FIELD SAMPLING PLAN

BAUSCH AND LOMB SUNTRU STREET SITE

Prepared For:

BAUSCH + LOMB

HELPING PEOPLE SEE BETTER TO LIVE BETTER

170 YEARS

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1.0 SITE PREPARATION AND SUBSURFACE CLEARANCE

Parsons' policy requires that the Parsons Project Manager follow all local, state, and federal laws that apply to intrusive subsurface work, where appropriate (i.e., inform agencies, obtain utility clearances and other similar activities). The Parsons Project Manager shall review, as available, current and historical site drawings and plans from the facility owner or tenant, utility providers, municipal government offices (i.e., city engineer, building department) and third parties as appropriate.

The Pre-Drilling/Subsurface Checklist for Intrusive Fieldwork shall be completed prior to initiating fieldwork. It is the responsibility of the Parsons Project Manager to require that the Pre-Drilling/Subsurface Checklist for Intrusive Fieldwork and Utility Clearance Variance Request form is followed. If a variance is sought, it is the responsibility of the Parsons Project Manager to gain written approval of the appropriate Parsons Sector Leader and/or Health and Safety Manager.

The Parsons Project Manager will be responsible for fulfilling the objectives of this protocol by requiring that the procedures are carried out by Parsons employees, subcontractors, and any other person acting on behalf of Parsons. The Parsons Project Manager will require that individuals working on drilling and other subsurface exploration projects are adequately trained and supervised. Parsons will practice sound investigation and work practices and employ necessary measures to avoid damage to subsurface systems and structures. The Parsons Sector Leader will be contacted and advised in advance of beginning field work in the event that a variance to this protocol is requested by the Parsons Project Manager or designee.

1.1 Pre-Clearance Tasks

The objectives of these tasks include compiling relevant information needed to identify accessibility improvement needs at the planned borehole locations.

One task is to obtain available as-built drawings and/or existing site plans. As-built drawings may not accurately depict the locations of improvements or the most recent subsurface features and should therefore not be solely relied upon to determine subsurface conditions.

Another task is to obtain utility mark outs. Parsons project staff will request a utility mark-out via the local utility's one-call system and subcontract with a private utility locating company for the work site. Investigation staff will document efforts to locate subsurface utilities (e.g., electrical, gas, communications, sewer, water, cable). The Parsons Project Manager must be notified of the status of locating underground utilities before fieldwork begins. If locating utilities becomes problematic, the Parsons Project Manager will update the property owners and discuss potential additional methods for locating or reducing risk of damage to underground utilities/structures. Such additional actions may include subcontracting a private locating service to use additional subsurface locating methodologies than those previously used/or and re-evaluating risk/reward of specific locations or utilizing intrusive non-destructive methods. Site plans will be updated as appropriate to include utility mark-out information. Detailed coordination with the site owner's representatives for mark-outs, review of as-builts, and other informational reviews will be conducted prior to the start of intrusive work.

Parsons will obtain information needed to prepare a vicinity map of the area that may include significant neighboring addresses, land use, surface water bodies, and other natural, as well as manmade features of note, as appropriate. A site visit/walkover will be scheduled concurrent with, or soon after the utility mark-out. The walkover will include inspections and notations of the locations of utility mark-outs and above-ground utilities/structures, including:

- Light standards
- Communication lines (phone, fiber optic)
- Sewer lines
- Site infrastructure
- Overhead lines
- Water lines and spigots/hydrants
- Catch basins
- Manholes
- Junction boxes
- Natural gas lines
- Other utilities
- Paving scars such as areas of new pavement or saw cuts

1.2 Subsurface Clearance

Parsons staff will ensure that no subsurface utilities, structures, or improvements exist where intrusive subsurface activities will occur. Locations will be cleared using results of historical data research and with geophysical methods within 25 feet in radius around the proposed boring location.

In accordance with Parsons Subsurface Soil Disturbance Protocol, intrusive clearance (e.g., hand clearing, air/water knife, or similar techniques) must be performed to clear the top five feet below ground surface. In addition, site knowledge by project staff, non-invasive clearance techniques, and close monitoring of drilling rates will be employed to avoid contact with utilities and anomalies as further detailed below.

Proactive investigative methods to clear specific drilling locations at the site will include non-invasive geophysical remote sensing. Ground-penetrating radar (GPR), electromagnetic detectors, magnetometers, or metal detectors will be used to survey an area around the boring location to a distance of 25 feet to identify potential subsurface utilities or facilities.

Utilities and associated site infrastructure will be located prior to drilling operations using remote sensing techniques in the event that borings are relocated, or that step-out borings are required.

Subsurface clearance may be performed on multiple sampling points prior to mobilization of the drill rig. To minimize confusion in the field, a survey stake will mark the drilling location as proposed in the work plan. The survey stake will include the sample point ID, written in black marker. Upon clearing the 25-foot radius using the above techniques, the stake will be spray painted with pink paint.

Significant anomalies detected by the geophysical remote sensing justifies the relocation of the staked sample point. New coordinates should be collected upon moving the stake to the alternative sample point. Any relocation of sample points shall be communicated to the Parsons Project Manager. Upon approval of the relocation, maps and lists of drilling points will be updated.

The final list and map of drilling points, with global positioning system (GPS) coordinates and whether the original point had been moved or not, shall be provided to the drilling team for their reference. The supervisor of the drilling team shall acknowledge through documentation that the final sample point and, if applicable, the original, relocated point have been positively identified.

Geophysical technologies may include but not be limited to GPR, radio frequency (RF), and electromagnetic induction (EM).

1.3 Event Notification

If any portion of a tank, pipe, utility, or other subsurface structure is encountered, or if there is any doubt it has been encountered, the work is to cease in that area and the Parsons Project Manager notified immediately. If there is reason to believe that the structure has been damaged, any emergency shut-off switches should be activated (if applicable) and the appropriate regulatory entity, municipality, and property owner notified immediately. The Parsons Project Manager, in consultation with the client, will decide if additional uncovering by hand is required. If it is confirmed that an underground storage tank system has been encountered, the appropriate regulatory entity should be notified and regulations followed. Under no circumstances is the area to be backfilled without notifying the Parsons Project Manager, unless risk of personal injury or damage warrants temporary backfilling.

In case of refusal or if an unknown subsurface object is encountered during intrusive subsurface activities, then the following specified resolution process must take place.

- If the cause CAN be readily and correctly defined as not destructive or hazardous, drilling may proceed ONLY after consultation with the Project Manager.
- Otherwise, drilling MUST STOP so that location re-evaluation can take place. The client, the utility owner (if applicable) and, if required, the appropriate regulatory agency, must be advised of the situation and consulted to determine if (1) the location is necessary, which may require additional effort to clear a new location, or (2) the location is not necessary, and can be deleted from the program.

2.0 SOIL BORING INSTALLATION

A Parsons Geologist will be the on-site representative responsible for overseeing boring installation activities. This representative will monitor that the work is performed with due caution and will be alert for warning signs that could indicate the presence of underground tanks, lines, or other hazards or structures.

Drilling equipment will be in proper working order and inspected to determine if it meets safety requirements, with inspection documentation to be provided by the drilling contractor. Field personnel will be briefed daily on potential hazards including working around moving equipment, physical hazards, biota, and risks associated with chemical exposures. Health and safety protocol/procedures pertaining to drilling in potentially impacted areas are included in the Project Safety, Health, and Environmental Plan (PSHEP).

It is anticipated that all work will be completed in modified Occupational Safety and Health Administration (OSHA) Level D personal protective equipment (PPE).

Once the data collection needs of the borehole, including laboratory sample collection have been met, the borehole will be decommissioned consistent with the methods described in American Society for Testing and Materials (ASTM) D5299 (2018a).

2.1 Drilling Methods

Depending on site-specific objectives and/or drilling conditions, soil borings may be advanced using conventional drilling methods. Typical drilling methods used to collect overburden soils and create boreholes for monitoring well installations include:

- Hollow stem augers (HSA)
- Drive and wash or spin and wash flush joint casing
- Fluid rotary methods (using potable water only)
- Air rotary
- Hand sampling

These drilling methods typically allow for the advancement of borings through most soil types including denser soils (e.g., glacial till), and when coupled with split spoon sampling conducted in accordance with ASTM Method D1586, can provide geotechnical information. When used, the following procedures will be followed by field personnel:

2.1.1 Equipment and Supplies

- Applicable drill rig and all associated supplies and equipment
- Digging implement: hand auger, garden trowel, disposable trowel, shovel, spoons, post-hole digger, etc. (if collecting by hand)
- Field log
- PID
- Re-sealable plastic bags (e.g., Ziploc®)
- Lab-provided sample containers

- Coolers, ice, sample labels

2.1.2 Conventional Drill Rig Procedure

- Soil samples will be collected continuously from the ground surface to the bottom of the borings using 2-inch diameter split-barrel samplers in accordance with ASTM Method D1586.
- Soil samples retrieved from the borehole will be described for: 1) percent recovery; 2) soil type; 3) color; 4) moisture content; 5) density; 6) texture; 7) grain size and shape; 8) consistency; 9) evidence of staining or other chemically-related impacts; and 10) any other relevant observations. In addition, soil will be screened with a photoionization detector (PID) to allow evaluation of the bulk volatile organic concentration of each soil sample. Soils will be described in accordance with the Unified Soil Classification System (USCS) and the modified Burmister system. This descriptive information will be recorded on a soil boring log form. An example of the typical soil boring log form is provided in Attachment 1.
- Samples for headspace screening samples will be collected. A representative portion of each soil sample will be placed in a re-sealable plastic (e.g., Ziploc®) bag filled approximately half full. The bag will be labeled with the boring number and interval sampled. After allowing the bagged soil to warm, the tip of the sample probe attached to the PID will be inserted into the bag to measure the headspace for organic vapors.
- Soil samples collected for laboratory analysis will be collected in laboratory-supplies containers according to the Quality Assurance Project Plan (QAPP) and as described below. Samples will be submitted to an approved New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory. Analyses will be conducted using U.S. Environmental Protection Agency (USEPA) methodologies. Samples will be managed in accordance with the QAPP.
- During sampling, volatile organic compound (VOC) samples will be obtained first from the center of the sample and placed in sample containers. VOC containers will be filled without headspace. The remainder of the interval will be homogenized in a stainless steel mixing bowl and distributed to the appropriate sample jars.
- Drilling equipment will be decontaminated between each boring in accordance with methods specified in Section 2.7.
- Decontamination water will be handled in accordance with the Investigation Work Plan.
- Each boring will be located using a total station GPS device that can provide coordinates with sub-inch accuracy, and will be performed with a licensed professional land surveyor (PLS).

If refusal is encountered during drilling operations, the Parsons Field Team Lead will evaluate the soils previously collected from the location for evidence of the cause of refusal. The Parsons Field Team Lead will also consider observed penetration rates, blow counts where measured, as well as input from the Field Geologist and Lead Driller. This information will be discussed with the Parsons Project Manager to determine if the borehole should be abandoned and relocated, or if drilling operations should cease and data collection (e.g., soil sampling, downhole measurements) should move forward. Should the boring location be abandoned or relocated, the borehole will be properly decommissioned consistent with the methods included in ASTM D5299 (2018a).

Once decommissioned, the boring location will be surveyed by a licensed PLS for the development of an as-drilled topographic survey.

2.1.3 Hand Sampling Methods

The soil at the selected sampling location will be loosened to the target depth using a trowel or other digging implement. Large rocks, vegetation, foreign objects, parking surface material, and fill will be removed (these items may also be collected as separate samples, if appropriate). Samples should be collected immediately below the zone of grass cover and associated roots (if present), or below the base of asphalt/concrete/gravel fill or other surface material, as applicable.

The remaining soil from each sampling interval (i.e., 0-2, 0 - 6 or 6 – 12 inches as dictated by the sampling plan) will be homogenized in a stainless-steel mixing bowl and distributed to the sampling containers. Homogenized soils will then be distributed to the appropriate sample containers. Subsequent depth intervals will be processed in the same manner for each interval collected if additional depths are being collected using hand sampling techniques. The field technician will record the sample identification, location, and other pertinent data on appropriate record forms, maps, drawings, and/or site logbook.

Sampling tools will be cleaned between each boring and sample according to the procedure outlined in Section 2.7 before proceeding with further sampling.

2.2 Monitoring Well/Borehole Decommissioning

There may be occasions when monitoring wells will require abandonment. The abandonment approach will be in accordance with New York State Department of Environmental Conservation (NYSDEC) Policy CP-43 – Groundwater Monitoring Well Decommissioning Policy.

Borings installed to collect soil samples for laboratory and geotechnical analysis only do not require sheeting or casing following borehole advancement. Following collection of subsurface measurements and soil samples (Section 2.4), the borehole will be decommissioned with grout. Grout will consist of a mixture high-solids bentonite in compliance with CP-43 which will be tremied through the drill string as it is being removed and completed in accordance with the requirements of CP-43.

2.3 Soil Sampling

2.3.1 Soil Description

Site media consisting of soil and soil/fill mixtures are referred to as "soil" for the purposes of this Field Sampling Plan. Soil will be collected at the site using HSA. Soils will be classified and described according to the methods and procedures outlined in the following sections.

2.3.1.1 Burmister Classification System

Samples described based on the Burmister Classification System (Burmister 1970) include the following components and are reported in the order shown below.

<u>Moisture Content</u>

The relative moisture content of the soil at the time of sampling shall be designated as "dry," "moist," or "wet."

Consistency

The consistency of the soil sample shall be described for fine grained soils (silts and clays) as “stiff,” “medium stiff,” or “soft” and state whether the soil is “plastic” or “non-plastic.” Coarse-grained soils (sands and gravels) shall be described as “loose,” “medium dense,” or “soft” and will include the degree of cementation. The description will also include the shape of the grains (“flat”, “angular,” or “rounded”) and the grading (“Well Graded,” “Poorly Graded,” or “Uniform”).

When applicable, the penetration rate while conducting standard penetration test (SPT) with split spoons is also an indication of the compaction/density of the material. The table shown below is a penetration guide and will be used to determine the consistency of the material. The SPT values across the middle of the 2-foot split spoon will be used to select a consistency description from the penetration guide below. SPT values are typically recorded in 6-inch intervals. For example: a 2-foot spoon has values (or blows) of four, three, six, eight for each 6-inch interval. The SPT value used to determine consistency is the sum of the last two values (6+8=14). If the material is sand the consistency from the table is “Medium Dense,” while if the material is clay the consistency is “Stiff.” For materials that are predominantly silt the “clay” section of the guide will be used.

PENETRATION GUIDE			
SAND		CLAY	
Very Loose	0-4 Blows per foot	Very Soft	<2 Blows per foot
Loose	4-10 Blows per foot	Soft	2-4 Blows per foot
Medium Dense	10-30 Blows per foot	Medium Stiff	4-8 Blows per foot
Dense	30-50 Blows per foot	Stiff	8-15 Blows per foot
Very Dense	50+ Blows per foot	Very Stiff	15-30 Blows per foot
		Hard	30+ Blows per foot

Color

The predominant color of the soil sample in the natural state shall be designated as “white,” “brown,” “yellow,” “red,” “gray,” “blue,” or “black.” In some cases, the sample may be “mottled” (a combination of colors such as red/gray, blue/gray, etc.)

Color codes and designations should follow those provided in Munsell soil color charts. Grain size description is listed in order of predominance starting with the most predominant.

Grain Size

Soils are predominantly classified based on grain size. The four main grain sizes are “gravel,” “sand,” “silt,” and “clay.” Sands are further described as coarse, medium, or fine and gravels are described as coarse or fine.

The first entry will be the most predominant grain size in the sample. The entry is fully capitalized (SAND, SILT, CLAY, and GRAVEL) if it comprises 50% or more of the sample. Otherwise the predominant fraction is listed first with only an initial capital.

The second, third, and other entries represent the most predominant grain size materials in order of predominance. The percentages of the constituents are indicated by the following descriptors:

- “and” 50-35%

- "some" 35-20%
- "little" 20-10%
- "trace" 10-1%

For example, a soil description may be SILT, some fine sand, trace clay (50% or more of silt with 20-35% fine sand, 1 to 10% of clay). Other common descriptions might be fine SAND, some silt and clay; SILT, trace of fine sand and clay; SILT, some coarse sand and gravel, trace clay.

The following table lists the breakdown of grain sizes and sieve numbers for each category (modified Burmister system).

GRAIN SIZE AND SIEVES				
SOIL	FROM SIEVE NUMBER	TO SIEVE NUMBER	FROM MM	TO MM
Gravel – coarse	3-inches	¾-inches	75	19.0
Gravel -fine	¾-inches	#4	19.0	4.75
Sand – coarse	#4	#10	4.75	2.0
Sand - medium	#10	#40	2.0	0.425
Sand - fine	#40	#200	0.420	0.075
Silt	#200	Material passing the No. 200 sieve that is usually non-plastic in character and exhibits little or no strength when air dried.		
Clay	#200	Material passing the No. 200 sieve that can be made to exhibit plasticity within a certain range of moisture contents and which exhibits considerable strength when air dried.		

<u>Vegetable Muck and Peat</u>

Vegetable mucks and peats are soil mixtures with varying percentages of organic and vegetable matter formed by decomposition of leaves, grasses, and other fibrous materials. The color ranges from light brown to black. The soil content of the mixture should be identified and an estimate should be made of the amount of vegetable material present. The vegetable matrix comprising the peat should be identified as "fibrous" or "woody." The sample composition should be further described with respect to texture as "cake-like," "spongy" or predominantly "granular."

<u>Miscellaneous</u>

Certain materials may be incorporated that do not fall under foregoing classifications and require further qualification for proper identification. Additional terms may be used, but should not replace the basic description. These additional terms may be used specifically to designate materials as "rock fragments," "stones," "cobbles," "rock flour," or other qualifying descriptions.

<u>Field Observations to Identify Silt and Clay Characteristics</u>

The field test listed in the table below may be used to distinguish between structural characteristics of a silt or clay soil. For mixtures of silt and clay, the tests indicate the predominant constituent.

FIELD OBSERVATIONS OF SILT AND CLAY CHARACTERISTICS		
CHARACTERISTICS	SILT	CLAY
Plasticity in moist state	Very little or no plasticity.	Plastic and sticky. Can be rolled.
Cohesiveness in dry state	Little or no cohesive strength in dry state and will slake readily.	Has a high dried strength. Crumbles with difficulty, slakes slowly in water.
Visual inspection and feel	Coarse silt grains can be seen. Silt feels gritty when rubbed between fingers.	Clay grains cannot be observed by visual inspection. They feel smooth and greasy when rubbed between fingers.
Settlement in water	Will settle out of suspension within one hour.	Will stay in suspension in water for several days unless it flocculates.
Movement of water in the voids	When a small quantity of silt is shaken in the palm of a hand, water will appear in the surface of the soil. When shaking is stopped, water will gradually disappear.	When a small quantity is shaken in the palm of the hand it will show no signs of water moving out of the voids.

2.3.1.2 Unified Soil Classification System

The USCS is based on textural characteristics. Soils fall into one of 15 groups, where each group is defined by a two-letter symbol. In general soils are classified as one of two broad categories:

- Coarse-grained soils: Group symbols start with either “G” for gravel or gravelly soils, or “S” for sand or sandy soils.
- Fine-grained soils: Group symbols start with “M” for non-plastic or low plasticity fines (inorganic silt), “C” for plastic fines (inorganic clays), “O” for organic silts and clays, or “Pt” for peat, muck, humus, swamp soils, and other highly organic soils.

2.3.1.3 Field Observations of Contamination, Putrescence or Site-Specific Characteristics

Environmental samples will also be screened for visual evidence of contamination or presence of non-aqueous phase liquid (NAPL). Descriptions of these observations and screening results should be added to the physical descriptions of samples including:

<u>Stain</u>

Stains are discoloration and coatings potentially of non-native materials on or in the sample. The stains can range from light tan to black. When handled, the staining material in the sample may transfer to fingers or gloves.

<u>Sheens</u>

Sheens are films floating on the water in saturated samples. The films may have rainbow colors, an oily appearance, or a silvery appearance.

<u>Visible NAPL/Free Product/Gross Contamination</u>

"Free product" means an immiscible NAPL present as a liquid in surface or sub-surface soil, surface water or groundwater in a potentially mobile state. Grossly contaminated media means soil, sediment, surface water or groundwater which contains sources or substantial quantities of mobile contamination in the form of NAPL that is identifiable either visually, through strong odor, by elevated contaminant vapor levels or is otherwise readily detectable without laboratory analysis.

<u>Odor</u>

Coal tar has a distinctive "mothball" odor. While describing the sample characteristics, note odors present in the sample. Understand that odor classification is a subjective measure; therefore, avoid making conclusions about specific chemical character of the sample.

<u>Screening</u>

Samples will be screened with a PID for VOCs and semivolatile organic compounds (SVOCs) as discussed in **Section 2.4.1.7**. VOC/SVOC screening will be performed using a MiniRAE 3000 portable handheld PID with 10.6 eV lamp or equivalent.

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS (More than 50% of the material is LARGER than No. 200 sieve size).	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly graded gravels or gravel-sand mixture, little or no fines.
		GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size).	CLEAN SANDS (Little or no fines)	SW	Well-graded sands, gravelly sands little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE-GRAINED SOILS (More than 50% of material is SMALLER than the No. 200 sieve size).	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayed fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.

MAJOR DIVISIONS		GROUP SYMBOLS	TYPICAL NAMES
	SILTS AND CLAYS (Liquid limit GREATER than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		CH	Inorganic clays of high plasticity, fat clays.
		OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils.
BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.			
PARTICLE SIZE LIMITS – see particle size limits in Burmister table (Section 2.4.1.3).			

2.4 Monitoring Well Development

Prior to sampling, monitoring wells will be developed to remove the fine material which may have settled within the filter pack and monitoring wells, to remove introduced drilling fluids (if used during installation), and to improve/restore the hydraulic communication with the surrounding formation.

- Monitoring well development will be performed or overseen by a field geologist.
- Development will be performed by surging and purging the well, as appropriate, using either a bailer or pump.
- Groundwater parameters will be recorded before, during, and after well development. Parameters will include turbidity, pH, temperature, and specific conductance.
- Water levels will be measured in each well to the nearest 0.01 foot prior to development.
- Monitoring wells will be developed until the water discharge from the well is 50 nephelometric turbidity units (NTU) or less, or until pH, temperature, and specific conductivity stabilize, or until a maximum of 10 borehole volumes of the water have been removed. If the well goes dry during development, it will be allowed to recharge to 80% of initial water level and pumped or bailed again. The well will be considered developed after pumping the well dry three times.
- Well development information will be recorded on a Well Development Log. An example of the Well Development Log is provided in Attachment 2.
- Ideally, dedicated and/or disposable equipment will be used for well development. However, if non-dedicated well development equipment is used, it will be decontaminated after use in accordance with Section 2.7.
- Development water will be containerized for characterization and disposal in accordance with Section 2.8.
- Following development, the monitoring wells will be allowed to equilibrate for a minimum of 24 hours prior to groundwater sampling.

2.5 Groundwater Sampling

Groundwater samples may be collected using various methods depending on specific project objectives. These methods may include hand bailing, pumping, or low-flow purging and sampling.

2.5.1 Hand Bailing

2.5.1.1 Equipment and Supplies

- Field book or log forms;
- Well gauging and sampling logs;
- Project plans;
- PPE in accordance with the PSHEP;
- PID, or other monitoring equipment if required by PSHEP;
- Water level probe and/or electronic oil/water interface probe;
- Disposable polyethylene bailers and/or stainless-steel bailers;
- Polypropylene rope;
- Temperature, conductivity, and pH meter;
- Turbidity meter;
- Graduated 5-gallon buckets plus lids;
- Decontamination supplies;
- Plastic sheeting;
- Clear tape, duct tape;
- Coolers and ice;
- Laboratory sample bottles; and
- Shipping labels.

2.5.1.2 Purging

- Prior to sampling, the static water level and thickness of any light non-aqueous phase liquid (LNAPL) or dense non-aqueous phase liquid (DNAPL) will be measured to the nearest 0.01 foot from the surveyed well elevation mark on the top of the PVC casing with a decontaminated oil/water interface probe. NAPL thickness will be confirmed using a clear bailer or a weighted string. The measurement will be recorded in the field book or log forms.
- Prior to commencing sampling activities and daily thereafter, the groundwater quality monitoring probes/meters including pH, conductivity, and turbidity will be calibrated in accordance with the manufacturer's instructions. At a minimum, two-point calibrations will be conducted for pH, conductivity, and turbidity. Calibration results will be recorded in the field log book or log forms.
- Initiate bailing of the well from the bottom. Lower and raise the bailer slowly to avoid causing turbidity. Keep the polypropylene rope on the plastic sheet. Pour the groundwater from the bailer into a graduated 5-gallon bucket to measure the volume withdrawn from the well.
- Continue bailing the well until at least three well volumes have been removed or until the well is dry. If the well is dry, allow sufficient time for the well to recover before proceeding. Record this information on the Standard Groundwater Sampling Log. An example of the Standard Groundwater Sampling Log is provided in Attachment 3.

- During the removal of successive well volumes, measure the water temperature, pH, conductivity, and turbidity with calibrated meters. Record the data on the Groundwater Sampling Field Log.
- Purge water will be containerized for characterization and disposal in accordance with Section 2.8.

2.5.1.3 Sampling

- Keep sample bottles cool and with their caps on until they are ready to receive samples. For per- and polyfluoroalkyl substances (PFAS) sampling, sample bottles for PFAS samples should be kept separate from other sample bottles. Be sure to change gloves prior to handling the PFAS bottleware. The type of analysis for which a sample is collected determines the type of container, preservative, holding time, and filtering requirement as specified in the QAPP.
- Minimize agitation of the water in the well; begin sampling by lowering the bailer slowly into the well. Lower it only far enough to fill it completely.
- Place a sample of well water in a container and measure and record the water temperature, pH, conductivity, and turbidity with calibrated meters. Record the data on the Groundwater Sampling Field Log. Turbidity reading should be less than 50 NTUs before sample collection. If turbidity levels remain high, consult the Parsons project manager to discuss the possibility of having the analytical laboratory filter samples prior to analysis.
- Record the appearance of the groundwater on the Standard Groundwater Sampling Log (Attachment 3).
- When you are ready to fill the bottles, remove them from their transport containers. Prepare them to receive the samples.
- Samples are transferred directly from the bailer to the container. The container should hold any necessary preservative and should be correctly labeled before the sample is transferred to it. VOC containers should be filled first with zero headspace, followed by other parameters, and then securely capped. Fill each sample container in accordance with the QAPP or other sampling outline.
- Inspect labels to see that the samples are properly identified.
- Return each sample bottle to its proper transport container.
- If the sample bottle cannot be filled quickly, keep them cool with the caps on until they are filled.
- Samples must not be allowed to freeze.
- Record the date and time and secure the well head.
- The sample containers will be labeled, placed in a laboratory-supplied cooler, with protective packaging (i.e. bubble wrap) and packed on ice (to maintain a temperature of 4˚C).
- A temperature blank in the appropriate sample bottle should accompany each cooler. VOC samples, if collected, should be placed in the same cooler, if possible, and a trip blank should accompany each cooler containing VOCs.
- Samples for laboratory analysis will be shipped overnight or delivered to an approved NYSDOH ELAP-certified laboratory. Analyses will be conducted using USEPA methodologies as specified in the Work Assignment Scoping Documents. Samples will be managed in accordance with the QAPP. Chain-of-custody (COC) procedures will be followed as outlined in the QAPP and Section 3.2.

2.5.2 Standard Purging

2.5.2.1 Equipment and Supplies

- Field book or field log forms;
- Well gauging and sampling logs;
- Project plans;
- PPE in accordance with the HASP;
- PID, or other monitoring equipment, if required by HASP;
- Water level probe and/or electronic oil/water interface probe;
- Polypropylene rope;
- Temperature, conductivity, and pH meter;
- Turbidity meter;
- Graduated 5-gallon buckets and lids;
- Generator;
- Extension cords;
- Decontamination supplies;
- Peristaltic or submersible pump;
- Plastic tubing;
- Plastic sheeting;
- Clear tape, duct tape;
- Coolers and ice;
- Laboratory sample bottles; and
- Shipping labels.

2.5.2.2 Purging

- Equipment will be decontaminated prior to use at each location.
- Prior to sampling, the static water level and thickness of any LNAPL or DNAPL will be measured to the nearest 0.01 foot from the surveyed well elevation mark on the top of the PVC casing with a decontaminated oil/water interface probe. NAPL thickness will be confirmed using a clear bailer or a weighted string. The measurement will be recorded in the field book or log forms.
- Prior to commencing sampling activities and daily thereafter, the groundwater quality monitoring probes/meters including pH, conductivity, and turbidity will be calibrated in accordance with the manufacturer’s instructions. At a minimum, two-point calibrations will be conducted for pH, conductivity, and turbidity. Calibration results will be recorded in the field log book or log form.
- Prepare the pump for operation. Follow the manufacturer's directions.
- Lower the pump intake to the middle of the water column for sites with unknown screen intervals and lower the pump intake to the mid-screen interval for sites with known screen intervals. For LNAPL or DNAPL sites, the pump intake depth should be biased towards the upper or lower portions of the water column, respectively.
- Pump the groundwater into a graduated 5-gallon bucket. Continue pumping until at least three well volumes have been removed or the well is pumped dry. Lower the pump's intake as necessary.

- If the well is pumped dry, allow sufficient time for the well to recover before proceeding. Record this information on the Standard Groundwater Sampling Log (Attachment 3).
- During the removal of successive well volumes, measure the water temperature, pH, conductivity, and turbidity with calibrated meters. Record the data on the Groundwater Sampling Field Log.
- Purge water will be containerized for characterization and disposal in accordance with Section 2.8.

2.5.2.3 Sampling

- Keep sample bottles cool and with their caps on until they are ready to receive samples. The type of analysis for which a sample is collected determines the type of container, preservative, holding time, and filtering requirement as specified in the QAPP.
- Place a sample of well water in a container and measure and record the water temperature, pH, conductivity, and turbidity with calibrated meters. Record the data on the Groundwater Sampling Field Log. Turbidity reading should be less than 50 NTUs before sample collection. If turbidity levels remain high, consult the Parsons project manager to discuss the possibility of having the analytical laboratory filter samples prior to analysis.
- Record the appearance of the groundwater on the Standard Groundwater Sampling Log (Attachment 3).
- When you are ready to fill the bottles, remove them from their transport containers. Prepare them to receive the samples.
- Arrange the sampling containers to allow for convenient filling.
- Fill the containers that will undergo analysis. VOC containers should be filled first with zero headspace, followed by other parameters, and then securely capped. Fill each sample container in accordance with the QAPP or other sampling outline.
- Inspect labels to see that the samples are properly identified.
- Return each sample bottle to its proper transport container.
- If the sample bottle cannot be filled quickly, keep them cool with the caps on until they are filled.
- Samples must not be allowed to freeze.
- Record the date and time and secure the well head.
- The sample containers will be labeled, placed in a laboratory-supplied cooler with protective packaging (i.e. bubble wrap) and packed on ice (to maintain a temperature of 4˚C).
- A temperature blank in the appropriate sample bottle should accompany each cooler. VOC samples, if collected, should be placed in the same cooler, if possible, and a trip blank should accompany each cooler containing VOCs.
- Samples for laboratory analysis will be shipped overnight or delivered to an approved NYSDOH ELAP-certified laboratory. Analyses will be conducted using USEPA methodologies as specified in the Work Assignment Scoping Documents. Samples will be managed in accordance with the QAPP. COC procedures will be followed as outlined in the QAPP.

2.5.3 Low Flow Purging and Sampling

2.5.3.1 Equipment and Supplies

- Field book or log forms;

- Well gauging and sampling logs;
- Project plans;
- PPE in accordance with the PSHEP;
- PID, or other monitoring equipment, if required by PSHEP;
- Water level probe and/or electronic oil/water interface probe;
- Polypropylene rope;
- Temperature, conductivity, and pH meter;
- Turbidity meter;
- Graduated 5-gallon buckets and lids;
- Flow-through cell;
- Generator;
- Extension cords;
- Decontamination supplies;
- Peristaltic or submersible pump capable of achieving flow rates of 0.5 liters per minute or less;
- Plastic tubing;
- Plastic sheeting;
- Clear tape, duct tape;
- Coolers and ice;
- Laboratory sample bottles; and
- Shipping labels.

2.5.3.2 Purging

- Equipment will be decontaminated prior to use at each location.
- Prior to sampling, the static water level and thickness of any LNAPL or DNAPL will be measured to the nearest 0.01 foot from the surveyed well elevation mark on the top of the PVC casing with a decontaminated oil/water interface probe. NAPL thickness will be confirmed using a clear bailer or a weighted string. The measurement will be recorded in the field book or log forms.
- Prior to commencing sampling activities and daily thereafter, the groundwater quality monitoring probes/meters including pH, conductivity, oxidation-reduction potential (ORP), dissolved oxygen, and turbidity will be calibrated in accordance with the manufacturer's instructions. At a minimum, two-point calibrations will be conducted for pH, conductivity, and turbidity. The dissolved oxygen probe will be checked against a zero-dissolved oxygen solution. In addition, the dissolved oxygen calibration will be corrected for local barometric pressure and elevation. Calibration results will be recorded in the field log book or log forms.
- Prepare the pump for operation. Follow the manufacturer's directions.
- Lower the pump intake to the middle of the water column for sites with unknown screen intervals and lower the pump intake to the mid-screen interval for sites with known screen intervals. For LNAPL or DNAPL sites, the pump intake depth should be biased towards the upper or lower portions of the water column, respectively.
- Pump the groundwater into a graduated 5-gallon bucket. The flow rate shall not exceed 0.5 liters/min (500 ml/min). Initially, a flow rate between 200 ml/min and 500 ml/min will be used. The drawdown will be monitored using a water level probe and the flow rate will be reduced if the drawdown exceeds 0.3 ft. Efforts should be made to minimize the generation of air bubbles in the

sample tubing by either increasing the flow rate as appropriate, or restricting the flow by clamping the tubing.

- Record the appearance of the groundwater on the Low Flow Groundwater Sampling Log, provided in Attachment 3.
- During purging, pH, specific conductivity, temperature, oxidation-reduction potential (redox), dissolved oxygen, and turbidity will be monitored and recorded at time intervals sufficient to evacuate the volume of the flow-through cell. This information along with water level readings to monitor drawdown will be recorded on the Low Flow Groundwater Sampling Log (Attachment 3).
- Well sampling will commence after equilibration of water quality parameters. The equilibration guidelines are as follows:

▪ Temperature	± 3% of measurement
▪ pH	± 0.1 pH units
▪ Specific conductance	± 3% of measurement
▪ Redox	±10 mV
▪ DO	±10% of measurement
▪ Turbidity	± 10% of measurement

- If the water level will not stabilize even at lower flow rates then the well will not be able to be sampled using the low flow method. In this situation, the well will be pumped to dryness and the water will be allowed to recover prior to collection of the sample. Purge water will be containerized for characterization and disposal in accordance with Section 2.8.

2.5.3.3 Sampling

- Prior to filling the sample bottles, the temperature, pH, dissolved oxygen, conductivity, and ORP will be measured within a flow-through cell. Turbidity will be measured with a hand-held turbidity meter. All measurements will be recorded on the Low Flow Groundwater Sampling Log (Attachment 3). If turbidity levels remain high, consult the Parsons Project Manager to discuss the possibility of having the analytical laboratory filter samples prior to analysis.
- Prior to collecting the sample, the flow-through cell will be disconnected from the tubing. Record the appearance of groundwater on the Low Flow Groundwater Sampling Log.
- Laboratory provided sample containers appropriate to meet USEPA requirements for each analysis will be used. Groundwater will be allowed to flow from the tubing into the sample container carefully so as to limit aeration of the sample. If preservative is present in a container, the container will not be overfilled.
- Keep sample bottles cool and with their caps on until they are ready to receive samples. The type of analysis for which a sample is collected determines the type of container, preservative, holding time, and filtering requirement as specified in the QAPP.
- When you are ready to fill the bottles, remove them from their transport containers. Prepare them to receive the samples.
- Arrange the sampling containers to allow for convenient filling.
- Fill the containers that will undergo analysis. VOC containers should be filled first with zero headspace, followed by other parameters, and then securely capped. Fill each sample container in accordance with the QAPP or other sampling outline.

- Inspect labels to see that the samples are properly identified.
- Return each sample bottle to its proper transport container.
- If the sample bottle cannot be filled quickly, keep them cool with the caps on until they are filled.
- Samples must not be allowed to freeze.
- Record the date and time and secure the well head.
- The sample containers will be labeled, placed in a laboratory-supplied cooler with protective packaging (i.e. bubble wrap) and packed on ice (to maintain a temperature of 4˚C).
- A temperature blank in the appropriate sample bottle should accompany each cooler. VOC samples, if collected, should be placed in the same cooler, if possible, and a trip blank should accompany each cooler containing VOCs.
- Samples for laboratory analysis will be shipped overnight or delivered to an approved NYSDOH ELAP-certified laboratory. Analyses will be conducted using USEPA methodologies as specified in the Work Assignment Scoping Documents. Samples will be managed in accordance with the QAPP. COC procedures will be followed as outlined in the QAPP.

2.6 Field Meter Calibration

The Site Supervisor is responsible for documenting that quality control and the approach to calibrating adhere to the procedures described below. Site workers are responsible for following the procedures. Field measurement equipment will be calibrated according to the manufacturers' recommended guidelines. If a meter exhibits unacceptable error according to manufacturer specifications, it will be recalibrated. If after recalibration, the meter still exhibits unacceptable error, it will be replaced. Field equipment will be supplied and maintained by a manufacturer-approved supplier.

2.6.1 Calibration of Organic Vapor Monitors

The purpose of this guideline is to provide general standards for the use and calibration of air quality monitoring equipment, designated as organic vapor monitors (OVMs) such as the PID, used to detect and quantify specific organic vapors. These instruments can be used for headspace gas analysis of collected soil samples as well as for site safety.

Proper implementation of these guidelines relies upon the following special considerations, requirements, and equipment. The OVMs will be charged nightly prior to field use the next day. Instrument life span between charges is approximately 8 hours. The instruments will be turned off between readings to conserve battery life. Operating instructions issued by the manufacturer will be used, as they are regularly updated.

The field instrument will be calibrated daily in accordance with the manufacturer's operating instructions and procedures, which will be provided on site with the instrument. OVMs should be calibrated using a two-point calibration system consisting of both zero and span gasses and will then be compared to an ambient air baseline. Instrument calibration readings will be recorded in field notes and on a record of calibration. Calibration documentation will be maintained in an on-site project office.

2.6.2 Calibration of Water Quality Meter

The purpose of this guideline is to provide general standards for the use and calibration of the water quality meter, which is used to take field measurements of turbidity, DO, pH, specific conductivity, ORP, and temperature.

Proper implementation of these guidelines relies upon the following special considerations, requirements, and equipment. Operating instructions and procedures issued and updated by the manufacturer will be used for field calibration and will be provided with the instruments. Instrument sensors (except temperature) will be calibrated daily and recorded in field notes. Calibrated parameters should read within the manufacturer's specification. If calibrated values do not fall within the manufacturer-specified threshold troubleshooting will be performed as outlined in the equipment manual or the equipment will be replaced. Calibration documentation detailing the calibration and maintenance history will be maintained at the on-site project office.

Prior to calibration, instrument probes should be cleaned and decontaminated in accordance with Section 2.7 below.

2.7 Decontamination

To prevent cross-contamination of the sample locations, field instruments to be re-used (e.g., electronic water level indicator, submersible pump, slug) will be thoroughly decontaminated after use at each location. Drilling equipment (i.e., HSAs, sonic drill rods) will be decontaminated by steam cleaning and/or pressure washing after use at each sample location. Decontamination activities will be performed over a temporary decontamination area lined with polyethylene sheeting for rinse water collection. Rinse water from the decontamination activities will be collected, drained into 55-gallon drums or polyethylene-lined roll-off containers, and labeled for appropriate waste management in accordance with Section 2.8.

Field instruments will be decontaminated in the following manner:

1. Tap water rinse
2. Scrub with tap water containing non-phosphate detergent Alconox™
3. Tap water rinse
4. De-ionized water rinse (for in-situ monitoring equipment)
5. Air dry

Disposable equipment (e.g., bailers, tubing, and soil sampler liners) will not be reused.

2.7.1 Equipment Decontamination

The following procedures will be used to decontaminate equipment used during the field activities.

- Drilling equipment including the backhoe, bucket, and drilling rig; augers; bits; rods; tools; split-spoon samplers; and tremie pipes will be cleaned with a high-pressure, steam-cleaning unit before beginning work, following the completion of borings, wells, test pits/excavations, and prior to exiting the site.

- Tools, drill rods, and augers will be placed on polyethylene plastic sheets following pressure washing. Direct contact with the ground will be avoided.
- Augers, rods, and tools will be decontaminated between each drilling location according to the above procedures.
- The back of the drill rig and all tools, augers, and rods will be decontaminated at the completion of the work and prior to leaving the site.

2.7.2 Sampling Equipment Decontamination

2.7.2.1 Equipment and Supplies

- Potable water;
- Phosphate-free detergent;
- Water, including potable water, distilled water, and/other laboratory-grade deionized water;
- Aluminum foil;
- Plastic/polyethylene sheeting;
- Plastic buckets and brushes; and
- PPE in accordance with the PSHEP

2.7.2.2 Decontamination Procedures

- Prior to sampling, non-dedicated sampling equipment (e.g., bailers, bowls, spoons, interface probes, etc.) will be washed with potable water and a phosphate-free detergent (such as Alconox™).
- Decontamination may take place at the sampling location as long as all liquids are contained in pails, buckets, etc.
- The sampling equipment will then be rinsed with potable water followed by a rinse with distilled water.
- Between rinses, equipment will be placed on polyethylene sheets or aluminum foil, if necessary. At no time will washed equipment be placed directly on the ground.
- Equipment will be wrapped in polyethylene plastic or aluminum foil for storage or transportation from the designated decontamination area to the sampling location.

2.8 Management of Investigation-Derived Waste

Field activities may generate waste materials that will require management. This section describes management procedures for investigation-derived waste (IDW).

Various IDW will be generated during many of the field activities associated with the Suntru Street Site. These wastes consist of liquids, solids, and PPE. Liquid IDW generally consists of water used for equipment and/or personnel decontamination (rinsate) and water produced during monitoring well development, sampling, and/or aquifer testing. Other potential sources of liquid IDW may include stormwater that has contacted temporarily exposed waste (from drilling) and surface accumulations of leachate that may require handling so as not to interfere with investigation activities. Solid IDW includes native soil cuttings and/or wastes extracted from the subsurface during drilling activities, used disposable items (PPE, decon pad), disposable sampling materials (bailers, plastic sampling liners and sheeting), used PVC pipe, and materials used during decontamination activities. All generated IDW will be properly containerized in polyethylene-lined rolloff boxes or 55-gallon drums, characterized by analytical sampling, and disposed offsite. Liquid IDW is currently planned to be trucked to the West Station MGP site to undergo treatment at the West Station Construction Water Treatment Plant. All offsite disposal will be done in compliance with the applicable local and federal regulations.

3.0 SAMPLE MANAGEMENT

3.1 Field Sampling Records

Information will be recorded in field notebooks to document the procedures used and the prevailing conditions during the field investigation. Previous field records will be reviewed at each site visit, and any unusual site conditions encountered during the field investigation will be described. Field documentation of activities will be comprehensively recorded. For example, when sampling is conducted, the following types of information will be recorded:

- Name of sampler(s)
- Date and time of sampling
- Sample type
- Sampling location description and/or grid coordinates (including photographs, if needed)
- Sampling method, sample containers, and preservatives used
- Sample weight or volume (if applicable)
- Number of samples taken
- Unique sample identification number (Location ID)
- Amount of water purged (for groundwater sampling)
- Field observations (prevailing weather conditions and other relevant factors that might influence sample integrity)
- Field measurements conducted
- Name/initials of person responsible for observation

The sample nomenclature system for the site was developed to provide consistency in field sample ID. Three identification labels will be associated with field samples:

- COC Number (#)
- Location ID
- Field Sample ID

3.1.1 COC

The COC # is a numeric designation that will be assigned by the Data Manager (DM) and provided to field team in advance of field operations.

3.1.2 Location ID

The Location ID represents the physical location where samples are collected. Each unique field sample will be associated with a Location ID and identified on the COC form at the time of sample collection. The Location ID consists of a description of the sampling event (BL), the sample location type (such as well or boring), and a three-digit sample location number:

B L - * * # # #
Sampling Event - Location type Location number

The location types will be:

- GW for groundwater
- SB for soil boring

The location numbers will be:

- Monitoring well IDs for groundwater samples
- Generic numbered counts for soil samples

Waste characterization samples will not have associated location numbers.

3.1.3 Field Sample ID

The Field Sample ID is the unique label assigned to each individual sample.

For soil samples, the Field Sample ID will consist of the Location ID, sample depth interval (d1-d2) and a signifier at the end denoting sample type. Groundwater samples will follow the same pattern, with the exception of the depth interval.

B L - * * # # # - d 1 - d 2 *
Location ID- Depth Sample Type

The sample types will be:

- A for normal analytical samples
- QC for analytical field duplicate, matrix spike, and matrix spike duplicate samples
- WC for waste characterization samples

For blanks, the Field Sample ID will consist of the sample type (TB, EB, FB), 6 digit date, and a cooler number. For example, a trip blank collected on 02/26/2020 for cooler 1 would be TB-022620-1.

Upon collection of the sample(s), a field team member will affix an identification label to the sample container(s). A label provided by the laboratory may be used or any other label that includes the information provided herein.

3.2 Sample Handling

Samples will be collected into the laboratory-supplied pre-preserved sample containers. Each individual sample container will be sealed according to laboratory specifications after sampling. Clean, disposable nitrile gloves will be worn during the handling of all samples and sampling devices.

3.2.1 Preservation of Samples

Each containerized sample will be labeled and placed as soon as possible into an insulated sample cooler. The cooler will serve as a shipping container and should be provided by the laboratory along with the appropriate sample containers. Wet ice will be placed directly in contact with the sample containers within a heavy-duty polyethylene bag. Samples will be maintained at a cool temperature (optimum 4°C ± 2°C) from the time of collection until the coolers arrive at the laboratory (if required).

Plastic "bubble wrap" and/or polystyrene foam will be used to protect glass sample jars during shipping.

3.2.2 Field Custody Procedures

The custody of samples collected during the field investigation will be traceable at all times. Prior to shipment of the samples to the laboratory, a COC form will be completed by the field sample custodian. Sample locations, sample identification numbers, description of samples, number of samples collected, and specific laboratory analyses to be run on each sample will be recorded on the sample COC form. The field sample custodian will sign and date the sample COC form and will retain a copy for the project records (if available). The sample COC form will record possession of the samples from the time of collection until disposing or archiving the sample. A sample is considered under custody if:

- It is in the investigator's possession.
- It is in the investigator's view after possession has been established.
- The investigator locks up the sample after possession.
- It is in a designated secure area.

The sample COC must be maintained at all times prior to analysis.

Prior to shipment by a registered courier, the sample shipping container (e.g., cooler, box) will be sealed with the signed sample COC inside. The authorized laboratory custodian that receives the samples will sign the sample COC forms, thus terminating custody of the field sample custodian.

3.2.3 Laboratory Custody Procedures

Sample custody at the analytical laboratory is maintained through systematic sample control procedures composed of the following items:

- Sample receipt
- Sample log-in
- Sample storage
- Sample archival/disposal

As samples are received by the laboratory, they will be entered into a sample management system. The following minimum information will be provided:

- Laboratory sample number/identification
- Field sample designation
- List of analyses requested for each sample container

Immediately after receipt, samples will be transferred to a secure storage area with appropriate temperature control to await preparation and analysis. The laboratory's COC procedures are documented in the laboratory's quality assurance plan, which will be provided upon request.

3.2.4 Quality Control Checks

Equipment blanks, method/preparation blanks, field duplicates, matrix spike/matrix spike duplicates /replicate samples, and laboratory control samples will be analyzed to assess the quality of the data resulting from the field sampling and analytical programs. The QAPP dictates the frequency of duplicate and blank collection.

Field quality assurance/quality control (QA/QC) samples are handled, transported, and analyzed in the same manner as the actual field samples. If possible, the QA/QC samples should not be held on site for more than four calendar days. If sample preservation includes cooling, the temperature of the blanks, except the trip blanks, must be maintained at 4°C while on site and during shipment. The trip blank is not shipped to the site on ice but must be maintained at 4°C when accompanying collected samples requiring cooling. Holding times for individual parameters are dictated by the specific analytical method used.

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ATTACHMENT 1 BORING LOG DRILLING RECORD

Contractor:	PARSONS DRILLING RECORD	BORING/ WELL NO.	Page of
Driller:		Location Description:	
Oversight:	PROJECT NAME:		
Rig Type:	PROJECT Location:		

GROUNDWATER OBSERVATIONS			
Apparent Borehole DTW:			ft bls
Measured Water Level:			ft (TOC)
Total Depth of Well:			ft bls
Additional Comments:			

Date/Time Start:

Date/Time Finish:

Location Plan

Sample Type	SPT	% Recovery	PID (ppm)	USCS Symbol	Depth (ft bls)	FIELD IDENTIFICATION OF MATERIAL	SCHEMATIC Drawing Not to Scale	COMMENTS

SAMPLING METHOD

HC = Hand Cleared (post hole)

SS= Split Spoon

COMMENTS:

ATTACHMENT 2 MONITORING WELL DEVELOPMENT LOG

WELL DEVELOPMENT LOG

Well ID:

Date ____________ Field Personnel ____________ Weather ____________
Site Name ____________ Contractor ____________ Project No. ____________
Site Location ____________ Evacuation Method ____________ ____________

Well information:

Depth to Bottom (Initial) * ____________ ft. Date(s) Installed ____________ Date(s) Developed ____________
Depth to Bottom (Final)* ____________ ft. Driller ____________ Development Time Start: ____________
Depth to Water (Initial)* ____________ ft. Well Diameter ____________ in. Stop: ____________
Depth to Water (Final)* ____________ ft. Casing Volume ____________ gal. Total: ____________

* Measuring point ____________ Pump setting* (intake) ____________

Well Volumes	Volume of Water Removed (Gallons)	Temperature ^{O}C	pH s.u	Conductivity mS/cm	Turbidity (NTU)	Approximate Flow Rate (gal/min)	Depth to Water (ft.)	Appearance of Water
Start								
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

Development Water Characteristics:

Total volume of Development water removed: ____________

Physical appearance at start
Color ____________
Odor ____________
Sheen/Free Product ____________

Physical appearance at end
Color ____________
Odor ____________
Sheen/Free Product ____________

NOTES:

Geologist Signature:

ATTACHMENT 3 LOW FLOW GROUNDWATER SAMPLING LOG

Low Flow Ground Water Sampling Log

Date ____________ Personnel ____________ Weather ____________

Site Name ____________ Evacuation Method ____________ Well # ____________

Site Location ____________ Sampling Method ____________ Project # ____________

Well information:

Depth of Well * ____________ ft.

Depth to Water * ____________ ft.

Length of Water Column ____________ ft.

Depth to Intake * ____________ ft.

* Measurements taken from

☐ Top of Well Casing

☐ Top of Protective Casing

☐ (Other, Specify)

Start Purge Time: ____________

		10.0%	0.1	3%	10 mV	10%	10%	100-500 ml/min
Elapsed Time (min)	**Depth To Water (ft)**	**Temperature (celsius)**	**pH**	**Conductivity (ms/cm)**	**Oxidation Reduction Potential**	**Dissolved Oxygen (mg/l)**	**Turbidity (NTU)**	**Flow Rate (ml/min).**

End Purge Time: ____________

Water sample:

Time collected: ____________

Total volume of purged water removed: ____________

Physical appearance at start

Color ____________

Odor ____________

Sheen/Free Product ____________

Physical appearance at sampling

Color ____________

Odor ____________

Sheen/Free Product ____________

Field Test Results:

Dissolved ferrous iron: ____________

Dissolved total iron: ____________

Dissolved total manganese: ____________

Analytical Parameters:

Sample	Container Type	# Collected	Field Filtered	Preservative	Container pH