



November 1, 2016

Sears Holdings Management Corporation
3333 Beverly Road, B5-335A
Hoffman Estates, Illinois 60179

Attn: Ms. Patricia Feeley
P: (847) 286-2884
E: Patricia.Feeley@searshc.com

Re: **Revised Work Plan for Monitoring Well Installations and Quarterly Sampling**
Former Sears Automotive Center # 2199
1616 Cornwall Avenue
Bellingham, Whatcom County, Washington
Project Number: 81167068

Dear Ms. Feeley:

Terracon Consultants, Inc. (Terracon) is pleased to present Sears Holdings Management Corporation (SHMC) with this revised work plan to install additional groundwater monitoring wells and conduct quarterly groundwater sampling and analyses at the former Sears Automotive Center #2199, located at 1616 Cornwall Avenue, Bellingham, Washington. Per our discussions, this revised work plan includes relocating a proposed monitoring well from the site building basement to the sidewalk area south of the building, and moving one proposed well in the drive area south of the building to a location further west, outside of the previous soil removal excavation area.

Three groundwater monitoring wells (MW-1, MW-2, and MW-12) were properly decommissioned in December 2014 to accommodate the removal of a decommissioned 10,000-gallon heating oil underground storage tank (UST) and associated petroleum contaminated soil (PCS) located on the south side of the main site building. Groundwater monitoring wells MW-3 through MW-11 are currently located at the site.

The revised scope of work includes drilling and installing four groundwater monitoring wells on the south side of the main building around the former UST location, installing one groundwater monitoring well inside the building basement in the downgradient direction from the former UST, and sampling groundwater at the site on a quarterly basis for one year. Additionally, Terracon will address the Washington State Department of Ecology (Ecology) request for additional site information, as listed in Ecology's July 5, 2016 letter to the property owner. Specifically, Terracon will include revised Washington State Model Toxics Control Act (MTCA) Method B site-specific soil cleanup level worksheets that include benzene concentrations and a rose diagram depicting historical groundwater flow directions at the site in our report of findings for this work plan.



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Geotechnical



Environmental



Construction Materials



Facilities

1.0 PROJECT INFORMATION

The site is comprised of approximately 2.33 acres and is developed with a main building and an annex building occupied by commercial tenants, asphalt paved drive and parking areas, concrete sidewalks, and minor landscaped areas. A Site Diagram (Figure 1) is attached for reference.

A 10,000-gallon heating oil UST was installed on the south side of the building in about 1948. Ecology documents indicate that the tank was cleaned and filled with an inert substance in 1992. A subsurface investigation completed at the site by Whatcom Environmental Services in 2008 revealed that soil and groundwater in the vicinity of the decommissioned heating oil UST contained diesel-range total petroleum hydrocarbons (TPH) at concentrations which exceed current cleanup levels, as defined in MTCA (Washington Administrative Code [WAC] 173-340).

Terracon completed a subsurface investigation to further assess the nature and extent of impacts apparently associated with the decommissioned heating oil UST in 2011. Light non-aqueous phase liquid (LNAPL) petroleum product was noted in groundwater monitoring wells MW-1 and MW-2, located in close proximity to the UST. According to the laboratory, the product had an analytical signature most similar to biologically degraded Bunker C or similar heavy fuel oil. Terracon estimated that the shallow groundwater flow direction was toward the northeast and northwest (toward Whatcom Creek) in 2011 and 2012, respectively, with a horizontal gradient of approximately 0.005 to 0.007 feet per foot. Terracon completed a Supplemental Remedial Investigation in 2012 and installed one additional groundwater monitoring well (MW-12) downgradient of the decommissioned heating oil UST.

In December 2014, Terracon supervised and documented the removal of the heating oil UST, and the removal and offsite disposal of approximately 400 tons of PCS, 80 tons of Class 2 (below MTCA cleanup levels) petroleum-impacted soil, and 7,950 gallons of petroleum-impacted water from the former heating oil UST area. PCS was excavated from the former heating oil UST area to the extent practicable based on field observations and site conditions. A total of 18 confirmation soil samples were collected from the remedial excavation sidewalls and bottom. Three soil samples collected from the final limits of the northeastern portion of the remedial excavation at 13 to 14 feet below the ground surface (bgs) contained diesel-range TPH, oil-range TPH, and/or polycyclic aromatic hydrocarbons (PAHs) at concentrations exceeding the MTCA Method A or MTCA Method B cleanup levels. A Site Detail map (Figure 2) depicting the UST and PCS removal excavation is attached for reference.

Approximately 495 pounds of oxygen release compound (Regenesys ORC Advanced® pellets) were applied to the bottom of the excavation and mixed into the soil in an effort to enhance the bioremediation of residual petroleum hydrocarbons in the soil and groundwater. In addition, two horizontal slotted remediation pipes and three vertical remediation wells (RW-1 through RW-3) were installed in the excavation for future potential use in treating residual petroleum hydrocarbons in the soil and groundwater. Remediation wells RW-1 through RW-3 were completed to the bottom of the excavation (15 feet bgs) prior to backfilling the excavation.

The remedial action was presented in Terracon's *Heating Oil UST Removal and Remedial Excavation Report*, dated May 21, 2015. Copies of the May 2015 report were provided to the site owner's attorney by SHMC for their files and for submittal to the Washington State Department of Ecology (Ecology). The site owner is the Voluntary Cleanup Program (VCP) applicant for this cleanup site, and has stipulated that Terracon is not to submit site documents directly to Ecology.

Groundwater monitoring wells MW-3 through MW-5 and MW-8 through MW-11 were sampled in November 2014, prior to the UST removal work. Monitoring wells MW-1, MW-2, and MW-12 contained an undetermined thickness of LNAPL and were not sampled. Well MW-6 was not accessible, and well MW-7 purged dry before a sample could be collected. All groundwater sample analytical results were reported as non-detect, or below the MTCA Method A or MTCA Method B cleanup levels. Monitoring wells MW-1, MW-2, and MW-12 were decommissioned by pressure-grouting prior to the removal of the UST. The groundwater sampling results were included in Terracon's May 2015 report.

Ecology issued an Opinion on Completed Interim Remedial Action letter to the property owner (Garnet LLC) in July 2016. Ecology recommended that a groundwater monitoring well be installed downgradient (northwest) of the former heating oil UST location, that a proposed well near existing well MW-7 be moved outside of the PCS excavation area, and that quarterly groundwater monitoring be conducted at the site for a minimum of one year (four quarters).

2.0 COMMITMENT TO SAFETY

Terracon has a commitment to the safety of all its employees. As such, and in accordance with our *Incident and Injury Free®* safety culture, Terracon will develop a safety plan to be used by our personnel during field services. Prior to commencement of on-site activities, Terracon will hold a meeting to review health and safety needs for this specific project. At this time, we anticipate performing fieldwork in a US Occupational Health and Safety Administration (OSHA) Level D work uniform consisting of hard hats, safety glasses, protective gloves, and steel-toed boots. It may become necessary to upgrade this level of protection while sampling activities are being conducted in the event that petroleum or chemical constituents are encountered in soils or groundwater that present an increased risk for personal exposure.

3.0 SCOPE OF SERVICES

Ecology recommends that quarterly groundwater monitoring and sampling be conducted over the course of a year in order to establish seasonal variations in groundwater quality and groundwater gradient. In addition, Ecology requires four consecutive quarters of post-remedial action groundwater sampling results in compliance with MTCA cleanup levels in order to obtain a No Further Action (NFA) site closure. The scope of services included herein is to install five additional

groundwater monitoring wells and conduct quarterly groundwater sampling at the site for one year.

We propose to complete the following activities prior to the initiation of field activities:

- Prepare this work plan for review and approval by SHMC and the site owner's attorney.
- Verify with SHMC that site access has been granted.
- Arrange for and coordinate the services of subcontractors.

3.1 Utility Locates in Work Area

In an effort to locate utilities in the work area, Terracon will review any site plans provided to us, and no later than 72 hours prior to intrusive activities for each drilling event, Terracon will contact the utility locator service to arrange for underground utility clearance for the proposed explorations. To the extent practicable, the locations and depths of the various utilities will be identified to avoid damage to such utilities.

In addition to the public utility locate, a private utility line locate survey will be performed at the site to identify utilities in the proposed areas of exploration, particularly in the building basement. The survey will be completed with electromagnetic (EM) and ground penetrating radar (GPR) instruments by a subcontractor accompanied by Terracon field personnel. Prior to the survey, the site owner will be responsible to prevent any obstructions during the survey. Terracon will coordinate with the site property manager to assure that parked cars are removed from the area of the site to be investigated prior to conducting the geophysical survey. The survey will be completed prior to the mobilization for the groundwater monitoring well installation services.

3.2 Subsurface Exploration

Subcontract drilling crews and a Terracon field representative will be used to conduct the monitoring well installation work at the following locations, as depicted on Figure 2:

- One in the asphalt pavement to the southwest of the remedial excavation (MW-13) near existing monitoring well MW-7, which is screened from 5 to 15 feet bgs and occasionally becomes dry during the summer months;
- One in the asphalt pavement adjacent west of the remedial excavation area (MW-14);
- One in the concrete sidewalk adjacent east of the remedial excavation area (MW-15);
- One in the concrete sidewalk northwest of the remedial excavation area (MW-16); and
- One in the former Sears building basement floor north (assumed hydraulically downgradient) of the northeast portion of the remedial excavation area, where residual soil impacts were documented (MW-17).

The borings located southwest, west, and east of the remedial excavation area (MW-13 through MW-15) will be advanced utilizing a truck-mounted hollow-stem auger (HSA) drilling rig. The boring located northwest of the remedial excavation (MW-16) beneath the covered portion of the concrete sidewalk will be advanced utilizing a truck-mounted direct-push technology (DPT) drilling rig, configured to drill in a low-overhead location. The boring in the building basement floor (MW-17) will be completed with a combination of hand auger and portable power auger equipment. The borings will be completed by Washington State-licensed drillers. The concrete sidewalk and basement floor at MW-15 through MW-17 will be cored to allow access to the drilling equipment.

Based on previous groundwater sampling events and observations from the December 2014 UST removal work, groundwater is anticipated to be encountered at a depth of approximately 15 feet bgs in the asphalt-paved parking and concrete sidewalk areas, and at approximately 5 feet below the building basement floor. The deeper borings will be advanced to approximately 22.5 feet bgs, and the shallower (basement) borings will be advanced to approximately 10 feet bgs.

3.3 Soil Sampling

Soil samples will be collected from the HSA borings (MW-13 through MW-15) at 2.5-foot intervals via the Standard Penetration Test Resistance (SPT) method (ASTM D-1586). An automatic SPT hammer will be used to advance a 2-inch diameter steel split-spoon sampler or a 3-inch diameter steel California split-spoon sampler in the borings. The split-spoon samplers will be extracted from the hole and opened for soil sample recovery. Soil samples will be collected continuously, to the extent practical, from the DPT boring (MW-16) using a clean stainless steel sampler equipped with clean acetate liners. Soil samples will be collected at approximately 1- to 2-foot intervals from the boring located in the building basement (MW-17) using a clean stainless steel hand auger.

Soils will be observed to document subsurface conditions and visual or olfactory indications of impacts. In addition, the samples will be field screened with a photoionization detector (PID) to qualitatively evaluate for the potential presence of volatile organic compounds (VOCs) and/or petroleum hydrocarbons utilizing the “headspace method”. The soil will also be field-screened by using a sheen test. A small portion of the soil will be placed into a shallow bowl containing potable water and observed to see if a sheen is emitted on the top of the water’s surface from the soil. Soil cuttings will be contained in properly labeled Department of Transportation (DOT)-approved 55-gallon drums and temporarily stored onsite.

All downhole drilling equipment will be cleaned with a non-phosphate soap wash followed by a potable water rinse prior to use in each boring. Equipment decontamination water will be contained in properly labeled DOT-approved 55-gallon drums and temporarily stored onsite.

The soil sampling will consist of the collection of a maximum of two soil samples from each exploration for submittal to a laboratory. Soil samples collected from areas exhibiting indications

of potential impact, or collected from the capillary fringe zone, from the interval exhibiting a change in stratigraphy, and/or from the interval of most probable environmental impact as determined in the field by the sampling professional, will be designated for laboratory analyses. Additional soil samples will be collected and placed on hold and only analyzed after consultation with the client and if field indications or laboratory results from the first samples merit the analyses of these samples. In addition, up to two soil samples with the highest TPH detections will be analyzed for volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH) in order to assist with establishing a site-specific TPH cleanup level for the site under MTCA Method B calculations.

Soil samples will be placed into appropriate containers provided by the laboratory, and immediately placed into a cooler containing ice or ice substitute. Each sample container will be labeled with the project number, date, time, well/boring number, and sample number. Samples will be delivered to a Washington State-accredited analytical laboratory in strict accordance with the industry standard chain-of-custody protocol.

Soil samples collected from the borings will be analyzed for the following chemicals of concern, based on Ecology protocols and previous sampling results:

Analysis	Sample Type	Maximum No. of Samples	Method
Groundwater monitoring well installation soil borings			
BTEX	Soil	10	EPA 8021
Diesel- and oil-range TPH	Soil	10	NWTPH Dx
MTCA 5 metals	Soil	10	EPA 6010/7471
PAHs	Soil	10	EPA 8270 SIM
VPH	Soil	2	VPH WA Method
EPH	Soil	2	EPH WA Method

BTEX: benzene, toluene, ethylbenzene, and xylenes; TPH: total petroleum hydrocarbons; MTCA 5 metals: Model Toxics Control Act metals (arsenic, cadmium, chromium, lead, and mercury); PAHs: polycyclic aromatic hydrocarbons; SIM: selected ion monitoring; VPH: volatile petroleum hydrocarbons; WA: Washington Department of Ecology; EPH: extractable petroleum hydrocarbons.

3.4 Groundwater Monitoring Well Installation, Development, and Surveying

Upon completion of the soil sampling activities, the soil borings will be converted to permanent groundwater monitoring wells to facilitate the collection of groundwater samples.

The permanent groundwater monitoring wells will be constructed as follows:

- Installation of 10 feet of 2-inch diameter 0.010-inch machine slotted polyvinyl chloride (PVC) well screen with a threaded bottom cap (HSA borings);
- Installation of 10 feet of 2-inch diameter, pre-packed, 0.010-inch machine slotted PVC well screen with a threaded bottom cap (DPT boring);

- Installation of 5 feet of 2-inch diameter, pre-packed, 0.010-inch PVC well screen with a threaded bottom cap (basement well);
- Installation of 2-inch diameter, threaded, flush-joint PVC riser pipe to surface;
- Addition of pre-sieved 10/20 grade silica sand for annular sand pack around the well screen from the bottom of the boring to approximately two-feet above the top of the well screen, overlain by one-foot of hydrated bentonite pellets;
- Addition of bentonite-cement grout well seal from the top of the bentonite pellets to approximately one-foot below the top of the paved surface; and
- Addition of hydrated bentonite chips and concrete from the top of the settled bentonite-cement grout to the top of the paved surface.
- The groundwater monitoring well will be completed with a lockable plug secured with a ground surface flush monument plate.

Following installation, groundwater monitoring wells MW-13 through MW-17 will be developed by surging and pumping using disposable PVC bailers and a clean surge block and down-hole pump until the recovered groundwater appears to be relatively free of fines and turbid water. Well development water will be contained in properly labeled DOT-approved 55-gallon drums and temporarily stored onsite. The wells will be allowed to equilibrate for a minimum of 48 hours prior to sampling.

Terracon will contract with a licensed surveyor to survey the top of the PVC well casing (TOC) at each of the newly-installed site wells to the nearest 0.01-foot relative to the North American Vertical Datum of 1988 (NAVD88), as required by Ecology. In addition, the position of each well (northing and easting) will be surveyed to the nearest 0.1-foot. The well TOC elevation and depth to groundwater measurements will be used to determine the groundwater elevation at each well. Based on the groundwater elevation data, Terracon will estimate the groundwater flow direction beneath the site, and produce a groundwater contour map.

3.5 Quarterly Groundwater Sampling

Terracon will conduct groundwater monitoring and sampling at the site on a quarterly basis for a minimum of one year in order to investigate the site for seasonal variations in groundwater quality and groundwater gradient, and to evaluate the groundwater quality in the vicinity of the former heating oil UST remedial excavation following the December 2014 remedial action.

Terracon will initially collect groundwater samples from nine existing site monitoring wells (MW-3 through MW-11) and the five newly-installed monitoring wells (MW-13 through MW-17). In addition, for quality assurance purposes, one duplicate sample will be collected from one of the newly-installed wells. Groundwater samples will not be collected from remediation wells RW-1 through RW-3 because these wells were installed to shallow depths (14 to 15 feet bgs) along the north edge of the UST removal excavation, where remnant soil impacts were left in place due to excavation restraints caused by buried utilities and unstable soil conditions.

Prior to each groundwater sampling event, depth to groundwater below TOC will be measured and recorded in all 14 groundwater monitoring wells, and in remediation wells RW-1 through RW-3. LNAPL thickness measurements, if present, will also be collected from the groundwater monitoring and remediation wells, where applicable. Each groundwater monitoring well to be sampled will then be purged using a low-flow sampling technique. LNAPL and well purge water will be contained in a properly labeled DOT-approved 55-gallon drum and temporarily stored onsite. Groundwater parameters (pH, temperature, specific conductance, and dissolved oxygen) will be measured during well purging, and samples will be collected when all parameters are within 10% for three consecutive readings.

Groundwater samples will be placed into appropriate containers provided by the laboratory, and immediately placed into a cooler containing ice or ice substitute. Each sample container will be labeled with the project number, date, time, well number, and sample number. Samples will be delivered to a Washington State-accredited analytical laboratory in strict accordance with the industry standard chain-of-custody protocol.

Groundwater samples collected from the monitoring wells will be analyzed for the following chemicals of concern, based on Ecology protocols and previous sampling results:

Analysis	Sample Type	Maximum No. of Samples	Method
Groundwater monitoring well samples plus one duplicate			
BTEX	Groundwater	15	EPA 8021
Diesel- and oil-range TPH	Groundwater	15	NWTPH Dx
MTCA 5 metals	Groundwater	15	EPA 6010/7471
PAHs	Groundwater	15	EPA 8270 SIM

BTEX: benzene, toluene, ethylbenzene, and xylenes; TPH: total petroleum hydrocarbons; MTCA 5 metals: Model Toxics Control Act metals (arsenic, cadmium, chromium, lead, and mercury), filtered in the field using a 45 micron filter; PAHs: polycyclic aromatic hydrocarbons; SIM: selected ion monitoring.

Following the initial groundwater sampling event, Terracon will conduct groundwater monitoring for a second, third and fourth quarterly event. These monitoring events will be completed approximately three months apart. Sampling procedures will follow the protocol discussed above. Based on historical groundwater sampling results, wells MW-3 through MW-11 have consistently had reported groundwater sampling results that were either non-detect, or were well below the MTCA Method A or Method B cleanup levels. Therefore, Terracon proposes to measure depth to groundwater in all 14 site monitoring wells and remediation wells RW-1 through RW-3 during the second, third and fourth quarterly groundwater sampling events, but only collect groundwater samples from the five newly-installed monitoring wells at the former heating oil UST area.

Groundwater samples plus one duplicate sample will be placed into appropriate containers provided by the laboratory, and immediately placed into a cooler containing ice or ice substitute. Each sample container was labeled with the project number, date, time, well number, and sample

number. Samples will be delivered to a Washington State-accredited analytical laboratory in strict accordance with the industry standard chain-of-custody protocol.

Groundwater samples collected from the monitoring wells during each of the second, third, and fourth quarterly sampling events will be analyzed for the following chemicals of concern, based on Ecology protocols and previous sampling results:

Analysis	Sample Type	Maximum No. of Samples	Method
Groundwater monitoring well samples (three quarters plus one duplicate)			
BTEX	Groundwater	6	EPA 8021
Diesel- and oil-range TPH	Groundwater	6	NWTPH Dx
MTCA 5 metals	Groundwater	6	EPA 6010/7471
PAHs	Groundwater	6	EPA 8270 SIM

BTEX: benzene, toluene, ethylbenzene, and xylenes; TPH: total petroleum hydrocarbons; MTCA 5 metals: Model Toxics Control Act metals (arsenic, cadmium, chromium, lead, and mercury), filtered in the field using a 45 micron filter); PAHs: polycyclic aromatic hydrocarbons; SIM: selected ion monitoring.

3.6 Investigation-Derived Waste

Soil cuttings, purge water and decontamination water will be contained in DOT-approved 55-gallon drums as investigation-derived waste (IDW), properly labeled, and staged on-site pending future disposal following review of laboratory analytical data. Six to seven drums of soil cuttings and three to four drums of decontamination/purge water are anticipated to be generated as part of the investigation. Once laboratory data are received, Terracon will recommend the final disposition of the materials generated during the course of completing this monitoring well installation and groundwater sampling work.

3.7 Report Preparation

Terracon will prepare a report of findings documenting the additional groundwater monitoring well installations and initial groundwater sampling event. This report will include the following:

- Documentation of field activities;
- Site diagram showing pertinent site features;
- Groundwater gradient map, including a rose diagram;
- Boring/well logs;
- Analytical laboratory results;
- IDW disposal;
- Data evaluation and presentation of pertinent findings;
- Revised MTCA Method B site-specific soil cleanup level worksheet calculations; and
- Recommendations concerning further action, if necessary.

Terracon will also prepare a separate report of findings documenting each additional quarterly groundwater sampling event. These reports will include the following:

- Documentation of field activities;
- Site diagram showing pertinent site features;
- Groundwater gradient map;
- Analytical laboratory results;
- IDW disposal (when completed);
- Data evaluation and presentation of pertinent findings; and
- Recommendations concerning further action, if necessary.


All reports will be provided to SHMC as client review drafts, for comments. Final copies of the reports will be provided to SHMC for distribution to the site owner's attorney by SHMC for their files and for submittal to Ecology.

3.8 Schedule

The work described above will be conducted upon approval of this work plan by SHMC and confirmation by SHMC that Terracon is granted access to the site. Terracon assumes one to two days of drilling for the HSA drilling well installations, and one to two days of drilling for the DPT and basement well installations. The well survey work will require approximately one day to complete. Each groundwater sampling event will require one to two days to complete. The well installation, initial groundwater sampling, and reporting will take four to six weeks to complete, based on driller availability and a standard laboratory turnaround time of 5 to 7 days.

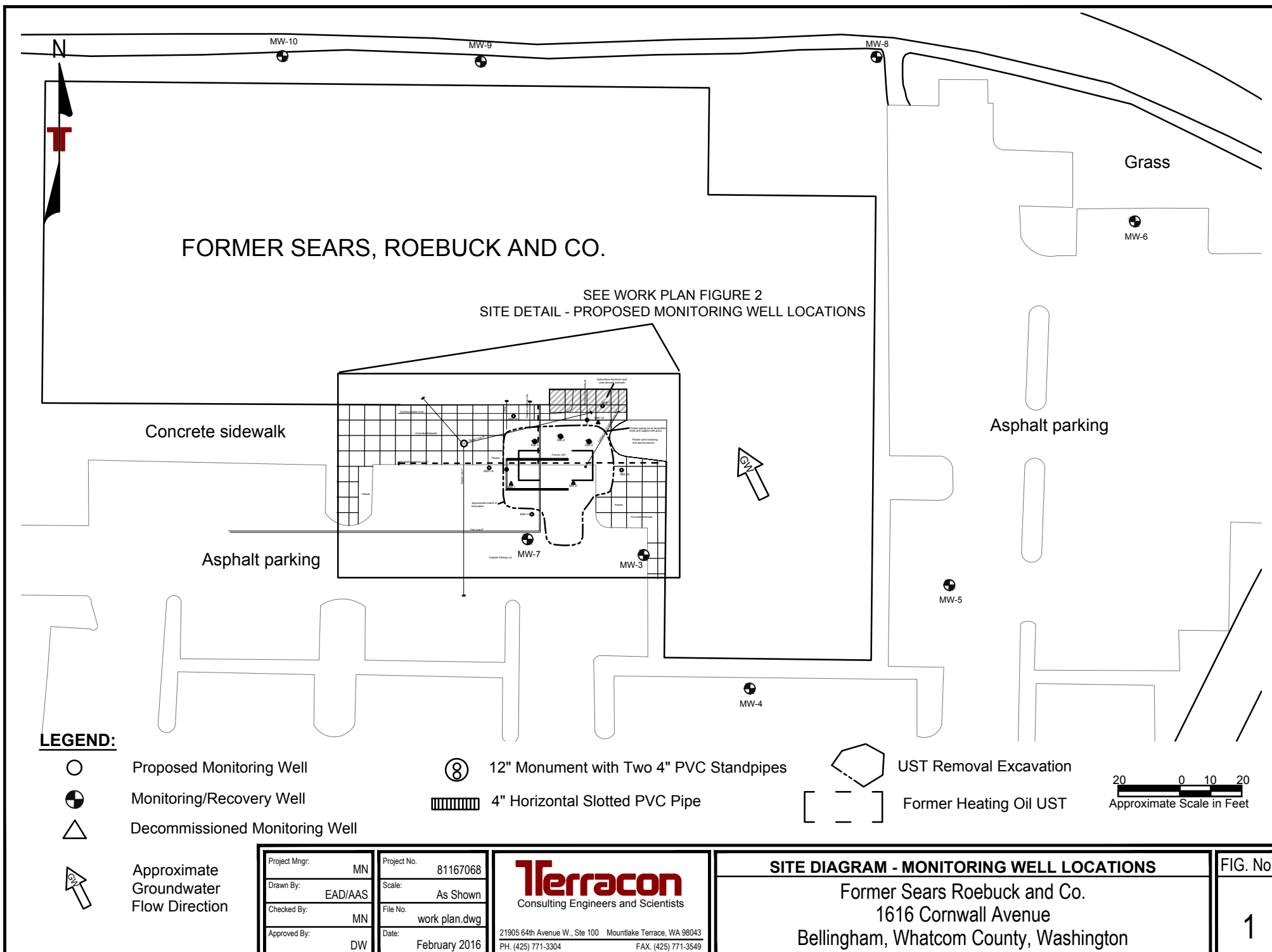
If you have any questions or comments regarding this work plan, please do not hesitate to contact us at your convenience.

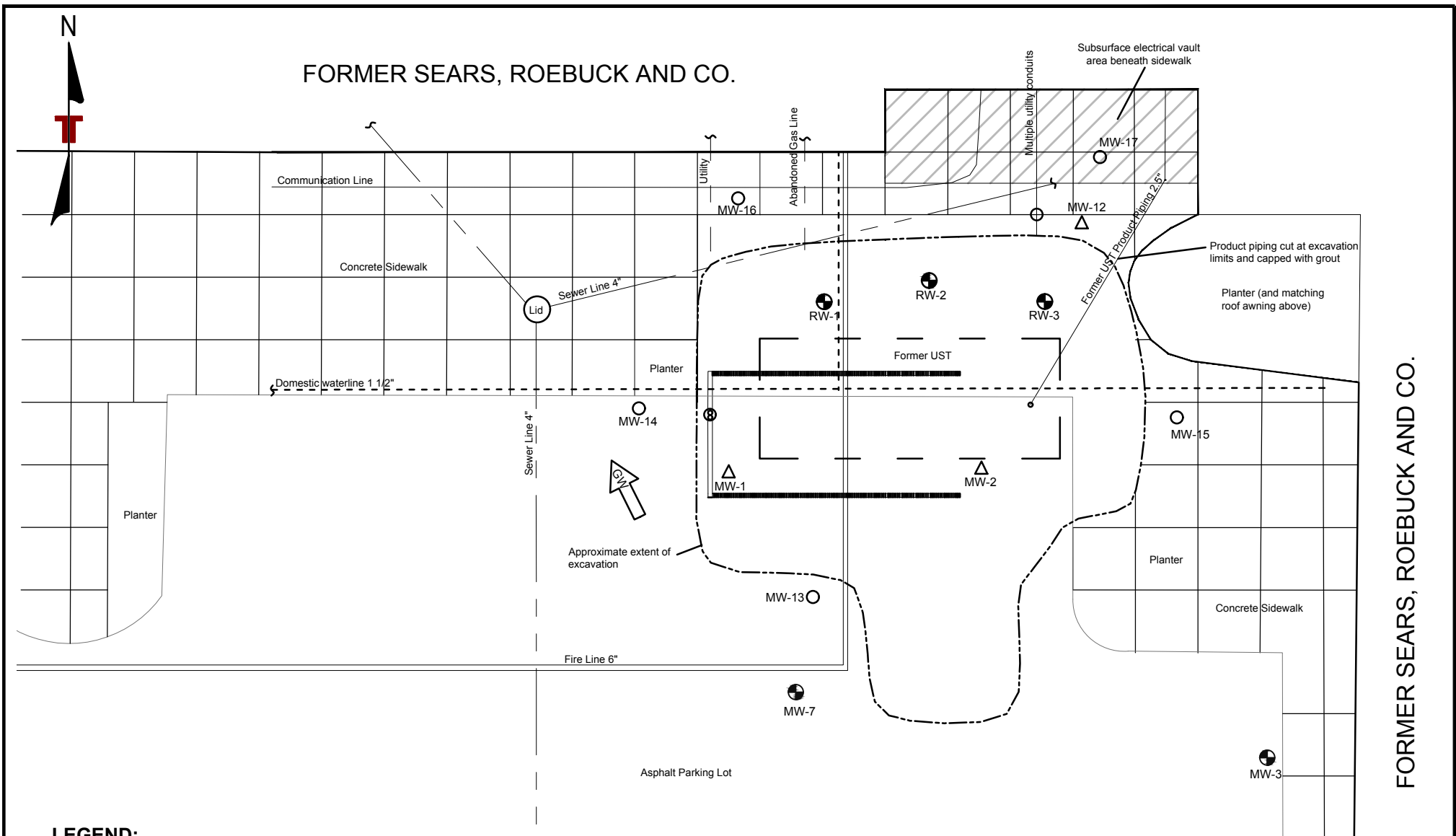
Sincerely,
Terracon Consultants, Inc.


Michael D. Noll, L.G., L.H.G.
Senior Project Manager


Matt Wheaton, L.G., E.I.T.
Department Manager

Attachments: Figure 1 – Site Diagram - Monitoring Well Locations
Figure 2 – Site Detail - Proposed Monitoring Well Locations





LEGEND:



Proposed Monitoring Well
Monitoring/Recovery Well
Decommissioned Monitoring Well



Approximate
Groundwater
Flow Direction



12" Monument with Two 4" PVC Standpipes



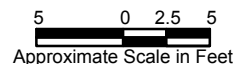
4" Horizontal Slotted PVC Pipe



UST Removal Excavation



Former Heating Oil UST



Project Mngr:	MN	Project No.	81167068
Drawn By:	EAD/AAS	Scale:	As Shown
Checked By:	MN	File No.	work plan.dwg
Approved By:	DW	Date:	February 2016

Terracon
Consulting Engineers and Scientists

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SITE DETAIL - PROPOSED MONITORING WELL LOCATIONS		FIG. No.
Former Sears Roebuck and Co. 1616 Cornwall Avenue Bellingham, Whatcom County, Washington		2