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Date: April 25, 2023
Our Ref: 30106649
Subject: Westchester Garden Center - Labriola Landfill
Phase 2 Site Characterization Work Plan
NYSDEC Site No. 360218, Standby Contract D009804-24.1

Dear Brittany O'Brien-Drake,

As discussed with the NYSDEC project team, Arcadis of New York, Inc. (Arcadis) has prepared this Phase 2 Site Characterization (SC) Work Plan to support the characterization for the Westchester Garden Center (WGC) - Labriola Landfill (the "Site") in the Town of North Castle, Westchester County, New York (Figure 1). The scope of the site characterization activities is presented below.

1. Introduction and Background

1.1 History

The Site is an approximately 7-acre property along Wampus Lake Drive in North Castle. The Site is a former landfill located within a residential neighborhood. It consists of the vegetated post-closure landfill cover surrounded by wooded land. The Site is bordered on the northwest and southwest by Wampus Lake Drive and on the northeast by the Westchester Garden Center.

The inactive landfill occupies approximately 3.5 acres of the middle portion of the Site. Historical operation of the landfill occurred from about 1954 to 1974 as an open-faced dump with a waste mass between 30 and 40 feet high, primarily accepting lumber and building debris. In 1979, the owner applied for a permit to receive construction and land clearing debris, however no information was found confirming if disposal of this type of waste occurred. A landfill closure plan was approved in May 1981 which included post-closure monitoring for five years and erosion control measures. However, it is unknown the extent to which this plan was implemented.

In May 2019, the NYSDEC's Division of Materials Management conducted Emerging Contaminant (EC) sampling under the Inactive Landfill Initiative. This sampling included the collection of one groundwater sample from an existing downgradient monitoring well. The analytical results showed the presence of perfluorooctanoic acid (PFOA) at 34 parts per trillion (ppt) and perfluorooctanesulfonic acid (PFOS) at 21 ppt. Samples were also analyzed for 1,4-dioxane, but it was not detected above the reporting limit. PFOA and PFOS were detected in nearby residential and commercial water supply wells. The potential for this contamination to be attributable to

past Site operations or subsequent uncontrolled discharges from the landfill is the subject of the currently-proposed site characterization activities.

1.2 Phase 1 Site Characterization

Arcadis performed the following Phase 1 site characterization activities between June and August of 2022:

- Monitoring well installation;
- Soil sampling from the monitoring well borings;
- Redevelopment of existing wells;
- Groundwater sampling;
- Sediment sampling; and
- Surface water sampling.

Five new overburden monitoring wells were installed between July and August 2022. The overburden wells installed prior to and during the 2022 investigation were set at depths ranging from 11 to 43 feet below ground surface (bgs). Monitoring well MW-2, installed prior to the 2022 investigations, is presumed to be a bedrock monitoring well, based on a depth to bottom of 62.4 feet bgs. Samples were analyzed to assess the presence of contaminants including perfluorinated alkyl substances (PFAS) and 1,4-dioxane. A subset was additionally analyzed for Target Analyte List (TAL) Metals plus mercury and cyanide, VOCs, SVOCs including 1,4-dioxane, PCBs, Pesticides, and Herbicides.

Arcadis collected soil samples from each monitoring well installation. The total PFAS concentrations ranged from 0.1 µg/Kg to 6.4 µg/Kg, general decreasing with soil interval depth.

After development of new wells and redevelopment of existing wells, the Arcadis personnel collected groundwater samples. Total PFAS concentrations in groundwater during this round of sampling ranged from 29 ng/L to 205 ng/L (Figure 3).

Five collocated surface water and sediment samples were collected from points along a stream adjacent to the Site. Surface water sampling showed a range of total PFAS concentrations between 39 ng/L to 150 ng/L.

1.3 Data Gaps

While the data confirms the presence of PFAS within the overburden groundwater, additional information is needed to determine whether PFAS exists in groundwater within the bedrock. PFAS was detected in groundwater both up and downgradient of the Site. Additional monitoring wells at and just upgradient of the Site may provide more evidence to determine if the former Site landfill is a source of PFAS in groundwater. In addition, the installation of soil borings (and conversion of one boring location to an overburden monitoring well) within the landfill bounds, should also provide data to assist in determining whether the Site landfill is a source of PFAS. Surface water sampling was conducted once (during the 2022 sampling event); an additional round of sampling will display any trends in PFAS concentrations and adjust for seasonal variability. The installation of stream gauges at several points along the stream adjacent to three previous surface water samples will be used to determine correlations between stream and groundwater elevation fluctuations and residential water usage.

2. Phase Two Site Characterization

The installation of additional overburden and bedrock monitoring wells as well as additional environmental sampling within and adjacent to the Site will assist in determining if the Site is a source of downgradient PFAS concentrations. Laboratory analytical services for the characterization will continue to be performed by a standby laboratory under contract with the NYSDEC. The following sections outline the specific phase 2 SC activities that are planned.

2.1. Geophysical Survey

Arcadis will subcontract with a geophysical survey firm to evaluate subsurface conditions at the thirteen proposed monitoring well locations. The geophysical surveyor will locate, mark, and map buried utilities and structures within the vicinity of the proposed monitoring well locations prior to drilling activities. Using the results of the geophysical survey, the subcontractor and Arcadis will identify potential points of conflict between existing surface and subsurface structures/utilities and the locations proposed for new monitoring wells. Geophysical survey reports will be produced following completion of field work activities and adjustments to the drilling locations will be made, if necessary.

2.2. Community Air Monitoring Program

In accordance with the New York State Department of Health (NYSDOH) generic community air monitoring plan (CAMP) guidelines, a CAMP will be implemented during all intrusive activities at the Site. Two CAMP stations will be utilized for this work, one positioned upwind and the other downwind of the intrusive work. The CAMP stations will monitor for VOCs and air particulates/dust using PIDs and aerosol monitors, respectively. Arcadis personnel on-site during the installation of the new monitoring wells will also conduct the CAMP monitoring.

2.3. Groundwater Monitoring Wells

2.3.1. Monitoring Well Decommissioning

Monitoring well MW-1 will be decommissioned in general accordance with NYSDEC Commissioner Policy 43: Groundwater Monitoring Well Decommissioning Policy (CP-43). One six-inch diameter steel-cased monitoring well, with curb box (and well risers, if existing), will be decommissioned. The decommissioning is assumed to include tremie-grouting of the existing well from the bottom to within two feet of the ground surface. Once the grout has cured, the well casing will be cut at two-feet below ground surface and removed along with the curb box and well riser. The remaining area will be backfilled with materials (i.e., topsoil) consistent with the surrounding area.

2.3.2. Installation of New Monitoring Wells

Phase 2 work includes the installation and development of eight new bedrock groundwater monitoring wells and five new overburden monitoring wells to assess groundwater quality at and in the vicinity of the Site (Figure 2). This work will be performed by a water well drilling subcontractor licensed by the state of New York.

Locations for the new wells will be hand-cleared to a depth of 5 feet below ground surface (bgs) by the driller, unless otherwise instructed by Arcadis. Overburden monitoring wells MW-1R, MW-9S, MW-10, MW-11S, and MW-12S will be installed using 4-inch sonic drilling methods. The five new wells will be completed as 2-inch monitoring wells, constructed of 2-inch diameter Schedule 40 polyvinyl chloride (PVC) risers, with 10-foot-long machine-slotted Schedule-40 PVC screens with a screen slot size of 0.010-inch. The monitoring wells will each be installed to an approximate depth of 25-40 ft. bgs. Each well will be sealed using a minimum 2-feet thick layer of hydrated bentonite above a #00 morie sand screen filter pack, with the remainder of the annulus grouted to the ground surface with a cement-bentonite grout. Two of the five wells (MW-11S and MW-12S) will be completed as flush-mount wells with 6-inch diameter steel protective curb boxes installed in concrete surface pads. The remaining wells (MW-1R, MW-9S, and MW-10) will be completed at the surface with a 4-inch diameter steel stickup protector (minimum 2 feet above ground surface) installed in a concrete surface pad. All overburden well locations will be sampled continuously to characterize lithology; soil samples will also be collected for laboratory analysis at a subset of the locations.

New bedrock monitoring wells MW-2D, MW-4D, MW-6D, MW-7D, MW-8D, MW-9D, MW-11D, and MW-12D will be installed using either sonic or hollow-stem auger (HSA) drilling techniques to advance the boring to the top of competent bedrock (~10-40 feet bgs). Continuous soil samples will be collected during the overburden drilling where previous information on overburden materials is not available. Upon reaching competent bedrock, a 5- 7/8 inch O.D. roller bit will then be inserted into the hollow-stem augers and used to drill at least five feet into competent bedrock, creating a "rock socket" in which to set a surface casing. Sonic drilling techniques may also be used to set the "rock socket" if used for the overburden drilling. The "rock socket" will be flushed with potable water to remove rock cuttings. Four-inch I.D. steel casing with an end cap and centralizers will then be placed in the borehole and pushed to the bottom of the "rock socket". Cement-bentonite grout will then be tremie pumped from the bottom of the "rock socket" to three feet below the ground surface. The augers/sonic casing will be incrementally withdrawn as the grout is emplaced. After the grout has cured for 24 hours, five of the wells will then be completed to the final depth of approximately 50-75 feet bgs (based on encountering water-bearing fractures) using a 3- 7/8 inch O.D. roller bit and mud, water, or air rotary drilling techniques. The sixth well will be completed to the final depth of approximately 50-75 feet bgs using HQ rock coring techniques and a wireline coring apparatus. Bedrock cores will be placed in wooden core boxes supplied by the driller. Drilling liquids and soil cuttings are to be contained in UN-approved 55-gallon drums provided by the driller and staged either at the well head or a central location designated by the on-site Arcadis field representative. One bedrock well will be cored using HQ rock coring techniques.

The driller will provide the equipment necessary to develop the 13 new monitoring wells via over-pumping and surging with a submersible pump to remove fines from the groundwater, as guided by Arcadis' onsite personnel.

2.3.3. Groundwater Sampling

Following the installation and development of the eight new bedrock groundwater monitoring wells and five new overburden monitoring wells, Arcadis will complete one groundwater sampling event inclusive of all existing monitoring wells, conducted at least two weeks after well installation and development is complete. Arcadis will

remobilize to the site and collect groundwater samples from the new wells and the six existing monitoring wells (a total of 20 groundwater samples, plus QA/QC samples – Table 1). Depth to groundwater will be measured in all site wells prior to the initiation of the groundwater sampling event. Groundwater sampling will be conducted using low-flow sampling techniques in accordance with Arcadis' Generic Field Activities Plan (FAP) for the NYSDEC Standby Engineering Services Contract. Groundwater samples at new and existing wells will be analyzed at the NYSDEC's callout laboratory for PFAS (21-analyte list), leachate indicators, and general chemistry parameters (phosphate, total Kjeldahl Nitrogen, pH, bicarbonate, carbonate). In addition, a subset of samples (a minimum of 20%) from new monitoring well locations will also be analyzed for Target Analyte List (TAL) metals and mercury, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and general chemistry analytes (chloride, sulfate, nitrate as N, phenolics, and total dissolved solids). A subset of samples from both new and existing wells will be analyzed for nitrate and the artificial sweeteners Sucralose & Acesulfame-K. Analytical results will be utilized to assess groundwater quality, the potential for transmission between shallow and bedrock aquifers, as well as domestic wastewater impacts at and in the vicinity of the Site.

2.4. Soil Borings

Arcadis will install four direct-push soil borings in the overburden of the landfill (Figure 2) to gain an understanding of the depth of the landfill as well as material within the landfill. Soil from continuous split spoon sampling will be visually characterized and screened with a photoionization detector (PID) Three soil samples will be collected from each boring, as well as from newly installed monitoring wells MW-1R and MW-9S (a total of 18 soil samples, plus QA/QC samples – Table 2): one sample will be collected at the surface (0-2 inches bgs), one will be collected at a depth between 2-12 inches bgs, and one will be collected either at refusal or just above the groundwater table, whichever comes first. The soil samples will be analyzed for PFAS (21-analyte list), with additional analysis of Synthetic Precipitation Leaching Procedure (SPLP) PFAS, pH, and TOC at the 2-12-inch sample depth. One soil boring will be completed as an overburden monitoring well.

2.5. Surface Water Sampling

Surface water samples will be collected from the five locations near the Site where surface water was collected during Phase I with another location further downstream (Figure 2) for a total of six surface water samples, plus QA/QC samples (Table 3). All surface water samples will be analyzed for PFAS, and a subset of the samples will also be analyzed for leachate indicators, artificial sweeteners, and nitrate.

2.6. Water Elevation Monitoring

2.6.1. Groundwater Level Monitoring

Transducers will be installed in five monitoring well clusters (MW-4S/4D, 6S/6D, 7S/7D, 8S/8D, 9S/9D) to monitor groundwater level fluctuations for a minimum of one month to evaluate the influence of residential water use in the area and the connectivity between the overburden and shallow bedrock aquifers.

2.6.2. Stream Gauging

Staff gauges will be installed and surveyed at three locations to measure surface water elevations, adjacent to three previous Phase I surface water samples. Stream elevation measurements will be conducted concurrent with groundwater elevation measurements.

2.7. Land Survey

Arcadis will retain a land surveyor licensed in New York State to complete survey work at the Site. The surveyor will locate the newly-installed monitoring wells, and provide measuring point elevations for the new wells and the three new stream staff gauges.

2.8. Data Validation

Laboratory analytical data produced during the Phase 2 Site Characterization (excluding geochemical parameters, artificial sweetener and IDW results) will be validated by a third-party data validator in accordance with DER-10 Appendix 2B Data Usability Summary Report requirements. Data collected during the Phase 2 SC will be entered into the NYSDEC's EQuIS database.

2.9. Investigation-Derived Waste (IDW) Drums/Disposal

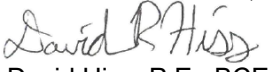
Waste disposal services will transport and properly dispose of 55-gallon drums of drill cutting soil, groundwater, and solid waste (decontamination materials, personal protective equipment, plastic, etc.) generated during the investigation. The drums will be staged at the Site (or another location designated by NYSDEC) on a level area that is truck accessible. One composite water sample, one composite soil sample, and one composite sample of personal protective equipment materials from the drums will be collected by Arcadis and analyzed by a NYSDEC-contracted laboratory for TCL VOCs by USEPA Method 8260B, TCL SVOCs by USEPA Method 8270, PCBs by USEPA Method 8082, and RCRA 8 metals by USEPA 6000/7000 Series for waste characterization purposes. A subcontracted waste disposal firm will then transport and dispose of the investigation-derived waste in accordance with local, state, and federal regulations.

3. Reporting

Following receipt of validated data from Phase 2 of the SC, Arcadis will upload the laboratory analytical data to the NYSDEC EQuIS database. In addition, Arcadis will prepare an overall SC Report documenting the work performed and compiling and analyzing the data from all the SC activities to date. Recommendations for subsequent investigations or other actions regarding the Site, if indicated to be necessary, will be made.

Please contact me at (518) 250-7309 or David.Hiss @arcadis.com if you have any questions or need additional information.

Sincerely,
Arcadis of New York, Inc.



David Hiss, P.E., BCEE
Principal Engineer

CC. Eric Hausamann – NYSDEC
Andy Vitolins P.G. – Arcadis

Enclosures:

- Figure 1 – Site Location
- Figure 2 – Proposed Monitoring Well/Sampling Locations
- Table 1 – Proposed Soil Samples
- Table 2 – Proposed Groundwater Samples
- Table 3 – Surface Water Samples

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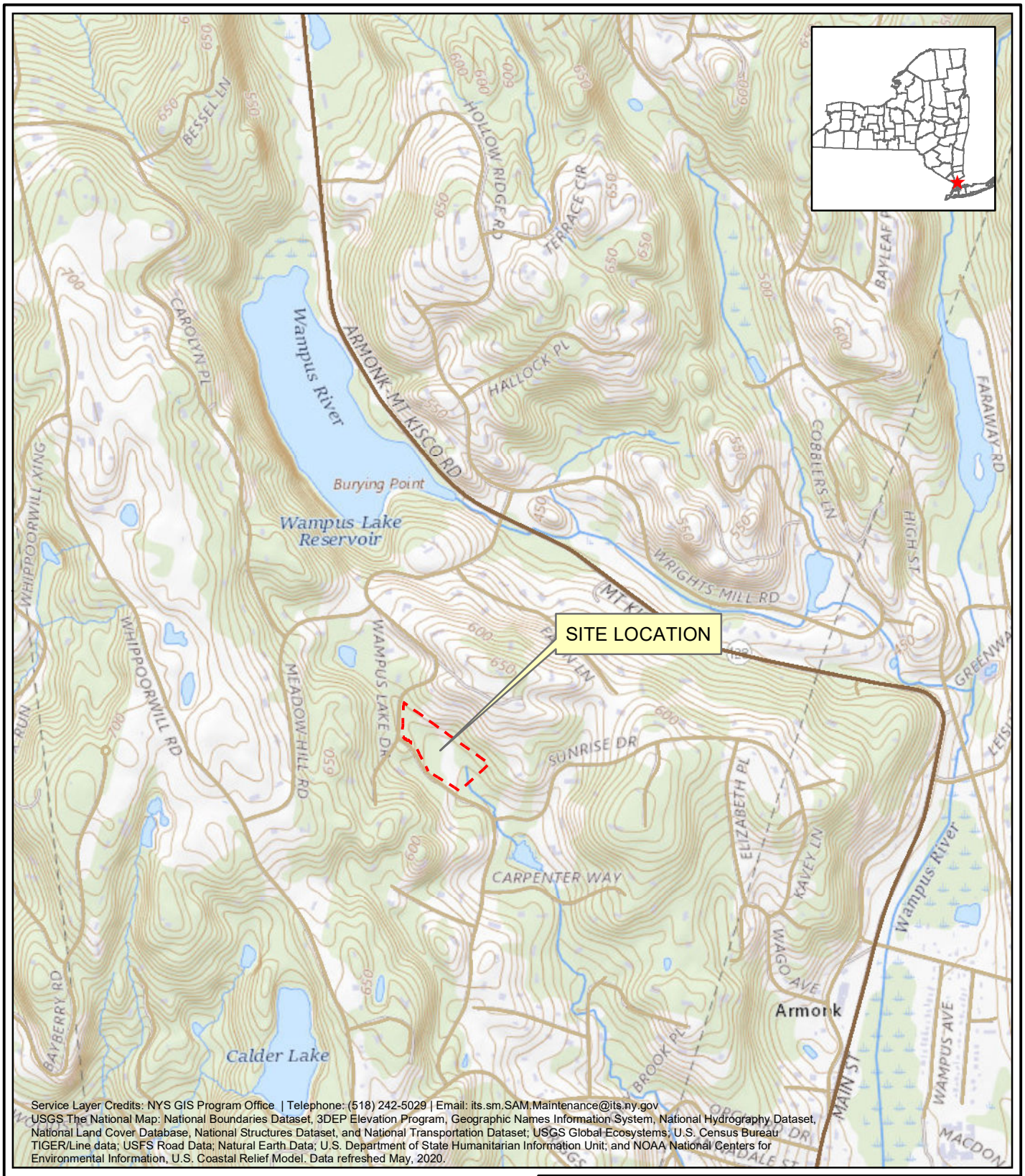

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Legend

Westchester Garden Center Labriola Landfill (Approximate)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Westchester Garden Center Labriola Landfill Site #360218
Armonk, New York

SITE LOCATION

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FIGURE 1

City: Clifton Park Div/Group: ENV Created By: D. Giroux Last Saved By: Giroux
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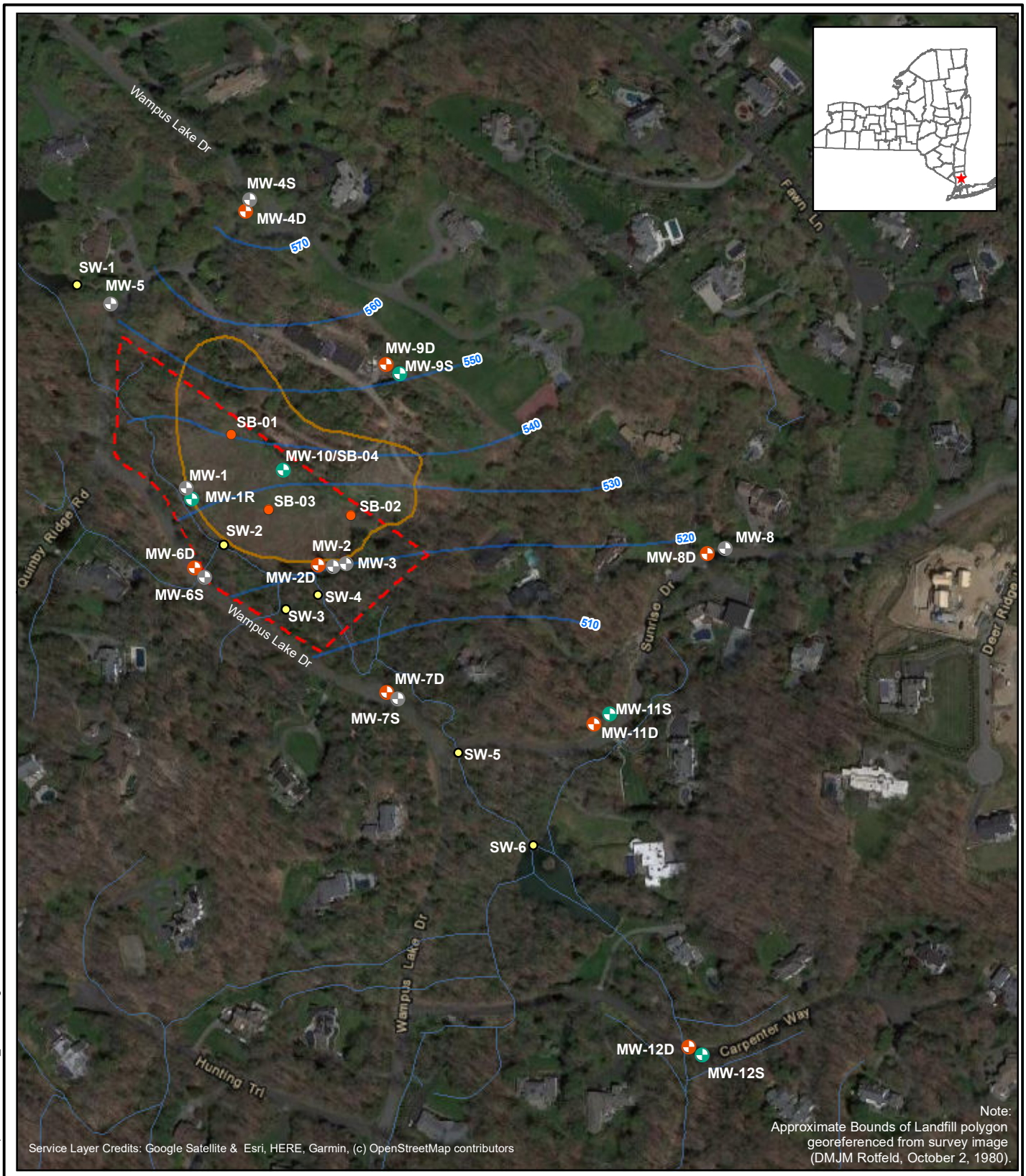

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Legend

- Proposed Bedrock Monitoring Well
- Proposed Overburden Monitoring Well
- Proposed Soil Boring
- Surface Water Sample
- Existing Monitoring Well
- Potentiometric Contour (Feet Above Mean Sea Level ft amsl)
- Streams
- Approximate Bounds of Landfill
- Westchester Garden Center Labriola Landfill Site (Approximate)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Westchester Garden Center Labriola Landfill Site #360218
Armonk, New York
SITE CHARACTERIZATION

PROPOSED MONITORING WELL/ SAMPLING LOCATIONS

ARCADIS

FIGURE 2

City: Clifton Park Div/Group: ENV Created By: D. Giroux Last Saved By: Giroux
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Table 1. Proposed Groundwater Samples
Westchester Garden Center Labriola Landfill
Site Characterization - Phase II
Site No. 360218

ID	Location	2023 Phase II Site Characterization Analytes
MW-1/ MW-1R	Landfill	PFAS (21-analyte list), Leachate Indicators, General Chemistry Parameters, Individual Metals
MW-2	Landfill	PFAS (21-analyte list), Leachate Indicators, General Chemistry Parameters, Individual Metals
MW-2D	Landfill	PFAS (21-analyte list), Leachate Indicators, General Chemistry Parameters, Individual Metals
MW-3	Landfill	PFAS (21-analyte list), Leachate Indicators, General Chemistry Parameters, Individual Metals
MW-4S	North of Landfill	PFAS (21-analyte list), **Artifical Sweeteners**, Nitrate, Leachate Indicators, General Chemistry Parameters, Individual Metals
MW-4D	North of Landfill	PFAS (21-analyte list), **Artifical Sweeteners**, Nitrate, Leachate Indicators, General Chemistry Parameters, Individual Metals
MW-5	Northwest of Landfill	PFAS (21-analyte list), Leachate Indicators, General Chemistry Parameters, Individual Metals
MW-6S	Southwest of Landfill	PFAS (21-analyte list), Leachate Indicators, General Chemistry Parameters, Individual Metals
MW-6D	Southwest of Landfill	PFAS (21-analyte list), Leachate Indicators, General Chemistry Parameters, Individual Metals
MW-7S	South-Southeast of Landfill	PFAS (21-analyte list), **Artifical Sweeteners**, Nitrate, Leachate Indicators, General Chemistry Parameters, Individual Metals
MS-7D	South-Southeast of Landfill	PFAS (21-analyte list), **Artifical Sweeteners**, TAL Metals, VOCs, SVOCs, PCBs, Leachate Indicators, General Chemistry Parameters
MW-8	East of Landfill	PFAS (21-analyte list), **Artifical Sweeteners**, Nitrate, Leachate Indicators, General Chemistry Parameters, Individual Metals
MW-8D	East of Landfill	PFAS (21-analyte list), **Artifical Sweeteners**, Nitrate, Leachate Indicators, General Chemistry Parameters, Individual Metals
MW-9S	Northeast of Landfill	PFAS (21-analyte list), **Artifical Sweeteners**, TAL Metals, VOCs, SVOCs, PCBs, Leachate Indicators, General Chemistry Parameters
MW-9D	Northeast of Landfill	PFAS (21-analyte list), **Artifical Sweeteners**, TAL Metals, VOCs, SVOCs, PCBs, Leachate Indicators, General Chemistry Parameters
MW-10	Landfill	PFAS (21-analyte list), **Artifical Sweeteners**, TAL Metals, VOCs, SVOCs, PCBs, Leachate Indicators, General Chemistry Parameters
MW-11S	Southeast of Landfill	PFAS (21-analyte list), **Artifical Sweeteners**, Nitrate, Leachate Indicators, General Chemistry Parameters, Individual Metals
MW-11D	Southeast of Landfill	PFAS (21-analyte list), **Artifical Sweeteners**, Nitrate, Leachate Indicators, General Chemistry Parameters, Individual Metals
MW-12S	Southeast of Landfill	PFAS (21-analyte list), **Artifical Sweeteners**, Nitrate, Leachate Indicators, General Chemistry Parameters, Individual Metals
MW-12D	Southeast of Landfill	PFAS (21-analyte list), **Artifical Sweeteners**, Nitrate, Leachate Indicators, General Chemistry Parameters, Individual Metals

General Chemistry Parameters: Phosphate, Total Kjeldahl Nitrogen, pH, Bicarbonate, Carbonate
Individual Metals: Calcium, Magnesium, Potassium, Sodium

Definitions
PFAS - Perfluorinated Alkyl Substances

Table 2. Proposed Soil Samples
Westchester Garden Center Labriola Landfill
Site Characterization - Phase II
Site No. 360218

ID	Location	Proposed Sampling Interval(s) (ft. bgs)	2023 Site Characterization Analytes
SB-01	Landfill	0-2"	PFAS 21-analyte list
		2-12"	PFAS (21 analyte), pH, TOC, SPLP PFAS
		Just above water table or at refusal	PFAS 21-analyte list
SB-02	Landfill	0-2"	PFAS 21-analyte list
		2-12"	PFAS (21 analyte), pH, TOC, SPLP PFAS
		Just above water table or at refusal	PFAS 21-analyte list
SB-03	Landfill	0-2"	PFAS 21-analyte list
		2-12"	PFAS (21 analyte), pH, TOC, SPLP PFAS
		Just above water table or at refusal	PFAS 21-analyte list
SB-04	Landfill	0-2"	PFAS 21-analyte list
		2-12"	PFAS (21 analyte), pH, TOC, SPLP PFAS
		Just above water table or at refusal	PFAS 21-analyte list
MW-9S	Northeast of Landfill	0-2"	PFAS 21-analyte list
		2-12"	PFAS (21 analyte), pH, TOC, SPLP PFAS
		Just above water table or at refusal	PFAS 21-analyte list
MW-1R	Landfill	0-2"	PFAS 21-analyte list
		2-12"	PFAS (21 analyte), pH, TOC, SPLP PFAS
		Just above water table or at refusal	PFAS 21-analyte list

Notes
1. "Just above water table or at refusal" = whichever comes first.

Definitions
" - inches
bgs - below ground surface
ft - feet
PFAS - Perfluorinated Alkyl Substances
TOC - Total Organic Carbon
SPLP - Synthetic Precipitation Leaching Procedure

Table 3. Proposed Surface Water Samples
Westchester Garden Center Labriola Landfill
Site Characterization - Phase II
Site No. 360218

ID	2023 Site Characterization Analytes
SW-1	PFAS 21-analyte list, Leachate Indicators, Artificial Sweeteners, Nitrate
SW-2	PFAS 21-analyte list
SW-3	PFAS 21-analyte list, Leachate Indicators, Artificial Sweeteners, Nitrate
SW-4	PFAS 21-analyte list
SW-5	PFAS 21-analyte list, Leachate Indicators
SW-6	PFAS 21-analyte list, Leachate Indicators, Artificial Sweeteners, Nitrate

Definitions
PFAS - Perfluorinated Alkyl Substances