# INTERIM ACTION REPORT
# Former Chevron Service Station No. 90129
## 4700 Brooklyn Avenue NE, Seattle, WA

Prepared for: FH Brooklyn, LLC & Chevron Environmental Management Company

Project No. 160092 • December 10, 2018 Agency Review Draft

Aspect CONSULTING

earth + water

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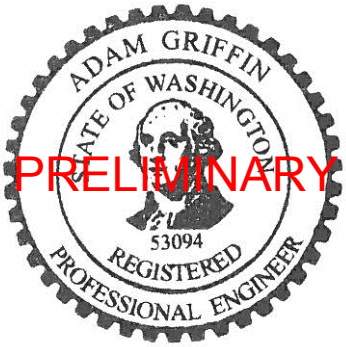


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# Executive Summary

An interim action was performed at the former Chevron Service Station No. 90129 property located at 4700 Brooklyn Avenue NE in Seattle, Washington (Site) to remove petroleum-contaminated soil and groundwater and allow the redevelopment of the Property. The interim action was completed by FH Brooklyn, LLC under an Agreed Order No. DE 13815 (Agreed Order), effective January 11, 2017, with the Washington State Department of Ecology (Ecology). All activities taken during the interim action were completed in full accordance with the Ecology-approved Final Interim Action Work Plan (Aspect 2018) and applicable Ecology regulations. These activities fully satisfy the interim action requirements under the Agreed Order, and are a significant remedial action component to the final cleanup action for the Site.

A November 2016 on-Property remedial investigation (RI) was conducted to design an interim action to address petroleum-contaminated soil and groundwater at the Property. Three groundwater monitoring wells in the southwest and one monitoring well in the northwest corners of the Property exhibited free product indicating that a significant release of petroleum contamination had migrated vertically downward until it encountered the water table (at approximately 15 feet below ground surface [bgs]). These areas of free product on the water table spread laterally and smeared vertically with seasonal groundwater changes (smear zone) creating large known areas of petroleum-contaminated soil. The RI results served as the basis of the Interim Action Work Plan (Aspect, 2018), which identified these two areas with free product and other areas of petroleum-contaminated soil that exceeded applicable cleanup levels to be completely removed through remedial excavation.

## *Soil Removal*

Interim action soil removal was completed in conjunction with the mass excavation planned for Property redevelopment. Contaminated soil comprised a subset of the total excavation volume, but where necessary to meet applicable cleanup levels and comply with the Interim Action Work Plan, excavation extended beyond redevelopment depths to achieve remedial action goals. A total of 6,837 tons of petroleum-contaminated soil exceeding Model Toxics Control Act (MTCA) Method A cleanup levels and a total of 1,259 tons of impacted soil (petroleum-contaminant concentrations below MTCA Method A cleanup levels) were removed from the Property and transported to Cadman's permitted facility in Everett, Washington, for treatment and disposal.

Aspect Consulting, LLC (Aspect) monitored soil excavation activities and performed field screening and soil sampling during construction. A total of 119 samples were collected during the interim action from soil stockpiles, test pits, and the final limits of the remedial excavation for characterization and performance monitoring purposes. The performance monitoring samples collected from the final extent of the remedial excavation show that all soil exceeding MTCA Method A (unrestricted use) cleanup levels was removed from the Property during the interim action and that all other

substantive requirements of the Interim Action Work Plan related to soil excavation were met.

Remedial excavation extended deeper than the planned development depth in several areas. The Final IAWP (Aspect, 2018) identified three isolated, deeper remedial excavations that were successfully completed to elevations as deep as 183 feet (depth of almost 34 feet bgs). The remedial excavation final depth was greater than construction subgrade elevation at approximately one-third of the Property. Where the final remedial excavation depth extended below the construction subgrade elevation, controlled density fill (CDF) was used to backfill to the construction subgrade as recommended by the geotechnical engineer of record in order to comply with City of Seattle Department of Construction and Inspections requirements given the allowable bearing pressure of the subject redevelopment, and to address geotechnical concerns related to the variable depth of the final remedial excavation and relevant seismic considerations.

A basic excavation dewatering system was necessary for the development including pretreatment for certain petroleum and solvent constituents. Dewatering system enhancements and longer operation timeframes were required to complete excavation of petroleum contaminated soils below the development depth. These dewatering system enhancements were pretreatment, permitted discharge conditions, and a supplemental dewatering sump necessary to excavate deep petroleum contaminated soils. Dewatering fluids were disposed of by permitted discharge to surface water via the storm sewer. Pretreatment and discharge was permitted by Ecology Water Quality issuance of a Construction Stormwater General Permit (CSWGP WAR No. 306191) and an Administrative Order Docket No.15705. All dewatering, pretreatment, and discharge operations were in full accordance with permit conditions.

## *Groundwater Monitoring and Chemical Vapor Barrier*

Aspect monitored the seven off-Property monitoring wells during construction of the interim action as required by the Final IAWP (Aspect, 2018) and Ecology's letter from April 23, 2018 (Ecology, 2018a). Consistent with the January 2018 preliminary Site-wide RI monitoring results, petroleum hydrocarbons (sourced from the Property) and chlorinated volatile organic compounds (CVOCs; from an off-Property source) were detected at concentrations that exceeded groundwater cleanup levels and applicable Ecology groundwater screening levels for vapor intrusion. A chemical vapor barrier was selected as the appropriate engineering control on all exterior below-grade foundation walls and beneath the lowest parking-garage floor slab to protect future occupants at the Property against exposure from potential vapor intrusion from residual concentrations of petroleum and CVOCs remaining in groundwater in accordance with Ecology guidance on vapor intrusion (Ecology, 2016b).

## *Summary Statement*

This interim action resulted in the removal of all petroleum-contaminated soil exceeding MTCA Method A (unrestricted use) cleanup levels from the Property. The removal of the source of petroleum contamination in soil (in addition to contaminated groundwater removal via dewatering) from the Property will enhance the natural degradation of petroleum-contaminated groundwater off-Property. The installed chemical vapor barrier will prevent any potential recontamination from residual petroleum- and CVOC-

contaminated groundwater off-Property, as well as protect future occupants of the Property. Based on the successful completion of the interim action, this Interim Action Report documents the interim action implementation and satisfies interim action reporting requirements of the Agreed Order. Additional remedial investigation and if necessary, cleanup action(s) are required off-Property to satisfy the remaining requirements of the Agreed Order and comprise the final remedy for the Site.

# 1 Introduction

Aspect Consulting, LLC, (Aspect) prepared this Interim Action Report to summarize the remedial excavation activities comprising the 2018 interim action that was completed at the former Chevron Service Station No. 90129 located at 4700 Brooklyn Avenue NE in Seattle, Washington (herein referred as the Property). The approximate location of the Site relative to surrounding physical features is shown on Figure 1.

FH Brooklyn, LLC (FH Brooklyn) and Chevron Environmental Management Company (CEMC) are signatories to Agreed Order No. DE 13815 (Agreed Order) with the Washington State Department of Ecology (Ecology), effective January 11, 2017. Under Washington Administrative Code (WAC) 173-340-430, Ecology permits implementation of interim actions, when warranted. The Agreed Order scope of work required FH Brooklyn and CEMC to complete remedial investigation (RI) activities that identified needed interim actions and defined the scope and schedule requirements for implementing those interim action(s). The Agreed Order also requires FH Brooklyn and CEMC to complete a Site-wide RI and feasibility study (FS), and to prepare a draft cleanup action plan (DCAP) for the Site, which will be completed after this interim action.

The first RI activities under the Agreed Order were completed in November 2016 by Aspect and documented in the On-Property Remedial Investigation Data Report, dated January 17, 2017 (Aspect, 2017). These RI activities were completed in accordance with the Ecology-approved Preliminary Draft Remedial Investigation Work Plan (Aspect, 2016) and consisted of investigations on the Property necessary to design the interim action; specifically, to establish the extent of petroleum-contaminated soil that exceeds MTCA Method A cleanup levels. These results served as a design basis of the interim action as defined in the Final Interim Action Work Plan (IAWP; Aspect, 2018).

A Final Remedial Investigation Work Plan (RIWP) was submitted to Ecology on May 26, 2017, by Leidos, Inc. (Leidos) on behalf of CEMC, describing Site-wide RI activities (Leidos, 2017). The objectives of these investigations were to define the nature and extent of petroleum and chlorinated volatile organic compound (CVOC) contamination in soil, groundwater, and soil vapor at the Site, and to comply with the requirements of the Agreed Order. The RI activities described in the Final RIWP were initiated in January 2018 and are ongoing. In a letter, dated April 23, 2018, Ecology approved a schedule extension request for implementing the Final RIWP, in addition to identifying additional RI scope to be completed based on the January 2018 results (Ecology, 2018).

Aspect prepared a Final IAWP that was approved by Ecology on March 8, 2018 (Aspect, 2018). This Final IAWP was prepared after completion of the public-comment period held from December 22, 2017, to January 22, 2018, and included a Public Review Draft IAWP and the State Environmental Policy Act (SEPA) Determination of Non-Significance (DNS). The Final IAWP described the design and requirements of the

interim action that entailed removal of soil and groundwater impacted by petroleum hydrocarbons.

## 1.1 Location and Description

The interim action occurred at King County Tax Parcel No. 8816400985, located at 4700 Brooklyn Ave NE, within the University District neighborhood in Seattle, Washington (herein referred as the Property). The Property totals 0.38 acres and the legal description is *University Heights Addition less the portion for Alley per Deed Rec #20160711000108* and situated in the SE Quarter – Section 8 – Township 25 – Range 4. The approximate location of the Site relative to surrounding features is shown on Figure 1.

The zoning is classified as commercial/mixed use (Seattle Mixed U-District [SM-U 75-240]) by the City of Seattle (City). The topography is relatively flat, with ground surface ranging in elevation from approximately 214 to 217 feet above mean sea level (amsl: North Atlantic Vertical Datum [NAVD] 88 vertical datum).

A gasoline service station began operating at the Property in the 1910s and ceased in November 2016. The most recent service-station configuration (former convenience store, former pump islands with a canopy, and historical fuel underground storage tanks [USTs]) is shown on Figure 2. The known USTs were removed in February 2017, and the convenience store, pump islands, and canopy were demolished in April/May 2018.

The Site is identified in Ecology's database as Cleanup Site ID: 10632 and Facility Site ID: 81966648.

## 1.2 Interim Action Objectives

The interim action was designed on behalf of FH Brooklyn in accordance with the Agreed Order and MTCA regulation found in WAC 173-340, which "establishes administrative processes and standards to identify, investigate, and clean up facilities where hazardous substances have come to be located." The purpose of the interim action was to remove soil and groundwater impacted by petroleum hydrocarbons to allow for Property redevelopment; the specific interim action elements are described in the Ecology-approved Final IAWP (Aspect, 2018).

## 1.3 Project Organization and Responsibilities

The parties involved in the interim action are as follows:

- **Ecology.** The interim action was performed under the Agreed Order with Ecology. This Interim Action Report is an Agreed Order-required deliverable and documents completion of the interim action.
- **Potentially Liable Parties (PLPs).** FH Brooklyn and CEMC are responsible for remedial investigation and cleanup activities at the Site under the Agreed Order. The current Property owner, FH Brooklyn, was the party that performed the interim action in conjunction with Property redevelopment.
- **Environmental Engineer.** Aspect prepared the Final IAWP (Aspect, 2018) and oversaw the implementation of the interim action as FH Brooklyn's

representative. Leidos, as CEMC's representative, provided oversight of the interim action on behalf of CEMC.

- **Geotechnical Engineer.** GeoEngineers, Inc., (GeoEngineers) was the geotechnical engineer of record for FH Brooklyn.
- **Construction Contractor.** Exxel Pacific was the general construction contractor to FH Brooklyn for the interim action construction.
- **Earthwork Contractors.** Elk Heights Excavation, LLC (Elk Heights) and their subcontractor River's Edge Environmental Services, Inc. (Rivers Edge) were the earthwork subcontractors responsible for excavation, transport, and disposal of soils. Exxel Pacific subcontracted the earthwork to Elk Heights. Additionally, Rivers Edge subcontracted Dixon Environmental Services (Dixon), a certified UST decomissioner, to permanently decommission USTs discovered during earthwork activities.
- **Shoring/Dewatering Contractor.** Kulchin Foundation Drilling Co. (Kulchin) installed the construction shoring and operated the dewatering system, and was subcontracted to Exxel Pacific.
- **Dewatering, Pretreatment, and Discharge Contractor.** Clear Water Services (Clear Water) was subcontracted to Exxel Pacific and designed, installed, and operated the temporary pretreatment and discharge system, and ensured conformance with conditions of the Ecology-issued Construction Stormwater General Permit (CSWGP).
- **Contaminated Soil Disposal.** All contaminated and impacted soil removed during the interim action was transported to Cadman's permitted facility in Everett, Washington, for treatment and/or disposal.

# 2 Pre-Interim Action Activities

This section summarizes the planning and reporting activities completed prior to the commencement of the interim action.

## 2.1 Construction Stormwater General Permit

FH Brooklyn applied for an industrial waste water discharge permit from the King County Industrial Waste Program (King County) in early 2017 for discharge to the public sanitary sewer during the interim action. King County, in coordination with the City, issued a Major Discharge Authorization No. 4422-01 (permit) to FH Brooklyn on May 17, 2017. However, the City's policy changed in early 2018 that required discharge to surface water via the public storm sewer and National Pollutant Discharge Elimination System (NPDES) permitting administered by the Ecology Water Quality Program.

FH Brooklyn applied to Ecology for a CSWGP in February 2018. Subsequently, Ecology issued a CSWGP (WAR306191) and an Administrative Order Docket No.15705, dated

February 22, 2018. The Administrative Order established the indicator levels for known Site contaminants for compliance with water quality standards for surface water of the State of Washington. Also, the Administrative Order defined the conditions and actions necessary to comply with CSWGP conditions that included installation of a temporary pretreatment system to treat water to below indicator levels, and discharge monitoring and reporting. Together, the CSWGP and the Administrative Order are referred to herein as the discharge permit.

A copy of the discharge permit is attached as Appendix A.

## 2.2 Environmental Construction Management Plan

Following Ecology's approval of the Final IAWP on March 8, 2018, Aspect prepared an Environmental Construction Management Plan (ECMP) dated March 19, 2018. The ECMP was consistent with the IAWP and complied with all Ecology requirements however was not an Ecology deliverable. The ECMP was prepared for use by the contractor and earthworks subcontractors and defined the soil categories (Clean, Impacted, and Contaminated), soil excavation and handling requirements for all soil categories, protocol to characterize unanticipated contaminated soil, water management, and construction worker safety and training requirements (Appendix B). The soil categories defined as:

- **Clean Soil**. Contaminants were not detected and no physical evidence of contamination (sheen, odor, or staining). Meets any additional acceptance criteria of receiving location, if transported off-Site.
- **Impacted Soil**. One or more contaminants are detected at a concentration below their respective MTCA Method A cleanup levels. Meets all acceptance criteria of the receiving permitted treatment/disposal facility.
- **Contaminated Soil**. Contaminant concentrations for any analyte exceed MTCA Method A cleanup levels. Meets all acceptance criteria of the receiving permitted treatment/disposal facility.

The ECMP described the measures to be implemented for excavation dewatering and managing contaminated groundwater related to the interim action and redevelopment construction activities completed at the Site. According to the ECMP:

- Dewatered liquids were to be managed, including stormwater runoff, contaminated groundwater from the excavation, and well dewatering.
- Excavation dewatering was designed by the Bender Consulting, LLC on behalf of FH Brooklyn. The construction contractors Kulchin and Elk Heights (both subcontracted to Exxel Pacific) were responsible for conducting dewatering to allow removal of contaminated soils. Dewatering was performed using perimeter vacuum well-point system and sumps, if needed.
- All dewatered liquids were to be pumped to tanks before pretreatment and discharge by Clear Water (also subcontracted to Exxel Pacific). Water was pretreated on-Site and discharged as surface water via the storm sewer in

accordance with the discharge permit. All monitoring conditions and discharge limits were met during operation of permitted discharge.

All actions mentioned in the ECMP complied with the Agreed Order, the Final IAWP (Aspect, 2018), and other applicable regulatory requirements. The ECMP is included as Appendix B.

# 3 Interim Action

The purpose of the interim action was to remove soil contaminated by petroleum hydrocarbons, allowing for subsequent redevelopment of the Property. The interim action activities were conducted in full accordance with the MTCA regulation found in WAC 173-340 concurrently with the redevelopment construction activities.

The average total excavation depth for the redevelopment was approximately 21 feet below the ground surface (bgs) (the average surface elevation is about 216 feet while the approximate average bottom excavation elevation was 195 feet). However, as required by the IAWP the remedial excavation was advanced deeper at select locations where exceedances of soil cleanup levels were identified during the RI activities, and where performance monitoring during the interim action indicated cleanup level exceedances.

Excavated soils were characterized for off-Site disposal. Soils above cleanup levels that were excavated below the final development depth were backfilled with controlled density fill (CDF) for development requirements.

The following sections summarize each completed interim action element.

## 3.1 Monitoring Well Decommissioning

A total of 17 wells (16 groundwater monitoring wells and 1 recovery well) located within the Property boundary were decommissioned by chipping-in-place in February 2017 and March 2018, in accordance with WAC 173-160-460. Holt Services, Inc., a driller licensed in the State of Washington performed the well decommissioning and recorded the decommissioning with Ecology. All decommissioning logs are included in Appendix C.

## 3.2 Soil Excavation and Disposal

### *3.2.1 UST Discovery, Removal and Assessment*

Decommissioning of the three documented fuel USTs in the southwestern corner of the Property (Figure 2) was completed in February 2017 and was described in the Final IAWP (Aspect, 2018). During the interim action excavation activities, Rivers Edge discovered an additional eight steel USTs ranging from 125 to 5,250 gallons, (six [UST 1 through UST 6] on June 19, 2018, and two [UST 7 and UST 8] on July 9, 2018) and associated piping/fill ports, at the Property. The approximate location of each tank is shown on Figure 2. All USTs were associated with historical service-station operations

that included five generations of UST infrastructure and date back to 1919 (Aspect, 2016). The details of the discovered and removed USTs are tabulated below.

| Tank ID | Tank Type | Approx. Storage Capacity (gallons) | Removal Date | Approx. Tank Base Elevation | Physical Evidence of a Release |
|---|---|---|---|---|---|
| UST 1 | Steel | 1,000 | June 22, 2018 | 206 | Yes |
| UST 2 | | 400 | | 208 | Yes |
| UST 3 | | 125 | | 208 | Yes |
| UST 4 | | 3,000 | | 200 | No |
| UST 5 | | 2,200 | | 200 | No |
| UST 6 | | 1,100 | | 208 | No |
| UST 7 | | 4,500 | July 12, 2018 | 202 | No |
| UST 8 | | 5,250 | | 202 | No |

UST 1 through UST 6 and associated piping/fill ports were removed on June 22, 2018. UST 7 and UST 8 and associated piping/fill ports were discovered later and removed on July 12, 2018. Aspect obtained a 30-day notification waiver from Ecology prior to the tank removals. Dixon, a certified UST decommissioner, requested that a marine chemist from U.S. Marine Chemists and a Fire Marshall from the City of Seattle's fire department be present at the time of tank removals. Aspect completed the UST site assessments, per Ecology requirements. A copy of the UST site assessment Checklists and tank removal documents are presented as Appendix D.

Each of the eight tanks were triple rinsed and inerted prior to their removal. Following completion of rinsing and inerting activities, the Fire Marshall issued a hot work permit that allowed Dixon to remove the tanks from the ground.

The four smaller tanks (USTs 1, 2, 3, and 6) were cut by Rivers Edge and transported off-Property as scrap metal. The four larger tanks (USTs 4, 5, 7, and 8) were loaded on flat-bed trailers by Rivers Edge and transported off-Site for disposal.

Aspect performed the UST site assessment on both days after the tanks were removed from the Property, in accordance with the Ecology's Guidance[1]. Aspect performed soil field screening by using water sheen testing, measuring headspace vapor with a photo-ionization detector (PID), and visual observations to identify physical evidence of contamination. Soil samples were collected to verify the field screening results and confirm whether or not a release had occurred. The soil samples were submitted to Friedman & Bruya, an Ecology-certified chemical analytical laboratory in Seattle, Washington, for chemical analysis of analytes listed in Table 6-1 of Ecology's Guidance (Ecology, 2016a). The following sections summarize the UST site assessments.

[1] Guidance for Site Checks and Site Assessments for Underground Storage Tanks, Department of Ecology, Underground Storage Tank Program, Publication #90-52, Revised April 2003.

#### 3.2.1.1 UST Site Assessment – June 22, 2018 (USTs 1 through 6)

Aspect field screened overburden that was removed to access the USTs and the soil at the base of the tank pits (glacial deposits consisting of grey silty sand with gravel) for physical evidence of contamination using water sheen testing, visual/odor observations, and headspace vapor measurements (using a PID).

Field screening results of soil beneath USTs 1, 2, and 3 yielded physical evidence of contamination (moderate to heavy sheen and up to 535 parts per million [ppm] headspace readings).

Field screening results of the overburden at each of the tank locations and soil from the base of USTs 4, 5, and 6 yielded no physical evidence of contamination (no sheen, no odor, and 0 ppm headspace readings).

Aspect collected soil samples to confirm a potential release and to verify the field screening results as follows (see Figure 2 for the tank locations):

- A soil sample was obtained from the bottom of the UST 1 tank pit.
- A soil sample was obtained from the bottom of the UST 6 tank pit.
- Because USTs 2 and 3 were near each other, Aspect collected one sample from their tank pit.
- Similarly, because USTs 4 and 5 were near each other, Aspect collected one sample from their tank pit.

Sidewall samples from the tank pits were not collected because soils adjacent to and beneath the discovered USTs were excavated, characterized, and disposed off-Site accordingly, regardless of UST assessment sample results.

The UST assessment analytical results are summarized below:

- **UST 1.** Gasoline- and diesel-range hydrocarbons were detected at concentrations (1,900 milligrams per kilogram [mg/kg] and 13,000 mg/kg, respectively) exceeding their MTCA Method A cleanup levels in the sample obtained from the UST 1 tank pit (Table 1).
- **UST 2 and 3.** Gasoline-, diesel-, and motor oil-range hydrocarbons, benzene, and xylene were all detected at concentrations exceeding their respective MTCA Method A cleanup levels in the sample obtained from the USTs 2 and 3 location (Table 1).
- **USTs 4, 5, and 6.** Analytes were not detected in soil samples from USTs 4, 5, and 6 pits.

#### 3.2.1.2 UST Site Assessment – July 12, 2018

Field screening of the overburden at each of the tank locations, and soil from the base of the USTs 7 and 8, yielded no physical evidence of contamination (no sheen, no odor, and 0 ppm headspace readings). A soil sample was obtained from the bottom of each tank pit (UST 7 and UST 8) and no contaminants were detected (Table 1).

The chemical analytical results of the soil samples obtained during the UST site assessments are summarized in Table 1. The approximate location of the discovered USTs 1 through 8 is shown on Figure 2. A copy of the UST site assessment Checklists and tank-removal documents are presented as Appendix D. A copy of the laboratory analytical reports are included in Appendix E.

### 3.2.2 Remedial Excavations

The primary objective of the interim action was to remove contaminated soil exceeding cleanup levels (MTCA Method A) from the Property. The performance monitoring samples collected from the final extent of all excavations (construction subgrade and remedial excavations) show that soil exceeding cleanup levels for unrestricted use were successfully removed from the Property during the interim action. Remedial excavation activities commenced on June 19, 2018 and were completed on September 13, 2018.

Quantities of 6,300 tons of Contaminated soil (petroleum-contaminant concentrations exceeding MTCA Method A cleanup levels) and 4,900 tons of Impacted soil (petroleum contaminant concentrations below MTCA Method A cleanup levels) were estimated in the Final IAWP (Aspect, 2018) – prior to the interim action and based on available characterization data.

At the conclusion of the interim action, a total of 6,837 tons of Contaminated soil and a total of 1,259 tons of Impacted soil was removed from the Property.

The final excavation grade varied across the Property based on the depth required to attain remedial action goals specified in the IAWP. The remedial excavation final depth was greater than construction-grade elevation at approximately one-third of the Property.

#### 3.2.2.1 Field Oversight and Sampling Methods

Aspect monitored excavation activities, including overseeing Elk Heights and their subcontractor River's Edge in segregating soils as defined in the ECMP during excavation. The ECMP was used to guide Elk Heights and River's Edge for known areas of Contaminated soil and approximate extents, but also outline methods of identifying, characterizing, and handling unanticipated Contaminated soil.

The characterization of unanticipated potentially contaminated soils entailed field screening by using water sheen testing, measuring headspace vapor with a PID, and visual/odor observations. If field screening indicated the soil was potentially Contaminated, soil samples were collected for laboratory analysis to categorize the soil for disposal. Additionally, laboratory analysis was used for performance monitoring to advance the remedial excavation to removal all soils above cleanup levels.

Soil samples were obtained using U.S. Environmental Protection Agency (EPA) Method 5035 sampling kits and submitted to Friedman & Bruya Laboratory in Seattle, Washington, for chemical analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8021B and gasoline-range hydrocarbons by Method NWTPH-Gx. Select samples were analyzed for diesel- and oil-range hydrocarbons by Method NWTPH-Dx, and volatile organic compounds (VOCs) by EPA Method 8260C. The scope of soil sampling and analysis was driven by the field screening results, Contaminated soil volume, and treatment/disposal facility profiling requirements.

#### 3.2.2.2 Known and Unanticipated Contamination Excavated

The mass excavation successfully achieved remedial action goals and involved removal of contaminated soil based on the RI (Aspect, 2017) and additional unanticipated contamination discovered as the excavation progressed.

Remedial excavation consisted of the following elements:

- **Known Contamination - West Half of Property.** The largest areas of known Contaminated soil (Figures 6 and 7 in the ECMP) was associated with two areas of light nonaqueous phase liquid (LNAPL) identified along the west and southwest portions of the Property. These areas of known contamination were beneath fuel islands and former USTs located in this part of the Property. The lateral and vertical extents of these known areas of contamination were refined during remedial excavation with test-pits and soil sampling prior to excavation as designed in the ECMP (Appendix B). Additionally, the Final IAWP (Aspect, 2018) identified three locations greater than (>) 24 feet bgs deep that exceeded cleanup levels and were successfully excavated during the interim action and confirmed through performance monitoring.

- **Unanticipated Contamination – Expanded portions of the West Half of Property and East Half of the Property Where USTs Were Discovered.** Additional areas of unanticipated Contaminated soil were discovered and removed during the remedial excavation. These unanticipated areas of contamination were characterized using a field screening, stockpiled soil and in-situ grab sample testing procedure that was outlined in the IAWP and ECMP prior to excavation. The two largest areas of unanticipated contamination on the eastern half of the Property were associated with the discovered USTs (Figure 4).

  Additionally, below the LNAPL smear zone at elevations approximately deeper than 198 feet, the excavation was advanced deeper (overexcavation) to achieve cleanup levels and confirmed through final performance monitoring.

The following sections describe the remedial excavation activities according to these three elements of excavation activities.

##### 3.2.2.1.1 Known Contamination – West Half of Property

Based on the RI explorations that were completed prior to the interim action, the approximate extent of the known Contaminated soil areas was estimated in the ECMP (Appendix B). The removal extents of these known areas of contamination identified in ECMP are consolidated as the red, non-hatched areas shown on Figure 4.

As the excavation reached the top elevation (approximately 202 feet) of the two known largest areas of contamination with LNAPL (the west half of the Property where the former USTs and pump islands were), the removal areas were refined by 15 test pits (TP-1 through TP-15, Figure 3) completed at the perimeter and within those predefined areas.

- The test pits were excavated approximately 3 to 7 feet deep from subgrade (from Elevations 200 down to 193 feet).

- Aspect obtained 25 soil samples from the 15 test pits for chemical analysis.

- According to the chemical analytical results, there were three locations where gasoline (6,500 mg/kg in TP-7 only) and benzene (0.038 to 0.093 mg/kg in TP-3, TP-8, and TP-13) was detected at concentrations exceeding MTCA Method A cleanup levels (Table 3).
- These results were used to redefine the areas of known Contaminated soil, as shown on Figure 4 and provided to the contractor for excavation.

Additionally, there were four smaller areas where known deep contamination existed (the AB-02, AB-06, AB-07, and AB-09 locations), and isolated remedial excavation was planned, as described in Section 3.1 of the Final IAWP. These small areas are shown on Figure 4 and were either completed as isolated excavation (AB-02, AB-07, AB-09), or were incorporated into expanded known excavations (AB-06).

The test pit sample analytical results are summarized in Table 3. The approximate location of the test pits and historical explorations along with the exceedances of cleanup levels are shown on Figure 3. The removal extents of the known Contaminated soil are shown on Figure 4 as the red nonhatched areas. Cross-section profiles of construction excavation are shown on Figures 6 and 7. Copies of the laboratory analytical reports is presented in Appendix E.

#### 3.2.2.2 Unanticipated Contamination – East Half of Property (and expanded portions of Known Contamination Areas)

Additional areas of contaminated soil were encountered during the mass excavation, characterized using the method described in the Final IAWP (Aspect 2018) and ECMP (Appendix B), and removed and disposed off-Site. These locations were unanticipated as limited investigation data existed in these areas prior to remedial excavation. However, the protocol that was established in the ECMP regarding how to evaluate potentially contaminated soil while mass construction excavation was ongoing consisted of: physical observation, field screening of soil samples, potentially contaminated soil stockpiling sampling/testing, and discrete grab soil sampling/testing from the construction excavation.

Areas of unanticipated Contaminated soil identified during mass construction excavation are shown as red, hatched areas on Figure 4. The unanticipated Contaminated soil that was discovered included the following areas:

1. Contaminated soil around undocumented USTs that were discovered; seven along the East half of the Property (Figure 2). These are illustrated as the hatched areas shown on Figure 4 and are summarized as:
    - Where USTs 1, 2, and 3 were discovered (Figure 2), sample locations E9S3 and E11S1 confirmed gasoline-range and diesel-range concentrations exceeded cleanup levels (Figure 4). This area was excavated to the construction subgrade elevation of 195 feet.
    - Where USTs 4, 5, 7 and were discovered in the southeastern corner of the Property (Figure 2), sample locations E16S3, E18S2, and E19S1 confirmed gasoline-range and BTEX concentrations exceeded cleanup levels (Figure 4). This area was excavated to the construction

subgrade elevation of 195 feet north of E19, and below the construction subgrade to 195 feet south of E19 to the southern wall (Figure 4).

Overexcavation of these unanticipated Contaminated soils was halted when field screening results indicated no evidence of contamination and performance monitoring samples confirmed all analytical results were nondetect or detections were below the cleanup levels. These data are presented in Table 4 and the deepest exceedances are presented on Figure 4.

2. Contaminated soil from shallow depths of the mass construction excavation and from drill cuttings of soldier piles installed around the perimeter of the Property.

   Thirteen stockpiles of potentially contaminated soils were generated between June 19 and August 3, 2018 from mass excavation of shallow soils and included soldier pile drill cuttings, limited areas of known Contamination soils identified in the ECMP (Appendix B), and larger areas of unanticipated contamination. Aspect collected 45 soil samples from 12 stockpiles (SS-1 through SS-7 and SS-9 through SS-13) for characterization after field screening suggested they were potentially contaminated (slight to heavy sheen and PID readings ranging from 5 to >1,000 ppm). No samples were obtained from the stockpile SS-8 because field screening results yielded no evidence of contamination (no sheen, no odor, and 0 ppm).

   According to the chemical analytical results, stockpiles were characterized and disposed as:

   - Stockpiles SS-1, SS-5, SS-8, SS-10, and SS-13 were Clean and were transported off-Site as Clean soil.
   - Stockpile SS-4 was characterized as Impacted and was disposed off-Site.
   - Stockpiles SS-2, SS-3, SS-6, SS-7, SS-9, and SS-11 exceeded the MTCA Method A cleanup levels and were disposed off-Site as Contaminated soil.

   Off-Site disposal is reported below in Section 3.2.4. The analytical results of soil stockpile samples are summarized in Table 2. A copy of the laboratory analytical reports is presented in Appendix E.

3. Contaminated soil from deeper areas than originally anticipated.

   There were two areas where Known contamination extended to depths greater than planned in the ECMP:

   - In the northwestern area of the Property where remedial excavation was planned to elevation 193 feet, soil at locations W16N4 and W18N4 was overexcavated to elevations 189.5 and 188 feet, respectively, to achieve cleanup levels (Figure 5).

- In the southwestern area of the Property where remedial excavation was planned to elevation 194 feet, soil at location W3S10 was overexcavated to 192 feet to achieve cleanup levels (Figure 5).

Overexcavation of Contaminated soils (both Known and/or Unanticipated) was halted when field screening results indicated no evidence of contamination, and performance monitoring samples confirmed all analytical results were non-detect or detections were below the cleanup levels.

### 3.2.3 Final Performance Monitoring

Aspect presents analytical results of 30 soil samples representing the base of the final excavation to demonstrate compliance with cleanup levels across the full extent of the Property (Figure 5). This base of excavation includes the final extents of the construction mass excavation and areas where the remedial excavation extended below the construction subgrade as required by the IAWP. All performance samples used for confirmation in Figure 5 were collected prior to any backfilling activities. Based on the analytical results of final performance monitoring soil samples, all soil exceeding cleanup levels was successfully excavated and removed from the Property as shown in Figure 5.

### 3.2.4 Contaminated Soil Disposal

Contaminated and Impacted soil excavated from the Property was transported to Cadman's permitted facility in Everett, Washington, for treatment/disposal. According to the Soil Disposal Tracking Sheet provided by Cadman, a total of 6,837 tons of Contaminated soil and a total of 1,260 tons of Impacted soil were removed from the Property for off-Site disposal.

A copy of the Cadman Soil Disposal Tracking Sheet is presented in Appendix F.

### 3.2.5 Backfill

Excavation of Contaminated soils extended deeper than the construction-design grade along most of the north and south Property boundary and at four other locations (AB-02, AB-07, and AB-09) on the Property. All these areas were backfilled using CDF as recommended by the geotechnical engineer of record in order to comply with City of Seattle Department of Construction and Inspections requirements given the allowable bearing pressure of the subject redevelopment, and to address geotechnical concerns related to the variable depth of the final remedial excavation and relevant seismic considerations.

## 3.3 Excavation Dewatering and Pretreatment

### 3.3.1 Dewatering Plan

A basic excavation dewatering system was necessary for the development including pretreatment for certain petroleum and solvent constituents. Dewatering system enhancements and longer operation timeframes were required to complete excavation of petroleum contaminated soils below the development depth. These dewatering system enhancements were pretreatment, permitted discharge conditions, and the supplemental dewatering sump necessary to excavate deep petroleum contaminated soils. The average total excavation depth for the redevelopment was approximately 21 feet bgs and the

average depth-to-groundwater was approximately 17 feet bgs, based on the groundwater measurements obtained from the former monitoring wells, at the Property.

A Dewatering Plan was prepared by Bender Consulting, LLC on behalf of FH Brooklyn and consisted of a series of vacuum well points installed through the shoring along the perimeter of the Property to an approximate depth of 30 feet bgs. The well points were connected to a header piping for conveyance to the pretreatment system. Kulchin installed the dewatering system. Rivers Edge utilized the dewatering sump approach locally at the AB-07 location where the remedial excavation was deeper than vacuum well points at an approximate depth of 34 feet bgs. Rivers Edge constructed the sump by installing a perforated PVC casing that housed the dewatering pump and the casing was surrounded by gravel to minimize clogging and enhance local dewatering.

In accordance with the Final IAWP (Aspect, 2018) and Ecology's letter dated April 23, 2018 (Ecology, 2018a), Aspect monitored groundwater levels in off-Property monitoring wells located in the rights-of-way (Brooklyn Avenue NE and NE 47th Ave Street) to observe the propagation of drawdown during the construction dewatering in August and September 2018. Based on the groundwater measurements, the dewatering system operation was successful in dewatering all soils targeted for remedial excavation. The off-Property groundwater monitoring results are discussed in the Section 3.4 of this report.

Dewatering observation monitoring at off-Property monitoring wells is summarized in Table 5. The approximate location of the monitoring wells utilized for dewatering observation is shown on Figure 8.

### 3.3.2 Treatment and Permitted Discharge

All water generated through dewatering was to be pumped to tanks, pretreated on-Site, and discharged to surface water via storm sewer in accordance with the discharge permit. The on-Site pretreatment system was installed and operated by Clear Water. The dewatering treatment consisted of a settling tank for initial storage, a treatment train comprised of 100 gallons per minute (gpm) nominal flow chitosan-enhanced sand filtration (CESF) with granular activated carbon, and a real-time computerized discharge-quality monitoring interface.

The treatment system monitoring data was acquired by Clear Water technicians, as well as computerized collection via a programmable logic controller (PLC). Effluent water quality was monitored and reported by Clear Water, and was in compliance with permit conditions during all events. The PLC recorded data at 15-minute intervals and was monitored in real time by Clear Water (Appendix G). Daily Operations Logs were recorded digitally and automatically saved to Clear Water's account.

A total of 1,842,284 gallons of water was treated and discharged to Portage Bay between August 13 and October 29, 2018 (Appendix G). The discharge met applicable local and state water quality parameters specified in the discharge permit issued by Ecology. The dewatering system was turned off and permitted discharge ceased on October 29, 2018.

## 3.4 Off-Property Groundwater Monitoring

Aspect performed off-Property groundwater monitoring during the interim action in accordance with the Final IAWP (Aspect, 2018) and Ecology's April 23, 2018, letter (Ecology, 2018a). The off-Property groundwater monitoring was conducted at monitoring wells installed by Leidos in January 2018 as part of the Site-wide RI (Leidos, 2017); monitoring well logs are included in Appendix H.

The depth to groundwater was measured from the top of casing in the accessible monitoring wells daily to monitor the propagation of drawdown. LNAPL was consistently observed in MW-27, and MW-28 located in the NE 47th Avenue adjacent to the south Property boundary. The LNAPL thickness ranged from 0.01 feet to 0.15 feet in these monitoring wells (Table 5). The depth to groundwater increased significantly in the wells after commencement of dewatering operations on August 13, 2018, with up to 10 feet of drawdown observed at MW-19. The drawdown reached steady-state conditions by the second week of dewatering on August 27, 2018, with groundwater elevations ranging from 189.69 (MW-26) to 195.29 feet (MW-25), as shown in Table 5. Further, with this amount of drawdown, the four monitoring wells installed to 25 feet bgs went dry (MW-17, MW-18, MW-27 and MW-28). The locations MW-19, MW-25, and MW -26 are completed deeper and had sufficient water column for gauging and sampling during maximum drawdown conditions.

Ecology identified MW-17, MW-25, MW-26, and MW-28 in the April 23 letter for groundwater monitoring (Ecology, 2018a). However, the drawdown conditions didn't allow sampling of MW-17 and MW-28 after dewatering operations. Ecology was notified of this condition and the change in monitoring locations during the monthly email status updates required by the Agreed Order.

Groundwater samples were collected from four off-Property wells MW-17, MW-18, MW-25, and MW-26 in August 2018. The first groundwater monitoring event was completed on August 2, 2018, when samples were collected from wells MW-17 and MW-25 prior to dewatering operations. The second groundwater monitoring event was completed on August 22, 2018, when samples were collected from wells MW-18, MW-25, and MW-26 following commencement of continuous dewatering operations. The third groundwater monitoring event was completed on August 31, 2018, when samples were collected from wells MW-18, MW-25, and MW-26 after the drawdown approached steady state. Based on the steady-state drawdown, Aspect requested Ecology to approve a reduction in the groundwater monitoring frequency from weekly to monthly. Ecology approved the request via email dated September 17, 2018 (Ecology, 2018b).

All groundwater samples collected from the off-Property monitoring wells were submitted to Friedman & Bruya, an Ecology-accredited chemical analytical laboratory, for chemical analysis of gasoline-range organics (GRO), diesel-range organics (DRO), oil-range organics (ORO) and CVOCs. The analytical results are presented in Table 6 and summarized as:

- **MW-17 Results**. Benzene (45 micrograms per liter [µg/L]), GRO (2,800 µg/L), DRO (860 µg/L), tetrachloroethene (PCE, 110 µg/L), trichloroethene (TCE, 27

µg/L) and cis-1,2-Dichloroethene (cis-1,2 DCE, 39 µg/L) were detected at concentrations exceeding their respective cleanup levels in MW-17.

- **MW-18 Results.** Analytes were either not detected or were detected at concentrations below their respective cleanup levels in MW-18.
- **MW-25 Results.** Benzene (9.7 to 32 µg/L), PCE (26 to 59 µg/L), TCE (270 to 480 µg/L), cis-1,2 DCE (230 to 540 µg/L), and vinyl chloride (9.5 to 78 µg/L) were detected at concentrations exceeding their respective MTCA Method A cleanup levels in MW-25. Additionally, GRO was detected at 1,200 µg/L in MW-25, exceeding the cleanup level during the first monitoring event. GRO was detected at concentrations below the cleanup level in MW-25 during subsequent monitoring events.
- **MW-26 Results.** GRO (940 to 1,300 µg/L), Benzene (23 to 28 µg/L), PCE (7.5 to 43 µg/L), TCE (810 to 1,400 µg/L), cis-1,2 DCE (430 to 660 µg/L), and vinyl chloride (5.2 to 26 µg/L) were detected at concentrations exceeding their respective cleanup levels in MW-26.

The dewatering observation monitoring is summarized in Table 5. The analytical results are summarized in Table 6. The approximate location of the groundwater monitoring wells and the exceedances of cleanup levels for the August 2018 monitoring events is shown on Figure 8. A copy of the laboratory analytical reports is presented in Appendix E.

The off-Property groundwater monitoring will continue, as required by Ecology, for the RI in accordance with their April 23 letter (Ecology, 2018a) and in accordance with the Agreed Order.

# 4 Chemical Vapor Barrier Design and Construction

The potential for vapor intrusion at the planned redevelopment on the Property was evaluated by Aspect in September 2018 on behalf of FH Brooklyn, and the results were reported in a Technical Memorandum Re: Vapor Intrusion Evaluation dated September 20, 2018 (Appendix J). Aspect utilized all groundwater quality results from the off-Property monitoring for this vapor intrusion evaluation, including the preliminary results from January 2018 reported by Leidos.

Except for MW-19, all monitoring wells (MW-11, MW-18, MW-25, MW-25, MW-26, MW-27, and MW-28) exhibited at least one exceedance of groundwater screening levels for vapor intrusion for benzene and TCE, which indicates a potential vapor intrusion concern via the groundwater-to-soil gas-to indoor air exposure pathway per Ecology's Guidance (Ecology, 2016b). Exceedances of total xylenes, PCE, and vinyl chloride also occur (Appendix J).

Therefore, based on exceedances of Ecology's established conservative screening levels and MTCA's implementing regulations, Aspect recommended a chemical vapor barrier

as the selected engineering control to protect future occupants of the building at the Property against exposure from vapor intrusion.

The chemical vapor barrier product selection, engineering design, installation, and installation inspection was completed by others at the direction of FH Brooklyn. The chemical vapor barrier consists of two products: PrePrufe® 300R was installed on all exterior below-grade foundation walls and VaporBlock ® Plus™ VBP20 was installed beneath the slab-on-grade (floor) sections of the building garage. It was not installed on the 9-feet-thick concrete foundation mat set at elevation 191.5 feet in the center of the Property, and less than 20% of the total aerial building footprint. Chemical vapor-barrier product information and installation requirements are presented in Appendix K.

The installed chemical vapor barrier will prevent potential recontamination from residual petroleum and CVOC-contaminated groundwater off-Property, as well as prevent potential vapor intrusion into the building.

# 5 Conclusions

An interim action was completed at the former Chevron Service Station No. 90129 Property located at 4700 Brooklyn Avenue NE to remove petroleum-contaminated soil and groundwater and allow the redevelopment of the Property. All activities taken during the interim action were completed in full accordance with the Ecology-approved Final Interim Action Work Plan (Aspect 2018) and applicable Ecology regulations.

Interim action soil removal was completed in conjunction with the mass excavation planned for Property redevelopment. A total of 6,837 tons of petroleum-contaminated soil exceeding Model Toxics Control Act (MTCA) Method A cleanup levels and a total of 1,259 tons of impacted soil (petroleum-contaminant concentrations below MTCA Method A cleanup levels) were removed from the Property and transported to Cadman's permitted facility in Everett, Washington, for treatment and disposal. Excavation dewatering was necessary and all dewatering, pretreatment, and discharge operations were in full accordance with Ecology's CSWGP WAR No. 306191 permit conditions. The performance monitoring samples collected from the final extent of the remedial excavation show that all soil exceeding MTCA Method A (unrestricted use) cleanup levels was removed from the Property during the interim action.

Aspect monitored the seven off-Property monitoring wells during construction of the interim action as required by the Final IAWP (Aspect, 2018) and Ecology's letter from April 23, 2018 (Ecology, 2018a). Consistent with the January 2018 preliminary Site-wide RI monitoring results, petroleum hydrocarbons (sourced from the Property) and chlorinated volatile organic compounds (CVOCs; from an off-Property source) were detected at concentrations that exceeded groundwater cleanup levels and groundwater screening levels for vapor intrusion. A chemical vapor barrier was selected as an appropriate engineering control to protect future occupants at the Property against exposure from potential vapor intrusion in accordance with Ecology guidance on vapor intrusion (Ecology, 2016b).

This interim action resulted in the removal of all petroleum-contaminated soil exceeding MTCA Method A (unrestricted use) cleanup levels from the Property. The removal of the source of petroleum contamination in soil (in addition to contaminated groundwater removal via dewatering) from the Property will enhance the natural degradation of petroleum-contaminated groundwater off-Property. The installed chemical vapor barrier will prevent recontamination from residual petroleum- and CVOC-contaminated groundwater off-Property, as well as protect future occupants of the Property. Additional remedial investigation is required off-Property as defined by Ecology in their April 23, 2018, letter and required by the Agreed Order.

Based on the successful completion of the interim action, Ecology's approval of this Interim Action Report is requested to document the interim action implementation and satisfy interim action reporting requirements of the Agreed Order.

# 6 References

Aspect Consulting, LLC (Aspect), 2018, Final Interim Action Work Plan, 4700 Brooklyn Avenue NE, Seattle, Washington. March 8, 2018.

Aspect Consulting, LLC (Aspect), 2017, Technical Memorandum to Washington State Department of Ecology (D. Myers) Re: On-Property Remedial Investigation Data Report, 4700 Brooklyn Avenue NE, Seattle, Washington. January 17, 2017.

Aspect Consulting, LLC (Aspect), 2016, Preliminary Draft Remedial Investigation Work Plan, 4700 Brooklyn Ave., Seattle, Washington, November 4, 2016

Leidos, 2017, Final Remedial Investigation Work Plan, Former Chevron Station No. 90129. May 26, 2017.

Washington State Department of Ecology (Ecology), 2018a, Agreed Order DE 13815, Formal Notification of Extension for Remedial Investigation Field Activities. April 23, 2018.

Washington State Department of Ecology (Ecology), 2018b. Email correspondence between Adam Griffin and Dale Myers. September 12, 2018.Washington State Department of Ecology (Ecology), 2016a, Guidance for Remediation of Petroleum Contaminated Sites, Ecology Publication No. 10-09-057, Revised June 2016.

Washington State Department of Ecology (Ecology), 2016b, Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action, Toxics Cleanup Program Publication No. 09-09-047, Review Draft Revised February 2016.

# 7 Limitations

Work for this project was performed for FH Brooklyn (Client), and this report was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This report does not represent a legal opinion. No other warranty, expressed or implied, is made.

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# TABLES

# Table 1. Soil Analytical Results - UST Site Assessments

Project No. 160092, Seattle, Washington

| | Sample Location | UST1 Tank Pit | UST2&3 Tank Pit* | UST4&5 Tank Pit | UST6 Tank Pit | UST7 Tank Pit | UST8 Tank Pit |
|---|---|---|---|---|---|---|---|
| | Sample Date | 06/22/2018 | 06/22/2018 | 06/22/2018 | 06/22/2018 | 07/12/2018 | 07/12/2018 |
| | Sample Identification | UST1-BASE-206 | UST2&3-BASE-208 | UST4&5-BASE-200 | UST6-BASE-208 | UST7-B-202 | UST8-B-202 |
| | Sample Elevation (ft) | 206 | 208 | 200 | 208 | 202 | 202 |
| **Chemical Name** | **Cleanup Level (mg/kg)** | **Samples were obtained during the Interim Action in 2018** | | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | | | |
| Gasoline-Range Organics | 30** | **1900 J** | **1200** | < 5 U | < 5 U | < 5 U | < 5 U |
| Diesel-Range Organics | 2000 | **13000** | **9500 X** | < 50 U | < 50 U | < 50 U | < 50 U |
| Motor Oil-Range Organics | 2000 | < 250 U | **33000** | < 250 U | < 250 U | < 250 U | < 250 U |
| BTEX Compounds in mg/kg | | | | | | | |
| Benzene | 0.03 | < 0.03 U | **0.12** | < 0.03 U | < 0.03 U | < 0.02 U | < 0.02 U |
| Toluene | 7 | **0.48** | **1.7** | < 0.05 U | < 0.05 U | < 0.02 U | < 0.02 U |
| Ethylbenzene | 6 | **1** | **2.2** | < 0.05 U | < 0.05 U | < 0.02 U | < 0.02 U |
| Total Xylenes | 9 | **7.3** | **25.5** | < 0.1 U | < 0.1 U | < 0.06 U | < 0.06 U |
| Volatile Organic Compounds (VOCs) in mg/kg | | | | | | | |
| Tetrachloroethene (PCE) | 0.05 | < 0.025 U | < 0.025 U | < 0.025 U | < 0.025 U | -- | -- |
| Trichloroethene (TCE) | 0.03 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | -- | -- |
| cis-1,2-Dichloroethene (DCE) | 160 | < 0.05 U | < 0.05 U | < 0.05 U | < 0.05 U | -- | -- |
| trans-1,2-Dichloroethene | 1600 | < 0.05 U | < 0.05 U | < 0.05 U | < 0.05 U | -- | -- |
| Methylene Chloride | 0.02 | < 0.5 U | < 0.5 U | < 0.5 U | < 0.5 U | -- | -- |
| Vinyl Chloride | 0.67 | < 0.05 U | < 0.05 U | < 0.05 U | < 0.05 U | -- | -- |
| 1,2-Dibromoethane (EDB) | 0.005 | < 0.05 U | < 0.05 U | < 0.05 U | < 0.05 U | -- | -- |
| 1,2-Dichloroethane (EDC) | 480 | < 0.05 U | < 0.05 U | < 0.05 U | < 0.05 U | -- | -- |
| Methyl tert-butyl ether (MTBE) | 0.1 | < 0.05 U | < 0.05 U | < 0.05 U | < 0.05 U | -- | -- |
| 1,2,4-Trimethylbenzene | NE | **10** | **27** | < 0.05 U | < 0.05 U | -- | -- |
| 1,3,5-Trimethylbenzene | NE | **4** | **7.8** | < 0.05 U | < 0.05 U | -- | -- |
| Isopropylbenzene | NE | **1.3** | **1.2** | < 0.05 U | < 0.05 U | -- | -- |
| n-Propylbenzene | NE | **1.8** | **2.9** | < 0.05 U | < 0.05 U | -- | -- |
| p-Isopropyltoluene | NE | **1.7** | **1.2** | < 0.05 U | < 0.05 U | -- | -- |
| sec-Butylbenzene | NE | **2.9** | **0.72** | < 0.05 U | < 0.05 U | -- | -- |
| tert-Butylbenzene | NE | **0.11** | **0.16** | < 0.05 U | < 0.05 U | -- | -- |

**Notes**

ft = Sample elevation in feet (North Atlantic Vertical Datum, 1988).

mg/kg = milligrams per kilogram

-- = Not analyzed

* = Sample was additionally analyzed for MTCA 5 Metals, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs). Metals were detected at concentrations less than the Puget Sound Natural Background Concentrations. PCBs were not detected. PAHs were detected at concentrations that were less than the MTCA Cleanup Level.

** = Cleanup level for gasoline-range hydrocarbons when benzene is present.

U = Analyte not detected atbove the listed reporting limit

X = Chromatographic pattern does not match quantitation standard. However, the listed values are considered detections based on field screening evidence (moderate sheen and slight odor).

J = Listed value is an estimate.

NE = Not Established

Select VOCs are listed in the table. Other VOCs were not detected. Please refer to the laboratory report in Appendix D.

MTCA = Model Toxics Control Act

**Bolded** value indicates analyte detected at the listed concentration.

Blue shading indicates analyte detected at a concentration greater than the corresponding cleanup level.

Soil represented by the samples with MTCA exceedances (blue shaded cells) was excavated from the Property and transported to Cadman's facility in Everett for permitted disposal.

# Table 2. Soil Analytical Results - Stockpiles

Agency Review Draft

Project No. 160092, Seattle, Washington

| Sample Location | | SS-1 | SS-1 | SS-1 | SS-1 | SS-1 | SS-1 | SS-1 | SS-1 | SS-1 | SS-1 | SS-2 | SS-2 | SS-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | | 06/19/2018 | 06/19/2018 | 06/19/2018 | 06/19/2018 | 06/19/2018 | 06/19/2018 | 06/19/2018 | 06/19/2018 | 06/19/2018 | 06/19/2018 | 06/19/2018 | 06/19/2018 | 06/22/2018 |
| Sample Identification | | SS1-1-061918 | SS1-2-061918 | SS1-3-061918 | SS1-4-061918 | SS1-5-061918 | SS1-6-061918 | SS1-7-061918 | SS1-8-061918 | SS1-9-061918 | SS1-10-061918 | SS2-1-061918 | SS2-2-061918 | SS2-3-062218 |
| **Chemical Name** | **Cleanup Level (mg/kg)** | | | | | | | | | | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | | | | | | | | | | |
| Gasoline-Range Organics | 30** | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | **310** | **360** | < 5 U |
| Diesel-Range Organics | 2000 | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | **200 X** | **160 X** | < 50 UJ |
| Motor Oil-Range Organics | 2000 | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | **420** | < 250 UJ |
| BTEX Compounds in mg/kg | | | | | | | | | | | | | | |
| Benzene | 0.03 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U |
| Toluene | 7 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.1 U | < 0.02 U | < 0.02 U |
| Ethylbenzene | 6 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | **0.79** | < 0.02 U | < 0.02 U |
| Total Xylenes | 9 | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | **3.1** | **2.4** | < 0.06 UJ |

**Notes**

mg/kg = milligrams per kilogram

* = Sample was additionally analyzed for volatile organic compounds (VOCs). VOCs were not detected. Please refer to the laboratory report in Appendix D.

** = Cleanup level for gasoline-range hydrocarbons when benzene is present.

U = Analyte not detected at or above the listed reporting limit.

X = Chromatographic pattern does not match quantitation standard. However, the listed values are considered detections based on field screening evidence (moderate sheen and slight odor).

J = Listed value is an estimate.

NE = Not Established

MTCA = Model Toxics Control Act

**Bolded** value indicates analyte detected at the listed concentration.

Blue shading indicates analyte detected at a concentration greater than the corresponding cleanup level.

Soil stockpiles with MTCA exceedances (blue shaded cells) of at least 1 sample were removed from the Property and transported to Cadman's facility in Everett for permitted disposal.

# Table 2. Soil Analytical Results - Stockpiles

Agency Review Draft

Project No. 160092, Seattle, Washington

| Sample Location | | SS-3* | SS-3* | SS-3* | SS-3* | SS-3* | SS-3* | SS-4 | SS-4 | SS-4 | SS-5 | SS-5 | SS-6 | SS-6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | | 06/28/2018 | 06/28/2018 | 06/28/2018 | 06/28/2018 | 06/28/2018 | 06/28/2018 | 06/29/2018 | 06/29/2018 | 06/29/2018 | 07/02/2018 | 07/03/2018 | 07/02/2018 | 07/03/2018 |
| Sample Identification | | SS3-1-062818 | SS3-2-062818 | SS3-3-062818 | SS3-4-062818 | SS3-5-062818 | SS3-6-062818 | SS4-1-062918 | SS4-2-062918 | SS4-3-062918 | SS5-1-070218 | SS5-2-070318 | SS6-1-070218 | SS6-2-070318 |
| **Chemical Name** | **Cleanup Level (mg/kg)** | **Samples were obtained during the Interim Action in 2018** | | | | | | | | | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | | | | | | | | | | |
| Gasoline-Range Organics | 30** | **58 J** | **95 J** | **240 J** | **140 J** | **96 J** | **140 J** | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U |
| Diesel-Range Organics | 2000 | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U |
| Motor Oil-Range Organics | 2000 | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U |
| BTEX Compounds in mg/kg | | | | | | | | | | | | | | |
| Benzene | 0.03 | < 0.03 U | < 0.03 U | **0.069** | < 0.03 U | < 0.03 U | < 0.03 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | **0.036** | **0.041** |
| Toluene | 7 | **0.18** | **0.17** | **0.13** | **0.16** | **0.21** | **0.18** | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U |
| Ethylbenzene | 6 | **1.1** | **0.98** | **1.3** | **0.77** | **1.1** | **2.8** | **0.067** | **0.066** | **0.065** | < 0.02 U | < 0.02 U | < 0.02 U | **0.033** |
| Total Xylenes | 9 | **3.25** | **2.88** | **2.73** | **2.58** | **3.64** | **7.73** | **0.23** | **0.2** | **0.21** | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U |

# Table 2. Soil Analytical Results - Stockpiles

Project No. 160092, Seattle, Washington

| Sample Location | | SS-7 | SS-7 | SS-7 | SS-9 | SS-9 | SS-9 | SS-9 | SS-9 | SS-10 | SS-11 | SS-11 | SS-11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | | 07/05/2018 | 07/05/2018 | 07/05/2018 | 07/06/2018 | 07/06/2018 | 07/09/2018 | 07/09/2018 | 07/09/2018 | 07/06/2018 | 08/03/2018 | 08/03/2018 | 08/03/2018 |
| Sample Identification | | SS7-1-070518 | SS7-2-070518 | SS7-3-070518 | SS9-1-070618 | SS9-2-070618 | SS9-3-070918 | SS9-4-070918 | SS9-5-070918 | SS10-1-070618 | SS11-1-080318 | SS11-2-080318 | SS11-3-080318 |
| **Chemical Name** | **Cleanup Level (mg/kg)** | | | | | | | | | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | | | | | | | | | |
| Gasoline-Range Organics | 30** | **110** | **130** | **77** | < 5 U | < 5 U | **530** | **170** | **250** | < 5 U | < 5 U | **21** | **100** |
| Diesel-Range Organics | 2000 | < 50 U | **69 X** | < 50 U | < 50 U | < 50 U | **310 X** | **160 X** | **75 X** | < 50 U | < 50 U | < 50 U | **140 X** |
| Motor Oil-Range Organics | 2000 | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U |
| BTEX Compounds in mg/kg | | | | | | | | | | | | | |
| Benzene | 0.03 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | **0.39** | **0.062** | **0.13** | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U |
| Toluene | 7 | **0.026** | **0.046** | < 0.02 U | < 0.02 U | < 0.02 U | **2.8** | **0.61** | **1** | < 0.02 U | < 0.02 U | **0.027** | < 0.1 U |
| Ethylbenzene | 6 | **0.18** | **0.34** | **0.14** | < 0.02 U | **0.029** | **4.6** | **1.2** | **2** | < 0.02 U | < 0.02 U | **0.052** | < 0.1 U |
| Total Xylenes | 9 | **0.48** | **0.72** | **0.33** | < 0.06 U | < 0.06 U | **15** | **2.7** | **5.9** | < 0.06 U | < 0.06 U | **0.37** | **1.3** |

# Table 2. Soil Analytical Results - Stockpiles

Project No. 160092, Seattle, Washington

| Sample Location | | SS-11 | SS-11 | SS-13 | SS-13 |
|---|---|---|---|---|---|
| Sample Date | | 08/03/2018 | 08/03/2018 | 08/03/2018 | 08/03/2018 |
| Sample Identification | | SS11-4-080318 | SS11-5-080318 | SS13-1-080318 | SS13-2-080318 |
| **Chemical Name** | **Cleanup Level (mg/kg)** | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | |
| Gasoline-Range Organics | 30** | **1800** | **69** | < 5 U | < 5 U |
| Diesel-Range Organics | 2000 | **620 X** | **97 X** | < 50 U | < 50 U |
| Motor Oil-Range Organics | 2000 | < 250 U | < 250 U | < 250 U | < 250 U |
| BTEX Compounds in mg/kg | | | | | |
| Benzene | 0.03 | < 2 U | < 0.02 U | < 0.02 U | < 0.02 U |
| Toluene | 7 | **3.3** | **0.17** | < 0.02 U | < 0.02 U |
| Ethylbenzene | 6 | **4.4** | **0.081** | < 0.02 U | < 0.02 U |
| Total Xylenes | 9 | **75** | **0.99** | < 0.06 U | < 0.06 U |

# Table 3. Soil Analytical Results - Test Pits

Project No. 160092, Seattle, Washington

| | Sample Location | TP-01 | TP-01 | TP-02 | TP-02 | TP-03 | TP-03 | TP-04 | TP-04 | TP-05 |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sample Date | 08/10/2018 | 08/10/2018 | 08/10/2018 | 08/10/2018 | 08/10/2018 | 08/10/2018 | 08/13/2018 | 08/13/2018 | 08/13/2018 |
| | Sample Identification | TP1-200-081018 | TP1-197-081018 | TP2-200-081018 | TP2-197-081018 | TP3-200-081018 | TP3-197-081018 | TP4-200-081318 | TP4-197-081318 | TP5-200-081318 |
| | Sample Elevation (ft) | 200 | 197 | 200 | 197 | 200 | 197 | 200 | 197 | 200 |
| **Chemical Name** | **Cleanup Level (mg/kg)** | | | | | | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | | | | | | |
| Gasoline-Range Organics | 30** | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U |
| Diesel-Range Organics | 2000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Motor Oil-Range Organics | 2000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| BTEX Compounds in mg/kg | | | | | | | | | | |
| Benzene | 0.03 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | **0.038** | < 0.02 U | < 0.02 U | < 0.02 U |
| Toluene | 7 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U |
| Ethylbenzene | 6 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | **0.042** | < 0.02 U |
| Total Xylenes | 9 | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U |

**Notes**

ft = Sample elevation in feet (North Atlantic Vertical Datum, 1988).

mg/kg = milligrams per kilogram

-- = Not analyzed

** = Cleanup level for gasoline-range hydrocarbons when benzene is present.

U = Analyte not detected atbove the listed reporting limit

MTCA = Model Toxics Control Act

**Bolded** value indicates analyte detected at the listed concentration.

Blue shading indicates analyte detected at a concentration greater than the corresponding cleanup level.

Soil represented by the samples with MTCA exceedances (blue shaded cells) was excavated from the Property and transported to Cadman's facility in Everett for permitted disposal.

# Table 3. Soil Analytical Results - Test Pits



Project No. 160092, Seattle, Washington

| | Sample Location | TP-05 | TP-06 | TP-06 | TP-07 | TP-07 | TP-08 | TP-08 | TP-09 |
|---|---|---|---|---|---|---|---|---|---|
| | Sample Date | 08/13/2018 | 08/13/2018 | 08/13/2018 | 08/15/2018 | 08/15/2018 | 08/15/2018 | 08/15/2018 | 08/15/2018 |
| | Sample Identification | TP5-197-081318 | TP6-200-081318 | TP6-193-081318 | TP7-200-081518 | TP7-197-081518 | TP8-200-081518 | TP8-197-081518 | TP9-200-081518 |
| | Sample Elevation (ft) | 197 | 200 | 193 | 200 | 197 | 200 | 197 | 200 |
| **Chemical Name** | **Cleanup Level (mg/kg)** | **Test Pits were completed during the Interim Action in 2018** | | | | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | | | | | |
| Gasoline-Range Organics | 30** | < 5 U | < 5 U | < 5 U | **6500** | < 5 U | **6.6** | **8** | **6.6** |
| Diesel-Range Organics | 2000 | -- | -- | -- | -- | -- | -- | -- | -- |
| Motor Oil-Range Organics | 2000 | -- | -- | -- | -- | -- | -- | -- | -- |
| BTEX Compounds in mg/kg | | | | | | | | | |
| Benzene | 0.03 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.4 U | < 0.02 U | < 0.02 U | **0.084** | < 0.02 U |
| Toluene | 7 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.4 U | < 0.02 U | **0.036** | **0.5** | < 0.02 U |
| Ethylbenzene | 6 | **0.066** | < 0.02 U | < 0.02 U | **36** | < 0.02 U | **0.065** | **0.16** | **0.048** |
| Total Xylenes | 9 | **0.13** | < 0.06 U | < 0.06 U | **70** | < 0.06 U | **0.19** | **0.97** | **0.14** |

# Table 3. Soil Analytical Results - Test Pits



Project No. 160092, Seattle, Washington

| | Sample Location | TP-09 | TP-10 | TP-11 | TP-12 | TP-13 | TP-13 | TP-14 | TP-15 |
|---|---|---|---|---|---|---|---|---|---|
| | Sample Date | 08/15/2018 | 08/16/2018 | 08/16/2018 | 08/16/2018 | 08/16/2018 | 08/16/2018 | 08/16/2018 | 08/16/2018 |
| | Sample Identification | TP9-196-081518 | TP10-198-081618 | TP11-197-081618 | TP12-197-081618 | TP13-197-081618 | TP13-193-081618 | TP14-197-081618 | TP15-198-081618 |
| | Sample Elevation (ft) | 196 | 198 | 197 | 197 | 197 | 193 | 197 | 198 |
| **Chemical Name** | **Cleanup Level (mg/kg)** | | | | | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | | | | | |
| Gasoline-Range Organics | 30** | < 5 U | < 5 U | < 5 U | < 5 U | **13** | < 5 U | < 5 U | **10** |
| Diesel-Range Organics | 2000 | -- | -- | -- | -- | -- | -- | -- | -- |
| Motor Oil-Range Organics | 2000 | -- | -- | -- | -- | -- | -- | -- | -- |
| BTEX Compounds in mg/kg | | | | | | | | | |
| Benzene | 0.03 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | **0.093** | < 0.02 U | < 0.02 U |
| Toluene | 7 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | **0.069** | < 0.02 U | < 0.02 U | **0.033** |
| Ethylbenzene | 6 | **0.14** | < 0.02 U | < 0.02 U | < 0.02 U | **0.21** | **0.24** | < 0.02 U | **0.24** |
| Total Xylenes | 9 | **0.7** | < 0.06 U | < 0.06 U | < 0.06 U | **2** | **0.088** | < 0.06 U | **0.16** |

# Table 4. Soil Analytical Results - Performance Monitoring

Project No. 160092, Seattle, Washington

| Sample Date | | AB-01 11/09/2016 | AB-01 11/09/2016 | AB-01 11/09/2016 | AB-02 11/08/2016 | AB-02 11/08/2016 | AB-02 09/04/2018 | AB-02 09/04/2018 | AB-02 09/04/2018 | AB-02 09/04/2018 | AB-02 09/04/2018 | AB-03 11/07/2016 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Identification | | AB-1-24 | AB-1-29 | AB-1-35 | AB-2-24 | AB-2-28 | AB02-BTM-090418 | AB02-SW1-090418 | AB02-SW2-090418 | AB02-SW3-090418 | AB02-SW4-090418 | AB-3-24* |
| Sample Depth | | 24 ft bgs | 29 ft bgs | 35 ft bgs | 24 ft bgs | 28 ft bgs | 25.5 ft bgs | 25 ft bgs | 25 ft bgs | 25 ft bgs | 25 ft bgs | 24 ft bgs |
| Sample Elevation (ft) | | 194 | 189 | 183 | 192 | 188 | 190.5 | 191 | 191 | 191 | 191 | 193 |
| **Chemical Name** | **Cleanup Level (mg/kg)** | | | | | | | | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | | | | | | | | |
| Gasoline-Range Organics | 30** | < 2 U | < 2 U | < 2 U | **6.6** | < 2 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 2 U |
| Diesel-Range Organics | 2000 | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | -- | -- | -- | -- | -- | < 50 U |
| Motor Oil-Range Organics | 2000 | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | -- | -- | -- | -- | -- | < 250 U |
| BTEX Compounds in mg/kg | | | | | | | | | | | | |
| Benzene | 0.03 | < 0.02 U | < 0.02 U | < 0.02 U | **0.053** | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U |
| Toluene | 7 | < 0.02 U | < 0.02 U | < 0.02 U | **0.05** | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U |
| Ethylbenzene | 6 | < 0.02 U | < 0.02 U | < 0.02 U | **0.33** | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U |
| Total Xylenes | 9 | < 0.06 U | < 0.06 U | < 0.06 U | **1** | < 0.06 U | < 0.06 U | < 0.06 U | **0.081** | < 0.06 U | < 0.06 U | < 0.06 U |

**Notes**

ft = Sample elevation in feet (North Atlantic Vertical Datum, 1988).

ft bgs = feet below ground surface

mg/kg = milligrams per kilogram

-- = Not analyzed

* = Sample was additionally analyzed for MTCA 5 Metals, and volatile organic compounds (VOCs). Metals were either were not detected or were detected at concentrations less than the Puget Sound Natural Background Concentrations. VOCs were not detected. These results are reported in the Final IAWP (Aspect, 2018).

** = Cleanup level for gasoline-range hydrocarbons when benzene is present.

*** = Sample was additionally analyzed for MTCA 5 Metals, VOCs, and polycyclic aromatic hydrocarbons (PAHs). Metals either were not detected or detected at concentrations less than the Puget Sound Natural Background Concentrations. PAHs and VOCs either were not detected or detected at concentrations that were less than the MTCA Cleanup Level. These results are reported in the Final IAWP (Aspect, 2018).

U = Analyte not detected atbove the listed reporting limit

X = Chromatographic pattern does not match quantitation standard. However, the listed values are considered detections based on field screening evidence (moderate to heavy sheen and petroleum odor).

J = Listed value is an estimate.

MTCA = Model Toxics Control Act

**Bolded** value indicates analyte detected at the listed concentration.

Blue shading indicates analyte detected at a concentration greater than the corresponding cleanup level.

Soil represented by the performance samples with MTCA exceedances (blue shaded cells) was over-excavated from the Property and transported to Cadman's facility in Everett for permitted disposal.

Green shading indicates samples that were obtained form the over-excavated areas. Analytes either were not detected or detected at a concentration less than the corresponding MTCA cleanup level. The green shaded samples and the lised historical samples (no shading) represent the final soi conditions at the Property following completion of the Interim Action.

# Table 4. Soil Analytical Results - Performance Monitoring

Project No. 160092, Seattle, Washington

| Sample Date | | AB-04 11/08/2016 | AB-04 11/08/2016 | AB-05 11/08/2016 | AB-05 11/08/2016 | AB-05 11/08/2016 | AB-06 11/09/2016 | AB-06 11/09/2016 | AB-06 11/09/2016 | AB-07 11/09/2016 | AB-07 11/09/2016 | AB-07 11/09/2016 | AB-07 09/10/2018 | AB-07 09/10/2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample Identification** | | **AB-4-24*** | **AB-4-29*** | **AB-5-24***** | **AB-5-29*** | **AB-5-32*** | **AB-6-24***** | **AB-6-29** | **AB-6-33** | **AB-7-24** | **AB-7-29** | **AB-7-33** | **AB07-BTM-091018** | **AB07-SW1-091018** |
| **Sample Depth** | | **24 ft bgs** | **29 ft bgs** | **24 ft bgs** | **29 ft bgs** | **32 ft bgs** | **24 ft bgs** | **29 ft bgs** | **33 ft bgs** | **24 ft bgs** | **29 ft bgs** | **33 ft** | **34 ft bgs** | **33 ft bgs** |
| **Sample Elevation (ft)** | | **192** | **187** | **191** | **186** | **183** | **193** | **188** | **184** | **193** | **188** | **184** | **183** | **184** |
| **Chemical Name** | **Cleanup Level (mg/kg)** | | | | | | | | | | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | | | | | | | | | | |
| Gasoline-Range Organics | 30** | < 2 U | < 2 U | **5.3** | < 2 U | < 2 U | **3.9** | < 2 U | < 2 U | < 2 U | < 2 U | | < 5 U | < 5 U |
| Diesel-Range Organics | 2000 | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | < 50 U | -- | -- |
| Motor Oil-Range Organics | 2000 | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | -- | -- |
| BTEX Compounds in mg/kg | | | | | | | | | | | | | | |
| Benzene | 0.03 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | **0.12 J** | < 0.02 U | < 0.02 U | **0.024** | < 0.02 U | **0.09** | < 0.02 U | < 0.02 U |
| Toluene | 7 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | **0.074** | < 0.02 U | < 0.02 U |
| Ethylbenzene | 6 | **0.068** | **0.041** | **0.14** | < 0.02 U | < 0.02 U | **0.39 J** | **0.087** | < 0.02 U | **0.16** | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U |
| Total Xylenes | 9 | **0.09** | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | **0.073** | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U |

# Table 4. Soil Analytical Results - Performance Monitoring

Project No. 160092, Seattle, Washington

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Sample Date** | **AB-07 09/10/2018** | **AB-08 11/09/2016** | **AB-08 11/09/2016** | **AB-08 11/09/2016** | **AB-09 11/07/2016** | **AB-09 09/06/2018** | **E11S1 08/14/2018** | **E11S1 08/21/2018** | **E16S3 08/14/2018** | **E16S3 08/21/2018** |
| | **Sample Identification** | **AB07-SW2-091018** | **AB-8-24** | **AB-8-29** | **AB-8-33** | **AB-9-27** | **AB09-BTM-090618** | **E11S1-198-081418** | **E11S1-195-082118** | **E16S3-200-081418** | **E16S3-195-082118** |
| | **Sample Depth** | **33 ft bgs** | **24 ft bgs** | **29 ft bgs** | **33 ft bgs** | **27 ft bgs** | **28 ft bgs** | **17 ft bgs** | **20 ft bgs** | **15 ft bgs** | **20 ft bgs** |
| | **Sample Elevation (ft)** | **184** | **193** | **188** | **184** | **188** | **187** | **198** | **195** | **200** | **195** |
| **Chemical Name** | **Cleanup Level (mg/kg)** | | | | | | | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | | | | | | | |
| Gasoline-Range Organics | 30** | < 5 U | < 2 U | < 2 U | < 2 U | < 2 U | < 5 U | **1200** | < 5 U | **640** | < 5 U |
| Diesel-Range Organics | 2000 | -- | < 50 U | < 50 U | < 50 U | < 50 U | -- | **1300 X** | < 50 U | **62 X** | < 50 U |
| Motor Oil-Range Organics | 2000 | -- | < 250 U | < 250 U | < 250 U | < 250 U | -- | **3000** | < 250 U | < 250 U | < 250 U |
| BTEX Compounds in mg/kg | | | | | | | | | | | |
| Benzene | 0.03 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | **0.06** | < 0.02 U | < 0.02 UJ | < 0.02 U | < 0.2 U | < 0.02 U |
| Toluene | 7 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.1 U | < 0.02 U | < 0.2 U | < 0.02 U |
| Ethylbenzene | 6 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | **0.91** | < 0.02 U | **0.88** | < 0.02 U |
| Total Xylenes | 9 | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | **3.3** | < 0.06 U | **3.5** | < 0.06 U |

# Table 4. Soil Analytical Results - Performance Monitoring

Project No. 160092, Seattle, Washington

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sample Date** | | **E18S2 08/14/2018** | **E18S2 08/21/2018** | **E19S1 08/21/2018** | **E19S1 08/21/2018** | **E19S3 08/21/2018** | **E19S3 08/21/2018** | **E2N10 7/11/2018** | **EX2 7/12/2018** |
| **Sample Identification** | | **E18S2-200-081418** | **E18S2-195-082118** | **E19S1-199-082118** | **E19S1-196-082118** | **E19S3-199-082118** | **E19S3-196-082118** | **E2N10-210-07118** | **EX2-2-212** |
| **Sample Depth** | | **15 ft bgs** | **20 ft bgs** | **16 ft bgs** | **19 ft bgs** | **16 ft bgs** | **19 ft bgs** | **5 ft bgs** | **4 ft bgs** |
| **Sample Elevation (ft)** | | **200** | **195** | **199** | **196** | **199** | **196** | **210** | **212** |
| **Chemical Name** | **Cleanup Level (mg/kg)** | | | | | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | | | | | |
| Gasoline-Range Organics | 30** | **6400** | < 5 U | **210** | < 5 U | < 5 U | < 5 U | **8** | **--** |
| Diesel-Range Organics | 2000 | **1100 X** | < 50 U | **670 X** | < 50 U | < 50 U | < 50 U | **5700 X** | **180 X** |
| Motor Oil-Range Organics | 2000 | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | **22000** | **1300** |
| BTEX Compounds in mg/kg | | | | | | | | | |
| Benzene | 0.03 | **1.1** | < 0.02 U | < 0.03 UJ | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | **--** |
| Toluene | 7 | **15** | < 0.02 U | < 0.2 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | **--** |
| Ethylbenzene | 6 | **35** | < 0.02 U | **0.53** | < 0.02 U | < 0.02 U | **0.025** | < 0.02 U | **--** |
| Total Xylenes | 9 | **140** | < 0.06 U | **1.3** | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | **--** |

# Table 4. Soil Analytical Results - Performance Monitoring

Project No. 160092, Seattle, Washington

| | | EX2 | E9S3 | E9S3 | W10N5 | W10N6 | W11.5N2 | W11N4 | W15N2 |
|---|---|---|---|---|---|---|---|---|---|
| **Sample Date** | | **7/12/2018** | **08/14/2018** | **08/21/2018** | **08/30/2018** | **08/30/2018** | **08/28/2018** | **08/29/2018** | **08/27/2018** |
| **Sample Identification** | | **EX2-3-212** | **E9S3-198-081418** | **E9S3-195-082118** | **W10N5-191.5-083018** | **W10N6-193.5-083018** | **W11.5N2-196-082818** | **W11N4-195.5-082918** | **W15N2-192-082718** |
| **Sample Depth** | | **4 ft bgs** | **17 ft bgs** | **20 ft bgs** | **25.5 ft bgs** | **23.5 ft bgs** | **21 ft bgs** | **21.5 ft bgs** | **25 ft bgs** |
| **Sample Elevation (ft)** | | **212** | **198** | **195** | **191.5** | **193.5** | **196** | **195.5** | **192** |
| **Chemical Name** | **Cleanup Level (mg/kg)** | | | | | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | | | | | |
| Gasoline-Range Organics | 30** | **--** | **840** | < 5 U | < 5 U | < 5 U | **280** | **22** | < 5 U |
| Diesel-Range Organics | 2000 | **91 X** | **5900** | < 50 U | -- | -- | -- | -- | -- |
| Motor Oil-Range Organics | 2000 | **730** | < 250 U | < 250 U | -- | -- | -- | -- | -- |
| BTEX Compounds in mg/kg | | | | | | | | | |
| Benzene | 0.03 | **--** | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.2 U | **0.025** | < 0.02 U |
| Toluene | 7 | **--** | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.2 U | **0.1** | < 0.02 U |
| Ethylbenzene | 6 | **--** | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | **0.77** | **0.35** | < 0.02 U |
| Total Xylenes | 9 | **--** | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | **2.6** | **2.4** | < 0.06 U |

# Table 4. Soil Analytical Results - Performance Monitoring

Project No. 160092, Seattle, Washington

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sample Date** | | **W16N4 08/28/2018** | **W16N4 09/05/2018** | **W16N7 09/05/2018** | **W17N2 08/27/2018** | **W17N2 08/27/2018** | **W18N4 08/27/2018** | **W18N4 08/27/2018** | **W18N4 09/05/2018** |
| **Sample Identification** | | **W16N4-190-082818** | **W16N4-189.5-090518** | **W16N7-192-090518** | **W17N2-192-082718** | **W17N2-190-082718** | **W18N4-192-082718** | **W18N4-190-082718** | **W18N4-189.5-090518** |
| **Sample Depth** | | **27 ft bgs** | **27.5 ft bgs** | **25 ft bgs** | **25 ft bgs** | **27 ft bgs** | **25 ft bgs** | **28 ft bgs** | **28.5 ft bgs** |
| **Sample Elevation (ft)** | | **190** | **189.5** | **192** | **192** | **190** | **192** | **190** | **189.5** |
| **Chemical Name** | **Cleanup Level (mg/kg)** | | | | | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | | | | | |
| Gasoline-Range Organics | 30** | < 5 U | < 5 U | < 5 U | **11** | < 5 U | **13** | **13** | < 5 U |
| Diesel-Range Organics | 2000 | -- | -- | -- | -- | -- | -- | -- | -- |
| Motor Oil-Range Organics | 2000 | -- | -- | -- | -- | -- | -- | -- | -- |
| BTEX Compounds in mg/kg | | | | | | | | | |
| Benzene | 0.03 | **0.038** | < 0.02 U | < 0.02 U | **0.49** | **0.33** | **1.9** | **0.87** | **0.046** |
| Toluene | 7 | < 0.02 U | < 0.02 U | < 0.02 U | **0.075** | < 0.02 U | **0.096** | **0.034** | < 0.02 U |
| Ethylbenzene | 6 | **0.026** | < 0.02 UJ | < 0.02 UJ | **0.85** | **0.39** | **0.54** | **1.2** | **0.19 J** |
| Total Xylenes | 9 | < 0.06 U | < 0.06 U | < 0.06 U | **0.68** | < 0.06 U | **0.72** | **1.1** | **0.1** |

# Table 4. Soil Analytical Results - Performance Monitoring

Project No. 160092, Seattle, Washington

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sample Date** | | **W18N4 09/06/2018** | **W18N4 09/10/2018** | **W18N6 08/27/2018** | **W18N6 08/27/2018** | **W18N6 09/05/2018** | **W18N7 09/05/2018** | **W1S10 08/24/2018** | **W1S12 08/24/2018** |
| **Sample Identification** | | **W18N4-189-090618** | **W18N4-188-091018** | **W18N6-196-082718** | **W18N6-193-082718** | **W18N6-189.5-090518** | **W18N7-192-090518** | **W1S10-193.5-082418** | **W1S12-193.5-082418** |
| **Sample Depth** | | **29 ft bgs** | **30 ft bgs** | **22 ft bgs** | **25 ft bgs** | **28.5 ft bgs** | **26 ft bgs** | **24.5 ft bgs** | **25.5 ft bgs** |
| **Sample Elevation (ft)** | | **189** | **188** | **196** | **193** | **189.5** | **192** | **193.5** | **193.5** |
| **Chemical Name** | **Cleanup Level (mg/kg)** | | | | | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | | | | | |
| Gasoline-Range Organics | 30** | -- | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U |
| Diesel-Range Organics | 2000 | -- | -- | -- | -- | -- | -- | -- | -- |
| Motor Oil-Range Organics | 2000 | -- | -- | -- | -- | -- | -- | -- | -- |
| BTEX Compounds in mg/kg | | | | | | | | | |
| Benzene | 0.03 | **0.5** | < 0.02 U | **0.034** | **0.32** | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U |
| Toluene | 7 | **0.024** | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U |
| Ethylbenzene | 6 | **0.17** | < 0.02 U | **0.13** | **0.96** | < 0.02 UJ | < 0.02 UJ | < 0.02 U | < 0.02 U |
| Total Xylenes | 9 | **0.3** | < 0.06 U | < 0.06 U | **0.12** | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U |

# Table 4. Soil Analytical Results - Performance Monitoring

Project No. 160092, Seattle, Washington

| | | W1S8 | W3S10 | W3S10 | W5S12 | W6S8 | W9N4 | W9N8 |
|---|---|---|---|---|---|---|---|---|
| **Sample Date** | | **08/24/2018** | **08/27/2018** | **08/27/2018** | **08/27/2018** | **09/13/2018** | **08/30/2018** | **09/13/2018** |
| **Sample Identification** | | **W1S8-193.5-082418** | **W3S10-193.5-082718** | **W3S10-192-082718** | **W5S12-193.5-082718** | **W6S8-191.5-091318** | **W9N4-193.5-083018** | **W9N8-191.5-091318** |
| **Sample Depth** | | **22.5 ft bgs** | **22.5 ft bgs** | **24 ft bgs** | **22.5 ft bgs** | **24.5 ft bgs** | **23.5 ft bgs** | **25.5 ft bgs** |
| **Sample Elevation (ft)** | | **193.5** | **193.5** | **192** | **193.5** | **191.5** | **193.5** | **191.5** |
| **Chemical Name** | **Cleanup Level (mg/kg)** | | | | | | | |
| Total Petroleum Hydrocarbons in mg/kg | | | | | | | | |
| Gasoline-Range Organics | 30** | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U |
| Diesel-Range Organics | 2000 | -- | -- | -- | -- | -- | -- | -- |
| Motor Oil-Range Organics | 2000 | -- | -- | -- | -- | -- | -- | -- |
| BTEX Compounds in mg/kg | | | | | | | | |
| Benzene | 0.03 | < 0.02 U | **0.04** | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U |
| Toluene | 7 | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U |
| Ethylbenzene | 6 | **0.066** | **0.046** | **0.047** | < 0.02 U | < 0.02 U | < 0.02 U | < 0.02 U |
| Total Xylenes | 9 | < 0.06 U | **0.09** | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U | < 0.06 U |

## Table 5. Dewatering Observation Monitoring

Project No. 160092, Seattle, Washington

| Date | Monitoring Well ID | TOC Elevation (ft amsl) | DTW (fbtoc) | GW Elevation (ft amsl) | LNAPL Thickness (ft.) | Monitoring Well ID | TOC Elevation (ft amsl) | DTW (fbtoc) | GW Elevation (ft amsl) | LNAPL Thickness (ft.) | Monitoring Well ID | TOC Elevation (ft amsl) | DTW (fbtoc) | GW Elevation (ft amsl) | LNAPL Thickness (ft.) | Monitoring Well ID | TOC Elevation (ft amsl) | DTW (fbtoc) | GW Elevation (ft amsl) | LNAPL Thickness (ft.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8/2/2018 | MW-17 | 215.4 | 16.71 | 198.69 | - | MW-18 | 215.95 | - | - | - | MW-19 | 216.36 | - | - | - | MW-25 | 212.81 | 15.53 | 197.28 | - |
| 8/13/2018 | | | 18.10 | 197.30 | - | | | 18.46 | 197.49 | - | | | 19.06 | 197.3 | - | | | - | - | - |
| 8/15/2018 | | | 18.13 | 197.27 | - | | | 18.47 | 197.48 | - | | | 19.01 | 197.35 | - | | | - | - | - |
| 8/16/2018 | | | 17.93 | 197.47 | - | | | 18.38 | 197.57 | - | | | 19.05 | 197.31 | - | | | 15.99 | 196.82 | - |
| 8/17/2018 | | | 24.27 | 191.13 | - | | | 19.25 | 196.7 | - | | | 20.43 | 195.93 | - | | | 16.20 | 196.61 | - |
| 8/20/2018 | | | 22.98 | 192.42 | - | | | 21.09 | 194.86 | - | | | 22.98 | 193.38 | - | | | 16.67 | 196.14 | - |
| 8/21/2018 | | | 24.52 | 190.88 | - | | | 21.81 | 194.14 | - | | | 23.67 | 192.69 | - | | | - | - | - |
| 8/22/2018 | | | 24.51 | 190.89 | - | | | 22.86 | 193.09 | - | | | - | - | - | | | 16.96 | 195.85 | - |
| 8/23/2018 | | | 24.22 | 191.18 | - | | | 22.6 | 193.35 | - | | | 23.99 | 192.37 | - | | | 17.1 | 195.71 | - |
| 8/24/2018 | | | DRY | | - | | | DRY | | - | | | 23.31 | 193.05 | - | | | 17.26 | 195.55 | - |
| 8/27/2018 | | | DRY | | - | | | DRY | | - | | | 23.92 | 192.44 | - | | | 17.52 | 195.29 | - |
| 8/28/2018 | | | DRY | | - | | | DRY | | - | | | 24.42 | 191.94 | - | | | - | - | - |
| 8/29/2018 | | | DRY | | - | | | DRY | | - | | | 24.55 | 191.81 | - | | | 17.61 | 195.2 | - |
| 8/30/2018 | | | DRY | | - | | | DRY | | - | | | 25.56 | 190.8 | - | | | 17.41 | 195.4 | - |
| 8/31/2018 | | | DRY | | - | | | DRY | | - | | | - | - | - | | | 17.65 | 195.16 | - |
| 9/1/2018 | | | DRY | | - | | | DRY | | - | | | 27.91 | 188.45 | - | | | - | - | - |
| 9/6/2018 | | | DRY | | - | | | DRY | | - | | | 28.09 | 188.27 | - | | | - | - | - |
| 9/7/2018 | | | DRY | | - | | | DRY | | - | | | 28.2 | 188.16 | - | | | - | - | - |

**Notes**

TOC = Top of the well casing
DTW = Depth-to-groundwater
GW = Groundwater
fbtoc - feet below top of casing
LNAPL = Light non-aqueous phase liquid
ft amsl = Elevation in feet above mean sea level

## Table 5. Dewatering Observation Monitoring

Project No. 160092, Seattle, Washington

| Date | Monitoring Well ID | TOC Elevation (ft amsl) | DTW (fbtoc) | GW Elevation (ft amsl) | LNAPL Thickness (ft.) | Monitoring Well ID | TOC Elevation (ft amsl) | DTW (fbtoc) | GW Elevation (ft amsl) | LNAPL Thickness (ft.) | Monitoring Well ID | TOC Elevation (ft amsl) | DTW (fbtoc) | GW Elevation (ft amsl) | LNAPL Thickness (ft.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8/2/2018 | MW-26 | 213.45 | 15.62 | 197.83 | 0.1 | MW-27 | 214.43 | - | - | - | MW-28 | 214.44 | 16.26 | 198.18 | 0.06 |
| 8/13/2018 | | | 17.10 | 196.35 | - | | | - | - | - | | | 17.82 | 196.62 | - |
| 8/15/2018 | | | 16.69 | 196.76 | - | | | - | - | - | | | 17.49 | 196.95 | - |
| 8/16/2018 | | | 16.56 | 196.89 | - | | | 17.42 | 197.01 | - | | | 17.29 | 197.15 | - |
| 8/17/2018 | | | 19.79 | 193.66 | - | | | 19.76 | 194.67 | 0.15 | | | 22.86 | 191.58 | 0.02 |
| 8/20/2018 | | | 20.76 | 192.69 | - | | | 22.71 | 191.72 | 0.1 | | | 23.07 | 191.37 | 0.04 |
| 8/21/2018 | | | 22.46 | 190.99 | - | | | 23.78 | 190.65 | 0.1 | | | 24.09 | 190.35 | 0.01 |
| 8/22/2018 | | | 22.72 | 190.73 | - | | | 24.23 | 190.20 | 0.08 | | | 24.41 | 190.03 | 0.02 |
| 8/23/2018 | | | 24.25 | 189.20 | - | | | 23.84 | 190.59 | 0.08 | | | 23.7 | 190.74 | - |
| 8/24/2018 | | | 24.35 | 189.10 | - | | | DRY | | - | | | DRY | | - |
| 8/27/2018 | | | 23.76 | 189.69 | - | | | DRY | | - | | | DRY | | - |
| 8/28/2018 | | | 23.21 | 190.24 | - | | | DRY | | - | | | DRY | | - |
| 8/29/2018 | | | 22.36 | 191.09 | - | | | DRY | | - | | | DRY | | - |
| 8/30/2018 | | | 22.88 | 190.57 | - | | | DRY | | - | | | DRY | | - |
| 8/31/2018 | | | 22 | 191.45 | - | | | DRY | | - | | | DRY | | - |
| 9/1/2018 | | | 22.35 | 191.10 | - | | | DRY | | - | | | DRY | | - |
| 9/6/2018 | | | 22.61 | 190.84 | - | | | DRY | | - | | | DRY | | - |
| 9/7/2018 | | | 22.6 | 190.85 | - | | | DRY | | - | | | DRY | | - |

# Table 6. Off-Property Groundwater Analytical Results

Project No. 160092, Seattle, Washington

| | Sample Location | MW-17 | MW-18 | MW-18 | MW-25 | MW-25 | MW-25 | MW-26 | MW-26 |
|---|---|---|---|---|---|---|---|---|---|
| | Sample Date | 08/02/2018 | 08/22/2018 | 08/31/2018 | 08/02/2018 | 08/22/2018 | 08/31/2018 | 08/22/2018 | 08/31/2018 |
| | Sample Identification | MW-17-080218 | MW-18-082218 | MW-18-083118 | MW-25-080218 | MW-25-082218 | MW-25-083118 | MW-26-082218 | MW-26-083118 |
| **Chemical Name** | **Cleanup Level (ug/L)** | | | | | | | | |
| Total Petroleum Hydrocarbons in ug/L | | | | | | | | | |
| Gasoline-Range Organics | 800* | **2800** | < 100 U | < 100 U | **1200** | **420** | **440** | **940** | **1300** |
| Diesel-Range Organics | 500 | **860 X** | **99 X** | **180 X** | **210 X** | **58 X** | < 50 U | **130 X** | **120 X** |
| Motor Oil-Range Organics | 500 | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 250 U | < 150 U |
| BTEX Compounds in ug/L | | | | | | | | | |
| Benzene | 5 | **45** | < 0.35 U | < 0.35 U | **32** | **9.7** | **12** | **28** | **23** |
| Toluene | 1000 | **4** | < 1 U | < 1 U | **2.7** | < 1 U | < 1 U | **1.9** | < 1 U |
| Ethylbenzene | 700 | **27** | < 1 U | < 1 U | **9.3** | < 1 U | < 1 U | **14** | < 1 U |
| Total Xylenes | 1000 | **87** | < 2 U | < 2 U | **6.9** | < 2 U | < 2 U | **1.2** | < 2 U |
| Volcatile Organic Compounds in ug/L | | | | | | | | | |
| Tetrachloroethene (PCE) | 5 | **110** | **2.9** | **1.6** | **26** | **59** | **42** | **7.5** | **43** |
| Trichloroethene (TCE) | 5 | **27** | R | < 1 U | **480** | **270 E** | **360** | **810** | **1400** |
| cis-1,2-Dichloroethene (DCE) | 16 | **39** | < 1 U | < 1 U | **540** | **230** | **280** | **430** | **660** |
| trans-1,2-Dichloroethene | 160 | **1.7** | < 1 U | < 1 U | **100** | **28** | **24** | **110** | **98** |
| Methylene Chloride | 5 | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U | < 5 U |
| Vinyl Chloride | 0.2 | < 0.2 U | < 0.2 U | < 0.2 UJ | **78** | **13** | **9.5 J** | **26** | **5.2 J** |
| 1,2-Dibromoethane (EDB) | 0.01 | < 1 U | < 1 U | < 1 U | < 1 U | < 1 U | < 1 U | < 1 U | < 1 U |
| 1,2-Dichloroethane (EDC) | 5 | < 1 U | < 1 U | < 1 U | < 1 U | < 1 U | < 1 U | < 1 U | < 1 U |
| 1,1-Dichloroethene | 400 | < 1 U | < 1 U | < 1 U | **1.8** | < 1 U | < 1 U | < 1 U | < 1 U |
| Methyl tert-butyl ether (MTBE) | 20 | < 1 U | < 1 U | < 1 U | < 1 U | < 1 U | < 1 U | < 1 U | < 1 U |

**Notes**

ug/L = micrograms per liter

* = Cleanup level for gasoline-range hydrocarbons when benzene is present.

U = Analyte not detected atbove the listed reporting limit

X = Chromatographic pattern does not match quantitation standard.

J = Listed value is an estimate.

E - exceeded calibration range (insufficient volume for reanalysis at dilution). Analyte is clearly present at a high concentration in sample, but numeric value is not viable for quantitative purposes.

R - Result is rejected. Unable to determine if analyte is present. Result is not usable for quantitative or qualitative purposes.

Select VOCs are listed in the table. Other VOCs either were not detected or detected at concentrations below the MTCA cleanup levels. Please refer to the laboratory report in Appendix D.

MTCA = Model Toxics Control Act

**Bolded** value indicates analyte detected at the listed concentration.

Blue shading indicates analyte detected at a concentration greater than the corresponding cleanup level.

# FIGURES

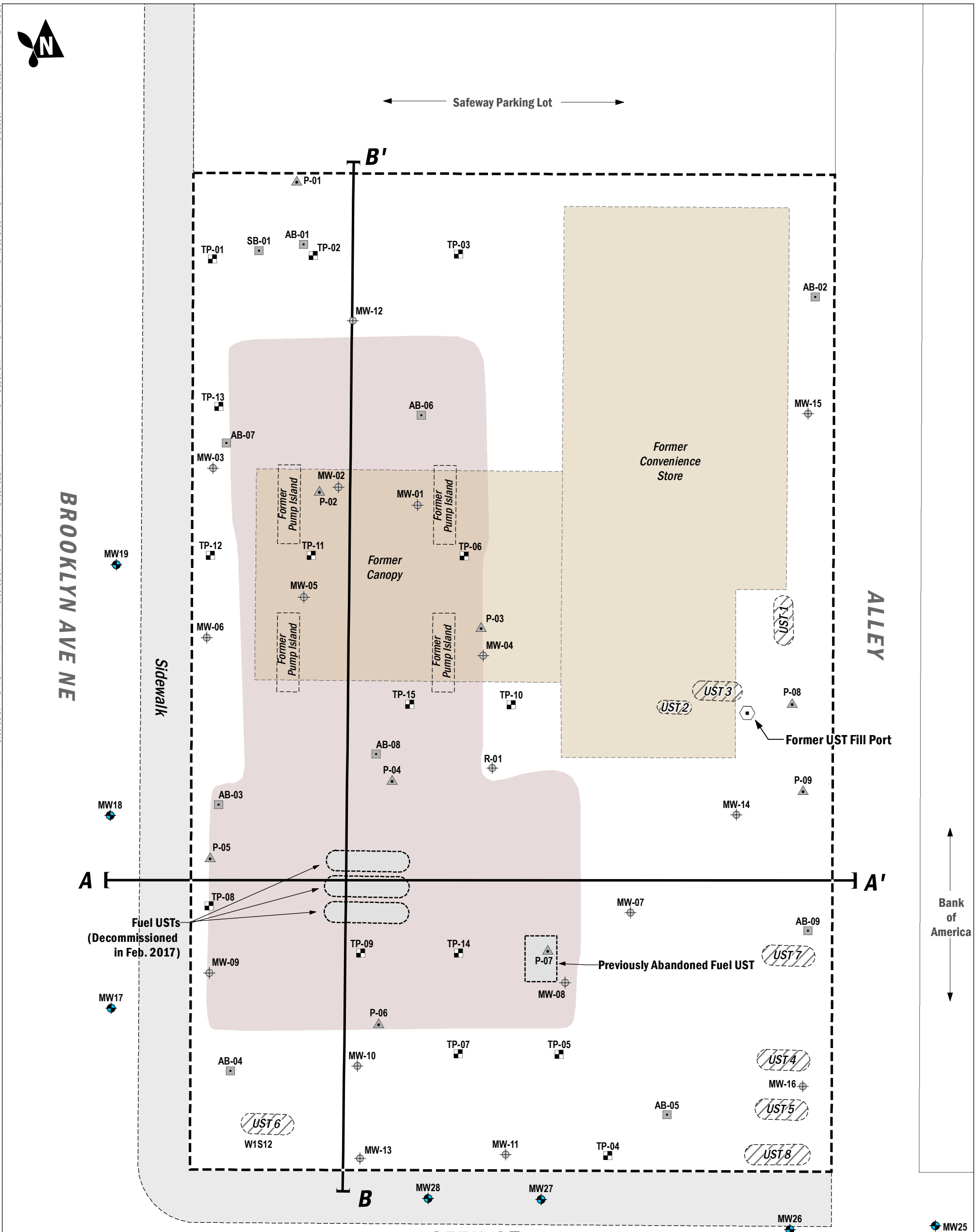

# Site Location Map

Interim Action Report
4700 Brooklyn Avenue NE
Seattle, Washington

| | | | |
|---|---|---|---|
| Aspect CONSULTING | OCT-2018 | BY: DLC / EAC | FIGURE NO. 1 |
| | PROJECT NO. 160092 | REVISED BY: FK / TDR | |



GIS Path: T:\projects_8\4700 Brooklyn 160092\Delivered\InterimActionReport2018\01 Site Location Map.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 10/24/2018 || User: trullen || Print Date: 10/24/2018




Abandoned on-Property Monitoring Well

Existing off-Property Monitoring Well

Test Pit (Aspect, 2018)
*Completed during the Interim Action*

Soil Boring (Aspect, 2016)

Test Probe (Riley, 2015)

Property Boundary

1990 Soil Excavation

Cross Section

USTs Discovered and Removed During Interim Action in 2018

Former UST

UST: Underground Storage Tank

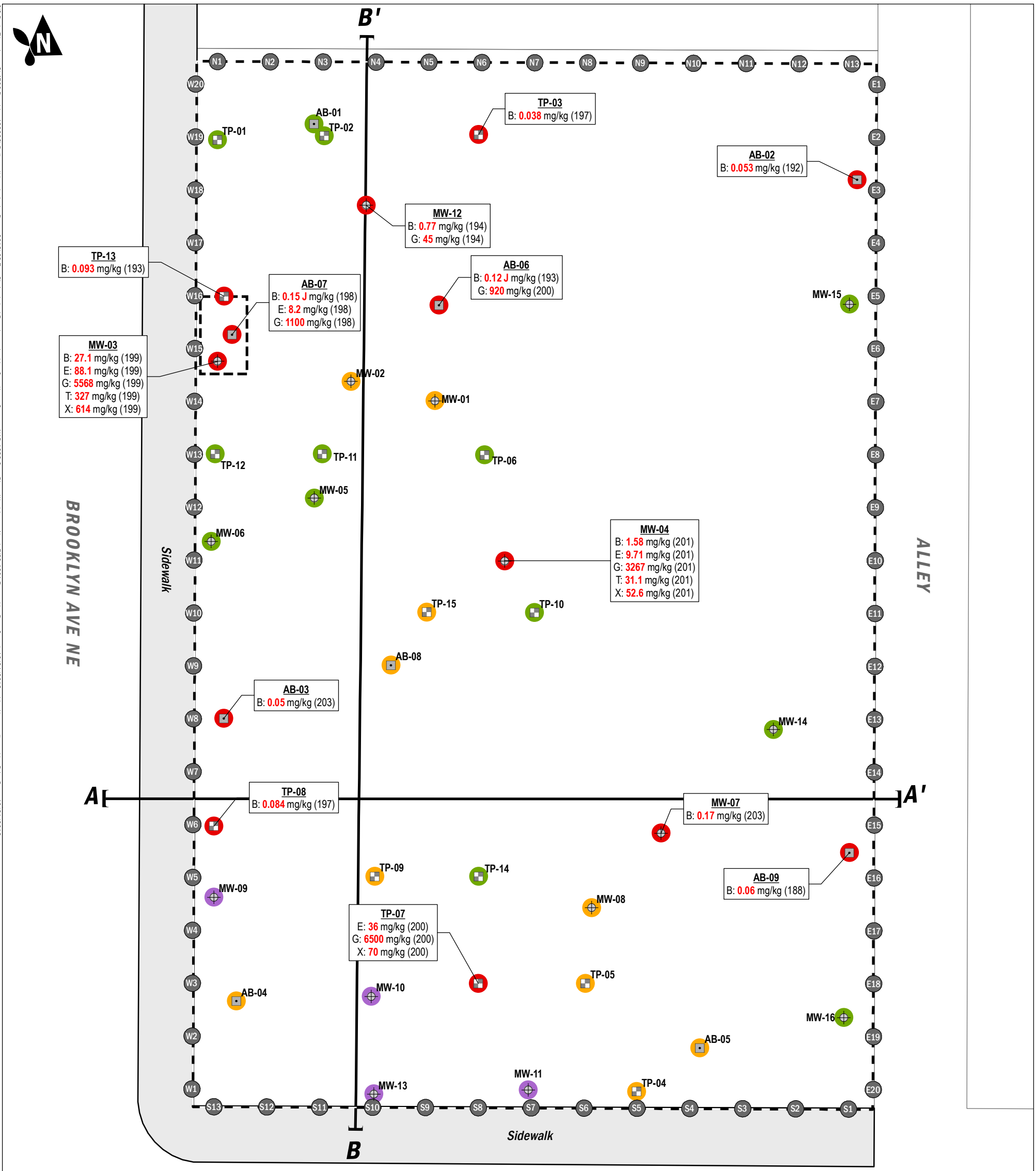
0 7.5 15
Feet

# Site Plan

Interim Action Report
4700 Brooklyn Avenue NE
Seattle, Washington

Aspect CONSULTING

| OCT-2018 | BY: DAH / EAC | FIGURE NO. 2 |
|---|---|---|
| PROJECT NO. 160092 | REVISED BY: --- | |




LNAPL Occured at this Monitoring Well Location and Supersedes Any Soil Analytical Data Collected During Well Installation in 1990

One or More Contaminant Detected Above Cleanup Level

One or More Contaminant Detected Below Cleanup Level

No Detections

**Explorations**

Abandoned on-Property Monitoring Well

Existing off-Property Monitoring Well

Test Pit (Aspect, 2018)
*Completed during the Interim Action*

Soil Boring (Aspect, 2016)

**Site Features Legend**

Face of Soldier Pile Wall

Soldier Pile

Cross Section

Tax Parcel

LNAPL: Light non-aqueous phase liquid

**Exploration Name (Sample Elevation In Feet)**
G: Gasoline Range Organics (mg/kg)
B: Benzene (mg/kg)
E: Ethylbenzene (mg/kg)
T: Toluene (mg/kg)
X:Total Xylenes (mg/kg)
mg/kg: Milligrams per kilogram

Results in **red bold** indicate concentration exceeds proposed cleanup levels.

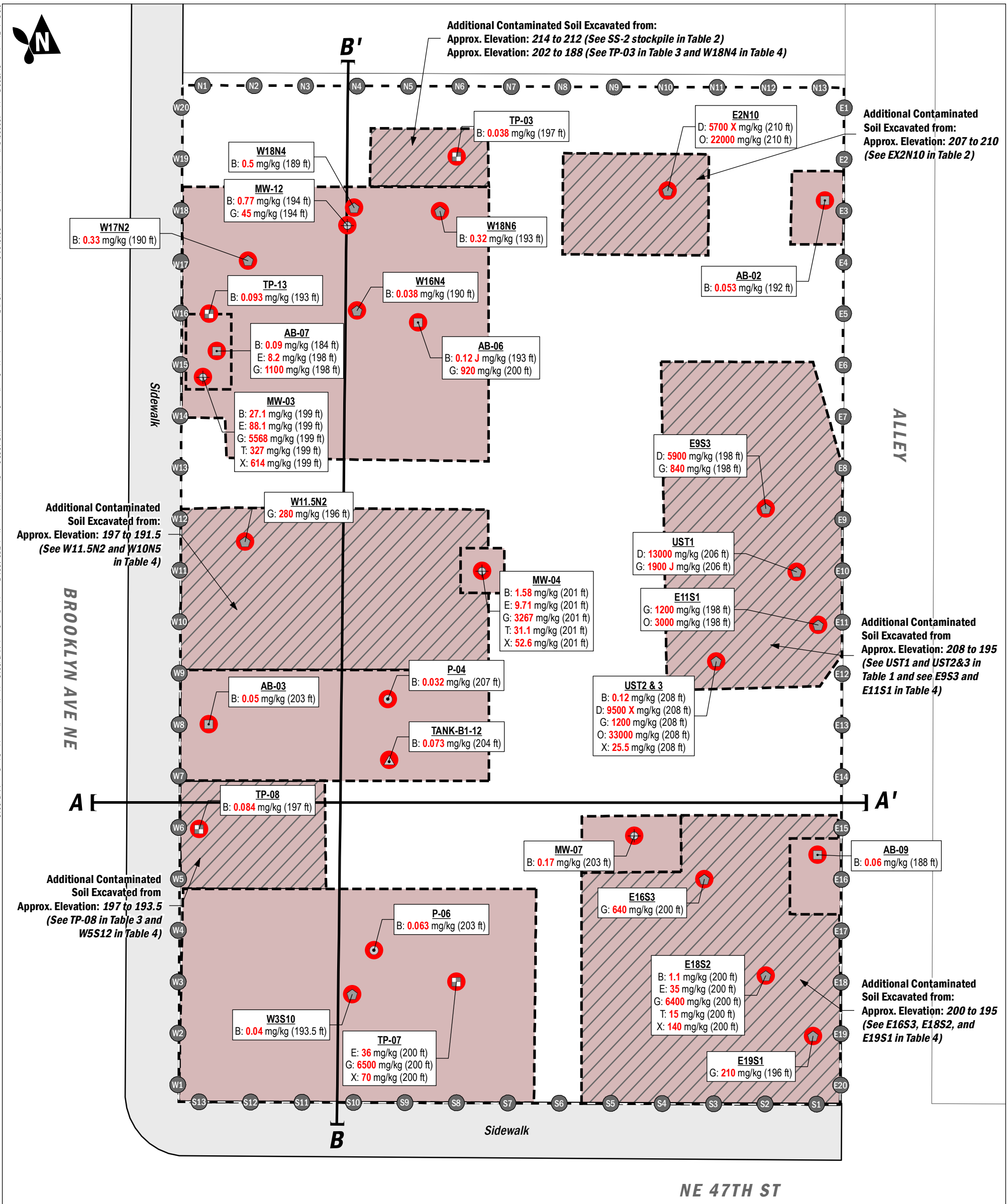
***Note:***
*1. Soldier pile locations shown are taken from the Temporary Shoring Wall Plans (Rev. 1) by Ground Support PLLC date November 3, 2017.*

0 7.5 15
Feet

# Test Pits and Historical Explorations Soil Analytical Results

Interim Action Report
4700 Brooklyn Ave NE
Seattle, Washington

| | | | |
|---|---|---|---|
| Aspect Consulting | OCT-2018 | BY: ACG / RAP | FIGURE NO. 3 |
| | PROJECT NO. 160092 | REVISED BY: TDR | |




One or More Contaminant Detected Above Cleanup Level

Known Contaminated Soil Area Excavation
*Presence of Contaminated Soil was confirmed during RI investigation, prior to the Interim Action*

Additional Contaminated Soil Excavation
*Contaminated Soil was discovered during Interim Action*

**Explorations**

- Abandoned on-Property Monitoring Well
- Test Pit (Aspect, 2018) *Completed during the Interim Action*
- Soil Sample (Aspect, 2018) *Sampled during the Interim Action*
- UST Site Assessment Soil Sample Location (Aspect, 2018)
- Soil Boring (Aspect, 2016)
- Test Probe (Riley, 2015)

**Site Features Legend**

- Face of Soldier Pile Wall
- Soldier Pile
- Cross Section
- Tax Parcel

0 7.5 15
Feet

**Exploration Name (Sample Elevation In Feet)**

G: Gasoline Range Organics (mg/kg)
B: Benzene (mg/kg)
E: Ethylbenzene (mg/kg)
T: Toluene (mg/kg)
X: Total Xylenes (mg/kg)
D: Diesel Range Organics (mg/kg)
O: Oil Range Organics (mg/kg)
mg/kg: Milligrams per kilogram

Results in **red bold** indicate concentration exceeds proposed cleanup levels.

***Note:***
*1. Soldier pile locations shown are taken from the Temporary Shoring Wall Plans (Rev. 1) by Ground Support PLLC date November 3, 2017.*

# Contaminated Soil Excavation

Interim Action Report
4700 Brooklyn Ave NE
Seattle, Washington

| Aspect Consulting | NOV-2018 | BY: ACG / RAP | FIGURE NO. 4 |
|---|---|---|---|
| | PROJECT NO. 160092 | REVISED BY: TDR | |

B'

N1 N2 N3 N4 N5 N6 N7 N8 N9 N10 N11 N12 N13

W20 W19 W18 W17 W16 W15 W14 W13 W12 W11 W10 W9 W8 W7 W6 W5 W4 W3 W2 W1

E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15 E16 E17 E18 E19 E20

S13 S12 S11 S10 S9 S8 S7 S6 S5 S4 S3 S2 S1

W18N4: 188 ft
W18N7: 192 ft
AB-02: 188 ft
W16N4: 189.5 ft
W16N7: 192 ft
AB-07: 183 ft
TP-12: 197 ft
TP-11: 197 ft
TP-06: 193 ft
MW19
E9S3: 195 ft
W11N4: 195.5 ft
MW-04: 196 ft
W10N5: 191.5 ft
E11S1: 195 ft
W9N4: 193.5 ft
W9N8: 191.5 ft
AB-03: 193 ft
MW18
MW-14: 201 ft
W6S8: 191.5 ft
AB-09: 187 ft
W5S12: 193.5 ft
MW17
TP-07: 197 ft
TP-05: 197 ft
E18S2: 195 ft
W3S10: 192 ft
E19S3: 196 ft
W1S12: 193.5 ft
W1S10: 193.5 ft
W1S8: 193.5 ft
TP-04: 197 ft
MW28
MW27
MW26
MW25

BROOKLYN AVE NE

Sidewalk

ALLEY

A

A'

B

Sidewalk

NE 47TH ST

One or More Contaminant Detected Below Cleanup Level

No Detections

**Explorations**

- Abandoned on-Property Monitoring Well
- Existing off-Property Monitoring Well
- Test Pit (Aspect, 2018) *Completed during the Interim Action*
- Soil Boring (Aspect, 2016)
- Soil Sample (Riley, 2015)

**Site Features Legend**

- Face of Soldier Pile Wall
- Soldier Pile
- Cross Section
- Tax Parcel

AB-99: 210 ft — Soil Sample Name; Sample Elevation in Feet

***Note:***

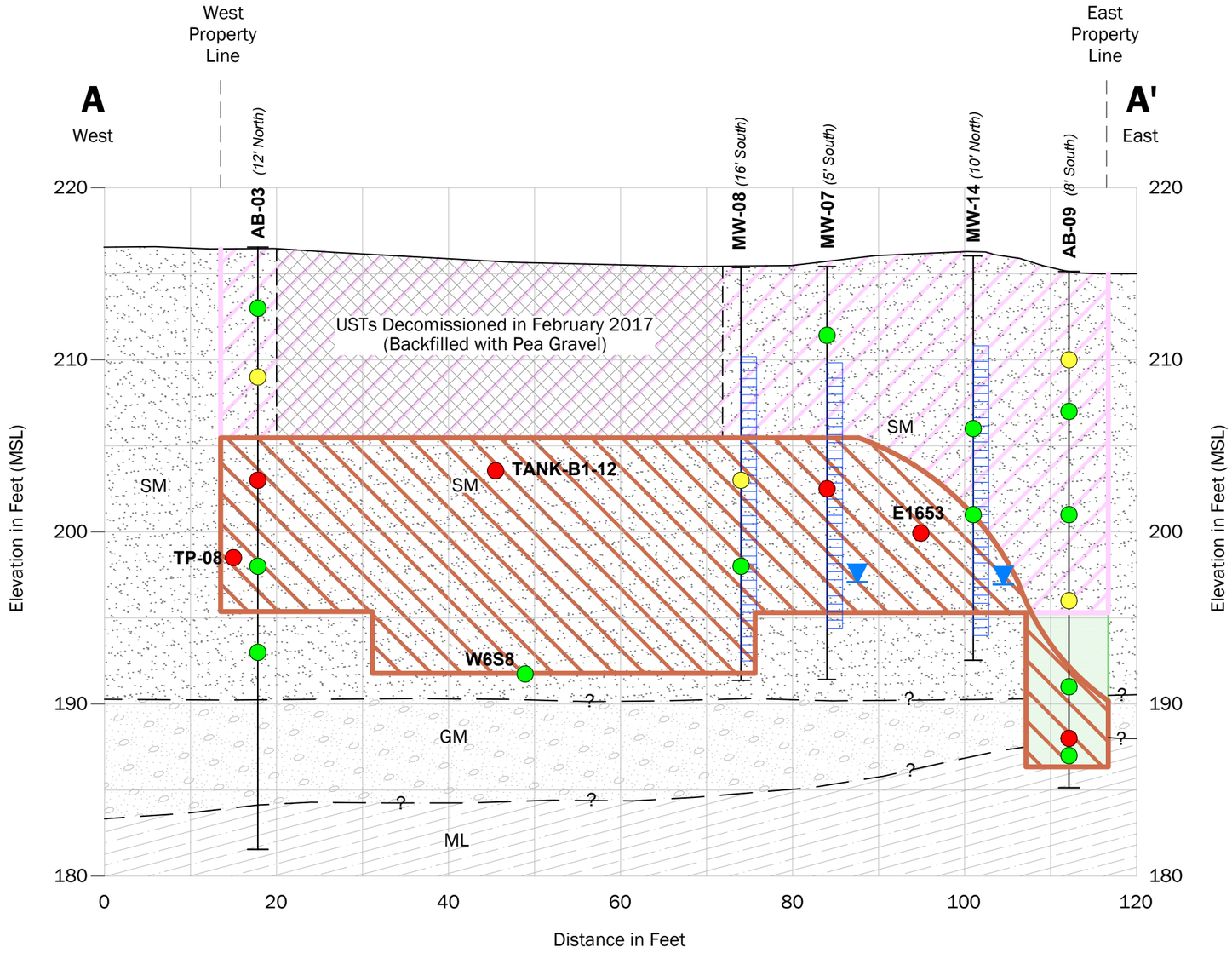
*1. Soldier pile locations shown are taken from the Temporary Shoring Wall Plans (Rev. 1) by Ground Support PLLC date November 3, 2017.*

0 7.5 15
Feet

# Final Performance Soil Sample Results

Interim Action Report
4700 Brooklyn Ave NE
Seattle, Washington

| Aspect Consulting | OCT-2018 | BY: ACG / RAP | FIGURE NO. 5 |
|---|---|---|---|
| | PROJECT NO. 160092 | REVISED BY: TDR | |




**Legend**

- Remedial Over-Excavation Backfilled with Controlled Density Fill
- Soil excavated from this area was considered Impacted or Clean
- Soil excavated from this area was considered Contaminated
- Gray fine to medium sand with silt and occasional gravel. Grades from loose to dense with depth (SM).
- Moist gray sandy, silty gravel. Fine to coarse subrounded gravel (GM)
- Medium stiff to hard gray silt (ML).
- Groundwater Elevation (November 2016)

Analytical Results

- Contaminants not detected
- Contaminants detected at concentrations below the MTCA Method A Cleanup Levels
- Contaminants detected at concentrations greater than the MTCA Method A Cleanup Level

Horizontal Scale: 1" = 15'
Vertical Scale: 1" = 7.5'
Vertical Exaggeration 2x

0 15 30 Feet

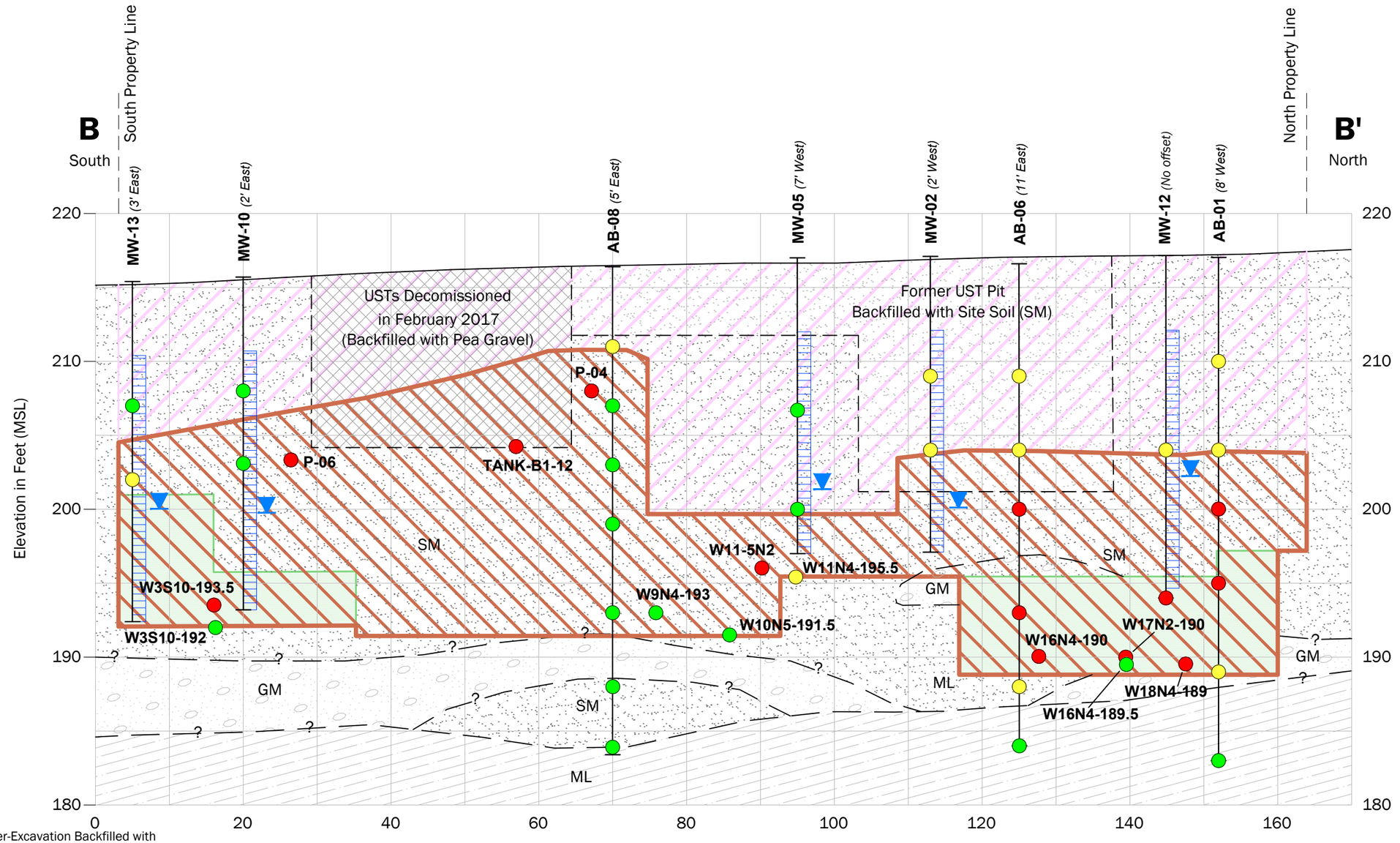
**Cross-Section A-A'**

Interim Action Report
4700 Brooklyn Avenue NE
Seattle, Washington

Aspect Consulting

| Oct-2018 | BY: FK/CMV | FIGURE NO. 6 |
|---|---|---|
| PROJECT NO. 160092 | REVISED BY: - | |

CAD Path: \\SEASTORE2\Drafting\4700 Brooklyn Avenue NE\160092 Interim Action \2018-10 IA_Oversight and Reporting\160092-AA.dwg Section AA || Date Saved: Nov 01, 2018 9:14am || User: cvanslyke




**Legend**

- Remedial Over-Excavation Backfilled with Controlled Density Fill
- Soil excavated from this area was considered Impacted or Clean
- Soil excavated from this area was considered Contaminated
- Gray fine to medium sand with silt and occasional gravel. Grades from loose to dense with depth (SM).
- Moist gray sandy, silty gravel. Fine to coarse subrounded gravel (GM)
- Medium stiff to hard gray silt (ML).
- Groundwater Elevation (November 2016)

Analytical Results

- Contaminants not detected
- Contaminants detected at concentrations below the MTCA Method A Cleanup Levels
- Contaminants detected at concentrations greater than the MTCA Method A Cleanup Level

Horizontal Scale: 1" = 15'
Vertical Scale: 1" = 7.5'
Vertical Exaggeration 2x

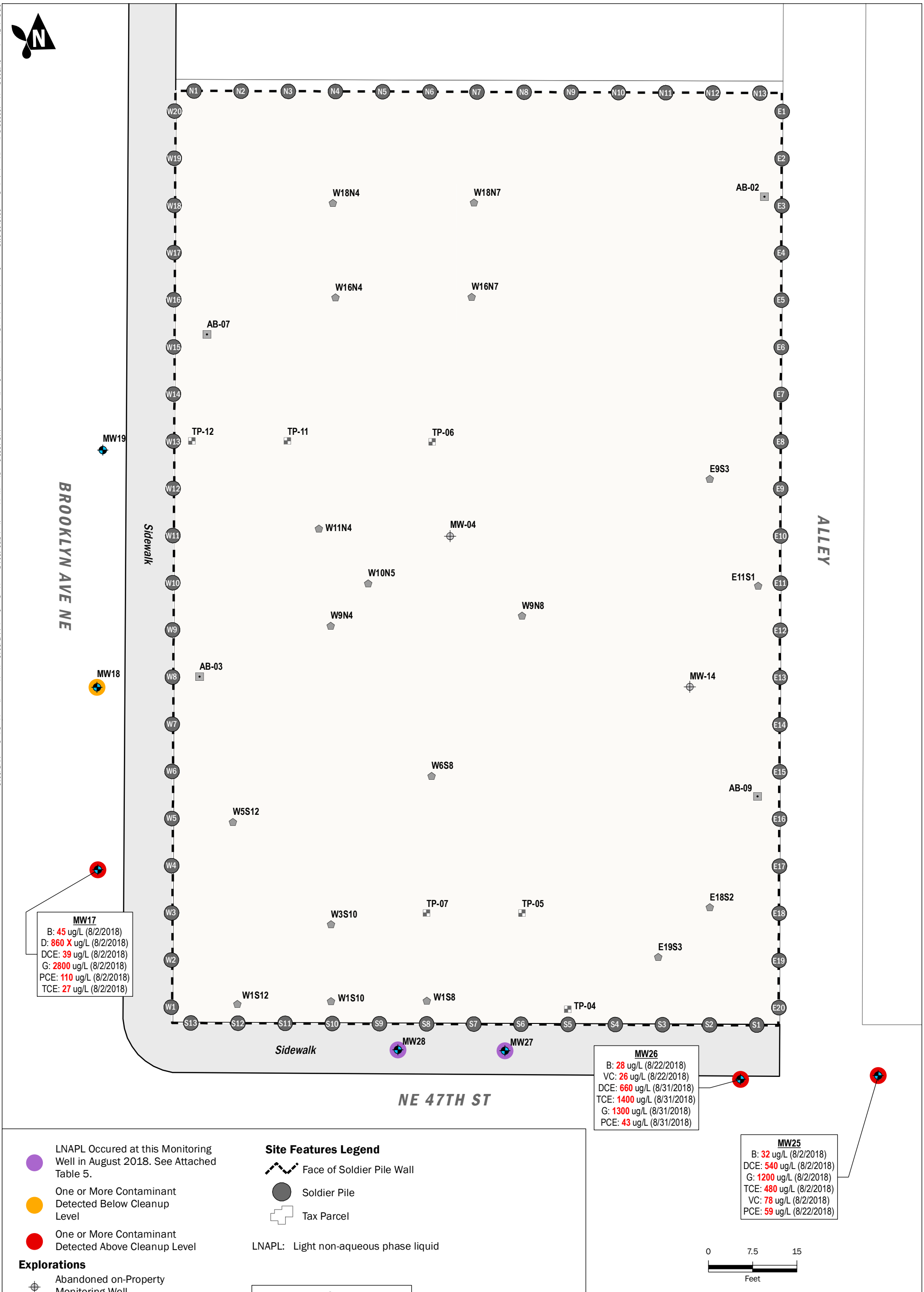
0 15 30 Feet

## Cross-Section B-B'

Interim Action Report
4700 Brooklyn Avenue NE
Seattle, Washington

| | | | |
|---|---|---|---|
| Aspect Consulting | Nov-2018 | BY: FK/CMV | FIGURE NO. 7 |
| | PROJECT NO. 160092 | REV BY: - | |

CAD Path: \\SEASTORE2\Drafting\4700 Brooklyn Avenue NE\160092 Interim Action\2018.10 IA_Oversight and Reporting\160092-BB.dwg Cross Section B-B' || Date Saved: Nov 01, 2018 9:29am || User: cvanslyke




LNAPL Occured at this Monitoring Well in August 2018. See Attached Table 5.

One or More Contaminant Detected Below Cleanup Level

One or More Contaminant Detected Above Cleanup Level

**Explorations**

- Abandoned on-Property Monitoring Well
- Existing off-Property Monitoring Well
- Test Pit (Aspect, 2018) *Completed during the Interim Action*
- Soil Boring (Aspect, 2016)
- Soil Sample (Riley, 2015)

**Site Features Legend**

- Face of Soldier Pile Wall
- Soldier Pile
- Tax Parcel

LNAPL: Light non-aqueous phase liquid

**Exploration Name**
G: Gasoline Range Organics (ug/L)
DCE: cis-1,2-Dichloroethene (ug/L)
B: Benzene (ug/L)
PCE: Tetrachloroethene (ug/L)
TCE: Trichloroethene (ug/L)
VC: Vinyl Chloride (ug/L)
ug/L: Micrograms per liter

# Off-Property Groundwater Analytical Results

Interim Action Report
4700 Brooklyn Ave NE
Seattle, Washington

| Aspect Consulting | NOV-2018 | BY: ACG / RAP | FIGURE NO. 8 |
|---|---|---|---|
| | PROJECT NO. 160092 | REVISED BY: TDR | |