CSID No. 3512 Avista Service Center Garage Remedial Action

Spokane Service Center Garage
1411 East Mission Avenue
Spokane, Washington

for
Avista Utilities

March 22, 2019

GeoEngineers

523 East Second Avenue
Spokane, Washington 99202
509.363.3125

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File No.2522-079-01

March 22, 2019

Prepared for:

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Spokane, Washington 99252

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EXECUTIVE SUMMARY

This report documents remedial activities and groundwater monitoring at the former Spokane Service Center Garage fleet maintenance building (Service Center Garage) on the Avista Corporation (Avista) Spokane campus located at 1411 East Mission Avenue in Spokane, Washington. The building was used to service Avista's vehicle fleet since 1955. Previous assessment work documented the presence of petroleum contamination beneath the building in and near the service bays. This assessment work was submitted to Washington Department of Ecology (Ecology) and was assigned a site identification number (CSID No. 3512) and Hazard Ranking Assessment (HRA) score. This remedial project is a response to a release that was documented in the site hazard ranking analysis provided by Ecology.

The building was demolished during the late summer months in 2018, concurrent with a limited pre-remediation soil assessment. Following the building demolition, Avista initiated soil excavation activities beneath the former building. Soil assessment, test pit exploration and remedial activities were conducted between August 31 and October 3, 2018. Groundwater level measurements were collected from February to August 2018 in preparation of remediation and groundwater samples were collected for analysis on August 17, August 20, October 10 and November 20, 2018.

GeoEngineers retained Spokane Environmental Services (SES) to conduct the remedial excavation and dispose about 3,792 tons of potentially contaminated soil at Waste Management's Graham Road Facility near Medical Lake, Washington. Confirmation soil samples were collected from the sidewalls and base of the remedial excavation. Confirmation soil sample results indicated diesel- and oil-range petroleum hydrocarbons (DRPH and ORPH) at concentrations exceeding Model Toxics Control Act (MTCA) Method A industrial cleanup levels remained beneath Bays 1, 2, 4, 5 and 7 at depths ranging from 15 to 24 feet below ground surface (bgs). Polycyclic aromatic hydrocarbons (PAHs) remaining in the west and northwest areas of the excavation did not exceed MTCA Method A industrial land use cleanup levels. Further excavation of contaminated soil could not be conducted without affecting the structural integrity of nearby buildings or utility infrastructure.

Following remedial excavation activities, a geosynthetic liner was placed within the excavation during backfill activities at a depth ranging from about 6 to 8½ feet bgs to serve as a cap above the remnant contaminated soil and positioned to divert precipitation infiltration into a drainage pipe trench. The drainage pipe trench is connected to Avista's stormwater system where Avista manages stormwater on-site. The excavation was backfilled to surrounding grade with imported select fill and bedding sand.

Groundwater samples were collected from five site monitoring wells before and after performing the remedial excavation activities. Except for one sample believed to have been influenced by fine silt in the well casing, contaminants were either not detected or detected at concentrations less than MTCA Method A cleanup levels in the groundwater samples collected before and after the remedial excavation activities. Groundwater does not appear to have been impacted by subsurface soil contamination beneath the former building.

The geosynthetic cap will reduce the potential for infiltration of precipitation and stormwater runoff through contaminated soil left at depth, and will serve as a visual marker to alert workers to the presence of the contaminated soil. Therefore, the on-site presence of limited volumes of soil affected by hydraulic oil should pose a low risk to human health and the environment.

1.0 INTRODUCTION

This report documents remedial activities and groundwater monitoring at and near the former Spokane Service Center (Service Center Garage) building on the Avista Corporation (Avista) Spokane campus. The site is located at 1411 East Mission Avenue in Spokane, Washington, as shown in the Vicinity Map, Figure 1. This report contains documentation of two groundwater monitoring events in 2018, demolition of the Service Center Garage building and subsequent removal of hydraulic lifts, test pit assessment, remedial excavation and soil disposal and confirmation sampling. As a component of these cleanup efforts, this report also documents a geosynthetic liner installation.

1.1. General Site Information

Site Information	Description
Site Name	Service Center Garage
Site Address	1411 East Mission Avenue, Spokane, Washington 99202
Ecology Regional Office	Eastern Region, 4601 N Monroe Street, Spokane Washington 98903
Consultant	GeoEngineers, Spokane Washington
Current Owner	Avista Utilities
Cleanup Site ID	3512
Assessor's Parcel No.	35093.2006

The Service Center Garage building was located on the Avista Spokane campus which resides on a 19.62-acre parcel in Spokane, Washington. The site is shown in Site Plan, Figure 2.

The Service Center Garage was operated to service fleet vehicles until July 2018. The building was built of brick reinforced with steel. The Service Center Garage building had eight main garage door bays, a high bay area to the north with two garage door bays and an office area connected to the south as shown in Figure 2.

The Spokane River is located approximately 400 feet east of the Service Center Garage building. Depth to groundwater, measured in site monitoring wells and varies seasonally. Groundwater flows from southeast to northwest, away from the Spokane River, based on 14 recent groundwater monitoring events conducted between February and October 2018 and previous reports (Pacific 2012).

1.2. Site History

The Service Center Garage building was used from 1955 to July 2018 to service fleet vehicles. The Service Center Garage building contained sub-slab hydraulic lifts for servicing line trucks in Bay 1, Bay 2, Bay 5 and Bay 7. The high bay area contained portable hydraulic lifts that were not located beneath the floor slab.

Avista demolished the Service Center Garage building in August 2018 and moved to a new facility located in the northern area of the campus. The Service Center Garage building was located adjacent to and east of the Auditorium\Cafeteria building as shown in Figure 2. Several canopies were located west of the Service Center Garage building and were demolished after completing demolition of the Service Center Garage building to make way for a future parking structure.

1.3. Site Use

The anticipated future use of the Service Center Garage property is landscaped grass area adjacent to the multistory parking garage that is currently under construction. Employees walk around the area via sidewalks and are not permitted on the landscaped area. Workers in the landscape area will be notified about precautions involved with soil disturbance within the footprint of the Service Center Garage. The Service Center Garage is a secure facility with security personnel onsite 24 hours a day, and 7 days a week. The public does not have access to the Service Center Garage property without escort. There are currently no plans to redevelop the site.

2.0 FIELD INVESTIGATIONS

2.1. Previous Environmental Investigations and Site Characterization

Previous environmental investigations completed for the Service Center Garage site are summarized below and include the following:

- Landau Associates, Inc. "Hydraulic Lift Excavations Spokane Service Center Garage," prepared for the Washington Water Power Company. November 6, 1995.
- Pacific Groundwater Group (Pacific), "Avista Injection Well 1, Construction, Testing, and Thermal Evaluation" prepared for Avista Corporation. January 2012.
- Memorandum from Sheila Pachernegg, P.E. Memorandum "Mission Garage – Hydraulic Lift Repairs," prepared for Avista Corporation. July 19, 1999.
- Sheila Pachernegg P.E. "Hydraulic Lift Excavations Spokane Service Center Garage," prepared for Washington Water Power Licensing and Environmental Affairs. March 31, 1996.
- Sheila Pachernegg, P.E. "Spokane Service Center Groundwater Monitoring," prepared for Washington Water Power. March 9, 1998.
- Strata, A Professional Services Corporation. "Phase 1 Geotechnical Engineering Evaluation," prepared for Avista Corporation. September 8, 2017.

In May 1994, Washington Water Power (WWP), now Avista, performed an independent investigation and partial cleanup at the site (Pachernegg 1996). Hydraulic lifts were removed from inside the Service Center Garage building and pea gravel was removed from around the footings of the lift cylinders. During these removal activities, soil near the lifts, to a depth of approximately 8 feet, was observed to be coated with hydraulic oil that appeared to have leaked from the cylinders or fittings.

An investigation was conducted from May to October 1994 to evaluate the extent of soil contaminated by hydraulic oil (Pachernegg 1996). Approximately 19 tons of soil were removed from the excavation and disposed. However, unstable conditions in the excavations undermined the footings material which threatened the structural integrity of the building and therefore, further soil excavation was halted. WWP notified Ecology that a release of petroleum contamination had been discovered. The site was listed on Ecology's Site Hazard Ranking list for petroleum contamination and the site was scored using Ecology's ranking criteria. The site contamination was affecting soil only and the property was enrolled in the Independent Remedial Action Program (IRAP). Ecology issued a site identification number (CSID No. 3512) and assigned a Site Hazard Assessment (SHA) score of 5, from a scale of 1 (very significant) to 5 (least significant) for potential impact to human health and the environment.

A subsequent investigation was conducted in 1995 to assess subsurface conditions and evaluate the extent of hydraulic oil contamination within the pea gravel footing material and adjacent soil during removal and replacement of the four remaining hydraulic lifts in the building (also referred to in documents as the Repair Garage). Six soil borings were drilled in and adjacent to the former excavation using a restricted clearance hollow-stem auger drill rig which met refusal at 8 to 10 feet bgs in native soils (Landau 1995). Three additional soil borings were drilled 6 to 10 feet west (immediately outside) of the Service Center Garage building doors using an air rotary drill rig and one boring was drilled at a 60-degree angle (from horizontal) to collect samples directly beneath the original excavation at a depth of approximately 15 feet bgs. Four additional air-rotary borings were drilled at 55- and 65-degree angles (from horizontal) to obtain samples and field screening from beneath the hydraulic lift excavations in Bay 1 through Bay 4.

Approximately 145 tons of potentially contaminated soil was excavated and disposed during installation of the four new hydraulic lifts. Some of the visibly-contaminated pea gravel footing material and underlying affected soil was not removed to avoid undermining the building footings. Contamination appeared to be limited to directly below the base of the hydraulic lifts and observations did not indicate significant lateral migration. (Pachernegg 1996). Hydraulic lifts were replaced with new equipment, including secondary containment (which consisted of large diameter concrete pipe on a concrete base).

WWP installed and developed four groundwater monitoring wells (MW-1 through MW-4) between October 1996 and April 1997 and collected quarterly groundwater samples for chemical analysis. Three sampling events were conducted for MW-1, MW-2 and MW-3 and two sampling events were conducted for MW-4. Petroleum hydrocarbons were not detected in the groundwater samples from the site monitoring wells (Pachernegg 1998). During previous monitoring events in the 1990s, groundwater was interpreted to generally flow south-southeasterly across the site towards the Spokane River. Monitoring well MW-5A was installed in August 2017 during a recent geotechnical investigation for the parking structure construction (Strata 2017). After the installation of MW-5A and a resurvey of site monitoring wells, groundwater was determined to flow northwest, away from the Spokane River as discussed in Section 2.1.2.

In April and May 1999, another hydraulic lift in the Service Center Garage building was removed and about 4 cubic yards of petroleum-contaminated soil were removed and disposed. No additional assessment was made at that time to determine the extent of remaining contamination.

2.1.1. Test Pit Soil Assessment

On July 9, 2018, Cascade Cable sawcut and excavated buried piping connected to hydraulic lifts in Bay 5 and Bay 7. The exposed hydraulic piping did not appear to have leaked, but odors were present, likely from the hydraulic lifts. GeoEngineers collected a sample [Bay 7(3-3.5)] from the Bay 7 exposed piping soil and submitted the sample to TestAmerica for Resource Conservation and Recovery Act (RCRA) 8 metals (Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium and Silver) and Zinc. RCRA 8 metals and Zinc were tested for waste profiling because the safety data sheet (SDS) for hydraulic oil used at the Service Center Garage building indicated that zinc was a constituent in the oil.

Rob's Demolition completed demolition of the Service Center Garage building the week of August 24, 2018 and SES mobilized to the site for remedial activities. SES excavated five test pits on August 31, 2018 to sample soil in areas of the Service Center Garage building to better understand where contaminated soil was present and best focus the removal activities. Prior to excavating the test pits, the one-call utility notification service was contacted to mark underground utility locations throughout the Site. SES used a Caterpillar 330F trackhoe to excavate the test pits. Test pits TP-1 through TP-5 were excavated to depths between 12 to 16 feet bgs. Test pit locations and chemical analytical results are shown on Pre-Remediation Test Pit Sample Locations and Chemical Analytical Results, Figure 3. Observations from the test pits included the following:

- Soil encountered in the test pits generally consisted of brown fine to coarse gravel with fine to coarse sand and silt.
- Debris, including brick, metal, metal piping, concrete, cinderblocks, Styrofoam and plastic was generally encountered from 0 to 7 feet bgs in test pits TP-1 through TP-4.
- Test pit TP-1 was excavated in the high bay area. Field screening did not indicate a presence of petroleum contamination in TP-1. Two samples [TP-1(3-4) and TP-1(11-12)] were submitted to TestAmerica for chemical analytical testing.
- Test pit TP-2 was excavated south of the high bay area to assess the edge of the contamination from Bay-7. Field screening did not indicate a presence of petroleum contamination in TP-2. Two samples [TP-2(3-4) and TP-2(11-12)] were submitted to TestAmerica for chemical analytical testing.
- Test pit TP-3 was excavated within the office area of the Service Center Garage building. Field screening did not indicate a presence of petroleum contamination in TP-3. Two samples [TP-3(3-4) and TP-3(11-12)] were submitted to TestAmerica for chemical analytical testing.
- Test pit TP-4 was excavated in east side of Bay-1 and Bay-2. Field screening did not indicate a presence of petroleum contamination in TP-4. One sample [TP-4(12-13)] was submitted to TestAmerica for chemical analytical testing.
- Test pit TP-5 was excavated in the west side of Bay-7. Field screening indicated that petroleum-related contamination was present from 9 to 16 feet bgs in soil from test pit TP-5 with moderate sheen and photoionization detector (PID) measurements of 0.9 to 4.0 parts per million (ppm). One sample [TP-5(9-10)] was submitted to TestAmerica for chemical analytical testing. TP-5 was terminated at 16 feet and the Bay-7 location was noted as a focus area for the remedial excavation.

The test pits were backfilled with the excavated materials in approximately the reverse order of the excavation (suspected contaminated soil was replaced at the approximate depth from which it was excavated). The test pits were compacted with the excavator bucket and each test pit location was logged with global positioning system (GPS). Field screening procedures and test pit logs are included in Field Procedures, Appendix A.

2.1.1.1. Test Pit Sample Chemical Analytical Results

Test pit soil samples were submitted to TestAmerica for the chemical analyses of DRPH and ORPH using Northwest Method NWTPH-Dx and PAHs using Environmental Protection Agency (EPA) Method 8270D SIM. One sample was tested for polychlorinated biphenyls (PCBs) using EPA Method 8082. TestAmerica's analytical laboratory reports and the data validation report are included in Chemical Analytical Laboratory Reports and Data Validation Report, Appendix B; chemical analytical results are summarized and compared to the Model Toxics Control Act (MTCA) Method A cleanup levels for unrestricted land use and for industrial land use in Test Pit – Petroleum Hydrocarbons, Metals, PCBs and PAHs – Soil, Table 1. Test pit sample locations and chemical analytical results are compared to MTCA Method A unrestricted land use and MTCA Method A industrial land use cleanup levels in Figure 3 and Figure 4, respectively.

- DRPH were detected in test pits TP-1, TP-2 and TP-5 at depths ranging from 3 to 12 feet bgs. DRPH concentrations in samples from test pits TP-1 and TP-2 did not exceed cleanup level. DRPH was detected at a concentration exceeding the MTCA Method A cleanup level in TP-5 from 9 to 10 feet bgs at a concentration of 6,300 milligrams per kilogram (mg/kg); the MTCA Method A cleanup level for both unrestricted land use and industrial land use is 2,000 mg/kg.
- ORPH were detected in test pits TP-1, TP-2 and TP-5 at depths ranging from 3 to 12 feet bgs. ORPH concentrations in samples from test pits TP-1 and TP-2 did not exceed the cleanup level. ORPH was detected at concentrations exceeding the MTCA Method A cleanup level in TP-5 from 9 to 10 feet bgs at a concentration of 25,000 mg/kg; the MTCA Method A cleanup level for both unrestricted land use and industrial land use is 2,000 mg/kg.
- PAHs were detected in test pits TP-1, TP-2 and TP-4 at depths ranging from 3 to 13 feet bgs. The carcinogenic PAH toxic equivalency (TEQ) (calculated using the toxic equivalency factors found in MTCA Table 708-2) for samples were calculated to range from 26 to 3,789 micrograms per kilogram (µg/kg). The MTCA Method A unrestricted land use TEQ cleanup level is 100 µg/kg; the MTCA Method A industrial land use TEQ cleanup level is 2,000 µg/kg. PAHs were detected at concentrations greater than the MTCA Method A unrestricted land use cleanup level in test pits TP-1 and TP-2 from depth of 3 to 12 feet bgs, but exceeded the MTCA Method A industrial cleanup level only in one sample collected from TP-1 at a depth of about 11 to 12 feet bgs. The sample from test pit TP-4 did not exceed the cleanup level for PAHs.
- PCBs were not detected.

2.1.2. Monitoring Well Groundwater Measurements

Avista resurveyed the site monitoring wells in January 2018. GeoEngineers collected water level data in 2018 from monitoring wells MW-1 through MW-4 and MW-5A. The supplemental survey data and addition of monitoring well MW-5A indicated groundwater flow direction was to the northwest, away from the Spokane River, which contradicts the flow direction previously reported (in the 1990s) to the south and southeasterly towards the Spokane River (Pachernegg 1998). Groundwater flow direction was also found to be west to northwest, away from the Spokane River, in Pacific Groundwater Group's Injection Well 1 Construction, Testing, and Thermal Evaluation Report (Pacific, 2012). Well Locations and Groundwater Elevations – August 17, 2018, Figure 11 and Well Locations and Groundwater Elevations – October 10, 2018, Figure 12 depict well locations, groundwater elevations and groundwater flow direction on August 17 and October 10, 2018, respectively.

GeoEngineers collected 14 groundwater measurements from MW-1, MW-2, MW-3, MW-4 and MW-5 from February 2, 2018 to October 10, 2018 to monitor the groundwater elevation at the Service Center Garage. Measurements were obtained to the nearest 0.01-inch using the procedures described in Appendix A. Groundwater measurements are found in Summary of Groundwater Level Measurements, Table 3.

2.1.3. Groundwater Monitoring (Before Excavation)

Groundwater samples were collected from monitoring wells MW-2, MW-3, MW-4 and MW-5A on August 17, 2018 and a sample was collected from MW-1 on August 20, 2018. Monitoring well MW-1 went dry during purging on August 17, 2018 and did not recover with sufficient water to collect a sample. GeoEngineers returned to the Service Center Garage on August 20, 2018 to collect the MW-1 sample. Depth to water ranged from 32.63 feet in MW-5A to 20.84 feet in MW-3. Groundwater elevations ranged from 1,866.85 in well MW-4 to 1,866.25 in well MW-5A. The gradient across the site is about 0.001 foot per foot with groundwater flowing to the northwest, away from the Spokane River.

Groundwater samples were collected using low-flow well purging techniques. A portable bladder and peristaltic pumps were used to purge and sample the monitoring wells.

Groundwater quality parameters generally were measured at 3-minute intervals during well purging. Groundwater samples were collected when each water quality parameter stabilized or after a maximum purge time of 60 minutes was achieved. Groundwater quality parameters are summarized in Summary of Groundwater Quality Measurements, Table 4. Field methods are described in Appendix A. Investigation derived waste (IDW) purge water was disposed by Avista.

Groundwater samples were submitted to TestAmerica for analysis of ORPH, DRPH, PCBs and PAHs using methods described in Appendix A. The sample collected from MW-1 was not tested for PCBs because sufficient sample volume was not obtained. Chemical analytical results are discussed below.

2.1.3.1. Groundwater Chemical Analytical Results

Groundwater samples were submitted to TestAmerica for the chemical analyses of DRPH, ORPH, PCBs and PAHs using the laboratory methods listed above. TestAmerica's laboratory report is included in Appendix B; chemical analytical results are summarized and compared to MTCA Method A cleanup levels for groundwater in Petroleum Hydrocarbons, PCBs and PAHs – Groundwater, Table 5. Chemical analytical results are summarized by the following:

- DRPH, ORPH and PCBs were not-detected in the samples collected.
- PAHs (naphthalene) were detected in wells MW-2, MW-3 and MW-4 at concentrations greater than the laboratory method reporting limit but less than the MTCA Method A groundwater cleanup level.

2.2. Proposed Cleanup Standards

2.2.1. General

Cleanup standards consist of: (1) cleanup levels that are protective of human health and the environment; (2) the point of compliance at which the cleanup levels must be met; and (3) applicable or relevant and appropriate requirements (ARARs). Cleanup levels were developed to identify potential exposure pathways for human and environmental impacts based on the planned land use. Cleanup standards are presented below.

2.3. Soil Cleanup Standards

The previous investigations documented the presence of contamination in soil at the Service Center Garage. Cleanup levels were not calculated during a formal remedial investigation (RI) process. Soil sample chemical analytical results obtained during the site characterization and remediation initially were compared to MTCA Method A unrestricted land use cleanup levels because they represent the most conservative cleanup levels including protection of groundwater and protection of human health and the environment.

This portion of the Avista campus is not accessible to the general public, and includes locked access points and lighting for security, and the campus is monitored and patrolled 24/7 by security personnel. Based on these conditions and anticipated future use, the Service Center Garage meets the following criteria for using MTCA Method A industrial land use cleanup levels found in WAC 173-340-745:

- The Service Center Garage meets the definition of an industrial property under WAC 173-340-200 and zoned as light industrial by the Spokane County Assessor's Office;
- The cleanup action provides for appropriate institutional controls (environmental covenant restriction) implemented in accordance with WAC 173-340-440 to limit potential exposure; and
- Contaminants remaining at the property after the remedial action will not pose a threat to human health or the environment at the site or in adjacent nonindustrial areas.

The standard point of compliance for the soil cleanup levels based on direct contact throughout the soil column from the ground surface to 15 feet bgs, in accordance with Washington Administrative Code (WAC) 173-340-740(6)(d).

This document, including tables and figures, includes reference to both unrestrictive and industrial land use cleanup levels in soil for comparative purposes; however, as stated above, industrial land use cleanup levels are the most applicable for the site.

2.4. Groundwater Cleanup Standards

Groundwater cleanup levels for the Site are based on MTCA Method A values for protection of groundwater. In accordance with WAC 173-340-720(2)(d), groundwater at the Site is classified as a potential future source of drinking water because it is present in sufficient quantity, contains less than 10,000 milligrams per liter (mg/L) total dissolved solids and is not too deep to recover. The standard point of compliance for the groundwater cleanup levels presented is throughout the site from the uppermost level of the saturated zone extending vertically to the lowest depth that could potentially be affected at the site.

2.4.1. Applicable or Relevant and Appropriate Requirements

Summary of ARARs, Table 6, includes ARARs for the cleanup action.

2.4.2. Terrestrial Ecological Evaluation

Terrestrial ecological evaluation (TEE) requirements were reviewed for the site. The site qualified for a simplified evaluation under WAC 173-340-7492(2)(C) because no contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet at concentrations that exceed the values listed in Table 749-2, and institutional controls are used to manage remaining contamination; therefore, the site is removed from further ecological consideration. The TEE form documenting this determination for the site is presented in Appendix E.

2.5. Selected Cleanup Method

2.5.1. Minimum requirements in WAC

The selected cleanup method covers the minimum components of WAC 173-340-360. Note the exception that the cleanup was an independent cleanup on private property and did not request public participation.

2.6. Description of the Cleanup Action

No feasibility study is presented in this report because the selected cleanup action meets the requirements of Ecology's Model Remedies for Sites with Petroleum Contaminated Soil (December 2017).

Several cleanup options were discussed with Avista during planning efforts. Key components to selecting a cleanup action included maximum removal of contamination, protection of critical utility infrastructure located adjacent to the cleanup area, protection of buildings and other infrastructure near the cleanup area, schedule (with respect to planned campus projects), and cost-effectiveness. Several in-situ remedial alternatives including injection galleries with nutrient injection methods to address subsurface contamination were considered. However, the in-situ methods were not implemented due to the effectiveness of the cleanup action, particularly in the short-term, the construction schedule, the additional remedial infrastructure needed to implement in-situ options, and the operation and maintenance schedule for the remediation system.

The most effective remedial action was to excavate the contaminated soil to the maximum extent possible and to limit any potential remaining contaminated soil from presenting a threat to human health and the environment. Therefore, the selected cleanup action for the Site included removal of petroleum and PAH-contaminated soil from beneath the Service Center Garage and off-site disposal of contaminated soil. Contaminated soil was removed to the maximum depth without undermining adjacent structures and utility infrastructure. A geosynthetic liner was installed within the excavation and graded to drain infiltrated water to Avista's stormwater system.

An environmental covenant will be recorded because industrial soil cleanup levels were used, and also to provide notice of the remaining soil contamination at the site.

The selected cleanup action complies with WAC 173-340-360 and protects human health and the environment, complies with cleanup standards, complies with applicable state and federal laws (ARARs), and provides for compliance monitoring. The cleanup action also provides a permanent solution and met a reasonable restoration timeframe. The selected cleanup action is protective of potential contaminated media by removing source material that could impact groundwater and capping the area to further prevent mobilization of contaminants. Basis of selection for the cleanup action was, in part, to meet internal Avista infrastructure construction schedules while protective sensitive and critical utility infrastructure; it also allowed for maximum contaminant removal, a relatively short timeframe, and cost efficiencies.

2.6.1. Compliance Monitoring

Groundwater monitoring before the remedial excavation is discussed in Section 2.1.3. Groundwater monitoring after the remedial excavation and liner installation is discussed in Section 4.0.

3.0 REMEDIAL ACTIVITIES

3.1. General

Remedial excavation activities, installation of the geosynthetic liner and backfill activities were performed at the Service Center Garage building from September 4 to October 3, 2018. Groundwater measurements were collected to estimate the depth to groundwater in the location of the Service Center Garage building from February 2 to October 10, 2018. At Avista's request, groundwater monitoring events were conducted about 1 week before excavation and 1 week after backfilling was complete.

Avista relocated a critical utility infrastructure (feeder power lines) from the east side of the Service Center Garage building to the west side of the Service Center Garage building prior to remedial activities. The Avista Auditorium building is located adjacent to and southeast of the Service Center Garage building. Accordingly, the stability of the excavation slopes and protection of infrastructure (utilities and buildings) during remedial excavation activities was critical.

3.2. Service Center Garage Demolition

Rob's Demolition finished demolition of the Service Center Garage building on August 31, 2018 and turned the site over to GeoEngineers and SES for remedial activities. Rob's Demolition then moved demolition activities to the canopy locations, west of the Service Center Garage.

During removal of the floor slab, Rob's Demolition removed the hydraulic lifts from the Service Center Garage building. Hydraulic lifts in Bay 1 and Bay 2 did not appear to have leaked to soil beneath because of the secondary containment structures. Rob's Demolition noted that soil beneath the hydraulic lifts removed from Bay 5 and Bay 7, which were not equipped with secondary containment, had petroleum odors.

Rob's Demolition removed floor drains in the high bay area on the north end of the Service Center Garage building. Avista reported that oily liquid was present in the high bay area floor drain sumps, but the liquid did not appear to have leaked to soil beneath the drain structures.

3.3. Soil Excavation and Confirmation Sampling

SES began the remedial excavation of soil using a Caterpillar 330F trackhoe at the Service Center Garage building on September 4, 2018. Soil was not segregated using field screening due to the difficulties related to field screening hydraulic oil. Based on the time constraints for the project, excavated soil was directly loaded into haul trucks. SES maintained an approximate 1.5:1 (horizontal:vertical) slope on the east sidewall for the Type C soil to safety maintain and preserve the foundation of the Auditorium building located to the east. Soil was removed based on discolored soil, odors and maintaining safe excavation slopes. The excavation extended deeper in the locations of hydraulic lifts, which are further distant from the Auditorium building, reaching depths of 15 to 20 feet bgs in Bay 1 through Bay 5 and to a depth of 24 feet bgs in Bay 7.

Soil within the excavation consisted of brown fine to coarse gravel with varying amounts of silt and sand. Cobbles and boulders up to about 4 feet in size were present. Groundwater seepage was not observed during excavation activities. Figures 13 through 26 include site photographs taken during the remedial excavation.

Soil samples collected from the sidewalls and the base of the excavation were field screened using methods described in Appendix B. Remedial Excavation Sample Locations and Chemical Analytical Results, Figure 5 depicts the remedial excavation sample locations and chemical analytical results. Details for the remedial excavation are below:

- GeoEngineers collected 26 samples from excavation sidewalls (EX-1 through EX-26) and collected 11 samples (Bay-1 through Bay-7 and EX-27 through EX-29) from the base of excavation. After overexcavation, 31 soil samples were used to represent final confirmation samples.
- Petroleum contamination was not observed directly beneath Bay 1 and Bay 2 in fill material placed during the 1994 hydraulic lift replacement. Petroleum contamination was observed at depths greater than 12 feet bgs in soil that was not disturbed during the lift replacement.
- Soil removal extended deeper (16 to 24 feet bgs) in the Bay 1 through Bay 7 areas, where petroleum contamination was present. The excavation reached depths of 15 to 20 feet in Bays 1 through 5. Bay 7 was excavated to about 24 feet, at Avista's request. The excavation in Bay 7 was stopped due to a maximum depth for the excavator, sidewall instability and a threat to adjacent structures. PAH-contaminated soil was excavated from the high bay area. Excavation of soil in the high bay area was stopped to avoid buried utilities.
- Sample EX-6-N(3-4) was not used to define the excavation limit. At Avista's request, sample EX-6-N(3-4) was collected from the north sidewall during excavation in the Bay 7 area because stained soil was observed. The excavation continued north into the high bay area.
- Based on the chemical analytical results from samples EX-1-E(8-9) and EX-2-E(8-9), the east wall was overexcavated approximately 5 feet laterally to the east and samples EX-18-E(8-9) and EX-19-E(8-9) were collected at the same depth. Remedial Excavation Cross Sections A-A′ and B-B′, Figure 7 depicts the remedial excavation cross sections in this area.

Approximately 3,792 tons of soil was transported to Waste Management's Graham Road facility near Medical Lake, Washington as contaminated material.

3.3.1. Confirmation Soil Sampling Chemical Analytical Results

Thirty-seven samples were analyzed for DRPH, ORPH and PAHs using the laboratory methods listed above, 31 samples were used as confirmation samples and 6 samples were overexcavated. The confirmation sample results discussed below represent the soil conditions that are left in place at the limit of the excavation. Remedial excavation sample locations and chemical analytical results are compared to MTCA Method A unrestricted land use and MTCA Method A industrial land use cleanup levels in Figure 5 and Figure 6, respectively. Laboratory reports are included in Appendix B; Chemical analytical results are summarized by the following and on Remedial Excavation – Petroleum Hydrocarbons and PAHs – Soil, Table 2:

- DRPH were detected at concentrations exceeding the MTCA Method A cleanup level in two samples [BAY-4(15-16) and BAY-7(23-24)] at concentrations of 2,100 and 6,800 mg/kg, respectively. DRPH were either not detected or detected at concentrations less than the MTCA Method A cleanup level in the other samples.
- ORPH were detected at concentrations exceeding the MTCA Method A cleanup level in five samples [BAY-1(18-19), BAY-2(19-20), BAY-4(15-16), BAY-5(18-19) and BAY-7(23-24)] at concentrations ranging from 2,600 to 25,000 mg/kg. ORPH were either not detected or detected at concentrations less than the MTCA Method A cleanup level in the other samples.
- PAHs were detected at concentrations greater than the MTCA Method A unrestricted land use cleanup level in two confirmation samples [EX-12-W(12-13) and EX-22-W(4-5)]. The carcinogenic PAH TEQ for

samples were calculated to range from 386 to 396 µg/kg. PAHs were either not detected or detected at concentrations less than the MTCA Method A unrestricted land use cleanup level in the other samples. PAHs concentrations did not exceed the MTCA Method A industrial land use cleanup level.

3.4. Manhole Excavation

Able Cleanup Technologies (ACT) mobilized to the site on September 14, 2018 to excavate soil with a vacuum truck near a storm sewer manhole located in the high bay area. ACT exposed the west side of the manhole to the bottom of the manhole. ACT disposed of approximately 10 tons of contaminated material from around the manhole. SES penetrated a 4-inch Schedule 40 polyvinyl chloride (PVC) pipe into the manhole at about 10 feet below the top of the manhole. The PVC pipe was stubbed out for the geosynthetic liner drain.

3.5. Backfill and Grading

Trucks backhauled select fill and bedding sand from Spokane Rock Products, Inc. in Airway Heights, Washington to the site. Backfill materials were stockpiled southwest of the excavation. SES imported 3,110 tons of select fill and 898 tons of bedding sand for backfilling the remedial excavation. Backfill documentation provided by SES is found in Spokane Environmental Services Documentation, Appendix C. SES segregated the excavated boulders larger than about 2-foot in diameter/length and placed them on the outside of the excavation for use as backfill.

SES graded the excavation to drain north at 1 percent from the Bay 1 through Bay 7 areas and to drain south at approximately 4 percent from the high bay area to a drainage trench. Due to this grading the entire excavation drains to a drainage trench, as shown on Site Plan – Geosynthetic Liner, Figure 8. The drainage trench was graded at 1.25 percent to drain east towards the manhole connected to Avista's stormwater system.

Backfill and compaction at the Service Center Garage building was performed from September 13 to October 3, 2018. SES placed segregated boulders in the excavation and backfilled with select fill until reaching 12 to 18 inches below the grade for the geosynthetic liner. SES placed approximately 12 to 18 inches of bedding sand in the excavation to prepare for the installation of the geosynthetic liner. After installation of the geosynthetic liner, SES placed a lift of approximately 12 to 18 inches of bedding sand over the liner. SES also placed orange construction fencing over the bedding sand to act as an indicator layer for future excavation within the capped area. SES placed lifts of approximately 12 to 18 inches of select fill over the bedding sand and compacted with a vibratory roller to a firm and unyielding state. Density testing was not performed on compacted material, but SES added water to the backfill material during compaction to reach a firm and unyielding state.

3.6. Geosynthetic Liner Installation

A geosynthetic liner was placed within the excavation to serve as a cap above the remnant contaminated soil to minimize the potential for contamination to reach groundwater. The cap was positioned to divert stormwater infiltration into a drainage pipe trench and into Avista's stormwater system.

AFC West mobilized to the site on September 24, 2018 and began installation of the textured 40-mil-thick linear low-density polyethylene (LLDPE) geosynthetic liner on September 25, 2018. The liner was placed at 6 feet in the south end to 8½ feet bgs at the collection trench as shown in Liner Cross Sections A-A', B-B' and C-C′, Figure 9. SES placed a layer of Mirafi 180N geotextile fabric beneath and over the geosynthetic liner to protect the liner. AFC West pre-cut sections of the liner to expedite the installation. The liner sections were approximately 20 feet wide and ran east/west across the excavation. The liner sections were overlapped with approximately 6 to 8 inches of overlap. AFC West welded the liner sections together using a wedge welder. The drain area was formed and welded with an extrusion welder. Liner specifications are found in Geosynthetic Liner Documentation, Appendix D. Figures 8, 9 and Pipe Trench Detail, Figure 10 depict the geosynthetic liner design.

3.6.1. Liner Drain Construction

SES connected the manhole piping to 10 feet of perforated drain pipe graded at about 1.25 percent to flow east towards the manhole. SES placed approximately 3.3 tons of ¾-inch drain rock around the perforated drain pipe. The drain rock was wrapped with geotextile fabric to keep fine material from entering the drain pipe perforations.

4.0 GROUNDWATER ASSESSMENT

4.1. Groundwater Monitoring (After Excavation)

Groundwater samples were collected from monitoring wells MW-1, MW-2, MW-3, MW-4 and MW-5A on October 10, 2018 after completion of the remedial excavation, liner installation, backfill and compaction. A duplicate sample was collected from MW-1. Depth to water ranged from 31.83 feet in MW-1 to 19.96 feet in MW-3. Groundwater elevations ranged from 1867.73 in well MW-4 to 1867.11 in well MW-1. The gradient across the site is about 0.001 foot per foot with groundwater flowing to the northwest, away from the Spokane River.

On November 20, 2018, MW-1 was redeveloped using pumping and surging techniques described in Appendix A. Well MW-1 was repeat sampled on November 20, 2018 after redevelopment.

Groundwater samples were submitted to TestAmerica for analysis of ORPH, DRPH, PCBs and PAHs using methods described in Section 2.1.3. Monitoring well MW-1 was re-developed and resampled on November 20, 2018. The sample from MW-1 collected on November 20, 2018 was tested for PAHs due to the results from the October 10, 2018 duplicate sample. Chemical results are discussed below.

4.1.1. Groundwater Chemical Analytical Results

Groundwater samples were submitted to TestAmerica for the chemical analyses of DRPH, ORPH, PCBs and PAHs using the laboratory methods listed above. TestAmerica's laboratory report is included in Appendix B; chemical analytical results are summarized and compared to MTCA Method A cleanup levels for unrestricted land use in Table 5. Chemical analytical results are summarized below:

- DRPH, ORPH, PCBs and PAHs were not detected.
- PAHs were detected in the duplicate sample (DUP:101018) collected from MW-1 in concentrations exceeding the MTCA Method A cleanup level. The results are presented in a preliminary laboratory report. The sample was reanalyzed out-of-hold time and the results were documented in the final lab report as non-detect with a "J" qualifier as an estimated result. The laboratory analyst did not find an issue with the preliminary results and the samples were tested in their own batch. MW-1 was scheduled

for a duplicate during the previous sampling event, but the well went dry during purging. MW-1 had silt in the bottom of the well.

- PAHs were not detected in repeat sample MW-1:112018 collected from MW-1. The results of sample DUP:101018 are attributed to fine silt material in the well casing.

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Soil assessment and remedial activities were conducted between August 31 and October 3, 2018 at the Service Center Garage building located at 1411 East Mission Avenue in Spokane, Washington. Groundwater assessment activities were conducted at the Service Center Garage on August 17, August 20, October 10 and November 20, 2018.

SES excavated and disposed approximately 3,792 tons of contaminated soil at Waste Management's Graham Road Facility near Medical Lake, Washington. Some contaminated soil remained within the base of the remedial excavation at depths of about 15 to 24 feet bgs; however, complete removal of contaminated soil could not be conducted without affecting the structural integrity of nearby buildings or utility infrastructure. Therefore, a geosynthetic liner cap was placed in the excavation to divert stormwater infiltration into a drainage pipe trench; the drainage pipe trench is connected to Avista's stormwater system where Avista manages stormwater on-site. ACF West installed a geosynthetic LLDPE liner in the footprint of the remedial excavation. SES backfilled and compacted the excavation with imported select fill and bedding sand. The liner also serves as a visual marker of the contamination.

Confirmation soil samples were collected from the sidewalls and base of the remedial excavation. Confirmation soil sample chemical analytical results for DRPH and ORPH indicated that petroleum contaminated soil was left beneath Bays 1, 2, 4, 5 and 7 at depths ranging from 15 to 24 feet bgs. Confirmation soil sample chemical analytical results for PAHs did not exceed the MTCA Method A industrial land use cleanup level.

Groundwater samples were collected from five site monitoring wells before and after performing the remedial excavation. Contaminants were either not detected or detected at concentrations less than MTCA Method A cleanup levels in the groundwater samples collected before and after the excavation activities. However, the duplicate sample collected from MW-1 after remediation indicated carcinogenic PAH (cPAH) TEQ concentrations above the cleanup level. MW-1 was redeveloped, repeat sampled and tested for PAH analysis. PAHs were not detected in the repeat sample from MW-1.

Concentrations of DPRH and ORPH exceeding the cleanup level remain in soils at depth. However, the point of compliance was met for DRPH and ORPH for soil since the contamination was contained in accordance with the requirements of WAC 173-340-740(6)(f). PAHs concentrations do not exceed the MTCA Method A industrial land use cleanup level. The PAHs-contaminated soil is not located within the zone of groundwater flux and is covered by the geosynthetic liner. PAH concentrations in west and northwest sidewall samples did not exceed MTCA Table 749-2 and the Service Center Garage qualified for a simplified TEE.

The geosynthetic cap will reduce, the potential for infiltration of precipitation and stormwater runoff through contaminated soil left at depth. Therefore, the on-site presence of limited volumes of soil affected by hydraulic oil should pose a low risk to human health and the environment.

6.0 REFERENCES

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Table 1

Test Pit - Petroleum Hydrocarbons, Metals, PCBs and PAHs[1] - Soil

Avista - Spokane Service Center

Spokane, Washington

			Location ID	Bay-7		TP-1				TP-2				TP-3				TP-4		TP-5	
			Sample ID	BAY 7(3-3.5)		TP-1(3-4)		TP-1(11-12)		TP-2(3-4)		TP-2(11-12)		TP-3(3-4)		TP-3(11-12)		TP-4(12-13)		TP-5(9-10)	
			Sample Date	7/9/2018		8/31/2018		8/31/2018		8/31/2018		8/31/2018		8/31/2018		8/31/2018		8/31/2018		8/31/2018	
			Sample Depth Interval (feet)	3-3.5		3-4		11-12		3-4		11-12		3-4		11-12		12-13		9-10	
Method	**Analyte**	**Cleanup Level[2]**	**Units**																		
NWTPH-DX[3]	Diesel-range hydrocarbons	2,000	mg/Kg	–	–	**11**	J	**120**	J	**140**	J	**20**	J	9.9	U	10	U	10	U	**6,300**	J
	Lube Oil-range Hydrocarbons	2,000	mg/Kg	–	–	27	U	**220**	J	**490**	J	**57**		25	U	26	U	26	U	**25,000**	
	Arsenic	20	mg/Kg	9.7	U	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Barium	NE	mg/Kg	**56**	J	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Cadmium	2	mg/Kg	7.8	U	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Chromium	19	mg/Kg	**12**		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Metals[4]	Lead	250\1,000	mg/Kg	**20**		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Mercury	2,000	µg/Kg	41	U	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Selenium	NE	mg/Kg	39	U	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Silver	NE	mg/Kg	9.7	U	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Zinc	NE	mg/Kg	**67**		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	PCB-Aroclor 1016		µg/Kg	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11	U
	PCBAroclor 1221		µg/Kg	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11	U
	PCB-Aroclor 1232		µg/Kg	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11	U
	PCB-Aroclor 1242		µg/Kg	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11	U
PCB-Aroclors[5]	PCB-Aroclor 1248	1,000\10,000	µg/Kg	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11	U
	PCB-Aroclor 1254		µg/Kg	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11	U
	PCBAroclor 1260		µg/Kg	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11	U
	PCB-Aroclor 1262		µg/Kg	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11	U
	PCB-Aroclor 1268		µg/Kg	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11	U
	1-Methylnaphthalene	5,000[7]	µg/Kg	–	–	**32**		**190**		**56**		10	U	9.9	U	10	U	10	U	110	U
	2-Methylnaphthalene	5,000[7]	µg/Kg	–	–	**33**		**210**		**96**		10	U	9.9	U	10	U	10	U	110	U
	Acenaphthene	NE	µg/Kg	–	–	**290**	J	**1,700**		**420**		**32**		9.9	U	10	U	10	U	110	U
	Acenaphthylene	NE	µg/Kg	–	–	11	U	100	U	**11**		10	U	9.9	U	10	U	10	U	110	U
	Anthracene	NE	µg/Kg	–	–	**280**	J	**1,800**		**380**		**39**		9.9	U	10	U	**12**		110	U
	Benzo(a)anthracene	NE	µg/Kg	–	–	**560**	J	**3,000**		**500**		**61**		9.9	U	10	U	**23**		110	U
PAHs[6]	Benzo(a)pyrene	100\2,000	µg/Kg	–	–	**550**	J	**2,800**		**460**		**54**		9.9	U	10	U	**19**		110	U
	Benzo(b)fluoranthene	NE	µg/Kg	–	–	**630**	J	**3,200**		**540**		**63**		9.9	U	10	U	**21**		110	U
	Benzo(g,h,i)perylene	NE	µg/Kg	–	–	**330**	J	**1,400**		**270**		**33**		9.9	U	10	U	**11**		110	U
	Benzo(k)fluoranthene	NE	µg/Kg	–	–	**270**	J	**1,300**		**210**		**29**		9.9	U	10	U	10	U	110	U
	Chrysene	NE	µg/Kg	–	–	**650**	J	**3,700**		**610**		**72**		9.9	U	10	U	**25**		110	U
	Dibenzo(a,h)anthracene	NE	µg/Kg	–	–	**100**		**520**		**89**		**12**		9.9	U	10	U	10	U	110	U

			Location ID	Bay-7		TP-1				TP-2				TP-3				TP-4		TP-5	
			Sample ID	BAY 7(3-3.5)		TP-1(3-4)		TP-1(11-12)		TP-2(3-4)		TP-2(11-12)		TP-3(3-4)		TP-3(11-12)		TP-4(12-13)		TP-5(9-10)	
			Sample Date	7/9/2018		8/31/2018		8/31/2018		8/31/2018		8/31/2018		8/31/2018		8/31/2018		8/31/2018		8/31/2018	
			Sample Depth Interval (feet)	3-3.5		3-4		11-12		3-4		11-12		3-4		11-12		12-13		9-10	
Method	**Analyte**	**Cleanup Level[2]**	**Units**																		
PAHs[6]	Fluoranthene	NE	µg/Kg	--	--	**1,300**	J	**7,000**		**1,300**		**140**		9.9	U	10	U	**47**		110	U
	Fluorene	NE	µg/Kg	--	--	**140**		**960**		**230**		**21**		9.9	U	10	U	10	U	110	U
	Indeno(1,2,3-c,d)pyrene	NE	µg/Kg	--	--	**320**	J	**1,500**		**260**		**32**		9.9	U	10	U	**11**		110	U
	Naphthalene	5,000[7]	µg/Kg	--	--	**75**		**390**		**280**		**14**		9.9	U	10	U	10	U	110	U
	Phenanthrene	NE	µg/Kg	--	--	**1,000**	J	**6,600**		**1,400**		**140**		9.9	U	10	U	**37**		110	U
	Pyrene	NE	µg/Kg	--	--	**1,100**	J	**6,300**		**1,000**		**120**		9.9	U	10	U	**42**		110	U
	Total cPAH TEQ (ND=0.5RL)	100	µg/Kg	--	--	**745**	J	**3,789**		**626**		**74**		7.5	U	7.6	U	**26**		83	U

Notes:

[1]Laboratory testing provided by TestAmerica Laboratories, Inc. in Spokane Valley, Washington.

[2]Cleanup level refers to Model Toxics Control Act (MTCA) Method A Cleanup Level for Unrestricted Land Use\MTCA Method A Cleanup Level for Industrial Land Use.

[3]Diesel- and Oil-range Petroleum Hydrocarbons (DRPH and ORPH) analyzed using Northwest Methods NWTPH-Dx.

[4]Metals analyzed using Environmental Protection Agency (EPA) 6000/7000 Series Methods.

[5]Polychlorinated biphenyls (PCBs) analyzed using EPA Method 8082A.

[6]Polycyclic aromatic hydrocarbons (PAHs) analyzed using EPA Method 8270D.

[7]Cleanup level is for the sum of all naphthalenes.

µg/Kg = micrograms per Kilogram; mg/Kg = milligrams per Kilogram; -- = not tested; NE = not established

U = analyte was not detected at concentrations greater than the laboratory reporting limit

J = estimated result

Bold = indicates the analyte was detected above the laboratory reporting limit.

Bold Red = indicates the analyte was detected above the respective cleanup level.

Table 2

Remedial Excavation - Petroleum Hydrocarbons and PAHs[1] - Soil

Avista - Spokane Service Center

Spokane, Washington

			Location ID	Bay-1		Bay-1/2		Bay-2		Bay-3		Bay-4		Bay-5		Bay-5/7		Bay-7		EX-1-E		EX-2-E		EX-3-E	
			Sample ID	BAY-1 (18-19)		BAY-1/2 W (15-16)		BAY-2 (19-20)		BAY-3 (17-18)		BAY-4 (15-16)		BAY-5 (18-19)		BAY-5/7 (12-13)		BAY-7 (23-24)		EX-1-E (8-9)[2]		EX-2-E (8-9)[2]		EX-3-E (8-9)[2]	
			Sample Date	9/10/2018		9/10/2018		9/10/2018		9/10/2018		9/10/2018		9/10/2018		9/7/2018		9/7/2018		9/6/2018		9/6/2018		9/6/2018	
			Sample Depth Interval (feet)	18-19		15-16		19-20		17-18		15-16		18-19		12-13		23-24		8-9		8-9		8-9	
			Sample Type	Base		Base		Base		Base		Base		Base		Base		Base		East Sidewall		East Sidewall		East Sidewall	
Method	**Analyte**	**Cleanup Level[3]**	**Units**																						
NWTPH-DX[4]	Diesel-range hydrocarbons	2,000	mg/Kg	**490**	J	**140**	J	**710**	J	11	U	**2,100**	J	**1,600**	J	**14**	J	**6,800**	J	**850**	J	**88**	J	**12**	J
	Lube Oil-range Hydrocarbons	2,000	mg/Kg	**2,600**		**650**		**3,700**		27	U	**5,600**		**4,300**		**52**		**25,000**		**2,000**		**190**		**38**	
PAHs[5]	1-Methylnaphthalene	5,000[6]	ug/Kg	10	U	11	U	10	U	11	U	10	U	10	U	11	U	11	U	**18**		11	U	10	U
	2-Methylnaphthalene	5,000[6]	ug/Kg	10	U	11	U	10	U	11	U	10	U	10	U	11	U	11	U	**22**		11	U	10	U
	Acenaphthene	NE	ug/Kg	10	U	11	U	10	U	11	U	**13**		10	U	11	U	11	U	**150**		11	U	10	U
	Acenaphthylene	NE	ug/Kg	10	U	11	U	10	U	11	U	10	U	10	U	11	U	11	U	10	U	**26**		10	U
	Anthracene	NE	ug/Kg	10	U	11	U	10	U	11	U	10	U	10	U	11	U	11	U	**250**		**22**		10	U
	Benzo(a)anthracene	NE	ug/Kg	10	U	11	U	10	U	11	U	10	U	10	U	11	U	11	U	**400**		**92**		**10**	
	Benzo(a)pyrene	100\2,000	ug/Kg	10	U	11	U	10	U	11	U	100	U	100	U	11	U	110	U	**330**		**87**		10	U
	Benzo(b)fluoranthene	NE	ug/Kg	10	U	11	U	10	U	11	U	100	U	100	U	11	U	110	U	**400**		**100**		**11**	
	Benzo(g,h,i)perylene	NE	ug/Kg	10	U	11	U	10	U	11	U	100	U	100	U	11	U	110	U	**160**		**41**		10	U
	Benzo(k)fluoranthene	NE	ug/Kg	10	U	11	U	10	U	11	U	100	U	100	U	11	U	110	U	**140**		**43**		10	U
	Chrysene	NE	ug/Kg	10	U	11	U	10	U	11	U	10	U	10	U	11	U	11	U	**440**		**100**		**12**	
	Dibenzo(a,h)anthracene	NE	ug/Kg	10	U	11	U	10	U	11	U	100	U	100	U	11	U	110	U	**55**		**15**		10	U
	Fluoranthene	NE	ug/Kg	10	U	11	U	10	U	11	U	10	U	10	U	11	U	11	U	**920**		**120**		**22**	
	Fluorene	NE	ug/Kg	10	U	11	U	10	U	11	U	10	U	10	U	11	U	11	U	**120**		11	U	10	U
	Indeno(1,2,3-c,d)pyrene	NE	ug/Kg	10	U	11	U	10	U	11	U	100	U	100	U	11	U	110	U	**170**		**41**		10	U
	Naphthalene	5,000[6]	ug/Kg	10	U	11	U	10	U	11	U	10	U	10	U	11	U	11	U	**45**		11	U	10	U
	Phenanthrene	NE	ug/Kg	10	U	11	U	10	U	11	U	10	U	10	U	11	U	11	U	**860**		**44**		**20**	
	Pyrene	NE	ug/Kg	10	U	11	U	10	U	11	U	10	U	10	U	11	U	11	U	**870**		**130**		**19**	
	Total cPAH TEQ (ND=0.5RL)	100\2,000	ug/Kg	7.55	U	8.3	U	7.6	U	8.3	U	71	U	71	U	8.3	U	78	U	**451**		**117**		**8.7**	

Method	Analyte	Cleanup Level[3]	Units	EX-4-E	EX-5-E	EX-6-N	EX-7-E	EX-8-S	EX-9-W	EX-10-W	EX-11-W	EX-12-W	EX-13-W	EX-14-E
			Sample ID	EX-4-E (8-9)[2]	EX-5-E (8-9)[2]	EX-6-N (3-4)[2]	EX-7-E (12-13)	EX-8-S (12-13)	EX-9-W (12-13)	EX-10-W (12-13)	EX-11-W (12-13)	EX-12-W (12-13)	EX-13-W (12-13)	EX-14-E (12-13)
			Sample Date	9/6/2018	9/6/2018	9/6/2018	9/13/2018	9/13/2018	9/13/2018	9/13/2018	9/13/2018	9/13/2018	9/13/2018	9/13/2018
			Sample Depth Interval (feet)	8-9	8-9	3-4	12-13	12-13	12-13	12-13	12-13	12-13	12-13	12-13
			Sample Type	East Sidewall	East Sidewall	North Sidewall	East Sidewall	South Sidewall	West Sidewall	West Sidewall	West Sidewall	West Sidewall	West Sidewall	East Sidewall
NWTPH-DX[4]	Diesel-range hydrocarbons	2,000	mg/Kg	10 U	**42** J	**16** J	**19** J	**20** J	10 U	10 U	11 U	**380** J	11 U	11 U
	Lube Oil-range Hydrocarbons	2,000	mg/Kg	**33**	**140**	**87**	**79**	31 U	26 U	**30**	26 U	**1,700**	27 U	26 U
PAHs[5]	1-Methylnaphthalene	5,000[6]	ug/Kg	11 U	11 U	11 U	11 U	13 U	10 U	11 U	10 U	**16**	10 U	10 U
	2-Methylnaphthalene	5,000[6]	ug/Kg	11 U	11 U	11 U	11 U	13 U	10 U	11 U	10 U	**20**	10 U	10 U
	Acenaphthene	NE	ug/Kg	11 U	11 U	11 U	11 U	13 U	10 U	**35**	10 U	**130**	10 U	10 U
	Acenaphthylene	NE	ug/Kg	11 U	11 U	**12**	11 U	13 U	10 U	11 U	10 U	11 U	10 U	10 U
	Anthracene	NE	ug/Kg	11 U	11 U	**12**	11 U	13 U	10 U	**51**	10 U	**240**	10 U	10 U
	Benzo(a)anthracene	NE	ug/Kg	11 U	**11**	**66**	11 U	13 U	10 U	**67**	10 U	**310**	10 U	10 U
	Benzo(a)pyrene	100\2,000	ug/Kg	11 U	11 U	**74**	11 U	13 U	10 U	**53**	10 U	**280**	10 U	10 U
	Benzo(b)fluoranthene	NE	ug/Kg	11 U	**12**	**110**	**11**	13 U	10 U	**68**	10 U	**370**	10 U	10 U
	Benzo(g,h,i)perylene	NE	ug/Kg	11 U	11 U	**54**	11 U	13 U	10 U	**31**	10 U	**160**	10 U	10 U
	Benzo(k)fluoranthene	NE	ug/Kg	11 U	11 U	**38**	11 U	13 U	10 U	**27**	10 U	**140**	10 U	10 U
	Chrysene	NE	ug/Kg	11 U	**12**	**96**	**11**	13 U	10 U	**73**	10 U	**380**	10 U	10 U
	Dibenzo(a,h)anthracene	NE	ug/Kg	11 U	11 U	**16**	11 U	13 U	10 U	11 U	10 U	**53**	10 U	10 U
	Fluoranthene	NE	ug/Kg	11 U	**24**	**130**	**24**	13 U	10 U	**160**	10 U	**810**	10 U	10 U
	Fluorene	NE	ug/Kg	11 U	11 U	11 U	11 U	13 U	10 U	**22**	10 U	**89**	10 U	10 U
	Indeno(1,2,3-c,d)pyrene	NE	ug/Kg	11 U	11 U	**50**	11 U	13 U	10 U	**29**	10 U	**150**	10 U	10 U
	Naphthalene	5,000[6]	ug/Kg	11 U	11 U	11 U	11 U	13 U	10 U	**25**	10 U	**47**	10 U	10 U
	Phenanthrene	NE	ug/Kg	11 U	**19**	**41**	**22**	13 U	10 U	**170**	10 U	**770**	10 U	10 U
	Pyrene	NE	ug/Kg	11 U	**20**	**110**	**20**	13 U	10 U	**140**	10 U	**690**	10 U	10 U
	Total cPAH TEQ (ND=0.5RL)	100\2,000	ug/Kg	8.3 U	**9.6**	**103**	**8.9**	9.8 U	7.6 U	**73**	7.6 U	**386**	7.6 U	7.6 U

Location ID				EX-15-E		EX-16-E		EX-17-E		EX-18-E		EX-19-E		EX-20-W		EX-21-W		EX-22-W		EX-23-N		EX-24-E		EX-25-E	
Sample ID				EX-15-E (12-13)		EX-16-E (12-13)		EX-17-E (12-13)		EX-18-E (8-9)		EX-19-E (8-9)		EX-20-W (8-9)		EX-21-W (8-9)		EX-22-W (4-5)		EX-23-N (3-4)		EX-24-E (4-5)		EX-25-E (8-9)	
Sample Date				9/13/2018		9/13/2018		9/13/2018		9/13/2018		9/13/2018		9/17/2018		9/17/2018		9/17/2018		9/17/2018		9/17/2018		9/17/2018	
Sample Depth Interval (feet)				12-13		12-13		12-13		8-9		8-9		8-9		8-9		4-5		3-4		4-5		8-9	
Sample Type				East Sidewall		East Sidewall		East Sidewall		East Sidewall		East Sidewall		West Sidewall		West Sidewall		West Sidewall		North Sidewall		East Sidewall		East Sidewall	
Method	**Analyte**	**Cleanup Level[3]**	**Units**																						
NWTPH-DX[4]	Diesel-range hydrocarbons	2,000	mg/Kg	10	U	10	U	10	U	10	U	11	U	11	U	11	U	11	U	10	U	11	U	11	U
	Lube Oil-range Hydrocarbons	2,000	mg/Kg	26	U	26	U	26	U	26	U	26	U	26	U	27	U	27	U	26	U	27	U	27	U
PAHs[5]	1-Methylnaphthalene	5,000[6]	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**14**		10	U	11	U	11	U
	2-Methylnaphthalene	5,000[6]	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**16**		10	U	11	U	11	U
	Acenaphthene	NE	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**170**		**21**		11	U	11	U
	Acenaphthylene	NE	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	10	U	10	U	11	U	11	U
	Anthracene	NE	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**190**		**17**		11	U	11	U
	Benzo(a)anthracene	NE	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**330**		**42**		11	U	11	U
	Benzo(a)pyrene	100\2,000	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**290**		**40**		11	U	11	U
	Benzo(b)fluoranthene	NE	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**340**		**46**		11	U	11	U
	Benzo(g,h,i)perylene	NE	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**150**		**22**		11	U	11	U
	Benzo(k)fluoranthene	NE	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**150**		**20**		11	U	11	U
	Chrysene	NE	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**360**		**48**		11	U	11	U
	Dibenzo(a,h)anthracene	NE	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**51**		10	U	11	U	11	U
	Fluoranthene	NE	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**700**		**94**		**11**		11	U
	Fluorene	NE	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**75**		10	U	11	U	11	U
	Indeno(1,2,3-c,d)pyrene	NE	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**150**		**20**		11	U	11	U
	Naphthalene	5,000[6]	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**23**		10	U	11	U	11	U
	Phenanthrene	NE	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**610**		**68**		11	U	11	U
	Pyrene	NE	ug/Kg	10	U	10	U	11	U	10	U	10	U	10	U	10	U	**620**		**88**		11	U	11	U
	Total cPAH TEQ (ND=0.5RL)	100\2,000	ug/Kg	7.6	U	7.6	U	8.3	U	7.6	U	7.6	U	7.6	U	7.6	U	**396**		**54**		8.3	U	8.3	U

			Location ID	EX-26-E		EX-27-B		EX-28-B		EX-29-B	
			Sample ID	EX-26-E (8-9)		EX-27-B (9-10)		EX-28-B (9-10)		EX-29-B (4-5)	
			Sample Date	9/17/2018		9/17/2018		9/17/2018		9/17/2018	
			Sample Depth Interval (feet)	8-9		9-10		9-10		4-5	
			Sample Type	East Sidewall		Base		Base		Base	
Method	**Analyte**	**Cleanup Level[3]**	**Units**								
NWTPH-DX[4]	Diesel-range hydrocarbons	2,000	mg/Kg	11	U	10	U	10	U	10	U
	Lube Oil-range Hydrocarbons	2,000	mg/Kg	**41**		26	U	26	U	26	U
PAHs[5]	1-Methylnaphthalene	5,000[6]	ug/Kg	11	U	10	U	10	U	10	U
	2-Methylnaphthalene	5,000[6]	ug/Kg	11	U	10	U	10	U	10	U
	Acenaphthene	NE	ug/Kg	11	U	10	U	10	U	10	U
	Acenaphthylene	NE	ug/Kg	11	U	10	U	10	U	10	U
	Anthracene	NE	ug/Kg	11	U	10	U	10	U	10	U
	Benzo(a)anthracene	NE	ug/Kg	11	U	10	U	10	U	10	U
	Benzo(a)pyrene	100\2,000	ug/Kg	11	U	10	U	10	U	10	U
	Benzo(b)fluoranthene	NE	ug/Kg	11	U	10	U	10	U	10	U
	Benzo(g,h,i)perylene	NE	ug/Kg	11	U	10	U	10	U	10	U
	Benzo(k)fluoranthene	NE	ug/Kg	11	U	10	U	10	U	10	U
	Chrysene	NE	ug/Kg	11	U	10	U	10	U	10	U
	Dibenzo(a,h)anthracene	NE	ug/Kg	11	U	10	U	10	U	10	U
	Fluoranthene	NE	ug/Kg	11	U	10	U	10	U	10	U
	Fluorene	NE	ug/Kg	11	U	10	U	10	U	10	U
	Indeno(1,2,3-c,d)pyrene	NE	ug/Kg	11	U	10	U	10	U	10	U
	Naphthalene	5,000[6]	ug/Kg	11	U	10	U	10	U	10	U
	Phenanthrene	NE	ug/Kg	11	U	10	U	10	U	10	U
	Pyrene	NE	ug/Kg	11	U	10	U	10	U	10	U
	Total cPAH TEQ (ND=0.5RL)	100\2,000	ug/Kg	8.3	U	7.6	U	7.6	U	7.6	U

Notes:

[1]Laboratory testing provided by TestAmerica Laboratories, Inc. in Spokane Valley, Washington.

[2]Sample was overexcavated and was not collected at the limit of the excavation.

[3]Cleanup level refers to Model Toxics Control Act (MTCA) Method A Cleanup Level for Unrestricted Land Use\MTCA Method A Cleanup Level for Industrial Land Use.

[4]Diesel- and Oil-range Petroleum Hydrocarbons (DRPH and ORPH) analyzed using Northwest Methods NWTPH-Dx.

[5]Polycyclic aromatic hydrocarbons (PAHs) analyzed using Environmental Protection Agency (EPA) Method 8270D.

[6]Cleanup level is for the sum of all naphthalenes.

µg/Kg = micrograms per Kilogram; mg/Kg = milligrams per Kilogram; NE = not established

U = analyte was not detected at concentrations greater than the laboratory reporting limit

J = estimated result

Bold = indicates the analyte was detected above the laboratory reporting limit.

Bold Red = indicates the analyte was detected above the respective cleanup level.

Table 3

Summary of Groundwater Level Measurements

Avista - Spokane Service Center

Spokane, Washington

Well Number	Top of Casing Elevation[1] (feet)	Screen Elevation[1] (feet)	Date Measured	Monitoring Well Headspace[2] (ppm)	Depth to Groundwater[3] (feet)	Groundwater Elevation[1] (feet)	Change in Groundwater Elevation[4] (feet)
MW-1	1,898.94	1,873.94	02/02/18	0.0	27.39	1,871.55	NA
		to	03/14/18	0.1	28.20	1,870.74	-0.81
		1,863.94	04/23/18	0.0	24.26	1,874.68	3.94
			05/15/18	0.3	22.63	1,876.31	1.63
			06/06/18	0.0	26.72	1,872.22	-4.09
			06/21/18	0.0	28.79	1,870.15	-2.07
			07/11/18	0.0	30.42	1,868.52	-1.63
			07/20/18	0.4	31.16	1,867.78	-0.74
			07/27/18	0.0	31.76	1,867.18	-0.60
			08/03/18	0.0	32.28	1,866.66	-0.52
			08/10/18	0.1	32.50	1,866.44	-0.22
			08/17/18	5.3	32.41	1,866.53	0.09
			09/06/18	0.2	37.16	1861.78 [6]	0.00
			10/10/18	0.1	31.83	1,867.11	5.33
			11/20/18	0.0	30.88	1,868.06	0.95
MW-2	1,897.70	1,872.70	02/02/18	0.0	26.08	1,871.62	NA
		to	03/14/18	0.0	26.92	1,870.78	-0.84
		1,862.70	04/23/18	0.0	22.99	1,874.71	3.93
			05/15/18	0.1	21.36	1,876.34	1.63
			06/06/18	0.0	25.41	1,872.29	-4.05
			06/21/18	0.0	27.45	1,870.25	-2.04
			07/11/18	0.0	29.03	1,868.67	-1.58
			07/20/18	0.0	29.74	1,867.96	-0.71
			07/27/18	0.0	30.30	1,867.40	-0.56
			08/03/18	0.0	30.81	1,866.89	-0.51
			08/10/18	0.0	31.02	1,866.68	-0.21
			08/17/18	0.3	31.25	1,866.45	-0.23
			09/06/18	0.0	32.78	1,864.92	-1.76
			10/10/18	0.0	30.41	1,867.29	2.37
MW-3	1,887.57	1,872.57	02/02/18	0.0	15.41	1,872.16	NA
		to	03/14/18	0.1	16.31	1,871.26	-0.90
		1,862.57	04/23/18	0.0	12.23	1,875.34	4.08
			05/15/18	0.0	10.54	1,877.03	1.69
			06/06/18	0.0	14.85	1,872.72	-4.31
			06/21/18	0.0	16.98	1,870.59	-2.13
			07/11/18	0.0	18.61	1,868.96	-1.63
			07/20/18	0.0	19.34	1,868.23	-0.73
			07/27/18	0.0	19.91	1,867.66	-0.57

Well Number	Top of Casing Elevation[1] (feet)	Screen Elevation[1] (feet)	Date Measured	Monitoring Well Headspace[2] (ppm)	Depth to Groundwater[3] (feet)	Groundwater Elevation[1] (feet)	Change in Groundwater Elevation[4] (feet)
MW-3 (Continued)			08/03/18	0.0	20.40	1,867.17	-0.49
			08/10/18	0.0	20.63	1,866.94	-0.23
			08/17/18	0.0	20.84	1,866.73	-0.21
			09/06/18	0.0	21.00	1,866.57	-0.37
			10/10/18	0.0	19.96	1,867.61	1.04
MW-4	1,888.23	1,873.23 to 1,863.23	02/02/18	0.0	16.16	1,872.07	NA
			03/14/18	0.0	17.05	1,871.18	-0.89
			04/23/18	0.0	13.02	1,875.21	4.03
			05/15/18	0.0	11.35	1,876.88	1.67
			06/06/18	0.0	15.55	1,872.68	-4.20
			06/21/18	0.0	17.63	1,870.60	-2.08
			07/11/18	0.0	19.22	1,869.01	-1.59
			07/20/18	0.0	19.92	1,868.31	-0.70
			07/27/18	0.0	20.47	1,867.76	-0.55
			08/03/18	0.0	20.93	1,867.30	-0.46
			08/10/18	0.0	21.17	1,867.06	-0.24
			08/17/18	0.0	21.38	1,866.85	-0.21
			09/06/18	0.0	21.55	1,866.68	-0.38
			10/10/18	0.0	20.50	1,867.73	1.05
MW-5A	1898.88	50 foot well[5]	02/02/18	0.0	27.39	1,871.49	NA
			03/14/18	0.2	28.21	1,870.67	-0.82
			04/23/18	0.0	24.29	1,874.59	3.92
			05/15/18	0.7	22.68	1,876.20	1.61
			06/06/18	0.3	26.71	1,872.17	-4.03
			06/21/18	0.3	28.77	1,870.11	-2.06
			07/11/18	0.8	30.37	1,868.51	-1.60
			07/20/18	0.5	31.09	1,867.79	-0.72
			07/27/18	0.0	31.66	1,867.22	-0.57
			08/03/18	0.0	32.17	1,866.71	-0.51
			08/10/18	0.4	32.40	1,866.48	-0.23
			08/17/18	1.2	32.63	1,866.25	-0.23
			09/06/18	0.3	32.78	1,866.10	-0.38
			10/10/18	0.5	31.76	1,867.12	1.02
Spokane River[7]			02/02/18	NA	10.60	NM	NA
			03/14/18	NA	20.78	NM	10.18
			04/23/18	NA	14.75	NM	-6.03
			05/15/18	NA	16.80	NM	2.05
			06/06/18	NA	9.95	NM	-6.85
			06/21/18	NA	7.77	NM	-2.18
			07/11/18	NA	6.07	NM	-1.70
			07/20/18	NA	5.80	NM	-0.27
			07/27/18	NA	5.47	NM	-0.33

Well Number	Top of Casing Elevation[1] (feet)	Screen Elevation[1] (feet)	Date Measured	Monitoring Well Headspace[2] (ppm)	Depth to Groundwater[3] (feet)	Groundwater Elevation[1] (feet)	Change in Groundwater Elevation[4] (feet)
Spokane River[7] (Continued)			08/03/18	NA	5.38	NM	-0.09
			08/10/18	NA	5.32	NM	-0.06
			09/06/18	NA	5.33	NM	0.01
			10/10/18	NA	5.97	NM	0.64

Notes:

[1]Elevations are referenced to the National Geodeteic Vertical Datum of 1929 (NGVD29).

[2]Well headspace measurements were obtained using a photoionization detector immediately upon removal of the well's compression cap.

[3]Depth to water measurements obtained from the north side of the top of PVC well casing.

[4]Represents change in groundwater elevation from previous event, as measured in monitoring wells.

[5]Well screen length is unknown.

[6]Groundwater elevation is lower than the screened interval and might not represent actual groundwater elevation.

[7]Spokane River Stage provided by United States Geological Survey (USGS) gauge at Greene Street. Measured in feet.

NA = Not Applicable; NM = Not Measured

Table 4

Summary of Groundwater Quality Measurements

Avista - Spokane Service Center

Spokane, Washington

Well Number	Date Measured	pH (pH units)	Specific Conductivity (µS/cm)	Redox Potential (mv)	Dissolved Oxygen (mg/L)	Turbidity[1] (NTU)	Temperature (degrees C)
MW-1[2]	08/17/18	7.20	538.0	-29.1	3.28	194.4	23.5
	10/10/18	7.14	259.8	32.5	7.79	6.2	13.4
	11/20/18	7.27	228.8	68.8	7.85	3.6	11.8
MW-2	08/17/18	7.61	286.5	127.4	8.84	5.7	15.1
	10/10/18	7.53	276.5	82.9	8.16	4.0	12.5
MW-3	08/17/18	6.81	227.2	157.1	3.04	6.6	18.4
	10/10/18	6.78	219.4	122.2	3.68	4.6	13.0
MW-4	08/17/18	6.63	207.6	168.1	1.63	5.6	19.5
	10/10/18	6.55	220.7	13.5	2.59	8.2	13.5
MW-5A	08/17/18	7.68	259.6	115.2	7.64	62.4	14.8
	10/10/18	7.80	274.9	102.2	7.89	95.2	13.4

Notes:

[1]Turbidity is not a natural attenuation parameter but was measured in the field to evaluate groundwater stabilization

[2]MW-1 went dry before sampling on 8/17/18. The water quality parameters reflect measurements taken immediately prior to the water level dropping below the level of the pump.

µS/cm = micro-Siemens per centimeter; mV = millivolts; mg/L = milligrams per liter;

NTU = nephelometric turbidity unit; C = Celsius

Table 5

Petroleum Hydrocarbons, PCBs and PAHs[1] - Groundwater

Avista - Spokane Service Center

Spokane, Washington

			Location ID	MW-1					MW-2		MW-3		MW-4		MW-5A	
			Sample ID	MW-1:082018[2]	MW-1:101018	DUP:101018[3]	DUP:101018[4]	MW-1:112018[5]	MW-2:081718	MW-2:101018	MW-3:081718	MW-3:101018	MW-4:081718	MW-4:101018	MW-5A:081718	MW-5A:101018
			Sample Date	8/20/2018	10/10/2018	10/10/2018	10/10/2018	11/20/2018	8/17/2018	10/10/2018	8/17/2018	10/10/2018	8/17/2018	10/10/2018	8/17/2018	10/10/2018
Method	Analyte	Cleanup Level[6]	Units													
NWTPH-DX[7]	Diesel-range hydrocarbons	0.5	mg/L	0.39 U	0.22 U	0.22 U	0.22 U	–	0.24 U	0.22 U	0.24 U	0.23 U	0.22 U	0.23 U	0.24 U	0.22 U
	Lube Oil-range Hydrocarbons	0.5	mg/L	0.66 U	0.37 U	0.37 U	0.37 U	–	0.40 U	0.37 U	0.40 U	0.38 U	0.37 U	0.38 U	0.40 U	0.37 U
PCB Aroclors[8]	PCB-Aroclor 1016	0.1	µg/L	0.32 U	0.10 U	0.10 U	0.10 U	–	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
	PCB Aroclor 1221		µg/L	0.32 U	0.10 U	0.10 U	0.10 U	–	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
	PCB Aroclor 1232		µg/L	0.32 U	0.10 U	0.10 U	0.10 U	–	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
	PCB-Aroclor 1242		µg/L	0.32 U	0.10 U	0.10 U	0.10 U	–	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
	PCB-Aroclor 1248		µg/L	0.32 U	0.10 U	0.10 U	0.10 U	–	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
	PCB-Aroclor 1254		µg/L	0.32 U	0.10 U	0.10 U	0.10 U	–	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
	PCB-Aroclor 1260		µg/L	0.32 U	0.10 U	0.10 U	0.10 U	–	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
	PCB-Aroclor 1262		µg/L	0.32 U	0.10 U	0.10 U	0.10 U	–	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
	PCB-Aroclor 1268		µg/L	0.32 U	0.10 U	0.10 U	0.10 U	–	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
PAHs[9]	1-Methylnaphthalene	NE	µg/L	–	0.091 U	0.090 U	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	2-Methylnaphthalene	NE	µg/L	–	0.091 U	0.090 U	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Acenaphthene	NE	µg/L	–	0.091 U	0.090 U	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Acenaphthylene	NE	µg/L	–	0.091 U	0.090 U	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Anthracene	NE	µg/L	–	0.091 U	0.090 U	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Benzo(a)anthracene	NE	µg/L	–	0.091 U	**0.38**	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Benzo(a)pyrene	0.1	µg/L	–	0.091 U	**0.40**	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Benzo(b)fluoranthene	NE	µg/L	–	0.091 U	**0.72**	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Benzo(g,h,i)perylene	NE	µg/L	–	0.091 U	**0.24**	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Benzo(k)fluoranthene	NE	µg/L	–	0.091 U	0.090 U	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Chrysene	NE	µg/L	–	0.091 U	**0.51**	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Dibenzo(a,h)anthracene	NE	µg/L	–	0.091 U	0.090 U	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Fluoranthene	NE	µg/L	–	0.091 U	**0.65**	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Fluorene	NE	µg/L	–	0.091 U	0.090 U	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Indeno(1,2,3-c,d)pyrene	NE	µg/L	–	0.091 U	**0.23**	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Naphthalene	160	µg/L	–	0.091 U	0.090 U	0.090 UJ	0.093 U	**0.11**	0.091 U	**0.11**	0.091 U	**0.17**	0.091 U	0.090 U	0.090 U
	Phenanthrene	NE	µg/L	–	0.091 U	**0.25**	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Pyrene	NE	µg/L	–	0.091 U	**0.50**	0.090 UJ	0.093 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.091 U	0.090 U	0.090 U
	Total cPAH TEQ (ND=0.5RL)	0.1	µg/L	–	0.0687 U	**0.55**	0.068 UJ	0.0702	0.068 U	0.0687 U	0.068 U	0.0687 U	0.068 U	0.0687 U	0.068 U	0.068 U

Notes:

[1]Laboratory testing provided by TestAmerica Laboratories, Inc. in Spokane Valley, Washington.

[2]MW-1:082018 sample was not tested for PAHs due to poor well recovery; the well went dry while pumping on 8/17/2018 and 8/20/2018.

[3]DUP:101018 sample is from a preliminary laboratory report. The sample was obtained from a silty well and the laboratory analyst did not find issues with the result.

[4]DUP:101018 sample was re-run out of hold-time due to the preliminary laboratory result.

[5]MW-1:112018 sample was obtained and tested for PAHs after well redevelopment to remove silt from the well.

[6]Cleanup level refers to Model Toxics Control Act (MTCA) Method A Cleanup Level for Unrestricted Land Use

[7]Diesel- and Oil-range Petroleum Hydrocarbons (DRPH and ORPH) analyzed using Northwest Method NWTPH-Dx.

[8]Polychlorinated biphenyls (PCBs) analyzed using Environmental Protection Agency (EPA) Method 8082A.

[9]Polycyclic aromatic hydrocarbons (PAHs) analyzed using EPA Method 8270D.

µg/L = micrograms per Liter; mg/L = milligrams per Liter; U = analyte was not detected at concentrations greater than the laboratory reporting limit; J = estimated result; – = not analyzed

Bold = indicates the analyte was detected above the laboratory reporting limit.

Bold Red= indicates the analyte was detected above the respective cleanup level.

Table 6

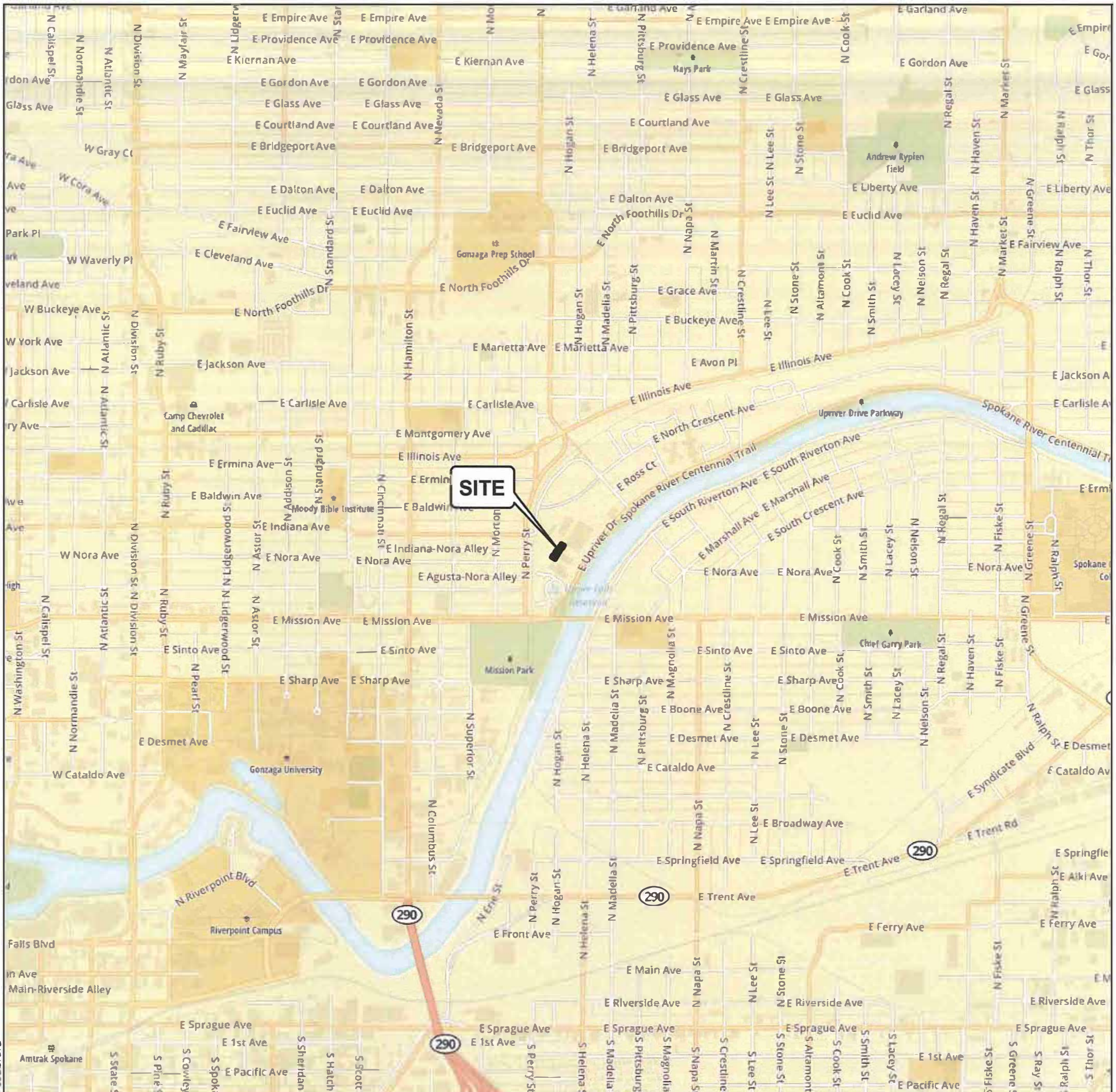
Summary of ARARs

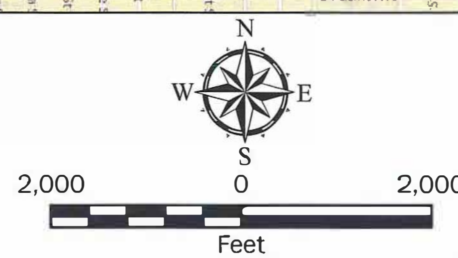
Avista Fleet Service Center
Spokane, Washington

ARAR	Regulated Activity	Excavation, Disposal and Geosynthetic Liner	Evaluation
Spokane County Codes			
Title 8	Health and Sanitation	Applies	Waste disposal must complies with this regulation.
Washington State			
Washington Administrative Code 173-60	Noise Levels	Applies	Maximum noise levels are applicable depending on action selected.
Washington Administrative Code 173-160	Well Construction and Maintenance	Applies	Minimum standards for construction of water and monitoring wells, and decommissioning.
Washington Administrative Code 173-162	Well Contractors and Operators	Applies	Procedures for well contractors and operators, applicable to installation and decommissioning of wells and borings.
Washington Administration Code 173-201A	Water Quality Standards for Surface Waters	Applies	MTCA requires cleanup action complies with applicable regulations.
Washington Administration Code 173304	Solid Waste Handing Standards	Applies	MTCA requires cleanup action complies with applicable regulations.
Washington Administration Code 173340	Toxic Waste Cleanup (MTCA)	Applies	The remedial action was conducted under MTCA as an independent cleanup. Remediation complies with MTCA regulations.
Washington Administrative Code 173-400	Fugitive Emissions	Applies	Requires owner to take reasonable precautions to prevent fugitive emissions.
Washington Administrative Code 197-11 and 173-802	State Environmental Policy Act	Applies	A SEPA review is required for projects with potential significant environmental impacts.
Washington Administrative Code 296-155	Safety Standards for Construction Work	Applies	Applicable during construction activities.
Washington Administrative Code 296-62	General Occupational Health Standards	Applies	Applicable during construction activities.
RCW 90.48	Water Pollution Control (Construction Stormwater Permit)	Applies	A Stormwater Pollution Prevention Plan (SWPPP) is required for each remediation alternative.
Federal Regulations			
Title 40 Code of Federal Regulations 50	Clean Air Act	Applies	MTCA requires cleanup actions comply with applicable regulations.
Title 40 Code of Federal Regulations 131	Water Quality Standards (National Toxics Rule)	Applies	MTCA requires cleanup actions comply with applicable regulations.
Title 40 Code of Federal Regulations 141/143	Drinking Water Regulations	Applies	MTCA requires cleanup actions comply with applicable regulations.
Title 40 Code of Federal Regulations 260-268	Hazardous Waste (RCRA)	Applies	MTCA requires cleanup actions comply with applicable regulations.
Title 33 of United States Code, Chapter 26	Water Pollution Control (Clean Water Act)	Applies	MTCA requires cleanup actions comply with applicable regulations.

Notes:

ARAR = Applicable or Relevant and Appropriate Requirements; SEPA = State Environmental Policy Act; RCRA = Resource Conservation and Recovery Act; MTCA = Model Toxics Control Act; WAC = Washington Administrative Code





Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Mapbox Open Street Map, 2016

Projection: NAD 1983 UTM Zone 11N

Vicinity Map

Avista - Service Center Garage
Spokane, Washington

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Figure 1

P:\2\2522079\GIS\MXD\252207900_F01_VM.mxd Date Exported: 03/11/19 by ccabrera

100 0 100
Feet

N S W E

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Data Source: ESRI, Spokane County GIS

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

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Site Plan

Avista - Service Center Garage
Spokane, Washington

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Figure 2

Notes:

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Data Source: Aerial from Google Earth Pro dated June 2017.

Vertical Datum: NAVD 88.

Projection: NAD83 Washington State Planes, North Zone, US Foot.

Legend

- Former Lift Assembly
- Bay-7 Soil Sample (Depth in Feet)
- TP-1 Approximate Test Pit Location
- Former Abovegrade Hydraulic System Piping
- Former Belowgrade Hydraulic System Piping
- Underground Power Line
- DRPH/ORPH Above MTCA Method A Unrestricted Land Use Cleanup Level
- cPAH TEQ Above MTCA Method A Unrestricted Land Use Cleanup Level

W N S E

15 0 15
Feet

Pre-Remediation Test Pit Sample Locations and Chemical Analytical Results - MTCA Method A Unrestricted Land Use Cleanup Levels

Avista - Spokane Center Garage
Spokane, Washington

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Figure 3

P:\2\2522079\CAD\01\As-Built Plan\252207901_F03_Pre-Remediation Test Pit Sample Locations and Chemical Analytical Results.dwg TAB:F03 Date Exported: 03/12/19 - 12:59 by syi

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Aerial from Google Earth Pro dated June 2017.

Vertical Datum: NAVD 88.

Projection: NAD83 Washington State Planes, North Zone, US Foot.

Legend

- Former Lift Assembly
- Bay-7 ◉ Soil Sample (Depth in Feet)
- TP-1 Approximate Test Pit Location
- Former Abovegrade Hydraulic System Piping
- Former Belowgrade Hydraulic System Piping
- Underground Power Line
- DRPH/ORPH Above MTCA Method A Industrial Land Use Cleanup Level
- cPAH TEQ Above MTCA Method A Industrial Land Use Cleanup Level

W N S E

15 0 15
Feet

Pre-Remediation Test Pit Sample Locations and Chemical Analytical Results - MTCA Method A Industrial Land Use Cleanup Levels

Avista - Spokane Center Garage
Spokane, Washington

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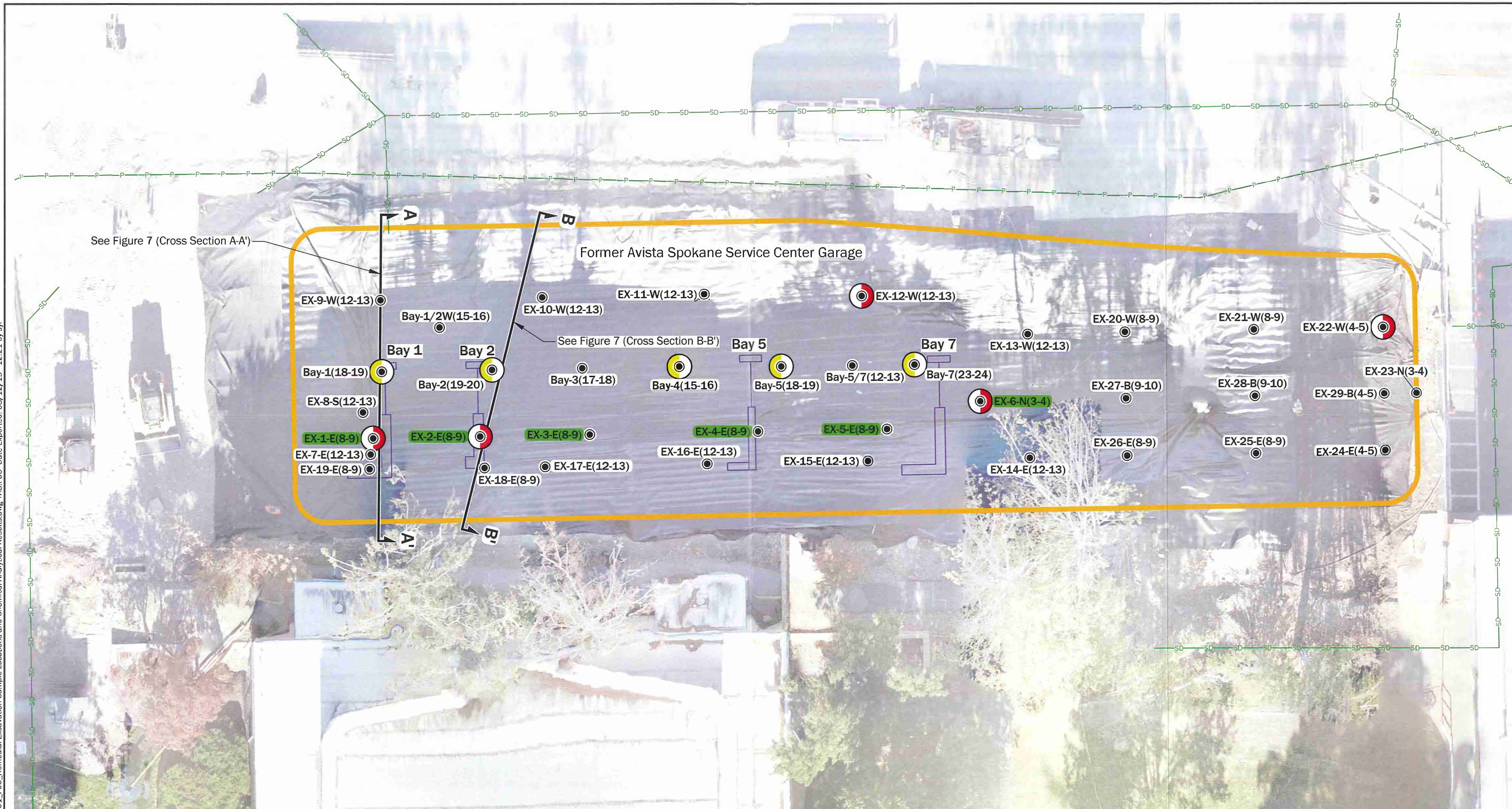
Figure 4

P:\2\2522079\CAD\01\As-Built Plan\252207901_F04_Pre-Remediation Test Pit Sample Locations and Chemical Analytical Results.dwg TAB:F04 Date Exported: 03/12/19 - 13:00 by syi



Notes:

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2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Aerial from Orthomosaic Aerial Photo dated October 2018.

Vertical Datum: NAVD 88.

Projection: NAD83 Washington State Planes, North Zone, US Foot.

Legend

- Remedial Excavation Limit
- Former Lift Assembly
- EX-7-E(12-13) Confirmation Soil Sample (Depth in Feet)
- EX-1-E(8-9) Overexcavated Soil Sample (Depth in Feet)
- DRPH/ORPH Above MTCA Method A Unrestricted Land Use Cleanup Level
- cPAH TEQ Above MTCA Method A Unrestricted Land Use Cleanup Level
- SD Existing Storm Sewer
- P Underground Power Line
- A A' Cross Section Location

15 0 15

Feet

Remedial Excavation Sample Locations and Chemical Analytical Results - MTCA Method A Unrestricted Land Use Cleanup Levels

Avista - Spokane Center Garage
Spokane, Washington

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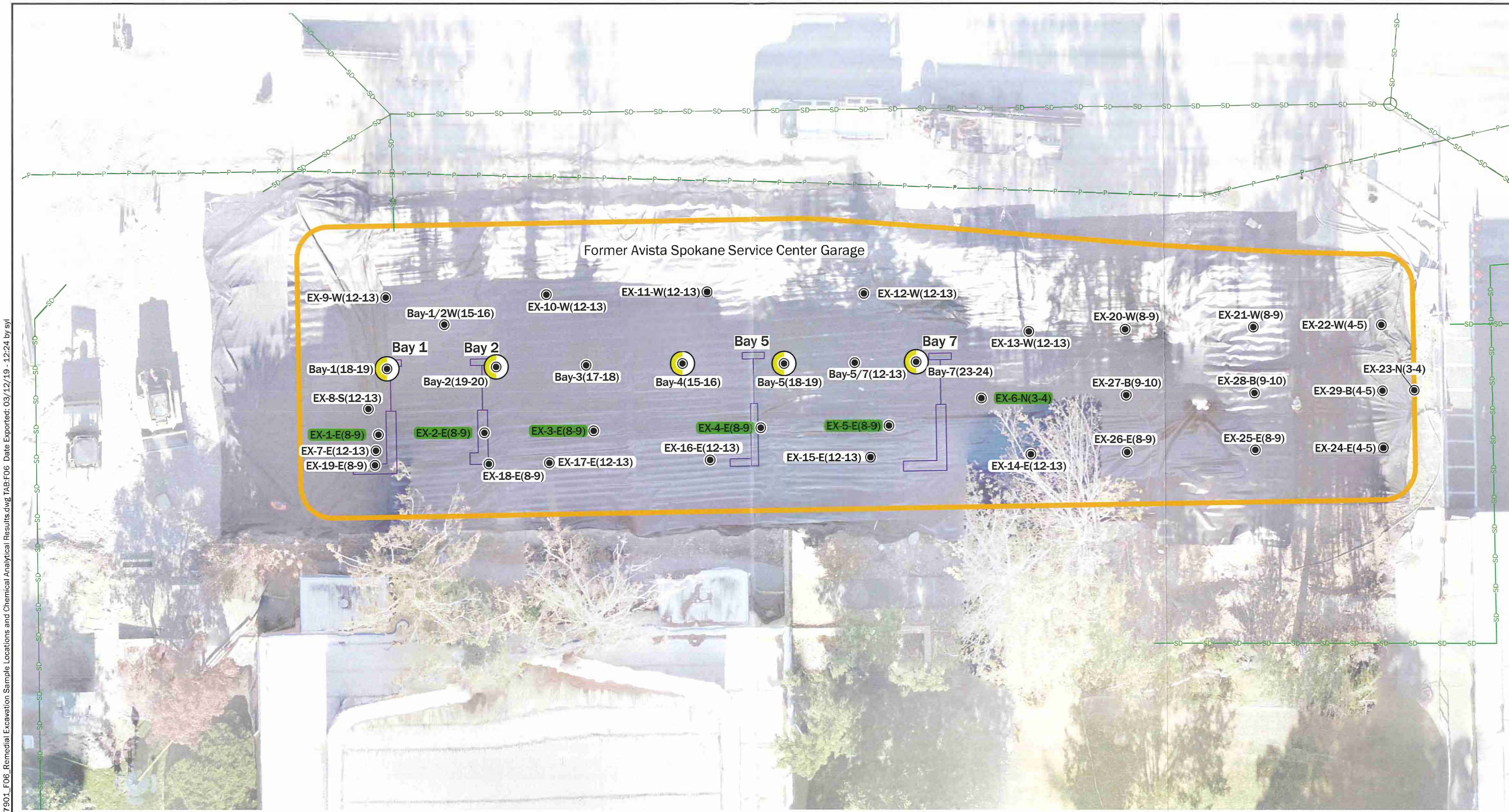
Figure 5

P:\2\2522079\CAD\01\As-Built Plan\252207901_F05_Remedial Excavation Sample Locations and Chemical Analytical Results.dwg TAB:F05 Date Exported: 03/12/19 - 12:21 by syi



Notes:
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Data Source: Aerial from Orthomosaic Aerial Photo dated October 2018.

Vertical Datum: NAVD 88.

Projection: NAD83 Washington State Planes, North Zone, US Foot.

Legend

- Remedial Excavation Limit
- Former Lift Assembly
- EX-7-E(12-13) Confirmation Soil Sample (Depth in Feet)
- EX-1-E(8-9) Overexcavated Soil Sample (Depth in Feet)
- DRPH/ORPH Above MTCA Method A Industrial Land Use Cleanup Level
- cPAH TEQ Above MTCA Method A Industrial Land Use Cleanup Level
- SD Existing Storm Sewer
- P Underground Power Line

W N S E

15 0 15
Feet

Remedial Excavation Sample Locations and Chemical Analytical Results - MTCA Method A Industrial Land Use Cleanup Levels

Avista - Spokane Center Garage
Spokane, Washington

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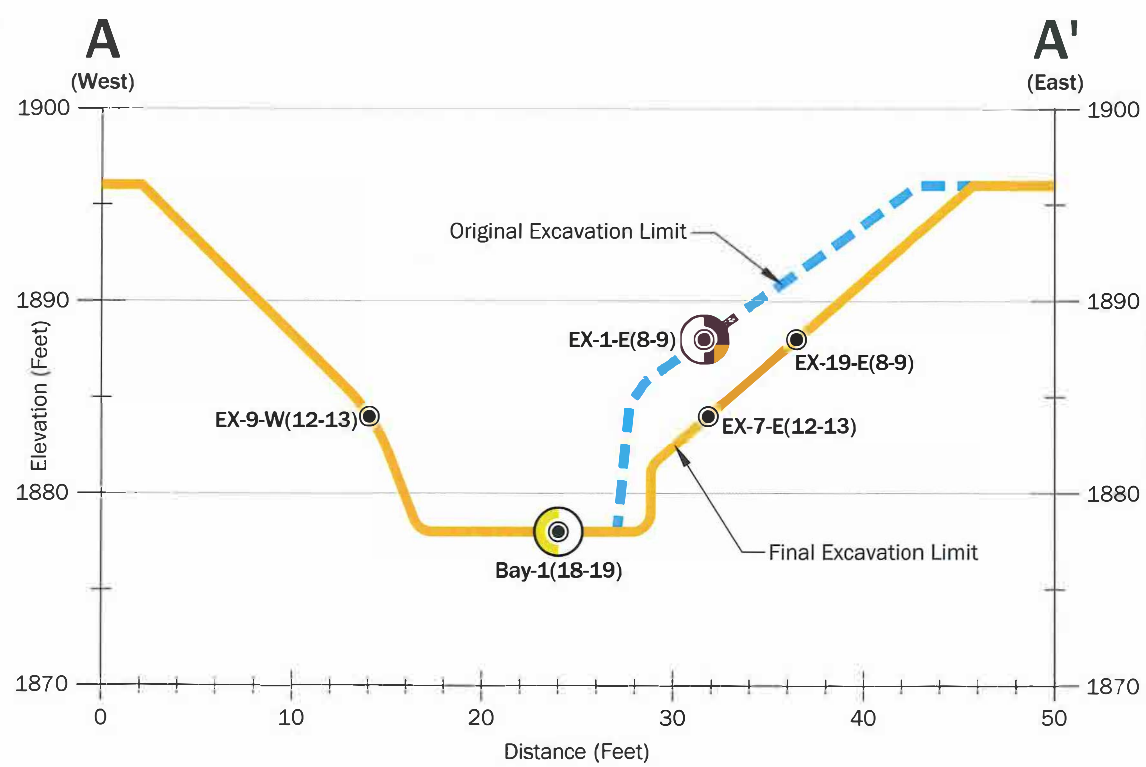
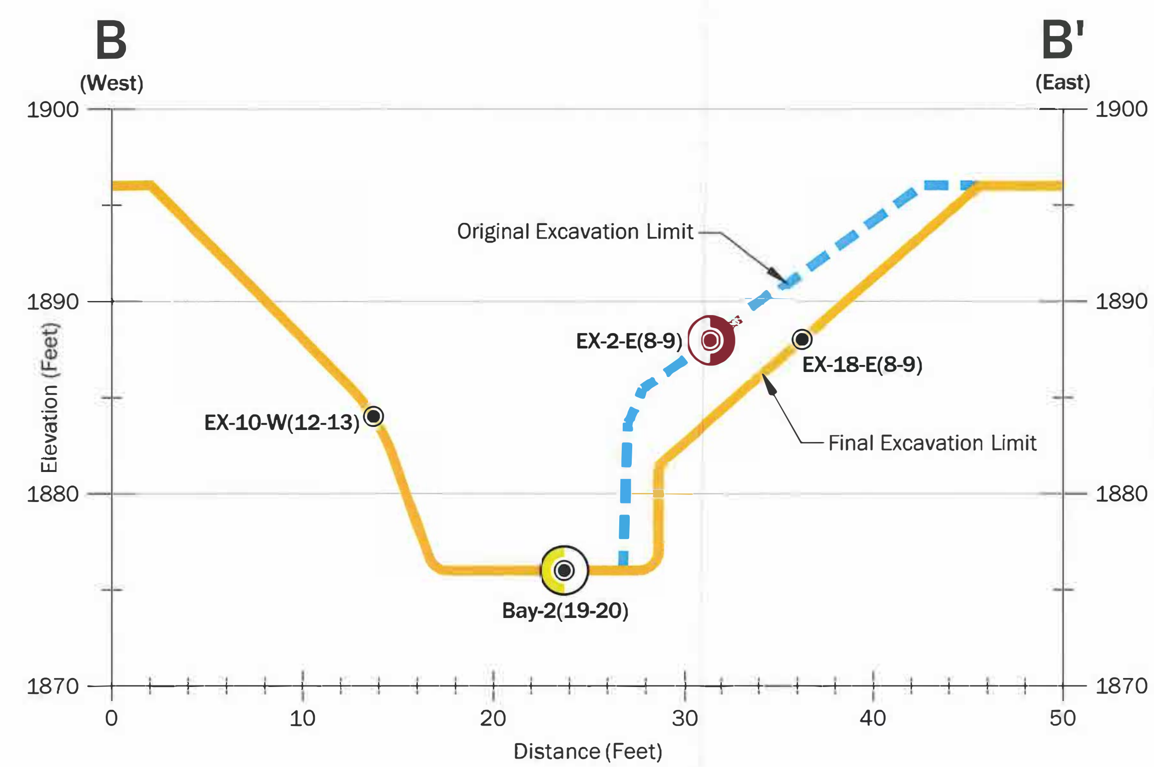
Figure 6

P:\25\2522079\CAD\01\As-Built Plan\252207901_F06_Remedial Excavation Sample Locations and Chemical Analytical Results.dwg TAB:F06 Date Exported: 03/12/19 - 12:24 by syi



CROSS SECTION A-A' (A-A' / F07)
SCALE:



CROSS SECTION B-B' (B-B' / F07)
SCALE:

Notes:

1. Samples located at original Excavation Limit were overexcavated. Samples located at Final Excavation are confirmation samples.
2. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.
3. This figure is for informational purposes only. It is intended to assist in the identification of features discussed in a related document. Data were compiled from sources as listed in this figure. The data sources do not guarantee these data are accurate or complete. There may have been updates to the data since the publication of this figure. This figure is a copy of a master document. The hard copy is stored by GeoEngineers, Inc. and will serve as the official document of record.

Datum: NAVD 88, unless otherwise noted.

Legend

- Final Excavation Limit
- Original Excavation Limit
- EX-1-E(8-9) Soil Sample (Depth in Feet)
- DRPH/ORPH Above MTCA Method A Cleanup Level / cPAH TEQ Above MTCA Method A Cleanup Level

10 0 10
Scale in Feet

Remedial Excavation
Cross Sections A-A' and B-B'

Avista - Spokane Center Garage
Spokane, Washington

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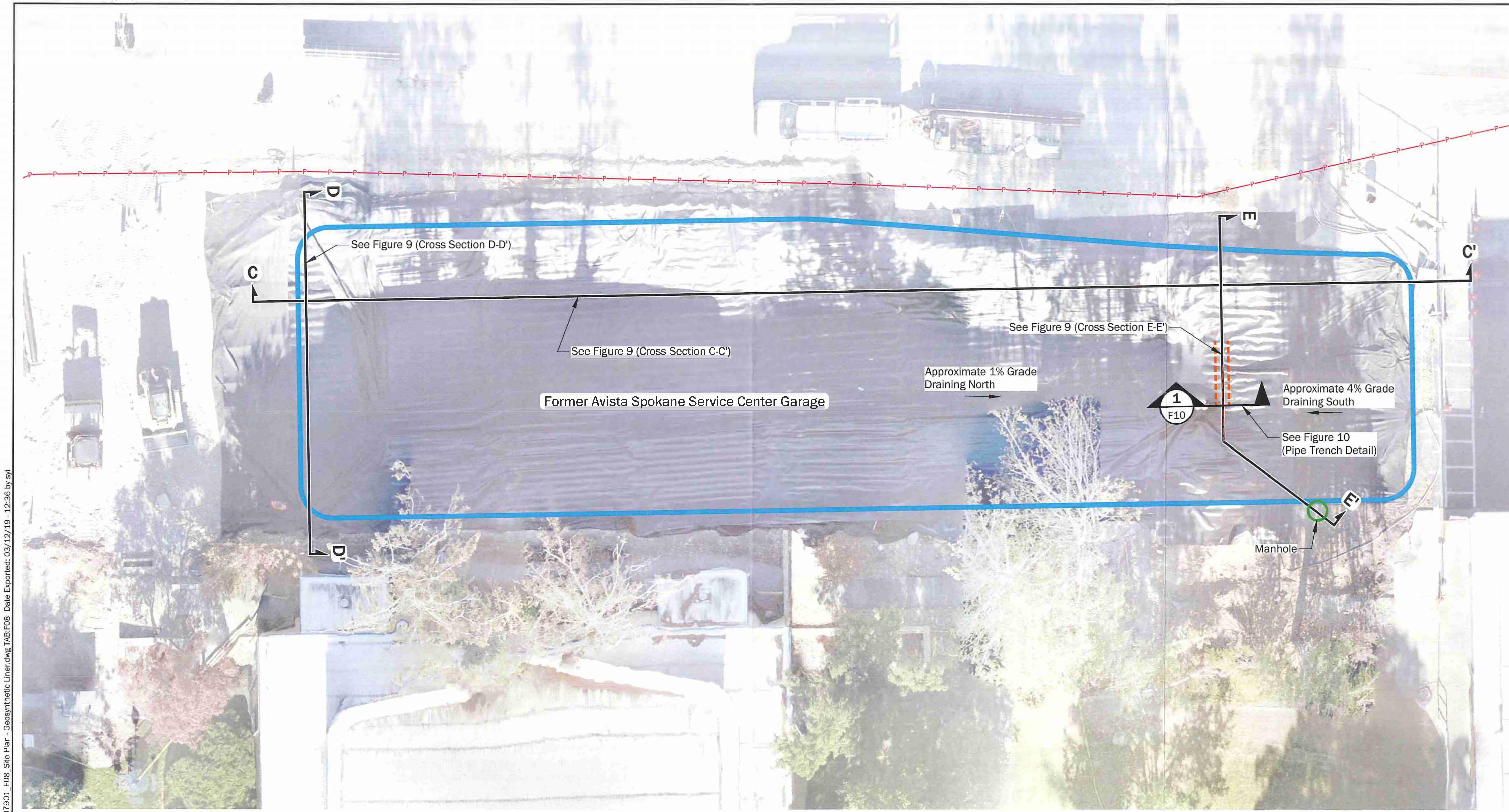
Figure 7

P:\25\2522079\CAD\01\As-Built Plan\252207901_F07_Remedial Excavation Cross Sections A-A'_B-B'.dwg TAB:F07 Date Exported: 03/12/19 - 12:32 by syi



Notes:
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Data Source: Aerial from Orthomosaic Aerial Photo dated October 2018.

Vertical Datum: NAVD 88.

Projection: NAD83 Washington State Planes, North Zone, US Foot.

Legend

- Geosynthetic Liner Footprint
- Approximate Location of Pipe Drain
- Underground Power Line
- C C' Cross Section Location

W N S E

15 0 15
Feet

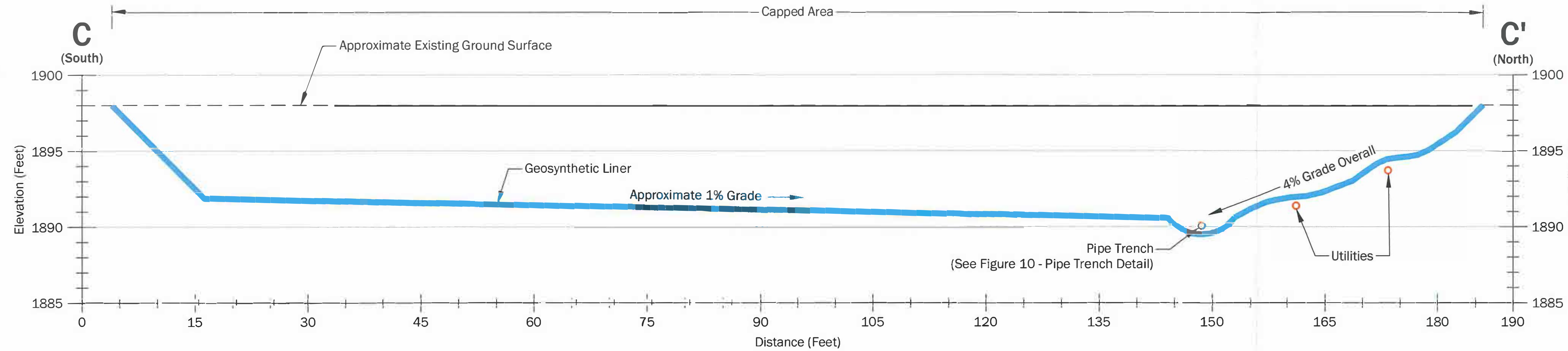
Site Plan - Geosynthetic Liner

Avista - Spokane Center Garage
Spokane, Washington

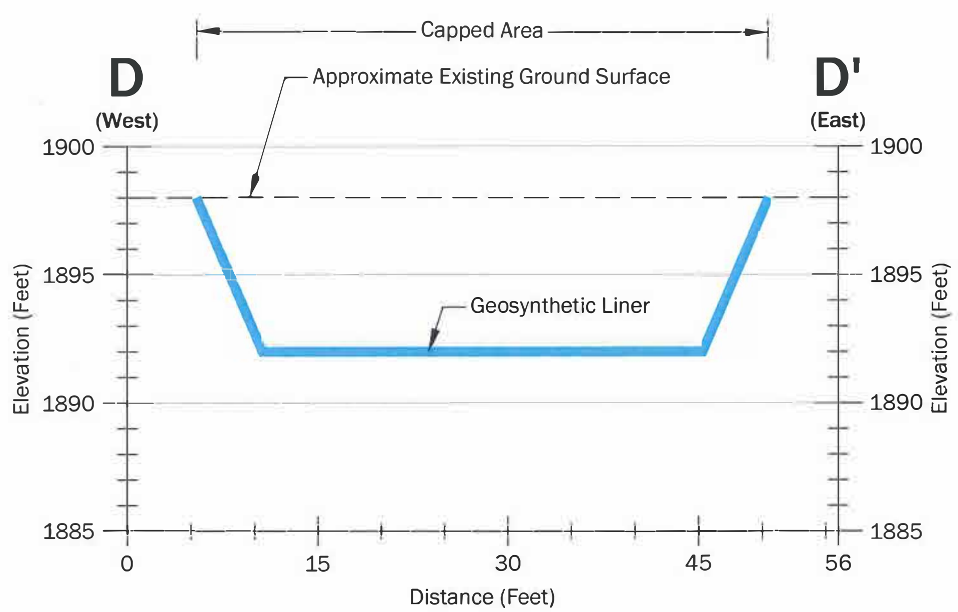
GeoEngineers

Figure 8

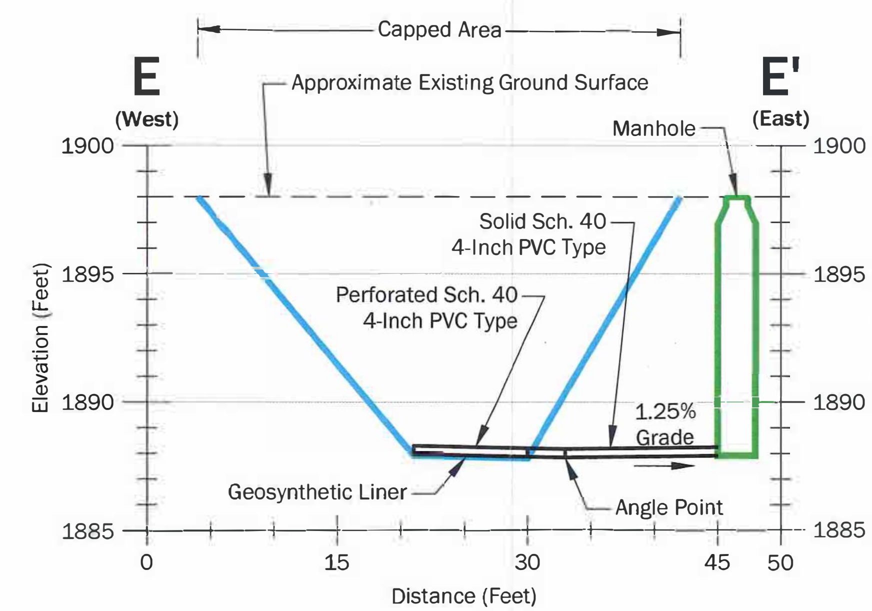
P:\2\2522079\CAD\01\As-Built Plan\252207901_F08_Site Plan - Geosynthetic Liner.dwg TAB:F08 Date Exported: 03/12/19 - 12:36 by syl



CROSS SECTION C-C' C-C'
SCALE: F09



CROSS SECTION D-D' D-D'
SCALE: F09



CROSS SECTION E-E' E-E'
SCALE: F09

Notes:
1. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.
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Datum: NAVD 88, unless otherwise noted.

15 0 15
Horizontal Scale in Feet
7.5 0 7.5
Vertical Scale in Feet
Vertical Exaggeration: 2X

Cross Sections C-C', D-D' and E-E'

Avista - Spokane Center Garage
Spokane, Washington

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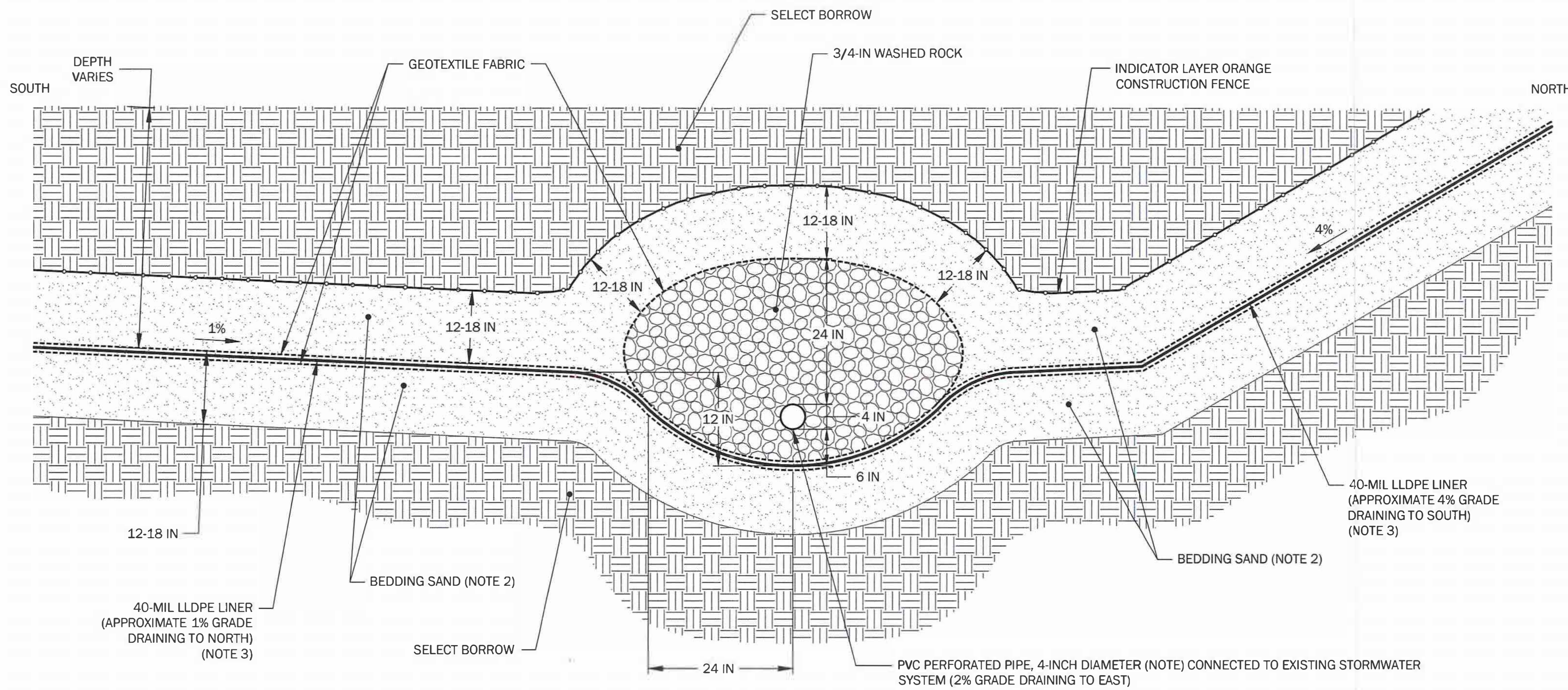
Figure 9

P:\2\2522079\CAD\01\As-Built Plan\252207901_F09_Cross Sections C-C'_D-D'_E-E'.dwg TAB:F09 Date Exported: 03/12/19 - 12:38 by syi



NOTES:

1. SOIL AND BACKFILL MATERIALS PLACED BENEATH THE GEOSYNTHETIC COVER WERE BE COMPACTED TO A FIRM AND UNYIELDING STATE WITH NO VISIBLE DEFLECTION.
2. BEDDING SAND CONSISTED OF MATERIAL MEETING WSDOT STANDARD SPECIFICATION 9-03.13.
3. 40-MIL LINEAR LOW-DENSITY POLYETHYLENE (LLDPE) LINER.
4. GEOTEXTILE FABRIC CONSISTED OF MIRAFI 180N.

PIPE TRENCH DETAIL 1 / F10

SCALE: NOT TO SCALE

P:\2\2522079\CAD\01\As-Built Plan\252207901_F10_Pipe Trench Detail.dwg TAB:F10 Date Exported: 03/12/19 - 12:40 by syi

Pipe Trench Detail

Avista - Spokane Center Garage
Spokane, Washington

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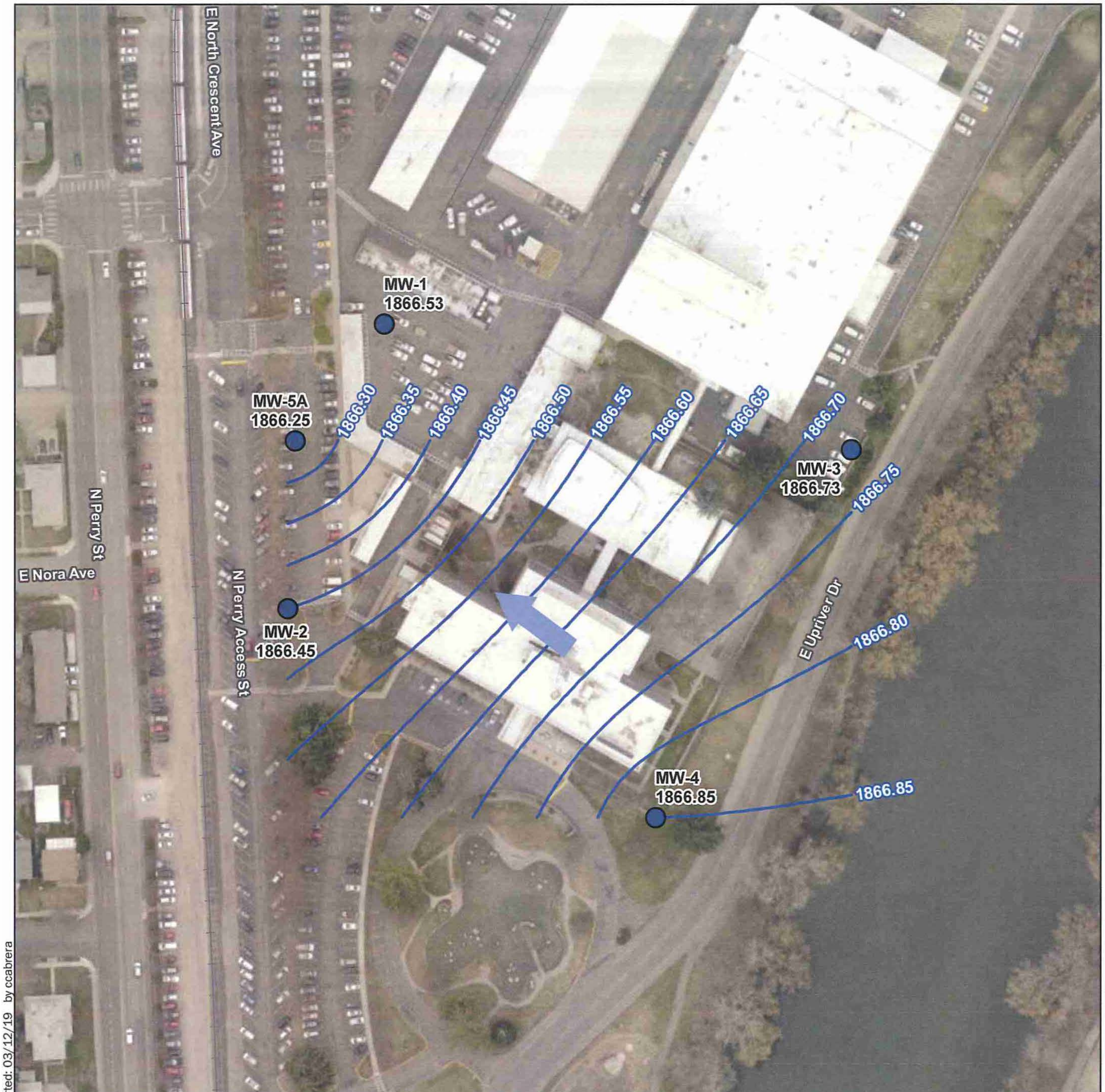
Figure 10



Legend

- Monitoring Well
- Approximate Groundwater Elevation Contour (0.05 feet)
- Approximate Groundwater Flow Direction

MW-1 was removed from contours due to low water level and poor recharge; MW-1 went dry shortly after purging on 8/17/2018 and 8/20/2018.

150 0 150
Feet

N W E S

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: ESRI, Spokane County GIS

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Well Locations and Groundwater Elevations – August 17, 2018

Avista - Service Center Garage
Spokane, Washington

GEOENGINEERS

Figure 11

P:\2\2522079\GIS\MXD\252207900_F11_WaterLevels081718.mxd Date Exported: 03/12/19 by ccabrera

Legend

Monitoring Well

Approximate Groundwater Elevation Contour (0.05 feet)

Approximate Groundwater Flow Direction

150 0 150

Feet

N S W E

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: ESRI, Spokane County GIS

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Well Locations and Groundwater Elevations – October 10, 2018

Avista - Service Center Garage
Spokane, Washington

GeoEngineers

Figure 12

Photograph 1. Outside Avista Spokane Service Center pre-demo, looking north.

Photograph 2. Inside Avista Spokane Service Center pre-demo, looking north.

Site Photographs July/August 2018

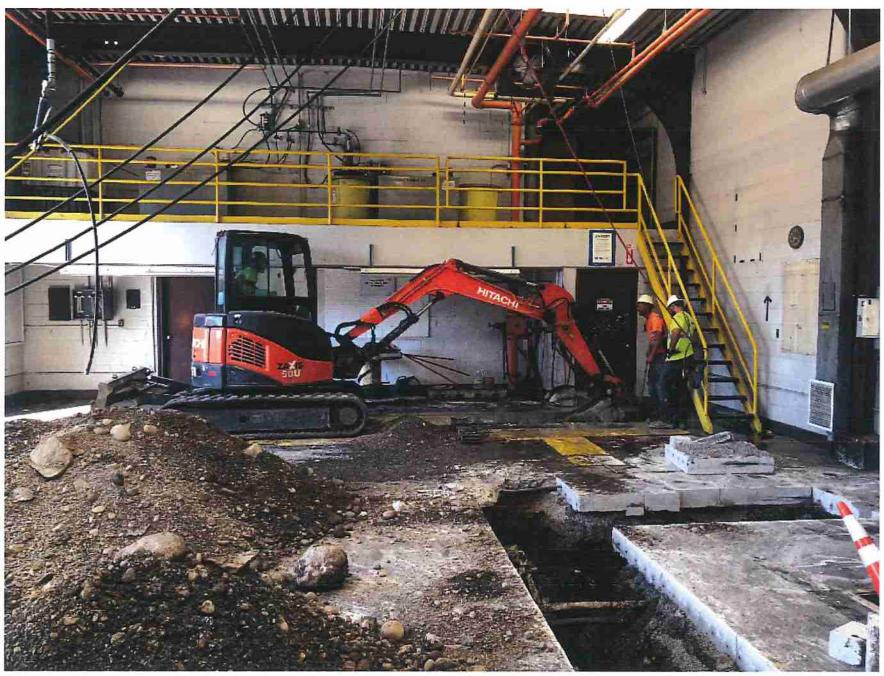
Avista – Spokane Service Center
Spokane, Washington

GEOENGINEERS

Figure 13

2252-079-01 Date Exported: 10/16/2018

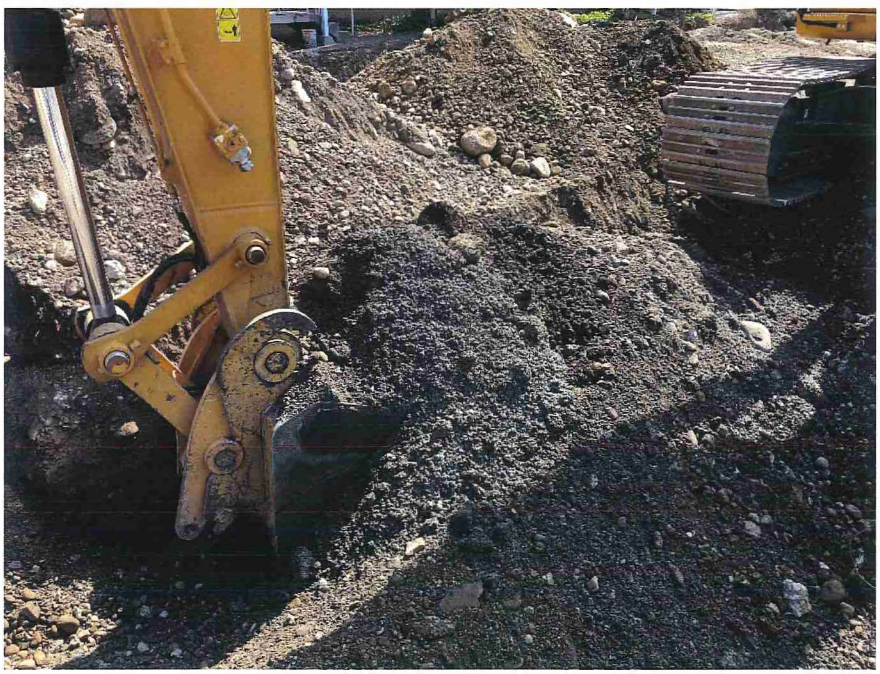
Photograph 3. Sawcut test pit in Bay-7. Looking East.



Photograph 4. Sawcut test pit in Bay-5 and sawcut test pits exposing buried hydraulic lines from reservoirs, looking north.

Site Photographs August 2018	
Avista - Spokane Service Center Spokane, Washington	
GeoEngineers	Figure 14

Photograph 5. SES excavates test pit TP-1 in highbay area, looking northwest.

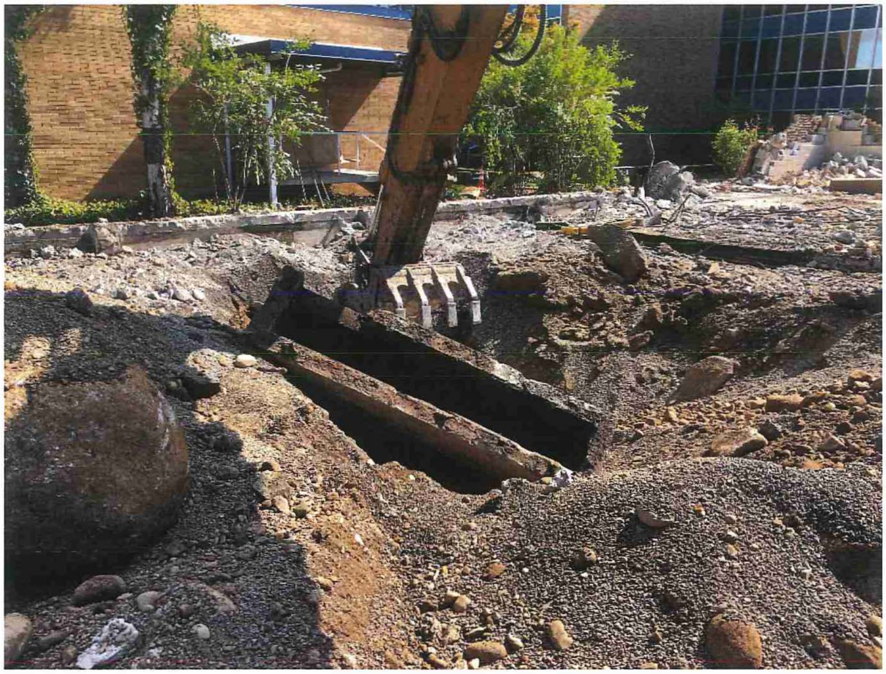


Photograph 6. SES excavates test pit TP-5 in Bay-7 area, looking east.

Site Photographs August 2018

Avista – Spokane Service Center
Spokane, Washington

GeoEngineers | Figure 15



Photograph 7. SES removes hydraulic lift concrete secondary containment from Bay-2.

Photograph 8. SES excavates PCS to a maximum depth of 24-feet bgs from beneath Bay-7 area, looking east.

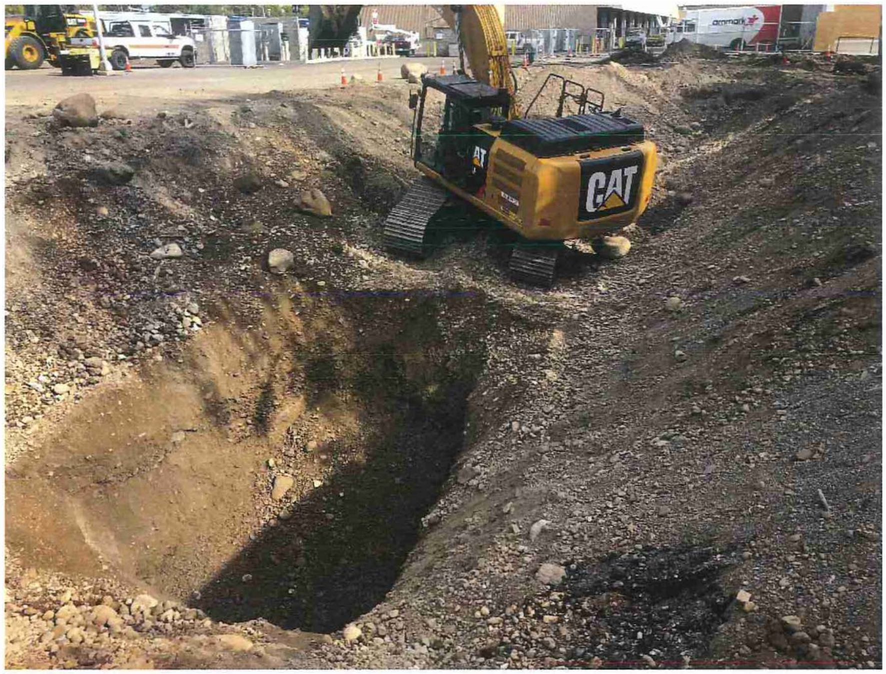
Site Photographs September 2018

Avista – Spokane Service Center
Spokane, Washington

GEOENGINEERS

Figure 16

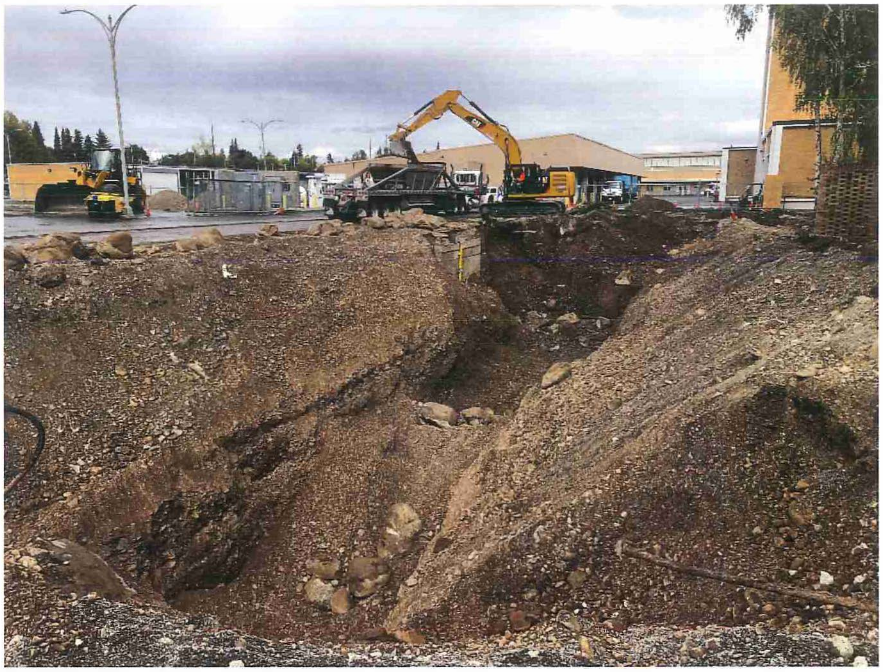
2252-079-01 Date Exported: 10/16/2018



Photograph 9. SES excavates PCS from beneath Bay-1 and Bay-2 areas, looking North.

Photograph 10. SES excavates PCS from beneath Bay-3 and Bay-4 areas, looking North.

Site Photographs September 2018	
Avista – Spokane Service Center Spokane, Washington	
GeoEngineers	Figure 17



Photograph 11. SES excavates PCS from beneath Bay-5 area, looking North.

Photograph 12. SES places boulders from excavation into base of excavation.

Site Photographs September 2018

Avista – Spokane Service Center
Spokane, Washington

GeoEngineers

Figure 18

2252-079-01 Date Exported: 10/16/2018

Photograph 13. Highbay area excavation of PAH contaminated soil. SES marked daylighted utilities with orange paint.

Photograph 14. SES shapes the west sidewall of the excavation, looking North.

Site Photographs September 2018

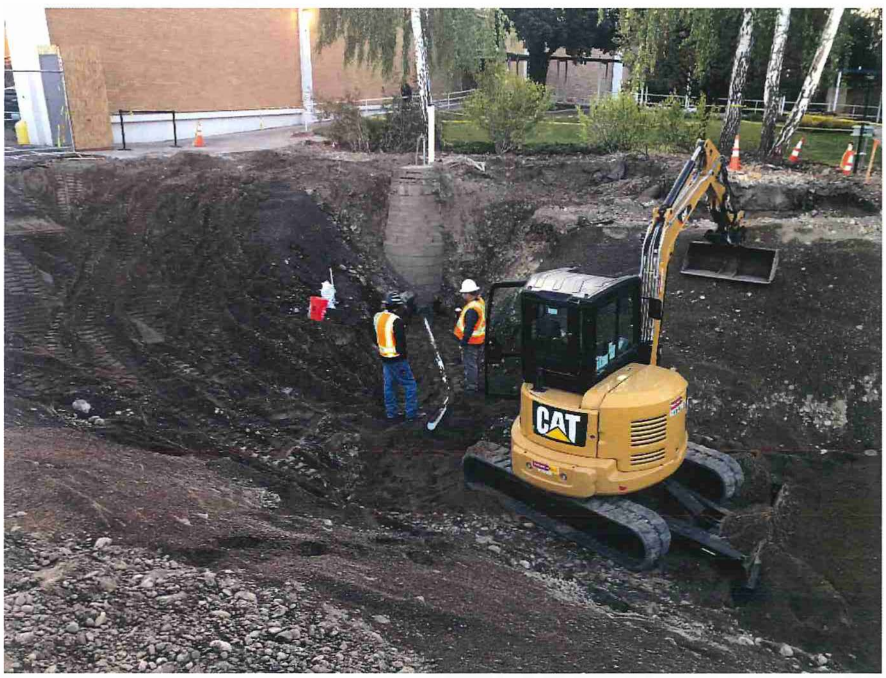
Avista – Spokane Service Center
Spokane, Washington

GEOENGINEERS

Figure 19

2252-079-01 Date Exported: 10/16/2018

Photograph 15. SES begins backfill and compaction of select fill in base of excavation, looking North.



Photograph 16. SES plumbs liner drain pipe into stormwater system manhole found on the east side of the highbay area, looking Northeast.

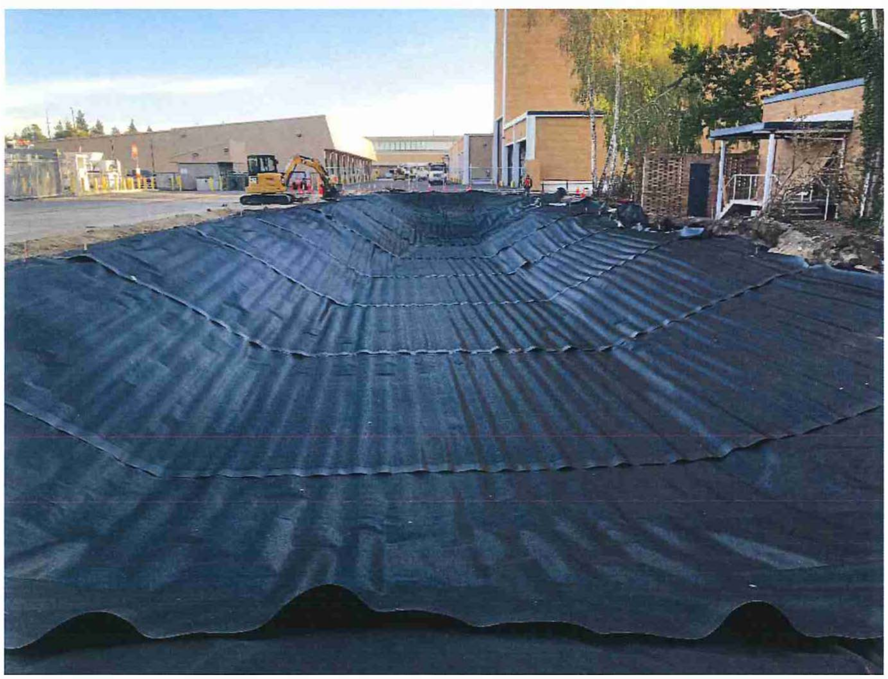
Site Photographs September 2018

Avista – Spokane Service Center
Spokane, Washington

GeoEngineers

Figure 20

Photograph 17. SES places geotextile fabric over bedding sand in excavation, looking North.



Photograph 18. ACF West places 40-mil thick LLDPE geosynthetic liner over fabric, looking North.

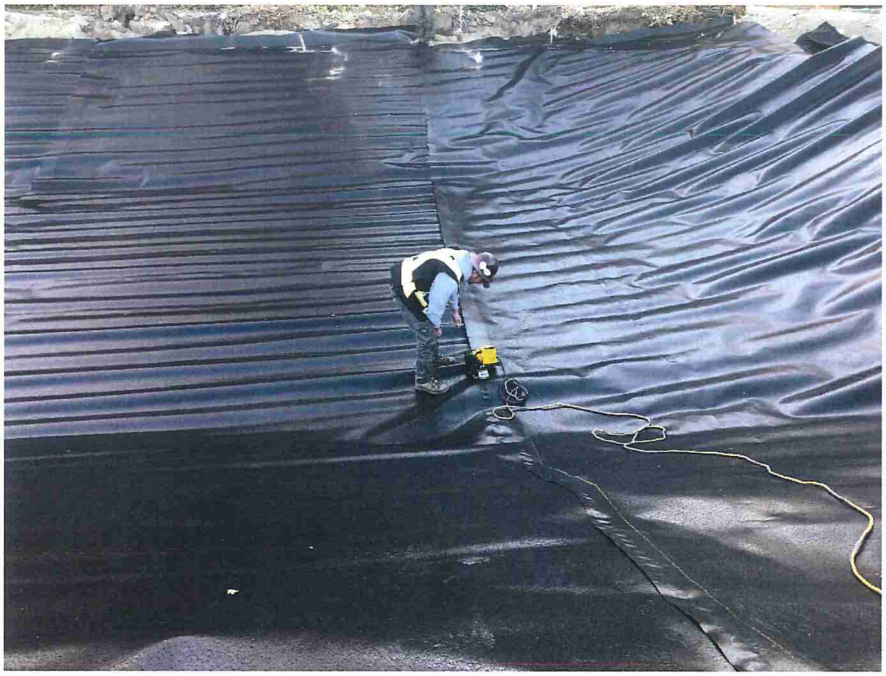
Site Photographs September 2018

Avista – Spokane Service Center
Spokane, Washington

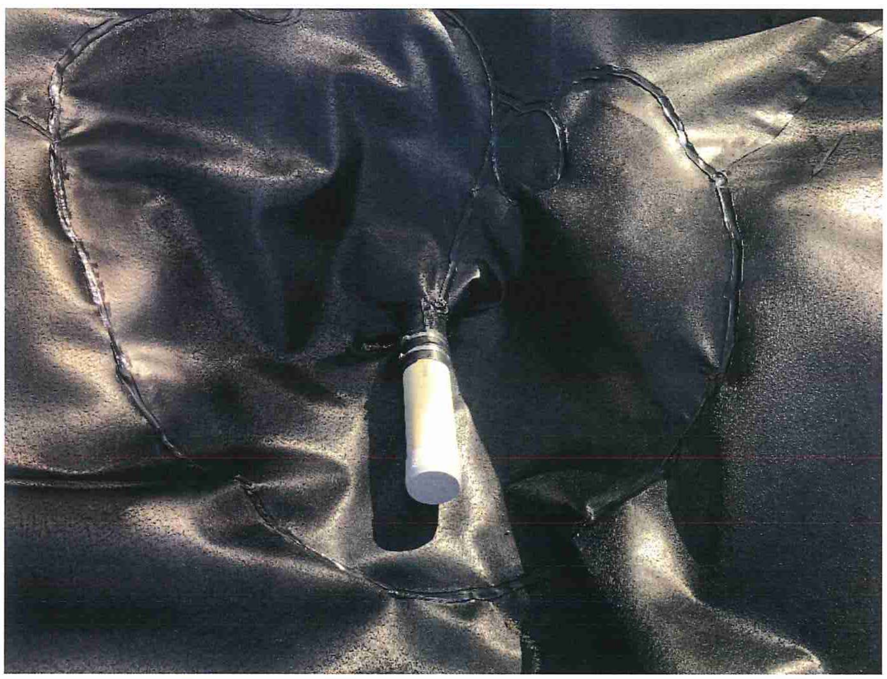
GEOENGINEERS

Figure 21

2252-079-01 Date Exported: 10/16/2018



Photograph 19. ACF West welds sections of geosynthetic liner, looking East.



Photograph 20. ACF West completes pipe stub penetration for drain pipe through geosynthetic liner, looking East.

Site Photographs September 2018	
Avista – Spokane Service Center Spokane, Washington	
GeoEngineers	Figure 22

Photograph 21. SES begins placing geotextile fabric and bedding sand over the geosynthetic liner, looking North.

Photograph 22. Perforated drain pipe connected to stub from stormwater manhole, looking South.

Site Photographs September 2018

Avista – Spokane Service Center
Spokane, Washington

GeoEngineers

Figure 23

Photograph 23. SES constructs the liner drain with ¾-inch drain rock around drain pipe and wrapped in geotextile fabric, looking East.

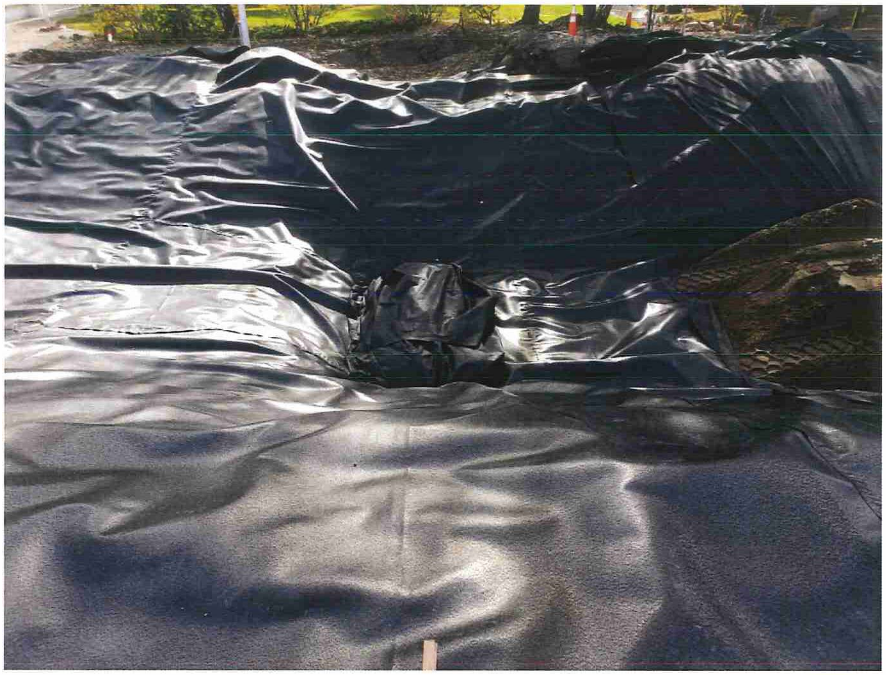
Photograph 24. SES constructs the liner drain with ¾-inch drain rock around drain pipe and wrapped in geotextile fabric, looking South.

Site Photographs September 2018

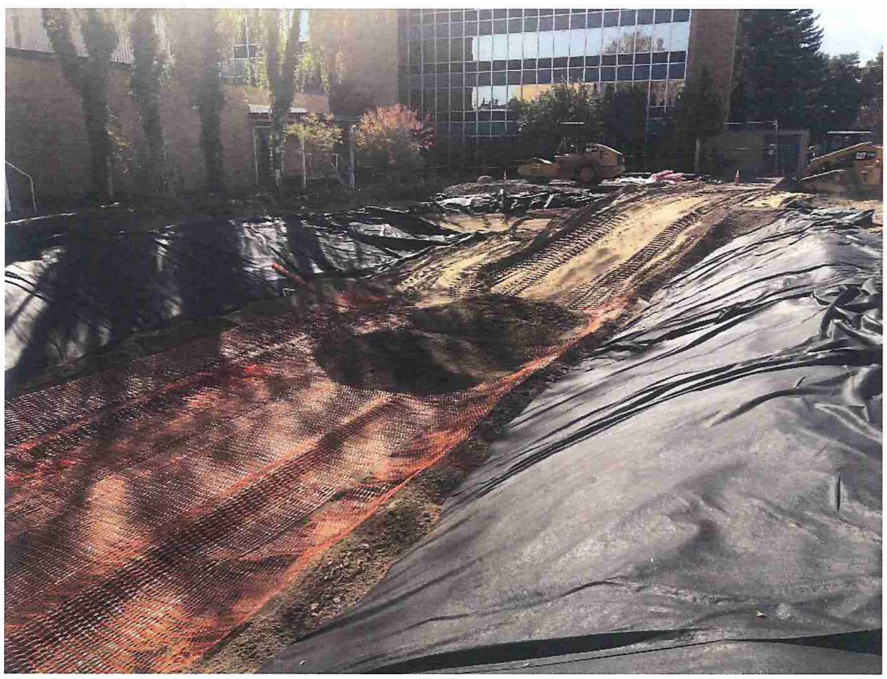
Avista – Spokane Service Center
Spokane, Washington

GEOENGINEERS

Figure 24



Photograph 25. Completed liner drain wrapped in geotextile fabric, looking East.



Photograph 26. SES backfilled the excavation and placed orange construction fencing approx 1-foot above the liner as an indicator layer for future construction.

Site Photographs September 2018

Avista – Spokane Service Center
Spokane, Washington

GeoEngineers | Figure 25

Photograph 27. Excavation backfill, looking South.

Photograph 28. Excavation backfilled and compacted, looking South.

Site Photographs September 2018

Avista – Spokane Service Center
Spokane, Washington

GeoEngineers

Figure 26

APPENDIX A
Field Procedures

APPENDIX A
FIELD PROCEDURES

General

Subsurface conditions at Avista's Service Center Garage were explored on August 31, 2018 by excavating five test pits (TP-1 through TP-5) at approximate locations shown on Figure 3. The test pits were excavated to depths between 12 and 16 feet below existing site grade using a track hoe. The test pits were backfilled with excavated material.

Remedial excavation activities at Avista's Service Center Garage building were conducted between September 4 and October 3, 2018. The remedial excavation had a maximum depth of 24 feet below ground surface (bgs) in the Bay 7 area. Remedial excavation activities were performed using a track hoe. The remedial excavation was graded, lined and backfilled with imported material.

Soil Sample Collection

Environmental Protection Agency (EPA) 5035 sampling methods were used to collect soil samples for potential volatile organic compounds (VOCs). Based on the chemical analytical results, the soil samples were not analyzed for VOCs. For analysis of other parameters, soil was placed in laboratory-supplied sample jars and filled to minimize headspace. Soil samples were stored in a chilled cooler until delivery to the analytical laboratory.

The test pit and remedial excavations were monitored by staff from our firm who examined and classified the soil encountered, obtained soil samples and maintained a continuous log of the explorations. Soil encountered in the borings was classified in general accordance with ASTM International (ASTM) D 2488 and the classification chart listed in Key to Exploration Logs, Figure A-1. Logs of the test pits are presented in Figures A-2 through A-6. The logs are based on interpretation of the field data and indicate the depth at which subsurface materials or their characteristics change, although these changes might actually be gradual.

Field Screening of Soil Samples

GeoEngineers' field representative performed field-screening tests on soil samples obtained from the test pits. Field screening results were used as a general guideline to assess areas of possible petroleum-related contamination. The field screening methods used included: (1) visual screening; (2) water-sheen screening; (3) Oil-In-Soil test kits; and (4) headspace-vapor screening using a MiniRAE photoionization detector (PID) calibrated to isobutylene on the day of testing.

Visual screening consisted of observing soil for stains indicative of petroleum-related contamination. Water-sheen screening involved placing soil in a pan of water and observing the water surface for signs of sheen. Sheen screening might detect both volatile and nonvolatile petroleum hydrocarbons. Sheens observed are classified as follows:

No Sheen (NS)	No visible sheen on the water surface.
Slight Sheen (SS)	Light, colorless, dull sheen; spread is irregular, not rapid; sheen dissipates rapidly. Natural organic matter in the soil may produce a slight sheen.
Moderate Sheen (MS)	Light to heavy sheen; may have some color/iridescence; spread is irregular to flowing, may be rapid; few remaining areas of no sheen on the water surface.
Heavy Sheen (HS)	Heavy sheen with color/iridescence; spread is rapid; entire water surface may be covered with sheen.

Headspace vapor screening involved placing a soil sample in a plastic sample bag. Air was captured in the bag, and the bag was shaken to expose the soil to the air trapped in the bag. Headspace vapor screening targeted volatile petroleum hydrocarbon compounds. In this application, the PID measured concentration of organic vapors ionizable by a 10.6 electron volt (ev) lamp in the range between 1.0 and 5,000 parts per million (ppm), with a resolution of +/- 2 ppm.

Oil-In-Soil kits will be used to identify the presence of oil-range petroleum products in soil at concentrations greater than 500 ppm. The kits were used following the manufacturer instructions provided with each kit.

Field screening results can be site specific. The effectiveness of field screening can vary with temperature, moisture content, organic content, soil type and type and age of contaminant. The presence or absence of a sheen or headspace vapors does not necessarily indicate the presence or absence of contaminants.

Depth to Groundwater Measurements

Depth to groundwater measurements from the monitoring wells were collected and recorded in the field notebook after the water level has stabilized after well purging. Depth to groundwater relative to the north side of top of monitoring well casing was measured to the nearest 0.01 foot using an electronic water level indicator and recorded in the field notebook. Groundwater elevation was calculated by subtracting the depth-to-water measurement from the surveyed casing rim elevation. The electronic water level indicator was decontaminated with Liquinox® solution wash and a distilled water rinse prior to use in each well.

Groundwater Sampling

Groundwater samples were collected from the five monitoring wells (MW-1 through MW-4 and MW-5A) consistent with the EPA's low-flow groundwater sampling procedure, as described in EPA (2017). One duplicate sample also was collected from monitoring well MW-1 during the October event. Groundwater monitoring events were conducted about 1 week before building demolition and 1 week after conclusion of remedial activities. One additional sampling event was conducted to redevelop and resample MW-1 on November 20, 2018.

Dedicated polyethylene tubing and a peristaltic pump were used for groundwater purging and sampling. A portable bladder pump was used for wells when water levels were lower than 30 feet bgs. During purging activities, water quality parameters, including pH, temperature, conductivity, dissolved oxygen and turbidity were measured using a multi-parameter meter equipped with a flow-through cell. Groundwater samples were collected after (1) water quality parameters stabilize; or (2) a maximum purge time of 60 minutes is achieved. During purging and sampling, drawdown was not allowed to exceed 0.3 feet and the purge rate was not allowed to exceed 400 milliliters per minute. Water quality parameter stabilization criteria included the following:

- Turbidity: ±10 percent for values greater than 5 nephelometric turbidity units (ntu);
- Conductivity: ±3 percent;
- pH: ±0.1 unit;
- Temperature: ±3 percent; and
- Dissolved oxygen: ± 10 percent.

Field water quality measurements and depth-to-water measurements were recorded on a Well Purging-Field Water Quality Measurement Form. The groundwater samples were transferred in the field to laboratory-prepared sample containers and kept cool during transport to the testing laboratory. Chain-of-custody procedures will be observed from the time of sample collection to delivery to the testing laboratory consistent with the Quality Assurance Project Plan (QAPP).

Decontamination Procedures

The objective of the decontamination procedures was to minimize the potential for cross-contamination between sample locations.

Sampling equipment was decontaminated in accordance with the following procedures before each sampling attempt or measurement.

1. Brush equipment with a nylon brush to remove large particulate matter.
2. Rinse with potable tap water.
3. Wash with non-phosphate detergent solution (Liquinox® and potable tap water).
4. Rinse with potable tap water.
5. Rinse with distilled water.

Handling of IDW

Investigation derived waste (IDW), which consists mainly of decontamination/purge water, typically was placed in a Department of Transportation (DOT)-approved 55-gallon drum or 5-gallon buckets and transferred to Avista for disposal. Each container was labeled with the project name, exploration location, general contents, and date. The IDW was stored at Avista pending analysis and disposal.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

Sampler Symbol Descriptions

- 2.4-inch I.D. split barrel
- Standard Penetration Test (SPT)
- Shelby tube
- Piston
- Direct-Push
- Bulk or grab
- Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata

Approximate contact between soil strata

Material Description Contact

Contact between geologic units

Contact between soil of the same geologic unit

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

Key to Exploration Logs

Date Excavated	8/31/2018	Total Depth (ft)	12	Logged By	JML	Excavator	Spokane Environmental Solutions	Groundwater not observed
				Checked By	SHL	Equipment	Catapiller 330F Track Hoe	See "Remarks" section for caving observed

Surface Elevation (ft)	1900	Easting (X)	2488825.24	Coordinate System	WA State Plane North
Vertical Datum	NAVD88	Northing (Y)	264966.89	Horizontal Datum	NAD83 (feet)

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor	Notes
1900	0				GP-GM	Brown fine to coarse gravel with silt and sand, occasional cobbles (loose, moist)			Moderate caving observed
1899	1								
1898	2								
1897	3	▯	TP1(3-4)				NS	13.4	
1896	4								
1895	5					Grades to with boulders up to 2 feet in diameter/length at 5 feet bgs (native)			
1894	6								
1893	7						NS	0.0	
1892	8								
1891	9								
1890	10								
1889	11	▯	TP-1(11-12)				NS	0.3	
1888	12								

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-1

GEOENGINEERS

Project: Mission Service Center
Project Location: Spokane, WA
Project Number: 2522-079-01

Figure A-2
Sheet 1 of 1

Date Excavated	8/31/2018	Total Depth (ft)	12	Logged By	JML	Checked By	SHL	Excavator Equipment	Spokane Environmental Solutions Catapiller 330F Track Hoe	Groundwater not observed. See "Remarks" section for caving observed

Surface Elevation (ft)	1900	Vertical Datum	NAVD88	Easting (X)	2488795.55	Northing (Y)	264930.77	Coordinate System	WA State Plane North	Horizontal Datum	NAD83 (feet)

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor	Notes
1900–1899	0–1				GP-GM	Dark brown fine to coarse gravel with silt and sand, occasional cobbles and debris (brick, metal, plastic) (medium dense, moist)			Moderate caving observed
1897	3	I	TP-2(3-4)				NS	1.8	Two conduits on east side of pit (2 inch PVC)
1895	5					Grades to brown with occasional boulders up to 1½ feet			
1894	6					Increasing moisture			
1893	7						NS	0.0	
1891	9					Boulders up to 30 inches in diameter/length			
1889	11	I	TP-2(11-12)				NS	0.0	
1888	12								

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-2

GEOENGINEERS

Project: Mission Service Center
Project Location: Spokane, WA
Project Number: 2522-079-01

Date Excavated	8/31/2018	Total Depth (ft)	12	Logged By	JML	Excavator	Spokane Environmental Solutions	Groundwater not observed
				Checked By	SHL	Equipment	Catapiller 330F Track Hoe	See "Remarks" section for caving observed

Surface Elevation (ft)	1900	Easting (X)	2488742.79	Coordinate System	WA State Plane North
Vertical Datum	NAVD88	Northing (Y)	264832.89	Horizontal Datum	NAD83 (feet)

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graph Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor	Notes
	0				GP-GM	Brown fine to coarse gravel with silt and sand, debris (metal pipe, concrete, plastic, styrofoam, cinder blocks) (medium dense, moist)			Severe caving observed 10 feet of steel pipe (2-inch diameter) with thick black sludge inside; not connected at either end, runs east to west
1899	1								
1898	2								
1897	3	▯	TP-3(3-4)				NS	0.0	
1896	4								
1895	5								
1894	6								
1893	7								
1892	8								
1891	9								
1890	10						NS	0.0	
1889	11	▯	TP-3(11-12)				NS	0.0	
1888	12								

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-3

GEOENGINEERS

Project: Mission Service Center
Project Location: Spokane, WA
Project Number: 2522-079-01

Date Excavated: 8/31/2018	Total Depth (ft): 14	Logged By: JML Checked By: SHL	Excavator: Spokane Environmental Solutions Equipment: Catapiller 330F Track Hoe	Groundwater not observed See "Remarks" section for caving observed

Surface Elevation (ft): 1900 Vertical Datum: NAVD88	Easting (X): 2488772.13 Northing (Y): 264853.66	Coordinate System: WA State Plane North Horizontal Datum: NAD83 (feet)

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor	Notes
1900	0				GP-GM	Brown fine to coarse gravel with silt and sand, occasional cobbles and debris (brick, metal, plastic) (loose, moist)			Severe caving observed
1899	1								
1898	2								
1897	3								
1896	4						NS	0.0	
1895	5								
1894	6								
1893	7					Boulders up to 4 feet in diameter/length			
1892	8					Pipe, clay and metal debris (native)			
1891	9						NS	1.8	
1890	10						NS	2.0	
1889	11								
1888	12	Testing sample 12–13 ft	TP-4(1213)				NS	0.5	
1887	13								
1886	14								

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-4

GeoEngineers

Project: Mission Service Center
Project Location: Spokane, WA
Project Number: 2522-079-01

Figure A-5
Sheet 1 of 1

Date Excavated	8/31/2018	Total Depth (ft)	16	Logged By	JML	Excavator	Spokane Environmental Solutions	Groundwater not observed
				Checked By	SHL	Equipment	Catapiller 330F Track Hoe	See "Remarks" section for caving observed

Surface Elevation (ft)	Undetermined	Easting (X)	2488790.87	Coordinate System	WA State Plane North
Vertical Datum	NAVD88	Northing (Y)	264909.24	Horizontal Datum	NAD83 (feet)

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor	Notes
	0				GP	Brown fine to coarse gravel with trace silt and sand (loose, moist)			Severe caving observed
	3						NS	0.9	
	4				GP-GM	Grades to with silt	MS	4.0	Petroleum-like eavy odor
	9	▯	TP-5(9-10)				MS	2.6	
	16								

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-5

GEOENGINEERS

Project: Mission Service Center
Project Location: Spokane, WA
Project Number: 2522-079-01