TETRA TECH

July 23, 2026

Mr. Anthony Bell
Circle K Stores, Inc.
1100 Situs Court, Suite 100
Raleigh, NC 27606

Delivered via email: abell@circlek.com

SUBJECT: Work Plan to Investigate Petroleum-Contaminated Media
Circle K Store 2746285, 785 South 20th Street West, Billings, Montana
MDEQ Facility I.D. No. 56-09753; Petroleum Release No. 3131; WP ID# 35199
Tetra Tech Project No.: 117-082722-25002A

Dear Mr. Bell:

Tetra Tech, Inc. (Tetra Tech) is pleased to submit this work plan to investigate petroleum-contaminated media at the Circle K Store #2746285 located at 785 South 20th Street West, Billings, Montana (**Figures 1** and **2**). This work plan was prepared in response to a request from Jonathan Love of the Montana Department of Environmental Quality (MDEQ) in correspondence dated June 3, 2026 (MDEQ, 2026).

The following work plan presents a brief discussion of the site's history and the proposed scope of work to meet the MDEQ request.

BACKGROUND

The Circle K Store 2746285 is a retail gasoline and diesel fueling facility and convenience store located at 785 South 20th Street West in Billings, Yellowstone County, Montana (**Figures 1** and **2**). The site is situated on Quaternary-age alluvial clays, sands, and gravels deposited as a terrace of the Yellowstone River (Lopez, 2002). Site features include the store building, an underground storage tank (UST) basin, and seven fuel dispenser islands.

A release of regular unleaded gasoline, estimated at approximately 2,000 gallons, was discovered in March 1997 through inventory record inspection and confirmed by tank tightness testing (Maxim Technologies, 1998a). In April 1997, four USTs, distribution piping, and fuel dispensers were removed. Approximately 1,300 cubic yards of petroleum-impacted soil exceeding MDEQ regulatory action levels were excavated from the UST basin and piping trenches (MDEQ, 1997).

In response to volatile petroleum hydrocarbon vapors detected inside the former Holiday StationStore 285 building, a soil vapor extraction (SVE) system was installed in November 1997. The system was connected to the UST basin recovery well RW-1 (**Figure 2**) and operated until May 1998, when vapors were no longer detected (Maxim Technologies, 1998b). The system operated intermittently in subsequent years before being shut down in January

2004 due to mechanical issues. A chemical oxidation pilot test performed in December 1999 resulted in short-term decreases in contaminant concentrations; however, subsequent monitoring did not show sustained, sitewide reductions, and the approach was discontinued (Maxim Technologies, 2000).

Groundwater monitoring was conducted at the site between April 1997 and July 2009. During July 2009 groundwater flowed east-northeast with an approximate gradient of 0.7 percent. Dissolved-phase petroleum hydrocarbon concentrations exceeded MDEQ risk-based screening levels (RBSLs: MDEQ, 2024) in samples from wells HSK-8, HSK-9, and HSK-10 (Figure 2) (Tetra Tech, 2009). Recommendations included installation of a monitoring well along the eastern property boundary, resurveying of existing wells, and semiannual groundwater monitoring of selected wells (Tetra Tech, 2009).

Monitoring well HSK-3 was abandoned on December 22, 2011, and a well abandonment report was submitted to the Montana Bureau of Mines and Geology Groundwater Information Center (Tetra Tech, 2012).

A groundwater monitoring event was performed in October 2025 (Tetra Tech, 2026). Monitoring wells HSK-5, HSK-6, HSK-8, HSK-9, and HSK-10 were not located during the sampling event. Monitoring well HSK-11 was observed to be dry. Benzene was observed above the RBSL in the sample collected from well HSK-13. Based on the results of the monitoring event, Tetra Tech recommended the installation of additional monitoring wells between the Circle K store building and the eastern property boundary to assess volatile petroleum hydrocarbon (VPH) concentrations in groundwater. Tetra Tech also recommended semi-annual monitoring of groundwater after the installation of the monitoring wells (Tetra Tech, 2026).

SCOPE OF WORK

This project's general scope of work is summarized below. Standard operating procedures are included in **Attachment A**.

WORK PLAN PREPARATION AND PROJECT MANAGEMENT

These tasks include preparing this work plan, and project management time necessary for coordination and scheduling of the project. In addition, a site-specific health and safety plan (HASP) will be prepared to address activities in this work plan prior to conducting any on-site activities.

ADJACENT PROPERTY ACCESS

This task includes contacting and obtaining a site access agreement to collect a water sample a domestic well that is registered with the Montana Bureau of Geology's Groundwater Information Center as being located at the property located adjacent to and east of the Circle K property.

UTILITY LOCATES

Tetra Tech will submit a utility locate request with Montana 811 to locate public utilities at the site. A private utility locator will also be employed to locate utilities within the proposed groundwater monitoring well installation areas.

SUBSURFACE INVESTIGATION

The following methods will be used during subsurface investigation activities.

- Drill up to six soil borings, HSK-14 through HSK-19, using direct push drilling techniques at the locations shown on **Figure 2**. Exact locations will be determined after an on-site assessment of site-specific access, underground utility locates, overhead power lines, and safety. Each of these locations will be potholed using air knife digging methods to a depth of approximately five feet below ground surface (bgs) to clear each location of subsurface utilities. The six borings will be advanced to a depth approximately 23 feet below ground surface (bgs) to assess petroleum hydrocarbon impacts within groundwater.
- Collect soil samples from each borehole continuously and log each sample for soil type, density, moisture content, color, and evidence of petroleum hydrocarbon staining and odor.
- Each sample will be screened for petroleum hydrocarbon impacts using visual observations of staining, odor, and standard headspace screening techniques with a photo-ionization detector (PID). These methods will be used to document the vertical extent of petroleum hydrocarbon impacts in each soil boring.
- Up to two soil samples will be collected from the zone of greatest petroleum impacts from each soil boring as identified during field screening. However, if impacts are not observed in the soil column, only the groundwater interface sample will be collected for laboratory analysis. For cost estimation purposes, it is assumed that two soil samples will be collected from each boring. Each soil sample will be placed in clean laboratory-supplied containers and submitted to Energy Laboratories in Billings, Montana. The soil samples will be analyzed for VPH using the Montana modified Massachusetts Department of Environmental Protection method (MDEP, 2008).
- Impacted drill cuttings identified by field screening will be containerized on-site in 55-gallon drums. A soil sample will be collected from the containerized soil and submitted for laboratory analysis of VPH, Resource Conservation and Recovery Act (RCRA) eight Toxicity Characteristic Leaching Procedure (TCLP) metals per landfill disposal requirements, and paint filter test.

MONITORING WELL INSTALLATION

The monitoring wells will be completed as follows:

- Each soil boring will be completed as a monitoring well with 2-inch diameter Schedule 40 PVC materials (**Figure 2**). The well screen piping will be 0.020 slot size prepacked well screen and installed from approximately eight to 23 feet bgs. A threaded cap will be installed on the bottom of the screen piping. Bentonite chips will be placed from above the top of the screen to two feet bgs. The monitoring wells will be completed with an 8-

inch diameter flush-mount steel protector casing concreted in place. The top of the PVC casings will be fitted with 2-inch diameter water-tight locking plugs.

- Each monitoring well will be developed using a surge block and water pumping technique. The well will be surged and pumped until the pumped water is sediment-free and clear. Development water will be containerized by the Disposal of Untreated Water from Monitoring Wells Flow Chart and disposed of appropriately following receipt of laboratory results (MDEQ, 2015).

GROUNDWATER MONITORING

Tetra Tech will conduct two groundwater monitoring events at the facility site. The sampling events will be scheduled to capture high and low groundwater conditions. The following table summarizes the scope of work for the two groundwater monitoring events.

Task Description	Monitoring Well/Parameter List
Depth to Water Measurements Only	HSK-2, HSK-4, and HSK-7
Monitoring Wells to be Sampled	R-1, HSK-12 through HSK-19
Domestic Well to be Sampled	1911 King Avenue West
Water Quality Stabilization Parameters	Parameter / Stabilization Range • pH: ± 0.1 units, • Temperature: ± 10%, • Dissolved Oxygen: ± 10% or 3 consecutive measurements less than 0.5 mg/L, • Specific Conductivity: ±3%, • Oxygen Reduction Potential: ± 10 millivolts, and • Turbidity: ±10% or 3 measurements less than 5 NTU
Sample Collection Criteria	• When water quality parameters are within the stabilization range listed above. •
Laboratory Analyses (all monitoring wells that are sampled and domestic well)	• VPH by Montana Method MADEP
Intrinsic Bioremediation Indicators (R-1, HSK-12 through HSK-19)	• Dissolved Ferrous Iron by Method E200.8 • Dissolved Manganese by Method E200.8 • Sulfate by Method E300.0 • Nitrates/Nitrites by Method E353.2 • Methane by Method 8015M

The following methods will be used for collecting a domestic well water sample and measuring static water level measurements and groundwater sampling of monitoring wells:

- A sample may be collected from the domestic well that may be located on the property adjacent to the east of the subject site. The water sample will be collected from a spigot and prior to any water softener, filtration system, or holding tank, if possible. Field instruments will be used to analyze the water for pH, temperature, dissolved oxygen, specific conductivity, oxidation-reduction potential, and turbidity during purging prior to sample collection.
- After a minimum of 48 hours following completion of monitoring well development activities, depth to groundwater will be measured using a decontaminated electronic oil/water interface meter. The meter will be decontaminated between each measurement.
- Each monitoring well that is sampled will be purged using the low-flow, slow-purge pumping method, using a submersible bladder pump or peristaltic pump, and dedicated polyethylene tubing. During purging, field instruments will analyze the water for pH, temperature, dissolved oxygen, specific conductivity, oxidation-reduction potential, and turbidity. Purge water will be containerized by the *Disposal of Untreated Water from the Monitoring Wells Flow Chart* and disposed of appropriately following receipt of laboratory results (MDEQ, 2015). The pump will be decontaminated between wells using a Liquinox® solution followed by a triple rinse technique. Additionally, a new bladder or tubing will be installed between sampling each well.
- A groundwater sample from each monitoring well will be collected using a submersible bladder pump or peristaltic pump and dedicated polyethylene tubing. Groundwater samples will be analyzed for VPH using the Montana Method based on the MADEP methods (MDEQ, 2024). Groundwater samples will also be analyzed for intrinsic biodegradation indicators (IBIs). The IBIs include dissolved ferrous iron (Method E200.7), dissolved manganese (Method E200.7/E200.8), sulfate (Method E300.0), nitrates/nitrites (nitrate plus nitrite as nitrogen; Method E353.2), and methane (GS-FID/Kampbell (SW8015 Modified).
- One duplicate sample will be collected from a well with presumed petroleum hydrocarbon impacts during each sampling event. Also, a trip blank will accompany the sample cooler during sampling and shipment. The duplicate and trip blank samples will be analyzed for the same constituents as the natural samples.

MONITORING WELL SURVEY

The measuring point of each monitoring well PVC casing will be surveyed to an accuracy of 0.01 feet vertically in the NAVD 88 datum and to the nearest 0.10 feet horizontally in the Montana State Plane Coordinate system. Surveying activities will be conducted by or overseen by a licensed surveyor or engineer.

DATA VALIDATION

The analytical data package will include a summary report that cross-references the sample identification with the laboratory identification and identifies variations from standard operating procedures; laboratory analytical results; quality control data, which may include but is not limited to surrogate recoveries, initial and continuing calibration blanks and spikes, method blanks, laboratory control blanks, laboratory spikes, and matrix spike and matrix spike duplicates; FID chromatograms; chain of custody form(s); and a sample receipt checklist. Additionally, data validation will be included with the groundwater monitoring report and will follow MDEQ's data validation guideline as per https//deq.mt.gov/Portals/112/Land/StateSuperfund/Documents/DataValidationReport.pdf. It is anticipated that three data validation reports will be completed for this project.

REPORTING

A Remedial Investigation Report will be prepared and submitted to MDEQ after the second groundwater monitoring event and validation of laboratory data. Historical soil and groundwater data from historical reports will be compiled into cumulative data tables for this report. This report will present the field and analytical results of soil samples and both groundwater monitoring events and compare laboratory analytical results to MDEQ Risk Based Screening Levels (RBSLs). Conclusions and recommendations detailing site conditions, and the extent and magnitude of the plume will be discussed, along with a to-scale map presenting necessary site information. Additionally, a Release Closure Plan (RCP) will be prepared to evaluate the potential path for closure of the release.

SCHEDULE AND BUDGET

Tetra Tech will schedule this work within three business days upon receiving formal authorization by Circle K Stores, Inc. and the MDEQ. The work described above will be conducted on a unit cost basis per attached cost estimate (**Attachment B**). Subcontractor bids for the monitoring well installation work are included in **Attachment C**. This site is eligible for reimbursement through the Montana Petroleum Tank Release Compensation Board (PTRCB).

AUTHORIZATION

This work will be conducted in accordance with the terms and conditions of the Master Consulting Services Agreement between Holiday Companies and Tetra Tech, Inc. dated March 28, 2017. This work plan may be accepted by signing the attached *Work Authorization #31* (**Attachment D**) and returning a copy to our Billings office. If you have questions or comments regarding this work plan, please call us at (406) 248-9161. For your convenience we have forwarded a copy of this work plan to Mr. Jonathan Love (MDEQ).

We appreciate the continuing opportunity to provide Circle K with consulting services and look forward to hearing from you. Please call if you have any questions or comments regarding this work plan.

Sincerely,

Tetra Tech, Inc.

Steven A. Marie, PE
Senior Engineer

Jacob Conver, PE
Senior Project Manager

SAM/JC

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cc: Jonathan Love-MDEQ, Billings jlove@mt.gov

Attachments: Figures
Attachment A: Standard Operating Procedures
Attachment B: Cost Estimate
Attachment C: Subcontractor Bids
Attachment D: Work Authorization #31

REFERENCES

Lopez, D.A., 2002. Geologic Map of the Billings Area, Yellowstone County, Montana. Montana Bureau of Mines and Geology, Butte, Montana. Geologic Map Series No. 61-A.

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Tetra Tech, 2026. Groundwater Monitoring Report, Circle K Store 2746285 (Former Holiday 285), 785 South 20th Street West, Billings, Montana. May 7.

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FIGURES

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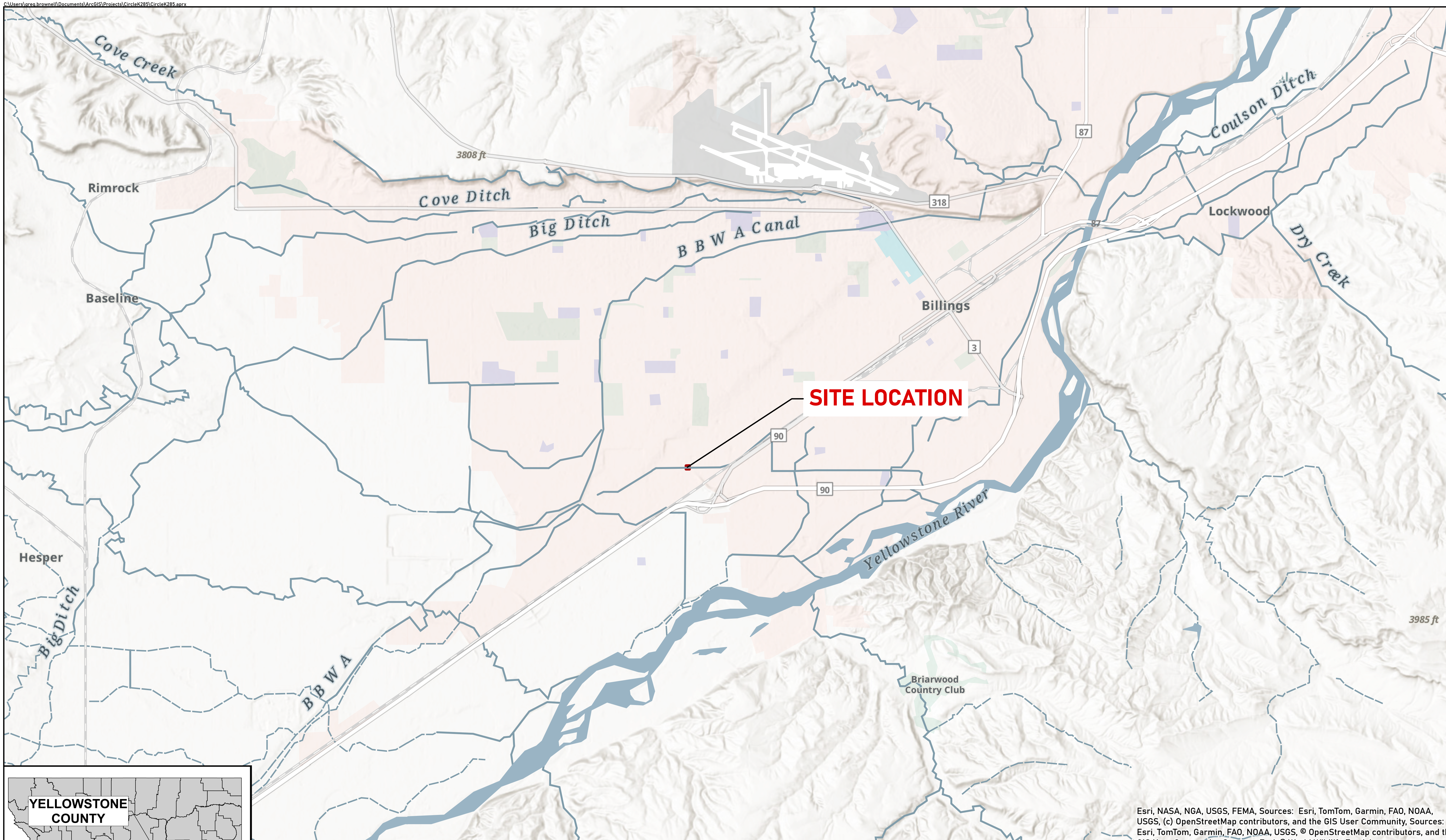

SITE LOCATION MAP
CIRCLE K STORE 2746285
785 S 20th St W
BILLINGS, MONTANA
FIGURE 1

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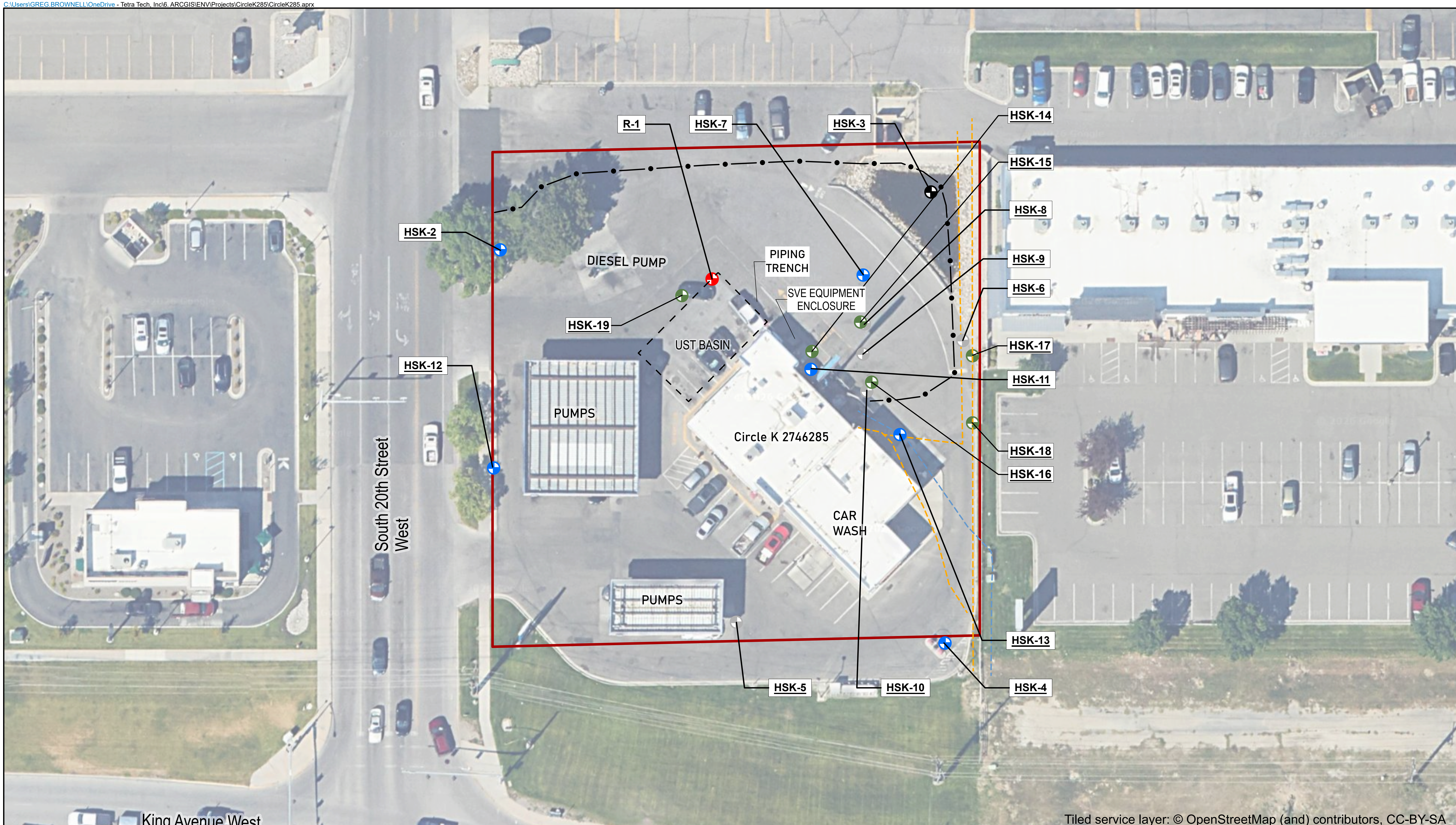

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Feet
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- Existing Monitoring Well
- Abandoned Well
- Recovery Well
- Well Not Located
- Remediation Pilot Test Well
- Proposed Monitoring Well Locations
- Site Boundary
- NM Not Measured
- Gas Line
- Water Line
- Telephone Line

Site and Proposed Well Locations Map
Circle K Store #285
785 S 20th St W
Billings, Montana
Figure 2

ATTACHMENT A

Standard Operating Procedures

STANDARD OPERATING PROCEDURE
EQUIPMENT DECONTAMINATION

The purpose of this section is to describe general decontamination procedures for field equipment in contact with mine/mill tailings, soil, or water. During field sampling activities, sampling equipment will become contaminated after it is used. Sampling equipment must be decontaminated between sample collection points if it is not disposable. Field personnel must wear disposable latex or vinyl gloves while decontaminating equipment at the project site. Change gloves between every sample. Every precaution must be taken by personnel to prevent contaminating themselves with the wash water and rinse water used in the decontamination process.

Table A-1 lists equipment and liquids necessary to decontaminate field equipment.

The following should be done in order to complete thorough decontamination:

1. Set up the decontamination zone upwind from the sampling area to reduce the chances of windborne contamination.

2. Visually inspect sampling equipment for contamination; use stiff brush to remove visible material.

3. The general decontamination sequence for field equipment includes: wash with Liquinox or an equivalent degreasing detergent; deionized water rinse; deionized water rinse; rinse with sample water three times.

4. Rinse equipment with methanol in place of the nitric rinse if sampling for organic contamination. Follow with a deionized water rinse.

5. Decontaminated equipment that is to be used for sampling organics should be wrapped in aluminum foil if not used immediately.

6. Clean the outside of sample container after filling sample container.

Alternatively, field equipment can be decontaminated by steam cleaning and rinsing with deionized water.

All disposable items (e.g., paper towels, latex gloves) should be deposited into a garbage bag and disposed of in a proper manner. Contaminated wash water does not have to be collected, under most circumstances. If vehicles used during sampling become contaminated, wash both inside and outside as necessary.

TABLE A-1. EQUIPMENT LIST FOR DECONTAMINATION

5-gallon plastic tubs	Liquinox (soap)
5-gallon plastic water-container	Hard bristle brushes
5-gallon carboy DI water	Garbage bags
1-gallon cube of 10% HNO_3	Latex gloves
1-gallon container or spray bottle of 10% Methanol or pesticide grade acetone for organics	Squeeze bottles
	Paper Towels

STANDARD OPERATING PROCEDURE
MONITORING WELL CONSTRUCTION

1. Arrive on-site with properly sized drilling equipment and materials for site conditions. All drilling equipment and materials should be properly decontaminated prior to its arrival on-site. Decontamination usually includes steam - or hot water-cleaning methods.

2. Drilling muds or drilling solutions of any kind are not to be used during drilling activities in conjunction with monitoring well construction. Acceptable drilling techniques include air-rotary, cable tool, or hollow-stem auger. If unconsolidated material is encountered, it may be necessary to drive steel casing during drilling to maintain borehole integrity. It is suggested threaded steel casing be used in lieu of welding joints together to minimize this source of potential well contamination. Hydraulic jacks or the drill rig can be used to pull back the steel casing following emplacement of plastic casing.

3. A detailed lithologic log shall be completed during drilling activities. Water bearing characteristics of the formations should also be denoted on the log. In addition, details of monitoring well construction should also be described on the well log including total depth, perforated interval, sizes and types of construction materials, etc.

4. Eight- or ten-inch outside diameter hollow-stem augers can be used in drilling shallow exploration drill holes in many situations. Care should be taken to avoid contamination due to oil and grease from the drill rig and split spoon sampler. Appropriate decontamination of the drill rig between drill holes is performed. Soil and sediment samples are collected using a standard 1.4-inch inside diameter split spoon sampler and a 140-pound drive hammer. The number of blows necessary to obtain an 18-inch length of sample is recorded on the exploration log. Appropriate decontamination of the split spoon sampler is accomplished between samples.

   Either a single- or multi-completion monitoring well can be constructed in a single borehole where hollow-stem auger drilling is not used. Backfill with chemically-inert silica sand to above the perforated interval and emplace a bentonite plug above the sand. Install factory-screened and blank PVC (or stainless steel or PTFE for organics) well casing into the borehole. Where appropriate, begin pulling temporary steel casing out of borehole. Emplace silica sand above and below any perforated sections in the borehole; install bentonite plugs above and below sand pack around perforated sections. Backfill remaining well annulus with a bentonite slurry or with grout to the surface. Monitoring well development is presented in SOP-17.

5. Place locking well steel protector over PVC casing(s) after outer steel casing has been removed from the borehole if necessary. Place bentonite plug below bottom of well protector; grout well protector in place and lock with high quality lock.

6. Many states now require certification and licensing for monitoring well drillers. Be sure you know the State's regulations before arriving on-site, especially if drilling outside your own State.

7. Safety equipment required on-site of the drill rig is mandatory. Personal protective equipment includes (at a minimum): hard hat, safety glasses, steel toed boots, gloves, first aid kit, and site safety plan - with routes to hospitals known by all personnel on-site.

SOP 17

STANDARD OPERATING PROCEDURE
MONITORING WELL DEVELOPMENT

1. Visually inspect all well development equipment for damage - repair as necessary.

2. Decontaminate all stingers, air hoses, surge blocks by scrubbing with brush and Liquinox solution, rinsing with dilute nitric acid solution, and rinsing with deionized water. If sampling for organics, replace the nitric acid rinse with 10% methanol as per SOP 11.

3. If using compressed air method for well development, make certain compressor utilized does not produce air laden with hydraulic fluid for lubricating purposes. This may affect the integrity of the monitoring well for producing viable water quality data.

4. Develop well by using surging techniques (surge block or bailer) followed by well evacuation. Repeat this procedure until evacuated water is visibly clean and essentially sand-free. In most cases, evacuated water can be disposed of on-site.

5. If specified in the project work plan, during evacuation process, collect water samples for field determinations of temperature, specific conductivity, and pH. Continue developing well until field parameters stabilize to within ±5 % on three consecutive measurements.

6. Report field observations and volume of water removed on standard form.

STANDARD OPERATING PROCEDURE
FIELD MEASUREMENT OF GROUND WATER LEVEL

1. Well probe should be calibrated annually or as needed. Note any corrections to well probe measurements on field forms.

2. Check well probe prior to leaving for field for defects by placing probe in water and testing buzzer and light. Repair as necessary. Make certain the well probe, a tape measure calibrated to tenths of feet and extra batteries are in the carrying case.

3. Measure all wells (monitoring and domestic) from the top of the well casing in the north quadrant or from a designated measuring point, as appropriate. Measure and record distance from measuring point to ground level. Make sure measuring point is labeled on well, so future measurements can be made from the same location.

4. Obtain a depth to water from measuring point to the nearest hundredth of a foot. Record data on appropriate field forms.

5. Decontaminate well probe between each measurement by rinsing with deionized water. Additional decontamination, such as *Liquinox*® scrubbing, may be required for certain wells; consult the project work plan.

STANDARD OPERATING PROCEDURE 46
LOW-FLOW (MINIMAL DRAWDOWN) GROUNDWATER SAMPLING

EQUIPMENT:

- oil/water interface or water level probe
- coolers and ice
- sample bottles
- preservatives
- decontamination equipment and fluids
- filter apparatus
- indelible marker
- flow through cell
- pH meter
- specific conductance meter
- peristaltic or submersible pump
- dissolved oxygen meter
- oxidation-reduction potential meter
- temperature meter
- field sampling forms

All sampling equipment shall be inspected for damage, and repaired if necessary, prior to arriving on-site.

GENERAL PROCEDURE – LOW FLOW (MINIMAL DRAWDOWN0N) PURGING:

Depth to Groundwater and LNAPL Thickness Measurements

Prior to purging or sampling each well, the depth to groundwater and light non-aqueous phase liquids (LNAPL) thickness (if present) will be measured. Depth to groundwater will be measured using a water level electric probe. LNAPL thickness will be measured using an oil/water interface probe. All probes will be decontaminated prior to use in accordance with our standard operating procedures for decontamination. The depth to groundwater and free product thickness data will be recorded on a groundwater water sampling log for each well.

Puls and Barcelona (1995) recommend that well depth be obtained from well logs. Measuring the bottom of the well casing will cause re-suspension of settled solids from the formation and require longer purging times for stabilization. Measure the well depth, if necessary, should be completed after sampling is completed.

Pre-Sampling Activities:

Wells without LNAPL

Purging will be conducted using a peristaltic or submersible pump. The intake of the pump will be placed at the approximate midpoint of the saturated screened interval. Water will be purged from the well at a rate that will minimize drawdown in the well and will keep the water level at least 6 inches above the pump intake. Puls and Barcelona (1995) recommend that drawdown be kept to <0.3 feet. Frequent measurements of depth to groundwater will be required to set pump flow rates.

Dissolved Oxygen (DO), oxidation-reduction potential (ORP), temperature (T), pH, and specific conductance (SC) will be monitored during the purging of each well. These parameters will be measured using field meters and a flow-through cell. Data will be recorded on the groundwater sampling log for each well. Measurements should be recorded periodically.

Purging will continue until pH, SC, and DO stabilize**.** Stabilization is achieved after all parameters have stabilized for three successive readings. The stabilization criterion is based on three successive readings of the water quality field parameters; the following are the criteria which must be used:

Parameter	**Stabilization Criteria**
pH	± 0.1 pH units
Temp	± 10% degree Celsius (°C)
SC	± 3% microSiemens per centimeter (uS/cm)
ORP	± 10% millivolts (mV)
DO	± 10% milligrams per liter (mg/L) or 3 consecutive measurements less than 0.5 mg/L
Turbidity	±10% or 3 measurements less than 5 NTU

All field instruments will be calibrated prior to sample collection. Instruments will be checked against standards daily. Instruments will be recalibrated as needed. Calibration notes will be kept on daily field logs.

Wells with LNAPL

Wells with LNAPL will be purged following the procedures presented for purging wells without LNAPL. However, the intake of the purge pump will be placed 18-24 inches below the base of LNAPL. The pump intake will be sealed and lowered to the correct sample depth. The seal will then be removed and purging started.

Depth to the base of LNAPL will be measured frequently during purging to establish flowrate. Flowrate will be adjusted to keep drawdown to <0.3 feet.

Field parameters will be measured during purging as described for purging wells without LNAPL. Purging will continue until field parameters have stabilized.

COLLECTING WATER QUALITY SAMPLES:

1. Generally, wells shall be sampled from the least contaminated to the most contaminated, if known. Open well, noting condition of well, and measure water level (SOP GW-3).

2. Use new disposable or dedicated pump tubing for each well.

3. Sampling Monitoring Wells

   - Collect a water quality sample, using the purge pump and tubing at the same pumping rates for purging.

4. If sampling for dissolved metals, field filter sample using a disposable filter.

5. Label each sample container with project number, sample location, well owner, date, military time, sampler's initials, preservative, and analysis required. For inorganics samples, rinse sample containers, without preservatives, three times with sample water before final collection.

6. Pour the sample into the appropriate sample containers and any needed preservatives in

accordance with SOP GS-6 or the project field sampling plan. Also see ("Handbook for Sampling and Sample Preservation of Water and Wastewater", EPA-600/4-82-029; "Guidelines Establishing Test Procedures for the Analyses of Pollutants Under the Clean Water Act", 40 CFR 136; and "Test Methods for Evaluating Solid Wastes," EPA SW-846). A few common sample preservatives are listed below:

• Dissolved Metals	Add 3-4 ml. Nitric Acid to 500 ml. sample
• Nutrients	Refrigerate to 4°C; Add 3-4 ml. Sulfuric Acid to 500 ml. sample
• Common Ions	Refrigerate to 4°C
• Hydrocarbon VOA	Refrigerate to 4°C; Add HCl to lower pH to 2 (see SOP-42)
• Diesel Range Organics	Refrigerate to 4°C; Add 80 drops (4ml) HCl

For additional bottling and sample preservation information, consult the project field sampling plan.

7. For volatile analyses, add preservative to the sample vial and fill vials at the rate of 100 milliliters per minute (24 seconds for 40 milliliter vial); form a positive meniscus over vial brim and cap. After capping, invert vial, gently tap and look for air bubbles. If bubbles are present, un-cap vial, add more water and repeat procedure.

8. If required by the project work plan, perform field parameter tests including pH, SC, DO, ORP, and temperature on water sampled from the well. Record field measurements on field forms.

9. Complete the necessary shipping and handling paperwork, and record all pertinent information on field sampling form.

SAMPLING DOMESTIC WELLS

1. Turn-on household fixture (preferably an outside faucet without a hose connected) that is on the well-side of any household water conditioning device.

2. Calculate the volume of water to be evacuated. Measure the discharge rate from the faucet in a graduated 5 gallon bucket, or other suitable container, to compute the rate of discharge. Calculate the time needed to evacuate the predicted volume from the well. Record all measurements and calculations on field forms.

3. Samples should be collected directly from hydrant or faucet and prior to entry of the water through any water conditioning devices. Do not collect samples through rubber hoses.

REFERENCES:

Puls, R.W. and Barecelona, M.J., 1995. Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures. USEPA Office of Research and Development, Office of Solid Waste and Emergency Response. EPA/540/S-95/504, December.