PRE-REMEDIAL DESIGN INVESTIGATION 3 PROJECT PLAN

Chlor-Alkali RAU, GP West Site, Bellingham, Washington

Prepared for: Port of Bellingham

Project No. 210368-B-09 • August 22, 2023 FINAL

Aspect CONSULTING

earth + water

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Acronyms

ASB	Aerated Stabilization Basin
Aspect	Aspect Consulting, LLC
CAP	Cleanup Action Plan
Ecology	Washington State Department of Ecology
FS	Feasibility Study
GP	Georgia-Pacific
HMA	hot mix asphalt
IDP	Inadvertent Discovery Plan
ISN	*in situ* neutralization
ISS	*in situ* solidification
mg/kg	milligrams/kilograms
PRDI	Pre-Remedial Design Investigation
RAU	Remedial Action Unit
RI	Remedial Investigation
TCLP	toxicity characteristic leaching procedure
TOC	total organic carbon

1 Introduction

This Pre-Remedial Design Investigation 3 Project Plan (PRDI 3 Project Plan) supports the Chlor-Alkali Remedial Action Unit (RAU) cleanup at the Georgia-Pacific (GP) West Site (Site) (Figure 1). The cleanup action selected in the RAU Cleanup Action Plan (CAP) includes *in-situ* neutralization (ISN) treatment of groundwater in the zone of highest groundwater pH, termed the Caustic Core, within the RAU. The ISN cleanup action will reduce the RAU groundwater's highest pH and reduce mercury solubility and mobility, thus reducing the mercury's downgradient migration. This PRDI 3 Project Plan defines the treatability testing necessary to complete the remedial design for the ISN cleanup action.

In August 2009, the Washington State Department of Ecology (Ecology) and the Port of Bellingham (Port) entered into Agreed Order No. DE 6834 (Order) to clean up the GP West Site. In August 2013, an amendment to the Order separated the GP West Site into the Pulp/Tissue Mill and Chlor-Alkali RAUs shown on Figure 1. In September 2021, Ecology issued the final Cleanup Action Plan (CAP) for the RAU (Ecology, 2021). In March 2022, Ecology issued a minor modification to the Order that revised a Schedule of Deliverables for Remedial Design for the RAU, including this PRDI 3 Project Plan as Deliverable D.2b (Ecology, 2022).

Accordingly, the following PRDI 3 activities will be conducted to inform the design for the ISN treatment of Caustic Core groundwater:

- **Groundwater Sampling** – Because the last groundwater quality sampling in the Caustic Core area occurred in 2015, a monitoring well inventory and groundwater sampling event was completed in April 2023 to define current groundwater conditions to scope PRDI 3 activities and contribute to the basis of ISN remedial design.
- **Remedial Design Data Gaps** – Three Fill Unit groundwater monitoring wells will be installed to refine the extent of groundwater pH exceeding the remediation level of pH 10 (Caustic Core). After the three new Fill Unit monitoring wells are installed, a second groundwater sampling event will be conducted in approximately September 2023.
- **ISN Treatability Testing** – ISN treatability testing will consist of two phases: 1) bench-scale pH titrations using groundwater and soil-groundwater slurry, and 2) column testing to evaluate chemical reagent with Site groundwater. All treatability testing will be conducted on Site.

In addition, the PRDI 3 activities include:

- Supplemental data collection will be performed to inform the design for excavation of mercury-contaminated soils from the former wastewater settling basin area, a separate component of the CAP's selected cleanup action. The

sampling results are necessary to refine the excavation lateral and vertical extents and provide analytical data for waste designation of the mercury-contaminated soils to be excavated.

- Test pits will be conducted to document the dimensions and condition of subsurface structures and utilities that may represent obstructions to excavation or may require physical protection (or temporary removal and replacement) in areas planned for excavation as part of the RAU remedy.
- A mapping and reconnaissance of current surface conditions will be conducted within CAP-required areas of soil capping to inform cap remedial design for the RAU.

The subsequent sections of this PRDI 3 Project Plan are organized as follows:

- Section 2 – Background
- Section 3 – Completed PRDI 3 Groundwater Monitoring for Caustic Core Area
- Section 4 – ISN Remedial Design Data Gaps
- Section 5 – ISN Treatability Testing
- Section 6 – Wastewater Settling Basin Soil Sampling
- Section 7 – Test Pits to Document Subsurface Obstructions
- Section 8 – Survey Surface Conditions to Inform Cap Design
- Section 9 – Survey of PRDI 3 Locations
- Section 10 – Cultural Resources and Inadvertent Discovery Plan
- Section 11 – Scheduling and Reporting
- Section 12 – References

2 Background

The PRDI 3 activities are a basis of design for three CAP cleanup action components outlined in this section.

2.1 ISN Component of Remedy

Mercury mobility in groundwater is increased by high-pH conditions. The CAP requires ISN of groundwater within the Caustic Core—the area of shallow Fill Unit[1] groundwater with elevated pH (>10 standard units[2])—to control a source of mercury migration in

[1] The Fill Unit groundwater is a shallow water table aquifer that varies in thickness from approximately 10 to 15 feet across RAU (Ecology, 2021).
[2] All pH values in this report are in standard units and the units are not stated hereafter.

groundwater. The ISN concept in the Feasibility Study (FS) and CAP is placing a neutralizing reagent[3] below the water table in a series of trenches in the Caustic Core area oriented perpendicular to the groundwater flow direction (Aspect, 2018; Ecology, 2021). The impacted groundwater will passively flow through the ISN trenches reducing groundwater pH, enhancing the attenuation of dissolved mercury in groundwater downgradient of Caustic Core area.

Figure 2 depicts the Caustic Core extent (based on 2015 data) and the conceptual ISN trench locations presented in the FS and CAP. However, the ISN trench layout will be developed during remedial design based on the PRDI 3 data collection and locations of subsurface utilities or other obstructions.

The ISN remedial design requires implementation of (1) a monitoring well inventory and groundwater sampling to understand current groundwater conditions, and (2) treatability testing defined herein.

2.2 Wastewater Settling Basin Soil Removal Component of Remedy

In 1970, Georgia-Pacific constructed an earthen wastewater settling basin in a newly filled area between the Chlorine Plant and the Log Pond to reduce suspended solids in Chlorine Plant wastewater prior to its discharge to the Log Pond (Figure 1). In 1976, Georgia-Pacific removed accumulated solids (sludge) from the bottom of the settling basin, chemically stabilized it on Site using a proprietary process (Chemfix) and buried and capped the stabilized material on Site roughly 400 feet east of the settling basin (Chemfix Area described in Aspect [2013]). In 1980, Georgia-Pacific again removed accumulated sludge, this time landfilling it at Chemical Waste Management's Subtitle C landfill in Arlington, Oregon, and then backfilled the settling basin with imported fill material.

The selected cleanup action in the CAP requires excavation and off-Site disposal of soils containing mercury concentrations exceeding the 300 milligrams per kilograms (mg/kg) remediation level that occurs in the northern portion of the historical wastewater settling basin[4], adjacent to the Log Pond shoreline (Figure 1). Section 6 outlines supplemental soil sampling and analysis necessary for remedial design. The supplemental soil sampling results will serve as a basis of excavation limits and waste designation of mercury-contaminated soils.

2.3 Soil Capping Component of Remedy

The selected cleanup action in the CAP requires installation and maintenance of hard caps (e.g., pavement) in all areas of the RAU where soil contaminant concentrations exceed cleanup levels following completion of the other cleanup components. A visual

[3] Ferrous sulfate heptahydrate (FeSO4*7H2O) was assumed in the FS (Aspect, 2018).
[4] The historical chlorine plant discharged untreated wastewater to the settling basin between approximately 1970 and 1980.

survey will be conducted to document existing surface conditions and thus support cap design for each area identified in the CAP.

3 Completed PRDI 3 Groundwater Monitoring for Caustic Core Area

This section reports the monitoring well inventory and groundwater monitoring activities completed to support preparation of this PRDI 3 Project Plan.

3.1 Well Inventory

The most recent available RAU groundwater data were collected in late August and early September of 2015 (Aspect, 2015). Given the Port's land use during the intervening 8 years, a monitoring well inventory was necessary to verify the existence and condition of the RAU monitoring wells for scoping the PRDI 3 activities.

The completed monitoring well inventory was conducted from March 27 through 29, 2023; well locations are shown on Figure 3. Based on existing project information, a total of 41 monitoring wells within the RAU had not been previously decommissioned: 30 monitoring wells in the Fill Unit, and 11 monitoring wells in the deeper Lower Sand[5].

The completed monitoring well inventory located 17 monitoring wells completed in the Fill Unit (the subject of PRDI 3 scope and ISN treatment) and 10 monitoring wells completed in the Lower Sand (not the subject of PRDI 3 scope and ISN treatment). The 14 other monitoring wells could not be located, with several inaccessible due to the Port's land uses (e.g., covered with stockpile of import or recycled materials). For each monitoring well located, depth to water and depth to bottom measurements were collected (Table 1). In Table 1, the located Fill Unit wells are highlighted in orange, located Lower Sand wells are highlighted in blue, and wells not located during the inventory are highlighted in gray.

3.2 Groundwater Sampling and Analysis

Groundwater monitoring was conducted on April 17 and 18, 2023 to define current groundwater conditions to scope PRDI 3 activities and as a contributing basis of ISN remedial design. Out of the 17 Fill Unit monitoring wells that were located, 15 Fill Unit monitoring wells were sampled (Figure 3).

Groundwater samples were collected using low-flow sampling techniques with a peristaltic pump and dedicated polyethylene and Teflon tubing. During purging prior to sample collection, field parameters (pH, temperature, specific electrical conductance, dissolved oxygen, and oxidation-reduction potential [ORP]) were measured using an In

[5] The Lower Sand aquifer is hydraulically separated from the Fill Unit aquifer by a naturally occurring silt aquitard that ranges in thickness from a few feet to as much as 10 feet (Ecology, 2021). Six of the Lower Sand wells are deep depressurization wells (CP-DW1 through CP-DW6) installed during the 2013-2014 Caustic Plume Interim Action.

Situ AquaTROLL 500 multiparameter sonde with flow-through cell. The groundwater samples were transmitted under chain-of-custody protocols to ALS, Inc. of Everett, Washington, an Ecology-accredited analytical laboratory, for chemical analysis. All sample analysis included low-level dissolved mercury by EPA Method 1631 performed by ALS, Inc of Kelso, Washington. For the 12 monitoring well locations exceeding pH and/or mercury cleanup levels in 2015, samples were also analyzed for geochemical parameters including:

- Dissolved metals (iron, manganese, aluminum) by EPA Method 200.8
- Common dissolved cations (calcium, potassium, magnesium, sodium) by EPA Method 200.8
- Common anions (chloride, nitrate, nitrite, sulfate) by EPA Method 300.0
- Sulfide by EPA Method 376.1
- Total alkalinity by Standard Method (SM) 2320B
- Total organic carbon (TOC) by SM 5310C

Groundwater investigation-derived waste (purge water) was discharged to the vault at the Port's dockside pump station for the Aerated Stabilization Basin (ASB) stormwater treatment system shown on Figure 1.

3.3 April 2023 Groundwater Quality

This section reports the April 2023 groundwater sampling results and summarizes current Fill Unit groundwater conditions based on those data.

- Fill Unit groundwater analytical results from the 15 locations sampled are presented in Table 2. The laboratory analytical report is in Appendix A.
- The Fill Unit groundwater pH data are shown on Figure 3. This figure also includes groundwater pH contours for the cleanup level (pH < 8.5) and remediation level (pH < 10) based on the April 2023 data plus those previously interpreted from 2015 data (Aspect, 2018).
- The generalized Fill Unit groundwater flow direction in the Caustic Core area interpreted from a Site-wide water level monitoring event conducted during the RI in 2010 is shown on Figures 3 and 4 (Aspect, 2013). The RI figures relied upon for Fill Unit groundwater flow direction are included as Appendix B for reference.
- April 2023 dissolved mercury concentrations in Fill Unit groundwater are shown on Figure 4.

3.3.1 Fill Unit Groundwater pH

Since the last sampling event in September 2015, the median[6] groundwater pH at three wells within the previously defined Caustic Core increased slightly (0.14 standard units) as of April 2023 (Figure 3). The pH at monitoring well CP-MWA1 declined from 11.06 when it was last measured in 2010 to pH of 10.55 in 2023, a decrease of 0.5 standard units over 13 years.

Fill Unit groundwater in monitoring wells AMW-02 and CP-MWA1 located toward the west-northwestern[7] (downgradient) side of the Caustic Core have lower pH in 2023 than their last prior measurement.

At six Fill Unit monitoring wells within the larger area of pH > 8.5 (cleanup level), groundwater pH has decreased since 2015. The 2023 median pH for the six wells declined 0.36 standard units in that time period. The pH of 10.4 measured at well CP-MWC1 in April 2023 is anomalous relative to the three sets of prior measurements collected between 2009 and 2015 (pH 9.49 to 9.79). The pH at CP-MWC1 will be verified during PRDI 3 given its location north of the identified Caustic Core area.

3.3.2 Dissolved Mercury in Fill Unit Groundwater

Within the Caustic Core and surrounding area, dissolved mercury concentrations in Fill Unit groundwater have decreased since 2015. The one exception is EMW-19S in the Caustic Core where dissolved mercury concentration increased from 8.61 micrograms per liter (µg/L) to 30 µg/L since 2015. Fill Unit monitoring wells EMW-19S and CP-MW22 are the only two RAU monitoring well location with current dissolved mercury concentration exceeding remediation level of 7.6 µg/L[8].

Since 2015, the dissolved mercury concentration at other Fill Unit groundwater monitoring wells within the Caustic Core and downgradient of have:

- Decreased from 11.1 in 2015 to 2.2 µg/L at AMW-03;
- Decreased from 35.6 in 2015 to 5.4 µg/L at AMW-02;
- Decreased from 14.3 µg/L in 2010 to 2.7 µg/L at CP-MWA1;
- Decreased from 1.32 µg/L in 2010 to 0.13 µg/L at CP-MW01;

In addition to pH and dissolved mercury, groundwater geochemical parameters were collected during the April 2023 sampling event to scope PRDI 3 activities and as a basis of ISN design. In addition to alkaline pH, the Caustic Core groundwater is anaerobic and reducing as interpreted by the Remedial Investigation (RI) (Aspect, 2013) and indicated in current 2023 data, specifically high total organic carbon (TOC) and sulfide

[6] Because pH is a logarithmic term representing hydrogen ion concentrations [H+] that vary by orders of magnitude, median is considered a better representation of the pH central tendency than is the mean (mean is skewed by extreme values, in this case low-pH values).
[7] Directions in this report are relative to "mill-north" (aka "project-north"), which is 45 degrees west of true north; refer to north arrows on the report figures.
[8] The groundwater remediation level applies at shoreline monitoring wells located upgradient of the conditional point of compliance for the Caustic Plume area (refer to Section 5.2 of the CAP).

concentrations (Table 2). High concentrations of sodium are present in the groundwater, which is likely due to the historical chlorine plant operations.[9]

The ISN treatment will reduce pH and therefore change the precipitation and dissolution equilibrium of non-mercury inorganic parameters, which is an important consideration in the basis of ISN design and will be further evaluated during PRDI 3 activities.

The April 2023 Fill Unit groundwater data indicate that, overall, the natural attenuation of alkaline pH and dissolved mercury documented in the RI/FS (Aspect, 2013 and 2018) is continuing, and the areal extent of the Caustic Core has decreased somewhat relative to that estimated from the 2015 data (Figure 3). However, the groundwater pH exceeding the remediation level of pH 10 persists within the Caustic Core and is the target of the ISN cleanup action.

4 ISN Remedial Design Data Gaps

This section identifies data gaps for the ISN trench extent and a work plan for data collection.

4.1 Caustic Core Extent

A primary data gap is defining the current areal extent of groundwater exceeding the groundwater remediation level of pH 10 for which to base the extent of ISN treatment. The April 2023 pH contours shown on Figure 3 were created with the best data available. However, some Fill Unit monitoring wells used previously to define the Caustic Core extent were inaccessible and the western, southern, and eastern extent of the Caustic Core area is a data gap.

To address that data gap, three new Fill Unit monitoring wells will be installed to refine the Caustic Core areal extent. The locations of the three Fill Unit monitoring wells, CP-MW101, CP-MW-102, and CP-MW103, are shown on Figure 3:

1. CP-MW101 approximately 110 and 130 feet east (upgradient) of AMW-03 and EMW-19S, respectively
2. CP-MW102 approximately 100 feet south (cross-gradient) of AMW-03, which had the highest groundwater pH measured in April 2023
3. CP-MW103 approximately 105 feet west (downgradient) of CP-MWA1 in the direction of the shoreline

The actual locations are subject to accessibility and utility clearance as determined in the field.

[9] Sodium chloride brine was a primary constituent used historically in the chlor-alkali process that produced both sodium hydroxide and chlorine gas products.

The three monitoring wells will be completed in the Fill Unit, with a 10-foot screened interval between approximately 5 and 15 feet below ground surface (bgs), subject to change depending on conditions encountered in the field. The three new monitoring wells will be constructed of 2-inch Schedule 40 polyvinyl chloride (PVC) with 0.010-inch screen slots and 20-40 sand filter pack. The new monitoring wells will be drilled and constructed by a Washington State-licensed resource protection well driller using direct-push drilling methods and will be developed using surge and purge methods.

Prior to drilling, a public one-call utility locate will be requested, and a private utility locating service will be subcontracted to identify utility locations to the extent practicable and clear the proposed areas of subsurface exploration.

Investigative-derived waste (IDW) soil cuttings generated during drilling will be containerized, profiled, and disposed of at an approved off-Site disposal facility. As-built monitoring well construction details, locations, and drilling observations will be reported in the PRDI 3 Data Report.

4.2 Groundwater Quality

Additional data to evaluate variability including seasonality in Fill Unit groundwater quality is an ISN remedial design data gap. The 15 Fill Unit monitoring wells sampled in April 2023 (wet season) had not been sampled in at least 8 years, and the collection of additional groundwater quality during the dry season is necessary to determine the extent of the Caustic Core and the corresponding ISN treatment.

Therefore, an additional round of groundwater sampling of the same 15 existing monitoring wells plus the three new monitoring wells will be conducted in September 2023. Prior to groundwater sampling, groundwater depth-to-water measurements will be collected at all 18 Fill Unit monitoring wells as synoptically as practicable to allow an updated interpretation of Fill Unit groundwater flow direction. After the water level gauging, groundwater will be sampled from all 18 Fill Unit monitoring wells and analyzed for the same parameters as the April 2023 event (dissolved mercury, geochemical parameters, and field parameters). The groundwater samples will be collected using low-flow sampling methods and analyzed by ALS Laboratory Group (ALS) in Everett, except that the trace-level mercury (EPA Method 1631) analyses will again be performed by ALS-Kelso.

5 ISN Treatability Testing

This section describes the treatability testing necessary for ISN remedial design.

5.1 Treatability Test Objectives

The ISN cleanup action will neutralize Fill Unit groundwater pH exceeding the remediation level of pH 10 to control a source of mercury migration in groundwater. The current attenuation of dissolved mercury in lower-pH groundwater downgradient of the Caustic Core area is associated with increased adsorption with mineral surfaces and under suitable redox and pH conditions, dissolved inorganic mercury precipitates as the

mercury-sulfide mineral metacinnabar, a relatively stable and insoluble mercury-sulfide (HgS) or in solid solution with other sulfides such as pyrite (FeS_2) (EPA, 1997; Skyllberg, 2008; Bloom et al., 2003; Liu et al., 2008). The relative stability and insolubility of the immobilized mercury was observed in Site soils and presented in the RI (Aspect, 2013). The ISN cleanup action relies on pH adjustment for treatment of Caustic Core groundwater. Therefore, treatability testing is focused on the evaluation of pH adjustment and is designed to achieve the following objectives:

- Comparatively evaluate performance of different chemical reagents at reducing Caustic Core groundwater pH.
- Quantify chemical reagents required to neutralize a unit volume of Caustic Core groundwater.
- Verify ability to effectively neutralize pH in Caustic Core groundwater.
- Evaluate changes in Caustic Core groundwater quality resulting from pH neutralization.

The treatability testing will consist of sample collection, titrations tests, and column tests and will all be conducted on Site.

5.2 Sample Collection

This section describes the field sample collection of soil and groundwater necessary for treatability testing.

5.2.1 Soil Sampling

Soil samples will be collected from the new monitoring well CP-MW101 (Figure 4). Soil samples for treatability testing will be collected from below the water table, between depths of approximately 5 and 15 feet bgs. All soil samples will be sealed inside a Mylar bag with oxygen-adsorbing packets, labeled, and preserved inside a cooler and retained on Site for treatability testing.

5.2.2 Groundwater Sampling

During the September 2023 dry-season groundwater monitoring event described in Section 4.2, an additional volume of groundwater will be collected to conduct the bench-scale testing. An estimated total of 3 gallons of groundwater will be collected from Fill Unit well AMW-03, which had the highest pH (12.17) measured in April 2023, for use in titration tests. The groundwater sample will be unfiltered and unpreserved and collected in 1-gallon cubitainers. The cubitainers will be sealed inside a Mylar bag with oxygen-adsorbing packets, labeled, and preserved inside a cooler and retained on-Site for treatability testing.

5.2.3 Sample Homogenization and Baseline Tests

Aspect will set up an on-Site temporary laboratory, inside a mobile office in the vicinity of EMW-19S, to conduct the treatability testing. Temporary power will be supplied with a generator and the mobile office will be ventilated.

The soil core collected from CP-MW101 will be opened and homogenized in a clean steel bowl creating a soil homogenate to be used in treatability testing. After soil homogenization, Aspect will measure soil pH in triplicate using a pH electrode in potassium chloride suspension (Thomas, 1996). Duplicate aliquots of the soil homogenate will be submitted to ALS for analysis of:

- Total mercury by EPA Method 1631.
- Total sulfide (SM 4500).

The September 2023 groundwater sampling of AMW-03 will establish baseline groundwater quality for the bulk AMW-03 sample to be used in treatability testing.

5.3 Titration Tests

The titration tests will be conducted with 200 milliliters (mL) of AMW-03 groundwater only, and with two slurries of soil homogenate and AMW-03 groundwater. Slurry titrations will be conducted at a liquid-to-solid ratio of 100-to-1 and 10-to-1. The 100-to-1 slurry will be prepared with 200 mL of AMW-03 groundwater and 2 grams of soil homogenate and the 10-to-1 slurry will be prepared with 200 mL of AMW-03 groundwater and 20 grams of AMW-03 soil homogenate. Titrations will be performed in 250-mL glass flasks. Titration tests will be conducted using solutions of the following four soluble chemical reagents, prepared from dry products:

- Ferrous Sulfate
- Ferric Sulfate
- Aluminum Sulfate
- Ferric Chloride

Chemical reagent product specification sheets are included in Appendix C. The titrating reagent will be added in approximately 5 mL volume increments and the pH measured at each increment until it reaches less than 8.5standard units. Because of the presence of solids, pH will be allowed to stabilize at each increment. The volume of acidic reagent will be recorded at each increment and a titration curve will be developed from each batch test.

5.4 Column Tests

Flow-through column tests will be conducted to evaluate pH neutralization of low-solubility chemical reagents. The column testing will be conducted at the Site using Fill Unit monitoring well EMW-19S groundwater with the highest dissolved mercury concentration in April 2023. The testing will be conducted on Site because groundwater at the Site is anaerobic and reducing, and it is considered impracticable to maintain reducing conditions of the required groundwater volume *ex situ*. Flow-through columns will be operated by in-line groundwater routing to minimize exposure to air and maintain the *in-situ* groundwater redox potential to the greatest extent practicable.

Four columns will be operated with a test variable of chemical reagent. Chemical reagents of iron carbonate (Siderite) and Evonik's Metafix® reagents will be evaluated in

column tests. Additionally, the soluble chemical reagent most effective at pH reduction in the titration tests will be evaluated in column testing. The four columns will consists of:

1. Control: Control 100% inert sand
2. Siderite: 30% by weight Siderite and 70% by weight sand
3. Metafix®: 30% by weight Metafix® and 70% by weight sand
4. Most effective soluble neutralizing reagent from titration tests (packed with 50% by weight reagent and 50% by weight sand)

The columns will be 3 inches in diameter and 36 inches long and be constructed of PVC. Each column will be constructed with one sample port located in the middle of the column.

Chemical reagent product specification sheets are included in Appendix C. Aliquots of dry chemical reagent and sand at the specified mixture will be packed vertically in lift sections to achieve a homogeneous mixture. Estimated values of bulk density, porosity, and pore volume will be determined gravimetrically using field methods. Before beginning the test with Site groundwater, the columns will be prepped by flushing with carbon dioxide (CO_2) gas at the bottom of the columns for approximately 90 minutes to 2 hours to replace air contained in the pore spaces of the column media. After the CO_2 flush, the column will be saturated with deionized water until 1 to 2 liters of effluent has been collected. Groundwater from well EMW-19S will then be introduced to each of the four columns using four discrete peristaltic pumps targeting a flow rate of approximately 100 milliliters per minute.

Columns will be operated for a total duration of up to 40 hours. Measurements of field parameters (temperature, pH, dissolved oxygen, oxygen reduction potential and electrical conductivity) will be collected at influent, port, and effluent using a YSI meter with a flow-through cell. Each column influent, port, and effluent will be sampled up to three times during the flowing conditions and submitted for laboratory analysis of:

- Low-level dissolved mercury by EPA Method 1631
- Dissolved metals (iron, manganese, aluminum) by EPA Method 200.8
- Common dissolved cations (calcium, potassium, magnesium, sodium) by EPA Method 200.8
- Common anions (chloride, nitrate, nitrite, sulfate) by EPA Method 300.0
- Sulfide by EPA Method 376.1
- Total alkalinity by Standard Method (SM) 2320B
- Total organic carbon (TOC) by SM 5310C

Effluent from the columns will be containerized and discharged to the vault at the Port's dockside pump station for the ASB stormwater treatment system.

6 Wastewater Settling Basin Soil Sampling

The planned excavation area within the former wastewater settling basin, as assumed in the FS and CAP, along with the existing soil mercury concentration data, are shown in Figure 5. The precise lateral and vertical dimensions of the former basin itself are poorly documented in Georgia-Pacific's historical documentation and are thus uncertain. However, the existing data indicate the highest mercury concentrations exist at depth, presumably representing the former bottom of the basin prior to its filling in 1980. Additional pre-design soil sampling and analysis is necessary to refine the excavation lateral and vertical extents and provide analytical data for waste designation of the mercury-contaminated soils to be excavated.

Thirteen soil borings will be advanced for soil sampling and analysis at the approximate locations depicted on Figure 5. The borings will be advanced to a depth of 20 feet bgs by a Washington State-licensed resource protection well driller using direct-push drilling methods. Continuous sample cores will be collected. From each boring, five soil samples will be collected for total mercury analysis at the following general depth intervals:

- 5 to 6 feet
- 8 to 9 feet
- 11 to 12 feet
- 13 to 14 feet
- 16 to 17 feet

The sample intervals in each boring will be adjusted somewhat based on field screening and/or the quantity of soil recovery in each core. Field screening will include watching for visual indications of suspected wastewater sludge residual. In addition, a hand-held x-ray fluorescence (XRF) spectrometer will be used to estimate concentrations of mercury in soils across the entire length of soil core retrieved. The visual and XRF screening information will be used to help select sample depth intervals for laboratory analysis, accounting for the existing soil data (Figure 5) with understanding for how the settling basin operated and was backfilled, as well as the need to provide a vertical distribution of data to a depth of at least 15 feet and vertically bound mercury concentrations exceeding 300 mg/kg.

The selected soil samples will be submitted to ALS-Everett for analysis of total mercury (EPA Method 7471). To support waste profiling, an estimated six soil samples with highest detected mercury concentrations will also be analyzed for RCRA 8 metals (EPA Method 6020), diesel- and oil-range petroleum hydrocarbons (Method NWTPH-Dx) and semivolatile organic compounds (SVOCs; EPA Method 8270). In addition, for any analyte on the toxicity characteristic list (WAC 173-303-090(8)) that is detected at soil concentration exceeding the "20-times rule of thumb" for the toxicity characteristic, the sample will also be submitted for toxicity characteristic leaching procedure (TCLP) analysis (EPA Method 1311).

7 Test Pits to Document Subsurface Obstructions

Test pits will be conducted to document the dimensions and condition of subsurface structures and utilities that may represent obstructions to excavation or may require physical protection (or temporary removal and replacement) in areas planned for excavation as part of the RAU remedy. The goal for the test pit explorations is to be able to include in the future project construction plans and specifications photographic and dimensional information regarding type, condition, and size of subsurface structures/utilities to be managed during the cleanup construction activities. Making known these conditions in the contract documents reduces uncertainty for project bidders and later chances for contractor change orders during project execution.

The first task will be to complete a desktop review of Georgia-Pacific's historical drawings for structures within planned excavation areas; pertinent drawings will be included in the contract documents. Likewise, available information regarding historical and active utilities will be assembled and reviewed. Data from the desktop review will also inform test pit exploration locations.

Test pits to document subsurface obstructions are warranted in the following areas of the historical Chlorine Plant, as depicted on Figure 6:

- The four locations planned for *in situ* solidification (ISS) of soils containing visible elemental mercury outside of the former mercury cell building footprint. The cell building foundation system is well documented including additional information collected during the PRDI 2 obstruction removal pilot test, completed in Fall 2022 (Aspect, 2022); therefore, test pits are not warranted within the cell building footprint. A total of nine test pits are proposed within the four ISS locations.
- Following the dry-season groundwater sampling and determination of Caustic Core dimensions, we will submit for Ecology approval a brief memorandum presenting the groundwater quality data, preliminary design ISN trench alignments, and proposed test pit locations. We anticipate that up to 10 test pits will be completed to verify subsurface structures along the preliminary-design ISN trench alignments.

Prior to test pitting, a public one-call utility locating service will be used, and a private utility locating service will be subcontracted to identify utility locations to the extent practicable, as well as clear the proposed areas of subsurface exploration.

Test pits will be completed by an excavation operator, under subcontract to Aspect, to depths of approximately 6 feet below grade or shallower if a structure or utility expected at the location is observed clearly enough at a shallower depth to allow its accurate documentation. Given the shallow water table across the area of interest, dewatering will be conducted within the test pits as needed to expose subsurface obstructions in unsaturated conditions for documentation. The water generated from excavation dewatering will be collected and conveyed to the Port's pump station for the ASB.

Each test pit will be logged by an Aspect field geologist, and photographs will be taken of structures or utilities encountered. The test pit work will be completed in accordance with the Inadvertent Discovery Plan (IDP) included as Appendix C. The time that each test pit is open will be the minimum required to document subsurface obstructions.

During test pit excavation, Aspect will conduct air monitoring for mercury within the breathing zone for the purpose of worker health and safety using a hand-held Jerome® mercury vapor analyzer. If measured mercury vapor concentrations in the breathing zone exceed the 100 micrograms per cubic meter (ug/m^3) Occupational Safety and Health Administration (OSHA) permissible exposure limit, the excavator operator will apply mercury vapor suppression methods (applying HgX® solution or equivalent to exposed soils).

All excavated soils will be backfilled into the test pit and lightly compacted by tamping with the backhoe bucket. After placement of the backfill, the excavation operator will restore the test area by constructing a hot mix asphalt (HMA) pavement section[10] to match the surrounding existing surface grade.

8 Survey Surface Conditions to Inform Cap Design

The CAP requires installation and maintenance of hard caps (minimum 3-inch-thick pavement or building foundation/slab that is at grade) in all areas of the RAU where contaminant concentrations exceed soil cleanup levels. The hard caps will control stormwater infiltration through, control direct contact exposure to, and erosion of, soil exceeding cleanup levels. Figure 7 depicts areas of the RAU that require hard capping of soils per the CAP[11]. Portions of the capping areas will first have intrusive cleanup actions (e.g., excavation in wastewater settling basin, ISS) completed prior to conducting capping. While soil capping is included as the final component of the RAU cleanup action (Project D) in the CAP, utility or structural improvements occurring outside of the intrusive cleanup action areas may dictate completion of the capping in phases.

Most of the areas required for capping are currently capped with pavement that may or may not have a thickness and condition[12] that adequately isolates underlying contaminated soil to achieve environmental protection. The surface conditions within the soil capping areas will therefore be surveyed as part of PRDI 3 to inform design of the soil cap for each required capping area of the RAU. The condition survey will be conducted generally as follows:

- Aspect will subcontract a Washington State-licensed surveyor, Wilson Engineering LLC (Wilson), to survey and field-mark vertices spaced no more

[10] A minimum of 3 inches of crushed surfacing base course overlain by 3 inches of HMA Class ½", PG 64-22.
[11] The CAP also required capping of cPAH-contaminated soils within the Lignin Operable Unit (OU) of the RAU. However, Ecology's July 2022 CAP for the Lignin OU changed that remedy from soil capping to soil removal, which was completed in December 2022. Therefore, capping is not required for that OU.
[12] Lack of voids or significant cracks.

than 100 feet around the perimeters of the cap areas. Within each capping area, Wilson will also survey transition lines between surface types (asphalt, concrete, and unpaved) as well as corners of any structures present within the ABC Recycling lease area.

- Within each marked capping area, Aspect will conduct a visual survey of existing surface conditions[13] including:
  - Surface type (e.g., concrete, asphalt, unpaved, or other to be described).
  - Condition of hard surface (e.g., competent versus degraded).
  - Thickness of hard surface. Based on understanding of Georgia-Pacific's historical structural construction methods and prior excavation work exposing subgrade structures, it is assumed with confidence that concrete slabs and footings present at the surface are greater than 3 inches in thickness. Where the thickness of competent asphalt pavement cannot be confidently determined by observing its edges, the asphalt thickness will be confirmed by coring at several locations conducted by a concrete coring subcontractor.

Aspect will use the survey information to develop a map of current surface cover and topography within the cap-required areas. The information will be used during cap design to determine areas with competent hard cap that can be retained versus areas that require new hard capping to meet CAP requirements.

In addition, because the location of the Chemfix area (requiring capping) was based on Georgia-Pacific's sketches from the time the material was placed (mid-1970s), its exact dimensions are uncertain and warrant better delineation to ensure any new capping required adequately covers it and to inform potential future subsurface utility or other intrusive work in that area. Therefore, the PRDI 3 work will include shallow test pitting around the currently defined perimeter of the Chemfix area. As described in the RI (Aspect, 2013), the solidified Chemfix material was capped with (from bottom up) a layer of bank run fill; a geotextile membrane extending 10 feet beyond the lateral extent of Chemfix; a 6-inch layer of sand; and two layers of asphalt together totaling 5 to 6 inches in thickness.

The test pitting will therefore seek to observe and define the limits of the geotextile beneath the asphalt and sand/base course without disrupting the geotextile to the extent practicable. This will involve sawcutting the asphalt, using a backhoe/small excavator to remove the asphalt, and if needed, hand methods (shovel) to remove underlying base course material and uncover the geotextile without damage. The exact locations for the potholes will be determined based on access, including within ABC Recycling's facility where material stockpiles come and go over time. For each test pit location, the excavated base course will be backfilled into the excavation and lightly compacted by tamping with the backhoe bucket, followed by paving with HMA to match the existing surface grade.

[13] Field information will be recorded in the GPS-enabled ArcGIS Field Maps application within which Wilson's prior topographic and utilities survey of the RAU can be viewed as a base map.

9 Survey of PRDI 3 Locations

In addition to completing a survey of the soil capping areas described in Section 8, Wilson Engineering will survey completed PRDI 3 locations including new monitoring wells, soil borings, test pit locations, subsurface structures and utilities, and preliminary ISN trench locations. All survey data will be tied to the City of Bellingham horizontal and vertical datums (NAD83 and NAVD88). The survey will be used for preparation of the Chlor-Alkali RAU Engineering Design Report and then cleanup action construction plans and specifications.

10 Cultural Resources and Inadvertent Discovery Plan

The PRDI 3 subsurface explorations lie within zones of moderate to high probability for encountering archaeological materials, as determined by Northwest Archaeological Associates as part of the Waterfront District New Whatcom Environmental Impact Statement (Appendix M to Blumen and Associates, 2007). If present, archaeological materials would be expected near the top of the native beach/tideflat deposits that underlie the fill. The PRDI 3 subsurface explorations will be completed in accordance with the IDP included as Appendix D. The IDP defines the stop-work and notification procedures for Aspect's field personnel to perform in the event of discovering potential archaeological materials while completing the subsurface explorations (monitoring wells described in Section 4, soil borings described in Section 6, and test pits described in Section 7).

11 Schedule and Reporting

The PRDI 3 results will be reported in the PRDI 3 Data Report in accordance with the schedule outlined in Table 4. The PRDI 3 Data Report will also include the treatability testing results and the recommended chemical reagents determined during treatability testing to be included in ISN remedial design.

The PRDI 3 Data Report, once approved by Ecology, will serve as the primary basis for design of the ISN cleanup action. The ISN cleanup action will be described in the Engineering Design Report for the entire Chlor-Alkali RAU cleanup action, and then refined in the construction plans and specifications for the Caustic Core ISN cleanup action (Project B as identified in the Chlor-Alkali RAU CAP).

Table 4. Agreed Order Schedule of Deliverables

Deliverable	Due Date
Final PRDI 3 Project Plan	August 22, 2023
Ecology Draft PRDI 3 Data Report	120 days after completion of PRDI 3 activities
Final PRDI 3 Data Report	60 days after Ecology comments on Draft

Assuming the date listed in Table 4 for the final PRDI 3 Project Plan, the estimated subsequent schedule for PRDI 3 activities is outlined below.

Table 5. Estimated Schedule of PRDI 3 Activities

Activity	Assumed Duration (days)	Estimated Completion Date
Groundwater Well Installation	2	September 15, 2023
Dry-Season Groundwater Sampling	3	September 22, 2023
Wastewater Settling Basin Soil Sampling	3	September 28, 2023
ISN Treatability Testing	10	October 27, 2023
Survey Surface Conditions in Cap Areas	2	November 30, 2023
Test Pits to Document Obstructions	5	November 30, 2023
Complete PRDI 3 Activities	75	November 30, 2023

12 References

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Washington State Department of Ecology (Ecology), 2022, Georgia-Pacific West Bellingham Site—Minor Modification to Third Amendment to Agreed Order No. 6834, March 22, 2022.

13 Limitations

Work for this project was performed for the 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.

All reports prepared by Aspect Consulting for the Client apply only to the services described in the Agreement(s) with the Client. Any use or reuse by any party other than the Client is at the sole risk of that party, and without liability to Aspect Consulting. Aspect Consulting's original files/reports shall govern in the event of any dispute regarding the content of electronic documents furnished to others.

TABLES

Table 1. Inventory of Existing Monitoring Wells

Project No. 210368-B, Chlor-Alkali RAU, GP West Site, Bellingham, Washington

Well ID	Unit Screened	Installed Total Depth (ft bgs)	Screened Interval (ft bgs)	Casing Diameter (in)	Depth to Water (ft bTOC)	Total Depth (ft bTOC)	Able to Locate (Y/N)
AMW-02	Fill Unit	15	10-15	2	3.91	12.94	Y
AMW-03	Fill Unit	15	10-15	2	2.28	14.34	Y
CP-DW1	Lower Sand	48	28-48	6	8.05	51.90	Y
CP-DW2	Lower Sand	48	28-48	8	5.55	52.78	Y
CP-DW3	Lower Sand	48	28-48	8	6.97	51.34	Y
CP-DW4	Lower Sand	48	28-48	8	8.10	52.39	Y
CP-DW5	Lower Sand	48	28-48	8	7.76	52.98	Y
CP-DW6	Lower Sand	48	28-48	4	8.35	47.38	Y
CP-MW01	Fill Unit	15	10-15	0.75	5.02	14.86	Y
CP-MW04	Lower Sand	40	30-40	2	7.74	40.11	Y
CP-MW06	Fill Unit	17	12-17	0.75	2.12	16.59	Y
CP-MW08	Fill Unit	15	10-15	0.75	5.07	14.60	Y
CP-MW09	Fill Unit	16	11-16	0.75	5.48	15.96	Y
CP-MW10	Fill Unit	12	7-12	0.75	0.53	11.72	Y
CP-MW12	Fill Unit	11	6-11	0.75	6.14	11.23	Y
CP-MW13	Fill Unit	16	11-16	0.75	1.05	15.79	Y
CP-MW21	Lower Sand	45	35-45	2	7.53	44.83	Y
CP-MW22	Fill Unit	15	10-15	2	2.41	13.71	Y
CP-MW23	Lower Sand	48	38-48	2	8.33	39.80	Y
CP-MW24	Fill Unit	15	5-15	2	2.21	15.12	Y
CP-MWA1	Fill Unit	16	11-16	2	4.17	15.34	Y
CP-MWB1	Fill Unit	16	11-16	2	5.86	15.41	Y
CP-MWC1	Fill Unit	14	9-14	2	4.28	13.58	Y
EMW-14S	Fill Unit	14	4-14	2	2.19	15.18	Y
EMW-19S	Fill Unit	15	5-15	2	1.33	15.13	Y
EMW-28D	Lower Sand	40	30-40	2	6.96	39.42	Y
L1-MW03	Fill Unit	19	14-19	0.75	5.34	19.27	Y
CP-MW05	Lower Sand	40	30-40	2	NM	NM	N
CP-MW07	Fill Unit	17	12-17	0.75	NM	NM	N
CP-MW11	Fill Unit	15	10-15	0.75	NM	NM	N
CP-MWA2	Fill Unit	16	11-16	2	NM	NM	N
CP-MWA3	Fill Unit	14	9-14	2	NM	NM	N
CP-MWB2	Fill Unit	15	10-15	0.75	NM	NM	N
CP-MWB3	Fill Unit	16	11-16	0.75	NM	NM	N
CP-MWC2	Fill Unit	16	11-16	2	NM	NM	N
CP-MWC3	Fill Unit	14.9	9.9-14.9	2	NM	NM	N
EMW-01S	Fill Unit	10	5-10	2	NM	NM	N
EMW-15S	Fill Unit	13	3-13	2	NM	NM	N
LAW-3	Fill Unit	14.5	5-14.5	2	NM	NM	N
LAW-4	Fill Unit	14	4-14.5	2	NM	NM	N
LAW-8	Fill Unit	12.5	3-12.5	2	NM	NM	N

Notes:

- Well not found or not accessible for sampling (as of March 2023 well inventory).
- Accessible Fill Unit well.
- Accessible Lower Sand well.

Wells previously decommissioned are not listed.

Measurements collected March 27-29, 2023.

NM - not measured. TOC - top of casing. bTOC - below top of casing. bgs - below ground surface.

ft - feet. In - inches.

Table 2. April 2023 Groundwater Sampling Results

Project No. 210368-B, Chlor-Alkali RAU, GP West Site, Bellingham, Washington

Analyte	Unit	Groundwater Cleanup Level	Groundwater Remediation Level	AMW-02 04/18/2023	AMW-03 04/18/2023	CP-MW01 04/17/2023	CP-MW06 04/17/2023	CP-MW08 04/17/2023	CP-MW09 04/17/2023	CP-MW13 04/17/2023	CP-MW22 04/17/2023	CP-MW24 04/17/2023	CP-MWA1 04/18/2023
Dissolved Metal													
Mercury	ug/L	0.059	7.6	**5.4**	**2.2**	**0.13**	**0.93**	**0.01**	< 0.0005 U	**0.23**	**8.2**	**0.66**	**2.7**
Geochemical Parameters													
Aluminum	ug/L			**2100**	**310**	< 50 U	**3600**	--	--	< 50 U	**270**	**970**	**280**
Alkalinity, Total	mg/L			**3600**	**4600**	**1600**	**1400**	--	--	**450**	**1200**	**580**	**8000**
Calcium	ug/L			**12000**	**6900**	**35000**	**6700**	--	--	**39000**	**25000**	**8400**	**10000**
Chloride	mg/L			**1700**	**250**	**90**	**810**	--	--	**670**	**1900**	**190**	**1600**
Iron	ug/L			**2300**	**5100**	**840**	**5500**	--	--	**410**	**670**	**2200**	**9200**
Magnesium	ug/L			**1600**	< 120 U	**19000**	**720**	--	--	**5000**	**12000**	**1600**	**160**
Manganese	ug/L			**160**	**25**	**1100**	**93**	--	--	**260**	**110**	**76**	**21**
Nitrate as Nitrogen	mg/L			< 0.76 U	< 0.76 U	< 0.15 U	< 0.15 U	--	--	< 0.15 U	< 0.15 U	< 0.15 U	< 0.76 UJ
Nitrite as Nitrogen	mg/L			< 2.5 U	< 0.71 U	< 0.5 U	< 2.5 U	--	--	< 2.5 U	< 2.5 U	< 1 U	< 2.5 U
Potassium	ug/L			**12000**	**20000**	**13000**	**2300**	--	--	**11000**	**13000**	**3800**	**60000**
Sodium	ug/L			**2500000**	**2900000**	**740000**	**1200000**	--	--	**590000**	**1800000**	**360000**	**6300000**
Sulfate	mg/L			**2.2**		**0.6**	**1.2**	--	--	**1.6**	**31**	< 0.26 U	**4.9**
Sulfide	mg/L			**70**	**72**	--	< 0.05 U	--	--	--	--	**0.21**	**120**
Total Organic Carbon	mg/L			**630**	**700**	--	**220**	--	--	--	--	**35**	**1200**
Field Parameters													
Temperature	deg C			**12.09**	**13.04**	**11.69**	**12.36**	**12.22**	**10.3**	**12.44**	**12.47**	**12.59**	**12.29**
Specific Conductance	uS/cm			**10551**	**7071.7**	**2895.4**	**5595.8**	**775.92**	**168.14**	**2650.3**	**6607.5**	**1502.5**	**12872**
Dissolved Oxygen	mg/L			<0.01	<0.01	<0.01	<0.01	**0.08**	**0.04**	**0.06**	**0.27**	**0.04**	<0.01
pH	pH units	6.2-8.5	10.0	**9.62**	**12.17**	**8.43**	**9.40**	**7.34**	**8.16**	**7.79**	**9.71**	**9.24**	**10.55**
Oxidation Reduction Potential	mV			**-391.1**	**-400.6**	**-294.7**	**-215.2**	**63.8**	**-8.5**	**-95.2**	**-1.5**	**14.1**	**-413.2**
Turbidity	NTU			**4.5**	**12.5**	**15.6**	**74.3**	**4.55**	**6.62**	**5.67**	**42.4**	**31.6**	**12.5**

Notes:

Groundwater cleanup levels and remediation levels are described in Section 5.2 of the CAP (Ecology, 2021). Groundwater remediation levels apply at shoreline monitoring wells located upgradient of the conditional point of compliance for the Caustic Plume area.

Bold - detected

Blue Shaded - Detected result exceeded cleanup level

Orange Shaded - Detected result exceeded remediation level

U - Analyte not detected at or above Reporting Limit (RL) shown

UJ - Analyte not detected and the Reporting Limit (RL) is an estimate

Table 2. April 2023 Groundwater Sampling Results

Project No. 210368-B, Chlor-Alkali RAU, GP West Site, Bellingham, Washington

Analyte	Unit	Groundwater Cleanup Level	Groundwater Remediation Level	CP-MWB1 04/18/2023	CP-MWC1 04/18/2023	EMW-04S 04/17/2023	EMW-14S 04/18/2023	EMW-19S 04/18/2023
Dissolved Metal								
Mercury	ug/L	0.059	7.6	**0.097**	**0.2**	**0.0009**	**0.28**	**30**
Geochemical Parameters								
Aluminum	ug/L			< 50 U	**580**	--	**550**	**660**
Alkalinity, Total	mg/L			**970**	**190**	**1000**	**220**	**720**
Calcium	ug/L			**8400**	**2900**	--	**13000**	**1900**
Chloride	mg/L			**230**	**10**	--	**150**	**45**
Iron	ug/L			**71**	**820**	--	**1100**	**4900**
Magnesium	ug/L			**3600**	**430**	--	**1800**	**64**
Manganese	ug/L			**19**	**20**	--	**67**	**47**
Nitrate as Nitrogen	mg/L			< 0.15 U	**0.28**	--	**3**	< 0.15 U
Nitrite as Nitrogen	mg/L			< 1 U	< 0.14 U	--	< 0.5 U	< 0.14 U
Potassium	ug/L			**4900**	**960**	--	**1100**	**1700**
Sodium	ug/L			**640000**	**120000**	--	**200000**	**460000**
Sulfate	mg/L			< 0.26 U	**2**	--	**6.1**	**160**
Sulfide	mg/L			**0.2**	--	--	--	**0.55**
Total Organic Carbon	mg/L			**23**	--	--	--	**32**
Field Parameters								
Temperature	deg C			**11.52**	**11.24**	**11.34**	**11.12**	**11.78**
Specific Conductance	uS/cm			**2280.5**	**302.21**	**2026.9**	**659.64**	**1769.2**
Dissolved Oxygen	mg/L			**0.1**	**0.58**	**0.04**	**0.16**	<0.01
pH	pH units	6.2-8.5	10.0	**8.33**	**10.40**	**6.46**	**7.25**	**10.64**
Oxidation Reduction Potential	mV			**42.5**	**59.4**	**-35.7**	**76.1**	**-287.1**
Turbidity	NTU			**5.31**	**233**	**23.1**	**13.7**	**8.75**

Notes:

Groundwater cleanup levels and remediation levels are described in Section 5.2 of the CAP (Ecology, 2021). Groundwater remediation levels apply at shoreline monitoring wells located upgradient of the conditional point of compliance for the Caustic Plume area.

Bold - detected

Blue Shaded - Detected result exceeded cleanup level

Orange Shaded - Detected result exceeded remediation level

U - Analyte not detected at or above Reporting Limit (RL) shown

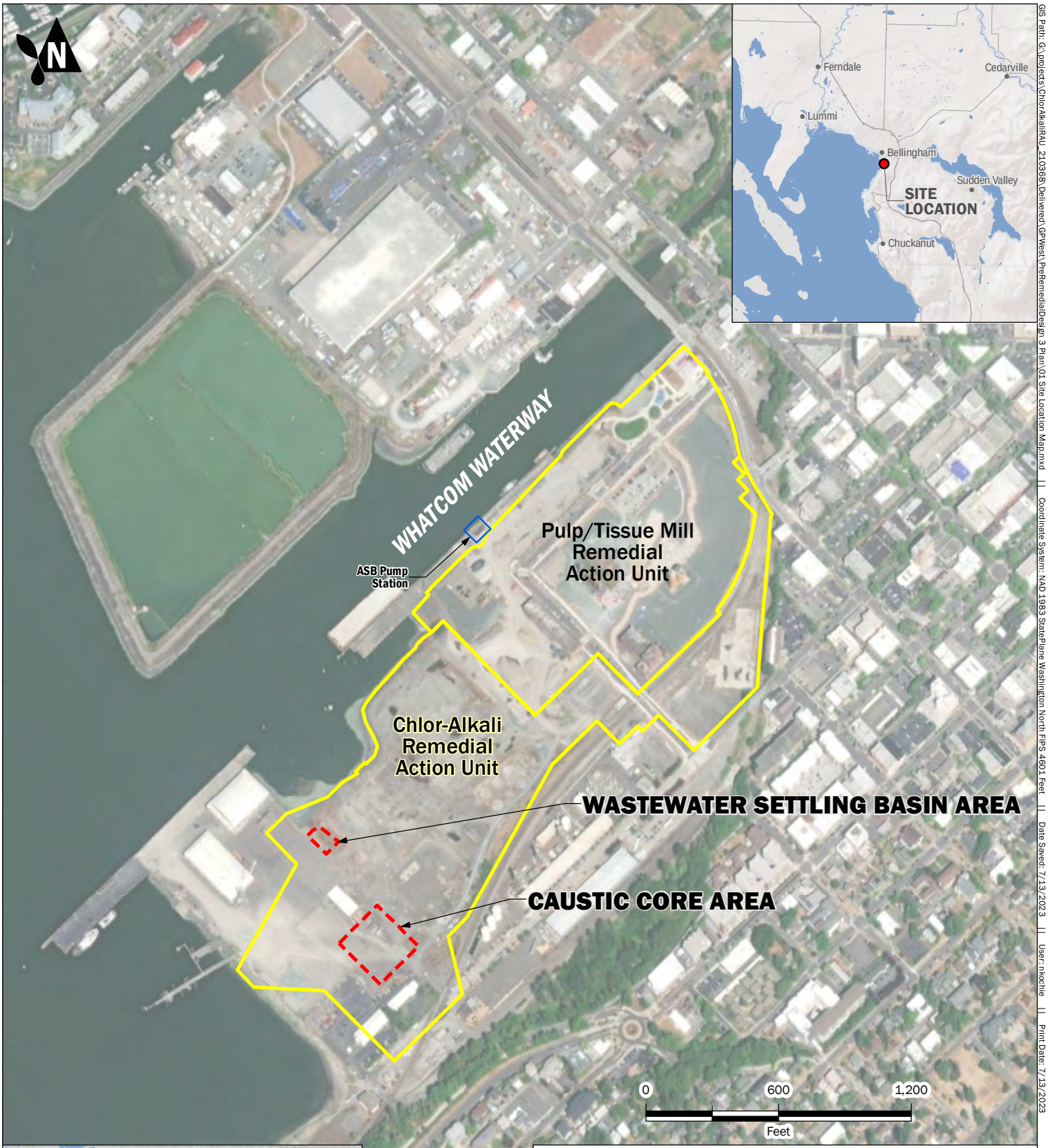
UJ - Analyte not detected and the Reporting Limit (RL) is an estimate

Table 3. Titration Batch Test Matrix

Project No. 210368-B, Chlor-Alkali RAU, GP West Site, Bellingham, Washington

Titrating Reagent	Test ID	Soil Mass (g)	Groundwater Volume (mL)	Liquid to Soild ratio
Ferrous Sulfate	Batch-1	0	200	--
	Batch-2	2	200	100
	Batch-3	20	200	10
Ferric Sulfate	Batch-4	0	200	--
	Batch-5	2	200	100
	Batch-6	20	200	10
Aluminum sulfate	Batch-7	0	200	--
	Batch-8	2	200	100
	Batch-9	20	200	10
Ferric Chloride	Batch-10	0	200	--
	Batch-11	2	200	100
	Batch-12	20	200	10
	Total:	**88**	**2400**	

FIGURES

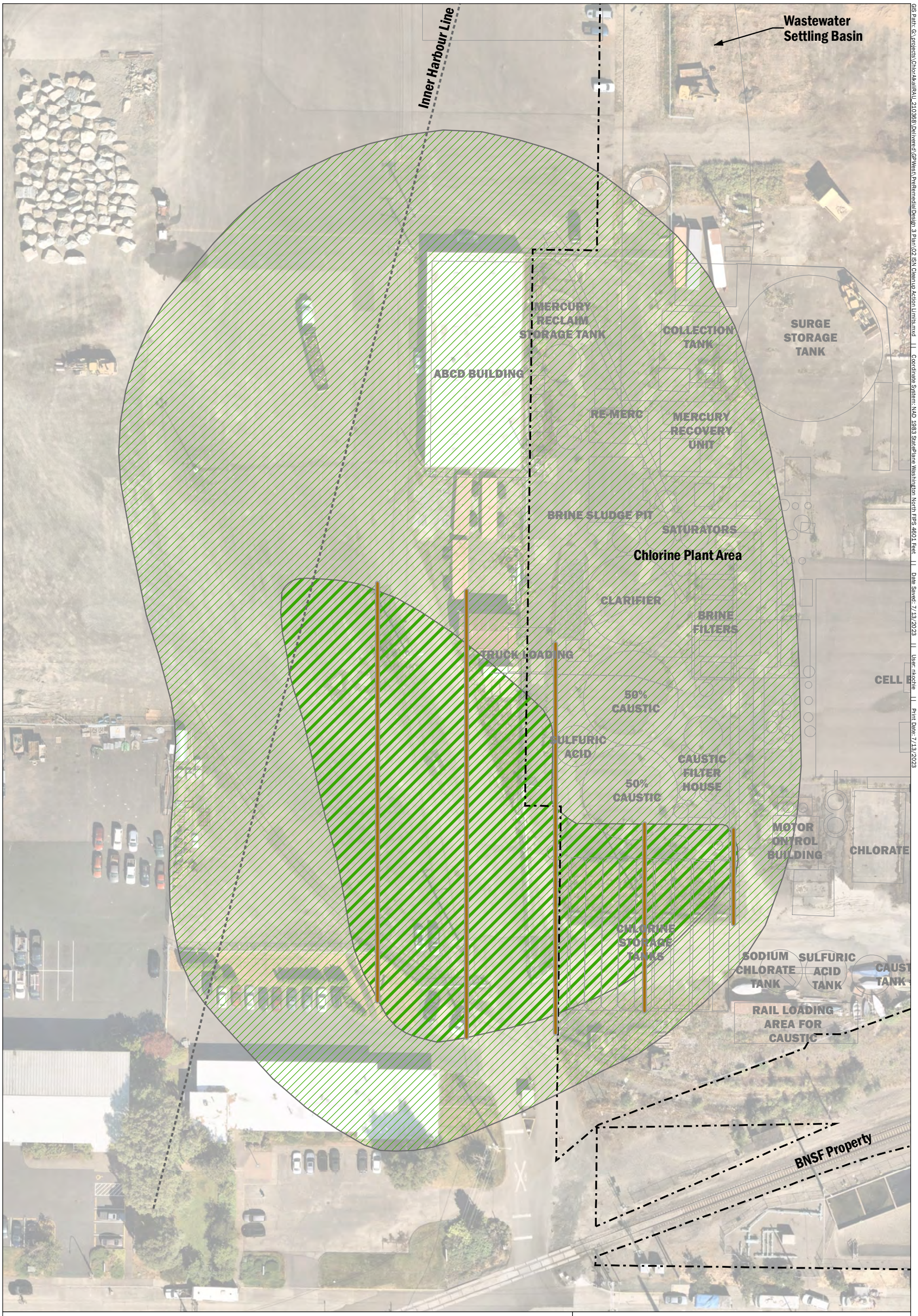


Site Location Map

Pre-Remedial Design Investigation 3 Project Plan
Chlor-Alkali RAU - GP West Site
Bellingham, Washington

Aspect CONSULTING	JUL-2023	BY: AAF / SCC	FIGURE NO. 1
	PROJECT NO. 210368	REVISED BY: NLK	

GIS Path: G:\projects\Chlor-Alkali\RAU_210368\Delivered\GPWest\PreRemedialDesign 3 Plan\01 Site Location Map.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 7/13/2023 || User: nkochie || Print Date: 7/13/2023



Groundwater Quality as of 2015
(to be refined during PRDI 3)

- Fill Unit Groundwater pH > 8.5
- Fill Unit Groundwater pH > 10 ("Caustic Core")
- Property Boundaries from ALTA Survey (David Evans and Associates, 2004)
- ISN Trench from CAP (Configuration to be refined during design)
- Historical GP West Features

MILL NORTH
TRUE NORTH
45°

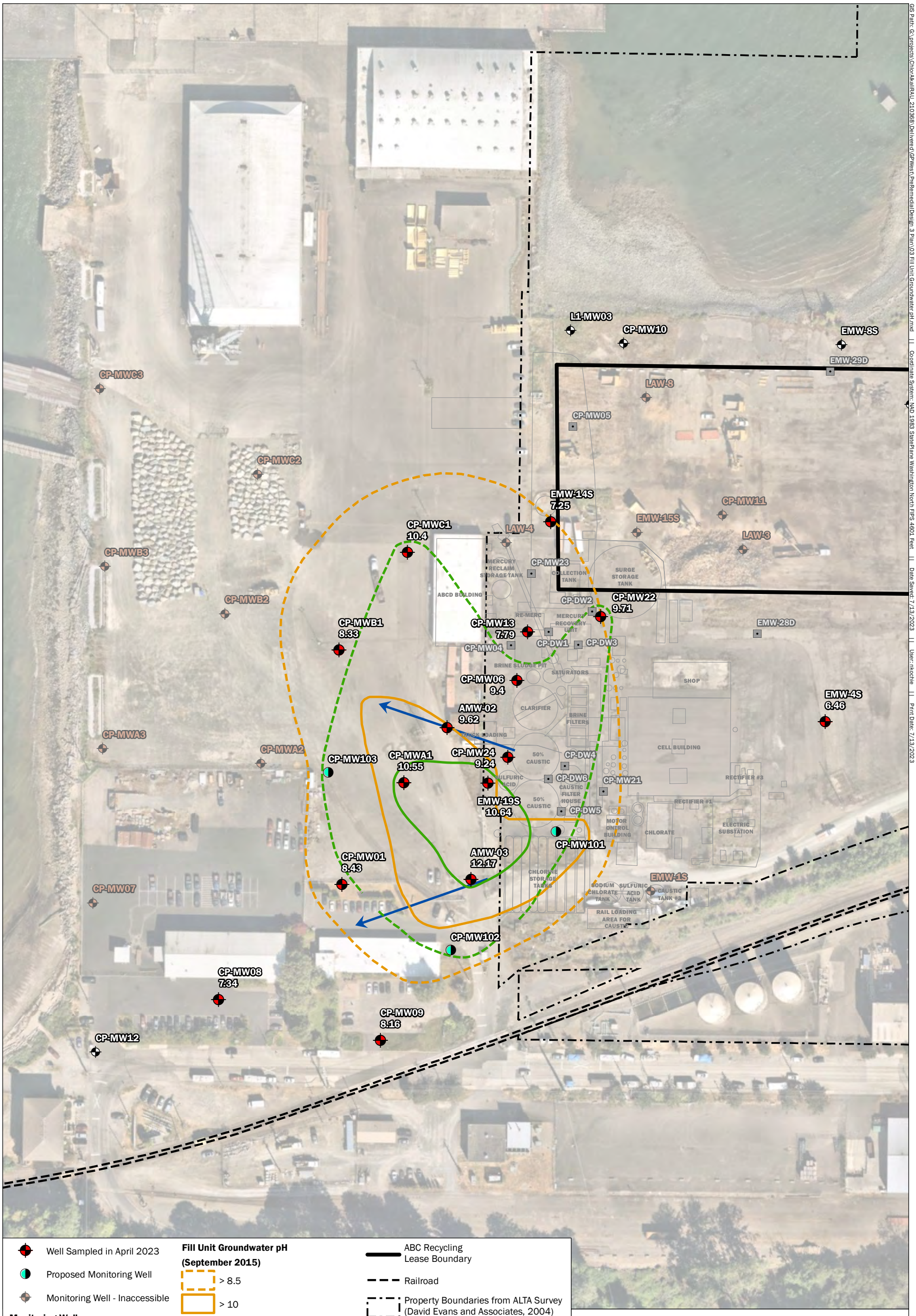
0 30 60
Feet

ISN Cleanup Action Limits

Pre-Remedial Design Investigation 3 Project Plan
Chlor-Alkali RAU - GP West Site
Bellingham, Washington

Aspect CONSULTING	JUL-2023	BY: DIM / NLK	FIGURE NO. 2
	PROJECT NO. 210368	REVISED BY: ---	

GIS Path: G:\projects\ChlorAlkaliRAU_210368\Delivered\GPWest\PreRemedialDesign 3 Plan\02 ISN Cleanup Action Limits.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 7/13/2023 || User: nkochle || Print Date: 7/13/2023



Well Sampled in April 2023

Proposed Monitoring Well

Monitoring Well - Inaccessible

Monitoring Well

Fill Unit

Lower Sand

Fill Unit Groundwater pH (Std. Units)
(April 2023)

> 8.5

> 10

Fill Unit Groundwater pH
(September 2015)

> 8.5

> 10

Generalized Groundwater Flow Directions (Mar. 2010 data)

CP-MW08 ← Well ID
7.34 ← Apr. 2023 Groundwater pH (std. units)

ABC Recycling Lease Boundary

Railroad

Property Boundaries from ALTA Survey (David Evans and Associates, 2004)

Historical GP West Features

0 60 120
Feet

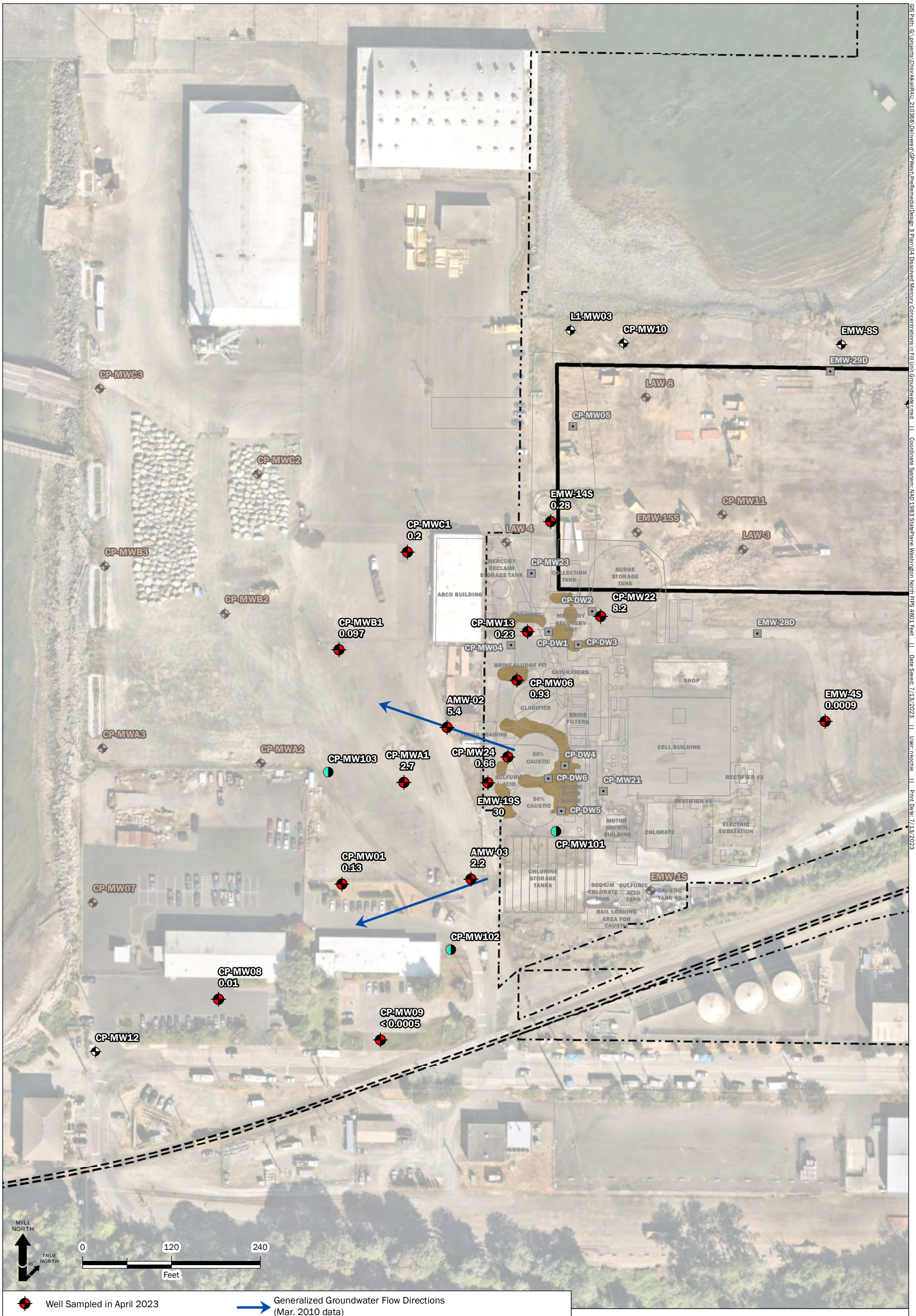
MILL NORTH
TRUE NORTH
45°

Fill Unit Groundwater pH

Pre-Remedial Design Investigation 3 Project Plan
Chlor-Alkali RAU - GP West Site
Bellingham, Washington

Aspect Consulting	JUL-2023	BY: DIM / NLK	FIGURE NO. 3
	PROJECT NO. 210368	REVISED BY: ---	

GIS Path: G:\projects\ChlorAlkaliRAU_210368\Delivered\GPWest\PreRemedialDesign 3 Plan\03 Fill Unit Groundwater pH.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 7/13/2023 || User: nkochle || Print Date: 7/13/2023



Well Sampled in April 2023

Proposed Monitoring Well

Monitoring Well - Inaccessible

Monitoring Well

Fill Unit

Lower Sand

Completed 2014 Interim Action Excavations

Generalized Groundwater Flow Directions (Mar. 2010 data)

ABC Recycling Lease Boundary

Railroad

Historical GP West Features

Property Boundaries from ALTA Survey (David Evans and Associates, 2004)

CP-MW01 ← Well ID
0.13 ← Apr. 2023 Dissolved Mercury Concentration (µg/L)

Dissolved Mercury Concentrations in Fill Unit Groundwater

Pre-Remedial Design Investigation 3 Project Plan
Chlor-Alkali RAU - GP West Site
Bellingham, Washington

Aspect Consulting	JUL-2023	BY: DIM / NLK	FIGURE NO. 4
	PROJECT NO. 210368	REVISED BY: ---	

L1-MW06
(3 - 5) 0.031
(5 - 7) 0.276
(13 - 14) 0.065
(16 - 17) 0.856

L1-MW02
(4 - 5) 0.219
(7 - 9) 6.49
(11 - 12) 3.37
(13 - 14) 0.075
(16 - 17) 0.143

STB-01
(3.5 - 5) 0.9
(7.5 - 9) 0.1U
(11.5 - 13) 0.6
(15 - 16.5) 0.8

L1-MW03
(4 - 5) 3.01
(7 - 9) 0.121
(11 - 12) 0.356
(13 - 14) 0.256
(15 - 16) 0.147

ESB-18S
(5 - 6.5) 0.13
(10 - 11.5) 0.43
(14 - 15.5) 74
(25 - 26.5) 0.11U

L1-MW01
(3 - 4) 0.195
(7 - 9) 1.02
(11 - 13) 3.72
(14 - 15) 51.5

ESB-16S
(5 - 6.5) 140
(10 - 11.5) 31
(18 - 19.5) 5.7

L1-MW05
(3 - 5) 22.5
(7 - 9) 108
(11 - 12) 5.26
(13 - 14) 7.08
(16 - 18) 1.27

WSB-101
WSB-102
WSB-103
WSB-104
WSB-105
WSB-106
WSB-107
WSB-108
WSB-109
WSB-110
WSB-111
WSB-112
WSB-113

L1-MW04
(3 - 4) 62.0
(5 - 7) 48.7
(8 - 10) 1760
(10 - 12) 5.65
(13 - 15) 3.31

CP-MW05
(2.5 - 4) 32.2
(5 - 6.5) 4.67
(7.5 - 9) 23.7
(10 - 11.5) 101
(12.5 - 14) 375
(15 - 16.5) 14.6
(17.5 - 19) 33.8
(20 - 21.5) 4.02
(22 - 23) 0.078
(26 - 27) 0.031
(30 - 31) 0.015J
(34 - 35) 0.019
(38 - 39) 0.014J

STB-12
(3.5 - 5) 0.9
(7.5 - 9) 16

SITE-6
(0 - 0.5) 1

CP-MW03
(1.5 - 2.5) 0.709
(13 - 15) 1050

SITE-5
(0 - 0.5) 21

AS-04
(0 - 2.5) 0.217
(2.5 - 5) 0.065
(5 - 7.5) 0.063
(5 - 7.5) 0.064
(7.5 - 10) 0.119

SITE-4
(0 - 0.5) 10

SITE-3
(0 - 0.5) 82

STB-15
(3.5 - 5) 69
(7.5 - 9) 0.9

ESB-17S
(7 - 8.5) 0.37
(11 - 12.5) 0.14
(11 - 12.5) 1.53
(20 - 21.5) 1.1

ESB-14S
(5 - 6.5) 0.60
(10 - 11.5) 200
(22 - 23.5) 0.13U

SITE-7
(0 - 0.5) 18

SITE-2
(0 - 0.5) 42

ESB-15S
(5 - 6.5) 0.11U
(10 - 11.5) 56
(22 - 23.5) 0.23

Truck Scale

Modular Scale Office

SITE-8
(0 - 0.5) 119

SITE-1
(0 - 0.5) 38

EMW-14S
(5 - 6.5) 3.6
(10 - 11.5) 160
(16 - 17.5) 47

EMW-15S
(5 - 6.5) 2.6

STB-04
(3.5 - 5) 3.1
(7.5 - 9) 0.1U

STB-13
(5 - 6.5) 1.1

40-ft Storage Containers

MILL NORTH
TRUE NORTH
45°
0
25
50
Feet

Mercury Concentrations in Soil (RI Data Set)

- Max Hg ≤ 0.1 mg/kg
- 0.1 mg/kg < Max Hg ≤ 24 mg/kg
- 24 mg/kg < Max Hg ≤ 300 mg/kg
- Max Hg > 300 mg/kg
- Proposed Soil Boring

- Estimated Extent of Soil > 300 mg/kg Hg to be Removed per CAP
- Wastewater Settling Basin (Approx)
- Limit of Log Pond Cap
- ABC Recycling Lease Boundary
- Mean Higher High Water (MHHW) Line

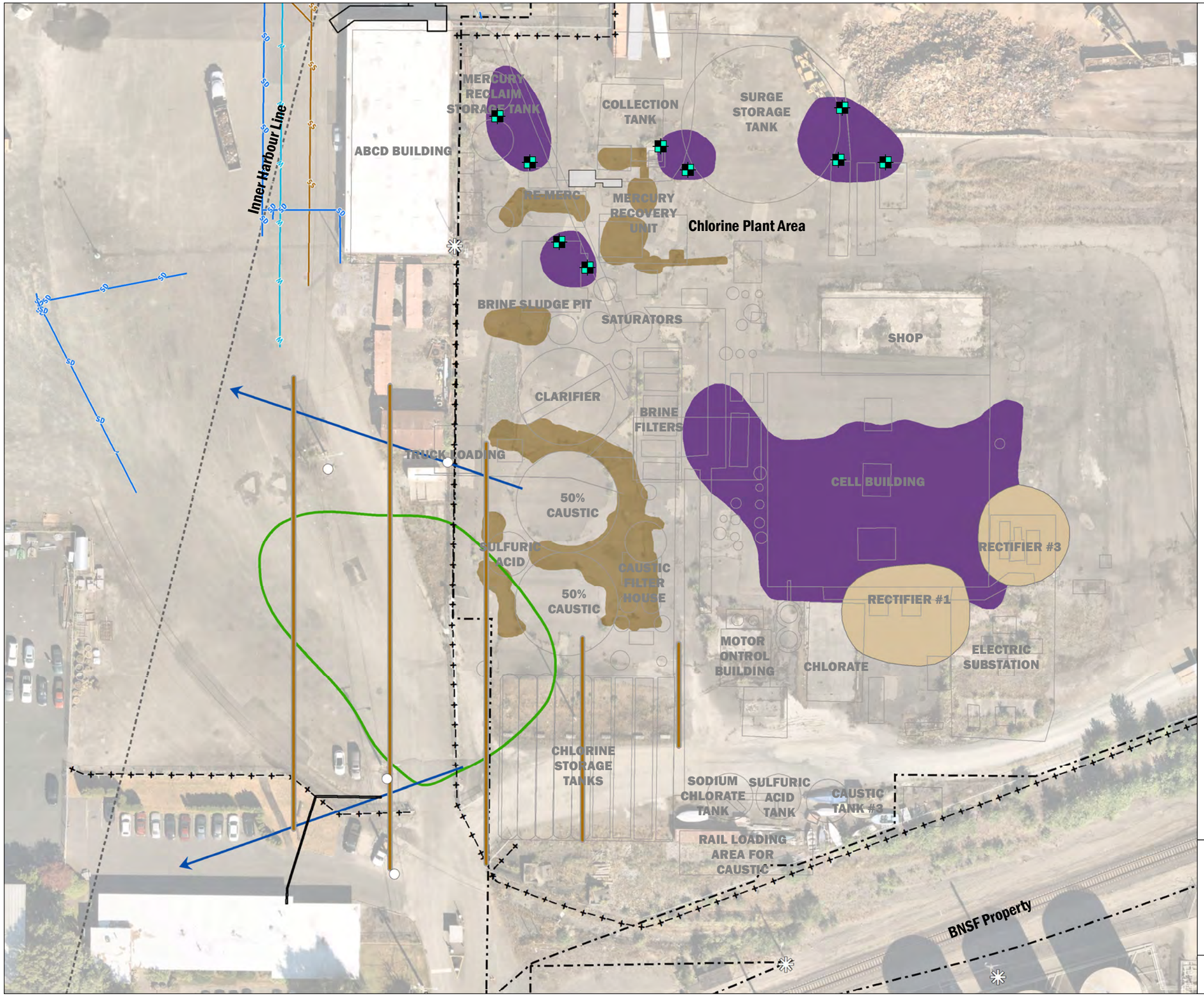
- x — x — Fence
- Utility Trench
- Stormwater Filter Drain

Proposed Wastewater Settling Basin Soil Sampling

Pre-Remedial Design Investigation 3 Project Plan
Chlor-Alkali RAU - GP West Site
Bellingham, Washington

Aspect Consulting	JUN-2023	BY: DIM / NLK	FIGURE NO. 5
	PROJECT NO. 210368	REVISED BY: ---	

GIS Path: G:\projects\ChlorAlkaliRAU_210368\Delivered\GPWest\PreRemedialDesign 3 Plan\05 Proposed Wastewater Settling Basin Soil Sampling.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 6/28/2023 || User: nkochie || Print Date: 7/14/2023



Proposed Exploratory Test Pit
(location subject to revision).
Additional test pits will be proposed following completion of the dry season 2023 groundwater sampling, updated interpretation of the Caustic Core location, and corresponding ISN trench locations (refer to Section 7).

Remedial Components

- Previous Soil Removal/Offsite Disposal Areas, Caustic Plume - Cell Building Interim Action
- TPH-Contaminated Soil Removal/Offsite Disposal
- Aggressive Removal of Obstructions and ISS of Soils Containing Visible Hg

Fill Unit Groundwater pH (Std. Units)

(April 2023)

- > 10
- Generalized Groundwater Flow Directions (Mar. 2010 data)
- ISN Trench from CAP (Configuration to be refined during design)
- Property Boundaries from ALTA Survey (David Evans and Associates, 2004)
- Fence
- Storm Drain Line
- Sanitary Sewer Line
- Water Line
- Telecom Line
- Utility Vault
- Light Tower
- Utility Pole
- Historical GP West Features

MILL NORTH
TRUE NORTH
45°

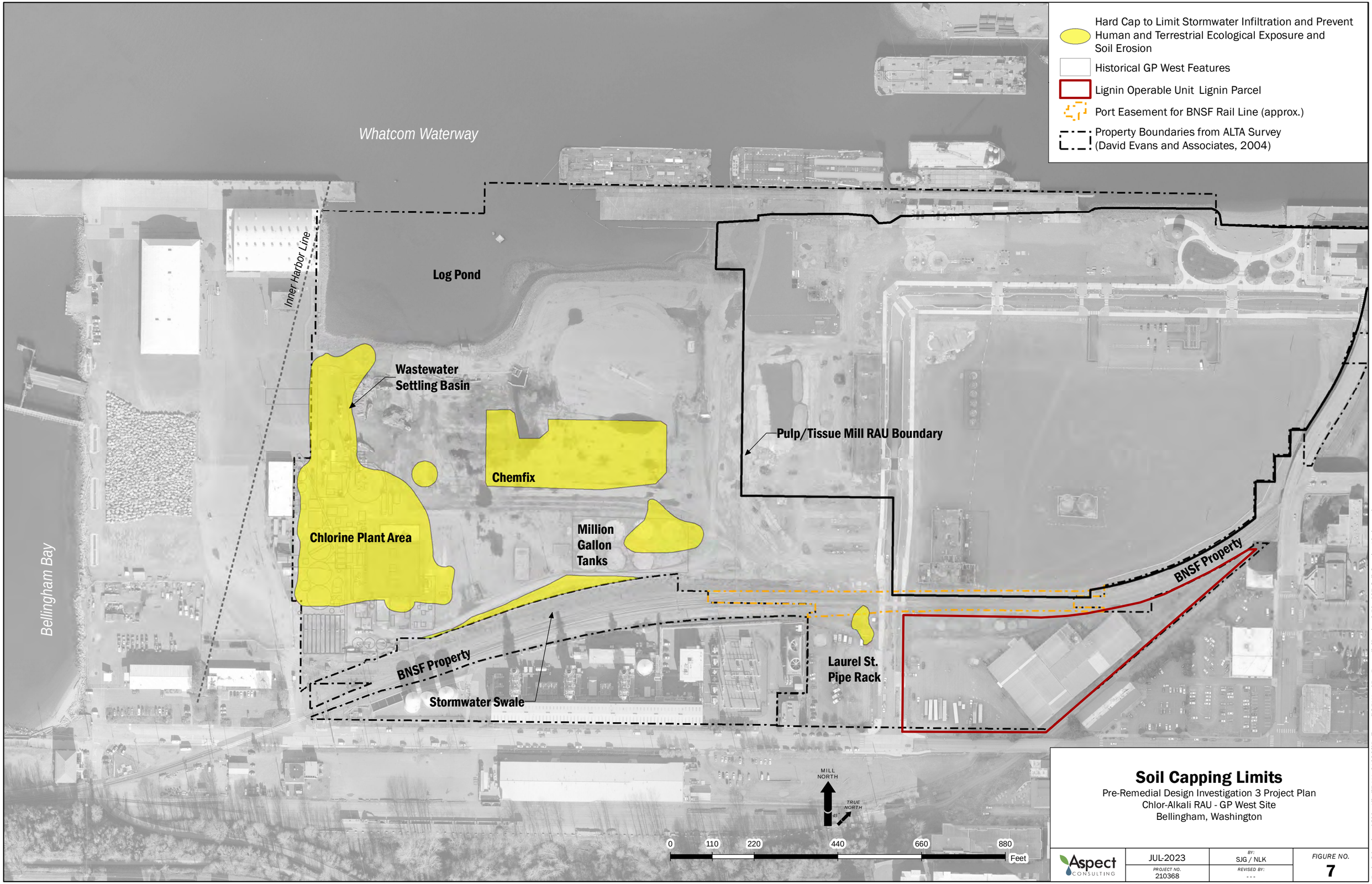
0 60 120
Feet

Proposed Test Pits - Chlorine Plant Area

Pre-Remedial Design Investigation 3 Project Plan
Chlor-Alkali RAU - GP West Site
Bellingham, Washington

Aspect Consulting	JUL-2023	BY: DIM / NLK	FIGURE NO. 6
	PROJECT NO. 210368	REVISED BY: ---	

GIS Path: G:\projects\Chlor-Alkali\RAU\210368\Deliverables\GPWest\PreRemedialDesign 3 Plan\06 Proposed Test Pits - Chlorine Plant Area.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 7/13/2023 || User: nkoehle || Print Date: 7/13/2023



Soil Capping Limits

Pre-Remedial Design Investigation 3 Project Plan
Chlor-Alkali RAU - GP West Site
Bellingham, Washington

Aspect Consulting	JUL-2023	BY: SJG / NLK	FIGURE NO. 7
	PROJECT NO. 210368	REVISED BY: ---	

Path: G:\projects\ChlorAlkaliRAU_210368\Delivered\GPWest\PreRemedialDesign 3 Plan\07 Soil Capping Limits.mxd

APPENDIX A

Laboratory Analytical Reports for April 2023 Groundwater Sampling

May 5, 2023

Ms. Delia Massey
Aspect Consulting, LLC
710 - 2nd Ave, Suite 550
Seattle, WA 98104

Dear Ms. Massey,

On April 19th, 15 samples were received by our laboratory and assigned our laboratory project number EV23040104. The project was identified as your 210368. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rob Greer
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS JOB#:	EV23040104
		ALS SAMPLE#:	EV23040104-01
CLIENT CONTACT:	Delia Massey	DATE RECEIVED:	04/19/2023
CLIENT PROJECT:	210368	COLLECTION DATE:	4/17/2023 11:10:00 AM
CLIENT SAMPLE ID	CP-MW09-20230417	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Mercury (Dissolved)	E1631E	U	0.50	1	NG/L	05/04/2023	CAS

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS JOB#:	EV23040104
		ALS SAMPLE#:	EV23040104-02
CLIENT CONTACT:	Delia Massey	DATE RECEIVED:	04/19/2023
CLIENT PROJECT:	210368	COLLECTION DATE:	4/17/2023 11:15:00 AM
CLIENT SAMPLE ID	CP-MW08-20230417	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Mercury (Dissolved)	E1631E	**10**	0.50	1	NG/L	05/04/2023	CAS

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ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS JOB#:	EV23040104
		ALS SAMPLE#:	EV23040104-03
CLIENT CONTACT:	Delia Massey	DATE RECEIVED:	04/19/2023
CLIENT PROJECT:	210368	COLLECTION DATE:	4/17/2023 12:50:00 PM
CLIENT SAMPLE ID	EMW-04S-20230417	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Alkalinity as CaCO3 o l	SM2320B	**1000**	2.0	1	MG/L	04/24/2023	CAS
Total Mercury (Dissolved)	E1631E	**0.90**	0.50	1	NG/L	05/04/2023	CAS

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ALS Group USA, Corp dba ALS Environmental

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CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS JOB#:	EV23040104
		ALS SAMPLE#:	EV23040104-04
CLIENT CONTACT:	Delia Massey	DATE RECEIVED:	04/19/2023
CLIENT PROJECT:	210368	COLLECTION DATE:	4/17/2023 1:20:00 PM
CLIENT SAMPLE ID	CP-MW22-20230417	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chloride	EPA-300.0	**1900**	23	250	MG/L	04/20/2023	RAL
Nitrate	EPA-300.0	U	0.15	1	MG/L	04/19/2023	RAL
Nitrite	EPA-300.0	U	2.5	1	MG/L	04/19/2023	RAL
Sulfate	EPA-300.0	**31**	6.5	25	MG/L	04/19/2023	RAL
Aluminum (Dissolved)	EPA-200.8	**270**	100	2	UG/L	04/21/2023	RAL
Calcium (Dissolved)	EPA-200.8	**25000**	100	2	UG/L	04/21/2023	RAL
Iron (Dissolved)	EPA-200.8	**670**	100	2	UG/L	04/21/2023	RAL
Magnesium (Dissolved)	EPA-200.8	**12000**	100	2	UG/L	04/21/2023	RAL
Manganese (Dissolved)	EPA-200.8	**110**	4.0	2	UG/L	04/21/2023	RAL
Potassium (Dissolved)	EPA-200.8	**13000**	100	2	UG/L	04/21/2023	RAL
Sodium (Dissolved)	EPA-200.8	**1800000**	500	5	UG/L	04/21/2023	RAL
Alkalinity as CaCO3, Total	SM2320B	**1200**	2.0	1	MG/L	04/24/2023	CAS
Mercury (Dissolved)	E1631E	**8200**	25	50	NG/L	05/04/2023	CAS

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS JOB#:	EV23040104
		ALS SAMPLE#:	EV23040104-05
CLIENT CONTACT:	Delia Massey	DATE RECEIVED:	04/19/2023
CLIENT PROJECT:	210368	COLLECTION DATE:	4/17/2023 2:00:00 PM
CLIENT SAMPLE ID	CP-MW13-20230417	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chloride	EPA-300.0	**670**	9.2	100	MG/L	04/20/2023	RAL
Nitrate	EPA-300.0	U	0.15	1	MG/L	04/19/2023	RAL
Nitrite	EPA-300.0	U	2.5	1	MG/L	04/19/2023	RAL
Sulfate	EPA-300.0	**1.6**	0.26	1	MG/L	04/20/2023	RAL
Aluminum (Dissolved)	EPA-200.8	U	50	1	UG/L	04/21/2023	RAL
Calcium (Dissolved)	EPA-200.8	**39000**	50	1	UG/L	04/21/2023	RAL
Iron (Dissolved)	EPA-200.8	**410**	50	1	UG/L	04/21/2023	RAL
Magnesium (Dissolved)	EPA-200.8	**5000**	50	1	UG/L	04/21/2023	RAL
Manganese (Dissolved)	EPA-200.8	**260**	2.0	1	UG/L	04/21/2023	RAL
Potassium (Dissolved)	EPA-200.8	**11000**	50	1	UG/L	04/21/2023	RAL
Sodium (Dissolved)	EPA-200.8	**590000**	100	1	UG/L	04/21/2023	RAL
Alkalinity as CaCO3, Total	SM2320B	**450**	2.0	1	MG/L	04/24/2023	CAS
Mercury (Dissolved)	E1631E	**230**	0.50	1	NG/L	05/04/2023	CAS

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
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CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS JOB#:	EV23040104
		ALS SAMPLE#:	EV23040104-06
CLIENT CONTACT:	Delia Massey	DATE RECEIVED:	04/19/2023
CLIENT PROJECT:	210368	COLLECTION DATE:	4/17/2023 3:20:00 PM
CLIENT SAMPLE ID	CP-MW06-20230417	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chloride	EPA-300.0	**810**	9.2	100	MG/L	04/20/2023	RAL
Nitrate	EPA-300.0	U	0.15	1	MG/L	04/19/2023	RAL
Nitrite	EPA-300.0	U	2.5	1	MG/L	04/19/2023	RAL
Sulfate	EPA-300.0	**1.2**	0.26	1	MG/L	04/19/2023	RAL
Aluminum (Dissolved)	EPA-200.8	**3600**	50	1	UG/L	04/21/2023	RAL
Calcium (Dissolved)	EPA-200.8	**6700**	50	1	UG/L	04/21/2023	RAL
Iron (Dissolved)	EPA-200.8	**5500**	50	1	UG/L	04/21/2023	RAL
Magnesium (Dissolved)	EPA-200.8	**720**	50	1	UG/L	04/21/2023	RAL
Manganese (Dissolved)	EPA-200.8	**93**	2.0	1	UG/L	04/21/2023	RAL
Potassium (Dissolved)	EPA-200.8	**2300**	50	1	UG/L	04/21/2023	RAL
Sodium (Dissolved)	EPA-200.8	**1200000**	500	5	UG/L	04/21/2023	RAL
Alkalinity as CaCO3, Total	SM2320B	**1400**	2.0	1	MG/L	04/24/2023	CAS
Sulfide	EPA-376.1	U	0.050	1	MG/L	04/24/2023	CAS
Total Organic Carbon (TOC)	SM5310C	**220**	50	100	MG/L	05/02/2023	CAS
Mercury (Dissolved)	E1631E	**930**	2.5	5	NG/L	05/04/2023	CAS

U - Analyte analyzed for but not detected at level above reporting limit.

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ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS JOB#:	EV23040104
		ALS SAMPLE#:	EV23040104-07
CLIENT CONTACT:	Delia Massey	DATE RECEIVED:	04/19/2023
CLIENT PROJECT:	210368	COLLECTION DATE:	4/17/2023 3:45:00 PM
CLIENT SAMPLE ID	CP-MW24-20230417	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chloride	EPA-300.0	**190**	2.3	25	MG/L	04/20/2023	RAL
Nitrate	EPA-300.0	U	0.15	1	MG/L	04/19/2023	RAL
Nitrite	EPA-300.0	U	1.0	1	MG/L	04/19/2023	RAL
Sulfate	EPA-300.0	U	0.26	1	MG/L	04/19/2023	RAL
Aluminum (Dissolved)	EPA-200.8	**970**	50	1	UG/L	04/21/2023	RAL
Calcium (Dissolved)	EPA-200.8	**8400**	50	1	UG/L	04/21/2023	RAL
Iron (Dissolved)	EPA-200.8	**2200**	50	1	UG/L	04/21/2023	RAL
Magnesium (Dissolved)	EPA-200.8	**1600**	50	1	UG/L	04/21/2023	RAL
Manganese (Dissolved)	EPA-200.8	**76**	2.0	1	UG/L	04/21/2023	RAL
Potassium (Dissolved)	EPA-200.8	**3800**	50	1	UG/L	04/21/2023	RAL
Sodium (Dissolved)	EPA-200.8	**360000**	100	1	UG/L	04/21/2023	RAL
Alkalinity as CaCO3, Total	SM2320B	**580**	2.0	1	MG/L	04/24/2023	CAS
Sulfide	EPA-376.1	**0.21**	0.050	1	MG/L	04/24/2023	CAS
Total Organic Carbon (TOC)	SM5310C	**35**	2.5	5	MG/L	05/02/2023	CAS
Mercury (Dissolved)	E1631E	**660**	2.5	5	NG/L	05/04/2023	CAS

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS JOB#:	EV23040104
		ALS SAMPLE#:	EV23040104-08
CLIENT CONTACT:	Delia Massey	DATE RECEIVED:	04/19/2023
CLIENT PROJECT:	210368	COLLECTION DATE:	4/17/2023 5:45:00 PM
CLIENT SAMPLE ID	CP-MW01-20230417	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chloride	EPA-300.0	**90**	0.92	10	MG/L	04/20/2023	RAL
Nitrate	EPA-300.0	U	0.15	1	MG/L	04/19/2023	RAL
Nitrite	EPA-300.0	U	0.50	1	MG/L	04/19/2023	RAL
Sulfate	EPA-300.0	**0.60**	0.26	1	MG/L	04/19/2023	RAL
Aluminum (Dissolved)	EPA-200.8	U	50	1	UG/L	04/21/2023	RAL
Calcium (Dissolved)	EPA-200.8	**35000**	50	1	UG/L	04/21/2023	RAL
Iron (Dissolved)	EPA-200.8	**840**	50	1	UG/L	04/21/2023	RAL
Magnesium (Dissolved)	EPA-200.8	**19000**	50	1	UG/L	04/21/2023	RAL
Manganese (Dissolved)	EPA-200.8	**1100**	2.0	1	UG/L	04/21/2023	RAL
Potassium (Dissolved)	EPA-200.8	**13000**	50	1	UG/L	04/21/2023	RAL
Sodium (Dissolved)	EPA-200.8	**740000**	500	5	UG/L	04/21/2023	RAL
Alkalinity as CaCO3, Total	SM2320B	**1600**	2.0	1	MG/L	04/24/2023	CAS
Mercury (Dissolved)	E1631E	**130**	0.50	1	NG/L	05/04/2023	CAS

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS JOB#:	EV23040104
		ALS SAMPLE#:	EV23040104-09
CLIENT CONTACT:	Delia Massey	DATE RECEIVED:	04/19/2023
CLIENT PROJECT:	210368	COLLECTION DATE:	4/18/2023 9:50:00 AM
CLIENT SAMPLE ID	CP-MWB1-20230418	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chloride	EPA-300.0	**230**	2.3	25	MG/L	04/20/2023	RAL
Nitrate	EPA-300.0	U	0.15	1	MG/L	04/19/2023	RAL
Nitrite	EPA-300.0	U	1.0	1	MG/L	04/19/2023	RAL
Sulfate	EPA-300.0	U	0.26	1	MG/L	04/19/2023	RAL
Aluminum (Dissolved)	EPA-200.8	U	50	1	UG/L	04/21/2023	RAL
Calcium (Dissolved)	EPA-200.8	**8400**	50	1	UG/L	04/21/2023	RAL
Iron (Dissolved)	EPA-200.8	**71**	50	1	UG/L	04/21/2023	RAL
Magnesium (Dissolved)	EPA-200.8	**3600**	50	1	UG/L	04/21/2023	RAL
Manganese (Dissolved)	EPA-200.8	**19**	2.0	1	UG/L	04/21/2023	RAL
Potassium (Dissolved)	EPA-200.8	**4900**	50	1	UG/L	04/21/2023	RAL
Sodium (Dissolved)	EPA-200.8	**640000**	500	5	UG/L	04/21/2023	RAL
Alkalinity as CaCO3, Total	SM2320B	**970**	2.0	1	MG/L	04/24/2023	CAS
Sulfide	EPA-376.1	**0.20**	0.050	1	MG/L	04/24/2023	CAS
Total Organic Carbon (TOC)	SM5310C	**23**	2.5	5	MG/L	05/02/2023	CAS
Mercury (Dissolved)	E1631E	**97**	0.50	1	NG/L	05/04/2023	CAS

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS JOB#:	EV23040104
		ALS SAMPLE#:	EV23040104-10
CLIENT CONTACT:	Delia Massey	DATE RECEIVED:	04/19/2023
CLIENT PROJECT:	210368	COLLECTION DATE:	4/18/2023 12:13:00 PM
CLIENT SAMPLE ID	CP-MWC1-20230418	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chloride	EPA-300.0	**10**	0.092	1	MG/L	04/19/2023	RAL
Nitrate	EPA-300.0	**0.28**	0.15	1	MG/L	04/19/2023	RAL
Nitrite	EPA-300.0	U	0.14	1	MG/L	04/19/2023	RAL
Sulfate	EPA-300.0	**2.0**	0.26	1	MG/L	04/19/2023	RAL
Aluminum (Dissolved)	EPA-200.8	**580**	50	1	UG/L	04/21/2023	RAL
Calcium (Dissolved)	EPA-200.8	**2900**	50	1	UG/L	04/21/2023	RAL
Iron (Dissolved)	EPA-200.8	**820**	50	1	UG/L	04/21/2023	RAL
Magnesium (Dissolved)	EPA-200.8	**430**	50	1	UG/L	04/21/2023	RAL
Manganese (Dissolved)	EPA-200.8	**20**	2.0	1	UG/L	04/21/2023	RAL
Potassium (Dissolved)	EPA-200.8	**960**	50	1	UG/L	04/21/2023	RAL
Sodium (Dissolved)	EPA-200.8	**120000**	100	1	UG/L	04/21/2023	RAL
Alkalinity as CaCO3, Total	SM2320B	**190**	2.0	1	MG/L	04/24/2023	CAS
Mercury (Dissolved)	E1631E	**200**	0.50	1	NG/L	05/04/2023	CAS

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS JOB#:	EV23040104
		ALS SAMPLE#:	EV23040104-11
CLIENT CONTACT:	Delia Massey	DATE RECEIVED:	04/19/2023
CLIENT PROJECT:	210368	COLLECTION DATE:	4/18/2023 10:35:00 AM
CLIENT SAMPLE ID	EMW-14S-20230418	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chloride	EPA-300.0	**150**	0.92	10	MG/L	04/20/2023	RAL
Nitrate	EPA-300.0	**3.0**	0.15	1	MG/L	04/19/2023	RAL
Nitrite	EPA-300.0	U	0.50	1	MG/L	04/19/2023	RAL
Sulfate	EPA-300.0	**6.1**	0.26	1	MG/L	04/19/2023	RAL
Aluminum (Dissolved)	EPA-200.8	**550**	50	1	UG/L	04/21/2023	RAL
Calcium (Dissolved)	EPA-200.8	**13000**	50	1	UG/L	04/21/2023	RAL
Iron (Dissolved)	EPA-200.8	**1100**	50	1	UG/L	04/21/2023	RAL
Magnesium (Dissolved)	EPA-200.8	**1800**	50	1	UG/L	04/21/2023	RAL
Manganese (Dissolved)	EPA-200.8	**67**	2.0	1	UG/L	04/21/2023	RAL
Potassium (Dissolved)	EPA-200.8	**1100**	50	1	UG/L	04/21/2023	RAL
Sodium (Dissolved)	EPA-200.8	**200000**	100	1	UG/L	04/21/2023	RAL
Alkalinity as CaCO3, Total	SM2320B	**220**	2.0	1	MG/L	04/24/2023	CAS
Mercury (Dissolved)	E1631E	**280**	5.0	10	NG/L	05/04/2023	CAS

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS JOB#:	EV23040104
		ALS SAMPLE#:	EV23040104-12
CLIENT CONTACT:	Delia Massey	DATE RECEIVED:	04/19/2023
CLIENT PROJECT:	210368	COLLECTION DATE:	4/18/2023 11:45:00 AM
CLIENT SAMPLE ID	CP-MWA1-20230418	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chloride	EPA-300.0	**1600**	23	250	MG/L	04/20/2023	RAL
Nitrate	EPA-300.0	U, H	0.76	5	MG/L	04/20/2023	RAL
Nitrite	EPA-300.0	U	2.5	5	MG/L	04/20/2023	RAL
Sulfate	EPA-300.0	**4.9**	1.3	5	MG/L	04/20/2023	RAL
Aluminum (Dissolved)	EPA-200.8	**280**	120	2.5	UG/L	04/21/2023	RAL
Calcium (Dissolved)	EPA-200.8	**10000**	120	2.5	UG/L	04/21/2023	RAL
Iron (Dissolved)	EPA-200.8	**9200**	120	2.5	UG/L	04/21/2023	RAL
Magnesium (Dissolved)	EPA-200.8	**160**	120	2.5	UG/L	04/21/2023	RAL
Manganese (Dissolved)	EPA-200.8	**21**	5.0	2.5	UG/L	04/21/2023	RAL
Potassium (Dissolved)	EPA-200.8	**60000**	120	2.5	UG/L	04/21/2023	RAL
Sodium (Dissolved)	EPA-200.8	**6300000**	2000	20	UG/L	04/21/2023	RAL
Alkalinity as CaCO3, Total	SM2320B	**8000**	10	5	MG/L	04/24/2023	CAS
Sulfide	EPA-376.1	**120**	10	200	MG/L	04/24/2023	CAS
Total Organic Carbon (TOC	SM5310C	**1200**	120	250	MG/L	05/02/2023	CAS
Mercury (Dissolved)	E1631E	**2700**	10	20	NG/L	05/04/2023	CAS

U - Analyte analyzed for but not detected at level above reporting limit.
H - Sample analyzed outside of hold time.

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CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS JOB#:	EV23040104
		ALS SAMPLE#:	EV23040104-13
CLIENT CONTACT:	Delia Massey	DATE RECEIVED:	04/19/2023
CLIENT PROJECT:	210368	COLLECTION DATE:	4/18/2023 2:25:00 PM
CLIENT SAMPLE ID	AMW-02-20230418	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chloride	EPA-300.0	**1700**	23	250	MG/L	04/20/2023	RAL
Nitrate	EPA-300.0	U	0.76	5	MG/L	04/20/2023	RAL
Nitrite	EPA-300.0	U	2.5	5	MG/L	04/20/2023	RAL
Sulfate	EPA-300.0	**2.2**	1.3	5	MG/L	04/20/2023	RAL
Aluminum (Dissolved)	EPA-200.8	**2100**	120	2.5	UG/L	04/21/2023	RAL
Calcium (Dissolved)	EPA-200.8	**12000**	120	2.5	UG/L	04/21/2023	RAL
Iron (Dissolved)	EPA-200.8	**2300**	120	2.5	UG/L	04/21/2023	RAL
Magnesium (Dissolved)	EPA-200.8	**1600**	120	2.5	UG/L	04/21/2023	RAL
Manganese (Dissolved)	EPA-200.8	**160**	5.0	2.5	UG/L	04/21/2023	RAL
Potassium (Dissolved)	EPA-200.8	**12000**	120	2.5	UG/L	04/21/2023	RAL
Sodium (Dissolved)	EPA-200.8	**2500000**	500	5	UG/L	04/21/2023	RAL
Alkalinity as CaCO3, Total	SM2320B	**3600**	10	5	MG/L	04/24/2023	CAS
Sulfide	EPA-376.1	**70**	10	200	MG/L	04/24/2023	CAS
otal Organic Carbon (TOC)	SM5310C	**630**	120	250	MG/L	05/02/2023	CAS
Mercury (Dissolved)	E1631E	**5400**	10	20	NG/L	05/04/2023	CAS

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS JOB#:	EV23040104
		ALS SAMPLE#:	EV23040104-14
CLIENT CONTACT:	Delia Massey	DATE RECEIVED:	04/19/2023
CLIENT PROJECT:	210368	COLLECTION DATE:	4/18/2023 2:55:00 PM
CLIENT SAMPLE ID	AMW-03-20230418	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chloride	EPA-300.0	**250**	2.3	25	MG/L	04/20/2023	RAL
Nitrate	EPA-300.0	U	0.76	5	MG/L	04/20/2023	RAL
Nitrite	EPA-300.0	U	0.71	5	MG/L	04/20/2023	RAL
Sulfate	EPA-300.0	**22**	1.3	5	MG/L	04/20/2023	RAL
Aluminum (Dissolved)	EPA-200.8	**310**	120	2.5	UG/L	04/21/2023	RAL
Calcium (Dissolved)	EPA-200.8	**6900**	120	2.5	UG/L	04/21/2023	RAL
Iron (Dissolved)	EPA-200.8	**5100**	120	2.5	UG/L	04/21/2023	RAL
Magnesium (Dissolved)	EPA-200.8	U	120	2.5	UG/L	04/21/2023	RAL
Manganese (Dissolved)	EPA-200.8	**25**	5.0	2.5	UG/L	04/21/2023	RAL
Potassium (Dissolved)	EPA-200.8	**20000**	120	2.5	UG/L	04/21/2023	RAL
Sodium (Dissolved)	EPA-200.8	**2900000**	500	5	UG/L	04/21/2023	RAL
Alkalinity as CaCO3, Total	SM2320B	**4600**	10	5	MG/L	04/24/2023	CAS
Sulfide	EPA-376.1	**72**	5.0	100	MG/L	04/24/2023	CAS
Total Organic Carbon(TOC)	SM5310C	**700**	50	100	MG/L	05/02/2023	CAS
Mercury (Dissolved)	E1631E	**2200**	10	20	NG/L	05/04/2023	CAS

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS JOB#:	EV23040104
		ALS SAMPLE#:	EV23040104-15
CLIENT CONTACT:	Delia Massey	DATE RECEIVED:	04/19/2023
CLIENT PROJECT:	210368	COLLECTION DATE:	4/18/2023 3:55:00 PM
CLIENT SAMPLE ID	EMW-19S-20230418	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chloride	EPA-300.0	**45**	0.92	10	MG/L	04/20/2023	RAL
Nitrate	EPA-300.0	U	0.15	1	MG/L	04/19/2023	RAL
Nitrite	EPA-300.0	U	0.14	1	MG/L	04/19/2023	RAL
Sulfate	EPA-300.0	**160**	2.6	10	MG/L	04/20/2023	RAL
Aluminum (Dissolved)	EPA-200.8	**660**	50	1	UG/L	04/21/2023	RAL
Calcium (Dissolved)	EPA-200.8	**1900**	50	1	UG/L	04/21/2023	RAL
Iron (Dissolved)	EPA-200.8	**4900**	50	1	UG/L	04/21/2023	RAL
Magnesium (Dissolved)	EPA-200.8	**64**	50	1	UG/L	04/21/2023	RAL
Manganese (Dissolved)	EPA-200.8	**47**	2.0	1	UG/L	04/21/2023	RAL
Potassium (Dissolved)	EPA-200.8	**1700**	50	1	UG/L	04/21/2023	RAL
Sodium (Dissolved)	EPA-200.8	**460000**	100	1	UG/L	04/21/2023	RAL
Alkalinity as CaCO3, Total	SM2320B	**720**	2.0	1	MG/L	04/24/2023	CAS
Sulfide	EPA-376.1	**0.55**	0.050	1	MG/L	04/24/2023	CAS
otal Organic Carbon (TOC)	SM5310C	**32**	2.5	5	MG/L	05/02/2023	CAS
Mercury (Dissolved)	E1631E	**30000**	120	250	NG/L	05/04/2023	CAS

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CERTIFICATE OF ANALYSIS

CLIENT: Aspect Consulting, LLC
710 - 2nd Ave, Suite 550
Seattle, WA 98104

CLIENT CONTACT: Delia Massey
CLIENT PROJECT: 210368

DATE: 5/5/2023
ALS SDG#: EV23040104
WDOE ACCREDITATION: C601

LABORATORY BLANK RESULTS

MBLK-R434523 - Batch R434523 - Water by EPA-300.0

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Chloride	EPA-300.0	U	MG/L	0.092	04/19/2023	RAL
Nitrate	EPA-300.0	U	MG/L	0.15	04/19/2023	RAL
Nitrite	EPA-300.0	U	MG/L	0.14	04/19/2023	RAL
Sulfate	EPA-300.0	U	MG/L	0.26	04/19/2023	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

MBLK-R434526 - Batch R434526 - Water by EPA-300.0

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Chloride	EPA-300.0	U	MG/L	0.092	04/20/2023	RAL
Nitrate	EPA-300.0	U	MG/L	0.15	04/20/2023	RAL
Nitrite	EPA-300.0	U	MG/L	0.14	04/20/2023	RAL
Sulfate	EPA-300.0	U	MG/L	0.26	04/20/2023	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

MB-042023W - Batch 192749 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Aluminum (Dissolved)	EPA-200.8	U	UG/L	50	04/21/2023	RAL
Calcium (Dissolved)	EPA-200.8	U	UG/L	50	04/21/2023	RAL
Iron (Dissolved)	EPA-200.8	U	UG/L	50	04/21/2023	RAL
Magnesium (Dissolved)	EPA-200.8	U	UG/L	50	04/21/2023	RAL
Manganese (Dissolved)	EPA-200.8	U	UG/L	2.0	04/21/2023	RAL
Potassium (Dissolved)	EPA-200.8	U	UG/L	50	04/21/2023	RAL
Sodium (Dissolved)	EPA-200.8	U	UG/L	100	04/21/2023	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

MBLK-R434509 - Batch R434509 - Water by SM2320B

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Alkalinity as CaCO3, Total	SM2320B	U	MG/L	2.0	04/24/2023	CAS

U - Analyte analyzed for but not detected at level above reporting limit.

MBLK-R434514 - Batch R434514 - Water by EPA-376.1

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Sulfide	EPA-376.1	U	MG/L	0.050	04/24/2023	CAS

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CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS SDG#:	EV23040104
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Delia Massey		
CLIENT PROJECT:	210368		

LABORATORY BLANK RESULTS

MBLK-R434514 - Batch R434514 - Water by EPA-376.1

U - Analyte analyzed for but not detected at level above reporting limit.

MBLK-R434516 - Batch R434516 - Water by SM5310C

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Total Organic Carbon (TOC)	SM5310C	U	MG/L	0.50	05/02/2023	CAS

U - Analyte analyzed for but not detected at level above reporting limit.

MBLK-R434520 - Batch R434520 - Water by E1631E

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Mercury (Dissolved)	E1631E	U	NG/L	0.50	05/04/2023	CAS

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT: Aspect Consulting, LLC
710 - 2nd Ave, Suite 550
Seattle, WA 98104

CLIENT CONTACT: Delia Massey
CLIENT PROJECT: 210368

DATE: 5/5/2023
ALS SDG#: EV23040104
WDOE ACCREDITATION: C601

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: R434523 - Water by EPA-300.0

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Chloride - BS	EPA-300.0	**97.5**			80	120	04/19/2023	RAL
Chloride - BSD	EPA-300.0	**100**	**3**		80	120	04/19/2023	RAL
Nitrate - BS	EPA-300.0	**96.5**			80	120	04/19/2023	RAL
Nitrate - BSD	EPA-300.0	**95.0**	**2**		80	120	04/19/2023	RAL
Nitrite - BS	EPA-300.0	**90.5**			80	120	04/19/2023	RAL
Nitrite - BSD	EPA-300.0	**91.5**	**1**		80	120	04/19/2023	RAL
Sulfate - BS	EPA-300.0	**96.0**			80	120	04/19/2023	RAL
Sulfate - BSD	EPA-300.0	**93.0**	**3**		80	120	04/19/2023	RAL

ALS Test Batch ID: R434526 - Water by EPA-300.0

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Chloride - BS	EPA-300.0	**100**			80	120	04/20/2023	RAL
Chloride - BSD	EPA-300.0	**99.0**	**1**		80	120	04/20/2023	RAL
Nitrate - BS	EPA-300.0	**96.0**			80	120	04/20/2023	RAL
Nitrate - BSD	EPA-300.0	**99.0**	**3**		80	120	04/20/2023	RAL
Nitrite - BS	EPA-300.0	**93.0**			80	120	04/20/2023	RAL
Nitrite - BSD	EPA-300.0	**93.0**	**0**		80	120	04/20/2023	RAL
Sulfate - BS	EPA-300.0	**92.0**			80	120	04/20/2023	RAL
Sulfate - BSD	EPA-300.0	**93.0**	**1**		80	120	04/20/2023	RAL

ALS Test Batch ID: 192749 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Aluminum (Dissolved) - BS	EPA-200.8	**102**			80	120	04/21/2023	RAL
Aluminum (Dissolved) - BSD	EPA-200.8	**102**	**0**		80	120	04/21/2023	RAL
Calcium (Dissolved) - BS	EPA-200.8	**96.3**			80	120	04/21/2023	RAL
Calcium (Dissolved) - BSD	EPA-200.8	**95.9**	**0**		80	120	04/21/2023	RAL
Iron (Dissolved) - BS	EPA-200.8	**102**			80	120	04/21/2023	RAL
Iron (Dissolved) - BSD	EPA-200.8	**100**	**2**		80	120	04/21/2023	RAL
Magnesium (Dissolved) - BS	EPA-200.8	**101**			80	120	04/21/2023	RAL
Magnesium (Dissolved) - BSD	EPA-200.8	**102**	**1**		80	120	04/21/2023	RAL
Manganese (Dissolved) - BS	EPA-200.8	**101**			82.2	110	04/21/2023	RAL
Manganese (Dissolved) - BSD	EPA-200.8	**100**	**1**		82.2	110	04/21/2023	RAL
Potassium (Dissolved) - BS	EPA-200.8	**99.2**			80	120	04/21/2023	RAL
Potassium (Dissolved) - BSD	EPA-200.8	**99.6**	**0**		80	120	04/21/2023	RAL
Sodium (Dissolved) - BS	EPA-200.8	**104**			80	105	04/21/2023	RAL
Sodium (Dissolved) - BSD	EPA-200.8	**102**	**2**		80	105	04/21/2023	RAL

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 710 - 2nd Ave, Suite 550 Seattle, WA 98104	DATE:	5/5/2023
		ALS SDG#:	EV23040104
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Delia Massey		
CLIENT PROJECT:	210368		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: R434509 - Water by SM2320B

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Alkalinity as CaCO3, Total - BS	SM2320B	**102**			85	115	04/24/2023	CAS

ALS Test Batch ID: R434514 - Water by EPA-376.1

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Sulfide - BS	EPA-376.1	**99.1**			85	106	04/24/2023	CAS

ALS Test Batch ID: R434516 - Water by SM5310C

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Total Organic Carbon (TOC) - BS	SM5310C	**98.0**			85	115	05/02/2023	CAS

ALS Test Batch ID: R434520 - Water by E1631E

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Mercury (Dissolved)- BS	E1631E	**91.6**			77	123	05/04/2023	CAS

APPROVED BY

Rob Greer
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV2304010 4

Date 04/19/23 Page 1 Of 2

PROJECT ID: 210368
REPORT TO COMPANY: Aspect Consulting
PROJECT MANAGER: Delia Massey, Steve Germinat
ADDRESS: 710 2nd Ave #550
Seattle, WA 98104
PHONE: (860) 368-9745 P.O. #: 210368
E-MAIL: dmassey@aspectconsulting.com, sgermint@"
INVOICE TO COMPANY: AP
ATTENTION:
ADDRESS:

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA 8021	BTEX by EPA 8260	MTBE by EPA 8021	MTBE by EPA 8260	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM	PCB by EPA 8082 Pesticides by EPA 8081	Metals-MTCA-5 RCRA-8 Pri Pol TAL	Metals Other (Specify)	TCLP-Metals VOA Semi-Vol Pest Herbs	OTHER (Specify)							NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
																						Hg by 1631	Alkalinity by EPA 310.1 Anions (Cl, NO2, NO3, SO4) by EPA 300.0	Dissolved Metals (Ca, K, Mg, Na) by 6020/200.8	TOC by EPA 415.1	Sulfide by EPA 376.1				
1. CP-MW09-20230417	04/17/23	1110	W	1																		X							1	
2. CP-MW08-20230417	"	1115	"	2																		X							1	
3. EMW-045-20230417	"	1250	"	3																		X	X							2	
4. CP-MW22-20230417	"	1320	"	4																		X	X	X	X					4	
5. CP-MW13-20230417	"	1400	"	5																		X	X	X	X					4	
6. CP-MW06-20230417	"	1520	"	6																		X	X	X	X	X	X			6	
7. CP-MW24-20230417	"	1545	"	7																		X	X	X	X	X	X			6	
8. CP-MW01-20230417	"	1745	"	8																		X	X	X	X					4	
9. CP-MW81-20230418	04/18/23	0950	"	9																		X	X	X	X	X	X			6	
10. CP-MW01-20230418	"	1213	"	10																		X	X	X	X					4	

SPECIAL INSTRUCTIONS Only run dissolved metals for: Al, Fe, Mn, Cations: Ca, K, Mg, Na. Anions: Cl, NO2, NO3, SO4.

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: [signature], Aspect 04/19/23 0825
   Received By: Shawn Robinson ALS 4/19/23 0825
2. Relinquished By: _____
   Received By: _____

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: [10] Standard [5] [3] [2] [1] [SAME DAY]

Fuels & Hydrocarbon Analysis: [5] Standard [3] [1] [SAME DAY]

OTHER: Specify: _____

*Turnaround request less than standard may incur Rush Charges

ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only)
EV2304010 4

Date 04/19/23 Page 2 Of 2

PROJECT ID: 210368
REPORT TO COMPANY: Aspect Consulting
PROJECT MANAGER: Delia Mussey, Steve Germiat
ADDRESS:
PHONE: P.O. #:
E-MAIL:
INVOICE TO COMPANY:
ATTENTION:
ADDRESS:

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA 8021	BTEX by EPA 8260	MTBE by EPA 8021	MTBE by EPA 8260	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM	PCB by EPA 8082	Pesticides by EPA 8081	Metals-MTCA-5	RCRA-8	Pri Pol	TAL	Metals Other (Specify)	VOA	Semi-Vol	Pest	Herbs	TCLP-Metals	OTHER (Specify) Hg by 1631	Alkalinity by EPA 310.1	Anions by EPA 300.0 (Cl, F, NO3, SO4)	Total Phosphorus by EPA 365.1	TOC by EPA 415.1	S, Sulfide by EPA 376.1		NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. ~~CP-MWB1-20230418~~	~~04/18/23~~	~~0950~~	W																											X	X	X	X	X	X		6	
2. EMW-145-20230418	04/18/23	1035	W	11																										X	X	X	X				4	
3. CP-MWA1-20230418		1145		12																										X	X	X	X	X	X		6	
4. AMW-02-20230418		1425		13																																	6	
5. AMW-03-20230418		1455		14																																	6	
6. EMW-195-20230418		1555		15																																	6	
7.																																						
8.																																						
9.																																						
10.																																						

SPECIAL INSTRUCTIONS EMW-195-20230418 Hg sample is in a 500 mL unpreserved, field filtered, HDPE bottle.

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: [signature], Aspect, 04/19/23 0825
   Received By: Shawn Roberson ALS 4/19/23 0825
2. Relinquished By:
   Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: ~~10~~ Standard | 5 | 3 | 2 | 1 | SAME DAY

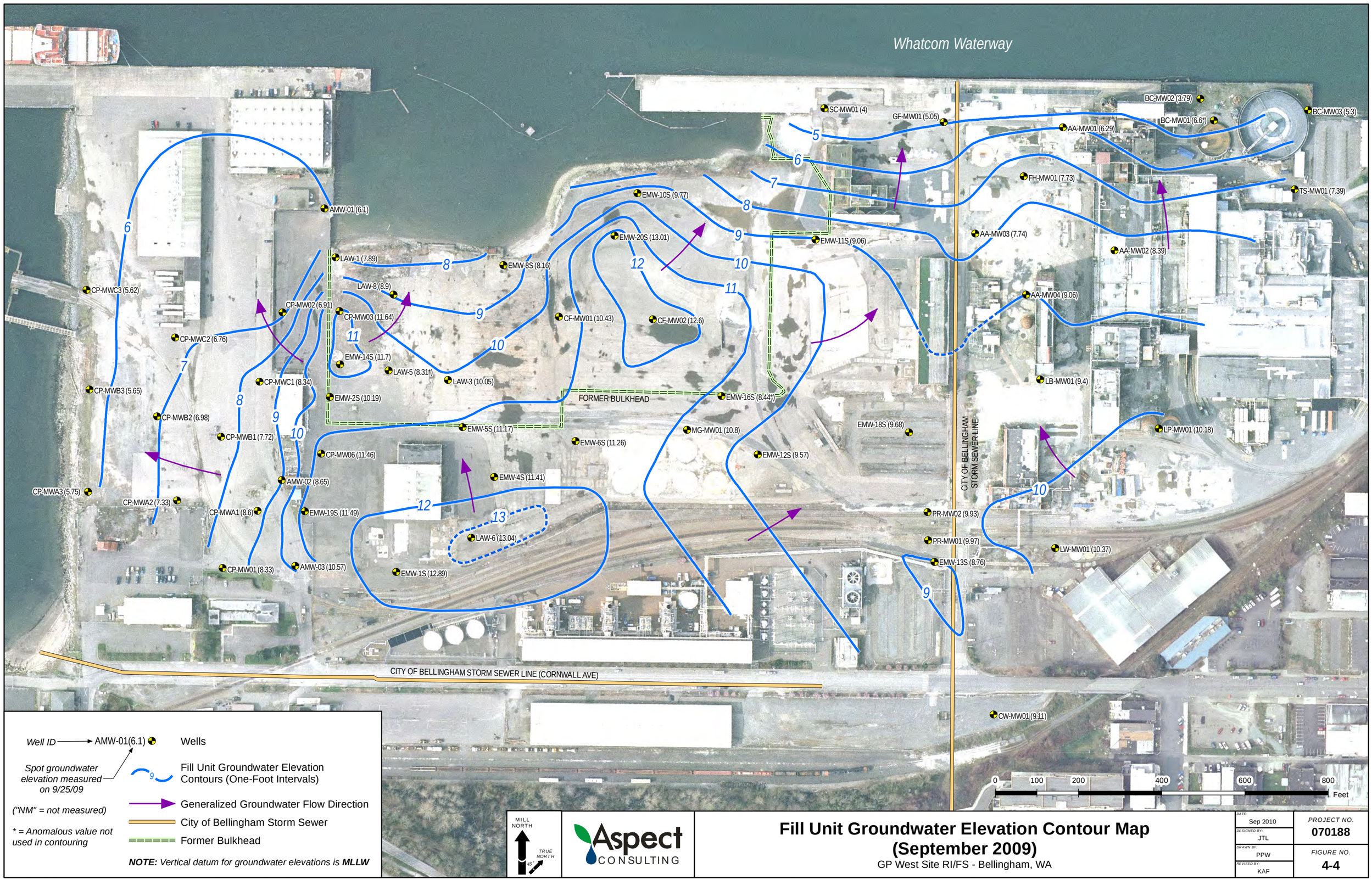
Fuels & Hydrocarbon Analysis: 5 Standard | 3 | 1 | SAME DAY

OTHER: Specify:

*Turnaround request less than standard may incur Rush Charges

APPENDIX B

Remedial Investigation Report Figures for Reference (Aspect, 2013)



Well ID → AMW-01(6.1) — Wells

Spot groundwater elevation measured on 9/25/09 — Fill Unit Groundwater Elevation Contours (One-Foot Intervals)

("NM" = not measured)

Generalized Groundwater Flow Direction

City of Bellingham Storm Sewer

Former Bulkhead

* = Anomalous value not used in contouring

NOTE: *Vertical datum for groundwater elevations is* ***MLLW***

MILL NORTH — TRUE NORTH (45°)

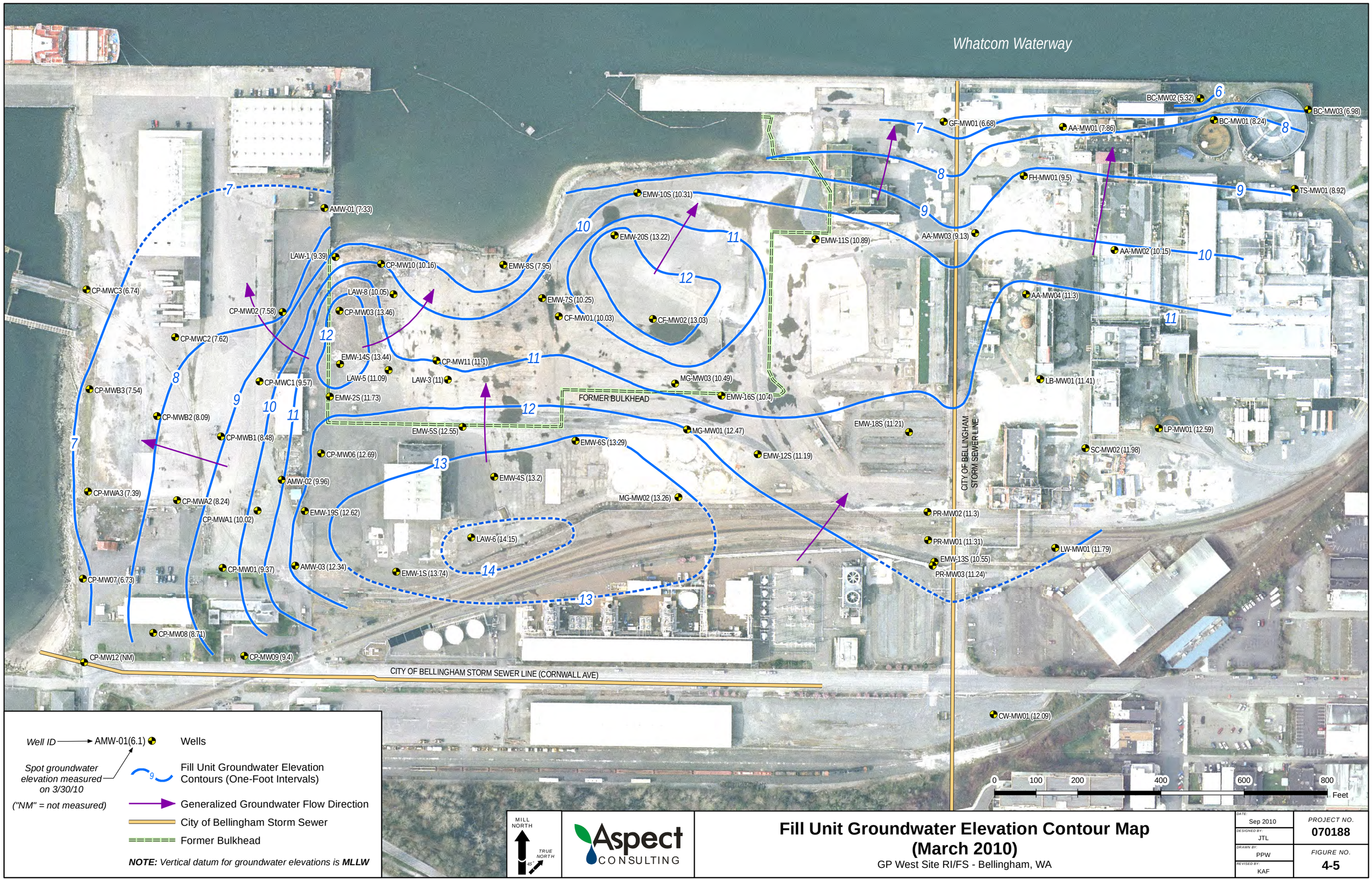
Aspect CONSULTING

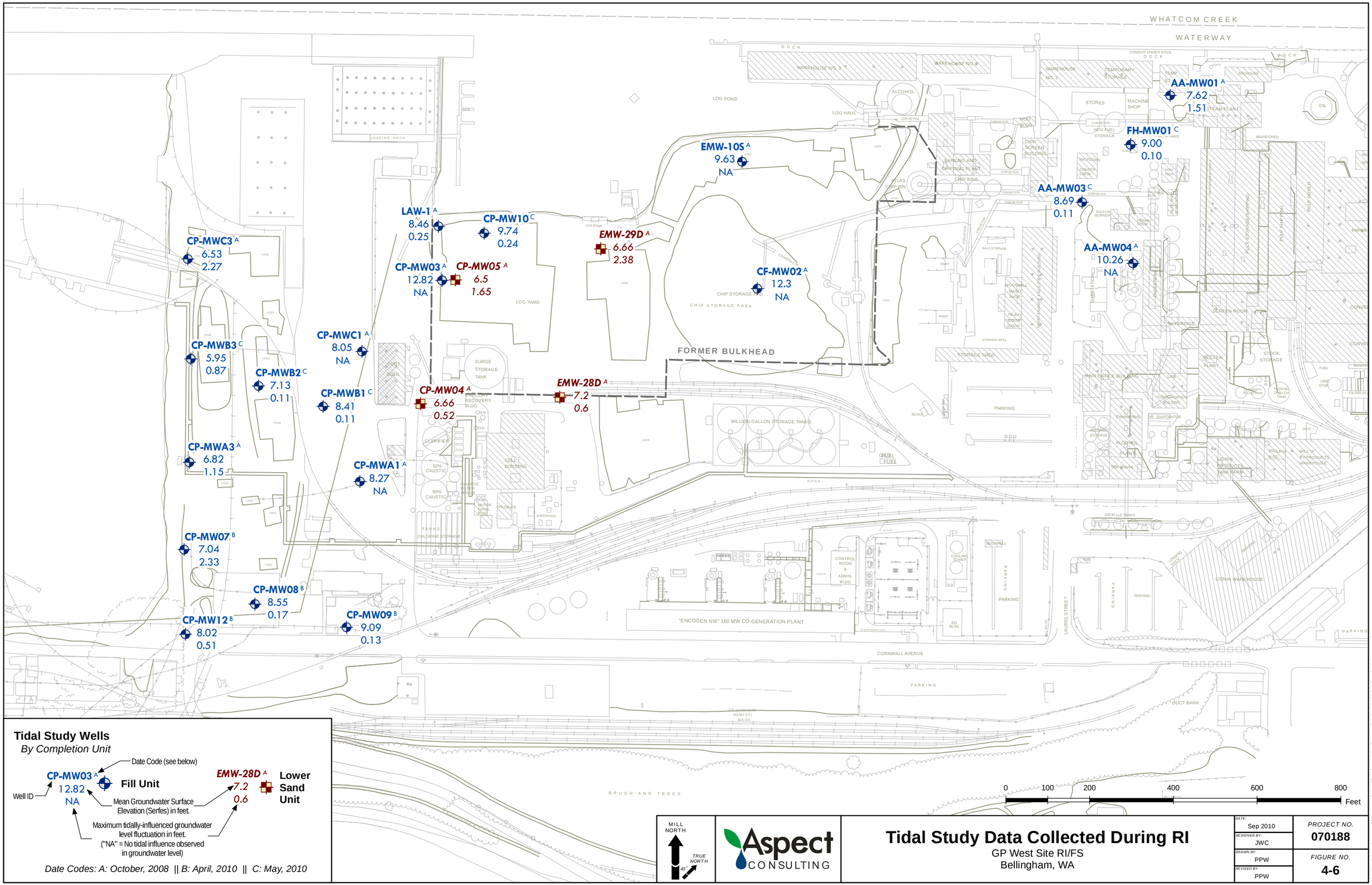
Fill Unit Groundwater Elevation Contour Map (September 2009)

GP West Site RI/FS - Bellingham, WA

DATE: Sep 2010	PROJECT NO. 070188
DESIGNED BY: JTL	
DRAWN BY: PPW	FIGURE NO. 4-4
REVISED BY: KAF	

Path: T:\projects_8\Port_of_Bellingham\Delivered\RI\4-4 Sept_2009_GW_Elev_Contours.mxd


Whatcom Waterway
AMW-01 (7.33)
LAW-1 (9.39)
CP-MWC3 (6.74)
CP-MW10 (10.16)
EMW-8S (7.95)
EMW-10S (10.31)
EMW-20S (13.22)
EMW-11S (10.89)
GF-MW01 (6.68)
AA-MW01 (7.86)
BC-MW02 (5.32)
BC-MW03 (6.98)
BC-MW01 (8.24)
FH-MW01 (9.5)
TS-MW01 (8.92)
AA-MW03 (9.13)
AA-MW02 (10.15)
AA-MW04 (11.3)
LB-MW01 (11.41)
LP-MW01 (12.59)
SC-MW02 (11.98)
CP-MW02 (7.58)
LAW-8 (10.05)
CP-MW03 (13.46)
EMW-7S (10.25)
CF-MW01 (10.03)
CF-MW02 (13.03)
CP-MWC2 (7.62)
EMW-14S (13.44)
CP-MW11 (11.1)
LAW-5 (11.09)
LAW-3 (11)
CP-MWC1 (9.57)
MG-MW03 (10.49)
EMW-16S (10.4)
FORMER BULKHEAD
CP-MWB3 (7.54)
EMW-2S (11.73)
CP-MWB2 (8.09)
CP-MWB1 (8.48)
EMW-5S (12.55)
EMW-18S (11.21)
MG-MW01 (12.47)
EMW-6S (13.29)
EMW-12S (11.19)
CP-MW06 (12.69)
EMW-4S (13.2)
AMW-02 (9.96)
CP-MWA3 (7.39)
CP-MWA2 (8.24)
CP-MWA1 (10.02)
EMW-19S (12.62)
MG-MW02 (13.26)
PR-MW02 (11.3)
PR-MW01 (11.31)
LW-MW01 (11.79)
EMW-13S (10.55)
PR-MW03 (11.24)
LAW-6 (14.15)
CP-MW07 (6.73)
CP-MW01 (9.37)
AMW-03 (12.34)
EMW-1S (13.74)
CP-MW08 (8.71)
CP-MW12 (NM)
CP-MW09 (9.4)
CITY OF BELLINGHAM STORM SEWER LINE (CORNWALL AVE)
CITY OF BELLINGHAM STORM SEWER LINE
CW-MW01 (12.09)
7
8
9
10
11
12
13
14
0
100
200
400
600
800
Feet
Well ID
AMW-01(6.1)
Wells
Spot groundwater elevation measured on 3/30/10
("NM" = not measured)
Fill Unit Groundwater Elevation Contours (One-Foot Intervals)
Generalized Groundwater Flow Direction
City of Bellingham Storm Sewer
Former Bulkhead
NOTE: Vertical datum for groundwater elevations is MLLW
MILL NORTH
TRUE NORTH
45°
Aspect CONSULTING
Fill Unit Groundwater Elevation Contour Map
(March 2010)
GP West Site RI/FS - Bellingham, WA
DATE: Sep 2010
DESIGNED BY: JTL
DRAWN BY: PPW
REVISED BY: KAF
PROJECT NO. 070188
FIGURE NO. 4-5
Path: T:\projects_8\Port_of_Bellingham\Delivered\RI\4-5 March_2010_GW_Elev_Contours.mxd



Tidal Study Wells

By Completion Unit

Date Code (see below)

CP-MW03 A — 12.82 — NA — **Fill Unit**

EMW-28D A — 7.2 — 0.6 — **Lower Sand Unit**

Well ID

Mean Groundwater Surface Elevation (Serfes) in feet.

Maximum tidally-influenced groundwater level fluctuation in feet. ("NA" = No tidal influence observed in groundwater level)

Date Codes: A: October, 2008 || B: April, 2010 || C: May, 2010

MILL NORTH — TRUE NORTH (45°)

Aspect CONSULTING

Tidal Study Data Collected During RI

GP West Site RI/FS
Bellingham, WA

DATE: Sep 2010	PROJECT NO. 070188
DESIGNED BY: JWC	
DRAWN BY: PPW	FIGURE NO. 4-6
REVISED BY: PPW	

Path: T:\projects_8\Port_of_Bellingham\Delivered\RI\4-6 TidalStudyData.mxd

APPENDIX C

Treatability Testing – Chemical Reagents

GEO®
SPECIALTY CHEMICALS

Product Specifications
Aluminum Sulfate Hydrate
Standard
Technical Grade

Formula $Al_2(SO_4)_3 \cdot 14.3\ H_2O$

Nomenclature
Aluminum Sulfate, Hydrate
Dry Alum
Filter Alum
Papermaker's Alum

CAS Number 10043-01-3

CAS Index Name Sulfuric Acid, Aluminum Salt (3:2)

Grade Technical

Molecular Weight 599.8

Description
Aluminum Sulfate Hydrate - Standard, technical grade is a white to light tan colored, ground crystalline solid. It complies with the chemical specifications of the American Water Works Association B403-03 and Federal Specification O-A-429D, Type 1, Class 2. It has been certified by the National Sanitation Foundation (NSF) for use in the treatment of drinking water at a maximum dosage of 150 mg/L.

Specifications

Assay (As available water soluble Al_2O_3):	17.0% min.
(As Aluminum Sulfate, Anhydrous ($Al_2(SO_4)_3$):	57.0% min.
Water Soluble Iron (as Fe_2O_3):	0.009% max.
Water Insolubles:	0.5% max.

Note: Depending on local requirements, solutions of variable acidity or basicity may be produced, as well as lower assay.

Typical Properties

pH (1% solution):	3.5
Solubility (pounds per gallon of water at 68® F):	7.28
Sieving:	
Ground: Through 10 mesh	>90%*
Powder: Through 100 mesh	>95%
Bulk Density (pounds per cubic foot):	65 (ground)

Continued On Reverse Side

Containers

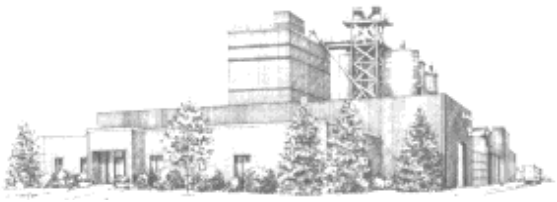
50 pound net weight Paper Bags
2250 pound net weight Super Sacks

Uses

Chemical: In the treatment of waste.
Pulp and Paper: In the production of paper.
Water Treatment: In the treatment of water and wastewater for coagulation, flocculation, pH control and phosphorus removal.

* Meets O-A-429-D, Type 1, Class 2 and B403-93 Ground

CROWN
TECHNOLOGY, INC.
ISO 9001:2000 CERTIFIED



Since 1946

FERROUS SULFATE (DRY)

FORMULA: $FeSO_4 \cdot 7H_2O$ F.W. = 278 CAS# 7782-63-0

TYPICAL CHEMICAL ANALYSIS:

FeSO4*7H2O	minimum	99.5% *
Ferrous Iron	minimum	20.0% *
pH (5% Solution)		2.5 to 5
Adherent water		<0.30%

*Complies with American Water Works Association Standard B402.

Heavy Metals (mg/kg)

Arsenic	< 0.2	Lead	< 2	Cadmium	< 3	Mercury	< 0.05
Chromium	< 40	Nickel	< 150	Copper	< 30	Zinc	< 80

Note: Some metals can be lowered upon special request.
Calcium Carbonate can be added as anti-caking agent upon request.

PHYSICAL

Physical Form	Blue-Green, Free Flowing Crystal
Bulk Density	55 lb. per cu. Ft.
Main Particle Size Range (90 – 95%)	- 7 + 60 MESH

TYPICAL USES: ODOR/CORROSION CONTROL-Most cost effective method of controlling odors and corrosion from hydrogen sulfide liquid and gas. Also, ammonia gas odor. Treat at 1.62 lbs. iron per 1.0 lbs. hydrogen sulfide in solution.
(8# FSH) $FeSO_4 + H_2S \rightarrow FeS + H_2SO_4$.

PHOSPHATE REMOVAL/CLARIFICATION during aeration, FSH can reduce phosphate levels to meet regulations. It increases the size of the floc particles for faster settling and is not pH sensitive. Replaces Alum to eliminate aluminum carry over.

HEXAVALENT CHROMIUM REDUCTION to trivalent.

FERTILIZER: SOIL/TURF/PLANTS:
Acidifying soil and correcting iron deficiencies in plants developing chlorosis. Flowers and vegetables apply at the rate of 4.5 oz. (2 Tbs.) per 100 square feet. Blend into the soil and water thoroughly. Trees/Shrubs, dissolve ¼ to ½ oz. (1/2 to 1 tsp.) in one gallon of water and apply to the soil along the drip line. Large Pin Oaks, pour ½ cup in hole along drip line for each inch of tree diameter. Water thoroughly. Lawns, dissolve 2 cups in three gallons of water per 1000 sq. feet of lawn. Water thoroughly.

7513 E. 96th Street • P.O. Box 50426 • Indianapolis, IN 46250-0426
(317) 845-0045 • Fax: (317) 845-9086

PACKAGING AND SHIPPING: Bulk - 40,000# Tandem Truck, Pneumatic Truck LTL or Truckload 50# Poly or 2000# Bulk Bags

CAUTION: Keep out of reach of children. Keep from contact with eyes, cuts, or sores. Not for human consumption. This product will stain concrete surfaces such as drives and sidewalks. Wash or sweep from concrete surfaces immediately after application.

FREIGHT CLASSIFICATIONS: Ferrous Sulfate has an RQ of 1000 pounds, if less than 1000 pounds is in a single container the material is not regulated by D.O.T. as a hazardous material. Bulk Bag and Bulk DOT Description (> 1000 in container): Environmentally hazardous substances, solid, n.o.s., 9, UN3077, III, RQ, (ferrous sulfate)

APPENDIX D

Inadvertent Discovery Plan for Subsurface Explorations

DEPARTMENT OF ECOLOGY
State of Washington

PLAN AND PROCEDURES FOR THE UNANTICIPATED DISCOVERY OF CULTURAL RESOURCES AND HUMAN SKELETAL REMAINS[1]

PROJECT TITLE: Subsurface Explorations for Pre-Remedial Design Investigation 3 Project Plan

COUNTY WASHINGTON: Whatcom

Section, Township, Range: Section 30 T38N R3E

1. INTRODUCTION

The following Inadvertent Discovery Plan (IDP) outlines procedures to perform in the event of discovering archaeological materials or human remains, in accordance with state and federal laws.

2. RECOGNIZING CULTURAL RESOURCES

A cultural resource discovery could be prehistoric or historic. Examples include:

a. An accumulation of shell, burned rocks, or other food related materials.
b. Bones or small pieces of bone.
c. An area of charcoal or very dark stained soil with artifacts.
d. Stone tools or waste flakes (i.e. an arrowhead. or stone chips).
e. Clusters of tin cans or bottles, logging or agricultural equipment that appears to be older than 50 years.
f. Buried railroad tracks, decking, or other industrial materials.

When in doubt, assume the material is a cultural resource.

3. ON-SITE RESPONSIBILITIES

STEP 1: *Stop Work*. If any employee, contractor or subcontractor believes that he or she has uncovered a cultural resource at any point in the project, all work must stop immediately. Notify the appropriate party(s). Leave the surrounding area untouched, and provide a demarcation adequate to provide the total security, protection, and integrity of the discovery. The discovery location must be secured at all times by a temporary fence or other onsite security.

STEP 2: *Notify Archaeological Monitor or Licensed Archaeologist*. If there is an Archaeological Monitor for the project, notify that person. If there is a monitoring plan in place, the monitor will follow the outlined procedure.

[1] If you need this document in a format for the visually impaired, call Water Quality Reception at Ecology, (360) 407-6600. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

STEP 3: *Notify the Project Manager* of this project and contact the Ecology Staff Project Manager, or other applicable contacts:

Project Manager: Name: Ben Howard Phone: 360-676-2500 Email: benh@portofbellingham.com	Ecology Staff Project Manager Name: John Rapp Phone: 360.407.6265 Email: john.rapp@ECY.WA.GOV

Assigned Alternates:

Assigned Project Manager Alternate: Name: Gina Stark Phone: 360-676-2500 Email: GinaS@portofbellingham.com	Ecology Cultural Resource Specialist (Alternate): Name: Phone: email:

The Project Manager or applicable staff will make all calls and necessary notifications. **If human remains are encountered**, treat them with dignity and respect at all times. Cover the remains with a tarp or other materials (not soil or rocks) for temporary protection and to shield them from being photographed. **Do not call 911 or speak with the media. Do not take pictures unless directed to do so by DAHP. See Section 5.**

4. FURTHER CONTACTS AND CONSULTATION

A. **Project Manager's Responsibilities**:

- *Protect Find*: The Project Manager is responsible for taking appropriate steps to protect the discovery site. All work will stop immediately in a surrounding area adequate to provide for the complete security of location, protection, and integrity of the resource. Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery site. Work in the immediate area will not resume until treatment of the discovery has been completed following provisions for treating archaeological/cultural material as set forth in this document.

- *Direct Construction Elsewhere on-Site*: The Project Manager may direct construction away from cultural resources to work in other areas prior to contacting the concerned parties.

- *Contact Senior Staff*: If the Senior Staff person has not yet been contacted, the Project Manager must do so.

B. **Senior Staff Responsibilities**:

- *Identify Find*: The Senior Staff (or a delegated Cultural Resource Specialist), will ensure that a qualified professional archaeologist examines the area to determine if there is an archaeological find.

    - If it is determined not to be of archaeological, historical, or human remains, work may proceed with no further delay.

- If it is determined to be an archaeological find, the Senior Staff or Cultural Resource Specialist will continue with all notifications.

- If the find may be human remains or funerary objects, the Senior Staff or Cultural Resource Specialist will ensure that a qualified physical anthropologist examines the find. **If it is determined to be human remains, the procedure described in Section 5 will be followed.**

- *Notify DAHP*: The Senior Staff (or a delegated Cultural Resource Specialist) will contact the involved federal agencies (if any) and the Washington Department of Archaeology and Historic Preservation (DAHP).

- *Notify Tribes*: If the discovery may be of interest to Native American Tribes, the DAHP and Ecology Supervisor or Coordinator will coordinate with the interested and/or affected tribes.

General Contacts

Federal Agencies:	**State Agencies**:
Agency: Name Title Number Email	Agency: Name Title Number Email

Department of Archaeology and Historic Preservation:

Dr. Allyson Brooks State Historic Preservation Officer 360-586-3066 Assigned Alternate:	Rob Whitlam, Ph.D. Staff Archaeologist 360-586-3050 Assigned Alternate:

The DAHP or appropriate Ecology Staff will contact the interested and affected Tribes for a specific project.

Tribes consulted on this project are:

Tribe: Lummi Nation	Tribe: Upper Skagit Tribe
Name: Lena Tso	Name: Scott Schuyler
Title: THPO	Title: Cultural Resources
Phone: 360-312-2257	Phone: 360-854-7009
Email: lenat@lummi-nsn.gov	Email: sschuyler@upperskagit.com

Tribe: Swinomish Tribal Community	Tribe: Nooksack Tribe
Name: Larry Campbell	Name: Trevor Delgado
Title: THPO	Title: THPO
Phone: 360-466-7314	Phone: 360-592-5176 ext. 32234
Email: lcampbell@swinomish.nsn.us	Email: tdelgado@nooksack-nsn.gov

Further Activities

- Archaeological discoveries will be documented as described in Section 6.
- Construction in the discovery area may resume as described in Section 7.

5. SPECIAL PROCEDURES FOR THE DISCOVERY OF HUMAN SKELETAL MATERIAL

Any human skeletal remains, regardless of antiquity or ethnic origin, will at all times be treated with dignity and respect. Do not take photographs by any means, unless you are pre-approved to do so.
If the project occurs on federal lands or receives federal funding (e.g., national forest or park, military reservation) the provisions of the Native American Graves Protection and Repatriation Act of 1990 apply, and the responsible federal agency will follow its provisions. Note that state highways that cross federal lands are on an easement and are not owned by the state.

If the project occurs on non-federal lands, the Project Manager will comply with applicable state and federal laws, and the following procedure:

A. **In all cases you must notify a law enforcement agency or Medical Examiner/Coroner's Office**:

In addition to the actions described in Sections 3 and 4, the Project Manager will immediately notify the local law enforcement agency or medical examiner/coroner's office.

The Medical Examiner/Coroner (with assistance of law enforcement personnel) will determine if the remains are human, whether the discovery site constitutes a crime scene, and will then notify DAHP.

Enter contact information below:

City of Bellingham Police Department
360-778-8800

B. **Participate in Consultation**:

Per RCW 27.44.055, RCW 68.50, and RCW 68.60, DAHP will have jurisdiction over non-forensic human remains. Ecology staff will participate in consultation.

C. **Further Activities**:

- Documentation of human skeletal remains and funerary objects will be agreed upon through the consultation process described in RCW 27.44.055, RCW 68.50, and RCW 68.60.

- When consultation and documentation activities are complete, construction in the discovery area may resume as described in Section 7.

6. DOCUMENTATION OF ARCHAEOLOGICAL MATERIALS

Archaeological deposits discovered during construction will be assumed eligible for inclusion in the National Register of Historic Places under Criterion D until a formal Determination of Eligibility is made.

Project staff will ensure the proper documentation and field assessment will be made of any discovered cultural resources in cooperation with all parties: the federal agencies (if any), DAHP, Ecology, affected tribes, and a contracted consultant (if any).

All prehistoric and historic cultural material discovered during project construction will be recorded by a professional archaeologist on a cultural resource site or isolate form using standard and approved techniques. Site overviews, features, and artifacts will be photographed; stratigraphic profiles and soil/sediment descriptions will be prepared for minimal subsurface exposures. Discovery locations will be documented on scaled site plans and site location maps.

Cultural features, horizons and artifacts detected in buried sediments may require further evaluation using hand-dug test units. Units may be dug in controlled fashion to expose features, collect samples from undisturbed contexts, or to interpret complex stratigraphy. A test excavation unit or small trench might also be used to determine if an intact occupation surface is present. Test units will be used only when necessary to gather information on the nature, extent, and integrity of subsurface cultural deposits to evaluate the site's significance. Excavations will be conducted using state-of-the-art techniques for controlling provenience, and the chronology of ownership, custody and location recorded with precision.

Spatial information, depth of excavation levels, natural and cultural stratigraphy, presence or absence of cultural material, and depth to sterile soil, regolith, or bedrock will be recorded for each probe on a standard form. Test excavation units will be recorded on unit-level forms, which include plan maps for each excavated level, and material type, number, and vertical provenience (depth below surface and stratum association where applicable) for all artifacts recovered from the level. A stratigraphic profile will be drawn for at least one wall of each test excavation unit.

Sediments excavated for purposes of cultural resources investigation will be screened through 1/8-inch mesh, unless soil conditions warrant ¼-inch mesh.

All prehistoric and historic artifacts collected from the surface and from probes and excavation units will be analyzed, catalogued, and temporarily curated. Ultimate disposition of cultural materials will be determined in consultation with the federal agencies (if any), DAHP, Ecology and the affected tribes.

Within 90 days of concluding fieldwork, a technical report describing any and all monitoring and resultant archaeological excavations will be provided to the Project Manager, who will forward the report for review and delivery to Ecology, the federal agencies (if any), DAHP, and the affected tribe(s).

If assessment activity exposes human remains (burials, isolated teeth, or bones), the process described in Section 5 will be followed.

7. PROCEEDING WITH WORK

Work outside the discovery location may continue while documentation and assessment of the cultural resources proceed. A professional archaeologist must determine the boundaries of the discovery location. In consultation with Ecology, DAHP and any affected tribes, the Project Manager will determine the appropriate level of documentation and treatment of the resource. If there is a federal nexus, Section 106 consultation and associated federal laws will make the final determinations about treatment and documentation.

Work may continue at the discovery location only after the process outlined in this plan is followed and the Project Manager, DAHP, any affected tribes, Ecology (and the federal agencies, if any) determine that compliance with state and federal law is complete.

8. RECIPIENT/PROJECT PARTNER RESPONSIBILITY

The Project Recipient/Project Partner is responsible for developing an IDP. The IDP must be immediately available onsite, be implemented to address any discovery, and be available by request by any party. The Project Manager and staff will review the IDP during a project kickoff or pre-construction meeting.

We recommend that you print images in color for accuracy.

Implement the IDP / UDP if …

You see chipped stone artifacts.

- Glass-like material
- Angular
- “Unusual” material for area
- “Unusual” shape
- Regularity of flaking
- Variability of size

Implement the IDP / UDP if …

You see ground or pecked stone artifacts.

- Striations or scratching
- Unusual or unnatural shapes
- Unusual stone
- Etching
- Perforations
- Pecking
- Regularity in modifications
- Variability of size, function, and complexity

Implement the IDP / UDP if …

You see bone or shell artifacts.

- Often smooth
- Unusual shape
- Carved
- Often pointed if used as a tool
- Often wedge shaped like a "shoehorn"

Bone Awls from Oregon and Bone Wedge from California

Implement the IDP / UDP if …

You see bone or shell artifacts.

- Often smooth
- Unusual shape
- Perforated
- Variability of size

Implement the IDP / UDP if …

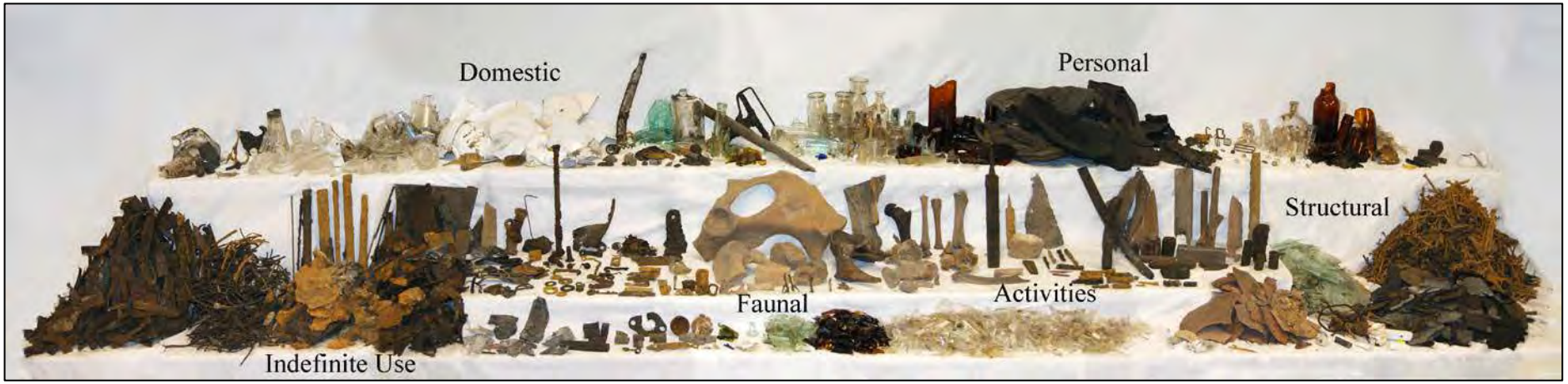
You see fiber or wood artifacts.

- Wet environments needed for preservation
- Variability of size, function, and complexity
- Rare

Artifacts from Mud Bay, Olympia, Washington

Implement the IDP / UDP if …

You see historic period artifacts.



Artifacts from Downtown Seattle, Alaskan Way Viaduct (Upper Left and Lower) and Unknown Site (Upper Right)

Implement the IDP / UDP if …

You see strange, different or interesting looking dirt, rocks, or

- Human activities leave traces in the ground that may or may not have artifacts associated with them
- "Unusual" accumulations of rock (especially fire-cracked rock)
- "Unusual" shaped accumulations of rock (e.g., similar to a fire ring)
- Charcoal or charcoal-stained soils
- Oxidized or burnt-looking soils
- Accumulations of shell
- Accumulations of bones or artifacts
- Look for the "unusual" or out of place (e.g., rock piles or accumulations in areas with few rock)

Implement the IDP / UDP if …

You see strange, different or interesting looking dirt, rocks, or

- "Unusual" accumulations of rock (especially fire-cracked rock)
- "Unusual" shaped accumulations of rock (e.g., similar to a fire ring)
- Look for the "unusual" or out of place (e.g., rock piles or accumulations in areas with few rock)

Site on Muckleshoot Indian Reservation, near WSDOT ROW along SR 164

Implement the IDP / UDP if …

You see strange, different or interesting looking dirt, rocks, or

- Often have a layered or “layer cake” appearance
- Often associated with black or blackish soil
- Often have very crushed and compacted shells

Implement the IDP / UDP if …

You see historic foundations or buried structures.