April 1, 2019

Ms. Stephanie Fitzgerald
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 11th Floor
Albany, NY 12233-7010

Consulting Engineers and Scientists

Re: Emerging Contaminant Groundwater Sampling Work Plan
Former Syracuse China Facility Landfill Site No. 734053

Dear Ms. Fitzgerald:

On behalf of TPC-York, Inc. (TPC), this letter provides a work plan for sampling groundwater at the closed Syracuse China landfill located adjacent to Factory Avenue in Salina, NY (Site No. 734053) as required by the New York State Department of Environmental Conservation (NYSDEC) in its correspondence dated May 16, 2018. Specifically, the NYSDEC requires preparation and execution of a work plan to assess the potential presence of 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS) in groundwater at the site.

This work plan summarizes the means and methods for sampling groundwater, analyzing samples for 1,4-dioxane and PFAS, and reporting in accordance with the requirements provided by NYSDEC. The location of and rationale for the wells proposed for sampling, the sampling schedule, and the reporting approach are also discussed.

1.0 SITE STATUS OVERVIEW

The site is a closed industrial landfill and wastewater settling ponds. The landfill area historically occupied an area of approximately 13.6 acres but was consolidated as part of remedial activities between 2000 and 2003, and now occupies an area of approximately 6.5 acres. The closed landfill contains broken china, gypsum molds, and wastewater settling pond sludge. The current post-closure monitoring involves sampling of groundwater every five years for analysis of lead. The most recent sampling was performed at six monitoring wells in December 2014 and lead was not detected in any of the wells. One of the wells was subsequently destroyed and decommissioned with NYSDEC approval, such that five wells are now present at the site and available for sampling. These include monitoring wells MW-2, MW-5, MW-6, MW-8, and MW-10, as shown on the attached Figure 1.

2.0 SCOPE OF WORK

This work plan identifies the proposed sample locations and rationale, the sample collection and analytical methods, and reporting procedures.

2.1 Sample Locations and Rationale

NYSDEC has required sampling of a "select number" of existing monitoring wells. Given the limited number of wells available for sampling, the screening-level nature of the emerging contaminant sampling program, and the lack of suspected PFAS and 1,4-dioxane associations with historical site operations, three well locations are proposed for sampling. Consistent with NYSDEC's recommendation, one of the locations will be an upgradient well location. The second location is in the shallow groundwater zone downgradient of the landfill. The third, MW-2, is included at the direction of the NYSDEC. The target wells and rationale are summarized as follows:

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1301 Trumansburg Road, Suite N, Ithaca, NY 14850
607.216.8955 fax: 607.274.7577

Target Well	Screened Interval (ft bgs)	Depth to Water (ft)	Rationale
MW-6	5 - 15	~4	Only available upgradient site monitoring well
MW-10	5 - 15	~3	Accessible, on-property location downgradient of landfill boundary; most hydraulically downgradient well at the site
MW-2	~2-12	~5	Required addition per NYSDEC based on review of draft work plan

Figure 1 indicates the wells proposed for sampling, as well as representative groundwater elevation measurements and inferred groundwater flow directions presented in prior site documents.

In the event that one or more proposed wells are found to not be accessible or suitable for sampling at the time of the work, the target alternative for MW-6 will be MW-5 due to its side-gradient location relative to the landfill. The target alternative for MW-10 would be MW-8 due to its downgradient location relative to the landfill and its proximity to MW-10. An alternative is not proposed for MW-2 since other wells do not represent comparable conditions to this well.

2.2 Sample Collection

Groundwater samples will be collected from selected wells using low flow methods according to GEI's Standard Operating Procedure (SOP) provided in Attachment A. Note that GEI's SOP complies with the sampling requirements and considerations indicated in the attachments to the NYSDEC's May 13, 2018 letter, plus provides additional information about minimizing the potential for cross-contamination of PFAS from known or suspected potential sources. This procedure is also suitable for the collection of samples for 1,4-dioxane, except that glass jars may be used for collection of aliquots for 1,4-dioxane analysis.

Anticipated groundwater depths are shallow enough such that a peristaltic pump will be used with high density polyethylene (HDPE) and silicone tubing to collect each groundwater sample. 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.

Field quality assurance samples will be collected as follows:

- One equipment blank will be collected per site. Equipment blank samples will be collected by pouring laboratory-supplied PFAS-free water over cleaned sample equipment at the site.
- One blind duplicate sample will be collected and assigned a sample ID that will not correlate to the parent sample.

- One set of matrix spike and matrix spike duplicate (MS/MSD) samples will be collected **for analysis of 1,4-dioxane only**. MS/MSD analyses are not necessary for PFAS analyses based on the use of the isotope dilution analytical method.

Samples will be packed in a cooler on ice and transported to the selected analytical laboratory under chain of custody procedures.

2.3 Laboratory Procedures

Each groundwater sample will be analyzed for PFAS using a laboratory-modified procedure based on United States Environmental Protection Agency (EPA) Method 537 and for 1,4-dioxane by EPA Method 8270D SIM. The PFAS reporting list will include, at a minimum, the 21 compounds indicated in NYSDEC's April 2018 "Groundwater Sampling for Emerging Contaminants" guidance, which was included as an attachment to the NYSDEC's May 16, 2018 letter. As required by NYSDEC, the laboratory will be directed to provide a reporting limit for PFAS not exceeding 2 ng/l (ppt) and the method detection limit (MDL) for 1,4-dioxane will not exceed 0.28 µg/l (ppb).

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's May 16, 2018 letter. We anticipate that the selected laboratory will be either TestAmerica West Sacramento, California or Alpha in Westborough, Massachusetts.

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.

2.4 Waste Management

Recent sampling of the landfill wells (RocTerra 2016) indicates non-detectable levels of lead, which is the only remaining analytical parameter associated with the current monitoring program. 1,4-Dioxane and PFAS are not anticipated to be present as a result of historical operations at the site. Accordingly, the small volumes of purge water expected to be generated by the low-flow sampling will be placed back into the well following sampling. Solid materials generated during the field program (e.g., used gloves and tubing) will be disposed as unregulated refuse.

2.5 Data Interpretation and Reporting

TPC-York will submit a report transmitting the emerging contaminant data to NYSDEC within 90 days of receiving laboratory analytical data. The report will include the following information:

- Summary of the groundwater sampling scope;
- A figure showing the general groundwater flow direction and sampled wells;
- Validated analytical data and an indication of whether target detection limits were achieved;
- Category B laboratory reports;
- DUSRs for each laboratory data package; and
- Observations and interpretation of the analytical results, including comparison to benchmark levels that may exist at the time of reporting.

TPC-York will also submit electronic data to NYSDEC as described at: https://www.dec.ny.gov/chemical/62440.html.

3.0 SCHEDULE

To the extent possible, field sampling will be conducted within 60 days following NYSDEC approval of this work plan. The schedule will depend on property access and field/weather conditions at the time. We will notify NYSDEC if the sampling will occur beyond the 60-day timeframe due to weather or access-related factors.

As indicated above, a summary report will be provided to NYSDEC within 90 days of receiving laboratory analytical data.

If you have any questions or comments, please contact Jeff Holden of GEI at 607-216-8956 or Amy Reichhart of Nixon Peabody at 585-263-1322. Otherwise, we look forward to your approval to implement the work as described above.

Sincerely,

GEI CONSULTANTS, INC., P.C.

Jeffrey S. Holden, P.E.
Senior Engineer

Daniel Kopcow, P.E., PMP
Senior Engineer, Branch Manager

JSH:mlr

Attachments: Figure 1 –Proposed Sample Locations
Attachment A – GEI's SOP - Groundwater Sampling for PFAS

c: Amy Reichhart – Nixon Peabody
Craig Bremer – TPC-York

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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/

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/

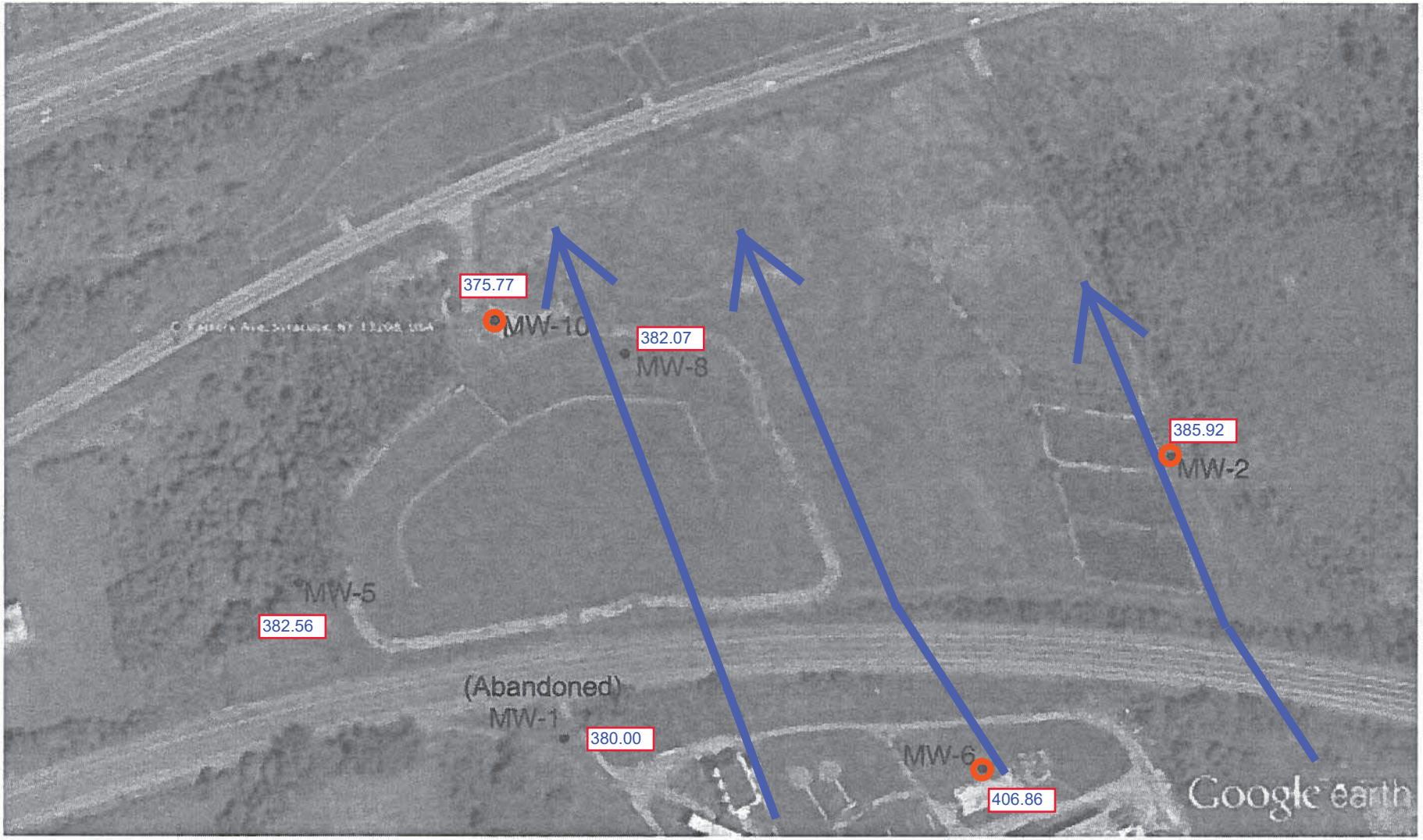
Geraghty & Miller, Inc. 1995. Figure titled "Water-Level Elevations, January 5, 1995." April 1995.

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

RocTerra 2016. Period Review Report Syracuse China, December 2016.

NYSDEC 2018. Per- and Polyfluoroalkyl Substances (PFAS) retrieved from https://www.dec.ny.gov/chemical/108831.html

Figure



Google Earth Pro

feet 1000
meters 400

RocTerra

MONITORING WELL PROPOSED FOR EMERGING CONTAMINANT SAMPLING

380.00 Groundwater elevation on 12/31/14 as reported in Periodic Review Report (RocTerra 2016)

General groundwater flow direction (Note 2)

Notes:
1. Figure Adapted from Figure 2 of "Periodic Review Report," RocTerra, December 2016
2. Groundwater flow direction based on Geraghty & Miller figure titled "Water-Level Elevations, January 5, 1995

Groundwater Monitoring Well Map

Figure 1

Attachment A

GEI's SOP – Groundwater Sampling for PFAS

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 ºC 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