



SoundEarth Strategies, Inc.  
2811 Fairview Avenue East, Suite 2000  
Seattle, Washington 98102

December 5, 2019

Mr. Dale Myers  
Washington State Department of Ecology  
3190 160th Avenue Southeast  
Bellevue, Washington 98008

**SUBJECT:     THIRD QUARTER 2019 SUMMARY REPORT**  
**SKS Shell Station Site**  
**3901 Southwest Alaska Street**  
**Seattle, Washington**  
**Project Number: 0914-001**

Dear Mr. Myers:

SoundEarth Strategies, Inc. (SoundEarth) is pleased to present the Washington State Department of Ecology (Ecology) with a status report for the Third Quarter 2019 post-cleanup compliance and reporting activities for the SKS Shell Station Site (SKS Site; Figure 1). The construction phase of the cleanup for the SKS Site was implemented in 2015 under the Prospective Purchaser Consent Decree (PPCD) #13-2-27556-2, entered on July 29, 2013. Remediation of petroleum-contaminated soil and groundwater, as well as post-cleanup groundwater monitoring has been performed in accordance with the PPCD and Chapter 173-340 of the Washington Administrative Code. Cleanup and development activities at the SKS Site included dewatering, extensive soil excavation, and the installation of a vapor barrier to eliminate the potential vapor intrusion exposure pathway in the mixed-use building constructed on the property. Cleanup of the SKS Site has been coordinated with remedial activities conducted at the adjacent Huling Brothers Property and Kennedy Family Limited Partnership Property, which were being managed separately under the Voluntary Cleanup Program (ID #NW2715) and received a Site No Further Action determination in March 2019.

### **THIRD QUARTER 2019 SUMMARY**

Third Quarter groundwater sampling was conducted on September 12 and 13, 2019, for 12 on-property and off-property compliance wells. Wells MW103 and MW104 were not sampled due to an insufficient volume of water in the wells.

The Third Quarter groundwater sampling event is the 15th event since cleanup was completed in 2015, and the 10th consecutive event in which all wells in the network work were sampled. SoundEarth uploaded Environmental Information Management analytical and location data for the Third Quarter data on October 2, 2019. Confirmation by Ecology as successfully uploaded is still pending and is expected in December 2019.

Data from the September 2019 sampling event is tabulated below. Washington State Model Toxics Control Act Method A exceedances are highlighted in red and bolded:

**Table A, Third Quarter 2019 Groundwater Analytical Results**

Well ID	Sample Date	Analytical Results (micrograms per liter)		
		GRPH	Benzene	DRPH
MW101	09/13/19	<100	<1	<50
MW102	09/12/19	<100	<1	110
MW103	09/12/19	Dry		
MW104	09/12/19	Dry		
MW105	09/12/19	<100	<1	<50
MW108	09/12/19	<100	<1	<b>1,200</b>
MW109	09/12/19	110	<1	110
MW110	09/12/19	<100	<1	73
MW111	09/13/19	<100	<1	<50
MW112	09/12/19	<100	<1	<50
MW113	09/12/19	<100	<1	87
RW03	09/13/19	270	<1	360
RW04	09/13/19	180	<1	290
RW05	09/12/19	<100	<1	190
<b>MTCA Method A Cleanup Level</b>		<b>1,000/800</b>	<b>5</b>	<b>500</b>

**NOTES:**

**Red** indicates concentration exceeds MTCA Method A cleanup level.  
 < = not detected above the laboratory reporting limit  
 DRPH = diesel-range petroleum hydrocarbons  
 GRPH = gasoline-range petroleum hydrocarbons  
 MTCA = Washington State Model Toxics Control Act

Please see the attached Groundwater Monitoring Report—Third Quarter 2019, for a more detailed discussion of the results and overall decreasing groundwater concentration trends for the SKS Site over the past 4 years.

**Ecology Meeting**

On October 1, 2019, SoundEarth met with Dale Myers and Mike Warfel at Ecology to discuss the next steps for the SKS Site cleanup action and site completion. There were four key outcomes of this meeting:

- (1) an additional monitoring well will be needed in the Alaska Street sidewalk (between MW111 and former well MW107) to evaluate diesel-range petroleum hydrocarbons (DRPH) that has been observed in MW108 over the past 3 quarters,
- (2) in situ treatment is recommended in the Fautleroy right-of-way (ROW) to treat gasoline-range petroleum hydrocarbons and DRPH that remains persistent but intermittent in remediation wells and MW104 located in this ROW,
- (3) a reduction in the groundwater monitoring program was verbally approved (wells MW101, MW102 and MW103 located within Fautleroy Way South and Southwest Alaska Street will no longer be sampled; MW101 and MW102 will only be monitored for groundwater table elevations), and

(4) decommissioning of well MW103 was recommended because it has been dry for many quarters and is not useful for the monitoring well network because of other wells closer to the SKS parcel that represent upgradient conditions.

The work outlined above will be further detailed in work plans to be sent to Ecology for review and final approval.

#### PLANNED FOURTH QUARTER 2019 ACTIVITIES

SoundEarth plans to conduct Fourth Quarter 2019 groundwater sampling in December 2019. Groundwater levels and analytical data trends will continue to be evaluated. Work plans for well installation, well decommissioning (MW103), and chemical injections will be submitted to Ecology during Fourth Quarter. An Underground Injection Control permit request will also be submitted to Dale Myers.

#### PROJECT SCHEDULE

The following summarizes the work conducted to date and the current schedule for anticipated reporting and monitoring work at the SKS Site.

Cleanup Plan Task	Status: Date
UST Fuel Removal and Station Shutdown	Conducted: July 2013
Installation of Shoring for UST removal	Conducted: November 2013
UST System Cleaning and Removal	Conducted: December 2013
Submit UST Removal Report	Conducted: January 2014
Permitting for Wells	Conducted: May 2014
Master Use Permit	Conducted: June 2014
Install Dewatering Wells (8 Wells)	Conducted: July 2014
Install West Bounding Well MW107 (post demolition)	Conducted: October 2014
SKS Site Demolition and Hoist Removal	Conducted: October–November 2014
Construct Dewatering System in ROW Wells	Conducted: March 2015
Operate Dewatering System	Conducted: March–June 2015
Contaminated Soil Excavation and Confirmation Sampling	Conducted: March–May 2015
Removal of Three Previously Unknown USTs	Conducted: March 2015
Backfill Excavation and Install Membrane Barrier	Conducted: August–September 2015
Install Compliance Wells MW108, MW109, and MW110	Conducted: September 2015
Prepare Interim Cleanup Action Report	Conducted: December–February 2016
First Quarter Post Cleanup Groundwater Monitoring	Conducted: March 2016
Submit preliminary Cleanup Action Report	Conducted: October 2016
Notice of Intent to Decommission Wells	Conducted: May 2017
Groundwater Elevation Study	In Progress: 2017–2018
Revised Agency-Review Cleanup Action Report	Conducted: January 2018
Alaska Street well closure technical meeting	Conducted: May 2018
Well Installation of MW113	Conducted: March 2018
Well Installation of MW111	Conducted: October 2018
Well Installation of MW112	Conducted: March 2019
Well Decommissioning (RW06–RW09, MW107)	Conducted: December 2018
Contingent ChemOx Injection*	Planned: February 2020

<u>Cleanup Plan Task</u>	<u>Status: Date</u>
Well Installation of MW114 in Alaska Street ROW	Planned: January 2020
Well Decommissioning of MW103	Planned: January 2020
Groundwater Monitoring (Quarterly)	Ongoing: 2019–2021

NOTES:

\* = to be determined  
ChemOx = Chemical Oxidant  
ROW = right-of-way  
SKS Site = SKS Shell Station Site  
UST = underground storage tank

**CLOSING**

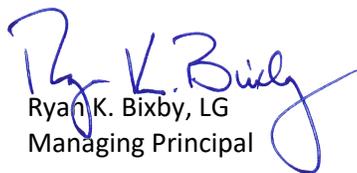
Please let me know if you would like to meet on-site or at your office to discuss any of the specific remedial activities. If you have any questions about the schedule and the cleanup activities, please contact Rob Roberts at 206-306-1900.

Respectfully,

**SoundEarth Strategies, Inc.**



Rob Roberts  
Senior Scientist



Ryan K. Bixby, LG  
Managing Principal

Attachment: Groundwater Monitoring Report—Third Quarter 2019

cc: Mr. Phil Carmody, GID  
Mr. Jason Sweatt, GID  
Mr. Elton Lee, GID  
Mr. William Joyce, Joyce Ziker Parkinson, PLLC  
Mr. Dave Cook, Aspect Consulting

CER/RKB:rt

# **GROUNDWATER MONITORING REPORT—THIRD QUARTER 2019**



SoundEarth Strategies, Inc.  
2811 Fairview Avenue East, Suite 2000  
Seattle, Washington 98102

December 5, 2019

Mr. Phil Carmody  
LMI West Seattle Holdings, LLC  
125 High Street  
High Street Tower, 24th Floor  
Boston, Massachusetts 02110

**SUBJECT: GROUNDWATER MONITORING REPORT—THIRD QUARTER 2019**  
**SKS Shell Station Site**  
**3901 Southwest Alaska Street**  
**Seattle, Washington**  
**Project Number: 0914-001**

Dear Mr. Carmody:

SoundEarth Strategies, Inc. (SoundEarth) has prepared this report to present the results of the Third Quarter 2019 groundwater monitoring event conducted at the SKS Shell Station Site located generally at 3901 Southwest Alaska Street in Seattle, Washington (SKS Site), as shown on Figure 1. The groundwater monitoring event was conducted to evaluate the long-term effectiveness of the cleanup activities completed on and beneath the SKS Site that are being performed pursuant to the Cleanup Action Plan under Prospective Purchase Consent Decree #13-2-27556-2, entered on July 29, 2013.

## **BACKGROUND**

The SKS Site was developed as a gasoline station and an automotive repair facility in 1934. In 1950, the original 1934 gasoline fueling equipment was removed and two 4,000-gallon underground storage tanks (USTs) were installed. The pump island and service station office were removed in 1961 and replaced with a new pump island, relocated to the locations shown on Figure 2. An additional 8,000-gallon UST was installed in 1974. The 1950-vintage USTs were removed in 1984 and replaced with one 10,000-gallon UST and two 12,000-gallon USTs. Over time, leaded and unleaded gasoline and diesel fuel have been used and stored in various USTs at the SKS Site. In December 2013, the three 1984-vintage USTs and the 1974-vintage UST were decommissioned and removed from the SKS Site.

SoundEarth conducted remedial activities on the SKS Site in 2015 as part of the Whittaker multifamily/mixed-use development. Remedial activities included lot-line to lot-line remedial excavation of petroleum-contaminated soil to approximately 29.5 feet below ground surface (bgs; 240 feet North American Vertical Datum 1988 [NAVD88]), right-of-way (ROW) dewatering to facilitate removal of contaminated water, and vapor barrier installation. Approximately 9,755 tons of petroleum-contaminated soil were removed from the SKS Site.

On September 1, 2015, monitoring wells MW108 through MW110 were installed in the basement/parking garage level of the building now located on the SKS Site to complete compliance groundwater monitoring.

On March 16, 2018, monitoring well MW113 was installed west of the SKS Site at the former Howden-Kennedy Funeral Home parcel (Kennedy Property) in the basement/parking garage level of the building (Figure 2). This well was installed to assess the lateral extent of groundwater impacts to the southwest of the SKS Site and to confirm that no residual groundwater contamination remains on the Kennedy Property. This well was also installed to provide groundwater elevation information for the evaluation of the reversal in groundwater flow direction at the SKS Site.

On October 3, 2018, monitoring well MW111 was installed in the Southwest Alaska Street sidewalk on the northeastern portion of the SKS Site. On March 1, 2019, MW112 was installed in Southwest Alaska Street approximately 26 feet east of MW111. These wells were installed to evaluate groundwater flow direction and gradient, natural attenuation, the potential for plume expansion or contraction, and to evaluate whether future chemical injections are warranted.

## FIELD ACTIVITIES

The Third Quarter monitoring event was conducted on September 12 and 13, 2019, to evaluate the long-term effectiveness of cleanup activities. Groundwater sampling was conducted on a total of 12 on-property and off-property compliance wells. The monitoring event included measuring depths to groundwater and sampling monitoring wells MW108 through MW110 and MW113, located in the building parking garage; wells MW101, MW102, MW105, and RW03 through RW05, located within the Fauntleroy Way Southwest ROW; and wells MW111 and MW112, located within the Southwest Alaska Street ROW. Consistent with the Second Quarter 2019 monitoring event, remediation wells RW01 and RW02 were not included in this monitoring event, based on a telephone discussion between Dale Myers of the Washington State Department of Ecology (Ecology) and Rob Roberts of SoundEarth prior to the Third Quarter 2017 groundwater sampling event.

Upon arrival at the SKS Site, SoundEarth personnel opened the monitoring wells and permitted water levels to equilibrate with atmospheric pressure for a minimum of 30 minutes before groundwater level measurements were obtained. Groundwater levels were measured relative to the top of well casing to an accuracy of 0.01 feet using an electronic water level meter. Monitoring wells MW103 and MW104 were observed to be dry and were therefore not sampled.

Groundwater samples were collected from monitoring wells MW101, MW102, MW105, and MW108 through MW113 and remediation wells RW03 through RW05, in accordance with the US Environmental Protection Agency (EPA) *Low-Flow (Minimal Drawdown) Ground-Water Procedures* (April 1996). Purging and sampling of each monitoring well were performed using a peristaltic pump and dedicated polyethylene tubing at flow rates ranging from 100 to 120 milliliters per minute. The intake was placed approximately 2 to 3 feet below the surface of the groundwater or mid-screen, if well screen was submerged, in each monitoring well. During purging, water quality was monitored using a YSI water quality meter equipped with a flow-through cell. The water quality parameters that were monitored and recorded included temperature, pH, specific conductance, dissolved oxygen, turbidity, and oxidation-reduction potential. Each monitoring well was purged until a minimum subset of pH, specific conductivity, and dissolved oxygen and/or turbidity stabilized. Monitoring well MW108 was purged dry while filling the flow-through cell. Therefore, a grab sample was collected from this well once it had recharged to its initial groundwater level. The low recharge rate observed during purging at well MW108 is similar to conditions observed during previous events.

Following purging, groundwater samples were collected from the pump outlet tubing located upstream of the flow-through cell and placed directly into clean, laboratory-prepared sample containers. Each container was labeled with a unique sample identification number, placed on ice in a cooler, and transported to Friedman & Bruya, Inc., of Seattle, Washington, under standard chain-of-custody protocols for laboratory analysis.

The groundwater samples were submitted for analysis of gasoline-range petroleum hydrocarbons (GRPH) by Northwest Total Petroleum Hydrocarbon (NWTPH) Method NWTPH-Gx; benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8021B; and diesel- and oil-range petroleum hydrocarbons (DRPH and ORPH, respectively) by Method NWTPH-Dx.

Purge water generated during the monitoring event was placed in an appropriately labeled 55-gallon steel drum and temporarily stored on the SKS Site pending receipt of analytical data and proper disposal.

## RESULTS

### Groundwater Elevations and Flow Direction

Groundwater elevations measured on September 12, 2019, ranged from approximately 240.70 (MW101 in the Fauntleroy Way Southwest ROW) to 239.18 (MW110 in the building parking garage) feet NAVD88 (Table 1). Historical groundwater measurements have indicated that groundwater at the Fauntleroy Way Southwest and Southwest Alaska Street intersection consistently flowed at a moderate gradient of 0.015 feet per foot to the north–northeast. However, groundwater elevation data collected since 2017 indicate a groundwater flow direction to the west at an average gradient of approximately 0.013 feet per foot along the Fauntleroy Way Southwest property edge. During Third Quarter 2019, the observed gradient was 0.007 feet per foot, with a groundwater flow direction to the west-southwest beneath the eastern side of the SKS Site. Until Second Quarter 2019, groundwater elevations were relatively flat on the eastern side of the SKS Site beneath the building. During Third Quarter 2019, groundwater elevations measured in wells MW108, MW109, and MW110, located within the parking garage adjacent to the building footings along the northern and eastern sides of the building, were noted to be approximately 0.25 foot lower than elevations measured in wells MW111, MW112, and RW03 through RW05, which are located outside of the building footings along the northern and eastern sides of the building. Similar conditions were observed in wells MW108 and MW110 compared with wells MW111, MW112, RW04, and RW05 during Third Quarter 2019. However, groundwater flow direction beneath the building during Third Quarter 2019 was observed to have shifted to the south–southwest, with a low point at MW110 in the southeastern portion of the property basement. Well MW104 was found to be dry, likely due to the lower groundwater levels (MW104 is screened from 20 to 30 feet below grade). Groundwater elevations measured in all wells at the SKS Site were also observed to be approximately 0.3 to 0.8 foot lower than elevations observed during Second Quarter 2019.

Figure 2 provides a rose diagram showing the groundwater flow directions and gradients prior to the remedial excavation, as well as the groundwater flow directions and gradients from all sampling events conducted after the remedial excavation. The change in groundwater flow observed during 2017 through Third Quarter 2019 is likely due to the footing drains and associated sub-slab drainage system that were installed between July and September 2015 for the underground parking garage, as discussed in the Conclusions section of this report. Groundwater beneath the eastern portion of the SKS Site and the Fauntleroy Way Southwest and Southwest Alaska Street ROWs appears to have reversed its flow direction due to the lower groundwater elevations observed in the vicinity of the building footings.

## Groundwater Chemical Analytical Results

Groundwater analytical results from the monitoring event are summarized below (Figure 3; Table 1). The analytical results for groundwater samples collected from MW101, MW102, MW105, MW109 through MW113, and RW03 through RW05 were below Washington State Model Toxics Control Act (MTCA) Method A cleanup levels (CULs) for the chemicals of concern at the SKS Site, including GRPH, DRPH, ORPH, and BTEX. Data from the Third Quarter 2019 sampling event are tabulated in Table A below.

**Table A, Third Quarter 2019 Groundwater Analytical Results**

Well ID	Sample Date	Analytical Results (micrograms per liter)		
		GRPH	Benzene	DRPH
MW101	09/13/19	<100	<1	<50
MW102	09/12/19	<100	<1	110
MW103	09/12/19	Dry		
MW104	09/12/19	Dry		
MW105	09/12/19	<100	<1	<50
MW108	09/12/19	<100	<1	<b>1,200</b>
MW109	09/12/19	110	<1	110
MW110	09/12/19	<100	<1	73
MW111	09/13/19	<100	<1	<50
MW112	09/12/19	<100	<1	<50
MW113	09/12/19	<100	<1	87
RW03	09/13/19	270	<1	360
RW04	09/13/19	180	<1	290
RW05	09/12/19	<100	<1	190
<b>MTCA Method A Cleanup Level</b>		<b>1,000/800</b>	<b>5</b>	<b>500</b>

**NOTES:**

**Red** indicates concentration exceeds MTCA Method A cleanup level

< = not detected above the laboratory reporting limit

DRPH = diesel-range petroleum hydrocarbons

GRPH = gasoline-range petroleum hydrocarbons

MTCA = Washington State Model Toxics Control Act

A summary of the analytical results for the primary chemicals of concern for the SKS Site, including GRPH, benzene, and DRPH, is provided below:

- **Gasoline-Range Petroleum Hydrocarbons.** GRPH concentrations in groundwater samples collected from all sampled wells were below the MTCA Method A CUL of 800 micrograms per liter ( $\mu\text{g}/\text{L}$ ) for GRPH. GRPH concentrations detected in wells MW109, RW03, and RW04 during the Third Quarter 2019 sampling event were generally similar to or lower than the concentrations detected in these wells during the Second Quarter 2019 groundwater sampling event.
- **Benzene.** The groundwater samples collected from all sampled monitoring wells were below the laboratory reporting limit for benzene.
- **Diesel-Range Petroleum Hydrocarbons.** DRPH concentrations in groundwater samples collected from wells MW101, MW102, MW105, MW109 through MW113, RW04, and RW05 were below the MTCA Method A CUL of 500  $\mu\text{g}/\text{L}$  for DRPH. The groundwater sample collected from well MW108 contained a DRPH concentration of 1,200  $\mu\text{g}/\text{L}$ , exceeding the MTCA Method A CUL. This

concentration is higher than concentrations detected in this well since sampling began in March 2016. Prior to First Quarter 2019, concentrations had not exceeded the CUL in well MW108 during any monitoring events. Additional groundwater monitoring will be completed at MW108 to evaluate whether this concentration represents a continued trend.

The DRPH concentration detected in well RW03 during Third Quarter 2019 was lower than the concentration detected in this well during Second Quarter 2019, which exceeded the applicable cleanup level, and generally consistent with the concentration detected in this well during Third Quarter 2018.

As shown in the attached Charts 1 through 6, which summarize trends in GRPH and benzene concentrations in monitoring wells MW104, MW108, MW109, MW110, RW03, and RW04 since 2011, GRPH and benzene in the four monitoring wells during Second Quarter 2019 are significantly lower than concentrations observed before the remedial excavation was completed. Note that well MW104 was dry during Third Quarter and has historically had GRPH detections. Aside from well RW03, GRPH and benzene concentrations in all six wells have remained below laboratory reporting limits or the MTCA Method A CULs since First Quarter 2017. Figure 4 includes trend charts as well as data comparison tables from the six ROW monitoring wells. The tables on Figure 4 illustrate that ROW groundwater concentrations were either non-detect for GRPH and benzene before and after the 2015 excavation (MW101 through MW103 and MW105), or that concentrations are significantly reduced (RW02 and RW04).

A copy of the laboratory analytical report is provided as Attachment A.

## DATA VALIDATION

SoundEarth contracted with Validata, LLC to conduct a Stage 2A-level quality assurance/quality control (QA/QC) review of the analytical results. The data were reviewed using the guidance and QC criteria documented in the EPA's *National Functional Guidelines for Organic Superfund Data Review* (2017). The quality control requirements that were reviewed included sample receipt, handling, and holding times; recoveries for method blanks, surrogates, spikes, and field duplicates; and reporting limits.

**Results.** The DRPH results for groundwater samples collected from wells MW102, MW108, MW109, MW110, MW113, RW03, RW04, and RW05 were qualified as estimated (J) since the laboratory reported the diesel and/or oil range results as "x", indicating that the chromatographic pattern does not match the standard. All other QA/QC criteria were confirmed to be acceptable for the groundwater samples, and the analytical results are considered to be acceptable for use. A copy of the data validation report is provided as Attachment B.

Following data validation, the groundwater data were uploaded to Ecology's Environmental Information Management system on October 2, 2019. Confirmation by Ecology as successfully uploaded is still pending and is expected in December 2019.

## CONCLUSIONS

Petroleum hydrocarbons (GRPH, DRPH, ORPH, and BTEX) were either not detected above laboratory reporting limits or detected at concentrations less than MTCA Method A CULs in 11 of the 12 wells sampled for groundwater at the SKS Site during the Third Quarter 2019 monitoring event. For well RW03, the decreases appear to be seasonal (GRPH and DRPH were above the MTCA Method A CULs during Fourth and First Quarters, and below MTCA Method A CULs during Second and Third Quarters).

Monitoring well MW108 contained a concentration of DRPH exceeding the MTCA Method A CUL. MW108 is located in the building parking garage near the northwestern corner of the SKS Site. This is the third consecutive quarter that DRPH has exceeded MTCA Method A CULs in MW108.

Although detectable concentrations of GRPH and/or DRPH remain in wells MW102, MW109, MW110, MW113, and RW03 through RW05, analytical data trends indicate that concentrations of these contaminants have decreased significantly between December 2016 and September 2019.

The historical groundwater flow direction was documented to be toward the north–northeast prior to development, but based on the most recent groundwater elevations, the flow direction has changed to the west–southwest (see Rose Diagrams in Figure 2). As shown on Figures 5 and 6, the building is equipped with a sub-slab drainage system that should (based on location) intercept groundwater at the southern and western boundaries of the new sub-grade parking levels. The two-level parking garage includes a grid-work of sub-slab drains and vertical wall footing drains that lead to a 300-foot-long, 6-foot-internal-diameter stormwater retention pipe located beneath the eastern side of the building (Figure 5). The southwestern portion of the parking garage was constructed approximately 28 feet bgs, and the current building footing drain system appears to be intercepting that groundwater beneath the SKS Site and the entire Whittaker property. During Second Quarter 2019, groundwater flow direction was measured to be toward the west–southwest on the eastern side of the SKS Site, with relatively consistent groundwater elevations on the western side of the SKS Site beneath the building. During Third Quarter 2019, groundwater flow directions remained consistent on the eastern side of the SKS Site. However, groundwater flow beneath the building appears to have shifted to the south, with a low point in the southeastern portion of the property basement. Groundwater elevations during Third Quarter were also observed to be approximately 0.3 to 0.8 foot lower than elevations observed during previous quarters.

During March 2018, monitoring well MW113 was installed in the parking garage beneath the building on the Kennedy Property to the west of the SKS Site. GRPH, DRPH, ORPH, and BTEX were all below the applicable MTCA Method A CULs in groundwater samples collected from this well during 2018 and First through Third Quarters 2019, indicating that the change in groundwater flow direction has not impacted groundwater to the west of the SKS Site.

## **SCHEDULE**

SoundEarth will conduct a monitoring event of the well network at the SKS Site in Fourth Quarter 2019, the results of which will be included in a groundwater monitoring report.

## **RECOMMENDATION**

SoundEarth recommends the decommissioning of well MW103 due to continued dry conditions as well as the absence of chemicals of concern exceeding the laboratory reporting limits and/or CULs from 2012 through Third Quarter 2018. SoundEarth also recommends suspending sampling from wells MW101 and MW102, as groundwater samples collected from these wells have not contained concentrations of chemicals of concern exceeding the applicable laboratory reporting limits and/or CULs since sampling was first conducted in 2012. Furthermore, sampling of well MW102 is difficult and costly to sample because it is located in the Alaska Street/Fauntleroy Way intersection, presenting safety concerns, creating obstructions to traffic flow in a major arterial, and affecting access to an adjacent Rapid Ride Metro bus stop. These revisions have been approved by Ecology during an October meeting. SoundEarth will submit

a separate request letter to Ecology for decommissioning of well MW103 and suspension of sampling at MW101 and MW102.

**CLOSING**

SoundEarth appreciates this opportunity to provide LMI West Seattle Holdings, LLC, with environmental consulting services. Please call Rob Roberts at 206-306-1900 if you have any questions or comments regarding the content of this report.

Respectfully,

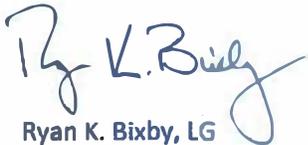
**SoundEarth Strategies, Inc.**



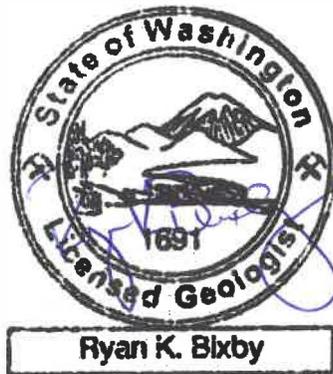
Clare Toichilin, LG  
Associate Geologist



Rob Roberts  
Senior Scientist



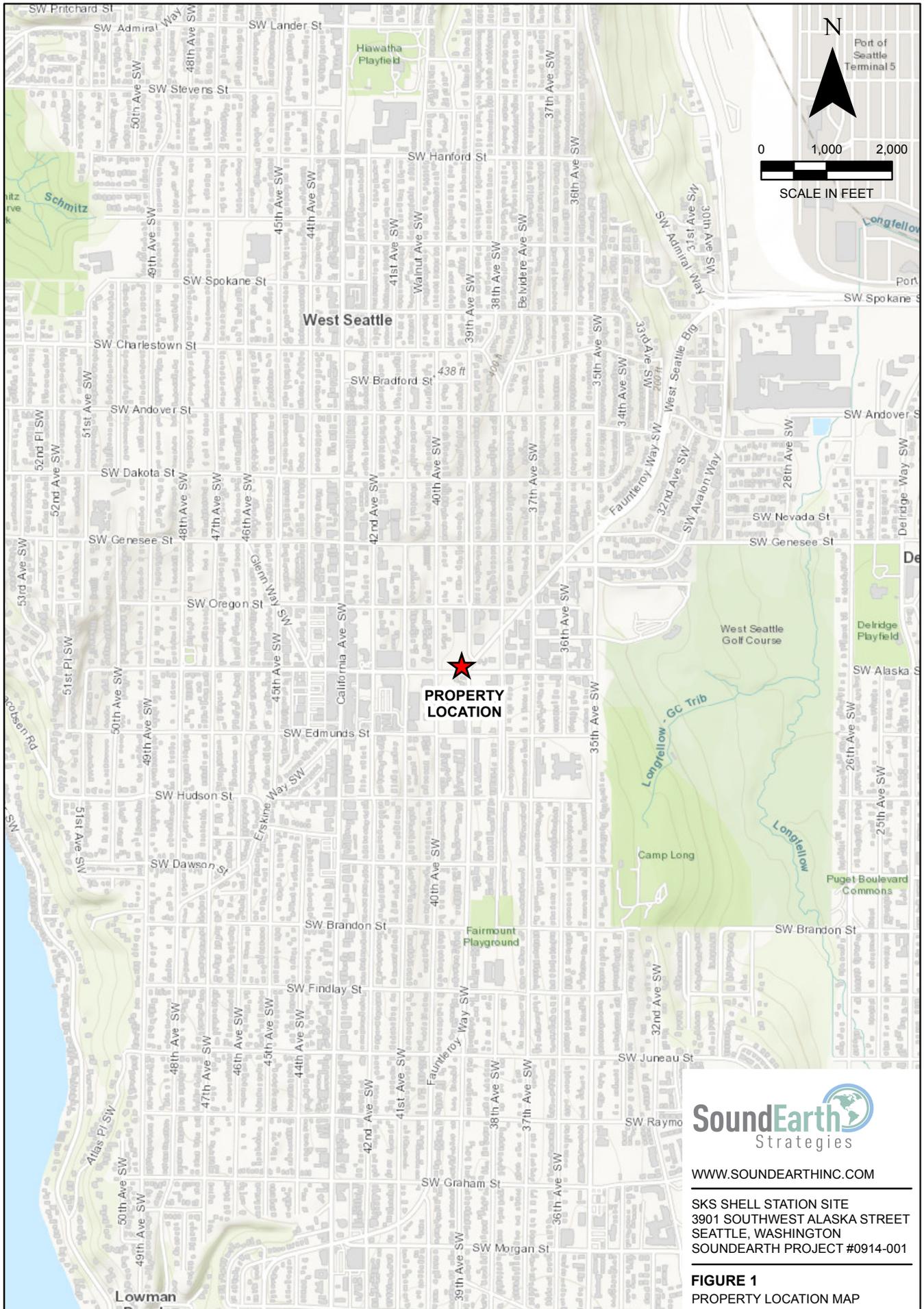
Ryan K. Bixby, LG  
Managing Principal



- Attachments:
- Figure 1, Property Location Map
  - Figure 2, Groundwater Elevation Contour Map (September 12, 2019)
  - Figure 3, 2019 Q3 Groundwater Analytical Data
  - Figure 4, GRPH and Benzene Concentration Trends in Groundwater
  - Figure 5, Sub-Slab Drainage Plan with Cross Section Location
  - Figure 6, Cross Section A-A'
  - Table 1, Summary of Groundwater Data
  - Chart 1, GRPH and Benzene Concentrations—MW104
  - Chart 2, GRPH and Benzene Concentrations—GLMW01/MW109
  - Chart 3, GRPH and Benzene Concentrations—MW110/MW-2
  - Chart 4, GRPH and Benzene Concentrations—MW-3/MW108
  - Chart 5, GRPH and Benzene Concentrations—RW03
  - Chart 6, GRPH and Benzene Concentrations—RW04
  - A, Laboratory Analytical Report
    - Friedman & Bruya, Inc. #909218*
  - B, Data Validation Report
    - Validata, LLC #909218*

CJT/CER:rt/dnm

## FIGURES



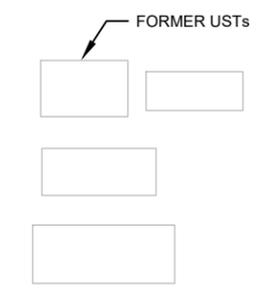
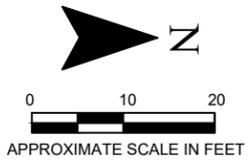
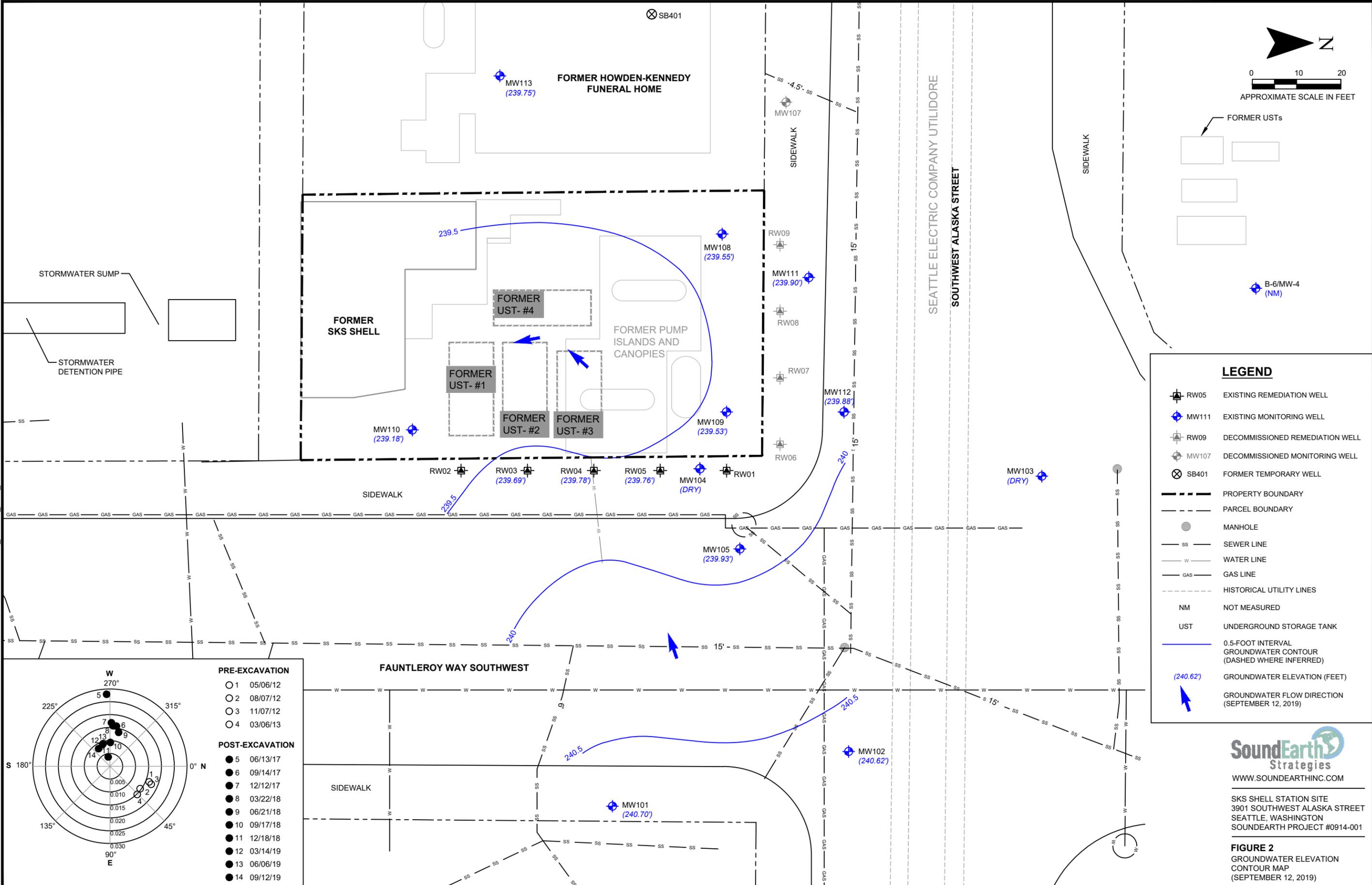
**SoundEarth**  
Strategies

WWW.SOUNDEARTHINC.COM

SKS SHELL STATION SITE  
3901 SOUTHWEST ALASKA STREET  
SEATTLE, WASHINGTON  
SOUNDEARTH PROJECT #0914-001

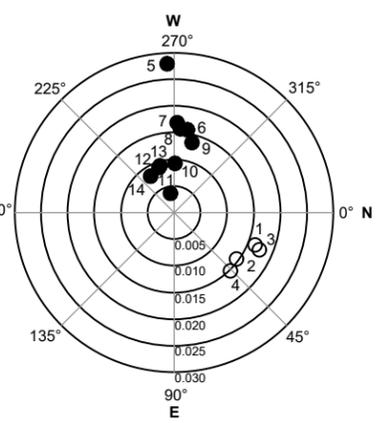
**FIGURE 1**  
PROPERTY LOCATION MAP

11/15/2019  
P:\0914 LENNAR SHELL\0914-001 SKS SHELL ROW\TECHNICAL\CAD\2019\2019Q3\0914-004\_2019Q3\_FIG2\_CAD.DWG



**LEGEND**

- RW05 EXISTING REMEDIATION WELL
- MW111 EXISTING MONITORING WELL
- RW09 DECOMMISSIONED REMEDIATION WELL
- MW107 DECOMMISSIONED MONITORING WELL
- SB401 FORMER TEMPORARY WELL
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- MANHOLE
- SEWER LINE
- WATER LINE
- GAS LINE
- HISTORICAL UTILITY LINES
- NM NOT MEASURED
- UST UNDERGROUND STORAGE TANK
- 0.5-FOOT INTERVAL GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
- (240.62) GROUNDWATER ELEVATION (FEET)
- GROUNDWATER FLOW DIRECTION (SEPTEMBER 12, 2019)



- PRE-EXCAVATION**
- 1 05/06/12
  - 2 08/07/12
  - 3 11/07/12
  - 4 03/06/13
- POST-EXCAVATION**
- 5 06/13/17
  - 6 09/14/17
  - 7 12/12/17
  - 8 03/22/18
  - 9 06/21/18
  - 10 09/17/18
  - 11 12/18/18
  - 12 03/14/19
  - 13 06/06/19
  - 14 09/12/19

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**FIGURE 2**  
GROUNDWATER ELEVATION CONTOUR MAP  
(SEPTEMBER 12, 2019)

**KEY**

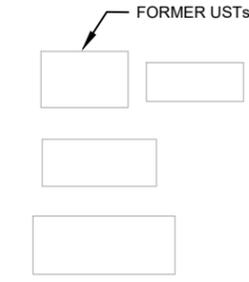
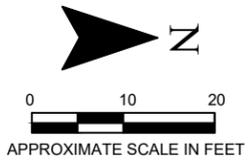
GRPH  
 DRPH  
 BENZENE

DENOTES CONCENTRATION EXCEEDS MTCA METHOD A CLEANUP LEVEL

DENOTES CONCENTRATION BELOW LABORATORY REPORTING LIMIT

DENOTES CONCENTRATION DETECTED ABOVE LABORATORY REPORTING LIMIT BUT BELOW MTCA METHOD A CLEANUP LEVEL

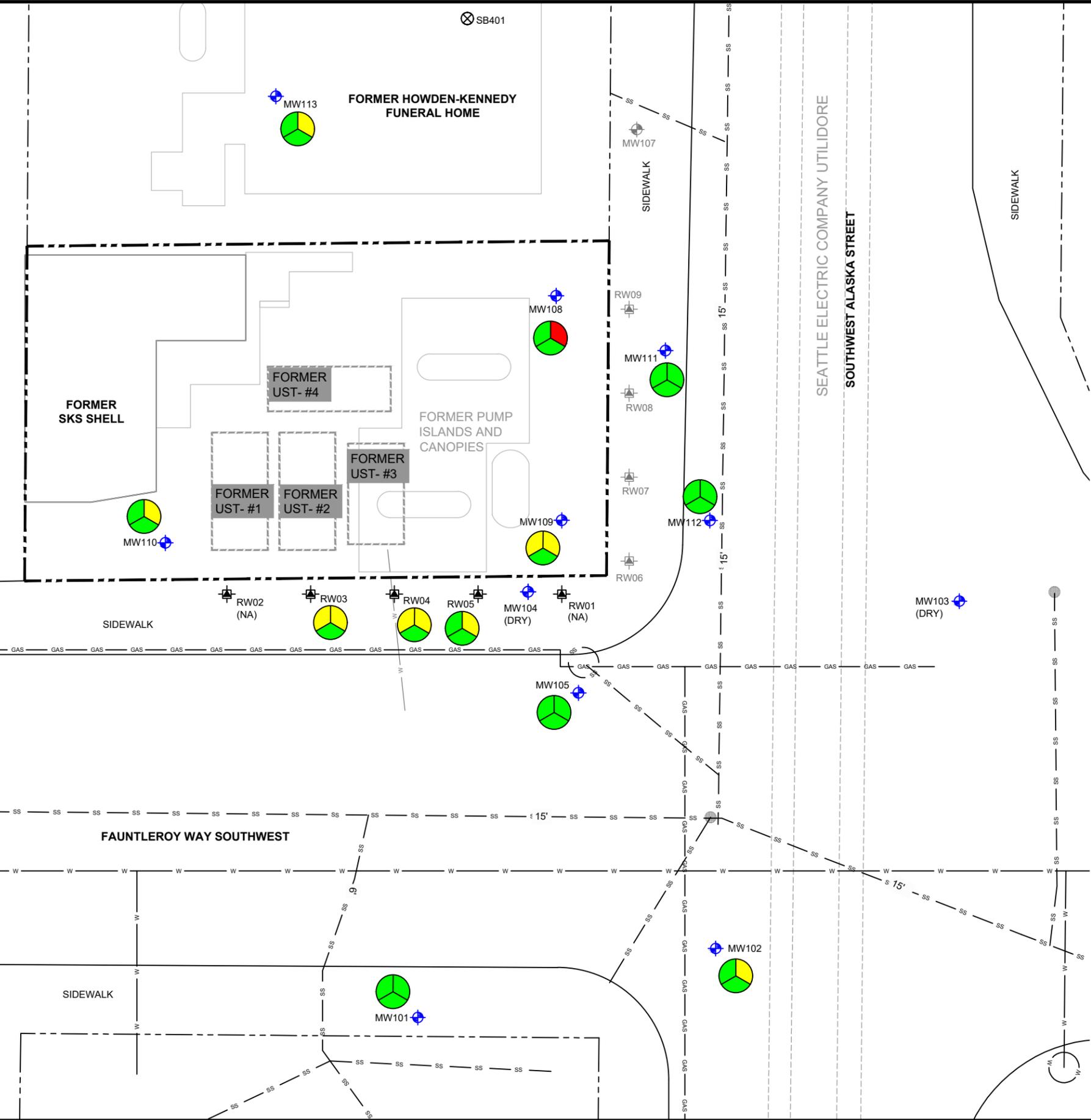
NOT ANALYZED



**LEGEND**

- RW05 EXISTING REMEDIATION WELL
- MW111 EXISTING MONITORING WELL
- RW09 DECOMMISSIONED REMEDIATION WELL
- MW107 DECOMMISSIONED MONITORING WELL
- SB401 FORMER TEMPORARY WELL
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- MANHOLE
- SEWER LINE
- WATER LINE
- GAS LINE
- HISTORICAL UTILITY LINES
- GRPH GASOLINE-RANGE PETROLEUM HYDROCARBONS
- DRPH DIESEL-RANGE PETROLEUM HYDROCARBONS
- ORPH OIL-RANGE PETROLEUM HYDROCARBONS
- MTCA WASHINGTON STATE MODEL TOXICS CONTROL ACT
- UST UNDERGROUND STORAGE TANK
- DENOTES CONCENTRATION EXCEEDS MTCA METHOD A CLEANUP LEVEL
- RESULT BELOW LABORATORY REPORTING LIMITS
- NA NOT ANALYZED

Well ID	Sample Date	Analytical Results (micrograms per liter)			
		GRPH	Benzene	DRPH	ORPH
MW101	12/18/18	<100	<1	210	<300
	03/14/19	<100	<1	<50	<250
	06/06/19	<100	<1	<50	<250
	09/13/19	<100	<1	<50	<250
MW102	12/18/18	<100	<1	<50	<250
	03/14/19	<100	<1	<50	<250
	06/06/19	<100	<1	61	<250
	09/12/19	<100	<1	110	<250
MW103	12/18/18	Dry			
	03/14/19	Dry			
	06/06/19	Insufficient water column to sample			
	09/12/19	Dry			
MW104	12/18/18	<100	<1	390	<250
	03/14/19	170	<1	690	<300
	06/06/19	210	<1	750	290
	09/12/19	Dry			
MW105	12/18/18	<100	<1	<50	<250
	03/14/19	<100	<1	<50	<250
	06/06/19	<100	<1	96	<250
	09/12/19	<100	<1	<50	<250
MW108	12/18/18	<100	<1	<50	<250
	03/14/19	<100	<1	680	<350
	06/06/19	<100	<1	590	<250
	09/12/19	<100	<1	1,200	<320
MW109	12/18/18	<100	<1	61	<250
	03/14/19	140	<1	<60	<300
	06/06/19	<100	<1	140	<250
	09/12/19	110	<1	110	<250
MW110	12/18/18	<100	<1	<50	<250
	03/14/19	<100	<1	74	<300
	06/06/19	<100	<1	91	<250
	09/12/19	<100	<1	73	<180
MW111	12/18/18	<100	<1	<50	<250
	03/14/19	<100	<1	83	<250
	06/06/19	<100	<1	84	<250
	09/13/19	<100	<1	<50	<250
MW112	12/18/18	<100	<1	58	<250
	06/06/19	<100	<1	59	<250
	09/12/19	<100	<1	<50	<250
	12/18/18	<100	<1	100	<250
MW113	03/14/19	<100	<1	79	<250
	06/06/19	<100	<1	89	<250
	09/12/19	<100	<1	87	<250
	06/14/17	<100	<1	<50	<250
RW02	12/18/18	2,800	6.5	1,600	<250
	03/15/19	1,700	1.9	730	<250
	06/07/19	410	<1	680	<250
	09/13/19	270	<1	360	<250
RW03	12/18/18	160	<1	510	<250
	03/15/19	300	<1	310	<250
	06/07/19	240	<1	470	<250
	09/13/19	180	<1	290	<250
RW04	12/18/18	110	<1	160	<250
	03/14/19	<100	<1	120	<250
	06/06/19	<100	<1	99	<250
	09/12/19	<100	<1	190	<250
RW05	12/18/18	160	<1	510	<250
	03/15/19	300	<1	310	<250
	06/07/19	240	<1	470	<250
	09/13/19	180	<1	290	<250
MW101	12/18/18	160	<1	510	<250
	03/15/19	300	<1	310	<250
	06/07/19	240	<1	470	<250
	09/13/19	180	<1	290	<250
MW102	12/18/18	110	<1	160	<250
	03/14/19	<100	<1	120	<250
	06/06/19	<100	<1	99	<250
	09/12/19	<100	<1	190	<250
<b>MTCA Method A Cleanup Level</b>		<b>1,000/800</b>	<b>5</b>	<b>500</b>	<b>500</b>



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**FIGURE 3**  
 2019 Q3 GROUNDWATER ANALYTICAL DATA

CHART 1: MW104 – GRPH AND BENZENE

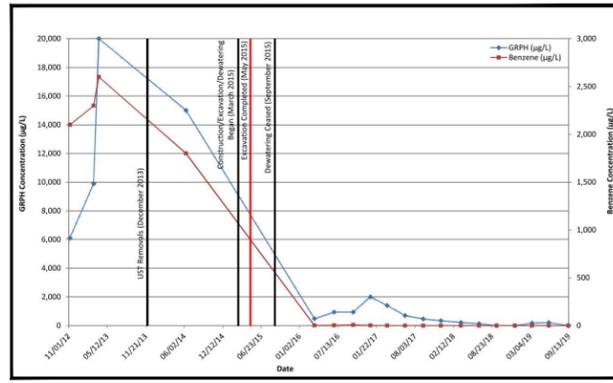


CHART 2: GLMW01 / MW109 – GRPH AND BENZENE

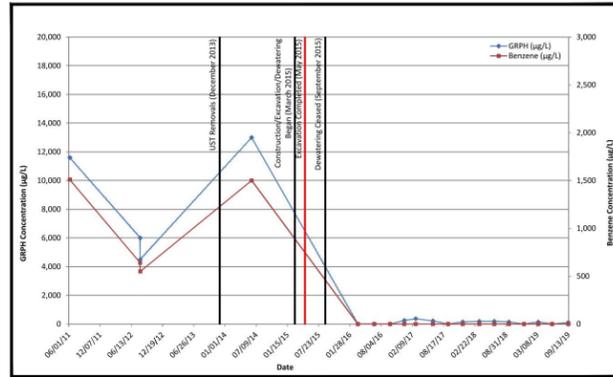


CHART 3: MW-2 / MW110 – GRPH AND BENZENE

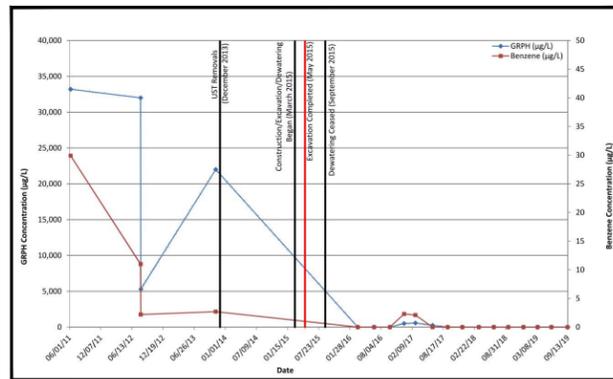
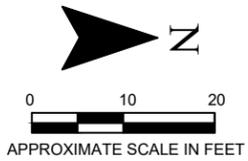
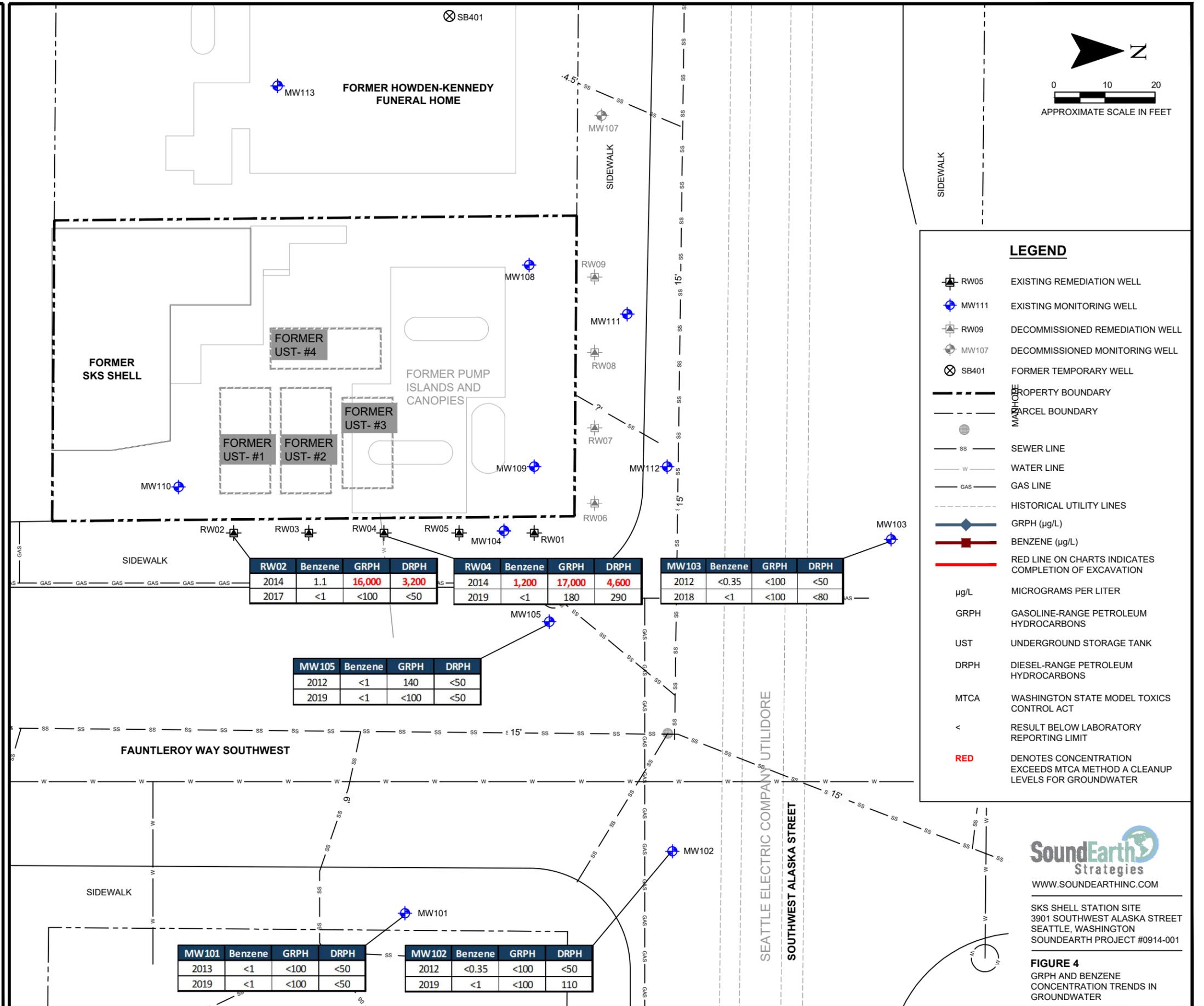
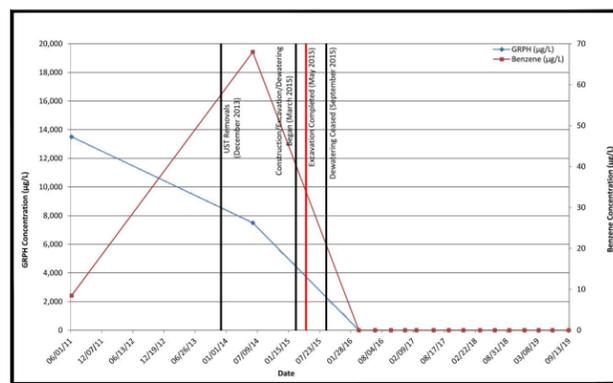


CHART 4: MW-3 / MW108 – GRPH AND BENZENE



**LEGEND**

- RW05 EXISTING REMEDIATION WELL
- MW111 EXISTING MONITORING WELL
- RW09 DECOMMISSIONED REMEDIATION WELL
- MW107 DECOMMISSIONED MONITORING WELL
- SB401 FORMER TEMPORARY WELL
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- MANHOLE
- SEWER LINE
- WATER LINE
- GAS LINE
- HISTORICAL UTILITY LINES
- GRPH (µg/L)
- BENZENE (µg/L)
- RED LINE ON CHARTS INDICATES COMPLETION OF EXCAVATION
- µg/L MICROGRAMS PER LITER
- GRPH GASOLINE-RANGE PETROLEUM HYDROCARBONS
- UST UNDERGROUND STORAGE TANK
- DRPH DIESEL-RANGE PETROLEUM HYDROCARBONS
- MTCA WASHINGTON STATE MODEL TOXICS CONTROL ACT
- < RESULT BELOW LABORATORY REPORTING LIMIT
- RED DENOTES CONCENTRATION EXCEEDS MTCA METHOD A CLEANUP LEVELS FOR GROUNDWATER

RW02	Benzene	GRPH	DRPH
2014	1.1	16,000	3,200
2017	<1	<100	<50

RW04	Benzene	GRPH	DRPH
2014	1,200	17,000	4,600
2019	<1	180	290

MW103	Benzene	GRPH	DRPH
2012	<0.35	<100	<50
2018	<1	<100	<80

MW105	Benzene	GRPH	DRPH
2012	<1	140	<50
2019	<1	<100	<50

MW101	Benzene	GRPH	DRPH
2013	<1	<100	<50
2019	<1	<100	<50

MW102	Benzene	GRPH	DRPH
2012	<0.35	<100	<50
2019	<1	<100	110



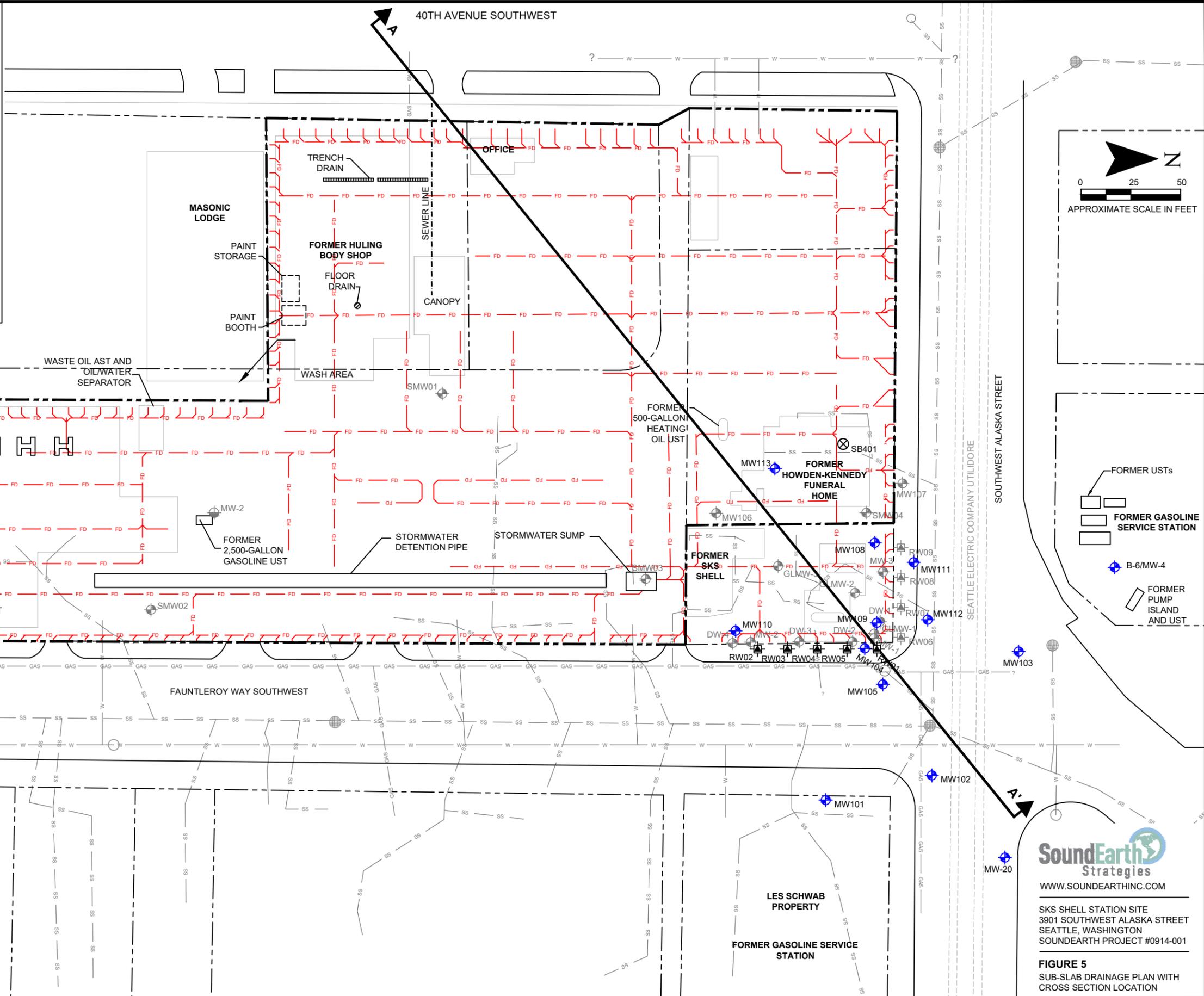
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**FIGURE 4**  
GRPH AND BENZENE  
CONCENTRATION TRENDS IN  
GROUNDWATER

11/15/2019  
P:\0914 LENNAR SELL\0914-001 SKS SHELL ROW\TECHNICAL\CAD\2019\201903\0914-004\_201903\_FIG5\_EL.DWG

### LEGEND

- RW05 EXISTING REMEDIATION WELL
- SB401 FORMER TEMPORARY WELL
- MW107 DECOMMISSIONED MONITORING WELL (SOUNDEARTH)
- MW-3 DECOMMISSIONED MONITORING WELL (EPI 1997)
- RW09 DECOMMISSIONED REMEDIATION WELL
- MW111 EXISTING MONITORING WELL
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- CROSS SECTION LOCATION
- SEWER LINE
- WATER LINE
- NATURAL GAS LINE
- SUB-SLAB DRAINAGE/FOOTING DRAINS
- HYDRAULIC HOIST
- ABOVEGROUND STORAGE TANK
- UNDERGROUND STORAGE TANK

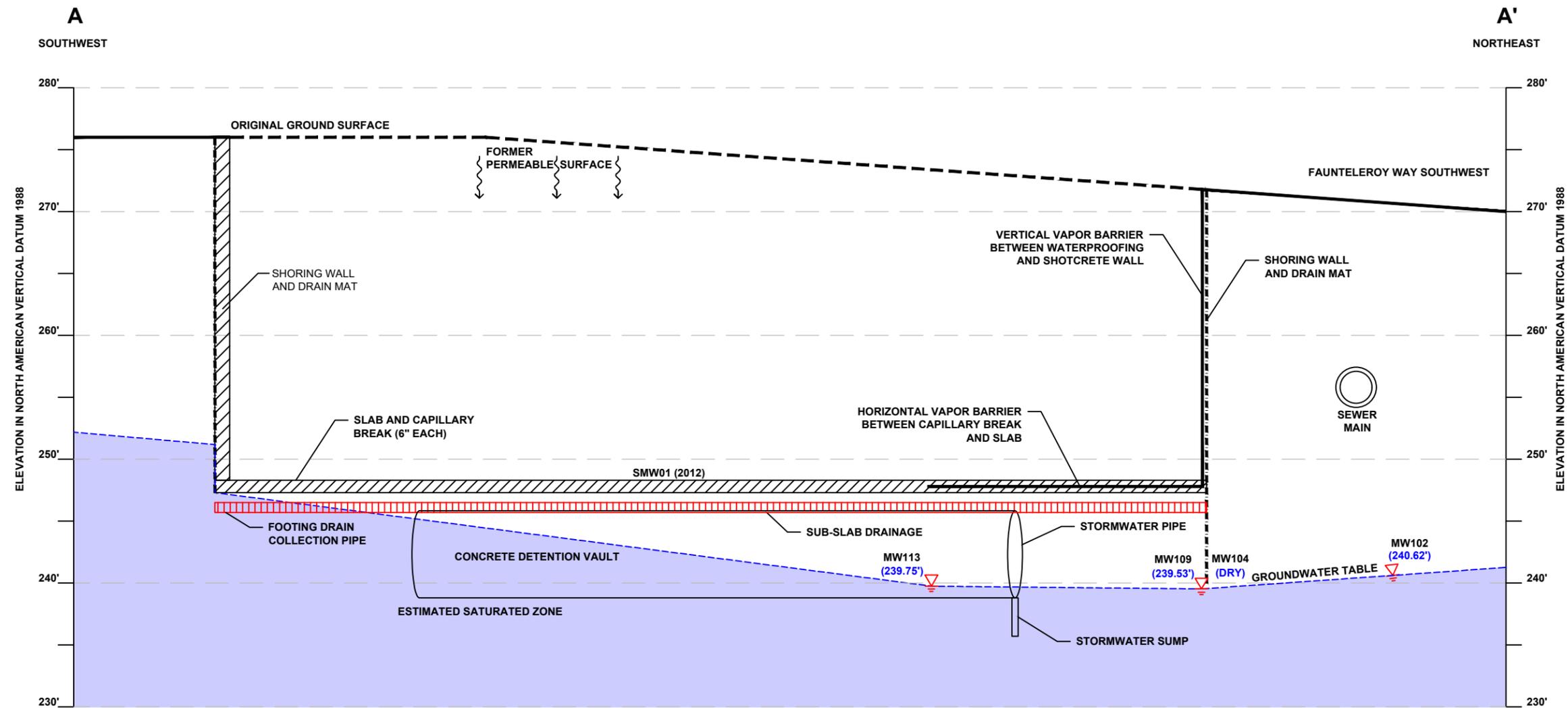


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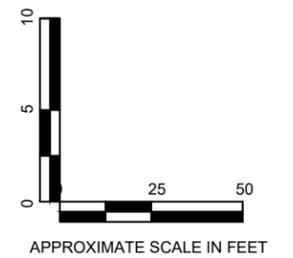
**FIGURE 5**  
SUB-SLAB DRAINAGE PLAN WITH  
CROSS SECTION LOCATION

P:\0914 LENNAR SHELL\0914-001 SKS SHELL ROW\TECHNICAL\CAD\2019\2019Q3\0914-004\_2019Q3\_FIG6\_XAA.DWG 11/15/2019



**LEGEND**

- GROUNDWATER TABLE LINE
- ▽ GROUNDWATER ELEVATION 09/12/19  
(239.53')
- GROUNDWATER
- INCHES
- FEET



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**FIGURE 6**  
CROSS SECTION A-A'

## TABLE



Table 1  
Summary of Groundwater Data  
SKS Shell Station Site  
3901 Southwest Alaska Street  
Seattle, Washington

Well ID	Sample Date	Top of Well Casing	Depth to Groundwater (feet below TOC)	Relative Groundwater Elevation <sup>(1)(7)</sup>	Analytical Results (µg/L)													
					GRPH <sup>(2)</sup>	Benzene <sup>(3)</sup>	Toluene <sup>(3)</sup>	Ethylbenzene <sup>(3)</sup>	Total Xylenes <sup>(3)</sup>	MTBE <sup>(3)</sup>	EDC <sup>(3)</sup>	EDB <sup>(3)</sup>	DRPH <sup>(2)</sup>	DRPH with Silica Gel <sup>(4)</sup>	ORPH <sup>(2)</sup>	ORPH with Silica Gel <sup>(4)</sup>		
MW101	08/06/12	269.54	24.39	245.15	<100	<0.35	<1	<1	<1	<3	<1	<1	<1	--	--	--	--	
	04/01/13		24.67	244.87	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	06/14/17		25.80	243.74	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	09/13/17		26.91	242.63	<100	<1	<1	<1	<1	<3	--	--	--	<60	--	<300	--	
	12/12/17		27.62	241.92	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	03/22/18		27.20	242.34	<100	<1	<1	<1	<1	<3	--	--	--	<60	--	<300	--	
	06/21/18		27.34	242.20	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	09/17/18		28.07	241.47	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	12/18/18		28.55	240.99	<100	<1	<1	<1	<1	<3	--	--	--	210	--	<300	--	
	03/14/19		28.02	241.52	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	06/06/19		28.35	241.19	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
09/13/19	28.84	240.70	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--			
MW102	11/07/12	269.06	25.41	243.65	<100	<0.35	<1	<1	<1	<3	<1	<1	<1	100	<50	<250	<250	
	06/13/17		25.42	243.64	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	09/13/17		26.54	242.52	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	12/12/17		27.15	241.91	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	03/22/18		26.69	242.37	<100	<1	<1	<1	<1	<3	--	--	--	<65	--	<320	--	
	06/22/18		27.37	241.69	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	09/17/18		27.75	241.31	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	12/18/18		28.25	240.81	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	03/14/19		27.50	241.56	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	06/06/19		27.60	241.46	<100	<1	<1	<1	<1	<3	--	--	--	61*	--	<250	--	
	09/12/19		28.44	240.62	<100	<1	<1	<1	<1	<3	--	--	--	110*	--	<250	--	
MW103 <sup>(8)</sup>	11/07/12	269.55	27.80	241.75	<100	<0.35	<1	<1	<1	<3	<1	<1	<1	130	<50	<250	<250	
	06/13/17		28.56	240.99	<100	<1	<1	<1	<1	<3	--	--	--	<60	--	<300	--	
	09/13/17		29.12	240.43	<100	<1	<1	<1	<1	<3	--	--	--	140*	--	<375	--	
	12/12/17		29.29	240.26	<100	<1	<1	<1	<1	<3	--	--	--	120	--	<250	--	
	03/22/18		29.14	240.41	<100	<1	<1	<1	<1	<3	--	--	--	<80	--	<400	--	
	06/21/18		29.45	240.10	Insufficient water column to sample													
	09/17/18		29.66	239.89	<100	<1	<1	<1	<1	<3	--	--	--	<750	--	<1,500	--	
	12/18/18		Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	03/14/19		Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	06/06/19		29.70	239.85	Insufficient water column to sample													
	09/12/19		Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW104	11/07/12	269.35	24.41	244.94	6,100	2,100	10	120	418	<1	<1	<1	4,000	--	<250	--		
	03/06/13		23.24	246.11	9,900	2,300	110	470	870	--	--	--	1,900*	--	<250	--		
	04/01/13		23.37	245.98	20,000	2,600	140	640	1,300	--	--	--	--	540*	--	<250		
	06/12/14		25.50	243.85	15,000	1,800	120	480	1,330	--	--	<0.01	14,000*	--	250*	--		
	03/17/16		26.41	242.94	480	1.2	1.8	2.2	5.7	--	--	--	1,200*	--	<300	--		
	06/24/16		25.16	244.19	940	2.5	2.0	3.0	9.5	--	--	--	3,200	--	<250	--		
	09/28/16		25.55	243.80	940	7.2	<1	3.7	7.4	--	--	--	4,000*	--	340*	--		
	12/23/16	27.28	242.07	2,000	2.1	2.1	17	27	--	--	--	16,000	180*	380*	<250			
	03/17/17	27.55	241.80	1,400	<1	<1	8.5	10	--	--	--	7,900	290*	<400	<400			
	06/15/17	27.92	241.45	700	<1	<1	4.0	3.1	--	<1	<1	3,000	370*	<250	<250			
	09/14/17	28.21	241.16	460	<1	<1	1.3	<3	--	--	--	2,200	230*	<300	<250			
	12/12/17	28.86	240.51	340	<1	1.1	1.3	<3	--	--	--	780*	--	<350	--			
	03/22/18	28.88	240.49	220	<1	<1	<1	<3	--	<1	<1	590*	--	<250	--			
	06/21/18	28.96	240.41	130	<1	<1	<1	<3	--	--	--	720	--	<350	--			
	09/17/18	29.27	240.10	<100	<1	<1	<1	<3	--	--	--	480	--	<350	--			
	12/18/18	29.02	240.35	<100	<1	<1	<1	<3	--	<1	<1	390	--	<250	--			
	03/14/19	29.25	240.12	170	<1	<1	<1	<3	--	--	--	690*	--	<300	--			
06/06/19	29.32	240.05	210	<1	<1	<1	<3	--	--	--	750*	--	290*	--				
09/12/19	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
MW105	12/13/12	269.30	24.25	245.05	140	<1	<1	<1	<3	--	--	--	820*	<50	<250	<250		
	03/06/13		23.33	245.97	<100	<0.35	<1	<1	<3	--	--	--	61*	--	<250	--		
	06/13/17		27.36	241.94	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--		
	09/13/17		27.96	241.34	<100	<1	<1	<1	<3	--	--	--	<60	--	<300	--		
	12/12/17		28.41	240.89	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--		
	03/22/18		28.45	240.85	<100	<1	<1	<1	<3	--	--	--	<65	--	<320	--		
	06/21/18		28.56	240.74	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--		
	09/17/18		28.96	240.34	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--		
	12/18/18		28.90	240.40	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--		
	03/14/19		28.66	240.64	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--		
	06/06/19		29.06	240.24	<100	<1	<1	<1	<3	--	--	--	96*	--	<250	--		
09/12/19	29.37	239.93	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--				
RW02	07/16/14	--	--	--	16,000	1.1	2.5	380	1,400	--	--	--	3,200*	--	<250	--		
	06/14/17	268.60	27.22	241.38	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--		
MTC Method A Cleanup Levels for Groundwater <sup>(5)</sup>					1,000/800 <sup>(6)</sup>	5	1,000	700	1,000	20	5	0.01	500	500	500	500		



Table 1  
Summary of Groundwater Data  
SKS Shell Station Site  
3901 Southwest Alaska Street  
Seattle, Washington

Well ID	Sample Date	Top of Well Casing	Depth to Groundwater (feet below TOC)	Relative Groundwater Elevation <sup>(1)(7)</sup>	Analytical Results (µg/L)											
					GRPH <sup>(2)</sup>	Benzene <sup>(3)</sup>	Toluene <sup>(3)</sup>	Ethylbenzene <sup>(3)</sup>	Total Xylenes <sup>(3)</sup>	MTBE <sup>(3)</sup>	EDC <sup>(3)</sup>	EDB <sup>(3)</sup>	DRPH <sup>(2)</sup>	DRPH with Silica Gel <sup>(4)</sup>	ORPH <sup>(2)</sup>	ORPH with Silica Gel <sup>(4)</sup>
RW03	03/17/16	--	26.23	--	2,300	41	6.9	51	260	--	--	--	1,400 <sup>x</sup>	--	<250	--
	06/24/16		25.40	--	1,600	27	4.4	27	59	--	--	--	3,600	--	<250	--
	09/28/16		25.71	--	1,100	6.7	<1	20	45	--	--	--	2,400 <sup>x</sup>	--	<300	--
	12/23/16		26.77	--	9,000	470	16	380	750	--	--	--	11,000	720 <sup>x</sup>	<300	<300
	03/02/17	269.50	27.22	--	4,900	150	<10	220	190	--	--	--	11,000 <sup>x</sup>	880 <sup>x</sup>	<250	<250
	06/14/17		27.91	241.59	1,300	7.0	<1	32	11	--	--	--	1,500	320 <sup>x</sup>	<250	<250
	09/14/17		28.30	241.20	560	2.8	1.3	15	4.5	--	--	--	690 <sup>x</sup>	140 <sup>x</sup>	<300	<300
	12/12/17		28.82	240.68	2,500	8.8	17	39	170	--	--	--	1,000 <sup>x</sup>	--	<300	--
	03/22/18		28.85	240.65	2,100	3.0	5.2	29	140	--	--	--	760 <sup>x</sup>	--	<250	--
	06/22/18		28.94	240.56	730	<1	2.3	31	34	--	--	--	740 <sup>x</sup>	--	<250	--
	09/17/18		29.28	240.22	370	<1	<11	11	15	--	--	--	430	--	<250	--
	12/18/18		29.05	240.45	2,800	6.5	5.0	75	250	--	--	--	1,600	--	<250	--
	03/15/19		29.05	240.45	1,700	1.9	1.7	46	140	--	--	--	730 <sup>x</sup>	--	<250	--
	06/07/19		29.35	240.15	410	<1	<1	14	4.3	--	--	--	680 <sup>x</sup>	--	<250	--
09/13/19	29.81	239.69	270	<1	<1	1.4	3.0	--	--	--	360 <sup>x</sup>	--	<250	--		
RW04	07/16/14	--	--	--	17,000	1,200	270	360	1,700	--	--	--	4,600 <sup>x</sup>	--	270 <sup>x</sup>	--
	06/14/17	269.22	27.62	241.60	790	2.5	<1	16	<3	--	--	--	400	--	<250	--
	09/14/17		27.93	241.29	400	6.4	<1	26	21	--	--	--	330 <sup>x</sup>	--	<250	--
	12/12/17		28.55	240.67	360	3.0	1.1	12	5.2	--	--	--	200 <sup>x</sup>	--	<300	--
	03/22/18		28.57	240.65	450	1.5	<1	14	<3	--	--	--	500 <sup>x</sup>	--	<250	--
	06/21/18		28.60	240.62	360	<1	2.6	4.8	4.5	--	--	--	400 <sup>x</sup>	--	<250	--
	09/17/18		29.08	240.14	130	<1	<1	1.5	<3	--	--	--	120	--	<250	--
	12/18/18		28.74	240.48	160	<1	<1	1.1	<3	--	--	--	510	--	<250	--
	03/15/19		28.76	240.46	300	<1	<1	1.9	<3	--	--	--	310 <sup>x</sup>	--	<250	--
	06/07/19		29.05	240.17	240	<1	<1	<1	<3	--	--	--	470 <sup>x</sup>	--	<250	--
09/13/19	29.44		239.78	180	<1	<1	<1	<3	--	--	--	290 <sup>x</sup>	--	<250	--	
RW05	06/14/17	269.09	27.64	241.45	400	<1	<1	4.4	<3	--	--	--	470	--	<250	--
	09/14/17		27.91	241.18	280	<1	1.2	1.5	<3	--	--	--	300 <sup>x</sup>	--	<300	--
	12/12/17		28.54	240.55	230	<1	1.3	1.5	<3	--	--	--	170 <sup>x</sup>	--	<300	--
	03/22/18		28.56	240.53	180	<1	<1	1.4	<3	--	--	--	140 <sup>x</sup>	--	<260	--
	06/21/18		28.63	240.46	140	<1	1.4	1.4	<3	--	--	--	180 <sup>x</sup>	--	<250	--
	09/17/18		28.96	240.13	140	<1	<1	2.1	<3	--	--	--	140	--	<250	--
	12/18/18		28.75	240.34	110	<1	<1	1.4	<3	--	--	--	160 <sup>x</sup>	--	<250	--
	03/14/19		28.74	240.35	<100	<1	<1	<1	<3	--	--	--	120 <sup>x</sup>	--	<250	--
	06/06/19		29.00	240.09	<100	<1	<1	<1	<3	--	--	--	99 <sup>x</sup>	--	<250	--
	09/12/19		29.33	239.76	<100	<1	<1	<1	<3	--	--	--	190 <sup>x</sup>	--	<250	--
RW07	07/16/14	--	--	--	1,600	110	8.3	8.3	17	--	--	--	1,100 <sup>x</sup>	--	<250	--
RW09	07/16/14	--	--	--	2,600	10	18	70	34	--	--	--	700 <sup>x</sup>	--	<250	--
MW108	03/17/16	--	5.52	--	<100	<1	<1	<1	<3	--	--	--	93 <sup>x</sup>	--	<300	--
	06/24/16		3.33	--	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--
	09/28/16		3.85	--	<100	<1	<1	<1	<3	--	--	--	<60	--	<300	--
	12/23/16		6.56	--	<100	<1	<1	<1	<3	--	--	--	94 <sup>x</sup>	<70	<350	<350
	03/03/17	247.83	6.64	--	<100	<1	<1	<1	<3	--	--	--	<80	<80	<400	<400
	06/14/17		7.06	240.77	<100	<1	<1	<1	<3	--	--	--	140 <sup>x</sup>	--	<250	--
	09/14/17		6.69	241.14	<100	<1	<1	<1	<3	--	--	--	160 <sup>x</sup>	--	<250	--
	12/12/17		7.70	240.13	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--
	03/23/18		7.44	240.39	<100	<1	<1	<1	<3	--	--	--	71 <sup>x</sup>	--	<250	--
	06/21/18		7.75	240.08	<100	<1	<1	<1	<3	--	--	--	150 <sup>x</sup>	--	<450	--
	09/17/18		7.83	240.00	<100	<1	<1	<1	<3	--	--	--	110	--	<480	--
	12/18/18		7.98	239.85	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--
	03/14/19		7.78	240.05	<100	<1	<1	<1	<3	--	--	--	680 <sup>x</sup>	--	<350	--
	06/06/19		7.87	239.96	<100	<1	<1	<1	<3	--	--	--	590 <sup>x</sup>	--	<250	--
09/12/19	8.28	239.55	<100	<1	<1	<1	<3	--	--	--	1,200 <sup>x</sup>	--	<320	--		
MW109	03/17/16	--	5.42	--	<100	<1	<1	<1	<3	--	--	--	97 <sup>x</sup>	--	<250	--
	06/24/16		3.35	--	<100	<1	<1	<1	<3	--	--	--	160 <sup>x</sup>	--	<250	--
	09/28/16		3.96	--	<100	<1	<1	<1	<3	--	--	--	260 <sup>x</sup>	--	<250	--
	12/23/16		6.59	--	250	<1	<1	<1	<3	--	--	--	430 <sup>x</sup>	<50	<250	<250
	03/03/17	247.92	6.70	--	370	<1	<1	1.2	<3	--	--	--	490 <sup>x</sup>	55 <sup>x</sup>	<250	<250
	06/14/17		6.87	241.05	220	<1	<1	<1	<3	--	--	--	330	--	<250	--
	09/14/17		6.84	241.08	<100	<1	<1	<1	<3	--	--	--	140 <sup>x</sup>	--	<300	--
	12/12/17		7.69	240.23	150	<1	1.1	<1	<3	--	--	--	<50	--	<250	--
	03/23/18		7.75	240.17	190	<1	<1	1.1	<3	--	--	--	110 <sup>x</sup>	--	<250	--
	06/21/18		7.87	240.05	190	<1	1.2	<1	<3	--	--	--	200	--	<250	--
	09/17/18		8.05	239.87	150	<1	<1	1.8	<3	--	--	--	110 <sup>x</sup>	--	<250	--
	12/18/18		7.61	240.31	<100	<1	<1	<1	<3	--	--	--	61 <sup>x</sup>	--	<250	--
	03/14/19		7.94	239.98	140	<1	<1	<1	<3	--	--	--	<60	--	<300	--
	06/06/19		8.10	239.82	<100	<1	<1	<1	<3	--	--	--	140 <sup>x</sup>	--	<250	--
09/12/19	8.39	239.53	110	<1	<1	<1	<3	--	--	--	110 <sup>x</sup>	--	<250	--		
MTCA Method A Cleanup Levels for Groundwater <sup>(5)</sup>					1,000/800 <sup>(5)</sup>	5	1,000	700	1,000	20	5	0.01	500	500	500	500



**Table 1**  
**Summary of Groundwater Data**  
**SKS Shell Station Site**  
**3901 Southwest Alaska Street**  
**Seattle, Washington**

Well ID	Sample Date	Top of Well Casing	Depth to Groundwater (feet below TOC)	Relative Groundwater Elevation <sup>(1)(7)</sup>	Analytical Results (µg/L)												
					GRPH <sup>(2)</sup>	Benzene <sup>(3)</sup>	Toluene <sup>(3)</sup>	Ethylbenzene <sup>(3)</sup>	Total Xylenes <sup>(3)</sup>	MTBE <sup>(3)</sup>	EDC <sup>(3)</sup>	EDB <sup>(3)</sup>	DRPH <sup>(2)</sup>	DRPH with Silica Gel <sup>(4)</sup>	ORPH <sup>(2)</sup>	ORPH with Silica Gel <sup>(4)</sup>	
MW110	03/17/16	--	5.70	--	<100	<1	<1	<1	<1	<3	--	--	--	<50	--	<250	--
	06/24/16		3.56	--	<100	<1	<1	<1	<1	<3	--	--	--	100 <sup>x</sup>	--	<250	--
	09/28/16		4.19	--	<100	<1	<1	<1	<1	<3	--	--	--	590 <sup>x</sup>	--	440 <sup>x</sup>	--
	12/23/16		6.96	--	500	2.3	<1	9.7	18	--	--	--	1,200	68 <sup>x</sup>	<300	<300	
	03/03/17	248.21	7.57	--	570	2.1	<1	9.3	4.7	--	--	--	1,000 <sup>x</sup>	110 <sup>x</sup>	<250	<250	
	06/14/17		7.78	240.43	260	<1	<1	2.0	<3	--	--	--	520	--	<250	--	
	09/14/17		7.44	240.77	<100	<1	<1	<1	<3	--	--	--	150 <sup>x</sup>	--	<250	--	
	12/12/17		8.02	240.19	<100	<1	<1	<1	<3	--	--	--	99 <sup>x</sup>	--	<250	--	
	03/23/18		8.05	240.16	<100	<1	<1	<1	<3	--	--	--	73 <sup>x</sup>	--	<250	--	
	06/21/18		8.15	240.06	<100	<1	<1	<1	<3	--	--	--	96 <sup>x</sup>	--	<250	--	
	09/17/18		8.40	239.81	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	12/18/18		7.98	240.23	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	03/14/19		8.20	240.01	<100	<1	<1	<1	<3	--	--	--	74 <sup>x</sup>	--	<300	--	
	06/06/19		8.30	239.91	<100	<1	<1	<1	<3	--	--	--	91 <sup>x</sup>	--	<250	--	
09/12/19	9.03	239.18	<100	<1	<1	<1	<3	--	--	--	73 <sup>x</sup>	--	<180	--			
MW111	10/09/18	270.62	30.51	240.11	<100	<1	<1	<1	<3	--	--	--	55 <sup>x</sup>	--	<250	--	
	12/18/18		29.90	240.72	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	03/14/19		30.15	240.47	<100	<1	<1	<1	<3	--	--	--	83 <sup>x</sup>	--	<250	--	
	06/06/19		30.50	240.12	<100	<1	<1	<1	<3	--	--	--	84 <sup>x</sup>	--	<250	--	
	09/13/19		30.72	239.90	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
MW112	03/14/19	269.32	28.88	240.44	<100	<1	<1	<1	<3	--	--	--	58 <sup>x</sup>	--	<250	--	
	06/06/19		29.15	240.17	<100	<1	<1	<1	<3	--	--	--	59 <sup>x</sup>	--	<250	--	
	09/12/19		29.44	239.88	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
MW113	03/23/18	248.06	7.68	240.38	<100	<1	<1	<1	<3	--	--	--	93 <sup>x</sup>	--	<250	--	
	06/21/18		7.81	240.25	<100	<1	<1	<1	<3	--	--	--	71 <sup>x</sup>	--	<250	--	
	09/17/18		8.05	240.01	<100	<1	<1	<1	<3	--	--	--	<50	--	<250	--	
	12/18/18		7.58	240.48	<100	<1	<1	<1	<3	--	--	--	100 <sup>x</sup>	--	<250	--	
	03/14/19		7.98	240.08	<100	<1	<1	<1	<3	--	--	--	79 <sup>x</sup>	--	<250	--	
	06/06/19		8.13	239.93	<100	<1	<1	<1	<3	--	--	--	89 <sup>x</sup>	--	<250	--	
	09/12/19		8.31	239.75	<100	<1	<1	<1	<3	--	--	--	87 <sup>x</sup>	--	<250	--	
<b>MTCA Method A Cleanup Levels for Groundwater<sup>(5)</sup></b>					<b>1,000/800<sup>(6)</sup></b>	<b>5</b>	<b>1,000</b>	<b>700</b>	<b>1,000</b>	<b>20</b>	<b>5</b>	<b>0.01</b>	<b>500</b>	<b>500</b>	<b>500</b>	<b>500</b>	

**NOTES:**

Red indicates concentrations exceeding MTCA Method A cleanup levels for groundwater.

Samples analyzed by Friedman & Bruya, Inc. of Seattle, Washington.

2011 Samples analyzed by G-Logics by Fremont Analytical of Seattle, Washington.

2012 Samples analyzed by Friedman & Bruya, Inc. of Seattle, Washington.

<sup>(1)</sup>Elevation reference datum North American Vertical Datum of 1988 (Dowl HKM November 2012).

<sup>(2)</sup>Analyzed by Method NWTPH-Gx (gasoline) and NWTPH-Dx (diesel and oil).

<sup>(3)</sup>Analyzed by EPA Method 8260B, 8260C, or 8021B.

<sup>(4)</sup>Analyzed by Method NWTPH-Dx; sample extracts passed through a silica gel column prior to analysis.

<sup>(5)</sup>MTCA Cleanup Regulation, Method A Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised November 2007.

<sup>(6)</sup>1,000 µg/L when benzene is not present and 800 µg/L when benzene is present.

<sup>(7)</sup>Top of well casing elevations for MW108, MW109, MW110, and MW113 are estimated based on parking garage design elevations.

<sup>(8)</sup>MW103 elevated detection limits due to low sample volume.

**Laboratory Note:**

\*The sample chromatographic pattern does not resemble the fuel standard used for quantitation. Concentration is estimated.

-- = not analyzed, not measured

< = not detected above the laboratory reporting limit

µg/L = micrograms per liter

DRPH = diesel-range petroleum hydrocarbons

EDB = 1,2 dibromoethane

EDC = 1,2 dichloroethane

EPA = US Environmental Protection Agency

GRPH = gasoline-range petroleum hydrocarbons

MTBE = methyl tertiary-butyl ether

MTCA = Washington State Model Toxics Control Act

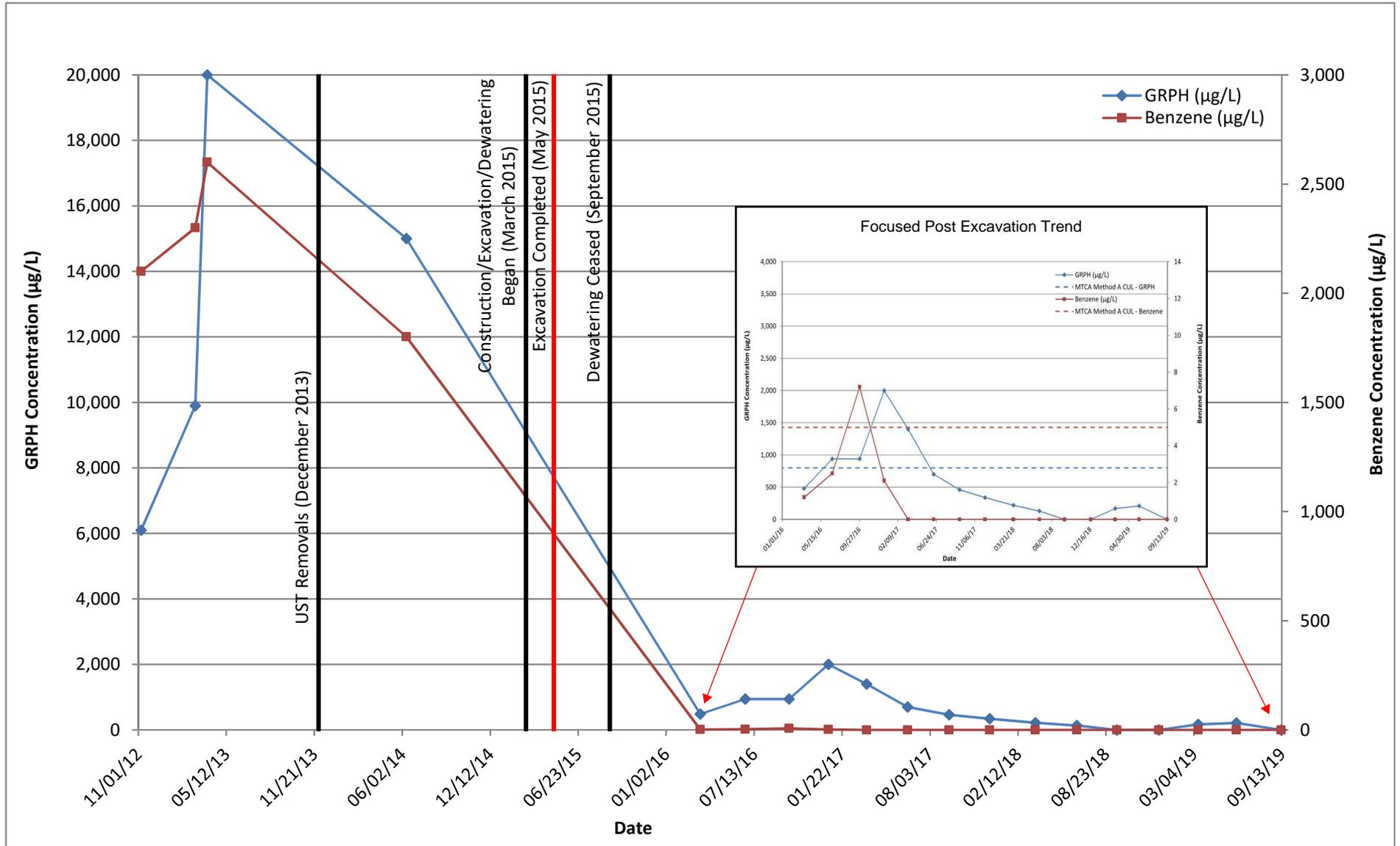
NWTPH = Northwest Total Petroleum Hydrocarbon

ORPH = oil-range petroleum hydrocarbons

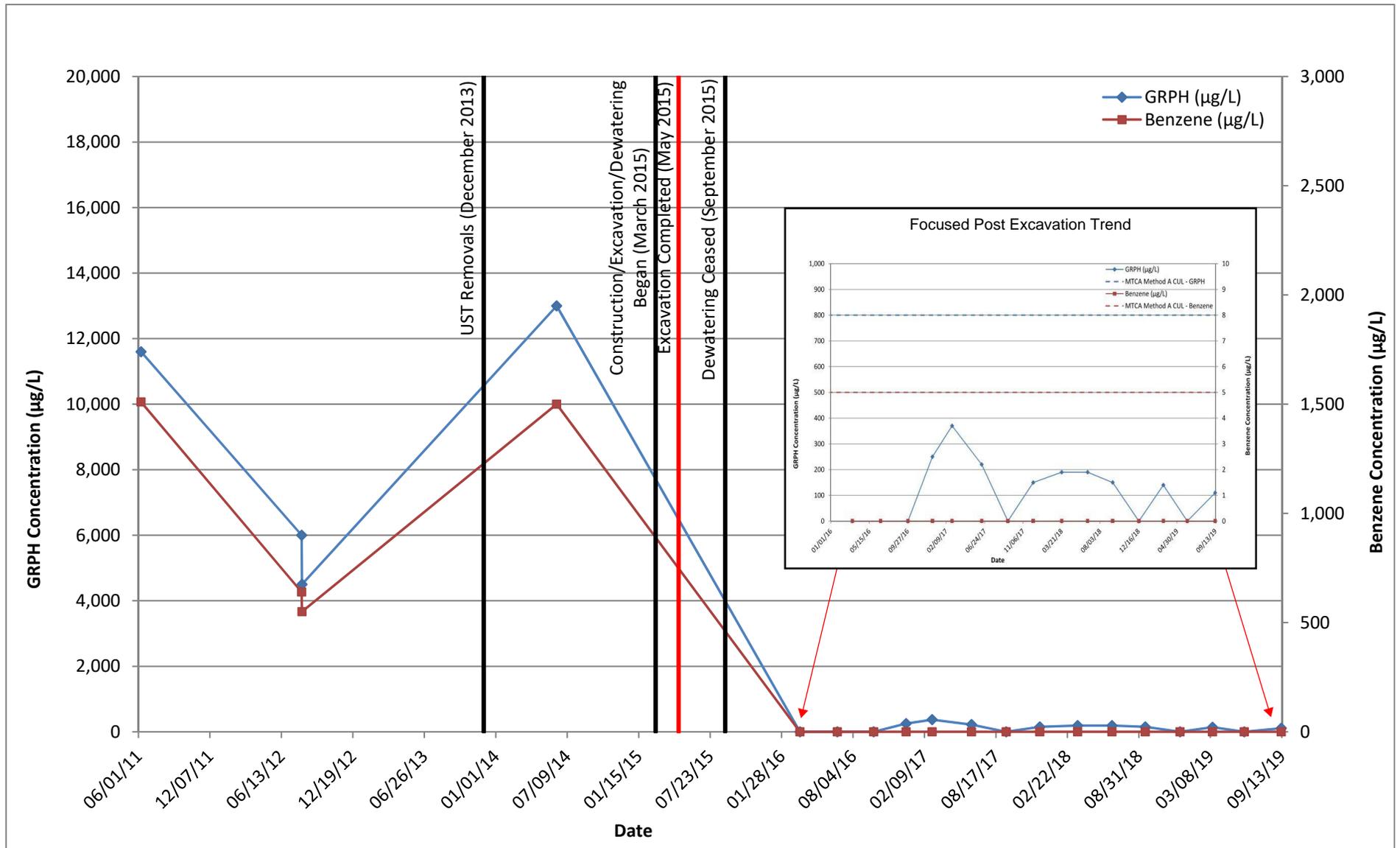
TOC = top of casing elevation

## CHARTS

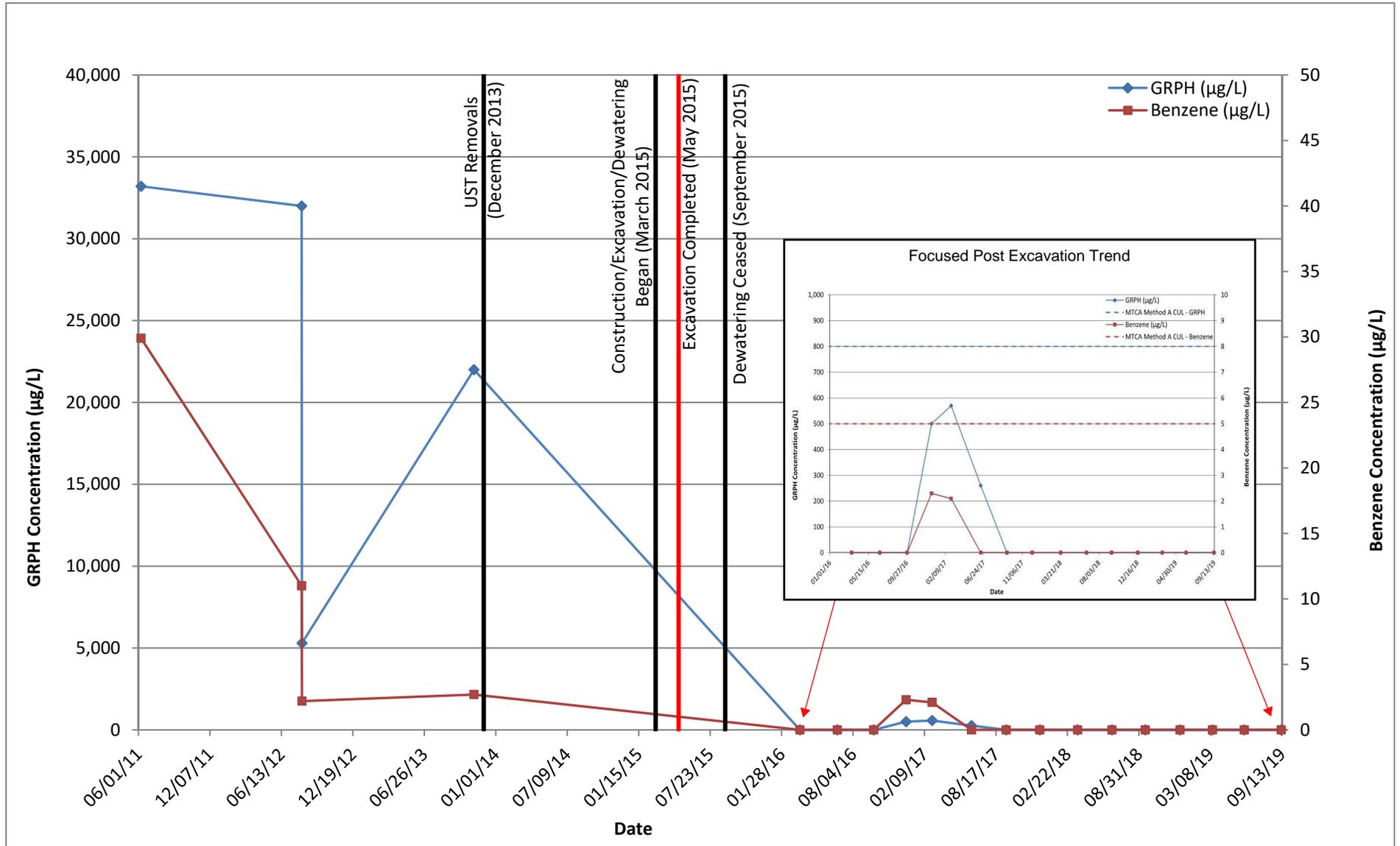
**Chart 1**  
**GRPH and Benzene Concentrations - MW104**  
**SKS Shell Station Site**  
**3901 Southwest Alaska Street**  
**Seattle, Washington**



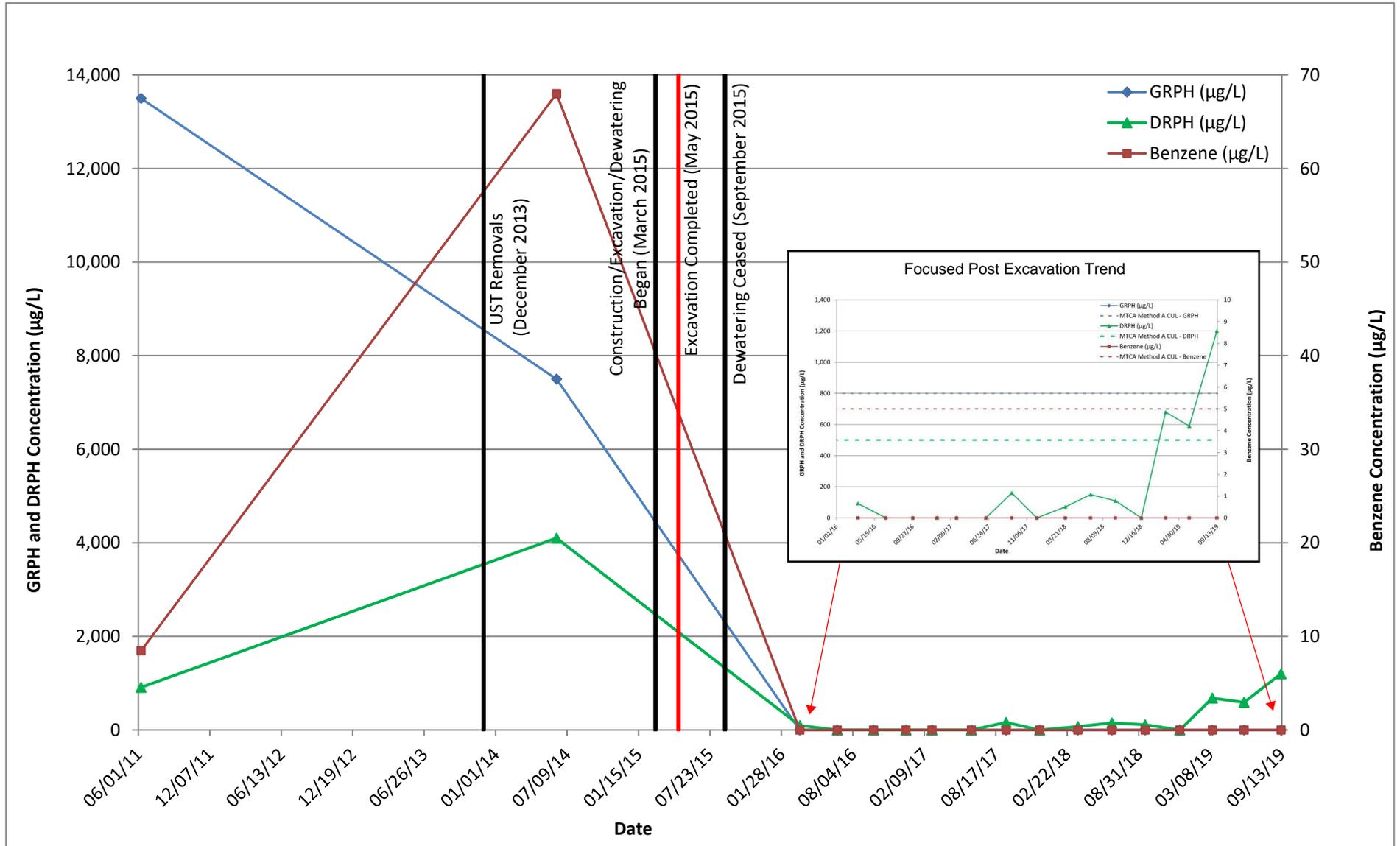
**Chart 2**  
**GRPH and Benzene Concentrations - GLMW01/MW109**  
**SKS Shell Station Site**  
**3901 Southwest Alaska Street**  
**Seattle, Washington**



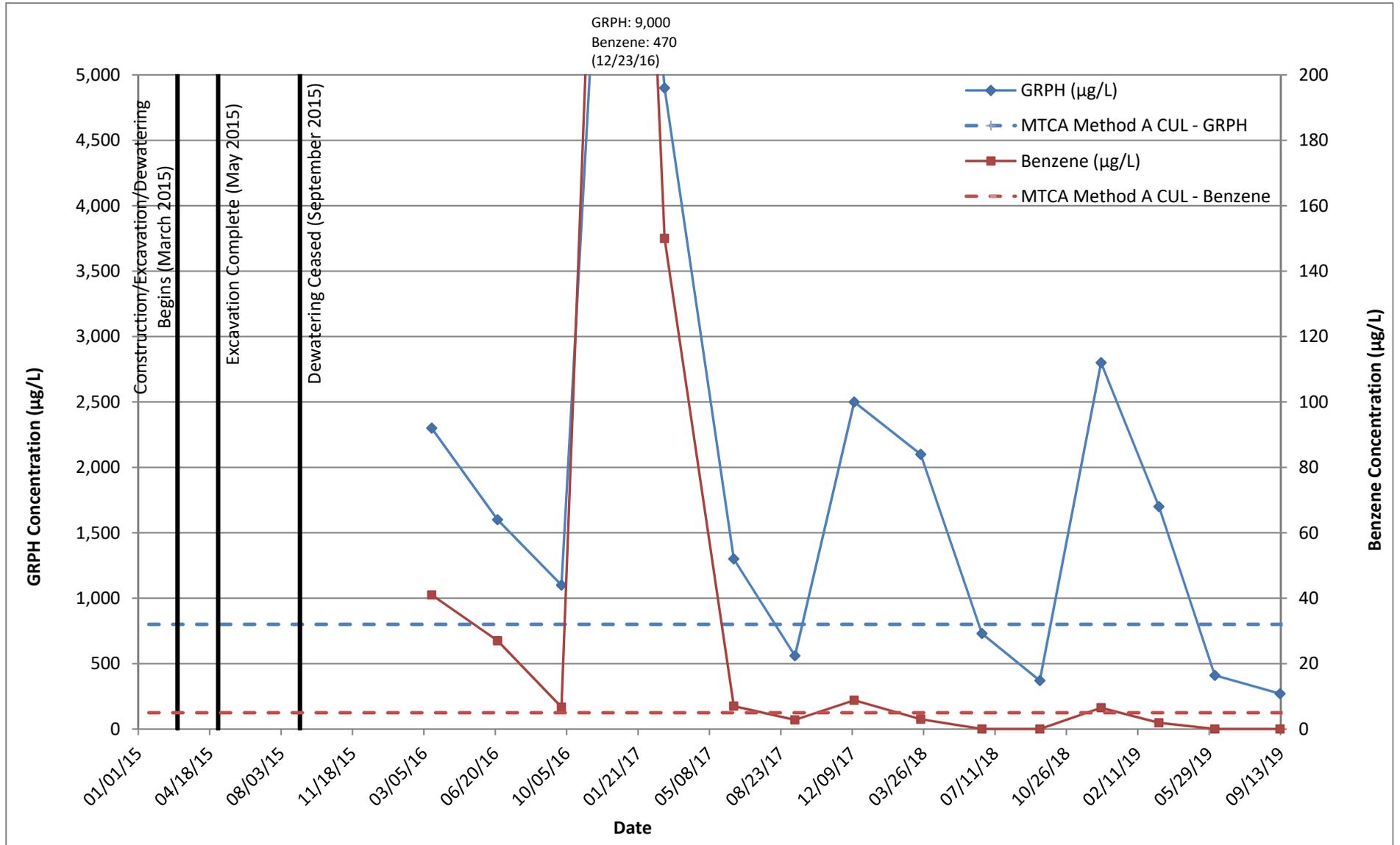
**Chart 3**  
**GRPH and Benzene Concentrations - MW110/MW-2**  
**SKS Shell Station Site**  
**3901 Southwest Alaska Street**  
**Seattle, Washington**



**Chart 4**  
**GRPH, DRPH, and Benzene Concentrations - MW-3/MW108**  
**SKS Shell Station Site**  
**3901 Southwest Alaska Street**  
**Seattle, Washington**

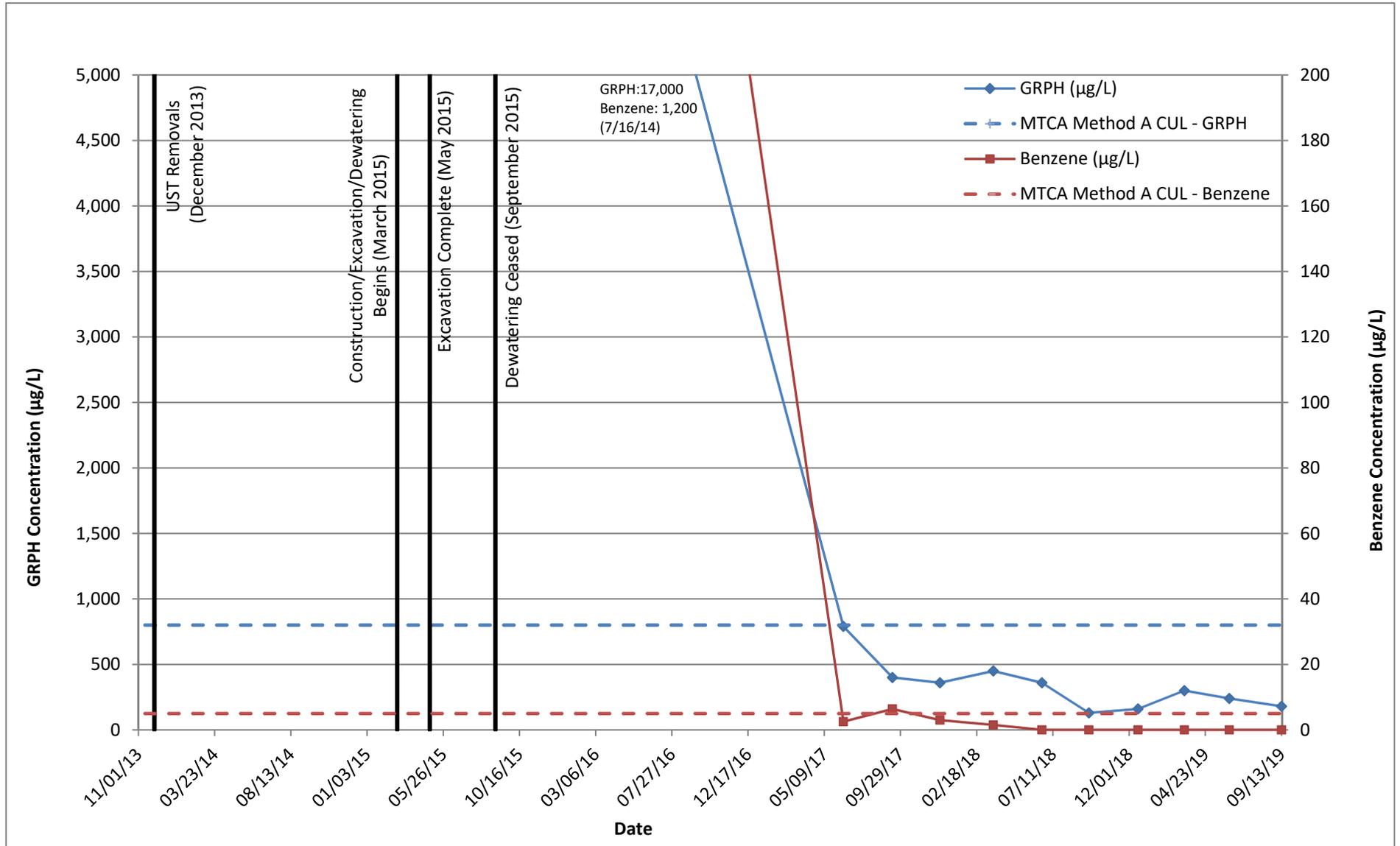


**Chart 5**  
**GRPH and Benzene Concentrations - RW03**  
**SKS Shell Station**  
**3501 SW Alaskan Street**  
**Seattle, Washington**





**Chart 6**  
**GRPH and Benzene Concentrations - RW04**  
**SKS Shell Station**  
**3501 SW Alaskan Street**  
**Seattle, Washington**



**ATTACHMENT A  
LABORATORY ANALYTICAL REPORT**

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.  
Yelena Aravkina, M.S.  
Michael Erdahl, B.S.  
Arina Podnozova, B.S.  
Eric Young, B.S.

3012 16th Avenue West  
Seattle, WA 98119-2029  
(206) 285-8282  
fbi@isomedia.com  
www.friedmanandbruya.com

September 19, 2019

Rob Roberts, Project Manager  
SoundEarth Strategies  
2811 Fairview Ave. East, Suite 2000  
Seattle, WA 98102

Dear Mr Roberts:

Included are the results from the testing of material submitted on September 13, 2019 from the SOU\_0914-001\_ 20190913, F&BI 909218 project. There are 8 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl  
Project Manager

Enclosures

c: Jonathan Loeffler, Clare Tochilin  
SOU0919R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on September 13, 2019 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU\_0914-001\_ 20190913, F&BI 909218 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>SoundEarth Strategies</u>
909218 -01	MW105-20190912
909218 -02	MW113-20190912
909218 -03	MW112-20190912
909218 -04	MW110-20190912
909218 -05	MW109-20190912
909218 -06	MW108-20190912
909218 -07	MW102-20190912
909218 -08	RW05-20190912
909218 -09	RW04-20190913
909218 -10	RW03-20190913
909218 -11	MW101-20190913
909218 -12	MW111-20190913
909218 -13	MW99-20190913

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/19/19  
 Date Received: 09/13/19  
 Project: SOU\_0914-001\_ 20190913, F&BI 909218  
 Date Extracted: 09/16/19  
 Date Analyzed: 09/16/19 and 09/17/19

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
 FOR BENZENE, TOLUENE, ETHYLBENZENE,  
 XYLENES AND TPH AS GASOLINE  
 USING METHODS 8021B AND NWTPH-Gx**  
 Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl Benzene</u>	<u>Total Xylenes</u>	<u>Gasoline Range</u>	<u>Surrogate (% Recovery)</u> (Limit 52-124)
MW105-20190912 909218-01	<1	<1	<1	<3	<100	82
MW113-20190912 909218-02	<1	<1	<1	<3	<100	85
MW112-20190912 909218-03	<1	<1	<1	<3	<100	83
MW110-20190912 909218-04	<1	<1	<1	<3	<100	84
MW109-20190912 909218-05	<1	<1	<1	<3	110	84
MW108-20190912 909218-06	<1	<1	<1	<3	100	84
MW102-20190912 909218-07	<1	<1	<1	<3	<100	84
RW05-20190912 909218-08	<1	<1	<1	<3	<100	86
RW04-20190913 909218-09	<1	<1	<1	<3	180	80
RW03-20190913 909218-10	<1	<1	1.4	3.0	270	81

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/19/19

Date Received: 09/13/19

Project: SOU\_0914-001\_ 20190913, F&BI 909218

Date Extracted: 09/16/19

Date Analyzed: 09/16/19 and 09/17/19

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR BENZENE, TOLUENE, ETHYLBENZENE,  
XYLENES AND TPH AS GASOLINE  
USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl Benzene</u>	<u>Total Xylenes</u>	<u>Gasoline Range</u>	<u>Surrogate (% Recovery)</u> (Limit 52-124)
MW101-20190913 909218-11	<1	<1	<1	<3	<100	82
MW111-20190913 909218-12	<1	<1	<1	<3	<100	82
MW99-20190913 909218-13	<1	<1	1.6	3.4	310	79
Method Blank 09-2216 MB	<1	<1	<1	<3	<100	87

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/19/19  
 Date Received: 09/13/19  
 Project: SOU\_0914-001\_ 20190913, F&BI 909218  
 Date Extracted: 09/16/19  
 Date Analyzed: 09/16/19

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
 FOR TOTAL PETROLEUM HYDROCARBONS AS  
 DIESEL AND MOTOR OIL  
 USING METHOD NWTPH-Dx  
 Results Reported as ug/L (ppb)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C <sub>10</sub> -C <sub>25</sub> )	<u>Motor Oil Range</u> (C <sub>25</sub> -C <sub>36</sub> )	<u>Surrogate</u> (% Recovery) (Limit 47-140)
MW105-20190912 909218-01	<50	<250	119
MW113-20190912 909218-02	87 x	<250	117
MW112-20190912 909218-03	<50	<250	110
MW110-20190912 909218-04 1/0.7	73 x	<180	105
MW109-20190912 909218-05	110 x	<250	111
MW108-20190912 909218-06 1/1.3	1,200 x	<320	91
MW102-20190912 909218-07	110 x	<250	124
RW05-20190912 909218-08	190 x	<250	122
RW04-20190913 909218-09	290 x	<250	118
RW03-20190913 909218-10	360 x	<250	122

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/19/19

Date Received: 09/13/19

Project: SOU\_0914-001\_ 20190913, F&BI 909218

Date Extracted: 09/16/19

Date Analyzed: 09/16/19

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL AND MOTOR OIL  
USING METHOD NWTPH-D<sub>x</sub>**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C <sub>10</sub> -C <sub>25</sub> )	<u>Motor Oil Range</u> (C <sub>25</sub> -C <sub>36</sub> )	<u>Surrogate</u> (% Recovery) (Limit 47-140)
MW101-20190913 909218-11	<50	<250	118
MW111-20190913 909218-12	<50	<250	106
MW99-20190913 909218-13	380 x	<250	119
Method Blank 09-2284 MB	<50	<250	122

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/19/19

Date Received: 09/13/19

Project: SOU\_0914-001\_ 20190913, F&BI 909218

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE,  
XYLENES, AND TPH AS GASOLINE  
USING METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 909204-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	89	65-118
Toluene	ug/L (ppb)	50	91	72-122
Ethylbenzene	ug/L (ppb)	50	92	73-126
Xylenes	ug/L (ppb)	150	92	74-118
Gasoline	ug/L (ppb)	1,000	103	69-134

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/19/19

Date Received: 09/13/19

Project: SOU\_0914-001\_ 20190913, F&BI 909218

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL EXTENDED USING METHOD NWTPH-D<sub>x</sub>**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	100	104	61-133	4

# FRIEDMAN & BRUYA, INC.

## ENVIRONMENTAL CHEMISTS

### **Data Qualifiers & Definitions**

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

909218

SAMPLE CHAIN OF CUSTODY

ME 09-13-19

VW4/A04  
Page # 1 of 2

Send Report to: Rob Roberts, cc: Jon Loeffler, Clare Tochilin

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) *[Signature]*

PROJECT NAME/NO. SKS SHELL / 0914-001 PO # 0914-001

REMARKS

TURNAROUND TIME  
Standard (2 Weeks)  
RUSH  
Rush charges authorized by: \_\_\_\_\_

SAMPLE DISPOSAL  
Dispose after 30 days  
Return samples  
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED				Notes
								NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	CVOCs by 8260C	
MW105-20190912	MW105	-	01A	9/12/19	1038	W	4	X	X	X		
MW113-20190912	MW113	-	02	9/12/19	1135		4	X	X	X		
MW112-20190912	MW112	-	03	9/12/19	1216		4	X	X	X		
MW110-20190912	MW110	-	04	9/12/19	1241		4	X	X	X		
MW109-20190912	MW109	-	05	9/12/19	1356		4	X	X	X		
MW108-20190912	MW108	-	06	9/12/19	1540		4	X	X	X		
MW102-20190912	MW102	-	07	9/12/19	1406		4	X	X	X		
RW05-20190912	RW05	-	08	9/12/19	1654		4	X	X	X		
RW04-20190913	RW04	-	09	9/13/19	0902		4	X	X	X		
RW03-20190913	RW03	-	10	9/13/19	1014		4	X	X	X		

Friedman & Bruya, Inc.  
3012 16th Avenue West  
Seattle, WA 98119-2029  
Ph. (206) 285-8282  
Fax (206) 233-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
<i>[Signature]</i>	Audrey Michniak	SES	9/13/19	304
<i>[Signature]</i>	Wham Pham	FEBI	9/13/19	1304
Relinquished by:			4	°C
Received by:		Samples received at		

909218

SAMPLE CHAIN OF CUSTODY

ME 09-13-19

JWY/AUY

Send Report to: Rob Roberts, cc: Jon Loeffler, Clare Tochilin

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)	
PROJECT NAME/NO. SKS SHELL / 0914-001	PO # 0914-001
REMARKS	

Page # 2 of 2

TURNAROUND TIME  
Standard (2 Weeks)  
RUSH \_\_\_\_\_  
Rush charges authorized by: \_\_\_\_\_

SAMPLE DISPOSAL  
Dispose after 30 days  
Return samples  
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED				Notes
								NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	CYOCs by 8260C	
MW101-20190913	MW101	-	11A	9/13/19	1117	W	4	X	X	X		
MW111-20190913	MW111	-	12	9/13/19	1158	W	4	X	X	X		
<del>MW99-20190913</del>	<del>MW99</del>	<del>-</del>	<del>13</del>	<del>9/13/19</del>	<del>1200</del>	<del>W</del>	<del>4</del>	<del>X</del>	<del>X</del>	<del>X</del>		# Added in Lab EUB 9/13
<del>ARM 89/13/19</del>												

Friedman & Bruya, Inc.  
3012 16th Avenue West  
Seattle, WA 98119-2029  
Ph. (206) 285-8282  
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Audrey Michniak	JES	9/13/19	1304
Received by:	Nhan Phan	FBI	9/13/19	1304
Relinquished by:				
Received by:				

**ATTACHMENT B  
DATA VALIDATION REPORT**

# **DATA VALIDATION REPORT**

## **SKS SHELL Third Quarter 2019**

### **Prepared for:**

Sound Earth Strategies, Inc.  
2811 Fairview Ave East, Suite 2000  
Seattle, Washington 98102

### **Prepared by:**

Validata, LLC  
3346 NE 178<sup>th</sup> St.  
Lake Forest Park, Washington 98155

# PROJECT NARRATIVE

## Data Validation

This report summarizes the results of the summary level validation (Stage 2A) performed on water samples for the SKS Shell sampling project. A complete list of samples is provided in the Sample Index. Samples were analyzed by Friedman & Bruya, Inc. laboratory, Seattle, Washington. The analytical methods are listed below:

## Sample Index

ANALYSIS	METHOD	Reviewer
BTEX, TPH as Gasoline Range	SW8021B/NWTPH-Gx	C. Jensen
Total Petroleum Hydrocarbons – Diesel Range, Motor Oil	NWTPH-Dx	C. Jensen

The data were reviewed using guidance and quality control criteria documented in the analytical methods; *USEPA National Functional Guidelines for Organic Data Review* (EPA, 2017).

The goal of data validation is to assign data assessment qualifiers for assistance in data interpretation. Results assigned as estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. For results assigned an R, the data are rejected and should not be used for site evaluation purposes. Unqualified data implies the data meet the data quality objectives as stated in the documents and methods referenced above. A summary of the data qualifiers used in validation are included in Appendix A. The summary of Qualified Data are provided in Appendix B. All validation worksheets are provided in Appendix C.

## SAMPLE INDEX

SDG	Sample ID	Lab Sample ID	BTEX	NWTPH-Gx	NWTPH-Dx
909218	MW112-20190912	909218-03	X	X	X
909218	MW113-20190912	909218-02	X	X	X
909218	MW109-20190912	909218-05	X	X	X
909218	RW03-20190913	909218-10	X	X	X
909218	RW04-20190913	909218-09	X	X	X
909218	RW05-20190912	909218-08	X	X	X
909218	MW101-20190913	909218-11	X	X	X
909218	MW99-20190913	909218-13	X	X	X
909218	MW102-20190912	909218-07	X	X	X
909218	MW108-20190912	909218-06	X	X	X
909218	MW105-20190912	909218-01	X	X	X
909218	MW110-20190912	909218-04	X	X	X
909218	MW111-20190913	909218-02	X	X	X

## DATA VALIDATION REPORT

### Volatile Organic Compounds - Method SW8021B – Benzene, Toluene, Ethylbenzene, Xylenes

This report documents the review of analytical data from the analyses of water samples and the associated laboratory and field quality control (QC) samples. Friedman & Bruya, Inc. laboratory, Seattle, Washington. Refer to the Sample Index for a complete list of samples.

SDG	NUMBER OF SAMPLES	VALIDATION LEVEL
909218	13	STAGE 2A

## DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables for a Stage 2A review. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

## HARDCOPY VERIFICATION

Sample IDs and results reported in the data summary spreadsheet were verified (10% verification) by comparing the spreadsheet with the laboratory data package. Ten percent (10%) of the laboratory QC results were also verified.

## TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Sample Receipt, Preservation, and Holding Times	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
Laboratory Blanks	Field Duplicates
Field Blanks	Target Analyte List
Surrogate Compounds	Reporting Limits
Laboratory Control Samples (LCS)	Reported Results

### Sample Receipt, Preservation, and Holding Times

The validation guidance documents state that the cooler temperatures should be within an advisory temperature range of 0° to 6°C. For volatiles analysis, no action is taken if the cooler temperature is <10°C. If the cooler temperature is >10°C, associated sample results are estimated (J/UJ-1). With the exceptions noted below, the laboratory received the sample coolers within the advisory temperature range.

*SDG 909218:* The cooler temperatures were within the recommended temperature range.

### Method and Field Blanks

The method blanks were all reported as undetected for target compounds.

### Surrogate Compounds

Surrogates were added to all samples. All surrogate recoveries were within the laboratory control limits.

### Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) samples were not specifically analyzed for this dataset. The laboratory demonstrated precision and accuracy through the analysis of laboratory control and laboratory control sample duplicate samples (LCS/LCSD) with acceptable results.

## Field Duplicates

For water samples, the RPD control limit is 20% for results greater than 5x the reporting limit (RL). For results less than 5x the RL, the absolute difference between the sample and replicate must be less than 1x the RL.

*SDG 909218*: Sample pair MW99-20190913/RW03-20190913 were identified as a field duplicate pair. Field precision was acceptable as summarized below. Field data are not qualified for duplicate precision exceedance.

Sample ID	lab ID	analyte	909218-13	909218-10	RPD
MW99-20190913	909218-13	benzene	0	0	0%
RW03-20190913	909218-10	toluene	0	0	0%
		ethyl benzene	1.6	1.4	13%
		xylene	3.4	3.0	12.5%

## Target Analyte List

A sampling plan was not available for review.

## Reporting Limits

The laboratory reporting limits were sufficiently below the MTCA Method A cleanup levels provided in appendix B.

## Reported Results

Reported results were considered acceptable.

## OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. With the exceptions noted above, accuracy was acceptable as demonstrated by the surrogate, LCS recovery values. Precision was acceptable as demonstrated by the LCS and field duplicate RPD values. All data are acceptable for use.

## DATA VALIDATION REPORT

### TPH as Gasoline Range Organics - Method NWTPH-Gx

This report documents the review of analytical data from the analyses of water samples and the associated laboratory and field quality control (QC) samples. Friedman & Bruya, Inc. laboratory, Seattle, Washington. Refer to the Sample Index for a complete list of samples.

SDG	NUMBER OF SAMPLES	VALIDATION LEVEL
909218	13	STAGE 2A

## DATA PACKAGE COMPLETENESS

With the exception noted below, the laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

## **HARDCOPY VERIFICATION**

Sample IDs and results reported in the data summary spreadsheet were verified (10% verification) by comparing the spreadsheet the laboratory data package. Ten percent (10%) of the laboratory QC results were also verified.

## **TECHNICAL DATA VALIDATION**

The QC requirements that were reviewed are listed below.

Sample Receipt, Preservation, and Holding Times	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
Laboratory Blanks	Field Duplicates
Field Blanks	Target Analyte List
Surrogate Compounds	Reporting Limits
Laboratory Control Samples (LCS)	Reported Results

### **Sample Receipt, Preservation, and Holding Times**

As stated in the validation guidance documents, sample shipping coolers should arrive at the laboratory within the advisory temperature range of 0°C-6°C and samples must be analyzed within 14 days. For volatiles analysis, no action is taken if the cooler temperature is <10°C. If the cooler temperature is >10°C, associated sample results are estimated (J/UJ-1). The following exceptions were noted during validation:

*SDG 909218:* The cooler temperatures were within the recommended temperature range.

### **Method and Field Blanks**

The method blanks were all reported as undetected for target compounds.

### **Surrogate Compounds**

Surrogates were added to all samples. All surrogate recoveries were within the laboratory control limits.

### **Matrix Spike/Matrix Spike Duplicates**

Matrix spike/matrix spike duplicate (MS/MSD) samples were not specifically analyzed for this dataset. The laboratory demonstrated precision and accuracy through the analysis of laboratory control and laboratory control duplicate samples (LCS/LCSD) with acceptable results.

### **Field Duplicates**

For water samples, the RPD control limit is 20% for results greater than 5x the reporting limit (RL). For results less than 5x the RL, the absolute difference between the sample and replicate must be less than 1x the RL.

*SDG 909218:* Sample pair MW99-20190913/RW03-20190913 were identified as a field duplicate pair. Field precision was acceptable as summarized below. Field data are not qualified for duplicate precision exceedance.

Sample ID	lab ID	analyte	909218-13	909218-10	RPD
MW99-20190913	909218-13	GRO	310	270	13.8%
RW03-20190913	909218-10				

### Target Analyte List

A sampling plan was not available for review.

### Reporting Limits

The laboratory reporting limits were sufficiently below the MTCA Method A cleanup levels provided in appendix B.

### Reported Results

Results reported were deemed acceptable.

### OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. With the exceptions noted above, accuracy was acceptable as demonstrated by the surrogate and LCS recovery values. Precision was acceptable as demonstrated by the LCS and laboratory and field duplicate RPD values. All data, as qualified, are acceptable for use.

## DATA VALIDATION REPORT

### Diesel Range, Motor Oil - Method NWTPH-Dx

This report documents the review of analytical data from the analyses of water samples and the associated laboratory and field quality control (QC) samples. Friedman & Bruya, Inc. laboratory, Seattle, Washington. Refer to the Sample Index for a complete list of samples.

SDG	NUMBER OF SAMPLES	VALIDATION LEVEL
909218	13	STAGE 2A

### DATA PACKAGE COMPLETENESS

With the exception noted below, the laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative if applicable.

### HARDCOPY VERIFICATION

Sample IDs and results reported in the data summary spreadsheet were verified (10% verification) by comparing the spreadsheet the laboratory data package. Ten percent (10%) of the laboratory QC results were also verified.

### TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Sample Receipt, Preservation, and Holding Times	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
Laboratory Blanks	Field Duplicates
Field Blanks	Target Analyte List
Surrogate Compounds	Reporting Limits
Laboratory Control Samples (LCS)	Reported Results

### Sample Preservation and Holding Times

As stated in validation guidance documents, sample shipping coolers should arrive at the laboratory within the advisory temperature range of 0°C - 6°C and be extracted within 7 days for aqueous samples and 14 days for soil samples. Sample extracts must be analyzed within 40 days of extraction.

*SDG 909218:* The cooler temperatures were within the recommended temperature range.

### Method and Field Blanks

The method blanks were all reported as undetected for target compounds. Field blanks were not submitted with this sampling event.

### Surrogate Compounds

Surrogates were added to all samples. All surrogate recoveries were within the laboratory control limits.

### Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) samples were not specifically analyzed for this dataset. The laboratory demonstrated precision and accuracy through the analysis of laboratory control samples (LCS) and laboratory control sample duplicates (LCSD) with acceptable results.

### Field Duplicates

For water samples, the RPD control limit is 20% for results greater than 5x the reporting limit (RL). For results less than 5x the RL, the absolute difference between the sample and replicate must be less than 1x the RL.

*SDG 909218:* Sample pair MW99-20190913/RW03-20190913 were identified as a field duplicate pair. Field precision was acceptable as summarized below. Field data are not qualified for duplicate precision exceedance.

Sample ID	lab ID	analyte	909218-13	909218-10	RPD
MW99-20190913	909218-13	Diesel Range	380	360	5.4%
RW03-20190913	909218-10	Motor Oil	0	0	0

### Target Analyte List

A sampling plan was not available for review.

### Reporting Limits

The laboratory reporting limits were sufficiently below the MTCA Method A cleanup levels provided in appendix B.

**Reported Results**

*SDG 909218*: Samples MW113-20190912, MW110-20190912, MW109-20190912, MW108-20190912, MW102-20190912, RW05-20190912, RW04-20190913, RW03-20190913 and MW99-20190913 were qualified as estimated (J+) and reason code 2 since the laboratory reported the diesel results as "x" indicating the chromatographic pattern does not match the standard.

**OVERALL ASSESSMENT**

As determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD recovery values. Precision was also acceptable as demonstrated by the LCS/LCSD and laboratory and field duplicate relative percent difference values. The data were qualified due to sample versus fuel reference material not matching, as indicated by the laboratory. All data, as reported, are acceptable for use.

**APPENDIX A  
DATA QUALIFIER DEFINITIONS  
REASON CODES  
AND CRITERIA TABLES**

## **DATA VALIDATION QUALIFIER CODES**

### **Based on National Functional Guidelines**

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the approximate concentration.

UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

## DATA QUALIFIER REASON CODES

Group	Code	Reason for Qualification
Sample Handling	1	Improper Sample Handling or Sample Preservation (i.e., headspace, cooler)
Instrument Performance	24	Instrument Performance (i.e., tune, resolution, retention time window, endrin breakdown, lock-mass)
Instrument Performance	5A	Initial Calibration (RF, %RSD, r2)
Instrument Performance	5B	Calibration Verification (CCV, CCAL; RF, %D, %R) Use bias flags (H,L)1 where appropriate
Instrument Performance	5C	Initial Calibration Verification (ICV %D, %R) Use bias flags (H,L)1 where appropriate
Blank Contamination	7	Field Blank Contamination (Equipment Rinsate, Trip Blank, etc.)
Blank Contamination	6	Lab Blank Contamination (i.e., method blank, instrument blank, etc.) Use low bias flag (L)1 for negative instrument blanks
Precision and Accuracy	8	Matrix Spike (MS and/or MSD) Recoveries Use bias flags (H,L)1 where appropriate
Precision and Accuracy	9	Precision (all replicates: LCS/LCSD, MS/MSD, Lab Replicate, Field Replicate)
Precision and Accuracy	10	Laboratory Control Sample Recoveries (a.k.a. Blank Spikes) Use bias flags (H,L)1 where appropriate
Precision and Accuracy	12	Reference Material Use bias flags (H,L)1 where appropriate
Precision and Accuracy	13	Surrogate Spike Recoveries (a.k.a. labeled compounds, recovery standards) Use bias flags (H,L)1 where appropriate
Interferences	16	ICP/ICP-MS Serial Dilution Percent Difference
Interferences	17	ICP/ICP-MS Interference Check Standard Recovery Use bias flags (H,L)1 where appropriate
Interferences	19	Internal Standard Performance (i.e., area, retention time, recovery)
Interferences	22	Elevated Detection Limit due to Interference (i.e., chemical and/or matrix)
Interferences	23	Bias from Matrix Interference (i.e. diphenyl ether, PCB/pesticides)
Identification and Quantitation	2	Chromatographic pattern in sample does not match pattern of calibration standard
Identification and Quantitation	3	2nd column confirmation (RPD or %D)
Identification and Quantitation	4	Tentatively Identified Compound (TIC) (associated with NJ only)
Identification and Quantitation	20	Calibration Range or Linear Range Exceeded
Identification and Quantitation	25	Compound Identification (i.e., ion ratio, retention time, relative abundance, etc.)
Miscellaneous	11	A more appropriate result is reported (multiple reported analyses i.e., dilutions, reextractions, etc. Associated with "R" and "DNR" only)
Miscellaneous	14	Other (See DV report for details)
Miscellaneous	26	Method QC information not provided

## DATA VALIDATION CRITERIA

Volatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)  
(Based on NFG 1999 & 2008 and SW-846 Method 8260, analyzed by SW8021B)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
<b>Blanks</b>					
Method Blank (MB)	MB: One per matrix per batch (of $\leq 20$ sample) No TICs present	NFG (2) Method (3)	U (pos) if result is $< 5X$ or $10X$ action level R (pos) TICs using $10X$ rule	7	10X action level for methylene chloride, acetone, & 2-butanone. 5X for all other target analytes Hierarchy of blank review: #1 - Review MB, qualify as needed #2 - Review TB, qualify as needed #3 - Review FB, qualify as needed Note: Actions as per NFG 1999
Trip Blank (TB)	No detected compounds $> MDL$	NFG (2) Method (3)	U (pos) if result is $< 5X$ or $10X$ action level	6	
Field Blank (FB)	No detected compounds $> MDL$	NFG (2) Method (3)	U (pos) if result is $< 5X$ or $10X$ action level	6	
<b>Precision and Accuracy</b>					
LCS/LCSD (recovery)	One per matrix per batch (of $\leq 20$ samples)	Method (3)	J (pos) if $\%R > UCL$ J (pos)/UJ (ND) if $\%R < LCL$ J (pos)/R (ND) $\%R < 10\%$	10 (H,L)4	No action if only one spike $\%R$ is outside criteria when LCSD is analyzed, unless one recovery is $< 10\%$ . QAPP may have overriding accuracy limits.
LCS/LCSD RPD	If LCSD analyzed RPD $< lab$ limits	Method (3)	J (pos)	9	Qualify all associated samples. QAPP may have overriding precision limits.
Reference Material (RM, SRM, or CRM)	Result $\pm 20\%$ of the 95% confidence interval of the true value for analytes	Standard review	J (pos)/UJ (ND) if $< LCL$ J (pos) if $> UCL$	12 (H,L)4	QAPP may have overriding accuracy limits. Some manufacturers may have different RM control limits
Surrogates	Added to all samples Within method/laboratory control limits	NFG (1) Method (3)	J (pos) if $\%R > UCL$ J (pos)/UJ (ND) if $\%R < LCL$ J (pos)/R (ND) if $< 10\%$	13 (H,L)4	No action if there are 4+ surrogates and only 1 outlier. Qualify all compounds if qualification is required.
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	NFG (1) Method (3)	J (pos) if $> 200\%$ J (pos)/UJ (ND) if $< 50\%$ J (pos)/R (ND) if $< 25\%$ if RT $> 30$ seconds use PJ	19	Qualify compounds quantified using particular internal standard
MS/MSD (recovery)	One per matrix per batch (of $\leq 20$ samples) Use method acceptance criteria/laboratory limits	NFG (1) Method (3)	J (pos) $\%R > UCL$ J (pos)/UJ (ND) if both $\%R < LCL$ J (pos)/R (ND) if both $\%R < 10\%$ J (pos)/UJ (ND) if one $> UCL$ & one $< LCL$ , with no bias	8 (H,L)4	No action if only one spike $\%R$ is outside criteria. No action if parent concentration is $> 4x$ the amount spiked. Qualify parent sample only.
MS/MSD (RPD)	One per matrix per batch (of $\leq 20$ samples) Use method acceptance criteria/laboratory limits	NFG (1) Method (3)	J (pos) If RPD $> control$ limit	9	Qualify parent sample only
Field Duplicates	Solids: RPD $< 50\%$ OR difference $< 2X$ RL (for results $< 5X$ RL) Aqueous: RPD $< 35\%$	Standard review	J (pos)/UJ (ND) Qualify only parent and field duplicate samples	9	Use project limits if specified

	OR difference < 1X RL (for results < 5X RL)				
<b>Compound Identification and Quantitation</b>					
Retention Time Relative Ion Intensities	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	NFG (1) Method (3)	U (pos) if identification criteria not met	25	
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NFG (1) Method (3)	NJ TIC R (pos) if common laboratory contaminants	4	Common laboratory contaminants: aldol condensation products, solvent preservatives, and reagent contaminants
Calibration Range	Results greater than highest calibration standard	Standar d review	Qualify J (pos)	20	If result from dilution analysis is not reported.
Dilutions, Reextractions and/or Reanalyses	Report only one result per analyte	Standar d review	Report best result	11	Best value reported

1 National Functional Guidelines for Organic Data Review, June, 2008 (pos): Positive Result

2 National Functional Guidelines for Organic Data Review, Oct, 1999 (ND): Non-detect

3 Method SW846 8260C Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

4 NFG 2013 suggests using "+ / -" to indicate bias; validation uses "H" = high bias indicated; "L" = low bias indicated.

## DATA VALIDATION CRITERIA

**Validation Guidelines for Total Petroleum Hydrocarbons-Gasoline Range  
(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Gx,  
June 1997, Wa DOE & Oregon DEQ)**

QC Element	Acceptance Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
<b>Sample Handling</b>				
Cooler Temperature & Preservation	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6°C	1	
Holding Time	Waters: 14 days preserved 7 days unpreserved Solids: 14 Days	J(+)/UJ(-) if hold times exceeded J(+)/R(-) if exceeded > 3X	1	Professional Judgement
<b>Instrument Performance</b>				
Initial Calibration	5 calibration points (All within 15% of true value) Linear Regression: $r^2 \geq 0.990$ If used, RSD of response factors $\leq 20\%$	Narrate if fewer than 5 calibration levels or if %R > 15% J(+)/UJ(-) if $r^2 < 0.990$ J(+)/UJ(-) if %RSD > 20% 5A Mid-range Calibration Check Std. Analyzed before and after each analysis shift & every 20 samples. Recovery range 80% to 120%	5A	
Mid-range Calibration Check Std.	Analyzed before and after each analysis shift & every 20 samples. Recovery range 80% to 120%	Narrate if frequency not met. J(+)/UJ(-) if %R < 80% J(+) if %R > 120%	5B	
<b>Blank Contamination</b>				
Method Blank	At least one per batch ( $\leq 10$ samples)	U (at the RL) if sample result is < RL & < 5X blank result. U (at reported sample value) if sample result is $\geq$ RL and < 5X blank result	7	
Trip Blank (if required by project)	No results > RL	Action is same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned.	18	
Field Blanks (if required by project)	No results > RL	remaining in field blank after method and trip blank qualifiers are assigned.	6	
<b>Precision and Accuracy</b>				
MS samples (accuracy) (if required by project)	%R within lab control limits	Qualify parent only, unless other QC indicates systematic problems. J(+) if both %R > upper control limit (UCL) J(+)/UJ(-) if both %R < lower control limit (LCL) No action if parent conc. > 5X the amount spiked.	8	Use Professional Judgement if only one %R outlier
Precision: MS/MSD or LCS/LCSD or sample/dup	At least one set per batch ( $\leq 10$ samples) RPD $\leq$ lab control limit	J(+) if RPD > lab control limits	9	
LCS (not required by method)	%R within lab control limits	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R < 10%	10	Professional Judgement
Surrogates	1,4-difluorobenzene added to all samples (inc. QC samples). %R = 50-150%	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R < 10% No action if 2 or more surrogates are used, and only one is outside control limits.	13	Professional Judgement
Pattern Identification	Compare sample chromatogram to standard chromatogram to ensure range and pattern are reasonable match. Laboratory may flag results which have poor match.	J(+)	2	
Field Duplicates	Use project control limits, if stated in QAPP default: water: RPD < 35% solids: RPD < 50%	Narrate outliers If required by project, qualify with J(+)/UJ(-)	9	
<b>Compound ID and Calculation</b>				
Two analyses for one sample (e.g., dilution)	Report only one result per analyte	best value chosen	11	

# DATA VALIDATION CRITERIA

Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range  
(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx,  
June 1997, Wa DOE & Oregon DEQ)

QC Element	Acceptance Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
<b>Sample Handling</b>				
Cooler Temperature & Preservation	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C	1	
Holding Time	Ext. Waters: 14 days preserved 7 days unpreserved Ext. Solids: 14 Days Analysis: 40 days from extraction	J(+)/UJ(-) if hold times exceeded J(+)/R(-) if exceeded > 3X	1	Professional Judgement
<b>Instrument Performance</b>				
Initial Calibration	5 calibration points (All within 15% of true value) Linear Regression: r2≥0.990 If used, RSD of response factors ≤20%	Narrate if fewer than 5 calibration levels or if %R >15% J(+)/UJ(-) if r2 <0.990 J(+)/UJ(-) if %RSD > 20%	5A	
Mid-range Calibration Check Std.	Analyzed before and after each analysis shift & every 20 samples. Recovery range 85% to 115%	Narrate if frequency not met. J(+)/UJ(-) if %R < 85% J(+) if %R >115%	5B	
<b>Blank Contamination</b>				
Method Blank	At least one per batch (≤20 samples) Method Blank No results >R	U (at the RL) if sample result is < RL & < 5X blank result. 7 U (at reported sample value) if sample result is ≥ RL and < 5X blank result	7	
Field Blanks (if required by project)	No results > RL.	Action is same as method blank for positive results remaining in the field blank after method blank qualifiers are assigned.	6	
<b>Precision and Accuracy</b>				
MS samples (accuracy) (if required by project)	%R within lab control limits	Qualify parent only, unless other QC indicates systematic problems. J(+) if both %R > upper control limit (UCL) J(+)/UJ(-) if both %R < lower control limit (LCL) No action if parent conc. >5X the amount spiked.	8	Use Professional Judgement if only one %R outlier
Precision: MS/MSD or LCS/LCSD or sample/dup	At least one set per batch (≤10 samples) RPD ≤ lab control limit	J(+) if RPD > lab control limits	9	
LCS (not required by method)	%R within lab control limits	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10%	10	Professional Judgement
Surrogates	2-fluorobiphenyl, p-terphenyl, o-terphenyl, and/or pentacosane added to all samples (inc. QC samples). %R = 50-150%	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10% No action if 2 or more surrogates are used, and only one is outside control limits	13	Professional Judgement
Pattern Identification	Compare sample chromatogram to standard chromatogram to ensure range and pattern are reasonable match. Laboratory may flag results which have poor match.	J(+)	2	
Field Duplicates	Use project control limits, if stated in QAPP default: water: RPD < 35% solids: RPD < 50%	Narrate (Use Professional Judgement to qualify)	9	
<b>Compound ID and Calculation</b>				
Two analyses for one sample (dilution)	Report only one result per analyte	all results that should not be reported.	11	



**APPENDIX B**  
**QUALIFIED DATA SUMMARY TABLE**

ID	Sample Date	GRPH <sup>(2)</sup>	Benzene <sup>(3)</sup>	Toluene <sup>(3)</sup>	Ethyl-benzene <sup>(3)</sup>	Total Xylenes <sup>(3)</sup>	DRPH <sup>(2)</sup>	validation qualifier	ORPH <sup>(2)</sup>	validation qualifier
MW101	9/13/19	<100	<1	<1	<1	<3	<50		<250	
MW102	9/12/19	<100	<1	<1	<1	<3	110x	J+, 2	<250	
MW105	9/12/19	<100	<1	<1	<1	<3	<50		<250	
RW03	9/13/19	270	<1	<1	1.4	3.0	360x	J+, 2	<250	
RW04	9/13/19	180	<1	<1	<1	<3	290x	J+, 2	<250	
RW05	9/12/19	<100	<1	<1	<1	<3	190x	J+, 2	<250	
MW108	9/12/19	100	<1	<1	<1	<3	1200x	J+, 2	<320	
MW109	9/12/19	110	<1	<1	<1	<3	110x	J+, 2	<250	
MW99	9/13/19	310	<1	<1	1.6	3.4	380x	J+, 2	<250	
MW113	9/12/19	<100	<1	<1	<1	<3	87x	J+, 2	<250	
MW112	9/12/19	<100	<1	<1	<1	<3	<50		<250	
MW111	9/13/19	<100	<1	<1	<1	<3	<50		<250	
MW110	9/12/19	<100	<1	<1	<1	<3	73x	J+, 2	<180	
<b>MTCA GW criteria</b>		<b>1,000/800<sup>(6)</sup></b>	<b>5</b>	<b>1,000</b>	<b>700</b>	<b>1,000</b>	<b>500</b>		<b>500</b>	

Red indicates concentrations exceeding MTCA Method A cleanup levels for groundwater.

Samples analyzed by Friedman & Bruya, Inc. of Seattle, Washington.

<sup>(2)</sup>Analyzed by Method NWTPH-Gx (gasoline) and NWTPH-Dx (diesel and oil).

<sup>(3)</sup>Analyzed by EPA Method 8260B or 8260C.

<sup>(4)</sup>Analyzed by Method NWTPH-Dx; sample extracts passed through a silica gel column prior to analysis.

<sup>(5)</sup>MTCA Cleanup Regulation, Method A Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised November 2007.

<sup>(6)</sup>1,000 µg/L when benzene is not present and 800 µg/L when benzene is present.

Laboratory Note:

\*The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Validation qualifiers

J+ numerical value is the approximate concentration

Validation Codes

2 Chromatographic pattern in sample does not match pattern of calibration standard

DRPH = diesel-range petroleum hydrocarbons

EPA = U.S. Environmental Protection Agency

GRPH = gasoline-range petroleum hydrocarbons

MTCA = Washington State Model Toxics Control Act

NWTPH = Northwest Total Petroleum Hydrocarbon

ORPH = oil-range petroleum hydrocarbons

SoundEarth = SoundEarth Strategies, Inc.

**APPENDIX C**  
**DATA VALIDATION CHECKLISTS**

# VALIDATION WORKSHEET

Method: BTEX MTPH-GX

Date Reviewed: 9-26-19

Sample Collection Dates: 9-12-19, 9-13-19

SDG: 709218  
Reviewer: C Jensen

The following data validation areas were reviewed:

Sample Identification	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Validation Criteria	MW105-20190912	MW113-	MW112-	MW110-	MW109-	MW108-	MW107-	MW105-	MW104-20190913	MW087-	MW101-	MW111-	MW099-							
Sample results	A																			
Holding Times	A																			
Completion	A																			
Method Blanks	A																			
LCS	A																			
duplicate RPD	A																			
MS/MSD:																				

Note: X = Criteria were evaluated and not met. A = Criteria were evaluated and met. N = Data was not available for review. NA = Not applicable.

**Comments:**

Surrogate

and 9/12/19, 9/13/19

and 9/16/19

and 9/16/19, 9/17/19

→ all MW087/MW099

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/19/19  
 Date Received: 09/13/19  
 Project: SOU\_0914-001\_20190913, F&BI 909218  
 Date Extracted: 09/16/19  
 Date Analyzed: 09/16/19 and 09/17/19

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
 FOR BENZENE, TOLUENE, ETHYLBENZENE,  
 XYLENES AND TPH AS GASOLINE  
 USING METHODS 8021B AND NWTPH-Gx  
 Results Reported as ug/L (ppb)**

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl Benzene</u>	<u>Total Xylenes</u>	<u>Gasoline Range</u>	<u>Surrogate (% Recovery)</u> (Limit 52-124)
MW105-20190912 909218-01	<1	<1	<1	<3	<100	82
MW113-20190912 909218-02	<1	<1	<1	<3	<100	85
MW112-20190912 909218-03	<1	<1	<1	<3	<100	83
MW110-20190912 909218-04	<1	<1	<1	<3	<100	84
MW109-20190912 909218-05	<1	<1	<1	<3	110	84
MW108-20190912 909218-06	<1	<1	<1	<3	100	84
MW102-20190912 909218-07	<1	<1	<1	<3	<100	84
RW05-20190912 909218-08	<1	<1	<1	<3	<100	86
RW04-20190913 909218-09	<1	<1	<1	<3	180	80
RW03-20190913 909218-10	<1	<1	1.4	3.0	270	81

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/19/19  
Date Received: 09/13/19  
Project: SOU\_0914-001\_20190913, F&BI 909218  
Date Extracted: 09/16/19  
Date Analyzed: 09/16/19 and 09/17/19

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR BENZENE, TOLUENE, ETHYLBENZENE,  
XYLENES AND TPH AS GASOLINE  
USING METHODS 8021B AND NWTPH-Gx**  
Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl Benzene</u>	<u>Total Xylenes</u>	<u>Gasoline Range</u>	<u>Surrogate (% Recovery)</u> (Limit 52-124)
MW101-20190913 909218-11	<1	<1	<1	<3	<100	82
MW111-20190913 909218-12	<1	<1	<1	<3	<100	82
MW99-20190913 909218-13	<1	<1	1.6	3.4	310	79
Method Blank 09-2216 MB	<1	<1	<1	<3	<100	87

NWTPH-

### VALIDATION WORKSHEET

Method: DX

SDG: 9109218  
Reviewer: C Jensen

Date Reviewed: 9.30.19

Sample Collection Dates: 9.12.19 9.13.19

The following data validation areas were reviewed:

Sample Identification	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Validation Criteria	MW105-20190912	113	112	110	109	108	102	PW05	PW04 - 20190912	PW03	MW101	111	99							
Sample results	A																			
Holding Times	A																			
Completion	A																			
Method Blanks	A																			
LCS / LCSN duplicate RPD	A																			
MS/MSD:																				

Note: X = Criteria were evaluated and not met. A = Criteria were evaluated and met. N = Data was not available for review. NA = Not applicable.

**Comments:**

all 9.12. + 9.13.19  
 prep 9.16.19  
 run 9.16.19

chron.

x. pattern not match final standard

JH JZ

Dresser MW113 | MW09

- 110
- 109
- 108
- 102
- PW05
- PW04
- PW03

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/19/19  
 Date Received: 09/13/19  
 Project: SOU\_0914-001\_20190913, F&BI 909218  
 Date Extracted: 09/16/19  
 Date Analyzed: 09/16/19

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
 FOR TOTAL PETROLEUM HYDROCARBONS AS  
 DIESEL AND MOTOR OIL  
 USING METHOD NWTPH-Dx  
 Results Reported as ug/L (ppb)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C <sub>10</sub> -C <sub>25</sub> )	<u>Motor Oil Range</u> (C <sub>25</sub> -C <sub>36</sub> )	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 47-140)
MW105-20190912 909218-01	<50	<250	119
MW113-20190912 909218-02	87 x J+ 2	<250	117
MW112-20190912 909218-03	<50	<250	110
MW110-20190912 909218-04 1/0.7	73 x J+ 2	<180	105
MW109-20190912 909218-05	110 x J+ 2	<250	111
MW108-20190912 909218-06 1/1.3	1,200 x J+ 2	<320	91
MW102-20190912 909218-07	110 x J+ 2	<250	124
RW05-20190912 909218-08	190 x J+ 2	<250	122
RW04-20190913 909218-09	290 x J+ 2	<250	118
RW03-20190913 909218-10	360 x J+ 2	<250	122

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/19/19  
Date Received: 09/13/19  
Project: SOU\_0914-001\_20190913, F&BI 909218  
Date Extracted: 09/16/19  
Date Analyzed: 09/16/19

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL AND MOTOR OIL  
USING METHOD NWTPH-Dx**  
Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C <sub>10</sub> -C <sub>25</sub> )	<u>Motor Oil Range</u> (C <sub>25</sub> -C <sub>36</sub> )	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 47-140)
MW101-20190913 909218-11	<50	<250	118
MW111-20190913 909218-12	<50	<250	106
MW99-20190913 909218-13	380 x J+Z	<250	119
Method Blank 09-2284 MB	<50	<250	122

909218

SAMPLE CHAIN OF CUSTODY

ME 09-13-19

VW4/A04  
Page # 1 of 2

Send Report to: Rob Roberts, cc: Jon Loeffler, Clare Tochilin

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) <i>[Signature]</i>	
PROJECT NAME/NO. SKS SHELL / 0914-001	PO # 0914-001
REMARKS	

TURNAROUND TIME Standard (2 Weeks) RUSH Rush charges authorized by:
SAMPLE DISPOSAL Dispose after 30 days Return samples Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED				Notes
								NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	CVOCs by 8260C	
MW105-20190912	MW105	-	A-01D	9/12/19	1038	W	4	X	X	X		
MW113-20190912	MW113	-	02	9/12/19	1135		4	X	X	X		
MW112-20190912	MW112	-	03	9/12/19	1216		4	X	X	X		
MW110-20190912	MW110	-	04	9/12/19	1241		4	X	X	X		
MW109-20190912	MW109	-	05	9/12/19	1356		4	X	X	X		
MW108-20190912	MW108	-	06	9/12/19	1540		4	X	X	X		
MW102-20190912	MW102	-	07	9/12/19	1406		4	X	X	X		
RW05-20190912	RW05	-	08	9/12/19	1654		4	X	X	X		
RW04-20190913	RW04	-	09	9/13/19	0902		4	X	X	X		
RW03-20190913	RW03	-	10	9/13/19	1014		4	X	X	X		

Friedman & Bruya, Inc.  
3012 16th Avenue West  
Seattle, WA 98119-2029  
Ph. (206) 285-8282  
Fax (206) 233-5044

FORMS/COC/C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: <i>[Signature]</i>	Audrey Michniak	SES	9/13/19	1304
Received by: <i>[Signature]</i>	Ngan Phan	FBI	9/13/19	1304
Relinquished by:			4	
Received by:		Samples received at	___ °C	