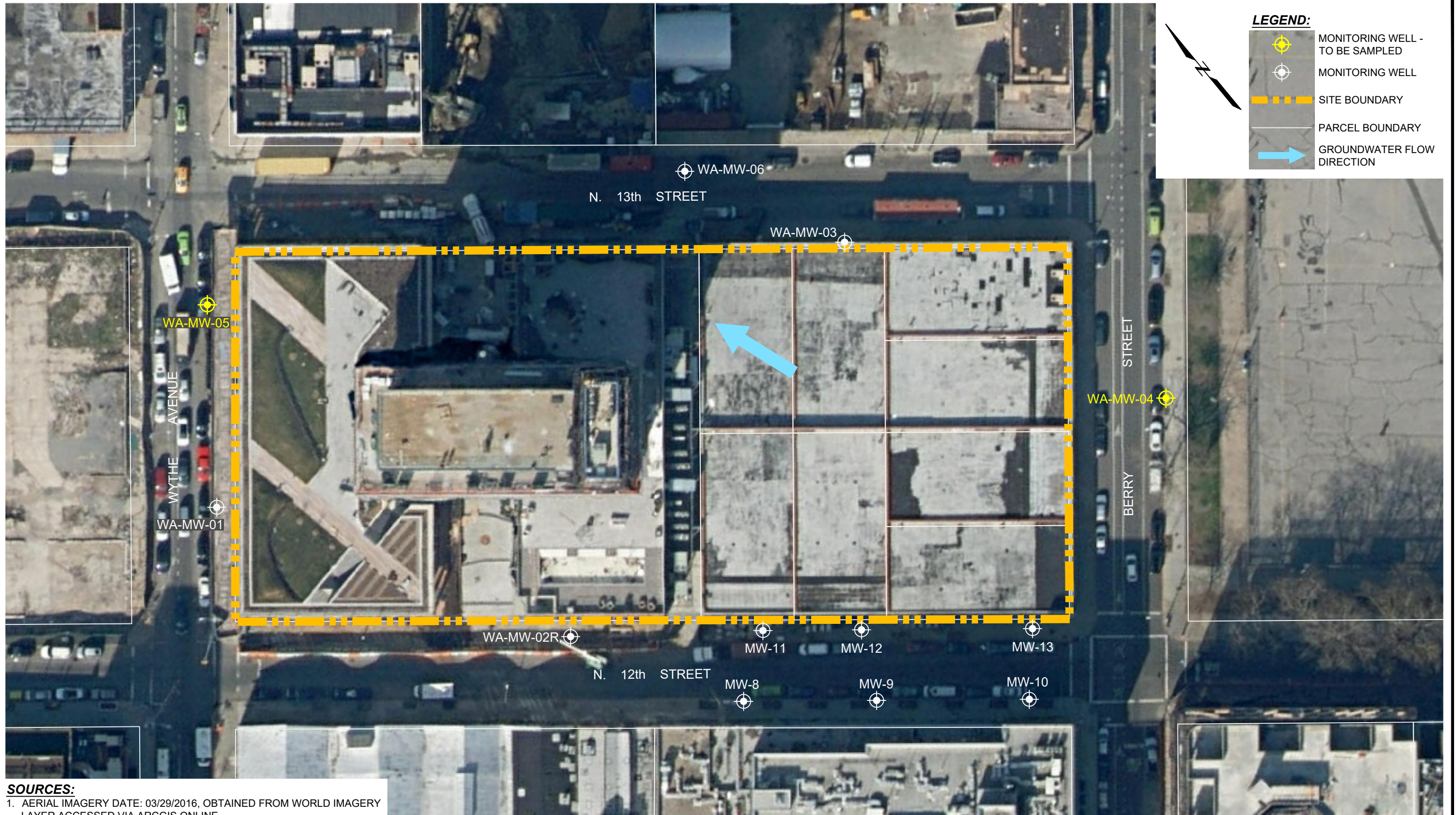
Project 1802728

GROUNDWATER SAMPLE
LOCATIONS -
UNION STATION HOLDER SITE

September 2018

Fig. 22





LEGEND:

- MONITORING WELL - TO BE SAMPLED
- MONITORING WELL
- SITE BOUNDARY
- PARCEL BOUNDARY
- GROUNDWATER FLOW DIRECTION

SOURCES:

1. AERIAL IMAGERY DATE: 03/29/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE.
2. INTERIM SITE MANAGEMENT PLAN, FIG. 4: HISTORICAL SITE CONDITIONS, SAMPLE LOCATION AND CROSS SECTION LOCATION MAP, PREPARED BY GEI CONSULTANTS, INC., DATE: SEPTEMBER 2017.
3. POST-REDEVELOPMENT GROUNDWATER SAMPLING REPORT, FIG. 4: JULY 2017 GROUNDWATER CONTOURS (ft) AND ANALYTICAL RESULTS SUMMARY (ug/L), PREPARED BY GEI CONSULTANTS, INC., DATE: OCTOBER 2017.



Emerging Contaminant Sampling Work Plan
National Grid New York Former MGP Sites

nationalgrid



Project 1802728

GROUNDWATER SAMPLE
LOCATIONS -
WYTHE AVE. STATION SITE

September 2018

Fig. 24

ATTACHMENT D

Proposed Sampling Locations Emerging Contaminant Sampling Upstate New York Sites

Explanation

- Monitoring well
- Wells recommended for sampling for emerging contaminants
- Parcel boundary
- Property boundary

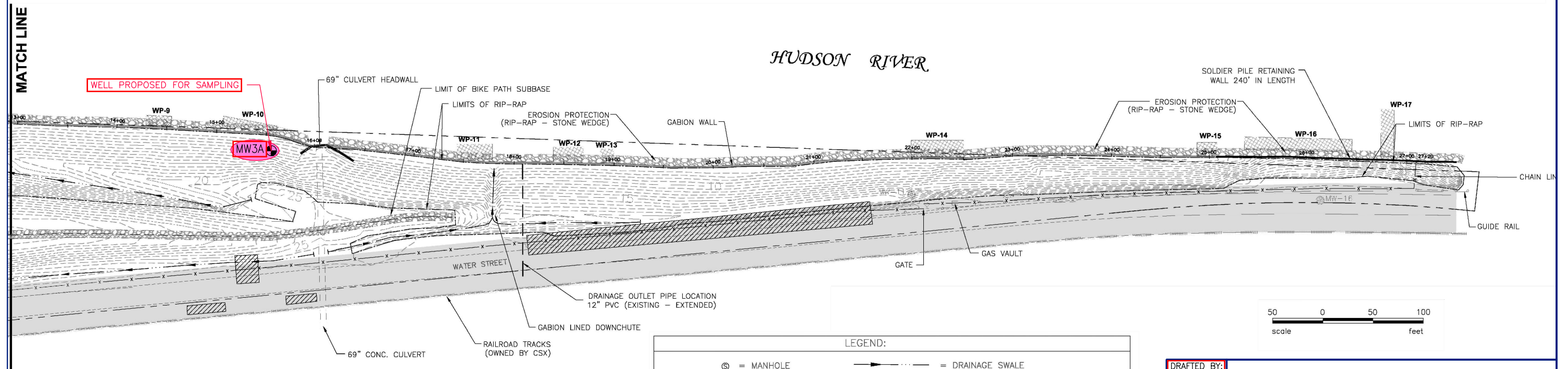
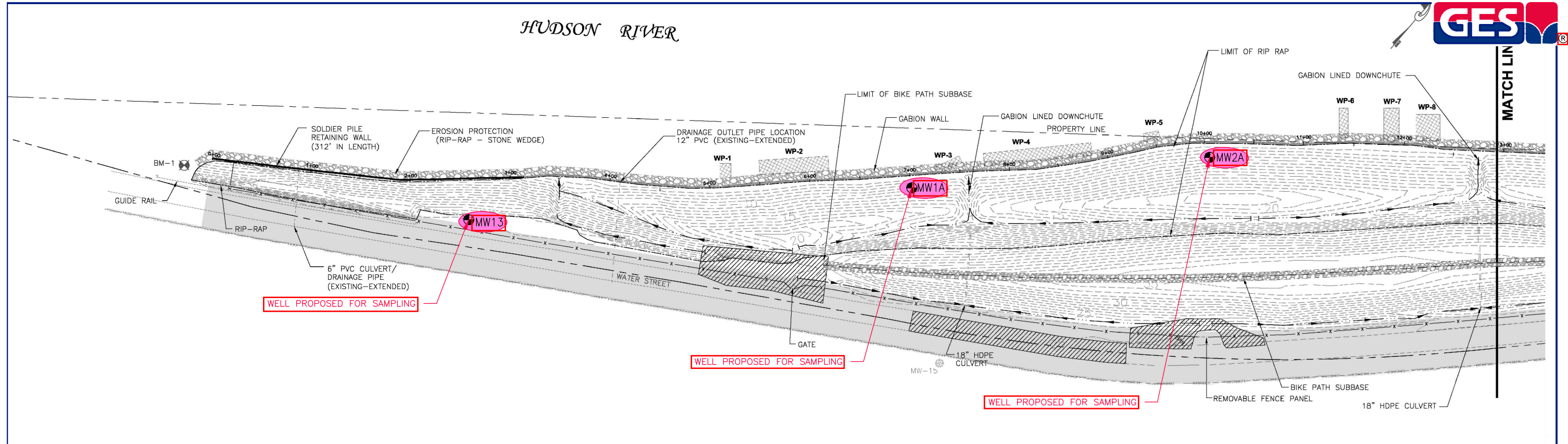
Note:
Groundwater flow direction is based on seasonal canal operating levels. Historical reports indicate that during high canal levels (non-winter), flow is generally to the southeast; during low/drained canal levels (winter), flow shifts to an easterly/northeasterly direction.

Aerial imagery from Google Earth.
Image date is 10/14/2016.



M:\Graphics\0600-Syracuse\Misc\National Grid\Troy (Water street)\Troy SM.dwg 7/11/2018 1:37:42 PM

HUDSON RIVER



LEGEND

MONITORING WELL PROPOSED AS PFAS SAMPLE LOCATION
MONITORING WELL

LEGEND:	
	= MANHOLE
	= SANITARY VALVE
	= MONITORING WELL
	= GAS STANDPIPE
	= SITE STATIONING
	= RIP RAP WEDGE
	= FINAL GRADE
	= UTILITY CORRIDOR
	= GABION RETAINING WALL
	= SOLDIER PILE RETAINING WALL
	= DRAINAGE SWALE
	= ROAD
	= RAILROAD TRACKS
	= GUIDE RAIL
	= FENCE
	= PROPERTY LINE
	= LIMIT OF RIP RAP (FLOOD PROTECTION)
	= BENCHMARK
	= GEOMEMBRANE BARRIER (UTILITY CORRIDOR)
	= REMOVED TAR WEEP LOCATION AND ID



DRAFTED BY:

W.G.S.

CHECKED BY:

REVIEWED BY:

NORTH



SITE MAP

NATIONAL GRID
S INT RIVER ROAD & WATER STREET
TROY, NEW YORK

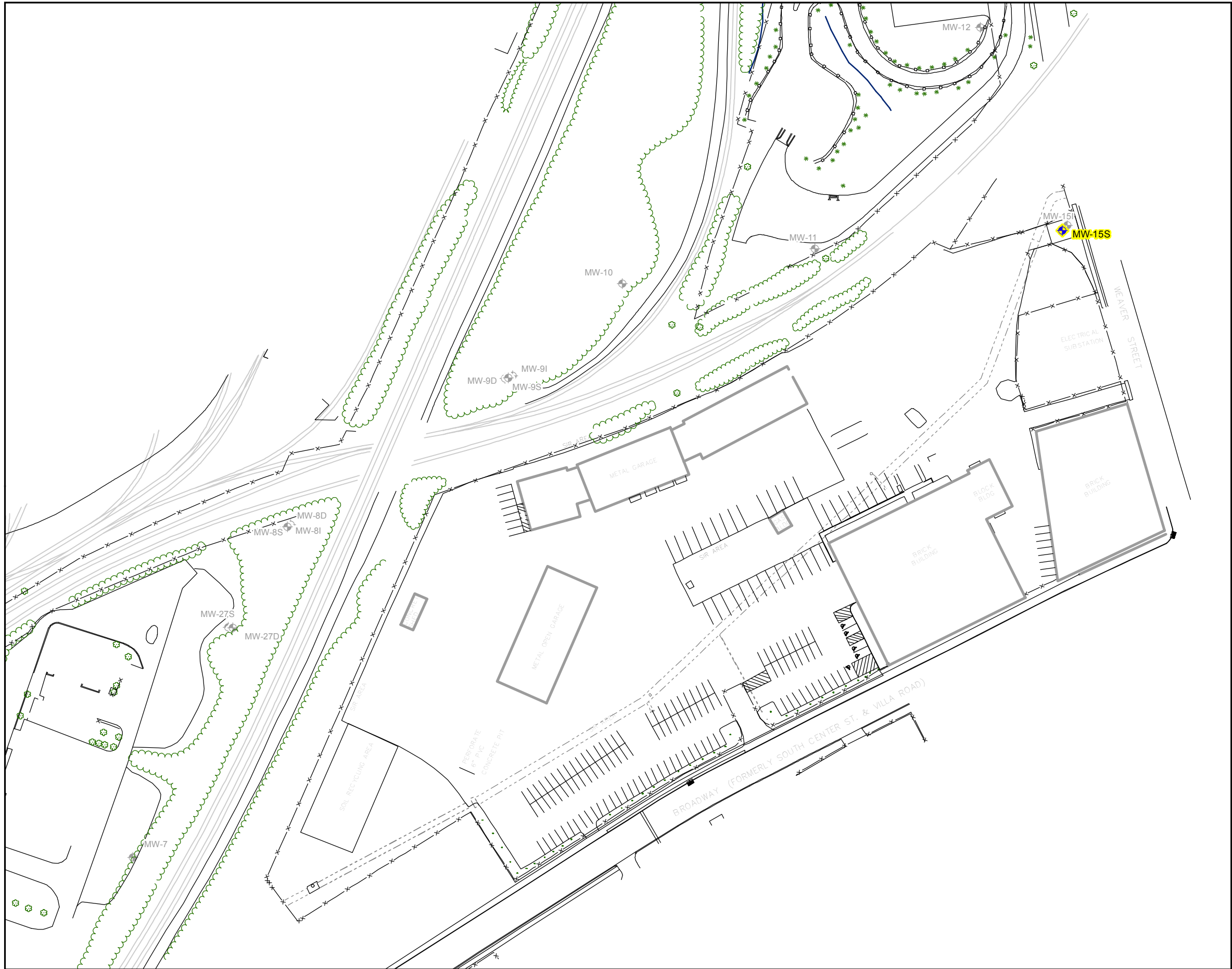
Groundwater & Environmental Services, Inc.
5 TECHNOLOGY PLACE, SUITE 4, EAST SYRACUSE, NY 13057

SCALE AS SHOWN

DATE

7-11-18

FIGURE

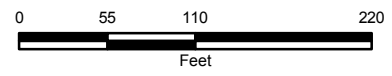


LEGEND

- PROPOSED PFC AND 1,4-DIOXANE SAMPLE LOCATION
- MONITORING WELL

NATIONAL GRID
SCHENECTADY
(BROADWAY) FORMER MGP SITE
SCHENECTADY, NEW YORK

PROPOSED
PFC AND 1,4-DIOXANE
SAMPLING LOCATIONS



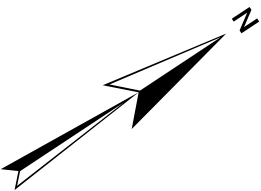
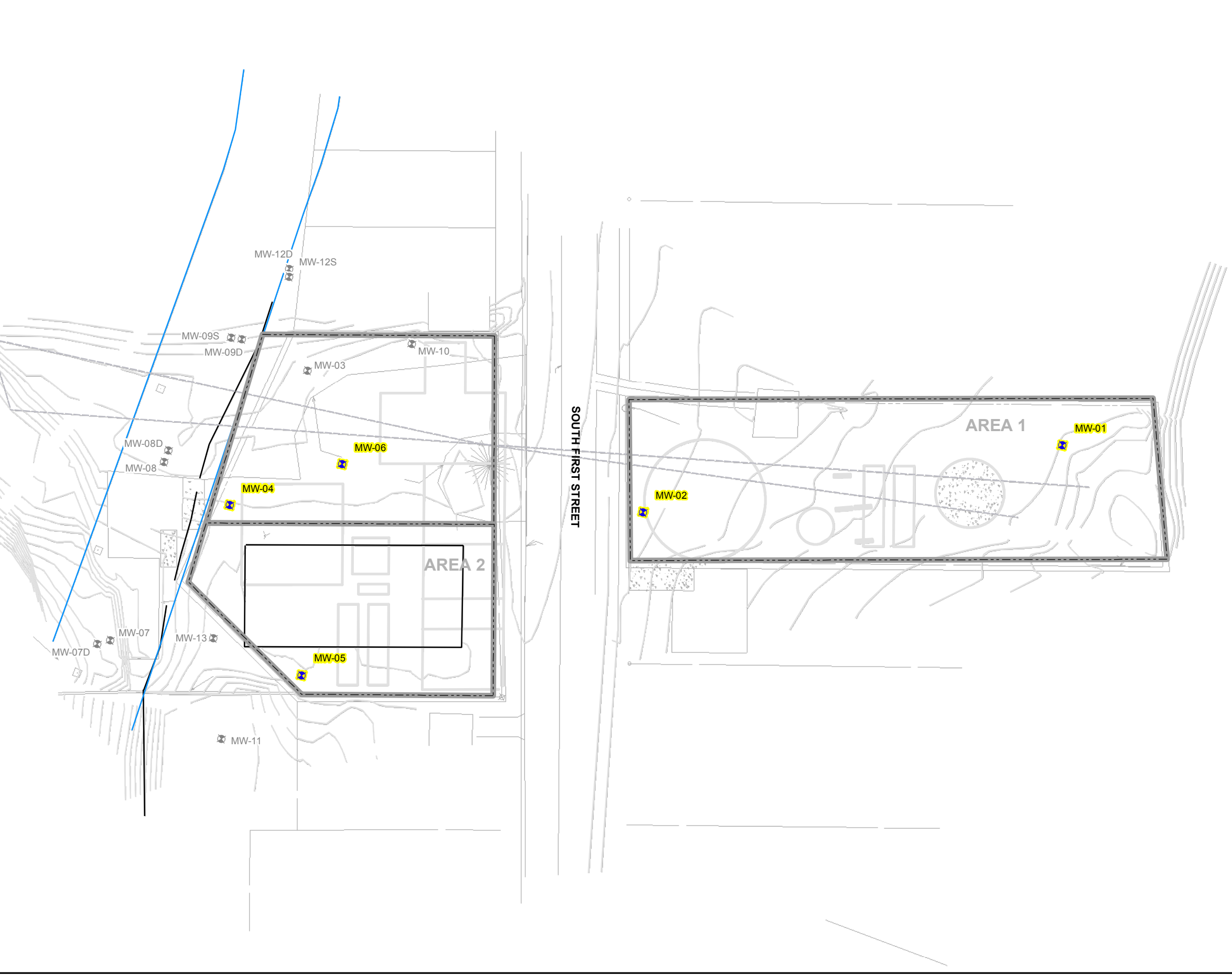
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JULY 2018



O'BRIEN & GERE ENGINEERS, INC.

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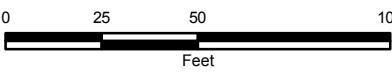


LEGEND

- PROPOSED PFC AND 1,4-DIOXANE SAMPLE LOCATION
- MONITORING WELL
- PROPERTY LINES

NATIONAL GRID
SOUTH FIRST STREET MGP SITE
FULTON, NEW YORK

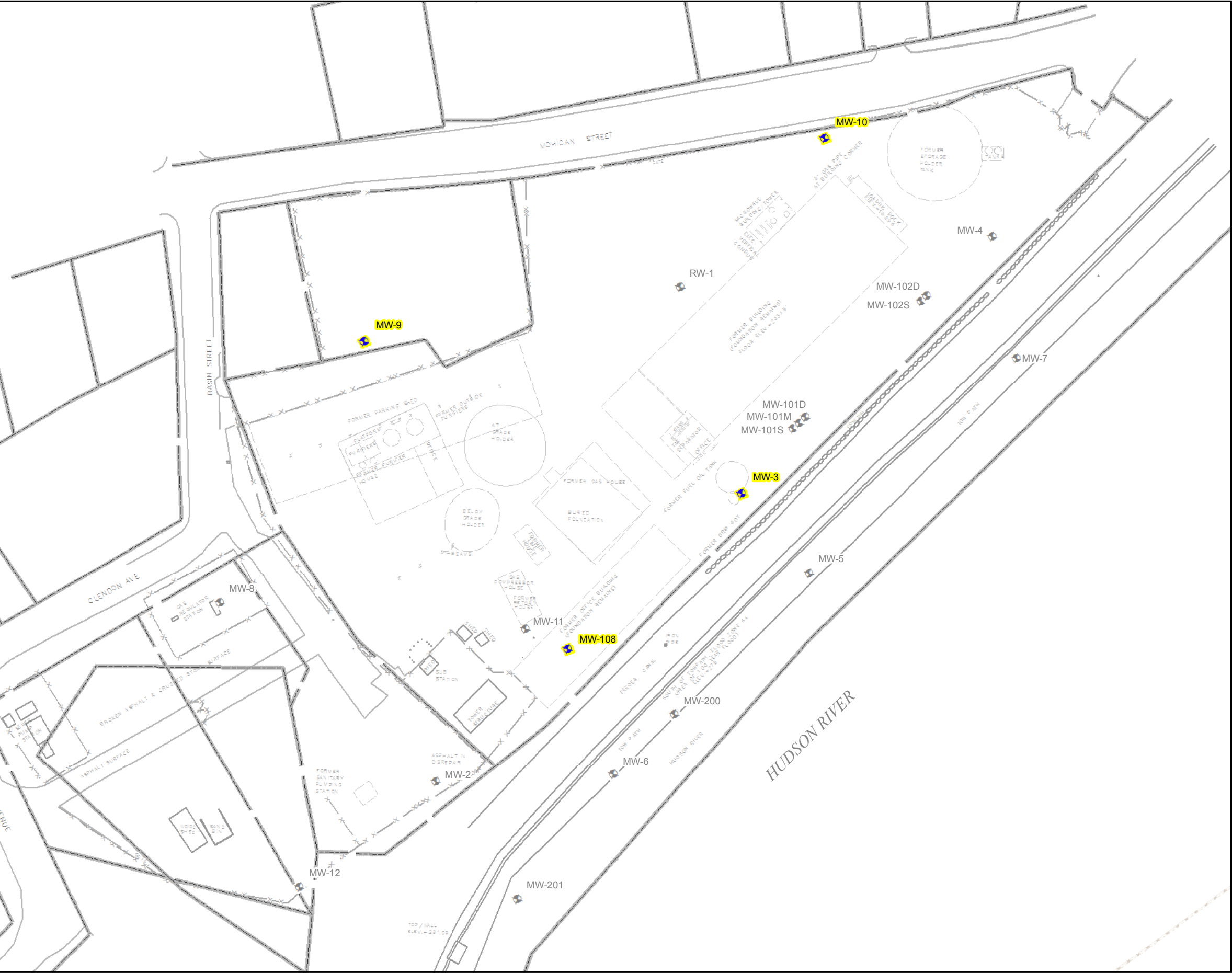
PROPOSED
PFC AND 1,4-DIOXANE
SAMPLING LOCATIONS



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JULY 2018



O'BRIEN & GERE ENGINEERS, INC.

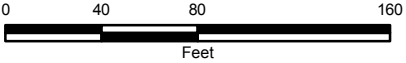


LEGEND

- PROPOSED PFPC AND 1,4-DIOXANE SAMPLE LOCATION
- MONITORING WELL
- PROPERTY LINE

NATIONAL GRID
FORMER GLENS FALLS
(MOHICAN ST.) MGP SITE
GLENS FALLS, NEW YORK

PROPOSED
PFC AND 1,4-DIOXANE
SAMPLING LOCATIONS

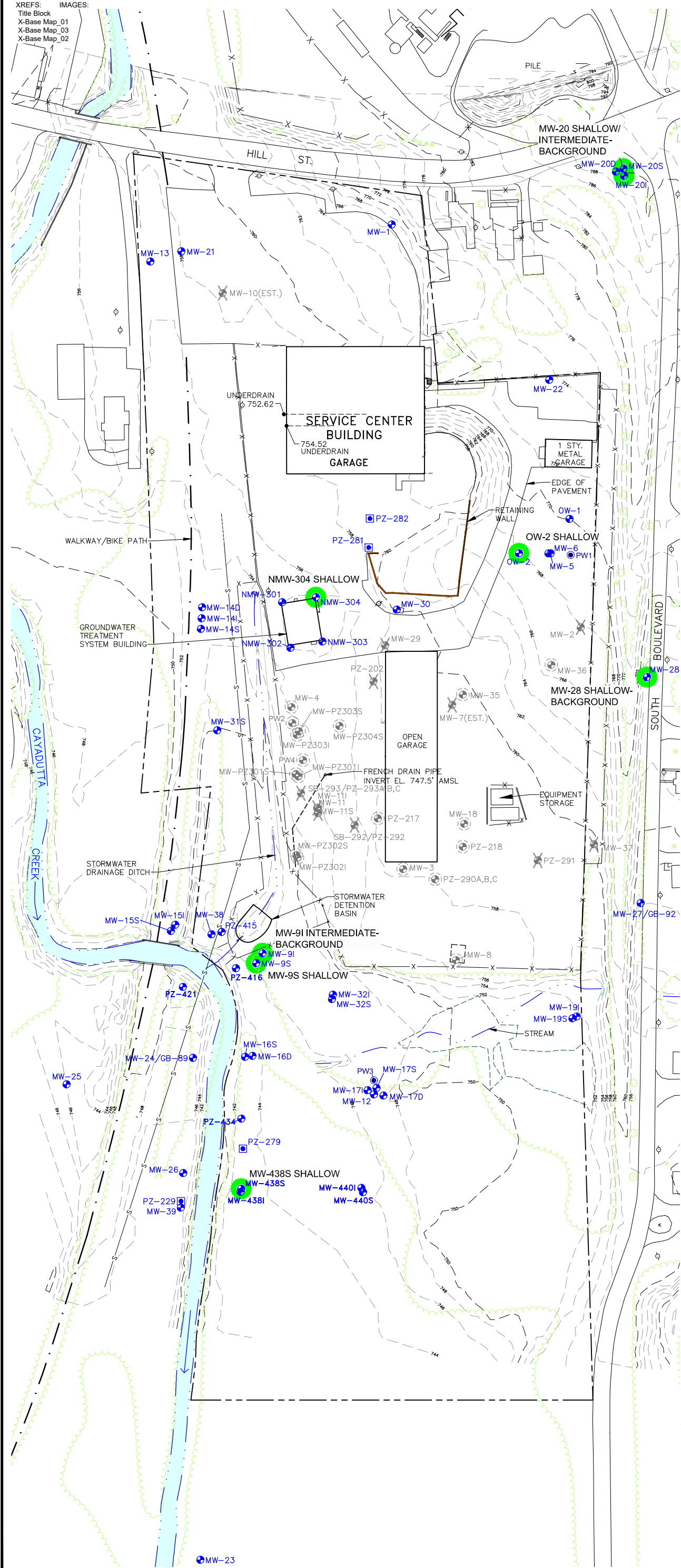


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JULY 2018



O'BRIEN & GERE ENGINEERS, INC.

XREFS: IMAGES:
Title Block
X-Base Map_01
X-Base Map_03
X-Base Map_02

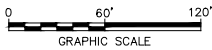


LEGEND:

- MW-19I MONITORING WELL
- PZ-29I PIEZOMETER
- PW-1 PUMPING WELL
- MW-2 MONITORING WELL OR PIEZOMETER DESTROYED OR OTHERWISE INACCESSIBLE
- MW-4I ABANDONED MONITORING WELL/PIEZOMETER/PUMPING WELL
- 746 TOPOGRAPHIC ELEVATION CONTOUR
- PROPERTY LINE
- WATER
- TREE LINE
- FENCE
- SANITARY SEWER
- UTILITY POLE
- PROPOSED MONITORING WELL TO BE SAMPLED

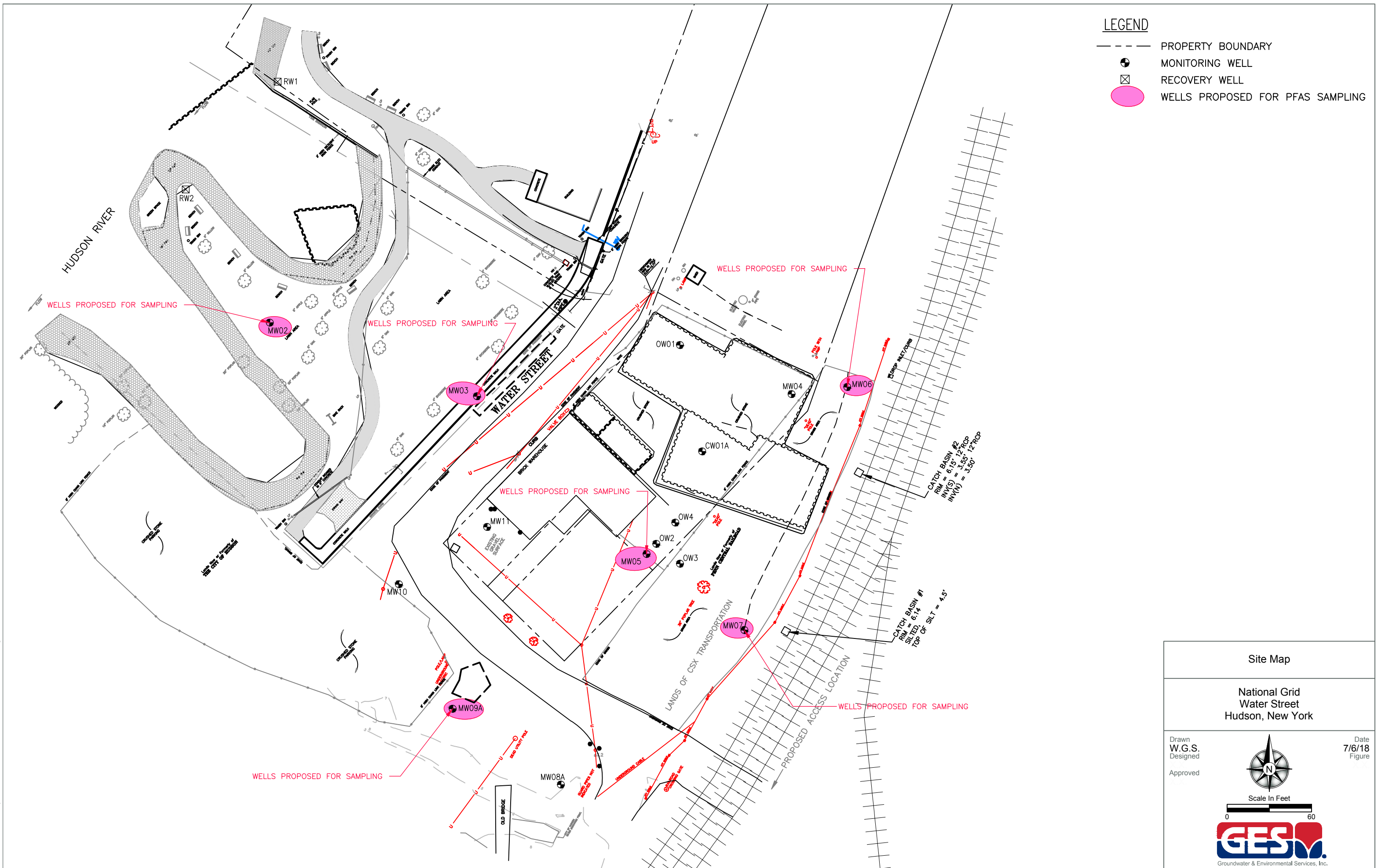
NOTES:

- ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929.
- THE NATIONAL GRID PROPERTY LINE SHOWN IS APPROXIMATE.
- ALL LOCATIONS ARE APPROXIMATE.
- BASEMAP PREPARED FROM ELECTRONIC SURVEY FILE PROVIDED BY NIAGARA MOHAWK ON 7/23/01. PRIMARY SURVEY CONTROL FOR PHOTOGRAMMETRIC MAPPING WAS ESTABLISHED FROM AN ON THE GROUND SURVEY, PERFORMED ON JULY 28, 1994 USING THE GLOBAL POSITIONING SYSTEM (GPS) AND CONFORMS TO ORDER 2 CLASS 2 FGCS ACCURACY SPECIFICATIONS. THE HORIZONTAL REFERENCE DATUM NORTH AMERICAN DATUM OF 1983 (NAD 83) ON REFERENCE ELLIPSOID ASSOCIATED WITH THE GEODETIC REFERENCE SYSTEM OF 1980 (GRS 80). THE COORDINATES ARE BASED ON THE NEW YORK STATE PLANE GEODETIC SYSTEM OF 1983 (EASTERN ZONE 3101).
- EXISTING SITE FEATURES BASED ON "ASBUILT SURVEY" PROVIDED BY STANTEC ON 7/18/08.
- FORMER LOCATIONS OF SITE FEATURES WERE DIGITIZED FROM PHOTOCOPIES OF FIGURES 2-4 & 2-5 FROM THE JUNE 1993 "GLOVERSVILLE MGP SITE ILM REPORT" BY ATLANTIC ENVIRONMENTAL SERVICES, INC., WHICH WERE BASED ON SANBORN INSURANCE MAPS, AND ARE APPROXIMATE ONLY.



NATIONAL GRID
GLOVERSVILLE (HILL STREET) FORMER MGP SITE
GLOVERSVILLE, NEW YORK

PROPOSED MONITORING WELL
SAMPLING LOCATIONS

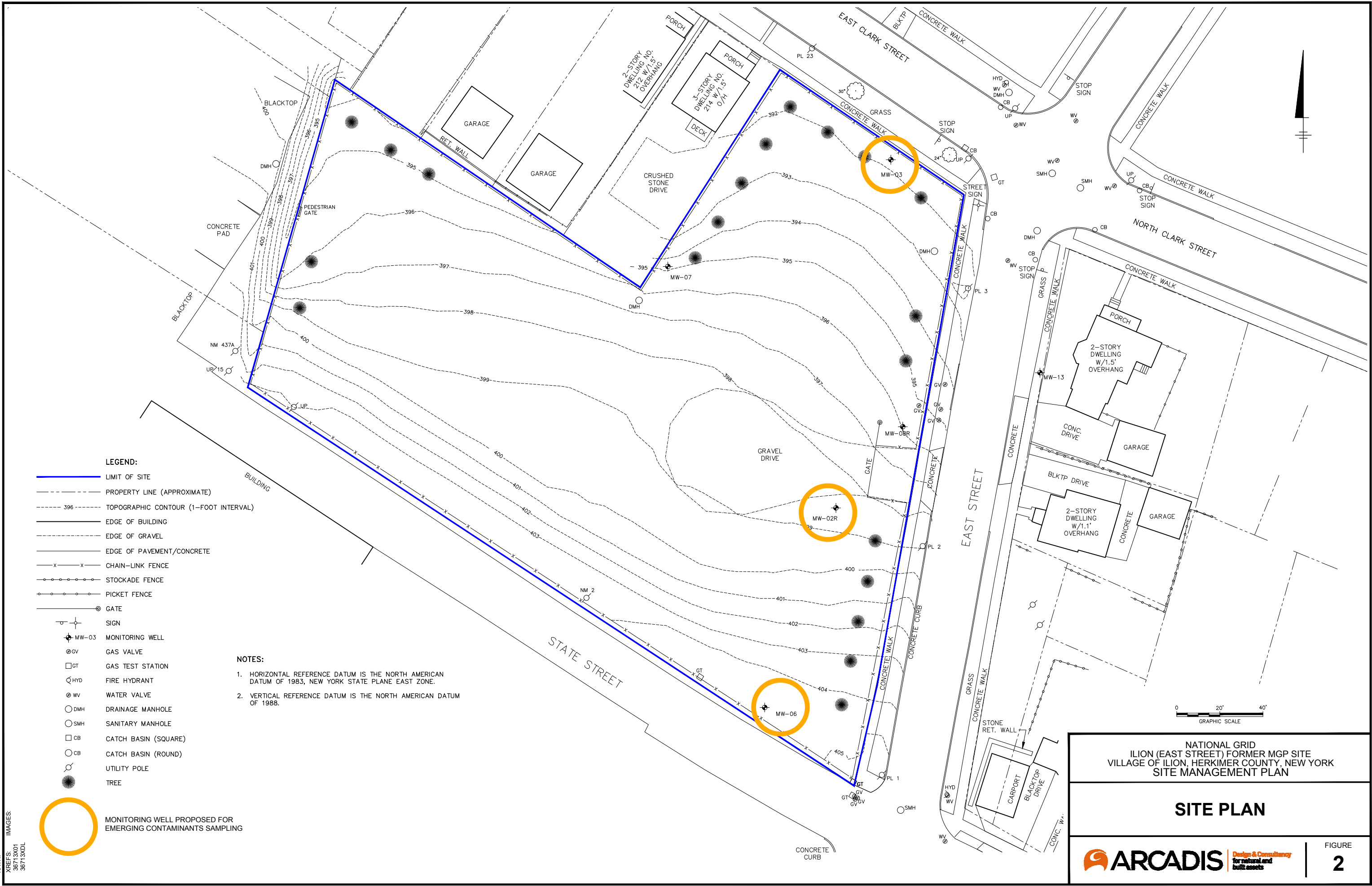


LEGEND:

- LIMIT OF SITE
- - - - - PROPERTY LINE (APPROXIMATE)
- - - - - 396 TOPOGRAPHIC CONTOUR (1-FOOT INTERVAL)
- EDGE OF BUILDING
- - - - - EDGE OF GRAVEL
- - - - - EDGE OF PAVEMENT/CONCRETE
- x - x - CHAIN-LINK FENCE
- o - o - STOCKADE FENCE
- o - o - PICKET FENCE
- ⊙ GATE
- ⊙ SIGN
- ⊙ MW-03 MONITORING WELL
- ⊙ GV GAS VALVE
- ⊙ GT GAS TEST STATION
- ⊙ HYD FIRE HYDRANT
- ⊙ WV WATER VALVE
- ⊙ DMH DRAINAGE MANHOLE
- ⊙ SMH SANITARY MANHOLE
- ⊙ CB CATCH BASIN (SQUARE)
- ⊙ CB CATCH BASIN (ROUND)
- ⊙ UTILITY POLE
- TREE
- MONITORING WELL PROPOSED FOR EMERGING CONTAMINANTS SAMPLING

NOTES:

- HORIZONTAL REFERENCE DATUM IS THE NORTH AMERICAN DATUM OF 1983, NEW YORK STATE PLANE EAST ZONE.
- VERTICAL REFERENCE DATUM IS THE NORTH AMERICAN DATUM OF 1988.

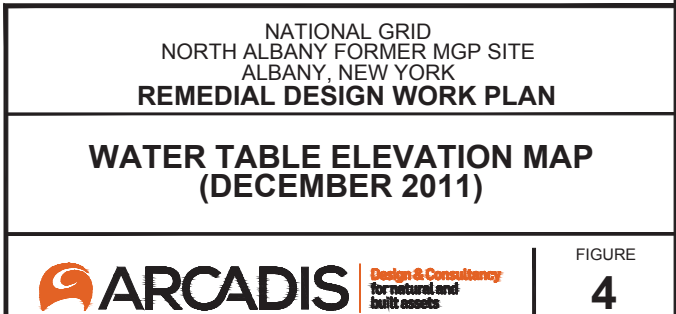


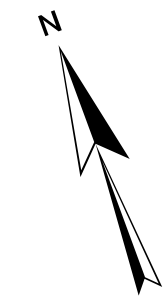
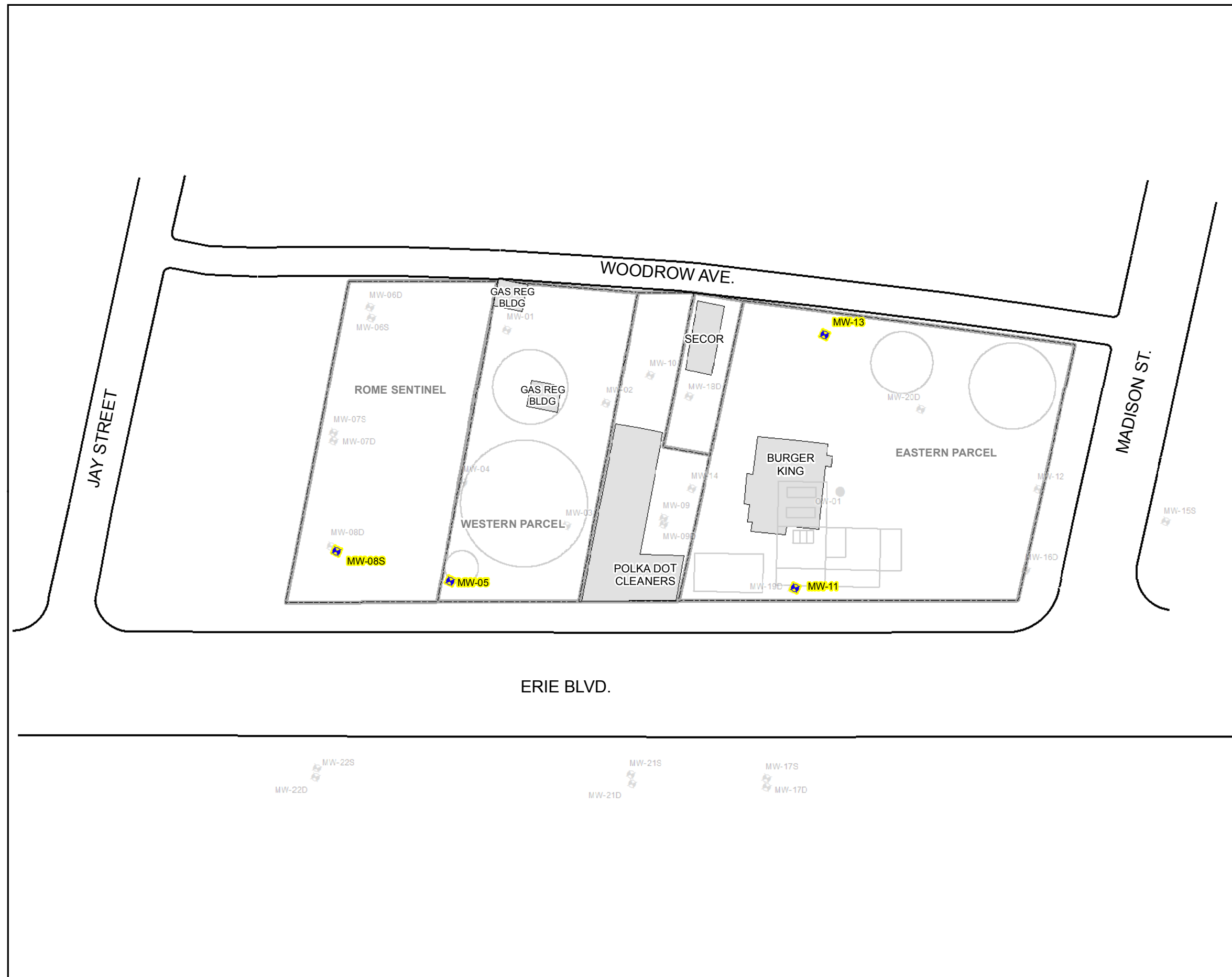
NATIONAL GRID
ILION (EAST STREET) FORMER MGP SITE
VILLAGE OF ILION, HERKIMER COUNTY, NEW YORK
SITE MANAGEMENT PLAN

SITE PLAN

ARCADIS Design & Consultancy
for natural and built assets

FIGURE
2



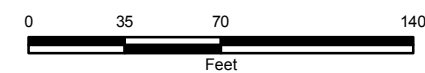


LEGEND

- PROPOSED PFC AND 1,4-DIOXANE SAMPLE LOCATION
- MONITORING WELL
- OBSERVATION WELL
- PROPERTY LINE

NATIONAL GRID
ROME
(JAY & MADISON STREET) MGP SITE
ROME, NEW YORK

PROPOSED
PFC AND 1,4-DIOXANE
SAMPLING LOCATIONS

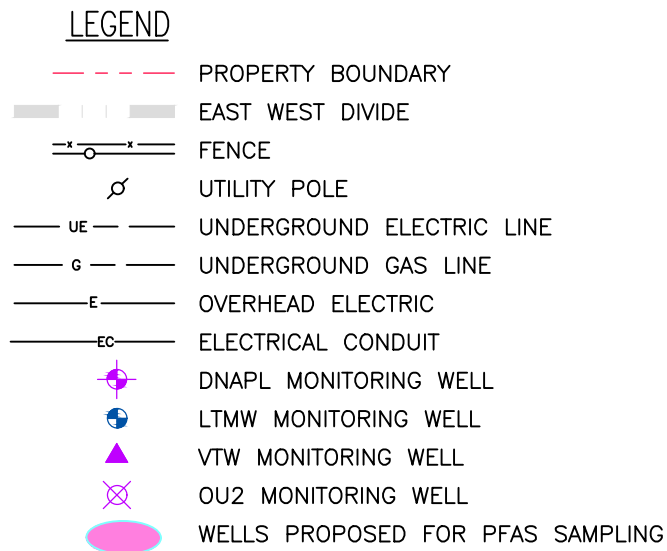
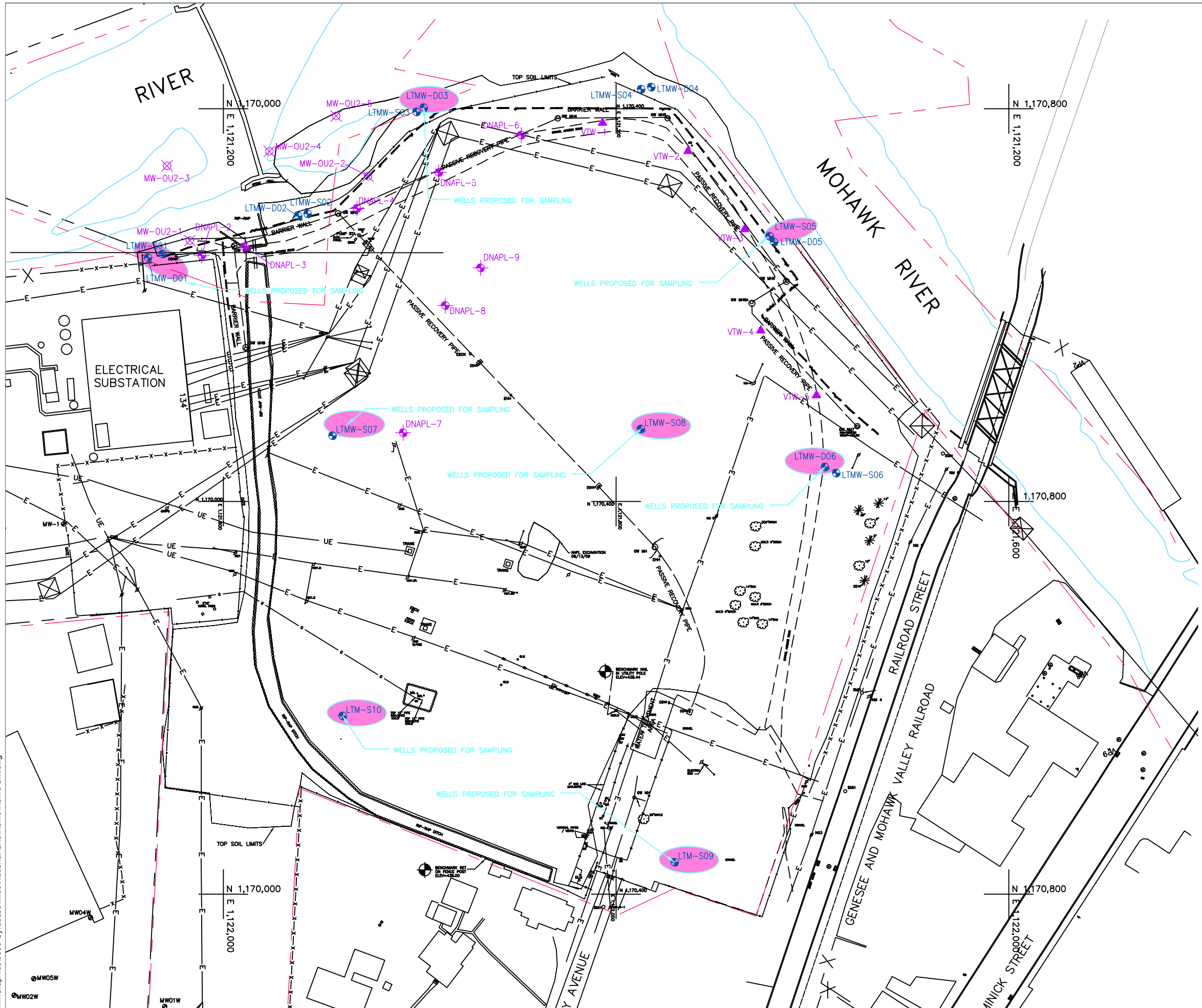


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JULY 2018



O'BRIEN & GERE ENGINEERS, INC.

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Site Map

National Grid
Kingsley Avenue
Rome, New York

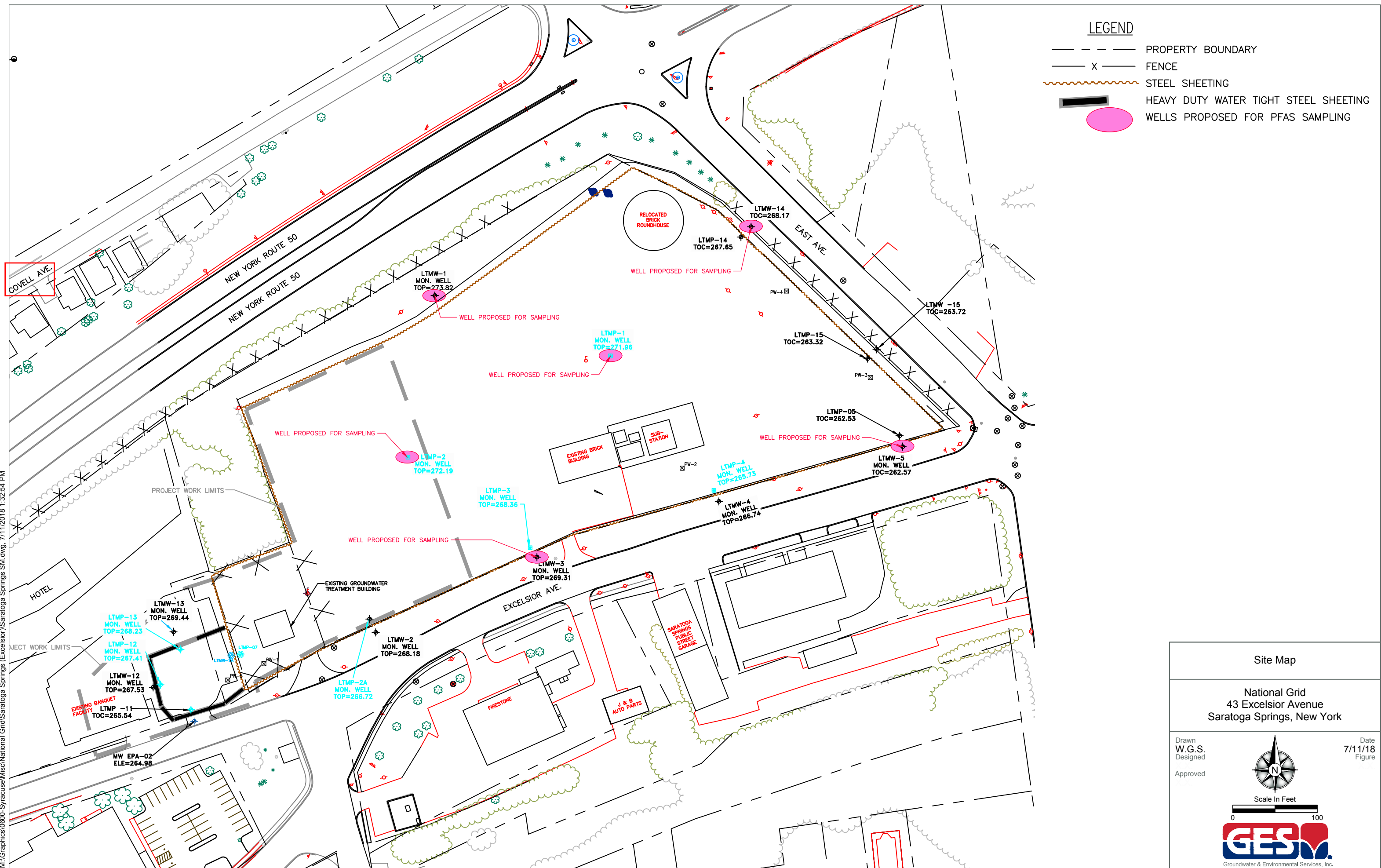
Drawn
W.G.S.
Designed
Approved

Date
8/23/13
Figure

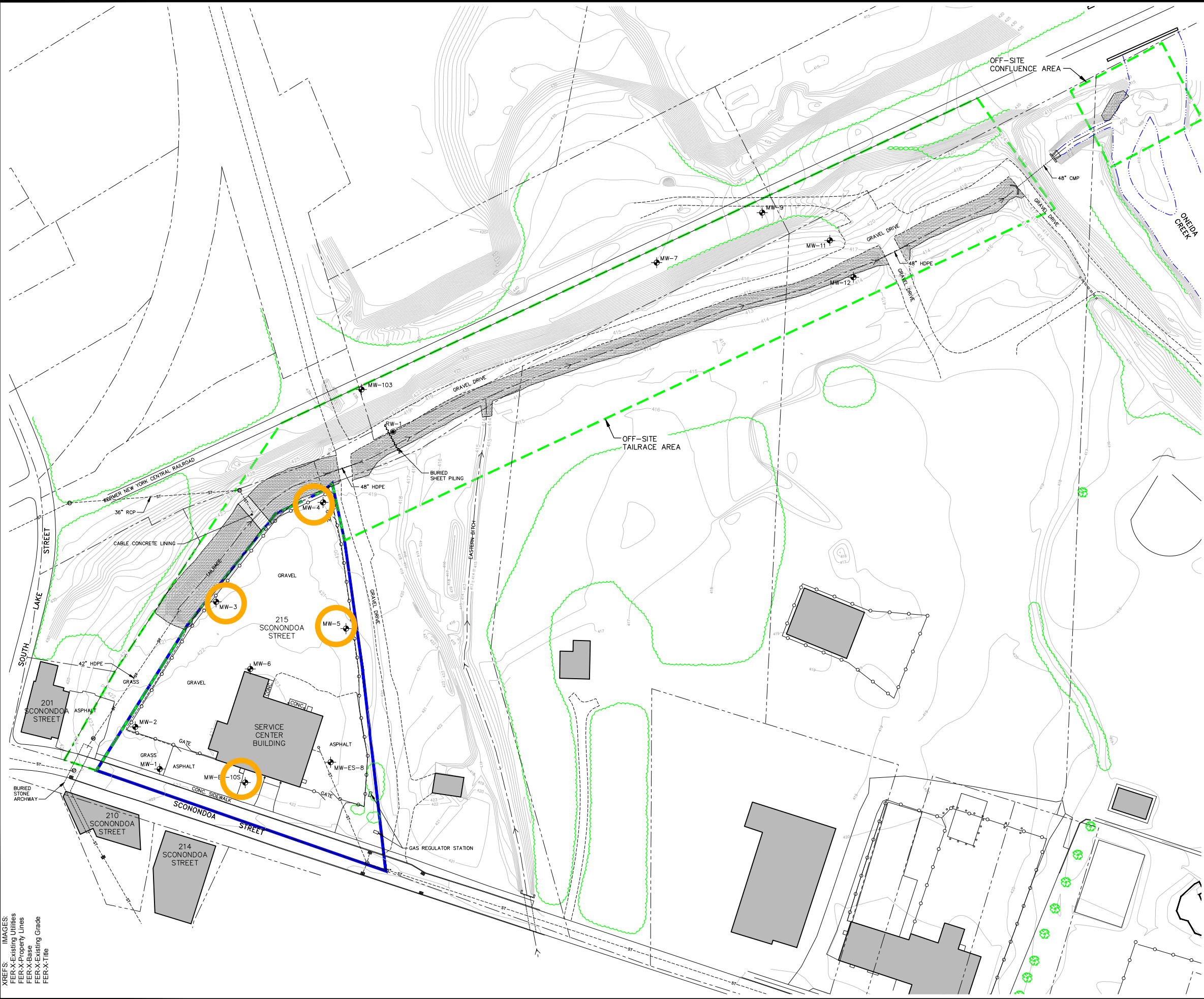


Scale In Feet





CITY: SYRACUSE; DIV: GROUP 14; ENV: DB: BGETTS; LD: BGETTS; PIC: T.YOUNG; PM: M.BENOIT; TM: D.NODINE; LYNONE: OFF-REF*
C:\Users\lclercq\OneDrive - ARCADIS\BIM\360 Docs\NATIONAL GRID\SCONONDOA STREET FORMER MGP SITE\2018\03\6653.0002\01-DWG\FER-Fig. 2-Site and Off-Site Area.dwg LAYOUT: 2 SAVED: 4/9/2018 1:52 PM ACADVER: 21.05 (LMS TECH) PAGES: 2 OF 2 PLOTSTYLETABLE: PLT\FULLCTB
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LEGEND:

- LIMIT OF SITE
- - - LIMIT OF OFF-SITE AREA (APPROXIMATE)
- - - PROPERTY LINE (APPROXIMATE)
- 415 TOPOGRAPHIC CONTOUR (1-FOOT INTERVAL)
- - - EDGE OF WATER (APPROXIMATE)
- - - EDGE OF GRAVEL
- - - EDGE OF PAVEMENT
- - - TREE LINE (APPROXIMATE)
- BUILDING
- - - CHAIN-LINK FENCE
- - - PZC-18 SHEET PILING
- - - DRAINAGE DITCH/CHANNEL AND FLOW DIRECTION
- ▨ RIPRAP
- - - ST- STORM SEWER
- ⊙ STORM SEWER MANHOLE
- CATCH BASIN
- - - CULVERT
- MW-ES-8 ⊙ MONITORING WELL
- RW-1 ⊙ RECOVERY/MONITORING WELL
- MONITORING WELL PROPOSED FOR EMERGING CONTAMINANTS SAMPLING

NOTES:

1. VERTICAL REFERENCE DATUM IS THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29).

0 60' 120'

GRAPHIC SCALE

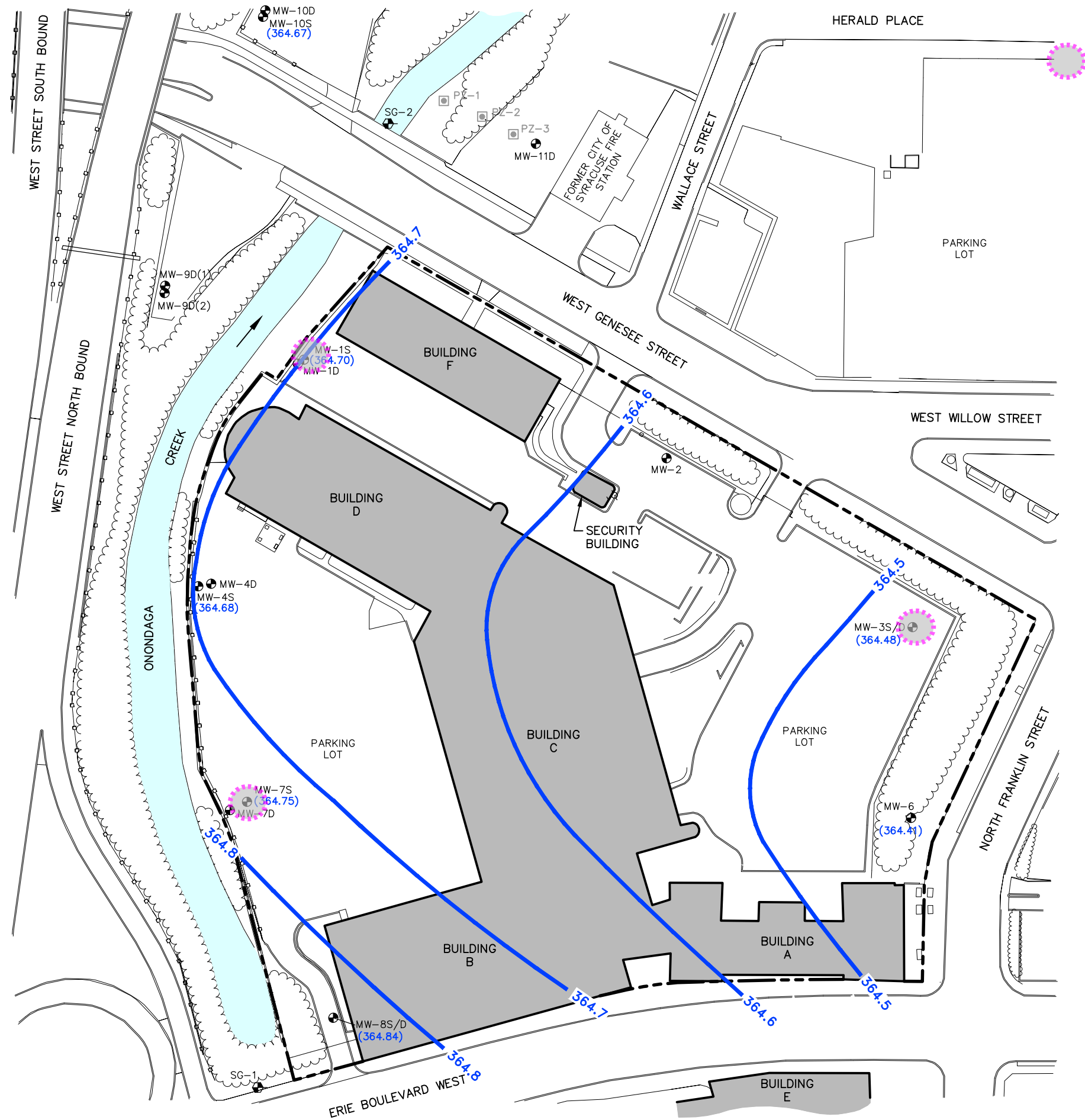
NATIONAL GRID
ONEIDA (SCONONDOA STREET) FORMER MGP SITE
CITY OF ONEIDA, MADISON COUNTY, NEW YORK
FINAL ENGINEERING REPORT

PLAN OF SITE AND OFF-SITE AREA

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: R. ALLEN A. SCHILLING, E. KRAHMER LD/Opd PIC: T. W. YOUNG PM: J. BRUSSEL TM: M. HYSELL TR: J. SINAY LTR/Opd/ION: OFF=REF
G:\ENVCAD\SYRACUSE\ACT\B0036894\000\000101\DWG\36894\W01.dwg LAYOUT: 6 SAVED: 4/28/2017 12:01 PM ACADVER: 19.1S (LMS TECH) PAGES: 6 PLOTSETUP: PLOTSTYLETABLE: PLOTTED: 5/5/2017 10:58 AM BY: KRAHMER, ERIC
XREFS: 36894\XLB 36894\X01
IMAGES: PROJECTNAME: --

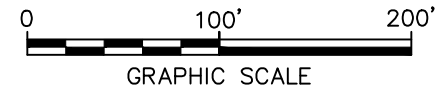


Proposed 1,4-dioxane
and PFAS groundwater
sampling locations



- LEGEND:**
- MW-1S/D EXISTING MONITORING WELL LOCATION
 - PZ-2 FORMER PIEZOMETER LOCATION (DECOMMISSIONED)
 - SG-2 EXISTING STAFF GAUGE LOCATION
 - SITE BOUNDARY (APPROXIMATE)
 - TREES/VEGETATION
 - GUARD RAIL
 - 364.5 GROUNDWATER CONTOUR
 - (364.48) GROUNDWATER ELEVATION

- NOTES:**
1. BASE MAP DEVELOPED FROM PHOTOGRAMMETRIC SURVEY PERFORMED BY LOCKWOOD MAPPING IN SPRING 1995.
 2. MONITORING WELL, PIEZOMETER, AND STAFF GAUGE LOCATIONS ARE BASED ON SURVEY PERFORMED BY NATIONAL GRID.
 3. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.

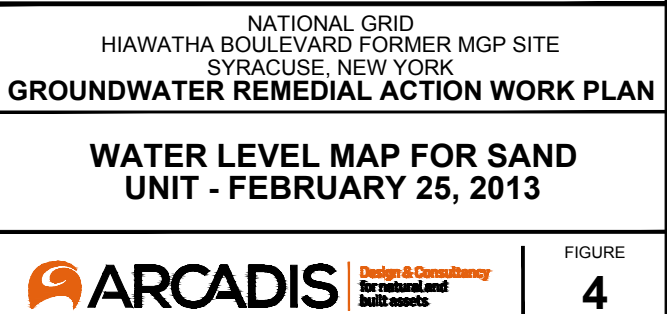


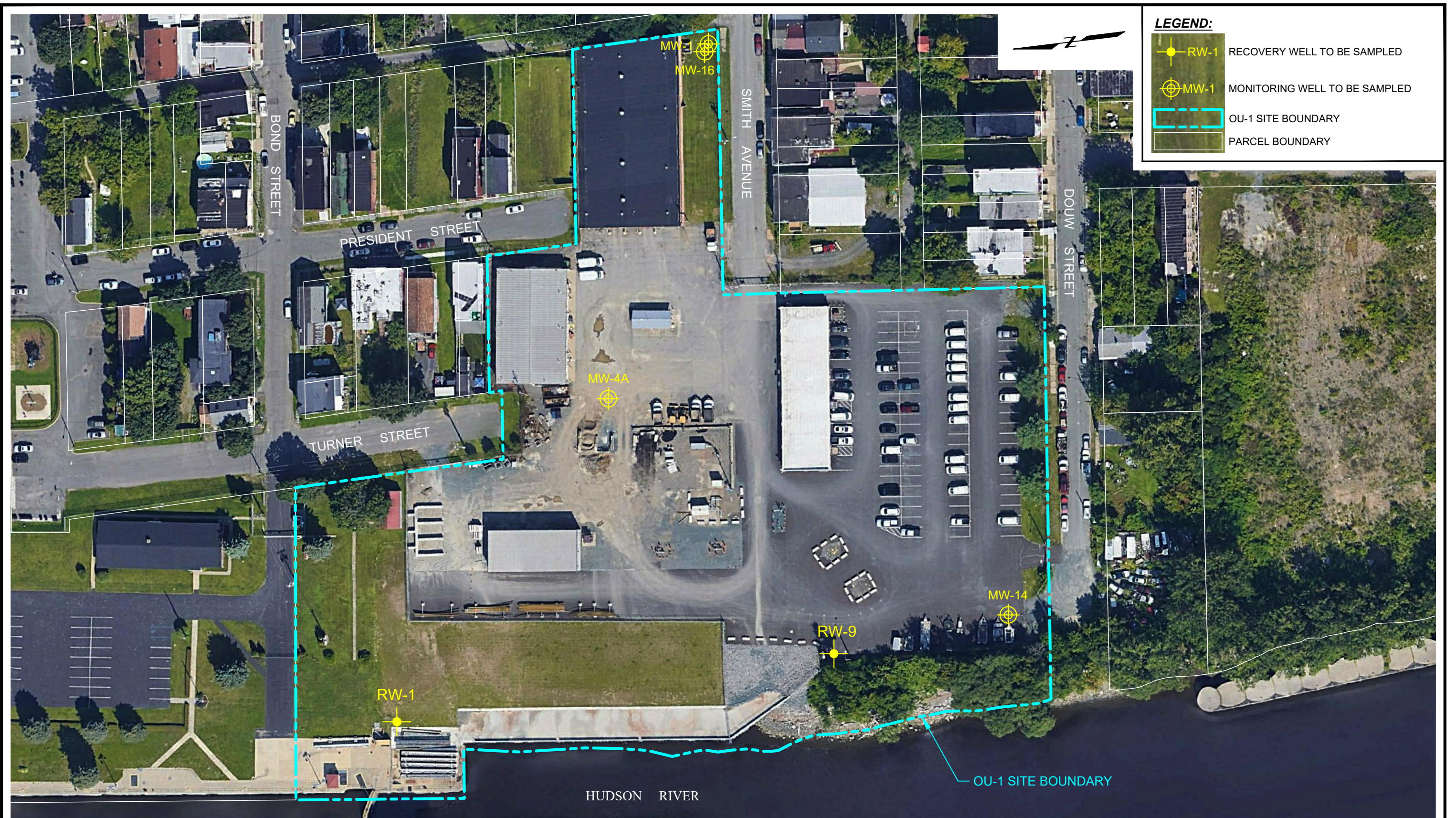
NATIONAL GRID
ERIE BOULEVARD FORMER MGP SITE
SYRACUSE, NEW YORK
SITE MANAGEMENT PLAN

**WATER TABLE MAP FOR SHALLOW
GROUNDWATER - APRIL 7 & 8, 2008**

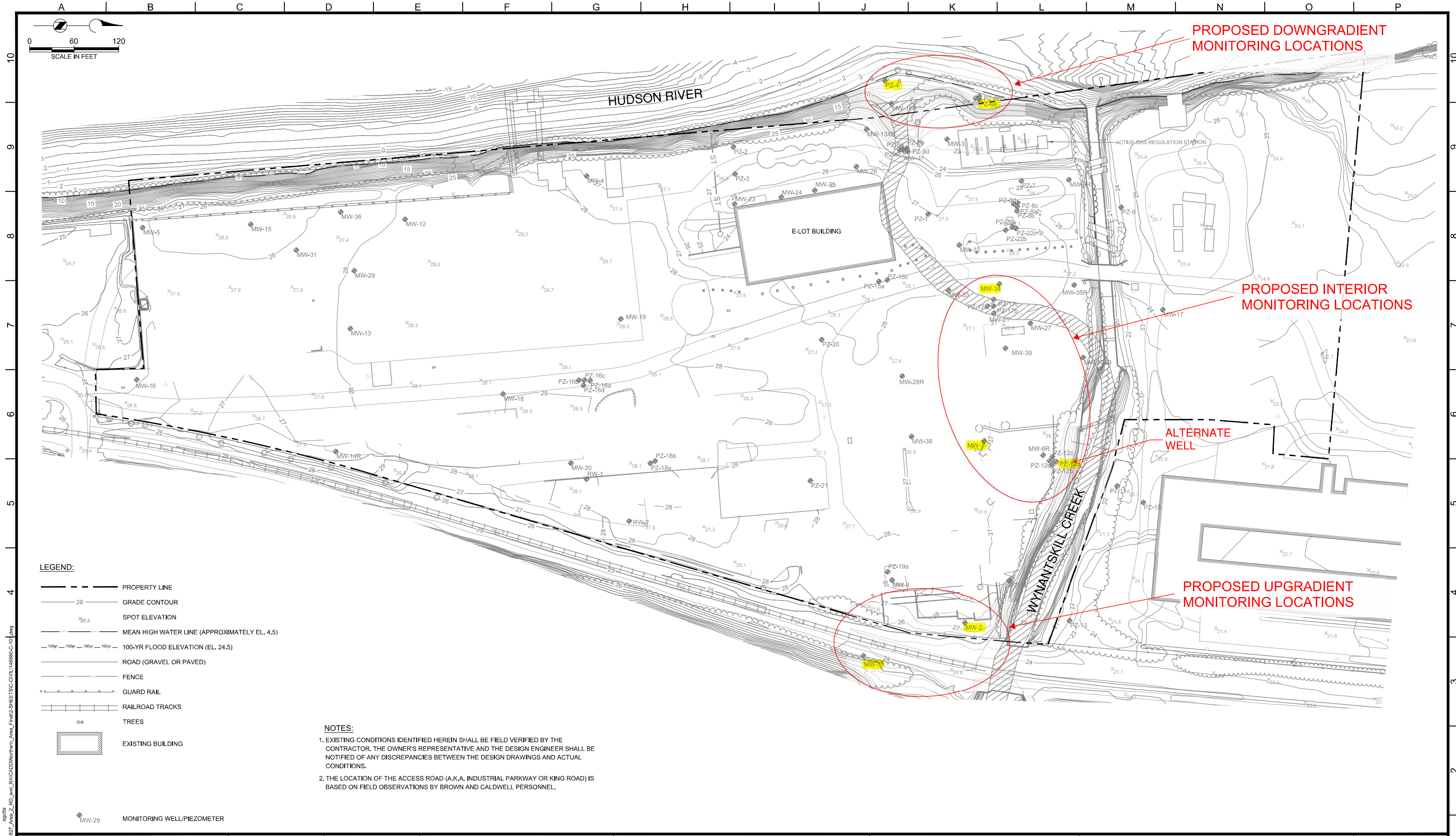
ARCADIS Design & Consultancy
for natural and
built assets

FIGURE
6



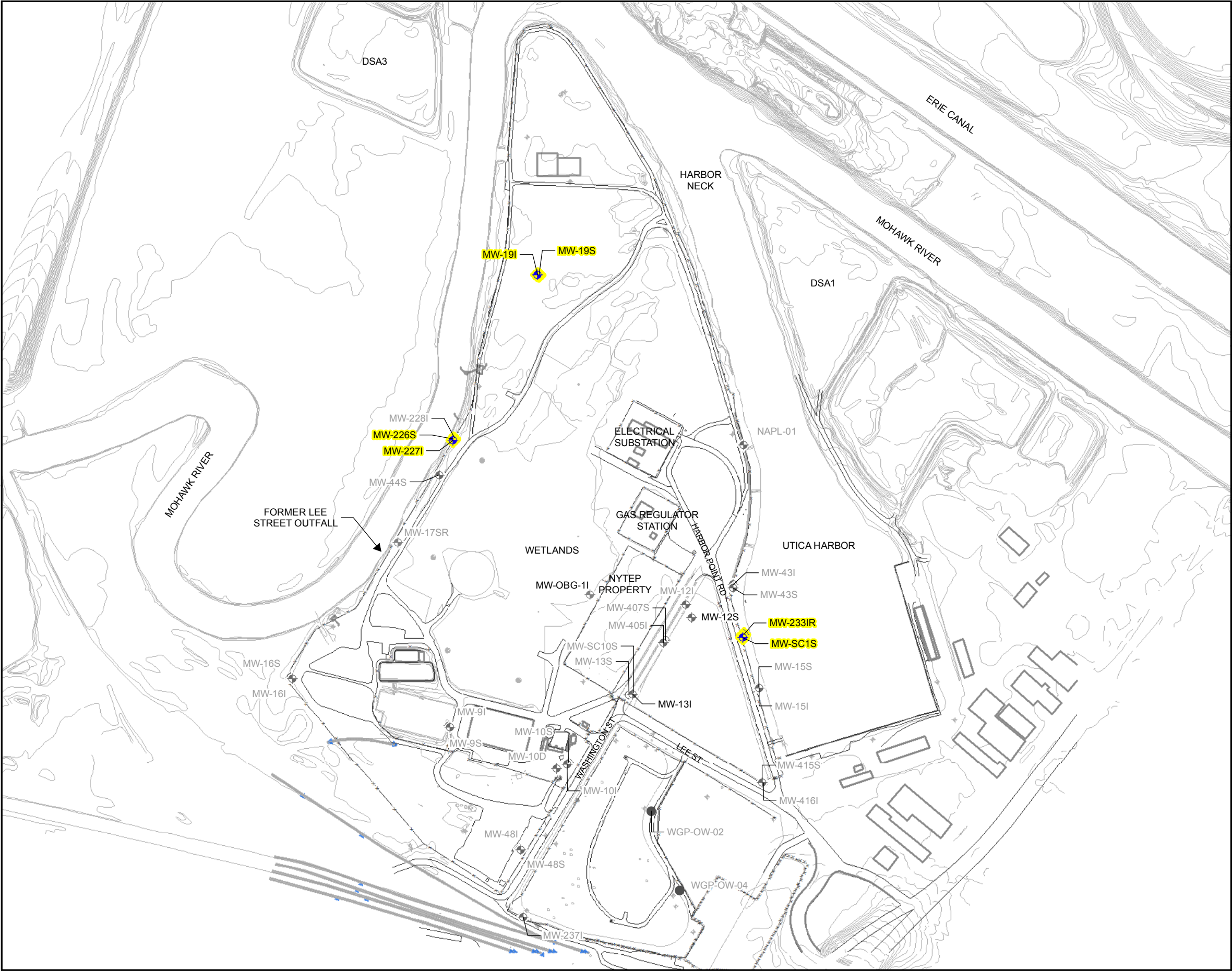


SOURCE:
GOOGLE EARTH PRO AERIAL IMAGE © 2018 GOOGLE INC.,
IMAGERY DATE: 7/30/2017, ACCESSED ON 7/3/2018.



 Brown and Caldwell Associates UPPER SADDLE RIVER, NEW JERSEY	WARNING: IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW ARTICLE 145, SECTION 7209(2) FOR ANY PERSON, UNLESS HE/SHE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY. IF THIS ITEM BEARING THE SEAL OF AN ENGINEER, IS ALTERED, THE ALTERING ENGINEER SHALL AFFIX TO THE ITEM HIS/HER SEAL AND THE NOTATION "ALTERED BY FOLLOWED BY HIS/HER SIGNATURE AND THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION."	NIAGARA MOHAWK POWER CORP. (D/B/A NATIONAL GRID)	TROY (WATER STREET) SITE - AREA 2 TAX SECTION-BLOCK-LOT NO. 111.75-1-1 CITY OF TROY, RENSSELAER COUNTY, NEW YORK	REMEDIAL ACTION CONSTRUCTION DRAWINGS FOR THE NORTHERN AREA	FILENAME 146880-C-101.dwg
					BC PROJECT NUMBER 146880
					CLIENT PROJECT NUMBER
					DRAWING NUMBER C-101
				SHEET NUMBER 3 OF 43	

FIGURE 1



LEGEND

- PROPOSED PFC AND 1,4-DIOXANE SAMPLE LOCATION
- MONITORING WELL
- OBSERVATION WELL

NATIONAL GRID
HARBOR POINT SITE
UTICA, NEW YORK

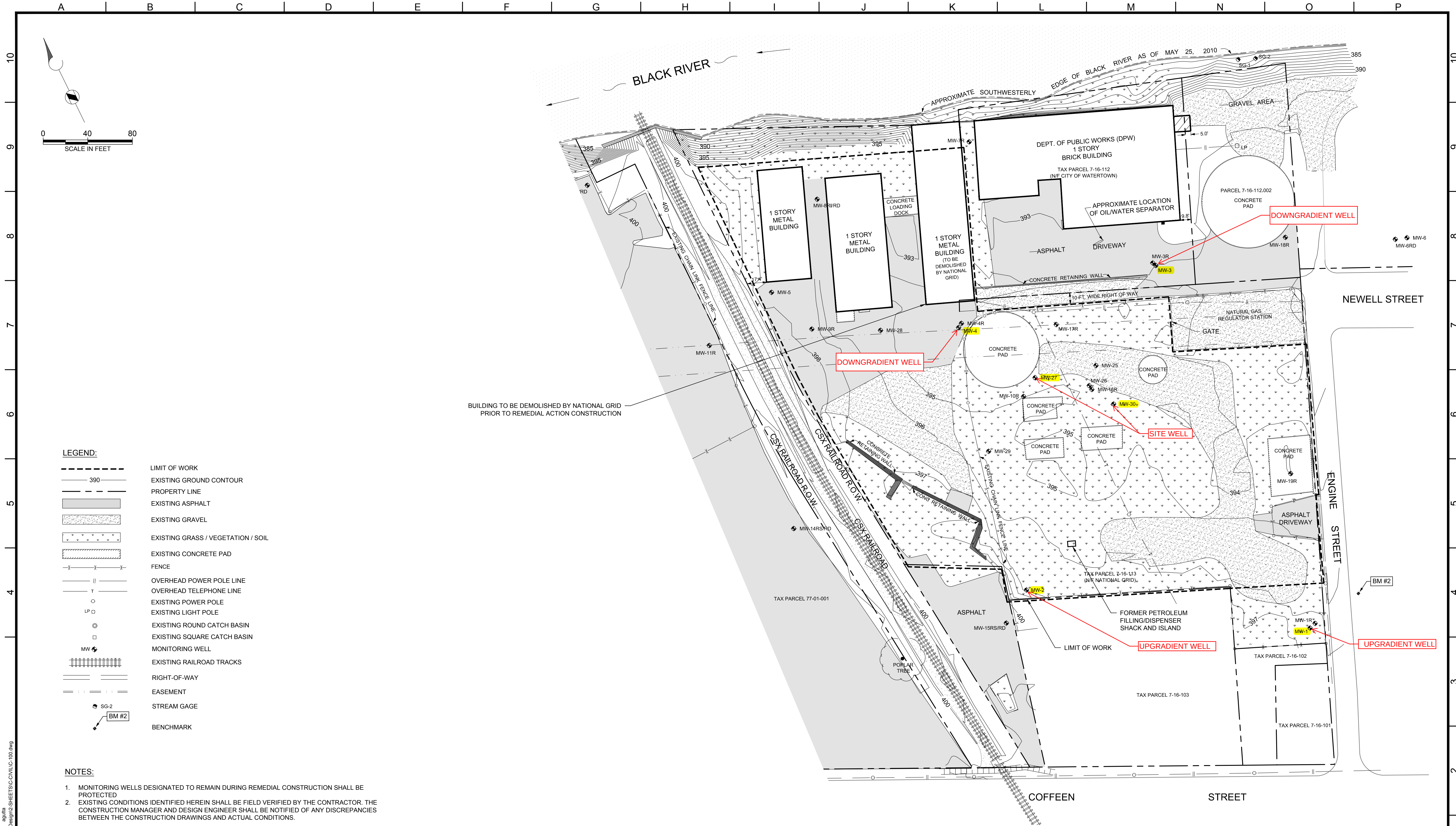
PROPOSED
PFC AND 1,4-DIOXANE
SAMPLING LOCATIONS



1118.43175
JULY 2018



O'BRIEN & GERE ENGINEERS, INC.



Brown and Caldwell

BROWN AND CALDWELL ASSOCIATES
ENVIRONMENTAL ENGINEERING AND CONSULTING
2 PARK WAY, SUITE 2A UPPER SADDLE RIVER, N.J. 07458

WARNING: IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW ARTICLE 145, SECTION 7209(2) FOR ANY PERSON, UNLESS HE/SHE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY IF THIS ITEM BEARING THE SEAL OF AN ENGINEER, IS ALTERED, THE ALTERING ENGINEER SHALL AFFIX TO THE ITEM HIS/HER SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS/HER SIGNATURE AND THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED: PP/CO
DRAWN: RJN
CHECKED: KB
CHECKED:
APPROVED: ARS

EXTERNAL REFERENCE FILES
Basemap_Topo-Bdry_Srvy.dwg
TBlock.dwg
Bench_Mark.dwg
LimitofWork.dwg



ADAM RICHMAN
PROFESSIONAL ENGINEER
N.Y. LICENSE NO. 134567

4/3/17
DATE

REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.
	0	SUBMITTAL TO NYSDEC		04/03/17	ARS

NIAGARA MOHAWK POWER CORPORATION
D/B/A NATIONAL GRID
300 ERIE BOULEVARD WEST
SYRACUSE, NEW YORK 13202

EXISTING SITE CONDITIONS PLAN

PHASE I - SOIL EXCAVATION PROJECT
WATERTOWN (ENGINE STREET) FORMER MGP SITE
WATERTOWN, NEW YORK

FILENAME
C-100.dwg
BC PROJECT NUMBER
145806
CLIENT PROJECT NUMBER
-
DRAWING NUMBER
C-100
SHEET NUMBER
3 OF 19

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau C

625 Broadway, 11th Floor, Albany, NY 12233-7014

P: (518) 402-9662 | F: (518) 402-9679

www.dec.ny.gov

May 30, 2018

Mr. Brian M. Stearns, P.E., Manager
Site Investigation & Remediation – Upstate NY
National Grid
300 Erie Blvd. West
Syracuse, NY 13202

RE: Request for Sampling of Emerging Contaminants
National Grid Upstate MGP Sites

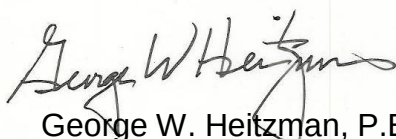
Dear Mr. Stearns:

The New York State Department of Environmental Conservation (DEC) is undertaking a Statewide evaluation of remediation sites to better understand the risk posed to New Yorkers by 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS). PFAS have historically not been evaluated at remediation sites, and 1,4-dioxane has not been evaluated at the levels that are now thought to represent a health concern. This initiative is being undertaken as a result of these “emerging contaminants” having been found in a number of drinking water supplies in New York. Accordingly, the DEC is requiring that you test site groundwater for these chemicals. To accommodate this requirement a select number of existing monitoring wells, representative of the potential of the attached list of sites to be a source of these emerging contaminants, must be sampled. DEC recommends that at least one of these wells should be upgradient of the site.

The enclosed guidance provides information on the analytical methods and reporting requirements. A second guidance document describes special precautions that need to be considered when sampling for PFAS.

Please prepare a draft letter work plan that identifies the wells proposed for sampling at each of the sites, a brief description of the sampling methods, and anticipated sampling dates within the next 60 days. If you wish to discuss the scope of the requested water testing, please contact me at 518-402-9682 or george.heizman@dec.ny.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "George W. Heitzman", is written over a light gray rectangular background.

George W. Heitzman, P.E.
Director, Remedial Bureau C
Division of Environmental Remediation

Enclosures

Groundwater Sampling for Emerging Contaminants

April 2018

Issue: NYSDEC has committed to analyzing representative groundwater samples at remediation sites for emerging contaminants (1,4-dioxane and PFAS) as described in the below guidance.

Implementation

NYSDEC project managers will be contacting site owners to schedule sampling for these chemicals. Only groundwater sampling is required. The number of samples required will be similar to the number of samples where “full TAL/TCL sampling” would typically be required in a remedial investigation. If sampling is not feasible (e.g., the site no longer has any monitoring wells in place), sampling may be waived on a site-specific basis after first considering potential sources of these chemicals and whether there are water supplies nearby.

Upon a new site being brought into any program (i.e., SSF, BCP), PFAS and 1,4-dioxane will be incorporated into the investigation of groundwater as part of the standard “full TAL/TCL” sampling. Until an SCO is established for PFAS, soil samples do not need to be analyzed for PFAS unless groundwater contamination is detected. Separate guidance will be developed to address sites where emerging contaminants are found in the groundwater. The analysis currently performed for SVOCs in soil is adequate for evaluation of 1,4-dioxane, which already has an established SCO.

Analysis and Reporting

Labs should provide a full category B deliverable, and a DUSR should be prepared by a data validator, and the electronic data submission should meet the requirements provided at: <https://www.dec.ny.gov/chemical/62440.html> ,

The work plan should explicitly describe analysis and reporting requirements.

PFAS sample analysis: Currently, ELAP does not offer certification for PFAS compounds in matrices other than finished drinking water. However, laboratories analyzing environmental samples (ex. soil, sediments, and groundwater) are required, by DER, to hold ELAP certification for PFOA and PFOS in drinking water by EPA Method 537 or ISO 25101.

Modified EPA Method 537 is the preferred method to use for groundwater samples due to the ability to achieve 2 ng/L (ppt) detection limits. If contract labs or work plans submitted by responsible parties indicate that they are not able to achieve similar reporting limits, the project manager should discuss this with a DER chemist. Note: Reporting limits for PFOA and PFOS should not exceed 2 ng/L.

PFAS sample reporting: DER has developed a PFAS target analyte list (below) with the intent of achieving reporting consistency between labs for commonly reportable analytes. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. This list may be updated in the future as new information is learned and as labs develop new capabilities. If lab and/or matrix specific issues are encountered for any particular compounds, the NYSDEC project manager will make case-by-case decisions as to whether particular analytes may be temporarily or permanently discontinued from analysis for each site. Any technical lab issues should be brought to the attention of a NYSDEC chemist.

Some sampling using this full PFAS target analyte list is needed to understand the nature of contamination. It may also be critical to differentiate PFAS compounds associated with a site from other

sources of these chemicals. Like routine refinements to parameter lists based on investigative findings, the full PFAS target analyte list may not be needed for all sampling intended to define the extent of contamination. Project managers may approve a shorter analyte list (e.g., just the UCMR3 list) for some reporting on a case by case basis.

1,4-Dioxane Analysis and Reporting: The method detection limit (MDL) for 1,4-dioxane should be no higher than 0.28 µg/l (ppb). ELAP offers certification for both EPA Methods 8260 and 8270. In order to get the appropriate detection limits, the lab would need to run either of these methods in “selective ion monitoring” (SIM) mode. DER is advising the use of method 8270, since this method provides a more robust extraction procedure, uses a larger sample volume, and is less vulnerable to interference from chlorinated solvents (we acknowledge that 8260 has been shown to have a higher recovery in some studies).

Full PFAS Target Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonates	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluoroalkyl carboxylates	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUA/PFUdA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTriA/PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTA/PFTeDA	376-06-7
Fluorinated Telomer Sulfonates	6:2 Fluorotelomer sulfonate	6:2 FTS	27619-97-2
	8:2 Fluorotelomer sulfonate	8:2 FTS	39108-34-4
Perfluorooctane-sulfonamides	Perfluorooctanesulfonamide	FOSA	754-91-6
Perfluorooctane-sulfonamidoacetic acids	N-methyl perfluorooctanesulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethyl perfluorooctanesulfonamidoacetic acid	N-EtFOSAA	2991-50-6

Bold entries depict the 6 original UCMR3 chemicals

Labs Certified for PFOA and PFOS in Drinking Water				
LAB ID	NAME	CITY	STATE	METHOD
10311	SUFFOLK	HAUPPAUGE	NY	EPA 537
10391	TESTAMERICA	SOUTH BURLINGTON	VT	ISO 25101
10670	EUROFINS	LANCASTER	PA	EPA 537
10730	AMERICAN	BELLEVILLE	IL	EPA 537
10756	MAXXAM	MISSISSAUGA	ON	EPA 537
10763	NYSDOH ORG	ALBANY	NY	EPA 537
10763	NYSDOH ORG	ALBANY	NY	ISO 25101
10899	CON-TEST	EAST LONGMEADOW	MA	EPA 537
10899	CON-TEST	EAST LONGMEADOW	MA	ISO 25101
11320	EUROFINS	MONROVIA	CA	EPA 537
11398	EUROFINS	SOUTH BEND	IN	EPA 537
11411	VISTA	EL DORADO HILLS	CA	EPA 537
11411	VISTA	EL DORADO HILLS	CA	ISO 25101
11501	GEL	CHARLESTON	SC	EPA 537
11608	PACE	ORMOND BEACH	FL	EPA 537
11627	ALPHA	WESTBOROUGH	MA	EPA 537
11666	TESTAMERICA	WEST SACRAMENTO	CA	EPA 537
11666	TESTAMERICA	WEST SACRAMENTO	CA	ISO 25101
11685	SGS NORTH	WILMINGTON	NC	EPA 537
11867	REGIONAL	NEW HAVEN	CT	EPA 537
12022	SGS NORTH	ORLANDO	FL	EPA 537
12060	ALS	KELSO	WA	EPA 537
12073	BSK ASSOCIATES	FRESNO	CA	EPA 537

Collection of Groundwater Samples for Perfluorooctanoic Acid (PFOA) and Perfluorinated Compounds (PFCs) from Monitoring Wells Sample 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.

The 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. **NOTE: Grunfos pumps and bladder pumps are known to contain PFC materials (e.g. Teflon™ washers for Grunfos pumps and LDPE bladders for bladder pumps).** 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. 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, ice, 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 $4 \pm 2^{\circ}$ 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.

National Grid Upstate sites

837012	NM - Albion MGP
442029A	NM - Area 4 Water St. - Troy MGP
447026	NM - Broadway - Schenectady MGP
738034	NM - Fulton MGP
557016	NM - Glens Falls MGP
518021	NM - Hill St. - Gloversville MGP
411005	NM - Hudson MGP
622019	NM - Ilion MGP
401040	NM - North Albany
633042	NM - Rome Jay/Madison MGP
633043	NM - Rome Kingsley Ave. MGP
546015	NM - Saratoga Springs Excelsior St. MGP
727008	NM - Sconondoa St. - Oneida MGP
734060	NM - Syracuse Erie Blvd. MGP
734059	NM - Syracuse Hiawatha Blvd. MGP
442030	NM - Troy Smith Ave. MGP
442029	NM - Troy Water St. MGP
633021	NM - Utica Harbor Point MGP
623011	NM - Watertown Engine St MGP

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Office of the Director

625 Broadway, 12th Floor, Albany, New York 12233-7011

P: (518) 402-9706 | F: (518) 402-9020

www.dec.ny.gov

September 12, 2018

Mr. William Ryan
Manager, Downstate New York MGP Program
175 East Old Country Rd.
Hicksville, NY 11801

Mr. Brian Stearns, P.E.
Manager, Site Investigation & Remediation – Upstate NY
National Grid
300 Erie Blvd. West
Syracuse, NY 13202

Re: National Grid Emerging Contaminant Groundwater Sampling Work Plan

Dear Mr. Ryan and Mr. Stearns:

Thank you for your continued assistance in evaluating the presence of emerging contaminants at sites that National Grid is managing under the Department's Manufactured Gas Plant program. Upon review of your September 4, 2018 revised work plan, the Department's comments have been acceptably addressed, and the work plan is approved for the remaining sites that had not been previously approved.

This to confirm that a separate sampling plan will be developed for the following National Grid Upstate sites:

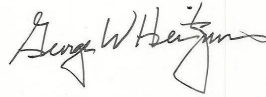
401078 NM - Cohoes MGP
401079 NM - 5th St. Watervliet MGP
429008 NM - Amsterdam MGP - River Link Pk MGP
442057 NM - Rensselaer MGP
447053 NM - Clinton Street - Schenectady MGP
517014 NM - Malone MGP
558044 NM - Whitehall MGP
622034 NM - Little Falls MGP
727014 NM - Canastota MGP
738049 NM - Oswego W. Utica St. MGP
738050 NM - Ontario St. - Fulton MGP



Department of
Environmental
Conservation

Please provide the Department's project manager at least 1 week advance notification of the sampling, and schedule sites in DEC Region 1 to ensure that data is accepted into the Department's electronic data management system before December 31, 2018.

Sincerely,

A handwritten signature in black ink, appearing to read "George W. Heitzman", is written over a light gray rectangular background.

George W. Heitzman, P.E.
Assistant Director
Division of Environmental Remediation

ec: Remedial Bureau C staff