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ENVIRONMENT
& HEALTH

Mr. Frank Sowers
New York State Department of Environmental Conservations
Department of Environmental Remediation, Region 8
6274 East Avon-Lima Road
Avon, NY 14414-9516

December 18, 2019

Emerging Contaminant Sampling and Analysis Plan – Portion of Former Vacuum Oil Refinery Site (Site #C828190)

Dear Mr. Sowers:

On behalf of the City of Rochester (City), O'Brien & Gere Engineers, Inc., a Ramboll company (Ramboll) prepared this Sampling and Analysis Plan (SAP) for the Portion of Former Vacuum Oil Refinery Site located south of Flint Street in Rochester, NY (NYSDEC Site #C828190). The City is the owner of the Site. As requested in the New York State Department of Environmental Conservation (NYSDEC) letter dated May 10, 2019 this plan provides for the collection of groundwater samples for analysis of emerging contaminants.

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Scope of Work

This SAP provides a focused sampling and analysis program for per- and polyfluoroalkyl substance (PFAS) and 1,4-dioxane. To accomplish this, groundwater samples will be collected from four existing monitoring wells, OVR-127, OVR-117, OVR-110 and OVR-131. The locations of these wells are provided on Figure 1 together with the groundwater elevation contours from the December 2016 groundwater monitoring event. The rationale for selection each of these wells is summarized as follows:

- OVR-110 is located on the northeastern side of the site near the Genesee River to assess the potential presence of emerging contaminants proximal to the river.
- OVR-117 is located near the center of the Site, within the 13 Cottage Street Parcel. The field observations and analytical data from this parcel are different that that identified in the northern end of the site.
- OVR-127 is located on the southern portion of the Site hydraulically upgradient of the site.

- OVR-131 is located in the downgradient end of the site based on our current understanding that groundwater flows northward through the former canal and is located topographically and hydraulically downgradient of 15 Flint Street (NYSDEC BCP Site #C828162).

Well construction information is provided in the table below:

Well ID	Screened Interval (Ft Below grade)
OVR-110	3.5 – 18.5
OVR-117	3.8 – 15.8
OVR-127	4.7 – 18.7
OVR-131	3 – 11

Based on information collected in 2016, water levels in these wells are less than 12 ft. below grade.

As requested by NYSDEC (letter dated May 10, 2019), PFAS analysis will be completed using modified USEPA Method 537 with quantification of 21 PFAS. Analysis for 1,4-dioxane will be completed using USEPA Method 8270 with selected ion monitoring (SIM). Quality control (QC) samples will also be collected, and a full analytical data package that is suitable for validation will be requested from the laboratory.

The existing Job Safety Analysis (JSA) for the Site will be used for health and safety purposes.
A letter report summarizing the sampling and analysis will be submitted to the NYSDEC after receipt of the analytical data package and completion of data validation.

Groundwater Sample Collection

Groundwater samples will be collected using a low-flow sampling method with a peristaltic pump at flow rates not less than 100 milliliters per minute (ml/min) and no greater than 500 ml/min. During purging, depth to water will be measured every 3 to 5 minutes. The flow rate will be adjusted such that purging does not induce drawdown greater than 0.3 feet. Water quality parameters will be measured using an in-line flow cell equipped with temperature, conductivity, pH, oxidation-reduction potential (ORP), and, dissolved oxygen (DO) probes. Turbidity readings will also be obtained from groundwater prior to the flow cell via an in-line bypass valve. The water quality measurements will be recorded at the same frequency as the depth to water measurements. Prior to sample collection, the water quality parameters will be allowed to stabilize for at least three consecutive measurements in accordance with the following stabilization criteria:

- pH within ±0.1 Standard Units (SU)
- Specific conductivity within ±3%
- ORP within ±10 millivolts (mV)
- DO within ±10%
- Turbidity within ±10% (ideally less than 50 nephelometric turbidity units [NTUs])

Should stabilization of the above water quality parameters not be reached after two consecutive hours of low flow pumping, samples will be collected nonetheless.

Visual and olfactory observations will also be noted at the start and end of purging. The field observations and measurements will be recorded on a low-flow groundwater sampling form. An example of the sampling form is provided in Attachment 3.

Sample Collection and Handling

Subsequent to stabilization, the flow cell will be detached from the discharge tubing and samples will be collected directly from the tubing into pre-labelled, polypropylene or high-density polyethylene (HDPE), Teflon®-free laboratory-provided bottles. The 1,4-dioxane samples will be collected after the PFAS sample has been collected.

The samples will be collected while wearing appropriate personal protective equipment (PPE). Additionally, special PFAS-related precautions will be taken during the sampling to minimize sample contamination, as outlined in Attachment 1 and the field checklist provided as Attachment 2. Reusable groundwater sampling equipment will be decontaminated after each use with Alconox and PFAS-free water.

Once filled, each water sample bottle will be immediately placed into a cooler containing regular ice. Samples for PFAS analysis will be placed in a separate cooler from the samples for 1,4-dioxane analysis. The sample identifier, location, date, time, and sample collector will be recorded on a groundwater sampling form and a chain-of-custody form. Sample coolers will be delivered to the laboratory.

Quality Control Samples

One set of quality control (QC) samples will be collected during the sampling event for the PFAS and 1,4-dioxane analyses. The QC samples for the PFAS and 1,4-dioxane analyses will each include one blind duplicate sample, one matrix spike/matrix spike duplicate (MS/MSD) sample pair, and one equipment blank. In addition, one field reagent blank (FRB) will be collected as part of the PFAS QC samples.

Laboratory Analyses and Data Validation

The groundwater samples and associated QC samples will be analyzed by a laboratory that is ELAP-certified for the analyses to be completed. The samples will be analyzed using the following methods:

- PFAS – USEPA Method 537 (modified) with a reporting limit equal to or below 2 ppt for PFOA, PFOS and most (but not all) of the other PFAS analytes. The lab will report the 21 PFAS analytes requested by NYSDEC.
- 1,4-dioxane – USEPA Method 8270 SIM with a method detection limit equal to or below 0.1 µg/L.

A table summarizing the samples to be collected and analyzed follows:

Analysis	No. Of samples	FRB	Blind Duplicate	Equipment blank	MS	MSD	Total
PFAS	4	1	1	1	1	1	9
1,4 dioxane	4	0	1	1	1	1	8

Category B analytical deliverables will be provided by the laboratory in electronic format. In addition, the laboratory will provide an EQuIS 4-file electronic data deliverable (EDD).

The analytical data will be reviewed by a data validator and a data Usability Summary Report (DUSR) will be prepared.

Management of Investigation Derived Materials (IDM)

Groundwater generated during monitoring well purging will be contained for off-site disposal. Personal protective equipment (i.e., nitrile gloves), tubing and other materials will be disposed off-site as general refuse.

Report

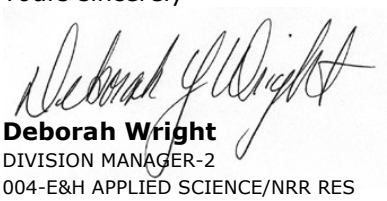
Upon receipt of the DUSR, a letter report will be prepared for submittal to NYSDEC. This report will document the sampling activities, provide the completed field forms and field measurements and summarize the results of the PFAS and 1,4-dioxane analyses. The letter report will also include the DUSR and analytical data packages as attachments.

Implementation Schedule

Groundwater samples will be collected during the first quarter of 2020 pending approval of this work plan and weather conditions. The department will be notified approximately 5 days prior to the sampling event. A report will be provided within 15 days following receipt of the DUSR from the validator.

Should you have any questions, please contact me at (315) 956-6377 or Joe Biondolillo at the City of Rochester at (585) 428-6649.

Yours sincerely



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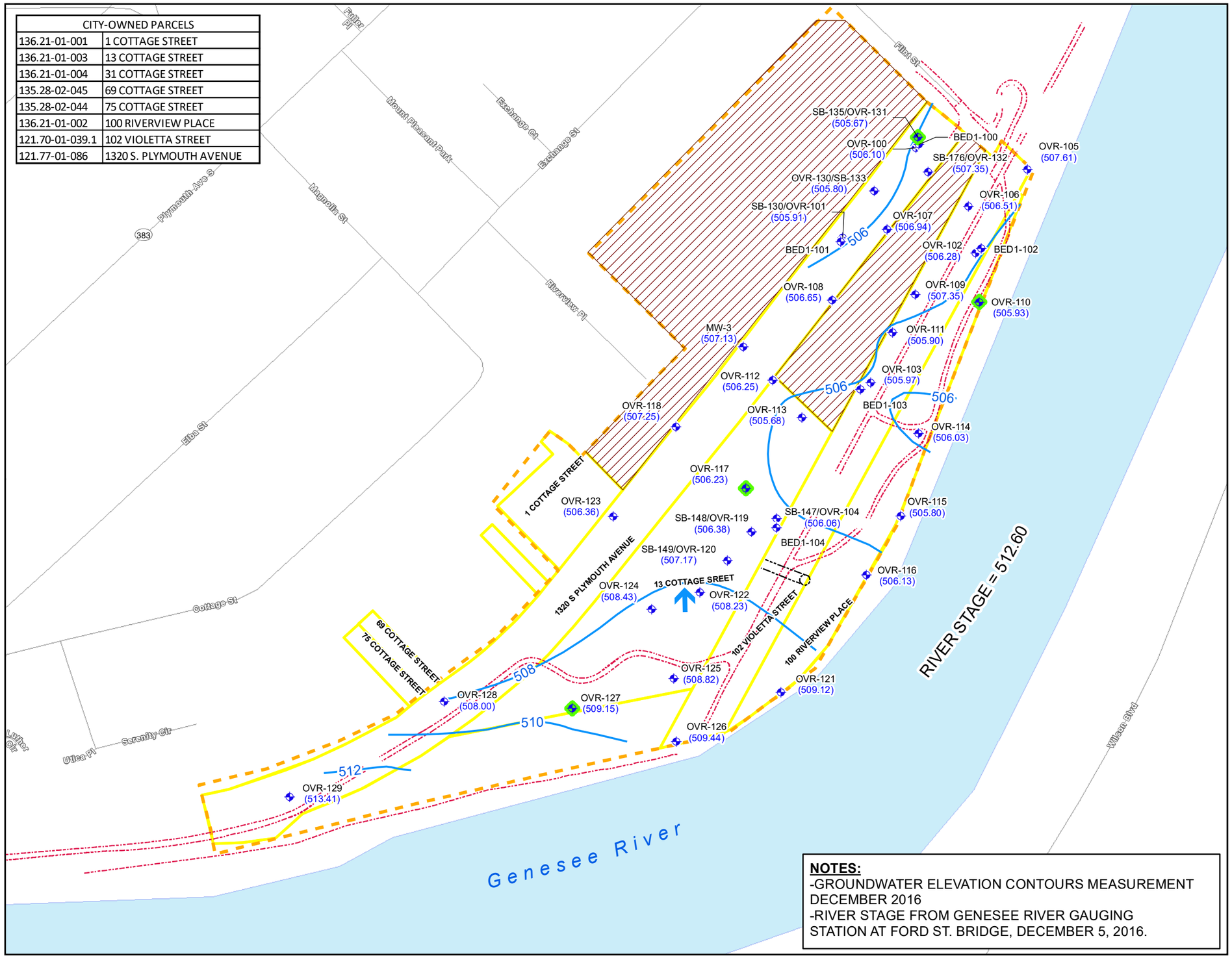
CC: Joseph Biondolillo – City of Rochester

CITY-OWNED PARCELS	
136.21-01-001	1 COTTAGE STREET
136.21-01-003	13 COTTAGE STREET
136.21-01-004	31 COTTAGE STREET
135.28-02-045	69 COTTAGE STREET
135.28-02-044	75 COTTAGE STREET
136.21-01-002	100 RIVERVIEW PLACE
121.70-01-039.1	102 VIOLETTA STREET
121.77-01-086	1320 S. PLYMOUTH AVENUE



NOTES:
-GROUNDWATER ELEVATION CONTOURS MEASUREMENT DECEMBER 2016
-RIVER STAGE FROM GENESEE RIVER GAUGING STATION AT FORD ST. BRIDGE, DECEMBER 5, 2016.

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LEGEND

- WELL TO BE SAMPLED FOR EMERGING CONTAMINANTS
- MONITORING WELL
- GROUNDWATER CONTOUR
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- DRAINPIPE
- BIKE PATH
- NOT PART OF CITY OF ROCHESTER BROWNFIELD CLEANUP PROGRAM SITE; HOWEVER, THESE PARCELS ARE BEING INVESTIGATED BY OTHER ENTITIES
- FORMER VACUUM OIL REFINERY SITE (APPROXIMATE)
- BROWNFIELD CLEANUP PROGRAM SITE LIMITS (APPROXIMATELY 15.4 ACRES)

CITY OF ROCHESTER BROWNFIELD CLEANUP PROGRAM REMEDIAL INVESTIGATION REPORT PORTION OF FORMER VACUUM OIL REFINERY

1, 13, 31, 69, AND 75 COTTAGE STREET; 100 RIVERVIEW PLACE; 102 VIOLETTA STREET; AND PORTION OF 1320 S. PLYMOUTH AVENUE ROCHESTER, NEW YORK

EMERGING CONTAMINANTS SAMPLE LOCATIONS

0 100 200 400
Feet

11862.61157
NOVEMBER 2019

O'BRIEN & GERE ENGINEERS, INC.

Summary of Prohibited and Acceptable Items for PFAS Sampling

Prohibited	Acceptable
Field Equipment	
Teflon® containing materials	High density polyethylene (HDPE), stainless steel or polypropylene materials
Low density polyethylene (LDPE) materials	Acetate liners
	Silicon tubing
Waterproof field books, waterproof paper and waterproof sample bottle labels	Loose non-waterproof paper and non-waterproof sample labels
Plastic clipboards, binders, or spiral hard cover notebooks	Aluminum field clipboards or with Masonite
Waterproof markers / Sharpies®	Pens
Post-It Notes®	
Chemical (blue) ice packs	Wet ice
Field Clothing and PPE	
New cotton clothing or synthetic water resistant, waterproof, or stain-treated clothing, clothing containing Gore-Tex™	Well-laundered clothing made of natural fibers (preferable cotton)
Clothing laundered using fabric softener	No fabric softener
Boots containing Gore-Tex™ or treated with water-resistant spray	Boots made with polyurethane and PVC
Tyvek®	Laundered cotton clothing
No cosmetics, moisturizers, hand cream, or other related products as part of personal leaning/showering routine on the morning of sampling Sunscreens or insecticides except as noted on right	**Sunscreens** - Alba Organics Natural Sunscreen, Yes To Cucumbers, Aubrey Organics, Jason Natural Sun Block, Kiss My Face, and baby sunscreens that are "chemical free", “toxin free” or "natural" **Insect Repellents** - Jason Natural Quit Bugging Me, Repel Lemon Eucalyptus Insect repellant, Herbal Armor, California Baby Natural Bug Spray, Baby Ganics **Sunscreen and insect repellant** - Avon Skin So Soft Bug Guard Plus - SPF 30 Lotion
Sample Containers	
LDPE or glass containers	HDPE or polypropylene
Teflon®-lined caps	Unlined polypropylene caps
Rain Events	
Waterproof or resistant rain gear	Wet weather gear made of polyurethane and PVC only; field tents that are only touched or moved prior to and following sampling activities
Equipment Decontamination	
Decon 90®	Alconox® and/or Liquinox®
Water from an on-site well	
Food Considerations	
All food and drink, with exceptions noted on right	Bottled water and hydration fluids (i.e., Gatorade® and Powerade®) to be brought and consumed only in the staging areas
Vehicle Considerations	
Vehicle fabrics, carpets and mats may contain PFAS	Avoid utilizing areas inside vehicle as sample staging areas.

ATTACHMENT 2 - PFAS SAMPLING CHECKLIST

Site Name: _____ Task: _____

Weather (temp/precip): _____ Date: _____

***Field Clothing and PPE*:**

☐ No clothing or boots containing Gore-Tex™

☐ No clothing or boots treated with water-resistant spray

☐ Safety boots made from polyurethane and PVC

☐ No materials containing Tyvek®

☐ Field crew has not used fabric softener on clothing

☐ Field crew has not used cosmetics, moisturizers, hand cream, or other related products this morning

☐ Field crew has not applied unauthorized sunscreen or insect repellant

☐ Samplers don fresh nitrile gloves for each PFAS sample collected

***Field Equipment*:**

☐ No Teflon® or LDPE containing materials

☐ All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene

☐ No waterproof field books, waterproof paper or waterproof bottle labels, waterproof markers/Sharpies®

☐ No plastic clipboards, binders, or spiral hard cover notebooks

☐ No Post-It Notes®

☐ Coolers filled with regular ice only; no chemical (blue) ice packs in possession

***Sample Containers*:**

☐ Sample containers made of HDPE or polypropylene

☐ Caps are unlined and made of HDPE or polypropylene

***Wet Weather (as applicable)*:**

☐ Wet weather gear made of polyurethane and PVC only

***Equipment Decontamination*:**

☐ "PFAS-free" water on-site for decontamination of sample equipment; no other water sources to be used

☐ Alconox® and Liquinox® to be used as decontamination cleaning agents

***Food Considerations*:**

☐ No food or drink on-site with exception of bottled water and/or hydration drinks (*i.e.*, Gatorade® and Powerade®) that is available for consumption only in the staging area

***Vehicle Considerations*:**

☐ Avoid utilizing areas inside vehicle as sample staging areas

If any applicable boxes cannot be checked, the field team leader shall describe the deviations below and work with field personnel to address issues prior to commencement of that day's work. If possible, materials identified as potentially containing PFASs (*i.e.*, Tyvek® coveralls, spare equipment) should be relocated to a separate area of the site as far away as possible from the sampling location(s) and containerized if practicable. To assist in the assessment of QC data, the field team leader should document the presence of such items, their location, whether they have been containerized, and, if containerized, what type of container.

Describe any deviation(s) and the action/outcome and document the presence of any potential PFAS-containing materials:

Field Team Leader Name: _____

Field Team Leader Signature: _____ Time: _____

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Low Flow Groundwater Sampling Log

Well ID: _____
Northing: _____
Easting: _____

Site Name: _____ Sampling Method: _____ Field Personnel: _____
Site Location: _____ Equipment Used: _____ Date: _____
Project #: _____ Pump/Controller ID#: _____ Weather: _____

Well information:
Installed Depth of Well*: _____ ft. bmp.
Measured Depth of Well*: _____ ft. bmp.
Depth to Water*: _____ ft. bmp.
Length of Water Column (LWC): _____ ft.
Well Diameter: _____ in.

Well Volume Multipliers:
___ 1 in. = 0.041 gal/ft
___ 2 in. = 0.163 gal/ft
___ 4 in. = 0.653 gal/ft
___ 6 in. = 1.469 gal/ft
___ 8 in. = 2.611 gal/ft

* Measurement Point: _____
Other: _____
Well Volume: _____ gal.
Pump Intake Depth*: _____ ft. bmp.

Start Purge Time: 12:00
Initial Observations: *Color* _____ *Odor* _____ *Sheen/Free Product* _____

Select Units from Dropdown Menus

Elapsed Time *Minutes*	**Depth to Water** *ft bmp*	**Temperature** *Fahrenheit*	**pH** *SU*	**Specific Conductivity** *mS/cm*	**ORP** *mV*	**Dissolved Oxygen** *mg/L*	**Turbidity** *NTU*	**Flow Rate** *ml/min*	**Other**
Stabilization	Δ ≤ 0.3'	± 3%	± 0.1	± 3%	± 10 mV	± 10%	± 10%	200 ≤ X ≤ 500	

End Purge Time: _____ DO Titrataion: _____ mg/L
Total volume of groundwater purged: _____ gal.

Final Observations: *Color* _____ *Odor* _____ *Sheen/Free Product* _____
Specific Gravity _____

Analytical Sample ID: _____ **Date:** _____ **Time:** _____

Container Size	Container Type	# Collected	Field Filtered?	Preservative	Laboratory

Notes: _____