ENGINEERING DESIGN REPORT
LIGNIN OPERABLE UNIT

Chlor-Alkali Remedial Action Unit of
Georgia-Pacific West Site
Bellingham, Washington

Prepared for: Port of Bellingham

Project No. 210368-A-05 • August 16, 2022 FINAL

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1 Introduction

This Engineering Design Report (EDR) describes the engineering concepts and design criteria for the final cleanup action selected by the Washington State Department of Ecology (Ecology) for the portion of the Georgia-Pacific (G-P) West Site (Site) referred to as the Lignin Operable Unit (OU) of the Chlor-Alkali Remedial Action Unit (RAU) (Figure 1). The Site is being cleaned up under the authority of the Washington State Model Toxics Control Act (MTCA), Chapter 70A.305 of the Revised Code of Washington (RCW), and the Model Toxics Control Act Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC).

The Port of Bellingham (Port) acquired the former G-P Mill property located at 300 West Laurel Street in Bellingham, Washington, in January 2005. In August 2009, Ecology and the Port entered into Agreed Order No. DE 6834 (Order), which required the Port to perform a Remedial Investigation (RI) and a Feasibility Study (FS) for the Site. The Site is defined by the extent of contamination caused by the release of hazardous substances from the former mill facility, which included a Chlorine Plant[1] and a Pulp and Tissue Mill, and associated facilities.

In August 2013, a Site-wide RI was completed (Aspect, 2013) and an amendment to the Order separated the Site into the Pulp/Tissue Mill and Chlor-Alkali RAUs, which are shown on Figure 1. The amended Order established independent timelines for cleanup of the two RAUs, which allowed for expedited cleanup and redevelopment at the Pulp/Tissue Mill RAU.

For the Pulp/Tissue Mill RAU, Ecology issued the final Cleanup Action Plan (CAP) in October 2014 (Ecology, 2014). In December 2014, the Port and Ecology executed Consent Decree No. 142027008 requiring cleanup of the Site (which included the Pulp/Tissue Mill RAU CAP as Exhibit C). Cleanup construction for the Pulp/Tissue Mill RAU was completed in 2016. Since then, monitoring of groundwater natural attenuation and inspection and maintenance of the environmental cap have been ongoing.

For the Chlor-Alkali RAU, Ecology issued the final CAP in September 2021 (Ecology, 2021). Since then, the Port has been conducting remedial design for cleanup of the Chlor-Alkali RAU under the Order.

The Lignin OU is an approximately 4-acre property located within the Chlor-Alkali RAU and at the corner of Cornwall and Laurel Streets (Figure 1). During G-P's operation of the pulp and paper mill, lignin, a byproduct of pulping, was converted into commercial lignin-containing products. No historical pulp/paper production processes occurred on the Lignin OU, although lignin waste liquors were stored in several aboveground storage

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[1] The terms "Chlor-Alkali Plant" and "Chlorine Plant" are used interchangeably.

tanks near the north[2] edge of the property. G-P used the Lignin Warehouse B, which occupied much of the Lignin OU (Figure 2), for storage of the finished lignin-containing commercial products until 2007. The Port demolished the Lignin Warehouse B in 2020.

The Chlor-Alkali RAU CAP-selected cleanup action for the Lignin OU included hard capping to contain soils contaminated with carcinogenic polycyclic aromatic hydrocarbons (cPAHs) that pose a direct contact risk for an unrestricted land use,[3] plus monitored natural attenuation (MNA) for dissolved chromium concentrations in groundwater.

Since 2019, the Port has been working with local development partners Mercy Housing Northwest and Millworks LLC to evaluate the feasibility of developing affordable/workforce housing and other mixed uses at the Lignin OU. In early 2019, Ecology selected the Port as a recipient of a Toxics Cleanup Healthy Housing Integrated Planning Grant (IPG) to fund early planning efforts for the integrated cleanup and redevelopment of the Lignin OU. In November 2021, Ecology issued an Affordable Housing Cleanup Grant to the Port to support remedial design and construction for the Lignin OU Affordable Housing Project. The preliminary plans for the Mercy Housing Northwest Affordable Housing Project will redevelop a portion of the Lignin OU with a total of 83 affordable housing units and childcare.

In March 2022, Ecology issued a minor modification to the Order, amending the Schedule of Deliverables to include preparation of a CAP and completion of a pre-remedial design investigation (PRDI) for the Lignin OU (termed PRDI 1), in addition to conducting remedial design for the Chlor-Alkali RAU outside of the Lignin OU.

Accordingly, PRDI 1 activities were conducted to inform the remedial design for a soil removal action at the Lignin OU, including additional soil characterization, installation of three additional monitoring wells, hydrogeologic testing to support excavation dewatering design, groundwater quality sampling, and test pitting to verify the presence and nature of subsurface features (not to conduct chemical sampling) for remedial design.

The subsequent sections of this EDR are therefore as follows:

- **Section 2 –** Pre-Remedial Design Investigation Results
- **Section 3 –** Remedial Action Objectives
- **Section 4 –** Contaminated Soil to be Removed
- **Section 5 –** Components of the Soil Removal Cleanup Action
- **Section 6 –** Overview of Groundwater MNA and Institutional Controls
- **Section 7 –** Permits and Substantive Requirements

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[2] For consistency with previous environmental reports for the GP West Site, this document uses the former Georgia-Pacific mill's "Mill north" as its directional reference, with "Mill-north" approximately 45 degrees west of true north (see north arrows on figures).

[3] Assuming a child's incidental ingestion of soil for a lifetime.

- **Section 8 –** Reporting of the Soil Removal Cleanup Action
- **Section 9 –** Schedule
- **Section 10 –** References

2 Pre-Remedial Design Investigation Results

This section describes the scope of work conducted as part of the PRDI 1, followed by an updated understanding of soil and groundwater quality and subsurface conditions pertinent to the engineering design of the soil removal action at the OU.

2.1 Scope of Work Conducted

In accordance with the PRDI 1 Project Plan (Aspect, 2022a), the following work was performed:

- Public and private utility locates to clear investigation locations and to map out utilities (January 13 and February 7, 2022).
- Supplemental soil sampling and analysis was conducted from 21 direct-push soil borings (LW-SB201 through LW-SB221) to a depth of approximately 15 feet on January 17 to 20, 2022. A hand-held x-ray fluorescence (XRF) spectrometer was used to estimate soil metals concentrations in real time.
- Three new monitoring wells (LW-MW02 through LW-MW04) were installed to a maximum depth of 15 feet on January 20, 2022, and developed along with the preexisting well LW-MW01.
- A professional survey of borings and monitoring wells was performed by Wilson Engineering on January 26 and 27, 2022.
- Groundwater sampling from all 4 monitoring wells was conducted in two rounds (January 24 and February 28, 2022)
- Hydraulic testing was performed at all four wells, including slug tests and continuous water level monitoring for approximately 9 days (January 24 to February 3, 2022)
- A desktop review of historical drawings for structures within the OU was performed, followed by test pits (LW-ATP-01 through LW-ATP-14 on February 8 and 9, 2022; LW-ATP-15 and LW-ATP-16 on April 21, 2022) to verify the presence and character of subsurface structures

The 24 new boring and well explorations included nine advanced through the floor slab of the former warehouse[4] and 15 outside of it at locations depicted on Figure 2. The soil borings and monitoring wells were completed using a direct push drill rig by a state-licensed resource-protection well driller from Cascade Drilling of Woodinville, Washington. The test pits were completed by RAM Construction of Bellingham, Washington. A field engineer from Aspect conducted geologic logging and soil sampling for the borings, wells, and test pits. In accordance with the Project Plan's Inadvertent Discovery Plan (IDP), Aspect's engineer watched for indications of potential

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[4] Concrete slab at these nine locations was cored prior to drilling. Thicknesses of the concrete slab are depicted on boring/well logs in Appendix A.

archaeological materials during logging of the soil cores and test pits. A thin layer of broken shell was observed at a depth of approximately 14 feet below grade during drilling of boring LW-SB217; the shell layer was evaluated as a shell midden and was determined by Drayton Archaeology to not be cultural material (Aspect, 2022b). Appendix A includes logs for the borings, monitoring wells, and test pit explorations.

At each of the boring locations, up to five soils samples were collected in accordance with the Project Plan. A hand-held XRF spectrometer was used to estimate chromium, copper, and zinc concentrations at approximate 2-foot intervals, and the readings are depicted on the boring logs (Appendix A). Field screening including odors, sheens, and photoionization detector (PID) readings are also depicted on the logs.

Table 1 presents well construction information (survey information and screen depth interval), along with groundwater depth and elevation data. Appendix A includes monitoring well construction logs. Wells LW-MW02 and LW-MW03 were placed in areas with elevated metals concentrations in soil as determined based on prior analytical data and the field XRF data from the PRDI 1 borings. Well development was performed at the four wells by surging the well screens, per the Project Plan. Stabilized field parameters measured during purging for the two groundwater sampling events are depicted in Table 3.

Soil and groundwater samples were submitted to Friedman & Bruya, Inc. in Seattle, Washington, an Ecology-accredited analytical laboratory, for analysis of one or more of the following constituents:

- Metals (soil: chromium, copper, and zinc; groundwater: dissolved cadmium, chromium, copper, zinc, and mercury)
- Polycyclic aromatic hydrocarbons (PAHs) (soil: throughout site; groundwater: only at LW-MW-04: analyzed for PAHs based on observed sheen during well installation)
- Diesel- and oil-range total petroleum hydrocarbons (TPH-Dx) (soil and groundwater: only at LW-MW-04; analyzed for TPH-Dx based on observed sheen during well installation)

Aspect conducted independent quality assurance validation of the PRDI 1 analytical data to ensure data usability for remedial design. All data were determined to be usable for their intended purposes, and no data were rejected. Analytical results packages and data validation reports for the PRDI 1 analytical data are included in Appendix B.

The data collected during the PRDI 1 and previously were evaluated relative to cleanup levels that were subsequently established in the Lignin OU CAP (Ecology, 2022), which, because the Lignin OU is part of the Chlor-Alkali RAU, are taken from the Chlor-Alkali CAP (Ecology, 2021). In accordance with the Lignin OU CAP, groundwater cleanup levels are protective of discharge to marine sediment and water as the highest beneficial use of groundwater throughout the entire Site.

Soil cleanup levels are protective of both soil direct contact under an unrestricted land use and leaching to groundwater to protect its highest beneficial use. The planned soil removal action outlined in this report will achieve soil cleanup levels for unrestricted direct contact and will partially remove soil exceeding soil cleanup levels for protection of groundwater to accelerate the restoration timeframe for groundwater.

A supplemental goal of the PRDI 1 was to delineate and characterize subsurface structures and utilities that may need to be removed, cut or capped within the planned cleanup action soil removal extents. This was achieved with the following efforts:

- Aspect conducted a desktop review by reviewing readily available G-P historical drawings for structures (especially foundation elements), utilities, and process piping within the OU in January and February 2022. Based on this information and mapped occurrences of concrete structures, test pits were located to verify the location and character of the remnant subsurface structures.
- Two private utility locates and two public locates were performed, one prior to the boring /well drilling program and a second prior to the test pit program. Aspect coordinated with the Port on utility locates and made use of existing figures showing known utilities.
- Following the desktop review and second utility locate, Aspect directed excavation of 16 test pits (LW-ATP1 through LW-ATP-16[5]; Figure 2) to observe the various foundations (thickness, depth, and evidence of potential obstructions that could complicate soil removal, such as pilings) and to document for planning and construction specification purposes. All excavated soils were backfilled into the test pit and lightly compacted by tamping with the backhoe bucket. For pits where the removed asphalt could not be readily fit back into the excavation, some asphalt was left piled next to the excavation (pending removal in planned soil cleanup action). Test pit logs are included in Appendix A.
- Locations of subsurface structural features were captured using a hand-held global positioning system (GPS) device and by marking up maps.

Field procedures including environmental sampling and analysis were performed in accordance with the PRDI 1 Project Plan's Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) (Aspect, 2022a). Aspect's field engineer also conducted the field work in accordance with Aspect's site-specific Health and Safety Plan that included hygiene and social distancing protocols specific to COVID-19.

Purge and decontamination water from the PRDI 1 was disposed of at the Port's on-property stormwater pump station. Soil cuttings from drilling and sediment-laden water from drilling decontamination were contained in two 55-gallon drums, and, once analytical data were available, were profiled and disposed of offsite as non-hazardous waste by DH Environmental under subcontract to Aspect on February 2, 2022.

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[5] Test pits LW-ATP-15 and -16 were conducted to verify the presence of City raw water lines in a second mobilization.

2.2 Topography and Surface Conditions

As shown on Figure 2, the current topography within the Lignin OU slopes gently toward the northwest, from maximum elevations of 20 to 21 feet above the North American Vertical Datum of 1988 (NAVD88) along the southern boundary to a minimum elevation just below 15 feet NAD88 along the historical railroad spur in the northwest corner. The majority of the current grade is covered by either asphalt pavement or remnant concrete structures (e.g., floor slab of the former Lignin Warehouse B, tank pads, etc.); crushed rock/gravel surfacing with minor vegetation covers the rest of the surface. In addition, a pair of historical railroad spurs are present in the northwest and southeast areas of the OU; the metal rails remain in place on the southeastern spur but not on the northwestern spur.

2.3 Subsurface Conditions

This section describes the current understanding of the geologic and groundwater conditions underlying the Lignin OU based on the prior and current investigations.

2.3.1 Geology

Material underlying the Lignin OU is characterized by fill placed over a wedge of unconsolidated materials all overlying the generally southwestward-sloping bedrock surface, as described below.

Fill

The entirety of the Site including the Lignin OU was built on land formed by historical filling of a tidal flat area of the Whatcom Creek Delta starting in the early 1900s. The fill material comprising the Lignin OU primarily includes dredge fill placed hydraulically during 1912 and 1913 by the U.S. Army Corps of Engineers (Aspect, 2020).

Fill material observed during the exploration activities consists primarily of silty sand (SM) with variable gravel and fines contents. Fragments of debris consisting of woody material or bricks were commonly encountered within the fill. The collective explorations indicate fill material extending to depths of about 5 to 12 feet below the ground surface (bgs) across the Lignin OU, corresponding to approximate elevation 8 to 13 feet above the North American Vertical Datum of 1988 (NAVD88).

The fill material has low shear strength, high compressibility, moderate hydraulic conductivity, and is susceptible to liquefaction.

Beach/Intertidal Deposits

Underlying the fill is a sequence of native marine beach/intertidal deposits ranging from about 10 to more than 35 feet thick. The beach/intertidal deposits generally consist of very loose to loose, sand (SP) or silty sand (SM) and commonly stratified with clay, sandy clay, or gravelly clay (CL). Most borings at the Lignin OU (about 15-feet-deep) have terminated in these deposits.

Beach/Intertidal deposits have low shear strength, moderate compressibility, low to moderate hydraulic conductivity, and are susceptible to liquefaction.

Chuckanut Formation Bedrock

The unconsolidated soil units pinch out to the north and east of the Lignin OU to bedrock of the Chuckanut formation consisting of sandstone, shale, conglomerate, and coal (GeoEngineers, 2007).

GeoEngineers (2007) describes the Chuckanut formation bedrock encountered within the vicinity of the Lignin OU to consist of weathered sandstone that varied from friable decomposed rock to a less decomposed, sound rock. GeoEngineers (2007) stated that the bedrock could be drilled with a mud-rotary tri-cone bit; however, it was difficult to penetrate using a hollow-stem-auger drill rig. To our knowledge, rock-coring methods of explorations have not been conducted in the vicinity of the Lignin OU.

Bedrock surface elevations were estimated across the Lignin OU based on previous mapping by W.D. Purnell and Associates (1977) and supplemented by boring data from GeoEngineers (2007 and 2021) and this 2022 investigation. The bedrock surface is estimated to be at a maximum elevation of around 4 feet NAVD88 near the southeastern boundary of the OU (at LW-SB217) and a minimum elevation of around -40 feet NAVD88 in the northwestern portion of the OU. These elevations correspond to depths of about 15 feet bgs near the southeastern boundary and about 50 feet bgs near the northwestern boundary of the Parcel, indicating a steep northwestward-sloping bedrock surface.

Although bedrock in the Lignin OU generally slopes down to the northwest, based on recent cone penetration tests (CPTs) at the OU, the bedrock surface is depressed in the area beneath the center of the warehouse slab, and slopes gradually upward towards the northwest, and steeply upward towards the southeast from that depression (GeoEngineers, 2021). The last page in Appendix A is a bedrock elevation map from the GeoEngineers (2021) report, which has been annotated to add the LW-SB217 data point generated from the more-recent PRDI drilling.

The Chuckanut formation typically has little primary porosity and limited groundwater movement through fractures. Chuckanut formation bedrock has high shear strength, very low compressibility, and is not susceptible to liquefaction.

2.3.2 Groundwater Conditions

Groundwater in the Lignin OU's four monitoring wells has been measured at depths ranging from about 3 to 7 feet bgs, representing a groundwater elevation of about 10 to 14 feet NAVD88 (Table 1). Based on the groundwater elevation mapping, groundwater in the Lignin OU's shallow unconfined water-bearing zone flows generally mill-northwestward with probable discharge into permeable bedding materials within the large-scale utility corridor beneath Laurel Street (Figure 5). This interpretation from Lignin OU data is consistent with that developed from Site-wide data in the RI, which indicated that the utility corridor beneath Laurel Street serves as a preferential groundwater flow pathway (Aspect, 2013).

Continuous water level monitoring data plots show that the Lignin OU groundwater has little to no tidal influence (See Figure C-1 in Appendix C). Water level monitoring across the broader Site indicates seasonal water table fluctuations of 2 to 3 feet typically. The hydrograph for 2022 water levels at the four OU monitoring wells, included on the bottom of Table 1, demonstrates an approximately 1.5- to 3-foot drop in groundwater levels between late-January and late-April, followed by a rise of about 0.5 to 1.5 feet between late-April and late-June in response to greatly above-normal precipitation in that period.

Based on slug testing analysis, the bulk hydraulic conductivity values for wells LW-MW01 through LW-MW04 range from 2 to 16 feet/day (6 x 10^{-4} to 6 x 10^{-3} cm/sec), respectively, with an aquifer-wide geometric mean of 5 feet/day (2 x 10^{-3} cm/sec). Appendix C provides more detail on the hydraulic testing analysis.

2.4 Soil Quality

Contaminants exceeding cleanup levels in Lignin OU soil include carcinogenic polycyclic aromatic hydrocarbons (cPAHs) and selected metals. Other PAHs and diesel- and oil-range total petroleum hydrocarbon (TPH) concentrations[6] were below cleanup levels in each of the 18 soil samples collected in August 2020 (Table 2B).

Figures 3 and 4 show the spatial distribution of locations with detected cPAH and metals concentrations exceeding soil cleanup levels. The spatial distributions of cPAHs and metals in soils are outlined below.

2.4.1 cPAHs

Total cPAH (TEQ[7]) concentrations exceeding the 0.19 mg/kg cleanup level were detected predominantly in shallow soils (upper 2 feet) within the following areas of the OU (Figure 3):

- On the north side of the former warehouse and around the historical railroad spur (0.36 to 29 mg/kg, and 0.81 to 1 mg/kg)
- Beneath one area of the former warehouse (0.21 mg/kg)
- On the west side of the former warehouse (0.21 to 0.47 mg/kg)

The only sample location for which a cPAH exceedance was reported at a depth greater than 4 feet was the 2004 boring LW-SB03 located near the northeast corner of the former warehouse (1.0 mg/kg in the 4-to-8-foot-depth sample; Table 2A). However, review of the well log from that boring indicates poor recovery of soil in both the 0- to 4-foot and 4- to 8-foot cores from this boring. This information, coupled with the more reliable data for cPAH vertical distribution derived from the tens of cPAH samples with 1-foot depth intervals collected in 2020 and 2022 within very close proximity, indicates that the reported cPAH exceedance in that deep soil sample was likely an artifact of the sampling procedure.

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[6] Reported TPH concentrations are the summation of diesel- and oil-range concentrations in accordance with Ecology policy.

[7] Total toxic equivalent concentration of benzo(a)pyrene calculated in accordance with MTCA (WAC 173-340-708(e)). All subsequent references to cPAH concentrations represent total cPAH (TEQ) concentrations.

The highest detected cPAH concentrations occur in shallow soils adjacent to the railroad spur on the north side of the former warehouse (Figure 3) and are likely attributable to creosote-treated railroad ties on the spur. cPAHs are known to be broadly distributed in urban soils at concentrations exceeding the 0.19 mg/kg soil cleanup level (e.g., refer to Ecology, 2011[8]), and cPAH concentrations in soils away from the railroad spur are likely attributable to the long-term industrial use of the parcel and not a specific point source.

The foundations for the historical warehouse and tank pads are supported by wooden pilings that, given their age, were likely treated using creosote or similar preservative. Of the eight soil borings advanced through the warehouse slab, with soil samples from multiple depths, only one soil sample had a marginal cPAH exceedance (0.21 mg/kg, versus the 0.19 mg/kg cleanup level). That data, in combination of lack of detectable cPAHs in groundwater at wells along the downgradient boundary of the OU described below, indicate empirically that the wooden pilings (treated or not) are not a source of cPAHs to the environment.

Based on the current data, Figure 3 depicts the current estimated extent of cPAH-contaminated soils within the Lignin OU. The extent of cPAH exceedances in soil is generally vertically and laterally bounded.

The soil cleanup level for total cPAHs (TEQ) (0.19 mg/kg) in unsaturated and saturated soils[9] is based on human direct contact with soils.[10] The detected cPAHs in some soil samples also exceed higher concentrations predicted by a conservative three-phase partitioning model to pose a risk via leaching to groundwater (6.2 mg/kg for unsaturated soil, 0.31 mg/kg for saturated soil; Aspect, 2013). However, cPAHs are hydrophobic compounds with low solubility and mobility in the environment, particularly in soils with relatively high organic carbon content as exist beneath the Lignin OU. Consistent with those characteristics, cPAHs were not detected in the groundwater samples collected from monitoring well LW-MW01 located along the Parcel's western boundary or monitoring well LW-MW04 located in the southwest of the OU (Table 3), indicating that the cPAH concentrations in soil are protective of groundwater in accordance with MTCA (WAC 173-340-747(9)).

cPAH concentrations in Lignin OU soil pose a risk for soil direct contact for the planned residential land use but do not pose a leaching risk to groundwater. This is consistent with the determination made in Ecology's CAP for the Chlor-Alkali RAU, which included a cleanup action to address direct contact risk posed by cPAHs in soil but included no cleanup action or monitoring to address cPAHs impacts to groundwater.

2.4.2 Sheen and Odor Observed at LW-MW04

During drilling of LW-MW04 in the northwest corner of the Lignin OU, dark soil with wood debris was observed near the base of the fill (5- to 6-foot depth interval). The field

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[8] Based on 120 samples of soil from residential parcels throughout Seattle, the 90th percentile total cPAH (TEQ) concentration was 0.39 mg/kg.

[9] Unsaturated and saturated soils occur above and below, respectively, the groundwater table.

[10] Soil cleanup levels based on direct contact apply to soil to a depth of 15 feet as per MTCA.

geologist observed a sheen on water draining from the soil core, a low detection (0.7 units) on the PID, and a chemical-like odor.

The 5- to 6-foot soil sample and the underlying sample of native soil (7.5 to 8.5 feet) were analyzed for PAHs and, given the field screening information, also for diesel- and oil-range organics by NWTPH-Dx.

There were no detectable diesel- or oil-range organics and no PAH concentrations exceeding cleanup levels in either soil sample (all PAH concentrations were at or below 0.013 mg/kg; Table 2A).

The groundwater data from this well indicated the presence of polar organic compounds but no TPH or PAH exceedances, as discussed in Section 2.5.

2.4.3 Metals

The heavy metals cadmium, copper, nickel, and zinc were detected in one or more Lignin OU soil samples at concentrations exceeding respective soil cleanup levels, all of which are based on soil leaching to groundwater[11] (not direct contact[12]). However, one soil sample contained a zinc concentration that also exceeded a higher cleanup level based on direct contact, as described below. Thirty of the 37 locations sampled have an exceedance of one or more metals in one or more soil samples as indicated on Figure 4.

The cadmium and nickel exceedances are collocated with copper and/or zinc exceedances in shallow soil, except for the 11 mg/kg cadmium exceedance in shallow soil at the LW-MW01 location (Table 2A; Figure 4). Cadmium was not detected in the 2022 groundwater sample from well LW-MW01, consistent with the lack of cadmium exceedances measured in 2009-2010 groundwater sampling at that well (Table 3). The groundwater data indicate empirically that the elevated soil cadmium concentration in that location is protective of groundwater in accordance with MTCA.

Nickel concentrations in Lignin OU soils comply with the 48 mg/kg cleanup level applying the MTCA 3-fold compliance criteria—no sample concentrations are greater than 2 times the cleanup level, less than 10 percent of the sample concentrations exceed the cleanup level, and the 95 percent upper confidence on the mean concentration (32 mg/kg calculated using MTCAstat software) is less than the cleanup level (WAC 173-340-740(7)(d) and (e)). No nickel exceedances were detected in the 2009 and 2010 groundwater samples collected from well LW-MW03 (Table 3).

All detected concentrations of total chromium[13] are less than its soil cleanup level. The highest concentrations of total chromium (722 to 1,560 mg/kg) in soil were detected in shallow soils at the LW-SB03, LW-SS03, and LW-SS04 locations in the vicinity of the

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[11] Using the MTCA methodology, soil concentrations protective of groundwater for the metals cadmium, hexavalent chromium, copper, nickel and zinc (saturated soil only) are calculated/predicted to be below natural background soil concentrations and thus are set at natural background in accordance with MTCA.

[12] The corresponding MTCA Method B soil cleanup levels based on unrestricted direct contact for Lignin OU metals of concern are 80 mg/kg cadmium, 120,000 mg/kg trivalent chromium, 3,200 mg/kg copper, 1,600 mg/kg nickel, and 24,000 mg/kg zinc.

[13] Includes trivalent plus hexavalent species of chromium.

conveyor and dry product storage tanks and the railroad spur on the north and east sides of the warehouse. While total chromium concentrations are elevated at these locations, hexavalent chromium was only detected in 3 of 15 samples and the detected concentrations were at or below 0.6 mg/kg—two orders of magnitude below the 48 mg/kg soil cleanup level.

The lack of detectable hexavalent chromium is consistent with it not having been handled on the Lignin OU. As discussed in Aspect (2004), hexavalent chromium was also not present at concentrations of concern where it was handled in the Lignin Plant, north of the BNSF railroad. This is not unexpected given that hexavalent chromium (Cr^{+6}, the oxidized form) is rapidly reduced to trivalent chromium (Cr^{+3}) in geochemically reducing conditions (EPA, 1994) such as exist in the dredge fill throughout the Site. As such, trivalent chromium is the chromium species of potential concern at the Lignin OU.

Of the various metals detected, copper and zinc have the most widespread exceedances within the Lignin OU soils. Given the historical use of the parcel, no specific industrial-process sources for metals contamination are identified. However, concentrations of copper and zinc are commonly elevated in urban soils as a result of vehicle traffic (copper in brake pads, zinc in tires) as well as building materials (copper in plumbing and wiring, zinc in galvanized metal).

Copper concentrations exceeding the 36 mg/kg soil cleanup level were detected in 39 of the 100 samples. Copper concentrations greater than two times the cleanup level (72 mg/kg) are widespread, as Figure 4 illustrates. The maximum copper concentration (954 mg/kg) occurred in shallow soil at LW-SB214 on the north railroad spur.

Zinc concentrations exceeding soil cleanup levels (100 mg/kg for unsaturated soil; 85 mg/kg for saturated soil) were detected in 28 of the 98 samples, with concentrations greater than two times the respective cleanup levels being widespread as Figure 4 illustrates. The maximum zinc concentration (152,000 mg/kg) occurred in shallow soil (1-2 feet bgs) at LW-SB202. This exceedance is the only location where metals concentrations exceeded a direct contact cleanup level (the MTCA Method B soil cleanup level for zinc based on unrestricted direct contact is 24,000 mg/kg).

As stated above, the most stringent soil cleanup levels for metals are based on soil leaching to groundwater with groundwater cleanup levels protective of marine surface water and sediment. As discussed in Section 2.5, chromium and copper were the only metals detected in Lignin OU groundwater at concentrations exceeding groundwater cleanup levels during the most recent rounds (2022) of sampling, suggesting that the concentrations of metals other than chromium in Lignin OU soil are protective of groundwater in accordance with MTCA (WAC 173-340-747(9)).

2.5 Groundwater Quality

Figure 5 depicts the locations of groundwater exceedances detected during the most recent (January and February 2022) sampling events, along with the interpreted groundwater elevation contours and flow direction for the Lignin OU.

During the 2004 groundwater sampling of well LW-MW01, PAHs, other SVOCs, VOCs, PCBs were generally not detected, and the concentrations detected were less than cleanup levels. Although each of the heavy metals analyzed in the groundwater sample from LW-MW01 in 2004 exceeded cleanup levels[14], the 2009-2010 groundwater data from well LW-MW01 showed substantial improvement in metals concentrations, with only a chromium exceedance. Given the single well sampled and age of the groundwater data, the PRDI 1 included additional groundwater quality sampling to verify current dissolved metals concentrations.

The most recent sampling results from 2022 show that the only metal exceedances in groundwater from the four OU monitoring wells were chromium at interior well LW-MW02 in January 2022, and copper at wells LW-MW02 and LW-MW03 in February 2022. Notably, mercury was not detected in any wells sampled[15], and cadmium was not detected at well LW-MW01 where an elevated cadmium concentration (11 mg/kg) was detected in soil during the 2004 investigation.

None of the metals exceedances were reproduced in the two groundwater sampling events, and each exceedance was less than two times the cleanup level. The dissolved chromium concentrations at well LW-MW01 declined from nearly 1,200 µg/L when measured in 2004 to an average of about 30 µg/L when measured in 2022. Likewise, dissolved copper and zinc concentrations declined substantially at this well over the same time period, as illustrated on Figure 6. No time-trend analysis can be conducted for the other three monitoring wells on the OU because they were only sampled in 2022. The reduction in dissolved metals concentrations at well LW-MW01 occurring over time is consistent with the groundwater MNA remedy selected for the Lignin OU in the Chlor-Alkali RAU CAP. The dissolved metals exceedances are largely attributable to natural geochemically reducing conditions that enhance the mobility of metals in the shallow water-bearing unit, as is observed throughout the entire Site.

Groundwater pH at LW-MW01 has historically shown exceedances of the pH 8.5 cleanup level, in 2004 (pH 10.8) and 2010 (pH 8.9). Given the historical warehouse operations on the Lignin OU, the cause of the elevated pH at this location is not known. The most recent sampling events at all four OU monitoring wells showed no exceedances of pH, with pH measured between 7.0 and 7.4 (Table 3).

Diesel- plus oil-range organics were detected below the cleanup level of 2,100 µg/L at monitoring well LW-MW04, at a concentration of 2,040 µg/L in January 2022. Following discussion with the laboratory regarding the nature of the January detection, the February 2022 sample was run using a silica gel/acid wash cleanup. Following the

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[14] The reporting limit for hexavalent chromium was above the groundwater cleanup level (Aspect, 2004), but subsequent samples collected in 2009 and 2010 confirmed no concentrations above the cleanup level (Table 3). The higher metals concentrations detected in 2004, right after the LW-MW01 well was installed, may have been due to lingering effects from drilling, as reflected by elevated turbidity (252 nephelometric turbidity units [NTU]) and total suspended solids (56 mg/L) in the groundwater sample (Table 3).

[15] Mercury analysis for groundwater from well LW-MW04 was added to the PRDI Project Plan to verify whether groundwater mercury contamination associated with the Laurel Street Pipe Rack Area (part of Chlor-Alkali RAU; Aspect, 2013) is present on the Lignin OU. During the first groundwater sampling event, the laboratory inadvertently analyzed the samples from all four wells for mercury (Table 3).

cleanup step, no oil-range organics were detected and the diesel-range organics concentration was 52 µg/L, with a summed diesel + oil concentration below the cleanup level (Table 3).

According to the laboratory, the material that passed through the silica gel is petroleum in nature and shows a pattern and boiling range consistent with diesel/heating oil. The material that did not pass through the silica gel is polar (non-hydrocarbon) in nature, and therefore that fraction is either biogenic or a fuel metabolite (Erdahl, 2022). Very low concentrations of PAHs were detected at this well during both 2022 events, but all were well below the cleanup levels (Table 3). Hydrocarbon concentrations in LW-MW04 groundwater are less than cleanup levels, consistent with soil concentrations at that location meeting cleanup levels (Tables 2A and 2B).

In summary, downgradient wells LW-MW01 and LW-MW04 did not have any exceedances for any constituent during the most recent sampling.

2.6 Subsurface Structure/Utility Findings

The following structures and utility pipes were documented within the Lignin OU during the PRDI 1 desktop review, utility locates, and test pits:

- Inactive utilities
    - A water sprinkler line (8-inch diameter cast iron pipe) and a 6-inch PVC drain pipe located on the west side of the warehouse slab, approximately 5 feet below grade (LW-ATP-13).
    - A 4-inch diameter concrete pipe running parallel to the building, on the northwest side of the warehouse slab, at a depth near the water table at time of test pit excavation (LW-ATP-9).
    - 10-inch cast iron pipe and 4-inch PVC footing drain along the northern side of the warehouse slab (LW-ATP-7).
    - Storm drain catch basins, 8-inch fiberglass pipe, and 4-inch PVC footing drain adjacent to the tank pads in the northwestern corner of the OU (LW-ATP-3).
- Concrete floor slab of the historical warehouse ranging in thickness from approximately 5 to 12 inches. Based on 8 concrete cores for borings performed within the slab footprint, the slab is an average thickness of approximately 9 inches. In addition, vertical concrete retaining walls extending to depths of nearly 6 feet bgs exist around west and -south portions of the warehouse perimeter.
- A metal lift-gate mechanism for the historical loading dock at the warehouse's northwest corner.
- Concrete foundation elements for historical tanks and ancillary structures ranging in thickness from approximately 1 foot to 3 feet.
- Asphalt pavement ranging in thickness from approximately 3 inches to as much as 14 inches.

- A railroad spur (metal rails with wooden railroad ties) extending from the warehouse to the property boundary in the eastern portion of the OU. The metal rails along the northern portion of the OU were previously removed.

Information regarding thickness and nature of subsurface structures as observed at the 16 test pit locations is included in the test pit logs in Appendix A.

Several active utilities (sanitary sewer, natural gas, potable water, and raw water) are present within the utility easements on the south and west sides of the OU. The one known active utility within the planned area of cleanup excavation is a subsurface stub-out pipe to the City of Bellingham storm drain located near the northwestern corner of the OU. The currently understood subsurface utilities are depicted on Figure 2.

3 Remedial Action Objectives

In accordance with the CAP, the remedial action objectives (RAOs) for the Lignin OU are as follows:

1. Permanently remove cPAH- and zinc-contaminated soils to achieve cleanup levels for unrestricted soil direct contact, which are listed in Table 4. This will eliminate the need for engineering and institutional controls with respect to soil direct contact exposure for the planned residential redevelopment with childcare.
2. Remove metals-impacted soil source material to enhance natural attenuation of metals contamination in groundwater and reduce the groundwater restoration timeframe.
3. Prevent discharge of metals-contaminated groundwater from the Lignin OU to the Whatcom Waterway.

An overview of the planned groundwater MNA program for the Lignin OU is included in Section 6. The detailed monitoring approach will be described in the Compliance Monitoring Plan for Groundwater MNA to be prepared under separate cover.

4 Contaminated Soil to be Removed

This section describes the soil excavation to achieve RAOs 1 and 2 described above. The estimated extents of soil exceeding direct contact cleanup levels and the metals-impacted soil for source control that will be excavated are depicted in plan view on Figure 7, and in cross sections on Figures 8, 9, and 10 (cross section locations are shown on Figure 7).

4.1 Excavation to Achieve Cleanup Levels for Unrestricted Direct Contact

The cleanup will include excavation and off-site disposal of an estimated 5,300 tons of soils containing concentrations of cPAHs and/or zinc greater than soil cleanup levels for unrestricted direct contact. Soils in the following areas will be excavated to meet the direct-contact RAO (Figure 7):

- cPAH-contaminated soils extending to an estimated depth of 2 feet in areas north of the historical warehouse including the entire rail spur there, at the west end of the warehouse, beneath a portion of the warehouse, and along the rail spur extending northeastward from the warehouse.
- The localized occurrence of zinc-contaminated soils in the southwest portion of the OU extending to the fill-native soil contact at an estimated depth of approximately 4 feet.

Once the compliance sampling for these excavation areas demonstrates that the direct-contact cleanup levels have been achieved for the OU, the excavation areas will be backfilled to the design grades within the subsequent redevelopment and to existing grades outside of the redevelopment area.

4.2 Excavation for Metals Source Removal

The cleanup will also include removal and off-site disposal of an estimated 10,100 tons of metals-impacted soils requiring excavation to achieve subgrade elevations for the affordable housing redevelopment. Removing those soils will permanently reduce the mass of metals contamination and thereby reduce the restoration timeframe for metals concentrations in the OU’s groundwater.

Using the existing sample data for the fill soils throughout the Lignin OU, we estimate an initial (existing) mass of the combined metals of concern (chromium, copper, and zinc) of approximately 98,000 kilograms (kg). Using the sample data representing fill soils planned for removal in the cleanup action, we estimate that the planned cleanup will remove nearly 72,000 kg of the combined metals, which equates to an estimated metals mass removal of approximately 73 percent. Appendix D presents the methods and results of the mass removal calculations.

These metals excavation areas will be backfilled as needed to meet the design grades for the subsequent redevelopment. For excavations greater than 4 feet in depth, additional clean borrow material will be placed temporarily to reduce physical safety hazards until redevelopment construction occurs in those locations, as described in Section 5.6.

5 Components of the Soil Cleanup Action

This section describes the primary components of the Lignin OU soil cleanup action.

5.1 Mobilization and Site Preparation

Prior to the start of cleanup construction, the Port's selected Contractor will prepare and submit for Port approval the following pre-construction submittals:

- **A Stormwater Pollution Prevention Plan (SWPPP)** describing erosion, sedimentation, and stormwater control Best Management Practices (BMPs) to be installed to manage and prevent stormwater runoff and fugitive dust emissions from leaving the construction site. The SWPPP and BMPs will be implemented by the Contractor and comply with City of Bellingham requirements throughout completion of the soil removal action.
- **Excavation and Water Management Plan** that describes in detail the Contractor's planned means and methods for means and methods for soil excavation, obstruction removal and size reduction, materials handling and stockpiling on-site, loading and off-site transportation of excavated materials, excavation backfill and compaction, as well as excavation dewatering, collection of runoff within the stockpile area, and treatment and discharge of water generated from excavation dewatering and from the stockpile area to comply with applicable permit requirements. The plan will also identify the permitted off-site facilities for disposal or recycling of materials generated during the soil removal action.

Cleanup mobilization and preparation activities include:

- Mobilize construction equipment, materials, and utilities (e.g., electrical generators).
- Mobilize, install, and test a water management equipment as necessary (refer to Section 5.4).
- Construct a bermed and lined stockpile area(s) for contaminated soil pending transportation for off-site landfill disposal and a separate stockpile area for inert debris pending transportation for off-site recycling.
- Construct stormwater, erosion, and sedimentation controls, including installation of a stabilized construction entrance, to ensure that no materials track-out and no construction stormwater leaves the OU property throughout the cleanup earthwork, in accordance with the SWPPP.
- Decommission the four monitoring wells on the OU in accordance with the provisions of Chapter 173-160 WAC.
- Establish perimeter fencing for site security.

The construction entrance will be established at the existing entrance to the property from Laurel Street (Figure 7). Warning signs notifying pedestrians of the construction entrance will be posted on the sidewalk on both sides of the entrance. Pedestrian access on the Laurel Street sidewalk and bicycle path will not be rerouted during the cleanup construction. However, the cleanup contractor will be required to have a flagger at the construction entrance to alert and temporarily halt pedestrians on the sidewalk and bicyclists on the bike path when their construction vehicles enter and exit the construction site. Trucks used for the cleanup construction will be required to follow City-designated truck routes when driving to and from the construction entrance.

5.2 Contaminated Soil Excavation, Segregation, and Stockpiling

The majority of the planned contaminated soil excavation will extend to depths of 2 feet below grade, with localized excavations planned to a maximum depth of 7 feet (Figure 7)[16]. For the excavations removing soils to comply with direct-contact cleanup levels, verification soil samples will be collected from the excavation sidewalls and floor to confirm that the OU soils comply with the cPAH and zinc cleanup levels for direct contact. Because the additional metals-impacted soils are being removed to reduce the total mass of metals in OU soils, and not to achieve a specific cleanup level for metals, verification sampling will not be conducted for those excavation areas. Details regarding the excavation verification soil sampling and analysis will be presented in the forthcoming Compliance Monitoring Plan (CMP) for the Lignin OU Soil Removal, which will be reviewed and approved by Ecology prior to cleanup construction.

Where the concentration of cPAHs or zinc in an excavation sidewall sample exceeds the direct contact cleanup level, the length of sidewall represented by the sample will be over-excavated a minimum 1 foot laterally, if feasible, and a new sidewall verification sample will be collected. Likewise, where the concentration in an excavation bottom sample exceeds the cleanup level, the excavation will be deepened in the area represented by the sample by a minimum 0.5 foot, if feasible, followed by collection of a new bottom verification sample.

5.2.1 Segregation of Excavated Soil

The excavated contaminated soils will be segregated into the following three waste streams from the point of excavation through offsite disposal at a permitted landfill:

1. **Class 3 Soil.** The soils excavated to comply with direct contact cleanup levels may be disposed of either at a Subtitle D landfill or as Class 3 soils at Cadman’s Everett facility where the soils would undergo thermal treatment followed by disposal in the facility’s inert landfill. The estimated quantity of Class 3 soils is 4,900 tons.

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[16] Because the affordable housing redevelopment subgrade design is in process, the excavation depths depicted on Figure 7 may change somewhat by the time that the cleanup construction plans and specifications are finalized.

2. **Class 2 Soil**. The estimated 10,100 tons of additional metals-impacted soils may be disposed of either at a Subtitle D landfill or as Class 2 soils at Cadman's Everett inert landfill.
3. **Subtitle D Material**. Soils along the eastern end of the northern rail spur, as identified on Figure 7, contain cPAH concentrations exceeding Cadman's acceptance criteria for Class 3 soils, and therefore must be disposed of at a Subtitle D landfill. This waste stream will also include contaminated debris (e.g., treated wood railroad ties or piling fragments) that is not acceptable for disposition at the Cadman-Everett facility. The estimated quantity of Subtitle D Material to be excavated is 400 tons.

The choice of facility for disposal of Class 2 and Class 3 soils will be decided by the Contractor selected by the Port to conduct the Lignin OU cleanup construction.

5.2.2 Stockpile Management

If temporary stockpiling of excavated materials is needed during the cleanup activities, it will be stockpiled within a designated stockpile area in a location on the OU that will not hinder completion of the cleanup activities. The location of the stockpile area may change through the course of construction if needed. Materials will be transported within the cleanup work area in a way to limit spillage of materials between the excavation location and the stockpile location.

Within the designated stockpile area, stockpiles of contaminated soil with debris will be segregated from stockpiles of inert debris such that intermixing does not occur. Each stockpile will be underlain by plastic sheeting with a minimum 10-mil thickness, with adjacent sheeting sections continuously overlapped by a minimum of 3 feet. The ground surface on which the sheeting will be placed will be free of objects that could damage the sheeting. In addition, a layer of geotextile or plywood will be required on top of the sheeting to protect it. The stockpile area perimeter will be bermed to prevent stormwater run-on into, or runoff out of, the stockpile area.

Each stockpile will be covered when not in active use by plastic sheeting of minimum 10-mil thickness to prevent precipitation from entering the stockpiled material. Each stockpile cover will be anchored (e.g., using sand bags) sufficiently to prevent it from being removed by wind. All stockpiles will be covered when not in use, and as needed, during periods of rain and wind to prevent transport of soil.

Water accumulating in the stockpile area will be pumped to the on-site water management system described in Section 5.4.

5.3 Structural Obstruction Removal

Because the remnants of historical structures are located on top of and adjacent to contaminated soils being removed. an estimated 7,600 tons of structural materials will be removed during the cleanup action. The structural elements include but are not limited to asphalt surfacing, the warehouse concrete floor slabs, retaining walls, stem walls, metal lift-gate apparatus, concrete tank pads and ancillary structures, wooden pilings supporting concrete foundations, metal rail spurs and associated wooden ties, and pipes of various sizes and materials.

The structural materials will be removed and resized as needed so that they can be handled and transported for offsite recycling or disposal. If visual and olfactory screening indicates that the removed debris is contaminated (e.g., chemical staining or odors), it will be managed and disposed of as part of the Subtitle D material waste stream. Any wood pilings encountered within a soil excavation area will be broken off or cut at the base of the excavation, and the removed wood will be disposed of at a Subtitle D landfill. All removed railroad ties will also be disposed of at a Subtitle D landfill. Any abandoned utilities will be cut and capped at the edge of the excavation; that portion of the utility extending within the excavation will be removed. All recyclable structural materials removed during the cleanup will be transported to permitted facilities for recycling.

There are no known active utilities requiring temporary rerouting or removal to accommodate the planned cleanup.

5.4 Excavation Dewatering and Water Management

The excavation work is planned to occur during dry season conditions (beginning of September through mid-October) and the majority of the planned soil excavations will remain above the water table; therefore, the need for excavation dewatering is anticipated to be minimal. Dewatering of deeper excavations will be conducted as necessary to maintain unsaturated excavation conditions in order to facilitate soil excavation/handling/loading for transport, verification soil sampling in the excavation, and excavation backfilling. Means and methods for dewatering will be determined by the selected Contractor, and likely would include temporary sumps within the open excavation.

Groundwater extracted during excavation dewatering, and any water accumulating within the contaminated soil stockpile area, will be conveyed to the Contractor’s temporary onsite water treatment system where it will be treated as needed to meet all permit requirements for discharge. The cleanup contractor will have the option to discharge the treated water by one of two methods:

1. Discharge to surface water via the City of Bellingham storm drain in accordance with a National Pollution Discharge Elimination System (NPDES) Construction Stormwater General Permit (CSGP) with project-specific Administrative Order issued by Ecology. The Port plans to obtain the CSGP with Administrative Order but, upon the execution of the contract for the soil removal project, the Port will transfer in full the permit to the Contractor. If the Contractor chooses to discharge to surface water under the permit, they will be required and responsible to comply with all of its provisions including but not limited to initial treatment batch testing to demonstrate achievement of permit indicator levels prior to any discharge, obtaining Ecology approval for flow-through operation and discharge based on the batch testing results, and conducting monitoring and reporting to Ecology throughout the duration of treatment and discharge; or

2. Pump the treated water into water truck(s) for conveyance to the Port's pump station for the Aeration and Settlement Basin (ASB) in accordance with the Port's NPDES permit for the facility (refer to Section 7 regarding permit details).

5.5 Soil Loading and Off-Site Disposal

Prior to start of construction, each of the three contaminated soil waste streams will be profiled, using existing data, to obtain pre-approval for proper off-site disposal as non-hazardous waste at a permitted disposal facility. The Contractor will be responsible for selecting and subcontracting with the permitted off-site soil disposal facility permitted to accept each of the waste streams. The Contractor will provide Aspect with copies of the certificates of disposal for material disposed of off-site, and Aspect will include them in the As-Built Cleanup Report documenting the soil removal cleanup action (refer to Section 8).

The truck route for the cleanup project will not use residential streets. Trucks hauling contaminated materials from the OU will remain covered from the time they leave the site until they off-load at the designated facility.

5.6 Excavation Backfill and Site Restoration

Once the excavation verification sampling demonstrates that direct contact cleanup levels have been achieved for the OU, the cleanup excavation areas will be backfilled, in lifts no greater than 12 inches in thickness, using virgin aggregate or crushed rock imported from a Washington State Department of Transportation (WSDOT)-approved source. During placement and compaction of backfill, the Contractor shall control surface water and groundwater inflow such that the backfill material can be compacted to meet the contract specifications.

Excavations outside of the affordable housing redevelopment area will be backfilled to match surrounding grade. The backfill will be compacted using a vibratory compactor (e.g., vibratory roller and/or hoe-pack) method acceptable to the Port's engineer. excavations outside of the affordable housing redevelopment area, final acceptance of the backfill compaction will be determined by the Port's engineer through observation of the contractor's means and methods, proof-rolling select areas with the equivalent of a fully loaded 10 cubic-yard truck, or other qualitative methods approved by the engineer.

Excavations within the affordable housing redevelopment area that are less than 4 feet deep will be backfilled to the design subgrades. Each lift of backfill will be compacted to at least 95% of the Modified Proctor maximum dry density (ASTM D-1557) using a vibratory compaction (e.g., vibratory roller and/or hoe-pack) method acceptable to the Port's engineer. However, excavation areas with design subgrades greater than 4 feet below surrounding grade will be temporarily backfilled with common borrow to a depth 4 feet or less below grade, without compaction, to eliminate physical safety risks associated with open excavations until the redevelopment project begins construction there. The affordable housing construction will remove and properly manage the temporary backfill placed for that purpose.

6 Overview of Groundwater MNA and Institutional Controls

In addition to the soil removal action described above, the Lignin OU cleanup action includes MNA for metals in groundwater and institutional controls. Each of those cleanup components is outlined below and will be implemented following completion of the soil removal action.

6.1 Groundwater MNA

Following the soil removal, groundwater MNA will address residual dissolved chromium and copper concentrations that exceed groundwater cleanup levels based on protection of discharge to the Whatcom Waterway. The dissolved metals concentrations are expected to continue to attenuate through a combination of sorption/complexation and dispersion. Attenuation will be significantly enhanced by the soil removal project and substantive source reduction.

The Compliance Monitoring Plan for groundwater MNA at the Lignin OU, to be prepared following execution of the Consent Decree amendment for cleanup of the Lignin OU, will identify monitoring locations, analytes, and frequency. All existing monitoring wells will be decommissioned at the start of the Lignin OU soil removal action, and therefore new monitoring wells will be installed for the MNA monitoring program after completion of the soil removal project. The MNA monitoring wells will include positions along the downgradient edge of the Lignin OU which, based on a groundwater flow direction toward the northwest, would be along the north and northwestern boundaries of the OU as suggested on Figure 5. Specific locations for the new wells will be identified in the MNA Compliance Monitoring Plan and may consider location of utilities or other access considerations following completion of the soil removal action.

The MNA Compliance Monitoring Plan will also define requirements for data evaluation and reporting, including a decision process for adjusting the monitoring program over time and ultimately ceasing it. It will also include provisions for implementation of a contingent action if it is determined that groundwater MNA within the Lignin OU is not sufficient to prevent migration of groundwater exceeding cleanup levels to the Whatcom Waterway. A first indication for assessing a contingent action for groundwater MNA would be observing a statistically significant increasing trend for dissolved metals concentrations in a well at the downgradient edge of the OU. An evaluation of concentration trends could be conducted after 2 to 3 years of data, allowing any temporary effects from the large-scale cleanup earthwork activities to dissipate.

Given that the cleanup levels are based on protection of the Whatcom Waterway, a first response action would be to monitor wells located between the Lignin OU and the Whatcom Waterway (north of the BNSF mainline) to assess extent and magnitude of the dissolved metals migration in groundwater. Such wells could include those currently being monitored for the groundwater MNA program on the Pulp/Tissue Mill RAU of the Site (refer to Aspect, 2021).

If potential failure of MNA is indicated based on the first response action, selection and design of a contingent action would be conducted. If a contingent action is determined to be neccesary, substantial additional information would be available at that time to determine the causes of MNA failure and, therefore, the most effective and practicable means to remedy it. The cause of increasing dissolved metals concentrations in groundwater would dictate the appropriate contingent action.

For example, if it is determined that increasing dissolved metals concentrations are a result of changes to groundwater pH, then a contingent action to restore groundwater pH to near-neutral conditions would likely be appropriate. This could be accomplished by delivering pH buffering/neutralization media into the water-bearing zone via injection or direct emplacement of a solid media in a permeable reactive barrier (PRB). In addition to delivery method, the choice of specific treatment media is further dependent on whether the goal is to mitigate acidic or alkaline pH.

PRBs employing reactive materials can also be used to control the migration of dissolved metals that are not created by pH changes. Common PRB treatment materials include granular activated carbon (GAC), organoclay, wood mulch/compost, and zero valent iron (ZVI). For example, ZVI has been successfully used in PRBs to treat groundwater contaminated with heavy metals including chromium, copper, and zinc.

Alternatively, groundwater containment could be applied to limit the migration of dissolved metals to the Whatcom Waterway. Migration of contaminated groundwater could also be controlled using physical containment methods such as slurry walls or by groundwater extraction and treatment (pump-and-treat). While technically feasible, groundwater containment measures are likely to be deemed less practicable than *in situ* treatment methods in this case.

6.2 Institutional Controls (Environmental Covenants)

The Port, Mercy Housing Northwest, and Ecology will develop environmental covenants for the Lignin OU that restrict certain activities and uses of the property to protect the integrity of the selected cleanup action and thereby protect human health and the environment. It is anticipated that institutional controls for the Lignin OU will:

- Prohibit interference with the completed cleanup action
- Prohibit use of groundwater
- Provide for long-term monitoring and stewardship of the cleanup action

The Port intends to sell Mercy Housing Northwest a parcel of land encompassing the southern portion of the Lignin OU (anticipated parcel boundary shown on Figure 6) within which the affordable housing redevelopment occur. The Port will retain ownership of the remaining northern parcel within the Lignin OU. The Port and Mercy Housing Northwest will seek separate environmental covenants for their respective parcels within the Lignin OU. The two parties will work with Ecology and the Attorney General’s Office to define each covenant’s specific restrictions and requirements applicable to each parcel prior to the covenants being legally recorded with Whatcom County.

7 Permits and Substantive Requirements

In accordance with MTCA, the Lignin OU cleanup action, being conducted under Consent Decree No. 142027008 as amended, is exempt from the procedural requirements of Chapters 70.94, 70.95, 70.105, 77.55, 90.48, and 90.58 of the Revised Code of Washington (RCW), and of any laws requiring or authorizing local government permits or approvals. However, the Port must still comply with the substantive requirements of such permits or approvals (WAC 173-340-520). In addition, the cleanup action is not exempt from federal permits and requirements presented in Exhibit F to the Consent Decree Amendment for the Lignin OU cleanup action.

The Lignin OU soil cleanup action will require infiltration of construction stormwater within the project boundary, and the Port will allow the cleanup Contractor the choice to discharge any excavation dewatering water and stormwater collecting within the soil stockpile areas[17] to either the Port's ASB facility under their NPDES permit or the surface waters of the state under a CSGP with project-specific Administrative Order issued by Ecology. If construction-generated stormwater and/or dewatering water is discharged to the Port's ASB, that process would need to comply with the Port's individual NPDES Waste Discharge Permit No. WA0001091 and any subsequent modifications. If construction-generated stormwater and/or dewatering water is discharged to surface waters of the state, that process would need to comply with all requirements of the CSGP with Administrative Order.

The cleanup action complies with the State Environmental Policy Act (SEPA; RCW 43.21C and WAC 197-11-250 through -259). Concurrent with execution of the Decree, Ecology conducted the SEPA review process, including the requisite public comment period, and in July 2021 issued a Determination of Non-Significance for the proposed cleanup action at the Chlor-Alkali RAU that includes the Lignin OU. Ecology has determined that the 2021 SEPA determination covers the planned cleanup action for the Lignin OU of the Chlor-Alkali RAU.

The following sections outline how substantive requirements of procedurally exempt local permits will be met during implementation of the Lignin OU soil removal component of the RAU cleanup action.

7.1 Permit Substantive Requirements

The Lignin OU cleanup action is subject to the following local requirements, but is procedurally exempt from them:

- Major Grading Permit as per City of Bellingham Grading Ordinance, Bellingham Municipal Code (BMC) 16.70;

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[17] Soil stockpile areas will be lined with an impermeable liner (e.g., visqueen) and bermed to prevent runoff outside of the lined area. Runoff collected within the stockpile area will be collected and managed consistent with excavation dewatering water as described in Section 5.4.

- Critical Areas Permit as per City of Bellingham Critical Areas Ordinance, BMC 16.55; and
- City of Bellingham Stormwater Requirements, BMC 15.42.

All work for this cleanup action will occur at distances greater than 200 feet from the ordinary high-water mark, so is outside jurisdiction of the City of Bellingham Shoreline Master Program (BMC Title 22).

The applicable substantive requirements of the state and local permits or approvals, and the general manner in which the cleanup action will meet them, are identified below. The Port will continue to coordinate with the City of Bellingham (City) regarding implementation of the cleanup action project. This includes providing to the City a letter describing, with references to specific portions of the Construction Plans and Specifications, how the cleanup action work will meet the substantive requirements of their permits listed below and obtaining written concurrence from the City, as done for all prior cleanup actions conducted within the G-P West Site. The Port will also submit to Ecology Water Quality a letter requesting a non-routine discharge of water to the ASB in accordance with condition S7 of the Port's NPDES permit for the ASB.

7.1.1 City of Bellingham Major Grading Permit

Pursuant to the City of Bellingham Grading Ordinance (BMC 16.70.070), a Major Grading Permit is required from the City for grading projects that involve more than 500 cubic yards of grading. The permit-required standards and requirements will be integrated into the cleanup action Construction Plans and Specifications to ensure that the construction complies with the substantive requirements of the City grading ordinance. Those substantive requirements include: location and protection of potential underground hazards, proper vehicle access point to prevent tracking of soil outside of the project site, erosion control, work hours and methods compatible with weather conditions and surrounding property uses, prevention of damage or nuisance, maintaining a safe and stable work site, compliance with noise ordinances and zoning provisions, and compliance with City traffic requirements when using City streets.

7.1.2 City of Bellingham Critical Areas Ordinance

This cleanup will occur on land designated as a seismic hazard area by BMC 16.55 Critical Areas because it occurs on man-made fill. However, this soil removal project is not a development proposal and does not include construction of any improvements. The planned soil removal activities, and the final excavation condition, will not exacerbate seismic hazards within the work area or surrounding property.

7.1.3 City of Bellingham Stormwater Requirements

Pursuant to the City of Bellingham Stormwater Management ordinance (BMC 15.42), the cleanup must meet the requirements of a City Stormwater Permit. The cleanup action does not include construction of any improvements, and the substantive requirements will be met by preparation of and compliance with a SWPPP to infiltrate construction stormwater and prevent its runoff offsite, control sources of pollution, and preserve natural drainage systems and outfalls.

8 Reporting of the Soil Removal Cleanup Action

Upon completion of the cleanup, a draft As-Built Cleanup Report describing the methods and outcome of the cleanup will be prepared and submitted to Ecology for review and comment. The data collected during the cleanup will be uploaded to Ecology's Environmental Information Management (EIM) database in accordance with the Decree.

9 Schedule

The preliminary anticipated schedule milestones for the Lignin OU soil removal cleanup project are as follows:

- June-July 2022: Lignin OU CAP and amendment to the Consent Decree – Public Comment Period
- May-July 2022: Review and finalization of the Construction Plans and Specifications and the Compliance Monitoring Plan for the soil removal.
- July 2022: Port solicits competitive construction bids for the soil removal.
- August 2022: Port awards contract to selected Contractor.
- August-December 2022: Cleanup construction. Once the excavation verification sampling and analysis data demonstrate to Ecology's satisfaction that direct contact soil cleanup levels have been achieved, and before completion of all components of the cleanup action, Ecology may provide a written authorization to proceed with the affordable housing redevelopment.
- January 2023: Submit draft As-Built Cleanup Report to Ecology for review.
- February 2023: Submit draft Groundwater MNA Compliance Monitoring Plan to Ecology for review.

This schedule may be adjusted based on conditions encountered during cleanup or other factors.

10 References

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Limitations

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

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TABLES

Table 1. Well Construction and Groundwater Elevations

Project No. 210368-A-05, Lignin Operable Unit, GP West Site, Bellingham, Washington

Well ID	Installation Date	Ground Surface Elevation (feet NAVD88)	Top of Casing Elevation (feet NAVD88)	Screen Interval Depth (feet bgs)	Date Measured	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)
LW-MW01	7/16/2004	15.4	15.16	3-13	08/04/04	5.17	9.99
					08/13/04	5.21	9.95
					01/24/22	2.77	12.39
					02/03/22	3.52	11.64
					02/28/22	3.50	11.66
					04/28/22	5.61	9.55
					06/22/22	4.00	11.16
LW-MW02	1/20/2022	18.6	18.32	5-15	01/24/22	5.61	12.71
					02/03/22	6.40	11.92
					02/28/22	6.59	11.73
					04/28/22	7.03	11.29
					06/22/22	6.34	11.98
LW-MW03	1/20/2022	17.6	17.16	4.5-14.5	01/24/22	3.49	13.67
					02/03/22	4.26	12.90
					02/28/22	4.21	12.95
					04/28/22	5.18	11.98
					06/22/22	4.65	12.51
LW-MW04	1/20/2022	15.1	14.80	3-13	01/24/22	2.82	11.98
					02/03/22	3.45	11.35
					02/28/22	3.11	11.69
					04/28/22	4.44	10.36
					06/22/22	3.62	11.18

Notes

NM = not measured.   bgs - below ground surface.   btoc - below top of PVC well casing.   NAVD88 - North American Vertical Datum of 1988.

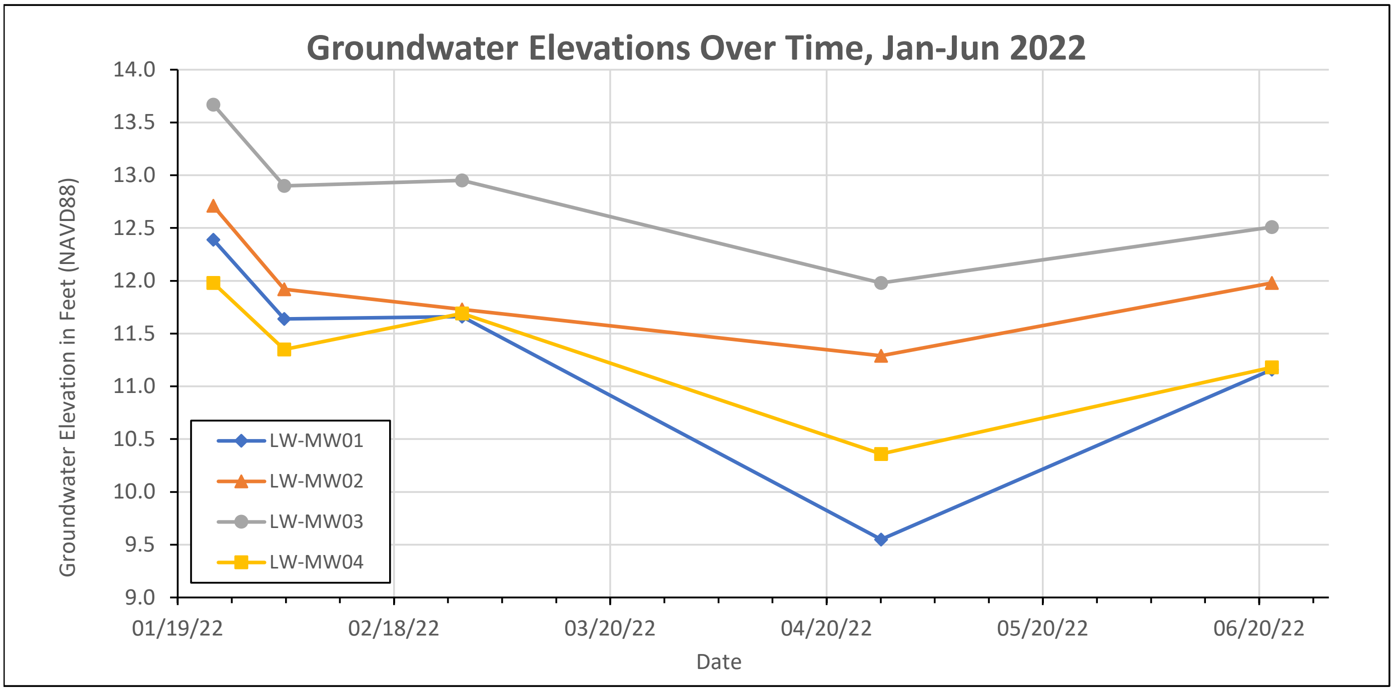

Table 2A. Soil Quality Data - Metals and PAHs

Project No. 210368-A-05 , Lignin Operable Unitl, GP West Site, Bellingham, Washington

				Location	**LW-MW01**	**LW-MW01**	**LW-MW02**	**LW-MW02**	**LW-MW02**	**LW-MW04**	**LW-MW04**	**LW-MW04**	**LW-SB01**	**LW-SB01**	**LW-SB02**	**LW-SB02**	**LW-SB03**
				Depth	**2.5 - 4 ft**	**5 - 6.5 ft**	**1 - 2 ft**	**5 - 6 ft**	**6 - 7 ft**	**0 - 1 ft**	**5 - 6 ft**	**7.5 - 8.5 ft**	**0 - 4 ft**	**4 - 8 ft**	**0 - 4 ft**	**4 - 8 ft**	**0 - 4 ft**
				Sample Type	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
				Date	**07/16/2004**	**07/16/2004**	**01/20/2022**	**01/20/2022**	**01/20/2022**	**01/20/2022**	**01/20/2022**	**01/20/2022**	**07/21/2004**	**07/21/2004**	**07/21/2004**	**07/21/2004**	**07/23/2004**
				Matrix	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Unsat. Soil**
			CUL Based on Leaching														
Analyte	Unit	CUL Based on Direct Contact	Saturated Soil	Unsaturated Soil													
Metals																	
Arsenic	mg/kg	20	20	20	30 U	6 U							10 U	6 U	20 U	6 U	6 U
Cadmium	mg/kg	80	1	1	**11 J**	**0.7 J**							0.6 U	0.2 U	0.6 U	0.3 U	**0.7**
Chromium	mg/kg	120000	260	5200	**35**	**25**	**74.5**	**118**					**43**	**39**	**48.9**	**35.3**	**844**
Chromium (VI)	mg/kg	240	48	48	0.12 U	0.132 U							**0.6**	**0.521**	0.127 U	0.138 U	0.121 U
Copper	mg/kg	3200	36	36	**31 J**	**13.7 J**	**140**	**87.7**	**11.5**				**72.7**	**29.1**	**49.1**	**20.8**	**58**
Lead	mg/kg	250	81	250	**40**	**9**							**171**	**16**	**15**	**7**	**97**
Mercury	mg/kg	24	24	24	**0.08**	0.06 U							**0.25 J**	**0.08 J**	**0.23 J**	**0.08 J**	**0.27**
Nickel	mg/kg	1600	48	48	**27**	**25**							**46**	**35**	**46**	**25**	**48**
Zinc	mg/kg	24000	85	100	**66**	**33.5**	**121**	**198**	**24.8**				**61 J**	**61.7 J**	**74 J**	**37.6 J**	**251**
PAHs																	
1-Methylnaphthalene	mg/kg	34			**0.029**	0.0082 U				0.01 U	0.01 U	0.01 U	**0.026**	0.0084 U	**0.046**	**0.026**	0.022 U
2-Methylnaphthalene	mg/kg	320			**0.046**	0.0082 U				0.01 U	0.01 U	0.01 U	**0.03**	0.0084 U	**0.08**	**0.041**	0.022 U
Acenaphthene	mg/kg	4800	0.26	5.2	0.0092 U	0.0082 U				0.01 U	0.01 U	0.01 U	0.0082 U	0.0084 U	0.0089 U	0.0084 U	**0.066**
Acenaphthylene	mg/kg				0.0092 U	0.0082 U				0.01 U	0.01 U	0.01 U	0.0082 U	0.0084 U	0.0089 U	0.0084 U	0.022 U
Anthracene	mg/kg	24000	3.5	71	0.0092 U	0.0082 U				0.01 U	0.01 U	0.01 U	**0.016**	0.0084 U	0.0089 U	0.0084 U	**0.067**
Benzo(g,h,i)perylene	mg/kg				**0.012**	0.0082 U				0.01 U	0.01 U	0.01 U	0.0082 U	0.0084 U	0.0089 U	0.0084 U	**0.2**
Fluoranthene	mg/kg	3200	2.6	52	**0.048**	**0.015**				**0.034**	**0.013**	0.01 U	**0.037**	**0.03**	**0.037**	**0.012**	**0.68**
Fluorene	mg/kg	3200	0.37	7.4	0.0092 U	0.0082 U				0.01 U	0.01 U	0.01 U	0.0082 U	0.0084 U	0.0089 U	0.0084 U	**0.024**
Naphthalene	mg/kg	1600	0.17	3.5	**0.02**	**0.0091**				0.01 U	0.01 U	**0.011**	**0.012**	**0.0093**	**0.025**	**0.011**	0.022 U
Phenanthrene	mg/kg				**0.066**	**0.014**				0.01 U	0.01 U	**0.012**	**0.09**	**0.048**	**0.053**	**0.024**	**0.24**
Pyrene	mg/kg	2400	16	330	**0.071**	**0.018**				**0.026**	**0.011**	0.01 U	**0.08**	**0.054**	**0.05**	**0.016**	**0.52**
Benz(a)anthracene	mg/kg				**0.024**	0.0082 U				**0.015**	0.01 U	0.01 U	**0.027**	**0.012**	**0.016**	0.0084 U	**0.41**
Benzo(a)pyrene	mg/kg				**0.026**	0.0082 U				**0.011**	0.01 U	0.01 U	**0.025**	**0.012**	**0.022**	**0.011**	**0.63**
Benzo(b)fluoranthene	mg/kg				**0.03**	0.0082 U				**0.017**	0.01 U	0.01 U	**0.026**	**0.012**	**0.036**	**0.016**	**0.62**
Benzo(j,k)fluoranthene	mg/kg																
Benzo(k)fluoranthene	mg/kg				**0.03**	0.0082 U				0.01 U	0.01 U	0.01 U	**0.02**	**0.0093**	**0.036**	**0.016**	**0.53**
Chrysene	mg/kg				**0.059**	0.0082 U				**0.012**	0.01 U	0.01 U	**0.048**	**0.018**	**0.046**	**0.023**	**0.42**
Dibenzo(a,h)anthracene	mg/kg				0.0092 U	0.0082 U				0.01 U	0.01 U	0.01 U	0.0082 U	0.0084 U	0.0089 U	0.0084 U	**0.058**
Indeno(1,2,3-cd)pyrene	mg/kg				0.0092 U	0.0082 U				0.01 U	0.01 U	0.01 U	0.0082 U	0.0084 U	0.0089 U	0.0084 U	**0.18**
Total cPAHs TEQ	mg/kg	0.19	0.31	6.2	**0.037**	0.0074 U				**0.015**	0.0076 U	0.0076 U	**0.034**	**0.016**	**0.032**	**0.016**	**0.81**

Notes:

Bold - detected

Blue Shaded - Detected result exceeded respective cleanup level based on unrestricted soil direct contact.

Tan Shaded - Detected result exceeded respective cleanup level based on predicted (modeled) leaching to groundwater. Refer to text regarding empirical groundwater data.

Leaching-based cleanup levels less than the analytical practical quantitation limit (PQL) are set at the PQL for the dataset.

U - Analyte not detected at or above the reporting limit shown

J - Analyte was positively identified, and the reported value is an estimate

" " - indicates result not available

Sample Type: N - Normal sample. FD - Field duplicate sample.

Table 2A. Soil Quality Data - Metals and PAHs

Project No. 210368-A-05 , Lignin Operable Unitl, GP West Site, Bellingham, Washington

				Location	**LW-SB03**	**LW-SB04**	**LW-SB04**	**LW-SB101**	**LW-SB101**	**LW-SB101**	**LW-SB102**	**LW-SB102**	**LW-SB102**	**LW-SB103**	**LW-SB103**	**LW-SB103**	**LW-SB104**
				Depth	**4 - 8 ft**	**0 - 4 ft**	**4 - 8 ft**	**1 ft**	**10.5 ft**	**13.5 ft**	**1 ft**	**8 ft**	**11 ft**	**1 ft**	**7.3 ft**	**11 ft**	**1.5 ft**
				Sample Type	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
				Date	**07/23/2004**	**07/22/2004**	**07/22/2004**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**
				Matrix	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**
Analyte	Unit	CUL Based on Direct Contact	CUL Based on Leaching														
			Saturated Soil	Unsaturated Soil													
Metals																	
Arsenic	mg/kg	20	20	20	5 U	5 U	6 U	10 U	12 U	12 U	11 U	12 U	13 U	11 U	12 U	12 U	11 U
Cadmium	mg/kg	80	1	1	0.2 U	0.2 U	**0.3**	0.52 U	0.62 U	0.60 U	0.54 U	0.61 U	0.64 U	0.53 U	0.60 U	0.60 U	0.56 U
Chromium	mg/kg	120000	260	5200	**390 J**	**140 J**	**60.4 J**	**21**	**17**	**29**	**31**	**13**	**17**	**14**	**17**	**26**	**58**
Chromium (VI)	mg/kg	240	48	48	0.116 U	0.123 U	0.146 U										
Copper	mg/kg	3200	36	36	**31.3 J**	**23.4 J**	**39 J**	**24**	**10**	**25**	**34**	**5.8**	**6.4**	**23**	**14**	**16**	**30**
Lead	mg/kg	250	81	250	**19 J**	**5 J**	**13 J**	**120**	6.2 U	6.0 U	**74**	6.1 U	6.4 U	5.3 U	6.0 U	6.0 U	**18**
Mercury	mg/kg	24	24	24	**0.08**	**0.04**	**0.06**	0.26 U	0.31 U	0.30 U	**1.2**	0.30 U	0.32 U	0.26 U	0.30 U	0.30 U	0.28 U
Nickel	mg/kg	1600	48	48	**32**	**28**	**41**	**18**	**22**	**34**	**34**	**14**	**17**	**17**	**24**	**23**	**32**
Zinc	mg/kg	24000	85	100	**81.9 J**	**91.8 J**	**58.9 J**	**130**	**36**	**44**	**65**	**16**	**21**	**51**	**63**	**34**	**55**
PAHs																	
1-Methylnaphthalene	mg/kg	34			**0.04**	**0.009**	**0.012**	0.035 U	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	**0.03**
2-Methylnaphthalene	mg/kg	320			**0.088**	**0.019**	**0.022**	0.035 U	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	**0.054**
Acenaphthene	mg/kg	4800	0.26	5.2	**0.1**	0.0073 U	0.0092 U	**0.05**	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	**0.069**	**0.0087**
Acenaphthylene	mg/kg				0.0076 U	0.0073 U	0.0092 U	**0.074**	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.0075 U
Anthracene	mg/kg	24000	3.5	71	**0.18**	0.0073 U	0.0092 U	**0.14**	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	**0.013**
Benzo(g,h,i)perylene	mg/kg				**0.23**	0.0073 U	0.0092 U	**0.24**	0.0083 U	0.0080 U	**0.04**	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	**0.011**
Fluoranthene	mg/kg	3200	2.6	52	**0.9**	0.0073 U	0.0092 U	**0.57**	0.0083 U	0.0080 U	**0.14**	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	**0.043**
Fluorene	mg/kg	3200	0.37	7.4	**0.069**	0.0073 U	0.0092 U	**0.065**	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	**0.014**	0.0075 U
Naphthalene	mg/kg	1600	0.17	3.5	**0.3**	0.0073 U	0.0092 U	**0.06**	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	**0.014**	**0.041**
Phenanthrene	mg/kg				**0.63**	0.0073 U	0.0092 U	**0.45**	0.0083 U	0.0080 U	**0.089**	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	**0.072**
Pyrene	mg/kg	2400	16	330	**0.81**	**0.025**	0.0092 U	**0.59**	0.0083 U	0.0080 U	**0.17**	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	**0.042**
Benz(a)anthracene	mg/kg				**0.71**	0.0073 U	0.0092 U	**0.32**	0.0083 U	0.0080 U	**0.044**	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	**0.016**
Benzo(a)pyrene	mg/kg				**0.76**	0.0073 U	0.0092 U	**0.33**	0.0083 U	0.0080 U	**0.051**	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	**0.012**
Benzo(b)fluoranthene	mg/kg				**0.59**	0.0073 U	0.0092 U	**0.64**	0.0083 U	0.0080 U	**0.07**	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	**0.02**
Benzo(j,k)fluoranthene	mg/kg							**0.16**	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.0075 U
Benzo(k)fluoranthene	mg/kg				**0.72**	0.0073 U	0.0092 U										
Chrysene	mg/kg				**0.69**	**0.027**	0.0092 U	**0.48**	0.0083 U	0.0080 U	**0.058**	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	**0.024**
Dibenzo(a,h)anthracene	mg/kg				**0.081**	0.0073 U	0.0092 U	**0.046**	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.0075 U
Indeno(1,2,3-cd)pyrene	mg/kg				**0.24**	0.0073 U	0.0092 U	**0.23**	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	**0.01**
Total cPAHs TEQ	mg/kg	0.19	0.31	6.2	**1.00**	**0.0058**	0.0083 U	**0.47**	0.0063 U	0.0060 U	**0.068**	0.0061 U	0.0064 U	0.0053 U	0.0061 U	0.0060 U	**0.018**

Notes:

Bold - detected

Blue Shaded - Detected result exceeded respective cleanup level based on unrestricte

Tan Shaded - Detected result exceeded respective cleanup level based on predicted (

Leaching-based cleanup levels less than the analytical practical quantitation limit (PQL

U - Analyte not detected at or above the reporting limit shown

J - Analyte was positively identified, and the reported value is an estimate

" " - indicates result not available

Sample Type: N - Normal sample. FD - Field duplicate sample.

Table 2A. Soil Quality Data - Metals and PAHs

Project No. 210368-A-05 , Lignin Operable Unitl, GP West Site, Bellingham, Washington

				Location	LW-SB104	LW-SB104	LW-SB105	LW-SB105	LW-SB105	LW-SB106	LW-SB106	LW-SB106	LW-SB201	LW-SB201	LW-SB202	LW-SB202	LW-SB202
				Depth	**5 ft**	**10 ft**	**1.5 ft**	**7 ft**	**12 ft**	**2 ft**	**8 ft**	**11.5 ft**	**0 - 1 ft**	**2.5 - 3 ft**	**0 - 1 ft**	**1 - 2 ft**	**5 - 5.5 ft**
				Sample Type	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
				Date	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**
				Matrix	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Sat. Soil**
			CUL Based on Leaching														
Analyte	Unit	CUL Based on Direct Contact	Saturated Soil	Unsaturated Soil													
Metals																	
Arsenic	mg/kg	20	20	20	13 U	15 U	11 U	13 U	13 U	14 U	13 U	12 U					
Cadmium	mg/kg	80	1	1	0.63 U	0.75 U	0.54 U	0.65 U	0.65 U	0.68 U	0.63 U	0.60 U					
Chromium	mg/kg	120000	260	5200	**16**	**38**	**19**	**26**	**15**	**150**	**17**	**14**	**30.4**	**20.1**		**56.2**	**82.9**
Chromium (VI)	mg/kg	240	48	48													
Copper	mg/kg	3200	36	36	**7**	**35**	**16**	**49**	**10**	**650**	**7.7**	**13**	**96**	**22.7**		**851**	**141**
Lead	mg/kg	250	81	250	6.3 U	**19**	5.4 U	**66**	6.5 U	**140**	6.3 U	6.0 U					
Mercury	mg/kg	24	24	24	0.31 U	0.37 U	0.27 U	0.33 U	0.33 U	0.34 U	0.32 U	0.30 U					
Nickel	mg/kg	1600	48	48	**15**	**42**	**25**	**33**	**22**	**28**	**17**	**21**					
Zinc	mg/kg	24000	85	100	**18**	**75**	**26**	**110**	**22**	**230**	**22**	**28**	**71**	**35**		**152,000**	**12,700**
PAHs																	
1-Methylnaphthalene	mg/kg	34			0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	**0.079**	0.0084 U	0.0080 U	0.01 U	0.01 U	0.05 U	**0.039**	
2-Methylnaphthalene	mg/kg	320			0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	**0.089**	0.0084 U	0.0080 U	0.01 U	0.01 U	0.05 U	**0.046**	
Acenaphthene	mg/kg	4800	0.26	5.2	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U	0.01 U	0.01 U	0.05 U	0.01 U	
Acenaphthylene	mg/kg				0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U	0.01 U	0.01 U	0.05 U	0.01 U	
Anthracene	mg/kg	24000	3.5	71	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	**0.04**	0.0084 U	0.0080 U	0.01 U	0.01 U	0.05 U	**0.057**	
Benzo(g,h,i)perylene	mg/kg				0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U	**0.021**	0.01 U	0.05 U	**0.059**	
Fluoranthene	mg/kg	3200	2.6	52	0.0083 U	0.010 U	0.0072 U	**0.019**	0.0087 U	**0.027**	0.0084 U	0.0080 U	**0.056**	0.01 U	0.05 U	**0.068**	
Fluorene	mg/kg	3200	0.37	7.4	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	**0.033**	0.0084 U	0.0080 U	0.01 U	0.01 U	0.05 U	0.01 U	
Naphthalene	mg/kg	1600	0.17	3.5	0.0083 U	**0.013**	0.0072 U	**0.058**	0.0087 U	**0.24**	**0.015**	0.0080 U	0.01 U	0.01 U	0.05 U	**0.019**	
Phenanthrene	mg/kg				0.0083 U	0.010 U	0.0072 U	**0.027**	0.0087 U	**0.13**	0.0084 U	0.0080 U	**0.017**	0.01 U	0.05 U	**0.056**	
Pyrene	mg/kg	2400	16	330	0.0083 U	0.010 U	0.0072 U	**0.02**	0.0087 U	**0.021**	0.0084 U	0.0080 U	**0.074**	0.01 U	0.05 U	**0.12**	
Benz(a)anthracene	mg/kg				0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U	**0.065**	0.01 U	0.05 U	**0.058**	
Benzo(a)pyrene	mg/kg				0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U	**0.037**	0.01 U	**0.025**	**0.075**	
Benzo(b)fluoranthene	mg/kg				0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U	**0.067**	0.01 U	0.05 U	**0.11**	
Benzo(j,k)fluoranthene	mg/kg				0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U					
Benzo(k)fluoranthene	mg/kg												**0.016**	0.01 U	0.05 U	**0.031**	
Chrysene	mg/kg				0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	**0.014**	0.0084 U	0.0080 U	**0.062**	0.01 U	**0.083**	**0.086**	
Dibenzo(a,h)anthracene	mg/kg				0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U	0.01 U	0.01 U	0.05 U	**0.02**	
Indeno(1,2,3-cd)pyrene	mg/kg				0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U	**0.019**	0.01 U	0.05 U	**0.049**	
Total cPAHs TEQ	mg/kg	0.19	0.31	6.2	0.0063 U	0.0076 U	0.0054 U	0.0066 U	0.0066 U	**0.0070**	0.0063 U	0.0060 U	**0.055**	0.0076 U	**0.038**	**0.10**	

Notes:

Bold - detected

Blue Shaded - Detected result exceeded respective cleanup level based on unrestricte

Tan Shaded - Detected result exceeded respective cleanup level based on predicted (

Leaching-based cleanup levels less than the analytical practical quantitation limit (PQL

U - Analyte not detected at or above the reporting limit shown

J - Analyte was positively identified, and the reported value is an estimate

" " - indicates result not available

Sample Type: N - Normal sample. FD - Field duplicate sample.

Table 2A. Soil Quality Data - Metals and PAHs

Project No. 210368-A-05 , Lignin Operable Unitl, GP West Site, Bellingham, Washington

				Location	LW-SB202	LW-SB202	LW-SB203	LW-SB203	LW-SB203	LW-SB203	LW-SB204	LW-SB204	LW-SB204	LW-SB204	LW-SB205	LW-SB205	LW-SB205
				Depth	**6.5 - 7 ft**	**10 - 11 ft**	**0 - 1 ft**	**2 - 3 ft**	**5 - 6 ft**	**6.5 - 7.5 ft**	**0 - 1 ft**	**1 - 2 ft**	**5 - 6 ft**	**6.5 - 7.5 ft**	**0.5 - 1 ft**	**1 - 1.5 ft**	**5 - 6 ft**
				Sample Type	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
				Date	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**
				Matrix	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Sat. Soil**
			CUL Based on Leaching														
Analyte	Unit	CUL Based on Direct Contact	Saturated Soil	Unsaturated Soil													
Metals																	
Arsenic	mg/kg	20	20	20													
Cadmium	mg/kg	80	1	1													
Chromium	mg/kg	120000	260	5200	**10.3**	**33.4**	**15.4**	**28.6**				**40.9**	**16.4**	**10**	**83**	**56.7**	
Chromium (VI)	mg/kg	240	48	48													
Copper	mg/kg	3200	36	36	**11**	**31.1**	**21.7**	**556**	**348**	**12.2**		**37.6**	**20.4**	**6.97**	**37.8**	**48.5**	**18.8**
Lead	mg/kg	250	81	250													
Mercury	mg/kg	24	24	24													
Nickel	mg/kg	1600	48	48													
Zinc	mg/kg	24000	85	100	**32.8**	**67.5**	**43.7**	**346**	**112**	**16.3**		**62.7**	**57**	**11.7**	**64.4**	**123**	**93.7**
PAHs																	
1-Methylnaphthalene	mg/kg	34					0.05 U	**0.019**			0.05 U	0.01 U			0.05 U	0.01 U	
2-Methylnaphthalene	mg/kg	320					0.05 U	**0.031**			0.05 U	0.01 U			**0.06**	0.01 U	
Acenaphthene	mg/kg	4800	0.26	5.2			0.05 U	**0.013**			0.05 U	0.01 U			0.05 U	0.01 U	
Acenaphthylene	mg/kg						0.05 U	0.01 U			0.05 U	0.01 U			0.05 U	0.01 U	
Anthracene	mg/kg	24000	3.5	71			0.05 U	**0.023**			0.05 U	0.01 U			0.05 U	0.01 U	
Benzo(g,h,i)perylene	mg/kg						0.05 U	**0.046**			0.05 U	0.01 U			0.05 U	**0.044**	
Fluoranthene	mg/kg	3200	2.6	52			**0.072**	**0.15**			0.05 U	0.01 U			**0.067**	**0.065**	
Fluorene	mg/kg	3200	0.37	7.4			0.05 U	**0.011**			0.05 U	0.01 U			0.05 U	0.01 U	
Naphthalene	mg/kg	1600	0.17	3.5			0.05 U	**0.05**			0.05 U	0.01 U			0.05 U	**0.012**	
Phenanthrene	mg/kg						**0.065**	**0.09**			**0.11**	0.01 U			**0.083**	**0.036**	
Pyrene	mg/kg	2400	16	330			**0.1**	**0.13**			**0.068**	0.01 U			**0.092**	**0.07**	
Benz(a)anthracene	mg/kg						0.05 U	**0.05**			0.05 U	0.01 U			0.05 U	**0.039**	
Benzo(a)pyrene	mg/kg						**0.05**	**0.049**			**0.038**	0.01 U			**0.042**	**0.052**	
Benzo(b)fluoranthene	mg/kg						**0.066**	**0.09**			**0.069**	0.01 U			**0.053**	**0.087**	
Benzo(j,k)fluoranthene	mg/kg																
Benzo(k)fluoranthene	mg/kg						0.05 U	**0.032**			0.05 U	0.01 U			0.05 U	**0.03**	
Chrysene	mg/kg						**0.074**	**0.062**			**0.12**	0.01 U			**0.12**	**0.058**	
Dibenzo(a,h)anthracene	mg/kg						0.05 U	**0.011**			0.05 U	0.01 U			0.05 U	0.01 U	
Indeno(1,2,3-cd)pyrene	mg/kg						0.05 U	**0.044**			0.05 U	0.01 U			0.05 U	**0.044**	
Total cPAHs TEQ	mg/kg	0.19	0.31	6.2			**0.067**	**0.072**			**0.056**	0.0076 U			**0.059**	**0.073**	

Notes:

Bold - detected

Blue Shaded - Detected result exceeded respective cleanup level based on unrestricte

Tan Shaded - Detected result exceeded respective cleanup level based on predicted (ı

Leaching-based cleanup levels less than the analytical practical quantitation limit (PQL

U - Analyte not detected at or above the reporting limit shown

J - Analyte was positively identified, and the reported value is an estimate

" " - indicates result not available

Sample Type: N - Normal sample. FD - Field duplicate sample.

Table 2A. Soil Quality Data - Metals and PAHs

Project No. 210368-A-05 , Lignin Operable Unitl, GP West Site, Bellingham, Washington

				Location	**LW-SB206**	**LW-SB206**	**LW-SB206**	**LW-SB207**	**LW-SB207**	**LW-SB207**	**LW-SB207**	**LW-SB208**	**LW-SB208**	**LW-SB208**	**LW-SB209**	**LW-SB209**	**LW-SB209**
				Depth	**0 - 1 ft**	**2 - 2.5 ft**	**5 - 6 ft**	**0.5 - 1 ft**	**1 - 2 ft**	**5 - 6 ft**	**7 - 8 ft**	**0.5 - 1.5 ft**	**5.5 - 6.5 ft**	**11 - 12 ft**	**0 - 1 ft**	**2 - 2.5 ft**	**5 - 6 ft**
				Sample Type	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
				Date	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/17/2022**	**01/17/2022**	**01/17/2022**	**01/19/2022**	**01/19/2022**	**01/19/2022**
				Matrix	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**
			CUL Based on Leaching														
Analyte	Unit	CUL Based on Direct Contact	Saturated Soil	Unsaturated Soil													
Metals																	
Arsenic	mg/kg	20	20	20													
Cadmium	mg/kg	80	1	1													
Chromium	mg/kg	120000	260	5200	**74.1**	**12**		**20.3**	**38.8**			**27.6**	**26.8**		**21.4**	**25.6**	**44.6**
Chromium (VI)	mg/kg	240	48	48													
Copper	mg/kg	3200	36	36	**58.5**	**11.8**		**33.5**	**68.6**	**92.2**	**9.62**	**21.3**	**183**	**10.7**	**58.6**	**32.1**	**113**
Lead	mg/kg	250	81	250													
Mercury	mg/kg	24	24	24													
Nickel	mg/kg	1600	48	48													
Zinc	mg/kg	24000	85	100	**183**	**16.4**		**53.7**	**48.5**			**31.7**	**192**	**16.3**	**183**	**229**	**232**
PAHs																	
1-Methylnaphthalene	mg/kg	34			0.5 U	**0.013**	0.05 U	0.01 U	0.01 U			0.01 U			0.01 U	0.05 U	**0.23**
2-Methylnaphthalene	mg/kg	320			0.5 U	0.01 U	0.05 U	0.01 U	**0.011**			0.01 U			0.01 U	0.05 U	**0.29**
Acenaphthene	mg/kg	4800	0.26	5.2	**0.52**	**0.21**	**0.44**	0.01 U	0.01 U			0.01 U			0.01 U	**0.055**	0.05 U
Acenaphthylene	mg/kg				0.5 U	0.01 U	0.05 U	0.01 U	0.01 U			0.01 U			0.01 U	0.05 U	0.05 U
Anthracene	mg/kg	24000	3.5	71	0.5 U	0.01 U	0.05 U	0.01 U	0.01 U			0.01 U			**0.011**	**0.095**	0.05 U
Benzo(g,h,i)perylene	mg/kg				**0.7**	0.01 U	**0.056**	**0.042**	**0.022**			0.01 U			**0.059**	**0.12**	**0.055**
Fluoranthene	mg/kg	3200	2.6	52	**3.9**	0.01 U	**0.57**	**0.078**	0.01 U			0.01 U			**0.11**	**0.49**	**0.13**
Fluorene	mg/kg	3200	0.37	7.4	0.5 U	**0.15**	**0.26**	0.01 U	0.01 U			0.01 U			0.01 U	0.05 U	0.05 U
Naphthalene	mg/kg	1600	0.17	3.5	0.5 U	**0.022**	0.05 U	0.01 U	0.01 U			0.01 U			0.01 U	**0.064**	**0.26**
Phenanthrene	mg/kg				**0.54**	0.01 U	0.05 U	**0.028**	0.01 U			0.01 U			**0.063**	**0.4**	**0.14**
Pyrene	mg/kg	2400	16	330	**3.4**	0.01 U	**0.42**	**0.079**	**0.017**			0.01 U			**0.12**	**0.55**	**0.13**
Benz(a)anthracene	mg/kg				**1.1**	0.01 U	**0.13**	**0.044**	0.01 U			0.01 U			**0.057**	**0.23**	**0.071**
Benzo(a)pyrene	mg/kg				**1.2**	0.01 U	**0.11**	**0.061**	0.01 U			0.01 U			**0.085**	**0.27**	**0.072**
Benzo(b)fluoranthene	mg/kg				**1.7**	0.01 U	**0.17**	**0.087**	0.01 U			0.01 U			**0.097**	**0.29**	**0.081**
Benzo(j,k)fluoranthene	mg/kg																
Benzo(k)fluoranthene	mg/kg				**0.58**	0.01 U	**0.06**	**0.028**	0.01 U			0.01 U			**0.034**	**0.11**	0.05 U
Chrysene	mg/kg				**1.2**	0.01 U	**0.14**	**0.054**	**0.011**			0.01 U			**0.067**	**0.25**	**0.086**
Dibenzo(a,h)anthracene	mg/kg				0.5 U	0.01 U	0.05 U	**0.01**	0.01 U			0.01 U			**0.013**	0.05 U	0.05 U
Indeno(1,2,3-cd)pyrene	mg/kg				**0.82**	0.01 U	**0.062**	**0.042**	0.01 U			0.01 U			**0.061**	**0.14**	**0.053**
Total cPAHs TEQ	mg/kg	0.19	0.31	6.2	**1.66**	0.0076 U	**0.16**	**0.082**	**0.0076**			0.0076 U			**0.11**	**0.35**	**0.098**

Notes:

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Leaching-based cleanup levels less than the analytical practical quantitation limit (PQL

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Sample Type: N - Normal sample. FD - Field duplicate sample.

Table 2A. Soil Quality Data - Metals and PAHs

Project No. 210368-A-05 , Lignin Operable Unitl, GP West Site, Bellingham, Washington

				Location	**LW-SB209**	**LW-SB210**	**LW-SB210**	**LW-SB210**	**LW-SB210**	**LW-SB211**	**LW-SB211**	**LW-SB212**	**LW-SB212**	**LW-SB212**	**LW-SB213**	**LW-SB213**	**LW-SB213**
				Depth	**7 - 8 ft**	**0 - 1 ft**	**2 - 2.5 ft**	**5 - 6 ft**	**8 - 8.5 ft**	**0 - 1 ft**	**6 - 7 ft**	**0.5 - 1.5 ft**	**5 - 6 ft**	**15 - 16 ft**	**0.5 - 1.5 ft**	**6 - 7 ft**	**10 - 11 ft**
				Sample Type	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
				Date	**01/19/2022**	**01/18/2022**	**01/18/2022**	**01/18/2022**	**01/18/2022**	**01/17/2022**	**01/17/2022**	**01/17/2022**	**01/17/2022**	**01/17/2022**	**01/17/2022**	**01/17/2022**	**01/17/2022**
				Matrix	**Sat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**
			CUL Based on Leaching														
Analyte	Unit	CUL Based on Direct Contact	Saturated Soil	Unsaturated Soil													
Metals																	
Arsenic	mg/kg	20	20	20													
Cadmium	mg/kg	80	1	1													
Chromium	mg/kg	120000	260	5200		**34.2**	**23.5**	**36.7**		**24.7**	**10.7**	**41.6**	**42.8**		**20.2**	**15.2**	**16.3**
Chromium (VI)	mg/kg	240	48	48													
Copper	mg/kg	3200	36	36	**11.7**	**115**	**26.8**	**41.1**	**35.9**	**17.8**	**12.2**	**34.5**	**147**	**14.4**	**20.5**	**16.8**	**24.6**
Lead	mg/kg	250	81	250													
Mercury	mg/kg	24	24	24													
Nickel	mg/kg	1600	48	48													
Zinc	mg/kg	24000	85	100	**20.6**	**398**	**58.1**	**97.6**	**290**	**39.9**	**20.4**	**72.9**	**155**	**32.6**	**38.9**	**35.3**	**38.5**
PAHs																	
1-Methylnaphthalene	mg/kg	34				**0.028**	0.01 U			0.01 U		0.05 U			0.01 U		
2-Methylnaphthalene	mg/kg	320				**0.033**	0.01 U			0.01 U		0.05 U			0.01 U		
Acenaphthene	mg/kg	4800	0.26	5.2		0.01 U	0.01 U			0.01 U		0.05 U			0.01 U		
Acenaphthylene	mg/kg					0.01 U	0.01 U			0.01 U		0.05 U			0.01 U		
Anthracene	mg/kg	24000	3.5	71		0.01 U	0.01 U			0.01 U		0.05 U			0.01 U		
Benzo(g,h,i)perylene	mg/kg					**0.084**	**0.015**			0.01 U		0.05 U			0.01 U		
Fluoranthene	mg/kg	3200	2.6	52		**0.15**	**0.028**			**0.033**		0.05 U			0.01 U		
Fluorene	mg/kg	3200	0.37	7.4		0.01 U	0.01 U			0.01 U		0.05 U			0.01 U		
Naphthalene	mg/kg	1600	0.17	3.5		**0.021**	0.01 U			0.01 U		0.05 U			0.01 U		
Phenanthrene	mg/kg					**0.11**	**0.019**			**0.035**		0.05 U			0.01 U		
Pyrene	mg/kg	2400	16	330		**0.18**	**0.03**			**0.022**		0.05 U			0.01 U		
Benz(a)anthracene	mg/kg					**0.13**	**0.013**			0.01 U		0.05 U			0.01 U		
Benzo(a)pyrene	mg/kg					**0.15**	**0.016**			0.01 U		**0.026**			0.01 U		
Benzo(b)fluoranthene	mg/kg					**0.32**	**0.023**			0.01 U		0.05 U			0.01 U		
Benzo(j,k)fluoranthene	mg/kg																
Benzo(k)fluoranthene	mg/kg					**0.075**	0.01 U			0.01 U		0.05 U			0.01 U		
Chrysene	mg/kg					**0.15**	**0.017**			0.01 U		0.05 U			0.01 U		
Dibenzo(a,h)anthracene	mg/kg					**0.024**	0.01 U			0.01 U		0.05 U			0.01 U		
Indeno(1,2,3-cd)pyrene	mg/kg					**0.085**	**0.013**			0.01 U		0.05 U			0.01 U		
Total cPAHs TEQ	mg/kg	0.19	0.31	6.2		**0.21**	**0.022**			0.0076 U		**0.039**			0.0076 U		

Notes:

Bold - detected

Blue Shaded - Detected result exceeded respective cleanup level based on unrestricte

Tan Shaded - Detected result exceeded respective cleanup level based on predicted (

Leaching-based cleanup levels less than the analytical practical quantitation limit (PQL

U - Analyte not detected at or above the reporting limit shown

J - Analyte was positively identified, and the reported value is an estimate

" " - indicates result not available

Sample Type: N - Normal sample. FD - Field duplicate sample.

Table 2A. Soil Quality Data - Metals and PAHs

Project No. 210368-A-05 , Lignin Operable Unitl, GP West Site, Bellingham, Washington

				Location	LW-SB214	LW-SB214	LW-SB214	LW-SB215	LW-SB215	LW-SB215	LW-SB216	LW-SB216	LW-SB216	LW-SB217	LW-SB217	LW-SB217	LW-SB218
				Depth	**0.5 - 1.5 ft**	**2 - 2.5 ft**	**5 - 6 ft**	**0.5 - 1.5 ft**	**5 - 6 ft**	**10 - 11 ft**	**0 - 1 ft**	**2.5 - 3.5 ft**	**7 - 8 ft**	**0 - 1 ft**	**1 - 1.5 ft**	**5 - 6 ft**	**0.5 - 1 ft**
				Sample Type	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
				Date	**01/19/2022**	**01/19/2022**	**01/19/2022**	**01/17/2022**	**01/17/2022**	**01/17/2022**	**01/17/2022**	**01/17/2022**	**01/17/2022**	**01/18/2022**	**01/18/2022**	**01/18/2022**	**01/18/2022**
				Matrix	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Unsat. Soil**
		CUL Based on Direct Contact	CUL Based on Leaching														
Analyte	Unit		Saturated Soil	Unsaturated Soil													
Metals																	
Arsenic	mg/kg	20	20	20													
Cadmium	mg/kg	80	1	1													
Chromium	mg/kg	120000	260	5200	**106**	**51.7**	**13.3**	**18**	**48.1**	**12.7**	**18.8**	**51**			**14.9**	**12.5**	
Chromium (VI)	mg/kg	240	48	48													
Copper	mg/kg	3200	36	36	**67.7**	**954**	**24.8**	**17**	**65.7**	**14.2**	**15.9**	**40.5**	**12.1**		**22.1**	**14.4**	
Lead	mg/kg	250	81	250													
Mercury	mg/kg	24	24	24													
Nickel	mg/kg	1600	48	48													
Zinc	mg/kg	24000	85	100	**178**	**29.4**	**19.4**	**25**	**38**	**25.6**	**27.7**	**101**	**22.2**		**54.4**	**26.3**	
PAHs																	
1-Methylnaphthalene	mg/kg	34			0.05 U	0.01 U	0.01 U	0.01 U			0.01 U	0.05 U	0.01 U	0.01 U	0.01 U		0.01 U
2-Methylnaphthalene	mg/kg	320			0.05 U	0.01 U	0.01 U	0.01 U			0.01 U	0.05 U	0.01 U	0.01 U	**0.012**		0.01 U
Acenaphthene	mg/kg	4800	0.26	5.2	**0.058**	0.01 U	0.01 U	0.01 U			0.01 U	0.05 U	0.01 U	0.01 U	0.01 U		0.01 U
Acenaphthylene	mg/kg				0.05 U	0.01 U	0.01 U	0.01 U			0.01 U	0.05 U	0.01 U	0.01 U	0.01 U		0.01 U
Anthracene	mg/kg	24000	3.5	71	0.05 U	0.01 U	0.01 U	0.01 U			0.01 U	0.05 U	0.01 U	0.01 U	0.01 U		0.01 U
Benzo(g,h,i)perylene	mg/kg				**0.19**	**0.029**	0.01 U	0.01 U			0.01 U	**0.11 J**	0.01 U	0.01 U	**0.012**		0.01 U
Fluoranthene	mg/kg	3200	2.6	52	**0.44**	**0.024**	0.01 U	0.01 U			0.01 U	**0.084**	0.01 U	0.01 U	**0.026**		0.01 U
Fluorene	mg/kg	3200	0.37	7.4	0.05 U	0.01 U	0.01 U	0.01 U			0.01 U	0.05 U	0.01 U	0.01 U	0.01 U		0.01 U
Naphthalene	mg/kg	1600	0.17	3.5	0.05 U	0.01 U	0.01 U	0.01 U			0.01 U	0.05 U	0.01 U	0.01 U	**0.033**		0.01 U
Phenanthrene	mg/kg				**0.24**	**0.012**	0.01 U	0.01 U			0.01 U	**0.072**	0.01 U	0.01 U	**0.023**		0.01 U
Pyrene	mg/kg	2400	16	330	**0.36**	**0.022**	0.01 U	0.01 U			0.01 U	**0.34**	0.01 U	0.01 U	**0.026**		0.01 U
Benz(a)anthracene	mg/kg				**0.22**	**0.019**	0.01 U	0.01 U			0.01 U	**0.083**	0.01 U	0.01 U	**0.014**		0.01 U
Benzo(a)pyrene	mg/kg				**0.27**	**0.029**	0.01 U	0.01 U			0.01 U	**0.15 J**	0.01 U	0.01 U	**0.019**		0.01 U
Benzo(b)fluoranthene	mg/kg				**0.33**	**0.039**	0.01 U	0.01 U			0.01 U	**0.27 J**	0.01 U	0.01 U	**0.028**		0.01 U
Benzo(j,k)fluoranthene	mg/kg																
Benzo(k)fluoranthene	mg/kg				**0.13**	**0.015**	0.01 U	0.01 U			0.01 U	0.05 UJ	0.01 U	0.01 U	0.01 U		0.01 U
Chrysene	mg/kg				**0.22**	**0.017**	0.01 U	0.01 U			0.01 U	**0.59**	0.01 U	0.01 U	**0.023**		0.01 U
Dibenzo(a,h)anthracene	mg/kg				0.05 U	0.01 U	0.01 U	0.01 U			0.01 U	**0.057 J**	0.01 U	0.01 U	0.01 U		0.01 U
Indeno(1,2,3-cd)pyrene	mg/kg				**0.21**	**0.031**	0.01 U	0.01 U			0.01 U	**0.057 J**	0.01 U	0.01 U	**0.011**		0.01 U
Total cPAHs TEQ	mg/kg	0.19	0.31	6.2	**0.364**	**0.04**	0.0076 U	0.0076 U			0.0076 U	**0.21 J**	0.0076 U	0.0076 U	**0.026**		0.0076 U

Notes:

Bold - detected

Blue Shaded - Detected result exceeded respective cleanup level based on unrestricte

Tan Shaded - Detected result exceeded respective cleanup level based on predicted (

Leaching-based cleanup levels less than the analytical practical quantitation limit (PQL

U - Analyte not detected at or above the reporting limit shown

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" " - indicates result not available

Sample Type: N - Normal sample. FD - Field duplicate sample.

Table 2A. Soil Quality Data - Metals and PAHs

Project No. 210368-A-05 , Lignin Operable Unitl, GP West Site, Bellingham, Washington

				Location	LW-SB218	LW-SB218	LW-SB218	LW-SB219	LW-SB219	LW-SB219	LW-SB219	LW-SB220	LW-SB220	LW-SB221	LW-SB221	LW-SB221	LW-SS01
				Depth	2 - 2.5 ft	8 - 9 ft	11 - 12 ft	0 - 1 ft	5 - 6 ft	10 - 11 ft	13 - 14 ft	1 - 2 ft	5 - 6 ft	0 - 1 ft	2 - 3 ft	5 - 6 ft	0 - 0.5 ft
				Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	FD
				Date	01/18/2022	01/18/2022	01/18/2022	01/17/2022	01/17/2022	01/17/2022	01/17/2022	01/17/2022	01/17/2022	01/20/2022	01/20/2022	01/20/2022	07/20/2004
				Matrix	Unsat. Soil	Sat. Soil	Sat. Soil	Unsat. Soil	Sat. Soil	Sat. Soil	Sat. Soil	Unsat. Soil	Sat. Soil	Unsat. Soil	Unsat. Soil	Sat. Soil	Unsat. Soil
			CUL Based on Leaching														
Analyte	Unit	CUL Based on Direct Contact	Saturated Soil	Unsaturated Soil													
Metals																	
Arsenic	mg/kg	20	20	20													10 U
Cadmium	mg/kg	80	1	1													0.5 U
Chromium	mg/kg	120000	260	5200	**47.5**	**58.5**	**16.5**	**243**	**222**	**21.7**	**26.8**	**17.7**	**22.7**	**29.6**	**43.4**	**11.6**	**25.9**
Chromium (VI)	mg/kg	240	48	48													0.108 U
Copper	mg/kg	3200	36	36	**17.1**	**407**	**11.3**	**41.1**	**39**	**40.7**	**24**	**17.8**	**15.6**	**68.5**	**39**	**4.01**	**35.1**
Lead	mg/kg	250	81	250													**6**
Mercury	mg/kg	24	24	24													**0.18 J**
Nickel	mg/kg	1600	48	48													**34**
Zinc	mg/kg	24000	85	100	**25**	**189**	**24.6**	**208**	**187**	**39.6**	**52**	**32.7**	**24.9**	**65.7**	**68.5**	**20.4**	**75 J**
PAHs																	
1-Methylnaphthalene	mg/kg	34			0.01 U			0.05 U				0.01 U		**0.062**			0.0068 U
2-Methylnaphthalene	mg/kg	320			0.01 U			0.05 U				0.01 U		**0.049**			0.0068 U
Acenaphthene	mg/kg	4800	0.26	5.2	0.01 U			0.05 U				0.01 U		0.01 U			0.0068 U
Acenaphthylene	mg/kg				0.01 U			0.05 U				0.01 U		0.01 U			0.0068 U
Anthracene	mg/kg	24000	3.5	71	0.01 U			0.05 U				0.01 U		0.01 U			0.0068 U
Benzo(g,h,i)perylene	mg/kg				0.01 U			**0.059**				0.01 U		**0.016**			0.0068 U
Fluoranthene	mg/kg	3200	2.6	52	0.01 U			**0.078**				0.01 U		**0.054**			**0.011**
Fluorene	mg/kg	3200	0.37	7.4	0.01 U			0.05 U				0.01 U		0.01 U			0.0068 U
Naphthalene	mg/kg	1600	0.17	3.5	0.01 U			0.05 U				0.01 U		**0.023**			0.0068 U
Phenanthrene	mg/kg				0.01 U			0.05 U				0.01 U		**0.088**			**0.012**
Pyrene	mg/kg	2400	16	330	0.01 U			**0.077**				0.01 U		**0.096**			**0.0081**
Benz(a)anthracene	mg/kg				0.01 U			**0.057**				0.01 U		**0.031**			0.0068 U
Benzo(a)pyrene	mg/kg				0.01 U			**0.066**				0.01 U		**0.028**			0.0068 U
Benzo(b)fluoranthene	mg/kg				0.01 U			**0.099**				0.01 U		**0.04**			0.0068 U
Benzo(j,k)fluoranthene	mg/kg																
Benzo(k)fluoranthene	mg/kg				0.01 U			0.05 U				0.01 U		**0.011**			0.0068 U
Chrysene	mg/kg				0.01 U			**0.086**				0.01 U		**0.074**			0.0068 U
Dibenzo(a,h)anthracene	mg/kg				0.01 U			0.05 U				0.01 U		0.01 U			0.0068 U
Indeno(1,2,3-cd)pyrene	mg/kg				0.01 U			0.05 U				0.01 U		**0.013**			0.0068 U
Total cPAHs TEQ	mg/kg	0.19	0.31	6.2	0.0076 U			**0.090**				0.0076 U		**0.039**			0.0061 U

Notes:

Bold - detected

Blue Shaded - Detected result exceeded respective cleanup level based on unrestricte

Tan Shaded - Detected result exceeded respective cleanup level based on predicted (

Leaching-based cleanup levels less than the analytical practical quantitation limit (PQL

U - Analyte not detected at or above the reporting limit shown

J - Analyte was positively identified, and the reported value is an estimate

" " - indicates result not available

Sample Type: N - Normal sample. FD - Field duplicate sample.

Table 2A. Soil Quality Data - Metals and PAHs

Project No. 210368-A-05 , Lignin Operable Unitl, GP West Site, Bellingham, Washington

				Location	**LW-SS01**	**LW-SS02**	**LW-SS03**	**LW-SS04**
				Depth	**0 - 0.5 ft**	**0 - 0.5 ft**	**0 - 0.5 ft**	**0 - 0.5 ft**
				Sample Type	**N**	**N**	**N**	**N**
				Date	**07/20/2004**	**07/20/2004**	**07/20/2004**	**07/20/2004**
				Matrix	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**
			CUL Based on Leaching					
Analyte	Unit	CUL Based on Direct Contact	Saturated Soil	Unsaturated Soil				
Metals								
Arsenic	mg/kg	20	20	20	10 U	**10**	10 U	10 U
Cadmium	mg/kg	80	1	1	0.5 U	**1**	**0.6**	**1.4**
Chromium	mg/kg	120000	260	5200	**24.9**	**173**	**1560**	**722**
Chromium (VI)	mg/kg	240	48	48	0.112 U	0.105 U	0.124 U	**0.123**
Copper	mg/kg	3200	36	36	**36.6**	**88.4**	**66.5**	**53.3**
Lead	mg/kg	250	81	250	**6**	**54**	**53**	**80**
Mercury	mg/kg	24	24	24	**0.19 J**	**0.57 J**	**0.34 J**	**0.29 J**
Nickel	mg/kg	1600	48	48	**30**	**52**	**24**	**36**
Zinc	mg/kg	24000	85	100	**71 J**	**377 J**	**489 J**	**1,450 J**
PAHs								
1-Methylnaphthalene	mg/kg	34			0.0068 U	**0.022**	**0.063**	0.0076 U
2-Methylnaphthalene	mg/kg	320			0.0068 U	**0.042**	**0.14**	**0.015**
Acenaphthene	mg/kg	4800	0.26	5.2	0.0068 U	**0.24**	**2.4**	**0.0091**
Acenaphthylene	mg/kg				0.0068 U	**0.039**	**0.049**	**0.015**
Anthracene	mg/kg	24000	3.5	71	0.0068 U	**0.3**	**2.4**	**0.046**
Benzo(g,h,i)perylene	mg/kg				0.0068 U	**0.57**	**15**	**0.022**
Fluoranthene	mg/kg	3200	2.6	52	**0.016**	**2.7**	**22**	**0.11**
Fluorene	mg/kg	3200	0.37	7.4	0.0068 U	**0.082**	**0.57**	**0.011**
Naphthalene	mg/kg	1600	0.17	3.5	0.0068 U	**0.048**	**0.17**	**0.014**
Phenanthrene	mg/kg				**0.018**	**1.1**	**8.8**	**0.084**
Pyrene	mg/kg	2400	16	330	**0.012**	**2.3**	**20**	**0.085**
Benz(a)anthracene	mg/kg				0.0068 U	**1.8**	**17**	**0.038**
Benzo(a)pyrene	mg/kg				0.0068 U	**2.4**	**22**	**0.049**
Benzo(b)fluoranthene	mg/kg				0.0068 U	**2.2**	**20**	**0.073**
Benzo(j,k)fluoranthene	mg/kg							
Benzo(k)fluoranthene	mg/kg				0.0068 U	**2.1**	**16**	**0.073**
Chrysene	mg/kg				**0.01**	**1.9**	**17**	**0.053**
Dibenzo(a,h)anthracene	mg/kg				0.0068 U	**0.25**	**1.5**	0.0076 U
Indeno(1,2,3-cd)pyrene	mg/kg				0.0068 U	**0.56**	**13**	**0.02**
Total cPAHs TEQ	mg/kg	0.19	0.31	6.2	**0.0052**	**3.11**	**28.95**	**0.07**

Notes:

Bold - detected

Blue Shaded - Detected result exceeded respective cleanup level based on unrestricte

Tan Shaded - Detected result exceeded respective cleanup level based on predicted (r

Leaching-based cleanup levels less than the analytical practical quantitation limit (PQL

U - Analyte not detected at or above the reporting limit shown

J - Analyte was positively identified, and the reported value is an estimate

" " - indicates result not available

Sample Type: N - Normal sample. FD - Field duplicate sample.

Table 2B. Soil Quality Data - TPH, SVOCs, and Conventionals

Project No. 210368-A-05 , Lignin Operable Unit, GP West Site, Bellingham, Washington

Location					**LW-MW01**	**LW-MW01**	**LW-MW04**	**LW-MW04**	**LW-MW04**	**LW-SB01**	**LW-SB01**	**LW-SB02**	**LW-SB02**	**LW-SB03**	**LW-SB03**	**LW-SB04**	**LW-SB04**	**LW-SB101**
Depth					**2.5 - 4 ft**	**5 - 6.5 ft**	**0 - 1 ft**	**5 - 6 ft**	**7.5 - 8.5 ft**	**0 - 4 ft**	**4 - 8 ft**	**0 - 4 ft**	**4 - 8 ft**	**0 - 4 ft**	**4 - 8 ft**	**0 - 4 ft**	**4 - 8 ft**	**1 ft**
Sample Type					**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Date					**07/16/2004**	**07/16/2004**	**01/20/2022**	**01/20/2022**	**01/20/2022**	**07/21/2004**	**07/21/2004**	**07/21/2004**	**07/21/2004**	**07/23/2004**	**07/23/2004**	**07/22/2004**	**07/22/2004**	**08/03/2020**
Matrix					**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**
			CUL Based on Leaching															
Analyte	Unit	CUL Based on Direct Contact	Saturated Soil	Unsaturated Soil														
TPHs																		
Diesel Range Organics	mg/kg						50 U	50 U	50 U									26 U
Motor Oil Range Organics	mg/kg						250 U	250 U	250 U									**120**
Diesel + Oil Range Organics	mg/kg		2000	2000			250 U	250 U	250 U									**133**
Other SVOCs																		
1,2,4-Trichlorobenzene	mg/kg	34	0.073	0.073	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
1,2-Dichlorobenzene	mg/kg	7200	0.073	0.073	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
1,3-Dichlorobenzene	mg/kg		0.073	0.073	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
1,4-Dichlorobenzene	mg/kg	190	0.073	0.073	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
2,4,5-Trichlorophenol	mg/kg	8000	0.37	0.37	0.46 U	2.5 U				0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	
2,4,6-Trichlorophenol	mg/kg	80	0.4	7	0.46 U	2.5 U				0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	
2,4-Dichlorophenol	mg/kg	240	0.22	0.22	0.28 U	1.5 U				0.24 U	0.25 U	0.27 U	0.25 U	0.22 U	0.23 U	0.22 U	0.28 U	
2,4-Dimethylphenol	mg/kg	1600	0.22	0.22	0.28 U	1.5 U				0.24 U	0.25 U	0.27 U	0.25 U	0.22 U	0.23 U	0.22 U	0.28 U	
2,4-Dinitrophenol	mg/kg	160	0.73	0.73	0.92 U	4.9 U				0.82 U	0.85 U	0.89 U	0.84 U	0.73 U	0.75 U	0.73 U	0.92 U	
2,4-Dinitrotoluene	mg/kg	3.2	0.37	0.37	0.46 U	2.5 U				0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	
2,6-Dinitrotoluene	mg/kg	0.67	0.37	0.37	0.46 U	2.5 U				0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	
2-Chloronaphthalene	mg/kg	6400	0.28	5.4	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
2-Chlorophenol	mg/kg	400	0.073	0.2	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
2-Methylphenol	mg/kg	4000	0.073	0.11	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
2-Nitroaniline	mg/kg	800	290	4600	0.46 U	2.5 U				0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	
2-Nitrophenol	mg/kg				0.46 U	2.5 U				0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	
3,3'-Dichlorobenzidine	mg/kg	2.2	0.37	0.37	0.46 U	2.5 U				0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	
3-Nitroaniline	mg/kg				0.55 U	3 U				0.49 U	0.51 U	0.53 U	0.51 U	0.44 U	0.45 U	0.44 U	0.55 U	
4,6-Dinitro-2-methylphenol	mg/kg		0.73	0.73	0.92 U	4.9 U				0.82 U	0.85 U	0.89 U	0.84 U	0.73 U	0.75 U	0.73 U	0.92 U	
4-Bromophenyl phenyl ether	mg/kg				0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
4-Chloro-3-methylphenol	mg/kg		0.15	0.5	0.18 U	0.98 U				0.16 U	0.17 U	0.18 U	0.17 U	0.15 U	0.15 U	0.15 U	0.18 U	
4-Chloroaniline	mg/kg	5	0.96	15	0.28 U	1.5 U				0.24 U	0.25 U	0.27 U	0.25 U	0.22 U	0.23 U	0.22 U	0.28 U	
4-Chlorophenyl phenyl ether	mg/kg				0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
4-Methylphenol	mg/kg	8000	0.073	1.1	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
4-Nitroaniline	mg/kg	50	30	430	0.46 U	2.5 U				0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	
4-Nitrophenol	mg/kg				0.46 U	2.5 U				0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	
Benzoic acid	mg/kg	320000	0.73	2.4	0.92 U	4.9 U				0.82 U	0.85 U	0.89 U	0.84 U	0.73 U	0.75 U	0.73 U	0.92 U	
Benzyl alcohol	mg/kg	8000	0.37	0.37	0.46 U	2.5 U				0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	
Benzyl butyl phthalate	mg/kg	530	0.073	0.073	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
Bis(2-chloro-1-methylethyl) ether	mg/kg		0.33	5.1						0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
Bis(2-chloroethoxy)methane	mg/kg	240			0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
Bis(2-chloroethyl) ether	mg/kg	0.91	0.15	0.15	0.18 U	0.98 U				0.16 U	0.17 U	0.18 U	0.17 U	0.15 U	0.15 U	0.15 U	0.18 U	
Bis(2-ethylhexyl) phthalate	mg/kg	71	0.073	0.1	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	**1**	**0.98**	0.073 U	0.092 U	
Carbazole	mg/kg				0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
Dibenzofuran	mg/kg	80	0.073	0.58	0.0092 U	0.0082 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
Diethyl phthalate	mg/kg	64000	0.073	0.52	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
Dimethyl phthalate	mg/kg		0.073	0.27	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	

Table 2B. Soil Quality Data - TPH, SVOCs, and Conventionals

Project No. 210368-A-05 , Lignin Operable Unit, GP West Site, Bellingham, Washington

Location					**LW-MW01**	**LW-MW01**	**LW-MW04**	**LW-MW04**	**LW-MW04**	**LW-SB01**	**LW-SB01**	**LW-SB02**	**LW-SB02**	**LW-SB03**	**LW-SB03**	**LW-SB04**	**LW-SB04**	**LW-SB101**
Depth					**2.5 - 4 ft**	**5 - 6.5 ft**	**0 - 1 ft**	**5 - 6 ft**	**7.5 - 8.5 ft**	**0 - 4 ft**	**4 - 8 ft**	**0 - 4 ft**	**4 - 8 ft**	**0 - 4 ft**	**4 - 8 ft**	**0 - 4 ft**	**4 - 8 ft**	**1 ft**
Sample Type					**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Date					**07/16/2004**	**07/16/2004**	**01/20/2022**	**01/20/2022**	**01/20/2022**	**07/21/2004**	**07/21/2004**	**07/21/2004**	**07/21/2004**	**07/23/2004**	**07/23/2004**	**07/22/2004**	**07/22/2004**	**08/03/2020**
Matrix					**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**
Analyte	Unit	CUL Based on Direct Contact	CUL Based on Leaching															
			Saturated Soil	Unsaturated Soil														
Other SVOCs (continued)																		
Di-n-butyl phthalate	mg/kg		0.073	0.28	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
Di-n-octyl phthalate	mg/kg	800	0.33	6.5	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
Hexachlorobenzene	mg/kg	0.63	0.073	0.073	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
Hexachlorobutadiene	mg/kg	13	0.15	0.15	0.18 U	0.98 U				0.16 U	0.17 U	0.18 U	0.17 U	0.15 U	0.15 U	0.15 U	0.18 U	
Hexachlorocyclopentadiene	mg/kg	480	0.37	0.37	0.46 U	2.5 U				0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	
Hexachloroethane	mg/kg	25	0.15	0.15	0.18 U	0.98 U				0.16 U	0.17 U	0.18 U	0.17 U	0.15 U	0.15 U	0.15 U	0.18 U	
Isophorone	mg/kg	1100	0.073	0.58	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
Nitrobenzene	mg/kg	160	0.073	0.64	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
N-Nitroso-di-n-propylamine	mg/kg	0.14	0.15	0.15	0.18 U	0.98 U				0.16 U	0.17 U	0.18 U	0.17 U	0.15 U	0.15 U	0.15 U	0.18 U	
N-Nitrosodiphenylamine	mg/kg	200	0.073	0.073	0.092 U	0.49 U				0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	
Pentachlorophenol	mg/kg	2.5	0.37	0.37	0.46 U	2.5 U				0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	
Phenol	mg/kg	24000	0.15	0.78	0.18 U	0.98 U				0.16 U	0.17 U	0.18 U	0.17 U	0.15 U	0.15 U	0.15 U	0.18 U	
Conventionals (including other metals)																		
Formaldehyde	mg/kg	16000				**261**				**6.51**			**36.4**	**19.7**			**150 J**	
Iron	mg/kg				**11500**	**13900**				**18400**	**20300**	**32800**	**16100**	**26000**	**20300**	**18600**	**26600**	
Manganese	mg/kg	3700			**265**	**174**				**2780**	**611**	**481**	**286**	**585**	**450**	**318**	**518**	
pH	pH units	2.5-11			**8.51**	**7.67**				**11.85**	**10.38**	**8.06**	**8.05**	**7.45**	**10.36**	**7.58**	**8.44**	

Notes:

Bold - detected

Blue Shaded - Detected result exceeded respective cleanup level based on unrestricted soil direct contact.

Tan Shaded - Detected result exceeded respective cleanup level based on predicted (modeled) leaching to groundwater. Refer to text regarding empirical groundwater data.

Leaching-based cleanup levels less than the analytical practical quantitation limit (PQL) are set at the PQL for the dataset.

U - Analyte not detected at or above the reporting limit shown

J - Analyte was positively identified, and the reported value is an estimate

" " - indicates result not available

Sample Type: N - Normal sample. FD - Field duplicate sample.

Table 2B. Soil Quality Data - TPH, SVOCs, and Conventionals

Project No. 210368-A-05 , Lignin Operable Unit, GP West Site, Bellingham, Washington

				Location	**LW-SB101**	**LW-SB101**	**LW-SB102**	**LW-SB102**	**LW-SB102**	**LW-SB103**	**LW-SB103**	**LW-SB103**	**LW-SB104**	**LW-SB104**	**LW-SB104**	**LW-SB105**	**LW-SB105**	**LW-SB105**
				Depth	**10.5 ft**	**13.5 ft**	**1 ft**	**8 ft**	**11 ft**	**1 ft**	**7.3 ft**	**11 ft**	**1.5 ft**	**5 ft**	**10 ft**	**1.5 ft**	**7 ft**	**12 ft**
				Sample Type	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
				Date	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**	**08/03/2020**
				Matrix	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**
			CUL Based on Leaching															
Analyte	Unit	CUL Based on Direct Contact	Saturated Soil	Unsaturated Soil														
TPHs																		
Diesel Range Organics	mg/kg				31 U	30 U	**31 J**	31 U	32 U	26 U	30 U	30 U	**29**	31 U	37 U	27 U	33 U	33 U
Motor Oil Range Organics	mg/kg				62 U	60 U	**770**	61 U	64 U	53 U	61 U	60 U	**170**	63 U	**76**	54 U	65 U	65 U
Diesel + Oil Range Organics	mg/kg		2000	2000	62 U	60 U	**801 J**	61 U	64 U	53 U	61 U	60 U	**199**	63 U	**94.5**	54 U	65 U	65 U
Other SVOCs																		
1,2,4-Trichlorobenzene	mg/kg	34	0.073	0.073														
1,2-Dichlorobenzene	mg/kg	7200	0.073	0.073														
1,3-Dichlorobenzene	mg/kg		0.073	0.073														
1,4-Dichlorobenzene	mg/kg	190	0.073	0.073														
2,4,5-Trichlorophenol	mg/kg	8000	0.37	0.37														
2,4,6-Trichlorophenol	mg/kg	80	0.4	7														
2,4-Dichlorophenol	mg/kg	240	0.22	0.22														
2,4-Dimethylphenol	mg/kg	1600	0.22	0.22														
2,4-Dinitrophenol	mg/kg	160	0.73	0.73														
2,4-Dinitrotoluene	mg/kg	3.2	0.37	0.37														
2,6-Dinitrotoluene	mg/kg	0.67	0.37	0.37														
2-Chloronaphthalene	mg/kg	6400	0.28	5.4														
2-Chlorophenol	mg/kg	400	0.073	0.2														
2-Methylphenol	mg/kg	4000	0.073	0.11														
2-Nitroaniline	mg/kg	800	290	4600														
2-Nitrophenol	mg/kg																	
3,3'-Dichlorobenzidine	mg/kg	2.2	0.37	0.37														
3-Nitroaniline	mg/kg																	
4,6-Dinitro-2-methylphenol	mg/kg		0.73	0.73														
4-Bromophenyl phenyl ether	mg/kg																	
4-Chloro-3-methylphenol	mg/kg		0.15	0.5														
4-Chloroaniline	mg/kg	5	0.96	15														
4-Chlorophenyl phenyl ether	mg/kg																	
4-Methylphenol	mg/kg	8000	0.073	1.1														
4-Nitroaniline	mg/kg	50	30	430														
4-Nitrophenol	mg/kg																	
Benzoic acid	mg/kg	320000	0.73	2.4														
Benzyl alcohol	mg/kg	8000	0.37	0.37														
Benzyl butyl phthalate	mg/kg	530	0.073	0.073														
Bis(2-chloro-1-methylethyl) ether	mg/kg		0.33	5.1														
Bis(2-chloroethoxy)methane	mg/kg	240																
Bis(2-chloroethyl) ether	mg/kg	0.91	0.15	0.15														
Bis(2-ethylhexyl) phthalate	mg/kg	71	0.073	0.1														
Carbazole	mg/kg																	
Dibenzofuran	mg/kg	80	0.073	0.58														
Diethyl phthalate	mg/kg	64000	0.073	0.52														
Dimethyl phthalate	mg/kg		0.073	0.27														

Table 2B. Soil Quality Data - TPH, SVOCs, and Conventionals

Project No. 210368-A-05 , Lignin Operable Unit, GP West Site, Bellingham, Washington

				Location	LW-SB101	LW-SB101	LW-SB102	LW-SB102	LW-SB102	LW-SB103	LW-SB103	LW-SB103	LW-SB104	LW-SB104	LW-SB104	LW-SB105	LW-SB105	LW-SB105
				Depth	10.5 ft	13.5 ft	1 ft	8 ft	11 ft	1 ft	7.3 ft	11 ft	1.5 ft	5 ft	10 ft	1.5 ft	7 ft	12 ft
				Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N
				Date	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020
				Matrix	Sat. Soil	Sat. Soil	Unsat. Soil	Sat. Soil	Sat. Soil	Unsat. Soil	Sat. Soil	Sat. Soil	Unsat. Soil	Sat. Soil	Sat. Soil	Unsat. Soil	Sat. Soil	Sat. Soil
			CUL Based on Leaching															
Analyte	Unit	CUL Based on Direct Contact	Saturated Soil	Unsaturated Soil														
Other SVOCs (continued)																		
Di-n-butyl phthalate	mg/kg		0.073	0.28														
Di-n-octyl phthalate	mg/kg	800	0.33	6.5														
Hexachlorobenzene	mg/kg	0.63	0.073	0.073														
Hexachlorobutadiene	mg/kg	13	0.15	0.15														
Hexachlorocyclopentadiene	mg/kg	480	0.37	0.37														
Hexachloroethane	mg/kg	25	0.15	0.15														
Isophorone	mg/kg	1100	0.073	0.58														
Nitrobenzene	mg/kg	160	0.073	0.64														
N-Nitroso-di-n-propylamine	mg/kg	0.14	0.15	0.15														
N-Nitrosodiphenylamine	mg/kg	200	0.073	0.073														
Pentachlorophenol	mg/kg	2.5	0.37	0.37														
Phenol	mg/kg	24000	0.15	0.78														
Conventionals (including other metals)																		
Formaldehyde	mg/kg	16000																
Iron	mg/kg																	
Manganese	mg/kg	3700																
pH	pH units	2.5-11																

Notes:

Bold - detected

Blue Shaded - Detected result exceeded respective cleanup level based on unrestricted

Tan Shaded - Detected result exceeded respective cleanup level based on predicted (m

Leaching-based cleanup levels less than the analytical practical quantitation limit (PQL)

U - Analyte not detected at or above the reporting limit shown

J - Analyte was positively identified, and the reported value is an estimate

" " - indicates result not available

Sample Type: N - Normal sample. FD - Field duplicate sample.

Table 2B. Soil Quality Data - TPH, SVOCs, and Conventionals

Project No. 210368-A-05 , Lignin Operable Unit, GP West Site, Bellingham, Washington

Location					**LW-SB106**	**LW-SB106**	**LW-SB106**	**LW-SS01**	**LW-SS01**	**LW-SS02**	**LW-SS03**	**LW-SS04**
Depth					**2 ft**	**8 ft**	**11.5 ft**	**0 - 0.5 ft**	**0 - 0.5 ft**	**0 - 0.5 ft**	**0 - 0.5 ft**	**0 - 0.5 ft**
Sample Type					**N**	**N**	**N**	**FD**	**N**	**N**	**N**	**N**
Date					**08/03/2020**	**08/03/2020**	**08/03/2020**	**07/20/2004**	**07/20/2004**	**07/20/2004**	**07/20/2004**	**07/20/2004**
Matrix					**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**
			CUL Based on Leaching									
Analyte	Unit	CUL Based on Direct Contact	Saturated Soil	Unsaturated Soil								
TPHs												
Diesel Range Organics	mg/kg				34 U	32 U	30 U					
Motor Oil Range Organics	mg/kg				68 U	63 U	60 U					
Diesel + Oil Range Organics	mg/kg		2000	2000	68 U	63 U	60 U					
Other SVOCs												
1,2,4-Trichlorobenzene	mg/kg	34	0.073	0.073				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
1,2-Dichlorobenzene	mg/kg	7200	0.073	0.073				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
1,3-Dichlorobenzene	mg/kg		0.073	0.073				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
1,4-Dichlorobenzene	mg/kg	190	0.073	0.073				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
2,4,5-Trichlorophenol	mg/kg	8000	0.37	0.37				0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
2,4,6-Trichlorophenol	mg/kg	80	0.4	7				0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
2,4-Dichlorophenol	mg/kg	240	0.22	0.22				0.2 U	0.2 U	0.2 U	0.22 U	0.23 U
2,4-Dimethylphenol	mg/kg	1600	0.22	0.22				0.2 U	0.2 U	0.2 U	0.22 U	0.23 U
2,4-Dinitrophenol	mg/kg	160	0.73	0.73				0.68 U	0.68 U	0.68 U	0.73 U	0.75 U
2,4-Dinitrotoluene	mg/kg	3.2	0.37	0.37				0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
2,6-Dinitrotoluene	mg/kg	0.67	0.37	0.37				0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
2-Chloronaphthalene	mg/kg	6400	0.28	5.4				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
2-Chlorophenol	mg/kg	400	0.073	0.2				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
2-Methylphenol	mg/kg	4000	0.073	0.11				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
2-Nitroaniline	mg/kg	800	290	4600				0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
2-Nitrophenol	mg/kg							0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
3,3'-Dichlorobenzidine	mg/kg	2.2	0.37	0.37				0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
3-Nitroaniline	mg/kg							0.41 U	0.41 U	0.41 U	0.44 U	0.45 U
4,6-Dinitro-2-methylphenol	mg/kg		0.73	0.73				0.68 U	0.68 U	0.68 U	0.73 U	0.75 U
4-Bromophenyl phenyl ether	mg/kg							0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
4-Chloro-3-methylphenol	mg/kg		0.15	0.5				0.14 U	0.14 U	0.14 U	0.15 U	0.15 U
4-Chloroaniline	mg/kg	5	0.96	15				0.2 U	0.2 U	0.2 U	0.22 U	0.23 U
4-Chlorophenyl phenyl ether	mg/kg							0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
4-Methylphenol	mg/kg	8000	0.073	1.1				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
4-Nitroaniline	mg/kg	50	30	430				0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
4-Nitrophenol	mg/kg							0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
Benzoic acid	mg/kg	320000	0.73	2.4				0.68 U	0.68 U	0.68 U	0.73 U	0.75 U
Benzyl alcohol	mg/kg	8000	0.37	0.37				0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
Benzyl butyl phthalate	mg/kg	530	0.073	0.073				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Bis(2-chloro-1-methylethyl) ether	mg/kg		0.33	5.1				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Bis(2-chloroethoxy)methane	mg/kg	240						0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Bis(2-chloroethyl) ether	mg/kg	0.91	0.15	0.15				0.14 U	0.14 U	0.14 U	0.15 U	0.15 U
Bis(2-ethylhexyl) phthalate	mg/kg	71	0.073	0.1				0.068 U	0.068 U	**0.36**	**1.4**	**0.14**
Carbazole	mg/kg							0.068 U	0.068 U	**0.14**	**1.1**	0.075 U
Dibenzofuran	mg/kg	80	0.073	0.58				0.068 U	0.068 U	0.068 U	**0.22**	0.075 U
Diethyl phthalate	mg/kg	64000	0.073	0.52				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Dimethyl phthalate	mg/kg		0.073	0.27				0.068 U	0.068 U	**0.37**	0.073 U	0.075 U

Table 2B. Soil Quality Data - TPH, SVOCs, and Conventionals

Project No. 210368-A-05 , Lignin Operable Unit, GP West Site, Bellingham, Washington

				Location	**LW-SB106**	**LW-SB106**	**LW-SB106**	**LW-SS01**	**LW-SS01**	**LW-SS02**	**LW-SS03**	**LW-SS04**
				Depth	**2 ft**	**8 ft**	**11.5 ft**	**0 - 0.5 ft**	**0 - 0.5 ft**	**0 - 0.5 ft**	**0 - 0.5 ft**	**0 - 0.5 ft**
				Sample Type	**N**	**N**	**N**	**FD**	**N**	**N**	**N**	**N**
				Date	**08/03/2020**	**08/03/2020**	**08/03/2020**	**07/20/2004**	**07/20/2004**	**07/20/2004**	**07/20/2004**	**07/20/2004**
				Matrix	**Unsat. Soil**	**Sat. Soil**	**Sat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**	**Unsat. Soil**
			CUL Based on Leaching									
Analyte	Unit	CUL Based on Direct Contact	Saturated Soil	Unsaturated Soil								
Other SVOCs (continued)												
Di-n-butyl phthalate	mg/kg		0.073	0.28				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Di-n-octyl phthalate	mg/kg	800	0.33	6.5				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Hexachlorobenzene	mg/kg	0.63	0.073	0.073				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Hexachlorobutadiene	mg/kg	13	0.15	0.15				0.14 U	0.14 U	0.14 U	0.15 U	0.15 U
Hexachlorocyclopentadiene	mg/kg	480	0.37	0.37				0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
Hexachloroethane	mg/kg	25	0.15	0.15				0.14 U	0.14 U	0.14 U	0.15 U	0.15 U
Isophorone	mg/kg	1100	0.073	0.58				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Nitrobenzene	mg/kg	160	0.073	0.64				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
N-Nitroso-di-n-propylamine	mg/kg	0.14	0.15	0.15				0.14 U	0.14 U	0.14 U	0.15 U	0.15 U
N-Nitrosodiphenylamine	mg/kg	200	0.073	0.073				0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Pentachlorophenol	mg/kg	2.5	0.37	0.37				0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
Phenol	mg/kg	24000	0.15	0.78				0.14 U	0.14 U	0.14 U	0.15 U	0.15 U
Conventionals (including other metals)												
Formaldehyde	mg/kg	16000						**11.1**	**9.26**	**18.1**	**15.8**	**11.7**
Iron	mg/kg							**28500**	**25600**	**39500**	**42400**	**29500**
Manganese	mg/kg	3700						**500**	**452**	**544**	**461**	**468**
pH	pH units	2.5-11						**6.85**	**7**	**7.49**	**5.21**	**7.76**

Notes:

Bold - detected

Blue Shaded - Detected result exceeded respective cleanup level based on unrestricted

Tan Shaded - Detected result exceeded respective cleanup level based on predicted (m

Leaching-based cleanup levels less than the analytical practical quantitation limit (PQL)

U - Analyte not detected at or above the reporting limit shown

J - Analyte was positively identified, and the reported value is an estimate

" " - indicates result not available

Sample Type: N - Normal sample. FD - Field duplicate sample.

Table 3. Groundwater Quality Data

Project 210368, Lignin Operable Unit, GP West Site, Bellingham, Washington

		Location	LW-MW01						LW-MW02		LW-MW03		LW-MW04	
		Sample Type	N	FD	N	N	N	N	N	N	N	N	N	N
		Date	7/27/2004	7/27/2004	10/1/2009	3/30/2010	1/24/2022	2/28/2022	1/24/2022	2/28/2022	1/24/2022	2/28/2022	1/24/2022	2/28/2022
Analyte	Unit	Groundwater Cleanup Level												
Dissolved Metals														
Arsenic	ug/L	8	17	17.0	3.95	2.3								
Cadmium	ug/L	7.9	12	11.1	0.074	0.047		1 U						
Chromium	ug/L	260	1,170	1,110	633	792	16.7	45.1	465	87.6	53.0	54.9	3.51	2.67
Chromium (VI)	ug/L	50	224 U	224 U	50 U	50 U								
Copper	ug/L	3.1	75	78	3.08	2.99	3 U	3 U	3 U	4.56	3 U	4.64	3 U	3 U
Lead	ug/L	8.1	34	32	0.132	0.133								
Mercury	ug/L	0.059	0.3	0.2	0.00197	0.00225	0.01 U		0.01 U		0.01 U		0.01 U	0.01 U
Nickel	ug/L	8.2	64	63	5.53	5.11								
Zinc	ug/L	81	110	100	4.4	3.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Total Petroleum Hydrocarbons (TPH)*														
Diesel Range Organics	ug/L		250 U	250 U									1100 x	52
Oil Range Organics	ug/L		500 U	500 U									940 x	250 U
Diesel + Oil Range Organics	ug/L	2100	500 U	500 U									2040 x	52
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene	ug/L	3.3	0.10 U	0.10 U									0.055	0.037
Acenaphthylene	ug/L		0.10 U	0.10 U									0.005 U	0.005 U
Anthracene	ug/L	9.6	0.10	0.10 U									0.005 U	0.005 U
Benzo(g,h,i)perylene	ug/L		0.10 U	0.10 U									0.01 U	0.01 U
Fluoranthene	ug/L	3.3	0.10 U	0.10 U									0.0096	0.0075
Fluorene	ug/L	3.0	0.15	0.10 U									0.029	0.022
Phenanthrene	ug/L		0.10 U	0.10 U									0.005 U	0.005 U
Pyrene	ug/L	15	0.10 U	0.10 U									0.011	0.005 U
1-Methylnaphthalene	ug/L		0.10 U	0.10 U									0.05 U	0.05 U
2-Methylnaphthalene	ug/L		0.11	0.10 U									0.05 U	0.05 U
Naphthalene	ug/L	1.4	0.10 U	0.10 U									0.05 U	0.05 U
Benz(a)anthracene	ug/L		0.10 U	0.10 U									0.005 U	0.005 U
Benzo(a)pyrene	ug/L		0.10 U	0.10 U									0.005 U	0.005 U
Benzo(b)fluoranthene	ug/L		0.10 U	0.10 U									0.005 U	0.005 U
Benzo(k)fluoranthene	ug/L		0.10 U	0.10 U									0.005 U	0.005 U
Chrysene	ug/L		0.10 U	0.10 U									0.005 U	0.005 U
Dibenzo(a,h)anthracene	ug/L		0.10 U	0.10 U									0.005 U	0.005 U
Indeno(1,2,3-cd)pyrene	ug/L		0.10 U	0.10 U									0.005 U	0.005 U
Total cPAHs TEQ	ug/L	0.02	0.15 U	0.15 U									0.0076 U	0.0076 U

Table 3. Groundwater Quality Data

Project 210368, Lignin Operable Unit, GP West Site, Bellingham, Washington

		Location	**LW-MW01**						**LW-MW02**		**LW-MW03**		**LW-MW04**	
		Sample Type	**N**	**FD**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
		Date	**7/27/2004**	**7/27/2004**	**10/1/2009**	**3/30/2010**	**1/24/2022**	**2/28/2022**	**1/24/2022**	**2/28/2022**	**1/24/2022**	**2/28/2022**	**1/24/2022**	**2/28/2022**
Analyte	Unit	Groundwater Cleanup Level												
Field Parameters														
Conductivity	us/cm		2,850		1,476	1,175	384	574	2,160	2117	1,058	932	416	393
Dissolved Oxygen	mg/L		1.62		0.43	0.6	0.52	N/A	0.15	N/A	0.51	N/A	0.19	N/A
ORP	mVolts		-418		-366	-306	16	-195	-126	-263	-49	-234	-102	-227
pH	pH units	6.2 - 8.5	10.8		8.4	8.9	7.2	7.3	7.2	7.4	7.0	7.2	7.2	7.2
Temperature	deg C		17.52		18	11.54	9.5	10	10.5	10.7	10	10.1	7.8	8.2
Total Suspended Solids	mg/L		56.2	42.7										
Turbidity	NTU		252		10	20	6	3	3	3	9	13	8	20

Notes:

Groundwater cleanup levels from the Chlor-Alkali RAU Cleanup Action Plan (September 2021)

Bold - detected

Blue Shaded - Detected result exceeded respective cleanup level

U - Analyte not detected at or above the reporting limit shown

J - Analyte was positively identified, and the reported value is an estimate

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

Sample Type: N - Normal sample. FD - Field duplicate sample.

*: For the 2022 groundwater TPH analyses, the February sample was run with silica gel cleanup and the January sample was not.

N/A - YSI was providing unreliable Dissolved Oxygen readings during February 2022 sampling event.

Table 4. Soil Cleanup Levels for Contaminants of Concern

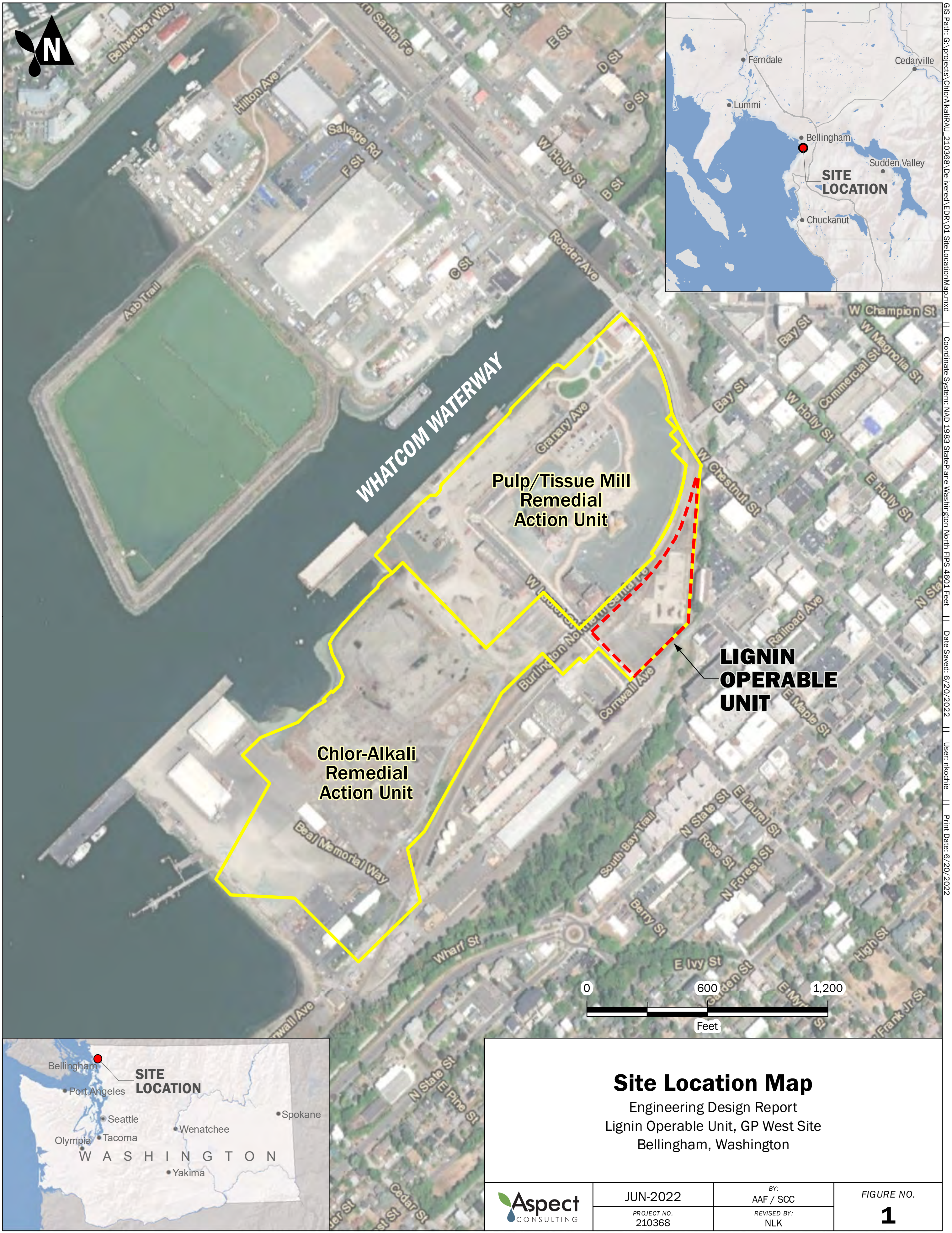
Project No. 210368-A-05 , Lignin Operable Unitl, GP West Site, Bellingham, Washington

Constituent of Concern	Soil Cleanup Level (mg/kg) Based on Unrestricted Direct Contact	Based on Leaching to Groundwater: Unsaturated Soil	Based on Leaching to Groundwater: Saturated Soil
Heavy Metals			
Cadmium	80	1	1
Chromium (Total)	120,000	5,200	260
Copper	3,200	36	36
Zinc	24,000	100	85
Polycyclic Aromatic Hydrocarbons (PAHs)			
Total cPAHs (TEQ)	0.19	6.2	0.31

Abbreviations: cPAH: carcinogenic PAH. mg/kg: milligrams per kilogram. TEQ: toxic equivalent concentration of benzo(a)pyrene.

Note: Cleanup levels are from the Chlor-Alkali Remedial Action Unit Cleanup Action Plan (Ecology, 2021), with distinction made here for levels based on soil direct contact versus those based on leaching to groundwater.

FIGURES



Site Location Map

Engineering Design Report
Lignin Operable Unit, GP West Site
Bellingham, Washington

Aspect CONSULTING	JUN-2022	BY: AAF / SCC	FIGURE NO.
	PROJECT NO. 210368	REVISED BY: NLK	1

GIS Path: G:\projects\ChlorAlkaliRAU_210368\Delivered\EDR\01 SiteLocationMap.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 6/20/2022 || User: nkochie || Print Date: 6/20/2022

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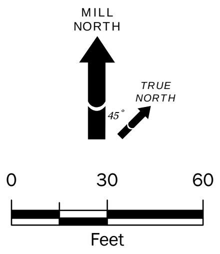
Explorations

- ● Soil Boring (2022)
- ● Soil Boring (2020)
- ● Soil Boring (2004)
- ⊕ Monitoring Well
- ▨ Test Pit

- G Gas Line
- SD Storm Drain Line
- S Sewer Line
- WM Water Line (Potable)
- WL Water Line (Non-potable)
- City Raw Water Line (non-potable)
- Storm Drain Stub
- Remnant Concrete Structure
- Existing Easement
- Existing Topographic Elevations (NAVD88)
- ▨ Asphalt Pavement
- Railroad Spur
- Lignin Operable Unit



Notes:
1. Existing features, specific binding plan, and utility lines from Millworks survey NOV-2021.
2. City raw water lines from Georgia-Pacific CAD file.

Investigation Locations and Existing Conditions

Engineering Design Report
Lignin Operable Unit, GP West Site
Bellingham, Washington

Aspect CONSULTING

JUN-2022	BY: SJG / AAF	FIGURE NO.
PROJECT NO. 210368	REVISED BY: NLK	2

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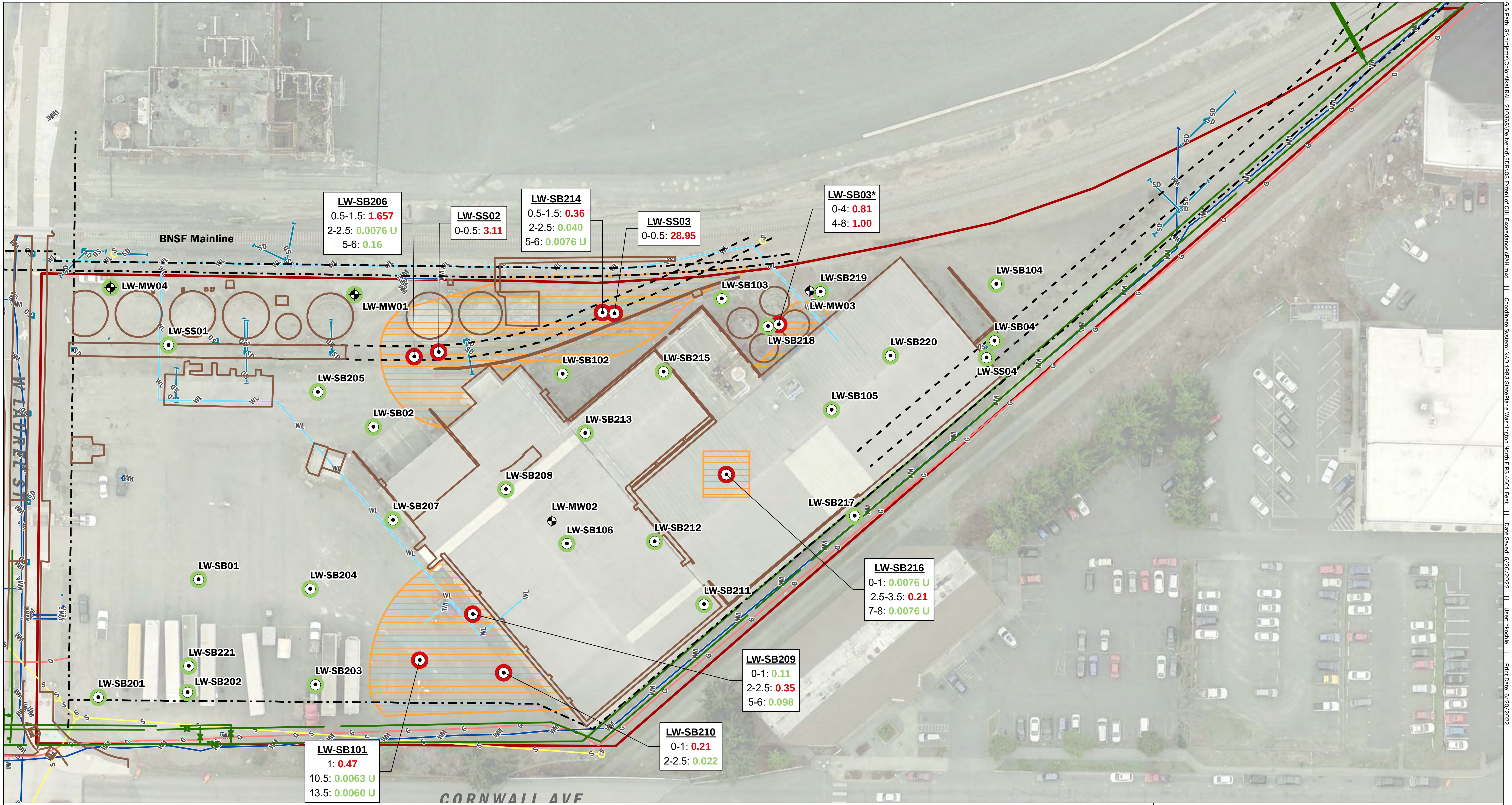
GIS Path: G:\projects\ChlorAlkaliRAU_210368\Delivered\EDR\02 Investigation Locations.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 6/20/2022 || User: nkochie || Print Date: 6/20/2022



Explorations

⊙ Soil Boring

⊕ Monitoring Well

● cPAH TEQ concentration in soil > CUL

● cPAH TEQ concentration in soil < CUL

▨ cPAH TEQ in soil > CUL (estimated)

-G- Gas Line

-SD- Storm Drain Line

-S- Sewer Line

-WM- Water Line (Potable)

-WL- Water Line (Non-potable)

— City Raw Water Line (non-potable)

— Remnant Concrete Structure

-·- Existing Easement

- - - Railroad Spur

□ Lignin Operable Unit

*: The 2004 boring LW-SB03 had 4-foot sample intervals and both of its 4-foot soil cores had very poor recovery. This information, plus the fact that cPAH exceedances were not observed below 4 feet in any other exploration, indicates that the deeper sample data may not be reliable (refer to text).

Note:
1. CUL = cleanup level
2. CUL for total cPAH (TEQ) is 0.19 mg/kg based on soil direct contact (unrestricted land use).
3. Analytical concentrations in milligrams per kilogram (mg/kg).
4. Sample depths for borings within the former warehouse footprint are relative to top of concrete floor slab.
5. Existing features, existing easements, and utility lines from Millworks survey NOV-2021.
6. City raw water lines from Georgia-Pacific CAD file.

Estimated Extents of CUL Exceedances in Soil - cPAHs

Engineering Design Report
Lignin Operable Unit, GP West Site
Bellingham, Washington

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JUN-2022
PROJECT NO. 210368
BY: SJG / AAF
REVISED BY: NLK
FIGURE NO. 3

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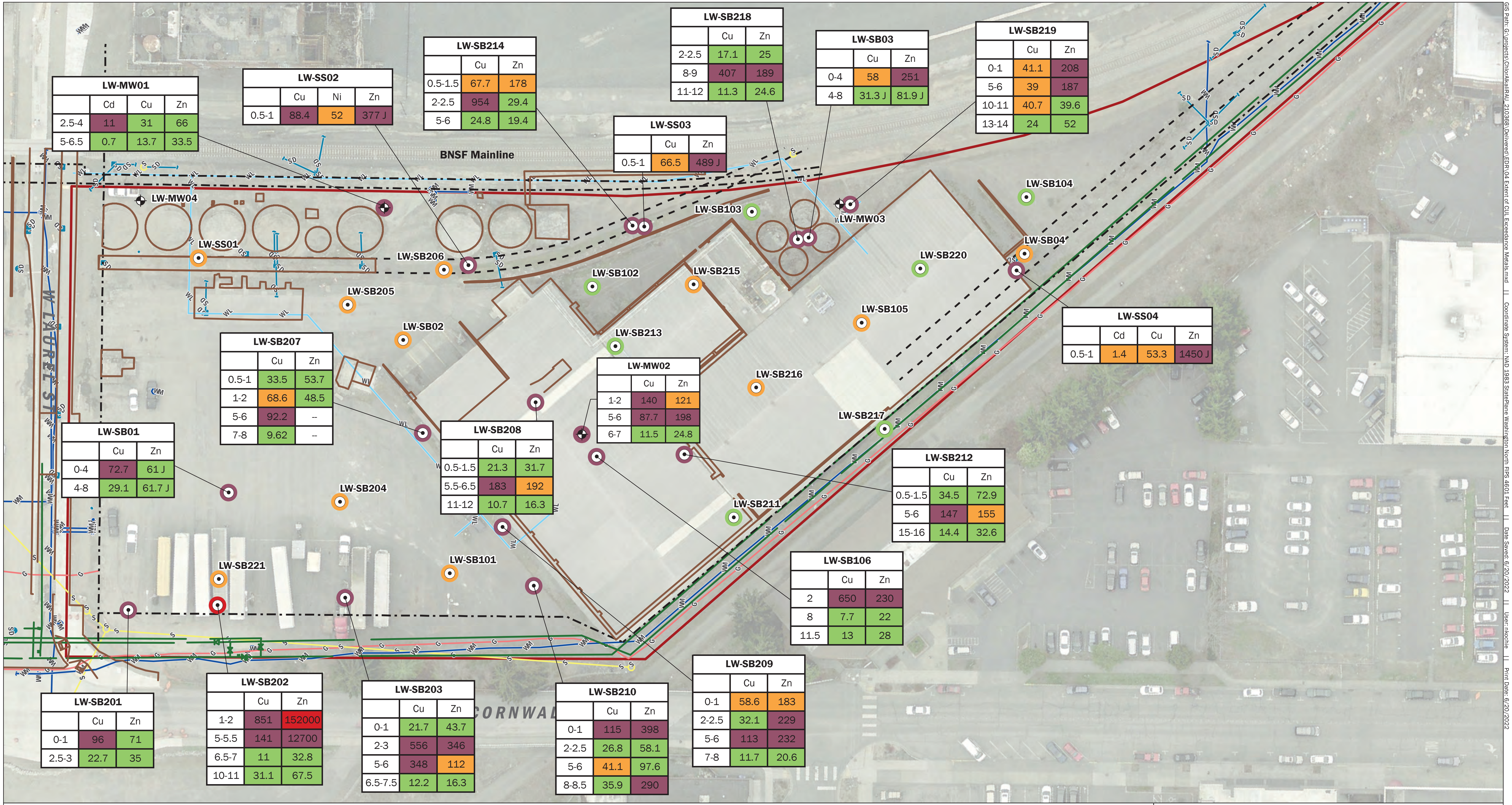
GIS Path: G:\projects\ChlorAlkaliRAU_210368\Delivered\EDR\03 Extent of CUL Exceedance cPAH.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 6/20/2022 || User: nkochie || Print Date: 6/20/2022



LW-MW01

	Cd	Cu	Zn
2.5-4	11	31	66
5-6.5	0.7	13.7	33.5

LW-SS02

	Cu	Ni	Zn
0.5-1	88.4	52	377 J

LW-SB214

	Cu	Zn
0.5-1.5	67.7	178
2-2.5	954	29.4
5-6	24.8	19.4

LW-SB218

	Cu	Zn
2-2.5	17.1	25
8-9	407	189
11-12	11.3	24.6

LW-SS03

	Cu	Zn
0.5-1	66.5	489 J

LW-SB03

	Cu	Zn
0-4	58	251
4-8	31.3 J	81.9 J

LW-SB219

	Cu	Zn
0-1	41.1	208
5-6	39	187
10-11	40.7	39.6
13-14	24	52

LW-SS04

	Cd	Cu	Zn
0.5-1	1.4	53.3	1450 J

LW-SB207

	Cu	Zn
0.5-1	33.5	53.7
1-2	68.6	48.5
5-6	92.2	--
7-8	9.62	--

LW-MW02

	Cu	Zn
1-2	140	121
5-6	87.7	198
6-7	11.5	24.8

LW-SB01

	Cu	Zn
0-4	72.7	61 J
4-8	29.1	61.7 J

LW-SB208

	Cu	Zn
0.5-1.5	21.3	31.7
5.5-6.5	183	192
11-12	10.7	16.3

LW-SB212

	Cu	Zn
0.5-1.5	34.5	72.9
5-6	147	155
15-16	14.4	32.6

LW-SB106

	Cu	Zn
2	650	230
8	7.7	22
11.5	13	28

LW-SB201

	Cu	Zn
0-1	96	71
2.5-3	22.7	35

LW-SB202

	Cu	Zn
1-2	851	152000
5-5.5	141	12700
6.5-7	11	32.8
10-11	31.1	67.5

LW-SB203

	Cu	Zn
0-1	21.7	43.7
2-3	556	346
5-6	348	112
6.5-7.5	12.2	16.3

LW-SB210

	Cu	Zn
0-1	115	398
2-2.5	26.8	58.1
5-6	41.1	97.6
8-8.5	35.9	290

LW-SB209

	Cu	Zn
0-1	58.6	183
2-2.5	32.1	229
5-6	113	232
7-8	11.7	20.6

Explorations

- ⊙ Soil Boring
- ⊕ Monitoring Well

- ● Metals concentration in soil > direct contact CUL
- ● Metals concentration in soil > 2x CUL (for leaching)
- ● Metals concentration in soil > CUL (for leaching)
- ● Metals concentration in soil < CUL (for leaching)

- G Gas Line
- SD Storm Drain Line
- S Sewer Line
- WM Water Line (Potable)
- WL Water Line (Non-potable)

- City Raw Water Line (non-potable)
- Remnant Concrete Structure
- Existing Easement

- Railroad Spur
- Lignin Operable Unit

Note:
1. CUL = soil cleanup level,
2. Cd = Cadmium. Cu = Copper. Ni = Nickle. Zn = Zinc.
3. Concentrations in milligrams per kilogram (mg/kg).
4. Sample depths for borings within the former warehouse footprint are relative to top of concrete floor slab.
5. Existing features, existing easements, and utility lines from Millworks survey NOV-2021.
6. City raw water lines from Georgia-Pacific CAD file.

MILL NORTH
TRUE NORTH
45°

0 30 60
Feet

Extent of CUL Exceedances in Soil - Metals

Engineering Design Report
Lignin Operable Unit, GP West Site
Bellingham, Washington

Aspect CONSULTING

JUN-2022	BY: SJG / AAF	FIGURE NO. 4
PROJECT NO. 210368	REVISED BY: NLK	

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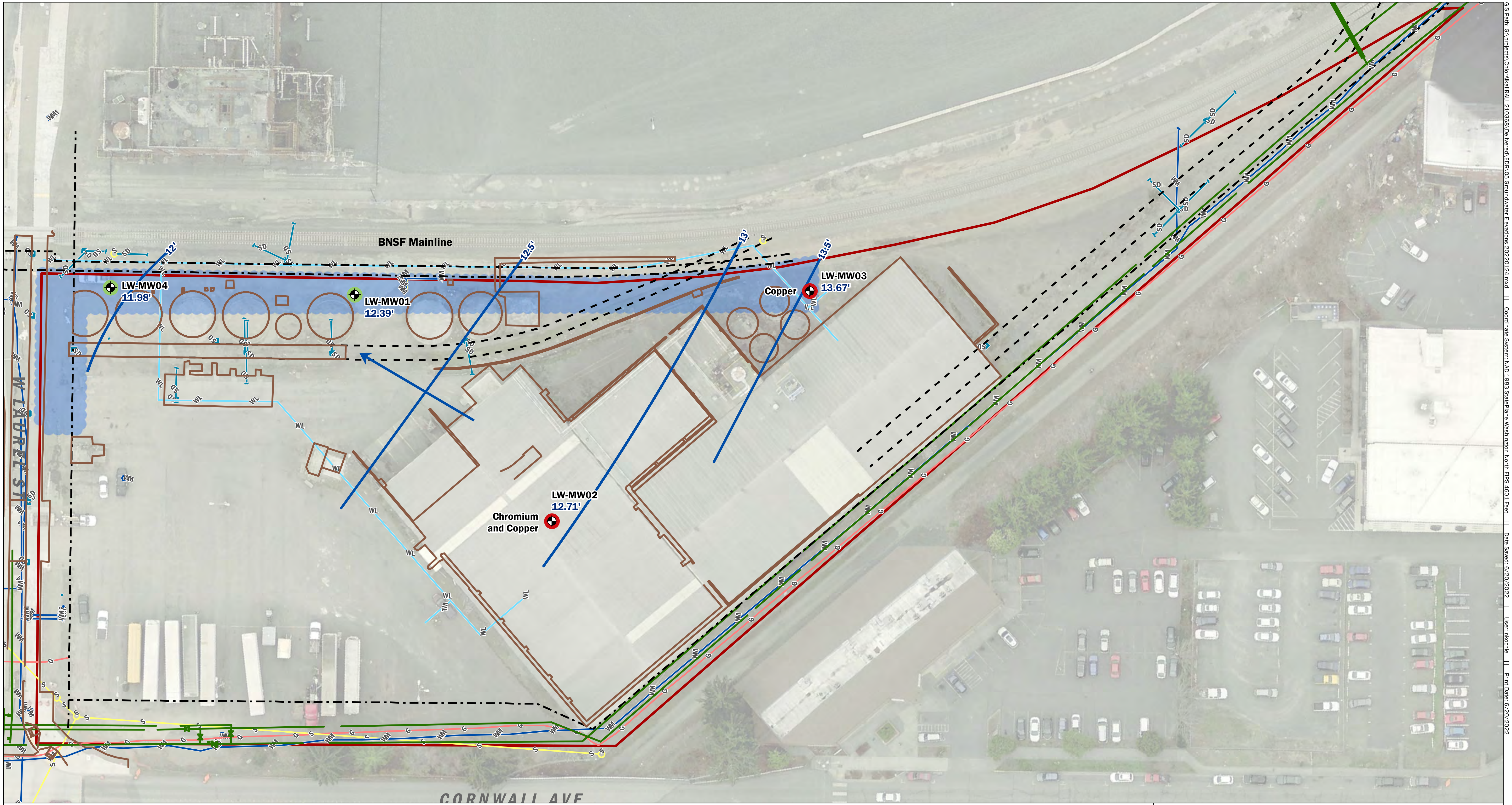
GIS Path: G:\projects\ChlorAlkaliRAU_210368\Delivered\EDR\04 Extent of CUL Exceedance Metals.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 6/20/2022 || User: nkochie || Print Date: 6/20/2022



Explorations

⊕ Monitoring Well

● CUL exceedance in January and/or February 2022 groundwater samples. Exceeding constituent is listed.

● No CUL exceedances in January or February 2022 groundwater samples

▨ Anticipated General Area for Future Groundwater MNA Monitoring Wells

Water table elevation, NAVD88 1/24/2022

Generalized Groundwater Flow Direction

Remnant Concrete Structure to be Removed

Existing Easement

-G- Gas Line

-SD- Storm Drain Line

-S- Sewer Line

-WM- Water Line (Potable)

-WL- Water Line (Non-potable)

City Raw Water Line (non-potable)

Railroad Spur

Lignin Operable Unit

Note:
1. Existing features, specific binding plan, and utility lines from Millworks survey NOV-2021.
2. City raw water lines from Georgia-Pacific CAD file.

MILL NORTH
TRUE NORTH
45°

0 30 60
Feet

Groundwater Analytical Results and Elevation Contours

Engineering Design Report
Lignin Operable Unit, GP West Site
Bellingham, Washington

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JUN-2022

PROJECT NO.
210368

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FIGURE NO.
5

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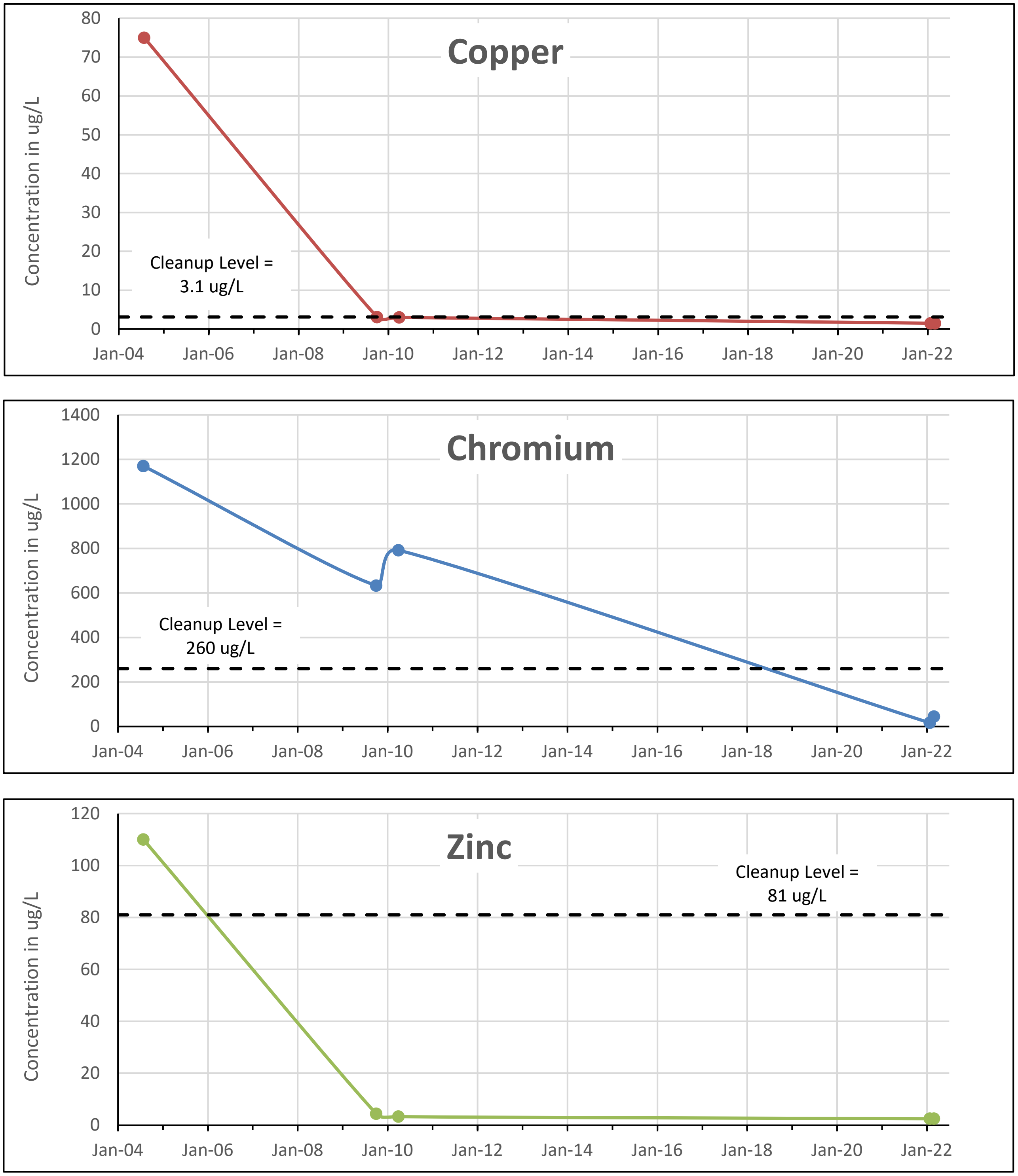


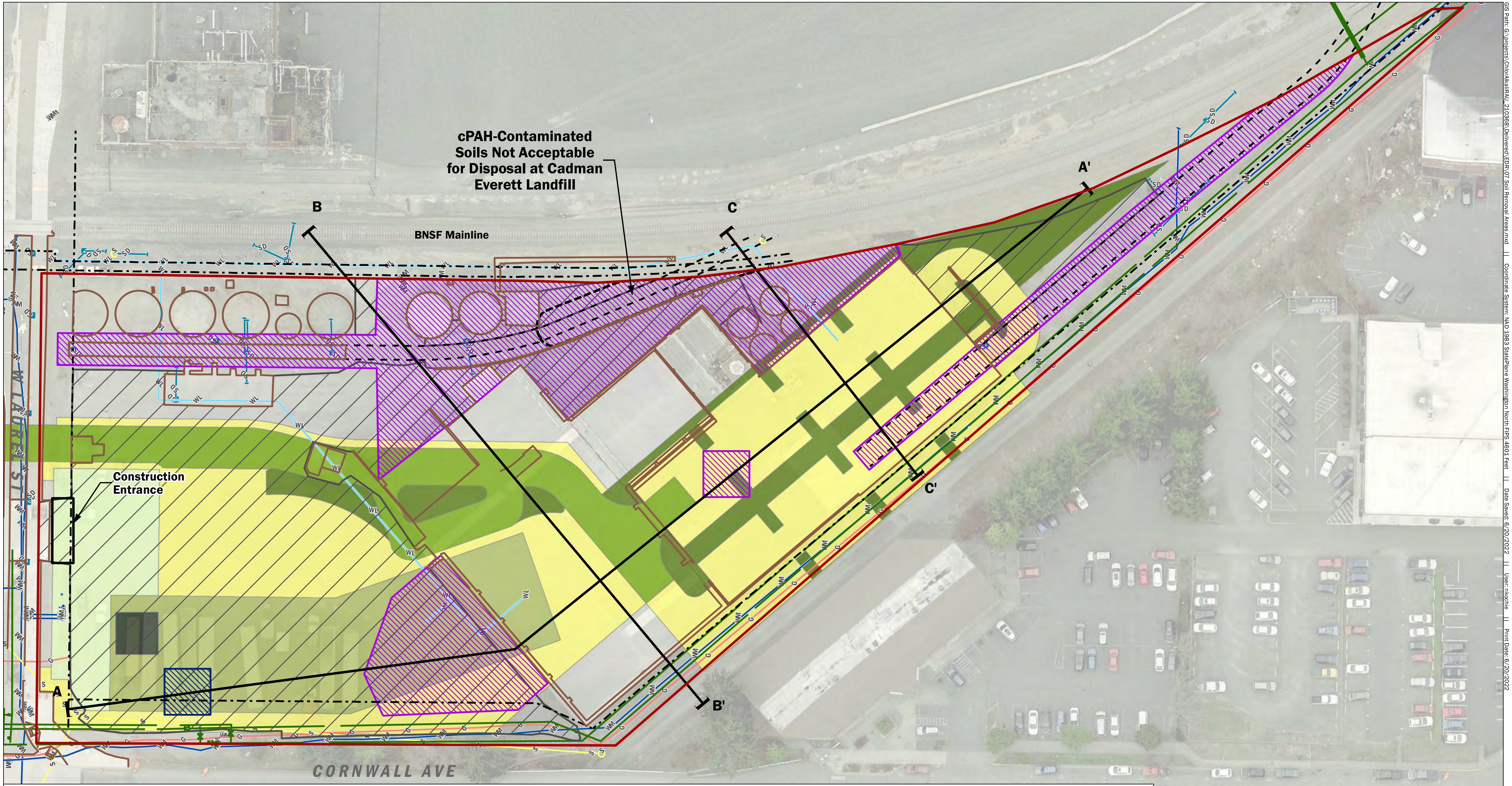
Figure 6

Groundwater Metals Concentration Trends Over Time, LW-MW01

Engineering Design Report
Lignin Operable Unit, GP West Site

Aspect Consulting
8/17/2022

\\seafps\Projects\Port of Bellingham\Lignin Parcel Affordable Housing 210368-A\Report Drafts\2022_02 Lignin Engineering Design Report\Figures\Fig 6 - GW Metals Trends



Soils to be Removed

Soil Exceeding Direct Contact CULs

▨ Metals > direct contact CUL (4-ft excavation)

▨ cPAH > direct contact CUL (2-ft excavation)

Soils to be Removed

Additional Metals-Impacted Soils*

□ 0.9-foot average depth excavation

□ 1-foot average depth excavation

□ 1.5-foot average depth excavation

□ 2.5-foot average depth excavation

□ 4-foot average depth excavation

■ 5.8-foot average depth excavation

G Gas Line

SD Storm Drain Line

S Sewer Line

WM Water Line (Potable)

WL Water Line (Non-potable)

City Raw Water Line (non-potable)

Remnant Concrete Structure to be Removed

Railroad Spur to be Removed

▨ Pavement to be Removed

Existing Easement

Cross Section Line

Lignin Operable Unit

Notes:
1. CUL = cleanup level
2. Existing features, specific binding plan, and utility lines from Millworks survey NOV-2021.
3. City raw water lines from Georgia-Pacific CAD file.
*: Because the affordable housing redevelopment subgrade design is in process, the excavation depths may change somewhat by the time that the cleanup construction plans and specifications are finalized.

MILL NORTH

TRUE NORTH

45°

0 30 60

Feet

Planned Soil Removal Areas

Engineering Design Report
Lignin Operable Unit, GP West Site
Bellingham, Washington

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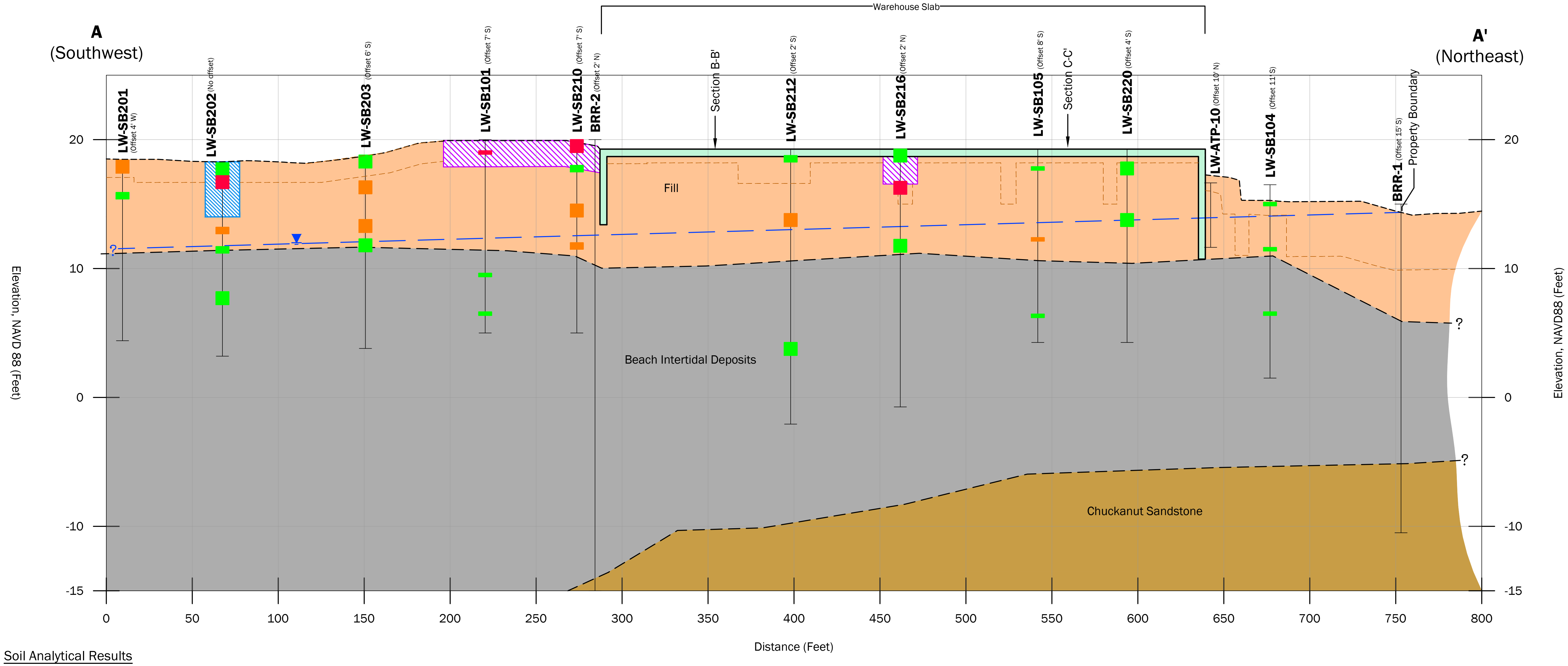
JUN-2022	BY: SJG / AAF	FIGURE NO. 7
PROJECT NO. 210368	REVISED BY: NLK	

Basemap Layer Credits || Whatcom County

GIS Path: G:\projects\ChlorAlkaliRAU_210368\Delivered\EDR\07 Soil Removal Areas.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 6/20/2022 || User: nkochie || Print Date: 6/20/2022



Soil Analytical Results

🟥 One or more of contaminants of concern detected at a concentration greater than the cleanup level based on direct contact

🟧 One or more metals of concern detected at a concentration greater than that predicted to contaminate groundwater by leaching

🟩 Contaminants of concern less than direct contact cleanup level and predicted concentration for leaching

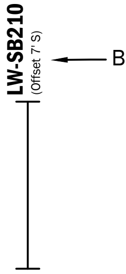
Notes:

1. Directional references are relative to mill-north, 45 degrees west of true north (refer to text).
2. Bedrock surface is derived from GeoEngineers (2021) and PRDI data from SB-217.
3. Additional metals-impacted soil not depicted pending finalization of subgrades required for affordable housing redevelopment.

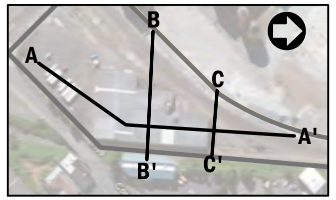
cPAH = carcinogenic Polycyclic Aromatic Hydrocarbons
CUL = Cleanup Levels
PRDI = Pre-Remedial Design Investigation

LEGEND

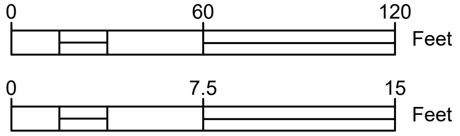
Soil Excavation Areas
▨ cPAHs > Direct Contact CUL
▨ Metals > Direct Contact CUL
- - - - Additional Metals-Impacted Soils
— — Estimated Soil Lithology Change
▼ — Approximate Water Table, 01/24/2022
🟩 Concrete
🟧 Fill
⬛ Beach Intertidal Deposits
🟫 Chuckanut Sandstone



Boring ID and Offset



Approximate Cross-Section Location



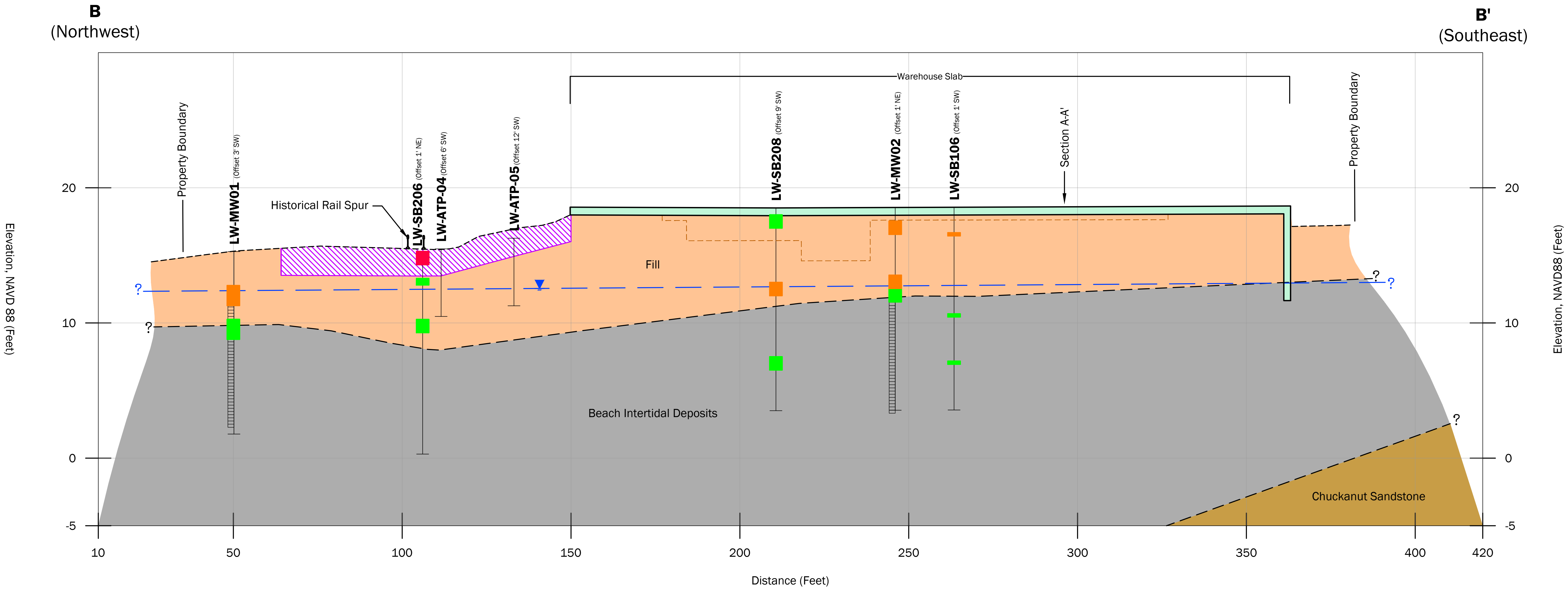
Horizontal Scale: 1" = 60'
Vertical Scale: 1" = 7.5'
Vertical Exaggeration 8x

Cross Section A-A'

Engineering Design Report
Lignin Operable Unit
GP West Site
Bellingham, Washington

Aspect CONSULTING
Jun-2022
PROJECT NO. 210368
BY: ZAS/CMV
REVISED BY: -
FIGURE NO. 8

CAD Path: Q:\Port of Bellingham\210368 GP West Chlor-Alkali\210368 Cross Sections.dwg Fig 9 AA || Date Saved: Jun 17, 2022 2:46pm || User: cvanslyke



Soil Analytical Results

🟥 One or more contaminants of concern detected at a concentration greater than the cleanup level based on direct contact

🟧 One or more metals of concern detected at a concentration greater than that predicted to contaminate groundwater by leaching

🟩 Contaminants of concern less than direct contact cleanup level and predicted concentration for leaching

Notes:
1. Directional references are relative to mill-north, 45 degrees west of true north (refer to text).
2. Bedrock surface is derived from GeoEngineers (2021) and PRDI data from SB-217.
3. Additional metals-impacted soil not depicted pending finalization of subgrades required for affordable housing redevelopment.

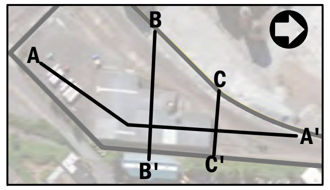
cPAH = carcinogenic Polycyclic Aromatic Hydrocarbons
CUL = Cleanup Levels
PRDI = Pre-Remedial Design Investigation

LEGEND

Soil Excavation Areas
▨ cPAHs > Direct Contact CUL
▨ Metals > Direct Contact CUL

- - - Additional Metals-Impacted Soils
— — Estimated Soil Lithology Change
▼ — Approximate Water Table, 01/24/2022
▭ Concrete
▭ Fill
▭ Beach Intertidal Deposits
▭ Chuckanut Sandstone

LW-SB206 (Offset 1' NE) ← Boring ID and Offset
Screened Interval



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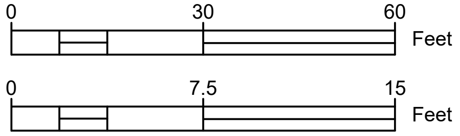


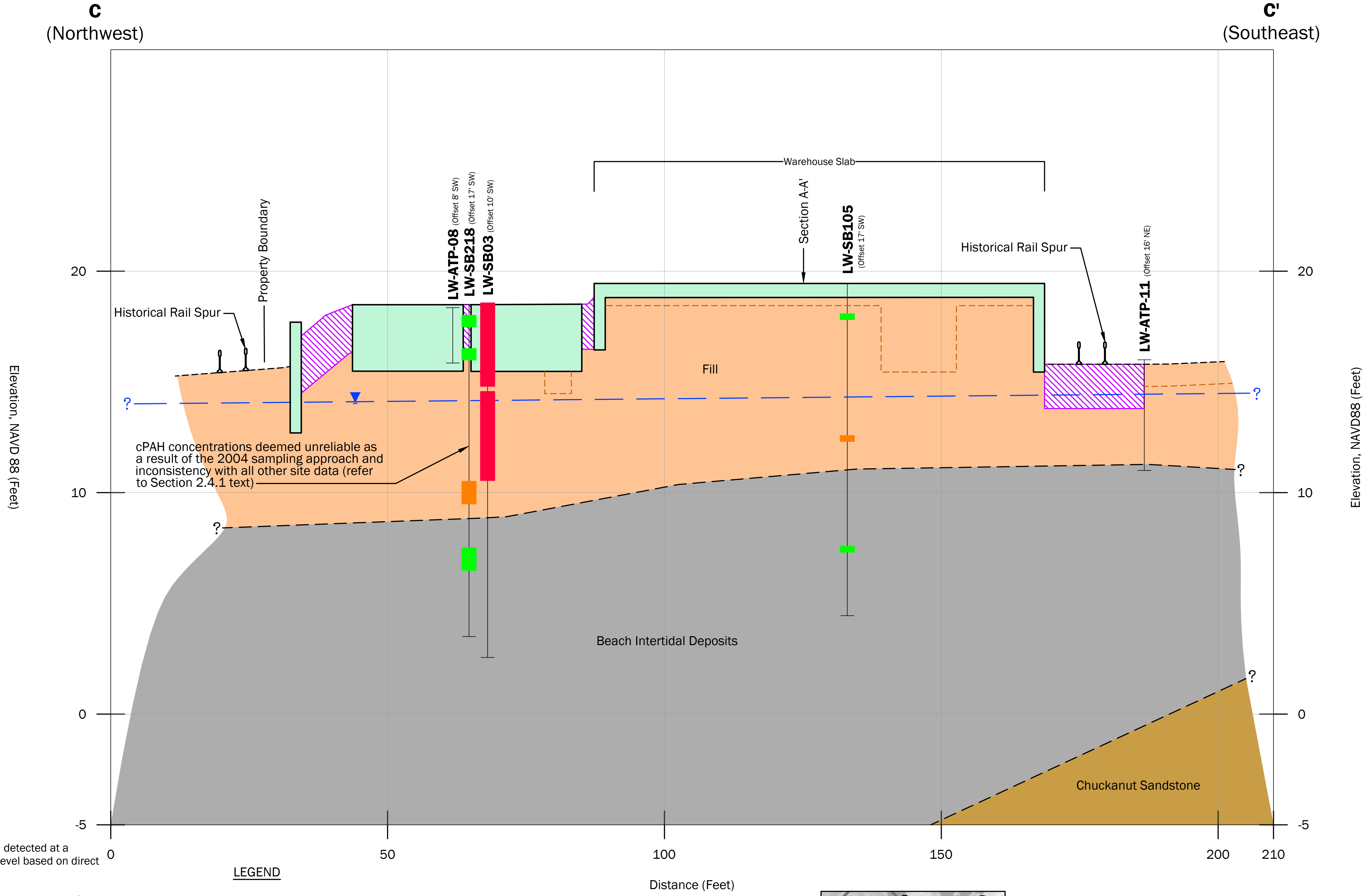
Horizontal Scale: 1" = 30'
Vertical Scale: 1" = 7.5'
Vertical Exaggeration 4x

Cross Section B-B'

Engineering Design Report
Lignin Operable Unit
GP West Site
Bellingham, Washington

Aspect CONSULTING
Jun-2022
BY: ZAS/CMV
PROJECT NO. 210368
REVISED BY: -
FIGURE NO. 9

CAD Path: Q:\Port of Bellingham\210368 GP West Chlor-Alkali\210368 Cross Sections.dwg Fig 10 BB || Date Saved: Jun 17, 2022 2:46pm || User: cvanslyke



Soil Analytical Results

🟥	One or more of contaminants of concern detected at a concentration greater than the cleanup level based on direct contact
🟧	One or more metals of concern detected at a concentration greater than that predicted to contaminate groundwater by leaching
🟩	Contaminants of concern less than direct contact cleanup level and predicted concentration for leaching

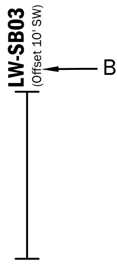
Notes:
1. Directional references are relative to mill-north, 45 degrees west of true north (refer to text).
2. Bedrock surface is derived from GeoEngineers (2021) and PRDI data from SB-217.
3. Additional metals-impacted soil not depicted pending finalization of subgrades required for affordable housing redevelopment.

cPAH = carcinogenic Polycyclic Aromatic Hydrocarbons
CUL = Cleanup Levels
PRDI = Pre-Remedial Design Investigation

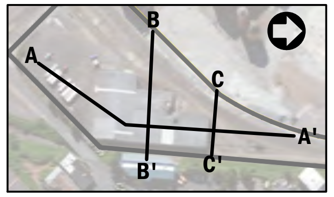
LEGEND

Soil Excavation Areas

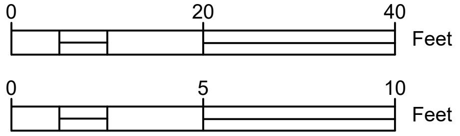
▨	cPAHs > Direct Contact CUL
▨	Metals > Direct Contact CUL
- - -	Additional Metals-Impacted Soils
— —	Estimated Soil Lithology Change
▼ —	Approximate Water Table, 01/24/2022
▭	Concrete
▭	Fill
▭	Beach Intertidal Deposits
▭	Chuckanut Sandstone



Boring ID and Offset



Approximate Cross-Section Location



Horizontal Scale: 1" = 20'
Vertical Scale: 1" = 5'
Vertical Exaggeration 4x

Cross Section C-C'

Engineering Design Report
Lignin Operable Unit
GP West Site
Bellingham, Washington

Aspect CONSULTING

Jun-2022	BY: ZAS/CMV	FIGURE NO.
PROJECT NO. 210368	REVISED BY: -	10

CAD Path: Q:\Port of Bellingham\210368 GP West Chlor-Alkali\210368 Cross Sections.dwg Fig 11 CC || Date Saved: Jun 17, 2022 2:46pm || User: cvanslyke

APPENDIX A

Soil Boring, Monitoring Well Construction, and Test Pit Logs

Coarse-Grained Soils - More than 50%1 Retained on No. 200 Sieve	Gravels - More than 50%^{1} of Coarse Fraction Retained on No. 4 Sieve	≤5% Fines	**GW**	Well-graded GRAVEL Well-graded GRAVEL WITH SAND
			GP	Poorly-graded GRAVEL Poorly-graded GRAVEL WITH SAND
		≥15% Fines	**GM**	SILTY GRAVEL SILTY GRAVEL WITH SAND
			GC	CLAYEY GRAVEL CLAYEY GRAVEL WITH SAND
	Sands - 50%^{1} or More of Coarse Fraction Passes No. 4 Sieve	≤5% Fines	**SW**	Well-graded SAND Well-graded SAND WITH GRAVEL
			SP	Poorly-graded SAND Poorly-graded SAND WITH GRAVEL
		≥15% Fines	**SM**	SILTY SAND SILTY SAND WITH GRAVEL
			SC	CLAYEY SAND CLAYEY SAND WITH GRAVEL
Fine-Grained Soils - 50%1 or More Passes No. 200 Sieve	Silts and Clays Liquid Limit Less than 50%		**ML**	SILT SANDY or GRAVELLY SILT SILT WITH SAND SILT WITH GRAVEL
			CL	LEAN CLAY SANDY or GRAVELLY LEAN CLAY LEAN CLAY WITH SAND LEAN CLAY WITH GRAVEL
			OL	ORGANIC SILT SANDY or GRAVELLY ORGANIC SILT ORGANIC SILT WITH SAND ORGANIC SILT WITH GRAVEL
	Silts and Clays Liquid Limit 50% or More		**MH**	ELASTIC SILT SANDY or GRAVELLY ELASTIC SILT ELASTIC SILT WITH SAND ELASTIC SILT WITH GRAVEL
			CH	FAT CLAY SANDY or GRAVELLY FAT CLAY FAT CLAY WITH SAND FAT CLAY WITH GRAVEL
			OH	ORGANIC CLAY SANDY or GRAVELLY ORGANIC CLAY ORGANIC CLAY WITH SAND ORGANIC CLAY WITH GRAVEL
Highly Organic Soils			**PT**	PEAT and other mostly organic soils

"WITH SILT" or "WITH CLAY" means 5 to 15% silt and clay, denoted by a "-" in the group name; e.g., SP-SM • "SILTY" or "CLAYEY" means >15% silt and clay • "WITH SAND" or "WITH GRAVEL" means 15 to 30% sand and gravel. • "SANDY" or "GRAVELLY" means >30% sand and gravel. • "Well-graded" means approximately equal amounts of fine to coarse grain sizes • "Poorly graded" means unequal amounts of grain sizes • Group names separated by "/" means soil contains layers of the two soil types; e.g., SM/ML.

Soils were described and identified in the field in general accordance with the methods described in ASTM D2488. Where indicated in the log, soils were classified using ASTM D2487 or other laboratory tests as appropriate. Refer to the report accompanying these exploration logs for details.

1. Estimated or measured percentage by dry weight
2. (SPT) Standard Penetration Test (ASTM D1586)
3. Determined by SPT, DCPT (ASTM STP399) or other field methods. See report text for details.

GEOTECHNICAL LAB TESTS

MC = Natural Moisture Content
PS = Particle Size Distribution
FC = Fines Content (% < 0.075 mm)
GH = Hydrometer Test
AL = Atterberg Limits
C = Consolidation Test
Str = Strength Test
OC = Organic Content (% Loss by Ignition)
Comp = Proctor Test
K = Hydraulic Conductivity Test
SG = Specific Gravity Test

CHEMICAL LAB TESTS

Organic Chemicals

BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
TPH-Dx = Diesel and Oil-Range Petroleum Hydrocarbons
TPH-G = Gasoline-Range Petroleum Hydrocarbons
VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds
PAHs = Polycyclic Aromatic Hydrocarbon Compounds
PCBs = Polychlorinated Biphenyls

Metals

RCRA8 = As, Ba, Cd, Cr, Pb, Hg, Se, Ag, (d = dissolved, t = total)
MTCA5 = As, Cd, Cr, Hg, Pb (d = dissolved, t = total)
PP-13 = Ag, As, Be, Cd, Cr, Cu, Hg, Ni, Pb, Sb, Se, Tl, Zn (d=dissolved, t=total)

FIELD TESTS

PID = Photoionization Detector
Sheen = Oil Sheen Test
SPT^2 = Standard Penetration Test
NSPT = Non-Standard Penetration Test
DCPT = Dynamic Cone Penetration Test

COMPONENT DEFINITIONS

Descriptive Term		***Size Range and Sieve Number***
Boulders	=	Larger than 12 inches
Cobbles	=	3 inches to 12 inches
Coarse Gravel	=	3 inches to 3/4 inches
Fine Gravel	=	3/4 inches to No. 4 (4.75 mm)
Coarse Sand	=	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	=	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	=	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	=	Smaller than No. 200 (0.075 mm)

ESTIMATED^1 PERCENTAGE

% by Weight		***Modifier***	***% by Weight***		***Modifier***
<1	=	Subtrace	15 to 25	=	Little
1 to <5	=	Trace	30 to 45	=	Some
5 to 10	=	Few	>50	=	Mostly

MOISTURE CONTENT

Dry = Absence of moisture, dusty, dry to the touch
Slightly Moist = Perceptible moisture
Moist = Damp but no visible water
Very Moist = Water visible but not free draining
Wet = Visible free water, usually from below water table

RELATIVE DENSITY

Non-Cohesive or Coarse-Grained Soils

Density³		***SPT² Blows/Foot***	***Penetration with 1/2" Diameter Rod***
Very Loose	=	0 to 4	≥ 2'
Loose	=	5 to 10	1' to 2'
Medium Dense	=	11 to 30	3" to 1'
Dense	=	31 to 50	1" to 3"
Very Dense	=	> 50	< 1"

CONSISTENCY

Cohesive or Fine-Grained Soils

Consistency³		***SPT² Blows/Foot***	***Manual Test***
Very Soft	=	0 to 1	Penetrated >1" easily by thumb. Extrudes between thumb & fingers.
Soft	=	2 to 4	Penetrated 1/4" to 1" easily by thumb. Easily molded.
Medium Stiff	=	5 to 8	Penetrated >1/4" with effort by thumb. Molded with strong pressure.
Stiff	=	9 to 15	Indented ~1/4" with effort by thumb.
Very Stiff	=	16 to 30	Indented easily by thumbnail.
Hard	=	> 30	Indented with difficulty by thumbnail.

GEOLOGIC CONTACTS

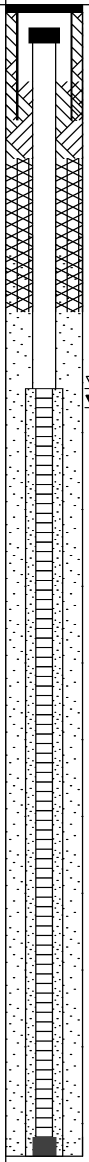
Observed and Distinct	Observed and Gradual	Inferred
———	———	— — — —

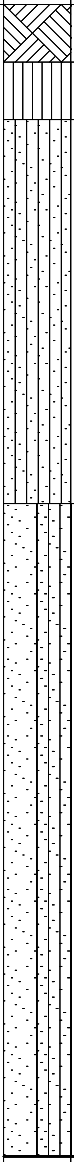
Aspect CONSULTING

Exploration Log Key

AI Path: Q:_ACAD Standards\FIELD REFERENCE\MASTERS\Exploration Log Key-2018.ai // user: jinman // last saved: 12/31/2018

Aspect CONSULTING	**Chlor-Alkali GP West Lignin Parcel - 210368**			**Monitoring Well Log**	
	Project Address & Site Specific Location			*Coordinates (SPN NAD83 ft)*	*Exploration Number*
	300 West Laurel Street, Bellingham WA, Center of Site, south side of slab			E:1242400 N:641820	**LW-MW02**
Contractor	*Equipment*	*Sampling Method*		*Ground Surface Elev.*	
Cascade Drilling	Direct push rig	Percussion hammer		18.64'	
Operator	*Exploration Method(s)*	*Work Start/Completion Dates*		*Top of Casing Elev.*	*Depth to Water (Below GS)*
Scott Busby	Direct push	1/20/2022		18.32'	5.25' (Static)





Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Description	Depth (ft)
		0 - 2 ft BGS, Surface seal concrete. 0 - 15 ft BGS, Schedule 40 PVC.				**CONCRETE SLAB** CONCRETE; concrete slab 8 inches thick with asphalt underneath.	
			▯ 🖐	LW-MW02-1-2 Cr, Cu, Zn by EPA 6020	PID=0 Odor=None Cr=49 Cu = 96 Zn = 395	**FILL** SILT WITH SAND (ML); moist, gray, medium stiff; medium sand; trace fine gravel.	
		2 - 4 ft BGS, Bentonite chips.				SILTY SAND (SM); moist, dark brown; medium sand; trace fine gravel.	
	15		○				
5		▽ 1/20/2022 ▼ 1/21/2022	▯ 🖐	LW-MW02-5-6 Cr, Cu, Zn by EPA 6020	PID=0 Odor=None Cr=83 Cu = 32 Zn = 80	Becomes wet. Woody debris present.	5
		4 - 15 ft BGS, #2/12 Silica sand pack.	▯ 🖐	LW-MW02-6-7 Cu and Zn by EPA 6020	PID=0 Odor=None Cr=47 Cu = ND Zn = 26	Woody debris present. **NATIVE** SAND WITH SILT (SP-SM); wet, gray; medium sand; trace shells present.	
					PID=0 Odor=None Cr=47 Cu = ND Zn = 26		
		3.75" diameter borehole; 2" diameter well.					
	10		○				
10		5 - 15 ft BGS, 0.010" prepacked slotted screen.	▯		PID=0 Odor=None Cr=65 Cu = ND Zn = 35	Sand becomes medium to coarse, interbedded with medium stiff lean clay.	10
			○				
	5						
15						Bottom of exploration at 15 ft. bgs.	15
	0						

Legend

Sample Type
- ○ No Soil Sample Recovery
- ▯ Continuous core 1.85" ID
- 🖐 Grab sample

Water Level
- ▼ Static Water Level
- ▽ Water Level ATD

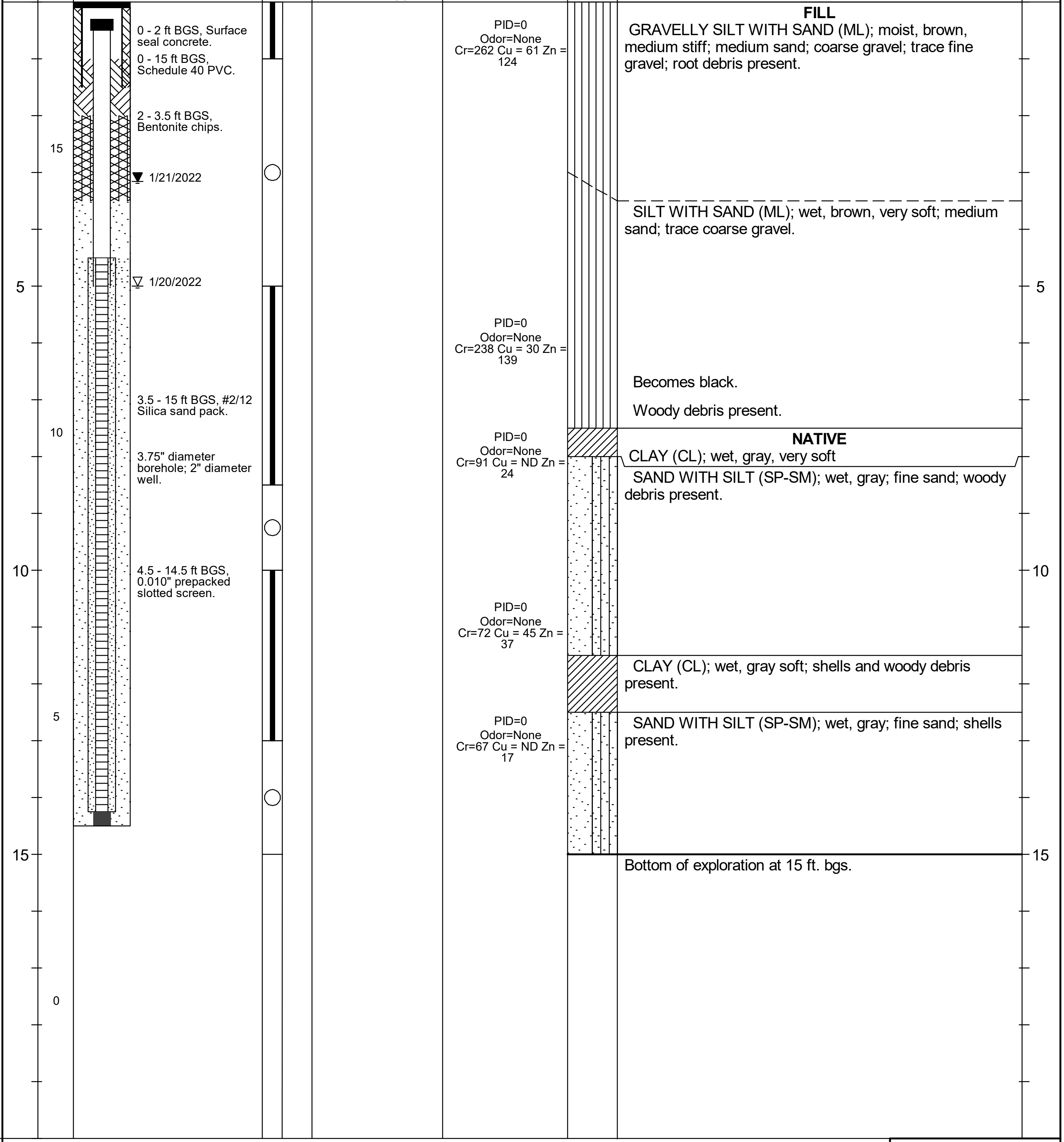
See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
Approved by: Zanna Satterwhite

Exploration Log
LW-MW02
Sheet 1 of 1

Aspect CONSULTING	**Chlor-Alkali GP West Lignin Parcel - 210368**		**Monitoring Well Log**	
	Project Address & Site Specific Location 300 West Laurel Street, Bellingham WA, Northwest corner of Site, west of slab		*Coordinates (SPN NAD83 ft)* E:1242400 N:642050	*Exploration Number* **LW-MW03**
Contractor Cascade Drilling	*Equipment* Direct push rig	*Sampling Method* Percussion hammer	*Ground Surface Elev.* 17.57'	
Operator Scott Busby	*Exploration Method(s)* Direct push	*Work Start/Completion Dates* 1/20/2022	*Top of Casing Elev.* 17.16'	*Depth to Water (Below GS)* 3.16' (Static)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)



0 - 2 ft BGS, Surface seal concrete.

0 - 15 ft BGS, Schedule 40 PVC.

2 - 3.5 ft BGS, Bentonite chips.

1/21/2022

1/20/2022

3.5 - 15 ft BGS, #2/12 Silica sand pack.

3.75" diameter borehole; 2" diameter well.

4.5 - 14.5 ft BGS, 0.010" prepacked slotted screen.

PID=0
Odor=None
Cr=262 Cu = 61 Zn = 124

PID=0
Odor=None
Cr=238 Cu = 30 Zn = 139

PID=0
Odor=None
Cr=91 Cu = ND Zn = 24

PID=0
Odor=None
Cr=72 Cu = 45 Zn = 37

PID=0
Odor=None
Cr=67 Cu = ND Zn = 17

FILL

GRAVELLY SILT WITH SAND (ML); moist, brown, medium stiff; medium sand; coarse gravel; trace fine gravel; root debris present.

SILT WITH SAND (ML); wet, brown, very soft; medium sand; trace coarse gravel.

Becomes black.

Woody debris present.

NATIVE

CLAY (CL); wet, gray, very soft

SAND WITH SILT (SP-SM); wet, gray; fine sand; woody debris present.

CLAY (CL); wet, gray soft; shells and woody debris present.

SAND WITH SILT (SP-SM); wet, gray; fine sand; shells present.

Bottom of exploration at 15 ft. bgs.

Legend

Sample Type
- ▢ No Soil Sample Recovery
- ◫ Continuous core 1.85" ID

Water Level
- ▼ Static Water Level
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
Approved by: Zanna Satterwhite

Exploration Log
LW-MW03
Sheet 1 of 1

Aspect CONSULTING

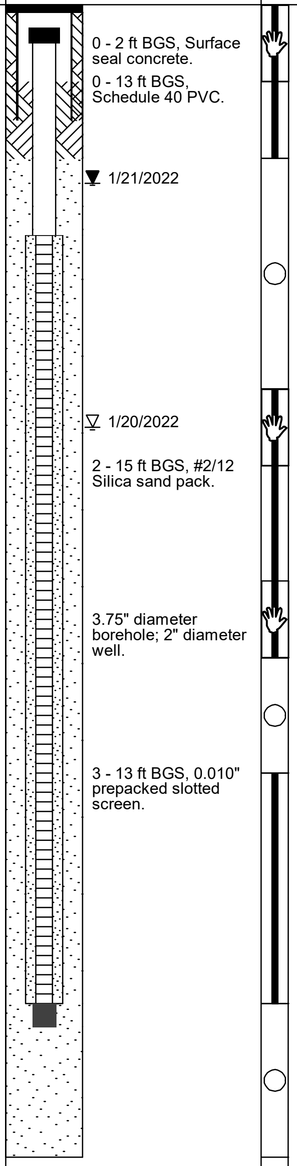
Chlor-Alkali GP West Lignin Parcel - 210368

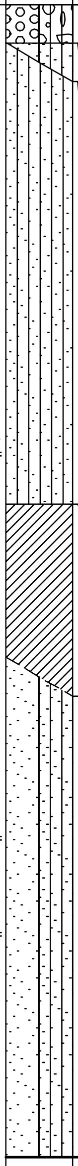
Monitoring Well Log

Project Address & Site Specific Location	*Coordinates (SPN NAD83 ft)*	*Exploration Number*
300 West Laurel Street, Bellingham WA, Southwest corner of Site	E:1242100 N:641720	**LW-MW04**

Contractor	*Equipment*	*Sampling Method*	*Ground Surface Elev.*
Cascade Drilling	Direct push rig	Percussion hammer	15.13'

Operator	*Exploration Method(s)*	*Work Start/Completion Dates*	*Top of Casing Elev.*	*Depth to Water (Below GS)*
Scott Busby	Direct push	1/20/2022	14.8'	2.32' (Static)





Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
	15	0 - 2 ft BGS, Surface seal concrete. 0 - 13 ft BGS, Schedule 40 PVC.		LW-MW04-0-1 NWTPH-Dx, Low-level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=102 Cu = ND Zn = 29		**FILL** GRAVEL WITH SILT (GP-GM); moist, brown; fine to coarse gravel.	
					PID=0 Odor=Sulfur odor Cr=22 Cu = 12 Zn = 47		SAND WITH SILT AND GRAVEL (SP-SM); moist, light brown; medium sand; fine to coarse gravel. SILTY SAND WITH GRAVEL (SM); very moist, gray and black; medium sand; fine to coarse gravel.	
		▼ 1/21/2022						
5	10	▽ 1/20/2022 2 - 15 ft BGS, #2/12 Silica sand pack.		LW-MW04-5-6 NWTPH-Dx, Low-level PAHs by EPA 8270DSIM	PID=0.7 Odor=Chemical-like Cr=84, Cu = 14 Zn = 31		Becomes black, wet, with heavy sheen on water.	5
							Woody debris present. **NATIVE** CLAY (CL); wet, gray very soft; fine to medium sand; woody debris present.	
		3.75" diameter borehole; 2" diameter well.		LW-MW04-7.5-8.5 NWTPH-Dx, Low-level PAHs by EPA 8270DSIM	PID=0.2 Odor=None Cr=51 Cu = 22 Zn = 78			
							SAND WITH SILT (SP-SM); wet, gray; medium sand; trace woody debris present.	
10	5	3 - 13 ft BGS, 0.010" prepacked slotted screen.			PID=0.4 Odor=None Cr=57 Cu = ND Zn = 25			10
					PID=1.8 Odor=None Cr=78 Cu = ND Zn = 28		Sand becomes fine. Woody debris present.	
15	0						Bottom of exploration at 15 ft. bgs.	15

Legend

Sample Type
- ▢ No Soil Sample Recovery
- ◫ Continuous core 1.85" ID
- ☒ Grab sample

Water Level
- ▼ Static Water Level
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
Approved by: Zanna Satterwhite

Exploration Log
LW-MW04
Sheet 1 of 1

Aspect CONSULTING	Chlor-Alkali GP West Lignin Parcel - 210368		Environmental Exploration Log	
	Project Address & Site Specific Location 300 West Laurel Street, Bellingham WA, South end of Site		*Coordinates (SPN NAD83 ft)* E:1242300 N:641530	*Exploration Number* **LW-SB201**
Contractor Cascade Drilling	*Equipment* Direct push rig	*Sampling Method* Percussion hammer	*Ground Surface Elev.* 18.4'	
Operator Scott Busby	*Exploration Method(s)* Direct push	*Work Start/Completion Dates* 1/19/2022	*Top of Casing Elev.* NA	*Depth to Water (Below GS)* 10' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
0				LW-SB201-0-1 Cr, Cu, Zn by EPA 6020, Low-level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=76 Cu = 39 Zn = 90		**ASPHALT** ASPHALT; 3 inches thick **FILL** SILT WITH SAND (ML); moist, brown, soft; medium to coarse sand; coarse gravel. Crushed rock at 1.5 ft. bgs. Becomes black with woody debris.	
				LW-SB201-2.5-3 Cr, Cu, Zn by EPA 6020, Low-level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=54 Cu = ND Zn = 30		SAND WITH SILT (SP-SM); moist, dark gray; medium to coarse sand; trace fine gravel.	
	15							
5					PID=0 Odor=None Cr=78 Cu = 20 Zn = 83		Trace shells present, layer of woody debris at 6 ft. bgs.	5
					PID=0 Odor=None Cr=76 Cu = ND Zn = 17		**NATIVE** CLAY (CL); moist, gray, soft SILT WITH SAND (ML); moist, gray; medium sand; shells present.	
		Boring backfilled with hydrated bentonite chips.						
	10							
10		⊻ 1/19/2022			PID=0 Odor=None Cr=47 Cu = 11 Zn = 38		Becomes wet, woody debris present. CLAY (CL); wet, gray soft; medium sand; shells present.	10
					PID=0 Odor=None Cr=157 Cu = ND Zn = 26		SAND WITH SILT (SP-SM); wet, gray; fine to medium sand; shells and woody debris present.	
	5							
15							Bottom of exploration at 15 ft. bgs.	15
	0							

Legend

Sample Type
- ○ No Soil Sample Recovery
- ◨ Continuous core 1.85" ID
- ☒ Grab sample

Water Level
- ⊻ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
Approved by: Zanna Satterwhite

Exploration Log LW-SB201

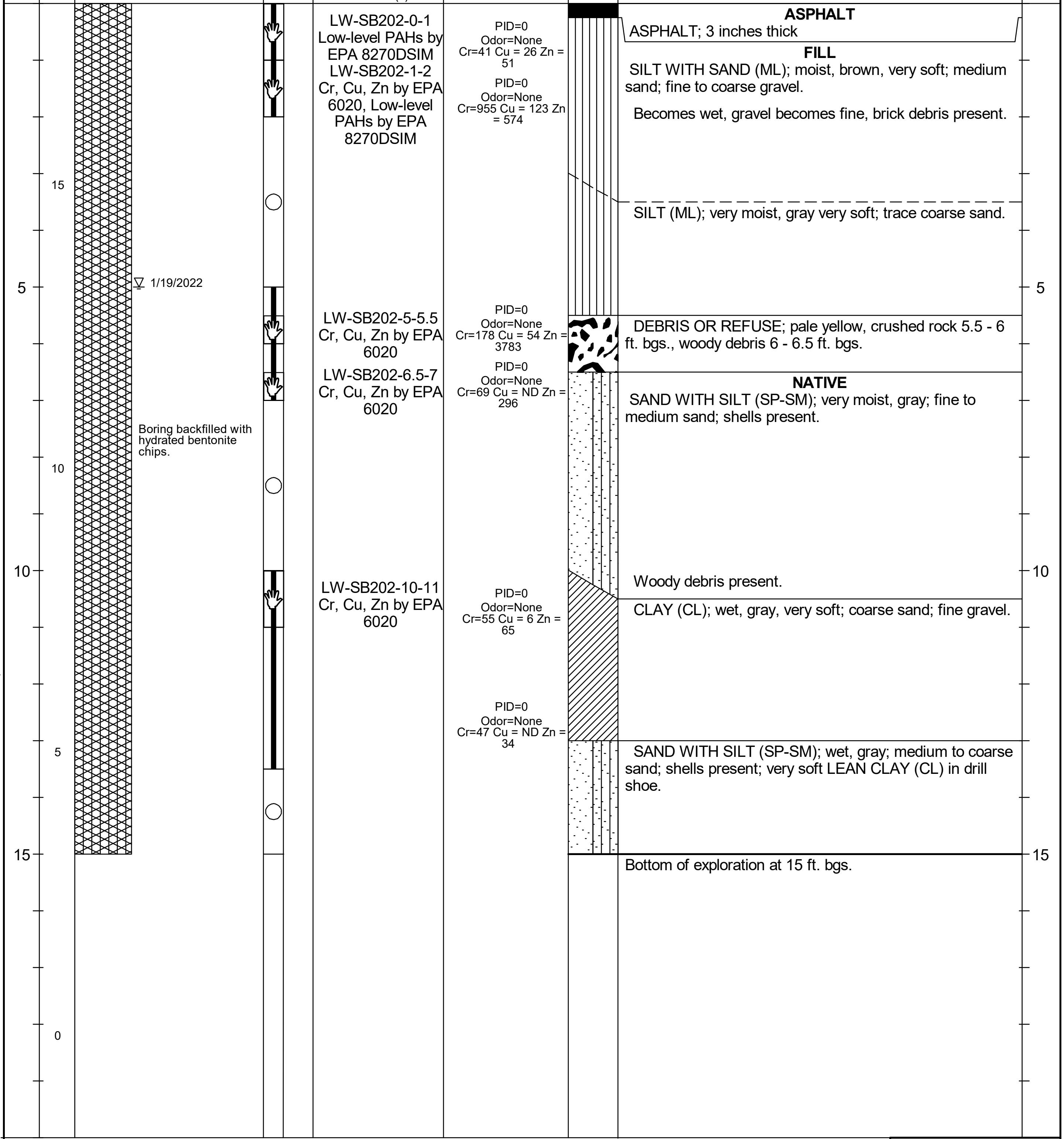
Sheet 1 of 1

Aspect CONSULTING

Chlor-Alkali GP West Lignin Parcel - 210368

Environmental Exploration Log

Project Address & Site Specific Location			*Coordinates (SPN NAD83 ft)*	*Exploration Number*
300 West Laurel Street, Bellingham WA, South end of Site			E:1242300 N:641580	**LW-SB202**
Contractor	*Equipment*	*Sampling Method*	*Ground Surface Elev.*	
Cascade Drilling	Direct push rig	Percussion hammer	18.2'	
Operator	*Exploration Method(s)*	*Work Start/Completion Dates*	*Top of Casing Elev.*	*Depth to Water (Below GS)*
Scott Busby	Direct push	1/19/2022	NA	5' (ATD)



Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
			☒	LW-SB202-0-1 Low-level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=41 Cu = 26 Zn = 51		**ASPHALT** ASPHALT; 3 inches thick **FILL** SILT WITH SAND (ML); moist, brown, very soft; medium sand; fine to coarse gravel.	
			☒	LW-SB202-1-2 Cr, Cu, Zn by EPA 6020, Low-level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=955 Cu = 123 Zn = 574		Becomes wet, gravel becomes fine, brick debris present.	
	15		○				SILT (ML); very moist, gray very soft; trace coarse sand.	
5		▽ 1/19/2022						5
			☒	LW-SB202-5-5.5 Cr, Cu, Zn by EPA 6020	PID=0 Odor=None Cr=178 Cu = 54 Zn = 3783		DEBRIS OR REFUSE; pale yellow, crushed rock 5.5 - 6 ft. bgs., woody debris 6 - 6.5 ft. bgs.	
			☒	LW-SB202-6.5-7 Cr, Cu, Zn by EPA 6020	PID=0 Odor=None Cr=69 Cu = ND Zn = 296		**NATIVE** SAND WITH SILT (SP-SM); very moist, gray; fine to medium sand; shells present.	
	10	Boring backfilled with hydrated bentonite chips.	○					
10			☒	LW-SB202-10-11 Cr, Cu, Zn by EPA 6020	PID=0 Odor=None Cr=55 Cu = 6 Zn = 65		Woody debris present. CLAY (CL); wet, gray, very soft; coarse sand; fine gravel.	10
					PID=0 Odor=None Cr=47 Cu = ND Zn = 34			
	5						SAND WITH SILT (SP-SM); wet, gray; medium to coarse sand; shells present; very soft LEAN CLAY (CL) in drill shoe.	
			○					
15							Bottom of exploration at 15 ft. bgs.	15
	0							

Legend

Sample Type
- ○ No Soil Sample Recovery
- ◨ Continuous core 1.85" ID
- ☒ Grab sample

Water Level
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
Approved by: Zanna Satterwhite

Exploration Log
LW-SB202
Sheet 1 of 1

Chlor-Alkali GP West Lignin Parcel - 210368			Environmental Exploration Log	
Project Address & Site Specific Location 300 West Laurel Street, Bellingham WA, South end of Site			*Coordinates (SPN NAD83 ft)* E:1242300 N:641640	*Exploration Number* **LW-SB203**
Contractor Cascade Drilling	*Equipment* Direct push rig	*Sampling Method* Percussion hammer	*Ground Surface Elev.* 18.8'	
Operator Scott Busby	*Exploration Method(s)* Direct push	*Work Start/Completion Dates* 1/19/2022	*Top of Casing Elev.* NA	*Depth to Water (Below GS)* 6' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
				LW-SB203-0-1 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=52 Cu = 30 Zn = 94		**ASPHALT** ASPHALT; asphalt with 3 inch base course.	
							FILL SAND WITH SILT (SP-SM); moist, red brown; medium to coarse sand; fine gravel.	
							SILT WITH SAND (ML); soft, moist, brown; medium sand; coarse gravel.	
				LW-SB203-2-3 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=110 Cu = 24 Zn = 64		SILT (ML); very stiff, moist, gray; trace woody debris present.	
	15		○					
							SILT WITH SAND (ML); soft, very moist, dark brown; fine to medium sand; fine gravel.	
5				LW-SB203-5-6 Cu and Zn by EPA 6020	PID=0 Odor=None Cr=59 Cu = 32 Zn = 56			5
		⊻ 1/19/2022						
							NATIVE SAND WITH SILT (SP-SM); wet, black; fine sand; trace shells present.	
				LW-SB203-6.5-7.5 Cu and Zn by EPA 6020	PID=0 Odor=None Cr=80 Cu = ND Zn = 18			
		Boring backfilled with hydrated bentonite chips.						
	10		○					
10								10
					PID=0 Odor=None Cr=42 Cu = ND Zn = 25			
							CLAY (CL); very soft, wet, gray; woody debris present; interbedded with sand.	
					PID=0 Odor=None Cr=126 Cu = ND Zn = 34			
	5		○					
15							Bottom of exploration at 15 ft. bgs.	15
	0							

Legend

Sample Type
- ○ No Soil Sample Recovery
- ◫ Continuous core 1.85" ID
- ☒ Grab sample

Water Level
- ⊻ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
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Exploration Log
LW-SB203

Sheet 1 of 1

Aspect CONSULTING	**Chlor-Alkali GP West Lignin Parcel - 210368**		**Environmental Exploration Log**	
	Project Address & Site Specific Location 300 West Laurel Street, Bellingham WA, South end of Site, center of parking lot		*Coordinates (SPN NAD83 ft)* E:1242300 N:641680	*Exploration Number* **LW-SB204**
Contractor Cascade Drilling	*Equipment* Direct push rig	*Sampling Method* Percussion hammer	*Ground Surface Elev.* 17.6'	
Operator Scott Busby	*Exploration Method(s)* Direct push	*Work Start/Completion Dates* 1/19/2022	*Top of Casing Elev.* NA	*Depth to Water (Below GS)* 7.5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
			🖐	LW-SB204-0-1 Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=47 Cu = ND Zn = 23		**ASPHALT** ASPHALT; asphalt with 3 inch thick base course.	
							FILL SILT WITH SAND (ML); very soft, mosit, brown; coarse sand; fine to coarse gravel.	
			🖐	LW-SB204-1-2 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=76 Cu = 14 Zn = 56		DEBRIS OR REFUSE; crushed rock.	
							SILT (ML); stiff, moist, gray and green; trace fine sand; fine gravel.	
	15		○					
5		Boring backfilled with hydrated bentonite chips.	🖐	LW-SB204-5-6 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=238 Cu = 37 Zn = 33		SAND WITH SILT (SP-SM); stiff, moist, dark brown; medium sand; shells and woody debris present.	5
			🖐	LW-SB204-6.5-7.5 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=35 Cu = ND Zn = 15		**NATIVE** SAND WITH SILT (SP-SM); very moist, gray; fine sand; trace shells present.	
	10	⊻ 1/19/2022						
			○					
10					PID=0 Odor=None Cr=58 Cu = ND Zn = 15			10
	5				PID=0 Odor=None Cr=130 Cu = ND Zn = 15		Layer of very soft LEAN CLAY (CL); woody debris present.	
							Becomes fine to medium sand, trace fine gravel; shells present.	
			○					
15							Bottom of exploration at 15 ft. bgs.	15
	0							

Legend

Sample Type
- ▢ No Soil Sample Recovery
- ◫ Continuous core 1.85" ID
- 🖐 Grab sample

Water Level
- ⊻ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
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Exploration Log
LW-SB204
Sheet 1 of 1

Aspect CONSULTING	Chlor-Alkali GP West Lignin Parcel - 210368		Environmental Exploration Log	
	Project Address & Site Specific Location 300 West Laurel Street, Bellingham WA, Southwest corner of Site, west of slab		*Coordinates (SPN NAD83 ft)* E:1242200 N:641780	*Exploration Number* **LW-SB205**
Contractor Cascade Drilling	*Equipment* Direct push rig	*Sampling Method* Percussion hammer	*Ground Surface Elev.* 15.4'	
Operator Scott Busby	*Exploration Method(s)* Direct push	*Work Start/Completion Dates* 1/19/2022	*Top of Casing Elev.* NA	*Depth to Water (Below GS)* 5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
	15			LW-SB205-0.5-1 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM LW-SB205-1-1.5 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=91 Cu = 16 Zn = 52 PID=0 Odor=None Cr=49 Cu = 15 Zn = 62		**ASPHALT** ASPHALT; asphalt with 6 inch base course. **FILL** SAND WITH SILT (SP-SM); moist, brown; medium sand. Becomes gray, very moist.	
			○					
5	10	▽ 1/19/2022		LW-SB205-5-6 Cu and Zn by EPA 6020	PID=0 Odor=None Cr=69 Cu = ND Zn = 12		Trace fine gravel and shells present.	5
		Boring backfilled with hydrated bentonite chips.			PID=0 Odor=None Cr=51 Cu = ND Zn = 32		Woody debris present. **NATIVE** SAND WITH SILT (SP-SM); wet, gray; medium to coarse sand; shells present; interbedded with LEAN CLAY (CL).	
			○					
10	5				PID=0 Odor=None Cr=35 Cu = ND Zn = 21		Woody debris present.	10
					PID=0 Odor=None Cr=77 Cu = 10 Zn = 41		CLAY (CL); wet, gray; non-plastic. Woody debris present.	
			○					
15	0						Bottom of exploration at 15 ft. bgs.	15

Legend

Sample Type
- ☐ No Soil Sample Recovery
- ◫ Continuous core 1.85" ID
- ☑ Grab sample

Water Level
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

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Exploration Log
LW-SB205
Sheet 1 of 1

Aspect CONSULTING

Chlor-Alkali GP West Lignin Parcel - 210368

Environmental Exploration Log

Project Address & Site Specific Location	300 West Laurel Street, Bellingham WA, Southwest corner of Site, west of slab	*Coordinates (SPN NAD83 ft)*	E:1242200 N:641840	*Exploration Number* **LW-SB206**
Contractor	Cascade Drilling	*Equipment*	Direct push rig	
Sampling Method	Percussion hammer	*Ground Surface Elev.*	15.3'	
Operator	Scott Busby	*Exploration Method(s)*	Direct push	
Work Start/Completion Dates	1/19/2022	*Top of Casing Elev.*	NA	
Depth to Water (Below GS)	6.5' (ATD)			

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
	15		✋	LW-SB206-0-1 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=78 Cu = 73 Zn = 262		**FILL** SILTY SAND WITH GRAVEL (SM); moist, brown; medium sand; fine to coarse gravel.	
							SAND WITH SILT (SP-SM); moist, dark gray; fine to medium sand; trace shells present.	
			✋	LW-SB206-2-2.5 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=56 Cu = ND Zn = 17			
			○					
5	10		✋	LW-SB206-5-6 Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=56 Cu = ND Zn = 21			5
		∇ 1/19/2022					Becomes wet.	
		Boring backfilled with hydrated bentonite chips.			PID=0 Odor=None Cr=65 Cu = 15 Zn = 43		**NATIVE** CLAY (CL); wet, gray; interbedded with medium sand; woody debris present.	
							SAND WITH SILT (SW-SM); wet, gray; fine to medium sand; shells and woody debris present.	
			○					
10	5				PID=0 Odor=None Cr=91 Cu = ND Zn = 21		Bedding of LEAN CLAY (CL).	10
					PID=0 Odor=None Cr=67 Cu = ND Zn = 54		Bedding of LEAN CLAY (CL); woody debris present.	
			○					
15	0						Bottom of exploration at 15 ft. bgs.	15

Legend

Sample Type
- ○ No Soil Sample Recovery
- ◫ Continuous core 1.85" ID
- ✋ Grab sample

Water Level
- ∇ Water Level ATD

See Exploration Log Key for explanation of symbols

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Exploration Log
LW-SB206
Sheet 1 of 1

Aspect CONSULTING

Chlor-Alkali GP West Lignin Parcel - 210368

Environmental Exploration Log

Project Address & Site Specific Location			*Coordinates (SPN NAD83 ft)*	*Exploration Number*
300 West Laurel Street, Bellingham WA, South end of Site, south of slab			E:1242300 N:641750	**LW-SB207**
Contractor	*Equipment*	*Sampling Method*	*Ground Surface Elev.*	
Cascade Drilling	Direct push rig	Percussion hammer	18.4'	
Operator	*Exploration Method(s)*	*Work Start/Completion Dates*	*Top of Casing Elev.*	*Depth to Water (Below GS)*
Scott Busby	Direct push	1/19/2022	NA	7.5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
0		Boring backfilled with hydrated bentonite chips.					**ASPHALT** ASPHALT; asphalt with 6 inch thick base course.	
			Grab sample	LW-SB207-0.5-1 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=59 Cu = 27 Zn = 75		**FILL** SILTY SAND (SM); moist, brown; fine to medium sand; trace coarse gravel.	
			Grab sample	LW-SB207-1-2 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=63 Cu = 25 Zn = 35			
	15		○					
5			Grab sample	LW-SB207-5-6 Cu by EPA 6020	PID=0 Odor=None Cr=44 Cu = 25 Zn = 66		Woody debris present.	5
							SILT (ML); medium stiff, moist, light brown with iron-oxide staining	
							SILTY SAND WITH GRAVEL (SM); moist, dark brown; fine to medium sand; coarse gravel; woody debris present.	
		∇ 1/19/2022	Grab sample	LW-SB207-7-8 Cu by EPA 6020	PID=0 Odor=None Cr=72 Cu = 10 Zn = 19		**NATIVE** SAND WITH SILT (SP-SM); very moist; medium sand; shells present; interbedded with LEAN CLAY (CL).	
	10		○					
10					PID=0 Odor=None Cr=38 Cu = ND Zn = 27			10
							Trace fine gravel.	
					PID=0 Odor=None Cr=92 Cu = ND Zn = 17		Woody debris present.	
	5		○					
15							Bottom of exploration at 15 ft. bgs.	15
	0							

Legend

Sample Type
- ○ No Soil Sample Recovery
- ▯ Continuous core 1.85" ID
- ✋ Grab sample

Water Level
- ∇ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
Approved by: Zanna Satterwhite

Exploration Log
LW-SB207
Sheet 1 of 1

Chlor-Alkali GP West Lignin Parcel - 210368

Environmental Exploration Log

Project Address & Site Specific Location			*Coordinates (SPN NAD83 ft)*	*Exploration Number*
300 West Laurel Street, Bellingham WA, Center of Site, south end of slab			E:1242300 N:641820	**LW-SB208**
Contractor	*Equipment*	*Sampling Method*	*Ground Surface Elev.*	
Cascade Drilling	Direct push rig	Percussion hammer	18.7'	
Operator	*Exploration Method(s)*	*Work Start/Completion Dates*	*Top of Casing Elev.*	*Depth to Water (Below GS)*
Scott Busby	Direct push	1/17/2022	NA	7' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
							CONCRETE CONCRETE; Concrete slab 6.5 inches thick.	
			✋	LW-SB208-0.5-1.5 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=55 Cu = 40 Zn = 98		**FILL** SAND WITH SILT (SP-SM); moist, gray; trace coarse gravel.	
							SILT WITH SAND (ML); moist, gray; medium sand. Woody debris present. Becomes very moist.	
	15		○					
5								5
							Woody debris present.	
			✋	LW-SB208-5.5-6.5 Cr/Cu/Zn by EPA 6020	PID=0.2 Odor=None Cr=91 Cu = 16 Zn = 67		SILTY SAND (SM); very moist, black; fine to coarse sand; woody debris and shells present.	
		⊻ 1/17/2022 Boring backfilled with hydrated bentonite chips.			PID=0.3 Odor=Sulfur-like odor Cr=77 Cu = ND Zn = 16		**NATIVE** SAND WITH SILT (SP-SM); very moist, black; medium sand; shells present.	
	10		○					
10								10
			✋	LW-SB208-11-12 Cu and Zn by EPA 6020	PID=0.1 Odor=Sulfur-like odor Cr=38 Cu = 20 Zn = 27			
							CLAY (CL); wet, dark gray; medium plasticity; interbedded with medium sand and shells.	
	5							
					PID=0 Odor=Sulfur-like odor Cr=55 Cu = ND Zn = 19		SAND WITH SILT (SP-SM); wet, gray; medium sand; shells present.	
15							Bottom of exploration at 15 ft. bgs.	15
	0							

Legend

Sample Type
- ○ No Soil Sample Recovery
- ▯ Continuous core 1.85" ID
- ✋ Grab sample

Water Level
- ⊻ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
Approved by: Zanna Satterwhite

Exploration Log LW-SB208

Sheet 1 of 1

Chlor-Alkali GP West Lignin Parcel - 210368

Environmental Exploration Log

Project Address & Site Specific Location	*Coordinates (SPN NAD83 ft)*	*Exploration Number*
300 West Laurel Street, Bellingham WA, Southeast corner of Site, south of slab	E:1242400 N:641750	**LW-SB209**

Contractor	*Equipment*	*Sampling Method*	*Ground Surface Elev.*
Cascade Drilling	Direct push rig	Percussion hammer	19.2'

Operator	*Exploration Method(s)*	*Work Start/Completion Dates*	*Top of Casing Elev.*	*Depth to Water (Below GS)*
Scott Busby	Direct push	1/19/2022	NA	7.5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Analytical Sample Number & Lab Test(s)	Field Tests	Description
0			LW-SB209-0-1 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=63 Cu = 44 Zn = 85	**FILL** GRAVEL WITH SILT (GP-GM); moist, brown; fine gravel. SILT WITH SAND (ML); medium stiff, moist, brown; medium sand. GRAVEL (GW); slightly moist, gray; fine to coarse gravel. SILT WITH SAND (ML); soft, moist, light brown; fine to medium sand.
			LW-SB209-2-2.5 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=72 Cu = 29 Zn = 243	Brick fragments present. Becomes very moist.
	15				
5		Boring backfilled with hydrated bentonite chips.	LW-SB209-5-6 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=66 Cu = 22 Zn = 78	Becomes stiff. Woody debris present. Trace fine to coarse gravel present.
		∇ 1/19/2022	LW-SB209-7-8 Cu and Zn by EPA 6020	PID=0 Odor=None Cr=42 Cu = ND Zn = 30	**NATIVE** SAND WITH SILT (SP-SM); wet, dark gray; fine to medium sand.
	10				
10				PID=0 Odor=None Cr=64 Cu = 9 Zn = 33	
				PID=0 Odor=None Cr=109 Cu = ND Zn = 37	CLAY (CL); very soft to soft, wet, gray; interbedded with medium sand; shells present.
	5				
15					Bottom of exploration at 15 ft. bgs.
	0				

Legend

Sample Type
- ○ No Soil Sample Recovery
- ◫ Continuous core 1.85" ID
- ☒ Grab sample

Water Level
- ∇ Water Level ATD

See Exploration Log Key for explanation of symbols

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Exploration Log
LW-SB209
Sheet 1 of 1

Aspect CONSULTING

Chlor-Alkali GP West Lignin Parcel - 210368

Environmental Exploration Log

Project Address & Site Specific Location 300 West Laurel Street, Bellingham WA, Southeast corner of Site, south of slab		*Coordinates (SPN NAD83 ft)* E:1242400 N:641730	*Exploration Number* **LW-SB210**
Contractor Cascade Drilling	*Equipment* Direct push rig	*Sampling Method* Percussion hammer	*Ground Surface Elev.* 20'
Operator Scott Busby	*Exploration Method(s)* Direct push	*Work Start/Completion Dates* 1/18/2022	*Top of Casing Elev.* NA
			Depth to Water (Below GS) 9.5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Description	Depth (ft)
			☒	LW-SB210-0-1 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM		**FILL** SILT WITH SAND (ML); moist, dark brown; fine to coarse sand; fine gravel; trace organic debris present.	
			☒	LW-SB210-2-2.5 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0.1 Odor=None Cr=48 Cu = 19 Zn = 81	SILTY SAND WITH GRAVEL (SM); moist, dark brown; medium sand; coarse gravel; trace woody debris present.	
			○				
5	15		☒	LW-SB210-5-6 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=79 Cu = 30 Zn = 93		5
						SILT (ML); medium dense, moist, light brown with iron-oxide staining; trace coarse sand; trace coarse gravel.	
		Boring backfilled with hydrated bentonite chips.				SAND WITH SILT (SW-SM); very moist, light gray and black; medium sand; interbedded with LEAN CLAY (CL); woody debris present.	
			☒	LW-SB210-8-8.5 Cu and Zn by EPA 6020	PID=0.2 Odor=None Cr=34 Cu = ND Zn = 7	**NATIVE** CLAY (CL); very moist, gray	
		∇ 1/18/2022	○				
10	10				PID=0 Odor=None Cr=36 Cu = ND Zn = 31	SILTY SAND (SM); wet, dark gray; medium sand; shells present; interbedded with LEAN CLAY (CL); woody debris present.	10
					PID=0 Odor=None Cr=29 Cu = ND Zn = 32		
			○				
15	5					Bottom of exploration at 15 ft. bgs.	15

Legend

Sample Type
- ○ No Soil Sample Recovery
- ◫ Continuous core 1.85" ID
- ☒ Grab sample

Water Level
- ∇ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
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Exploration Log
LW-SB210
Sheet 1 of 1

Aspect CONSULTING	**Chlor-Alkali GP West Lignin Parcel - 210368**		**Environmental Exploration Log**	
	Project Address & Site Specific Location 300 West Laurel Street, Bellingham WA, East side of Site, east end of slab		*Coordinates (SPN NAD83 ft)* E:1242500 N:641860	*Exploration Number* **LW-SB211**
Contractor Cascade Drilling	*Equipment* Direct push rig	*Sampling Method* Percussion hammer	*Ground Surface Elev.* 18.6'	
Operator Scott Busby	*Exploration Method(s)* Direct push	*Work Start/Completion Dates* 1/17/2022	*Top of Casing Elev.* NA	*Depth to Water (Below GS)* 5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
				LW-SB211-0-1 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM			**CONCRETE** CONCRETE; Concrete slab 6 inches thick.	
					PID=0 Odor=None Cr=125 Cu = 18 Zn = 45		**FILL** SAND WITH SILT (SP-SM); moist, light brown; medium sand; trace fine gravel.	
	15		○					
							SILTY SAND WITH GRAVEL (SM); wet, dark brown; medium sand; fine gravel; black woody debris present.	
5		∇ 1/17/2022						5
				LW-SB211-6-7 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=95 Cu = ND Zn = 17		**NATIVE** SAND WITH SILT (SP-SM); wet, light gray; medium sand; trace shells present.	
		Boring backfilled with hydrated bentonite chips.					Becomes gray.	
	10		○					
10							Trace coarse gravel, shells present, interbedded with lean clay.	10
					PID=0 Odor=None Cr=43 Cu = ND Zn = 15			
							Sand becomes fine to medium.	
	5							
					PID=0 Odor=None Cr=94 Cu = ND Zn = 22		Woody debris present.	
15							Bottom of exploration at 15 ft. bgs.	15
	0							

Legend

Sample Type
- ○ No Soil Sample Recovery
- ▯ Continuous core 1.85" ID
- ✋ Grab sample

Water Level
- ∇ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
Approved by: Zanna Satterwhite

Exploration Log
LW-SB211
Sheet 1 of 1

Aspect CONSULTING	Chlor-Alkali GP West Lignin Parcel - 210368		Environmental Exploration Log	
	Project Address & Site Specific Location 300 West Laurel Street, Bellingham WA, Center of Site, south end of slab		*Coordinates (SPN NAD83 ft)* E:1242400 N:641860	*Exploration Number* **LW-SB212**
Contractor Cascade Drilling	*Equipment* Direct push rig	*Sampling Method* Percussion hammer	*Ground Surface Elev.* 18.8'	
Operator Scott Busby	*Exploration Method(s)* Direct push	*Work Start/Completion Dates* 1/17/2022	*Top of Casing Elev.* NA	*Depth to Water (Below GS)* 4.5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
							CONCRETE CONCRETE; concrete slab 8.5 inches thick.	
				LW-SB212-0.5-1.5 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=95 Cu = 14 Zn = 33		**FILL** SAND WITH SILT (SW-SM); moist, light brown; medium sand; trace fine gravel.	
							SANDY SILT (ML); moist, dark brown; medium to coarse sand.	
	15						SILTY SAND (SM); wet, dark brown and black; medium to coarse sand; trace woody debris.	
		∇ 1/17/2022						
5				LW-SB212-5-6 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=52 Cu = 23 Zn = 41			5
							Brick debris present.	
		Boring backfilled with hydrated bentonite chips.	○				**NATIVE** SAND WITH SILT AND GRAVEL (SW-SM); wet, dark gray; coarse sand; fine gravel; trace shells present.	
	10							
10								10
			○					
	5							
15				LW-SB212-15-16 Cu and Zn by EPA 6020	PID=0 Odor=None Cr=99 Cu = 10 Zn = 24			15
	0		○					
20							Bottom of exploration at 20 ft. bgs.	20

Legend

Sample Type
- ○ No Soil Sample Recovery
- ◫ Continuous core 1.85" ID
- ☒ Grab sample

Water Level
- ∇ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
Approved by: Zanna Satterwhite

Exploration Log
LW-SB212
Sheet 1 of 1

Aspect CONSULTING	Chlor-Alkali GP West Lignin Parcel - 210368		Environmental Exploration Log	
	Project Address & Site Specific Location 300 West Laurel Street, Bellingham WA, Center of Site, West side of slab		*Coordinates (SPN NAD83 ft)* E:1242400 N:641880	*Exploration Number* **LW-SB213**
Contractor Cascade Drilling	*Equipment* Direct push rig	*Sampling Method* Percussion hammer	*Ground Surface Elev.* 18.7'	
Operator Scott Busby	*Exploration Method(s)* Direct push	*Work Start/Completion Dates* 1/17/2022	*Top of Casing Elev.* NA	*Depth to Water (Below GS)* 6' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
							CONCRETE CONCRETE; concrete slab 8.5 inches thick.	
							FILL SAND WITH SILT AND GRAVEL (SP-SM); moist, light brown; medium sand; fine to coarse gravel.	
			▯ 🖑	LW-SB213-0.5-1.5 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=118 Cu = 48 Zn = 74		SILT WITH SAND (ML); moist, dark gray; coarse sand; trace fine gravel.	
	15		○					
5								5
			▯				Becomes very moist, dark brown; woody debris present.	
		⊽ 1/17/2022	🖑	LW-SB213-6-7 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=133 Cu = 79 Zn = 142		SILTY SAND WITH GRAVEL (SM); wet, black; medium to coarse sand; fine to coarse gravel; woody debris present.	
		Boring backfilled with hydrated bentonite chips.					**NATIVE** SILTY SAND WITH GRAVEL (SM); wet, black; medium to coarse sand; fine to coarse gravel; woody debris present.	
	10		○					
10			▯ 🖑	LW-SB213-10-11 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=89 Cu = 37 Zn = 61		Becomes dark gray and black.	10
	5		○					
15							Bottom of exploration at 15 ft. bgs.	15
	0							

Legend

Sample Type
- ○ No Soil Sample Recovery
- ▯ Continuous core 1.85" ID
- 🖑 Grab sample

Water Level
- ⊽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
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Exploration Log
LW-SB213
Sheet 1 of 1

Chlor-Alkali GP West Lignin Parcel - 210368

Environmental Exploration Log

Project Address & Site Specific Location			*Coordinates (SPN NAD83 ft)*	*Exploration Number*	
300 West Laurel Street, Bellingham WA, Northwest corner of Site, west of slab			E:1242300 N:641940	**LW-SB214**	
Contractor	*Equipment*	*Sampling Method*	*Ground Surface Elev.*		
Cascade Drilling	Direct push rig	Percussion hammer	15.1'		
Operator	*Exploration Method(s)*	*Work Start/Completion Dates*	*Top of Casing Elev.*	*Depth to Water (Below GS)*	
Scott Busby	Direct push	1/19/2022	NA	6' (ATD)	

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
	15		◫ ⛶	LW-SB214-0.5-1.5 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=227 Cu = 8 Zn = 68	GM ML	**FILL** SILTY GRAVEL (GM); very moist, red brown; fine to coarse gravel. SILT WITH SAND (ML); moist, dark gray; medium to coarse sand.	
			◫ ⛶	LW-SB214-2-2.5 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=1.8 Odor=Sulfur-like odor Cr=119 Cu = 394 Zn = 45	SP-SM	SAND WITH SILT (SP-SM); very moist, dark brown; medium sand; trace fine gravel.	
			○					
5	10		◫ ⛶	LW-SB214-5-6 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=36 Cu = 18 Zn = 14	GP-GM	GRAVEL WITH SILT AND SAND (GP-GM); wet, dark brown; medium to coarse sand; fine gravel.	5
		∇ 1/19/2022	◫			SP-SM	**NATIVE** SAND WITH SILT (SP-SM); wet, dark gray; fine sand.	
		Boring backfilled with hydrated bentonite chips.	◫		PID=0 Odor=None Cr=36 Cu = 18 Zn = 14		Bedding of LEAN CLAY (CL); woody debris present.	
			◫		PID=0 Odor=None Cr=64 Cu = 9 Zn = 26		Becomes medium sand, trace shells present.	
			◫			CL	CLAY (CL); wet, dark gray	
10	5		◫		PID=0 Odor=None Cr=107 Cu = ND Zn = 17	SP-SM	SAND WITH SILT (SP-SM); wet, dark gray; medium sand; trace shells present.	10
			○					
15	0						Bottom of exploration at 15 ft. bgs.	15

Legend

Sample Type
- ○ No Soil Sample Recovery
- ◫ Continuous core 1.85" ID
- ⛶ Grab sample

Water Level
- ∇ Water Level ATD

See Exploration Log Key for explanation of symbols

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Exploration Log
LW-SB214
Sheet 1 of 1

Aspect CONSULTING

Chlor-Alkali GP West Lignin Parcel - 210368

Environmental Exploration Log

Project Address & Site Specific Location 300 West Laurel Street, Bellingham WA, Northwest corner of Site, west side of slab			*Coordinates (SPN NAD83 ft)* E:1242400 N:641950	*Exploration Number* **LW-SB215**
Contractor Cascade Drilling	*Equipment* Direct push rig	*Sampling Method* Percussion hammer	*Ground Surface Elev.* 18.6'	
Operator Scott Busby	*Exploration Method(s)* Direct push	*Work Start/Completion Dates* 1/17/2022	*Top of Casing Elev.* NA	*Depth to Water (Below GS)* 5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
			🖑	LW-SB215-0.5-1.5 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=115 Cu = 29 Zn = 56		**CONCRETE** CONCRETE; concrete slab 5 inches thick. **FILL** SAND WITH SILT AND GRAVEL (SP-SM); moist, brown; medium to coarse sand; fine to coarse gravel.	
	15		○				SILTY SAND WITH GRAVEL (SM); wet, dark brown; medium sand; fine gravel.	
5		∇ 1/17/2021	🖑	LW-SB215-5-6 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=122 Cu = 41 Zn = 67			5
		Boring backfilled with hydrated bentonite chips.	○					
	10							
10			🖑	LW-SB215-10-11 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=120 Cu = 28 Zn = 56		**NATIVE** SILTY SAND (SM); wet, dark gray; medium sand; trace coarse gravel; interbedded with LEAN CLAY (CL).	10
					PID=0 Odor=Sulfur-like odor Cr=46 Cu = ND Zn = 30			
	5		○					
15							Bottom of exploration at 15 ft. bgs.	15
	0							

Legend

Sample Type
- ○ No Soil Sample Recovery
- ◨ Continuous core 1.85" ID
- 🖑 Grab sample

Water Level
- ∇ Water Level ATD

See Exploration Log Key for explanation of symbols

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Exploration Log
LW-SB215
Sheet 1 of 1

Aspect CONSULTING	Chlor-Alkali GP West Lignin Parcel - 210368		Environmental Exploration Log	
	Project Address & Site Specific Location		*Coordinates (SPN NAD83 ft)*	*Exploration Number*
	300 West Laurel Street, Bellingham WA, Center of Site, center of slab		E:1242400 N:641930	**LW-SB216**
Contractor	*Equipment*	*Sampling Method*	*Ground Surface Elev.*	
Cascade Drilling	Direct push rig	Percussion hammer	18.4'	
Operator	*Exploration Method(s)*	*Work Start/Completion Dates*	*Top of Casing Elev.*	*Depth to Water (Below GS)*
Scott Busby	Direct push	1/17/2022	NA	5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Description	Depth (ft)
				LW-SB216-0-1 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM		**CONCRETE** CONCRETE; concrete slab 5.75 inches thick.	
					PID=0 Odor=None Cr=42 Cu = 9 Zn = 24	**FILL** SAND WITH SILT AND GRAVEL (SW-SM); moist, light brown; medium to coarse sand; fine gravel.	
						DEBRIS OR REFUSE; Crushed rock 1.5 - 2 ft BGS.	
	15		○	LW-SB216-2.5-3.5 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0.6 Odor=None Cr=81 Cu = 12 Zn = 49	SILTY SAND WITH GRAVEL (SM); moist, dark brown; medium to coarse sand; coarse gravel.	
5		⊻ 1/17/2022			PID=0 Odor=Sulfur-like odor Cr=31 Cu = 164 Zn = 75	DEBRIS OR REFUSE; wet, black; woody debris 5 - 6 ft BGS.	5
	10	Boring backfilled with hydrated bentonite chips.	○	LW-SB216-7-8 Cu and Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=44 Cu = ND Zn = 34	**NATIVE** CLAY (CL); wet, dark gray; non-plastic.	
10					PID=0 Odor=None Cr=64 Cu = ND Zn = 24	SILTY SAND (SM); wet, gray; medium to coarse sand; trace shells present.	10
	5		○		PID=0 Odor=None Cr=124 Cu = ND Zn = 27		
15					PID=0 Odor=None Cr=104 Cu = ND Zn = 24		15
	0				PID=0 Odor=Sulfur-like odor Cr=154 Cu = ND Zn = 13	Sand becomes fine to medium; woody debris and shells present.	
20						Bottom of exploration at 20 ft. bgs.	20

Legend

Sample Type
- ○ No Soil Sample Recovery
- ◨ Continuous core 1.85" ID
- ☒ Grab sample

Water Level
- ⊻ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
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Exploration Log LW-SB216

Sheet 1 of 1

Chlor-Alkali GP West Lignin Parcel - 210368

Environmental Exploration Log

Project Address & Site Specific Location	Coordinates (SPN NAD83 ft)	Exploration Number
300 West Laurel Street, Bellingham WA, East side of Site, east of slab	E:1242500 N:641970	**LW-SB217**

Contractor	Equipment	Sampling Method	Ground Surface Elev.
Cascade Drilling	Direct push rig	Percussion hammer	18.6'

Operator	Exploration Method(s)	Work Start/Completion Dates	Top of Casing Elev.	Depth to Water (Below GS)
Scott Busby	Direct push	1/18/2022	NA	5.5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Description	Depth (ft)
			Grab sample	LW-SB217-0-1 Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=47 Cu = 7 Zn = 50	**FILL** SILTY GRAVEL (GM); moist, brown; fine to coarse gravel.	
			Grab sample	LW-SB217-1-1.5 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=68 Cu = 9 Zn = 55	SILTY SAND (SM); moist, brown; trace fine gravel. SILT WITH SAND (ML); soft, moist, dark brown; medium to coarse sand; asphalt chunks and brick fragments present.	
			No Soil Sample Recovery				
	15					SILTY SAND WITH GRAVEL (SM); very moist, brown; medium to coarse sand; fine gravel.	
5		▽ 1/18/2022	Grab sample	LW-SB217-5-6 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=41 Cu = ND Zn = 15		5
			Continuous core			SILTY SAND (SM); wet, black; fine sand; woody debris present.	
		Boring backfilled with hydrated bentonite chips.			PID=0 Odor=None Cr=42 Cu = ND Zn = 30	**NATIVE** CLAY (CL); wet, dark gray; medium plasticity. SILTY SAND (SM); wet, dark gray; fine to medium sand; trace fine gravel; shells present; interbedded with LEAN CLAY (CL).	
	10				PID=0 Odor=None Cr=70 Cu = 20 Zn = 59		
10							10
					PID=0 Odor=None Cr=56 Cu = ND Zn = 19	DEBRIS OR REFUSE; Woody debris SILTY SAND (SM); wet, dark gray; fine to medium sand; woody debris present; interbedded with LEAN CLAY (CL).	
	5				PID=0 Odor=None Cr=64 Cu = ND Zn = 15	SAND WITH SILT (SW-SM); wet, gray and green; medium sand; woody debris present; 2 inch layer of dense crushed shells at 14.5 ft bgs.	
15						Bottom of exploration at 15 ft. bgs. Note: Chuckanut Sandstone observed at base of core.	15
	0						

Legend

Sample Type		Water Level	
▢	No Soil Sample Recovery	▽	Water Level ATD
◫	Continuous core 1.85" ID		
☒	Grab sample		

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
Approved by: Zanna Satterwhite

Exploration Log
LW-SB217
Sheet 1 of 1

Aspect CONSULTING

Chlor-Alkali GP West Lignin Parcel - 210368

Environmental Exploration Log

Project Address & Site Specific Location			*Coordinates (SPN NAD83 ft)*	*Exploration Number*
300 West Laurel Street, Bellingham WA, Northwest corner of Site, west of slab			E:1242400 N:642010	**LW-SB218**
Contractor	*Equipment*	*Sampling Method*	*Ground Surface Elev.*	
Cascade Drilling	Direct push rig	Percussion hammer	18.5'	
Operator	*Exploration Method(s)*	*Work Start/Completion Dates*	*Top of Casing Elev.*	*Depth to Water (Below GS)*
Scott Busby	Direct push	1/18/2022	NA	5.5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
			▮			■	**ASPHALT** ASPHALT; asphalt with base course 6 inches thick.	
			✋	LW-SB218-0.5-1 Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=160 Cu = 16 Zn = 74 Cr=62 Cu = ND Zn = 24		**FILL** SILTY SAND WITH GRAVEL (SM); moist to very moist, brown; medium sand; fine to coarse gravel.	
			✋	LW-SB218-2-2.5 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=111 Cu = 7 Zn = 31			
	15		○					
5			▮					5
		⊻ 1/18/2022			PID=0 Odor=None Cr=155 Cu = 15 Zn = 66		Becomes wet.	
							Woody debris present.	
							SANDY SILT WITH GRAVEL (ML); loose, wet, dark gray and black; medium sand; fine gravel; woody debris present.	
		Boring backfilled with hydrated bentonite chips.						
	10		✋	LW-SB218-8-9 Cr/Cu/Zn by EPA 6020	PID=0 Odor=kreosote-like odor Cr=70 Cu = 146 Zn = 182		Woody debris present.	
						▨	**NATIVE** CLAY (CL); wet, black	
10								10
			✋	LW-SB218-11-12 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=153 Cu = ND Zn = 20			
							SILTY SAND (SM); wet, dark gray; fine to medium sand; trace fine gravel; shells present; interbedded with LEAN CLAY (CL).	
	5				PID=0 Odor=None Cr=62 Cu = ND Zn = 24			
15							Bottom of exploration at 15 ft. bgs.	15
	0							

Legend

Sample Type
- ○ No Soil Sample Recovery
- ◫ Continuous core 1.85" ID
- ☒ Grab sample

Water Level
- ⊻ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
Approved by: Zanna Satterwhite

Exploration Log
LW-SB218
Sheet 1 of 1

Chlor-Alkali GP West Lignin Parcel - 210368

Environmental Exploration Log

Project Address & Site Specific Location	300 West Laurel Street, Bellingham WA, Northwest corner of Site, west of slab	*Coordinates (SPN NAD83 ft)*	E:1242400 N:642050	*Exploration Number* **LW-SB219**
Contractor	Cascade Drilling	*Equipment*	Direct push rig	
Sampling Method	Percussion hammer	*Ground Surface Elev.*	17.2'	
Operator	Scott Busby	*Exploration Method(s)*	Direct push	
Work Start/Completion Dates	1/17/2022	*Top of Casing Elev.*	NA	*Depth to Water (Below GS)* 5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
0			◙	LW-SB219-0-1 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=57 Cu = 19 Zn = 58		**FILL** SILTY SAND WITH GRAVEL (SM); moist, brown; fine to coarse sand; fine to coarse gravel.	
	15							
			○					
5		▽ 1/17/2022	◙	LW-SB219-5-6 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=411 Cu = 52 Zn = 313		Becomes wet, gravel becomes fine.	5
	10	Boring backfilled with hydrated bentonite chips.						
			○				**NATIVE** SAND WITH SILT (SP-SM); wet, black; medium sand; interbedded with LEAN CLAY (CL).	
10			◙	LW-SB219-10-11 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=78 Cu = 54 Zn = 59			10
	5							
			◙	LW-SB219-13-14 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=66 Cu = ND Zn = 18			
			○					
15							Bottom of exploration at 15 ft. bgs.	15
	0							

Legend

Sample Type
- ○ No Soil Sample Recovery
- ◫ Continuous core 1.85" ID
- ◙ Grab sample

Water Level
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
Approved by: Zanna Satterwhite

Exploration Log
LW-SB219
Sheet 1 of 1

Aspect CONSULTING	Chlor-Alkali GP West Lignin Parcel - 210368	Environmental Exploration Log	
	Project Address & Site Specific Location 300 West Laurel Street, Bellingham WA, North side of Site, north side of slab	*Coordinates (SPN NAD83 ft)* E:1242500 N:642060	*Exploration Number* **LW-SB220**

Contractor	*Equipment*	*Sampling Method*	*Ground Surface Elev.*
Cascade Drilling	Direct push rig	Percussion hammer	18.4'

Operator	*Exploration Method(s)*	*Work Start/Completion Dates*	*Top of Casing Elev.*	*Depth to Water (Below GS)*
Scott Busby	Direct push	1/17/2022	NA	5.5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Description	Depth (ft)
						CONCRETE SLAB CONCRETE; concrete slab 7.25 inches thick.	
						FILL SILTY SAND WITH GRAVEL (SM); medium dense, moist, brown; medium to coarse sand; coarse gravel.	
				LW-SB220-1-2 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=204 Cu = ND Zn = 35		
	15						
5						Gravel becomes fine.	5
		▽ 1/17/2022		LW-SB220-5-6 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=73 Cu = ND Zn = 27		
						NATIVE SANDY SILT WITH GRAVEL (ML); wet, gray; medium sand; fine gravel.	
		Boring backfilled with hydrated bentonite chips.					
	10					SANDY SILT (ML); wet, gray; fine sand.	
10							10
					PID=0 Odor=None Cr=116 Cu = ND Zn = 20		
						CLAY (CL); very moist; medium plasticity.	
						Interbedded with medium to coarse sand; trace shells.	
	5				PID=0 Odor=None Cr=85 Cu = ND Zn = 23		
						SAND WITH SILT (SP-SM); wet, black; medium to coarse sand.	
15						Bottom of exploration at 15 ft. bgs.	15
	0						

Legend

Sample Type
- ○ No Soil Sample Recovery
- ▮ Continuous core 1.85" ID
- ☒ Grab sample

Water Level
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

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Exploration Log
LW-SB220
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINTW\PROJECTS\210368 CHLOR-ALKALI LIGNIN PARCEL V2.GPJ May 11, 2022

Aspect CONSULTING

Chlor-Alkali GP West Lignin Parcel - 210368

Environmental Exploration Log

Project Address & Site Specific Location 300 West Laurel Street, Bellingham WA, South end of Site			*Coordinates (SPN NAD83 ft)* E:1242300 N:641590	*Exploration Number* **LW-SB221**
Contractor Cascade Drilling	*Equipment* Direct push rig	*Sampling Method* Percussion hammer	*Ground Surface Elev.* 18'	
Operator Scott Busby	*Exploration Method(s)* Direct push	*Work Start/Completion Dates* 1/20/2022	*Top of Casing Elev.* NA	*Depth to Water (Below GS)* 5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Description	Depth (ft)
	18		🖑	LW-SB221-0-1 Cr/Cu/Zn by EPA 6020, Low-Level PAHs by EPA 8270DSIM	PID=0 Odor=None Cr=160 Cu = 81 Zn = 81	**ASPHALT** ASPHALT; asphalt with 3 inch thick base course. **FILL** SILT WITH SAND (ML); soft, moist, brown; medium sand; fine gravel.	
			◨				
			🖑	LW-SB221-2-3 Cr/Cu/Zn by EPA 6020	PID=0.1 Odor=None Cr=79 Cu = 14 Zn = 51	Becomes dark brown, very moist. Woody debris present. Becomes dark gray.	
	15		○				
5		∇ 1/20/2022	🖑	LW-SB221-5-6 Cr/Cu/Zn by EPA 6020	PID=0 Odor=None Cr=115 Cu = ND Zn = 37	Becomes very wet, very soft.	5
			◨			DEBRIS OR REFUSE; Crushed rock, woody debris, and brick debris. **NATIVE** SAND WITH SILT (SP-SM); wet, gray; medium sand; woody debris present.	
		Boring backfilled with bentonite chips.			PID=0 Odor=None Cr=61 Cu = ND Zn = 17		
	10		○				
10			◨		PID=0 Odor=None Cr=55 Cu = 14 Zn = 40		10
						CLAY (CL); very soft, wet, gray; woody debris present.	
					PID=0 Odor=None Cr=88 Cu = ND Zn = 19		
	5						
						SAND WITH SILT (SP-SM); wet, gray; fine to medium sand; woody debris present.	
15						Bottom of exploration at 15 ft. bgs.	15
	0						

Legend

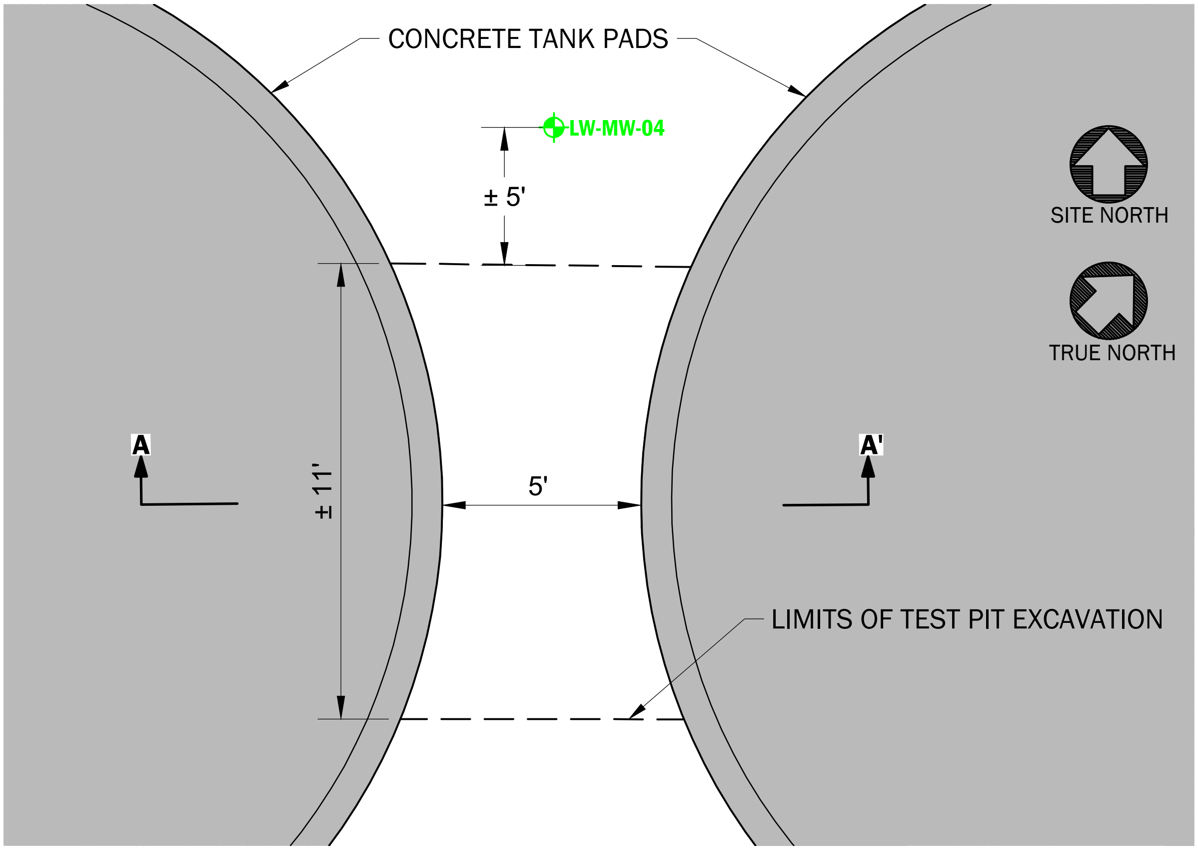
Sample Type
- ○ No Soil Sample Recovery
- ◨ Continuous core 1.85" ID
- 🖑 Grab sample

Water Level
- ∇ Water Level ATD

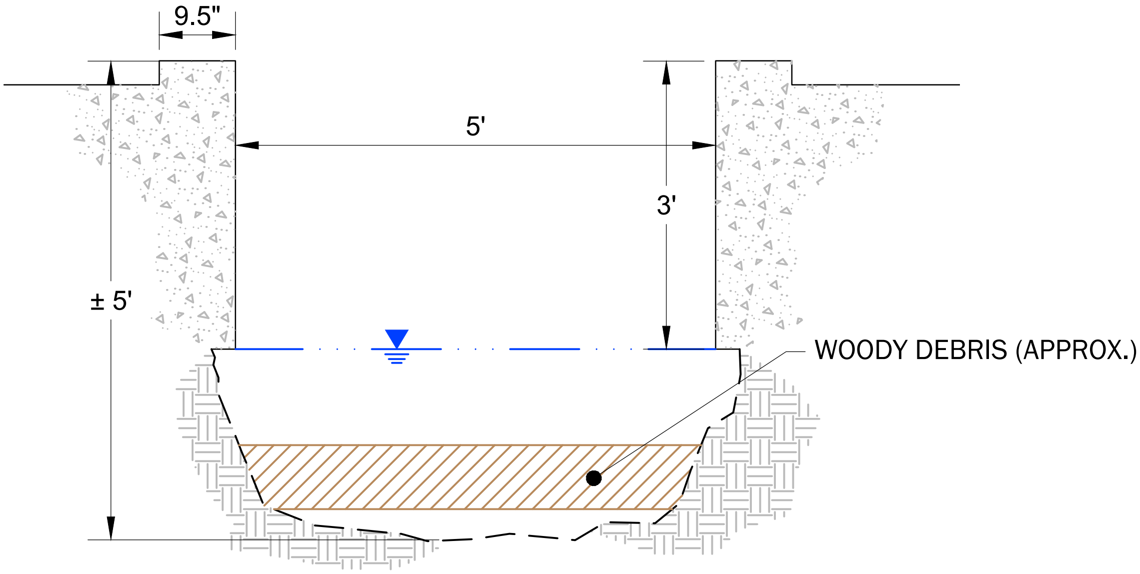
See Exploration Log Key for explanation of symbols

Logged by: Baxter Call
Approved by: Zanna Satterwhite

Exploration Log
LW-SB221
Sheet 1 of 1



TEST PIT PLAN
SCALE: NOT TO SCALE



TEST PIT SECTION A - A'
SCALE: NOT TO SCALE

Source: Base map provided by

Legend

⊕ Monitoring Well Location

Test Pit 1

Pre-Remedial Design Investigation
Lignin Parcel Affordable Housing Project - GP West Site
Bellingham, Washington

Aspect CONSULTING

Aspect CONSULTING	Feb-22	BY: JRG	FIGURE NO.
	PROJECT NO. 210368	REVISED BY: -	1

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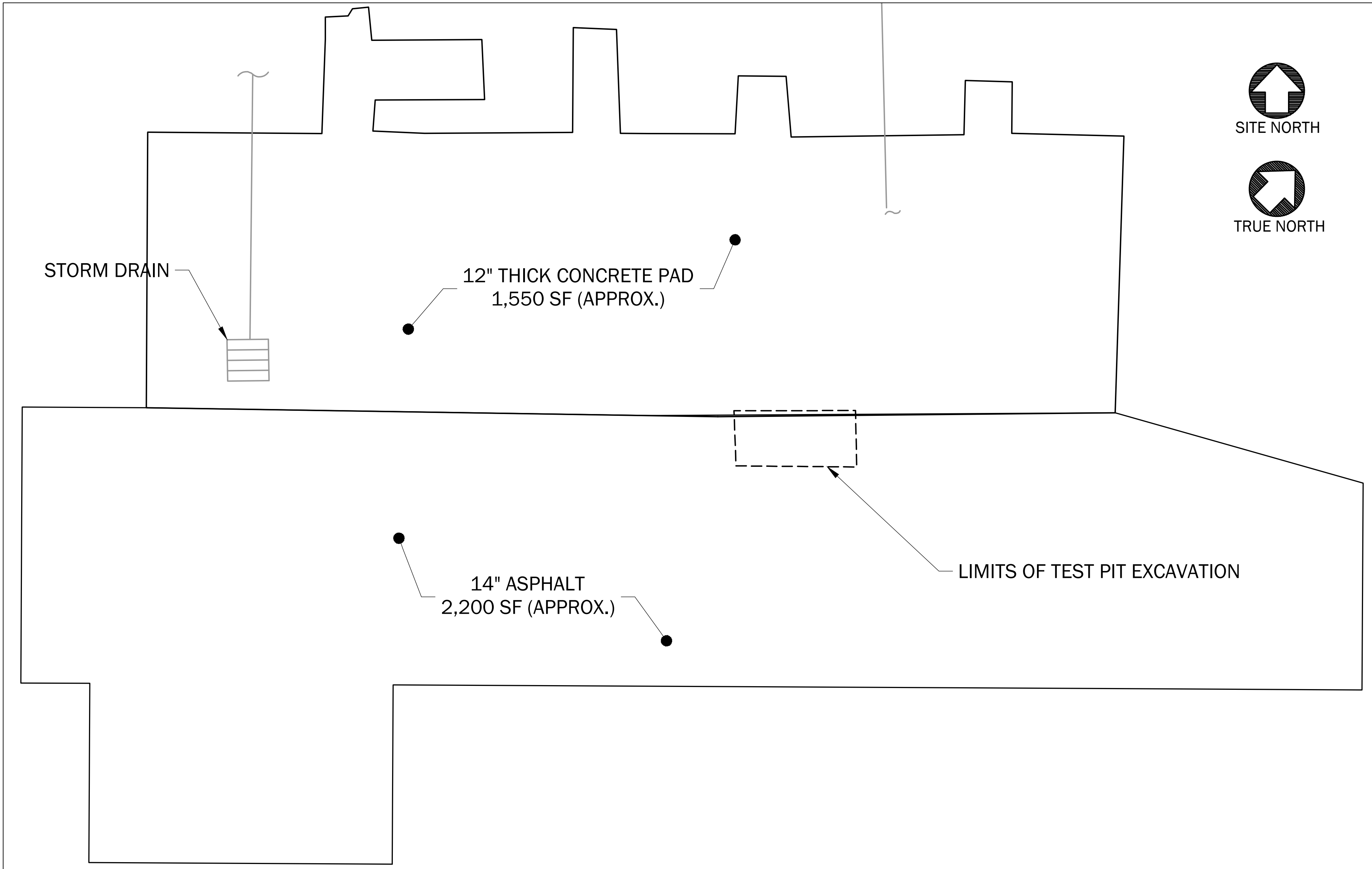

Test Pit 2

Pre-Remedial Design Investigation 1 Project Plan
Lignin Parcel Affordable Housing Project - GP West Site
Bellingham, Washington

Aspect CONSULTING

Feb-2022	BY: JRG	FIGURE NO. **2**
PROJECT NO. 210368	REVISED BY: -	

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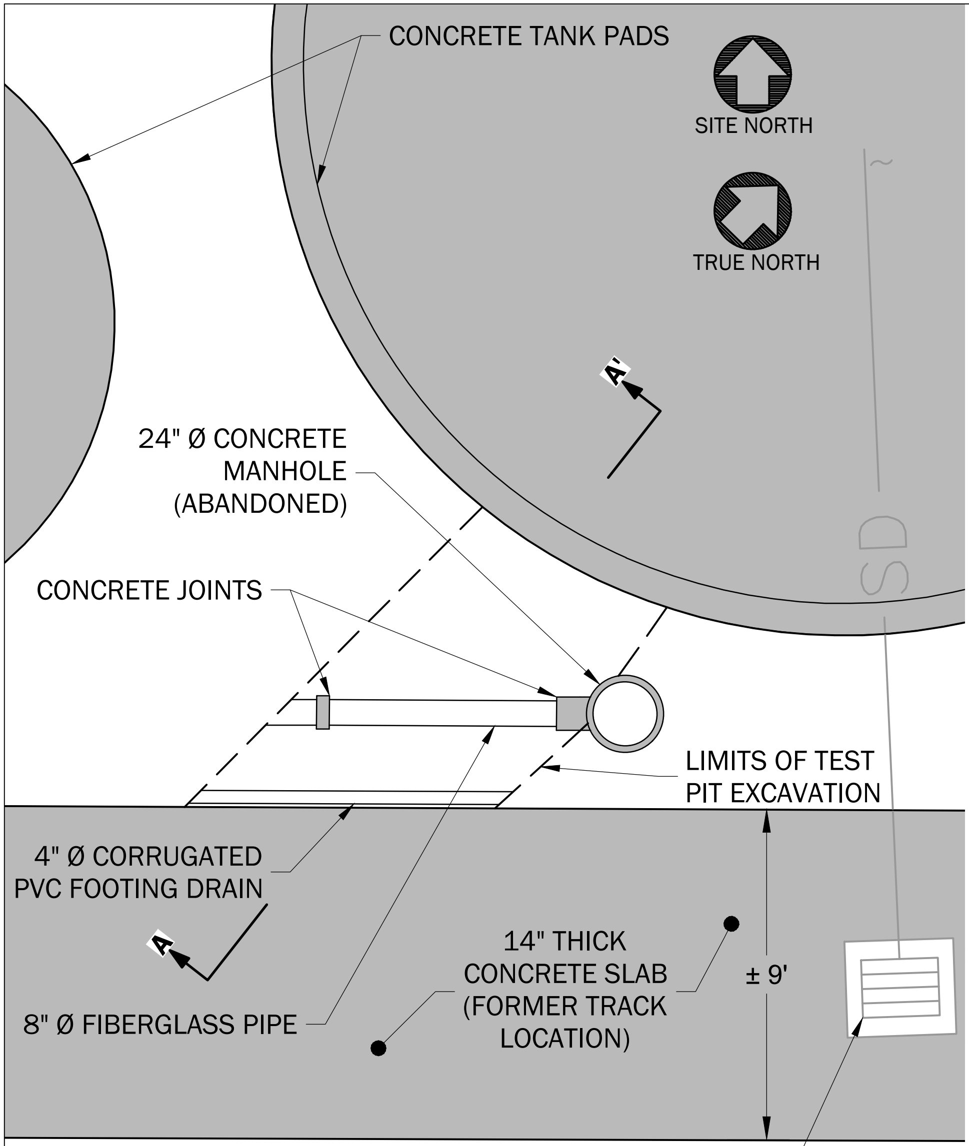

TEST PIT PLAN

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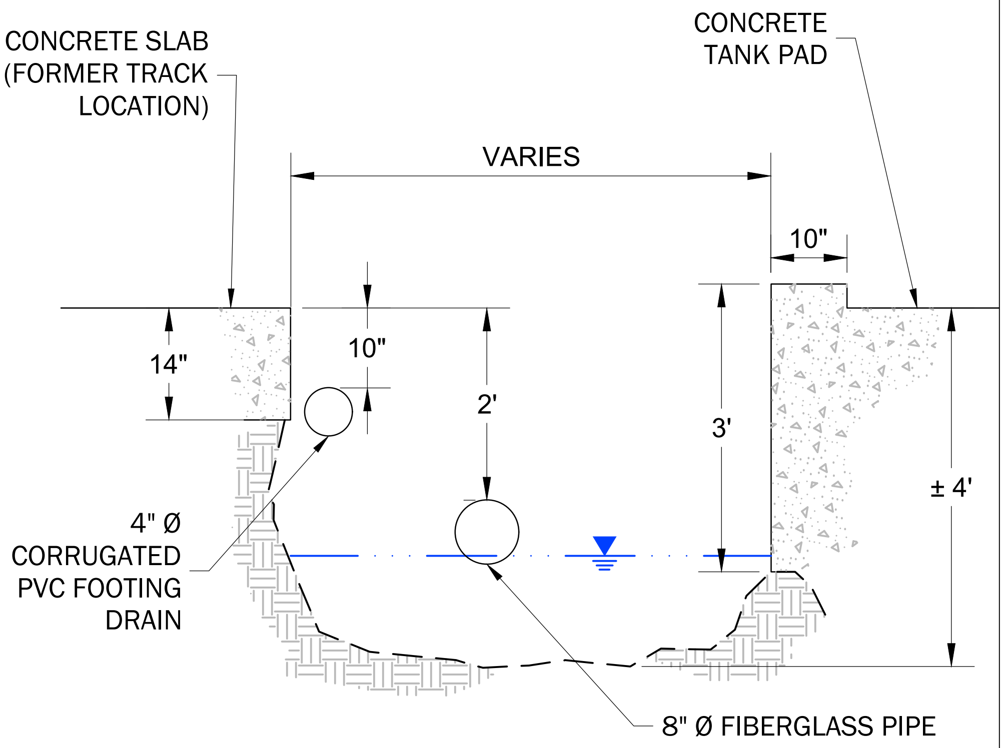


TEST PIT SECTION A - A'

SCALE: NOT TO SCALE

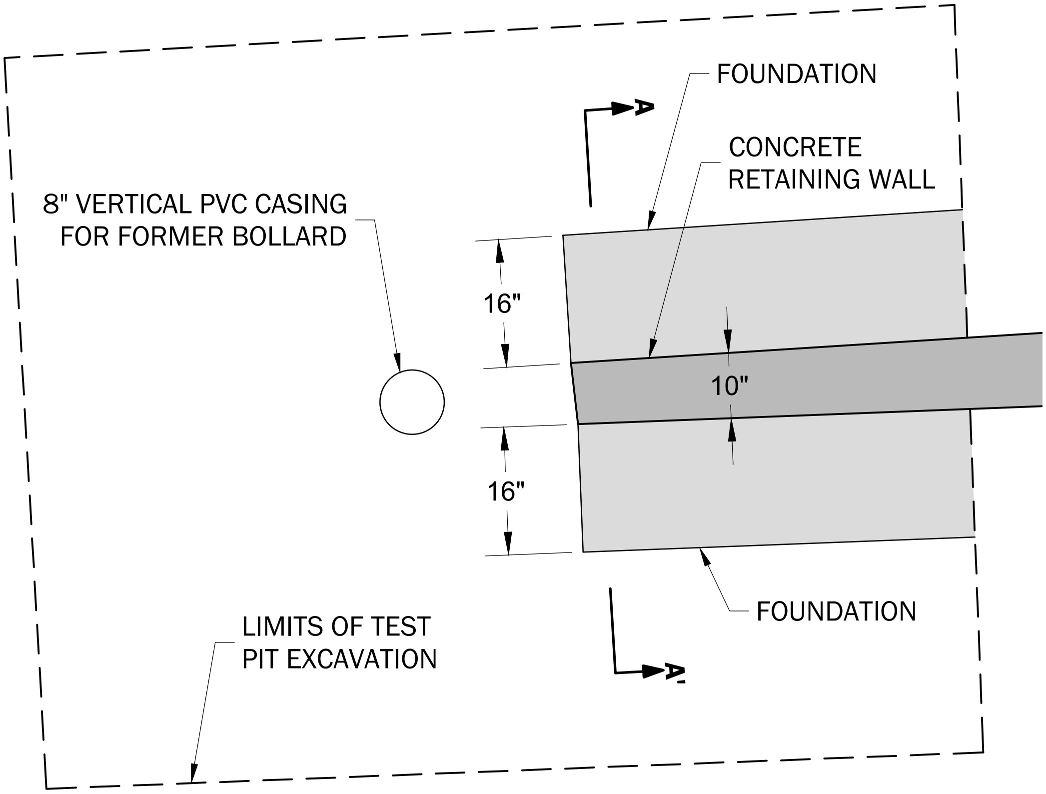
0 10 20 Feet

Test Pit 3

Pre-Remedial Design Investigation 1
Lignin Parcel Affordable Housing Project - GP West Site
Bellingham, Washington

Aspect CONSULTING

Feb-2022	BY: JRG	FIGURE NO. 3
PROJECT NO. 210368	REVISED BY: -	



TEST PIT PLAN
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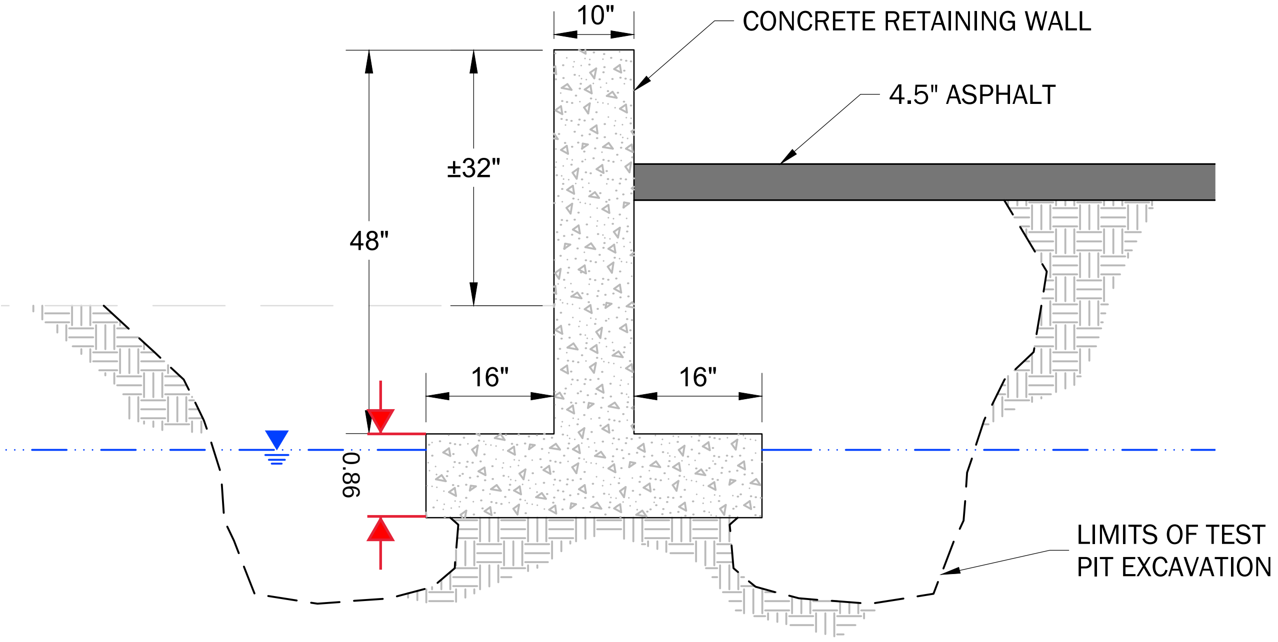

Source: Base map provided by

TEST PIT SECTION A - A'
SCALE: NOT TO SCALE

Legend

⊕ Monitoring Well Location

Test Pit 4

Pre-Remedial Design Investigation
Lignin Parcel Affordable Housing Project - GP West Site
Bellingham, Washington

Aspect CONSULTING	Feb-22	BY: JRG	FIGURE NO.
	PROJECT NO. 210368	REVISED BY: -	4

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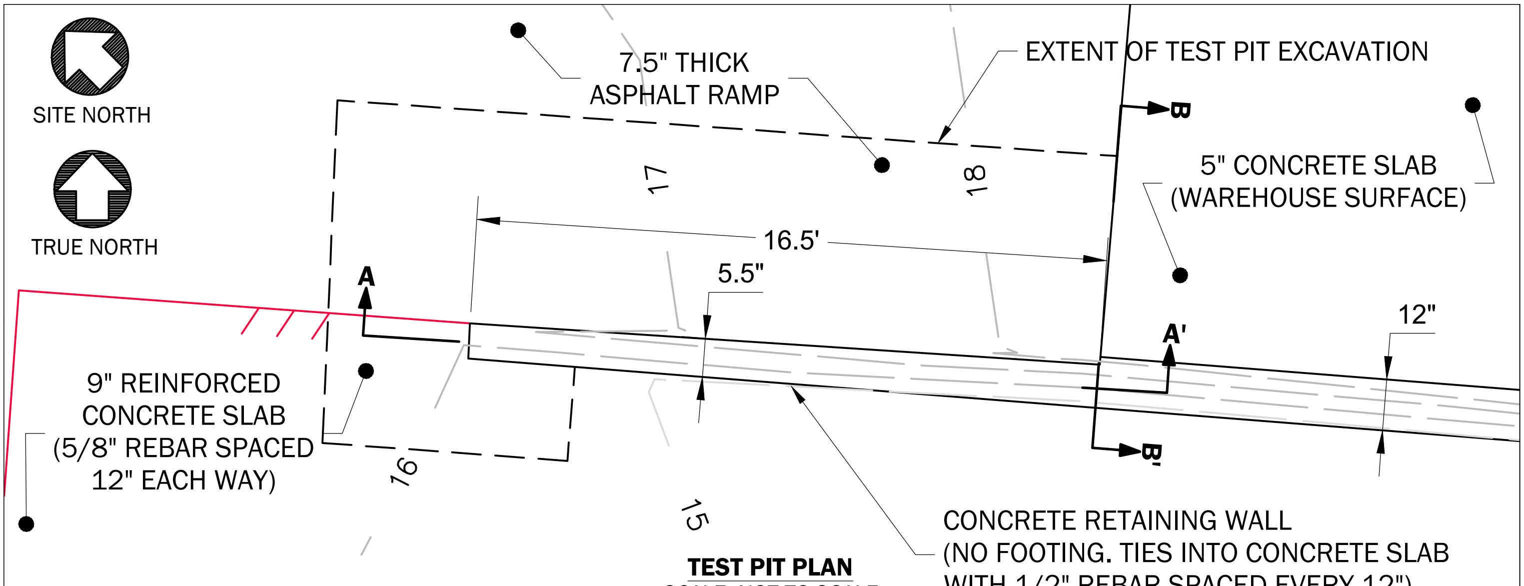

TEST PIT PLAN

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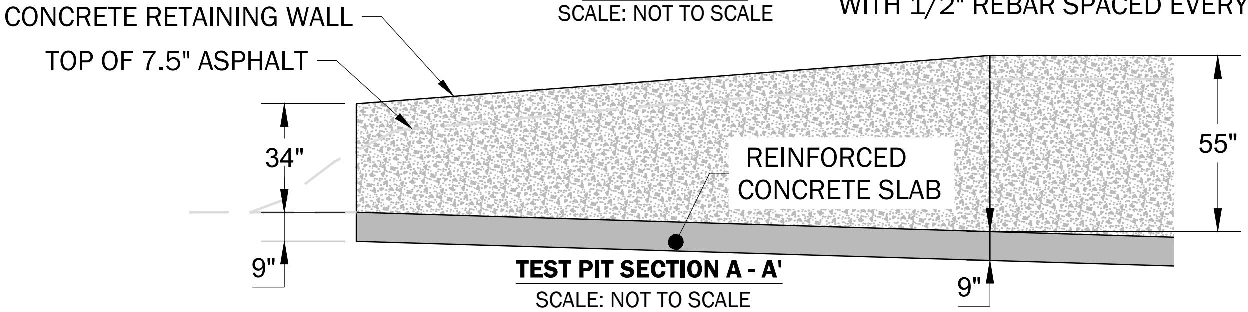

TEST PIT SECTION A - A'

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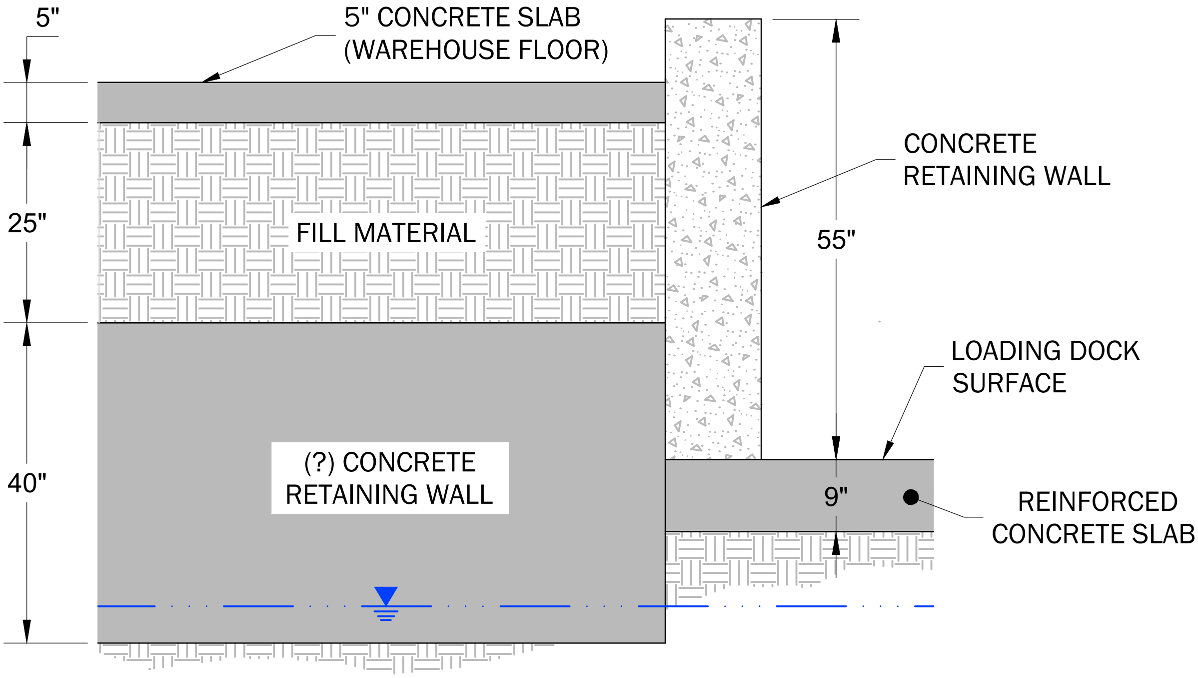


TEST PIT SECTION B - B'

SCALE: NOT TO SCALE

Source: Base map provided by

Legend

⌖ Monitoring Well Location

Test Pit 5

Retaining Wall

Pre-Remedial Design Investigation

Lignin Parcel Affordable Housing Project - GP West Site

Bellingham, Washington

Aspect CONSULTING

Feb-22

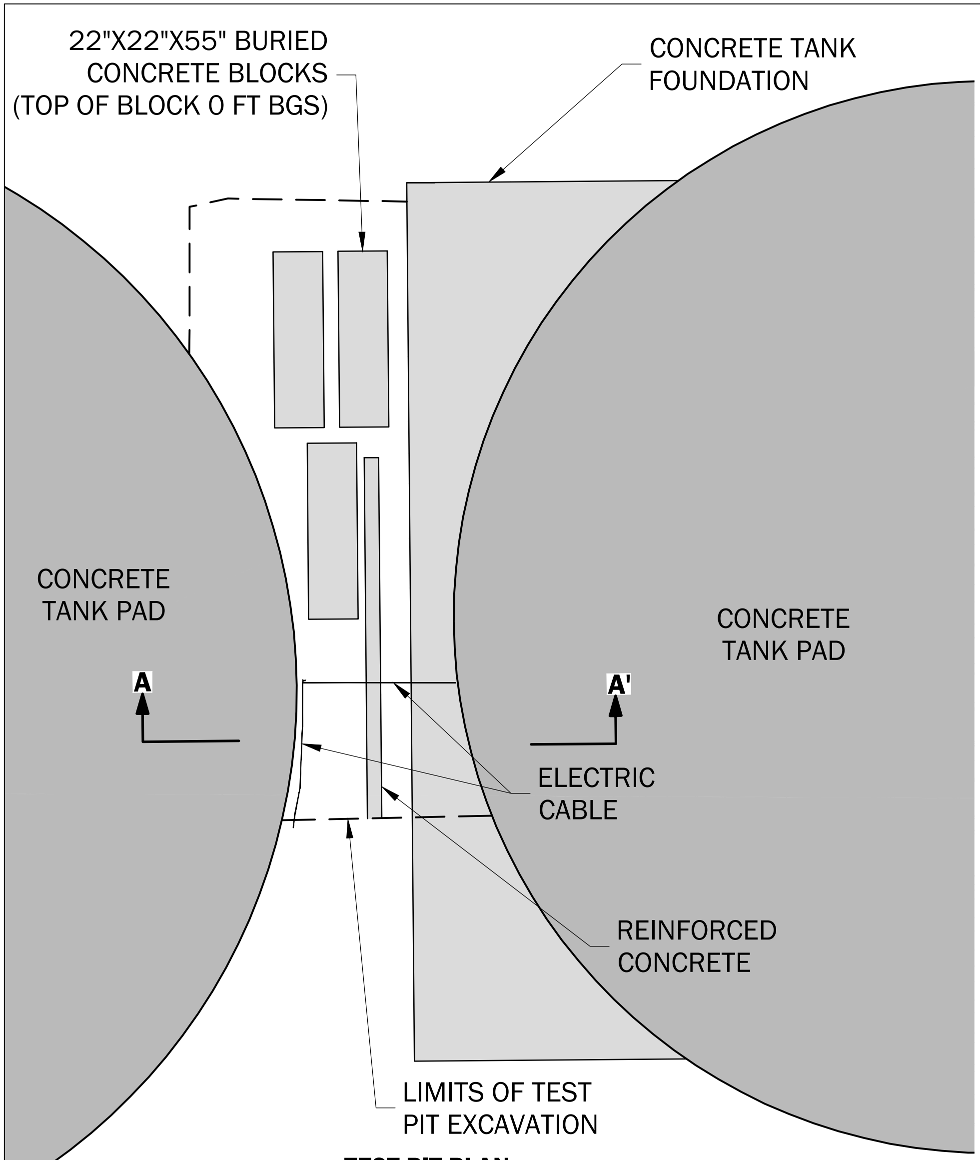
PROJECT NO.
210368

BY:
JRG

REVISED BY:
-

FIGURE NO.
5

CAD Path: C:\Users\jgregg\Desktop\210368 GP West Chlor-Alkali\Test Pit Results\Test Pits 1 to 14.dwg Test Pit 5 || Date Saved: Feb 10, 2022 4:18pm || User: jgregg



TEST PIT PLAN

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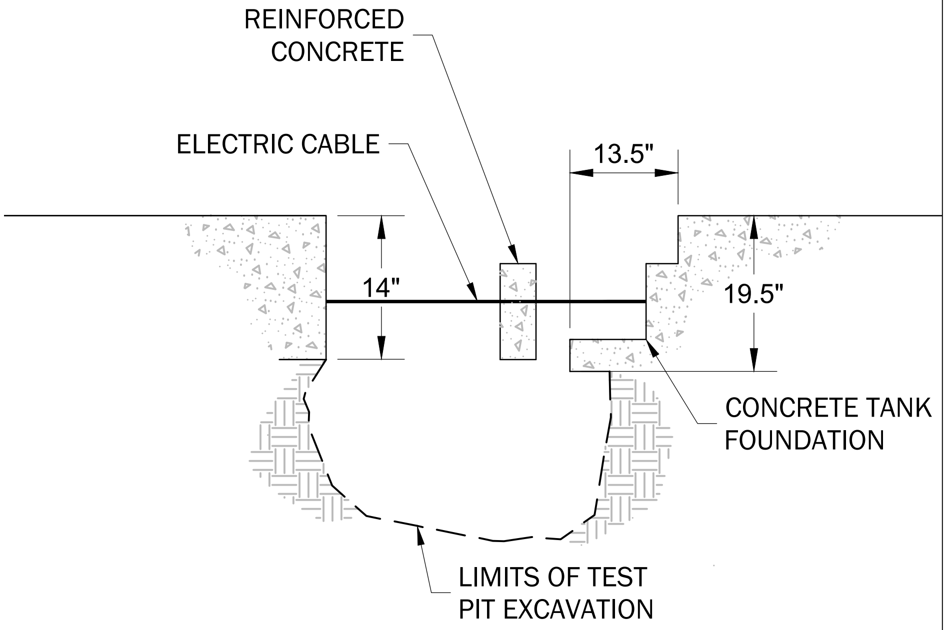

TEST PIT SECTION A - A'

SCALE: NOT TO SCALE

0 10 20 Feet

Test Pit 6
Tank Foundations

Pre-Remedial Design Investigation 1

Lignin Parcel Affordable Housing Project - GP West Site

Bellingham, Washington

Aspect CONSULTING

Feb-2022	BY: JRG	FIGURE NO.
PROJECT NO. 210368	REVISED BY: -	6

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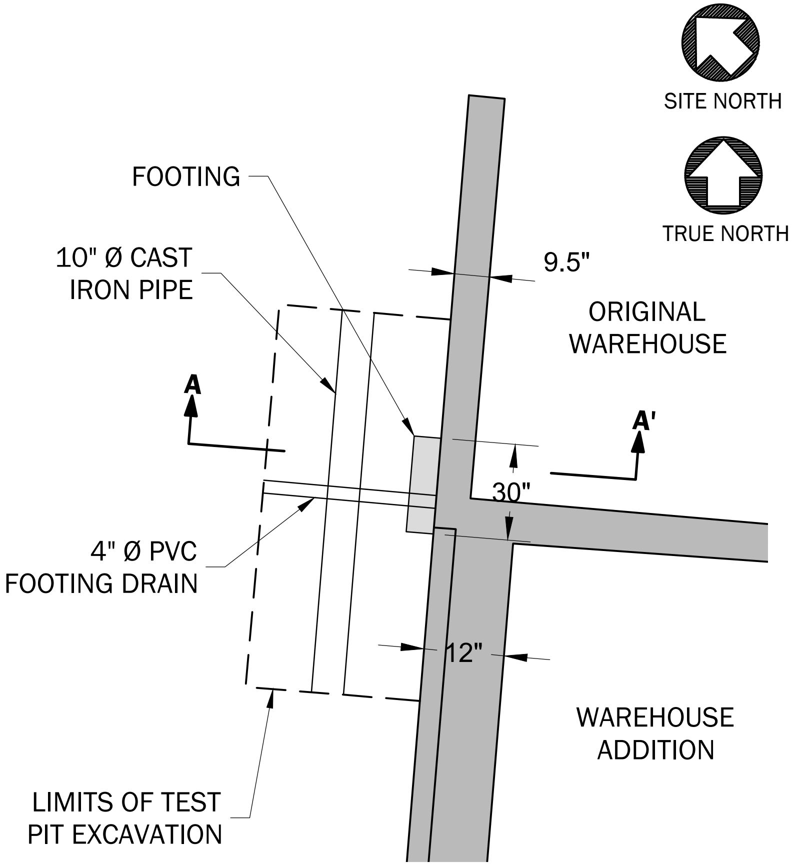

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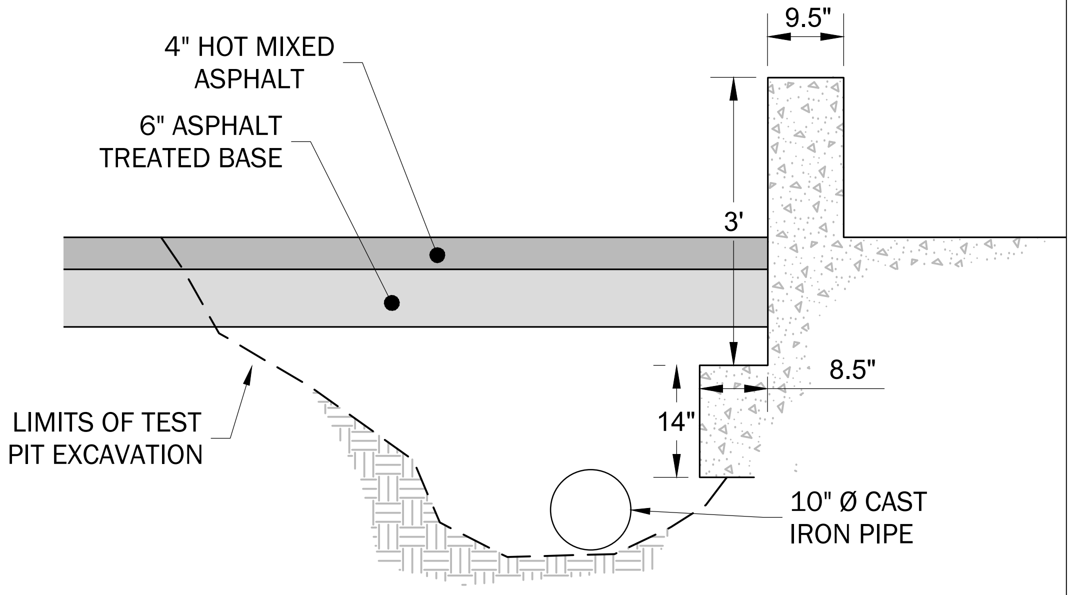

TEST PIT SECTION A - A'
SCALE: NOT TO SCALE

0 10 20
Feet

Test Pit 7
Warehouse Foundation

Pre-Remedial Design Investigation 1
Lignin Parcel Affordable Housing Project - GP West Site
Bellingham, Washington

Aspect CONSULTING

Feb-2022	BY: JRG	FIGURE NO.
PROJECT NO. 210368	REVISED BY: -	7

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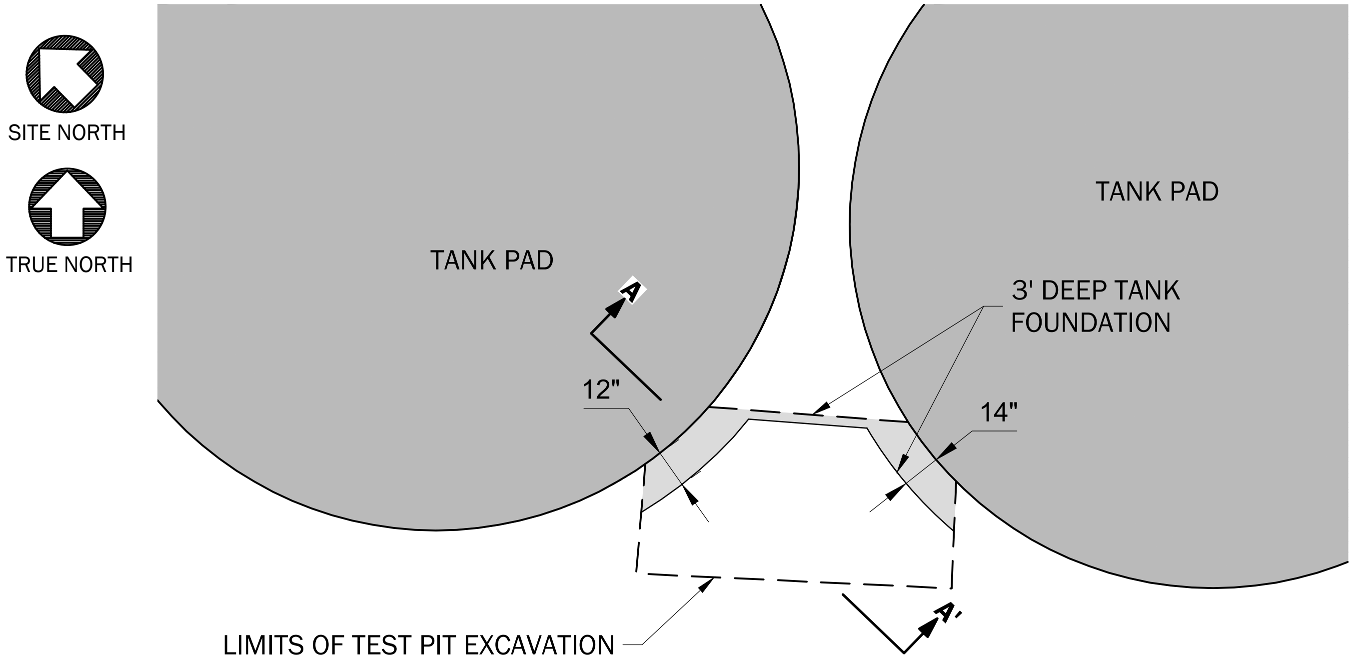

TEST PIT PLAN
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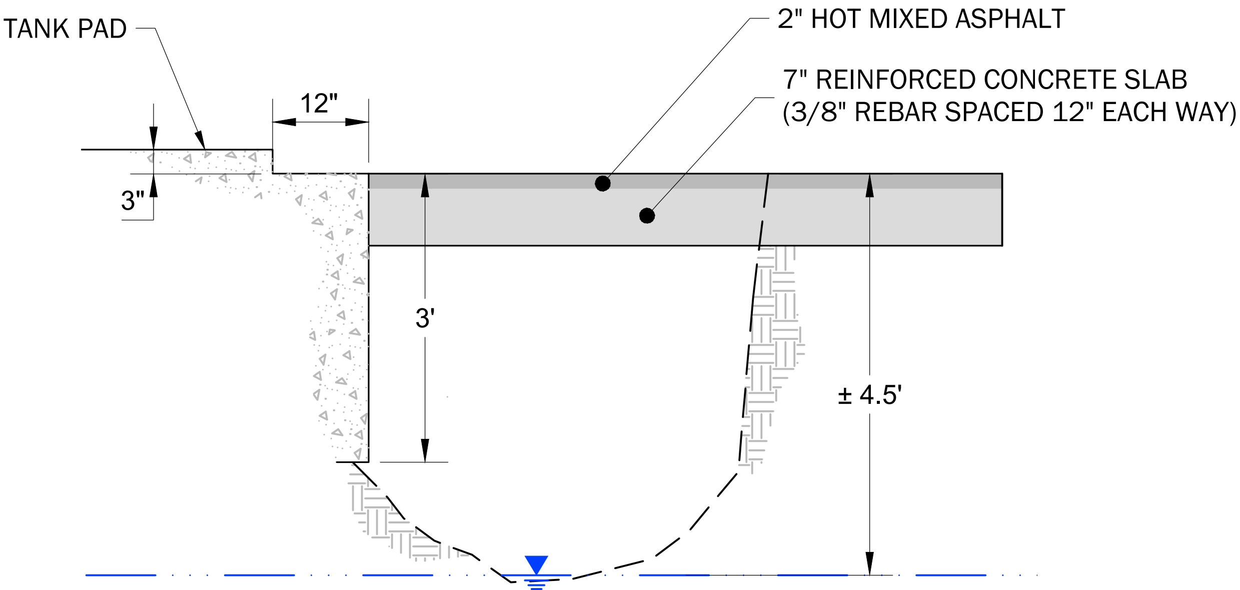


TEST PIT SECTION A - A'
SCALE: NOT TO SCALE

Test Pit 8
Tank Foundations

Pre-Remedial Design Investigation
Lignin Parcel Affordable Housing Project - GP West Site
Bellingham, Washington

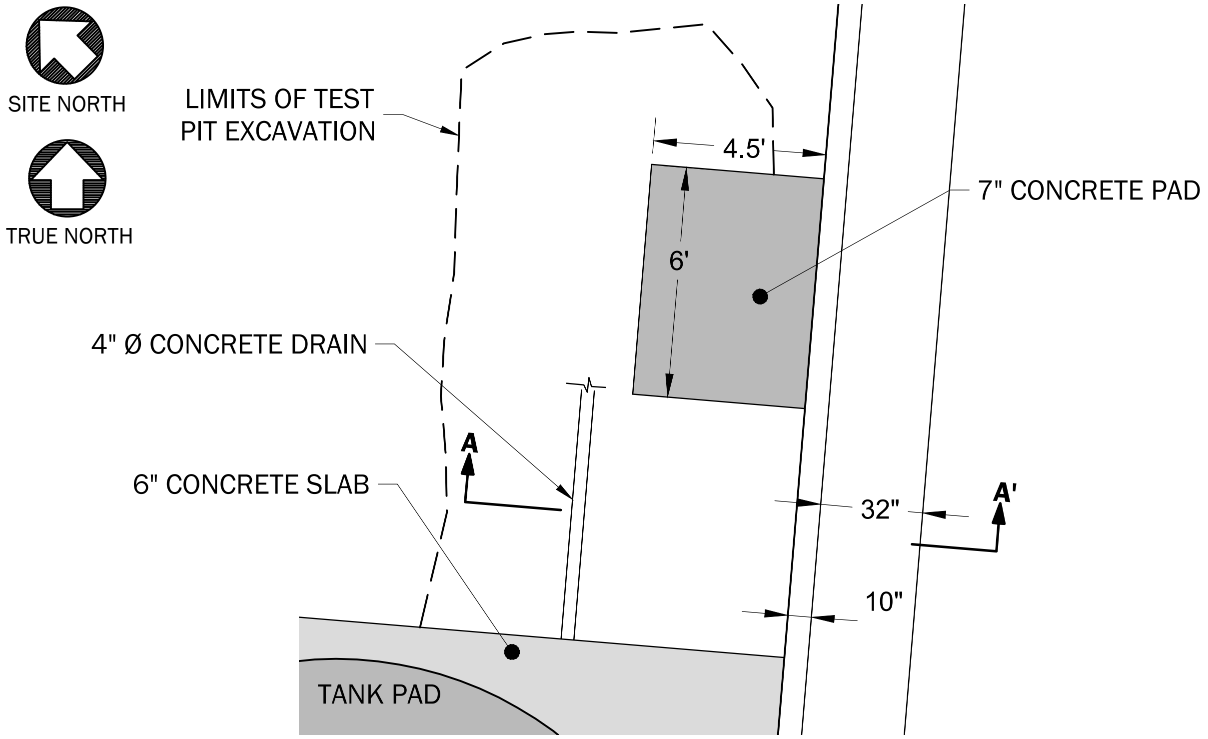
Aspect CONSULTING

Feb-22
PROJECT NO.
210368

BY:
JRG
REVISED BY:
-

FIGURE NO.
8

CAD Path: C:\Users\jgregg\Desktop\210368 GP West Chlor-Alkali\Test Pit Results\Test Pits 8 to 14.dwg Test Pit 8 || Date Saved: Feb 10, 2022 5:57pm || User: jgregg



TEST PIT PLAN
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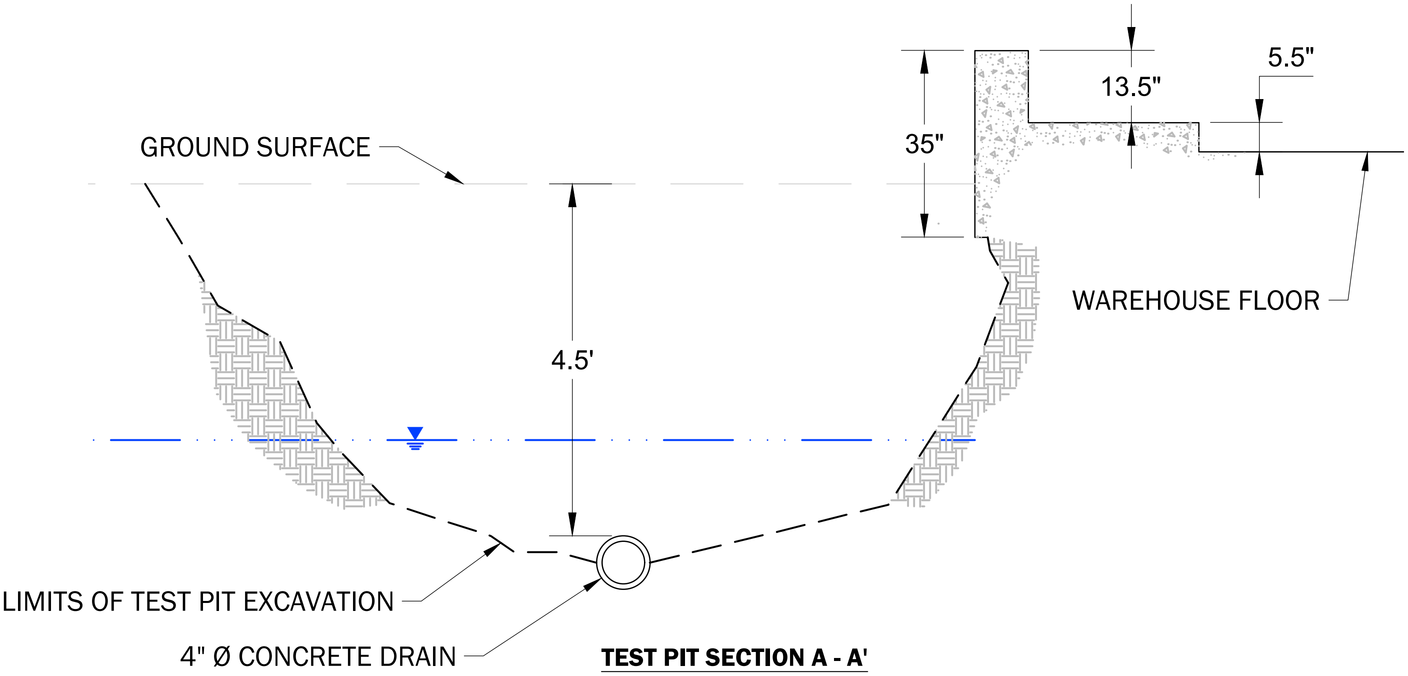

TEST PIT SECTION A - A'
SCALE: NOT TO SCALE

NOTE:
THE PURPOSE OF THIS TEST PIT WAS TO LOCATE AN 8" DIAMETER WATER LINE. THE WATER LINE COULD NOT BE LOCATED.

Test Pit 9
Warehouse Foundation

Pre-Remedial Design Investigation
Lignin Parcel Affordable Housing Project - GP West Site
Bellingham, Washington

Aspect CONSULTING

Feb-22	BY: JRG	FIGURE NO. 9
PROJECT NO. 210368	REVISED BY: -	

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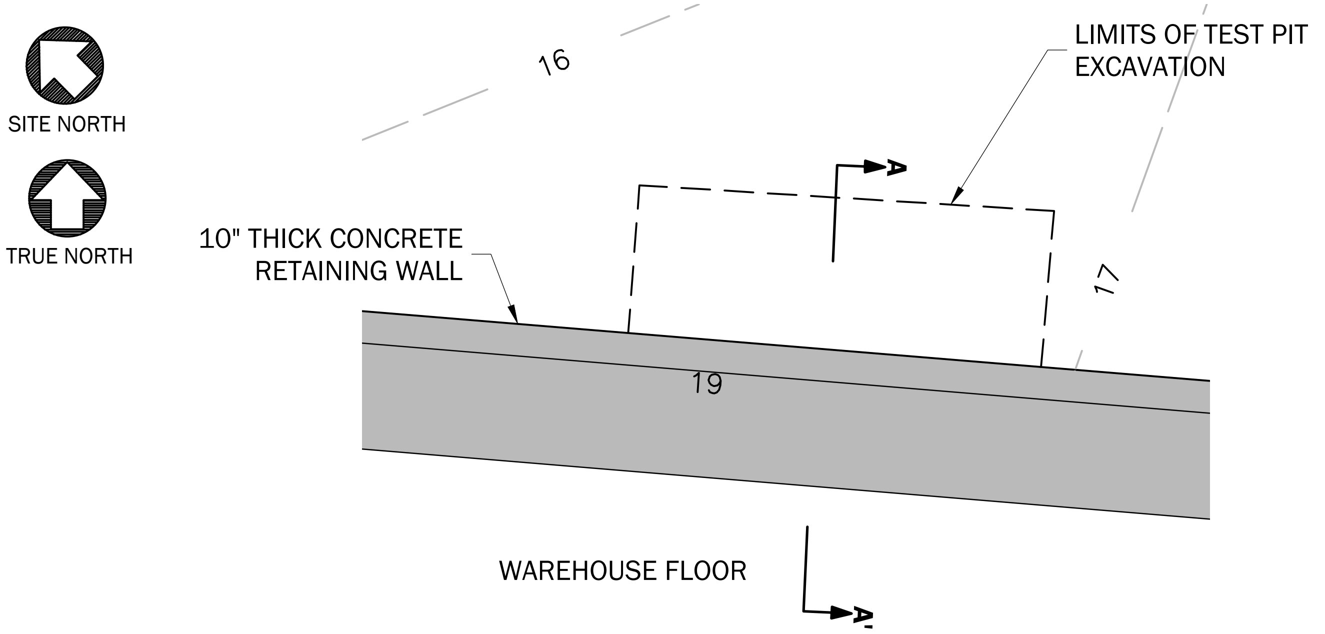

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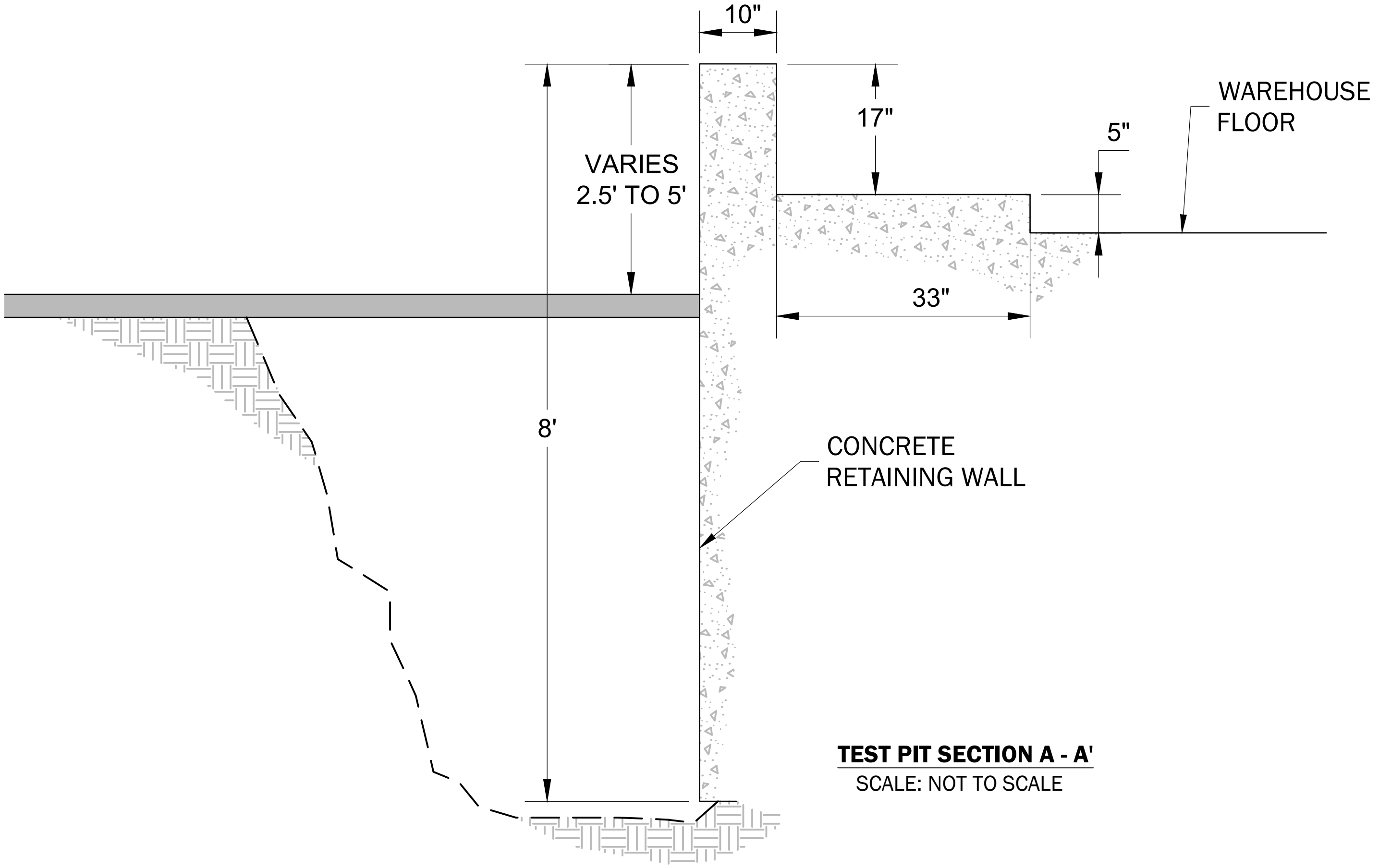

TEST PIT SECTION A - A'
SCALE: NOT TO SCALE

Test Pit 10
Warehouse Retaining Wall

Pre-Remedial Design Investigation
Lignin Parcel Affordable Housing Project - GP West Site
Bellingham, Washington

Aspect CONSULTING

Feb-22	BY: JRG	FIGURE NO.
PROJECT NO. 210368	REVISED BY: -	10

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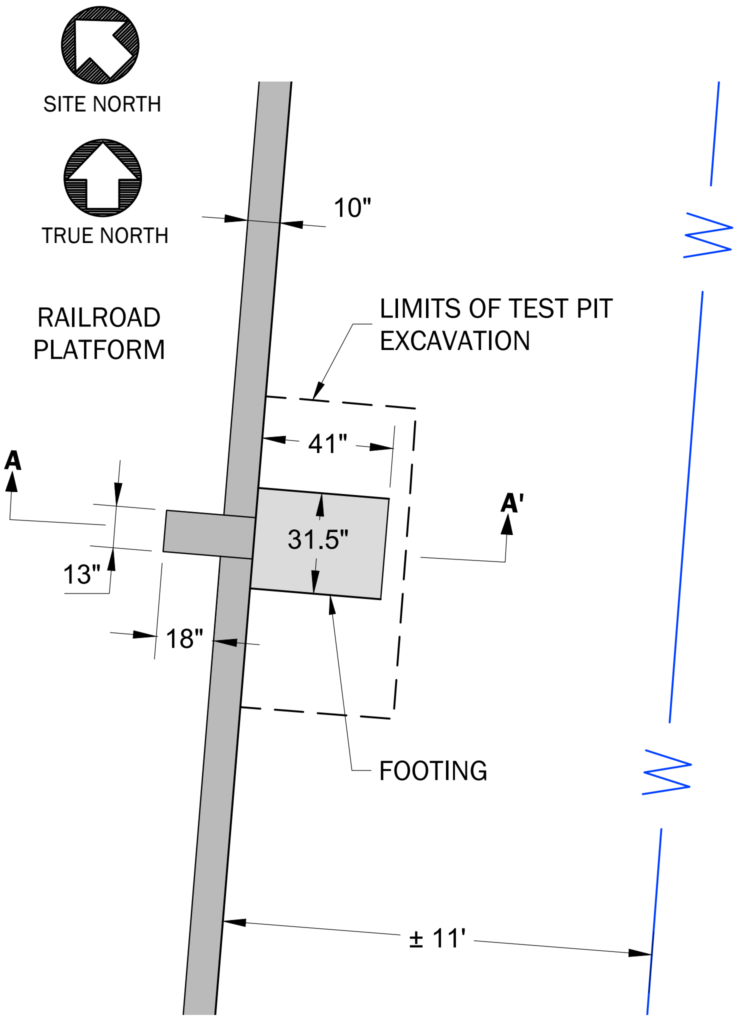

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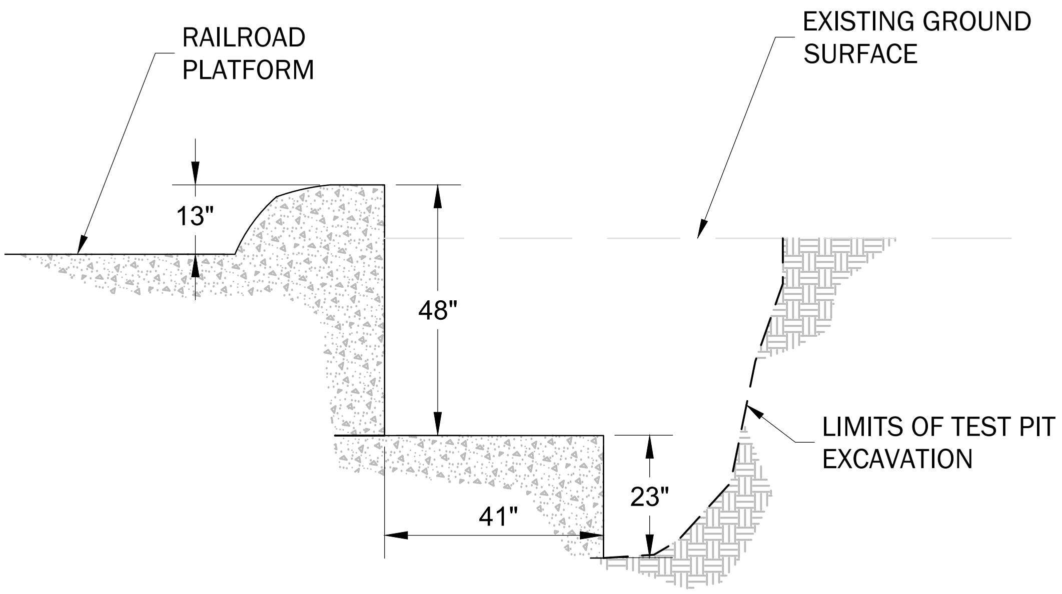

TEST PIT SECTION A - A'
SCALE: NOT TO SCALE

NOTE:
THERE ARE 9 FOUNDATIONS ALONG THE RAILROAD RETAINING WALL. THE WALL IS OTHERWISE 4 FEET HIGH BY 10 INCHES WIDE.

Test Pit 11
Rail Road Retaining Wall

Pre-Remedial Design Investigation 1
Lignin Parcel Affordable Housing Project - GP West Site
Bellingham, Washington

Aspect CONSULTING

Feb-2022	BY: JRG	FIGURE NO. 11
PROJECT NO. 210368	REVISED BY: -	

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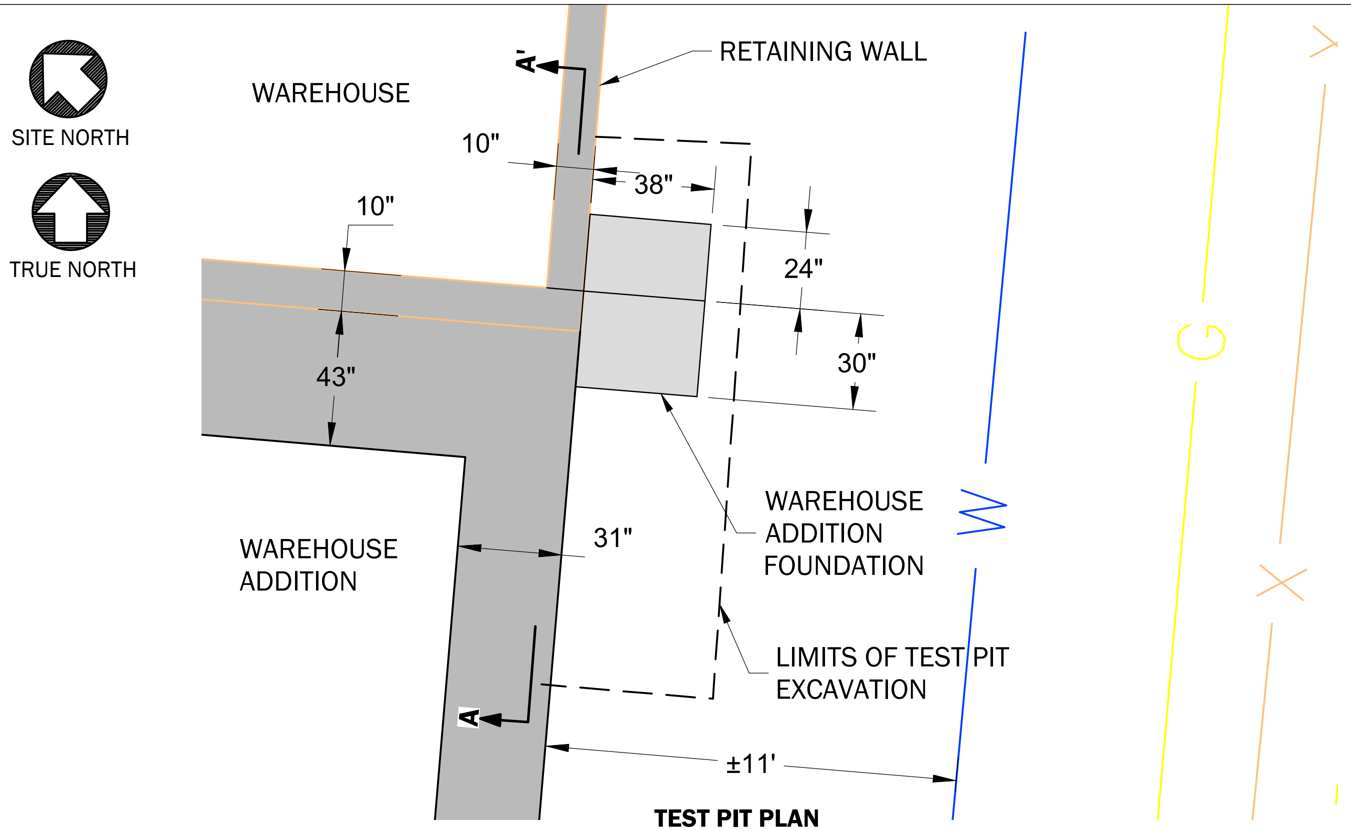
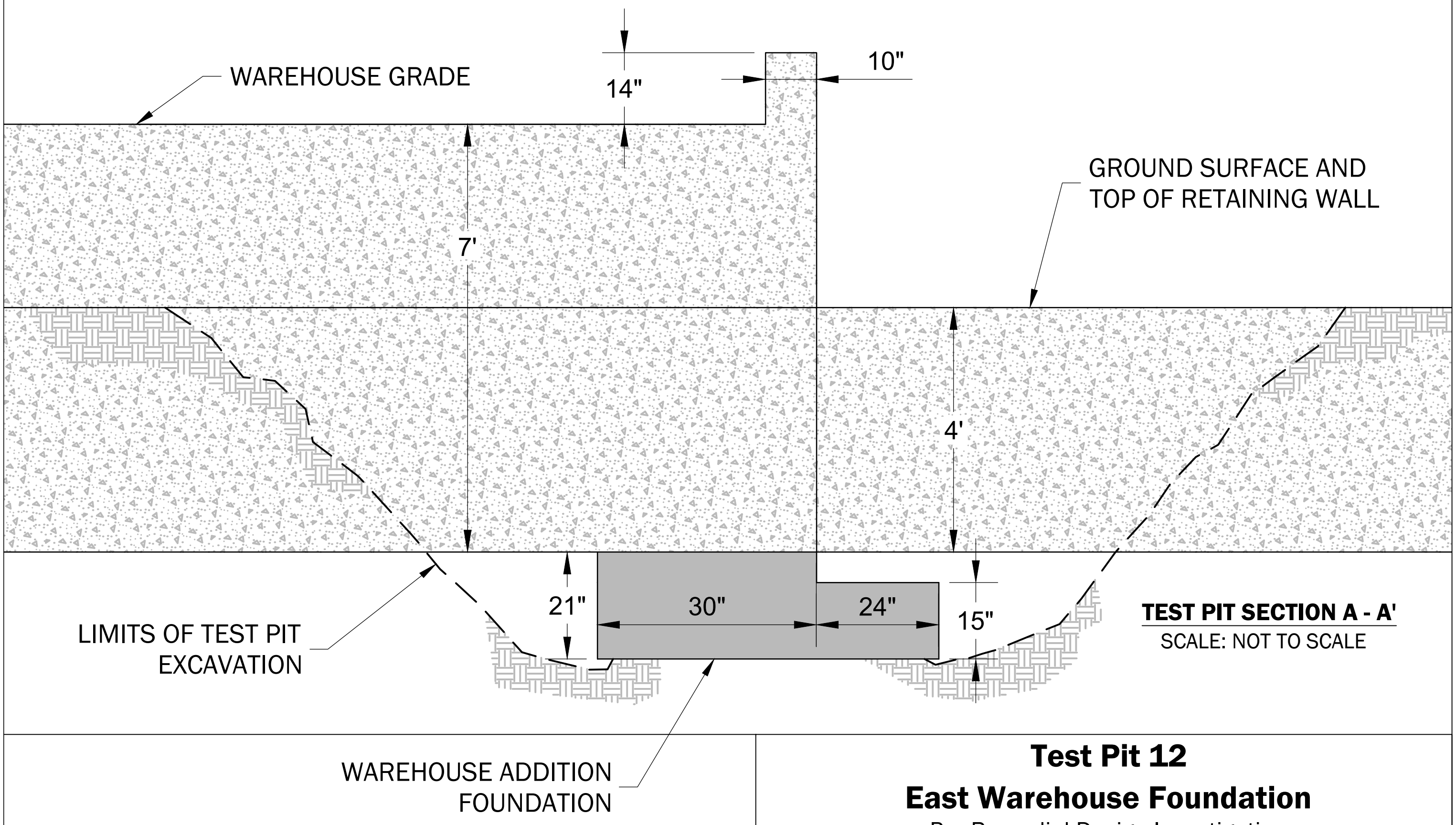


TEST PIT PLAN
SCALE: NOT TO SCALE



TEST PIT SECTION A - A'
SCALE: NOT TO SCALE

Test Pit 12
East Warehouse Foundation

Pre-Remedial Design Investigation
Lignin Parcel Affordable Housing Project - GP West Site
Bellingham, Washington

Aspect CONSULTING	Feb-22	BY: JRG	FIGURE NO.
	PROJECT NO. 210368	REVISED BY: -	12

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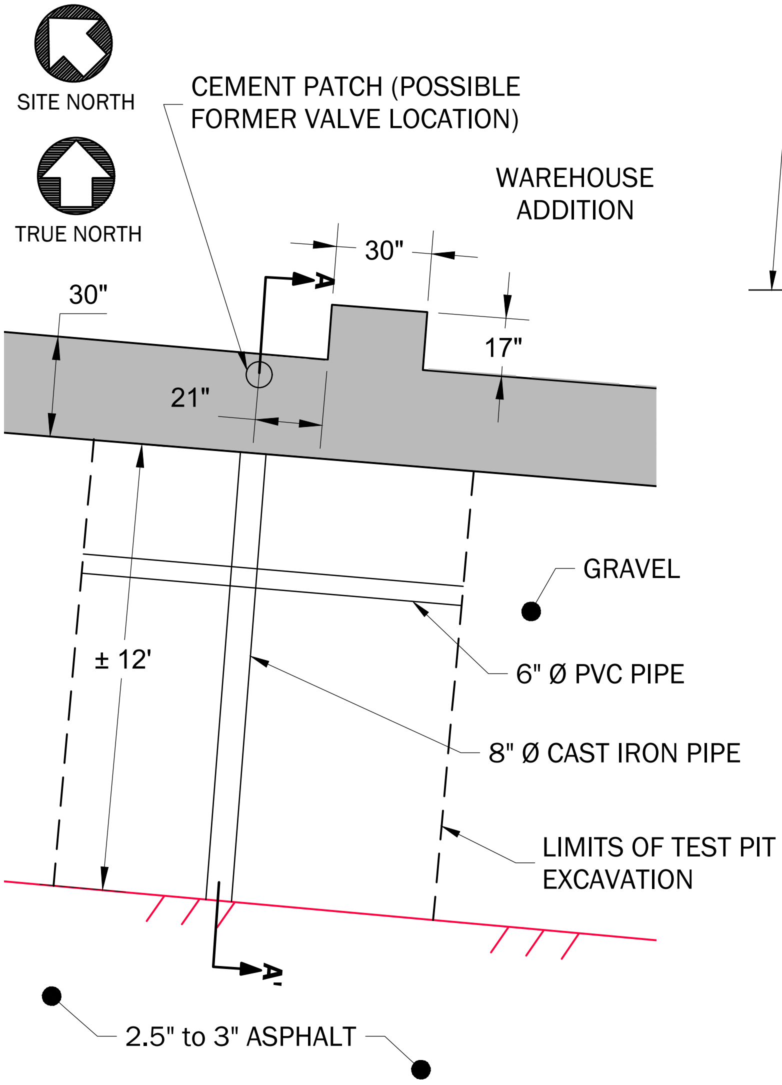

TEST PIT PLAN
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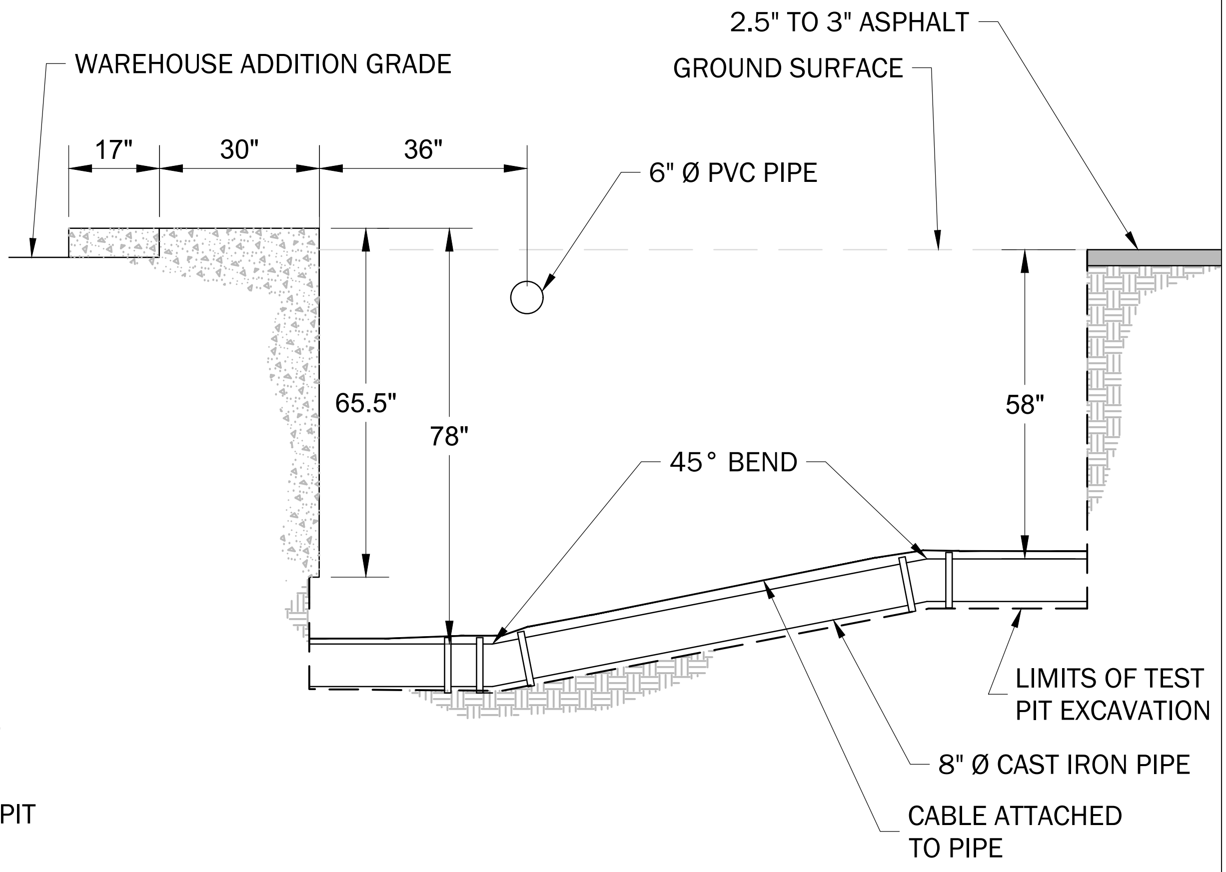


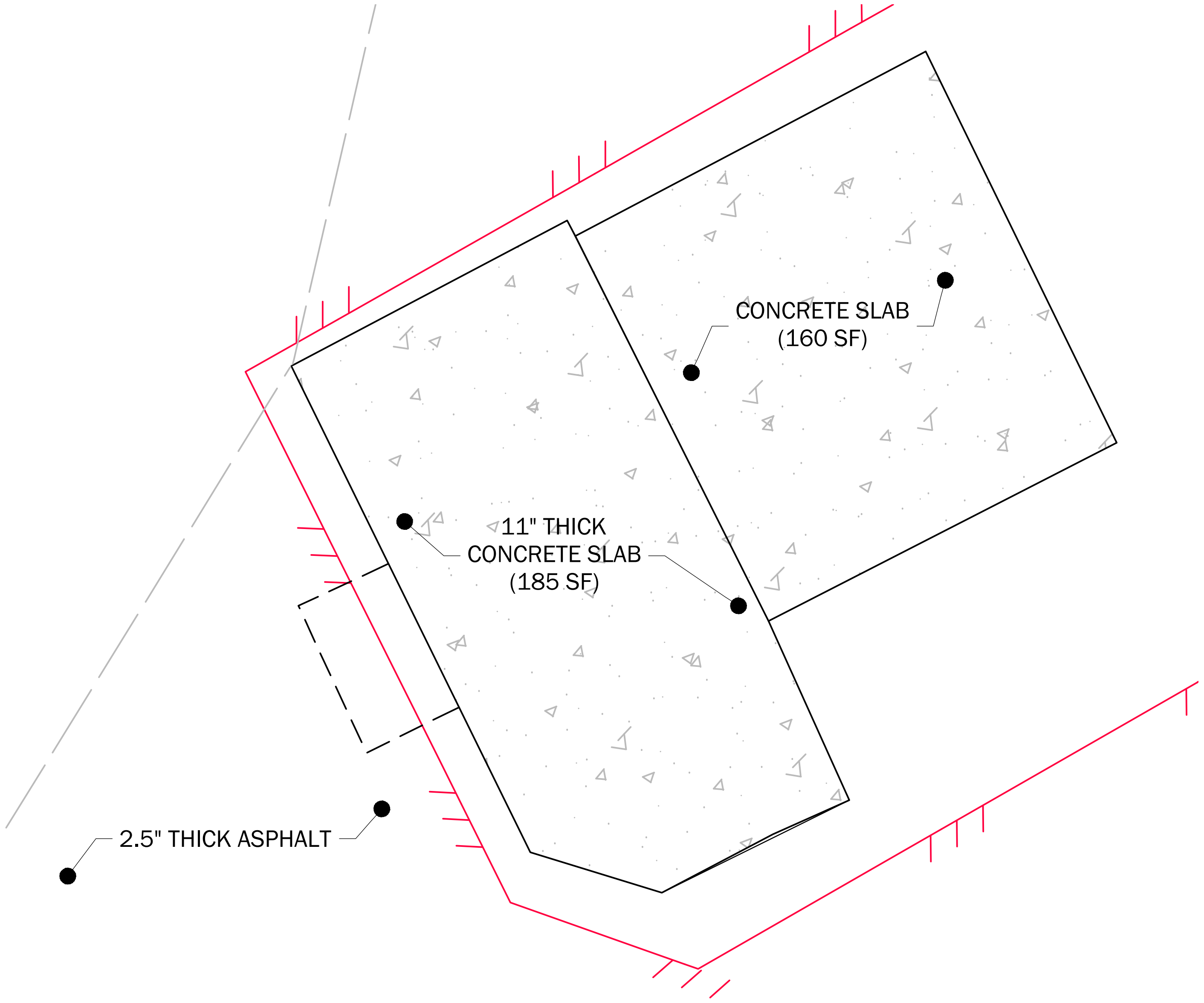
TEST PIT SECTION A - A'
SCALE: NOT TO SCALE

Test Pit 13
Water Line Location - South of Warehouse

Pre-Remedial Design Investigation 1
Lignin Parcel Affordable Housing Project - GP West Site
Bellingham, Washington

Aspect CONSULTING

Feb-2022	BY: JRG	FIGURE NO. 13
PROJECT NO. 210368	REVISED BY: -	



TEST PIT PLAN
SCALE: NOT TO SCALE

Test Pit 14
Pavement and Slab Thickness

Pre-Remedial Design Investigation 1
Lignin Parcel Affordable Housing Project - GP West Site
Bellingham, Washington

Aspect CONSULTING

Feb-2022	BY: JRG	FIGURE NO. 14
PROJECT NO. 210368	REVISED BY: -	

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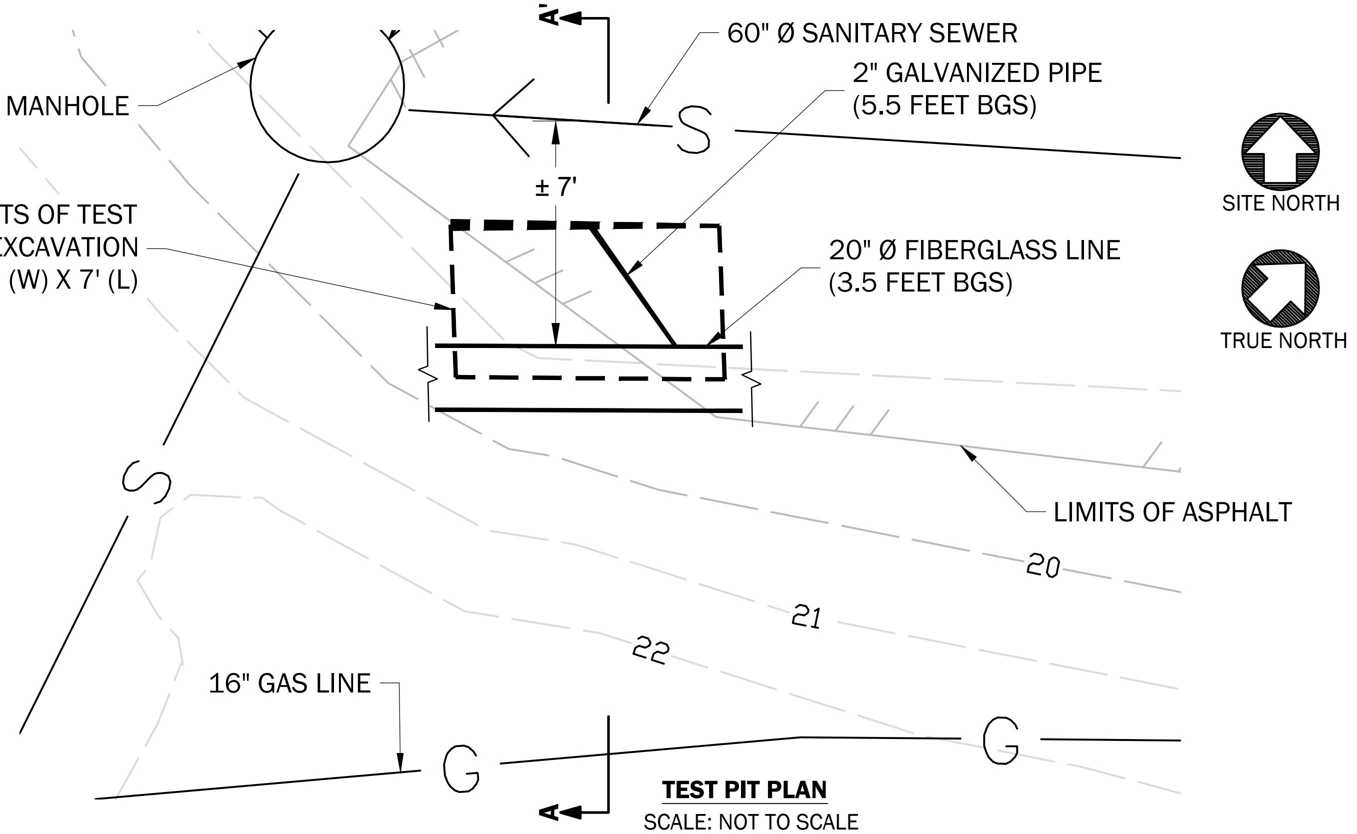

TEST PIT PLAN
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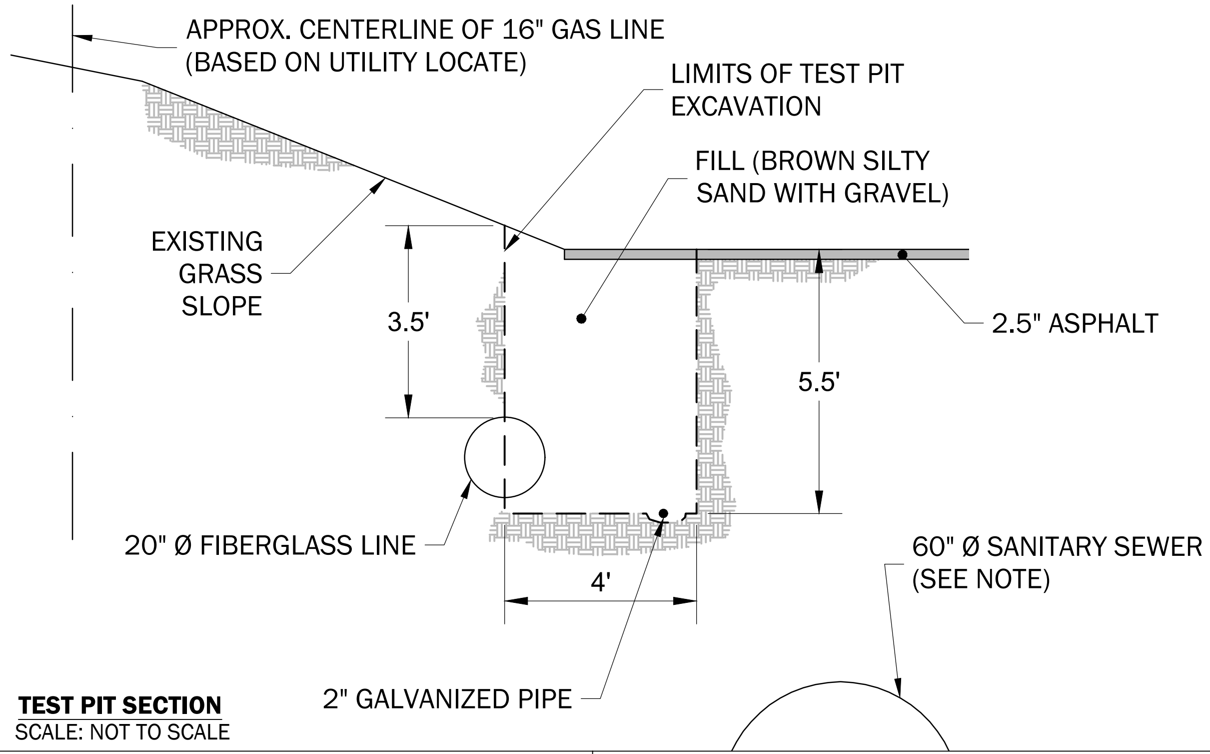

TEST PIT SECTION
SCALE: NOT TO SCALE

NOTE: LOCATION OF SANITARY SEWER FROM UTILITY LOCATE & DEPTH FROM MANHOLE OBSERVATION.

Test Pit 15

Pre-Remedial Design Investigation
Lignin Parcel Affordable Housing Project - GP West Site
Bellingham, Washington

Aspect CONSULTING	May-22	BY: JRG	FIGURE NO. 15
	PROJECT NO. 210368	REVISED BY: -	

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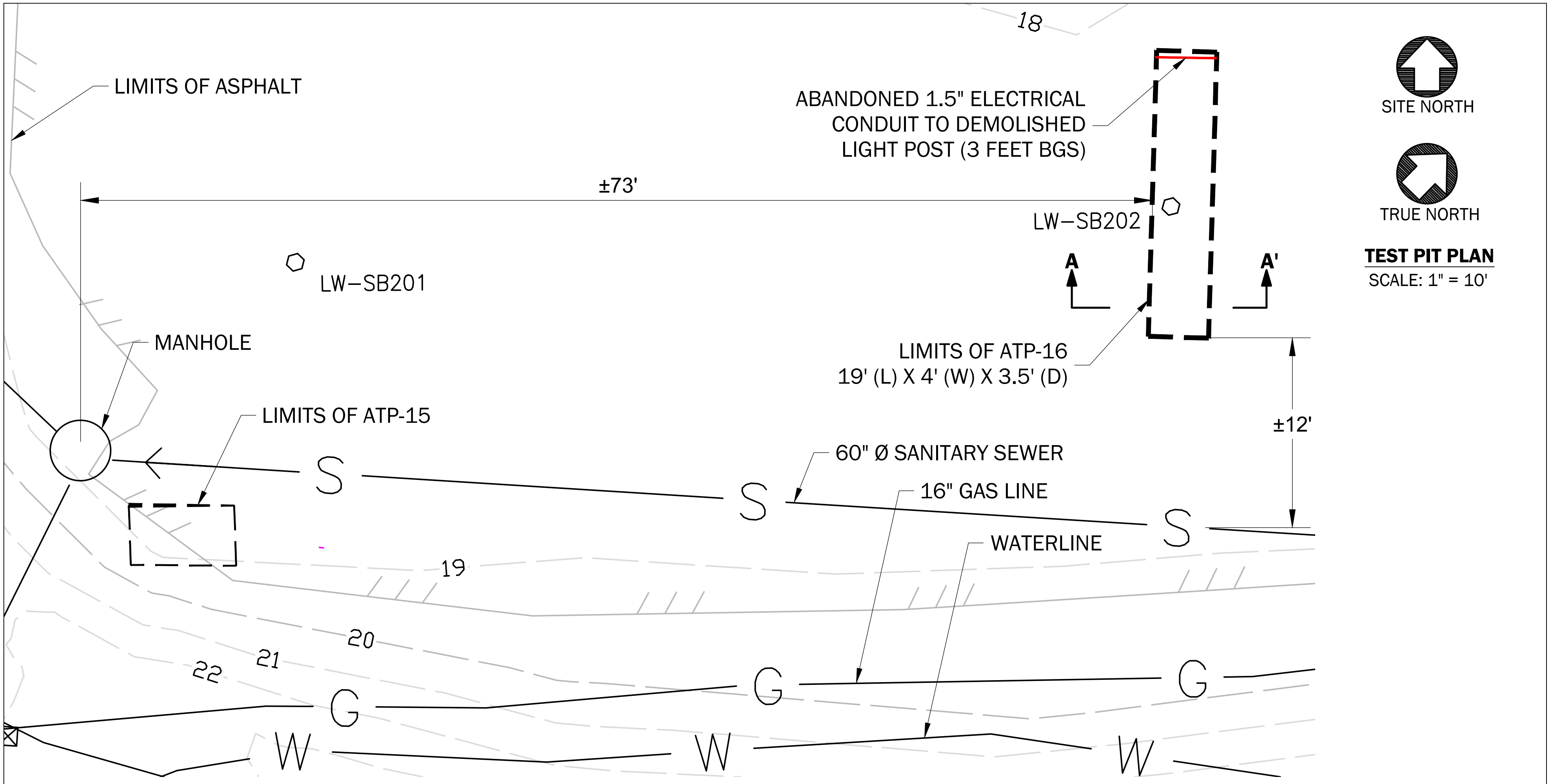
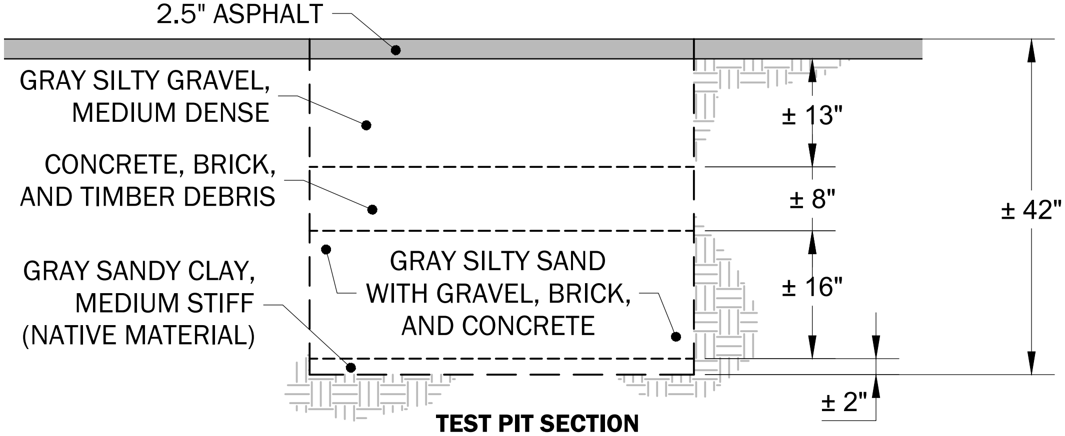


TEST PIT PLAN

SCALE: 1" = 10'



TEST PIT SECTION

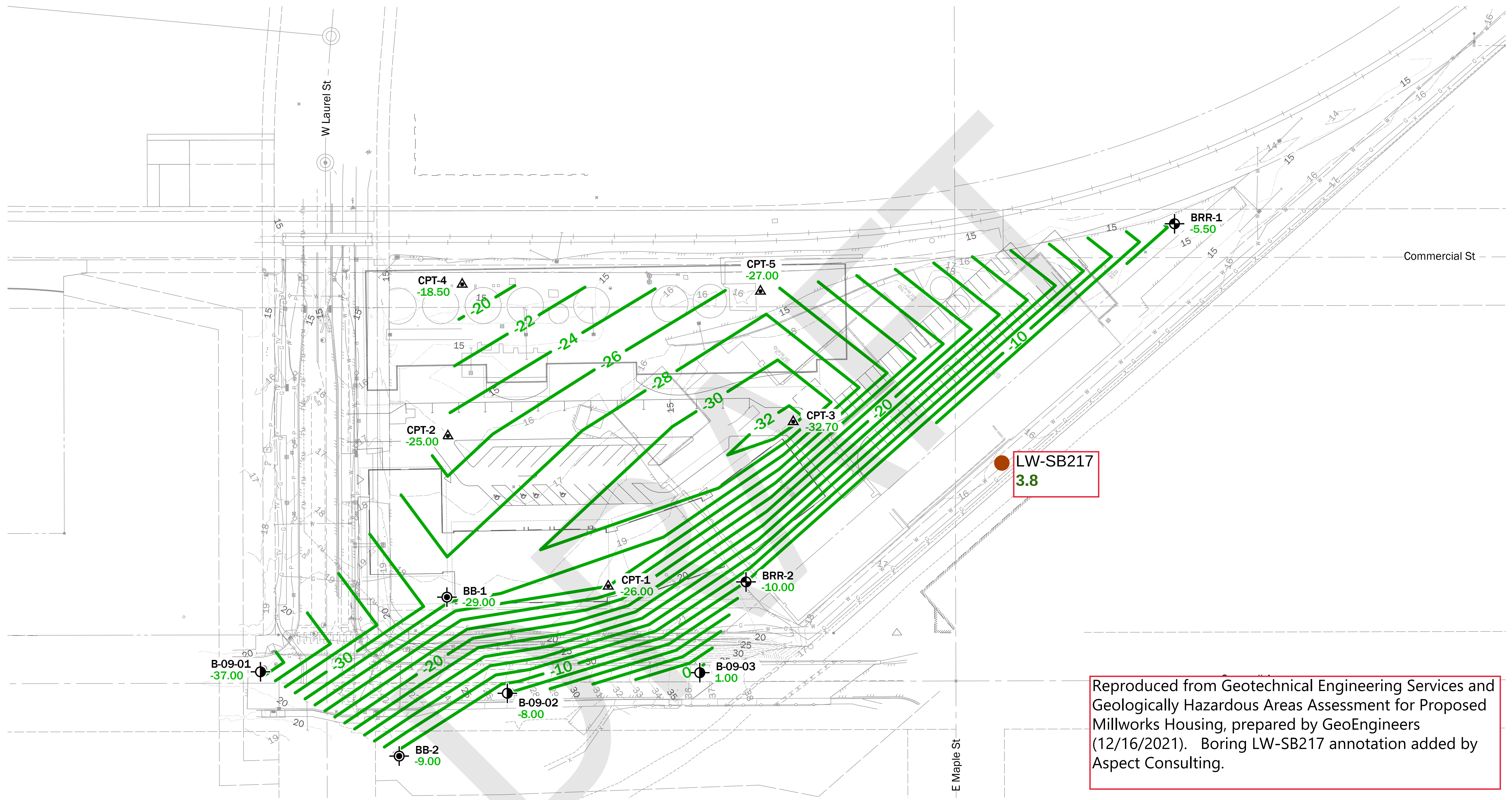
SCALE: NOT TO SCALE

Test Pit 16

Pre-Remedial Design Investigation 1 Project Plan
Lignin Parcel Affordable Housing Project - GP West Site
Bellingham, Washington

Aspect CONSULTING	May-2022	BY: JRG	FIGURE NO.
	PROJECT NO. 210368	REVISED BY: -	16

CAD Path: Q:\Port of Bellingham\210368 GP West Chlor-Alkali\Test Pit Results\Test Pits 15 and 16.dwg Test Pit 16 || Date Saved: May 10, 2022 12:40pm || User: jgregg



Reproduced from Geotechnical Engineering Services and Geologically Hazardous Areas Assessment for Proposed Millworks Housing, prepared by GeoEngineers (12/16/2021). Boring LW-SB217 annotation added by Aspect Consulting.

Legend

CPT-1	▲	Cone Penetrometer Test by GeoEngineers, Inc., 2021
BRR-1	⊕	Boring by GeoEngineers, Inc., 2007
BB-1	⊙	Boring by GeoEngineers, Inc., 2007
B-09-01	◐	Exploration and Approximate Locations by GeoEngineers, Inc., 2009
	-26	Estimated Bedrock Contour (2 foot Interval)

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: Background from Wilson Engineering dated 08/23/2021.

Projection: Washington State Plane, North Zone, NAD83, US Foot

80 0 80
Feet

Bedrock Contour Map

Millworks Housing
Bellingham, Washington

GEOENGINEERS

Figure 3

APPENDIX B

Data Validation and Laboratory Analytical Reports

DATA VALIDATION REPORT

Lignin Parcel
Soil and Groundwater Sampling
January – March 2022
SDGs 201370, 201301, 203037

Prepared by:

Aspect Consulting, LLC
710 Second Ave, Suite 550
Seattle, WA 98104

Project No. 210368 • March 2022

S:\Aspect\InfoServices\Database\EQuIS\Data Projects\Lignin Parcel\2022-02

Contents

1 Introduction

This report summarizes the findings of the United States Environmental Protection Agency (USEPA) Stage 2A data validation performed on analytical data for soil and groundwater samples collected from January 2022 through March 2022 for the Lignin Parcel project. This data quality review is divided into sections by sample delivery group (SDG). A complete list of samples and analyses for each SDG is provided in the Sample Index at the beginning of each section.

Samples were sent to Friedman & Bruya, Inc. in Seattle, Washington (F&B). The analytical methods performed are summarized in Table 1 below:

Table 1. Analytical Methods

Analysis	Method	Lab	Validation Level
Diesel and Heavy Oil	NWTPH-Dx	Friedman & Bruya, Inc.	2A
PAHs	SW8270E-SIM	Friedman & Bruya, Inc.	2A
Metals*	SW6020B / EPA 200.8	Friedman & Bruya, Inc.	2A
Mercury*	SW7471B / EPA 1631E	Friedman & Bruya, Inc.	2A

* Dissolved metals for groundwater matrix samples. Groundwater samples were field filtered.

Data assigned a J/UJ qualifier (estimated) may be used for site evaluation purposes but the reasons for qualification should be considered when interpreting sample concentrations. Values without qualification meet all data measurement quality objectives and are suitable for use.

Data qualifier definitions and a summary table of the qualified data are included in the Qualified Data Summary at the end of this report. Data qualifiers have been incorporated into the project chemistry database to reflect the validation in this report.

2 Data Validation Findings for SDG 201370

Samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Table 2. Sample Index for 201370

Sample Name	Sample Date	NWTPH-Dx	SW8270E-SIM	EPA 200.8	EPA 1631E
LW-MW-03-01242022	1/24/2022			X	X
LW-MW-02-01242022	1/24/2022			X	X
LW-MW-01-01252022	1/25/2022			X	X
LW-MW-04-01252022	1/25/2022	X	X	X	X

2.1 Sample Receipt and Preservation

All samples were received in good condition and in the correct containers. Temperature upon receipt was within standard acceptable range.

2.2 Diesel and Heavy Oil (NWTPH-Dx)

2.2.1 Holding Times

Samples were analyzed within the requisite holding time. No qualification or action was needed.

2.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

2.2.3 Surrogates

All surrogate %R values were within laboratory specified control limits. No qualification or action was needed.

2.2.4 Laboratory Control Samples

All LCS and LCSD %R were within the laboratory specified control limits. No qualification or action was needed.

2.2.5 Lab Duplicates

All LD RPD were within the laboratory specified control limits. No qualification or action was needed.

2.2.6 Other

The laboratory flagged the Diesel Range Organics and Oil Range Organics results in sample LW-MW-04-01252022 as “X” to indicate that chromatographic pattern does not match the pattern of a known petroleum product standard. The results retain the ‘X’ flag for final reporting.

2.2.7 Overall Assessment

Accuracy was acceptable based on LCS and surrogate percent recoveries. Precision was acceptable based on the LD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

2.3 PAHs (SW8270E-SIM)

2.3.1 Holding Times

Samples were analyzed within the requisite holding time. No qualification or action was needed.

2.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

2.3.3 Surrogates

All surrogate %R values were within laboratory specified control limits. No qualification or action was needed.

2.3.4 Laboratory Control Sample

All LCS %R values were within laboratory specified control limits. No qualification or action was needed.

2.3.5 Matrix Spikes/Matrix Spike Duplicates

All MS and MSD %R and RPD were within the laboratory specified control limits. No qualification or action was needed.

2.3.6 Overall Assessment

Accuracy was acceptable based on the LCS and surrogate percent recoveries. Precision was acceptable based on the MS/MSD RPD values. The data are of known quality and are acceptable for use as qualified.

2.4 Metals (EPA200.8, EPA1631E)

2.4.1 Holding Times

Samples were analyzed within the requisite holding time. No qualification or action was needed.

2.4.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

2.4.3 Laboratory Control Samples

All LCS/LCSD %R were within the laboratory specified control limits. The LCS/LCSD RPD was within the acceptable laboratory control limit. No qualification or action was needed.

2.4.4 Matrix Spikes/Matrix Spike Duplicates

All MS and MSD %R were within the laboratory specified control limits. The MS/MSD RPD for mercury exceeded the 20% laboratory control limit; however, mercury was not detected in any associated samples. No qualification or action was needed.

2.4.5 Overall Assessment

Accuracy was acceptable based on the LCS %R. The data are of known quality and are acceptable for use as qualified.

3 Data Validation Findings for SDG 201301

Samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Table 3. Sample Index for SDG 201301

Sample Name	Sample Date	NWTPH-DX	SW6020B	SW8270E
LW-MW02-1-2	01/20/2022		X	
LW-MW02-5-6	01/20/2022		X	
LW-MW02-6-7	01/20/2022		X	
LW-MW04-0-1	01/20/2022	X		X
LW-MW04-5-6	01/20/2022	X		X
LW-MW04-7.5-8.5	01/20/2022	X		X
LW-SB201-0-1	01/19/2022		X	X
LW-SB201-2.5-3	01/19/2022		X	X
LW-SB202-0-1	01/19/2022			X
LW-SB202-10-11	01/19/2022		X	
LW-SB202-1-2	01/19/2022		X	X
LW-SB202-5-5.5	01/19/2022		X	
LW-SB202-6.5-7	01/19/2022		X	
LW-SB203-0-1	01/19/2022		X	X
LW-SB203-2-3	01/19/2022		X	X
LW-SB203-5-6	01/19/2022		X	
LW-SB203-6.5-7.5	01/19/2022		X	
LW-SB204-0-1	01/19/2022			X
LW-SB204-1-2	01/19/2022		X	X
LW-SB204-5-6	01/19/2022		X	
LW-SB204-6.5-7.5	01/19/2022		X	
LW-SB205-0.5-1	01/19/2022		X	X
LW-SB205-1-1.5	01/19/2022		X	X
LW-SB205-5-6	01/19/2022		X	
LW-SB206-0-1	01/19/2022		X	X
LW-SB206-2-2.5	01/19/2022		X	X
LW-SB206-5-6	01/19/2022			X
LW-SB207-0.5-1	01/19/2022		X	X
LW-SB207-1-2	01/19/2022		X	X
LW-SB207-5-6	01/19/2022		X	
LW-SB207-7-8	01/19/2022		X	
LW-SB208-0.5-1.5	01/17/2022		X	X
LW-SB208-11-12	01/17/2022		X	
LW-SB208-5.5-6.5	01/17/2022		X	
LW-SB209-0-1	01/19/2022		X	X
LW-SB209-2-2.5	01/19/2022		X	X
LW-SB209-5-6	01/19/2022		X	X
LW-SB209-7-8	01/19/2022		X	
LW-SB210-0-1	01/18/2022		X	X
LW-SB210-2-2.5	01/18/2022		X	X

Sample Name	Sample Date	NWTPH-DX	SW6020B	SW8270E
LW-SB210-5-6	01/18/2022		X	
LW-SB210-8-8.5	01/18/2022		X	
LW-SB211-0-1	01/17/2022		X	X
LW-SB211-6-7	01/17/2022		X	
LW-SB212-0.5-1.5	01/17/2022		X	X
LW-SB212-15-16	01/17/2022		X	
LW-SB212-5-6	01/17/2022		X	
LW-SB213-0.5-1.5	01/17/2022		X	X
LW-SB213-10-11	01/17/2022		X	
LW-SB213-6-7	01/17/2022		X	
LW-SB214-0.5-1.5	01/19/2022		X	X
LW-SB214-2-2.5	01/19/2022		X	X
LW-SB214-5-6	01/19/2022		X	X
LW-SB215-0.5-1.5	01/17/2022		X	X
LW-SB215-10-11	01/17/2022		X	
LW-SB215-5-6	01/17/2022		X	
LW-SB216-0-1	01/17/2022		X	X
LW-SB216-2.5-3.5	01/17/2022		X	X
LW-SB216-7-8	01/17/2022		X	X
LW-SB217-0-1	01/18/2022			X
LW-SB217-1-1.5	01/18/2022		X	X
LW-SB217-5-6	01/18/2022		X	
LW-SB218-0.5-1	01/18/2022			X
LW-SB218-11-12	01/18/2022		X	
LW-SB218-2-2.5	01/18/2022		X	X
LW-SB218-8-9	01/18/2022		X	
LW-SB219-0-1	01/17/2022		X	X
LW-SB219-10-11	01/17/2022		X	
LW-SB219-13-14	01/17/2022		X	
LW-SB219-5-6	01/17/2022		X	
LW-SB220-1-2	01/17/2022		X	X
LW-SB220-5-6	01/17/2022		X	
LW-SB221-0-1	01/20/2022		X	X
LW-SB221-2-3	01/20/2022		X	
LW-SB221-5-6	01/20/2022		X	

3.1 Sample Receipt and Preservation

All samples were received in good condition and in the correct containers. Temperature upon receipt was within standard acceptable range.

3.2 Diesel and Heavy Oil (NWTPH-Dx)

3.2.1 Holding Times

Samples were analyzed within the requisite holding time. No qualification or action was needed.

3.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

3.2.3 Surrogates

All surrogate %R values were within laboratory specified control limits. No qualification or action was needed.

3.2.4 Laboratory Control Samples

All LCS %R were within the laboratory specified control limits. No qualification or action was needed.

3.2.5 Matrix Spike Samples

All MS and MSD %R were within the laboratory specified control limits. No qualification or action was needed.

3.2.6 Overall Assessment

Accuracy was acceptable based on LCS and surrogate percent recoveries. Precision was acceptable based on the MS/MSD RPD values. The data are of known quality and are acceptable for use as qualified.

3.3 PAHs (SW8270E-SIM)

3.3.1 Holding Times

Samples were analyzed within the requisite holding time. No qualification or action was needed.

3.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

3.3.3 Surrogates

2,4,6-Tribromophenol was recovered below the laboratory control limit in sample LW-SB209-2-2.5; however, the sample was diluted so no associated results are considered affected. No qualification or action was needed.

3.3.4 Laboratory Control Sample

All LCS %R values were within laboratory specified control limits. No qualification or action was needed.

3.3.5 Matrix Spikes/Matrix Spike Duplicates

All MS and MSD %R and RPD were within the laboratory specified control limits. No qualification or action was needed.

3.3.6 Overall Assessment

Accuracy was acceptable based on the LCS and surrogate percent recoveries. Precision was acceptable based on the MS/MSD RPD values. The data are of known quality and are acceptable for use as qualified.

3.4 Metals (SW6020B)

3.4.1 Holding Times

Samples were analyzed within the requisite holding time. No qualification or action was needed.

3.4.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

3.4.3 Laboratory Control Samples

All LCS %R were within the laboratory specified control limits. The LCS/LCSD RPD was within the acceptable laboratory control limit. No qualification or action was needed.

3.4.4 Matrix Spikes/Matrix Spike Duplicates

Copper was recovered outside laboratory control limits in the MS and MSD of spiked parent sample LW-SB201-0-1; additionally, the MS/MSD RPD exceeded the laboratory control limit. However, the spiking concentration was lower than five times (5X) the native analyte concentration, so the result is not considered affected. No qualification or action was needed.

Zinc was recovered below the laboratory control limit in the MS and MSD of spiked parent sample. However, the spiking concentration was lower than 5X the native analyte concentration, so the result is not considered affected. No qualification or action was needed.

Chromium, copper, and zinc were recovered outside laboratory control limits in the MS and/or MSD of the spiked parent sample LW-SB216-2.5-3.5. The MS/MSD RPD also exceeded the control limit for each analyte. However, the spiking concentration was lower than 5X the native analyte concentration, so no results are considered affected. No qualification or action was needed.

Copper was recovered outside laboratory control limits in the MS and MSD of the spiked parent sample LW-SB203-5-6. The MS/MSD RPD also exceeded the control limit for this analyte. However, the spiking concentration was lower than 5X the native analyte concentration, so no results are considered affected. No qualification or action was needed.

3.4.5 Overall Assessment

Accuracy was acceptable based on the LCS and surrogate percent recoveries. Precision was acceptable based on the MS/MSD RPD values, where appropriate. The data are of known quality and are acceptable for use as qualified.

4 Data Validation Findings for SDG 203037

Samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Table 4. Sample Index for SDG 203037

Sample Name	Sample Date	NWTPH-Dx	SW8270E-SIM	EPA 200.8	EPA 1631E
LW-MW-02-02282022	2/28/2022			X	X
LW-MW-03-02282022	2/28/2022			X	X
LW-MW-01-02282022	2/28/2022			X	X
LW-MW-04-02282022	2/28/2022	X	X	X	X

4.1 Sample Receipt and Preservation

All samples were received in good condition and in the correct containers. Temperature upon receipt was within standard acceptable range.

4.2 Diesel and Heavy Oil (NWTPH-Dx)

4.2.1 Holding Times

Samples were analyzed within the requisite holding time. No qualification or action was needed.

4.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

4.2.3 Surrogates

All surrogate %R values were within laboratory specified control limits. No qualification or action was needed.

4.2.4 Laboratory Control Samples

All LCS and LCSD %R were within the laboratory specified control limits. The LCS/LCSD RPD was within control limits. No qualification or action was needed.

4.2.5 Overall Assessment

Accuracy was acceptable based on LCS and surrogate percent recoveries. Precision was acceptable based on the LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

4.3 PAHs (SW8270E-SIM)

4.3.1 Holding Times

Samples were analyzed within the requisite holding time. No qualification or action was needed.

4.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

4.3.3 Surrogates

2-Fluorophenol and phenol-d6 were recovered below the lower laboratory control limit in sample LW-MW-04-02282022. The laboratory qualifier indicated that the low recovery was due to ‘sample matrix effects’, however, both surrogates were also recovered below the laboratory control limit in the associated method blank sample, indicating poor instrument response / poor analytical performance. However, these surrogates are generally associated with other semi-volatile analytes that are not reported under the 8270E-SIM method performed for this work order. No qualification or action was needed.

4.3.4 Laboratory Control Sample

2-Methylnaphthalene was recovered above laboratory control limits in the LCSD for the single 8270E-SIM preparatory batch for this SDG. However, 2-methylnaphthalene was not detected in any associated samples. All other LCS %R and LCS/LCSD RPDs were within limits. No qualification or action was needed.

4.3.5 Overall Assessment

Accuracy was acceptable based on the LCS and LCSD and surrogate percent recoveries. Precision was acceptable based on the LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

4.4 Metals (EPA200.8, EPA1631E)

4.4.1 Holding Times

Samples were analyzed within the requisite holding time. No qualification or action was needed.

4.4.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

4.4.3 Laboratory Control Samples

All LCS %R were within the laboratory specified control limits. No qualification or action was needed.

4.4.4 Matrix Spikes/Matrix Spike Duplicates

Zinc was recovered below the laboratory control limit in the MS and MSD, and the MS/MSD RPD exceeded the 20% control limit. However, the spiked sample was not associated with the project sample set. No qualification or action was needed.

4.4.5 Overall Assessment

Accuracy was acceptable based on the LCS %R. Analytical precision was acceptable based on the MS/MSD RPD values, where appropriate. The data are of known quality and are acceptable for use as qualified.

5 Qualified Data Summary

Qualified sample results are listed below. Results flagged as non-detect (U) by the laboratory and no additional qualifiers are not listed.

Table 5. Qualified Data Summary

Sample ID	Method	Analyte	Qualifier	Reason
LW-MW-04-01252022	NWTPH-Dx	Diesel Range Organics	X	Result does not match the chromatographic pattern for a known petroleum product standard.
LW-MW-04-01252022	NWTPH-Dx	Oil Range Organics	X	Result does not match the chromatographic pattern for a known petroleum product standard.

Table 6. Data Qualifier Definitions

Data Qualifier	Definition
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
R	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
U	The analyte was analyzed for but was considered not detected at the reporting limit or reported value.
UJ	The analyte was analyzed for, and the associated quantitation limit was an estimated value.
X	Result does not match the chromatographic pattern for a known petroleum product standard.

6 Acronyms and Definitions

%D – Percent Difference

%R – Percent Recovery
5X – Five Times
ASTM – American Standard Test Method
COC – Chain of Custody
EB – Equipment Blank
EPA – Environmental Protection Agency
FB – Field Blank
FD – Field Duplicate
HCID – Hydrocarbon Identification
LCS – Laboratory Control Sample
LCSD – Laboratory Control Sample Duplicate
LD – Laboratory Duplicate
MB – Method Blank
MDL – Method Detection Limit
MS – Matrix Spike
MSD – Matrix Spike Duplicate

NWTPH – Northwest Total Petroleum Hydrocarbon

PCB – Polychlorinated Biphenyl
PFAS – Polyfluoroalkyl Substances
PPCP – Pharmaceuticals and Personal Care Products
QAPP – Quality Assurance Project Plan
QC – Quality Control
RL – Reporting Limit
RPD – Relative Percent Difference
SDG – Sample Delivery Group
SM – Standard Methods
SVOC – Semi-Volatile Organic Compound
SW – Solid Waste
TB – Trip Blank
TCLP – Toxicity Characteristic Leaching Procedure
TPH – Total Petroleum Hydrocarbon
VOC – Volatile Organic Compound

ATTACHMENT

Data Validation

Reports

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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March 8, 2022

Zanna Satterwhite, Project Manager
Aspect Consulting, LLC
710 2nd Ave S, Suite 550
Seattle, WA 98104

Dear Ms Satterwhite:

Included are the results from the testing of material submitted on March 1, 2022 from the GP West Lignin 210368, F&BI 203037 project. There are 15 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Aspect Data
ASP0308R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on March 1, 2022 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC GP West Lignin 210368, F&BI 203037 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
203037 -01	LW-MW-02-02282022
203037 -02	LW-MW-03-02282022
203037 -03	LW-MW-01-02282022
203037 -04	LW-MW-04-02282022

The 8270E laboratory control sample duplicate exceeded the acceptance criteria for 2-methylnaphthalene. The compound was not detected, therefore the data were acceptable.

All other quality control requirements were acceptable.

Date of Report: 03/08/22
Date Received: 03/01/22
Project: GP West Lignin 210368, F&BI 203037
Date Extracted: 03/02/22
Date Analyzed: 03/02/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Sample Extracts Passed Through a Silica Gel Column Prior to Analysis

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
LW-MW-04-02282022 203037-04	52	<250	114
Method Blank 02-536 MB	<50	<250	124

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	LW-MW-02-02282022	Client:	Aspect Consulting, LLC
Date Received:	03/01/22	Project:	GP West Lignin 210368
Date Extracted:	03/04/22	Lab ID:	203037-01
Date Analyzed:	03/04/22	Data File:	203037-01.064
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	87.6
Copper	4.56
Zinc	<5

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	LW-MW-03-02282022	Client:	Aspect Consulting, LLC
Date Received:	03/01/22	Project:	GP West Lignin 210368
Date Extracted:	03/04/22	Lab ID:	203037-02
Date Analyzed:	03/04/22	Data File:	203037-02.065
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	54.9
Copper	4.64
Zinc	<5

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	LW-MW-01-02282022	Client:	Aspect Consulting, LLC
Date Received:	03/01/22	Project:	GP West Lignin 210368
Date Extracted:	03/04/22	Lab ID:	203037-03
Date Analyzed:	03/04/22	Data File:	203037-03.066
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Cadmium	<1
Chromium	45.1
Copper	<3
Zinc	<5

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	LW-MW-04-02282022	Client:	Aspect Consulting, LLC
Date Received:	03/01/22	Project:	GP West Lignin 210368
Date Extracted:	03/04/22	Lab ID:	203037-04
Date Analyzed:	03/04/22	Data File:	203037-04.067
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	2.67
Copper	<3
Zinc	<5

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	GP West Lignin 210368
Date Extracted:	03/04/22	Lab ID:	I2-174 mb
Date Analyzed:	03/04/22	Data File:	I2-174 mb.036
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Cadmium	<1
Chromium	<1
Copper	<3
Zinc	<5

Date of Report: 03/08/22
Date Received: 03/01/22
Project: GP West Lignin 210368, F&BI 203037
Date Extracted: 03/03/22
Date Analyzed: 03/04/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED MERCURY USING EPA METHOD 1631E

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Dissolved Mercury
LW-MW-04-02282022 203037-04	<0.01
Method Blank i2-169 MB	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-MW-04-02282022	Client:	Aspect Consulting, LLC
Date Received:	03/01/22	Project:	GP West Lignin 210368
Date Extracted:	03/02/22	Lab ID:	203037-04 1/0.25
Date Analyzed:	03/02/22	Data File:	030208.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	8 ip	10	60
Phenol-d6	7 ip	10	49
Nitrobenzene-d5	46	15	144
2-Fluorobiphenyl	50	25	128
2,4,6-Tribromophenol	40	10	142
Terphenyl-d14	76	41	138

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.05
2-Methylnaphthalene	<0.05
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.005
Acenaphthene	0.037
Fluorene	0.022
Phenanthrene	<0.005
Anthracene	<0.005
Fluoranthene	0.0075
Pyrene	<0.005
Benz(a)anthracene	<0.005
Chrysene	<0.005
Benzo(a)pyrene	<0.005
Benzo(b)fluoranthene	<0.005
Benzo(k)fluoranthene	<0.005
Indeno(1,2,3-cd)pyrene	<0.005
Dibenz(a,h)anthracene	<0.005
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	GP West Lignin 210368
Date Extracted:	03/02/22	Lab ID:	02-532 mb4 1/0.25
Date Analyzed:	03/02/22	Data File:	030206.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	9 vo	10	60
Phenol-d6	7 vo	10	49
Nitrobenzene-d5	79	15	144
2-Fluorobiphenyl	76	25	128
2,4,6-Tribromophenol	56	10	142
Terphenyl-d14	101	41	138

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.05
2-Methylnaphthalene	<0.05
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.005
Acenaphthene	<0.005
Fluorene	<0.005
Phenanthrene	<0.005
Anthracene	<0.005
Fluoranthene	<0.005
Pyrene	<0.005
Benz(a)anthracene	<0.005
Chrysene	<0.005
Benzo(a)pyrene	<0.005
Benzo(b)fluoranthene	<0.005
Benzo(k)fluoranthene	<0.005
Indeno(1,2,3-cd)pyrene	<0.005
Dibenz(a,h)anthracene	<0.005
Benzo(g,h,i)perylene	<0.01

Date of Report: 03/08/22
Date Received: 03/01/22
Project: GP West Lignin 210368, F&BI 203037

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	108	112	63-142	4

Date of Report: 03/08/22
Date Received: 03/01/22
Project: GP West Lignin 210368, F&BI 203037

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 200.8

Laboratory Code: 203067-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Cadmium	ug/L (ppb)	5	<1	96	95	70-130	1
Chromium	ug/L (ppb)	20	<1	97	96	70-130	1
Copper	ug/L (ppb)	20	<5	96	96	70-130	0
Zinc	ug/L (ppb)	50	2,710	31 b	45 b	70-130	37 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Cadmium	ug/L (ppb)	5	96	85-115
Chromium	ug/L (ppb)	20	97	85-115
Copper	ug/L (ppb)	20	96	85-115
Zinc	ug/L (ppb)	50	100	85-115

Date of Report: 03/08/22
Date Received: 03/01/22
Project: GP West Lignin 210368, F&BI 203037

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED MERCURY USING EPA METHOD 1631E

Laboratory Code: 203029-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	ug/L (ppb)	0.01	0.011	73 b	75	71-125	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Mercury	ug/L (ppb)	0.01	80	90	78-125	13

Date of Report: 03/08/22
Date Received: 03/01/22
Project: GP West Lignin 210368, F&BI 203037

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: Laboratory Control Sample 1/0.5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	2.5	88	89	62-90	1
2-Methylnaphthalene	ug/L (ppb)	2.5	93	94 vo	64-93	1
1-Methylnaphthalene	ug/L (ppb)	2.5	92	93	64-93	1
Acenaphthylene	ug/L (ppb)	2.5	94	94	70-130	0
Acenaphthene	ug/L (ppb)	2.5	91	91	70-130	0
Fluorene	ug/L (ppb)	2.5	95	97	70-130	2
Phenanthrene	ug/L (ppb)	2.5	91	92	70-130	1
Anthracene	ug/L (ppb)	2.5	95	97	70-130	2
Fluoranthene	ug/L (ppb)	2.5	97	98	70-130	1
Pyrene	ug/L (ppb)	2.5	100	104	70-130	4
Benz(a)anthracene	ug/L (ppb)	2.5	92	95	70-130	3
Chrysene	ug/L (ppb)	2.5	95	99	70-130	4
Benzo(a)pyrene	ug/L (ppb)	2.5	101	103	70-130	2
Benzo(b)fluoranthene	ug/L (ppb)	2.5	99	105	70-130	6
Benzo(k)fluoranthene	ug/L (ppb)	2.5	101	102	70-130	1
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	2.5	97	98	70-130	1
Dibenz(a,h)anthracene	ug/L (ppb)	2.5	102	99	70-130	3
Benzo(g,h,i)perylene	ug/L (ppb)	2.5	100	97	70-130	3

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

203037

SAMPLE CHAIN OF CUSTODY

03-01-22

E03/A,I2

Page # 1 of 1

Report To Zanna Satterwhite

Company Aspect

Address

City, State, ZIP

Phone 206 499 7588 Email zsatterwhite@aspectconsulting.com

SAMPLERS (*signature*)

PROJECT NAME
GP West Lignin
210368

PO #

REMARKS

INVOICE TO
Aspect

Project specific RLs? [✓ Yes] / No

TURNAROUND TIME
☐ Standard turnaround
☐ RUSH
Rush charges authorized by:

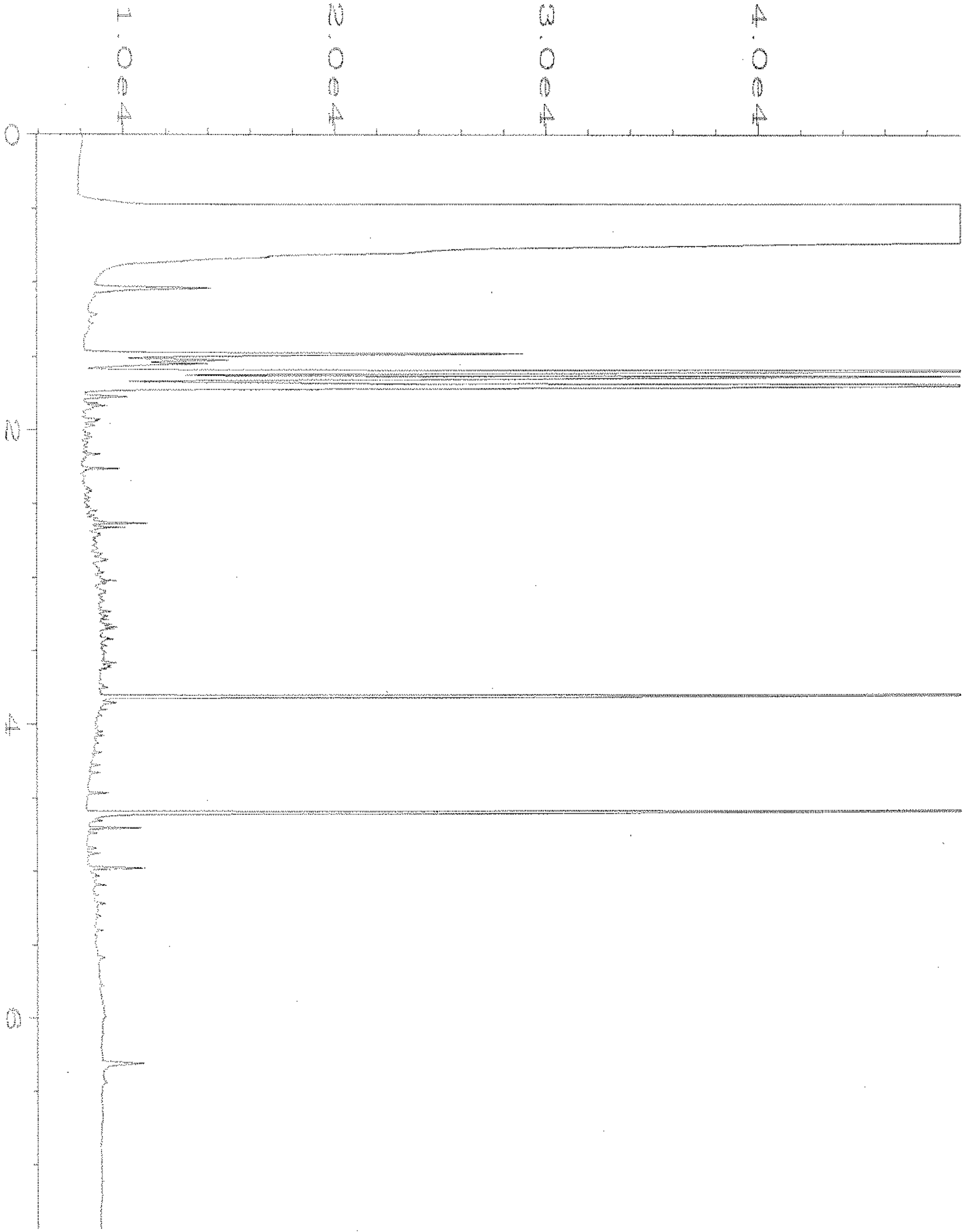
SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx*	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Dissolved Cu, Zn, Cr	Dissolved Cu, Zn, Cr, Cd	Dissolved Hg	SIM-PAHs LL	Notes
LW-MW-02-02282022	01	2/28/22	1100 am	GW	1								1				
LW-MW-03-02282022	02	2/28/22	1240 pm	GW	1								1				
LW-MW-01-02282022	03	2/28/21	1415 pm	GW	1									1			
LW-MW-04-02282022	04A-E	2/28/21	1615 pm	GW	5	1							1		1	~~2~~	1

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE		PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Jane Gregg	Aspect to Fedex	2/28/22	530pm
Received by:		Mac Goldman	F&BI	03-1-22	1624
Relinquished by:					
Received by:					

Samples received at 4 °C



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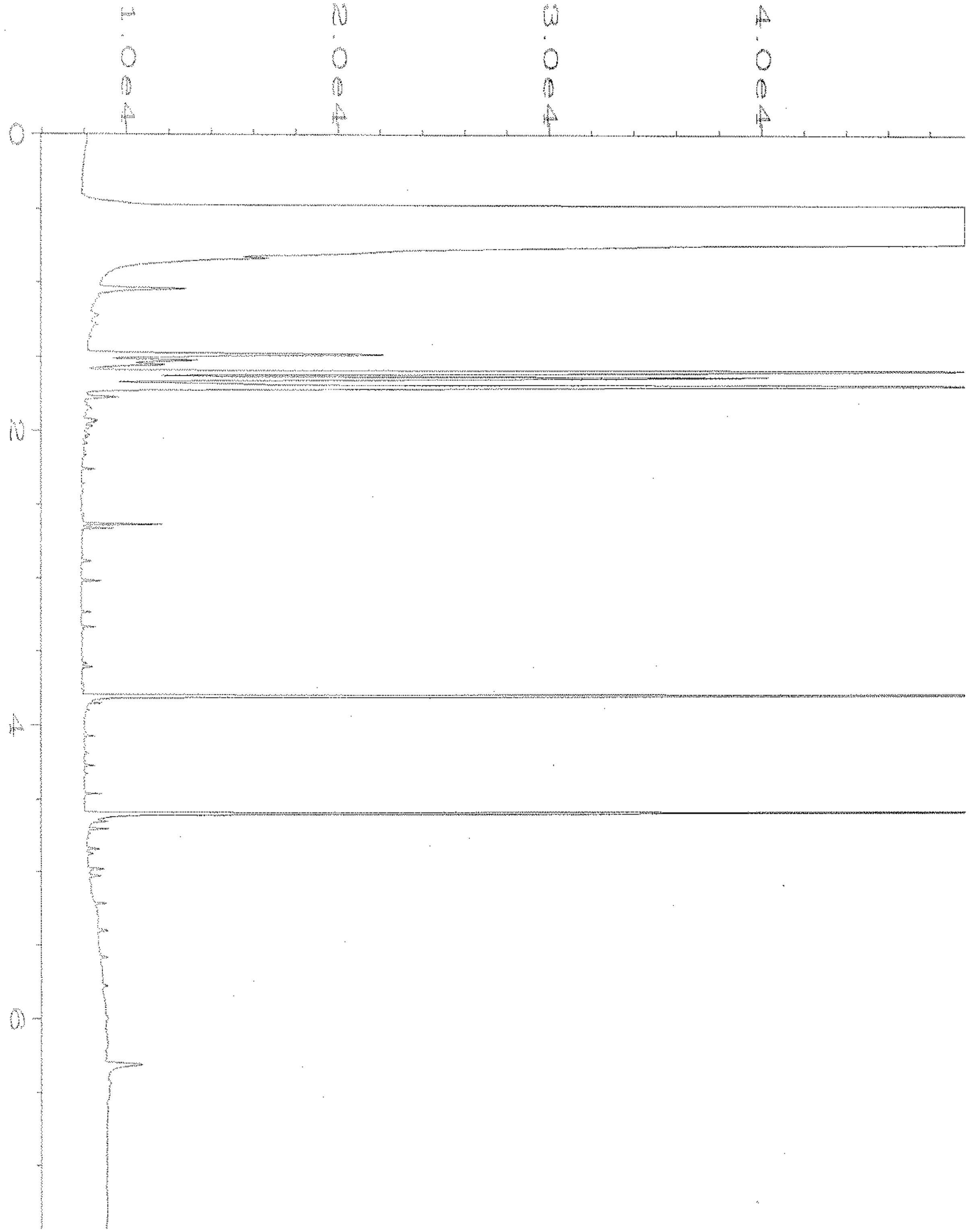
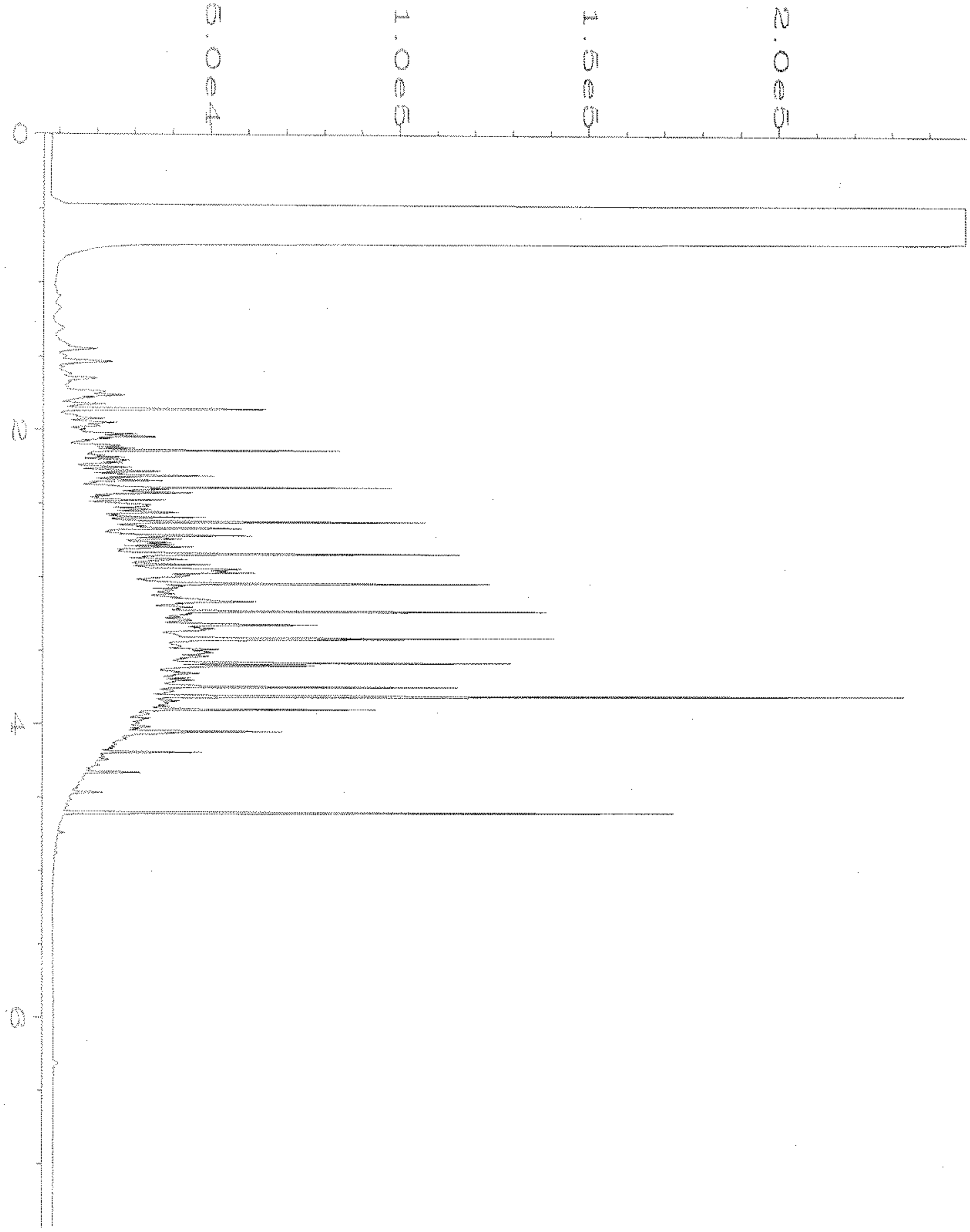
Data File Name    : C:\HPCHEM\1\DATA\03-02-22\035F0601.D
Operator          : TL                                   Page Number        : 1
Instrument        : GC1                                  Vial Number        : 35
Sample Name       : 203037-04 sg                         Injection Number : 1
Run Time Bar Code:                                       Sequence Line      : 6
Acquired on       : 02 Mar 22   05:23 PM                 Instrument Method: DX.MTH
Report Created on: 03 Mar 22   08:50 AM                  Analysis Method   : DEFAULT.MTH
```



Data File Name   : C:\HPCHEM\1\DATA\03-02-22\032F0601.D
Operator   : TL
Instrument   : GC1
Sample Name   : 02-536 mb sg
Run Time Bar Code:
Acquired on   : 02 Mar 22   04:40 PM
Report Created on: 03 Mar 22   08:50 AM

Page Number   : 1
Vial Number   : 32
Injection Number : 1
Sequence Line   : 6
Instrument Method: DX.MTH
Analysis Method   : DEFAULT.MTH



```
Data File Name    : C:\HPCHEM\1\DATA\03-02-22\003F0701.D
Operator          : TL                                    Page Number      : 1
Instrument        : GC1                                   Vial Number      : 3
Sample Name       : 500 Dx 65-27F                         Injection Number : 1
Run Time Bar Code:                                        Sequence Line    : 7
Acquired on       : 02 Mar 22   05:53 PM                  Instrument Method: DX.MTH
Report Created on: 03 Mar 22   08:50 AM                   Analysis Method  : DEFAULT.MTH
```

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

February 14, 2022

Zanna Satterwhite, Project Manager
Aspect Consulting, LLC
710 2nd Ave S, Suite 550
Seattle, WA 98104

Dear Ms Satterwhite:

Included are the additional results from the testing of material submitted on January 21, 2022 from the GP West Lignin Parcel 210368, F&BI 201301 project. There are 8 pages included in this report.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Aspect Data
ASP0214R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 21, 2022 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC GP West Lignin Parcel 210368, F&BI 201301 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
201301 -01	LW-SB201-0-1
201301 -02	LW-SB201-2.5-3
201301 -03	LW-SB201-5-6
201301 -04	LW-SB201-6-7
201301 -05	LW-SB202-0-1
201301 -06	LW-SB202-1-2
201301 -07	LW-SB202-5-5.5
201301 -08	LW-SB202-6.5-7
201301 -09	LW-SB202-10-11
201301 -10	LW-SB203-0-1
201301 -11	LW-SB203-2-3
201301 -12	LW-SB203-5-6
201301 -13	LW-SB203-6.5-7.5
201301 -14	LW-SB204-0-1
201301 -15	LW-SB204-1-2
201301 -16	LW-SB204-5-6
201301 -17	LW-SB204-6.5-7.5
201301 -18	LW-SB205-0.5-1
201301 -19	LW-SB205-1-1.5
201301 -20	LW-SB205-5-6
201301 -21	LW-SB205-7-8
201301 -22	LW-SB206-0-1
201301 -23	LW-SB206-2-2.5
201301 -24	LW-SB206-5-6
201301 -25	LW-SB206-7-8
201301 -26	LW-SB207-0.5-1
201301 -27	LW-SB207-1-2
201301 -28	LW-SB207-5-6
201301 -29	LW-SB207-7-8
201301 -30	LW-SB208-0.5-1.5
201301 -31	LW-SB208-5.5-6.5
201301 -32	LW-SB208-11-12
201301 -33	LW-SB209-0-1
201301 -34	LW-SB209-2-2.5
201301 -35	LW-SB209-5-6

CASE NARRATIVE (continued)

Laboratory ID	Aspect Consulting, LLC
201301 -36	LW-SB209-7-8
201301 -37	LW-SB210-0-1
201301 -38	LW-SB210-2-2.5
201301 -39	LW-SB210-5-6
201301 -40	LW-SB210-8-8.5
201301 -41	LW-SB211-0-1
201301 -42	LW-SB211-6-7
201301 -43	LW-SB211-11-12
201301 -44	LW-SB211-14-15
201301 -45	LW-SB212-0.5-1.5
201301 -46	LW-SB212-5-6
201301 -47	LW-SB212-15-16
201301 -48	LW-SB213-0.5-1.5
201301 -49	LW-SB213-6-7
201301 -50	LW-SB213-10-11
201301 -51	LW-SB214-0.5-1.5
201301 -52	LW-SB214-2-2.5
201301 -53	LW-SB214-5-6
201301 -54	LW-SB214-6.5-7.5
201301 -55	LW-SB215-0.5-1.5
201301 -56	LW-SB215-5-6
201301 -57	LW-SB215-10-11
201301 -58	LW-SB215-12-13
201301 -59	LW-SB216-0-1
201301 -60	LW-SB216-2.5-3.5
201301 -61	LW-SB216-7-8
201301 -62	LW-SB216-12-13
201301 -63	LW-SB216-19-20
201301 -64	LW-SB217-0-1
201301 -65	LW-SB217-1-1.5
201301 -66	LW-SB217-5-6
201301 -67	LW-SB217-7.5-8.5
201301 -68	LW-SB218-0.5-1
201301 -69	LW-SB218-2-2.5
201301 -70	LW-SB218-5-6
201301 -71	LW-SB218-8-9
201301 -72	LW-SB218-11-12
201301 -73	LW-SB219-0-1

CASE NARRATIVE (continued)

Laboratory ID	Aspect Consulting, LLC
201301 -74	LW-SB219-5-6
201301 -75	LW-SB219-10-11
201301 -76	LW-SB219-13-14
201301 -77	LW-SB220-1-2
201301 -78	LW-SB220-5-6
201301 -79	LW-SB220-10-11
201301 -80	LW-SB220-13-14
201301 -81	LW-SB221-0-1
201301 -82	LW-SB221-2-3
201301 -83	LW-SB221-5-6
201301 -84	LW-SB221-7-8
201301 -85	LW-MW02-1-2
201301 -86	LW-MW02-5-6
201301 -87	LW-MW02-6-7
201301 -88	LW-MW03-0-1
201301 -89	LW-MW03-5-6
201301 -90	LW-MW03-7.5-8.5
201301 -91	LW-MW03-10-11
201301 -92	LW-MW03-12-13
201301 -93	LW-MW04-0-1
201301 -94	LW-MW04-5-6
201301 -95	LW-MW04-7.5-8.5
201301 -96	LW-MW04-10-11
201301 -97	LW-SB208-14-15

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB203-6.5-7.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	GP West Lignin Parcel 210368, F&BI 201301
Date Extracted:	02/08/22	Lab ID:	201301-13
Date Analyzed:	02/08/22	Data File:	201301-13.075
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Copper	12.2
Zinc	16.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB207-7-8	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	GP West Lignin Parcel 210368, F&BI 201301
Date Extracted:	02/08/22	Lab ID:	201301-29
Date Analyzed:	02/08/22	Data File:	201301-29.076
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Copper	9.62

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	GP West Lignin Parcel 210368, F&BI 201301
Date Extracted:	02/08/22	Lab ID:	I2-107 mb2
Date Analyzed:	02/08/22	Data File:	I2-107 mb2.034
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Copper	<5
Zinc	<5

Date of Report: 02/14/22
Date Received: 01/21/22
Project: GP West Lignin Parcel 210368, F&BI 201301

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 202055-01 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Copper	mg/kg (ppm)	50	<25	97	97	75-125	0
Zinc	mg/kg (ppm)	50	29.7	94	88	75-125	7

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Copper	mg/kg (ppm)	50	96	80-120
Zinc	mg/kg (ppm)	50	97	80-120

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

201301

SAMPLE CHAIN OF CUSTODY

ME 01-21-22 [redacted] Page # 1 of 10 BDH

[redacted] Zanna Satterwhite
Company Aspect Consulting
Address
City, State, ZIP
Phone Email zsatterwhite@aspectconsulting.com

SAMPLERS (*signature*) B Call

PROJECT NAME	PO #
GP WEA Lignin Parcel	210368

REMARKS
see project specific RL's emailed to Mike Erdahl on 1/24/22
Project specific RLs? [✓ Yes] No

INVOICE TO

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn by EPA 6020	low level PAHs by EPA 8270 DSIM	Copper	Zinc	Notes ● per ZS 1/28/22
LW-SB201-0-1	01	1/19/22	1410	Soil	1								X	X			ME
LW-SB201-2.5-3	02		1415										X	X			◆ per ZS 2/7/22
LW-SB201-5-6	03		1420														Hold ME
LW-SB201-6-7	04		1425														Hold
LW-SB202-0-1	05		1530											X			
LW-SB202-1-2	06		1535										X	X			
LW-SB202-5-5.5	07		1540										X				
LW-SB202-6.5-7	08		1545										X				
LW-SB202-10-11	09		1550										X				
LW-SB203-0-1	10	↓	1245	↓	↓								X	X			

Friedman & Bruya, Inc.
Ph. (206) 285-8282

EWB

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: B Call	Baxter Call	Aspect	1/21/22	1500
Received by:	Liz Webber-Bruya	F&B	1/21/22	1500
Relinquished by:				
Received by:		Samples received at	3 °C	

201301

[redacted]

Report To Zanna Satterwhite

Company Aspect Consulting

Address

City, State, ZIP

Phone Email

SAMPLE CHAIN OF CUSTODY

ME 01-21-22 [redacted]

Page # 2 of 10 BDY

SAMPLERS (signature) B Coll

PROJECT NAME GP West Lynn Parcel

PO # 210368

REMARKS

INVOICE TO

Project specific RLs? [✓ Yes] / No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAHs	Copper	Zinc	Notes
LW-SB203-2-3	11	1/19/22	1250	Soil	1								X	X			
LW-SB203-5-6	12		1255										~~X~~	~~X~~	BC ●	●	~~Hold~~
LW-SB203-6.5-7.5	13		1300												◆	◆	~~Hold~~
LW-SB204-0-1	14		1305											X			
LW-SB204-1-2	15		1310										X	X			
LW-SB204-5-6	16		1315										X				
LW-SB204-6.5-7.5	17		1320										X				
LW-SB205-0.5-1	18		1050										X	X			
LW-SB205-1-1.5	19		1055										X	X			
LW-SB205-5-6	20	↓	1100	↓	↓										●	●	~~Hold~~

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: B Coll	Baxter Coll	Aspect	1/21/22	1500
Received by:	Liz Webber-Bruya	F&B	1/21/22	1500
Relinquished by:				
Received by:				

20130l

SAMPLE CHAIN OF CUSTODY

ME 01-21-22

[redacted] Zanne Satterwhite

Company Aspect Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (signature)

PROJECT NAME CP West Lynn Pond

PO # 210368

REMARKS

Project specific RLs? - [✓ Yes] No

INVOICE TO

[redacted] Page # 3 of 10 BI

TURNAROUND TIME

☒ Standard turnaround

☐ RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

☒ Archive samples

☐ Other

Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAHs	Copper	Zinc	Notes
LW-SB205-7-8	21	1/19/21	1105	Soil	1												Hold
LW-SB206-0-1	22	↓	1025	↓	↓								X	X			
LW-SB206-2-2.5	23	↓	1030	↓	↓								X	X			
LW-SB206-5-6	24	↓	1035	↓	↓									X			
LW-SB206-7-8	25	↓	1040	↓	↓												Hold
LW-SB207-0.5-1	26	↓	1205	↓	↓								X	X			
LW-SB207-1-2	27	↓	1210	↓	↓								X	X			
LW-SB207-5-6	28	↓	1215	↓	↓										●		~~Hold~~
LW-SB207-7-8	29	↓	1220	↓	↓										●		~~Hold~~
LW-SB208-0.5-1.5	30	1/17/22	1435	↓	↓								X	X			

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Baxter Cole	Aspect	1/21/22	1508
Received by:	Liz Webber-Bruya	F&B	1/21/22	1500
Relinquished by:				
Received by:				

201301

SAMPLE CHAIN OF CUSTODY

ME 01-21-22 [redacted]

[redacted] Zanna Satterwhite
Company Aspect Consulting
Address
City, State, ZIP
Phone Email

SAMPLERS (signature) B Cl
PROJECT NAME GP West Lignin Site
PO # 210368
REMARKS
INVOICE TO
Project specific RLs? - [✓ Yes] / No

Page # 4 of 10

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAH's	Copper	Zinc	Notes
LW-SB208-5.5-6.5	31	1/17/22	1440	~~1440~~ soil	1								X				
LW-SB208-11-12	32	↓	1445	↓	↓										●	●	~~Hold~~
LW-SB209-0-1	33	1/19/22	1220										X	X			
LW-SB209-2-2.5	34	↓	1225										X	X			
LW-SB209-5-6	35		1230										X	●			
LW-SB209-7-8	36	↓	1235												●	●	~~Hold~~
LW-SB210-0-1	37	1/18/22	1105										X	X			
LW-SB210-2-2.5	38	↓	1110										X	X			
LW-SB210-5-6	39		1115										X				
LW-SB210-8-8.5	40	↓	1120	↓	↓										●	●	~~Hold~~

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: B Cl	Baxter Cole	Aspect	1/21/22	1500
Received by:	Liz Webber-Bruya	F&B	1/21/22	1500
Relinquished by:				
Received by:				

201301

[redacted] Zanne Satterwhite

Company Aspect Consulting

Address

City, State, ZIP

Phone Email

SAMPLE CHAIN OF CUSTODY

ME 01-21-22 [redacted]

Page # 5 of 10 BD4

SAMPLERS (signature) B Call

PROJECT NAME GP West Lignin Parcel

PO # 210368

REMARKS

INVOICE TO

Project specific RLs? - [✓ Yes] No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAH's	Copper	Zinc	Notes
LW-SB211-0-1	41	1/17/22	1205	Soil	1								X	X			
LW-SB211-6-7	42		1210										X				
LW-SB211-11-12	43		1215														Hold
LW-SB211-14-15	44		1220														Hold
LW-SB212-0.5-1.5	45		1405										X	X			
LW-SB212-5-6	46		1410										X				
LW-SB212-15-16	47		1415												●	●	~~Hold~~
LW-SB213-0.5-1.5	48		1350										X	X			
LW-SB213-6-7	49		1355										X				
LW-SB213-10-11	50	↓	1400	↓	↓								X				

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: B Call	Baxter Call	Aspect	1/21/22	1500
Received by:	Liz Webber-Bruya	F?B	1/21/22	1500
Relinquished by:				
Received by:				

201301

SAMPLE CHAIN OF CUSTODY

ME 01-21-22

Page # 6 of 10 BI4

~~Report To~~ Zanna Satterwhite

Company Aspect Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (signature) B Call

PROJECT NAME	PO #
GP West Lignin Parcel	210368

REMARKS

Project specific RLs? [✓ Yes] No

INVOICE TO

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAH's	Copper	Zinc	Notes
LW-SB214-0.5-1.5	51	1/19/22	1000	Soil	1								X	X			
LW-SB214-2-2.5	52	↓	1005	↓	↓								X	X			
LW-SB214-5-6	53	↓	1010	↓	↓								X	X			
LW-SB214-6.5-7.5	54	↓	1015	↓	↓												Hold
LW-SB215-0.5-1.5	55	1/17/22	1335	↓	↓								X	X			
LW-SB215-5-6	56	↓	1340	↓	↓								X				
LW-SB215-10-11	57	↓	1345	↓	↓								X				
LW-SB215-12-13	58	↓	1350	↓	↓												Hold
LW-SB216-0-1	59	↓	1130	↓	↓								X	X			
LW-SB216-2.5-3.5	60	↓	1135	↓	↓								X	X			

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: B Call	Baxter Call	Aspect	1/21/22	1500
Received by:	Liz Webber-Bry	F:B	1/21/22	1500
Relinquished by:				
Received by:				

201301

SAMPLE CHAIN OF CUSTODY

ME 01-21-22 [redacted]

Page # 7 of 10 BDY

~~Report To~~ Zanna Satterwhite
Company Aspect Consulting
Address
City, State, ZIP
Phone Email

SAMPLERS (*signature*) B Call

PROJECT NAME GP West Lignin Pond

PO # 210368

REMARKS

INVOICE TO

Project specific RLs? [✓ Yes] / No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAH's	Copper	Zinc	Notes
LW-SB216-7-8	61	1/17/22	1140	soil	1									●	●	●	~~Hold~~
LW-SB216-12-13	62		1145														Hold
LW-SB216-19-20	63		1235														Hold
LW-SB217-0-1	64	1/18/22	1045											X			
LW-SB217-1-1.5	65		1050										X	X			
LW-SB217-5-6	66		1055										X				
LW-SB217-7.5-8.5	67		1100														Hold
LW-SB218-0.5-1	68		1005											X			
LW-SB218-2-2.5	69		1010										X	X			
LW-SB218-5-6	70		1015														Hold

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Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: B Call	Baxter Call	Aspect	1/21/22	1500
Received by:	Liz Webber-Bruya	F&B	1/21/22	1500
Relinquished by:				
Received by:				

20130I

SAMPLE CHAIN OF CUSTODY

ME 01-21-22

Page # 8 of 10 BI

Report To Zanna Satterwhite

Company Aspect Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (signature) B CM

PROJECT NAME CP West Gym Parcel

PO # 210368

REMARKS

Project specific RLs? - [✓ Yes] / No

INVOICE TO

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAHs	Copper	Zinc	Notes
LW-SB218-8-9	71	1/18/22	1020	Soil	1								X				
LW-SB218-11-12	72	↓	1025	↓	↓								X				
LW-SB219-0-1	73	1/17/22	1520										X	X			
LW-SB219-5-6	74	↓	1525										X				
LW-SB219-10-11	75		1530										X				
LW-SB219-13-14	76		1535										X				
LW-SB220-1-2	77		1055										X	X			
LW-SB220-5-6	78		1100										X				
LW-SB220-10-11	79		1105														Hold
LW-SB220-13-14	80	↓	1110	↓	↓												Hold

Friedman & Bruya, Inc.
Ph. (206) 285-8282

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	B CM	Baxter Call	Aspect	1/21/22	1508
Received by:		Liz Webber-Bruya	F&B	1/21/22	1500
Relinquished by:					
Received by:					

SAMPLE CHAIN OF CUSTODY

MC 01-21-22 [redacted]

Page # 9 of 10 BE4

201301

[redacted] Report To Zamm Schtowhite

Company Aspect Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*) B Call

PROJECT NAME GP West Lignin Parcel

PO # 210368

REMARKS

INVOICE TO

Project specific RLs? [✓ Yes] / No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAHs	Copper	Zinc	Notes
LW-SB221-0-1	81	1/20/22	1445	Soil	1								X	X			
LW-SB221-2-3	82		1450										X				
LW-SB221-5-6	83		1455										X				
LW-SB221-7-8	84		1500														Hold
LW-MW02-1-2	85		1125										X				
LW-MW02-5-6	86		1130										X				
LW-MW02-6-7	87		1135												●	●	~~Hold~~
LW-MW03-0-1	88		1245														Hold
LW-MW03-5-6	89		1250														Hold
LW-MW03-7.5-85	90		1255														Hold

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: B Call	Baxter Call	Aspect	1/21/22	1500
Received by:	Liz Webber-Bruya	F&B	1/21/22	1500
Relinquished by:				
Received by:				

201301

[redacted] Zanne Satterwhite

Company Aspect Consulting

Address

City, State, ZIP

Phone Email

SAMPLE CHAIN OF CUSTODY

ME 01-21-22

[redacted]

Page # 10 of 18 BIY

SAMPLERS (signature) B Cerr

PROJECT NAME GP West Lignin Parcel

PO # 210368

REMARKS

INVOICE TO

Project specific RLs? - [✓ Yes] / No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAH's	Copper	Zinc	Notes
LW-MW03-10-11	91	1/20/22	1300	Soil	1												Hold
LW-MW03-12-13	92	↓	1305	↓	↓												Hold
LW-MW04-0-1	93	↓	1105	↓	↓	X						BC	~~X~~	X			
LW-MW04-5-6	94AB	↓	1110	↓	2	X						BC	~~X~~	X			rec 2 Jars EWB
LW-MW04-7.5-8.5	95	↓	1115	↓	↓	X						BC	~~X~~	X			
LW-MW04-10-11	96	↓	1120	↓	↓												Hold
LW-SB208-14-15	97																

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: B Cerr	Baxter Cerr	Aspect	1/21/22	1500
Received by:	Liz Webber-Bryan	F&B	1/21/22	1500
Relinquished by:				
Received by:				

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

February 7, 2022

Zanna Satterwhite, Project Manager
Aspect Consulting, LLC
710 2nd Ave S, Suite 550
Seattle, WA 98104

Dear Ms Satterwhite:

Included are the results from the testing of material submitted on January 21, 2022 from the GP West Lignin Parcel 210368, F&BI 201301 project. There are 132 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Aspect Data
ASP0207R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 21, 2022 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC GP West Lignin Parcel 210368, F&BI 201301 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
201301 -01	LW-SB201-0-1
201301 -02	LW-SB201-2.5-3
201301 -03	LW-SB201-5-6
201301 -04	LW-SB201-6-7
201301 -05	LW-SB202-0-1
201301 -06	LW-SB202-1-2
201301 -07	LW-SB202-5-5.5
201301 -08	LW-SB202-6.5-7
201301 -09	LW-SB202-10-11
201301 -10	LW-SB203-0-1
201301 -11	LW-SB203-2-3
201301 -12	LW-SB203-5-6
201301 -13	LW-SB203-6.5-7.5
201301 -14	LW-SB204-0-1
201301 -15	LW-SB204-1-2
201301 -16	LW-SB204-5-6
201301 -17	LW-SB204-6.5-7.5
201301 -18	LW-SB205-0.5-1
201301 -19	LW-SB205-1-1.5
201301 -20	LW-SB205-5-6
201301 -21	LW-SB205-7-8
201301 -22	LW-SB206-0-1
201301 -23	LW-SB206-2-2.5
201301 -24	LW-SB206-5-6
201301 -25	LW-SB206-7-8
201301 -26	LW-SB207-0.5-1
201301 -27	LW-SB207-1-2
201301 -28	LW-SB207-5-6
201301 -29	LW-SB207-7-8
201301 -30	LW-SB208-0.5-1.5
201301 -31	LW-SB208-5.5-6.5
201301 -32	LW-SB208-11-12
201301 -33	LW-SB209-0-1
201301 -34	LW-SB209-2-2.5
201301 -35	LW-SB209-5-6
201301 -36	LW-SB209-7-8

CASE NARRATIVE (continued)

Laboratory ID	Aspect Consulting, LLC
201301 -37	LW-SB210-0-1
201301 -38	LW-SB210-2-2.5
201301 -39	LW-SB210-5-6
201301 -40	LW-SB210-8-8.5
201301 -41	LW-SB211-0-1
201301 -42	LW-SB211-6-7
201301 -43	LW-SB211-11-12
201301 -44	LW-SB211-14-15
201301 -45	LW-SB212-0.5-1.5
201301 -46	LW-SB212-5-6
201301 -47	LW-SB212-15-16
201301 -48	LW-SB213-0.5-1.5
201301 -49	LW-SB213-6-7
201301 -50	LW-SB213-10-11
201301 -51	LW-SB214-0.5-1.5
201301 -52	LW-SB214-2-2.5
201301 -53	LW-SB214-5-6
201301 -54	LW-SB214-6.5-7.5
201301 -55	LW-SB215-0.5-1.5
201301 -56	LW-SB215-5-6
201301 -57	LW-SB215-10-11
201301 -58	LW-SB215-12-13
201301 -59	LW-SB216-0-1
201301 -60	LW-SB216-2.5-3.5
201301 -61	LW-SB216-7-8
201301 -62	LW-SB216-12-13
201301 -63	LW-SB216-19-20
201301 -64	LW-SB217-0-1
201301 -65	LW-SB217-1-1.5
201301 -66	LW-SB217-5-6
201301 -67	LW-SB217-7.5-8.5
201301 -68	LW-SB218-0.5-1
201301 -69	LW-SB218-2-2.5
201301 -70	LW-SB218-5-6
201301 -71	LW-SB218-8-9
201301 -72	LW-SB218-11-12
201301 -73	LW-SB219-0-1
201301 -74	LW-SB219-5-6

CASE NARRATIVE (continued)

Laboratory ID	Aspect Consulting, LLC
201301 -75	LW-SB219-10-11
201301 -76	LW-SB219-13-14
201301 -77	LW-SB220-1-2
201301 -78	LW-SB220-5-6
201301 -79	LW-SB220-10-11
201301 -80	LW-SB220-13-14
201301 -81	LW-SB221-0-1
201301 -82	LW-SB221-2-3
201301 -83	LW-SB221-5-6
201301 -84	LW-SB221-7-8
201301 -85	LW-MW02-1-2
201301 -86	LW-MW02-5-6
201301 -87	LW-MW02-6-7
201301 -88	LW-MW03-0-1
201301 -89	LW-MW03-5-6
201301 -90	LW-MW03-7.5-8.5
201301 -91	LW-MW03-10-11
201301 -92	LW-MW03-12-13
201301 -93	LW-MW04-0-1
201301 -94	LW-MW04-5-6
201301 -95	LW-MW04-7.5-8.5
201301 -96	LW-MW04-10-11
201301 -97	LW-SB208-14-15

An 8270E internal standard failed the acceptance criteria for sample LW-SB216-2.5-3.5. The sample was diluted and reanalyzed with acceptable results. Both data sets were reported.

All other quality control requirements were acceptable.

Date of Report: 02/07/22
Date Received: 01/21/22
Project: GP West Lignin Parcel 210368, F&BI 201301
Date Extracted: 01/25/22
Date Analyzed: 01/25/22

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 56-165)
LW-MW04-0-1 201301-93	<50	<250	102
LW-MW04-5-6 201301-94	<50	<250	105
LW-MW04-7.5-8.5 201301-95	<50	<250	105
Method Blank 02-243 MB	<50	<250	105

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB201-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-01 x5
Date Analyzed:	01/24/22	Data File:	201301-01 x5.193
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	30.4
Copper	96.0
Zinc	71.0

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB201-2.5-3	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-02 x2
Date Analyzed:	01/24/22	Data File:	201301-02 x2.111
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	20.1
Copper	22.7
Zinc	35.0

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB202-1-2	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-06 x2
Date Analyzed:	01/24/22	Data File:	201301-06 x2.112
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	56.2
Copper	851

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB202-1-2	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-06 x250
Date Analyzed:	01/25/22	Data File:	201301-06 x250.045
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Zinc	152,000

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB202-5-5.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-07 x2
Date Analyzed:	01/24/22	Data File:	201301-07 x2.113
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	82.9
Copper	141

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB202-5-5.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-07 x25
Date Analyzed:	01/25/22	Data File:	201301-07 x25.046
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Zinc	12,700

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB202-6.5-7	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-08 x2
Date Analyzed:	01/24/22	Data File:	201301-08 x2.114
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	10.3
Copper	11.0
Zinc	32.8

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB202-10-11	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-09 x2
Date Analyzed:	01/24/22	Data File:	201301-09 x2.124
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	33.4
Copper	31.1
Zinc	67.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB203-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-10 x2
Date Analyzed:	01/24/22	Data File:	201301-10 x2.125
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	15.4
Copper	21.7
Zinc	43.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB203-2-3	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-11 x2
Date Analyzed:	01/24/22	Data File:	201301-11 x2.126
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	28.6
Copper	556
Zinc	346

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB203-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	02/01/22	Lab ID:	201301-12
Date Analyzed:	02/01/22	Data File:	201301-12.057
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Copper	348
Zinc	112

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB204-1-2	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-15 x2
Date Analyzed:	01/24/22	Data File:	201301-15 x2.129
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	40.9
Copper	37.6
Zinc	62.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB204-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-16 x2
Date Analyzed:	01/24/22	Data File:	201301-16 x2.130
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	16.4
Copper	20.4
Zinc	57.0

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB204-6.5-7.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-17 x2
Date Analyzed:	01/24/22	Data File:	201301-17 x2.131
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	10.0
Copper	6.97
Zinc	11.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB205-0.5-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-18 x2
Date Analyzed:	01/24/22	Data File:	201301-18 x2.132
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	83.0
Copper	37.8
Zinc	64.4

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB205-1-1.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-19 x2
Date Analyzed:	01/24/22	Data File:	201301-19 x2.133
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	56.7
Copper	48.5
Zinc	123

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB205-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	02/01/22	Lab ID:	201301-20 x2
Date Analyzed:	02/01/22	Data File:	201301-20 x2.063
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Copper	18.8
Zinc	93.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB206-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-22 x2
Date Analyzed:	01/24/22	Data File:	201301-22 x2.134
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	74.1
Copper	58.5
Zinc	183

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB206-2-2.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-23 x2
Date Analyzed:	01/24/22	Data File:	201301-23 x2.135
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	12.0
Copper	11.8
Zinc	16.4

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB207-0.5-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-26 x2
Date Analyzed:	01/24/22	Data File:	201301-26 x2.136
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	20.3
Copper	33.5
Zinc	53.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB207-1-2	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-27 x2
Date Analyzed:	01/24/22	Data File:	201301-27 x2.137
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	38.8
Copper	68.6
Zinc	48.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB207-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	02/01/22	Lab ID:	201301-28 x2
Date Analyzed:	02/01/22	Data File:	201301-28 x2.068
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Copper	92.2

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB208-0.5-1.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-30 x2
Date Analyzed:	01/24/22	Data File:	201301-30 x2.138
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	27.6
Copper	21.3
Zinc	31.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB208-5.5-6.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-31 x2
Date Analyzed:	01/24/22	Data File:	201301-31 x2.141
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	26.8
Copper	183
Zinc	192

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB208-11-12	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	02/01/22	Lab ID:	201301-32 x2
Date Analyzed:	02/01/22	Data File:	201301-32 x2.069
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Copper	10.7
Zinc	16.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB209-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-33 x2
Date Analyzed:	01/24/22	Data File:	201301-33 x2.142
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	21.4
Copper	58.6
Zinc	183

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB209-2-2.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-34 x5
Date Analyzed:	01/24/22	Data File:	201301-34 x5.196
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	25.6
Copper	32.1
Zinc	229

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB209-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-35 x2
Date Analyzed:	01/24/22	Data File:	201301-35 x2.147
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	44.6
Copper	113
Zinc	232

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB209-7-8	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	02/01/22	Lab ID:	201301-36 x2
Date Analyzed:	02/01/22	Data File:	201301-36 x2.070
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Copper	11.7
Zinc	20.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB210-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-37 x2
Date Analyzed:	01/24/22	Data File:	201301-37 x2.148
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	34.2
Copper	115
Zinc	398

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB210-2-2.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-38 x2
Date Analyzed:	01/24/22	Data File:	201301-38 x2.149
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	23.5
Copper	26.8
Zinc	58.1

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB210-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-39 x2
Date Analyzed:	01/24/22	Data File:	201301-39 x2.150
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	36.7
Copper	41.1
Zinc	97.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB210-8-8.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	02/01/22	Lab ID:	201301-40 x2
Date Analyzed:	02/01/22	Data File:	201301-40 x2.071
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Copper	35.9
Zinc	290

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB211-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-41 x2
Date Analyzed:	01/24/22	Data File:	201301-41 x2.153
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	24.7
Copper	17.8
Zinc	39.9

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB211-6-7	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-42 x2
Date Analyzed:	01/24/22	Data File:	201301-42 x2.154
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	10.7
Copper	12.2
Zinc	20.4

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB212-0.5-1.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-45 x2
Date Analyzed:	01/24/22	Data File:	201301-45 x2.155
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	41.6
Copper	34.5
Zinc	72.9

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB212-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-46 x2
Date Analyzed:	01/24/22	Data File:	201301-46 x2.156
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	42.8
Copper	147
Zinc	155

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB212-15-16	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	02/01/22	Lab ID:	201301-47 x2
Date Analyzed:	02/01/22	Data File:	201301-47 x2.072
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Copper	14.4
Zinc	32.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB213-0.5-1.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-48 x2
Date Analyzed:	01/24/22	Data File:	201301-48 x2.157
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	20.2
Copper	20.5
Zinc	38.9

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB213-6-7	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-49 x2
Date Analyzed:	01/24/22	Data File:	201301-49 x2.158
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	15.2
Copper	16.8
Zinc	35.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB213-10-11	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-50 x2
Date Analyzed:	01/24/22	Data File:	201301-50 x2.159
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	16.3
Copper	24.6
Zinc	38.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB214-0.5-1.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-51 x2
Date Analyzed:	01/24/22	Data File:	201301-51 x2.160
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	106
Copper	67.7
Zinc	178

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB214-2-2.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-52 x2
Date Analyzed:	01/24/22	Data File:	201301-52 x2.161
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	51.7
Copper	954
Zinc	29.4

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB214-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-53 x2
Date Analyzed:	01/24/22	Data File:	201301-53 x2.162
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	13.3
Copper	24.8
Zinc	19.4

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB215-0.5-1.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-55 x2
Date Analyzed:	01/24/22	Data File:	201301-55 x2.165
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	18.0
Copper	17.0
Zinc	25.0

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB215-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-56 x2
Date Analyzed:	01/24/22	Data File:	201301-56 x2.166
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	48.1
Copper	65.7
Zinc	38.0

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB215-10-11	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-57 x2
Date Analyzed:	01/24/22	Data File:	201301-57 x2.167
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	12.7
Copper	14.2
Zinc	25.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB216-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-59 x2
Date Analyzed:	01/24/22	Data File:	201301-59 x2.168
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	18.8
Copper	15.9
Zinc	27.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB216-2.5-3.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-60
Date Analyzed:	01/24/22	Data File:	201301-60.169
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	51.0
Copper	40.5
Zinc	101

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB216-7-8	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	02/01/22	Lab ID:	201301-61 x2
Date Analyzed:	02/01/22	Data File:	201301-61 x2.073
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Copper	12.1
Zinc	22.2

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB217-1-1.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-65 x2
Date Analyzed:	01/24/22	Data File:	201301-65 x2.173
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	14.9
Copper	22.1
Zinc	54.4

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB217-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-66 x2
Date Analyzed:	01/24/22	Data File:	201301-66 x2.174
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	12.5
Copper	14.4
Zinc	26.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB218-2-2.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-69 x2
Date Analyzed:	01/24/22	Data File:	201301-69 x2.177
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	47.5
Copper	17.1
Zinc	25.0

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB218-8-9	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-71 x2
Date Analyzed:	01/24/22	Data File:	201301-71 x2.178
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	58.5
Copper	407
Zinc	189

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB218-11-12	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-72 x2
Date Analyzed:	01/24/22	Data File:	201301-72 x2.179
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	16.5
Copper	11.3
Zinc	24.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB219-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-73 x2
Date Analyzed:	01/24/22	Data File:	201301-73 x2.180
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	243
Copper	41.1
Zinc	208

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB219-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-74 x2
Date Analyzed:	01/24/22	Data File:	201301-74 x2.181
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	222
Copper	39.0
Zinc	187

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB219-10-11	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-75 x2
Date Analyzed:	01/24/22	Data File:	201301-75 x2.182
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	21.7
Copper	40.7
Zinc	39.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB219-13-14	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-76 x2
Date Analyzed:	01/24/22	Data File:	201301-76 x2.183
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	26.8
Copper	24.0
Zinc	52.0

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB220-1-2	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-77 x2
Date Analyzed:	01/24/22	Data File:	201301-77 x2.184
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	17.7
Copper	17.8
Zinc	32.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB220-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-78 x2
Date Analyzed:	01/24/22	Data File:	201301-78 x2.185
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	22.7
Copper	15.6
Zinc	24.9

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB221-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-81 x2
Date Analyzed:	01/24/22	Data File:	201301-81 x2.186
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	29.6
Copper	68.5
Zinc	65.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB221-2-3	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-82 x2
Date Analyzed:	01/24/22	Data File:	201301-82 x2.189
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	43.4
Copper	39.0
Zinc	68.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-SB221-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-83 x2
Date Analyzed:	01/24/22	Data File:	201301-83 x2.190
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	11.6
Copper	4.01
Zinc	20.4

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-MW02-1-2	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-85 x2
Date Analyzed:	01/24/22	Data File:	201301-85 x2.191
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	74.5
Copper	140
Zinc	121

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-MW02-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-86 x2
Date Analyzed:	01/24/22	Data File:	201301-86 x2.192
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	118
Copper	87.7
Zinc	198

Analysis For Total Metals By EPA Method 6020B

Client ID:	LW-MW02-6-7	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	02/01/22	Lab ID:	201301-87 x2
Date Analyzed:	02/01/22	Data File:	201301-87 x2.074
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Copper	11.5
Zinc	24.8

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	I2-56 mb
Date Analyzed:	01/24/22	Data File:	I2-56 mb.076
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	<1
Copper	<1
Zinc	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	I2-57 mb
Date Analyzed:	01/24/22	Data File:	I2-57 mb.071
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	<1
Copper	<1
Zinc	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	I2-58 mb
Date Analyzed:	01/24/22	Data File:	I2-58 mb.108
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	<1
Copper	<1
Zinc	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	210368, F&BI 201301
Date Extracted:	02/01/22	Lab ID:	I2-91 mb
Date Analyzed:	02/01/22	Data File:	I2-91 mb.045
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Copper	<5
Zinc	<5

Analysis for TCLP Metals By EPA Method 6020B and 1311

Client ID:	LW-SB219-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	02/02/22	Lab ID:	201301-73
Date Analyzed:	02/03/22	Data File:	201301-73.051
Matrix:	Soil/Solid	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP

Analyte:	Concentration mg/L (ppm)	TCLP Limit
Chromium	<1	5.0

Analysis for TCLP Metals By EPA Method 6020B and 1311

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	210368, F&BI 201301
Date Extracted:	02/02/22	Lab ID:	I2-96 mb
Date Analyzed:	02/03/22	Data File:	I2-96 mb.039
Matrix:	Soil/Solid	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP

Analyte:	Concentration mg/L (ppm)	TCLP Limit
Chromium	<1	5.0

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB201-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-01 1/5
Date Analyzed:	01/28/22	Data File:	012815.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	61	24	111
Phenol-d6	66	37	116
Nitrobenzene-d5	74	38	117
2-Fluorobiphenyl	80	45	117
2,4,6-Tribromophenol	70	11	158
Terphenyl-d14	97	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	0.017
Anthracene	<0.01
Fluoranthene	0.056
Pyrene	0.074
Benz(a)anthracene	0.065
Chrysene	0.062
Benzo(a)pyrene	0.037
Benzo(b)fluoranthene	0.067
Benzo(k)fluoranthene	0.016
Indeno(1,2,3-cd)pyrene	0.019
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	0.021

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB201-2.5-3	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-02 1/5
Date Analyzed:	01/25/22	Data File:	012517.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	74	39	103
Phenol-d6	83	48	109
Nitrobenzene-d5	81	23	138
2-Fluorobiphenyl	89	50	150
2,4,6-Tribromophenol	90	40	127
Terphenyl-d14	99	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB202-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-05 1/25
Date Analyzed:	01/27/22	Data File:	012716.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	72 d	24	111
Phenol-d6	82 d	37	116
Nitrobenzene-d5	86 d	38	117
2-Fluorobiphenyl	91 d	45	117
2,4,6-Tribromophenol	65 d	11	158
Terphenyl-d14	99 d	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.05
2-Methylnaphthalene	<0.05
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	<0.05
Fluorene	<0.05
Phenanthrene	<0.05
Anthracene	<0.05
Fluoranthene	<0.05
Pyrene	<0.05
Benz(a)anthracene	<0.05
Chrysene	0.083
Benzo(a)pyrene	0.025
Benzo(b)fluoranthene	<0.05
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	<0.05
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	<0.05

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB202-1-2	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-06 1/5
Date Analyzed:	01/25/22	Data File:	012508.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	55	24	111
Phenol-d6	71	37	116
Nitrobenzene-d5	69	38	117
2-Fluorobiphenyl	80	45	117
2,4,6-Tribromophenol	28	11	158
Terphenyl-d14	94	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	0.019
2-Methylnaphthalene	0.046
1-Methylnaphthalene	0.039
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	0.056
Anthracene	0.057
Fluoranthene	0.068
Pyrene	0.12
Benz(a)anthracene	0.058
Chrysene	0.086
Benzo(a)pyrene	0.075
Benzo(b)fluoranthene	0.11
Benzo(k)fluoranthene	0.031
Indeno(1,2,3-cd)pyrene	0.049
Dibenz(a,h)anthracene	0.020
Benzo(g,h,i)perylene	0.059

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB203-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-10 1/25
Date Analyzed:	01/25/22	Data File:	012514.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	43 d	24	111
Phenol-d6	48 d	37	116
Nitrobenzene-d5	73 d	38	117
2-Fluorobiphenyl	88 d	45	117
2,4,6-Tribromophenol	0 d	11	158
Terphenyl-d14	108 d	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.05
2-Methylnaphthalene	<0.05
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	<0.05
Fluorene	<0.05
Phenanthrene	0.065
Anthracene	<0.05
Fluoranthene	0.072
Pyrene	0.10
Benz(a)anthracene	<0.05
Chrysene	0.074
Benzo(a)pyrene	0.050
Benzo(b)fluoranthene	0.066
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	<0.05
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	<0.05

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB203-2-3	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-11 1/5
Date Analyzed:	01/25/22	Data File:	012518.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	74	39	103
Phenol-d6	80	48	109
Nitrobenzene-d5	85	23	138
2-Fluorobiphenyl	87	50	150
2,4,6-Tribromophenol	95	40	127
Terphenyl-d14	100	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	0.050
2-Methylnaphthalene	0.031
1-Methylnaphthalene	0.019
Acenaphthylene	<0.01
Acenaphthene	0.013
Fluorene	0.011
Phenanthrene	0.090
Anthracene	0.023
Fluoranthene	0.15
Pyrene	0.13
Benz(a)anthracene	0.050
Chrysene	0.062
Benzo(a)pyrene	0.049
Benzo(b)fluoranthene	0.090
Benzo(k)fluoranthene	0.032
Indeno(1,2,3-cd)pyrene	0.044
Dibenz(a,h)anthracene	0.011
Benzo(g,h,i)perylene	0.046

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB204-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-14 1/25
Date Analyzed:	01/27/22	Data File:	012717.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	74 d	24	111
Phenol-d6	84 d	37	116
Nitrobenzene-d5	86 d	38	117
2-Fluorobiphenyl	87 d	45	117
2,4,6-Tribromophenol	97 d	11	158
Terphenyl-d14	101 d	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.05
2-Methylnaphthalene	<0.05
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	<0.05
Fluorene	<0.05
Phenanthrene	0.11
Anthracene	<0.05
Fluoranthene	<0.05
Pyrene	0.068
Benz(a)anthracene	<0.05
Chrysene	0.12
Benzo(a)pyrene	0.038
Benzo(b)fluoranthene	0.069
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	<0.05
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	<0.05

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB204-1-2	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-15 1/5
Date Analyzed:	01/25/22	Data File:	012519.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	69	39	103
Phenol-d6	81	48	109
Nitrobenzene-d5	77	23	138
2-Fluorobiphenyl	82	50	150
2,4,6-Tribromophenol	84	40	127
Terphenyl-d14	88	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB205-0.5-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-18 1/25
Date Analyzed:	01/25/22	Data File:	012517.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	39 d	24	111
Phenol-d6	46 d	37	116
Nitrobenzene-d5	73 d	38	117
2-Fluorobiphenyl	91 d	45	117
2,4,6-Tribromophenol	0 d	11	158
Terphenyl-d14	108 d	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.05
2-Methylnaphthalene	0.060
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	<0.05
Fluorene	<0.05
Phenanthrene	0.083
Anthracene	<0.05
Fluoranthene	0.067
Pyrene	0.092
Benz(a)anthracene	<0.05
Chrysene	0.12
Benzo(a)pyrene	0.042
Benzo(b)fluoranthene	0.053
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	<0.05
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	<0.05

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB205-1-1.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-19 1/5
Date Analyzed:	01/25/22	Data File:	012509.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	69	24	111
Phenol-d6	79	37	116
Nitrobenzene-d5	85	38	117
2-Fluorobiphenyl	86	45	117
2,4,6-Tribromophenol	85	11	158
Terphenyl-d14	99	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	0.012
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	0.036
Anthracene	<0.01
Fluoranthene	0.065
Pyrene	0.070
Benz(a)anthracene	0.039
Chrysene	0.058
Benzo(a)pyrene	0.052
Benzo(b)fluoranthene	0.087
Benzo(k)fluoranthene	0.030
Indeno(1,2,3-cd)pyrene	0.044
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	0.044

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB206-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-22 1/250
Date Analyzed:	01/25/22	Data File:	012519.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	4 d	24	111
Phenol-d6	0 d	37	116
Nitrobenzene-d5	10 d	38	117
2-Fluorobiphenyl	85 d	45	117
2,4,6-Tribromophenol	0 d	11	158
Terphenyl-d14	95 d	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.5
2-Methylnaphthalene	<0.5
1-Methylnaphthalene	<0.5
Acenaphthylene	<0.5
Acenaphthene	0.52
Fluorene	<0.5
Phenanthrene	0.54
Anthracene	<0.5
Fluoranthene	3.9
Pyrene	3.4
Benz(a)anthracene	1.1
Chrysene	1.2
Benzo(a)pyrene	1.2
Benzo(b)fluoranthene	1.7
Benzo(k)fluoranthene	0.58
Indeno(1,2,3-cd)pyrene	0.82
Dibenz(a,h)anthracene	<0.5
Benzo(g,h,i)perylene	0.70

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB206-2-2.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-23 1/5
Date Analyzed:	01/25/22	Data File:	012520.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	65	39	103
Phenol-d6	74	48	109
Nitrobenzene-d5	70	23	138
2-Fluorobiphenyl	76	50	150
2,4,6-Tribromophenol	83	40	127
Terphenyl-d14	85	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	0.022
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	0.013
Acenaphthylene	<0.01
Acenaphthene	0.21
Fluorene	0.15
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB206-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-24 1/25
Date Analyzed:	01/25/22	Data File:	012520.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	52 d	24	111
Phenol-d6	50 d	37	116
Nitrobenzene-d5	71 d	38	117
2-Fluorobiphenyl	87 d	45	117
2,4,6-Tribromophenol	13 d	11	158
Terphenyl-d14	106 d	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.05
2-Methylnaphthalene	<0.05
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	0.44
Fluorene	0.26
Phenanthrene	<0.05
Anthracene	<0.05
Fluoranthene	0.57
Pyrene	0.42
Benz(a)anthracene	0.13
Chrysene	0.14
Benzo(a)pyrene	0.11
Benzo(b)fluoranthene	0.17
Benzo(k)fluoranthene	0.060
Indeno(1,2,3-cd)pyrene	0.062
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	0.056

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB207-0.5-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-26 1/5
Date Analyzed:	01/25/22	Data File:	012510.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	71	24	111
Phenol-d6	79	37	116
Nitrobenzene-d5	89	38	117
2-Fluorobiphenyl	88	45	117
2,4,6-Tribromophenol	74	11	158
Terphenyl-d14	99	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	0.028
Anthracene	<0.01
Fluoranthene	0.078
Pyrene	0.079
Benz(a)anthracene	0.044
Chrysene	0.054
Benzo(a)pyrene	0.061
Benzo(b)fluoranthene	0.087
Benzo(k)fluoranthene	0.028
Indeno(1,2,3-cd)pyrene	0.042
Dibenz(a,h)anthracene	0.010
Benzo(g,h,i)perylene	0.042

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB207-1-2	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-27 1/5
Date Analyzed:	01/25/22	Data File:	012512.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	56	24	111
Phenol-d6	57	37	116
Nitrobenzene-d5	78	38	117
2-Fluorobiphenyl	82	45	117
2,4,6-Tribromophenol	57	11	158
Terphenyl-d14	94	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	0.011
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	0.017
Benz(a)anthracene	<0.01
Chrysene	0.011
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	0.022

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB208-0.5-1.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-30 1/5
Date Analyzed:	01/25/22	Data File:	012510.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	86	39	103
Phenol-d6	92	48	109
Nitrobenzene-d5	97	23	138
2-Fluorobiphenyl	97	50	150
2,4,6-Tribromophenol	87	40	127
Terphenyl-d14	105	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB209-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-33 1/5
Date Analyzed:	01/25/22	Data File:	012511.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	77	24	111
Phenol-d6	84	37	116
Nitrobenzene-d5	84	38	117
2-Fluorobiphenyl	90	45	117
2,4,6-Tribromophenol	83	11	158
Terphenyl-d14	100	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	0.063
Anthracene	0.011
Fluoranthene	0.11
Pyrene	0.12
Benz(a)anthracene	0.057
Chrysene	0.067
Benzo(a)pyrene	0.085
Benzo(b)fluoranthene	0.097
Benzo(k)fluoranthene	0.034
Indeno(1,2,3-cd)pyrene	0.061
Dibenz(a,h)anthracene	0.013
Benzo(g,h,i)perylene	0.059

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB209-2-2.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-34 1/25
Date Analyzed:	01/25/22	Data File:	012518.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	46 d	24	111
Phenol-d6	46 d	37	116
Nitrobenzene-d5	74 d	38	117
2-Fluorobiphenyl	90 d	45	117
2,4,6-Tribromophenol	0 d	11	158
Terphenyl-d14	104 d	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	0.064
2-Methylnaphthalene	<0.05
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	0.055
Fluorene	<0.05
Phenanthrene	0.40
Anthracene	0.095
Fluoranthene	0.49
Pyrene	0.55
Benz(a)anthracene	0.23
Chrysene	0.25
Benzo(a)pyrene	0.27
Benzo(b)fluoranthene	0.29
Benzo(k)fluoranthene	0.11
Indeno(1,2,3-cd)pyrene	0.14
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	0.12

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB209-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	02/01/22	Lab ID:	201301-35 1/25
Date Analyzed:	02/02/22	Data File:	020214.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	66 d	24	111
Phenol-d6	76 d	37	116
Nitrobenzene-d5	80 d	38	117
2-Fluorobiphenyl	90 d	45	117
2,4,6-Tribromophenol	44 d	11	158
Terphenyl-d14	103 d	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	0.26
2-Methylnaphthalene	0.29
1-Methylnaphthalene	0.23
Acenaphthylene	<0.05
Acenaphthene	<0.05
Fluorene	<0.05
Phenanthrene	0.14
Anthracene	<0.05
Fluoranthene	0.13
Pyrene	0.13
Benz(a)anthracene	0.071
Chrysene	0.086
Benzo(a)pyrene	0.072
Benzo(b)fluoranthene	0.081
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	0.053
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	0.055

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB210-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-37 1/5
Date Analyzed:	01/25/22	Data File:	012521.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	69	39	103
Phenol-d6	80	48	109
Nitrobenzene-d5	86	23	138
2-Fluorobiphenyl	90	50	150
2,4,6-Tribromophenol	76	40	127
Terphenyl-d14	97	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	0.021
2-Methylnaphthalene	0.033
1-Methylnaphthalene	0.028
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	0.11
Anthracene	<0.01
Fluoranthene	0.15
Pyrene	0.18
Benz(a)anthracene	0.13
Chrysene	0.15
Benzo(a)pyrene	0.15
Benzo(b)fluoranthene	0.32
Benzo(k)fluoranthene	0.075
Indeno(1,2,3-cd)pyrene	0.085
Dibenz(a,h)anthracene	0.024
Benzo(g,h,i)perylene	0.084

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB210-2-2.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	201301-38 1/5
Date Analyzed:	01/25/22	Data File:	012522.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	74	39	103
Phenol-d6	83	48	109
Nitrobenzene-d5	84	23	138
2-Fluorobiphenyl	88	50	150
2,4,6-Tribromophenol	89	40	127
Terphenyl-d14	95	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	0.019
Anthracene	<0.01
Fluoranthene	0.028
Pyrene	0.030
Benz(a)anthracene	0.013
Chrysene	0.017
Benzo(a)pyrene	0.016
Benzo(b)fluoranthene	0.023
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	0.013
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	0.015

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB211-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-41 1/5
Date Analyzed:	01/26/22	Data File:	012610.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	71	24	111
Phenol-d6	76	37	116
Nitrobenzene-d5	83	38	117
2-Fluorobiphenyl	79	45	117
2,4,6-Tribromophenol	76	11	158
Terphenyl-d14	84	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	0.035
Anthracene	<0.01
Fluoranthene	0.033
Pyrene	0.022
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB212-0.5-1.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-45 1/25
Date Analyzed:	01/27/22	Data File:	012711.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	66 d	24	111
Phenol-d6	72 d	37	116
Nitrobenzene-d5	82 d	38	117
2-Fluorobiphenyl	79 d	45	117
2,4,6-Tribromophenol	66 d	11	158
Terphenyl-d14	87 d	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.05
2-Methylnaphthalene	<0.05
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	<0.05
Fluorene	<0.05
Phenanthrene	<0.05
Anthracene	<0.05
Fluoranthene	<0.05
Pyrene	<0.05
Benz(a)anthracene	<0.05
Chrysene	<0.05
Benzo(a)pyrene	0.026
Benzo(b)fluoranthene	<0.05
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	<0.05
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	<0.05

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB213-0.5-1.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-48 1/5
Date Analyzed:	01/28/22	Data File:	012813.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	67	24	111
Phenol-d6	76	37	116
Nitrobenzene-d5	81	38	117
2-Fluorobiphenyl	76	45	117
2,4,6-Tribromophenol	82	11	158
Terphenyl-d14	86	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB214-0.5-1.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-51 1/25
Date Analyzed:	01/26/22	Data File:	012618.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	53 d	24	111
Phenol-d6	74 d	37	116
Nitrobenzene-d5	86 d	38	117
2-Fluorobiphenyl	83 d	45	117
2,4,6-Tribromophenol	56 d	11	158
Terphenyl-d14	89 d	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.05
2-Methylnaphthalene	<0.05
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	0.058
Fluorene	<0.05
Phenanthrene	0.24
Anthracene	<0.05
Fluoranthene	0.44
Pyrene	0.36
Benz(a)anthracene	0.22
Chrysene	0.22
Benzo(a)pyrene	0.27
Benzo(b)fluoranthene	0.33
Benzo(k)fluoranthene	0.13
Indeno(1,2,3-cd)pyrene	0.21
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	0.19

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB214-2-2.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-52 1/5
Date Analyzed:	01/26/22	Data File:	012619.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	47	24	111
Phenol-d6	51	37	116
Nitrobenzene-d5	57	38	117
2-Fluorobiphenyl	52	45	117
2,4,6-Tribromophenol	67	11	158
Terphenyl-d14	66	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	0.012
Anthracene	<0.01
Fluoranthene	0.024
Pyrene	0.022
Benz(a)anthracene	0.019
Chrysene	0.017
Benzo(a)pyrene	0.029
Benzo(b)fluoranthene	0.039
Benzo(k)fluoranthene	0.015
Indeno(1,2,3-cd)pyrene	0.031
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	0.029

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB214-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-53 1/5
Date Analyzed:	01/26/22	Data File:	012611.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	70	24	111
Phenol-d6	73	37	116
Nitrobenzene-d5	76	38	117
2-Fluorobiphenyl	70	45	117
2,4,6-Tribromophenol	76	11	158
Terphenyl-d14	78	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB215-0.5-1.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-55 1/5
Date Analyzed:	01/26/22	Data File:	012612.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	66	24	111
Phenol-d6	72	37	116
Nitrobenzene-d5	74	38	117
2-Fluorobiphenyl	73	45	117
2,4,6-Tribromophenol	64	11	158
Terphenyl-d14	80	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB216-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-59 1/5
Date Analyzed:	01/26/22	Data File:	012613.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	66	24	111
Phenol-d6	71	37	116
Nitrobenzene-d5	76	38	117
2-Fluorobiphenyl	71	45	117
2,4,6-Tribromophenol	64	11	158
Terphenyl-d14	81	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB216-2.5-3.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-60 1/25
Date Analyzed:	01/27/22	Data File:	012718.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	76 d	24	111
Phenol-d6	84 d	37	116
Nitrobenzene-d5	93 d	38	117
2-Fluorobiphenyl	89 d	45	117
2,4,6-Tribromophenol	100 d	11	158
Terphenyl-d14	117 d	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.05
2-Methylnaphthalene	<0.05
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	<0.05
Fluorene	<0.05
Phenanthrene	0.072
Anthracene	<0.05
Fluoranthene	0.084
Pyrene	0.34
Benz(a)anthracene	0.083
Chrysene	0.59
Benzo(a)pyrene	0.15 J
Benzo(b)fluoranthene	0.27 J
Benzo(k)fluoranthene	<0.05 J
Indeno(1,2,3-cd)pyrene	0.057 J
Dibenz(a,h)anthracene	0.057 J
Benzo(g,h,i)perylene	0.11 J

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB216-2.5-3.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-60 1/250
Date Analyzed:	01/27/22	Data File:	012712.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	54 d	24	111
Phenol-d6	50 d	37	116
Nitrobenzene-d5	60 d	38	117
2-Fluorobiphenyl	80 d	45	117
2,4,6-Tribromophenol	127 d	11	158
Terphenyl-d14	85 d	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.5
2-Methylnaphthalene	<0.5
1-Methylnaphthalene	<0.5
Acenaphthylene	<0.5
Acenaphthene	<0.5
Fluorene	<0.5
Phenanthrene	<0.5
Anthracene	<0.5
Fluoranthene	<0.5
Pyrene	<0.5
Benz(a)anthracene	<0.5
Chrysene	0.57
Benzo(a)pyrene	<0.5
Benzo(b)fluoranthene	<0.5
Benzo(k)fluoranthene	<0.5
Indeno(1,2,3-cd)pyrene	<0.5
Dibenz(a,h)anthracene	<0.5
Benzo(g,h,i)perylene	<0.5

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB216-7-8	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	02/01/22	Lab ID:	201301-61 1/5
Date Analyzed:	02/02/22	Data File:	020207.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	60	24	111
Phenol-d6	85	37	116
Nitrobenzene-d5	88	38	117
2-Fluorobiphenyl	86	45	117
2,4,6-Tribromophenol	74	11	158
Terphenyl-d14	95	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB217-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-64 1/5
Date Analyzed:	01/26/22	Data File:	012614.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	65	24	111
Phenol-d6	70	37	116
Nitrobenzene-d5	72	38	117
2-Fluorobiphenyl	71	45	117
2,4,6-Tribromophenol	65	11	158
Terphenyl-d14	80	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB217-1-1.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-65 1/5
Date Analyzed:	01/28/22	Data File:	012810.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	64	24	111
Phenol-d6	74	37	116
Nitrobenzene-d5	80	38	117
2-Fluorobiphenyl	76	45	117
2,4,6-Tribromophenol	75	11	158
Terphenyl-d14	85	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	0.033
2-Methylnaphthalene	0.012
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	0.023
Anthracene	<0.01
Fluoranthene	0.026
Pyrene	0.026
Benz(a)anthracene	0.014
Chrysene	0.023
Benzo(a)pyrene	0.019
Benzo(b)fluoranthene	0.028
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	0.011
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	0.012

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB218-0.5-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-68 1/5
Date Analyzed:	01/28/22	Data File:	012811.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	67	24	111
Phenol-d6	76	37	116
Nitrobenzene-d5	81	38	117
2-Fluorobiphenyl	77	45	117
2,4,6-Tribromophenol	78	11	158
Terphenyl-d14	81	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB218-2-2.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-69 1/5
Date Analyzed:	01/26/22	Data File:	012615.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	61	24	111
Phenol-d6	67	37	116
Nitrobenzene-d5	70	38	117
2-Fluorobiphenyl	71	45	117
2,4,6-Tribromophenol	71	11	158
Terphenyl-d14	79	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB219-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-73 1/25
Date Analyzed:	01/27/22	Data File:	012714.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	91 d	24	111
Phenol-d6	101 d	37	116
Nitrobenzene-d5	112 d	38	117
2-Fluorobiphenyl	114 d	45	117
2,4,6-Tribromophenol	77 d	11	158
Terphenyl-d14	118 d	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.05
2-Methylnaphthalene	<0.05
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	<0.05
Fluorene	<0.05
Phenanthrene	<0.05
Anthracene	<0.05
Fluoranthene	0.078
Pyrene	0.077
Benz(a)anthracene	0.057
Chrysene	0.086
Benzo(a)pyrene	0.066
Benzo(b)fluoranthene	0.099
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	<0.05
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	0.059

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB220-1-2	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-77 1/5
Date Analyzed:	01/26/22	Data File:	012616.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	68	24	111
Phenol-d6	75	37	116
Nitrobenzene-d5	79	38	117
2-Fluorobiphenyl	78	45	117
2,4,6-Tribromophenol	64	11	158
Terphenyl-d14	83	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-SB221-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-81 1/5
Date Analyzed:	01/28/22	Data File:	012816.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	45	24	111
Phenol-d6	69	37	116
Nitrobenzene-d5	79	38	117
2-Fluorobiphenyl	76	45	117
2,4,6-Tribromophenol	6 ip	11	158
Terphenyl-d14	89	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	0.023
2-Methylnaphthalene	0.049
1-Methylnaphthalene	0.062
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	0.088
Anthracene	<0.01
Fluoranthene	0.054
Pyrene	0.096
Benz(a)anthracene	0.031
Chrysene	0.074
Benzo(a)pyrene	0.028
Benzo(b)fluoranthene	0.040
Benzo(k)fluoranthene	0.011
Indeno(1,2,3-cd)pyrene	0.013
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	0.016

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-MW04-0-1	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-93 1/5
Date Analyzed:	01/28/22	Data File:	012812.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	70	24	111
Phenol-d6	78	37	116
Nitrobenzene-d5	82	38	117
2-Fluorobiphenyl	79	45	117
2,4,6-Tribromophenol	82	11	158
Terphenyl-d14	88	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	0.034
Pyrene	0.026
Benz(a)anthracene	0.015
Chrysene	0.012
Benzo(a)pyrene	0.011
Benzo(b)fluoranthene	0.017
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-MW04-5-6	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-94 1/5
Date Analyzed:	01/28/22	Data File:	012814.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	70	24	111
Phenol-d6	79	37	116
Nitrobenzene-d5	75	38	117
2-Fluorobiphenyl	79	45	117
2,4,6-Tribromophenol	88	11	158
Terphenyl-d14	86	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	0.013
Pyrene	0.011
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-MW04-7.5-8.5	Client:	Aspect Consulting, LLC
Date Received:	01/21/22	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	201301-95 1/5
Date Analyzed:	01/26/22	Data File:	012617.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	65	24	111
Phenol-d6	72	37	116
Nitrobenzene-d5	79	38	117
2-Fluorobiphenyl	72	45	117
2,4,6-Tribromophenol	75	11	158
Terphenyl-d14	77	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	0.011
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	0.012
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	210368, F&BI 201301
Date Extracted:	01/24/22	Lab ID:	02-240 mb 1/5
Date Analyzed:	01/25/22	Data File:	012509.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	84	39	103
Phenol-d6	91	48	109
Nitrobenzene-d5	93	23	138
2-Fluorobiphenyl	97	50	150
2,4,6-Tribromophenol	84	40	127
Terphenyl-d14	114	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	210368, F&BI 201301
Date Extracted:	01/26/22	Lab ID:	02-241 mb 1/5
Date Analyzed:	01/26/22	Data File:	012609.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	75	24	111
Phenol-d6	80	37	116
Nitrobenzene-d5	87	38	117
2-Fluorobiphenyl	82	45	117
2,4,6-Tribromophenol	79	11	158
Terphenyl-d14	83	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	210368, F&BI 201301
Date Extracted:	02/01/22	Lab ID:	02-276 mb 1/5
Date Analyzed:	02/03/22	Data File:	020239.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	88	39	103
Phenol-d6	96	48	109
Nitrobenzene-d5	95	23	138
2-Fluorobiphenyl	97	50	150
2,4,6-Tribromophenol	84	40	127
Terphenyl-d14	102	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Date of Report: 02/07/22
Date Received: 01/21/22
Project: GP West Lignin Parcel 210368, F&BI 201301

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 201301-93 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	102	106	63-146	4

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	98	79-144

Date of Report: 02/07/22
Date Received: 01/21/22
Project: GP West Lignin Parcel 210368, F&BI 201301

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 201301-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Chromium	mg/kg (ppm)	50	22.1	90	103	75-125	13
Copper	mg/kg (ppm)	50	64.3	139 b	60 b	75-125	79 b
Zinc	mg/kg (ppm)	50	46.1	84	94	75-125	11

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	101	80-120
Copper	mg/kg (ppm)	50	100	80-120
Zinc	mg/kg (ppm)	50	98	80-120

Date of Report: 02/07/22
Date Received: 01/21/22
Project: GP West Lignin Parcel 210368, F&BI 201301

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 201301-34 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Chromium	mg/kg (ppm)	50	20.5	96	94	75-125	2
Copper	mg/kg (ppm)	50	25.7	87	82	75-125	6
Zinc	mg/kg (ppm)	50	183	0 b	0 b	75-125	200 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	107	80-120
Copper	mg/kg (ppm)	50	103	80-120
Zinc	mg/kg (ppm)	50	100	80-120

Date of Report: 02/07/22
Date Received: 01/21/22
Project: GP West Lignin Parcel 210368, F&BI 201301

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 201301-60 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Chromium	mg/kg (ppm)	50	45.4	54 b	86 b	75-125	46 b
Copper	mg/kg (ppm)	50	36.0	41 b	66 b	75-125	47 b
Zinc	mg/kg (ppm)	50	90.2	58 b	161 b	75-125	94 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	107	80-120
Copper	mg/kg (ppm)	50	107	80-120
Zinc	mg/kg (ppm)	50	106	80-120

Date of Report: 02/07/22
Date Received: 01/21/22
Project: GP West Lignin Parcel 210368, F&BI 201301

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 201301-12 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Copper	mg/kg (ppm)	50	268	0 b	303 b	75-125	200 b
Zinc	mg/kg (ppm)	50	86.6	107	111	75-125	4

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Copper	mg/kg (ppm)	50	102	80-120
Zinc	mg/kg (ppm)	50	99	80-120

Date of Report: 02/07/22
Date Received: 01/21/22
Project: GP West Lignin Parcel 210368, F&BI 201301

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL/SOLID SAMPLES FOR TCLP METALS USING EPA METHODS 6020B AND 1311

Laboratory Code: 201124-08 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Chromium	mg/L (ppm)	2.0	<1	92	91	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	mg/L (ppm)	2.0	89	80-120

Date of Report: 02/07/22
Date Received: 01/21/22
Project: GP West Lignin Parcel 210368, F&BI 201301

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: 201301-30 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	mg/kg (ppm)	0.83	<0.01	81	83	50-150	2
2-Methylnaphthalene	mg/kg (ppm)	0.83	<0.01	82	79	50-150	4
1-Methylnaphthalene	mg/kg (ppm)	0.83	<0.01	84	81	50-150	4
Acenaphthylene	mg/kg (ppm)	0.83	<0.01	82	87	50-150	6
Acenaphthene	mg/kg (ppm)	0.83	<0.01	84	89	50-150	6
Fluorene	mg/kg (ppm)	0.83	<0.01	85	89	50-150	5
Phenanthrene	mg/kg (ppm)	0.83	<0.01	87	89	50-150	2
Anthracene	mg/kg (ppm)	0.83	<0.01	84	88	50-150	5
Fluoranthene	mg/kg (ppm)	0.83	<0.01	92	92	50-150	0
Pyrene	mg/kg (ppm)	0.83	<0.01	86	90	50-150	5
Benz(a)anthracene	mg/kg (ppm)	0.83	<0.01	88	89	50-150	1
Chrysene	mg/kg (ppm)	0.83	<0.01	88	88	50-150	0
Benzo(a)pyrene	mg/kg (ppm)	0.83	<0.01	79	82	50-150	4
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	<0.01	85	92	50-150	8
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	<0.01	89	91	50-150	2
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	<0.01	83	96	50-150	15
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	<0.01	85	98	50-150	14
Benzo(g,h,i)perylene	mg/kg (ppm)	0.83	<0.01	84	100	50-150	17

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Naphthalene	mg/kg (ppm)	0.83	86	61-102
2-Methylnaphthalene	mg/kg (ppm)	0.83	83	62-108
1-Methylnaphthalene	mg/kg (ppm)	0.83	85	62-108
Acenaphthylene	mg/kg (ppm)	0.83	88	61-111
Acenaphthene	mg/kg (ppm)	0.83	90	61-110
Fluorene	mg/kg (ppm)	0.83	91	62-114
Phenanthrene	mg/kg (ppm)	0.83	89	64-112
Anthracene	mg/kg (ppm)	0.83	88	63-111
Fluoranthene	mg/kg (ppm)	0.83	97	66-115
Pyrene	mg/kg (ppm)	0.83	92	65-112
Benz(a)anthracene	mg/kg (ppm)	0.83	92	64-116
Chrysene	mg/kg (ppm)	0.83	93	66-119
Benzo(a)pyrene	mg/kg (ppm)	0.83	84	62-116
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	92	61-118
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	93	65-119
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	89	64-130
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	91	67-131
Benzo(g,h,i)perylene	mg/kg (ppm)	0.83	91	67-126

Date of Report: 02/07/22
Date Received: 01/21/22
Project: GP West Lignin Parcel 210368, F&BI 201301

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: 201301-41 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	mg/kg (ppm)	0.83	<0.01	84	85	34-118	1
2-Methylnaphthalene	mg/kg (ppm)	0.83	<0.01	87	89	29-130	2
1-Methylnaphthalene	mg/kg (ppm)	0.83	<0.01	91	92	37-119	1
Acenaphthylene	mg/kg (ppm)	0.83	<0.01	91	92	45-128	1
Acenaphthene	mg/kg (ppm)	0.83	<0.01	92	93	36-125	1
Fluorene	mg/kg (ppm)	0.83	<0.01	96	96	48-121	0
Phenanthrene	mg/kg (ppm)	0.83	0.032	88	90	50-150	2
Anthracene	mg/kg (ppm)	0.83	<0.01	93	95	50-150	2
Fluoranthene	mg/kg (ppm)	0.83	0.030	98	98	50-150	0
Pyrene	mg/kg (ppm)	0.83	0.020	89	94	50-150	5
Benz(a)anthracene	mg/kg (ppm)	0.83	<0.01	96	96	50-150	0
Chrysene	mg/kg (ppm)	0.83	<0.01	92	92	50-150	0
Benzo(a)pyrene	mg/kg (ppm)	0.83	<0.01	90	92	50-150	2
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	<0.01	97	98	50-150	1
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	<0.01	96	99	50-150	3
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	<0.01	100	95	41-134	5
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	<0.01	101	94	44-130	7
Benzo(g,h,i)perylene	mg/kg (ppm)	0.83	<0.01	95	86	33-131	10

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Naphthalene	mg/kg (ppm)	0.83	86	58-108
2-Methylnaphthalene	mg/kg (ppm)	0.83	91	67-108
1-Methylnaphthalene	mg/kg (ppm)	0.83	94	66-107
Acenaphthylene	mg/kg (ppm)	0.83	91	70-130
Acenaphthene	mg/kg (ppm)	0.83	91	66-112
Fluorene	mg/kg (ppm)	0.83	96	67-117
Phenanthrene	mg/kg (ppm)	0.83	92	70-130
Anthracene	mg/kg (ppm)	0.83	93	70-130
Fluoranthene	mg/kg (ppm)	0.83	99	70-130
Pyrene	mg/kg (ppm)	0.83	93	70-130
Benz(a)anthracene	mg/kg (ppm)	0.83	98	70-130
Chrysene	mg/kg (ppm)	0.83	96	70-130
Benzo(a)pyrene	mg/kg (ppm)	0.83	90	68-120
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	96	69-125
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	105	70-130
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	96	67-129
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	98	67-128
Benzo(g,h,i)perylene	mg/kg (ppm)	0.83	95	64-127

Date of Report: 02/07/22
Date Received: 01/21/22
Project: GP West Lignin Parcel 210368, F&BI 201301

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: 201434-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	mg/kg (ppm)	0.83	<0.01	86	85	50-150	1
2-Methylnaphthalene	mg/kg (ppm)	0.83	<0.01	81	83	50-150	2
1-Methylnaphthalene	mg/kg (ppm)	0.83	<0.01	84	85	50-150	1
Acenaphthylene	mg/kg (ppm)	0.83	<0.01	88	91	50-150	3
Acenaphthene	mg/kg (ppm)	0.83	<0.01	91	93	50-150	2
Fluorene	mg/kg (ppm)	0.83	<0.01	87	91	50-150	4
Phenanthrene	mg/kg (ppm)	0.83	<0.01	95	94	50-150	1
Anthracene	mg/kg (ppm)	0.83	<0.01	91	90	50-150	1
Fluoranthene	mg/kg (ppm)	0.83	<0.01	91	90	50-150	1
Pyrene	mg/kg (ppm)	0.83	<0.01	92	96	50-150	4
Benz(a)anthracene	mg/kg (ppm)	0.83	<0.01	96	96	50-150	0
Chrysene	mg/kg (ppm)	0.83	<0.01	97	95	50-150	2
Benzo(a)pyrene	mg/kg (ppm)	0.83	<0.01	91	92	50-150	1
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	<0.01	99	101	50-150	2
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	<0.01	97	98	50-150	1
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	<0.01	116	111	50-150	4
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	<0.01	124	117	50-150	6
Benzo(g,h,i)perylene	mg/kg (ppm)	0.83	<0.01	124	116	50-150	7

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Naphthalene	mg/kg (ppm)	0.83	94	61-102
2-Methylnaphthalene	mg/kg (ppm)	0.83	89	62-108
1-Methylnaphthalene	mg/kg (ppm)	0.83	92	62-108
Acenaphthylene	mg/kg (ppm)	0.83	95	61-111
Acenaphthene	mg/kg (ppm)	0.83	98	61-110
Fluorene	mg/kg (ppm)	0.83	93	62-114
Phenanthrene	mg/kg (ppm)	0.83	101	64-112
Anthracene	mg/kg (ppm)	0.83	99	63-111
Fluoranthene	mg/kg (ppm)	0.83	97	66-115
Pyrene	mg/kg (ppm)	0.83	97	65-112
Benz(a)anthracene	mg/kg (ppm)	0.83	101	64-116
Chrysene	mg/kg (ppm)	0.83	101	66-119
Benzo(a)pyrene	mg/kg (ppm)	0.83	91	62-116
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	98	61-118
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	99	65-119
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	117	64-130
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	124	67-131
Benzo(g,h,i)perylene	mg/kg (ppm)	0.83	126	67-126

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SAMPLE CHAIN OF CUSTODY

201301

ME 01-21-22

BD4

Page # 1 of 10

~~Report To~~ Zanna Satterwhite

Company Aspect Consulting

Address

City, State, ZIP

Phone Email zsatterwhite@aspectconsulting.com

SAMPLERS (*signature*) B Call

PROJECT NAME GP WEA Lignin Parcel

PO # 210368

REMARKS see project specific RL's emailed to Mike Erdahl on 1/21/22

Project specific RLs? [✓ Yes] / No

INVOICE TO

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn by EPA 6020	low level PAHs by EPA 8270 DS	Copper	Zinc	Notes
LW-SB201-0-1	01	1/19/22	1410	Soil	1								X	X			
LW-SB201-2.5-3	02		1415										X	X			
LW-SB201-5-6	03		1420														Hold
LW-SB201-6-7	04		1425														Hold
LW-SB202-0-1	05		1530											X			
LW-SB202-1-2	06		1535										X	X			
LW-SB202-5-5.5	07		1540										X				
LW-SB202-6.5-7	08		1545										X				
LW-SB202-10-11	09		1550										X				
LW-SB203-0-1	10		1245										X	X			

Friedman & Bruya, Inc.
Ph. (206) 285-8282

EWB

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	B Call	Baxter Call	Aspect	1/21/22	1500
Received by:		Liz Webber-Bruya	F&B	1/21/22	1500
Relinquished by:			Samples received at	3 °C	
Received by:					

201301

SAMPLE CHAIN OF CUSTODY

ME 01-21-22

Page # 2 of 10 BD4

~~Report~~ To Zanna Satterwhite

Company Aspect Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*) B Call

PROJECT NAME GP West Lignin Parcel

PO # 210368

REMARKS

INVOICE TO

Project specific RLs? [✓ Yes] No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAH's	Copper	Zinc	Notes
LW-SB203-2-3	11	1/19/22	1250	Soil	1								X	X			
LW-SB203-5-6	12		1255										~~X~~	~~X~~	BC ●	●	~~Hold~~
LW-SB203-6.5-7.5	13		1300														Hold
LW-SB204-0-1	14		1305											X			
LW-SB204-1-2	15		1310										X	X			
LW-SB204-5-6	16		1315										X				
LW-SB204-6.5-7.5	17		1320										X				
LW-SB205-0.5-1	18		1050										X	X			
LW-SB205-1-1.5	19		1055										X	X			
LW-SB205-5-6	20	↓	1100	↓	↓										●	●	~~Hold~~

Friedman & Bruya, Inc.
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SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: B Call	Baxter Call	Aspect	1/21/22	1500
Received by:	Liz Webber-Bruya	F&B	1/21/22	1500
Relinquished by:				
Received by:				

201301

SAMPLE CHAIN OF CUSTODY

ME 01-21-22 [redacted]

Page # 3 of 10 BI;

[redacted] Zanne Satterwhite
Company Aspect Consulting
Address
City, State, ZIP
Phone Email

SAMPLERS (signature) B Cl

PROJECT NAME	PO #
CP West Lignin Pond	210368
REMARKS Project specific RLs? - [✓ Yes] No	INVOICE TO

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAHs.	Copper	Zinc	Notes
LW-SB205-7-8	21	1/19/21	1105	Soil	1												Hold
LW-SB206-0-1	22	↓	1025	↓	↓								X	X			
LW-SB206-2-2.5	23		1030										X	X			
LW-SB206-5-6	24		1035											X			
LW-SB206-7-8	25		1040														Hold
LW-SB207-0.5-1	26		1005										X	X			
LW-SB207-1-2	27		1210										X	X			
LW-SB207-5-6	28		1215												●		~~Hold~~
LW-SB207-7-8	29		1220														Hold
LW-SB208-0.5-1.5	30	1/17/22	1435										X	X			

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: B Cl	Baxter Cole	Aspect	1/21/22	1500
Received by:	Liz Webber-Bruya	F&B	1/21/22	1500
Relinquished by:				
Received by:				

SAMPLE CHAIN OF CUSTODY

201301

ME 01-21-22

Page # 4 of 10 BE

~~Report To~~ Zanna Satterwhite

Company Aspect Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*) B Clr

PROJECT NAME GP West Lignin Site

PO # 210368

REMARKS

Project specific RLs? - [✓ Yes] / No

INVOICE TO

TURNAROUND TIME

☒ Standard turnaround

☐ RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

☒ Archive samples

☐ Other

Default: Dispose after 30 days

						ANALYSES REQUESTED													
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAH's	Copper	Zinc	Notes
LW-SB208-5.5-6.5	31	1/17/22	1440	~~1440~~ soil	1								X				
LW-SB208-11-12	32	↓	1445												●	●	~~Hold~~
LW-SB209-0-1	33	1/19/22	1220										X	X			
LW-SB209-2-2.5	34		1225										X	X			
LW-SB209-5-6	35		1230										X	●			
LW-SB209-7-8	36	↓	1235												●	●	~~Hold~~
LW-SB210-0-1	37	1/18/22	1105										X	X			
LW-SB210-2-2.5	38		1110										X	X			
LW-SB210-5-6	39		1115										X				
LW-SB210-8-8.5	40	↓	1120	↓	↓										●	●	~~Hold~~

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: B Clr	Baxter Clr	Aspect	1/21/22	1500
Received by:	Liz Webber-Bry	F?B	1/21/22	1500
Relinquished by:				
Received by:				

201301

Report To Zanna Satterwhite

Company Aspect Consulting

Address

City, State, ZIP

Phone Email

SAMPLE CHAIN OF CUSTODY

ME 01-21-22

SAMPLERS (*signature*) B Call [redacted]

Page # 5 of 10 BD4

PROJECT NAME GP West Lignin Parcel

PO # 210368

REMARKS

Project specific RLs? - [✓ Yes] No

INVOICE TO

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAH's	Copper	Zinc	Notes
LW-SB211-0-1	41	1/17/22	1205	Soil	1								X	X			
LW-SB211-6-7	42		1210										X				
LW-SB211-11-12	43		1215														Hold
LW-SB211-14-15	44		1220														Hold
LW-SB212-0.5-1.5	45		1405										X	X			
LW-SB212-5-6	46		1410										X				
LW-SB212-15-16	47		1415												●	●	~~Hold~~
LW-SB213-0.5-1.5	48		1350										X	X			
LW-SB213-6-7	49		1355										X				
LW-SB213-10-11	50		1400										X				

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: B Call	Baxter Call	Aspect	1/21/22	1500
Received by:	Liz Webber-Bruya	F&B	1/21/22	1500
Relinquished by:				
Received by:				

201301

SAMPLE CHAIN OF CUSTODY

ME 01-21-22

Page # 6 of 10BI4

Report To Zanna Satterwhite

Company Aspect Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (signature) B Call

PROJECT NAME GP West Lignin Parcel

PO # 210368

REMARKS

Project specific RLs? [✓ Yes] No

INVOICE TO

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED												
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAH's	Copper	Zinc	Notes
LW-SB214-0.5-1.5	51	1/19/22	1000	Soil	1								X	X			
LW-SB214-2-2.5	52	↓	1005	↓	↓								X	X			
LW-SB214-5-6	53		1010										X	X			
LW-SB214-6.5-7.5	54		1015														Hold
LW-SB215-0.5-1.5	55	1/17/22	1335										X	X			
LW-SB215-5-6	56	↓	1340										X				
LW-SB215-10-11	57		1345										X				
LW-SB215-12-13	58		1350														Hold
LW-SB216-0-1	59		1130										X	X			
LW-SB216-2.5-3.5	60		1135										X	X			

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Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: B Call	Baxter Call	Aspect	1/21/22	1500
Received by:	Liz Webber-Bruya	F.B	1/21/22	1500
Relinquished by:				
Received by:				

SAMPLE CHAIN OF CUSTODY

201301

ME 01-21-22

Page # 7 of 10 BI4

~~Report To~~ Zanna Satterwhite

Company Aspect Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*) B Call

PROJECT NAME GP west Lignin Parcel

PO # 210368

REMARKS

INVOICE TO

Project specific RLs? [✓ Yes] / No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAH's	Copper	Zinc	Notes
LW-SB216-7-8	61	1/17/22	1140	soil	1									●	●	●	~~Hold~~
LW-SB216-12-13	62	↓	1145	↓	↓												Hold
LW-SB216-19-20	63	↓	1235														Hold
LW-SB217-0-1	64	1/18/22	1045											X			
LW-SB217-1-1.5	65		1050										X	X			
LW-SB217-5-6	66		1055										X				
LW-SB217-7.5-8.5	67		1100														Hold
LW-SB218-0.5-1	68		1005											X			
LW-SB218-2-2.5	69		1010										X	X			
LW-SB218-5-6	70	↓	1015	↓	↓												Hold

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: B Call	Baxter Call	Aspect	1/21/22	1500
Received by:	Liz Webber-Bruya	F&B	1/21/22	1500
Relinquished by:				
Received by:				

201301

SAMPLE CHAIN OF CUSTODY

ME 01-21-22

Page # 8 of 10 BDI

Report To Zanna Satterwhite

Company Aspect Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (signature) B Carr

PROJECT NAME GP West Gym-Parcel

PO # 210368

REMARKS

INVOICE TO

Project specific RLs? - [✓ Yes] / No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAHs	Copper	Zinc	Notes
LW-SB218-8-9	71	1/18/22	1020	Soil	1								X				
LW-SB218-11-12	72	↓	1025										X				
LW-SB219-0-1	73	1/17/22	1520										X	X			
LW-SB219-5-6	74		1525										X				
LW-SB219-10-11	75		1530										X				
LW-SB219-13-14	76		1535										X				
LW-SB220-1-2	77		1055										X	X			
LW-SB220-5-6	78		1100										X				
LW-SB220-10-11	79		1105														Hold
LW-SB220-13-14	80	↓	1110	↓	↓												Hold

Friedman & Bruya, Inc.
Ph. (206) 285-8282

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	B Carr	Baxter Carr	Aspect	1/21/22	1500
Received by:		Liz Webber-Bruya	F? B	1/21/22	1500
Relinquished by:					
Received by:					

201301

SAMPLE CHAIN OF CUSTODY

MC 01-21-22

Page # 9 of 10 BI4

~~Report To~~ Zanna Satterwhite
Company Aspect Consulting
Address
City, State, ZIP
Phone Email

SAMPLERS (*signature*) B Call

PROJECT NAME GP West Lignin Parcel

PO # 210368

REMARKS

INVOICE TO

Project specific RLs? [✓ Yes] / No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAHs	Copper	Zinc	Notes
LW-SB221-0-1	81	1/20/22	1445	Soil	1								X	X			
LW-SB221-2-3	82		1450										X				
LW-SB221-5-6	83		1455										X				
LW-SB221-7-8	84		1500														Hold
LW-MW02-1-2	85		1125										X				
LW-MW02-5-6	86		1130										X				
LW-MW02-6-7	87		1135												●	●	~~Hold~~
LW-MW03-0-1	88		1245														Hold
LW-MW03-5-6	89		1250														Hold
LW-MW03-7.5-8.5	90		1255														Hold

Friedman & Bruya, Inc.
Ph. (206) 285-8282

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Baxter Call	Aspect	1/21/22	1500
Received by:		Liz Webber-Bruya	F&B	1/21/22	1500
Relinquished by:					
Received by:					

201301

SAMPLE CHAIN OF CUSTODY

ME 01-21-22

Page # 10 of 18 BIY

~~Report To~~ Zanna Satterwhite

Company Aspect Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*) B Cen

PROJECT NAME GP West Lignin Parcel

PO # 210368

REMARKS

INVOICE TO

Project specific RLs? - [✓ Yes] / No

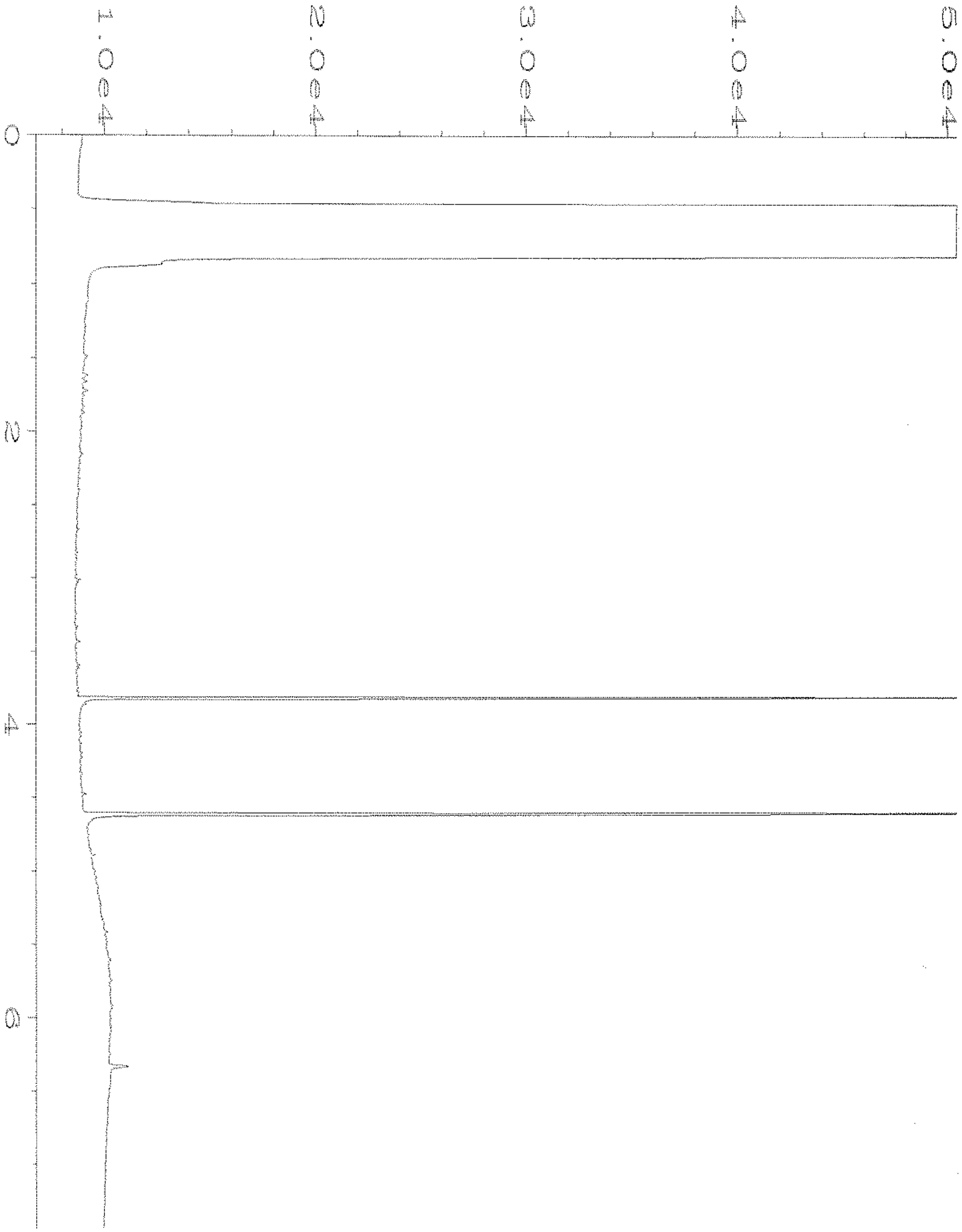
TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Archive samples
☐ Other
Default: Dispose after 30 days

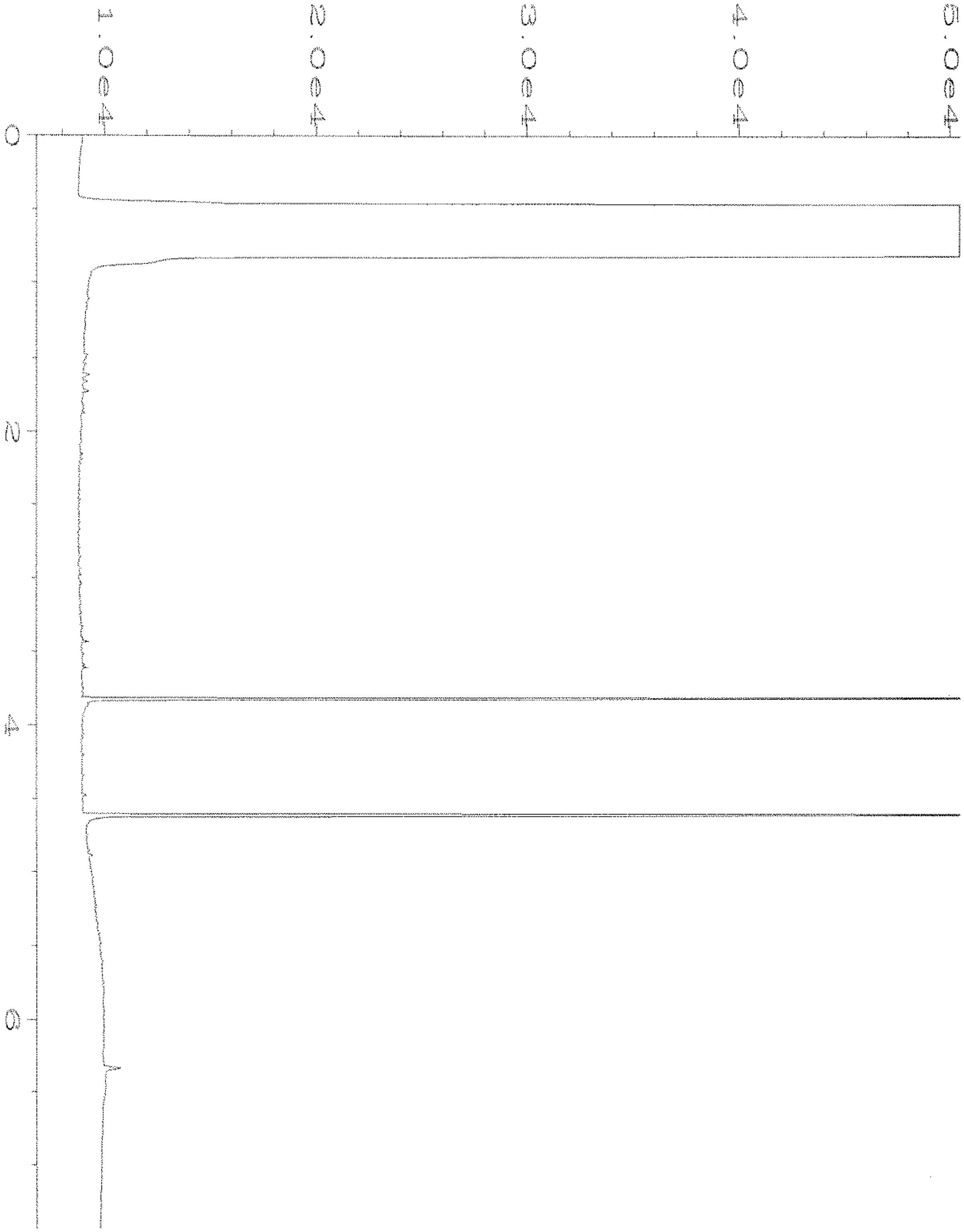
						ANALYSES REQUESTED													
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cr, Cu, Zn	low level PAH's	Copper	Zinc	Notes
LW-MW03-10-11	91	1/20/22	1300	Soil	1												Hold
LW-MW03-12-13	92	↓	1305	↓	↓												Hold
LW-MW04-0-1	93	↓	1105	↓	↓	X						BC	~~X~~	X			
LW-MW04-5-6	94AB	↓	1110	↓	2	X						BC	~~X~~	X			rec 2 Jars EUB
LW-MW04-7.5-8.5	95	↓	1115	↓	↓	X						BC	~~X~~	X			
LW-MW04-10-11	96	↓	1120	↓	↓												Hold
LW-SB208-14-15	97																

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: B Cen	Baxter Cen	Aspect	1/21/22	1500
Received by:	Liz Webber-Bruya	F:B	1/21/22	1500
Relinquished by:				
Received by:				



```
Data File Name    : C:\HPCHEM\1\DATA\01-25-22\010F0301.D
Operator          : TL                              Page Number       : 1
Instrument        : GC1                             Vial Number       : 10
Sample Name       : 201301-~~03~~ 93 JL0126         Injection Number : 1
Run Time Bar Code:                                  Sequence Line     : 3
Acquired on       : 25 Jan 22   09:02 AM            Instrument Method: DX.MTH
Report Created on: 26 Jan 22   08:34 AM             Analysis Method   : DX.MTH
```



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Data File Name    : C:\HPCHEM\1\DATA\01-25-22\011F0301.D
Operator          : TL                               Page Number        : 1
Instrument        : GC1                              Vial Number        : 11
Sample Name       : 201301-~~04~~                    Injection Number   : 1
Run Time Bar Code:          94 tw01.26               Sequence Line      : 3
Acquired on       : 25 Jan 22   09:16 AM             Instrument Method: DX.MTH
Report Created on: 26 Jan 22   08:34 AM              Analysis Method   : DX.MTH
```
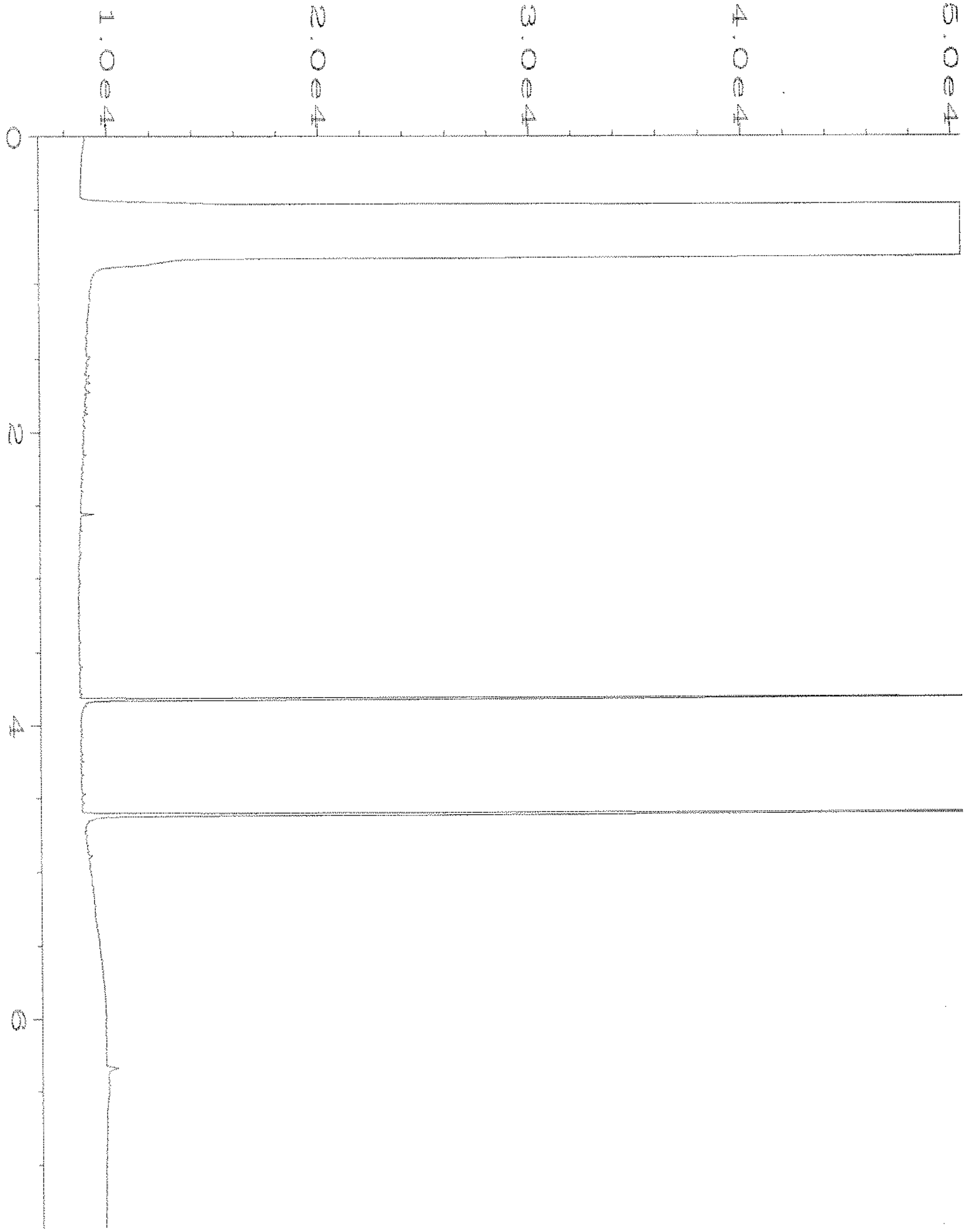
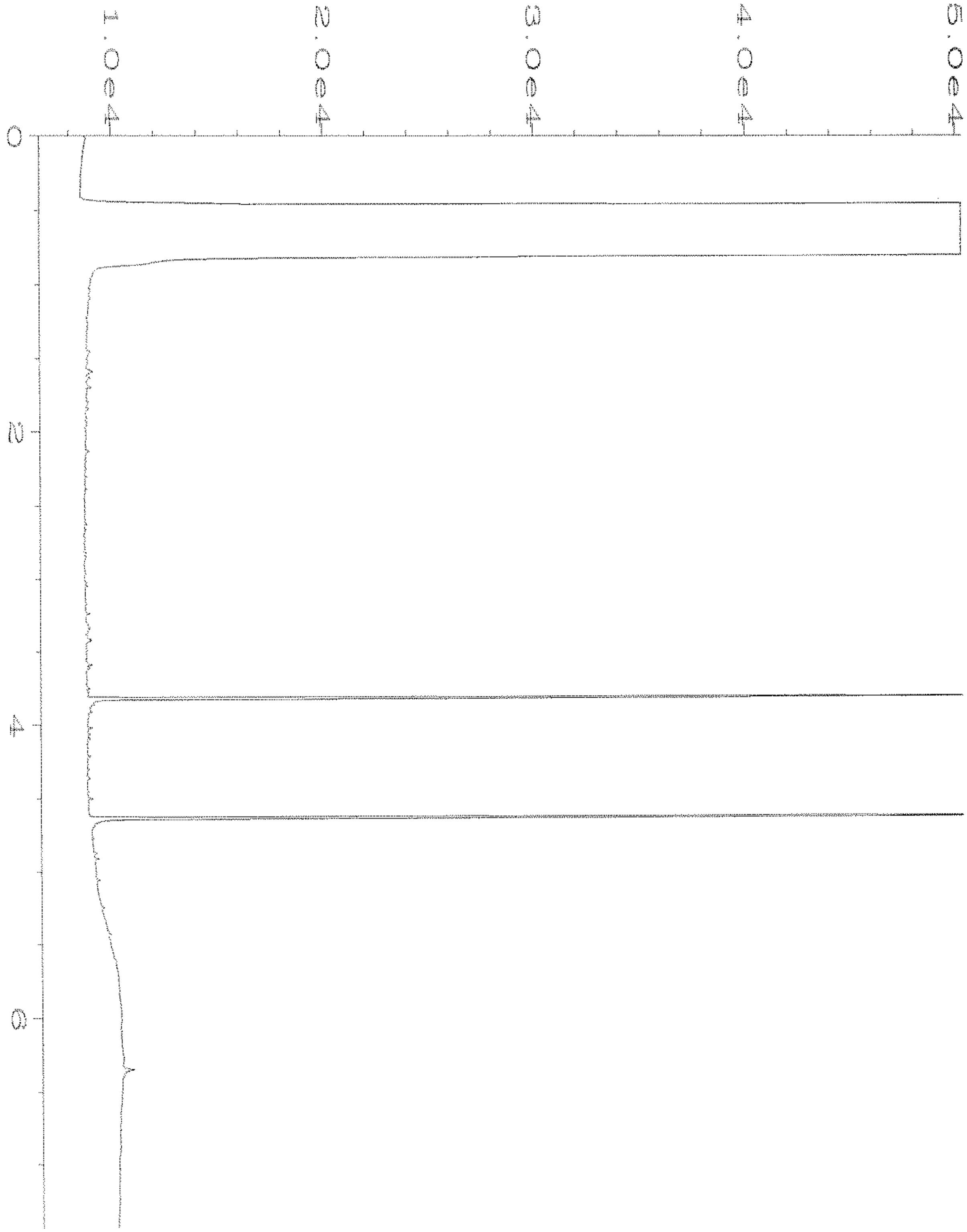
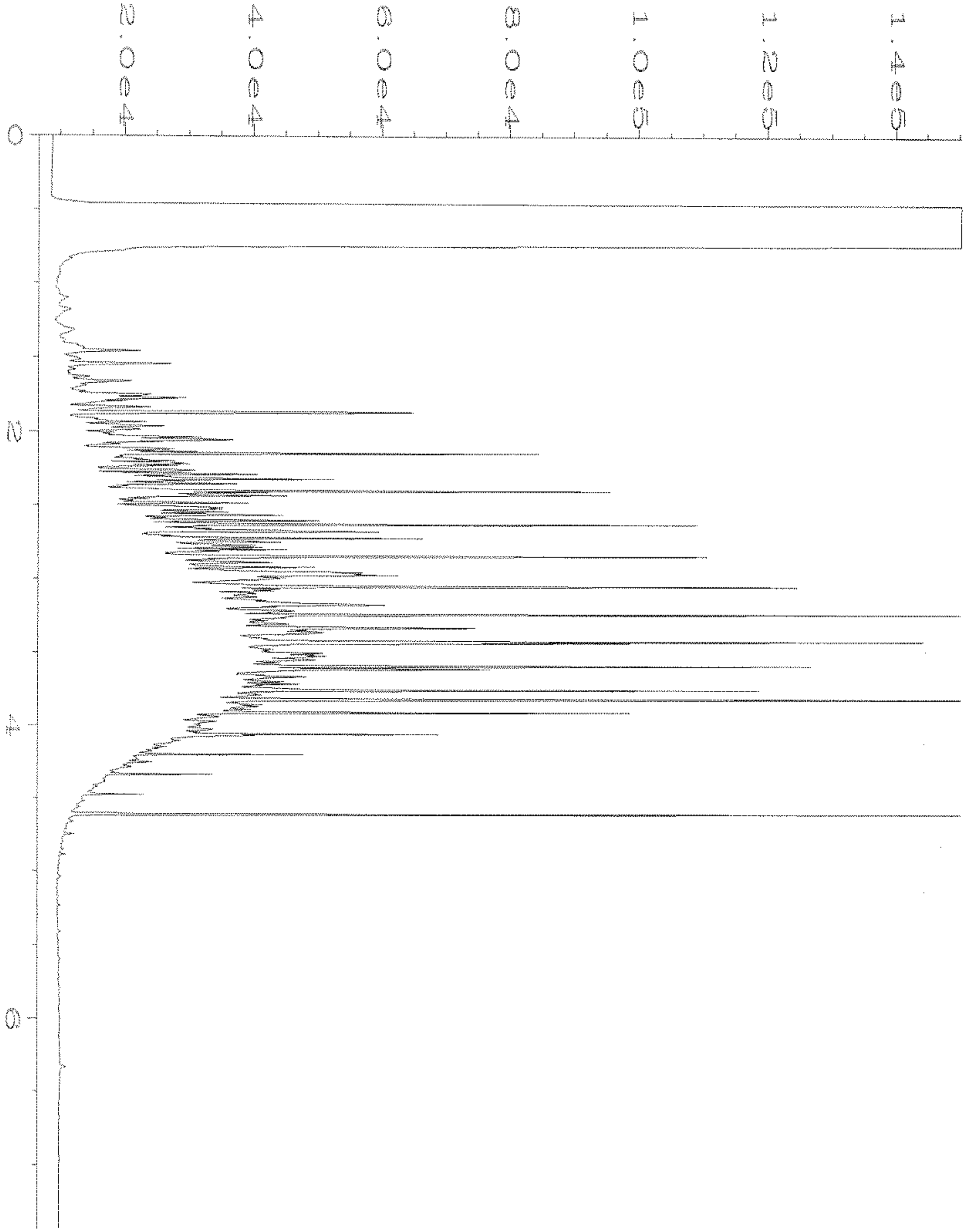



Data File Name : C:\HPCHEM\1\DATA\01-25-22\012F0301.D
Operator : TL
Instrument : GC1
Sample Name : 201301-~~05~~ 95 JC01.26
Run Time Bar Code:
Acquired on : 25 Jan 22 09:31 AM
Report Created on: 26 Jan 22 08:34 AM

Page Number : 1
Vial Number : 12
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DX.MTH



```
Data File Name    : C:\HPCHEM\1\DATA\01-25-22\006F0301.D
Operator          : TL                            Page Number       : 1
Instrument        : GC1                           Vial Number       : 6
Sample Name       : 02-243 mb                     Injection Number : 1
Run Time Bar Code:                                Sequence Line     : 3
Acquired on       : 25 Jan 22   08:10 AM          Instrument Method: DX.MTH
Report Created on: 26 Jan 22   08:34 AM           Analysis Method   : DX.MTH
```



```
Data File Name    : C:\HPCHEM\1\DATA\01-25-22\003F0201.D
Operator          : TL                               Page Number       : 1
Instrument        : GC1                              Vial Number       : 3
Sample Name       : 500 Dx 65-27F                    Injection Number : 1
Run Time Bar Code:                                   Sequence Line     : 2
Acquired on       : 25 Jan 22  06:16 AM              Instrument Method: DX.MTH
Report Created on: 26 Jan 22  08:34 AM               Analysis Method   : DX.MTH
```

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

February 4, 2022

Zanna Satterwhite, Project Manager
Aspect Consulting, LLC
710 2nd Ave S, Suite 550
Seattle, WA 98104

Dear Ms Satterwhite:

Included are the results from the testing of material submitted on January 26, 2022 from the Lignin Parcel 210368, F&BI 201370 project. There are 15 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Aspect Data
ASP0204R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 26, 2022 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Lignin Parcel 210368, F&BI 201370 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
201370 -01	LW-MW-03-01242022
201370 -02	LW-MW-02-01242022
201370 -03	LW-MW-01-01252022
201370 -04	LW-MW-04-01252022

The 1631E matrix spike and matrix spike duplicate failed the relative percent difference for mercury. The analyte was not detected therefore the data were acceptable.

All other quality control requirements were acceptable.

Date of Report: 02/04/22
Date Received: 01/26/22
Project: Lignin Parcel 210368, F&BI 201370
Date Extracted: 01/27/22
Date Analyzed: 01/27/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
LW-MW-04-01252022 201370-04	1,100 x	940 x	115
Method Blank 02-250 MB	<50	<250	118

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	LW-MW-03-01242022	Client:	Aspect Consulting, LLC
Date Received:	01/26/22	Project:	Lignin Parcel 210368, F&BI 201370
Date Extracted:	02/02/22	Lab ID:	201370-01
Date Analyzed:	02/02/22	Data File:	201370-01.052
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	53.0
Copper	<3
Zinc	<5

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	LW-MW-02-01242022	Client:	Aspect Consulting, LLC
Date Received:	01/26/22	Project:	Lignin Parcel 210368, F&BI 201370
Date Extracted:	02/02/22	Lab ID:	201370-02
Date Analyzed:	02/02/22	Data File:	201370-02.053
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	465
Copper	<3
Zinc	<5

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	LW-MW-01-01252022	Client:	Aspect Consulting, LLC
Date Received:	01/26/22	Project:	Lignin Parcel 210368, F&BI 201370
Date Extracted:	02/02/22	Lab ID:	201370-03
Date Analyzed:	02/02/22	Data File:	201370-03.054
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	16.7
Copper	<3
Zinc	<5

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	LW-MW-04-01252022	Client:	Aspect Consulting, LLC
Date Received:	01/26/22	Project:	Lignin Parcel 210368, F&BI 201370
Date Extracted:	02/02/22	Lab ID:	201370-04
Date Analyzed:	02/02/22	Data File:	201370-04.055
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	3.51
Copper	<3
Zinc	<5

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	Lignin Parcel 210368, F&BI 201370
Date Extracted:	02/02/22	Lab ID:	I2-94 mb
Date Analyzed:	02/02/22	Data File:	I2-94 mb.041
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	<1
Copper	<3
Zinc	<5

Date of Report: 02/04/22
Date Received: 01/26/22
Project: Lignin Parcel 210368, F&BI 201370
Date Extracted: 01/27/22
Date Analyzed: 01/28/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED MERCURY USING EPA METHOD 1631E

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Dissolved Mercury
LW-MW-03-01242022 201370-01	<0.01
LW-MW-02-01242022 201370-02	<0.01
LW-MW-01-01252022 201370-03	<0.01
LW-MW-04-01252022 201370-04	<0.01
Method Blank i2-73 MB	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	LW-MW-04-01252022	Client:	Aspect Consulting, LLC
Date Received:	01/26/22	Project:	Lignin Parcel 210368, F&BI 201370
Date Extracted:	01/28/22	Lab ID:	201370-04 1/0.25
Date Analyzed:	01/31/22	Data File:	013116.D
Matrix:	Water	Instrument:	GCMS12
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	8 vo	11	65
Phenol-d6	5 vo	11	65
Nitrobenzene-d5	51	50	150
2-Fluorobiphenyl	51	44	108
2,4,6-Tribromophenol	66	10	140
Terphenyl-d14	63	50	150

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.05
2-Methylnaphthalene	<0.05
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.005
Acenaphthene	0.055
Fluorene	0.029
Phenanthrene	<0.005
Anthracene	<0.005
Fluoranthene	0.0096
Pyrene	0.011
Benz(a)anthracene	<0.005
Chrysene	<0.005
Benzo(a)pyrene	<0.005
Benzo(b)fluoranthene	<0.005
Benzo(k)fluoranthene	<0.005
Indeno(1,2,3-cd)pyrene	<0.005
Dibenz(a,h)anthracene	<0.005
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Lignin Parcel 210368, F&BI 201370
Date Extracted:	01/28/22	Lab ID:	02-260 mb2 1/0.25
Date Analyzed:	01/31/22	Data File:	013115.D
Matrix:	Water	Instrument:	GCMS12
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	13	11	65
Phenol-d6	8 vo	11	65
Nitrobenzene-d5	91	50	150
2-Fluorobiphenyl	89	44	108
2,4,6-Tribromophenol	82	10	140
Terphenyl-d14	99	50	150

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.05
2-Methylnaphthalene	<0.05
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.005
Acenaphthene	<0.005
Fluorene	<0.005
Phenanthrene	<0.005
Anthracene	<0.005
Fluoranthene	<0.005
Pyrene	<0.005
Benz(a)anthracene	<0.005
Chrysene	<0.005
Benzo(a)pyrene	<0.005
Benzo(b)fluoranthene	<0.005
Benzo(k)fluoranthene	<0.005
Indeno(1,2,3-cd)pyrene	<0.005
Dibenz(a,h)anthracene	<0.005
Benzo(g,h,i)perylene	<0.01

Date of Report: 02/04/22
Date Received: 01/26/22
Project: Lignin Parcel 210368, F&BI 201370

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	108	108	63-142	0

Date of Report: 02/04/22
Date Received: 01/26/22
Project: Lignin Parcel 210368, F&BI 201370

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 200.8

Laboratory Code: 201370-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Chromium	ug/L (ppb)	20	3.51	93	91	70-130	2
Copper	ug/L (ppb)	20	<5	90	89	70-130	1
Zinc	ug/L (ppb)	50	<5	91	90	70-130	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	ug/L (ppb)	20	95	85-115
Copper	ug/L (ppb)	20	95	85-115
Zinc	ug/L (ppb)	50	98	85-115

Date of Report: 02/04/22
Date Received: 01/26/22
Project: Lignin Parcel 210368, F&BI 201370

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED MERCURY USING EPA METHOD 1631E

Laboratory Code: 201370-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	ug/L (ppb)	0.01	<0.01	88	71	71-125	21 vo

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Mercury	ug/L (ppb)	0.01	96	90	78-125	7

Date of Report: 02/04/22
Date Received: 01/26/22
Project: Lignin Parcel 210368, F&BI 201370

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: 201356-02 1/0.5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	2.5	<0.1	78	71	50-150	9
2-Methylnaphthalene	ug/L (ppb)	2.5	<0.1	82	79	50-150	4
1-Methylnaphthalene	ug/L (ppb)	2.5	<0.1	84	82	50-150	2
Acenaphthylene	ug/L (ppb)	2.5	<0.01	84	86	50-150	2
Acenaphthene	ug/L (ppb)	2.5	<0.01	87	88	50-150	1
Fluorene	ug/L (ppb)	2.5	<0.01	93	95	50-150	2
Phenanthrene	ug/L (ppb)	2.5	<0.01	90	92	50-150	2
Anthracene	ug/L (ppb)	2.5	<0.01	89	92	50-150	3
Fluoranthene	ug/L (ppb)	2.5	<0.01	91	97	50-150	6
Pyrene	ug/L (ppb)	2.5	<0.01	98	92	50-150	6
Benz(a)anthracene	ug/L (ppb)	2.5	<0.01	95	97	50-150	2
Chrysene	ug/L (ppb)	2.5	<0.01	94	97	50-150	3
Benzo(a)pyrene	ug/L (ppb)	2.5	<0.01	87	91	50-150	4
Benzo(b)fluoranthene	ug/L (ppb)	2.5	<0.01	94	96	50-150	2
Benzo(k)fluoranthene	ug/L (ppb)	2.5	<0.01	91	100	50-150	9
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	2.5	<0.01	109	109	50-150	0
Dibenz(a,h)anthracene	ug/L (ppb)	2.5	<0.01	113	114	50-150	1
Benzo(g,h,i)perylene	ug/L (ppb)	2.5	<0.02	113	114	50-150	1

Laboratory Code: Laboratory Control Sample 1/0.5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Naphthalene	ug/L (ppb)	2.5	87	62-90
2-Methylnaphthalene	ug/L (ppb)	2.5	88	64-93
1-Methylnaphthalene	ug/L (ppb)	2.5	91	64-93
Acenaphthylene	ug/L (ppb)	2.5	93	70-130
Acenaphthene	ug/L (ppb)	2.5	96	70-130
Fluorene	ug/L (ppb)	2.5	103	70-130
Phenanthrene	ug/L (ppb)	2.5	97	70-130
Anthracene	ug/L (ppb)	2.5	96	70-130
Fluoranthene	ug/L (ppb)	2.5	98	70-130
Pyrene	ug/L (ppb)	2.5	95	70-130
Benz(a)anthracene	ug/L (ppb)	2.5	98	70-130
Chrysene	ug/L (ppb)	2.5	98	70-130
Benzo(a)pyrene	ug/L (ppb)	2.5	89	70-130
Benzo(b)fluoranthene	ug/L (ppb)	2.5	95	70-130
Benzo(k)fluoranthene	ug/L (ppb)	2.5	94	70-130
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	2.5	113	70-130
Dibenz(a,h)anthracene	ug/L (ppb)	2.5	121	70-130
Benzo(g,h,i)perylene	ug/L (ppb)	2.5	122	70-130

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

201370 [redacted]

SAMPLE CHAIN OF CUSTODY

01-26-22 [redacted] D03/AI3

Report To Zanna Satterwhite

Company Aspect

Address zsatterwhite@aspectconsulting.com

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME	PO #
Lignin Parcel	210368
REMARKS Project specific RLs? [✓ Yes] / No	INVOICE TO

Page # 1 of 1

TURNAROUND TIME
☐ Standard turnaround
☐ RUSH
Rush charges authorized by:

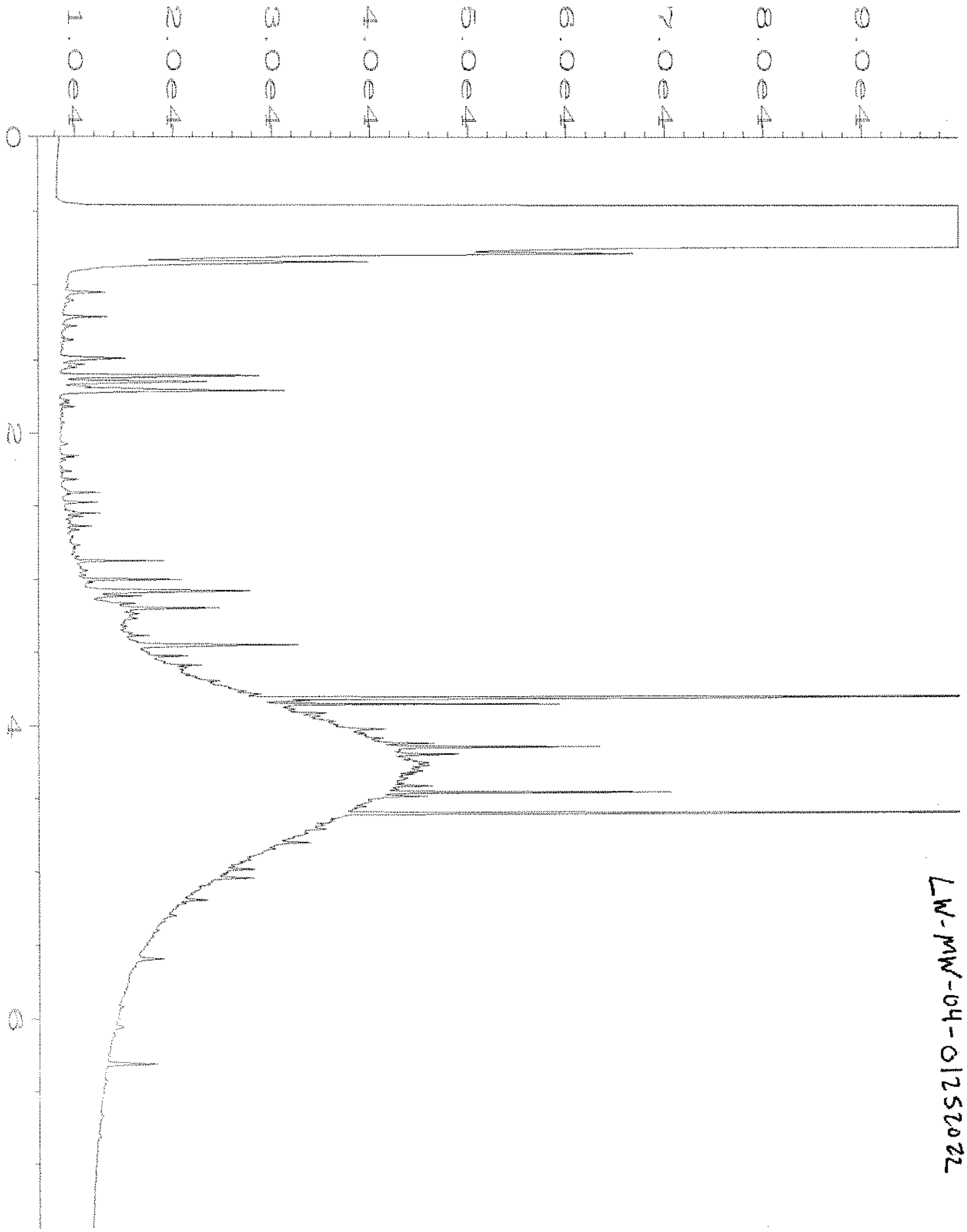
SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Cu, Zn, Cr in HNO3 *	Hg in Cl *	TPH-Dx	SIM-PAHs	* Dissolved Notes
LW-MW-03-01242022	01A-B	1/24	13:00	ground water	2								1	1			filtered
LW-MW-02-01242022	02	1/24	16:00	"	2								1	1			filtered
LW-MW-01-01252022	03 ↓	1/25	09:00	"	2								1	1			filtered
LW-MW-04-01252022	04A-E	1/25	1200	"	5								1	1	1	2	metals filtered TPH/PAHs NOT

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:				
Received by: Tokala C.	Tokala Christensen	F+B	01/26/22	13:09
Relinquished by:				
Received by:			Samples received at 4 °C	

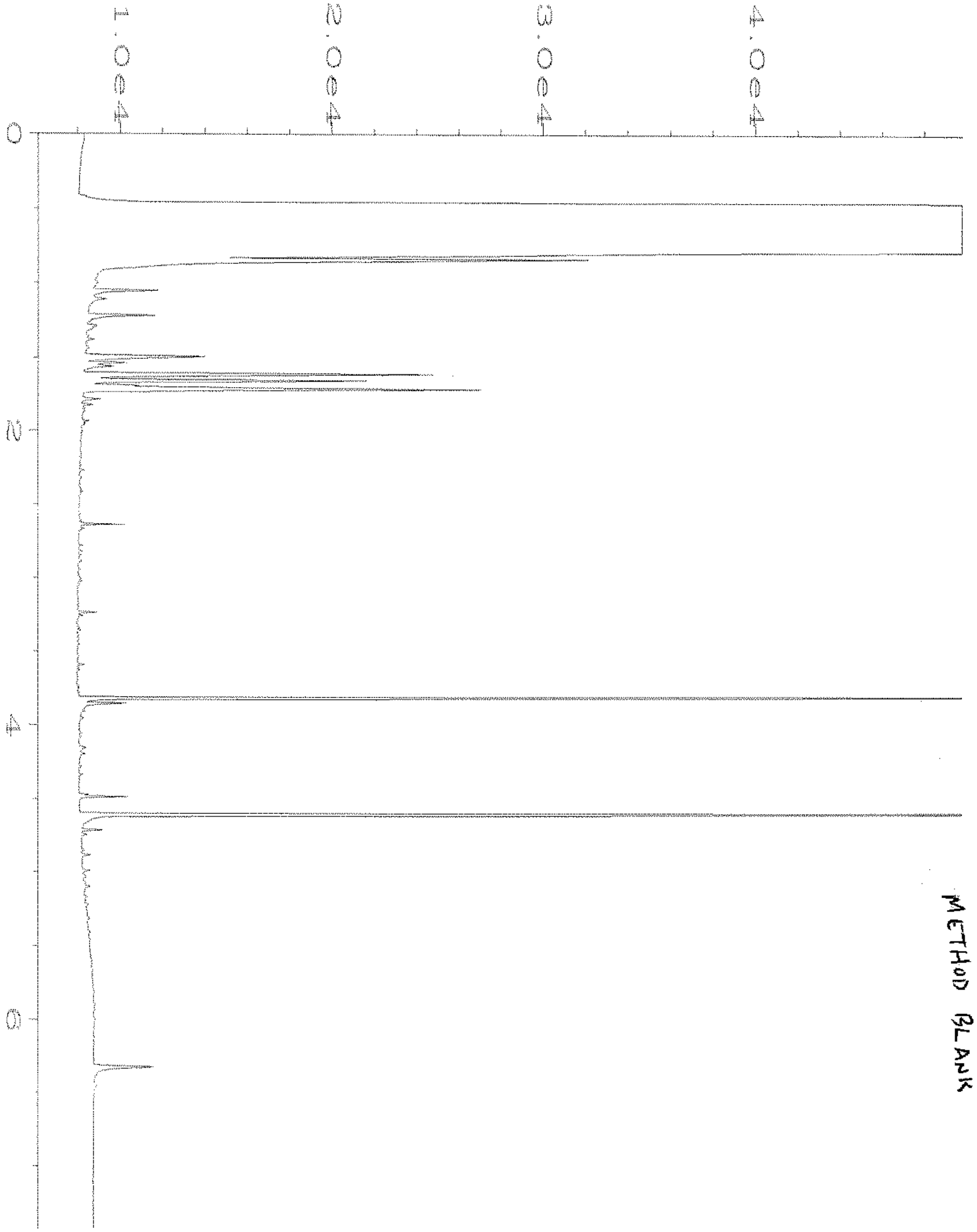
Use project-specific RLs emailed to F+B on 1/21/22



LW-MW-04-012522

Data File Name : C:\HPCHEM\1\DATA\01-27-22\050F1201.D
Operator : TL
Instrument : GC1
Sample Name : 201370-04
Run Time Bar Code:
Acquired on : 27 Jan 22 09:59 PM
Report Created on: 28 Jan 22 11:27 AM

Page Number : 1
Vial Number : 50
Injection Number : 1
Sequence Line : 12
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



METHOD BLANK

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Data File Name    : C:\HPCHEM\1\DATA\01-27-22\030F1001.D
Operator          : TL                              Page Number      : 1
Instrument        : GC1                             Vial Number      : 30
Sample Name       : 02-250 mb                       Injection Number : 1
Run Time Bar Code:                                  Sequence Line    : 10
Acquired on       : 27 Jan 22   04:40 PM            Instrument Method: DX.MTH
Report Created on: 28 Jan 22   11:27 AM             Analysis Method  : DEFAULT.MTH
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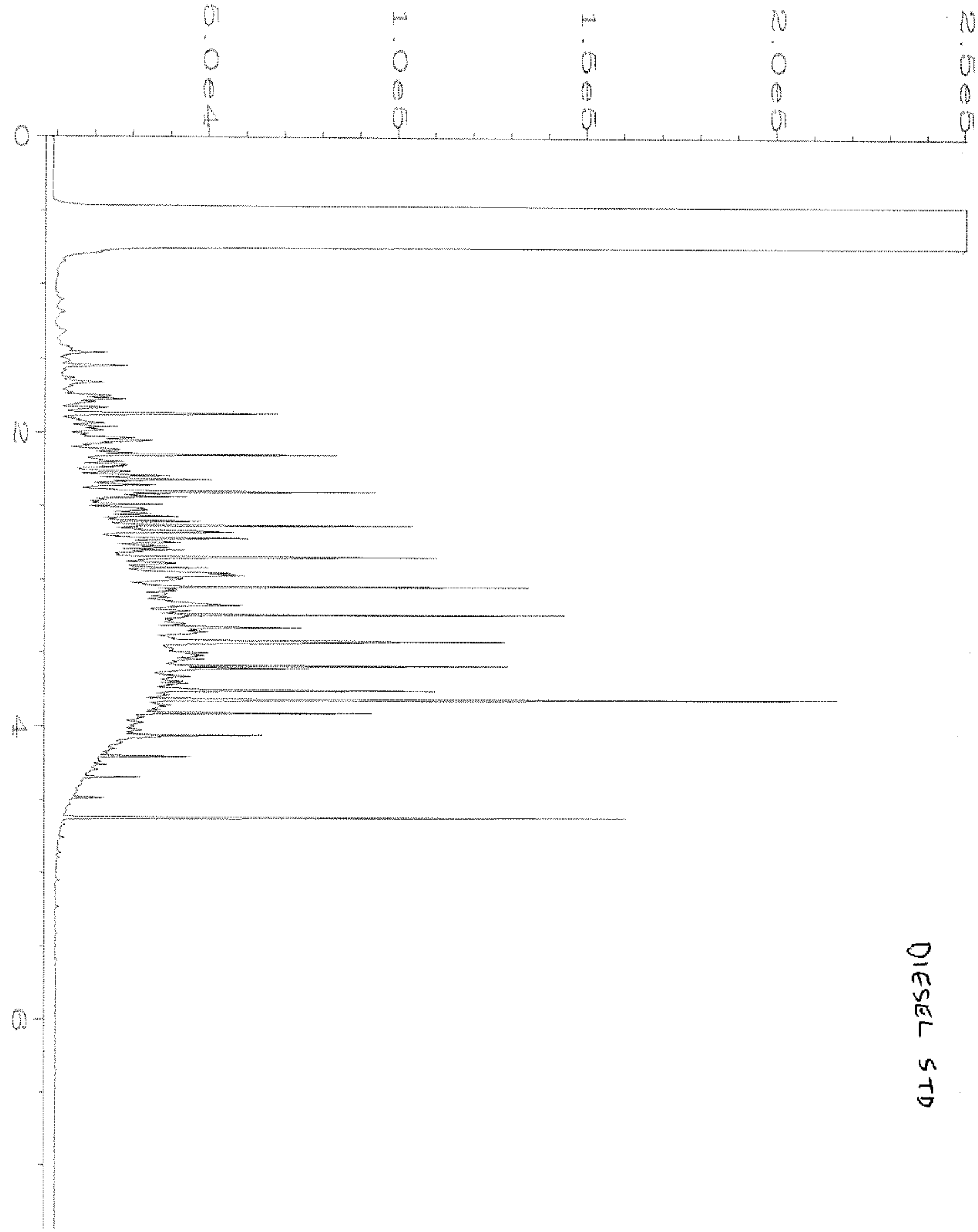

DIESEL STD

Data File Name : C:\HPCHEM\1\DATA\01-27-22\003F0201.D
Operator : TL
Instrument : GC1
Sample Name : 500 Dx 65-27F
Run Time Bar Code:
Acquired on : 27 Jan 22 05:46 AM
Report Created on: 28 Jan 22 11:27 AM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 2
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

APPENDIX C

Aquifer Hydraulic Testing Methods and Results

C. Aquifer Hydraulic Testing Methods and Results

This appendix describes the methods and results conducted to document hydraulic characteristics of the shallow water-bearing unit on the Lignin Parcel. The hydraulic data were collected to assist the Port of Bellingham's selected cleanup construction contractor with design of their excavation dewatering approach as needed. The testing included both continuous water level monitoring in four shallow monitoring wells on the Lignin Parcel (LW-MW01 through LW-MW04) as well hydraulic conductivity (K) testing (slug testing) of the four wells. Each data collection activity is described below.

C.1. Continuous Water Level Monitoring

Continuous water level monitoring was performed for 9 days in the four Lignin Parcel wells LW-MW01 through LW-MW04 to document groundwater elevations and the magnitude of tidal influence, if any, on them. The monitoring wells were equipped with a downhole pressure transducer/data logger to allow automated collection of water level data on a 1-hour interval throughout the 9-day monitoring period. The data loggers were deployed on January 25, 2022, and were retrieved on February 3, 2022. A barometric pressure data logger was also installed on site to allow the water level data to be corrected for changes in atmospheric pressure throughout the study. Figure C.1 depicts the continuous water level data from the four wells.

The continuous groundwater elevation data show a consistent gradient in a mill-northwest direction (higher groundwater elevations at wells LW-MW02 and LW-MW03 than at LW-MW01 and LW-MW04; also see Figure 5 in the main body of this report).

The Lignin Parcel is located approximately 1,000 feet inland from the Whatcom Waterway and the water level monitoring data show no discernable tidal influence in any of the four wells. This finding is consistent with information collected during the GP West Site Remedial Investigation, which did not observe tidal influence in Fill Unit monitoring wells at distances greater than 400 feet inland (Aspect, 2013).

Over the period of monitoring, the water level data from each of the four wells show a relatively consistent declining trend, punctuated by a short-term water level rise in the middle of the day on January 30, 2022. As plotted on Figure C.1, a small amount of precipitation fell in Bellingham on January 30 for the first time in more than a week, which may explain the rise. However, the water level rise was temporary and water levels subsequently continued the declining trend as precipitation continued. Water levels in wells LW-MW01 and LW-MW04 both showed a rise in the last few hours of the monitoring period on February 3 when greater than 0.2 inch of precipitation fell in Bellingham.

C.2. Hydraulic Conductivity Testing

Slug tests were performed in the four Lignin Parcel wells to estimate the hydraulic conductivity (K) of the shallow water-bearing materials. The test method involved quickly displacing a volume of water within a well and measuring water level recovery rate consistent with the methods described in Appendix A to the Pre-Remedial Design Investigation Project Plan (Aspect, 2021), including conducting three replicate tests in each well. Analytical methods were then used to estimate hydraulic conductivity of the soil from the recorded water level data.

Figures C.2 through C.5 present the normalized water level displacement[1] versus time for slug tests conducted in wells LW-MW01 through LW-MW04, respectively. Table C.1 presents the K estimates from each test in each well, as well as the average (geometric mean) K value for each well based on the three replicate tests. Table C.1 also presents a geometric mean K value for the Lignin Parcel shallow water-bearing materials based on K estimates from the four individual wells.

Based on the slug testing results, the K estimates for the four well locations range from 2 to 16 feet/day (6×10^{-4} to 6 to 10^{-3} cm/sec) with a site-wide mean of 5 feet/day (2×10^{-3} cm/sec). The estimates are consistent with predominantly silty to non-silty sand observed within the screened interval depths of the wells as noted in the last row on Table C.1.

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[1] Ratio of water level change from static at a given time divided by the total water level displacement achieved for the test (dimensionless number).

Table C.1. Hydraulic Conductivity Estimates from Slug Tests

210368-A Lignin Operable Unit, GP West Site, Port of Bellingham

Monitoring Well	LW-MW01			LW-MW02			LW-MW03			LW-MW04		
Well Depth in Feet	13.0			15.0			15.0			13.0		
Screen Length in Feet	10.0			10.0			10.0			10.0		
Depth to Screen in Feet	3.0			5.0			5.0			3.0		
Depth to Aquitard in Feet (estimated)	37			48			36			34		
Depth to Water in Feet bTOC	2.91			5.64			3.49			2.97		
Depth to Sandpack in Feet	2.5			4.0			4.0			2.0		
Slug Displacement (Ho) in Feet	1.00	1.00	0.57	0.97	0.94	0.78	1.06	1.04	0.52	0.55	0.55	0.55
Porosity (n)	0.30			0.30			0.30			0.30		
Radius of Casing (rc) in Feet	0.08			0.08			0.08			0.08		
Radius of Borehole (rw) in Feet	0.35			0.16			0.16			0.16		
Saturated Aquifer Thickness (H) in Feet	**34**			**42**			**33**			**31**		
Saturated Well Thickness (Lw) in Feet	**10.1**			**9.4**			**11.5**			**10.0**		
Effective Radius (reff) in Feet	**0.21**			**0.11**			**0.08**			**0.11**		
Effective Screen Length (Le) in Feet	**10.0**			**9.4**			**10.0**			**10.0**		
Slug Size	*2.5' x1.7"*	*2.5' x1.7"*	*1.5' x1"*	*2.5' x1.7"*	*2.5' x1.7"*	*1.5' x1"*	*2.5' x1.7"*	*2.5' x1.7"*	*1.5' x1"*	*2.5' x1.7"*	*2.5' x1.7"*	*1.5' x1"*
Rising/Falling Head Test	*Rising*	*Rising*	*Rising*	*Rising*	*Rising*	*Falling*	*Rising*	*Rising*	*Rising*	*Rising*	*Rising*	*Rising*
Fully Submerged Sandpack	*No*	*No*	*No*	*No*	*No*	*No*	*No*	*No*	*No*	*No*	*No*	*No*
Transiently Exposed Sandpack	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Transiently Exposed Screen	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*No*	*No*	*Yes*	*Yes*	*Yes*
Partially Submerged Screen	*No*	*No*	*No*	*Yes*	*Yes*	*Yes*	*No*	*No*	*No*	*No*	*No*	*No*
Bouwer and Rice Analysis Parameters												
Normalized Head at t1 (y1) in Feet	**0.30**	**0.26**	**0.30**	**0.16**	**0.20**	**0.21**	**0.35**	**0.42**	**0.30**	**0.33**	**0.31**	**0.31**
Time - t1 in Seconds	**27**	**32**	**27**	**29**	**25**	**16**	**40**	**35**	**43**	**29**	**32**	**31**
Normalized Head at t2 (y2) in Feet	**0.15**	**0.16**	**0.15**	**0.06**	**0.10**	**0.11**	**0.20**	**0.20**	**0.15**	**0.20**	**0.21**	**0.20**
Time - t2 in Seconds	**47**	**46**	**49**	**54**	**45**	**34**	**68**	**73**	**74**	**45**	**46**	**45**
Le/rw	**28.2**			**59.9**			**64.0**			**64.0**		
Calculated K in cm/sec	**6.0E-03**	**5.7E-03**	**5.6E-03**	**2.1E-03**	**1.9E-03**	**2.0E-03**	**5.9E-04**	**5.8E-04**	**6.6E-04**	**1.7E-03**	**1.5E-03**	**1.6E-03**
Calculated K in ft/day	**17**	**16**	**16**	**6.0**	**5.3**	**5.7**	**1.7**	**1.6**	**1.9**	**4.7**	**4.4**	**4.5**
Geometric Mean K in ft/day	**16**			**6**			**2**			**5**		
Site Geometric Mean K in ft/day	**5**											
Screened Interval Soil Type	SP + GW			SM + SP-SM			SP-SM + CL			SP-SM + CL		

Notes:

Data analysis by method of Bouwer and Rice (1976; 1989) or Butler-Garnett (2000).

For each well, analyses are run for three individual tests.

Bold values are entered from field data and other values are calculated.

All depths are below ground surface

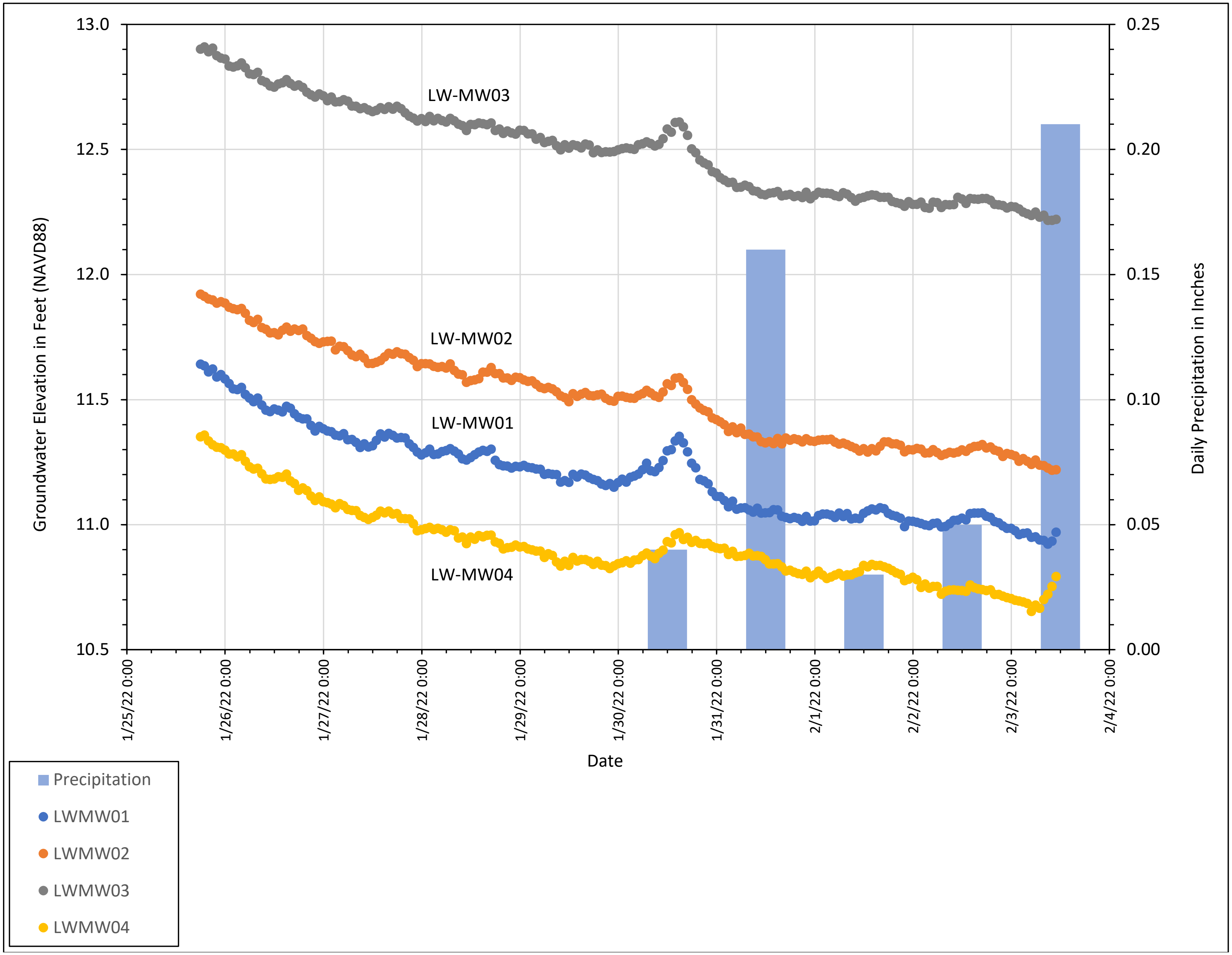

Figure C-1

Water Level Hydrographs, Jan. 25 - Feb 4, 2022

Engineering Design Report
Lignin Parcel, Bellingham, WA

Aspect Consulting
6/26/2022
S:\Port of Bellingham\Lignin Parcel Affordable Housing 210368-A\Report Drafts\2022_02 Lignin Engineering Design Report\Appendices\App C Hydraulic Testing Analysis\Fig C-1 Four well hydrographs

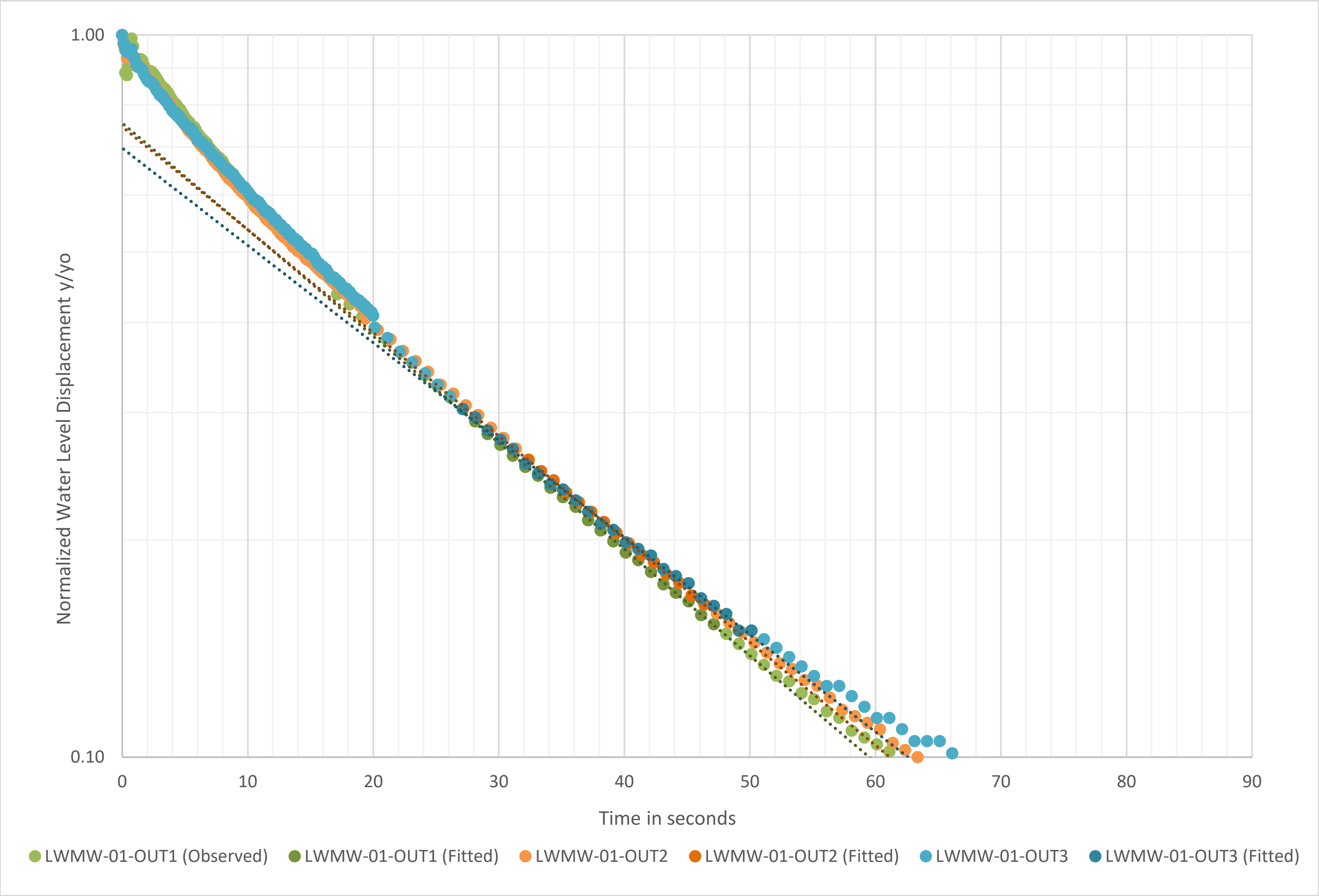

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Figure C.2
LW-MW01 Slug Response

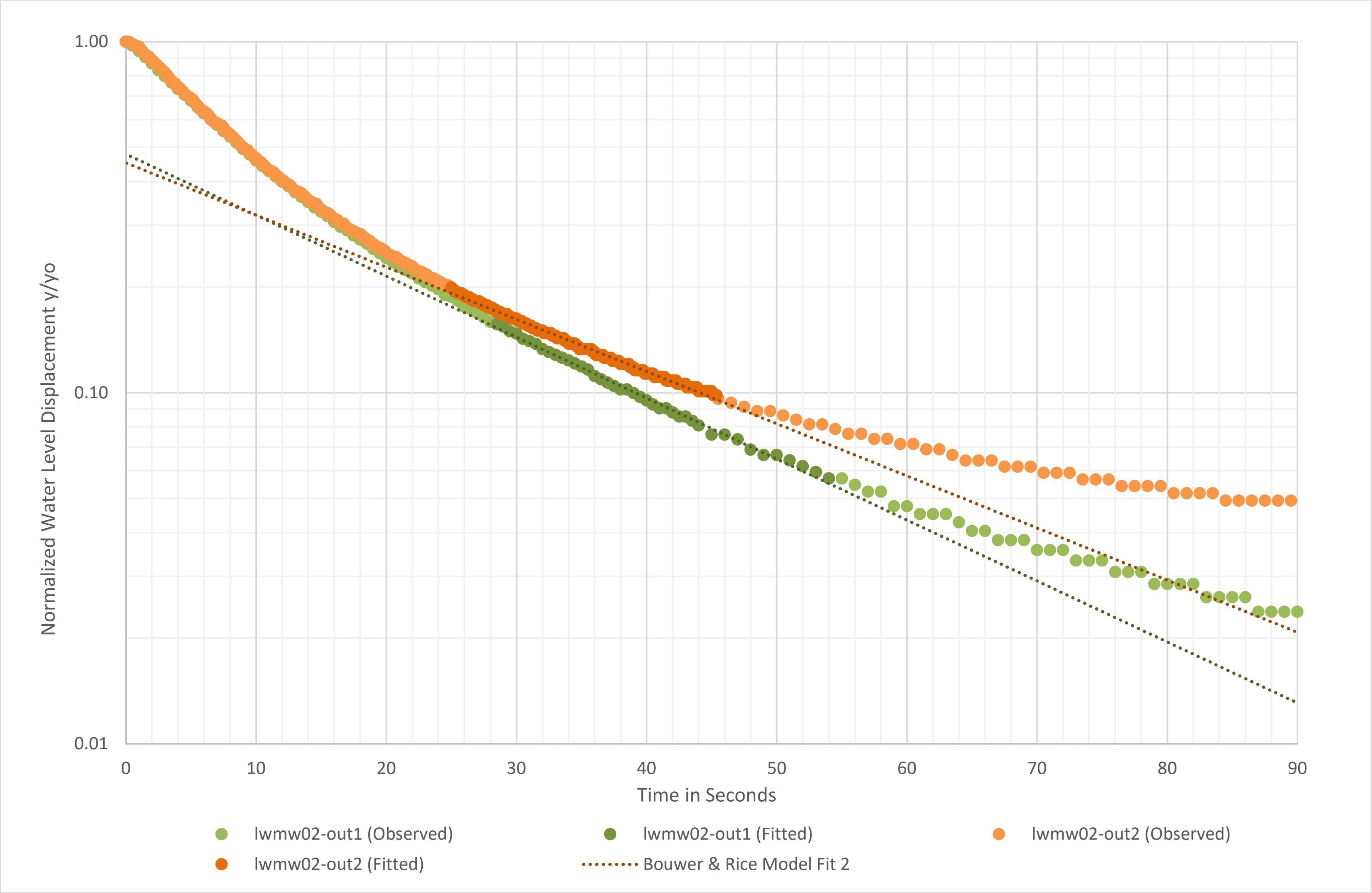

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Figure C.3
LW-MW02 Slug Response

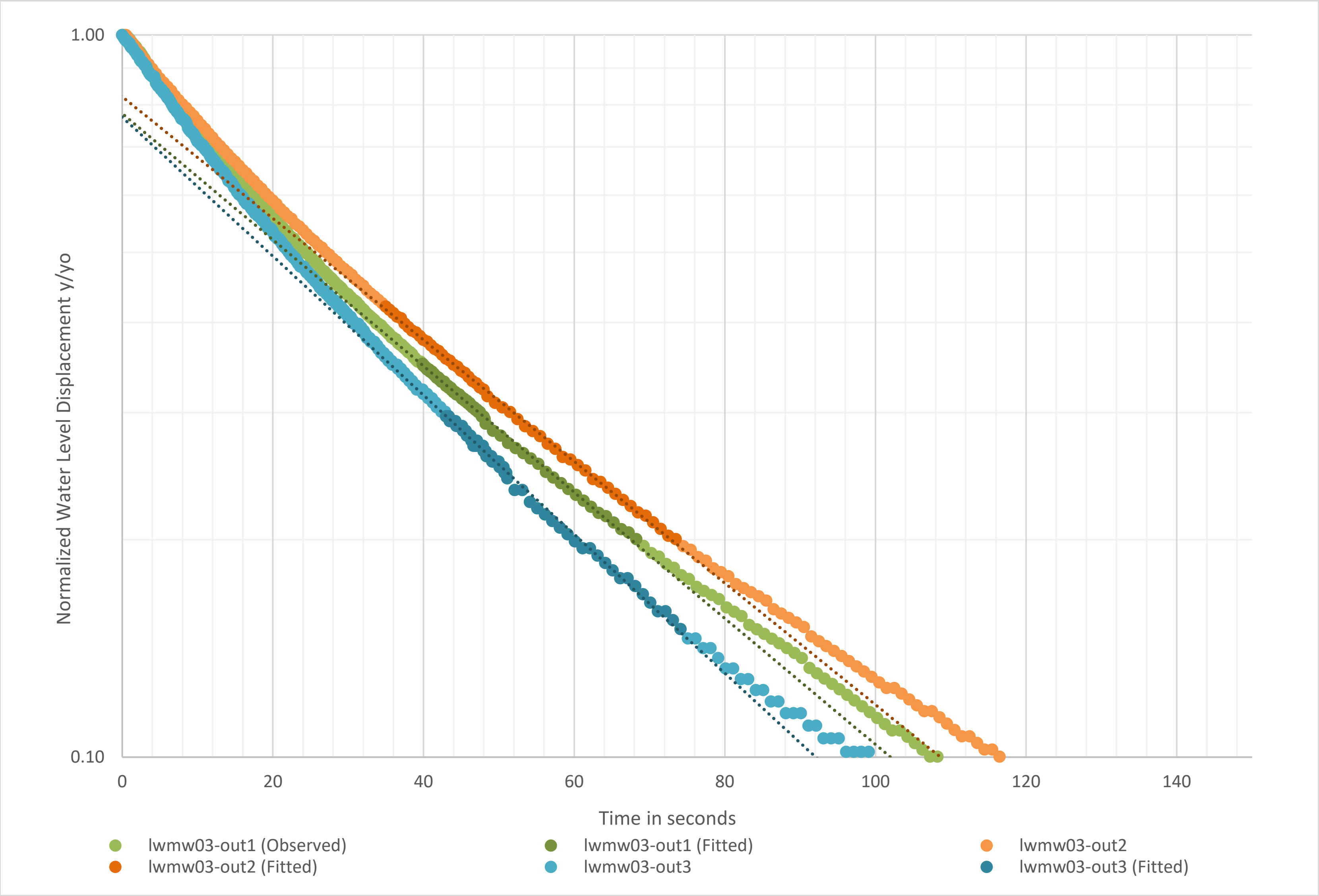

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Figure C.4
LW-MW03 Slug Response

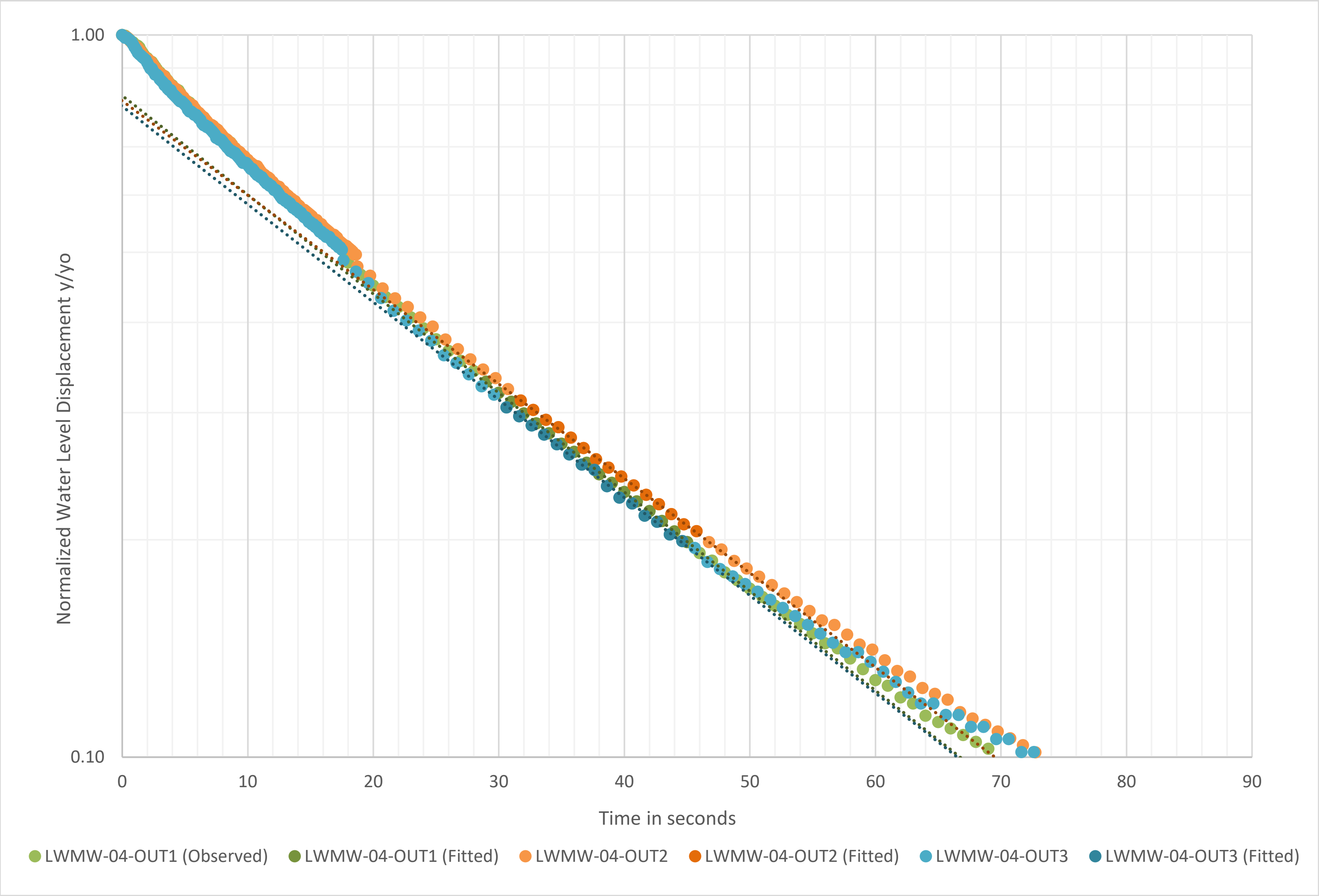

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Figure C.5
LW-MW05 Slug Response

APPENDIX D

Estimate of Soil Metals Mass Removal Resulting from the Planned Soil Removal

Introduction

This appendix presents the calculation methods and results for estimating the percent of the metals of concern (chromium, copper, and zinc) mass in fill soil to be removed during the planned soil removal action at the Lignin Operable Unit (OU). The removal of metals-contaminated soil will be conducted to achieve source control and thus accelerate the restoration timeframe for achieving metals cleanup levels in groundwater.

Estimation Methods

Calculations were performed to estimate the percent of metals mass in soil to be removed during the planned soil removal action. For each target metal, the existing mass in fill soil across the entire Lignin OU was calculated using a Thiessen polygon area analysis and soil analytical results from soil samples collected across the Lignin OU. The metals mass to be removed was similarly calculated using Thiessen polygon area analyses and analytical results from soil samples representing soil planned to be excavated. There were no metals exceedances detected in samples of native soil underlying the fill layer, and only fill soil is planned for removal during the cleanup; therefore the analysis addresses only the fill soil within the OU.

The masses of chromium, copper, and zinc that currently exist within the Lignin OU fill soil ("initial condition") were estimated as follows:

1. Divide the Lignin OU into Thiessen polygons surrounding each exploratory boring sample location with metals results for the fill soils.
2. Assign each polygon a 6.5-foot thickness based on average fill depth(s) at the Lignin OU and calculate the volume of soil within each polygon. Convert that volume to a soil mass assuming a soil density of 1.5 ton per in-place cubic yard.
3. For borings with samples of fill soil from multiple depths, calculate the average metal concentrations for each location representing a Thiessen polygon.
4. Calculate metals mass within each Thiessen polygon, and then sum the masses associated with each polygon to calculate initial total metals mass for the fill soil in the OU.

The masses of chromium, copper, and zinc that will be removed during the soil removal action ("mass removal"), and the percent of the initial (pre-cleanup) mass to be removed, were estimated as follows:

5. Divide the proposed soil removal areas into two depth layers of Thiessen polygons surrounding sample locations with metals results in fill soils proposed to be excavated (0 to 2 feet below ground surface [bgs], and 2 to 6 feet bgs).

6. Assign each polygon a thickness based on proposed excavation depth(s) and calculate the volume of soil within each polygon. Convert that volume to a soil mass assuming a soil density of 1.5 ton per in-place cubic yard.
7. For borings with samples from multiple depths within a depth layer, calculate the average metals concentrations for each location and depth interval representing a Thiessen polygon.
8. Calculate metals mass within each Thiessen polygon, and then sum the masses associated with each polygon to calculate metals mass to be removed.
9. Compare total mass to-be-removed to the initial condition total mass across the Lignin OU, and thereby calculate the percent of target metal mass to be removed during the planned soil removal action.

Each of the nine steps is described further below.

Step 1 (Initial Conditions): Divide the Lignin OU into Thiessen polygons

The Lignin OU was divided into sets of GIS-generated Thiessen polygons (Figure D-1). Each polygon surrounds a boring location at which metals were analyzed in soil. The area of each polygon was generated automatically by QGIS open-source geographic information system[1] for ArcGIS.

Step 2 (Initial Conditions): Assign each polygon a thickness and calculate associated soil mass

For each Thiessen polygon, one or more fill soil samples were collected at different depth intervals at the associated boring location. A fill soil layer thickness of 6.5 feet was assigned each polygon, based on the average depth of fill encountered in borings across the Lignin OU. Each soil layer thickness was used in conjunction with the polygon area to calculate a soil volume (cubic meters), which was converted to soil mass assuming a soil density of 1.5 ton per in-place cubic yard (1,800 kilograms per cubic meter) as shown in Table D-2.

Step 3 (Initial Conditions): Calculate average concentration for each target metal in soil

All fill soil samples with metals concentrations were compiled into a worksheet along with their analytical results. There were no non-detected results. The average concentration for each target metal was then calculated for each boring, using multiple samples per boring. Table D-3 presents the average metals concentrations for each polygon across the Lignin OU in the initial condition.

Step 4 (Initial Conditions): Calculate mass for each target metal

The mass of each metal was calculated for each Thiessen polygon throughout the Lignin OU based on the average metal concentration in the polygon. Average sample concentrations (in milligram per kilogram [mg/kg]) were multiplied by the soil mass of each Thiessen volume and converted to kilograms (kg) of metal mass for reporting (Table D-2).

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[1] https://www.qgis.org/en/site/

Step 5 (Mass Removal): Divide the Excavation Areas into Thiessen polygons in two depth layers

The proposed soil excavation areas (as depicted on EDR Figure 7) were divided into two sets, or layers, of GIS-generated Thiessen polygons, representing shallow (0 to 2 feet bgs) and deeper (2 to 6 feet bgs) excavations (Figures D-2 and D-3). It should be noted that excavation areas and depths presented on Figure 7 in the main report are averaged and not exact, and subject to change as the design and cleanup proceeds. Each polygon surrounds a boring location at which metals were analyzed in soil and the soil samples are also proposed to be removed as part of the cleanup action. The area of each polygon was generated automatically by QGIS.

Step 6 (Mass Removal): Assign each polygon a thickness and calculate associated soil mass

For each Thiessen polygon, one or more soil samples were collected from the associated boring location at different depth intervals within the soil depth interval to be removed. Soil layer thicknesses were assigned for each polygon based on the proposed excavation depth for that polygon. Each soil layer thickness was used in conjunction with the polygon area to calculate a soil volume and then a soil mass, as shown in Table D-4.

Step 7 (Mass Removal): Calculate average concentration for each target metal in soil

Soil samples with metals concentrations in proposed excavation areas/depths were compiled into a worksheet along with their analytical results. There were no non-detected results. The average concentration for each target metal was then calculated for each boring, using multiple samples per depth interval where they exist. Only concentrations for samples within fill planned for removal at a given boring were averaged. Averages for target metals in soil excavation areas are included in Table D-5.

Step 8 (Mass Removal): Calculate mass for each target metal

The mass of each metal was calculated for each Thiessen polygon in proposed excavation areas based on the average metal concentration in the polygon. Average sample concentrations (in mg/kg) were multiplied by the total soil mass (kg) of each Thiessen volume to be removed. Table D-4 summarizes the total estimated mass removal of target metals to be achieved during the planned soil removal action, including all excavation areas.

Step 9: Calculate percentage of metals metal mass removed

Finally, the target metal mass to be removed, as a percentage of the initial condition mass, was calculated. As a final step, the percent mass removal for the combined copper, zinc, and chromium combined was calculated as the sum of mass removed for each divided by the initial condition mass for each.

Table D-1 summarizes the estimated mass of each target metal and for the combined three metals to be removed, and the percentages of initial mass to be removed, during the planned Lignin OU soil removal action.

Evaluation Results

Using the methodology outlined above, we estimate that the planned Lignin OU soil removal action will achieve permanent removal of the following masses of the individual metals of concern (Table D-1):

- 4,600 kg (10,100 pounds) of chromium
- 4,500 kg (9,900 pounds) of copper
- 89,000 kg (196,000 pounds) of zinc

Expressed in terms of percent mass removal, the estimated percentages of metals mass in fill soil to be removed are as follows:

- 55 percent of the initial soil chromium mass
- 29 percent of the initial soil copper mass
- 76 percent of the initial soil zinc mass

For the three metals combined, it is estimated that approximately 98,000 kg (216,000 pounds), representing 73 percent of the initial metals mass in fill soils, will be removed.

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Table D-1. Summary of Estimated Soil Metals Mass Removal for Lignin OU Soil Removal Action

Project No. 210368-A-05, Lignin OU, Bellingham, Washington

			Engineer	**Date**
Site:	Lignin Operable Unit - GP West Bellingham			
Calculations:	Calculate the % of metals (Cr, Cu, Zn) mass in fill soils to be removed during the planned soil removal action for Lignin OU.	Calculations By:	ZAS	6/21/2022
		Checked By:	SJG	6/22/2022

In Units of Kilograms

Target Contaminant	Total Initial Mass (kg)	Mass Estimated to be Removed (kg)	Percent of Total Mass Estimated to be Removed
Chromium	4,600	2,500	54%
Copper	4,500	1,300	29%
Zinc	89,000	67,700	76%
Sum of 3 Metals	**98,100**	**71,500**	**73%**

In Units of Pounds

Target Contaminant	Total Initial Mass (pounds)	Mass Estimated to be Removed (pounds)	Percent of Total Mass Estimated to be Removed
Chromium	10,100	5,500	54%
Copper	9,900	2,900	29%
Zinc	195,800	148,900	76%
Sum of 3 Metals	**215,800**	**157,300**	**73%**

Table D-2. Estimated Initial Metals Mass in Fill Soils

Project No. 210368-A-05, Lignin OU, Bellingham, Washington

Site: Lignin Operable Unit - GP West Bellingham
Calculations Estimate the existing (initial) contaminant mass in soil.

	Engineer	Date
Calculations By:	ZAS	6/21/2022
Checked By:	SJG	6/22/2022

Assumptions:

Conversion Factors:
907 kg/ton
2000 lb/ton

Default Values (soil density):
kg/m^3 1800
pcf 112
ton/cy 1.5

Boundary is edge of Lignin Operable Unit
Every boring location is the center of the polygon.
Concentrations for samples within fill at a given boring are averaged for that polygon.
Analysis addresses metals of concern - chromium, copper, and zinc
Limited analysis to the fill only; doesn't take into account native soil concentrations because there are no detected exceedances in it.
Assumes average thickness of fill of 6.5 feet bgs across entire OU (all polygons).

Equations:

Average Concentration = ∑ (Sample Concentration) / Number of Samples
Soil Volume = Area*(top elevation - bottom elevation)
Soil Mass = Soil volume * Soil Density
Contaminant Mass = Soil Mass * Average contaminant concentration

Thiessen Polygon/ Boring ID	Area of Thiessen Polygon (ft^2)	Top Elevation (feet)	Bottom Elevation (feet)	Soil Volume (m^3)	Soil Mass (kg)	Average Chromium Concentration in Fill (mg/kg)	Average Copper Concentration in Fill (mg/kg)	Average Zinc Concentration in Fill (mg/kg)	Chromium Mass (kg)	Copper Mass (kg)	Zinc Mass (kg)
LW-MW01	3515	6.5	0	642	1,154,720	35	31	66	40	36	76
LW-MW02	1874	6.5	0	342	615,585	96.25	113.85	159.5	59	70	98
LW-SB101	4935	6.5	0	901	1,621,519	21	24	130	34	39	211
LW-SB102	3843	6.5	0	701	1,262,679	31	34	65	39	43	82
LW-SB103	2195	6.5	0	401	721,136	14	23	51	10	17	37
LW-SB104	19539	6.5	0	3,566	6,419,625	58	30	55	372	193	353
LW-SB105	4689	6.5	0	856	1,540,576	22.5	32.5	68	35	50	105
LW-SB106	3579	6.5	0	653	1,175,975	150	650	230	176	764	270
LW-SB201	8467	6.5	0	1,545	2,781,673	25.25	59.35	53	70	165	147
LW-SB202	3003	6.5	0	548	986,587	69.55	496	82350	69	489	81,245
LW-SB203	5429	6.5	0	991	1,783,699	22	308.57	167.23	39	550	298
LW-SB204	8778	6.5	0	1,602	2,883,835	28.65	29	59.85	83	84	173
LW-SB205	8706	6.5	0	1,589	2,860,405	69.85	35.03	93.7	200	100	268
LW-SB206	3058	6.5	0	558	1,004,759	43.05	35.15	99.7	43	35	100
LW-SB207	6558	6.5	0	1,197	2,154,736	29.55	64.77	51.1	64	140	110
LW-SB208	4529	6.5	0	827	1,487,843	27.6	21.3	31.7	41	32	47
LW-SB209	3741	6.5	0	683	1,229,223	30.53	67.9	214.67	38	83	264
LW-SB210	7820	6.5	0	1,427	2,569,234	31.47	60.97	184.57	81	157	474
LW-SB211	7346	6.5	0	1,341	2,413,567	24.7	17.8	39.9	60	43	96
LW-SB212	4126	6.5	0	753	1,355,674	42.2	90.75	113.95	57	123	154
LW-SB213	3679	6.5	0	671	1,208,619	20.2	20.5	38.9	24	25	47
LW-SB214	1902	6.5	0	347	624,857	78.85	510.85	103.7	49	319	65
LW-SB215	3973	6.5	0	725	1,305,390	18	17	25	23	22	33
LW-SB216	5856	6.5	0	1,069	1,923,887	34.9	28.2	64.35	67	54	124
LW-SB217	4714	6.5	0	860	1,548,787	13.7	18.25	40.35	21	28	62
LW-SB218	2996	6.5	0	547	984,170	53	212.05	107	52	209	105
LW-SB219	3313	6.5	0	605	1,088,325	232.5	40.05	197.5	253	44	215
LW-SB220	4724	6.5	0	862	1,552,142	17.7	17.8	32.7	27	28	51
LW-SB221	8068	6.5	0	1,473	2,650,834	28.2	37.17	51.53	75	99	137
LW-SS01	19043	6.5	0	3,476	6,256,490	25.4	35.85	73	159	224	457
LW-SS02	4611	6.5	0	842	1,515,036	173	88.4	377	262	134	571
LW-SS03	1576	6.5	0	288	517,914	1560	66.5	489	808	34	253
LW-SS04	4834	6.5	0	882	1,588,199	722	53.3	1,450	1,147	85	2,303
								Total Initial Mass (kg)	**4,579**	**4,517**	**89,033**

Table D-3. Estimated Initial Metals Concentrations for Fill Soils

Project No. 210368-A-05, Lignin OU, Bellingham, Washington

			Engineer	Date
Site:	Lignin Operable Unit - GP West Bellingham			
Calculations:	Estimate the average concentration in existing fill soil at each boring ID (Theissen polygon)	Calculations By:	ZAS	6/21/2022
		Checked By:	SJG	6/22/2022

Assumptions:

Concentrations for analytical results within fill at a given boring are averaged for that boring.

Analysis addresses metals of concern - chromium, copper, and zinc

Limited analysis to the fill only; doesn't take into account native soil concentrations because there are no detected exceedances in it.

Equations:

Average Concentration = ∑ (Sample Concentration) / Number of Samples

Dataset - Samples Representing Initial Conditions

Sample Location	**Concrete Slab Thickness**	**Sample Depth**	**Sample Date**	**MATRIX_CODE**	**Chromium (mg/kg)**	**Copper (mg/kg)**	**Zinc (mg/kg)**
LW-MW01	--	2.5 - 4 ft	07/16/2004	Sat. Soil	35	31	66
LW-MW02	8"	1 - 2 ft	01/20/2022	Unsat. Soil	74.5	140	121
LW-MW02	8"	5 - 6 ft	01/20/2022	Sat. Soil	118	87.7	198
LW-SB101	--	1 ft	08/03/2020	Unsat. Soil	21	24	130
LW-SB102	--	1 ft	08/03/2020	Unsat. Soil	31	34	65
LW-SB103	--	1 ft	08/03/2020	Unsat. Soil	14	23	51
LW-SB104	--	1.5 ft	08/03/2020	Unsat. Soil	58	30	55
LW-SB105	15"	1.5 ft	08/03/2020	Unsat. Soil	19	16	26
LW-SB105	15"	7 ft	08/03/2020	Sat. Soil	26	49	110
LW-SB106	18"	2 ft	08/03/2020	Unsat. Soil	150	650	230
LW-SB201	--	0 - 1 ft	01/19/2022	Unsat. Soil	30.4	96	71
LW-SB201	--	2.5 - 3 ft	01/19/2022	Unsat. Soil	20.1	22.7	35
LW-SB202	--	1 - 2 ft	01/19/2022	Unsat. Soil	56.2	851	152,000
LW-SB202	--	5 - 5.5 ft	01/19/2022	Sat. Soil	82.9	141	12,700
LW-SB203	--	0 - 1 ft	01/19/2022	Unsat. Soil	15.4	21.7	43.7
LW-SB203	--	2 - 3 ft	01/19/2022	Unsat. Soil	28.6	556	346
LW-SB203	--	5 - 6 ft	01/19/2022	Unsat. Soil		348	112
LW-SB204	--	1 - 2 ft	01/19/2022	Unsat. Soil	40.9	37.6	62.7
LW-SB204	--	5 - 6 ft	01/19/2022	Unsat. Soil	16.4	20.4	57
LW-SB205	--	0.5 - 1 ft	01/19/2022	Unsat. Soil	83	37.8	64.4
LW-SB205	--	1 - 1.5 ft	01/19/2022	Unsat. Soil	56.7	48.5	123
LW-SB205	--	5 - 6 ft	01/19/2022	Sat. Soil		18.8	93.7
LW-SB206	--	0 - 1 ft	01/19/2022	Unsat. Soil	74.1	58.5	183
LW-SB206	--	2 - 2.5 ft	01/19/2022	Unsat. Soil	12	11.8	16.4
LW-SB207	--	0.5 - 1 ft	01/19/2022	Unsat. Soil	20.3	33.5	53.7
LW-SB207	--	1 - 2 ft	01/19/2022	Unsat. Soil	38.8	68.6	48.5
LW-SB207	--	5 - 6 ft	01/19/2022	Unsat. Soil		92.2	
LW-SB208	6.5"	0.5 - 1.5 ft	01/17/2022	Unsat. Soil	27.6	21.3	31.7
LW-SB209	--	0 - 1 ft	01/19/2022	Unsat. Soil	21.4	58.6	183
LW-SB209	--	2 - 2.5 ft	01/19/2022	Unsat. Soil	25.6	32.1	229
LW-SB209	--	5 - 6 ft	01/19/2022	Unsat. Soil	44.6	113	232
LW-SB210	--	0 - 1 ft	01/18/2022	Unsat. Soil	34.2	115	398
LW-SB210	--	2 - 2.5 ft	01/18/2022	Unsat. Soil	23.5	26.8	58.1
LW-SB210	--	5 - 6 ft	01/18/2022	Unsat. Soil	36.7	41.1	97.6
LW-SB211	6"; 5 3/4"-6 1/2"	0 - 1 ft	01/17/2022	Unsat. Soil	24.7	17.8	39.9
LW-SB212	8 1/4"-8 1/2"	0.5 - 1.5 ft	01/17/2022	Unsat. Soil	41.6	34.5	72.9
LW-SB212	8 1/4"-8 1/2"	5 - 6 ft	01/17/2022	Sat. Soil	42.8	147	155
LW-SB213	8 3/4"; 8"-9.5"	0.5 - 1.5 ft	01/17/2022	Unsat. Soil	20.2	20.5	38.9
LW-SB214	--	0.5 - 1.5 ft	01/19/2022	Unsat. Soil	106	67.7	178
LW-SB214	--	2 - 2.5 ft	01/19/2022	Unsat. Soil	51.7	954	29.4
LW-SB215	5"	0.5 - 1.5 ft	01/17/2022	Unsat. Soil	18	17	25
LW-SB216	5 1/2" - 5 3/4"	0 - 1 ft	01/17/2022	Unsat. Soil	18.8	15.9	27.7
LW-SB216	5 1/2" - 5 3/4"	2.5 - 3.5 ft	01/17/2022	Unsat. Soil	51	40.5	101
LW-SB217	7 1/2"; asphalt	1 - 1.5 ft	01/18/2022	Unsat. Soil	14.9	22.1	54.4
LW-SB217	7 1/2"; asphalt	5 - 6 ft	01/18/2022	Sat. Soil	12.5	14.4	26.3
LW-SB218	--	2 - 2.5 ft	01/18/2022	Unsat. Soil	47.5	17.1	25
LW-SB218	--	8 - 9 ft	01/18/2022	Sat. Soil	58.5	407	189
LW-SB219	--	0 - 1 ft	01/17/2022	Unsat. Soil	243	41.1	208
LW-SB219	--	5 - 6 ft	01/17/2022	Sat. Soil	222	39	187
LW-SB220	7"-7 1/4"	1 - 2 ft	01/17/2022	Unsat. Soil	17.7	17.8	32.7
LW-SB221	--	0 - 1 ft	01/20/2022	Unsat. Soil	29.6	68.5	65.7
LW-SB221	--	2 - 3 ft	01/20/2022	Unsat. Soil	43.4	39	68.5
LW-SB221	--	5 - 6 ft	01/20/2022	Sat. Soil	11.6	4.01	20.4
LW-SS01	--	0 - 0.5 ft	07/20/2004	Unsat. Soil	25.9	35.1	75
LW-SS01	--	0 - 0.5 ft	07/20/2004	Unsat. Soil	24.9	36.6	71
LW-SS02	--	0 - 0.5 ft	07/20/2004	Unsat. Soil	173	88.4	377
LW-SS03	--	0 - 0.5 ft	07/20/2004	Unsat. Soil	1560	66.5	489
LW-SS04	--	0 - 0.5 ft	07/20/2004	Unsat. Soil	722	53.3	1,450

Average Concentrations by Location

Location	**Average Chromium (mg/kg)**	**Average Copper (mg/kg)**	**Average Zinc (mg/kg)**
LW-MW01	35	31	66
LW-MW02	96	114	160
LW-SB101	21	24	130
LW-SB102	31	34	65
LW-SB103	14	23	51
LW-SB104	58	30	55
LW-SB105	23	33	68
LW-SB106	150	650	230
LW-SB201	25	59	53
LW-SB202	70	496	82350
LW-SB203	22	309	167
LW-SB204	29	29	60
LW-SB205	70	35	94
LW-SB206	43	35	100
LW-SB207	30	65	51
LW-SB208	28	21	32
LW-SB209	31	68	215
LW-SB210	31	61	185
LW-SB211	25	18	40
LW-SB212	42	91	114
LW-SB213	20	21	39
LW-SB214	79	511	104
LW-SB215	18	17	25
LW-SB216	35	28	64
LW-SB217	14	18	40
LW-SB218	53	212	107
LW-SB219	233	40	198
LW-SB220	18	18	33
LW-SB221	28	37	52
LW-SS01	25	36	73
LW-SS02	173	88	377
LW-SS03	1560	67	489
LW-SS04	722	53	1,450

Table D-4. Estimated Contaminant Mass in Fill Soils to be Removed

Project No. 210368-A-05, Lignin OU, Bellingham, Washington

Site: Lignin Operable Unit - GP West Bellingham
Calculations: Estimate the metals mass in fill soils to be removed during planned soil removal action.

	Engineer	Date
Calculations By:	ZAS	6/21/2022
Checked By:	SJG	6/22/2022

Assumptions:

Conversion Factors:		Default Values (soil density):	
907	kg/ton	kg/m^3	1800
2000	lb/ton	pcf	112
		ton/cy	1.5066

Boundary is excavation areas shown on EDR Figure 7. Uses "Planned Excavation Depths"; depths are averaged and not exact.

Polygons are limited to excavation areas.

Calculated average concentration from all depths within the planned excavation depth; only concentrations for analytical results within fill that are expected to be removed at a given boring are averaged for that polygon.

Boring location is the center of the polygon.

Equations:

Average Concentration = ∑ (Sample Concentration) / Number of Samples

Soil Volume = Area*(top elevation - bottom elevation)

Soil Mass = Soil volume * Soil Density

Contaminant Mass = Soil Mass * Average contaminant concentration

Thiessen Polygon/ Boring ID	Area of Thiessen Polygon (ft^2)	Top Elevation (feet)	Bottom Elevation (feet)	Soil Volume (m^3)	Soil Mass (kg)	Average Chromium Concentration in Fill (mg/kg)	Average Copper Concentration in Fill (mg/kg)	Average Zinc Concentration in Fill (mg/kg)	Chromium Mass (kg)	Copper Mass (kg)	Zinc Mass (kg)
LW-MW02	4583	2	0	257	463,254	75	140	121	35	65	56
LW-SB101	4898	2	0	275	495,127	21	24	130	10	12	64
LW-SB102	3027	2	0	170	306,034	31	34	65	9	10	20
LW-SB103	3063	2	0	172	309,648	14	23	51	4	7	16
LW-SB201	7453	2	0	419	753,462	30	96	71	23	72	53
LW-SB202	2446	2	0	137	247,255	56	851	152,000	14	210	37,583
LW-SB202	1670	4	2	94	168,797	56	851	152,000	9	144	25,657
LW-SB203	7009	2	0	394	708,534	15	22	44	11	15	31
LW-SB206	4646	2	0	261	469,642	74	59	183	35	27	86
LW-SB207	14196	2	0	797	1,435,047	30	51	51	42	73	73
LW-SB207	9848	5.8	2	1,051	1,891,620	30	51	51	56	97	97
LW-SB208	4042	2	0	227	408,622	28	21	32	11	9	13
LW-SB208	4323	5.8	2	461	830,289	28	21	32	23	18	26
LW-SB209	3917	2	0	220	395,926	21	59	183	8	23	72
LW-SB210	4411	2	0	248	445,959	34	115	398	15	51	177
LW-SB211	4918	2	0	276	497,160	25	18	40	12	9	20
LW-SB212	5238	2	0	294	529,470	42	35	73	22	18	39
LW-SB212	13993	5.8	2	1,493	2,687,642	42	35	73	112	93	196
LW-SB214	1902	2	0	107	192,264	106	68	178	20	13	34
LW-SB216	12124	2	0	681	1,225,608	35	28	64	43	35	79
LW-SB219	8358	2	0	469	844,955	243	41	208	205	35	176
LW-SB221	15368	2	0	863	1,553,535	30	69	66	46	106	102
LW-SS01	3234	2	0	182	326,910	25	36	73	8	12	24
LW-SS02	4358	2	0	245	440,552	173	88	377	76	39	166
LW-SS03	1951	2	0	110	197,244	1560	67	489	308	13	96
LW-SS04	18855	2	0	1,059	1,906,095	722	53	1450	1,376	102	2,764
								Total Mass to Be Removed (kg)	**2,536**	**1,308**	**67,721**

Table D-5. Estimated Average Concentrations for Removed Soils

Project No. 210368-A-05, Lignin OU, Bellingham, Washington

Site: Lignin Operable Unit - GP West Bellingham

Calculations: Estimate the average concentration representing fill soil to be excavated, for each boring ID, (Theissen polygon)

	Engineer	**Date**
Calculations By:	ZAS	6/21/2022
Checked By:	SJG	6/22/2022

Assumptions:

Boundary for included samples is excavation areas shown on EDR Figure 7. Uses "Planned Excavation Depths"; depths are averaged and not exact.

Calculated average concentration from all depths sampled within the planned excavation depth; only concentrations for analytical results within fill from sample depths that are expected to be removed at a given boring are used.

Equations:

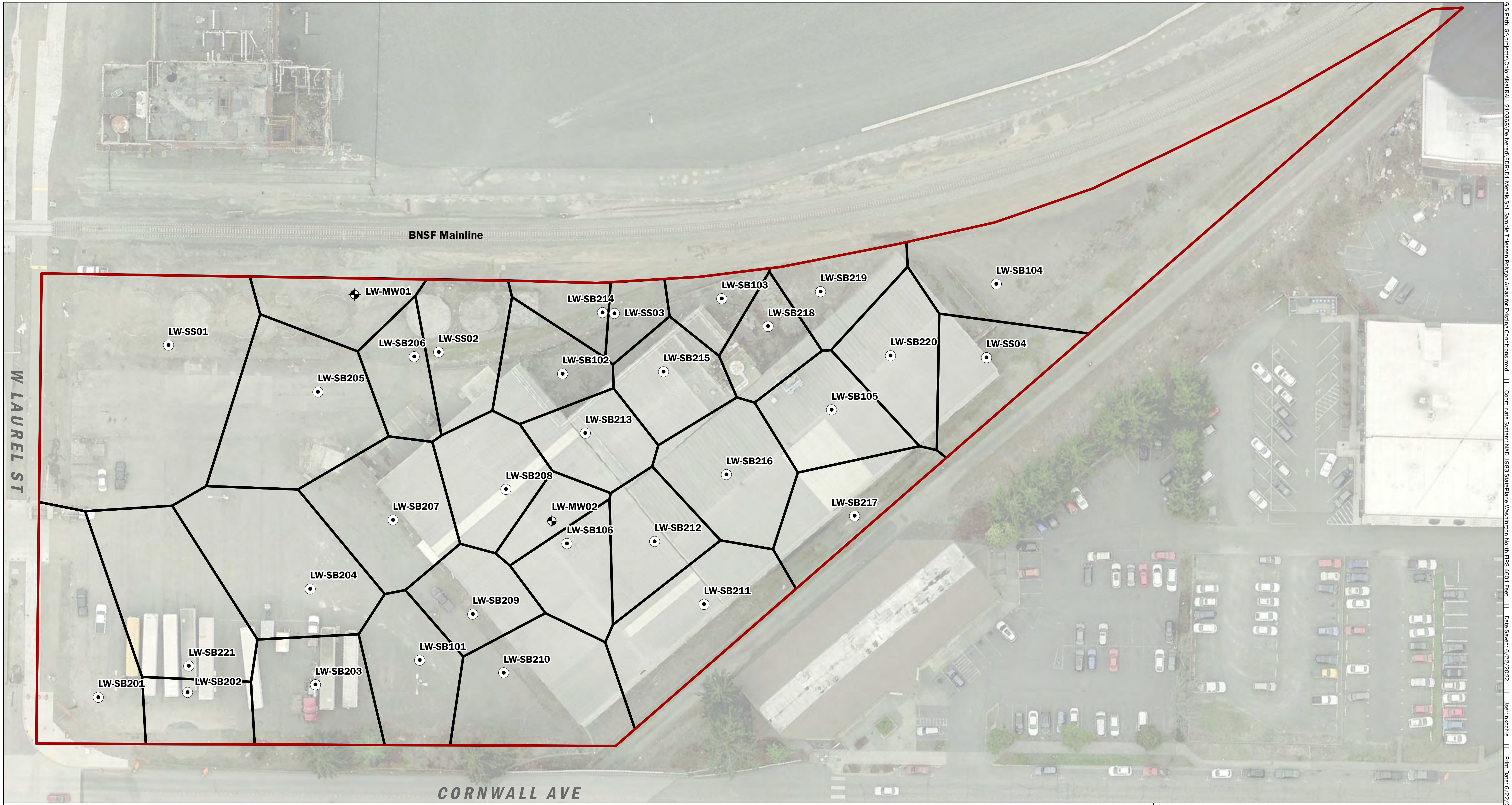
Average Concentration = ∑ (Sample Concentration) / Number of Samples

Dataset - Samples to Be Removed

Sample Location	Concrete Slab Thickness	Depth	Date	MATRIX_CODE	Chromium (mg/kg)	Copper (mg/kg)	Zinc (mg/kg)
LW-MW02	8"	1 - 2 ft	01/20/2022	Unsat. Soil	74.5	140	121
LW-SB101	--	1 ft	08/03/2020	Unsat. Soil	21	24	130
LW-SB102	--	1 ft	08/03/2020	Unsat. Soil	31	34	65
LW-SB103	--	1 ft	08/03/2020	Unsat. Soil	14	23	51
LW-SB201	--	0 - 1 ft	01/19/2022	Unsat. Soil	30.4	96	71
LW-SB202	--	1 - 2 ft	01/19/2022	Unsat. Soil	56.2	851	152,000
LW-SB203	--	0 - 1 ft	01/19/2022	Unsat. Soil	15.4	21.7	43.7
LW-SB206	--	0 - 1 ft	01/19/2022	Unsat. Soil	74.1	58.5	183
LW-SB207	--	0.5 - 1 ft	01/19/2022	Unsat. Soil	20.3	33.5	53.7
LW-SB207	--	1 - 2 ft	01/19/2022	Unsat. Soil	38.8	68.6	48.5
LW-SB208	6.5"	0.5 - 1.5 ft	01/17/2022	Unsat. Soil	27.6	21.3	31.7
LW-SB209	--	0 - 1 ft	01/19/2022	Unsat. Soil	21.4	58.6	183
LW-SB210	--	0 - 1 ft	01/18/2022	Unsat. Soil	34.2	115	398
LW-SB211	6"; 5 3/4"-6 1/2"	0 - 1 ft	01/17/2022	Unsat. Soil	24.7	17.8	39.9
LW-SB212	8 1/4"-8 1/2"	0.5 - 1.5 ft	01/17/2022	Unsat. Soil	41.6	34.5	72.9
LW-SB214	--	0.5 - 1.5 ft	01/19/2022	Unsat. Soil	106	67.7	178
LW-SB216	5 1/2" - 5 3/4"	0 - 1 ft	01/17/2022	Unsat. Soil	18.8	15.9	27.7
LW-SB216	5 1/2" - 5 3/4"	2.5 - 3.5 ft	01/17/2022	Unsat. Soil	51	40.5	101
LW-SB219	--	0 - 1 ft	01/17/2022	Unsat. Soil	243	41.1	208
LW-SB221	--	0 - 1 ft	01/20/2022	Unsat. Soil	29.6	68.5	65.7
LW-SS01	--	0 - 0.5 ft	07/20/2004	Unsat. Soil	25.9	35.1	75
LW-SS01	--	0 - 0.5 ft	07/20/2004	Unsat. Soil	24.9	36.6	71
LW-SS02	--	0 - 0.5 ft	07/20/2004	Unsat. Soil	173	88.4	377
LW-SS03	--	0 - 0.5 ft	07/20/2004	Unsat. Soil	1560	66.5	489
LW-SS04	--	0 - 0.5 ft	07/20/2004	Unsat. Soil	722	53.3	1,450

Average Concentrations by Location

Location	Average Chromium (mg/kg)	Average Copper (mg/kg)	Average Zinc (mg/kg)
LW-MW02	74.5	140	121
LW-SB101	21	24	130
LW-SB102	31	34	65
LW-SB103	14	23	51
LW-SB201	30.4	96	71
LW-SB202	56.2	851	152000
LW-SB203	15.4	21.7	43.7
LW-SB206	74.1	58.5	183
LW-SB207	29.55	51.05	51.1
LW-SB208	27.6	21.3	31.7
LW-SB209	21.4	58.6	183
LW-SB210	34.2	115	398
LW-SB211	24.7	17.8	39.9
LW-SB212	41.6	34.5	72.9
LW-SB214	106	67.7	178
LW-SB216	34.9	28.2	64.35
LW-SB219	243	41.1	208
LW-SB221	29.6	68.5	65.7
LW-SS01	25.4	35.85	73
LW-SS02	173	88.4	377
LW-SS03	1560	66.5	489
LW-SS04	722	53.3	1450



Metals Soil Sample Locations

- ⊙ Soil Boring
- ⊕ Monitoring Well
- ▭ Thiessen Polygon
- ▭ Lignin Operable Unit

Metals Soil Sample Thiessen Polygon Areas for Existing Conditions

Engineering Design Report
Lignin Operable Unit, GP West Site
Bellingham, Washington

Aspect CONSULTING

JUN-2022	BY: SJG / AAF	FIGURE NO. D-1
PROJECT NO. 210368	REVISED BY: NLK	

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GIS Path: G:\projects\ChlorAlkaliRAU_210368\Delivered\EDR\D1 Metals Soil Sample Thiessen Polygon Areas for Existing Conditions.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 6/22/2022 || User: nkochie || Print Date: 6/22/2022

Metals Soil Sample Locations

- ⊙ Soil Boring
- ⌖ Monitoring Well
- ▭ Thiessen Polygon
- ▭ Lignin Operable Unit

Soils to be Removed

Soil Exceeding Direct Contact CULs

- ▨ Metals > direct contact CUL (4-ft excavation)
- ▨ cPAH > direct contact CUL (2-ft excavation)

Soils to be Removed

Additional Metals-Impacted Soils*

- 🟩 0.9-foot average depth excavation
- 🟨 1-foot average depth excavation
- 🟩 1.5-foot average depth excavation
- 🟩 2.5-foot average depth excavation
- 🟩 4-foot average depth excavation
- ⬛ 5.8-foot average depth excavation

Notes:
1. CUL = cleanup level
2. Lignin operable unit from Millworks survey NOV-2021.
*: Because the affordable housing redevelopment subgrade design is in process, the excavation depths may change somewhat by the time that the cleanup construction plans and specifications are finalized.

MILL NORTH
TRUE NORTH
45°

0 30 60
Feet

Metals Soil Sample Thiessen Polygon Areas for Shallow Removal (0 to 2 feet)

Engineering Design Report
Lignin Operable Unit, GP West Site
Bellingham, Washington

Aspect CONSULTING	JUN-2022	BY: SJG / AAF	FIGURE NO. D-2
	PROJECT NO. 210368	REVISED BY: NLK	

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GIS Path: G:\projects\ChlorAlkaliRAU_210368\Delivered\EDR\D2 Metals Soil Sample Thiessen Polygon Areas for Shallow Removal 0 to 2 feet.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 6/22/2022 || User: nkochie || Print Date: 6/22/2022

Metals Soil Sample Locations

- ⊙ Soil Boring
- ▭ Thiessen Polygon
- ▭ Lignin Operable Unit

Soils to be Removed

Soil Exceeding Direct Contact CULs

- ▨ Metals > direct contact CUL (4-ft excavation)
- ▨ cPAH > direct contact CUL (2-ft excavation)

Soils to be Removed

Additional Metals-Impacted Soils*

- ▢ 0.9-foot average depth excavation
- 🟨 1-foot average depth excavation
- ▢ 1.5-foot average depth excavation
- 🟩 2.5-foot average depth excavation
- 🟩 4-foot average depth excavation
- ■ 5.8-foot average depth excavation

Notes:
1. CUL = cleanup level
2. Lignin operable unit from Millworks survey NOV-2021.
*: Because the affordable housing redevelopment subgrade design is in process, the excavation depths may change somewhat by the time that the cleanup construction plans and specifications are finalized.

MILL NORTH
TRUE NORTH
45°

0 30 60
Feet

Metals Soil Sample Thiessen Polygon Areas for Deep Removal (2 to 5.8 feet)

Engineering Design Report
Lignin Operable Unit, GP West Site
Bellingham, Washington

Aspect CONSULTING	JUN-2022	BY: SJG / AAF	FIGURE NO. D-3
	PROJECT NO. 210368	REVISED BY: NLK	

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GIS Path: G:\projects\ChlorAlkaliRAU_210368\Delivered\EDR\D3 Metals Soil Sample Thiessen Polygon Areas for Deep Removal 2 to 5.8 feet.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 6/22/2022 || User: nkochie || Print Date: 6/22/2022