REMEDIAL INVESTIGATION WORK PLAN

Dawn Foods Site
6901 Fox Ave South

January 31, 2024

Prepared for:

Bridge Point Seattle 130, LLC

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Prepared by:

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Acronyms and Abbreviations

APH	Air-Phase Petroleum Hydrocarbon
ACGIH	American Conference of Governmental Industrial Hygienists
bgs	below ground surface
Bridge	Bridge Point Seattle 130, LLC
BTEX	benzene, toluene, ethylbenzene, and xylenes
COC	contaminant of concern
COI	constituent of interest
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CSM	conceptual site model
CUL	cleanup level
CVOC	chlorinated volatile organic compound
DOSH	Washington State Division of Occupational Safety and Health
Ecology	Washington Department of Ecology
EPA	United States Environmental Protection Agency
FBI	Friedman & Bruya, Inc
ft	foot
GC/MS	gas chromatography/mass spectrometry
GWCC	Great Western Chemical/Cascade Columbia Distribution Company
HCID	hydrocarbon identification
µg/m^3	micrograms per cubic meter of air
µg/L	micrograms per liter
mg/kg	milligram per kilogram
mS/cm	milliSiemens/centimeter
MTCA	Model Toxics Control Act
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	perchloroethylene (tetrachloroethene)
PVI	Petroleum Vapor Intrusion
QAPP	Quality Assurance Project Plan
RI/FS	Remedial Investigation/Feasibility Study
RIWP	Remedial Investigation Work Plan
Site	Dawn Foods facility and anywhere contamination originating on or from the Dawn Foods property has come to be located
SL	Screening level
SVOC	semivolatile organic compound
TCE	trichloroethene
TEE	Terrestrial Ecological Evaluation
TEQ	toxicity equivalent
TPH	total petroleum hydrocarbons
VI	vapor intrusion

VOC	volatile organic compound
WAC	Washington Administrative Code

Professional Certification

Remedial Investigation Work Plan

Dawn Foods Site
6901 Fox Avenue South
Seattle, WA 98108

King County Parcel Number 000180-0113

Ecology Facility Site ID No. 3505
Ecology Cleanup Site ID No. 16678

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1 Introduction

This Remedial Investigation Work Plan (RIWP) describes investigation activities to be conducted as part of efforts to develop a Remedial Investigation / Feasibility Study (RI/FS) report for the Dawn Foods Site (Site). The Dawn Foods facility (Property) is located at 6901 Fox Ave South in Seattle, Washington (Figure 1; King County Parcel Number 000180-0113). This RIWP was prepared for Bridge Point Seattle 130, LLC (Bridge) to comply with the requirements of Agreed Order (AO) No. DE 21602.

Key historical reports are included in Appendix A. Copies of boring logs from the recent environmental investigations are included in Appendix B. Recent soil, groundwater, and vapor data results and summaries are included in Appendix C. Results of the tidal study are included in Appendix D, Appendix E includes Petroleum Air Compliance spreadsheets, and initial constituent of interest (COI) screening is included in Appendix E. The supporting Quality Assurance Project Plan (QAPP) and Health and Safety Plan for the field investigations are included in Appendices G and H, respectively. Section 5 of this RIWP provides the field sampling plan.

The field work in Section 5 includes limited soil disturbance; however, based on the proximity of the Site to a historic-era cemetery, an Inadvertent Discovery Protocol is included in Appendix I and was submitted to Washington State Department of Archaeology and Historic Preservation on October 31, 2023.

After finalization of this RIWP, Bridge will implement the RIWP and continue working with Ecology to develop the RI/FS and draft Cleanup Action Plan.

2 Site Location and Description

2.1 Past, Current and Future Conditions

The Property covers 5.4-acres and is located in the Georgetown neighborhood of Seattle adjacent to the Duwamish River. The Property includes a warehouse building built in 1977 that is approximately 128,800 square feet (2.96 acres). The Property, including the warehouse building, are currently leased to Dawn Food Products, Inc. to mix and package dry commercial baking mixes.

2.1.1 Site History/Past Land Use

The history of the Site was determined using information from the Environmental Data Resources, Inc.'s (EDR's) state and federal environmental database searches, King County Assessor's Property Characteristics Report, Polk records, historical aerial photographs, Sanborn maps, USGS topographic maps, and the Washington State Department of Ecology (Ecology) central records.

The Site is located in the Duwamish River Valley and is adjacent to the Duwamish River. The river formerly meandered throughout the area until the 1913 to 1916 dredging program provided a channelized Duwamish Waterway.

Records reviewed indicate that ship building activities, such as ship repair, painting, and fabrication, likely occurred between 1929 and 1966 after which time the Property was leased and used by Emerson GM Diesel, a sheet metal fabrication and generator manufacturing company, to the mid 1970's (Hart Crowser 1996a). Figures 2A through 2E show the changes to the shoreline between 1936, when ship building operations were present, through 1977, when the property had been developed to the current footprint. These aerials show the transformation along the shoreline, from berths for boat repairs to upland that is present today. Figure 3 shows the historical features pulled from historical aerials and Sanborn maps. Historical features of particular interest (from east to west) include thermostat manufacturing (metals), enameling (metals), spray painting (TPH, VOCs, PCBs) and boat maintenance and painting at the incline wharves (Figures 2A and 2B; TPH, VOCs, PCBs, metals).

Tax records from the Emerson GM Diesel operations indicate that the existing warehouse was constructed in 1977 with all other buildings demolished at that time. Records indicate that the current warehouse was used by various food companies, such as Dawn Foods (1988 to 2003), Ener-G Foods, Oroweat Foods Company, and Sam Wylde Flour Company (EPA 2008).

2.1.2 Current Conditions and Land Use

In 2020 Bridge purchased the Property from Guimont Fox Avenue LLC. Currently the Property is leased to Dawn Food Products, Inc. which uses the Property to store, produce, and ship dry food products, such as cake and brownie mixes. Bulk oils such as canola oil are received by truck and were previously received by rail. Dry bulk items, such as sugar and flour, are received by truck. The warehouse is divided into areas that mix products with some offices (the western half), food product storage (middle and eastern half), and additional office space (very eastern end). A small quantity of cleaning solvents is stored and used on site for equipment maintenance and facility cleaning.

There are five silos along the western end of the warehouse and three above ground storage tanks. These contain dry products (flour and sugar) and cooking oils (such as canola oil [Hart Crowser 1996a]). A secondary containment system is present around the silos. There is a carbon dioxide tank (80,000-pound storage) which is used to cool agents in the mixes. A propane tank formerly located at the south end of the warehouse was used to fuel the forklifts, but it was removed when the operation converted to electric forklifts.

There are several stormwater drain lines along the southern portion of the Property, shown on Figure 4. Discharge from the Property occurs via a single outfall to the Duwamish Waterway. The outfall is located on the west end of the Property and crosses the northwest corner of the adjacent property to the south, known as the Seattle Boiler Works property (00180-0091), prior to discharge.

Dawn Foods manages stormwater in compliance with Industrial Stormwater General Permit (ISGP) No. No. WAR011560. In 2020, Dawn Foods was required to implement a Level 3 Corrective Action for total zinc and a Level 2 corrective action for total copper. Based on historical water quality data which showed consistent total copper benchmark exceedances, Dawn Foods elected to implement a treatment BMP that will address both total copper and total zinc pollutant concentrations. An Engineering Design Report describing the proposed treatment technology to be implemented to meet permit discharge benchmarks and limits has been submitted to Ecology (Clear Water and Landau 2021). The Level 3 advanced treatment BMP was installed during the third quarter of 2022.

2.1.3 Future Planned Land Use

Bridge is scheduled to upgrade the existing warehouse in 2024 and maintain its use as an industrial warehouse. A future tenant will likely use the warehouse for distribution.

2.1.4 Great Western Chemical

Great Western Chemical/Cascade Columbia Distribution Company (GWCC) is located upgradient to the east of the Site (Figure 1). GWCC operated a chemical and petroleum repackaging and distribution facility on the upgradient property. Groundwater flows from GWCC towards the Site (in an east to west direction) with eventual discharge to the Duwamish Waterway.

In 1990, releases on the GWCC property were reported from multiple USTs of unspecified petroleum products, halogenated organics, and non-halogenated solvents. In 2012, Ecology entered into an Agreed Order with the current property owner, Fox Ave Building LLC, to require implementation of the Cleanup Action Plan.

Based on information reported by Ecology,[1] contaminants of concern in the soil and groundwater originating from the GWCC property are:

- Chlorinated volatile organic compounds (CVOCs)
- Petroleum hydrocarbons
- Semi-volatile organic compounds (SVOCs), including polycyclic aromatic hydrocarbons (PAHs)
- Dioxins and furans

Documents for the GWCC cleanup show the “Northwest Corner Plume CAA” and the “Loading Dock Area” overlapping with the Site, as shown on Figure 5. Data from the 2012 Cleanup Action suggest that offsite contamination includes tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene, and vinyl chloride which are present in groundwater beneath the Site.

In 2019, groundwater sampling was completed at the GWCC site that indicated CVOCs in the shallow groundwater bearing zone are present immediately upgradient from the Site at concentrations between 63.2 and 144 µg/L, as shown on Figure 4 of the Technical Memorandum Summarizing June 2019 Sampling for the Fox Avenue Site (Calibre 2019).

Seep samples were collected at multiple locations along the Lower Duwamish Waterway Site shoreline. Seep sample S-11 was collected close to the vicinity of current well location MW-1. S-11 was sample six times between 1994 and 1998. This sample had detected concentrations of total 1,2-dichloroethene (8 µg/L) and vinyl chloride (1 µg/L) during the October 27, 1995 event. No other VOCs were detected in any of the other sampling events (Floyd|Snider 2011).

2.1.5 Schultz Distributing

The Emerson/Schultz Distributing block is located northeast of the Site, immediately north of GWCC. This property was developed in the 1920s for the Gypsum Products Corporation. From the late 1930s until the 1960s, Federal Pipe manufactured wood pipes and tanks on the property. Its operations included a dip tank, drying kilns, and warehouse space. In 1964, a group of individuals, including members of the Emerson family, purchased the property. Emerson GM Diesel leased the property in the 1960s, and performed maintenance and repair of diesel motors and trucks on the property. Pacific Detroit Diesel occupied the property between 1989 and 1996. In 1996, the property was leased to Schultz Distributing, Inc. Schultz has used the property as a distribution center for petroleum products. A number of ASTs were installed on the site as part of the Schultz operation.

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[1] https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=5082

Past environmental investigations identified solvent use in the central part of the yard and in the shop area. In the west part of the yard, a 2,000- to 6,000-gallon UST collected paint material and solvents from a former paint room/carpenter shop (Floyd|Snider 2011).

CVOCs from this site may be commingling with impacts from the GWCC site and contributing to CVOC impacts on the Site.

2.1.6 Duwamish Waterway

The western Site boundary is adjacent to the Duwamish Waterway. This portion of the waterway is within the Lower Duwamish Waterway (LDW) Superfund Site which is a 5-mile stretch of the channelized river that flows north into Elliot Bay. LDW was added to the Superfund National Priorities List by the U.S. Environmental Protection Agency (EPA) in 2001. Sediment in the LDW contains a wide range of contaminants due to decades of industrial activity and runoff from urban areas. EPA is leading efforts to clean up the sediment, while Ecology maintains control of the upgradient properties along the LDW.

2.2 Previous Field Investigations

2.2.1 Earth Consultants - 1988

On May 24, 1988, ECI conducted soil sampling activities on the Property. Laboratory analyses were conducted to evaluate soils for the presence of petroleum hydrocarbons and heavy metals. Conclusions presented in ECI's report to Larco Development dated May 31, 1988 acknowledged the presence of relatively small, localized surficial spillages of oil along the railroad tracks north of the building. The report concluded that the data suggested that the concentration of petroleum (oil) was below current environmental regulatory agency "action levels" and that no remedial measures would be required under existing law. No heavy metals were detected (ECI 1988).

2.2.2 Hart Crowser - 1996

In 1996 Hart Crowser completed a limited subsurface investigation for the Property (Figure 6; Hart Crowser 1996). Sample locations focused on four areas of the site: vicinity of the GWCC property boundary (HC-1); in the vicinity of the sheet metal and assembling area/near a historical tar kettle building and boiler/aluminum dipping area (HC-2); downgradient of the sheet metal area and near a possible paint spray booth (HC-3); and in the vicinity of ship painting and repair (HC-4 and HC-5). Results of this report include field observations of metal debris and petroleum like odor in one location (sample location HC-4), and TPH and metals detected at two locations in the western portion of the Property (in sample locations HC-4 and HC-5). Lead was detected above MTCA direct contact values at one location (HC-4). Volatile organic compounds were detected in several sample locations above screening levels. Sample locations are shown on Figure 6 and sample results are summarized in Table 1. Appendix A includes a copy of the 1996 Hart Crowser report.

2.2.3 CRETE - 2020-2023

On January 2020 through June 2023 CRETE conducted additional environmental investigations at the Site. This work was done to confirm the 1996 Hart Crowser data, verify that chlorinated volatile organic compounds (CVOCs) were present along the eastern portion the Site due to the likely upgradient migration from the GWCC site, define the vertical extent of contamination in soil, evaluate sub-slab and indoor air conditions, evaluate additional chemicals of concerns, and to provide additional data to address current site conditions. Sampling efforts focused on the following areas:

- **Confirmation of 1996 data:** Additional soil and groundwater samples were collected from soil boreholes and temporary wells located in close vicinity to samples collected in 1996 by Hart Crowser.
- **GWCC CVOC Impacts & Potential On-site Gasoline Source:** Additional soil and groundwater samples were collected from soil boreholes, temporary wells and permanent wells located along the upgradient property boundary to determine if CVOCs are present from the GWCC plume.
- **Extent of Metals Contamination:** Collection of additional soil and groundwater samples from soil boreholes along the northern and southern property boundaries and within the warehouse.
- **Groundwater Discharge to Surface Water:** Installation of 3 nearshore groundwater monitoring wells to determine groundwater metals concentrations at the shoreline.
- **Indoor Air Quality and Sources:** Collection of TPH soil and groundwater samples to evaluate potential sub-slab sources of elevated TPH indoor air concentrations. Indoor air vapor samples collected to confirm possible migration from sub-slab to indoor air.
- **Extent of Chemical Exceedances for COC Analysis:** Collection of additional soil and groundwater samples from across the site for a wide variety of chemical analysis to provide additional data on site releases. Past sampling focused on metals, TPH and CVOCs. Additional samples collected for polychlorinated biphenyls (PCBs), semi-volatile organic compounds (SVOCs), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), mercury, and tributyltin.
- **Groundwater Flow Direction and Gradient & Tidal Study:** Gauged all wells and performed tidal study on the six nearshore wells.

Six monitoring wells (MW-1, MW-2, MW-3, MW-4, MW-5, and MW-6) were installed December 15-16, 2021 and subsequently developed on December 17, 2021. Three additional monitoring wells (MW-7, MW-8, and MW-9) were installed on March 9, 2023 and developed on March 13, 2023. Wells were installed with a hollow stem auger by Holt Drilling, a Washington State licensed driller. Copies of boring logs are included in Appendix B. Table 2 provides a summary of well completion details.

Sample locations are shown on Figure 7. The results of these investigation efforts are summarized in Section 3. Appendix C includes copies of the laboratory reports. Soil and groundwater samples were collected as follows:

- Investigations were performed using standard operating procedures that are consistent with MTCA and EPA requirements. Soil boreholes were advanced using direct-push drilling equipment (DPT). Groundwater monitoring well boreholes were completed using hollow stem auger.
- Soil samples were collected from multiple depth intervals at each borehole and sample locations included areas with elevated PID readings or other olfactory evidence of contamination.
- Groundwater grab samples were collected from temporary wells at all direct push borehole locations to provide an indication of groundwater quality. The groundwater monitoring wells were sampled and tested after installation and development.
- The nearshore tidally-influenced groundwater monitoring wells were sampled during a negative low tide cycle at a predetermined lag time from low tide. A tidal study was performed for a subset of the permanent monitoring wells (MW-1 through MW-6) to determine the net groundwater flow direction and to establish the appropriate lag time at which to sample each well such that the groundwater in the well at the time of sampling is close to its lowest elevation during the tidal cycle (thus representing groundwater discharge). Wells further than 200 feet away from the shoreline were not included in the tidal study. A pressure transducer was installed in each nearshore monitoring wells to observe water level response to tidal variation.
- All groundwater sampling included measurement of pH, specific conductance, temperature, ORP, and dissolved oxygen to ensure proper purging of wells, and in support of fate and transport analyses.
- For monitoring wells with low-flow stabilized specific conductivity values greater than 2,000 microSiemens per centimeter, salt water influence on quantification of select metals (arsenic, copper, nickel) is likely. Split groundwater samples from the first sampling event were submitted to Friedman and Bruya, Inc. (FBI) and Brooks Applied Labs (BAL) for chemical analysis. Groundwater samples submitted to BAL were analyzed total and dissolved metals by EPA Method 1638. EPA Method 1638 uses inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS) modified using a Closed-Vessel Hotblock Digestion sample preparation. This method allows for low detection limits even with dilution. The split samples submitted to FBI were analyzed for total and dissolved metals by EPA Method 6020B with triple quadrupole (QQQ) mass spectrometry. The results of the split samples indicated that elevated arsenic, copper, and nickel results occurred in high salinity wells using EPA Method 6020B. As a result, all subsequent groundwater metals analyses were performed using EPA Method 1638 at BAL. Dissolved metals samples were field filtered.

Sampling to assess vapor intrusion was conducted at the Property in June 2020, June 2021, and July 2023. The sampling was conducted based on groundwater data that indicated CVOC releases from the GWCC site may have migrated beneath the Dawn Foods building. The objective of the indoor and ambient air sampling was to determine if potential vapor intrusion from contaminants beneath the building could impact indoor air. The results of this sampling effort are discussed in Section 3.1.3.

2.3 Site Conditions

2.3.1 Physical Habitat Features

The Property is located in the Georgetown neighborhood of Seattle adjacent to the Duwamish Waterway in a predominately industrial/commercial area of Seattle. The Property covers 5.4-acres and includes a 128,800 square feet (2.96 acres) warehouse. The Property is covered in pavement/concrete surfaces except for two small landscape areas along the shoreline and the rail spur north of the building. The shoreline is heavily armored from the top of bank and down the steep embankment into the Duwamish Waterway to an elevation of about -1 ft MLLW.

2.3.2 Regional Geology

The greater Duwamish Valley was formed by the carving action of glaciers that last advanced into this area from British Columbia approximately 15,000 years ago. When the ice sheets began to retreat approximately 5,700 years ago, the waters of Puget Sound extended up the Duwamish Valley as far south as Auburn, about 32 km (19 mi) upstream of the present mouth of the Duwamish River at Elliott Bay. Around that same time, the Osceola Mudflow descended from Mount Rainier, depositing a massive layer of sediment into the then marine waters near present-day Auburn and Kent. The mudflow diverted the historical course of the White River, at that time a tributary of the Puyallup River, to the Green River (Booth and Herman 1998).

The alluvial fill within the Duwamish Valley deepened over time from the deposition of upstream fluvial sediments of the White, Green, and Black Rivers, advancing the mouth of the Duwamish River farther to the north. The fill included beds of fine silts gravels deposited near the water’s edge. These sediments eventually buried the post-glacial form of the valley so that only a few outcroppings of bedrock remain exposed at the ground surface. As the river flooded and migrated back and forth across the floodplain, these sediments were re-deposited by the river and continually intermixed with additional riverine and floodplain deposits (Booth and Herman 1998). In the late 1800s and early 1900s, extensive modifications were made to the river, including the filling of tide flats and floodplains to straighten the river channel, resulting in the abandonment of almost 6 km (3.7 mi) of the original meandering river bed. Several current side slips in the LDW are remnants of these old river meanders. The channel was dredged for navigational purposes, and the excavated material was frequently used to fill the old channel areas and the lowlands to bring them above flood levels. Subsequent filling of the lowlands for continued development resulted in a surficial layer of fill over most of the lower Duwamish Valley. Although the sediment types encountered in the LDW are variable (either from changing regional or local hydrodynamics or anthropogenic disturbances), basic sedimentary patterns of interbedded silts and sands are present in the LDW (Booth and Herman 1998).

Valley deposits consist of 50 to 100 feet of older alluvium (Qoal), representing sand and silt estuarine deposits. Locally, these older sediments contain discontinuous gravel lenses, shells, and some wood. The younger alluvial deposits atop the older alluvium have a relatively uniform thickness and depth, with a base that almost everywhere is within 5 to 10 feet of the modern sea level. These deposits, which consist of silt, sand, and sandy silt with abundant wood and organics, represent channel and floodplain deposits laid down by the modern Duwamish River. Overlying the younger alluvium are varying amounts of fill that range in thickness from 3 to 10 feet. The fill material is composed of a mixture of sand, gravel, silt, and miscellaneous construction debris.

2.3.3 Site Geology

Site geologic conditions are illustrated on the site geologic cross sections figures (Figures 8 through 11). The cross-section locations were chosen as a representative schematic of the geologic units encountered by site explorations. Appendix B includes site borehole logs collected during the 2020 and 2023 field investigations. Geoprobe cores and monitoring well hollow stem augers were advanced to a depth of approximately 15 to 21.5 ft below ground surface (bgs). The units encountered beginning at the surface and progressing deeper are discussed in the following subsections.

Fill Material

Near-surface soil at the Site predominately consists of fill material. Fill is present ground surface (below pavement and structures) to a depth of 4 to 12 ft bgs). Fill material is predominately composed of poorly graded silty fine sand to gravelly sand or sandy silt to gravelly sandy silt. Locally, fill includes some organic matter, wood, and debris, including concrete rubble.

Recent Alluvial Deposits

The first native soils encountered beneath the fill are interpreted to represent recent (i.e., predevelopment) alluvial deposits of the lower Duwamish Valley. These deposits range in composition from fine to medium sand to slightly silty to very silty fine to medium sand. Locally, within these deposits, fine sandy silt lenses are intercepted. Where fill is not present, these alluvial deposits range in depth from near-surface to the total depth investigated. These deposits have been interpreted to represent channel and floodplain deposits laid down by the modern Duwamish River (Booth and Herman 1998). These younger alluvial deposits are where the water table is encountered.

Silt Horizon

The upgradient GWCC site identified a thin layer of silt occasionally at 11 to 14 ft bgs. This silt horizon was used to define the base of an upper shallow groundwater unit. Except for direct push location GP-SB-2, this silt horizon was not encountered on the Site. A separate shallow silt (above 6 ft bgs) was observed in limited areas on the eastern portion of the Site that was also observed in the Northwest Corner of the GWCC site.

2.3.4 Groundwater

The shallow unconfined aquifer in the Duwamish River Valley is generally located within the native alluvium unit. Shallow groundwater can also occur locally within fill material. In general, the valley alluvium is believed to comprise a single, large aquifer system (Booth and Herman 1998). Groundwater recharge to the valley occurs via both infiltration and from upland aquifers that discharge into the alluvial valley both along subsurface pathways and through visible seeps along valley walls. Groundwater discharge is primarily to the channel of the Duwamish Waterway.

Groundwater was generally encountered at between 8 and 10 ft bgs although tidal influence significantly increases that range near the Waterway. Regional groundwater flow direction is generally to the west-southwest with groundwater discharging to the Duwamish Waterway. A groundwater contour map is included on Figure 12.

Data from the GWCC site indicate that the alluvium has an average hydraulic conductivity of 5.3×10^{-3} cm/s with a range from 3×10^{-3} to 1×10^{-2} cm/s.

Groundwater and surface water interactions also affect the salinity of the groundwater at the Site. Specific conductance, a proxy for salinity, is elevated in shoreline wells. This is likely due to the infiltration of brackish surface water from the LDW. To determine the extent of the surface water interactions, a tidal study was conducted from January 4 to 10, 2022 during a time period including negative and non-negative low tides, allowing for observation of the tidal response. The 6 nearshore monitoring wells and the nearest NOAA-monitored tidal station (ID# 9447130 in Seattle, WA) were used to measure tidal variations. The results of the tidal study are included in Appendix D.

3 Existing Data Summary

Data from the 1996 investigation are summarized on Table 1. The 1996 data were used as the basis for more recent work, which was conducted to confirm results from 1996 and also provide a more comprehensive assessment of contamination at the site. Recent sampling efforts have included a wider chemical analysis suite for soil, water and vapor and sampling locations have considered off site migration from the site to surface water. The discussion below focusses on the recent data, which is summarized on Tables 3 through 9. Sample locations are shown on Figure 7, extents of contamination are shown on Figures 13 through 21, and Appendix C includes laboratory reports from data collected from 2020 through 2023.

Soil and groundwater results are compared to screening levels presented on Tables 3 through 6. Values are based on MTCA levels protective of surface water discharge or default MTCA values as noted.

3.1 Soil Results

Soil samples were analyzed for metals, CVOCs, semivolatile organic compound (SVOCs), benzene, toluene, ethylbenzene, and xylenes (BTEX), polychlorinated biphenyl Aroclors® (PCBs), and total petroleum hydrocarbons (TPH). Samples were generally collected from the vadose zone and from the top of the saturated zone. Temporary soil boreholes were advanced using DPT. Three of these DPT borings were installed at MW-7, MW-8, and MW-9 locations in advance of the monitoring wells installation. Sample results are summarized on Tables 3 and 4. A vadose or saturated zone designation is identified for each soil sample so that the results can be compared to the appropriate soil screening levels. The designation was determined using a conservatively high water table elevation assumption (approximately 9 ft NAVD88) that was further raised to 10 and 11 ft NAVD88 in nearshore areas to account for tidal influence. Sample locations are shown on Figure 7 and data for the most frequently detected compounds are presented on Figures 14 to 21. Soil data collected since 2020 are represented as colored circles around sample locations, with green/blue representing a concentration below the screening level and red representing a concentration exceeding the screening level. Vadose zone samples are represented as dashed circles and saturated samples are represented as solid circles. This convention varies slightly on Figures 14 and 15. No CVOCs have been detected in soil samples, so no colored circles on shown on Figure 14. TPH-G and TPH-Dx each have just one screening level, so these compounds are both shown on Figure 15, with no differentiation between vadose and saturated zone samples. A sample location that was not analyzed for a specific compound is grayed.

Metals

Soil samples were collected for metal analysis from soil borings SB-5, SB-6, SB-8 through SB-12, and SB-18 through -31, RI-SB-01, RI-SB-02, RI-SB-04 through -06 and MW-1 through MW-8. Soil detections included the following:

- Mercury at GP-SB-5 at 7 ft bgs was detected at the MTCA Method A unrestricted land use value of 2 milligram per kilogram (mg/kg). Mercury was not detected in any other soil sample collected at the site.
- Arsenic was detected above the screening level of 7.3 mg/kg at GP-SB-8 (at 8 ft bgs), GP-SB-23 (5 and 11 ft bgs) and GP-SB-24 (at 10 and 12 ft bgs). Concentrations above screening levels ranged from 8.31 mg/kg (SB-23 at 11 ft bgs) to 13.6 mg/kg (GP-SB-23 at 5 ft bgs). All other detections were below screening levels. The estimated extent of arsenic at the site is shown on Figure 16.
- Cadmium was detected in two soil samples, SB-8 (at 8 ft bgs) at a concentration of 2.76 mg/kg, above the screening level of 2 mg/kg and at MW-5 (at 12.5 ft bgs) at a concentration of 1.08 above the MTCA Method B saturated soil protection of surface water value of 0.055 mg/kg.
- Chromium was detected in two soil samples, SB-22-07 (at 7 ft bgs) and RI-SB-04 (at 2 ft bgs) at a concentration of 98.4 mg/kg and 43.3 mg/kg, respectively, above the screening level of 19 mg/kg, based on Chromium VI (hexavalent chromium). These detections are below the Chromium III screening level of 2,000 mg/kg.
- Copper was detected above the screening level of 36.4 mg/kg at GP-SB-5-7 (7 ft bgs), GP-SB-8 (9 ft bgs), GP-SB-11 (4 ft bgs), and RI-SB-04 (at 2 ft bgs). Concentrations above the screening level ranged from 213 mg/kg (GP-SB-5-7) to 78 mg/kg (GP-SB-8). All other detections were below the screening level. The estimated extent of copper at the site is shown on Figure 17.
- Lead was detected in one soil sample, MW-5 (at 12.5 ft bgs) at a concentration of 93.1 above the screening level of 81 mg/kg.
- Nickel was detected above the screening level of 48 mg/kg at GP-SB-8 (9 ft bgs) at 62.1 mg/kg and GP-SB-11 (4 ft bgs) at 174 mg/kg. All other detections were below screening levels. The estimated extent of nickel at the site is shown on Figure 18.
- Zinc was detected above the screening level of 100.9 mg/kg at GP-SB-5-7 (7 ft bgs), GP-SB-8 (9 ft bgs), GP-SB-11 (4 ft bgs) GP-SB-25 (8 ft bgs), RI-SB-04 (at 2 ft bgs) and MW-5 (at 12.5 ft bgs). Concentrations above the screening level ranged from 140 mg/kg (GP-SB-25) to 7,110 mg/kg (GP-SB-8). All other detections were below screening levels. The estimated extent of zinc at the site is shown on Figure 19.

CVOCs, SVOCs, BTEX, PCBs, and TPH Compounds

Select soil samples from soil borings SB-15 through SB-17, SB-21 through SB-32, RI-SB-01, RI-SB-02, RI-SB-04, MW-1 through MW-6, and MW-8 were sampled for CVOCs, SVOCs, BTEX, PCBs, and TPH compounds (including cPAHs). Sample results are shown on Table 3 and summarized below:

- CVOCs – Soil samples from MW-4, MW-5 and MW-6 were tested for CVOCs in December 2021. All results were below laboratory detection limits as shown on Figure 14.
- SVOCs – Soil samples from GP-SB-22 through -26 were tested for SVOCs. Total cPAH TEQ exceeded the screening level of 0.007 mg/kg at GP-SB-22-09 (0.12 mg/kg), GP-SB-25-08 (0.199 mg/kg) and GP-SB-26-06 (0.018 mg/kg) as shown on Figure 21. All

other SVOC compounds were below screening levels or detected below laboratory detection limits (Table 3).

- BTEX – Soil samples from GP-SB-15 through -17,GP-SB-31, and GP-SB-32 were analyzed for BTEX compounds. All results were below laboratory detection limits, as shown on Table 3.
- PCBs – Soil samples from GP-SB-21 through -31 were analyzed for PCBs. All results were below laboratory detection limits with the exception of GP-SB-30, which had a total PCB Aroclor® concentration of 0.57 mg/kg, above the screening level of 0.03 mg/kg as shown on Figure 20. TPH – TPH (gasoline range and total diesel range) were sampled from select locations including GP-SB-15 through -17, GP-SB-31, GP-SB-32, MW-5, RI-SB-01, RI-SB-02, RI-SB-04, and MW-8. All results were below screening levels as shown on Figure 15.

3.2 Groundwater Results

Groundwater samples were collected from direct push borings and monitoring wells MW-1 through MW-9 (Figure 7). Sample locations were selected to assess the potential for groundwater contamination from off-site and historical onsite activities. Analytical data for the most frequently detected compounds are presented on Figures 14 to 21. Groundwater data are shown in tabular format for each sample location. Detected results are present in bold font and results that exceeded the screening level are shaded.

Grab Groundwater Results

Select samples were analyzed for metals (total and dissolved), gasoline range TPH, and volatile organic compounds (VOCs). Results are shown on Table 5; laboratory reports are included in Appendix C.

Metals

Groundwater samples collected from direct push boreholes in 2020 and 2021 were analyzed for total and dissolved metals by EPA Method 6020B with triple quadrupole (QQQ) mass spectrometry. Although this method addresses some interference from sea water, at high specific conductivity values, sea water interference is still likely for arsenic, copper, and nickel. As a result, groundwater grab samples from direct push boreholes are not presented for arsenic, copper, and nickel on Figures 16, 17, and 18, respectively.

Groundwater detections for dissolved metals include the following compounds:

- Dissolved arsenic was detected in groundwater from several temporary boring locations (GP-SB-6 through -10, GP-SB-18, GP-SB-20 through -24, GP-SB-30, GP-SB-31 and RI-SB-06) above the screening level (8 µg/L).
- Dissolved nickel was detected above the screening level of 8.2 µg/L in groundwater from GP-SB-6, GP-SB-7, GP-SB-11, GP-SB-21, and GP-SB-24.

- Dissolved zinc was detected above the screening level of 81 µg/L in groundwater from GP-SB-6 through GP-SB-9, GP-SB-29 and RI-SB-05. µg/L The estimated extent of zinc at the site is shown on Figure 19.
- Dissolved copper was detected above the screening level of 3.1 µg/L in groundwater from GP-SB-8 through GP-SB-10.

No other metals were detected above screening levels.

CVOC Compounds

- Groundwater detections for CVOCs include the following compounds: Vinyl chloride was detected in groundwater from GP-SB-1, GP-SB-2, GP-SB-3, GP-SB-15 above the screening level of 0.18 µg/L. Detections in GP-SB-1, GP-SB-2, GP-SB-15 were also above the MTCA screening level for protection of indoor air (0.32 µg/L; Figure 14).
- Cis-1,2-dichloroethene was detected in groundwater from GP-SB-2above the screening level of 180 µg/L .
- Trichloroethene (TCE) was not detected above the laboratory detection limit in any of the temporary grab samples (laboratory detection limit is below the screening value of 0.7 µg/L), and tetrachloroethene (PCE) was detected at 2 locations (GP-SB-15 and RI-SB-01) with all detections below the screening value (2.9 µg/L; Figure 14).

No other CVOC compounds were detected above screening levels.

TPH, BTEX and TBT Compounds

Groundwater detections for TPH, BTEX, TBT include the following compounds:

- TPH-gasoline was detected in groundwater from GP-SB-15 (detected at 3,300 µg/L) above the screening level of 1,000 µg/L. All other detections were below the screening level. Estimated extent of TPH-gasoline in groundwater is shown on Figure 15.
- TPH-diesel range organics was detected in groundwater from RI-SB-01 below the screening level (500 µg/L) with silica gel cleanup. All other detections were below the screening level. Estimated extent of TPH-gasoline in groundwater is shown on Figure 15.
- BTEX – groundwater samples from GP-SB-1 through 6, GP-SB-9, GP-SB-13 through GP-SB-17, GP-SB-31, and GP-SB-32 were tested for BTEX and all results were below laboratory detection limits for benzene, and all other detections (toluene, ethylbenzene, and xylenes) were below screening levels.
- Tributyltin (TBT) was a common compound added to marine paints as an antifouling biocide by the shipping industry and small boats owner in the 1970's (2001 Santillo et all). Boat building and repair were performed at the Property from 1929 through 1966 (Section 2.1.1) which predates the prevalent use of TBT in the industry. One groundwater grab sample was collected from GP-SB-09 (Figure 7), which is downgradient of documented ship building activities (from aerials, see Figure 2A). TBT was not detected above the laboratory reporting limit in the sample (Table 5).

Monitoring Well Groundwater Results

Six monitoring wells (MW-1, MW-2, MW-3, MW-4, MW-5, and MW-6) were installed December 15-16, 2021 and subsequently developed on December 17, 2021. These six monitoring wells were sampled in January/February 2022, April 2022, August 2022, and December 2022. Three additional monitoring wells (MW-7, MW-8, and MW-9) were installed on March 9, 2023 and developed on March 13, 2023. All nine monitoring wells were sampled in March 2023. Select samples were analyzed for metals (total and dissolved), gasoline range TPH, and volatile organic compounds (VOCs). Results are shown on Table 6; laboratory reports are included in Appendix C.

Metals

Due to potential sea water interference on metals quantification, split groundwater samples were collected during the first quarterly groundwater sampling event (MW-1 through MW-6). Groundwater samples submitted to Brooks Applied Labs (BAL) were analyzed for dissolved metals following EPA Method 1638. EPA Method 1638 uses inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS) and is modified using a Closed-Vessel Hotblock Digestion sample preparation method. This method allows for low detection limits even with dilution. The split samples were submitted to Friedman and Bruya (F&B) for total and dissolved metals analysis by EPA Method 6020B with triple quadrupole (QQQ) mass spectrometry. These results indicated that EPA Method 6020B did not adequately address polyatomic interferences and resulted in artificially elevated concentrations for arsenic, copper, and nickel. The data are presented in the data tables and Figures 16, 17, and 18, but are not used to interpret the extent of groundwater contamination. Groundwater detections for dissolved metals include the following compounds:

- Dissolved arsenic was detected in groundwater from MW-1, MW-2, MW-3 and MW-6 during the first sampling event, January 2022, above the screening level of 8 µg/L; however, dissolved arsenic has not detected above screening levels in the subsequent four monitoring events (April, August, December 2022 and March 2023). Dissolved arsenic was also detected in MW-8 above the screening level during the one time that well has been sampled (March 2023). The estimated extent of arsenic at the site is shown on Figure 16.
- Dissolved copper was detected in one well, MW-3, during the January 2022 event, above the screening level of 3.1 µg/L. The estimated extent of copper at the site is shown on Figure 17.
- Dissolved nickel was detected below the screening level of 8.2 µg/L in all groundwater sampling events. The estimated extent nickel at the site is shown on Figure 18.
- Dissolved zinc was detected above the screening level of 81 µg/L in groundwater from MW-1, MW-4, and MW-5. Concentrations above the screening level range from 99.4 µg/L (MW-4, August 2022) to 1,900 µg/L (MW-5, January 2022). The estimated extent of zinc at the site is shown on Figure 19.

No other metals were detected above screening levels.

CVOC Compounds

Groundwater detections for CVOCs include the following compounds:

- PCE was detected in groundwater at MW-5 above the screening level of 2.4 µg/L with exceedances ranging from 3.2 µg/L (January 2022) to 9.8 µg/L (March 2023). The estimated extent of VOCs in groundwater is shown on Figure 14.
- TCE was detected in groundwater at MW-5 and MW-8 above MTCA the screening level of 0.7 µg/L with exceedances ranging from 0.98 µg/L (MW-8, March 2023) to 12 µg/L (MW-9, March 2023; Figure 14).
- Vinyl chloride was detected in groundwater from MW-4, MW-5, MW-8 and MW-9 above the screening level of 0.18 µg/L and above MTCA screening level for protection of indoor air (0.32 µg/L). Exceedances ranged from 0.11 µg/L (MW-4, March 2023) to 12 µg/L (MW-9, March 2023; Figure 14).

No other CVOC compounds were detected above screening levels.

TPH, BTEX, PCB, and SVOCs Compounds

Groundwater detections for TPH, BTEX, PCB, and SVOCs include the following compounds:

- TPH-diesel range organics was detected in groundwater from MW-5 (detected at 2,640 µg/L, detected during the April 2022 event) above the screening level (500 µg/L). All other detections were below the screening level.
- TPH-gasoline range organics was detected in groundwater from MW-8 (detected at 2,300 µg/L, detected during the March 2023 event) above the screening level of 1,000 µg/L. All other detections were below the screening level. Estimated extent of TPH-gasoline in groundwater is shown on Figure 15.
- BTEX compounds were tested for at MW-5, in the vicinity of former ship building activities. BTEX compounds were not detected above the laboratory detection limit.
- PCBs were tested for at MW-5, in the vicinity of former ship building activities. PCB Aroclors® were not detected above the laboratory detection limit. The estimated extent of PCB in site groundwater and soil is shown on Figure 20.
- SVOCs –SVOCs were tested for at MW-5. The only detected compound was acenaphthene, detected below screening levels. All other SVOCs, including cPAHs, were detected below laboratory detection limits (Figure 21).

3.3 Vapor Intrusion

Based on the potential for CVOCs in groundwater from the upgradient GWCC site to impacts indoor air, vapor testing to assess vapor intrusion was performed in June 2020. Follow-up indoor and ambient air sampling was also performed in June 2021 and July 2023. Sub-slab, indoor, and ambient air samples were analyzed using Air-Phase Petroleum Hydrocarbon (APH) analysis and Environmental Protection Agency (EPA) Method TO-15. The APH method detects gasoline and the volatile fraction of diesel fuel oil. The TO-15 method detects volatile organic compounds (VOCs), including CVOCs.

June 2020 Sub-slab, Indoor, and Ambient Air Sampling

Samples were collected in accordance with EPA Method TO-15 for VOCs and the Air Phase Hydrocarbon (APH) Method using Summa-type evacuated cylinders with regulators calibrated to collect sub-slab grab samples and indoor and ambient air composite samples over 8 hours. The samples were analyzed by FBI using gas chromatography/mass spectrometry (GC/MS). Results are summarized on Table 7 and Appendix C includes the results from the vapor intrusion work completed in 2020.

The sub-slab and indoor air samples were collected from 2 locations in the office area (BR-SS/IA and OF-SS/IA) and 1 location in the warehouse (WH-SS/IA), all toward the east side of the building. The ambient samples (UP and DOWN) were collected from upwind and downwind locations to estimate background levels of the COCs in the project area.

Table 7 summarizes the data collected during the sampling event. TCE and PCE were detected above Method C industrial screening levels in the three sub-slab locations. Two sampling locations (restroom/BR-SS-0620; detected at 810 µg/m^3 and office/OF-SS-0620 detected at 290 µg/m^3) resulted in TCE detections above the MTCA Vapor Intrusion Short-term TCE subsurface screening Level of 250 µg/m^3, which is based on a short-term exposure for a workplace scenario.

TCE detections in vapor samples collected from indoor air were below MTCA Method C industrial screening level in indoor air at all locations. The highest detection was from the sample located in the bathroom (detection of 0.37 µg/m^3) was below the MTCA Vapor Intrusion TCE Indoor Action Level of 7.5 µg/m^3, which is based on a short-term exposure for a workspace scenario.

PCE in vapor samples collected from indoor air was below laboratory detection limits.

TPH was detected in sub-slab and indoor air vapor samples during the 2020 sampling event. Total TPH concentrations in sub-slab samples ranged from 1,570 µg/m^3 to 6,400 µg/m^3. TPH concentrations in indoor air vapor samples ranged from 242.58 µg/m^3 to 272.52 µg/m^3.

1,2-dichloroethane (EDC), naphthalene, benzene, and TPH were detected in both ambient (outdoor samples) and indoor samples. Indoor vapor sample results were corrected for ambient air measurements; Table 7 shows both the detected concentrations and corrected concentrations with the ambient air concentration subtracted. VOCs[2] in the ambient air could be from sources outside of the building such as paints, aerosol sprays, fuels, or from emissions released from industrial uses in the area. The warehouse has many truck bay doors

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[2] https://www.epa.gov/indoor-air-quality-iaq/volatile-organic-compounds-impact-indoor-air-quality

and windows that are directly connected to ambient air. During sampling activities, the doors were closed to minimize the influence of ambient sources on indoor air vapor.

June 2021 Indoor and Ambient Air Sampling

Air sampling was performed in June 2021 to further assess indoor air quality. Samples were collected in accordance with EPA Method TO-15 for VOCs and the APH Method using 6-liter (L) Summa-type evacuated cylinders with regulators calibrated to collect composite samples over 24 hours. The field sampling program was carried out during a 24-hour period, over two consecutive days to account for fluctuations in temperature, ambient pressure, surrounding traffic, and other environmental conditions. The samples were analyzed by FBI using gas chromatography/mass spectrometry (GC/MS). Results are summarized on Table 8 and Appendix C includes the results from the vapor intrusion work completed in 2021.

A total of six samples were collected inside the Warehouse building (IAI through IA6), with two in the office space on the east end of the building and four in the warehouse space. In addition, two ambient samples were collected outdoors on the south side of the building in the traffic/loading area. The ambient samples were collected from upwind and downwind locations to estimate background levels of the COCs in the project area. Sample locations are shown on Figure 7.

Table 8 summarizes the data collected during the sampling event. Table 8 shows both the detected concentrations and corrected concentrations, which removes the average concentration of the VOC compound if it was detected in ambient air. During sampling activities, the doors were closed.

TPH was detected indoor air samples during the 2021 sampling event. TPH concentrations in indoor air samples collected inside the building ranged from 104 µg/m3 to 341 µg/m3. TPH was also detected in ambient air, detected in samples collected outside of the building at upwind and downwind locations, the average concentration of these detections was 109 µg/m3.

July 2023 Indoor and Ambient Air Sampling

Air sampling was performed in July 2023 to further assess indoor air quality. Sample collection followed methods used in the 2 previous indoor air sampling events. All samples were collected in accordance with EPA Method TO-15 for VOCs and the APH Method using 6-L Summa-type evacuated cylinders with regulators calibrated to collect composite samples over 24 hours. The field sampling program was carried out during a 24-hour period, over two consecutive days to account for fluctuations in temperature, ambient pressure, surrounding traffic, and other environmental conditions. The samples were analyzed by FBI using gas chromatography/mass spectrometry (GC/MS). Results are summarized on Table 9 and Appendix C includes the results from the vapor intrusion work completed in 2023.

Sampling was conducted from Tuesday (July 4, 2023) to Wednesday (July 5, 2023) morning when the building was at minimal occupancy. Past sampling events included 6 indoor air samples. The 2023 event included the same 6 locations but also include 2 additional locations. A total of six samples were collected inside the Warehouse building (IAI through IA6), with two in the office space on the east end of the building and four in the warehouse space. 2 new sample locations (IA7 and IA8) were collected from the south side of the Warehouse where sprinkler system risers enter the Warehouse through floor penetrations and on the north side of the Warehouse just outside of the Dawn Foods test kitchen. In addition, two canisters were collected outdoors on the south side of the building in the traffic/loading area (ambient samples). The ambient samples were collected from presumed upwind and downwind locations to provide data on background levels of the COCs in the project area. Sample locations are shown on Figure 7.

Table 9 summarizes the data collected during the sampling event. Table 9 shows both the detected concentrations and a corrected concentration, which removes the average concentration of the VOC compound if it was detected in ambient air. During sampling activities, the doors were closed. All sample results for the 2023 event were below screening levels.

TPH was detected indoor air samples during the 2023 sampling event. TPH concentrations in indoor air samples collected inside the building ranged from 22 µg/m^3 to 151 µg/m^3. TPH was also detected in ambient air, detected in samples collected outside of the building at upwind and downwind locations, the average concentration of these detections was 88 µg/m^3.

Ecology has not developed a TPH vapor intrusion screening level for commercial or industrial land use. In the absence of a MTCA screening level, indoor vapor sample results from July 2023 were evaluated on a point-by-point basis against risk thresholds using spreadsheets developed by Ecology and provided with the December 11, 2023 comments (Ecology 2023). The spreadsheets are provided in Appendix E. The July 2023 results (summarized on Table 9) were compared to MTCA Method B Unrestricted, MTCA Commercial, and MTCA Method C Industrial risks using the hazard index, total cancer risk, and individual cancer risks. The July 2023 results were evaluated because those samples were collected when Dawn Foods production was slowing down (because of the transition in property ownership) and they were collected over a break in production at the facility (July 4 holiday). Results from all locations were below the MTCA Commercial and MTCA Method C vapor risk. Sample results from the “Indoor Warehouse Fire Sprinkler Risers” (IA7) and “Indoor Warehouse Outside Kitchen” (IA8) failed for the hazard index under the MTCA Method B Unrestricted scenario; all other results were below MTCA Method B Unrestricted scenario risks.

3.4 Sediment

The Site is located between river mile 2.2 and 2.3 of the LDW. Surface and subsurface data available on the LDW website, collected in close proximity to the Site, indicate that sediment is not contaminated (Windward 2010). The Record of Decision for the LDW confirms that sediment adjacent to the Site does not require cleanup (EPA 2014, Figure 18). Sites immediately upstream and downstream of the Site do have contaminated sediment that could migrate to sediment adjacent to the Site. These contaminants include: metals such as arsenic, lead, mercury, and zinc; PAHs, such as fluoranthene and phenanthrene; PCBs, TPH, and SVOCs such as benzyl alcohol (Ecology 2009). The cleanup action proposed for these nearby sites includes removal of contaminated sediment (EPA 2014, Figure 18).

4 Screening Levels and Constituents of Interest

Existing data were evaluated relative to screening levels (SLs) in this RIWP to select constituents of interest (COIs) for further evaluation during the RI. The COI evaluation presented in this RIWP is preliminary and used to refine the site conceptual model and inform additional data needs for the project. The RI/FS report will further evaluate these COIs and other constituents evaluated during the RI to develop COCs and Indictor Hazardous Substances, consistent with MTCA. As discussed in Sections 2 and 3, the soil and groundwater sample locations and analyses were selected based on past known and suspected site use. Soil and groundwater samples have been collected across the site (Figure 7) and have been analyzed for a wide variety of chemical compounds including: metals, TPH, CVOCs, PCBs, SVOCs, BTEX, PAHs, and tributyltin.

This section presents an initial screening of COIs. The table below provides a brief description of the terms COI, COC and indicator hazardous substance and how they will be used during the RI/FS process.

Term	How List is Formed
COI	At least one detected value over the SL. SLs corrected for natural background and practical quantitation limits, as appropriate. Documented in this RIWP.
COC	Detected exceedances of SLs where RI data verify exposure pathway is complete. To be documented in RI/FS report.
Indicator Hazardous Substance	COCs for which effectiveness of remedial alternatives evaluated in the FS will be evaluated. Subject of long-term monitoring, if part of remedy. To be documented in the RI/FS report.

4.1 Soil Screening Levels

Soil SLs are based on the Preliminary Cleanup Level (PCUL) workbook for Lower Duwamish Waterway, which has been developed by Ecology specifically for upland sites adjacent to the LDW. During the RI/FS, multiple lines of evidence related to exposure pathways and additional empirical data will be used to confirm or narrow the list of soil COIs to the COCs or IHSs.

4.1.1 Terrestrial Ecological Evaluation

The Site was evaluated for a Terrestrial Ecological Evaluation (TEE) exclusion based on WAC 173-340-7491. The Site primarily qualifies for an exclusion because all hazardous substances are located below buildings and pavement in compliance with WAC 173-340-7491(1)(b). There are two small unpaved areas along the shoreline that include landscaping and a picnic table and shelter. Data within and adjacent to these areas indicates that any soil contamination is present below a conditional point of compliance of 6 ft bgs based on WAC

173-240-7490(4). The only exceedance of soil SLs occurred at a depth of 9 to 10 ft bgs at GP-SB-22 for cPAHs indicating that any contaminated soil in unpaved areas is below the point of compliance in compliance with WAC 173-340-7491(1)(a). In order to support this TEE exclusion, an institutional control will be required per WAC 173-340-440.

4.2 Groundwater Screening Levels

Groundwater SLs are based on the PCUL workbook for the Lower Duwamish Waterway. Where relevant, the SLs have been adjusted upward based on PQLs or natural background concentrations. The default MTCA screening values are provided if other screening levels are not available.

As with soil, the data collected in the RI/FS will be used to confirm or narrow the groundwater COI list to the groundwater COCs/IHSs.

4.2.1 Groundwater Non-Potability

Groundwater potability was reviewed for applicability of human consumption of groundwater as a potential exposure pathway. Based on the criteria presented in WAC 173-340-720(2)(d), groundwater beneath the Site satisfies the MTCA non-potability criteria, and therefore human consumption of groundwater is not an exposure pathway of concern. Protection of drinking water is not applicable because the shallow groundwater is not potable and is expected to remain non-potable in the future under MTCA and local regulations based on the following evaluation:

- WAC 173-340-720(2)(d)(i) The conditions of (a) and (c) of this subsection are met:
  - WAC 173-340-720(2)(a) Neither the Site nor groundwater in its vicinity is a current source of drinking water based on Ecology’s on-line well construction inventory.
  - WAC 173-340-720(2)(c) Ecology determines it is unlikely that hazardous substances will be transported from the Site groundwater to groundwater that is a current or potential future source of drinking water based on the following site-specific factors:
    - (i) The extent of affected groundwater was discussed in Section 3.2.
    - (ii) The distance to the nearest existing water supply well is estimated to be about 0.6 miles to the north.
    - (iii) The likelihood of interconnection between the contaminated ground water and ground water that is a current or potential future source of drinking water since drinking water wells would be installed in deeper aquifers and there is an upward vertical gradient in the vicinity of the site.
    - (iv) The characteristics of the hazardous substances were discussed in Section 3.

  - (v) The hydrogeologic characteristics of the site were discussed in Section 2.3. Upward vertical gradient was discussed above in (iii) and the direct connection of shallow groundwater to surface water is discussed below in (d).
  - (vi) The impacted shallow aquifer is part of an upper groundwater zone in the valley that is present to about 80 feet bgs. A specific discontinuous shallow silt was identified at GWCC but the upper groundwater zone is a deltaic deposit that includes numerous silt, silty sand, and sand interbeds.
- WAC 173-340-720(2)(d)(ii) Groundwater beneath the Site is known to discharge to surface water (LDW).
- WAC 1730340-720(2)(d)(iii) The LDW is not classified as a suitable domestic water supply source under WAC 173-201A.
- WAC 173-340-720(2)(d)(iv) The shallow aquifer has an average hydraulic conductivity of $5x10^{-3}$ cm/s. Groundwater response to tidal fluctuation at this Site and GWCC has been observed several hundred feet into the upland, and elevated specific conductance (up to greater than 33 milliSiemens/centimeter [mS/cm]) consistent with the presence of saline surface water mixing has been measured in groundwater. These observations indicate significant hydraulic connection between groundwater and surface water.

Other information to consider with respect to whether Site groundwater is a potential future source of drinking water include:

- Specific conductance measured in groundwater contains natural background levels up more than 45 times the state and local secondary maximum contaminant level of 0.7 mS/cm.
- A domestic supply well could not be placed in the vicinity of the Site as state and local codes prohibit the construction of drinking water wells in the vicinity of the Site.
  - WAC 246-290-130(1) requires drinking water supplies to come from the highest quality source, which at the Site is the municipal water supply system.
  - WAC 290-135(2)(b) specifies a minimum 100-foot drinking water well setback from surface water, roads, utilities, and buildings.

4.3 Vapor Screening Levels

Default vapor SLs are Method C CULs for indoor air based on an industrial exposure pathway. Ecology has not developed a TPH vapor intrusion screening level for commercial or industrial land use. In the absence of a MTCA screening level, indoor vapor sample results will be evaluated on a point-by-point basis against vapor risk using spreadsheets developed by Ecology and provided in the December 11, 2023 comments (Ecology 2023). The spreadsheets are provided in Appendix E.

During the RI, multiple lines of evidence related to exposure pathways and additional empirical data will be used to confirm or narrow the list of vapor COIs to the COCs/IHSs.

4.4 COIs

The following COIs have been identified based on at least one detection over a screening level (Appendix F):

Soil:
- Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc)
- cPAHs

Water:
- Metals (arsenic, cadmium, chromium, copper, mercury, nickel, zinc)
- Vinyl Chloride, PCE, TCE and cis-1,2-Dichloroethene
- TPH-gasoline and TPH-diesel

Indoor Air:
- Naphthalene, TCE and TPH (office area indoor air)
- TPH (warehouse area indoor air)

5 Conceptual Site Model and Data Gaps

This section presents a brief conceptual site model (CSM) and identifies data gaps. This initial CSM is based on the available data summarized in this RIWP. The field sampling planned to address the data gaps is discussed in Section 5.

The exposure pathways at the Site for human health or the environment are:

- Direct contact with soil by maintenance/construction workers
- Leaching of soil contaminants to groundwater and subsequent discharge of groundwater to surface water where aquatic life could be exposed, as well as humans that consume local fish
- Inhalation of indoor air containing contaminants volatilized from groundwater (vapor intrusion [VI]) by onsite office workers and maintenance workers.

5.1 Sources

There are no current releases or ongoing sources of contamination at the site. Historical sources which may have contaminated soil, groundwater, and or vapor include the following:

- Ship painting and repair activities in the vicinity of MW-5: As discussed in Section 2, activities such as ship repair, painting, and fabrication, likely occurred between 1929 and 1956. These activities occurred primarily in the southwestern portion of the property, as seen on historical aerials included as Figures 2A and 2B. After ship building, the Site was leased and used by Emerson GM Diesel to the mid 1970's, a sheet metal fabrication and generator manufacturing company (Hart Crowser 1996a). These past operations may have resulted in releases and spills. Historical sources in the vicinity of MW-5 have resulted in metals, TPH-diesel, and CVOC contamination in soil and groundwater. Figure 3 shows work areas/buildings based on information provided in Sanborn maps. These maps were used to identify other potential sources, including thermometer manufacturing (metals), enameling (metals), and spray painting (VOCs, TPH, PCBs, metals).

- TPH-gasoline in the vicinity of MW-8: Site data suggest that some sort of surface spill, likely TPH, occurred in the vicinity of MW-8. The exact event is not known but the extent appears to be limited. CVOC concentrations at this location are consistent with the migration of off-site impacts as discussed below.

- GWCC and Emerson/Schultz Distributing: As discussed in Section 2, the Site is downgradient of known chlorinated solvent releases from GWCC and the Emerson/Schultz Distributing block. Numerous site investigations have documented these cVOC impacts and off-site groundwater migration.

5.2 Nature and Extent of Contaminants

5.2.1 Extent of Groundwater Impacts

VOC Contamination

The light blue shaded area on Figure 14 identifies the estimated extent of groundwater contamination due to chlorinated solvent releases. This area is primarily the result of vinyl chloride that exceeds both the groundwater screening level for vapor intrusion (0.34 µg/L) and for discharge to surface water, adjusted to the practical quantitation level (0.1 µg/L).

Vinyl chloride is the result of anaerobic degradation of chlorinated solvents such as trichloroethene (TCE) and tetrachloroethene (PCE). The presence of cis-1,2-dichloroethene (cis-1,2-DCE) in most of these samples (Tables 5 and 6) supports the biodegradation pathway source. These CVOCs have been detected in temporary grab groundwater samples and from monitoring wells (MW-4, MW-5, MW-8 and MW-9), shown on Figure 14. Since the CVOCs are a family of compounds generated due to biodegradation processes from a common source, the use of molar concentrations provides a more precise measure of relative contamination than a sum of CVOCs would provide. The molar concentrations contoured in Figure 14 are the sum of PCE, TCE, cis- and trans-DCE, and VC.

Concentrations of PCE at MW-5, which is downgradient of MW-8 and MW-9 are higher than what is observed at MW-8 and MW-9 (Table 6) suggesting that a small on-site release of PCE may have occurred in this area.

TPH Impacts

Gasoline exceeds the screening level in groundwater in the vicinity of MW-8 as shown on Figure 15.

TPH-diesel range organics was detected in one groundwater sample from MW-5, but after using silica gel cleanup to remove organic interferences, the resulting total TPH-diesel detection is below the screening level.

Metals Impacts

Groundwater samples were analyzed for both total and dissolved metals (Tables 5 and 6). Total metal results are biased high due to turbidity in the groundwater samples. As a result, this discussion focusses on the dissolved metals results.

Arsenic, copper, nickel, and zinc exceed screening levels at multiple locations on the Site (Figures 16 through 19). The bulk of these exceedances are concentrated near the waterfront in the vicinity of the former shipways. The isolated exceedances closer to Fox Avenue (GP-SB-30 through SB-31) are likely due to reducing groundwater conditions that are caused by the anaerobic degradation of the GWCC and TPH impacts (in the vicinity of MW-8).

For the waterfront area, arsenic, copper, and nickel are often quantified in groundwater due to interference from sea water. The analytical methods used for this analysis were intended to account for some level of interference; however, the specific conductance data (7,000 to 24,000 µS/cm) collected at the four temporary wells along the shoreline (GP-SB-20, SB-22, SB-23, and SB-24) indicated that the seawater influence on groundwater was more significant than expected. As a result, arsenic, copper, and nickel results from temporary boring locations are not included in the interpretation of groundwater impacts in Figures 16 through 18. In addition, while both sets of the split data for the first round of monitoring well sampling are shown in the analytical data boxes on Figures 16 through 18, the data analyzed using EPA Method 6020B are not used to interpret the extent of groundwater impacts due to the artificially elevated concentrations due to interference from sea water.

PCBs and SVOCs in groundwater were sampled at one well, MW-5, with no detections above the laboratory reporting limit as shown on Figures 20 and 21.

5.2.2 Extent of Soil Impacts

Soil samples have been collected from across the site and have been analyzed for a wide variety of chemical compounds including: metals, TPH, CVOCs, PCBs, SVOCs, BTEX, PAHs, and tributyltin. Some analytes were tested for in specific areas (e.g., mercury near former thermostat manufacturing) while others were tested widely from throughout the site. Soil with contamination exceeding screening levels is focused in the waterfront area (within about 250 feet of the Duwamish) and is primarily due to arsenic, copper, nickel, and zinc, consistent with groundwater impacts. One soil sample exceeded the screening level for each of lead, mercury, and carcinogenic PAHs. Two soil samples exceeded the screening level for cadmium and chromium.

Soil data from within about 50 feet of the shoreline indicated that metals, cPAHs, and PCBs were below SLs with a few exceptions:

- Chromium was detected at GP-SB-22 at 98.4 mg/kg but this detection is below the total chromium PCUL value for protection of sediment via erosion of 260 mg/kg.
- Arsenic was detected in six samples from GP-SB-23, GP-SB-24, RI-SB-04, and MW-2 at concentrations between 8.31 to 13.6 mg/kg. While these individual results exceed the SL, site wide data suggest that arsenic is below natural background. Using EPA's proUCL 5.2 tool, the 90% UCL using full detection limits for non-detected results is 4.6 mg/kg, below the natural background concentration of 7.3 mg/kg (See Appendix F for ProUCL backup). All of these concentrations are below 2 times the screening level (14.6 mg/kg). The allowable number of exceedances was calculated using Technical Attachment 1 to Figure 12 of Statistical Guidance for Ecology Site Managers (Ecology 1992). The actual number of site-wide arsenic exceedances is 7, below the allowable number of 11.

5.2.3 Extent of Vapor Impacts

Results of the indoor air sampling program indicated that all contaminants are below the MTCA Method C CULs for industrial exposure. TPH was detected in indoor air samples during all sampling events. The 2020 and 2021 vapor events occurred when Dawn Foods was in full operations, with activities associated with blending dry baking mixes. Kitchen based aerosols are a source of indoor air pollution and cooking oils can produce aliphatic aldehydes[3] and can also be comprised of oils with a similar signature to EC9-12 aliphatic ranges[4]. The laboratory indicated that the vapor data for APH EC9-10 aromatics sample chromatographs do not resemble the fuel standard used for quantification by the APH method (Appendix C).

Results from the 2023 indoor air event, which occurred as Dawn Foods operations were shutting down (because of the transition in property ownership) and were collected over a holiday weekend, demonstrated that TPH was detected below vapor risk for MTCA Commercial and MTCA Method C Industrial. There is no direct or known source for the TPH detections. Based on the link between kitchen aerosols, the laboratory findings, and decreased concentrations with decreased food mix production, it is likely that indoor air samples were cross contaminated with kitchen aerosols.

Sub-slab sampling indicated that PCE and TCE are present above Method C industrial screening levels protective of indoor air. However, PCE and TCE in indoor air vapor samples were detected below Method C industrial cleanup levels. The source of PCE and TCE beneath the building slab appears to be from the CVOC plume originating at the GWCC site.

5.2.4 Extent of Sediment Impacts

Surface and subsurface data available on the LDW website collected in close proximity to the Site indicate that sediment adjacent to the Site is not contaminated (Windward 2010).

5.3 Potential Transport Mechanisms

Contaminant release mechanisms refer to the manner in which contaminants are released from the primary source. Primary release mechanisms associated with the former ship building facility included upland process-related releases and spills. Urban and industrial sources outside the Site, including on-site migration, could also have resulted in releases to sediment, soil, groundwater, stormwater, or air within the Site boundaries. The Site is almost entirely paved and the shoreline is heavily armored, thereby limiting the potential transport mechanisms to the following:

- Soil leaching to groundwater – Soil impacts are limited to metals within about 250 feet of the shoreline. The primary groundwater metals plume is coincident with

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[3] https://hero.epa.gov/hero/index.cfm/reference/details/reference_id/6020855

[4] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7694132/

these soil impacts suggesting that soil leaching to groundwater may be occurring in this area of the Site.
- Groundwater transport and potential discharge to surface water – CVOC impacts have migrated via groundwater transport from the upgradient GWCC site. Groundwater metals in the nearshore area have the potential to migrate to sediment and surface water.
- Groundwater Volatilization to Indoor Air – CVOCs and TPH are present in sub-slab vapor in the area of the GWCC plume and some indoor air exceedances for TCE and TPH have been measured.

Stormwater is currently managed by the tenant, Dawn Foods, under ISGP No. WAR011560. The majority of the property is paved and stormwater has been monitored based on the permit.

5.4 Potential Ecological and Human Receptors

Potential human exposure scenarios are described qualitatively below. If required, subsequent quantitative analysis may occur as part of the RI.

Ecological and human receptors could be directly or indirectly exposed to contaminants in soil, sediment, and surface water as follows:

- Ecological – Organisms using the LDW for habitat, including benthic invertebrates, fish, birds, and mammals
    - Direct exposure – Contact with or ingestion of pore water, surface water, or sediment
    - Indirect exposure – Consumption of benthic invertebrates or fish
- Human – People using the LDW for recreation or food, including fishermen (tribal and recreational), kayakers, industrial and construction worker
    - Direct exposure – Incidental ingestion or dermal contact with sediment, soil, or surface water
    - Indirect exposure – Consumption of seafood
    - Inhalation – Groundwater volatilization to indoor air
    - Direct contact or ingestion with soil – Direct contact (incidental ingestion and dermal contact) could occur in areas where soil is uncapped, such as on the bank, or where soil could become exposed during construction.
    - Direct contact or ingestion with groundwater – Direct contact (incidental ingestion and dermal contact) could occur in areas where groundwater becomes exposed during construction.

5.5 Data Gaps

Based on historical operations and data previously collected at the Site, the following data gaps have been identified for evaluation during the RI:

- **Groundwater Discharge to Surface Water:** Three existing monitoring wells (MW-1, MW-2 and MW-3) are located along the shoreline, representing the most downgradient locations before discharge to the Duwamish Waterway. Additional sampling is proposed to collect and analyze samples from these wells for SVOCs, CVOCs, PCBs, and TPH. Dioxin/furans may be analyzed depending on the PCB sampling results. **Groundwater Point of Discharge Concentration:** Reconnaissance groundwater data and groundwater data from MW-1 indicate that zinc may be discharging to surface water at concentrations that pose a risk to aquatic organisms. Groundwater point of discharge sampling is proposed downgradient of MW-1. A well point will be driven into the sediment at the toe of the shoreline rip-rap. Sampling protocols for the well point are discussed in Section 6.1 The well point will remain in place semi-permanently and will be sampled during quarterly groundwater sampling events. The well point concentration will be directly compared to surface water quality criteria and an estimate of attenuation between MW-1 and the point of discharged will be determined.
- **Extent of CVOCs:** As discussed above, MW-5 is located in the former ship repair area. Groundwater data from MW-5 and select temporary borings (RI-SB-04 and RI-SB-05) suggest CVOCs (specifically TCE, PCE and VC) are present in the vicinity of MW-5. Additionally, CVOCs have been detected at RI-SB-01, located under the existing warehouse. The source of the CVOCs in these locations has not yet been identified. Additional groundwater and soil data is needed to fully delineate the extent of CVOCs in the vicinity of MW-5 and RI-SB-01.
- **Additional Groundwater Data:** Additional sampling is proposed to collect and analyze groundwater samples from MW-4 through MW-9 for SVOCs, CVOCs, PCBs, and TPH. Dioxin/furans may be analyzed depending on the PCB sampling results.
- **Elevated Reporting Limits:** Cadmium and mercury have been added to the suite of metals analyses for quarterly groundwater sampling in January 2024. Soil and groundwater metals analyses (including cadmium and mercury) have been added to the CVOC direct push investigation. These analyses have been added for the 4 direct push locations around MW-5 since this is the locations where previous detections have occurred. Other samples will be archived pending these results.
- **TBT Data:** TBT may have been used at the property between 1961 and 1966, when shipbuilding and maintenance operations ceased. TBT has been added to the suite of analyses for quarterly groundwater sampling in January 2024 at monitoring wells MW-1, MW-2, MW-4, MW-5, and MW-6. Soil and groundwater TBT analyses have been added to the CVOC direct push investigation. These analyses have been added for the 4 direct push locations around MW-5 since this is the location of other soil and groundwater impacts. Other samples will be archived pending these results.
- **Chromium Speciation:** Chromium has been detected in soil and groundwater above SLs for chromium VI. Limited soil and groundwater samples will be tested for chromium speciation to confirm it is present as chromium III.
- **Groundwater Flow Direction and Gradient:** Additional information is needed to fully define the tidal influence at the site. A 48-hour tidal study at all existing site

monitoring wells will be performed to assess average groundwater flow and estimate the tidal lag for groundwater sampling.

- **Vapor Intrusion:** Additional sub-slab vapor data is needed to confirm the detected values observed in 2020 (discussed in Section 3.1.3). Since Dawn Foods has vacated the premises, indoor air samples will also be collected to evaluate whether previous TPH Method B indoor air exceedances were associated with baking mix ingredients.

6 Sampling and Analysis Plan

Based on data gaps identified in Section 5.5 additional soil, groundwater, and vapor data collection is proposed in this RIWP. Additional environmental sample locations are shown on Figure 22. Table 10 summarizes sample media and analytes. Specific sampling protocols are described in the QAPP (Appendix G) and health and safety protocols are included in the project Health and Safety Plan (Appendix H). Appendix I includes an Inadvertent Discovery Protocol for the Site.

6.1 Groundwater Investigation – Permanent Monitoring Wells

The groundwater investigation will be performed using standard operating procedures that are consistent with MTCA and EPA requirements. Groundwater point of discharge sampling will be collected with a temporary piezometer, such as a Solinst model 615 drive-point piezometer that can be installed up to 25 feet bgs. The well point will be installed just downgradient of MW-1 in the shoreline of the Duwamish River, at the base of the riverbank toe. The screen will be placed at least 1 foot below the sediment surface and sampling will occur at low tide, once there is no surface water covering that area. The well point will have a 6-inch screen and the top of the screen will be positioned at approximately -3 ft MLLW. Sample collection will generally follow EPA Pore Water Sampling SOP (EPA 2023).

All groundwater sampling will include measurement of pH, specific conductance, temperature, ORP, and dissolved oxygen to ensure proper purging of wells, and in support of fate and transport analyses. Samples for groundwater metals analysis will be submitted to BAL and all other samples will be submitted to FBI for analysis. All samples for chemical analysis will be submitted under chain of custody. Metals analyses will be performed using EPA Method 1638 to remove interference from saline water. EPA Method 1638 uses inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS) and is modified with Closed-Vessel Hotblock Digestion.

The nearshore tidally-influenced groundwater monitoring wells will be sampled during a negative low tide cycle at a predetermined lag time from low tide. A tidal study will be performed for all permanent monitoring wells (MW-1 through MW-9) to establish the appropriate lag time at which to sample each well such that the groundwater in the well at the time of sampling is close to its lowest elevation during the tidal cycle (thus representing groundwater discharge). Pressure transducers will be installed in monitoring wells for 48 to 72 hours to observe water level response to tidal variation.

6.2 Soil and Groundwater Investigation – Temporary Well Points

The soil and groundwater investigation will be performed using standard operating procedures that are consistent with MTCA and EPA requirements. Soil and temporary groundwater grab boreholes will be advanced using direct-push drilling equipment.

Soil samples will be collected from multiple depth intervals at each borehole and sample locations will include areas with elevated PID readings or other olfactory evidence of contamination. Many of these soil samples will be archived and may be analyzed depending on the results of other soil sample analyses. Samples will be submitted to FBI for analysis.

Groundwater grab samples will be collected from temporary wells at all direct push borehole locations to provide an indication of groundwater quality. Samples for groundwater metals analysis will be submitted to BAL and all other samples will be submitted to FBI for analysis. All samples for chemical analysis will be submitted under chain of custody. Metals analyses will be performed using EPA Method 1638 to remove interference from saline water. EPA Method 1638 uses inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS) and is modified with Closed-Vessel Hotblock Digestion.

6.3 Sub-Slab, Indoor and Ambient Vapor Samples

An additional round of sub-slab and indoor air samples will be collected at similar locations as the last events to confirm previous detections. Indoor and ambient air samples will be collected over 24 hours so that a time weighted average sample can be collected. Samples will be collected using an integrated passive air sampler consisting of a 6-L laboratory-certified evacuated Summa (vacuum) canister. Each Summa canister will be equipped with a pressure gauge and a calibrated critical orifice air flow controller, all supplied by the laboratory. All samples will be collected according to the laboratory’s instructions which are specific to the canister supplied at the time of sampling. Generally, canisters include a flow meter with a sample port attached to the canister. No tubing or additional connections are required.

Existing sub-slab sample points will be utilized or new sampling ports will be installed. If new sampling ports are installed, they will be left undisturbed for a minimum of 24 hours to allow the cement grout to fully set or for at least 2 hours if a vapor pin is being used to allow for the soil vapor to equilibrate. Guidance suggests a minimum of 2 hours for equilibration (EPA 2012).

Each sub-slab sample will be collected in a 1-L Summa canister fitted with a flow controller. The flow controller will be calibrated by the laboratory to a flow rate not to exceed 200 milliliters per minute. The Summa canister will be connected to the sample port in a sample train. The tubing and fittings for the sample train will be provided by the laboratory and will be dedicated for each location. Leak test procedures will be implemented as part of the sub-slab soil gas sampling to check for potential ambient air leaks that could compromise soil-gas sample results. Leak testing will include testing to ensure that pressure will be maintained in the sample train. Prior to sampling, purging will be completed to remove approximately three volumes of air from the soil-gas sampling port and sampling line using a flow rate of 200 mL/min. Once purging is completed, sampling will be conducted.

The samples will be submitted to FBI to measure the concentrations COIs which include: naphthalene and TCE (office area) and TPH (warehouse area) using U. S. Environmental Protection Agency (EPA) Total Organics Method TO-15 low-level (indoor air and ambient air samples) and aliphatic and aromatic petroleum hydrocarbons using Massachusetts Department of Environmental Protection (MA DEP) Air-Phase Petroleum Hydrocarbons (APH) test Methods.

6.4 Schedule

RIWP field work will start within 30 days of Ecology approval of this RIWP.

Consistent with the AO, Bridge will submit a draft RI/FS report to Ecology for review and comment within 90 days of the completion of all RIWP field work and receipt of all laboratory data.

7 References

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Tables

Table 1 Well Construction Details
Bridge - Former Dawn Foods

Well ID	Construction Date	Well Tag ID	Well Diameter (inches)	Type	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Total Well Depth (ft bgs)	Top of PVC Elevation (ft NAVD88)	Northing (NAD 83)	Easting (NAD 83)
MW-1	12/16/2021	BNL-604	2	flush mount	5	20	20	15.85	200604.88	1270762.88
MW-2	12/15/2021	BNL-602	2		5	20	20	14.36	200718.75	1270647.59
MW-3	12/16/2021	BNL-605	2		5	20	20	16.22	200859.86	1270528.95
MW-4	12/16/2021	BNL-606	2		5	20	20	15.51	200608.63	1270863.35
MW-5	12/16/2021	BNL-601	2		5	20	20	14.27	200661.37	1270801.29
MW-6	12/15/2021	BNL-603	2		5	20	20	14.76	200757.39	1270710.38
MW-7	3/9/2023	BPW-457	2		4	19	19.5	14.79	200861.72	1271103.47
MW-8	3/9/2023	BPW-455	2		4	19	20	14.83	200661.56	1271382.73
MW-9	3/9/2023	BPW-456	2		4	19	20	15.54	200757.05	1271420.24

ft bgs - feet below ground surface

Table 2 Summary of 1996 Hart Crowser Soil Data
Bridge - Former Dawn Foods

Sample ID	Updated DOE Comments Screening Level (mg/kg)[A]	HC-1, S-2	HC-1, S-3	HC-2, S-1	HC-2, S-2	HC-3, S-1	HC-3, S-2	HC-4, S-3	HC-4, S-4	HC-5, S-1	HC-5, S-2	
Date Sample		9/6/1996	9/6/1996	9/6/1996	9/6/1996	9/6/1996	9/6/1996	9/6/1996	9/6/1996	9/6/1996	9/6/1996	
Depth ft. bgs		7.5-9.0	12.5-14.0	2.5-4.0	7.5-9	2.5-4.0	7.5-9.0	7.5-9.0	12.5-14.0	2.5-4.0	7.5-9	
PID Reading		1	5	0	0	0	0	NA	1.5	0	0	MDL
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TPH												
Gasoline Range	100[A]	ND	ND	ND	NA	ND	ND	ND	ND	ND	NA	10
Stoddard Solvent	1000	ND	ND	ND	ND	ND	ND	20	ND	ND	NA	10
Diesel	2000	ND	ND	ND	ND	ND	ND	ND	85	ND	NA	20
Oil	2000	ND	ND	ND	ND	ND	ND	170	800	110	NA	50
PCBs												
Total Aroclors	0.03	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	0.5
VOCs												
Acetone	72000	NA	0.013	NA	ND	NA	0.049	0.038	0.046[C]	NA	NA	0.0019
Methylene Chloride	0.43/0.032[B]	NA	0.0032[C]	NA	0.003[C]	NA	0.003 B	0.0038[C]	0.0031[C]	NA	NA	0.0028
cis-1,2-Dichloroethene	160/120	NA	0.0037	NA	ND	NA	ND	0.08	ND	NA	NA	0.0014
Trichloroethene	0.0044/0.00027[B]	NA	0.014	NA	ND	NA	ND	0.068	ND	NA	NA	0.0014
Tetrachloroethene	0.029/0.0016[B]	NA	0.12	NA	0.0091	NA	ND	0.33	ND	NA	NA	0.0014
Carbon Disulfide	8,000/7,400[B]	NA	ND	NA	ND	NA	ND	0.0029	0.0019	NA	NA	0.0014
trans-1,2-Dichloroethene	5/0.32[B]	NA	ND	NA	ND	NA	ND	0.0034	ND	NA	NA	0.0014
Isoproplybenzene	8000/1600[B]	NA	ND	NA	ND	NA	ND	0.0014	ND	NA	NA	0.0014
1,3,5-Trimethylbenzene	800/170[B]	NA	ND	NA	ND	NA	ND	0.016	ND	NA	NA	0.0014
1,2,4-Trimethylbenzene	800/170[B]	NA	ND	NA	ND	NA	ND	0.035	ND	NA	NA	0.0014
sec-Butylbenzene	8000/1400[B]	NA	ND	NA	ND	NA	ND	0.005	ND	NA	NA	0.0014
4-Isoproplyltoluene	na	NA	ND	NA	ND	NA	ND	0.0062	ND	NA	NA	0.0014
n-Butylbenzene	4000/690[B]	NA	ND	NA	ND	NA	ND	0.0028	ND	NA	NA	0.0014
Naphthalene	0.039/0.002[1 B]	NA	ND	NA	ND	NA	ND	0.0089	ND	NA	NA	0.0069
Metals												
Aluminum	80000	NA	8180	NA	12400	NA	12000	12300	9620	NA	16000	3
Arsenic	7.3	NA	ND	NA	ND	NA	ND	26	ND	NA	ND	7
Iron	56000	NA	3100	NA	4400	NA	4000	28000	8200	NA	8200	2.5
Cadmium	0.77	NA	ND	NA	ND	NA	ND	1.8	ND	NA	ND	0.5
Chromium	Cr III: 550/27 Cr VI: 0.14/0.0069	NA	3.2	NA	5.9	NA	4.4	44	4.5	NA	8.5	1.5
Lead	250/56	NA	ND	NA	ND	NA	ND	580	36	NA	ND	5
Mercury	0.07	NA	ND	NA	ND	NA	ND	0.41	0.29	NA	ND	0.05
Copper	36	NA	7.1	NA	8.5	NA	8.8	360	47	NA	24	1
Nickel	48	NA	1.6 J	NA	4.9	NA	4.5	76	9.7	NA	11	5
Zinc	100/85	NA	9.4	NA	9.6	NA	11	6400	55	NA	32	0.25

Notes:

Bold = detection

Shading denotes an exceedance of a screening level

feet bgs = feet below ground surface

mg/kg = milligrams per kilograms

U = laboratory detection limit

J = reported concentration is an estimate.

NA = Not analyzed

ND = Not detected

MTCA - Model Toxics Control Act

A - MTCA screening levels are from Preliminary Cleanup Levels (pCUL) for Lower Duwamish Waterway workbook, these have been developed by Ecology specifically for the LDW. Source: https://apps.ecology.wa.gov/cleanupsearch/site/1643#site-documents.

C - Analyte detected in method blank

B - Screening Level MTCA Soil Protective of Groundwater Vadose/Saturated (based on protection of surface water)

Table 3 Summary 2000-2023 Soil Data - Metals
Bridge - Former Dawn Foods

Sample ID	Date Sampled	Sample Depth (feet bgs)	Vadose or Saturated	Units	Aluminum	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
GP-SB-5-7	1/2/2020	7	Saturated	mg/kg	NA	**5.09**	1 U	NA	**213**	**222**	**2**	**6.84**	**180**
GP-SB-5-12	1/2/2020	12	Saturated	mg/kg	NA	**2.48**	1 U	NA	**19.1**	**3.09**	1 U	**9.08**	**24.9**
GP-SB-6-4	1/2/2020	4	Vadose	mg/kg	NA	**4.98**	1 U	NA	**26.9**	**25**	1 U	**10.6**	**78.7**
GP-SB-6-10	1/2/2020	10	Saturated	mg/kg	NA	**2.37**	1 U	NA	**12.7**	**2.17**	1 U	**5.32**	**26.7**
GP-SB-08	6/9/2020	9 to 10	Saturated	mg/kg	NA	**11.6**	**2.76**	NA	**78**	**227**	1 U	**62.1**	**7110**
GP-SB-09	6/9/2020	9 to 10	Saturated	mg/kg	NA	**5.32**	1 U	NA	25 U	**4.23**	1 U	**11.8**	**71.9**
GP-SB-10	6/9/2020	8 to 10	Saturated	mg/kg	NA	5 U	1 U	NA	**35**	**18.6**	1 U	**14.2**	**57.6**
GP-SB-11	6/9/2020	4 to 5	Vadose	mg/kg	NA	5 U	1 U	NA	**83.1**	**48.2**	1 U	**174**	**459**
GP-SB-12	6/9/2020	8.5 to 9.5	Saturated	mg/kg	NA	5 U	1 U	NA	25 U	**1.04**	1 U	**5.40**	**34.5**
GP-SB-18-03	12/1/2020	2 to 3	Vadose	mg/kg	NA	**4.81**	1 U	**15.9 J / 15.7**	NA	**13.5**	1 U	**4.71 J / 5.05**	**46.3 J / 55.3**
GP-SB-18-09.5	12/1/2020	9 to 9.5	Saturated	mg/kg	NA	1 U	1 U	**7.66**	NA	**1 U**	1 U	**3.00**	**24.2**
GP-SB-19-03.5	12/1/2020	3 to 3.5	Vadose	mg/kg	**6790**	**3.56**	1 U	**9.41**	NA	**49.1**	1 U	**5.04**	**40.1**
GP-SB-19-08.5	12/1/2020	8 to 8.5	Saturated	mg/kg	**14500**	**3.48**	1 U	**9.91**	NA	**2.27**	1 U	**9.19**	**57.1**
GP-SB-20-04.5	12/1/2020	3.5 to 4.5	Vadose	mg/kg	NA	**3.41**	1 U	**8.53**	NA	**6.36**	1 U	**8.16**	**29.7**
GP-SB-20-09	12/1/2020	7 to 9	Saturated	mg/kg	NA	**2.49**	1 U	**8.34**	NA	**2.96**	1 U	**6.79**	**26.8**
GP-SB-21-05	12/1/2020	3 to 5	Vadose	mg/kg	NA	**1.75**	1 U	**9.89**	NA	**2.04**	1 U	**11.5**	**19.3**
GP-SB-21-10	12/1/2020	7.5 to 10	Saturated	mg/kg	NA	**6.11**	1 U	**7.63**	NA	**5.41**	1 U	**5.18**	**27.7**
GP-SB-22-07	12/1/2020	5 to 7	Saturated	mg/kg	NA	**4.87**	1 U	**98.4**	NA	**3.41**	1 U	**17.4**	**30.2**
GP-SB-22-09	12/1/2020	9 to 10	Saturated	mg/kg	NA	**2.09**	1 U	**9.35**	NA	**2.42**	1 U	**12.4**	**19.4**
GP-SB-23-05	12/1/2020	3 to 5	Saturated	mg/kg	NA	**13.6**	1 U	**11.6 J / 12.8**	NA	**7.66**	1 U	**15.2 J / 17.1**	**67.1 J / 77.5**
GP-SB-23-11	12/1/2020	10 to 11	Saturated	mg/kg	NA	**8.31**	1 U	**12.2**	NA	**7.16**	1 U	**14.2**	**55.4**
GP-SB-24-10	12/1/2020	7.5 to 10	Saturated	mg/kg	NA	**10.4**	1 U	**11.2**	NA	**6.27**	1 U	**15.0**	**51.7**
GP-SB-24-12	12/1/2020	10 to 12	Saturated	mg/kg	NA	**8.53**	1 U	**11.7**	NA	**4.35**	1 U	**12.4**	**43.3**
GP-SB-25-08	12/5/2020	6 to 8	Vadose	mg/kg	NA	**5.44**	1 U	**9.67**	NA	**48.3**	1 U	**6.49**	**140**
GP-SB-25-13.5	12/5/2020	12 to 13.5	Saturated	mg/kg	NA	**5.07**	1 U	**9.10**	NA	**3.37**	1 U	**11.4**	**29.2**
GP-SB-26-06	12/5/2020	4 to 6	Vadose	mg/kg	NA	**4.13**	1 U	**20.3**	NA	**20.0**	1 U	**14.7**	**39.8**
GP-SB-26-12	12/5/2020	10 to 12	Saturated	mg/kg	NA	**2.48**	1 U	**8.91**	NA	**3.01**	1 U	**9.48**	**22.8**
GP-SB-27-08	12/5/2020	6 to 8	Vadose	mg/kg	NA	**2.03**	1 U	**6.61**	NA	**1.08**	1 U	**5.45**	**18.5**
GP-SB-27-12	12/5/2020	11 to 12	Saturated	mg/kg	NA	**3.05**	1 U	**9.13**	NA	**6.60**	1 U	**7.43**	**32.3**
GP-SB-27-14.5	12/5/2020	12 to 14.5	Saturated	mg/kg	NA	**4.79**	1 U	**11.3**	NA	**3.83**	1 U	**7.00**	**20.7**
GP-SB-28-04	12/5/2020	2 to 4	Vadose	mg/kg	NA	**2.31**	1 U	**18.4**	NA	**34.0**	1 U	**22.9**	**36.9**
GP-SB-28-08	12/5/2020	6 to 8	Vadose	mg/kg	NA	**1.81**	1 U	**6.53**	NA	**1.04**	1 U	**5.68**	**17.5**
GP-SB-28-12	12/5/2020	11.2 to 12	Saturated	mg/kg	NA	**6.91**	1 U	**11.6**	NA	**5.49**	1 U	**12.8**	**39.5**
GP-SB-28-13	12/5/2020	12 to 13	Saturated	mg/kg	NA	**3.26**	1 U	**11.3**	NA	**2.81**	1 U	**7.09**	**16.5**
GP-SB-29-06.5	12/5/2020	5.2 to 6.5	Vadose	mg/kg	NA	**3.87**	1 U	**9.71**	NA	**3.31**	1 U	**6.13**	**19.9**
GP-SB-29-10.5	12/5/2020	9.5 to 10.5	Saturated	mg/kg	NA	**1.85**	1 U	**10.6**	NA	**1.83**	1 U	**3.88**	**28.1**
GP-SB-29-12	12/5/2020	11 to 12	Saturated	mg/kg	NA	**1.33**	1 U	**8.60**	NA	**1.42**	1 U	**3.93**	**18.4**
GP-SB-30-05.5	12/12/2020	4 to 5.5	Vadose	mg/kg	NA	**6.06**	1 U	**9.67**	NA	**24.8**	1 U	**7.62**	**58.6**
GP-SB-30-08	12/12/2020	7 to 8	Vadose	mg/kg	NA	**1.40**	1 U	**5.74**	NA	1 U	1 U	**4.2**	**12.1**
GP-SB-30-13.3	12/12/2020	12.5 to 13.3	Saturated	mg/kg	NA	**3.56**	1 U	**17.5**	NA	**5.90**	1 U	**12.4**	**54.6**
GP-SB-31-06	12/12/2020	4.5 to 6	Vadose	mg/kg	NA	**4.50**	1 U	**9.68**	NA	**16.5**	1 U	**6.97**	**99.8**
GP-SB-31-08	12/12/2020	7 to 8	Vadose	mg/kg	NA	**3.85**	1 U	**12.9**	NA	**2.50**	1 U	**6.59**	**22.8**
GP-SB-31-14	12/12/2020	12.5 to 14	Saturated	mg/kg	NA	**1.08**	1 U	**9.36**	NA	**1.79**	1 U	**4.82**	**23.2**
MW-1 13-14'	12/16/2021	13 to 14	Saturated	mg/kg	NA	**3.86**	1 U	**9.48**	NA	**1.73**	1 U	**5.18**	**17.8**
MW-2 7.5-9'	12/15/2021	7.5 to 9	Saturated	mg/kg	NA	**2.51**	1 U	**9.4**	NA	**2.73**	1 U	**12.3**	25 U
MW-2 12.5-14'	12/15/2021	12.5 to 14	Saturated	mg/kg	NA	**8.55**	1 U	**12.0**	NA	**3.77**	1 U	**17.1**	41.7
MW-3 7.5-9'	12/16/2021	7.5 to 9	Saturated	mg/kg	NA	**1.36**	1 U	**8.96**	NA	**2.37**	1 U	**14.9**	25 U
MW-3 12.5-14'	12/16/2021	12.5 to 14	Saturated	mg/kg	NA	**4.21**	1 U	**10.1**	NA	**6.00**	1 U	**10.7**	**38.3**
MW-4 7.5-9'	12/16/2021	7.5 to 9	Saturated	mg/kg	NA	**1.86**	1 U	**8.83**	NA	**1.89**	1 U	**6.09**	**138**
MW-4 11-11.5'	12/16/2021	11 to 11.5	Saturated	mg/kg	NA	**2.50**	1 U	**11.3**	NA	**2.67**	1 U	**10.7**	**89.2**
MW-5 12.5-14'	12/15/2021	12.5 to 14	Saturated	mg/kg	NA	**5.46**	**1.08**	**17.1**	NA	**93.1**	1 U	**8.37**	**7,000**
MW-6 7.5-9'	12/15/2021	7.5 to 9	Saturated	mg/kg	NA	**3.80**	1 U	**9.06**	NA	**13.9**	1 U	**6.89**	**36.1**
RI-SB-01-10	12/18/2021	8 to 10	Saturated	mg/kg	NA	**2.20**	1 U	**14.9**	NA	**7.51**	1 U	**8.21**	**49.2**
RI-SB-01-14	12/18/2021	12.5 to 14	Saturated	mg/kg	NA	**3.31**	1 U	**13.0**	NA	**2.60**	1 U	**7.39**	**16.9**
RI-SB-02-08	12/18/2021	6 to 8	Vadose	mg/kg	NA	**3.17**	1 U	**9.21**	NA	**2.14**	1 U	**5.74**	**64.9**
RI-SB-02-12	12/18/2021	10 to 12	Saturated	mg/kg	NA	**1.59**	1 U	**10.2**	NA	**1.49**	1 U	**4.96**	**25.1**
-SB-04 2-4' / DUP-0228	2/28/2023	2 to 4	Vadose	mg/kg	NA	**13.0 / 8.24**	1 U / 1 U	**43.3 / 32.9**	**161 / 38.8**	**97.6 / 76.9**	1 U / 1 U	**28.8 / 23.5**	**694 / 627**
RI-SB-04 11-12'	2/28/2023	11 to 12	Saturated	mg/kg	NA	**2.73**	1 U	**10.7**	**20.1**	**3.15**	1 U	**7.98**	**116**
RI-SB-05 9-10'	2/28/2023	9 to 10	Saturated	mg/kg	NA	**2.09**	1 U	**7.51**	**8.24**	**1.35**	1 U	**5.51**	**58.3**
RI-SB-05 12.5-14'	2/28/2023	12.5 to 14	Saturated	mg/kg	NA	**7.30**	1 U	**11.2**	**16.5**	**2.13**	1 U	**14.2**	**26.0**
RI-SB-06 6-8'	2/28/2023	6 to 8	Saturated	mg/kg	NA	**1.63**	1 U	**8.51**	**8.44**	**5.51**	1 U	**5.24**	**24.1**
RI-SB-06 12.5-13.5'	2/28/2023	12.5 to 13.5	Saturated	mg/kg	NA	**3.37**	1 U	**10.2**	**15.1**	**1.90**	2 U	**8.79**	**23.8**
MW-7 8-10'	2/28/2023	8 to 10	Saturated	mg/kg	NA	**5.44**	1 U	**11.2**	**18.2**	**5.70**	1 U	**8.15**	**21.3**
MW-7 16-18'	2/28/2023	16 to 18	Saturated	mg/kg	NA	**2.89**	1 U	**11.1**	**18.1**	**2.42**	1 U	**9.74**	**25.9**
MW-8 11-13'	2/28/2023	11 to 13	Saturated	mg/kg	NA	1 U	1 U	**5.23**	**7.76**	1 U	1 U	**4.19**	**15.3**
Screening Level MTCA Soil Protective of Groundwater Vadose (based on protection of surface water)					80000	7.3	0.77	Cr III: 550 Cr VI: 0.14	36.4	250	0.07	48	100
Screening Level MTCA Soil Protective of Groundwater Saturated (based on protection of surface water)					80000	7.3	0.77	Cr III: 27 Cr VI: 0.0069	36.4	56	0.07	48	85

Notes:

Bold = detection

Shading indicates an exceedance of a screening level

MTCA screening levels are from Preliminary Cleanup Levels (pCUL) for Lower Duwamish Waterway workbook, these have been developed by Ecology specifically for the LDW. Source: https://apps.ecology.wa.gov/cleanupsearch/site/1643#site-documents.

feet bgs = feet below ground surface	NA = Not analyzed
mg/kg = milligrams per kilograms	ND = Not detected
U = laboratory detection limit	MTCA - Model Toxics Control Act

J = reported concentration is an estimate.

Cr Vi = Chromium VI (hexavalent chromium); Cr III = Chromium three. Both screening levels are presented, the lowest is used for shading.

Table 4 Summary of 2000-2023 Soil Data - Non Metal Compounds
Bridge - Former Dawn Foods

Sample ID	Screening Level (mg/kg)	GP-SB-15	GP-SB-1510 (Duplicate)	GP-SB-16-07	GP-SB-16-11	GP-SB-17-05	GP-SB-17-10	GP-SB-21-05	GP-SB-21-10	GP-SB-22-07	GP-SB-22-09	GP-SB-23-05	GP-SB-23-11	GP-SB-24-10	GP-SB-24-12	GP-SB-25-08	GP-SB-25-13.5	GP-SB-26-06
Date Sample		6/9/2020	6/9/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/5/2020	12/5/2020	12/5/2020
Depth ft. bgs		10 to 11	10 to 11	6 to 7	10 to 11	4 to 5	9 to 10	3 to 5	7.5 to 10	5 to 7	9 to 10	3 to 5	10 to 11	7.5 to 10	10 to 12	6 to 8	12 to 13.5	4 to 6
Zone		Saturated	Saturated	Saturated	Saturated	Vadose	Saturated	Vadose	Saturated	Saturated	Saturated	Vadose	Saturated	Saturated	Saturated	Vadose	Saturated	Vadose
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BTEX/GRO/DRO									BTEX/GRO/DRO									
Benzene	0.0088/0.00056	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	0.72/0.044	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	0.18/0.01	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	0.94/0.055	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range	100	5 U	6 U	5 U	5 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diesel Range Organics (DRO)	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diesel Range Organics (DRO) - SGC	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lube Range Oil (ORO)	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lube Range Oil (ORO) - SGC	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DRO/ORO (Diesel + Lube Oil)	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DRO/ORO (Diesel + Lube Oil) - SGC	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CVOCs									CVOCs									
Vinyl chloride	0.0011/0.000056	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	No Criteria	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	260/1.4	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	0.43/0.03	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	5.2/0.32	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	180/110	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	160/120	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane (EDC)	0.35/0.024	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	3700/210	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	0.0044/0.0027	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	0.029/0.0016	0.025 U	0.025 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs									SVOCs									
Naphthalene	0.039/0.0021	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01
2-Methylnaphthalene	0.67/0.039	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.28**	<0.01	<0.01
1-Methylnaphthalene	34/2.1	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**1.8**	<0.01	<0.01
Acenaphthylene	1.3/1.3	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01
Acenaphthene	1.3	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.43**	<0.01	<0.01
Fluorene	54/0.029	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.67**	<0.01	<0.01
Phenanthrene	4.5/1.5	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**1.0**	<0.01	<0.01
Anthracene	0.96/0.051	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01
Fluoranthene	1.7/0.09	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.21**	<0.01	**0.016**
Pyrene	2.6/0.14	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	**0.062**	<0.05	<0.05	<0.05	<0.05	**0.24**	<0.01	**0.017**
Benzo(g,h,i)perylene	0.67	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	**0.01 J**	<0.05	<0.05	**0.064 J**	**0.051 J**	**0.10**	<0.01	**0.010**
Benz(a)anthracene	see total cPAHs	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.11**	<0.01	<0.01
Chrysene	see total cPAHs	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.14**	<0.01	**0.012**
Benzo(a)pyrene	see total cPAHs	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05 J	<0.05	<0.05	<0.05 J	<0.05 J	**0.15**	<0.01	**0.015**
Benzo(b)fluoranthene	see total cPAHs	NA	NA	NA	NA	NA	NA	<0.05	<0.01	**0.060**	**0.12 J**	<0.05	<0.05	**0.064 J**	**0.060 J**	**0.19**	<0.01	**0.019**
Benzo(k)fluoranthene	see total cPAHs	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05 J	<0.05	<0.05	<0.05 J	<0.05 J	**0.063**	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	see total cPAHs	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05 J	<0.05	<0.05	<0.05 J	<0.05 J	**0.11**	<0.01	**0.010**
Dibenz(a,h)anthracene	see total cPAHs	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05 J	<0.05	<0.05	<0.05 J	<0.05 J	<0.05	<0.01	<0.01
Total cPAHs TEQ	0.007	NA	NA	NA	NA	NA	NA	<0.05	<0.01	**0.006**	**0.012**	<0.05	<0.05	**0.0064**	**0.006**	**0.199**	<0.01	**0.018**
PCBs									PCBs									
Aroclor 1221	see total	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1232	see total	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1016	see total	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1242	see total	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1248	see total	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1254	see total	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1260	see total	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1262	see total	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1268	see total	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Total Aroclors	0.03	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

Table 4 Summary of 2000-2023 Soil Data - Non Metal Compounds

Bridge - Former Dawn Foods

Sample ID	Screening Level (mg/kg)	GP-SB-27-08	GP-SB-27-12	GP-SB-28-08	GP-SB-28-13	GP-SB-29-10.5	GP-SB-30-05.5	GP-SB-30-13.3	GP-SB-31-06	GP-SB-31-14	GP-SB-32-04	GP-SB-32-12	MW-1	MW-2	MW-2	MW-3	MW-3	MW-4 11-11.5'
Date Sample		12/5/2020	12/5/2020	12/5/2020	12/5/2020	12/5/2020	12/12/2020	12/12/2020	12/12/2020	12/12/2020	12/12/2020	12/12/2020	12/16/2021	12/15/2021	12/15/2021	12/16/2021	12/16/2021	12/16/2021
Depth ft. bgs		6 to 8	11 to 12	6 to 8	12 to 13	9.5 to 10.5	4 to 5.5	12.5 to 13.3	4.5 to 6	12.5 to 14	2 to 4	10.3 to 12	13 to 14	7.5 to 9	12.5 to 14	7.5 to 9	12.5 to 14	11 to 11.5
Zone		Vadose	Saturated	Vadose	Saturated	Saturated	Vadose	Saturated	Vadose	Saturated	Vadose	Saturated	Saturated	Saturated	Saturated	Saturated	Saturated	Saturated
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BTEX/GRO/DRO		BTEX/GRO/DRO							BTEX/GRO/DRO									
Benzene	0.0088/0.00056	NA	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA
Toluene	0.72/0.044	NA	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA
Ethylbenzene	0.18/0.01	NA	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA
Total Xylenes	0.94/0.055	NA	NA	NA	NA	NA	NA	NA	0.06 U	0.06 U	0.06 U	0.06 U	NA	NA	NA	NA	NA	NA
Gasoline Range	100	NA	NA	NA	NA	NA	NA	NA	5 U	5 U	**5.6**	5 U	NA	NA	NA	NA	NA	NA
Diesel Range Organics (DRO)	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diesel Range Organics (DRO) - SGC	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lube Range Oil (ORO)	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lube Range Oil (ORO) - SGC	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DRO/ORO (Diesel + Lube Oil)	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DRO/ORO (Diesel + Lube Oil) - SGC	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CVOCs		CVOCs							CVOCs									
Vinyl chloride	0.0011/0.000056	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U
Chloroethane	No Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U
1,1-Dichloroethene	260/1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U
Methylene chloride	0.43/0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U
trans-1,2-Dichloroethene	5.2/0.32	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U
1,1-Dichloroethane	180/110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U
cis-1,2-Dichloroethene	160/120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U
1,2-Dichloroethane (EDC)	0.35/0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U
1,1,1-Trichloroethane	3700/210	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U
Trichloroethene	0.0044/0.0027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U
Tetrachloroethene	0.029/0.0016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.025 U
SVOCs		SVOCs							SVOCs									
Naphthalene	0.039/0.0021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	0.67/0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	34/2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	1.3/1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	54/0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	4.5/1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	0.96/0.051	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	1.7/0.09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	2.6/0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	0.67	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	see total cPAHs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	see total cPAHs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	see total cPAHs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	see total cPAHs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	see total cPAHs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	see total cPAHs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	see total cPAHs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total cPAHs TEQ	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs		**PCBs**							PCBs									
Aroclor 1221	see total	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1232	see total	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1016	see total	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1242	see total	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1248	see total	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	see total	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	see total	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.057**	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1262	see total	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1268	see total	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA
Total Aroclors	0.03	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.057**	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA

Table 4 Summary of 2000-2023 Soil Data - Non Metal Compounds
Bridge - Former Dawn Foods

Sample ID	Screening Level (mg/kg)	MW-4 11-11.5'	MW-5 12.5-14'	MW-6 7.5-9'	RI-SB-01-10	RI-SB-01-14	RI-SB-02-08	RI-SB-02-12 / Duplicate	RI-SB-04 2-4' / DUP-022823	MW-8 11-13'
Date Sample		12/16/2021	12/15/2021	12/15/2021	12/18/2021	12/18/2021	12/18/2021	12/18/2021	2/28/2023	2/28/2023
Depth ft. bgs		11 to 11.5	12.5 to 14	7.5 to 9	8 to 10	12.5 to 14	6 to 8	10 to 12	2 to 4	11 to 13
Zone		Saturated	Saturated	Saturated	Saturated	Saturated	Vadose	Saturated	Vadose	Saturated
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BTEX/GRO/DRO		BTEX/GRO/DRO								
Benzene	0.0088/0.00056	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	0.72/0.044	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	0.18/0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	0.94/0.055	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range	100	NA	5 U ht	NA	5 U	5 U	5 U	5 U / 5 U	**11 x**	5 U
Diesel Range Organics (DRO)	2000	NA	**470 x**	NA	50 U	50 U	50 U	50 U / 50U	50 U / **90 x**	50 U
Diesel Range Organics (DRO) - SGC	2,000	NA	**730 x**	NA	NA	NA	NA	NA	NA	NA
Lube Range Oil (ORO)	2000	NA	**1,200**	NA	250 U	250 U	250 U	250 U / 250U	250 U / 250 U	250 U
Lube Range Oil (ORO) - SGC	2,000	NA	**1,300**	NA	NA	NA	NA	NA	NA	NA
DRO/ORO (Diesel + Lube Oil)	2,000	NA	**1,200**	NA	250 U	250 U	250 U	250 U / 250 U	250 U / **90 x**	250 U
DRO/ORO (Diesel + Lube Oil) - SGC	2,000	NA	**1,300**	NA	NA	NA	NA	NA	NA	NA
CVOCs		CVOCs								
Vinyl chloride	0.0011/0.000056	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
Chloroethane	No Criteria	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	260/1.4	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
Methylene chloride	0.43/0.03	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	5.2/0.32	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	180/110	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	160/120	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane (EDC)	0.35/0.024	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	3700/210	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
Trichloroethene	0.0044/0.0027	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
Tetrachloroethene	0.029/0.0016	0.025 U	0.025 U	0.025 U	NA	NA	NA	NA	NA	NA
SVOCs		SVOCs								
Naphthalene	0.039/0.0021	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	0.67/0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	34/2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	1.3/1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	54/0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	4.5/1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	0.96/0.051	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	1.7/0.09	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	2.6/0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	0.67	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	see total cPAHs	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	see total cPAHs	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	see total cPAHs	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	see total cPAHs	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	see total cPAHs	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	see total cPAHs	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	see total cPAHs	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total cPAHs TEQ	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs		PCBs								
Aroclor 1221	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1232	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1016	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1242	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1248	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1262	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1268	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Aroclors	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 4 Summary of 2000-2023 Soil Data - Non Metal Compounds
Bridge - Former Dawn Foods

Notes:

Bold = detection

Shading denotes an exceedance of a screening level

MTCA screening levels are from Preliminary Cleanup Levels (pCUL) for Lower Duwamish Waterway workbook, these have been developed by Ecology specifically for the LDW. Source: https://apps.ecology.wa.gov/cleanupsearch/site/1643#site-documents.

[A] - No benzene present in soil
feet bgs = feet below ground surface
mg/kg = milligrams per kilograms
U = laboratory detection limit
J = reported concentration is an estimate.
NA = Not analyzed
ND = Not detected
MTCA - Model Toxics Control Act

TPH GRO - Total Petroleum Hydrocarbons Gasoline Range Organics
TPH DRO - Total Petroleum Hydrocarbons Diesel Range Organics
BTEX - Benzene, toluene, ethylbenzene, xylenes
CVOCs - Chlorinated Volatile Organic Compounds
SVOCs - Semi Volatile Organic Compounds
PCBs - Polychlorinated biphenyls
cPAHs - carcinogenic polycyclic aromatic hydrocarbons

Table 5 Summary of 2000-2023 Direct Push Borehole Groundwater Samples - Detected Compounds Only
Bridge - Former Dawn Foods

Sample ID	**Screening Level (ug/L)**	**GP-SB-1**	**GP-SB-2**	**GP-SB-3**	**GP-SB-5**	**GP-SB-6**	**GP-SB-7**	**GP-SB-08**	**GP-SB-09**	**Dup (GP-SB-09)**	**GP-SB-10**	**GP-SB-11**	**GP-SB-12**	**GP-SB-13**	**GP-SB-14**	**GP-SB-15**	**GP-SB-16**	**GP-SB-17**	**GP-SB-18**	**GP-SB-19**	**GP-SB-20**	**GP-SB-21**
Date Sampled		**1/2/2020**	**1/2/2020**	**1/2/2020**	**1/2/2020**	**1/2/2020**	**1/2/2020**	**6/9/2020**	**6/9/2020**	**6/9/2020**	**6/9/2020**	**6/9/2020**	**6/9/2020**	**6/9/2020**	**6/9/2020**	**6/9/2020**	**12/1/2020**	**12/1/2020**	**12/1/2020**	**12/1/2020**	**12/1/2020**	**12/1/2020**
																	Sample results are in ug/L					
Metals Total/Dissolved																						
Aluminum - total	See dissolved	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	100 U	NA	NA
Arsenic - total	See dissolved	NA	NA	**7.22**	**29**	**23**	**37.9**	**14.0**	**10.2**	**10.7**	**48.7**	**3.68**	1 U	NA	NA	NA	NA	NA	**16.3**	**10 U**	**21.6**	**25**
Cadmium - total	See dissolved	NA	NA	1 U	**2.87**	10 U	1 U	1 UJ	1 UJ	1 U	1 UJ	1 U	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 UJ	5 UJ
Chromium - total	See dissolved	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**12.1**	**4.25**	**13.7**	10 U
Copper - total	See dissolved	NA	NA	25 U	**1,460**	**66.1**	5 U	**8.84**	**4.65**	**3.68 J**	**53.5**	**4.01**	2.4 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead - total	See dissolved	NA	NA	**24.2**	**632**	10 U	1 U	**12.6**	1 U	1 U	**63.9**	**1.11**	1 U	NA	NA	NA	NA	NA	**1.55**	**1.08**	**5.85**	10 U
Mercury - total	See dissolved	NA	NA	1 U	**4.29**	1 U	1 U	0.2 UJ	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U	NA	NA	NA	NA	NA	1 U	1 U	1 U	10 U
Nickel - total	See dissolved	NA	NA	5 U	**66**	**42.4**	**24**	**6.11**	**4.24**	**4.74 J**	**18.2**	**10.8**	**2.23 J**	NA	NA	NA	NA	NA	**9.65**	**6.54**	**8.30**	**12.8**
Selenium - total	See dissolved	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc - total	See dissolved	NA	NA	25 U	**1,070**	**3770**	**22,800**	**562**	**342**	**502**	**104**	**32.2**	**17.9 J**	NA	NA	NA	NA	NA	50 U	50 U	50 U	50 U
Arsenic - dissolved	8.00	NA	NA	**6.92**	1 U	**10.6**	**29.7**	**13.1**	**10.2**	**10.7**	**25.2**	**4.61 ca**	1 Uca	NA	NA	NA	NA	NA	**14.8**	**1.85**	**11.9**	**20**
Cadmium - dissolved	1.20	NA	NA	1 U	1 U	5 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U	1 UJ
Chromium - dissolved	Cr III: 27.5 Cr VI: 0.36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.72**	10 U	**4.06**	10 U
Copper - dissolved	3.10	NA	NA	25 U	25 U	5 U	5 U	**7.00**	**5.58**	**2.97**	**5.29**	**2.73**	2.4 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead - dissolved	5.60	NA	NA	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U	1 UJ
Mercury - dissolved	0.03	NA	NA	1 U	1 U	5 U	1 U	0.2 U	0.2 U	**2 J**	0.2 UJ	0.2 U	0.2 U	NA	NA	NA	NA	NA	1 U	1 U	1 U	1 UJ
Nickel - dissolved	8.20	NA	NA	5 U	5 U	**8.71**	**22.7**	**6.35**	**4.88**	**4.14**	**5.74**	**10.9**	**2.37 J**	NA	NA	NA	NA	NA	**5.30**	10 U	**4.26**	**14.8**
Zinc - dissolved	81	NA	NA	25 U	25 U	**3,110**	**22,300**	**574**	**378**	**317**	5 U	**18.8**	**16.5 J**	NA	NA	NA	NA	NA	**7.01**	50U	5 U	50U
TPH GRO/DRO																						
Gasoline Range Organics	1000	100 U	**800**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**100**	**380**	**3,300**	100 U	100 U	NA	NA	NA	NA
Diesel Range Organics	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diesel Range Organics w/ SGC	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Motor Oil Organics (ORO)	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Motor Oil Organics (ORO) w/ SGC	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Dx (DRO + ORO)	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Dx (DRO + ORO) w/ SGC	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOCs																						
Benzene	1.6	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	NA	NA	0.35 U	0.35 U	NA	NA	NA	1 U	1 U	1U	1 U	1 U	NA	NA	NA	NA
Chloroethane	15000	1U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	1 U	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	180	**16**	**400**	1 U	1 U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	**11**	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane (EDC)	3.5	1U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	1 U	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	11	1U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	1 U	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	130	1U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	1 U	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	77	1U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	1 U	NA	NA	NA	NA	NA	NA
Ethylbenzene	21	1 U	1 U	1 U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	NA	1 U	**3.1**	**5.1**	1 U	1 U	NA	NA	NA	NA
Phenanthrene	No Criteria	NA	NA	NA	NA	0.04 U	NA	NA	0.02 U	**0.039**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl t-butyl ether	800	**1.1**	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	100	5U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	5U	NA	NA	1 U	NA	NA	NA	NA	NA	NA
Tetrachloroethene	2.9	1 U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	**2.5**	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	5400	1U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	1 U	NA	NA	NA	NA	NA	NA
Trichloroethene	0.7	1 U	1 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	1U	1U	1 U	NA	NA	NA	NA	NA	NA
Toluene	100	1 U	1 U	1U	1 U	1 U	NA	1 U	1 U	1 U	NA	NA	NA	NA	NA	**8.1**	1 U	1 U	NA	NA	NA	NA
Vinyl chloride	0.18	**44**	**72**	**0.31**	0.2 U	0.2 U	NA	0.1 U	1 U	1 U	NA	NA	0.21	NA	NA	**1.8**	NA	NA	NA	NA	NA	NA
Xylenes, Total	110	2 U	2 U	2 U	2 U	2 U	NA	2 U	2 U	2 U	NA	NA	NA	1 U	**5.6**	**8.3**	3 U	3 U	NA	NA	NA	NA
Tributyltin	0.19	NA	NA	NA	NA	NA	NA	NA	0.31U	0.36U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5 Summary of 2000-2023 Direct Push Borehole Groundwater Samples - Detected Compounds Only
Bridge - Former Dawn Foods

Sample ID	Screening Level (ug/L)	GP-SB-22	GP-SB-23	GP-SB-24	GP-SB-25	GP-SB-27	GP-SB-28	GP-SB-29	GP-SB-30	GP-SB-31	GP-SB-32	RI-SB-01	RI-SB-02 / Duplicate	RI-SB-04	RI-SB-05	RI-SB-06
Date Sampled		12/1/2020	12/1/2020	12/1/2020	12/5/2020	12/5/2020	12/5/2020	12/5/2020	12/12/2020	12/12/2020	12/12/2020	12/18/2021	12/18/2021	2/28/2023	2/28/2023	2/28/2023
Metals Total/Dissolved																
Aluminum - total	See dissolved	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic - total	See dissolved	**20**	**38.4**	**26.6**	**15.7**	**2.76**	**5.07**	**1.15**	**15.1**	**17.5**	NA	**5.03**	**2.53 / 6.40**	**0.944**	**1.68**	**11.5**
Cadmium - total	See dissolved	1 UJ	5 UJ	5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U / 1 U	0.061 U	0.061 U	0.061 U
Chromium - total	See dissolved	10 U	**13.8**	10 U	**18.6**	10 U	**23.7**	1 U	**11.4**	**3.19**	NA	**13.5**	**6.56 / 19.5**	**7.21**	**3.19 J**	**7.02**
Copper - total	See dissolved	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5.66**	**7.00**	**9.38**
Lead - total	See dissolved	1 U	**11.1**	10 U	**12.4**	10 U	10 U	1 U	**3.44**	1 U	NA	**4.27**	**2.70 / 11.0**	**1.35**	**1.82**	**2.22**
Mercury - total	See dissolved	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U / 1 U	NA	NA	NA
Nickel - total	See dissolved	10 U	**15.4**	10 U	**18.6**	10 U	**12.2**	**3.10**	**12.0**	**5.77**	NA	**15.7**	5 U / **8.65**	**3.58 J**	**2.67 J**	**4.13**
Selenium - total	See dissolved	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.06**	1 U / 1 U	NA	NA	NA
Zinc - total	See dissolved	50 U	**52.7**	50 U	**95.5**	50 U	**91.9**	**210**	**67.6**	**17.4**	NA	**38.9**	**31.1 / 77.4**	**65.7**	**138**	**19.0 J**
Arsenic - dissolved	8.00	**18.4**	**27.2**	**27.1**	**5.05**	1 U	1 U	1 U	**11.3**	**16.4**	NA	1 U	**1.29 / 1.20**	0.162 U	**0.766**	**11.1**
Cadmium - dissolved	1.20	1 U	1 UJ	1 UJ	1U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U / 1 U	0.061 U	0.061 U	0.061 U
Chromium - dissolved	Cr III: 27.5 Cr VI: 0.36	**2.14**	10 U	10 U	1 U	1 U	1 U	1 U	1 U	**1.19**	NA	**1.39**	**2.12 / 2.06**	1.72 U	1.72 U	**3.48 J**
Copper - dissolved	3.10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.505 U	0.505 U	0.505 U
Lead - dissolved	5.60	1 U	1 UJ	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U / 1 U	0.061 U	0.061 U	0.061 U
Mercury - dissolved	0.03	1 U	1 UJ	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U / 1 U	NA	NA	NA
Nickel - dissolved	8.20	10U	10 U	**11.3**	**1.62**	**2.33**	**3.28**	**3.41**	**2.96**	**4.49**	NA	**1.95**	**1.66 / 1.62**	1.21 U	**1.41 J**	**2.17 J**
Zinc - dissolved	81	5 U	50U	50U	**14.6**	5 U	**6.36**	**209**	**33.0**	**12.3**	NA	**5.49**	**10.7 / 9.96**	7.07 U	**123**	**8.80 J**
TPH GRO/DRO																
Gasoline Range Organics	1000	NA	NA	NA	NA	NA	NA	NA	NA	100 U	100 U	100 U	100 U / 100 U	NA	NA	NA
Diesel Range Organics	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**150 x**	**65 x / 710 x**	NA	NA	NA
Diesel Range Organics w/ SGC	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50 U	50 U / 50 U	NA	NA	NA
Motor Oil Organics (ORO)	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**490 x**	250 U / **290 x**	NA	NA	NA
Motor Oil Organics (ORO) w/ SGC	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**290**	250 U / 250 U	NA	NA	NA
Total Dx (DRO + ORO)	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**640 x**	**315 / 1,000**	NA	NA	NA
Total Dx (DRO + ORO) w/ SGC	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**290**	250 U / 250 U	NA	NA	NA
VOCs																
Benzene	1.6	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	NA	NA	NA	NA	NA
Chloroethane	15000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U / 1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	180	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U / 1 U	1 U	1 U	1 U
1,2-Dichloroethane (EDC)	3.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.2 U / 0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethane	11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U / 1 U	1 U	1 U	1 U
1,1-Dichloroethene	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U / 1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U / 1 U	1 U	1 U	1 U
Ethylbenzene	21	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	NA	NA	NA	NA	NA
Phenanthrene	No Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl t-butyl ether	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5.2 ca lc**	**11 ca lc / 9.3 ca lc**	5 U	5 U	5 U
Tetrachloroethene	2.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.6**	1 U / 1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	5400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U / 1 U	1 U	1 U	1 U
Trichloroethene	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U / 0.5 U	0.5 U	0.5 U	0.5 U
Toluene	100	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	NA	NA	NA	NA	NA
Vinyl chloride	0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.21**	**0.30 / 0.28**	**0.50**	**0.55**	**0.40**
Xylenes, Total	110	NA	NA	NA	NA	NA	NA	NA	NA	3 U	3 U	NA	NA	NA	NA	NA
Tributyltin	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5 Summary of 2000-2023 Direct Push Borehole Groundwater Samples - Detected Compounds Only
Bridge - Former Dawn Foods

Notes:
Bold = detection
Shading denotes an exceedance of a screening level
MTCA screening levels are from Preliminary Cleanup Levels (pCUL) for Lower Duwamish Waterway workbook, these have been developed by Ecology specifically for the LDW. Source: https://apps.ecology.wa.gov/cleanupsearch/site/1643#site-documents.
Cr Vi = Chromium VI (hexavalent chromium); Cr III = Chromium trivalent. Both screening levels are presented, the lowest is used for shading.
TEq - Toxicity Equivalency to cPAHs, calculated by multiplying result by appropriate TEF.
Ca = The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.
x = Sample chromatographic pattern does not resemble the fuel standard used for quantitation.
ug/L = micrograms per liters
U = laboratory detection limit
J = reported concentration is an estimate.
NC - No Criterion
NA = Not analyzed

TPH GRO - Total Petroleum Hydrocarbons Gasoline Range Organics
TPH DRO - Total Petroleum Hydrocarbons Diesel Range Organics
VOCs -Volatile Organic Compounds
ND = Not detected

Table 6 Summary of Monitoring Well Groundwater Samples
Bridge - Former Dawn Foods

Sample ID	Screening Level (ug/L)	MW-1						MW-2						MW-3						MW-4						MW-5					
																												MW-5 / DUP-0422 (duplicate)	MW-5 / DUP-0822 (duplicate)		
Date Sampled		2/1/2022	2/1/2022	4/19/2022	8/8/2022	12/21/2022	3/25/2023	1/31/2022	1/31/2022	4/19/2022	8/9/2022	12/22/2022	3/26/2023	1/30/2022	1/30/2022	4/20/2022	8/8/2022	12/22/2022	3/26/2023	2/2/2022	2/2/2022	4/20/2022	8/9/2022	12/22/2022	3/26/2023	1/31/2022	1/31/2022	4/21/2022	8/9/2022	12/21/2022	3/25/2023
Sample results are in ug/L																															
Metals Total/Dissolved																															
Laboratory - Analytical Method for Metals Only		F&B - 6020B	BAL-1638 Mod					F&B - 6020B	BAL - 1638 Mod.					F&B - 6020B	BAL - 1638 Mod.					F&B - 6020B	BAL - 1638 Mod.					F&B - 6020B	BAL - 1638 Mod.				
Arsenic - total	See dissolved	**12.5**	**1.70**	**1.62**	**1.38**	**1.19**	**1.35**	**20.1**	**3.14**	**3.97**	**3.32**	**4.46**	**2.86**	**37.2**	**3.06**	**3.66**	**3.08**	**2.74**	**3.37**	**3.38 / 3.18**	**0.586 J**	**0.410 J**	**0.204 J**	**0.162 U**	**0.163 J**	**9.51**	**2.08**	**0.681 J / 0.513 J**	0.404 U / **0.182 J**	**0.297 J**	**0.555 J**
Cadmium - total	See dissolved	10 U	**0.179 J**	**0.154 J**	**0.289**	**0.550**	**0.252**	10 U	0.061 U	0.061 U	**0.225**	**0.178 J**	0.152 U	10 U	**0.168 J**	**0.293 J**	**0.254 J**	**0.148 J**	0.152 U	1 U / 1 U	0.061 U	0.061 U	0.061 U	0.061 U	0.061 U	1 U	0.061 U	0.061 U / 0.061 U	0.152 U / 0.061 U	0.061 U	0.061 U
Chromium - total	See dissolved	10 U	**2.27 J**	1.72 U	1.72 U	1.72 U	1.72 U	10 U	1.72 U	1.72 U	1.72 U	**5.06 J**	4.29 U	10 U	4.29 U	4.29 U	4.29 U	**16.4**	4.29 U	5 U / 5 U	1.72 U	1.72 U	1.72 U	1.72 U	1.72 U	10 U	1.72 U	1.72 U / 1.72 U	4.29 U / 1.72 U	1.72 U	1.72 U
Copper - total	See dissolved	**8.42**	**4.12**	**2.16**	**1.46**	**2.25**	**1.91**	**6.88**	**1.10**	**3.10**	**1.51**	**9.56**	1.26 U	50 U	**1.09 J**	**3.30**	**2.20 J**	**2.60**	4.64 U	5 U / 5 U	0.404 U	**0.449 J**	0.505 U	**0.582 J**	**0.720 J**	5 U	**1.3**	0.404 U / 0.404 U	1.26 U / 0.505 U	0.505 U	**0.595 J**
Lead - total	See dissolved	1 U	**0.332**	**0.053 J**	0.061 U	0.061 U	0.061 U	10 U	**0.081 J**	**0.725**	**0.194**	**2.55**	0.152 U	10 U	0.101 U	**0.595**	**0.292 J**	**0.351**	**0.920**	1 U / 1 U	0.040 U	0.040 U	0.061 U	0.061 U	0.061 U	**1.72**	**2.09**	**0.142** / 0.040 U	0.152 U / 0.061 U	**0.063 J**	**0.074 J**
Nickel - total	See dissolved	NA	NA	1.21 U	1.21 U	**2.05 J**	1.21 U	NA	NA	**1.31 J**	**1.64 J**	**4.35**	3.03 U	NA	NA	3.03 U	**3.35 J**	**8.88**	3.03 U	NA	NA	**2.11 J**	1.21 U	**1.23 J**	**1.94 J**	NA	NA	1.21 U / 1.21 U	3.03 U / 1.21 U	1.21 U	**1.86 J**
Zinc - total	See dissolved	**234**	**278**	**292**	**225**	**652**	**388**	5 U	7.07 U	7.07 U	7.07 U	**11.0 J**	17.7 U	50 U	17.7 U	17.7 U	17.7 U	7.07 U	17.7 U	**522 / 537**	**535**	**446**	**106**	**534**	**1,380**	**2,020**	**1,930**	**268 / 195**	**32.8 J / 36.9**	**240**	**684**
Arsenic - dissolved	8.00	**10.4**	**1.23**	**1.58**	**1.37**	**1.14**	**1.41**	**19.8**	**3.37**	**3.48**	**3.29**	**2.94**	**2.82**	**36.0**	**4.10**	**3.07**	**3.10**	**2.54**	**2.59**	**2.14 / 2.22**	**0.645 J / 0.564 J**	**0.323 J**	**0.165 J**	**0.162 U**	0.162 U	**5.25**	**1.98**	**0.568 J / 0.473 J**	0.404 U / **0.182 J**	**0.309 J**	**0.443 J**
Cadmium - dissolved	1.20	10 U	**0.175 J**	**0.159 J**	**0.235**	**0.532**	**0.215**	10 U	**0.071 J**	0.061 U	**0.214**	**0.131 J**	0.152 U	10 U	**0.221 J**	**0.247 J**	**0.296 J**	**0.175 J**	0.152 U	1 U / 1 U	0.061 U / 0.061 U	0.061 U	0.061 U	0.061 U	0.061 U	1 U	0.061 U	0.061 U / 0.061 U	0.152 U / 0.061 U	0.061 U	0.061 U
Chromium - dissolved	Cr III: 27.5 Cr VI: 0.36	10 U	1.72 U	1.72 U	1.72 U	1.72 U	1.72 U	10 U	1.72 U	1.72 U	1.72 U	1.72 U	4.29 U	10 U	4.29 U	4.29 U	4.29 U	**2.49 J**	4.29 U	**1.02** / 1 U	1.72 U / 1.72 U	1.72 U	1.72 U	1.72 U	1.72 U	1 U	1.72 U	1.72 U / 1.72 U	4.29 U / 1.72 U	1.72 U	1.72 U
Copper - dissolved[b]	3.10	5 U	**2.30**	**2.07**	**1.56**	**2.14**	**2.91**	50 U	**1.13**	**1.02**	**1.13**	**1.30**	1.26 U	50 U	**6.18**	**1.59 J**	**1.43 J**	**1.70**	**1.37 J**	5 U / 5 U	**0.626 J / 0.635 J**	**0.514 J**	**1.66**	**0.553**	**1.33**	5 U	0.404 U	0.404 U / **0.983 J**	1.26 U / **0.866 J**	**1.46**	0.505 U
Lead - dissolved	5.60	10 U	0.040 U	0.040 U	0.061 U	0.061 U	0.061 U	10 U	0.040 U	0.040 U	0.061 U	0.061 U	0.152 U	10 U	**1.49**	0.101 U	0.152 U	0.061 U	0.152 U	1 U / 1 U	0.040 U / 0.040 U	0.040 U	0.061 U	0.061 U	0.061 U	1 U	**0.147**	**0.078 J / 0.093 J**	0.152 U / 0.061 U	**0.116 J**	0.061 U
Nickel - dissolved	8.20	NA	NA	1.21 U	**1.37 J**	**1.85 J**	1.21 U	NA	NA	1.21 U	1.21 U	1.21 U	3.03 U	NA	NA	3.03 U	**4.70 J**	**4.36**	3.03 U	NA	NA	**2.02 J**	**1.76 J**	**1.45 J**	**2.04 J**	NA	NA	1.21 U / 1.21 U	3.03 U	**1.52 J**	1.21 U
Zinc - dissolved	81	**217**	**260**	**282**	**209**	**637**	**380**	50 U	7.07 U	7.07 U	7.07 U	7.07 U	17.7 U	50 U	17.7 U	17.7 U	17.7 U	7.07 U	17.7 U	**500 / 509**	**515 / 516**	**399**	**99.4**	**533**	**1310**	**1,900**	**1,880**	**122 / 103**	**34.9 J / 33.6**	**241**	**700**
GRO/DRO - NWTPH-Dx/-Gx																															
Gasoline Range Organics	1000	NA	NA	NA	100 U	NA	NA	NA	NA	NA	**1000[g] 100 U ht**	**100 U**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	100 U	NA	NA	NA	NA	100 U	100 U	NA	NA
Diesel Range Organics	see total	NA	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50 U	NA	NA	NA	NA	**2,100 x**	**330 x**	**120x / 96x ***	NA
Diesel Range Organics w/ SGC	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50 U	NA	NA	NA
Motor Oil Organics (ORO)	see total	NA	NA	NA	250 U	NA	NA	NA	NA	NA	250 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	250 U	NA	NA	NA	NA	**540 x**	250 U	250 U / 250 U *	NA
Motor Oil Organics (ORO) w/ SGC	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	250 U	NA	NA	NA
Total Dx (DRO + ORO)	500	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	**2,640**	**330**	**120 / 96 ***	NA
Total Dx (DRO + ORO) w/ SGC	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA
VOCs																															
Benzene	1.60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	NA	NA	NA
Chloroethane	15000.00	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U / 1 U	NA	1 U	NA	1 U	1 U	1 U	NA	1 U / 1 U	NA	1 U	1 U
cis-1,2-Dichloroethene	180.00	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	**1.2 / 1.2**	NA	**2.5**	NA	**1.8**	1 U	**2.5**	NA	**5.0 / 4.7**	NA	**10**	**6.3**
1,2-Dichloroethane (EDC)	3.5	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	NA	NA	NA	0.2 U	NA	0.2 U	NA	NA	NA	NA	NA	0.2 U	0.2 U/ 0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U / 0.2 U	NA	0.2 U	0.2 U
1,1-Dichloroethane	11	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U / 1 U	NA	1 U	NA	1 U	1 U	1 U	NA	1 U / 1 U	NA	1 U	1 U
1,1-Dichloroethene	130	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U / 1 U	NA	1 U	NA	1 U	1 U	1 U	NA	1 U / 1 U	NA	1 U	1 U
trans-1,2-Dichloroethene	77	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U / 1 U	NA	1 U	NA	1 U	1 U	1 U	NA	**1.9 / 1.8**	NA	1 U	1 U
Ethylbenzene	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U / 1 U	NA	NA	NA
Methylene chloride	100.00	5 U	NA	5 U	NA	5 U	5 U	NA	NA	NA	5 U	NA	5 U	NA	NA	NA	NA	NA	5 U	5 U / 5 U	NA	5 U	NA	5 U	5 U	5 U	NA	5 U / 5 U	NA	5 U	5 U
Tetrachloroethene	2.90	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U / 1 U	NA	1 U	NA	**1.2**	**1.9**	**3.2**	NA	**6.1 / 6.0**	NA	**5.9**	**9.8**
Trichloroethane	No critiera	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U / 1 U	NA	0.5 U	NA	1 U	1 U	1 U	NA	1 U / 1 U	NA	1 U	1 U
1,1,1-Trichloroethane	5400.00	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U / 1 U	NA	1 U	NA	1 U	1 U	1 U	NA	1 U / 1 U	NA	1 U	1 U
Trichloroethene	0.70	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	NA	NA	NA	0.5 U	NA	0.5 U	NA	NA	NA	NA	NA	0.5 U	0.5 U/ 0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	**2.1**	NA	**1.7 / 1.7**	NA	0.5 U	**0.53**
Toluene	100.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	NA	NA	NA
Vinyl chloride	0.18	0.02 U	NA	**0.021**	NA	0.02 U	0.02 U	NA	NA	NA	0.02 U	NA	0.02 U	NA	NA	NA	NA	NA	0.02 U	**0.43 / 0.41**	NA	**0.59**	NA	**0.53**	**0.11**	**1.4**	NA	**2.1 / 1.4**	NA	**6.9**	**5.0**
Xylenes, Total	110.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3 U	NA	NA	NA
SVOCs																															
Naphthalene[a]	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA
2-Methylnaphthalene	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA
1-Methylnaphthalene	7500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA
Acenaphthylene	5.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Acenaphthene	No critiera	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.034**	NA	NA	NA
Fluorene	3.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Phenanthrene	No critiera	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Anthracene	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Fluoranthene	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Pyrene	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Benzo(g,h,i)perylene	No critiera	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.04 U	NA	NA	NA
Benz(a)anthracene	see total cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Chrysene	see total cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Benzo(a)pyrene	see total cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Benzo(b)fluoranthene	see total cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Benzo(k)fluoranthene	see total cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Indeno(1,2,3-cd)pyrene	see total cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Dibenz(a,h)anthracene	see total cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Total cPAH TEQ	0.000016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA
PCBs																															
Aroclor 1221	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Aroclor 1232	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Aroclor 1016	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Aroclor 1242	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Aroclor 1248	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Aroclor 1254	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Aroclor 1260	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Aroclor 1262	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Aroclor 1268	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Total PCBs	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA

Table 6 Summary of Monitoring Well Groundwater Samples
Bridge - Former Dawn Foods

Sample ID	**Screening Level (ug/L)**	**MW-6**						**MW-7**	**MW-8**	**MW-9**
						DUP02-1222 (duplicate)		DUP03-0323 (duplicate)	DUP01-0323 (duplicate)	DUP02-0323 (duplicate)
Date Sampled		1/30/2022	1/30/2022	4/21/2022	8/8/2022	12/21/2022	3/25/2023	3/28/2023	3/25/2023	3/28/2023
Sample results are in ug/L										
Metals Total/Dissolved										
Laboratory - Analytical Method for Metals Only		F&B - 6020B	BAL - 1638 Mod.					BAL - 1638 Mod.	BAL-1638 Mod	BAL-1638 Mod
Arsenic - total	See dissolved	**31.1**	**0.504 J**	**1.04 J**	**0.416 J**	**0.294 J / 0.336 J**	0.404 U	**0.448 J**	**8.12 / 8.55 ***	**3.59**
Cadmium - total	See dissolved	10 U	0.152 U	0.152 U	0.061 U	0.061 U / 0.061 U	0.152 U	0.061 U	0.061 U / 0.061 U *	0.061 U
Chromium - total	See dissolved	10 U	4.29 U	4.29 U	**2.29 J**	1.72 U / 1.72 U	4.29 U	1.72 U	1.72 U / 1.72 U *	1.72 U
Copper - total	See dissolved	**6.48**	1.01 U	**1.30 J**	0.505 U	**0.990 J / 0.945 J**	1.26 U	**0.655 J**	**0.966 J / 1.04 ***	**0.556 J**
Lead - total	See dissolved	10 U	0.101 U	**0.414**	**0.062 J**	0.061 U / 0.061 U	**0.599**	0.061 U	0.061 U / 0.061 U *	0.061 U
Nickel - total	See dissolved	NA	NA	3.03 U	1.21 U	1.21 U / 1.21 U	3.03 U	1.21 U	**2.08 J / 2.17 J ***	**1.23 J**
Zinc - total	See dissolved	5 U	17.7 U	17.7 U	7.07 U	7.07 U / 7.07 U	17.7 U	7.07 U	7.07 U / 7.07 U *	7.07 U
Arsenic - dissolved	8.00	**28.2**	**0.286 J**	**0.241 J**	**0.367 J**	**0.189 J / 0.216 J**	0.404 U	**0.415 J**	**8.26 / 8.40 ***	**3.31**
Cadmium - dissolved	1.20	10 U	0.152 U	0.152 U	0.061 U	0.061 U / 0.061 U	0.152 U	0.061 U	0.061 U / 0.061 U *	0.061 U
Chromium - dissolved	Cr III: 27.5 Cr VI: 0.36	10 U	4.29 U	4.29 U	**1.90 J**	1.72 U / 1.72 U	4.29 U	1.72 U	1.72 U / 1.72 U *	1.72 U
Copper - dissolved [b]	3.10	50 U	1.01 U	1.01 U	0.505 U	**0.653 J / 0.707 J**	1.26 U	**0.521 J**	**0.748 J / 0.907 J ***	0.505 U
Lead - dissolved	5.60	10 U	0.101 U	0.101 U	0.061 U	0.061 U / 0.061 U	0.152 U	0.061 U	0.061 U / 0.061 U *	0.061 U
Nickel - dissolved	8.20	NA	NA	3.03 U	1.21 U	1.21 U / 1.21 U	3.03 U	**1.40 J**	**2.10 J / 2.31 J ***	1.21 U
Zinc - dissolved	81	50 U	17.7 U	17.7 U	7.07 U	7.07 U / 7.07 U	17.7 U	7.07 U	7.07 U / 7.07 U *	7.07 U
GRO/DRO - NWTPH-Dx/-Gx										
Gasoline Range Organics	1000	NA	NA	NA	NA	NA	NA	NA	**2,300**	100 U / 100 U *
Diesel Range Organics	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diesel Range Organics w/ SGC	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Motor Oil Organics (ORO)	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Motor Oil Organics (ORO) w/ SGC	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Dx (DRO + ORO)	500	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Dx (DRO + ORO) w/ SGC	500	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOCs										
Benzene	1.60	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	15000.00	NA	NA	NA	1 U	1 U / 1 U *	1 U	1 U / 1 U *	1 U	1 U
cis-1,2-Dichloroethene	180.00	NA	NA	NA	1 U	1 U / 1 U *	1 U	1 U / 1 U *	**9.0**	**6.1**
1,2-Dichloroethane (EDC)	3.5	NA	NA	NA	0.2 U	0.2 U / 0.2 U	0.2 U	0.2 U / 0.2 U	0.2 U	0.2 U
1,1-Dichloroethane	11	NA	NA	NA	1 U	1 U / 1 U *	1 U	1 U / 1 U *	1 U	1 U
1,1-Dichloroethene	130	NA	NA	NA	1 U	1 U / 1 U *	1 U	1 U / 1 U *	1 U	1 U
trans-1,2-Dichloroethene	77	NA	NA	NA	1 U	1 U / 1 U *	1 U	1 U / 1 U *	1 U	1 U
Ethylbenzene	21	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	100.00	NA	NA	NA	**7.1 lc**	5 U / 5 U *	5 U	5 U / 5 U *	5 U	5 U
Tetrachloroethene	2.90	NA	NA	NA	1 U	1 U / 1 U *	1 U	1 U / 1 U *	**2.6**	1 U
Trichloroethane	No critiera	NA	NA	NA	1 U	1 U / 1 U *	1 U	1 U / 1 U *	1 U	1 U
1,1,1-Trichloroethane	5400.00	NA	NA	NA	1 U	1 U / 1 U *	1 U	1 U / 1 U *	1 U	1 U
Trichloroethene	0.70	NA	NA	NA	0.5 U	0.5 U / 0.5 U *	0.5 U	0.5 U / 0.5 U *	**0.98**	0.5 U
Toluene	100.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	0.18	NA	NA	NA	**0.12**	**0.057 / 0.051 ***	0.02 U	**0.14 / 0.15**	**1.5**	**12**
Xylenes, Total	110.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs										
Naphthalene [a]	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	7500	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	5.3	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	No critiera	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	3.7	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	No critiera	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	No critiera	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	see total cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	see total cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	see total cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	see total cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	see total cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	see total cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	see total cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total cPAH TEQ	0.000016	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs										
Aroclor 1221	see total	**NA**	**NA**	NA	NA	NA	NA	NA	NA	NA
Aroclor 1232	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1016	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1242	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1248	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1262	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1268	see total	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 6 Summary of Monitoring Well Groundwater Samples
Bridge - Former Dawn Foods

Notes:
All results in ug/L.
Bold = detection
Shading denotes an exceedance of a screening level
Cr Vi = Chromium VI (hexavalent chromium); Cr III = Chromium trivalent. Both screening levels are presented, the lowest is used for shading.
* Indicates duplicate value with associated normal sample.
[a] - Sum of naphthalene, 1-methyl naphthalene, and 2-methylnaphthalene
[b] - Filter blank results from February 2022 sampling included dissolved copper results greater than the method reporting limit.
g - The presence of the analyte may be due to carryover from previous sample injections.
MTCA screening levels are from Preliminary Cleanup Levels (pCUL) for Lower Duwamish Waterway workbook, these have been developed by Ecology specifically for the LDW. Source: https://apps.ecology.wa.gov/cleanupsearch/site/1643#site-documents.
MTCA - Model Toxics Control Act
ug/L = micrograms per liters
U = laboratory detection limit
J = reported concentration is an estimate.
NC - No Criterion
NA = Not analyzed
ND = Not detected
TPH GRO - Total Petroleum Hydrocarbons Gasoline Range Organics
TPH DRO - Total Petroleum Hydrocarbons Diesel Range Organics
BTEX - Benzene, toluene, ethylbenzene, xylenes
VOCs -Volatile Organic Compounds
cPAHs - carcinogenic polycyclic aromatic hydrocarbons, TEQ - toxicity Equivalency to cPAHs, calculated by multiplying result by appropriate TEF.
TEQ - toxicity Equivalency to cPAHs, calculated by multiplying result by appropriate toxic equivalency factors.
NC - No Criterion
Ca = The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.
x = Sample chromatographic pattern does not resemble the fuel standard used for quantitation.
lc - The presence of the analyte is likely due to laboratory contamination.
ht - The re-run analysis was performed outside the method holding time requirement.

Table 7 - Summary of June 2020 Vapor Intrusion Assessment Results
Bridge - Former Dawn Foods

	MTCA Screening Level (indoor air) Method C	**Indoor Air Samples**				**Ambient**			**Method C Screening Level (sub slab)**	**Sub slab Samples**			
		WH-IA-0620	Duplicate (WH-IA-100)	BR-IA-0620	OF-IA-0620	UP-0620	DOWN-0620	Average of Detected Ambient Values		BR-SS-0620	OF-SS-0620	Duplicate (OF-SS-100)	WH-SS-0620
		Warehouse	Warehouse	Restroom	Office	Upgradient	Down-gradient			Restroom	Office	Office	Warehouse
		6/27/2020	6/27/2020	6/27/2020	6/27/2020	6/27/2020	6/27/2020			6/27/2020	6/27/2020	6/27/2020	6/27/2020
Compounds	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3
1,1-Dichloroethane	15.63	<0.4	<0.4	<0.57	<0.4	<0.4	<0.4	---	520	<16	<17	<16	**14**
1,1,1-Trichloroethane	5000	<0.55	<0.55	<0.76	<0.55	<0.55	<0.55	---	170,000	<21	<22	<21	**29**
1,1,2-Trichloroethane	1.56	<0.11	<0.11	<0.15	<0.11	<0.11	<0.11	---	52	<4.3	<4.5	<4.3	<0.88
1,2-Dichloroethane (EDC)		**0.33**	**0.31**	**0.24**	**0.25**	**0.065**	**0.065**	**0.065**		<1.6	<1.7	<1.6	<0.33
1,2-Dichloroethane (EDC) corrected for Ambient	0.96	**0.265**	**0.245**	**0.175**	**0.185**	---	---	---	32	---	---	---	---
cis-1,2-Dichloroethene	40	<0.4	<0.4	<0.56	<0.4	<0.4	<0.4	---	1,300	**150**	**29**	**29**	<3.2
Tetrachloroethene	40	<6.8	<6.8	<9.5	<6.8	<6.8	<6.8	---	1,300	**5,900**	**2,100**	**2,100**	**570**
Trichloroethene	2.00	<0.27	<0.27	**0.37**	**0.33**	<0.27	<0.27	---	67	**810**	**290**	**290**	**220**
Vinyl chloride	2.84	<0.26	<0.26	<0.36	<0.26	<0.26	<0.26	---	95	<10	<10	<10	<2.1
Benzene	3.210	**0.75**	**0.81**	**0.63**	**0.68**	<0.32	<0.32	---	110	<12	<13	<12	<2.6
Toluene	5000	<19	<19	<26	<19	<19	<19	---	170,000	<730	<770	<730	<150
Ethylbenzene	1000	<0.43	<0.43	<0.61	<0.43	<0.43	<0.43	---	33,000	<17	<18	<17	<3.5
m,p-Xylene	100	**1.1**	**1.1**	**1.2**	**1.1**	<0.87	<0.87	---	3,300	<34	<36	<34	<7
o-Xylene	100	**0.44**	<0.43	<0.61	**0.46**	<0.43	<0.43	---	3,300	<17	<18	<17	<3.5
Naphthalene		**0.35**	**0.27**	**0.37**	**0.46**	**0.12**	**0.12**	**0.12**		<10	<11	<10	<2.1
Naphthalene corrected for Ambient	0.74	**0.23**	**0.15**	**0.25**	**0.34**	---	---	---	25	---	---	---	---
Chloroethane	NV	<2.6	<2.6	<3.7	<2.6	<2.6	<2.6	---	NV	<100	<110	<100	<21
1,1-Dichloroethene	200	<0.4	<0.4	<0.56	<0.4	<0.4	<0.4	---	6,700	<15	<16	<15	<3.2
trans-1,2-Dichloroethene	40	<0.4	<0.4	<0.56	<0.4	<0.4	<0.4	---	1,300	<15	<16	<15	<3.2
Analysis For Volatile Compounds By Method MA-APH													
APH EC5-8 aliphatics/ACGIH C5-8 aliphatics	NV	**140**	**140**	**120**	**130**	<30	<30	---	NV	**6,400**	**2,000**	**2,000**	**990**
APH EC9-12 aliphatics/ACGIH C9-15 aliphatics	NV	**130**	**120**	**130**	**110**	<35	<35	---	NV	<1,400	<1,400	<1,400	**580**
APH EC9-10 aromatics/ACGIH C9-15 aromatics	NV	<25	<25	<35	<25	<25	<25	---	NV	<970	<1,000	<970	<200
TPH[a]	NV	**272.5**	**262.1**	**252.1**	**242.6**	ND	ND	---	NV	**6,400**	**2,000**	**2,000**	**1,570**

Notes:
YELLOW shade = detection exceeds indoor air Method C or site specific TPH screening level
BLUE shade = detection exceeds sub slab screening level
ug/m3 = micrograms per cubic meter
Bold = detected compound
TPH = Total Petroleum Hydrocarbons
µg/m^3 = micrograms per cubic meter of air

[a] Ecology has not developed a TPH vapor intrusion screening level for commercial or industrial land use. In the absence of a MTCA screening level, indoor vapor sample results from July 2023 were evaluated on a point-by-point basis against vapor risk using spreadsheets developed by Ecology and provided in the December 11, 2023 comments (Ecology 2023). See Appendix E.

Table 8 - Summary of June 2021 Vapor Intrusion Assessment Results
Bridge - Former Dawn Foods

	MTCA Screening Level (indoor air) Method C	**Indoor Air Samples**						**Ambient**		
		IA1-061221 21:14 - 20:29	IA2-061221 21:18 - 20:28	IA3-061221 21:23 - 20:27	IA4-061221 21:27 - 20:40	IA5-061221 21:34 - 20:39	IA6-061221 21:37 - 20:38	AE-061221 21:02 - 20:15	AW-061221 21:07 - 20:24	Average of Detected Ambient Values
		Indoor Office Women's Bath	Indoor Office	Indoor Warehouse SE Corner	Indoor Warehouse E Center	Indoor Warehouse Stairs to Office	Indoor Warehouse Center	Ambient East	Ambient West	
		6/21/2021	6/21/2021	6/21/2021	6/21/2021	6/21/2021	6/21/2021	6/21/2021	6/21/2021	
Compounds	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3
1,1-Dichloroethane	15.63	<0.4	<0.53	<0.4	<0.4	<0.53	<0.4	<0.4	<0.4	---
1,1,1-Trichloroethane	5000	<0.55	<0.71	<0.55	<0.55	<0.71	<0.55	<0.087	<0.087	---
1,1,2-Trichloroethane	1.56	<0.055	<0.071	<0.055	<0.055	<0.071	<0.055	<0.55	<0.55	---
1,2-Dichloroethane (EDC)		**0.16**	**0.15**	**0.27**	**0.33**	**0.18**	**0.13**	**0.077**	**0.065**	**0.071**
1,2-Dichloroethane (EDC) corrected for Ambient	0.96	**0.09**	**0.08**	**0.2**	**0.26**	**0.11**	**0.06**	**---**	**---**	**---**
cis-1,2-Dichloroethene	40	<0.4	<0.53	<0.4	<0.4	<0.53	<0.4	<0.4	<0.4	---
Tetrachloroethene	40	**7.1**	<8.8	<6.8	<6.8	<8.8	<6.8	<11	<11	---
Trichloroethene	2.00	**0.38**	**0.34**	**0.13**	**0.15**	<0.14	<0.11	<0.17	<0.17	---
Vinyl chloride	2.84	<0.26	<0.33	<0.26	<0.26	<0.33	<0.26	<0.26	<0.26	---
Benzene		**0.39**	<0.42	**0.50**	**0.50**	**0.43**	**0.41**	**0.50**	**0.38**	**0.44**
Benzene corrected for Ambient	3.210	neg	<0.42	**0.06**	**0.06**	neg	neg	---	---	**---**
Toluene	5000	<19	<24	<19	<19	<24	<19	<30	<30	---
Ethylbenzene	1000	<0.43	<0.56	<0.43	<0.43	<0.56	<0.43	<0.43	<0.43	---
m,p-Xylene	100	<0.87	<1.1	<0.87	<0.87	<1.1	<0.87	<0.87	<0.87	---
o-Xylene	100	<0.43	<0.56	<0.43	<0.43	<0.56	<0.43	<0.43	<0.43	---
Naphthalene		**0.3**	**0.35**	**0.26**	**0.24**	**0.22**	**0.31**	**0.19**	**0.24**	**0.215**
Naphthalene corrected for Ambient	0.74	**0.08**	**0.13**	**0.04**	**0.02**	**0.005**	**0.09**	---	---	**---**
Analysis For Volatile Compounds By Method MA-APH										
APH EC5-8 aliphatics/ACGIH C5-8 aliphatics		**140**	**130**	**120**	**130**	**120**	**140**	**98 a**	**120 a**	**109**
APH EC5-8 aliphatics/ACGIH C5-8 aliphatics corrected for Ambient	NV	**31**	**21**	**11**	**21**	**11**	**31**	**---**	**---**	---
APH EC9-12 aliphatics/ACGIH C9-15 aliphatics	NV	**73**	**91**	**200**	**240**	**320**	**310**	<25	<25	---
APH EC9-10 aromatics/ACGIH C9-15 aromatics	NV	<25	<32	<25	<25	<32	**27**	<25	<25	---
TPH [b]	NV	**104.1**	**112.1**	**211.1**	**261.1**	**331.0**	**341.1**	**98.0**	**120.0**	---

Notes:
YELLOW shade = detection exceeds indoor air Method C or site specific TPH screening level
ug/m3 = micrograms per cubic meter
Bold = detected compound
TPH = Total Petroleum Hydrocarbons
µg/m^3 = micrograms per cubic meter of air
a The internal standard associated with the analyte is out of control limits. The value reported is an estimate.
b Ecology has not developed a TPH vapor intrusion screening level for commercial or industrial land use. In the absence of a MTCA screening level, indoor vapor sample results from July 2023 were evaluated on a point-by-point basis against vapor risk using spreadsheets developed by Ecology and provided in the December 11, 2023 comments (Ecology 2023). See Appendix E.
neg = average ambient concentrations exceed the indoor air measured value.

Table 9 - Summary of July 2023 Vapor Intrusion Assessment Results
Bridge - Former Dawn Foods

	MTCA Screening Level (indoor air) Method C	Indoor Air Samples								Ambient		
		IA1-070423	IA2-070423	IA3-070423	IA4-070423	IA5-070423	IA6-070423	IA7-070423	IA8-070423	AE-070423	AW-070423	Average of Detected Ambient Values
		5:03 - 5:57	5:03 - 5:57	5:03 - 5:57	5:03 - 5:57	5:03 - 5:57	5:03 - 5:57	5:21 - 5:59	4:59 - 5:57	4:46 - 5:34	4:46 - 5:34	
		Indoor Office Women's Bath	Indoor Office	Indoor Warehouse SE Corner	Indoor Warehouse E Center	Indoor Warehouse Stairs to Office	Indoor Warehouse Center	Indoor Warehouse Fire Sprinkler Risers	Indoor Warehouse Outside Test Kitchen	Ambient East	Ambient West	
		7/4/2023	7/4/2023	7/4/2023	7/4/2023	7/4/2023	7/4/2023	7/4/2023	7/4/2023	7/4/2023	7/4/2023	
Compounds	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3
1,1-Dichloroethane	15.63	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.49	<0.4	---
1,1,1-Trichloroethane	5000	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.65	<0.55	---
1,1,2-Trichloroethane	1.56	<0.055	<0.055	<0.055	<0.055	<0.055	<0.055	<0.055	<0.055	<0.065	<0.055	---
1,2-Dichloroethane (EDC)		**0.18**	**0.18**	**0.44**	**0.41**	**0.33**	**0.13**	**0.1**	**0.11**	**0.063**	**0.053**	**0.058**
1,2-Dichloroethane (EDC) corrected for Ambient	0.96	**0.12**	**0.122**	**0.382**	***0.352***	**0.272**	**0.072**	**0.042**	**0.052**	**---**	**---**	**---**
cis-1,2-Dichloroethene	40	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	---
Tetrachloroethene	40	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<8.1	<6.8	---
Trichloroethene	2.00	**0.17**	**0.19**	**0.14**	**0.12**	**0.14**	<0.11	**0.13**	**0.11**	<0.13	<0.11	---
Vinyl chloride	2.84	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.16	<0.13	---
Benzene		**0.71**	**0.72**	**1.40**	**1.40**	**1.3**	**0.79**	**0.8**	**0.79**	**0.83**	**0.73**	**0.78**
Benzene corrected for Ambient	3.210	**neg**	**neg**	**0.62**	**0.62**	**0.52**	**0.01**	**0.02**	**0.01**	---	---	---
Toluene	5000	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5	<9	<7.5	---
Ethylbenzene	1000	**0.5**	**0.51**	**0.74**	**0.74**	**0.76**	**0.75**	**0.76**	**0.76**	**0.75**	**0.57**	**0.66**
Ethylbenzene corrected for Ambient		**neg**	**neg**	**0.08**	**0.08**	**0.1**	**0.09**	**0.1**	**0.1**			
m,p-Xylene	100	**1.5**	**1.5**	**2.6**	**2.5**	**2.6**	**2.4**	**2.5**	**2.5**	**1.9**	**1.8**	**1.85**
m,p-Xylene corrected for Ambient		**neg**	**neg**	**0.75**	**0.65**	**0.75**	**0.55**	**0.65**	**0.65**			
o-Xylene	100	**0.56**	**0.57**	**0.88**	**0.92**	**0.97**	**0.87**	**0.91**	**0.94**	**0.72**	**0.66**	**0.69**
o-Xylene corrected for Ambient		**neg**	**neg**	**0.19**	**0.23**	**0.28**	**0.18**	**0.22**	**0.25**			
Naphthalene		**0.47**	**0.49**	**0.68**	**0.54**	**0.72**	**0.45**	**0.75**	**0.72**	**0.36**	**0.73**	**0.55**
Naphthalene corrected for Ambient	0.74	**neg**	**neg**	**0.13**	**neg**	**0.170**	**neg**	**0.200**	**0.17**	**---**	**---**	**---**
Method MA-APH												
APH EC5-8 aliphatics/ACGIH C5-8 aliphatics		**110**	**100**	**190**	**210**	**230**	**170**	**170**	**160**	**88**	**88**	**88**
APH EC5-8 aliphatics/ACGIH C5-8 aliphatics corrected for Ambient	NV	**22**	**12**	**102**	**122**	**142**	**82**	**82**	**72**	---	---	---
APH EC9-12 aliphatics/ACGIH C9-15 aliphatics	NV	<25	<25	<25	<25	<25	<25	**68**	**55**	<25	<25	---
APH EC9-10 aromatics/ACGIH C9-15 aromatics	NV	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	---
TPH [b]	NV	**22.0**	**12.0**	**103.8**	**123.6**	**143.8**	**82.8**	**151.2**	**128.2**	**88.0**	**88.0**	---
TPH - Risk Factors (See Appendix D)	MTCA Commercial/ Industrial	pass	pass	pass	pass	pass	pass	pass	pass	NA	NA	NA

Notes:

YELLOW shade = detection exceeds indoor air Method C or site specific TPH screening level

ug/m3 = micrograms per cubic meter

Bold = detected compound

TPH = Total Petroleum Hydrocarbons

μg/m^3 = micrograms per cubic meter of air

a The internal standard associated with the analyte is out of control limits. The value reported is an estimate.

b Ecology has not developed a TPH vapor intrusion screening level for commercial or industrial land use. In the absence of a MTCA screening level, indoor vapor sample results from July 2023 were evaluated on a point-by-point basis against vapor risk using spreadsheets developed by Ecology and provided in the December 11, 2023 comments (Ecology 2023). See Appendix E.

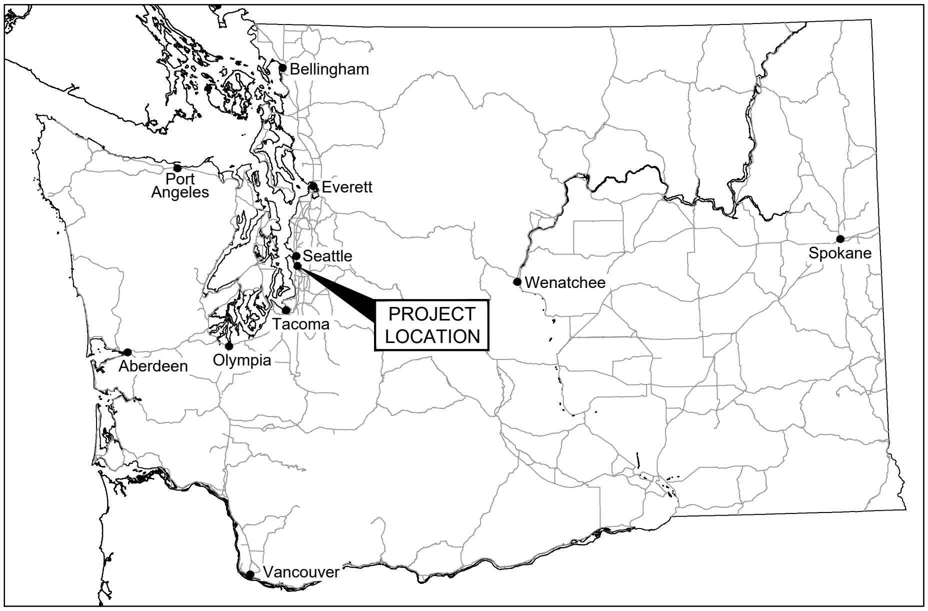
neg = average ambient concentrations exceed the indoor air measured value.

Table 10 Summary of Proposed RIWP Field Work
Bridge - Former Dawn Foods

Data Gap	Sample Type and Sample ID	Frequency	Analysis
Groundwater Discharge to Surface Water: Sample 3 nearshore groundwater monitoring wells to determine groundwater concentrations at the shoreline.	Quarterly groundwater sampling from site monitoring wells	Quarterly (analysis may be modified based on results)	MW-1 through MW-3 Groundwater– SVOCs, CVOCs, PCBs, TPH, BTEXs, and total/dissolved metals. Dioxin/furans may be analyzed depending on the PCB sampling results.
Groundwater Point of Discharge: Sample one well point to determine groundwater metals concentrations.	Groundwater sampling from monitoring well MW-1 and well point PD-1	Two quarterly events – first event for zinc, second event additional parameters	Groundwater Samples: MW-1 and PD-1 sampled for total/dissolved metals. Additional analysis may be done at PD-1 pending exceedances of PCULs at MW-1.
Extent of CVOCs: Confirm presence of contaminants in the vicinity of MW-5 and RI-SB-01.	Soil and groundwater data from geoprobe locations in the vicinity of MW-5 and RI-SB-01.	One time event	Groundwater and soil*– CVOCs. Additional soil and groundwater analytes as described under other data gaps, below.
Additional Groundwater Data: Sample 6 non-shoreline groundwater monitoring wells to determine groundwater concentrations.	Quarterly groundwater sampling from site monitoring wells	Quarterly (analysis may be modified based on results)	MW-4 through MW-9 groundwater– SVOCs, CVOCs, PCBs, TPH, BTEXs, and total/dissolved metals. Dioxin/furans may be analyzed depending on the PCB sampling results.
Elevated Reporting Limits: Add cadmium and mercury to the metals suite for groundwater sampling and extent of CVOC investigation.	Groundwater monitoring well sampling	One time event unless results exceed PCULs.	MW-1 through MW-9 groundwater - cadmium and mercury added to metals analysis suite.
	Soil and groundwater direct push samplling - 4 direct push locations around MW-5. Other locations archived.	One time event	Soil and groundwater cadmium and mercury.
TBT Data	Groundwater monitoring well sampling	One time event unless results exceed PCUL.	MW-1, MW-2, MW-4, MW-5, and MW-6 groundwater for TBT.
	Soil and groundwater direct push samplling - 4 direct push locations around MW-5. Other locations archived.	One time event	Soil and groundwater TBT.
Chromium Speciation	Groundwater monitoring well sampling	One time event unless results exceed PCUL.	MW-1 and MW-2 groundwater sample chrmomium speciation.
	Soil direct push samplling - 2 westernmost direct push locations.	One time event	Soil sample chromium speciation.
Groundwater Flow Direction and Gradient Tidal Study: To determine tidal influence at the site.	A 48-hour tidal study at all existing site wells (MW-1 through MW-9).	One time event	Average groundwater flow gradient and tidal lag estimates for groundwater sampling.
Vapor Intrusion: Collect sub slab, indoor air and ambient air samples to confirm previous results and refine the extent of possible contamination.	Sub slab, indoor and ambient vapors samples.	One time event	Vapor – TO-15 CVOCs and Air-Phase Petroleum Hydrocarbons (APH).

Notes:
* Soil samples may be analyzed pending groundwater results
TPH - Total Petroleum Hydrocarbons Gasoline Range & Diesel Range Organics
BTEX - Benzene, toluene, ethylbenzene, xylenes
cVOCs - Chlorinated Volatile Organic Compounds
SVOCs - Semi Volatile Organic Compounds
PCBs - Polychlorinated biphenyls
Cr Vi = Chromium VI (hexavalent chromium); Cr III = Chromium trivalent

Figures



WASHINGTON LOCATION MAP

VICINITY MAP

0 800 1600
SCALE IN FEET

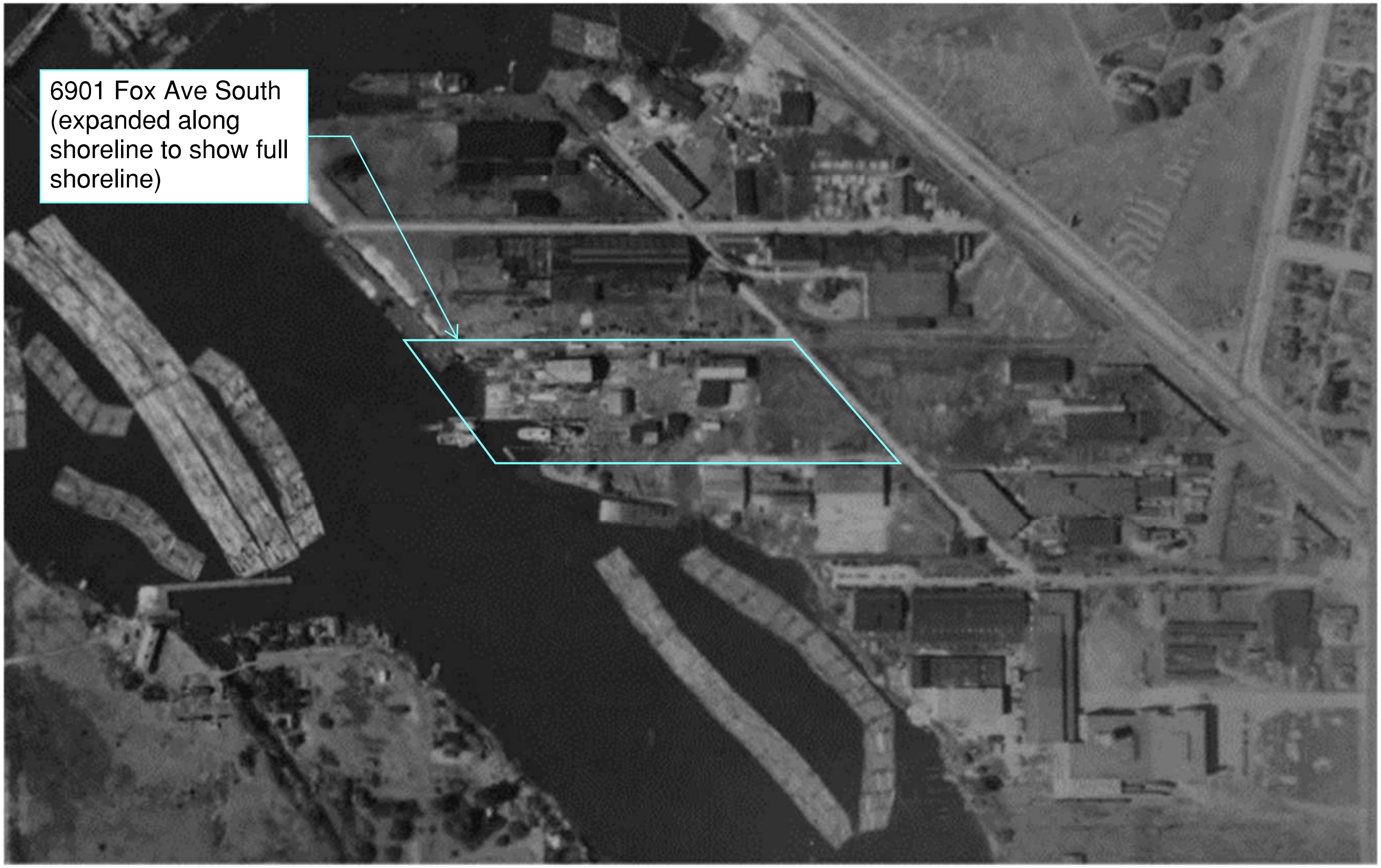
Source: Google Earth. Image date 8/22/2022

CRETE
CONSULTING, INC.

Former Dawn Foods Site
Bridge Point Seattle 130, LLC
1/22/2024

Figure 1
Vicinity Map

File: Dawn Foods Vicmap.dwg Layout: Vicmap

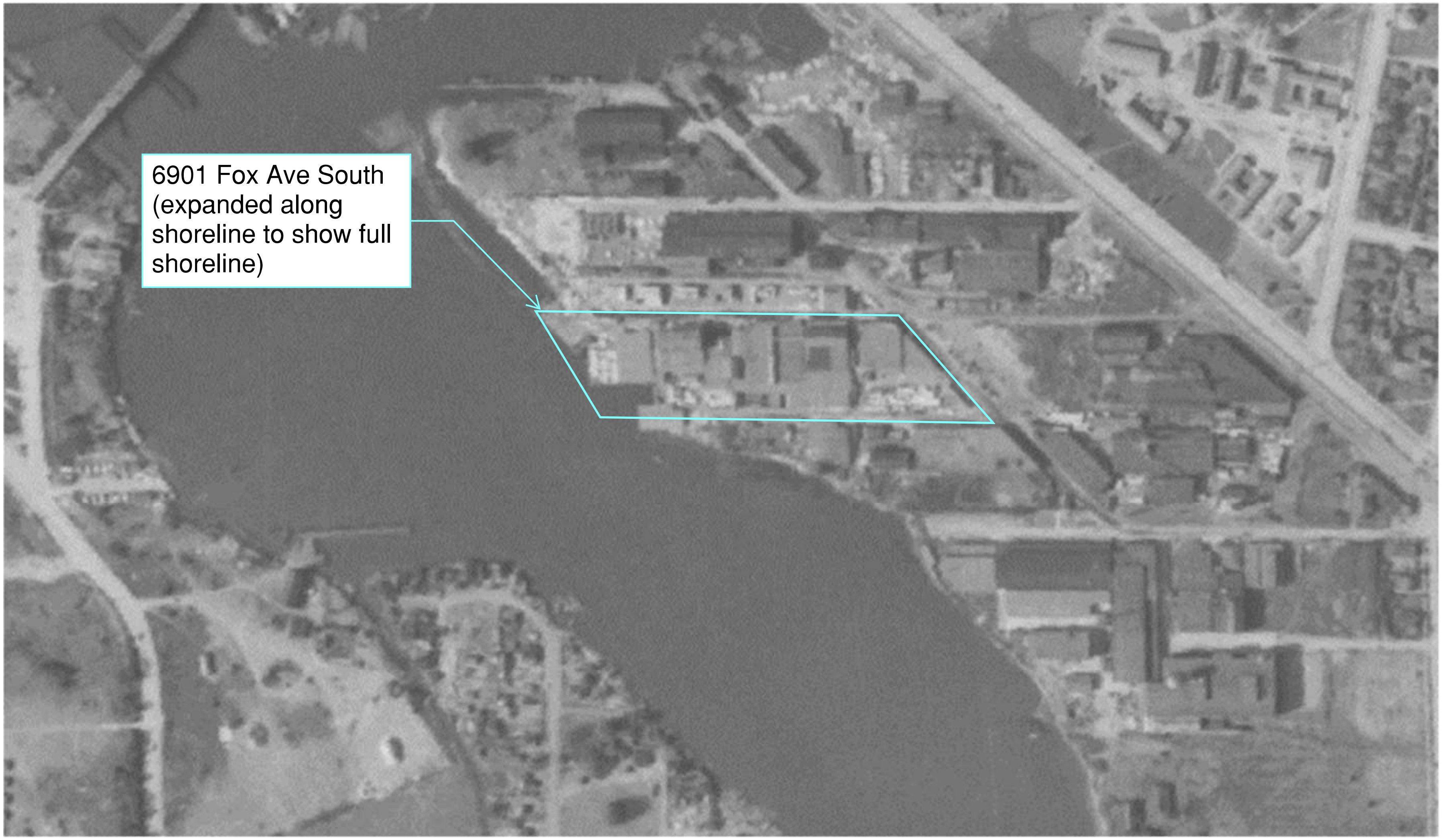


6901 Fox Ave South (expanded along shoreline to show full shoreline)

1936

CRETE
CONSULTING, INC.

Former Dawn Foods Site Bridge Point Seattle 130, LLC 1/22/2024	Figure 2A Historical Aerial Photographs Parcel Number 000180-0113

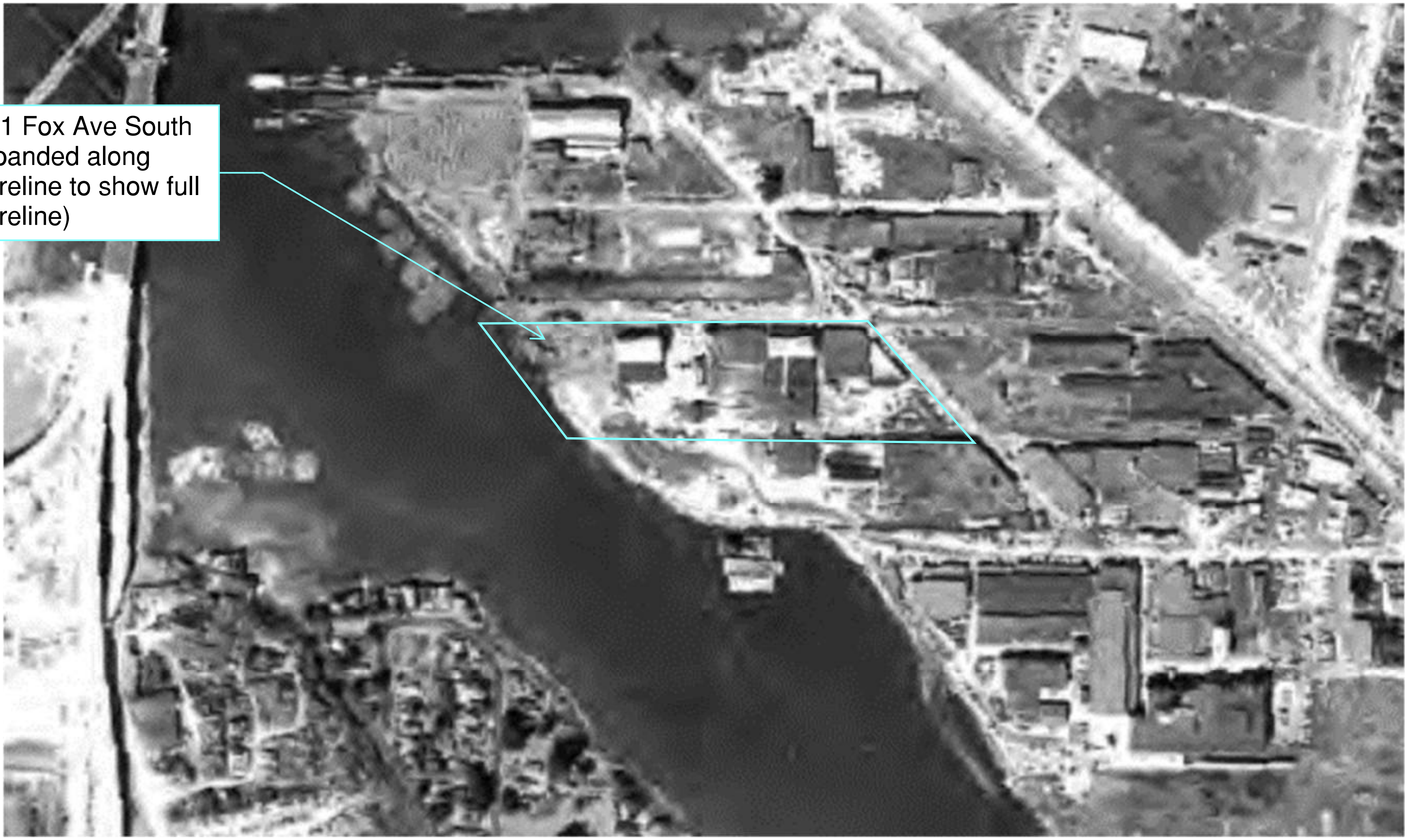


1943

CRETE
CONSULTING, INC.

Former Dawn Foods Site
Bridge Point Seattle 130, LLC
1/22/2024

Figure 2B
Historical Aerial Photographs
Parcel Number 000180-0113



6901 Fox Ave South (expanded along shoreline to show full shoreline)

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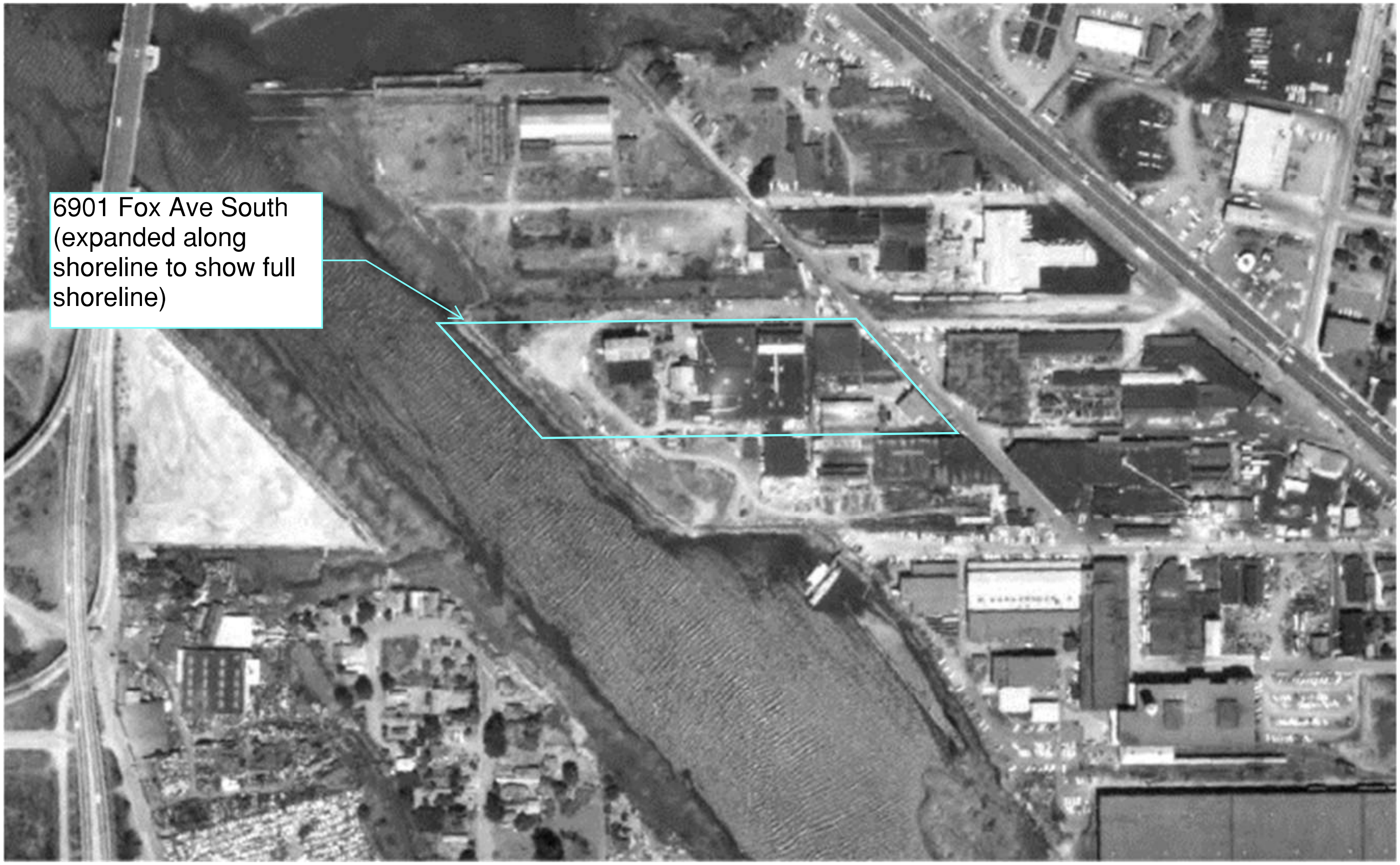
CRETE CONSULTING, INC.

Former Dawn Foods Site
Bridge Point Seattle 130, LLC
1/22/2024

Figure 2C
Historical Aerial Photographs
Parcel Number 000180-0113



1965

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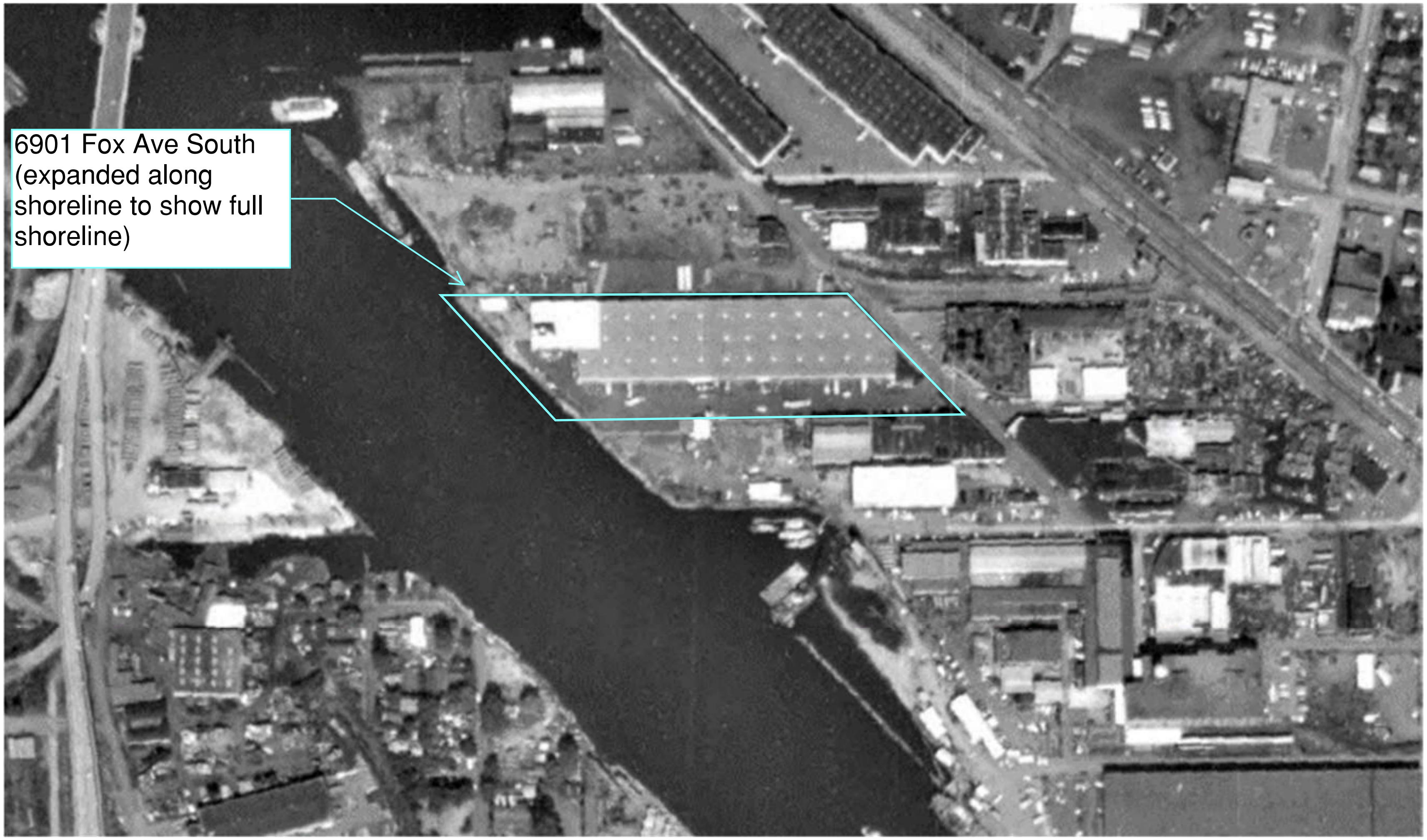
Figure 2D
Historical Aerial Photographs
Parcel Number 000180-0113



1977

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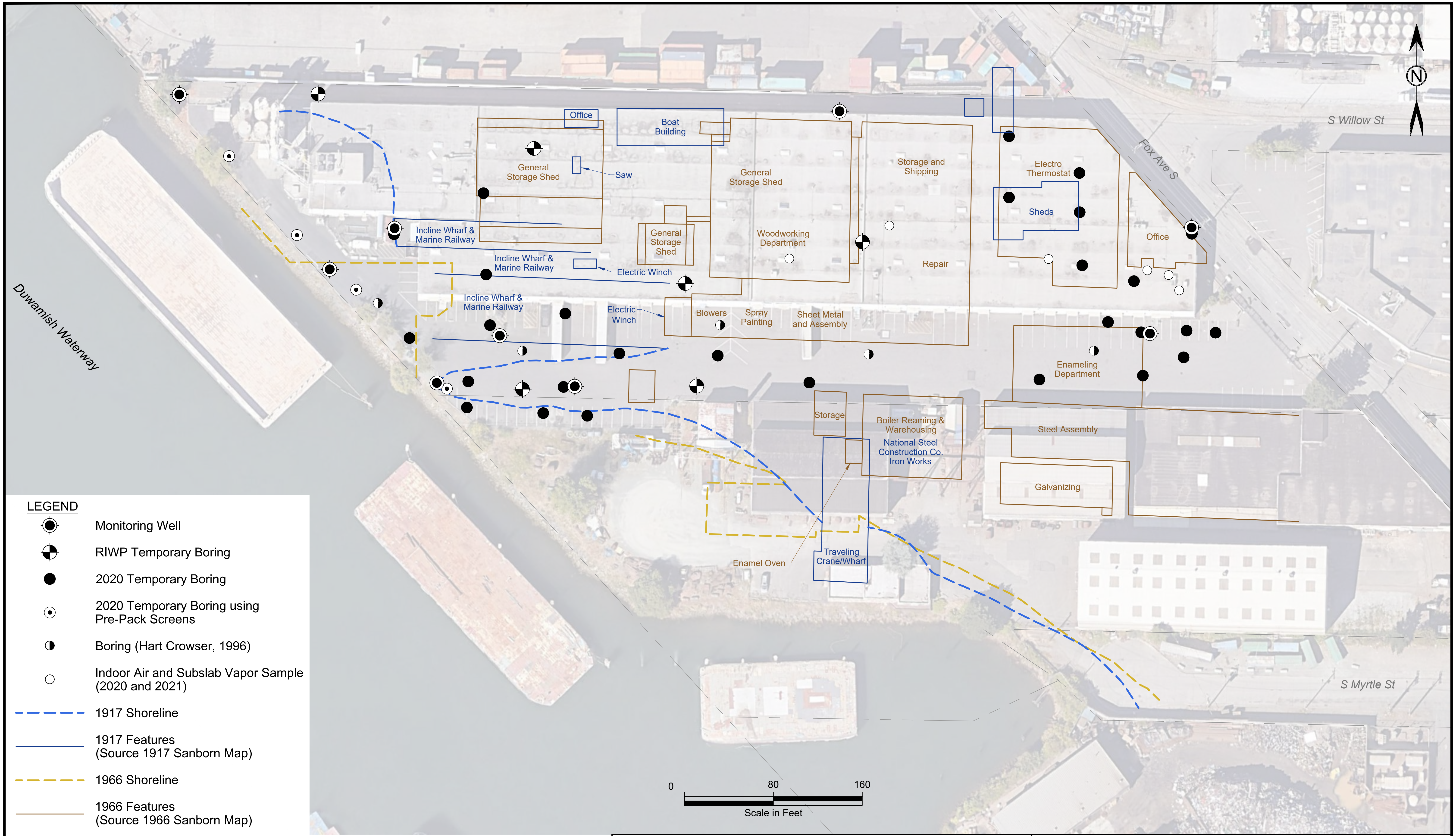
Figure 2E
Historical Aerial Photographs
Parcel Number 000180-0113



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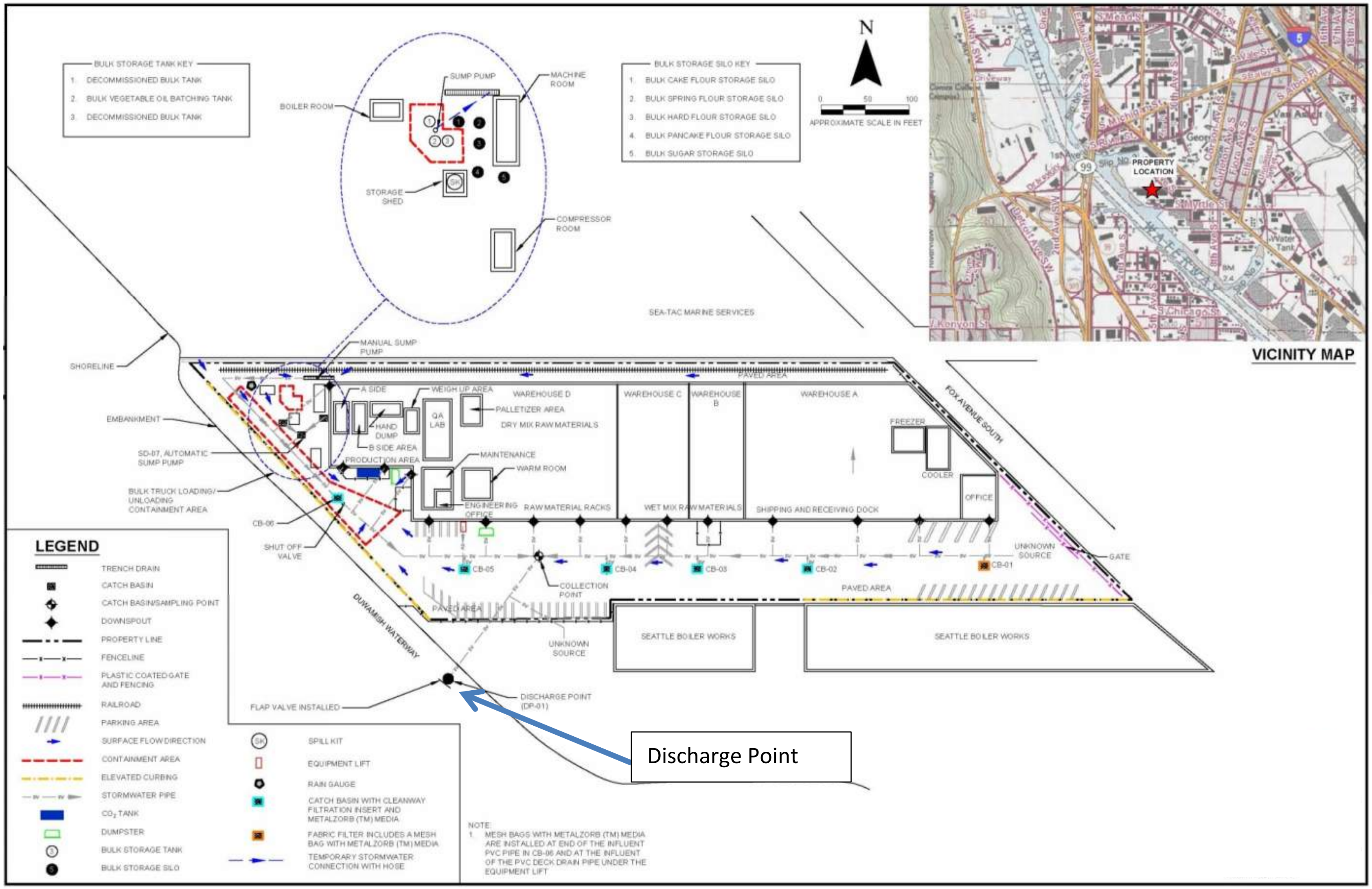
Bridge Point Seattle 130, LLC
1/22/2024

Figure 3
Site Historical Features



Source of Figure –Stormwater Treatment Engineering Design Report. Perpared by Clear Water Services and Landau Assoicates, Inc. May 2021.

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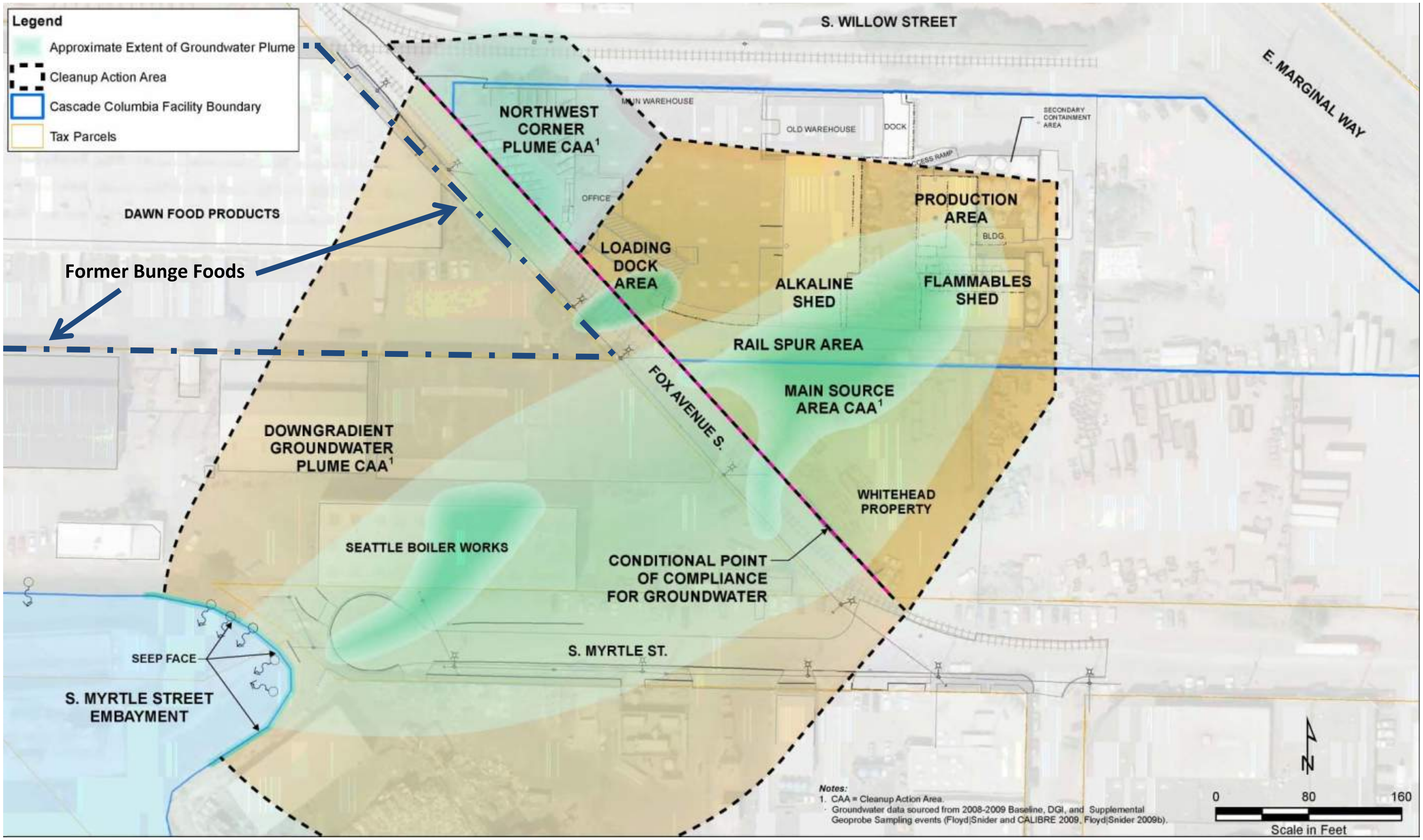
Figure 4
Stormwater Facility Site Map



Notes:
1. CAA = Cleanup Action Area.
· Groundwater data sourced from 2008-2009 Baseline, DGI, and Supplemental Geoprobe Sampling events (Floyd|Snider and CALIBRE 2009, Floyd|Snider 2009b).

Source of Figure: Floyd Snider, 2012. Cleanup Action Plan. Figure 2.3 Cleanup Action Areas.

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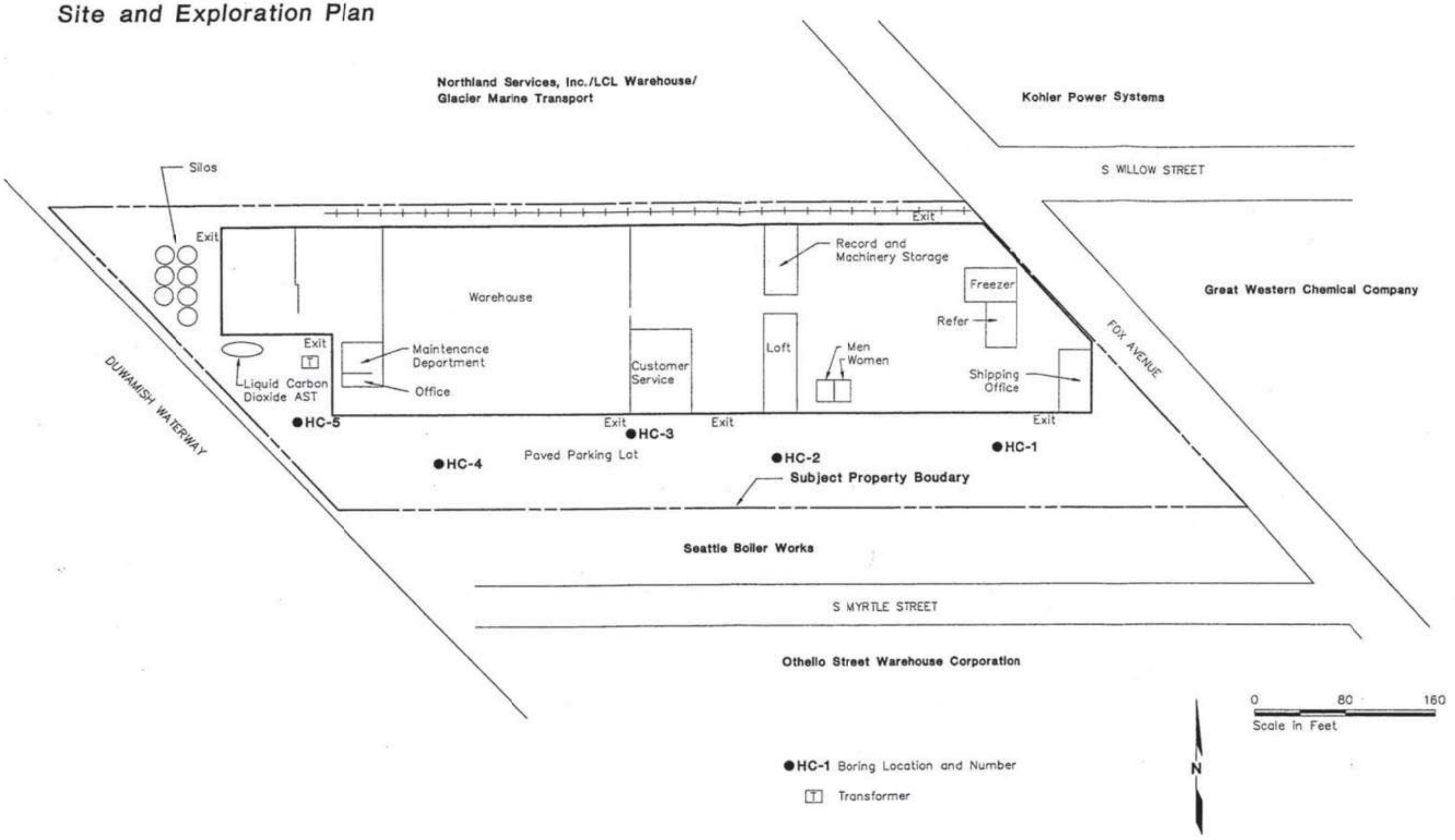
Figure 5
Upgradient Groundwater Plume

Site and Exploration Plan



Source: Figure 2 from Limited Subsurface Investigation Fox Avenue property, 6901 Fox Avenue, Seattle, Washington. Prepared by Hart Crowser, November 12, 1996.

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Figure 6
1996 Soil and Groundwater Sample Locations

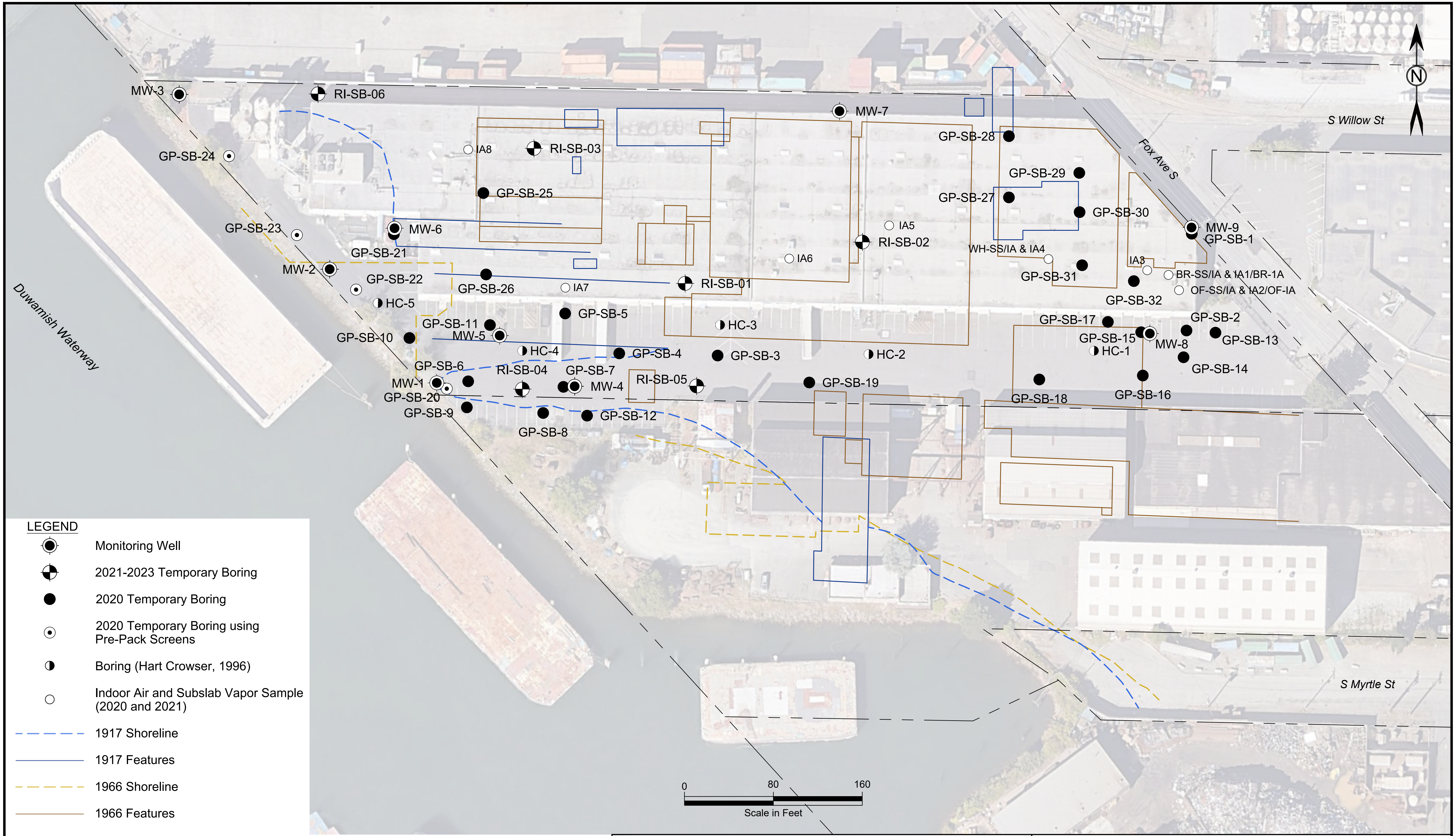

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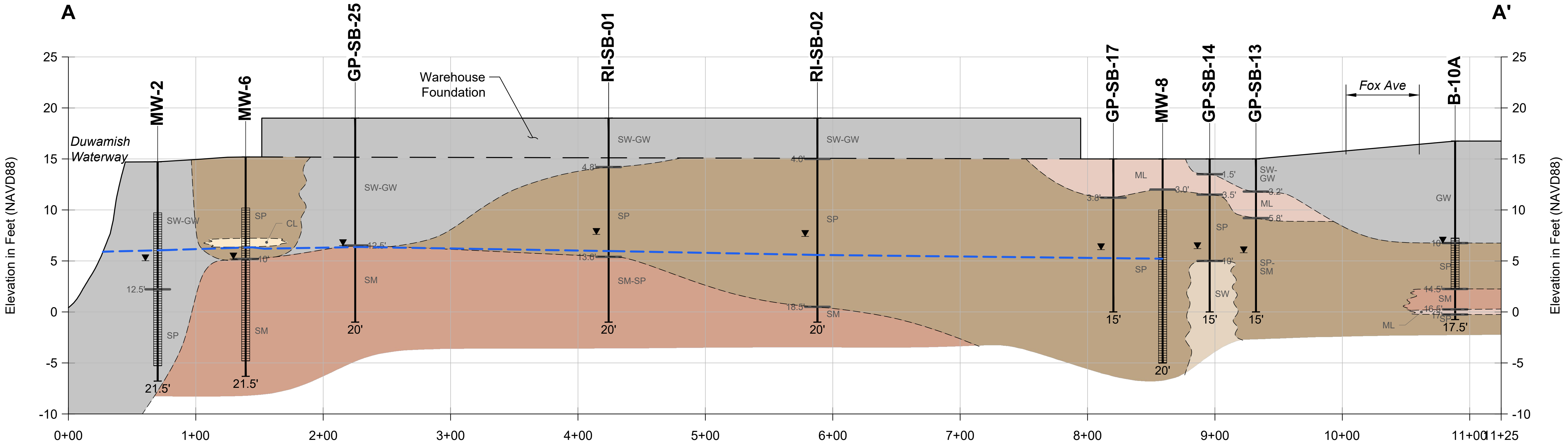
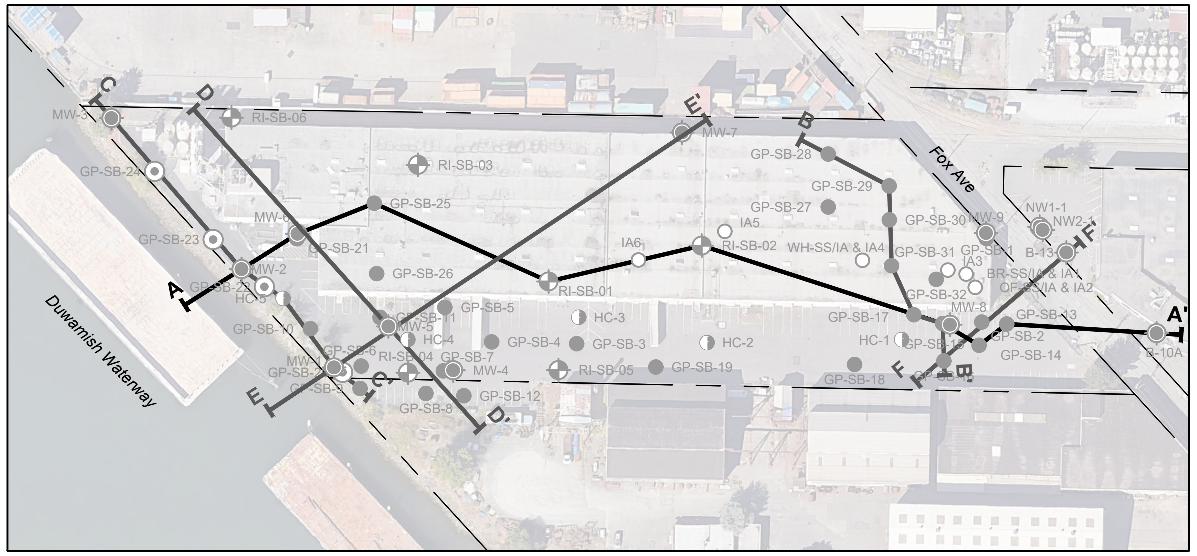
Figure 7
Previous Investigation Locations





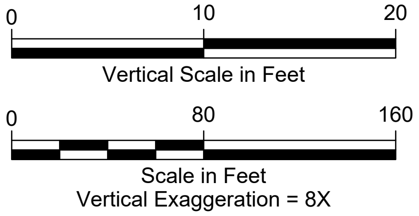
KEY MAP

LEGEND

B-1	Exploration Designation
2'	Noted Lithologic Contact Depth Below Ground Surface (in Feet)
SM	Unified Soil Classification System
▼	Water Level Observed at Time of Drilling
— — —	Approximate Distinct Lithologic Contact
- - -	Approximate Groundwater Surface
▥	Screen Interval
15'	Depth of Exploration (in Feet)

LITHOLOGY LEGEND

▨	GW, SW-GW, SW (FILL) - Gravelly Sand or Sand with Gravel, Sometimes with Concrete Rubble, Occasional Wood Debris
▨	SW - SAND - Variable Fine to Fine to Coarse-Grained, often with Gravel or Concrete Rubble, Sometimes Wood
▨	SP - SAND - Variable Fine to Fine to Coarse-Grained, Sometimes Wood/Roots
▨	SM - SILTY SAND, Variable Fine to Fine to Coarse-Grained, Sometimes Wood/Roots, Occasional Clay Seams
▨	ML - SILT or SANDY SILT, often with very fine to fine grained sand
▨	CL - SANDY CLAY, SILTY CLAY



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NOTE
Ground surface elevations based on monitoring well survey data and warehouse as-built drawings. Bathymetric data from GIS data for LDW FS posted to LDWG website (https://ldwg.org/project-library/).

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Bridge Point Seattle 130, LLC
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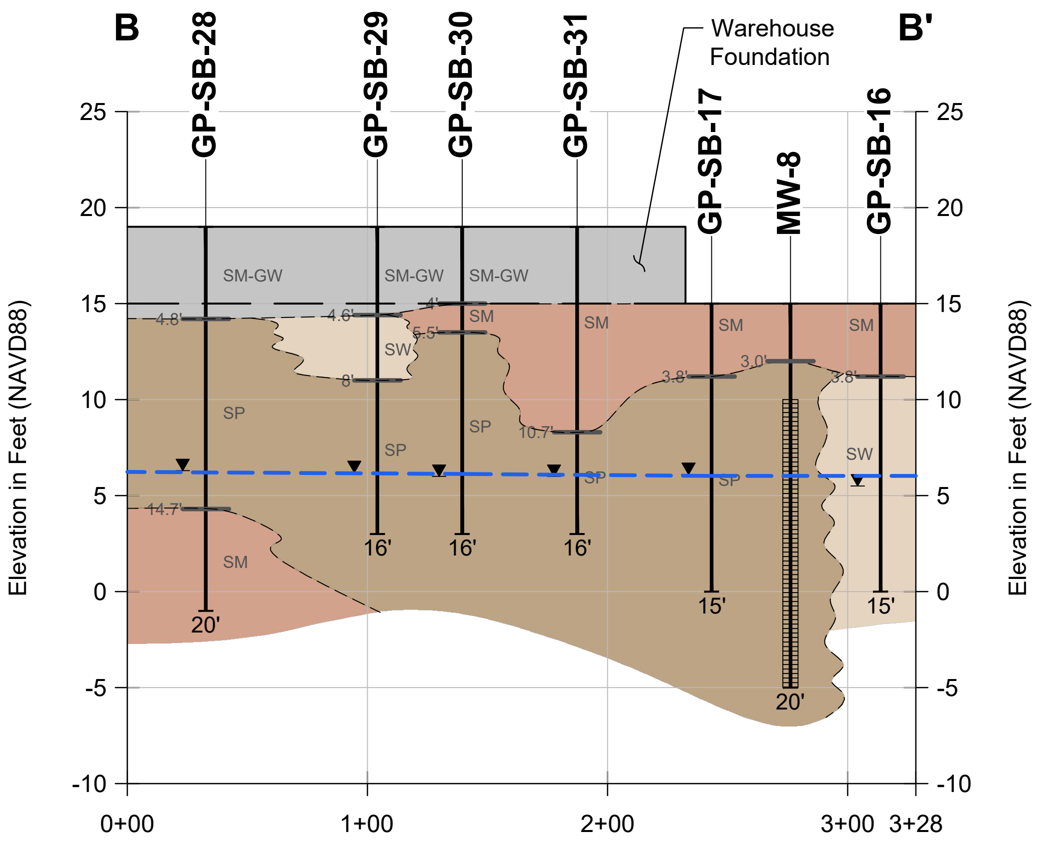
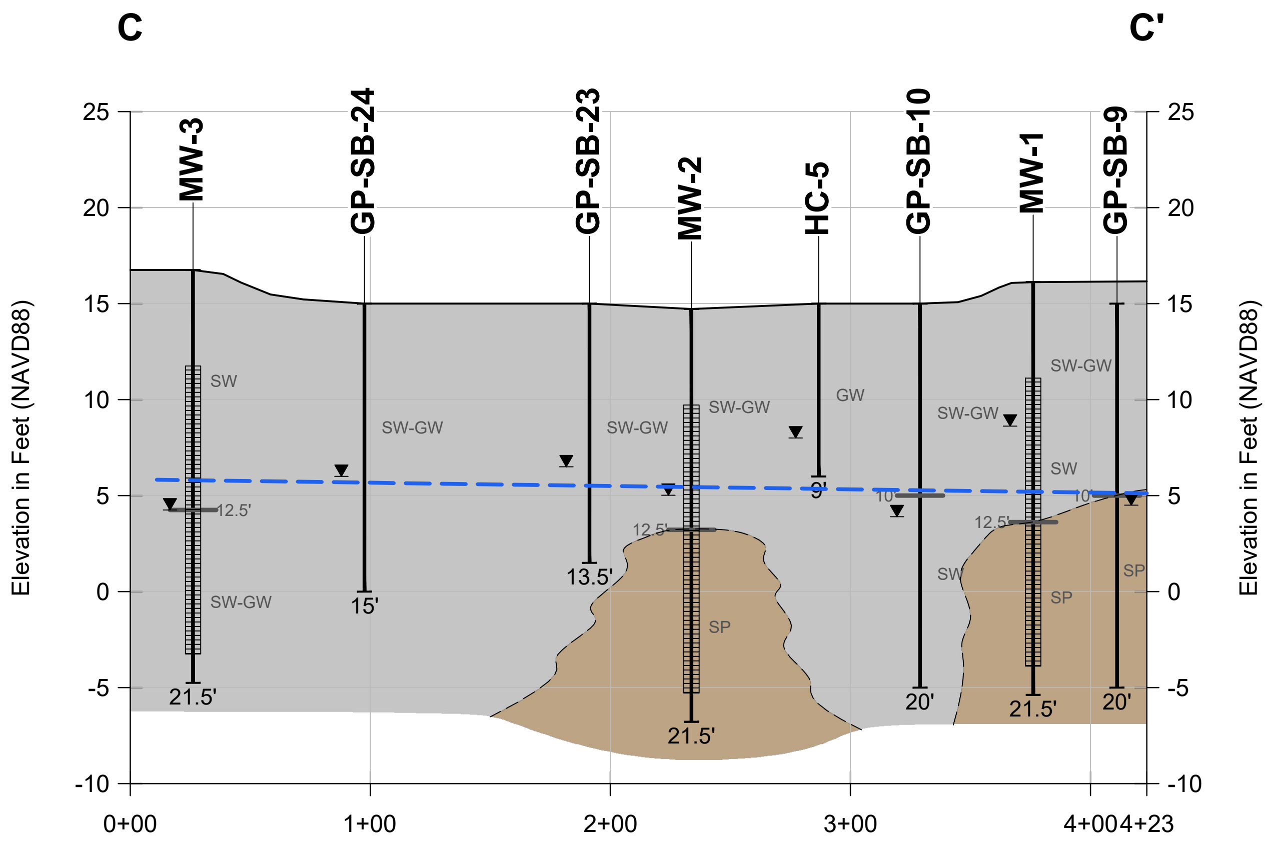
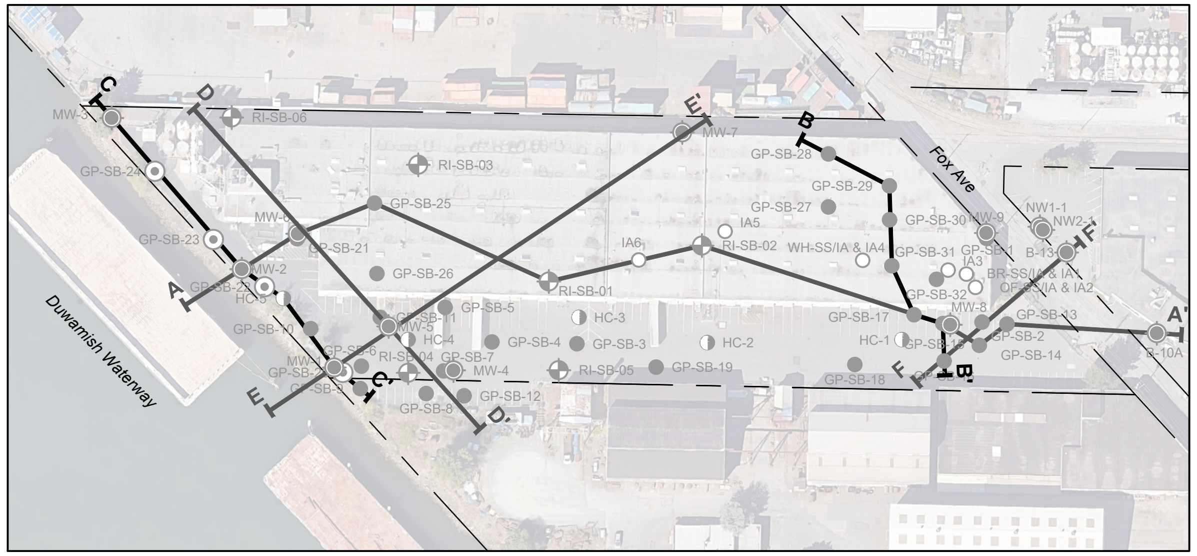
Figure 8
Cross Section A-A'







KEY MAP

LEGEND

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2'	Noted Lithologic Contact Depth Below Ground Surface (in Feet)
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– – –	Approximate Distinct Lithologic Contact
– – –	Approximate Groundwater Surface
▥	Screen Interval
15'	Depth of Exploration (in Feet)

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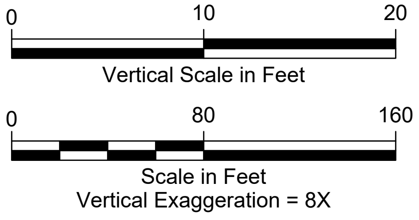
▨	CL - SANDY CLAY, SILTY CLAY



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NOTE
Ground surface elevations based on monitoring well survey data and warehouse as-built drawings. Bathymetric data from GIS data for LDW FS posted to LDWG website (https://ldwg.org/project-library/).

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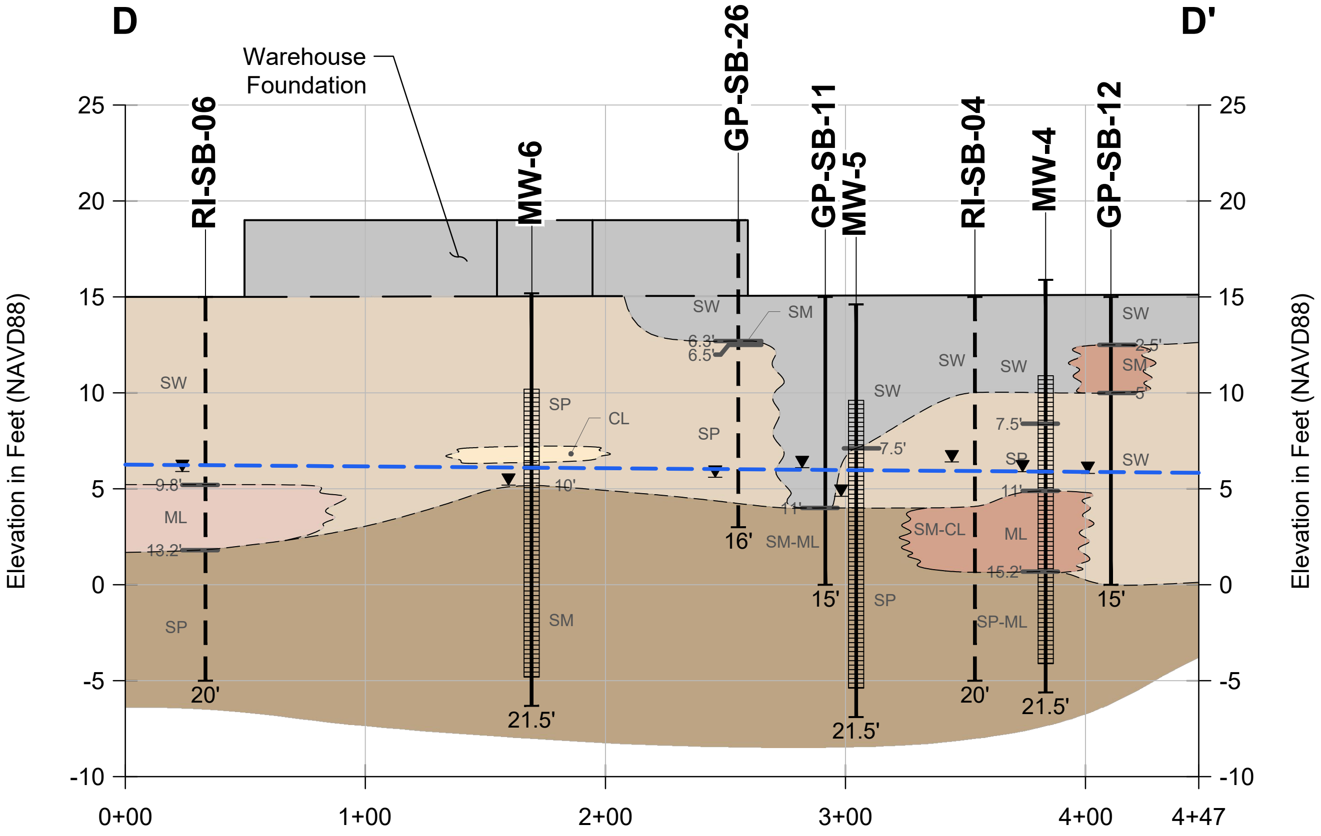
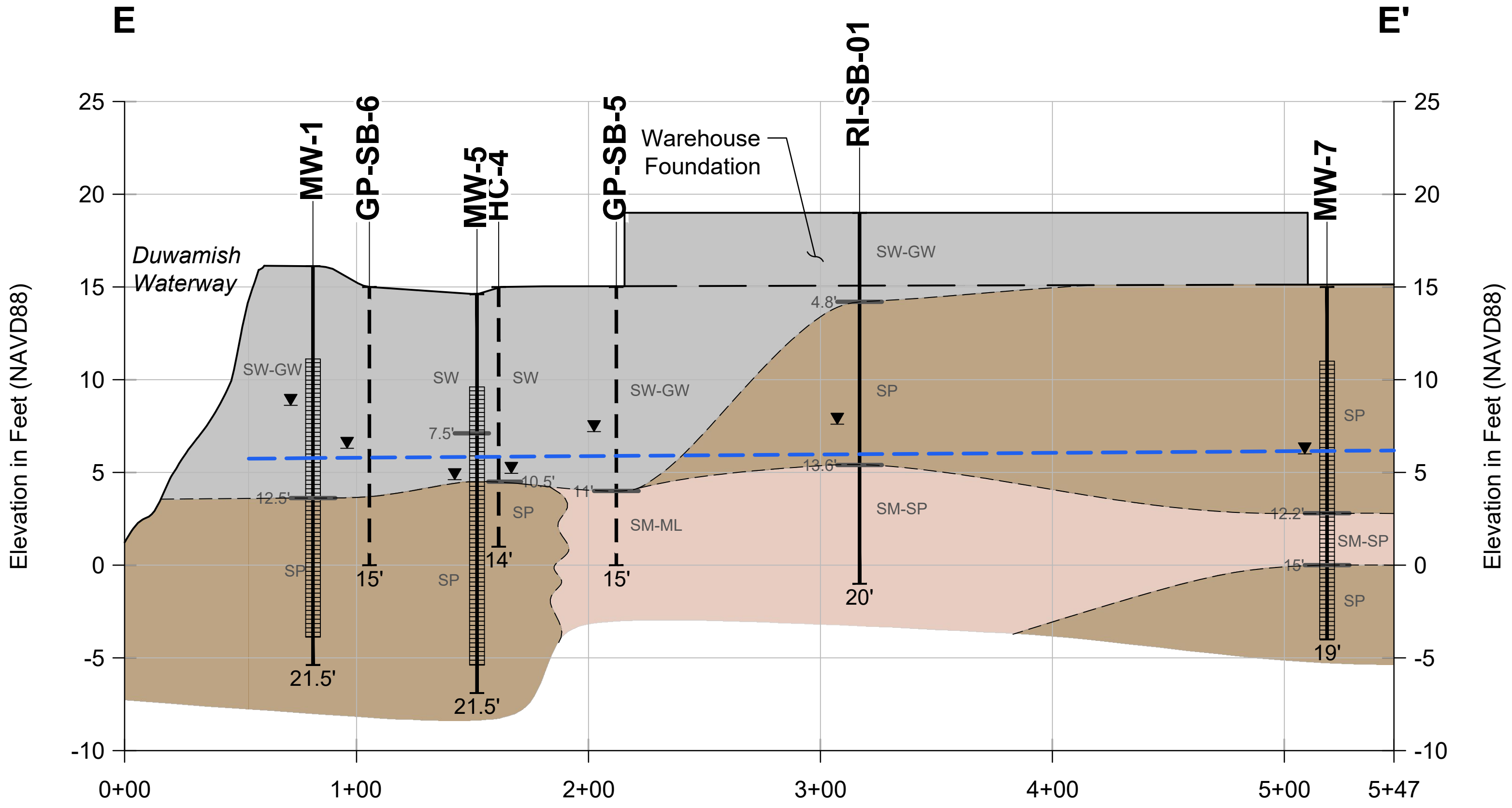
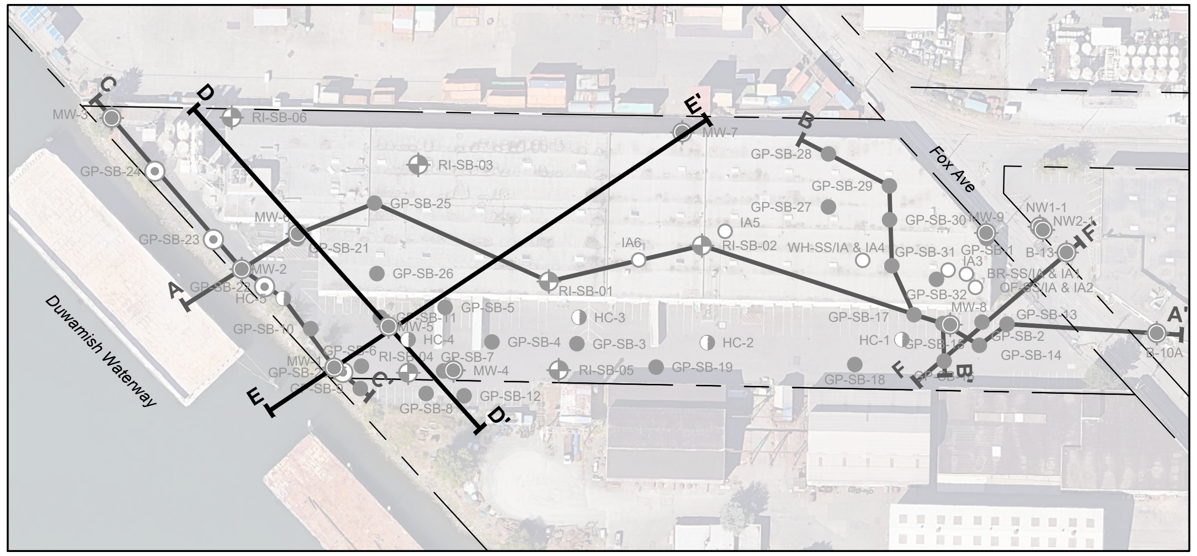
Bridge Point Seattle 130, LLC
1/22/2024

Figure 9
Cross Sections B-B' and C-C'







KEY MAP

LEGEND

B-1	Exploration Designation
2'	Noted Lithologic Contact Depth Below Ground Surface (in Feet)
SM	Unified Soil Classification System
▼	Water Level Observed at Time of Drilling
– – –	Approximate Distinct Lithologic Contact
– – –	Approximate Groundwater Surface
▥	Screen Interval
15'	Depth of Exploration (in Feet)

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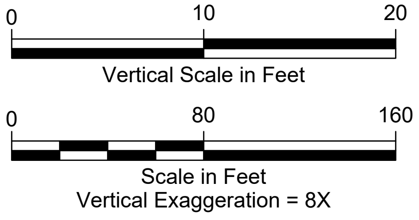
▨	CL - SANDY CLAY, SILTY CLAY



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NOTE
Ground surface elevations based on monitoring well survey data and warehouse as-built drawings. Bathymetric data from GIS data for LDW FS posted to LDWG website (https://ldwg.org/project-library/).

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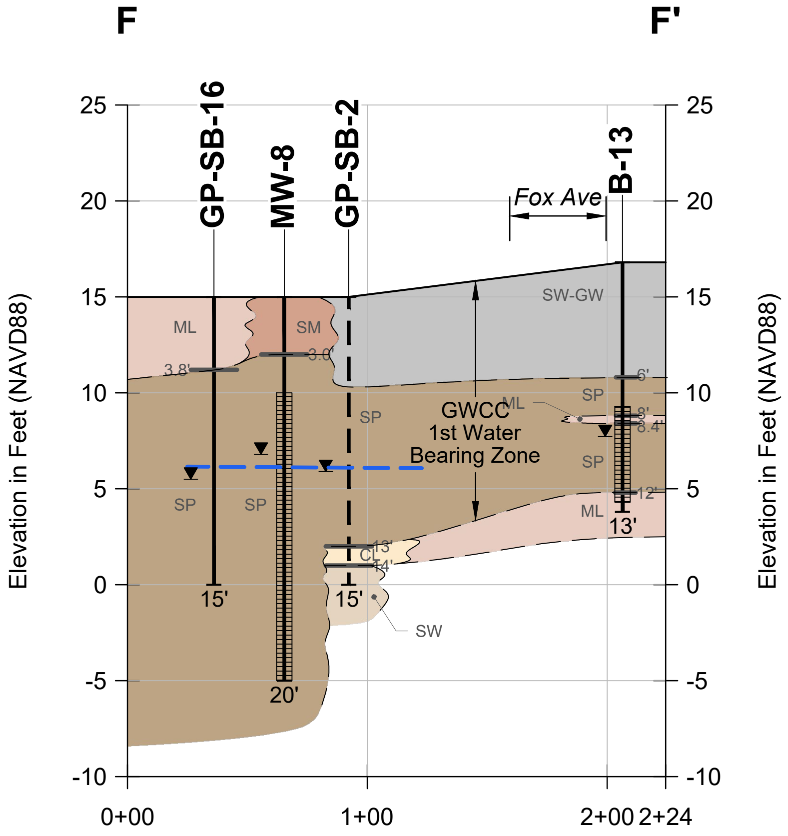
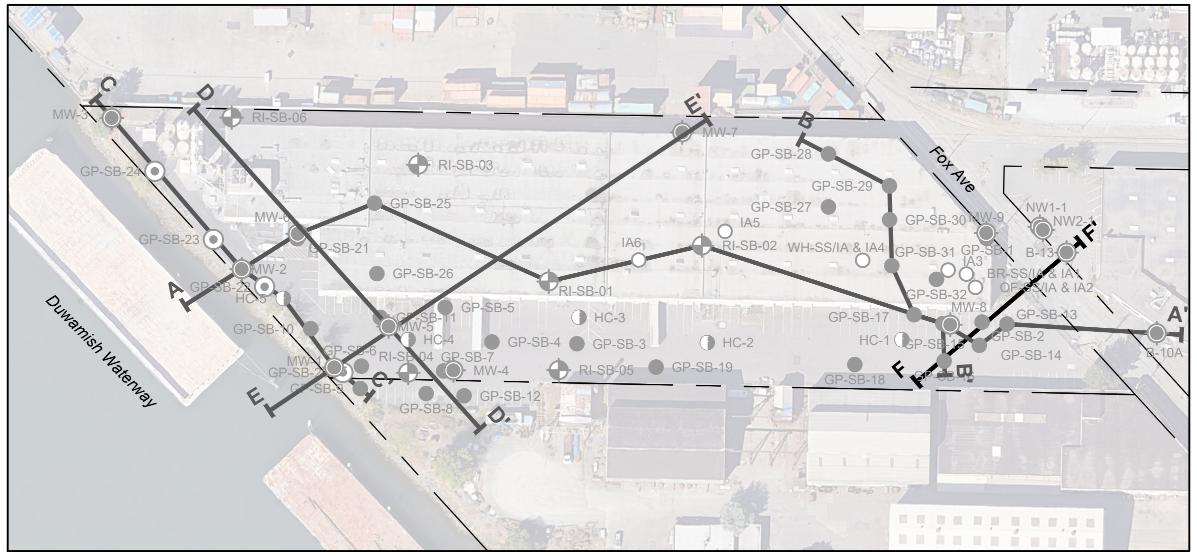
Figure 10
Cross Sections D-D' and E-E'





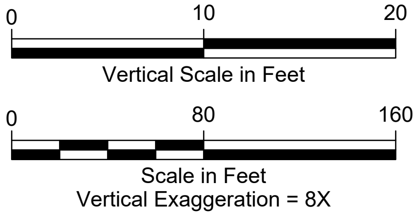
KEY MAP

LEGEND

B-1	Exploration Designation
2'	Noted Lithologic Contact Depth Below Ground Surface (in Feet)
SM	Unified Soil Classification System
▼	Water Level Observed at Time of Drilling
- - -	Approximate Distinct Lithologic Contact
— —	Approximate Groundwater Surface
▥	Screen Interval
15'	Depth of Exploration (in Feet)

LITHOLOGY LEGEND

▨	GW, SW-GW, SW (FILL) - Gravelly Sand or Sand with Gravel, Sometimes with Concrete Rubble, Occasional Wood Debris
▨	SW - SAND - Variable Fine to Fine to Coarse-Grained, often with Gravel or Concrete Rubble, Sometimes Wood
▨	SP - SAND - Variable Fine to Fine to Coarse-Grained, Sometimes Wood/Roots
▨	SM - SILTY SAND, Variable Fine to Fine to Coarse-Grained, Sometimes Wood/Roots, Occasional Clay Seams
▨	ML - SILT or SANDY SILT, often with very fine to fine grained sand
▨	CL - SANDY CLAY, SILTY CLAY



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NOTE
Ground surface elevations based on monitoring well survey data and warehouse as-built drawings. Bathymetric data from GIS data for LDW FS posted to LDWG website (https://ldwg.org/project-library/).

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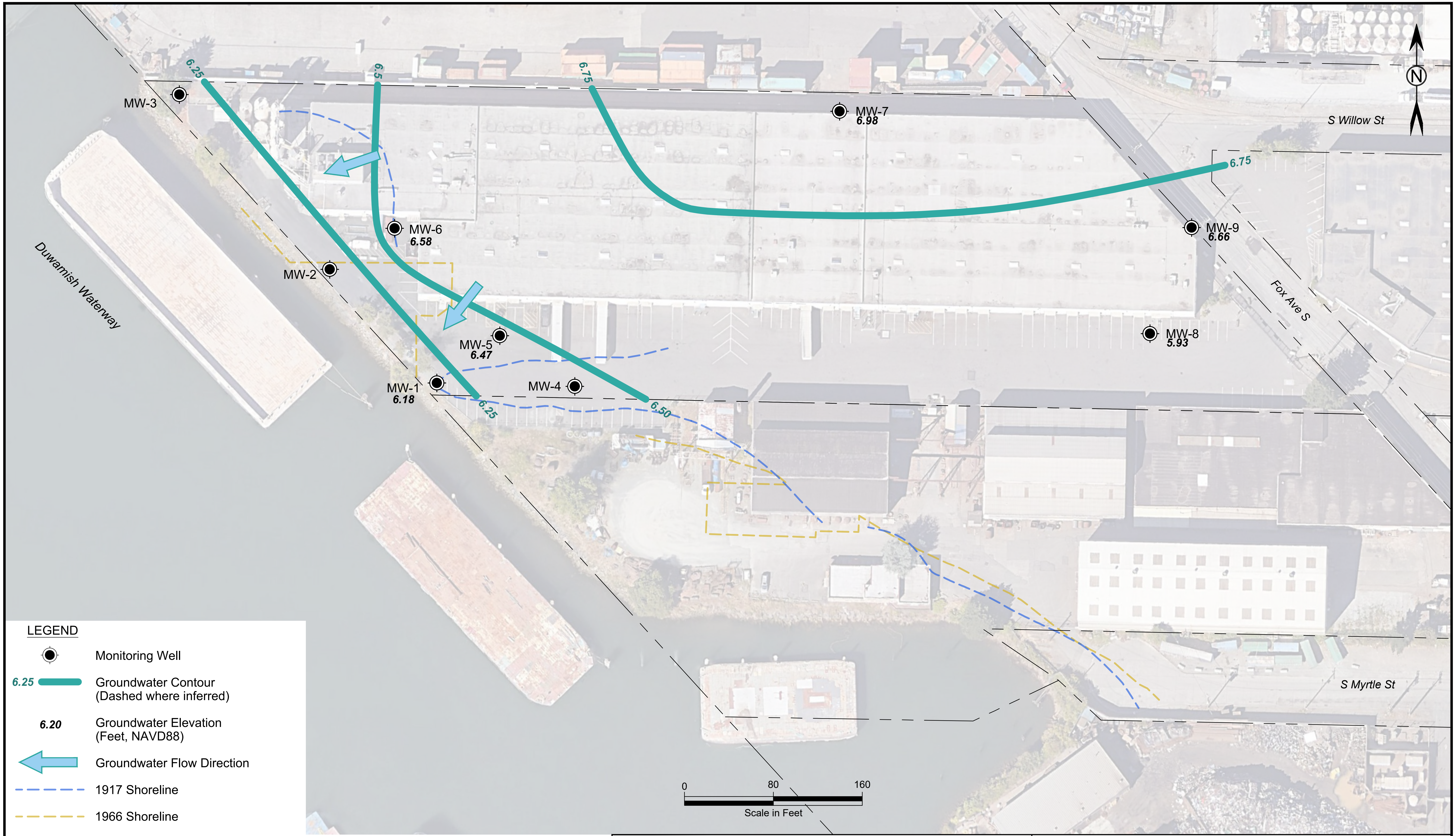
1/22/2024

Figure 11
Cross Section F-F'



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NOTE
MW-1, MW-5, and MW-6 groundwater elevations averaged using Serfes (1991) method from 1/6/2022 00:00 to 1/8/2022 23:50. Elevations for MW-7, MW-8, and MW-9 from 3/25/2023 to 3/28/2023 gauging.

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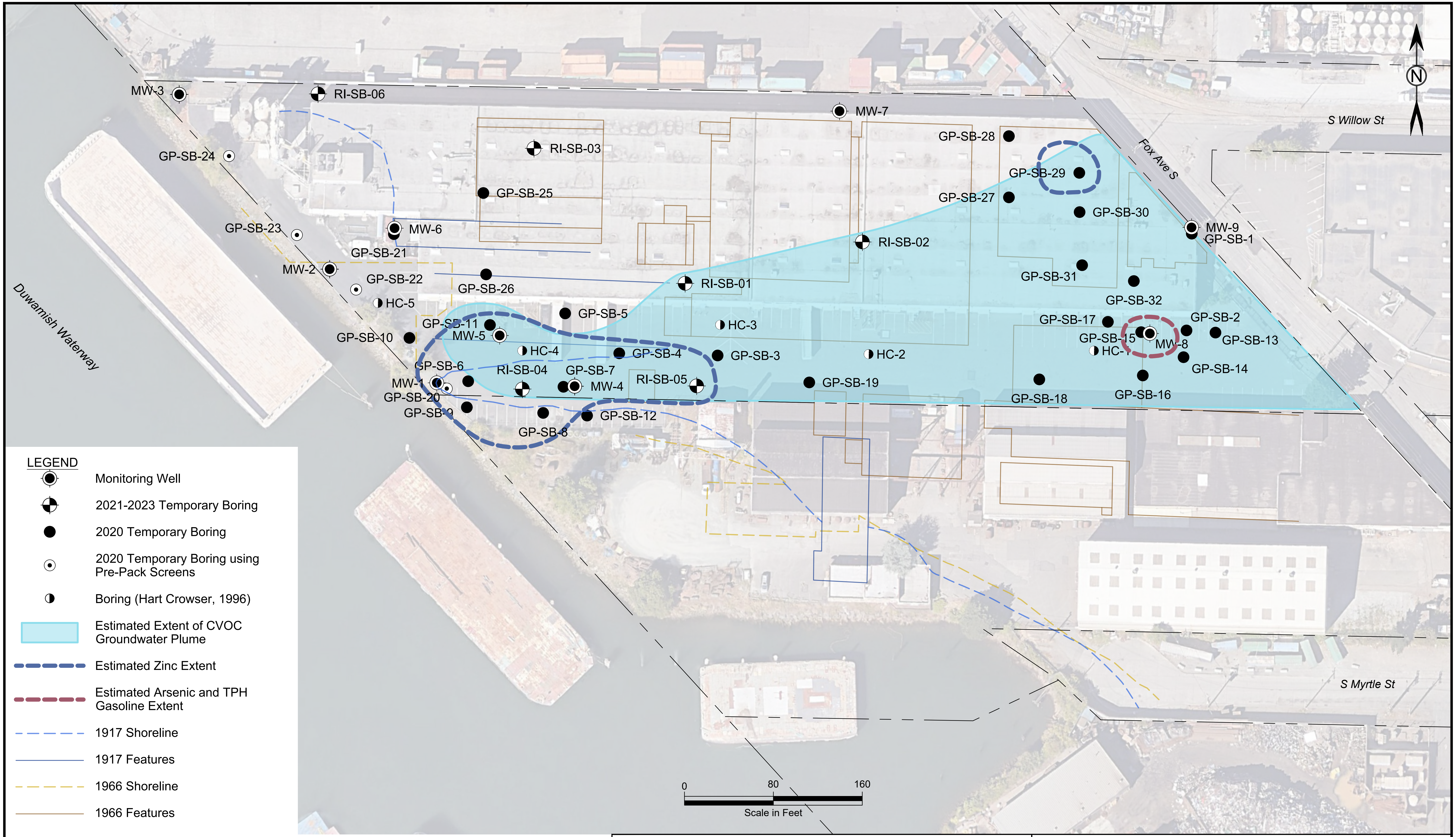
Figure 12
Groundwater Flow Map



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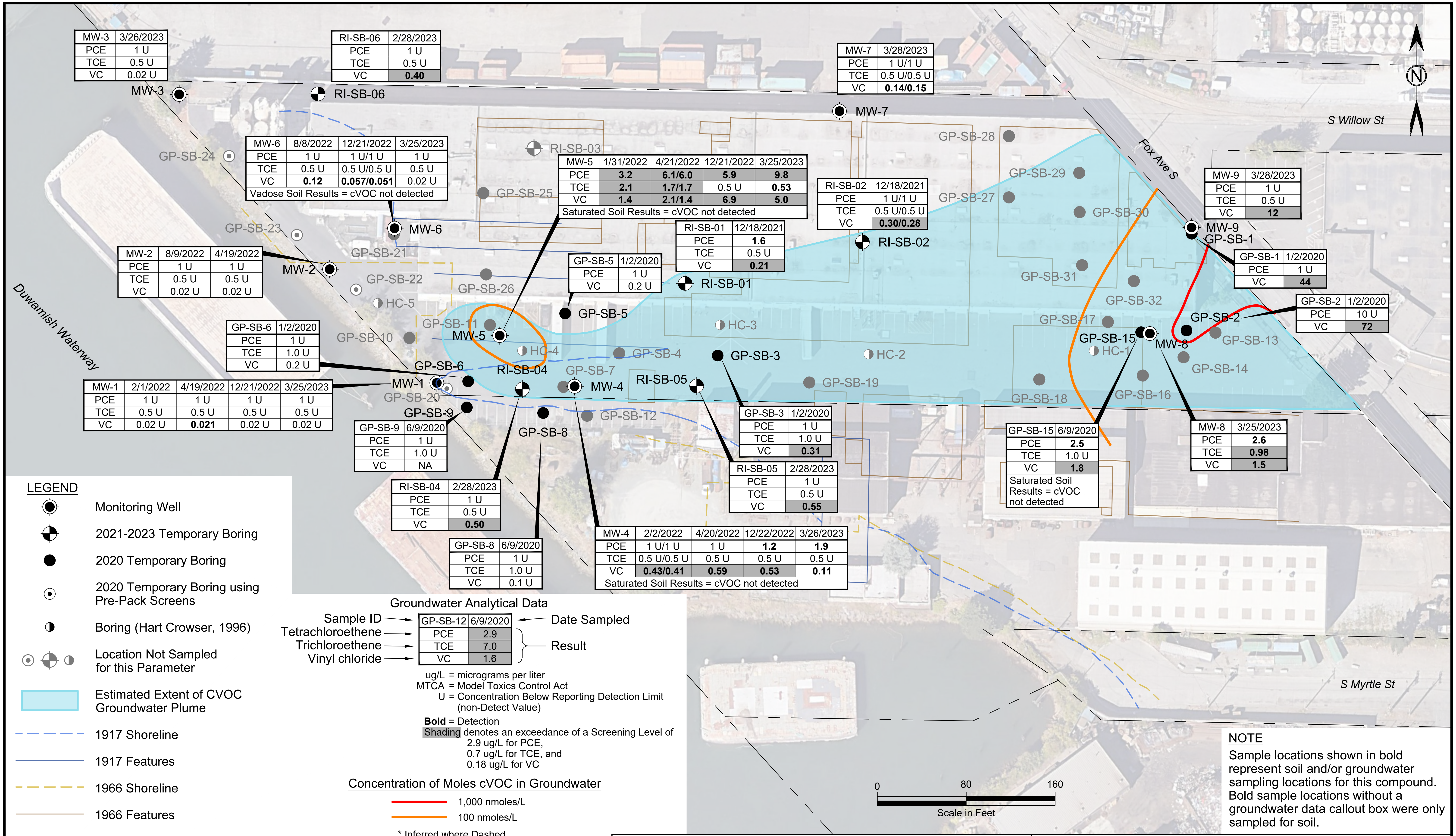
Former Dawn Foods Site
Bridge Point Seattle 130, LLC
1/22/2024

Figure 13
Estimated Extent of Groundwater Exceeding Screening Levels - Monitoring Wells



MW-3	3/26/2023
PCE	1 U
TCE	0.5 U
VC	0.02 U

RI-SB-06	2/28/2023
PCE	1 U
TCE	0.5 U
VC	**0.40**

MW-7	3/28/2023
PCE	1 U/1 U
TCE	0.5 U/0.5 U
VC	**0.14/0.15**

MW-6	8/8/2022	12/21/2022	3/25/2023
PCE	1 U	1 U/1 U	1 U
TCE	0.5 U	0.5 U/0.5 U	0.5 U
VC	**0.12**	**0.057/0.051**	0.02 U
Vadose Soil Results = cVOC not detected			

MW-5	1/31/2022	4/21/2022	12/21/2022	3/25/2023
PCE	**3.2**	**6.1/6.0**	**5.9**	**9.8**
TCE	**2.1**	**1.7/1.7**	0.5 U	**0.53**
VC	**1.4**	**2.1/1.4**	**6.9**	**5.0**
Saturated Soil Results = cVOC not detected				

RI-SB-02	12/18/2021
PCE	1 U/1 U
TCE	0.5 U/0.5 U
VC	**0.30/0.28**

MW-9	3/28/2023
PCE	1 U
TCE	0.5 U
VC	**12**

RI-SB-01	12/18/2021
PCE	**1.6**
TCE	0.5 U
VC	**0.21**

MW-2	8/9/2022	4/19/2022
PCE	1 U	1 U
TCE	0.5 U	0.5 U
VC	0.02 U	0.02 U

GP-SB-5	1/2/2020
PCE	1 U
VC	0.2 U

GP-SB-1	1/2/2020
PCE	1 U
VC	**44**

GP-SB-2	1/2/2020
PCE	10 U
VC	**72**

GP-SB-6	1/2/2020
PCE	1 U
TCE	1.0 U
VC	0.2 U

MW-1	2/1/2022	4/19/2022	12/21/2022	3/25/2023
PCE	1 U	1 U	1 U	1 U
TCE	0.5 U	0.5 U	0.5 U	0.5 U
VC	0.02 U	**0.021**	0.02 U	0.02 U

GP-SB-3	1/2/2020
PCE	1 U
TCE	1.0 U
VC	**0.31**

GP-SB-9	6/9/2020
PCE	1 U
TCE	1.0 U
VC	NA

GP-SB-15	6/9/2020
PCE	**2.5**
TCE	1.0 U
VC	**1.8**
Saturated Soil Results = cVOC not detected	

MW-8	3/25/2023
PCE	**2.6**
TCE	**0.98**
VC	**1.5**

RI-SB-05	2/28/2023
PCE	1 U
TCE	0.5 U
VC	**0.55**

RI-SB-04	2/28/2023
PCE	1 U
TCE	0.5 U
VC	**0.50**

GP-SB-8	6/9/2020
PCE	1 U
TCE	1.0 U
VC	0.1 U

MW-4	2/2/2022	4/20/2022	12/22/2022	3/26/2023
PCE	1 U/1 U	1 U	**1.2**	**1.9**
TCE	0.5 U/0.5 U	0.5 U	0.5 U	0.5 U
VC	**0.43/0.41**	**0.59**	**0.53**	**0.11**
Saturated Soil Results = cVOC not detected				

LEGEND

⊙	Monitoring Well
◕	2021-2023 Temporary Boring
●	2020 Temporary Boring
⊙	2020 Temporary Boring using Pre-Pack Screens
◑	Boring (Hart Crowser, 1996)
⊙ ◕ ◑	Location Not Sampled for this Parameter
🟦	Estimated Extent of CVOC Groundwater Plume
– – –	1917 Shoreline
——	1917 Features
– – –	1966 Shoreline
——	1966 Features

Groundwater Analytical Data

Sample ID → GP-SB-12 | 6/9/2020 ← Date Sampled

GP-SB-12	6/9/2020	
Tetrachloroethene → PCE	2.9	Result
Trichloroethene → TCE	7.0	
Vinyl chloride → VC	1.6	

ug/L = micrograms per liter
MTCA = Model Toxics Control Act
U = Concentration Below Reporting Detection Limit (non-Detect Value)

Bold = Detection
Shading denotes an exceedance of a Screening Level of
2.9 ug/L for PCE,
0.7 ug/L for TCE, and
0.18 ug/L for VC

Concentration of Moles cVOC in Groundwater

——	1,000 nmoles/L
——	100 nmoles/L

* Inferred where Dashed
nmoles/L = nanomoles per liter

NOTE

Sample locations shown in bold represent soil and/or groundwater sampling locations for this compound. Bold sample locations without a groundwater data callout box were only sampled for soil.

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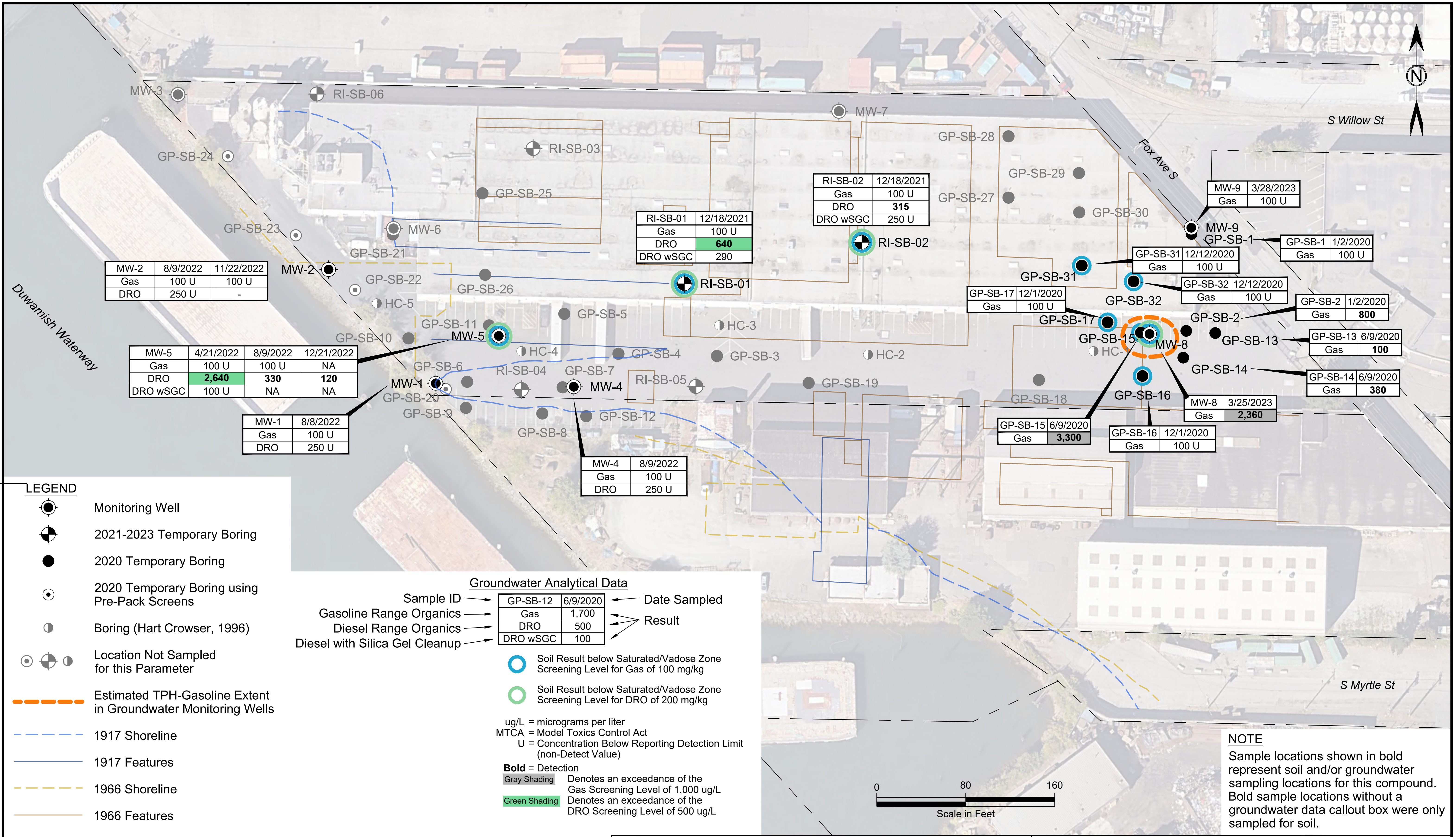
Bridge Point Seattle 130, LLC
1/22/2024

Figure 14
Estimated Extent of VOCs
in Soil and Groundwater



LEGEND

◉	Monitoring Well
⊕	2021-2023 Temporary Boring
●	2020 Temporary Boring
⊙	2020 Temporary Boring using Pre-Pack Screens
◑	Boring (Hart Crowser, 1996)
⊙ ⊕ ◑	Location Not Sampled for this Parameter
🟧	Estimated TPH-Gasoline Extent in Groundwater Monitoring Wells
- - -	1917 Shoreline
—	1917 Features
- - -	1966 Shoreline
—	1966 Features

Groundwater Analytical Data

Sample ID → GP-SB-12 | 6/9/2020 ← Date Sampled

GP-SB-12	6/9/2020
Gas	1,700
DRO	500
DRO wSGC	100

Gasoline Range Organics → Gas
Diesel Range Organics → DRO
Diesel with Silica Gel Cleanup → DRO wSGC
Result

○	Soil Result below Saturated/Vadose Zone Screening Level for Gas of 100 mg/kg
○	Soil Result below Saturated/Vadose Zone Screening Level for DRO of 200 mg/kg

ug/L = micrograms per liter
MTCA = Model Toxics Control Act
U = Concentration Below Reporting Detection Limit (non-Detect Value)
Bold = Detection
Gray Shading Denotes an exceedance of the Gas Screening Level of 1,000 ug/L
Green Shading Denotes an exceedance of the DRO Screening Level of 500 ug/L

NOTE
Sample locations shown in bold represent soil and/or groundwater sampling locations for this compound. Bold sample locations without a groundwater data callout box were only sampled for soil.

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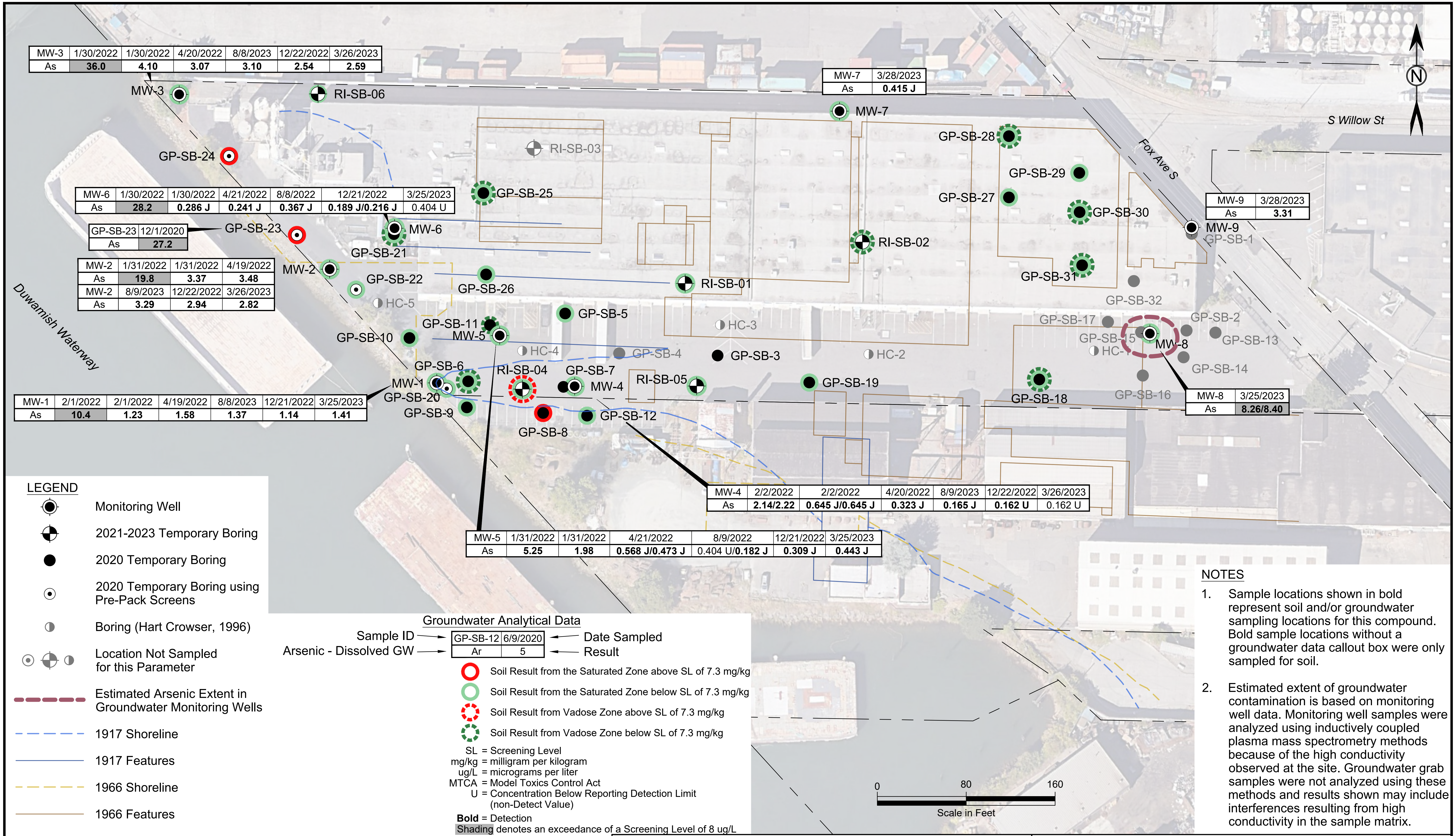
Former Dawn Foods Site
Bridge Point Seattle 130, LLC
1/22/2024

Figure 15
Estimated Extent of TPH
in Soil and Groundwater



MW-3	1/30/2022	1/30/2022	4/20/2022	8/8/2023	12/22/2022	3/26/2023
As	**36.0**	**4.10**	**3.07**	**3.10**	**2.54**	**2.59**

MW-7	3/28/2023
As	**0.415 J**

MW-6	1/30/2022	1/30/2022	4/21/2022	8/8/2022	12/21/2022	3/25/2023
As	**28.2**	**0.286 J**	**0.241 J**	**0.367 J**	**0.189 J/0.216 J**	0.404 U

MW-9	3/28/2023
As	**3.31**

GP-SB-23	12/1/2020
As	**27.2**

MW-2	1/31/2022	1/31/2022	4/19/2022
As	**19.8**	**3.37**	**3.48**
MW-2	8/9/2023	12/22/2022	3/26/2023
As	**3.29**	**2.94**	**2.82**

MW-1	2/1/2022	2/1/2022	4/19/2022	8/8/2023	12/21/2022	3/25/2023
As	**10.4**	**1.23**	**1.58**	**1.37**	**1.14**	**1.41**

MW-8	3/25/2023
As	**8.26/8.40**

MW-4	2/2/2022	2/2/2022	4/20/2022	8/9/2023	12/22/2022	3/26/2023
As	**2.14/2.22**	**0.645 J/0.645 J**	**0.323 J**	**0.165 J**	**0.162 U**	0.162 U

MW-5	1/31/2022	1/31/2022	4/21/2022	8/9/2022	12/21/2022	3/25/2023
As	**5.25**	**1.98**	**0.568 J/0.473 J**	0.404 U/**0.182 J**	**0.309 J**	**0.443 J**

LEGEND

⊙	Monitoring Well
⊕	2021-2023 Temporary Boring
●	2020 Temporary Boring
⊙	2020 Temporary Boring using Pre-Pack Screens
◑	Boring (Hart Crowser, 1996)
⊙ ⊕ ◑	Location Not Sampled for this Parameter
▬ ▬	Estimated Arsenic Extent in Groundwater Monitoring Wells
– –	1917 Shoreline
—	1917 Features
– –	1966 Shoreline
—	1966 Features

Groundwater Analytical Data

Sample ID →
Arsenic - Dissolved GW →

GP-SB-12	6/9/2020
Ar	5

← Date Sampled
← Result

○	Soil Result from the Saturated Zone above SL of 7.3 mg/kg
○	Soil Result from the Saturated Zone below SL of 7.3 mg/kg
◌	Soil Result from Vadose Zone above SL of 7.3 mg/kg
◌	Soil Result from Vadose Zone below SL of 7.3 mg/kg

SL = Screening Level
mg/kg = milligram per kilogram
ug/L = micrograms per liter
MTCA = Model Toxics Control Act
U = Concentration Below Reporting Detection Limit (non-Detect Value)

Bold = Detection
Shading denotes an exceedance of a Screening Level of 8 ug/L

NOTES

1. Sample locations shown in bold represent soil and/or groundwater sampling locations for this compound. Bold sample locations without a groundwater data callout box were only sampled for soil.
2. Estimated extent of groundwater contamination is based on monitoring well data. Monitoring well samples were analyzed using inductively coupled plasma mass spectrometry methods because of the high conductivity observed at the site. Groundwater grab samples were not analyzed using these methods and results shown may include interferences resulting from high conductivity in the sample matrix.

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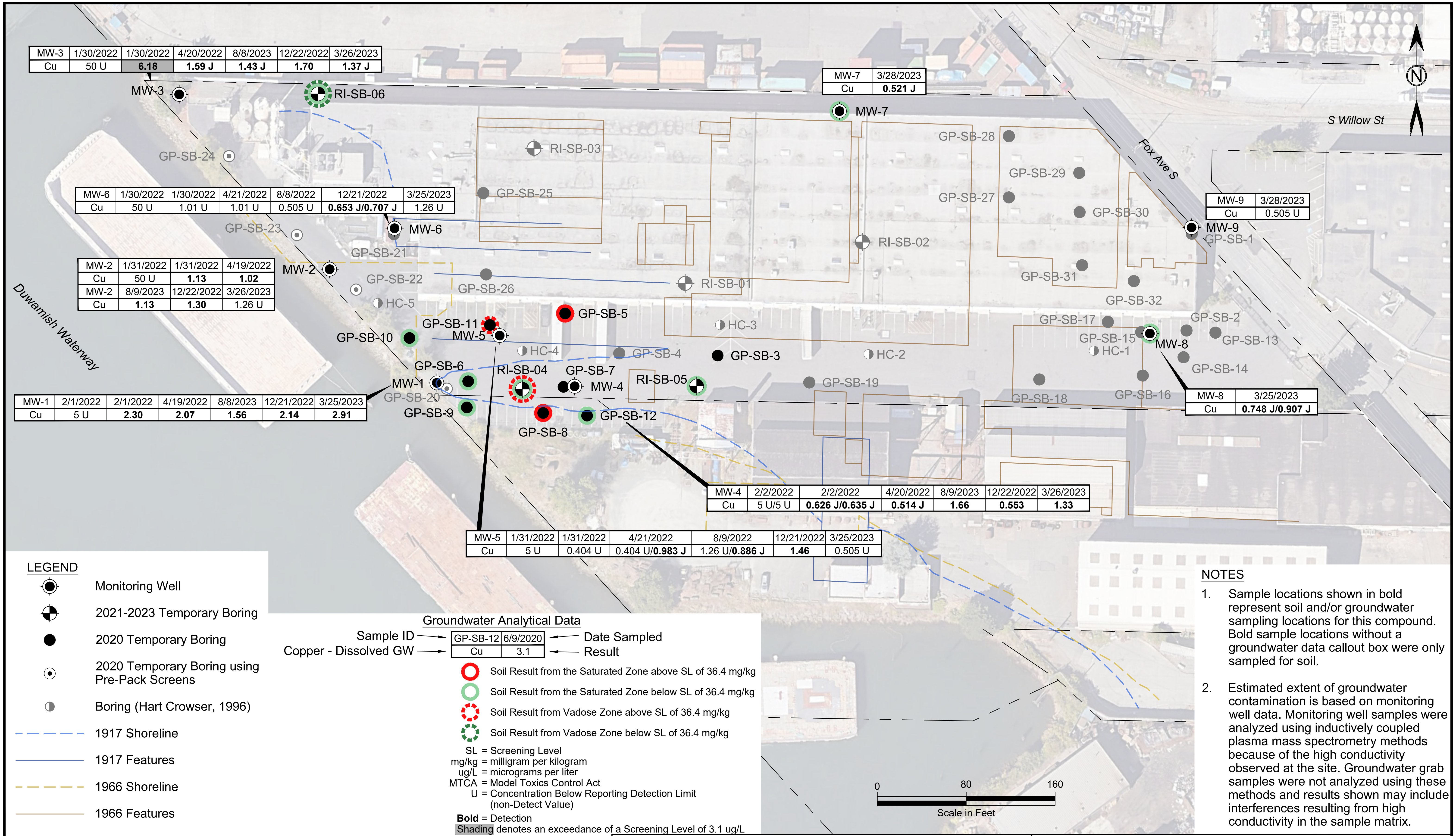
Former Dawn Foods Site
Bridge Point Seattle 130, LLC
1/22/2024

Figure 16
Estimated Extent of Arsenic in Soil and Groundwater



MW-3	1/30/2022	1/30/2022	4/20/2022	8/8/2023	12/22/2022	3/26/2023
Cu	50 U	**6.18**	**1.59 J**	**1.43 J**	**1.70**	**1.37 J**

MW-7	3/28/2023
Cu	**0.521 J**

MW-6	1/30/2022	1/30/2022	4/21/2022	8/8/2022	12/21/2022	3/25/2023
Cu	50 U	1.01 U	1.01 U	0.505 U	**0.653 J/0.707 J**	1.26 U

MW-9	3/28/2023
Cu	0.505 U

MW-2	1/31/2022	1/31/2022	4/19/2022
Cu	50 U	**1.13**	**1.02**
MW-2	8/9/2023	12/22/2022	3/26/2023
Cu	**1.13**	**1.30**	1.26 U

MW-1	2/1/2022	2/1/2022	4/19/2022	8/8/2023	12/21/2022	3/25/2023
Cu	5 U	**2.30**	**2.07**	**1.56**	**2.14**	**2.91**

MW-8	3/25/2023
Cu	**0.748 J/0.907 J**

MW-4	2/2/2022	2/2/2022	4/20/2022	8/9/2023	12/22/2022	3/26/2023
Cu	5 U/5 U	**0.626 J/0.635 J**	**0.514 J**	**1.66**	**0.553**	**1.33**

MW-5	1/31/2022	1/31/2022	4/21/2022	8/9/2022	12/21/2022	3/25/2023
Cu	5 U	0.404 U	0.404 U/**0.983 J**	1.26 U/**0.886 J**	**1.46**	0.505 U

LEGEND

⊕	Monitoring Well
⊕	2021-2023 Temporary Boring
●	2020 Temporary Boring
⊙	2020 Temporary Boring using Pre-Pack Screens
◑	Boring (Hart Crowser, 1996)
– – –	1917 Shoreline
———	1917 Features
– – –	1966 Shoreline
———	1966 Features

Groundwater Analytical Data

Sample ID → | GP-SB-12 | 6/9/2020 | ← Date Sampled

Copper - Dissolved GW → | Cu | 3.1 | ← Result

○	Soil Result from the Saturated Zone above SL of 36.4 mg/kg
○	Soil Result from the Saturated Zone below SL of 36.4 mg/kg
○	Soil Result from Vadose Zone above SL of 36.4 mg/kg
○	Soil Result from Vadose Zone below SL of 36.4 mg/kg

SL = Screening Level
mg/kg = milligram per kilogram
ug/L = micrograms per liter
MTCA = Model Toxics Control Act
U = Concentration Below Reporting Detection Limit (non-Detect Value)
Bold = Detection
Shading denotes an exceedance of a Screening Level of 3.1 ug/L

NOTES

1. Sample locations shown in bold represent soil and/or groundwater sampling locations for this compound. Bold sample locations without a groundwater data callout box were only sampled for soil.

2. Estimated extent of groundwater contamination is based on monitoring well data. Monitoring well samples were analyzed using inductively coupled plasma mass spectrometry methods because of the high conductivity observed at the site. Groundwater grab samples were not analyzed using these methods and results shown may include interferences resulting from high conductivity in the sample matrix.

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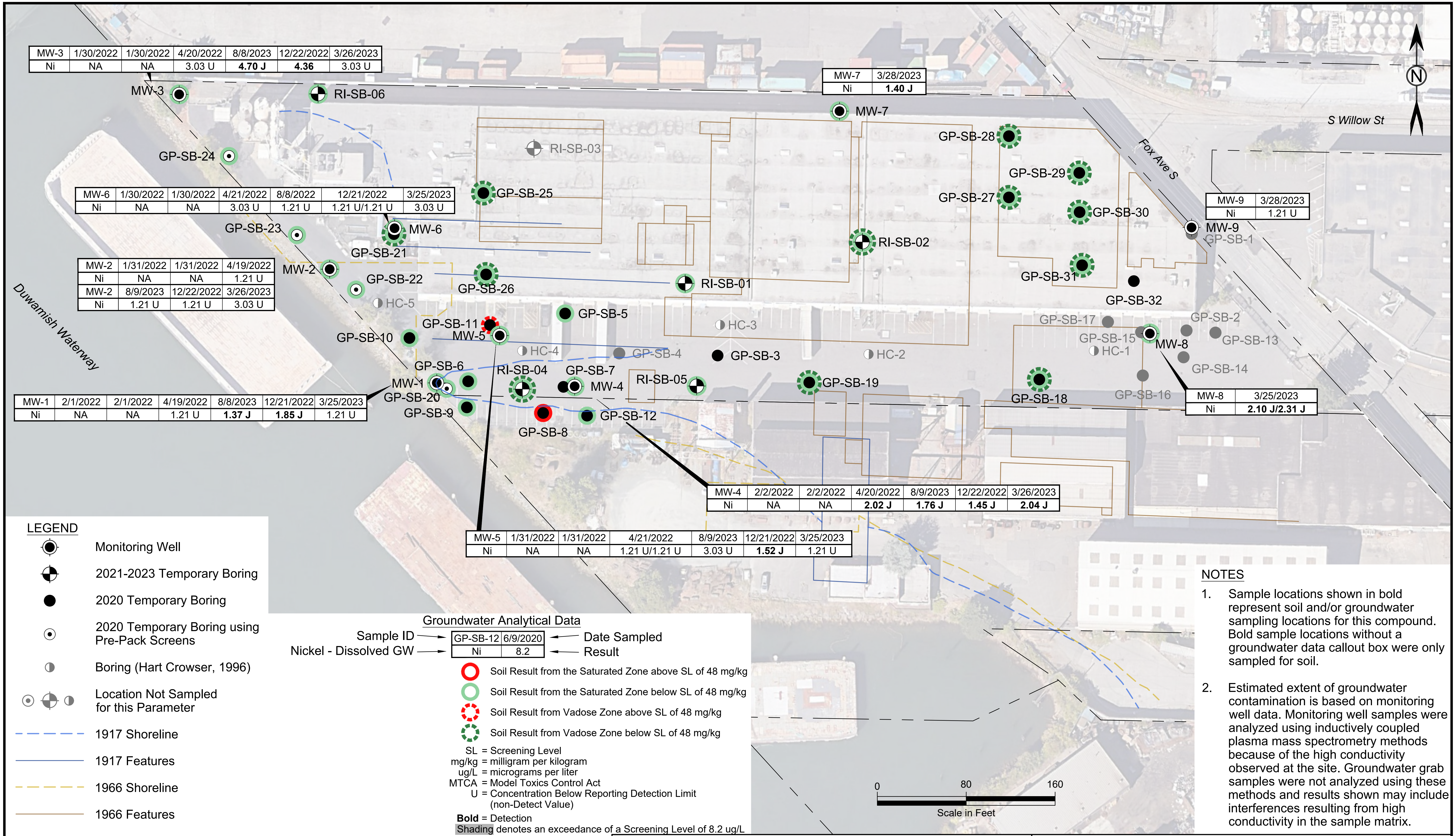
Former Dawn Foods Site
Bridge Point Seattle 130, LLC
1/22/2024

Figure 17
Estimated Extent of Copper
in Soil and Groundwater



MW-3	1/30/2022	1/30/2022	4/20/2022	8/8/2023	12/22/2022	3/26/2023
Ni	NA	NA	3.03 U	**4.70 J**	**4.36**	3.03 U

MW-7	3/28/2023
Ni	**1.40 J**

MW-6	1/30/2022	1/30/2022	4/21/2022	8/8/2022	12/21/2022	3/25/2023
Ni	NA	NA	3.03 U	1.21 U	1.21 U/1.21 U	3.03 U

MW-9	3/28/2023
Ni	1.21 U

MW-2	1/31/2022	1/31/2022	4/19/2022
Ni	NA	NA	1.21 U
MW-2	8/9/2023	12/22/2022	3/26/2023
Ni	1.21 U	1.21 U	3.03 U

MW-1	2/1/2022	2/1/2022	4/19/2022	8/8/2023	12/21/2022	3/25/2023
Ni	NA	NA	1.21 U	**1.37 J**	**1.85 J**	1.21 U

MW-8	3/25/2023
Ni	**2.10 J/2.31 J**

MW-4	2/2/2022	2/2/2022	4/20/2022	8/9/2023	12/22/2022	3/26/2023
Ni	NA	NA	**2.02 J**	**1.76 J**	**1.45 J**	**2.04 J**

MW-5	1/31/2022	1/31/2022	4/21/2022	8/9/2023	12/21/2022	3/25/2023
Ni	NA	NA	1.21 U/1.21 U	3.03 U	**1.52 J**	1.21 U

LEGEND

◉	Monitoring Well
⊕	2021-2023 Temporary Boring
●	2020 Temporary Boring
⊙	2020 Temporary Boring using Pre-Pack Screens
◑	Boring (Hart Crowser, 1996)
⊙ ⊕ ◑	Location Not Sampled for this Parameter
– – –	1917 Shoreline
———	1917 Features
– – –	1966 Shoreline
———	1966 Features

Groundwater Analytical Data

Sample ID → GP-SB-12 | 6/9/2020 ← Date Sampled
Nickel - Dissolved GW → Ni | 8.2 ← Result

○	Soil Result from the Saturated Zone above SL of 48 mg/kg
○	Soil Result from the Saturated Zone below SL of 48 mg/kg
◌	Soil Result from Vadose Zone above SL of 48 mg/kg
◌	Soil Result from Vadose Zone below SL of 48 mg/kg

SL = Screening Level
mg/kg = milligram per kilogram
ug/L = micrograms per liter
MTCA = Model Toxics Control Act
U = Concentration Below Reporting Detection Limit (non-Detect Value)
Bold = Detection
Shading denotes an exceedance of a Screening Level of 8.2 ug/L

NOTES

1. Sample locations shown in bold represent soil and/or groundwater sampling locations for this compound. Bold sample locations without a groundwater data callout box were only sampled for soil.
2. Estimated extent of groundwater contamination is based on monitoring well data. Monitoring well samples were analyzed using inductively coupled plasma mass spectrometry methods because of the high conductivity observed at the site. Groundwater grab samples were not analyzed using these methods and results shown may include interferences resulting from high conductivity in the sample matrix.

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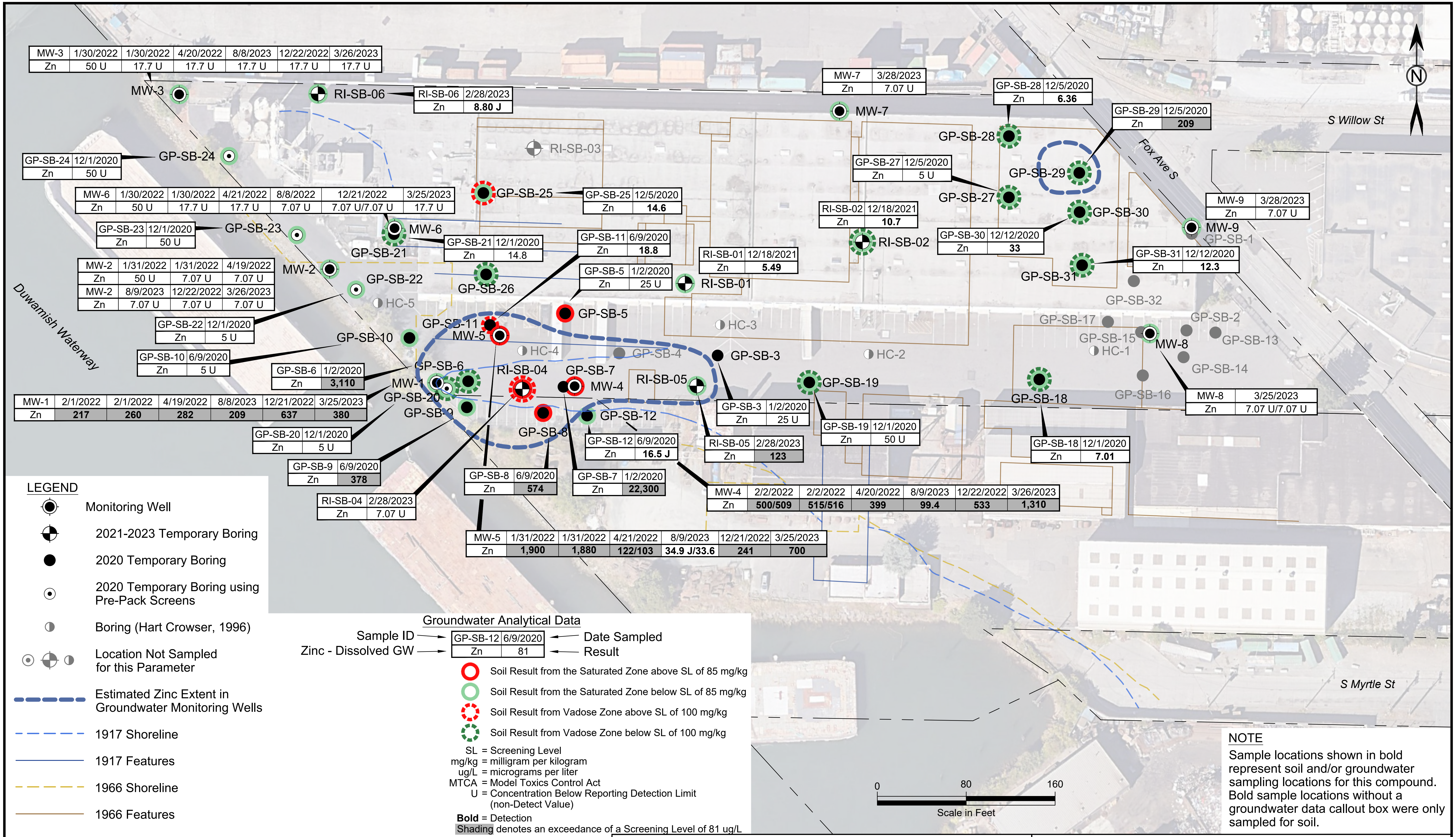
Former Dawn Foods Site
Bridge Point Seattle 130, LLC
1/22/2024

Figure 18
Estimated Extent of Nickel in Soil and Groundwater



LEGEND

◉	Monitoring Well
⊕	2021-2023 Temporary Boring
●	2020 Temporary Boring
⊙	2020 Temporary Boring using Pre-Pack Screens
◑	Boring (Hart Crowser, 1996)
⊙ ⊕ ◑	Location Not Sampled for this Parameter
▬ ▬	Estimated Zinc Extent in Groundwater Monitoring Wells
– – –	1917 Shoreline
——	1917 Features
– – –	1966 Shoreline
——	1966 Features

Groundwater Analytical Data

Sample ID → GP-SB-12 | 6/9/2020 ← Date Sampled

Zinc - Dissolved GW → Zn | 81 ← Result

○	Soil Result from the Saturated Zone above SL of 85 mg/kg
○	Soil Result from the Saturated Zone below SL of 85 mg/kg
◌	Soil Result from Vadose Zone above SL of 100 mg/kg
◌	Soil Result from Vadose Zone below SL of 100 mg/kg

SL = Screening Level
mg/kg = milligram per kilogram
ug/L = micrograms per liter
MTCA = Model Toxics Control Act
U = Concentration Below Reporting Detection Limit (non-Detect Value)
Bold = Detection
Shading denotes an exceedance of a Screening Level of 81 ug/L

NOTE
Sample locations shown in bold represent soil and/or groundwater sampling locations for this compound. Bold sample locations without a groundwater data callout box were only sampled for soil.

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Former Dawn Foods Site
Bridge Point Seattle 130, LLC
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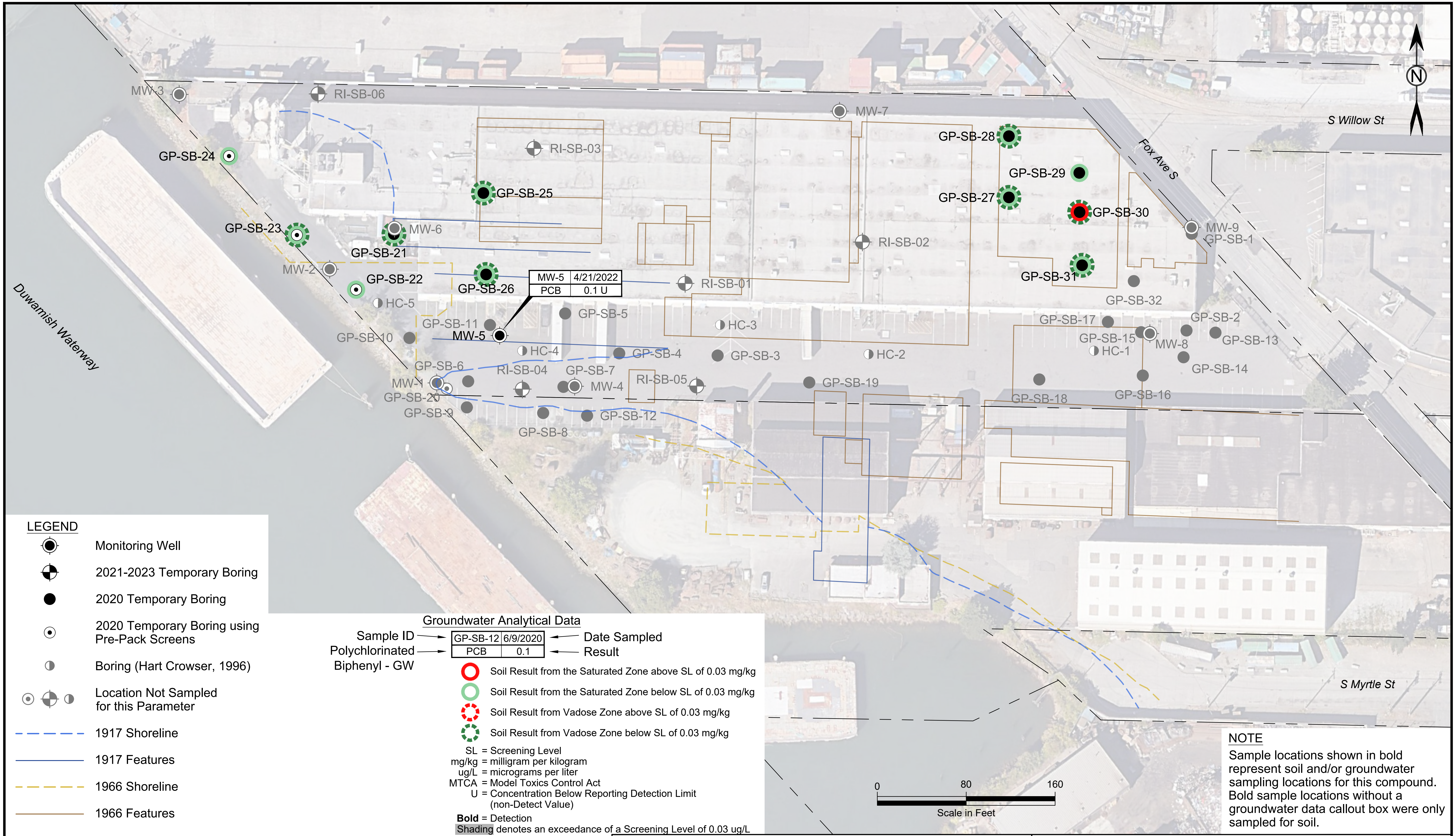
Figure 19
Estimated Extent of Zinc
in Soil and Groundwater



LEGEND

⊕	Monitoring Well
⊕	2021-2023 Temporary Boring
●	2020 Temporary Boring
⊙	2020 Temporary Boring using Pre-Pack Screens
◐	Boring (Hart Crowser, 1996)
⊙ ⊕ ◐	Location Not Sampled for this Parameter
– – –	1917 Shoreline
———	1917 Features
– – –	1966 Shoreline
———	1966 Features

Groundwater Analytical Data

Sample ID → GP-SB-12 | 6/9/2020 ← Date Sampled
Polychlorinated Biphenyl - GW → PCB | 0.1 ← Result

○	Soil Result from the Saturated Zone above SL of 0.03 mg/kg
○	Soil Result from the Saturated Zone below SL of 0.03 mg/kg
◌	Soil Result from Vadose Zone above SL of 0.03 mg/kg
◌	Soil Result from Vadose Zone below SL of 0.03 mg/kg

SL = Screening Level
mg/kg = milligram per kilogram
ug/L = micrograms per liter
MTCA = Model Toxics Control Act
U = Concentration Below Reporting Detection Limit (non-Detect Value)

Bold = Detection
Shading denotes an exceedance of a Screening Level of 0.03 ug/L

NOTE
Sample locations shown in bold represent soil and/or groundwater sampling locations for this compound. Bold sample locations without a groundwater data callout box were only sampled for soil.

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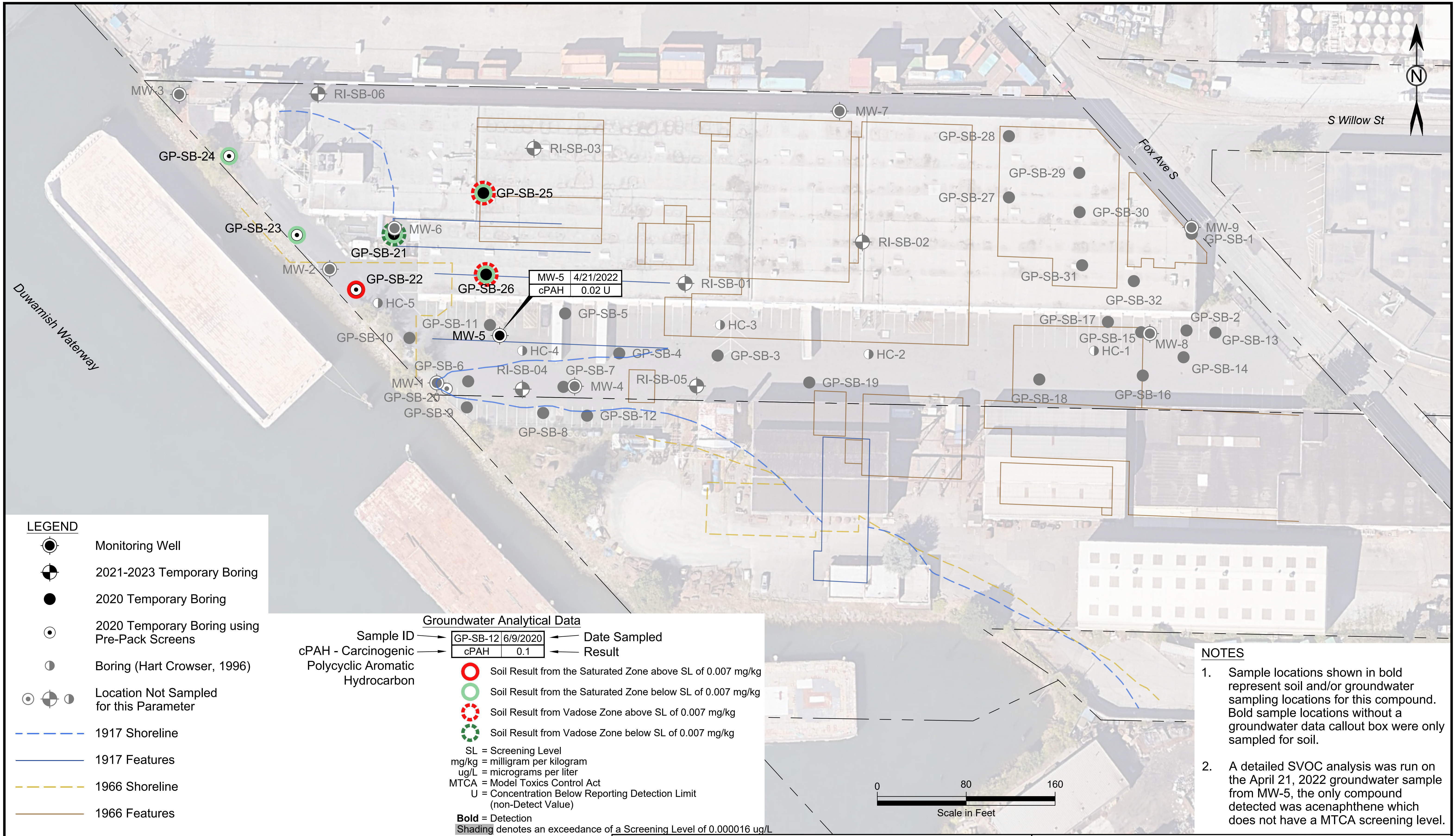
Former Dawn Foods Site
Bridge Point Seattle 130, LLC
1/22/2024

Figure 20
Estimated Extent of PCB
in Soil and Groundwater



NOTES

1. Sample locations shown in bold represent soil and/or groundwater sampling locations for this compound. Bold sample locations without a groundwater data callout box were only sampled for soil.
2. A detailed SVOC analysis was run on the April 21, 2022 groundwater sample from MW-5, the only compound detected was acenaphthene which does not have a MTCA screening level.

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1/22/2024

Figure 21
Estimated Extent of cPAH
in Soil and Groundwater

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Former Dawn Foods Site
Bridge Point Seattle 130, LLC
1/22/2024

Figure 22
Proposed Soil and Groundwater Sample Locations

Appendix A

Historical Reports

Stormwater Treatment Engineering Design Report

Dawn Food Products Inc.

Prepared for:
Dawn Food Seattle
6901 Fox Avenue South
Seattle, WA 98108

Prepared by:
Clear Water Services, LLC.
2525 West Casino Rd Suite 7a
Everett, WA 98204

Landau Associates, Inc.
130 Second Ave S
Edmonds, WA 98020

Date Prepared:
May 2021

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Engineering Report

This report has been prepared by, or under the supervision of those listed below.

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List of Abbreviations and Acronyms

µg/L	micrograms per liter
AKART	All known, available and reasonable methods of prevention, control, and treatment
ASME	American Society of Mechanical Engineers
BMP	Best Management Practices
CB	catch basin
CP	collection point
Cu	copper
Clear Water	Clear Water Services
Dawn Food	Dawn Food Products Inc.
Ecology	Washington State Department of Ecology
Facility	Dawn Food Products Inc. Facility
GAC	Granular Activated Carbon
gpm	gallons per minute
IEAA	Iron Enhanced Activated Alumina
IGSP	Industrial Stormwater General Permit
IX	Ion Exchange
LDW	Lower Duwamish Waterway
mg/L	milligrams per liter
MMFA	Multi-Media Filtration and Adsorption
NAICS	North American Industry Classification System
O&M	Operations and Maintenance
Permit	Industrial Stormwater General Permit No. W011560
Report	Engineering Report
SD	storm drain
SIC	Standard Industrial Classification

SWMMWW	Stormwater Management Manual for Western Washington
SWPPP	Stormwater Pollution Prevention Plan
WAC	Washington Administrative Code
WWHM	Western Washington Hydrologic Model
Zn	zinc

1 Introduction

Clear Water Services (Clear Water) and Landau Associates, Inc. have prepared this Engineering Design Report for Dawn Food Products Inc. (Dawn Food) Dry Mix Plant in Seattle, Washington. The Dawn Food facility, located at 6901 Fox Avenue South, WA, discharges stormwater regulated under Washington State Department of Ecology (Ecology) Industrial Stormwater General Permit (ISGP): Permit No. WAR011560. This facility produces bakery product dry mixes. Production operations include sifting dry materials, blending of dry and liquid materials (mostly edible oils), packaging, and labeling. Production occurs inside the main building. Dust collectors exhaust to the in-plant environment to control dust generated by the powder handling operations. Storage operations include unloading, materials handling, and shipping. The shipping and receiving truck docks are equipped with loading skirts. Bulk materials (edible oils, flour, and sugar), which are stored outside, are brought on site by bulk truck, and loaded into bulk tanks (oils) or silos (flour and sugar).

Historically, Dawn Food has exceeded their total copper and total zinc ISGP permit benchmark on multiple occasions. Adaptive management has been implemented in accordance with the requirements of the ISPG including aggressive operational source control BMPs, installing structural BMPS, and treatment BMPs. Previously installed treatment best management practices (BMPs) were implemented throughout the Facility including installing Filterra downspout filters on the buildings tight lined down spouts and installing CleanWay catch basin inserts with MetalZorb^{TM} media in all facility catch basins.

With these adaptive management BMPs implemented, in 2020 Dawn Food triggered a Level 3 Corrective Action for total zinc and a Level 2 corrective action for total copper. Based on historical water quality data which showed consistent total copper benchmark exceedances, Dawn Food has elected to implement a treatment BMP which will address both total copper and total zinc pollutant concentrations.

This engineering report is intended to address the requirements for engineering reports listed in Chapter 173-240-060, Engineering Report for Domestic Wastewater Facility, of the Washington Administrative Code (WAC-173-240-060) and is organized as follows: section headers and subsections are organized in general accordance with the requirements of the WAC in the order that best outlines all Property operations and effluent water control efforts. This engineering report has also been prepared to comply with the most recent version of the Stormwater Management Manual for Western Washington (SWMMWW; Ecology 2019).

1.1 Purpose

This engineering report's purpose is to provide the Facility with information of proper design sizing, operations, and expected performance of the stormwater treatment system. This report describes the Property operations and the proposed treatment technology to be implemented to meet permit discharge benchmarks and limits.

2 Property Assessment

2.1 Property Description

2.1.1 Facility Information

Dawn Foods Facility is located at 6901 Fox Avenue South, Seattle Washington (Figure 1). The site is in the industrial area of South Seattle nearest the neighborhood of Georgetown and borders the Lower Duwamish Waterway (LDW). The Facility is five acres consisting of a 126,000 square foot of building area, loading/unloading truck bays, parking areas, and four smaller buildings. The Facility was originally built in 1977 and operated since 1979 by Bunge Foods. Dawn Foods leases the Facility and has been in operations at this location since 2004.

2.1.2 Neighboring Properties

Seattle Boiler Works, a ASME certified material fabrication facility, is located directly to the south. Cascade Columbia Distribution, a chemical wholesale and distribution facility, is located across Fox Ave South to the east. SeaTac Marine Services, a full-service marine cargo and transportation facility, is located to the north. The western boundary of the property is a portion of the shoreline of Lower Duwamish Waterway.

2.1.3 Property Building Structures

The Facility generally consists of one 126,000 square foot building area and four smaller buildings. The main building houses shipping and receiving, material storage, manufacturing, packaging, finished goods warehousing, laboratory, and office operations. The four smaller buildings west of the main building consist of a storage shed, boiler room, machine room, and compressor room. Almost all site activities, except for material delivery and truck offloading, occur indoors or under cover. The boiler room has been shut down and disconnected. The main building is a single story and consists of concrete slabs for walls and floors, wood beams and roof.

2.1.4 Stormwater Drainage System

The Facility stormwater drainage system consists of six onsite catch basins (CBs); three storm drains (SD), two of which have manually operated sump pumps to transfer water to CB-06, located within the bulk oil unloading area; a series of tightlined building roof downspouts; and one Type 2 manhole (Collection Point) located near the center of the Facility parking. The facility drainage map is included as (See Figure 1). CB-01 through CB-05 are offset from the main stormwater line. All onsite CBs are elevated and equipped with a 90-degree downturn elbow for oil-water separation. The Collection Point (CP) manhole acts as the compliance sampling location and directs all onsite stormwater to discharge offsite to the LDW. A backflow preventor is installed at the outfall to the LDW. On the conveyance line between the CP and the LDW, there is a tie in from offsite (presumably the Facility to the South). As such, stormwater at the LDW outfall is comingled with offsite water and is not inclusive to stormwater generated at the Dawn Foods Facility.

2.1.5 Industrial Activities

Dawn Foods primary North American Industry Classification System (NAICS) code is 311822 (Flour mixes and Dough Manufacturing from Purchased Flour), and primary Standard Industrial Classification (SIC) code is 2045 (Prepared Flour Mixes and Doughs). As the majority of Facility operations occurs indoors or under cover, the Facility has a limited number of industrial activities exposed to stormwater mostly consisting of truck traffic associated with shipping and receiving and the loading/unloading of bulk food grade edible oils and bulk sugar/flour. Bulk loading and unloading are performed by trained delivery personnel following protocols developed by Dawn Foods. Further description of industrial activities and associated BMPS are described below.

2.1.6 Kind and Quantity of Finished Products

Dawn Food production operation includes sifting dry materials, blending of dry and liquid materials (mostly edible oil), packaging, and labeling. Production occurs inside the main building. The packaged dry food mixes are delivered offsite through the loading bay directly into trailers. No finished products are located outdoors or come into contact with stormwater.

2.2 Current Water Flow and Existing Treatment

This section describes the current stormwater conveyance system and associated BMPs.

2.2.1 Stormwater Flow

Stormwater which falls on the facility parking lot sheet-flows over graded asphalt to a series of catch basins and storm drains before entering the underground conveyance system. Stormwater collected on the building roofs are directed to downspouts which are tightlined into the underground stormwater conveyance system. The Facility has one outfall labeled as Collection Point. The Collection Point is the central manhole in which all onsite catch basins, storm drains, and downspouts combine prior to discharge to the LDW.

2.2.2 Process Wastewater Flow

No process wastewater is generated at the Facility; therefore, process wastewater is not considered to impact the design of this engineering report.

2.2.3 Domestic Wastewater Flow

Domestic wastewater uses at the Facility consist of indoor sinks and bathrooms discharging to the sanitary sewer.

2.2.4 Existing Stormwater Treatment BMPs

The Facility has implemented treatment BMPs on all onsite CBs and building downspouts. CleanWay inserts utilizing both fabric sediment filters and MetalZorb metals removal media filters have been installed in CB-02 through CB-06. CB-01's sump is not large enough to accommodate a CleanWay insert, therefore loose MetalZorb media pouches and hydrocarbon absorbent pillows are deployed in this CB in conjunction with a fabric filter insert. The MetalZorb media filters are changed out semiannually at a minimum; sediment filters are inspected regularly and changed out as needed to maintain functionality.

The main building downspouts were fitted with a Filterra model inline downspout filter with metals removal media that treat the stormwater collected on the roof prior to discharge into the underground stormwater conveyance system. The media for the downspout filters are inspected and changed on a quarterly basis.

2.3 Solids Handling

Accumulated sediment within the stormwater conveyance system is removed annually at a minimum, or when the sump of the CBs reaches 60% capacity. The solids are removed via line-jetting and vactor truck and disposed of at a permitted facility.

2.4 Potential Sources of Pollutants from Past Activities, Materials, and Spills

There has been no unauthorized release or spills of bulk materials since permit coverage under the ISGP began at the Facility. The Facility parking lot was re-paved in 2014. All onsite material is maintained per the Facility SWPPP, and no existing pollutants from past activities are known to exist. Therefore, pollutants from past actives are not a consideration for treatment system design.

3 Conservation, Flow Reduction, and Pollution Prevention

A stormwater treatment system is being proposed for this Facility. No municipal water is required to be used as part of this treatment system. Good housekeeping and best management practices will be used for pollution prevention in accordance with the current version of the facility Storm Water Pollution Prevention Plan (SWPPP).

3.1 Treatment System Water Quantity and Quality

The section below discusses historic water quality results from the Facility, the quality and quantity of stormwater to be treated by the proposed stormwater treatment BMP.

3.1.1 Treatment System Water Quantity

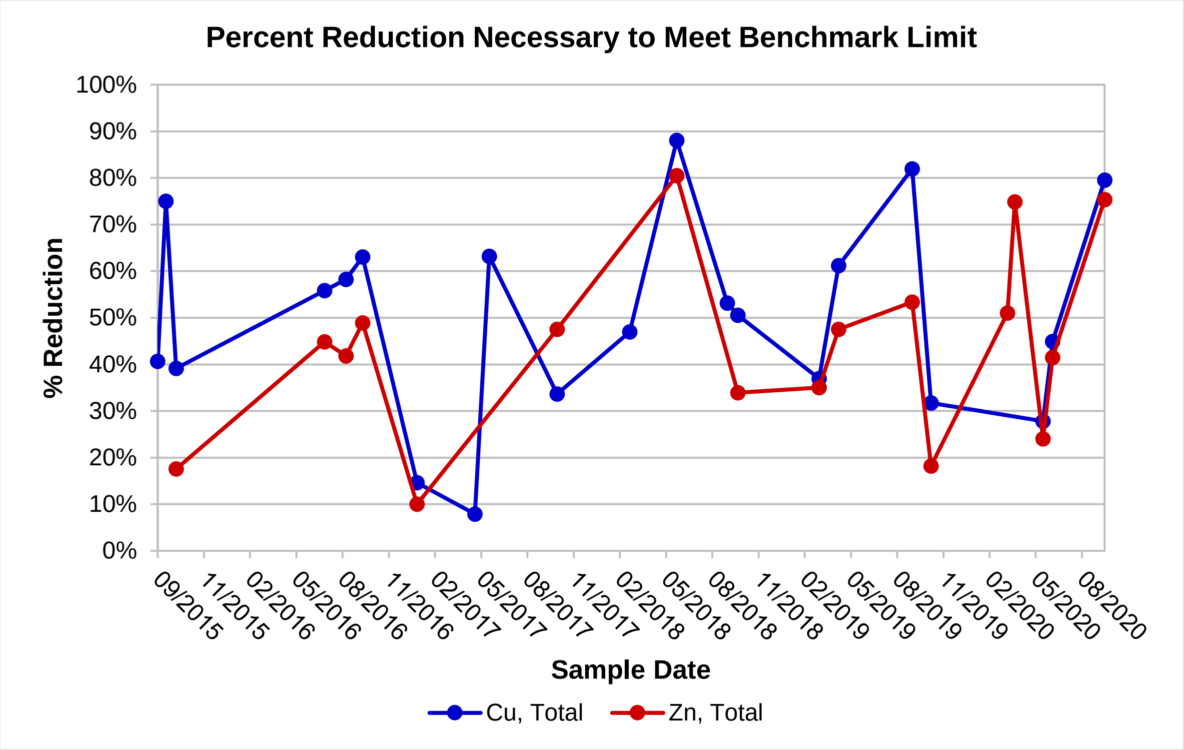
Currently all stormwater at the Facility is directed off site via the Collection Point to the LDW. The site is approximately 5 acres of impervious surfaces including pavement and building roofs. There are minimal areas of landscaped garden beds around the facility. Due to existing infrastructure of the roof downspouts being tightlined to the CP, the volume accumulated from the roof is included in the design sizing. Using the Western Washington Hydrology Model (WWHM), the total site stormwater runoff was calculated to be 206 gallons-per-minute (gpm) based on the 91 percent of the annual flow for the 15-minute flowrate for an off-line BMP. There is no additional input of water necessary for this treatment process, therefore current and future flows are predicted to be the same.

3.1.2 Water Quality Characterization

Historical stormwater quality data for total copper and total zinc as sampled from 2015 to date is included as an attachment to this report. Based on historical sample results, the percent reduction needed to achieve permit benchmarks for total copper ranges from 0 - 88.03%, while the average percent reduction necessary to achieve permit benchmark is 50.19%. Based on historical sample results, the percent reduction needed to achieve permit benchmarks for total zinc ranges from 0 – 80.47%, while the average percent reduction necessary to achieve permit benchmark is 43.88%.

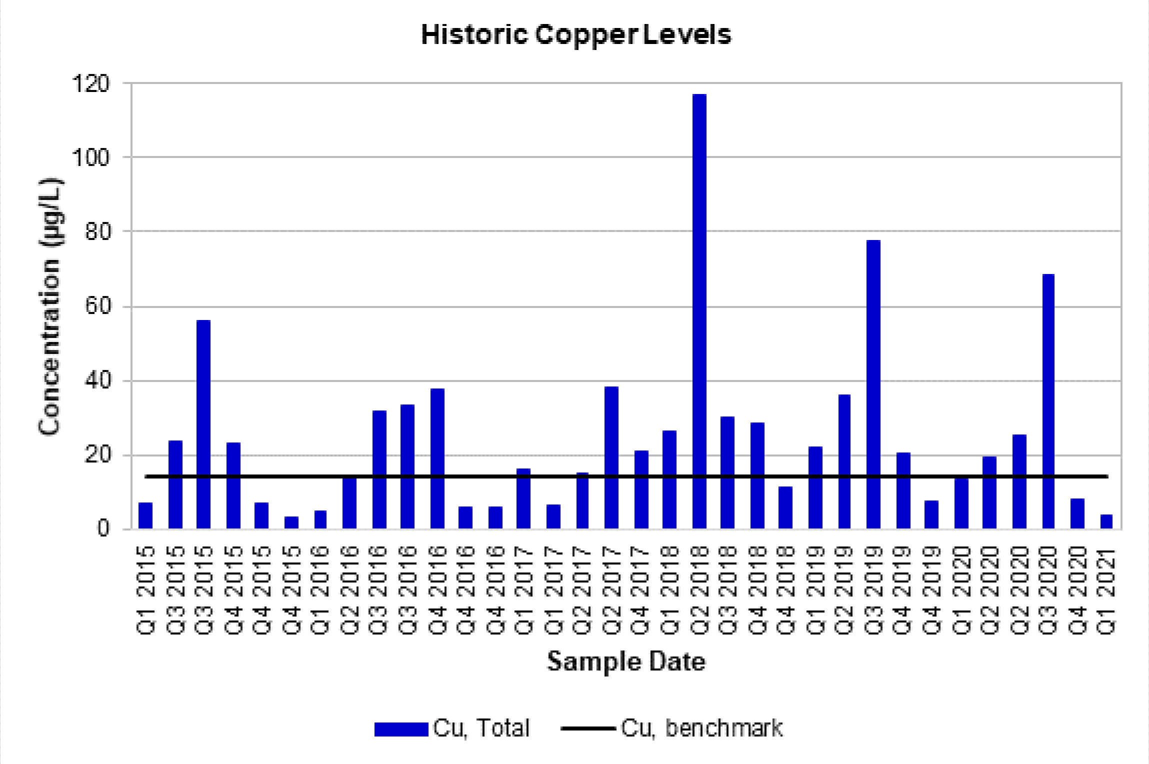
The figure below shows the percent reduction needed for total copper and total zinc to achieve permit benchmarks.

Figure 1. Percent reduction



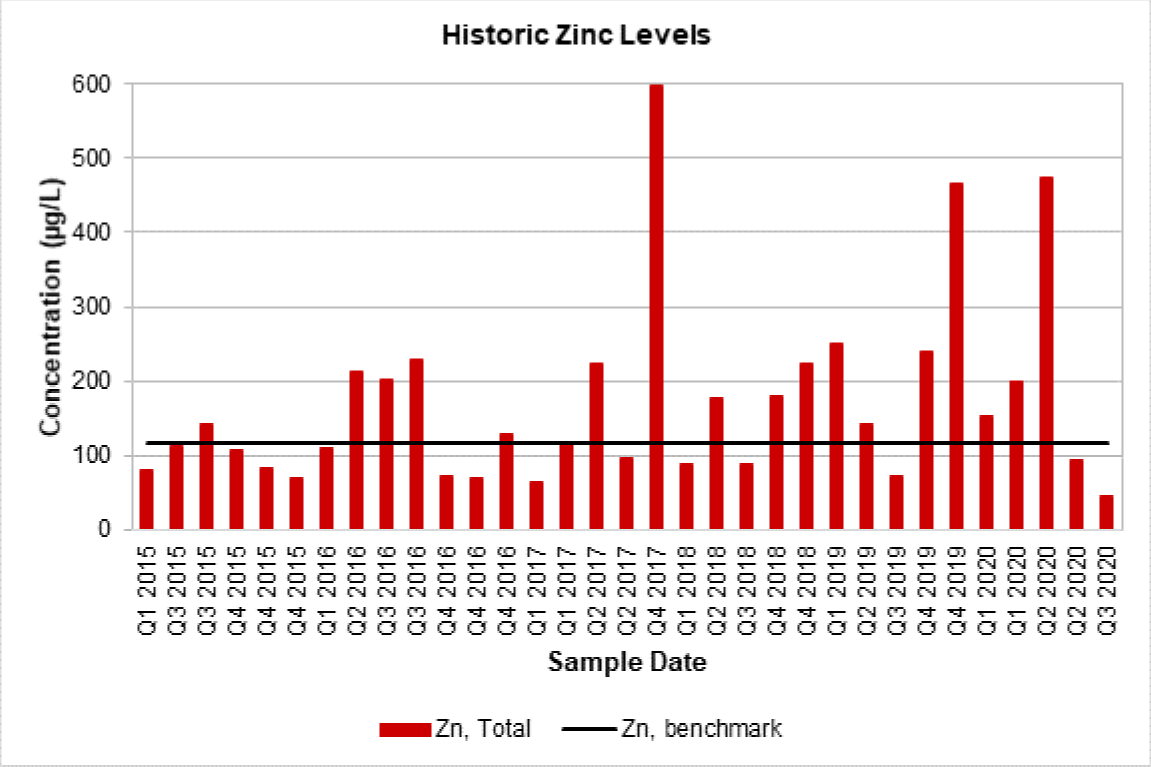
The graph below represents historic total copper concentrations compared to permit benchmark.

Figure 2. Historic Total Copper vs. Permit Benchmark



The graph below represents historic total zinc concentrations compared to permit benchmark.

Figure 3. Historic Total Zinc vs. Permit Benchmark



3.1.3 Particle Size Distribution & Total vs. Dissolved Metals

Water quality characterization samples obtained in May 2021 for particle size distribution show that the majority of particles in the onsite stormwater discharge are relatively small, with a mean particle size of 2.52 microns and over 90% of particulates under 5 microns. The particle size distribution analytical report is included in the treatability report as attachment A.

Sample ID	Particle Size Distribution								Mean Particle Size (µm)
	Count Percent by Particle Size (%)				Volume Percent by Particle Size (%)				
	1-5 µm	5-15 µm	15-30 µm	50-100 µm	1-5 µm	5-15 µm	15-30 µm	50-100 µm	
13CWS1-P67-1	90.59	8.79	0.62	0	18.89	32.24	48.87	0	2.52

Total and dissolved zinc and copper were sampled in conjunction the PSD analysis discussed above. For this sampling event, 100% of particulate metals with dissolved metals analysis were below the detection limits for both copper and zinc.

Sample ID	Copper		Zinc	
	Total µg/L	Dissolved µg/L	Total µg/L	Dissolved µg/L
13CWS1-P67-1	51.9	ND	539	ND

4 Treatment System Water Technologies Analysis

A treatment system technology analysis was conducted at the Facility to determine the most viable method for stormwater treatment. A bench scale treatability test was performed and is included as Attachment A. This test describes methodology used and treatment pollutant reduction achieved to determine the most appropriate and cost-effective treatment alternative for this Facility.

4.1 Treatment System Requirements

To determine the applicable technology best suited for this facility, a feasibility analysis was conducted on several treatment technologies to evaluate the pollutant reduction capabilities and applicability for implementation at the Facility. Part of the feasibility analysis was performed by conducting untreated stormwater water quality characterization and a treatability analysis on selected engineered options comparing the effectiveness of pollutant concentration reduction. The criteria used in determining the best fit option include the following: expected approval by the Department of Ecology due to the implementation of similar technologies at other industrial facilities; ability to achieve the pollutant reduction necessary to meet permit benchmarks; ease of operations and maintenance which could be performed by Dawn Foods or its selected operations personnel; ability to fit within the Facilities space constraints. The treatment systems alternative analysis and treatability study is discussed further in the sections below.

4.2 Treatment System Alternative Analysis

The following treatment engineering options were evaluated in accordance with all known, available, and reasonable methods of prevent, control and treatment (AKART):

- Sanitary Discharge
- Infiltration
- Modular Wetland
- Bag filtration followed by Multi-Media Filtration and Adsorption (MMFA) using Granular Activated Carbon (GAC) and Evoqua SCU Trace Metals Removal Media
- Bag filtration followed by MMFA using Hydrosil HS-200 media.
- Bag filtration followed by MMFA using Purolite C104IX resin and GAC media.
- Bag filtration followed by MMFA using Iron Enhanced Activated Alumina (IEAA) and HS-200 media
- Chemical Enhanced Sand Filtration

4.2.1 Engineering Option 1 Sanitary Discharge

Collection and discharge of all onsite stormwater to the City of Seattle Sanitary sewer would eliminate the necessity for coverage under the ISGP and render treatment BMP implementation unnecessary. Investigation with both the City of Seattle and King County Industrial Waste indicated that the collection and discharge of industrial stormwater is not accepted to their Facilities if a surface water discharge is available. Therefore, discharge to the sanitary sewer was not selected as an option for further investigation.

4.2.2 Engineering Option 2 – Infiltration

Utilizing infiltration as a stormwater treatment BMP alternative would require all stormwater captured onsite to be infiltrated into the groundwater table. Based on the Facilities proximity to the tidally influenced LDW shoreline, high groundwater table, and lack of available onsite space to allow for an appropriately sized infiltrative gallery, this option was not selected for further investigation.

4.2.3 Engineering Option 3 – Modular Wetland

Modular Wetland treatment facilities combine passive gravity infiltration through a bioretention media gallery with associated plantings. The expected percent reduction information available for total zinc and total copper removal as provided by the technical brochures indicate a 69% and 50% removal, respectively. Due to the lower than necessary pollutant concentration removal, depth of the existing CP outlet piping, and necessity to re-route the outfall piping, Modular Wetlands were not investigated further.

4.2.4 Engineering Option 4 – (MMFA) using Granular Activated Carbon (GAC) and Evoqua SCU Trace Metal Removal Media

This option utilizes mechanical bag filtration followed by a filtration and adsorption step utilizing activated carbon and a proprietary Evoqua SCU trace metals removal media. Activate carbon is a porous media that removes particulate pollutants through adsorption. Evoqua SCU trace metals removal media is a proprietary adsorbent media which is similar in appearance and functionality to activated carbon although harder and denser. Absorption is defined as "*a process whereby a substance (adsorbate, or sorbate) is accumulated on the surface of a solid (adsorbent, or sorbent). The adsorbate can be in a gas or liquid phase. The driving force for adsorption is unsaturated forces at the solid surface which can form bonds with the adsorbate."* This media mix was evaluated in the bench scale treatability study as a viable option for implementation at this facility.

4.2.5 Engineering Option 5 – (MMFA) using Hydrosil HS-200 Media

This option is similar to option 4 although uses Hydrosil HS-200 media mix. HS-200 is an organoclay adsorbent media manufactured from zeolites. Zeolites are a naturally occurring mineral with a high surface area and is mined to be used for its cation exchange and anion adsorption properties. This media mix was evaluated in the bench scale treatability study as a viable option for implementation at this facility.

4.2.6 Engineering Option 6 – (MMFA) using Purolite C104IX ion exchange media and GAC media.

This option is similar to option 4 although uses Purolite ion exchange resin C104IX and GAC. Purolite is a high purity premium grade bead made from conventional gel polystyrene sulphate cation exchange resin. This media mix was evaluated in the bench scale treatability study as a viable option for implementation at this facility.

4.2.7 Engineering Option 7 – (MMFA) using Iron Enhanced Activated Alumina (IEAA) and HS-200 media

This option is similar to option 4 although uses IEAA and HS-200. IEAA is granular and highly porous form of aluminum oxide used for its absorbent properties in water treatment. This media mix was evaluated in the bench scale treatability study as a viable option for implementation at this facility.

4.2.8 Engineering Option 8 – Chemical Enhanced Sand Filtration

Due to the low concentration of historic turbidity, raw water particulate concentrations, and cost of installation and ongoing operations and maintenance, chemical enhanced sand filtration was not selected as a treatment alternative to be investigated further. Similar particulate removal could be achieved with mechanical bag filtration.

4.3 Water quality Treatability Test Study

A bench scale treatability test was performed to determine the effectiveness of the selected technologies listed above in Section 4.2. The treatability report and associated laboratory reports are included as Attachment A.

4.3.1 Bench scale Test Result

Water was obtained from the Control point with equal volumes from the east and west conveyance system. The water was combined in a 5-gallon bucket and delivered to the testing lab at Clear Water's Facility in Everett, Washington for testing. Testing procedures included analysis of raw water characteristics, mechanical filtration through 11-µm filter paper, and pumping the filtrate through media columns loaded with the mixes described above in Section 4.2 to simulate a 10-min empty bed contact time. Treated water was collected from the effluent of those columns and sent to Fremont Analytical Laboratory for total and dissolved metals analysis. Results of the bench scale test are provided in Table 1 below.

Table 1. Benchscale Treatability Results

Engineering Option	Treatment	Metals Concentrations			
		Total Copper	Dissolved Copper	Total Zinc	Dissolved Zinc
		µg/L	µg/L	µg/L	µg/L
	Raw water	51.9	ND	539	ND
Option 4	50% GAC / 50% SCU	4.99	ND	4.58	ND
Option 5	HS-200	28.6	ND	4.48	ND
Option 6	75% GAC / 25% C104IX	9.70	ND	4.14	ND
Option 7	50% HS-200 / 50% IEAA	3.97	ND	2.71	ND

Percent reduction for each media mix is shown in Table 2 below.

Table 2. Bench Scale Treatability Percent Reduction

Engineering Option	Treatment	% Removal Rates			
		Total Copper	Dissolved Copper	Total Zinc	Dissolved Zinc
Option 4	50% GAC / 50% SCU	90.4	ND	99.2	ND
Option 5	HS-200	44.9	ND	99.2	ND
Option 6	75% GAC / 25% C104IX	81.3	ND	99.2	ND
Option 7	50% HS-200 / 50% IEAA	92.4	ND	99.5	ND

All media options selected were able to remove pollutant concentration of total zinc and total copper to below permit benchmark levels. All media mixes were similarly effective at removing total zinc concentrations to near non-detect levels showing removal efficiency percentages of 99.2% - 99.5%. Option 2 and Option 5 were unable to reduce total copper below the required reduction necessary to meet permit benchmarks based on the historical water quality results. Option 4 and Option 7 were able to meet the required percent reduction necessary to meet permit benchmarks.

4.3.2 Cost Comparison

Design costs for all options tested are similar however for this evaluation we are considering the construction installation cost, annual operating and maintenance cost, and anticipated media replacement costs and frequency. Costs were not evaluated for options that would not meet the needs of the Facility. As the main difference in the effective treatment options is media type, the installation and annual O&M costs are expected to be similar. Table 3 below shows average costs for each of these technologies.

Table 3. Cost Comparison

Treatment System Technology	Construction Installation Cost	Annual O&M Cost	Media Replacement Cost and Frequency
Engineering Option - 4 MMFA using GAC/SCU	$225,000	$15,000	$65,000 / every 3 years
Engineering Option – 7 MMFA using IEAA and HS-200	$225,000	$15,000	$30,000 / every 3 years

4.4 Treatment System AKART Recommendation

Based on the results of the treatability testing, water quality characterization, historic pollutant concentration removal needs and anticipated pollutant removal, the ability to feasibly deploy at the Facility, the recommended treatment system technology based on AKART standards is Engineering Option 7; Bag filtration followed by MMFA using Iron Enhanced Activated Alumina (IEAA) and HS-200 media.

4.4.1 Contingency Plan

Ongoing operations and maintenance will include bag filter replacement as differential pressure across the bag filter indicates necessary, removal of accumulated sediment within the settling tank, and obtaining performance sampling at various locations throughout the treatment train to evaluate the system pollutant removal effectiveness. Operations and maintenance practices, including media replacement, will be implemented when breakthrough is observed on the lead media vessel.

5 Treatment System Design and Operations

The following section discusses treatment system design sizing, process flow path, and system operations.

5.1 Treatment System Sizing

5.1.1 System Design Data and Hydrologic Modeling

The treatment system water quantity was determined by using the Western Washington Hydrology Model (WWHM, 2012) for the site stormwater runoff and calculated to be 0.4577-cfs or 206 gallons-per-minute (gpm) based on the 91 percent of the annual flow for the 15-minute flowrate for an off-line BMP. The report prepared by WWHM is included as Attachment B and described in the table below.

Parameter	Value
Impervious Surfaces drainage Area	5 acres
Pervious Surfaces Drainage Area	0 acres
Offline Water Quality Flow Rate	0.4577 cubic feet per second
Offline Water Quality Flow Rate	206 gallons per minute

5.1.2 Treatment System Process Flow

Onsite stormwater is collected by the CP sump. An open-top upturn 90-degree elbow will be installed within the sump on the outfall piping to increase sump capacity and provide an overflow for storm events that exceed system design capacity. A submersible pump (Pump 1) will be installed within the CP sump. When stormwater within the CP sump reaches the mechanical float system, the float will elevate and trigger the pump to run. This pump will convey untreated stormwater at the design flow rate, controlled and monitored by valving and a flow meter, to an above ground 8,000-gallon vertical upright poly equalization tank. When water level lowers within the sump, the mechanical float will return to its normally off position and Pump 1 will shut off. This automated pumping function will occur and fill the 8000-gallon poly tank.

The poly tank will have a separate pump control float system which will operate the centrifugal filter pump (Pump 2). As the poly tank fills and reaches the Pump 2 float on set point, the float will lift and trigger Pump 2 to turn on and operate at 206 gpm as controlled and monitored by valving and a flow meter. Pump 2 will convey collected stormwater through a 250gpm rated duplex bag filtration skid. The bag filters will be fitted with 10-micron filter bags. As differential pressure increases across the bag filter, maintenance activities will be triggered, and bags filters will need replaced. The mechanically filtered effluent will be pumped to a 5,000 lb. duplex multimedia filter vessel set. Each filter vessel will be filled with 50% IEAA and 50% HS-200 media. The volume of media per vessel is 166.7 cubic feet. Total media volume is 333.34 cubic feet providing 12.4 minutes of contact time. The MMFA filter effluent will be directed back to the outfall piping within the CP for discharge to the LDW. As the level of stormwater in the poly tank lowers past the off setpoint, the mechanical float will lower, and Pump 2 will turn off.

Both pumps will have a stand-alone pump control box with visible and audible alarms. A high-level float will be installed in the CP and poly tank which will alert facility personnel to a pump malfunction. A high-level overflow pipe will be installed on the poly tank to divert tank overflow back to the CP if Pump 2 should fail and Pump 1 continues to operate. If Pump 1 fails, the open-top upturn 90-degree elbow within the CP will allow stormwater to discharge offsite and not cause flooding/damage.

The main components for the treatment system are listed below and shown in Figure 2. The proposed treatment system location is shown in Figure 3.

- 8,000-gallon poly equalization tank
- 1- submersible pump with floats and pump controls
- 1-centrifugal filter pump with floats and pump controls
- 1- duplex bag filtration skid capable of 250gpm with 10-micorn disposable filter bags
- 1-duplex 5,000lb. duplex media vessels filled with 50%/50% mix IEAA/HS200 media
- Piping, valving, flow meters, pressure gages

5.1.3 Cost and Expenses

The treatment system equipment including tanks, plumbing, pumps, filters, and media are included in the table below as initial capital costs. O&M costs provided below include labor and consumable material costs. These components are essential to the functionality of the proposed treatment system. The costs below are provided as a rough order of magnitude estimate for budgetary purposes. Actual installation costs will be provided upon completion of construction installation specifications and planning.

Treatment Technology	Total Initial Capital Costs	O&M Costs[1]
Bag Filtration followed by MMFA with IEAA & HS-200	\$225,000 – \$275,000	\$15,000

Notes:

1. Annual O&M costs include regular site inspections, system performance monitoring, and routine consumables.

5.1.4 ISGP Sampling Requirements

Continued stormwater quality monitoring from the compliance sampling location will be performed on a quarterly basis as required by the ISGP. Breakthrough monitoring of the lead media vessel will be conducted on a semi-annual basis to monitor breakthrough of pollutants through the lead media vessel. Should breakthrough occur, this will trigger the Facility to engage in a lead vessel media replacement. Based on experience with similar projects, the lead vessel life expectancy is approximately three years. Media life expectancy is relative to the influent water quality. Should pollutant loading exceed historically observed levels the media life expectancy will be reduced. ISGP sampling requirements are shown in the table below.

Parameter	Units	Analytical Method	Benchmark	Maximum Daily Effluent Limit	Laboratory Quantitation Level	Sampling Frequency
pH	Standard Unit	Meter/Paper	5.0 – 9.0	--	+/- 0.5	Quarterly
Turbidity	NTU	EPA 180.1	25	--	0.5	Quarterly
Oli Sheen	Yes/No	N/A	No Visible Sheen	--	N/A	Quarterly
Total Copper	µg/L	EPA 200.8	14	--	2.0	Quarterly
Total Zinc	µg/L	EPA 200.8	117	--	2.5	Quarterly
BOD Total	mg/L	SM 5210B	30	--	2.0	Quarterly

Nitrate + Nitrite, Total	mg/L	SM 4500-NO3-E/F/H (EPA 353.1)	0.68	--	0.10	Quarterly
Total Phosphorus	mg/L	EPA 365.1	2.0	--	0.10	Quarterly
Total Suspended Solids	mg/L	SM2540	--	30	5	Quarterly

Notes:
EPA = U.S Environmental Protection Agency
N/A = Not Applicable
SM = Standard Method
µg/L = micrograms per liter
mg/L = milligrams per liter
NTU = nephelometric turbidity units

5.1.5 System Reliability

Regular system monitoring and component maintenance is required to ensure system is optimally performing. System inspection and performance monitoring will be performed frequently after system installation and startup to verify components functionating properly. Lead and Lag media vessel operation and breakthrough monitoring will provide early indication of lead vessel reaching adsorbent capacity triggering a media change prior to the lag vessel media reaching capacity. Audible and visible level alarms monitoring tank and CP levels will alert Facility personnel to pumping system malfunctions.

5.1.6 Regulatory Compliance Schedule

The proposed treatment system is designed to comply with the ISGP and applicable state and federal laws.

Project Milestones and Proposed Schedule is as follows:

- May 15th, 2021- Submittal of this Engineering Report to the Department of Ecology
- May 15th - July 15th ,2021 – Ecology Approval
- July 15th, 2021– Capital Equipment procurement
- August 15th – September 15th, 2021 -Construction Installation and Startup
- September 15th - October 15th, 2021 – Treatment System O&M manual development and SWPPP updates

6 Treatment System Ownership, Operations, and Maintenance

The stormwater treatment system will operate automatically 24 hours a day. Routine system maintenance, in accordance with the treatment system operations and maintenance manual, will be performed by trained operators. Pump control box audible alarms will alert personnel to a system malfunction.

Dawn Food Products, Inc. is the sole owner and responsible party to maintain and operate the treatment system after installation.

7 Sound Engineering Justification

Stormwater treatment utilizing particulate filtration followed by multi-media adsorbent technology is an industry standard treatment method. Similar treatment technologies have been used at numerous facilities with similar influent raw water characteristics showing effective levels of pollutant removal. Therefore, similar effectiveness is expected at this Facility.

The Facility will continue to maintain its current operational good housekeeping and structural source control BMPs in conjunction with installation and operation of the proposed stormwater treatment system.

8 Use of This Report

The design recommendations, feasibility analysis, and treatability services described in this report were performed consistent with generally accepted professional consulting principles and practices. These services were performed under our agreement with the client and this report is solely for use by our client unless otherwise noted. No other warranty is made, expressed, or implied. This report has been prepared for Dawn Food Products, Inc. for the specific use at the 6901 Fox Avenue South Facility in Seattle Washington. Use of this report by a third party is at such party's sole risk.

9 References

Washington State Department of Ecology. 2019 Stormwater Management Manual for Western Washington Publication number 19-10-021

Washington State Department of Ecology. 2013 Guidelines for the Preparation of Industrial Stormwater General Permit Engineering Reports. Publication number 13-10-007

Attachments

STORMWATER CHARACTERIZATION AND BENCH-SCALE TREATBILITY SUMMARY

DAWN FOOD PRODUCTS, INC.

SEATTLE, WA

Date: May 5, 2021
Prepared by: Josh Kirby
Reviewed by: Kelli Quist & Daniel Lipinski

CLEAR WATER
SERVICES

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ATTACHMENTS

Attachment A: Analytical Lab Reports

Executive Summary

Clear Water Services, LLC. (Clear Water) is pleased to present this Stormwater Characterization and Bench-Scale Treatability Summary for Dawn Food Products, Inc. (Dawn Food) located in Seattle, WA. Dawn Food is regulated under Washington State Department of Ecology's Industrial General Permit (ISGP) number WAR011560 and discharges stormwater to the Lower Duwamish River. The target parameters of this study were total copper and zinc. In response to the exceedances, Dawn Food chose to conduct bench-scale treatability testing to determine and select a performance-based treatment train capable of achieving ISGP compliance.

Drawing from stormwater treatment experience with similar facilities, historical monitoring data, and the nature of the site activities, Clear Water identified passive treatment with adsorptive media filtration as the best approach. Adsorptive/ion-exchange media filtration was evaluated at the Clear Water lab. Four adsorptive medias were evaluated and include the following:

1. 50% Granulated Activated Carbon (GAC) / 50% Evoqua SCU™ Trace Metal Removal Media (SCU)
2. Hydrosil HS-200 (HS-200)
3. 75% GAC / 25% Purolite® C104 Ion-Exchange Resin (Purolite)
4. 50% HS-200 / 50% Iron Enhanced Activated Alumina (IEAA)

After filtering stormwater independently through each column, analytical samples were collected to compare parameter removal efficacy.

All raw and treated water samples were to Fremont Analytical for analysis. The raw water was tested for total and dissolved copper and zinc, as well as particle size distribution. The treated samples were tested for total and dissolved copper and zinc. Bench-scale measurements, including turbidity, were taken at each point in the study.

Of the four treated samples tested, the analytical results show that all benchmarks were met with each approach, with the exception of HS-200 alone for total copper. The HS-200/IEAA 50:50 blend performed best with 92.4% removal of total copper and 99.5% removal of total zinc. The HS-200/IEAA blend also reduced the turbidity the most of all four options. The other options other than HS-200 alone were also capable of reducing total copper and zinc below the benchmark levels, with the 50:50 GAC/SCU blend yielding similar results.

Based on a review of the results, and Clear Water Services' experience with treatment of stormwater at similar facilities, Clear Water recommends adsorptive media filtration with a 50:50 blend of HS-200 and IEAA. This media blend performed the best in the removal of both copper and zinc, with the added benefit of also being more economical than the GAC/SCU blend, which is more expensive per unit. Up front treatment with basic filtration through bag/cartridge filters is also recommended to extend the life of the media.

1.0 Introduction

1.1 Treatability Purpose

The primary goal of this Stormwater Characterization and Bench-Scale Treatability study was to evaluate the ability of practical stormwater treatment methods to reduce the contaminants of concern to below permit benchmarks. To accomplish this goal, a comprehensive "Stormwater Characterization and Bench-Scale Treatability Plan" was prepared by Clear Water prior to testing. The results of the treatability test were evaluated and rated upon both physical performance and contaminant removal. The contaminants of concern that were evaluated are based on parameters located in Dawn Food's ISGP, shown below in Table 1.

Table 1. ISGP Benchmark Parameters

Parameter	Benchmark
pH	5.0 – 9.0
Turbidity	25 NTU
Oil Sheen	No visible sheen
Total Copper	14 ug/L
Total Zinc	117 ug/L
Total Petroleum Hydrocarbons (NWTPH-Dx)	10 mg/L

2.0 Raw Water Sampling

Clear Water staff collected one five-gallon bucket of stormwater at the Dawn Food facility from the collection point on April 24th, 2021. Samples were transported on the morning of April 26th, 2021 to Clear Water's lab in Everett, WA. The following morning, the raw water sample was measured for benchtop characteristics. All analytical samples were submitted to Fremont Analytical, Inc. in Seattle, WA. Samples were immediately collected from the raw water sample and bottled for delivery to Fremont Analytical, and analyzed for copper and zinc (total and dissolved), as well as particle size distribution.

3.0 Bench-Scale Treatability Overview

This section includes an overview of the treatability procedure and equipment and covers any deviations to the preplanned methods.

3.1 Bench-Scale Treatment Equipment

Clear Water utilized the following bench-top equipment listed below to evaluate treatment performance.

- 2-inch column apparatus
- Hach 2100Q Turbidimeter
- Oakton pH 700 meter
- Hanna DiST 3 Conductivity meter
- Oakton DO 6+ meter
- Thermometer
- Magnetic stir-plate
- Stir rods
- Personal protective equipment
- Stopwatch/timer
- Camera
- Glass Beakers
- Consumables include: Paper towels, KimWipes, distilled water and nitrile gloves

3.2 Bench-Scale Treatment Methods

3.2.1 Instrument Calibrations

All instruments were calibrated according to the manufacturer's specifications prior to use.

3.2.1.1 Adsorptive Filtration

For adsorptive filtration modeling, four different media combinations were tested:

1. 50% GAC / 50% SCU
2. HS-200
3. 75% GAC / 25% Purolite
4. 50% HS-200 / 50% IEAA

Four 2-inch diameter filter columns were filled with the blends described above. Prior to use, the media was soaked for 24 hours and thoroughly rinsed to remove the fines. The media was then rinsed with reverse osmosis (RO) water prior to loading into filter columns. After the media was loaded into the columns, it was rinsed again by running several liters of RO water through the columns, until the effluent turbidity remained constant. The columns were then fully drained. A peristaltic pump was set to obtain 10 minutes of contact time. Three bed volumes of stormwater were used to rinse the media prior to capturing samples.

3.3 Bench Parameters

Turbidity, pH, conductivity, TDS, and other physical characteristics were observed/measured and recorded in the Clear Water lab manually by the water quality chemist, utilizing calibrated instruments (See Table 2).

Table 2. Handheld Instruments and Specifications

Instrument Model	Parameter	Units	Range	Accuracy
Hach 2100Q	Turbidity	NTU	0 to 1000 NTU	± 2%
Oakton pH 700	pH ORP Temperature	S.U. mV °C/°F	0.00 to 14.00 S.U. ± 2000 mV 0.0 to 100.0°C	± 0.01 ± 0.2 (± 2 >200 mV) ± 0.3
Hanna DiST 6	Conductivity TDS	mS/cm ppt	0.00 to 20.00 mS/cm 0.00 to 10.00 ppt	± 2% ± 2%
Oakton DO 6+	Dissolved oxygen	mg/L	0.00 to 20.00 mg/L	± 1.5%

3.4 Analytical Laboratory Methods

Treated stormwater samples were delivered to Fremont Analytical, Inc. for analysis of copper and zinc (total and dissolved). A full analytical lab report is included as Attachment A. Sample ID 13CWS4-P65-1 refers to samples submitted for a separate project, the results of which were therefore eliminated from this report.

4.0 Bench-Scale Treatment Results and Discussion

4.1 Raw Stormwater Characterization

It is important to characterize the waste stream to establish a baseline of pollutant concentrations and water composition to better inform treatment system selection. The raw stormwater samples were delivered to the Clear Water lab, where the raw water characteristics were measured at the bench by Clear Water lab technicians (See Table 3). Raw stormwater samples were also immediately captured for delivery to Fremont Analytical (See Table 4).

Table 3. Raw Stormwater Characteristics – Bench-Top Measurements

Sample	Turbidity (NTU)	pH (S.U.)	ORP (mV)	D.O. (mg/L)	TDS (ppm)	Conductivity (µS/cm)	Temp (°C)	Color
Collection Point	3.24	6.45	19.8	8.72	55	117	17.2	clear/ yellow

The water was mostly clear with a slight yellowish tint. There was no visible oil sheen or detectable odor.

Table 4. Raw Stormwater Characteristics – Analytical Lab Results

	Copper		Zinc	
	Total	Dissolved	Total	Dissolved
Sample ID	µg/L	µg/L	µg/L	µg/L
13CWS1-P67-1	51.9	ND	539	ND

Particle Size Distribution (PSD) samples were also taken to investigate the filterability of the raw stormwater. PSD analysis of the field collected raw water showed that by count, over 90% of the particles were 1-5 µm in size, with the mean particle size being 2.52 µm.

Table 5. Raw Stormwater Characteristics – PSD Sampling Results

	Particle Size Distribution								Mean Particle Size (µm)
	Count Percent by Particle Size (%)				Volume Percent by Particle Size (%)				
Sample ID	1-5 µm	5-15 µm	15-30 µm	50-100 µm	1-5 µm	5-15 µm	15-30 µm	50-100 µm	
13CWS1-P67-1	90.59	8.79	0.62	0	18.89	32.24	48.87	0	2.52

4.2 Bench-Scale Test Results

The raw water sample was processed through a Buchner funnel lined with two #1 Whatman filter papers (11-micron) to simulate bag/cartridge filtration. Benchtop characteristic measurements were taken from the filtrate. Using this method, the turbidity of the filtrate was reduced to 0.82 NTU. For the final steps, samples were run through each adsorptive media blend with 10 minutes of contact time. The first three bed volumes of filtrate were discarded, and samples were then taken for analysis.

All benchtop measurements are shown below in Table 6. All filtrate was clear, with very low turbidity. Clear Water did notice a higher effluent pH post-adsorptive media filtration, which is typical for the first couple dozen bed volumes.

Table 6. Benchtop measurements

Sample ID	Treatment Method	pH	Turbidity
		S.U.	NTU
Filtered Raw water	Vacuum Filtered Raw water	6.44	0.82
13CWS1-P68-1	50% GAC / 50% SCU	9.1	0.74
13CWS1-P68-2	HS-200	7.26	0.98
13CWS1-P68-3	75% GAC / 25% IX	7.96	0.66
13CWS1-P68-4	50% HS-200 / 50% IEAA	6.60	0.65

The analytical results and percent removals of all analyzed contaminants for each treated sample, compared to the raw sample, are listed below in Tables 7 and 8. Overall, filtration via all of the media columns reduced the copper and zinc to below the permit benchmarks with the exception of HS-200 media for copper. The GAC/SCU and HS-200/IEAA filtration was slightly more effective than the others for both total copper and zinc.

Table 7. Analytical Results

Sample ID	Treatment	Metals Concentrations			
		Total Copper	Dissolved Copper	Total Zinc	Dissolved Zinc
		µg/L	µg/L	µg/L	µg/L
13CWS1-P67-1	Raw Water	51.9	ND	539	ND
13CWS1-P68-1	50% GAC / 50% SCU	4.99	ND	4.58	ND
13CWS1-P68-2	HS-200	28.6	ND	4.48	ND
13CWS1-P68-3	75% GAC / 25% Purolite	9.70	ND	4.14	ND
13CWS1-P68-4	50% HS-200 / 50% IEAA	3.97	ND	2.71	ND

Table 8. Percent Removal Results

Sample ID	Treatment	% Removal Rates			
		Total Copper	Dissolved Copper	Total Zinc	Dissolved Zinc
13CWS1-P68-1	50% GAC / 50% SCU	90.4	ND	99.2	ND
13CWS1-P68-2	HS-200	44.9	ND	99.2	ND
13CWS1-P68-3	75% GAC / 25% Purolite	81.3	ND	99.2	ND
13CWS1-P68-4	50% HS-200 / 50% IEAA	92.4	ND	99.5	ND

5.0 Conclusions

Three of the four treatment methods were shown to be capable of reducing copper and zinc below the permit benchmarks. Filtration through 11-µm filter paper followed by column filtration through a 50:50 HS-200/IEAA media blend performed the best across all tested parameters. Therefore, Clear Water recommends filtration with this media blend to follow basic filtration through bag/cartridge filters.

Attachment A: Analytical Lab Reports

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Clear Water Compliance Services
John Mandelin
2525 West Casino Road, Suite 7A
Everett, WA 98204

RE: Dawn Foods
Work Order Number: 2104385

Attention John Mandelin:

Fremont Analytical, Inc. received 2 sample(s) on 4/28/2021 for the analyses presented in the following report.

Dissolved Metals by EPA Method 200.8

Particle Size Distribution in Water

Total Metals by EPA Method 200.8

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910

Date: *04/30/2021*

CLIENT: Clear Water Compliance Services
Project: Dawn Foods
Work Order: 2104385

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2104385-001	13CWS1-P65-1	04/27/2021 11:05 AM	04/28/2021 8:48 AM
2104385-002	13CWS1-P67-1	04/27/2021 10:50 AM	04/28/2021 8:48 AM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **2104385**

Date:

CLIENT: Clear Water Compliance Services

Project: Dawn Foods

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.
2104385-001C
PHY-PART-W has been Sub Contracted.
2104385-002C
PHY-PART-W has been Sub Contracted.
2104385-002C
PHY-PART-W has been Sub Contracted.

Qualifiers & Acronyms

Qualifiers:

*	Flagged value is not within established control limits
B	Analyte detected in the associated Method Blank
D	Dilution was required
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
I	Analyte with an internal standard that does not meet established acceptance criteria
J	Analyte detected below Reporting Limit
N	Tentatively Identified Compound (TIC)
Q	Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S	Spike recovery outside accepted recovery limits
ND	Not detected at the Reporting Limit
R	High relative percent difference observed

Acronyms:

%Rec	Percent Recovery
CCB	Continued Calibration Blank
CCV	Continued Calibration Verification
DF	Dilution Factor
DUP	Sample Duplicate
HEM	Hexane Extractable Material
ICV	Initial Calibration Verification
LCS/LCSD	Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL	Maximum Contaminant Level
MB or MBLANK	Method Blank
MDL	Method Detection Limit
MS/MSD	Matrix Spike / Matrix Spike Duplicate
PDS	Post Digestion Spike
Ref Val	Reference Value
REP	Sample Replicate
RL	Reporting Limit
RPD	Relative Percent Difference
SD	Serial Dilution
SGT	Silica Gel Treatment
SPK	Spike
Surr	Surrogate

Client: Clear Water Compliance Services

Collection Date: 4/27/2021 10:50:00 AM

Project: Dawn Foods

Lab ID: 2104385-002

Matrix: Water

Client Sample ID: 13CWS1-P67-1

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 32126		Analyst: EH
Copper	ND	2.00		µg/L	1	4/30/2021 1:23:34 PM
Zinc	ND	3.80		µg/L	1	4/30/2021 1:23:34 PM
Total Metals by EPA Method 200.8				Batch ID: 32124		Analyst: EH
Copper	51.9	2.00		µg/L	1	4/29/2021 1:35:25 PM
Zinc	539	2.50		µg/L	1	4/29/2021 1:35:25 PM

SPECTRA Laboratories ...Where experience matters
2221 Ross Way • Tacoma, WA 98421 • (253) 272-4850 • Fax (253) 572-9838 • www.spectra-lab.com

04/29/2021

Fremont Analytical
3600 Fremont Ave N
Seattle, WA 98103
Attn: Mike Ridgeway

Client ID: 13CWS1-P67-1
Sample Matrix: Water
Date Sampled: 04/27/2021
Date Received: 04/28/2021
Spectra Project: 2021040617
Spectra Number: 1
Rush

Analyte	Result	Units	Method	Analyst	Date Analyzed
Particle Count by LASER NSF	99,400	#/cc	NSF	KLH	04/29/2021

*Please see attached scans.

SPECTRA LABORATORIES

Marie Holt

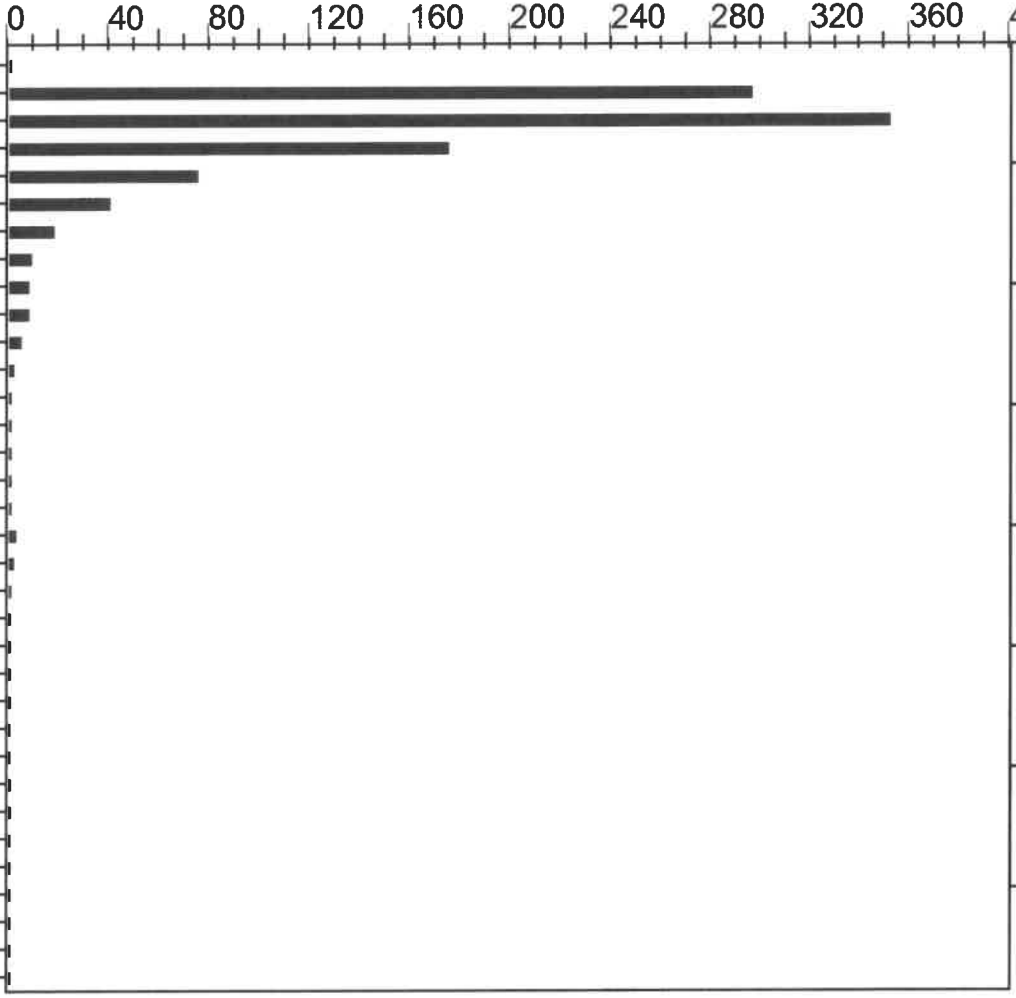
Marie Holt, Customer Support & Proj. Manager
a6/klh

Page 1 of 1

04/29/21
Fremont Analytical
2021040617-1
13CWS1-P67-1
Water

Spectrex Laser Particle Counter 800-822-3940 v12.5

#	um	%	Interim Count
	<	0.00	0
1	1	29.82	296
2	2	35.57	353
3	3	17.70	175
4	4	7.50	74
5	5	4.00	39
6	6	1.80	17
7	7	0.90	8
8	8	0.79	7
9	9	0.73	7
10	10	0.45	4
11	11	0.11	1
12	12	0.00	0
13	13	0.00	0
14	14	0.00	0
15	15	0.06	0
16	16	0.00	0
17	17	0.28	2
18	22	0.19	1
19	27	0.09	0
20	32	0.00	0
21	37	0.00	0
22	42	0.00	0
23	47	0.00	0
24	52	0.00	0
25	57	0.00	0
26	62	0.00	0
27	67	0.00	0
28	72	0.00	0
29	77	0.00	0
30	82	0.00	0
31	87	0.00	0
32	92	0.00	0
	>	0.00	0



Filter
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32 s

S-T
32 s

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Offset
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Gain
5.55x

Counts
99350

NSF
Groups

Bin	Size	Total counts /cc	Counts percent	Surface area percent	Volume percent	Mass/bin ppm
	< 1	0.00	0.00%	0.00%	0.00%	0.0000
1	1-5	89,997.44	90.59%	41.69%	18.89%	0.5054
2	5-15	8,736.53	8.79%	34.89%	32.24%	0.8627
3	15-30	616.04	0.62%	23.42%	48.87%	1.3076
4	30-50	0.00	0.00%	0.00%	0.00%	0.0000
	50-100	0.00	0.00%	0.00%	0.00%	0.0000

Total counts: 99,350.00/cc
Total suspended solids: 2.68ppm (mg/liter)
Dilution factor: 100.00:1
Spec. gravity: 1.00
Mean size: 2.52um
Standard dev: 2.11um

Sample taken on April 29, 2021 at 10:02

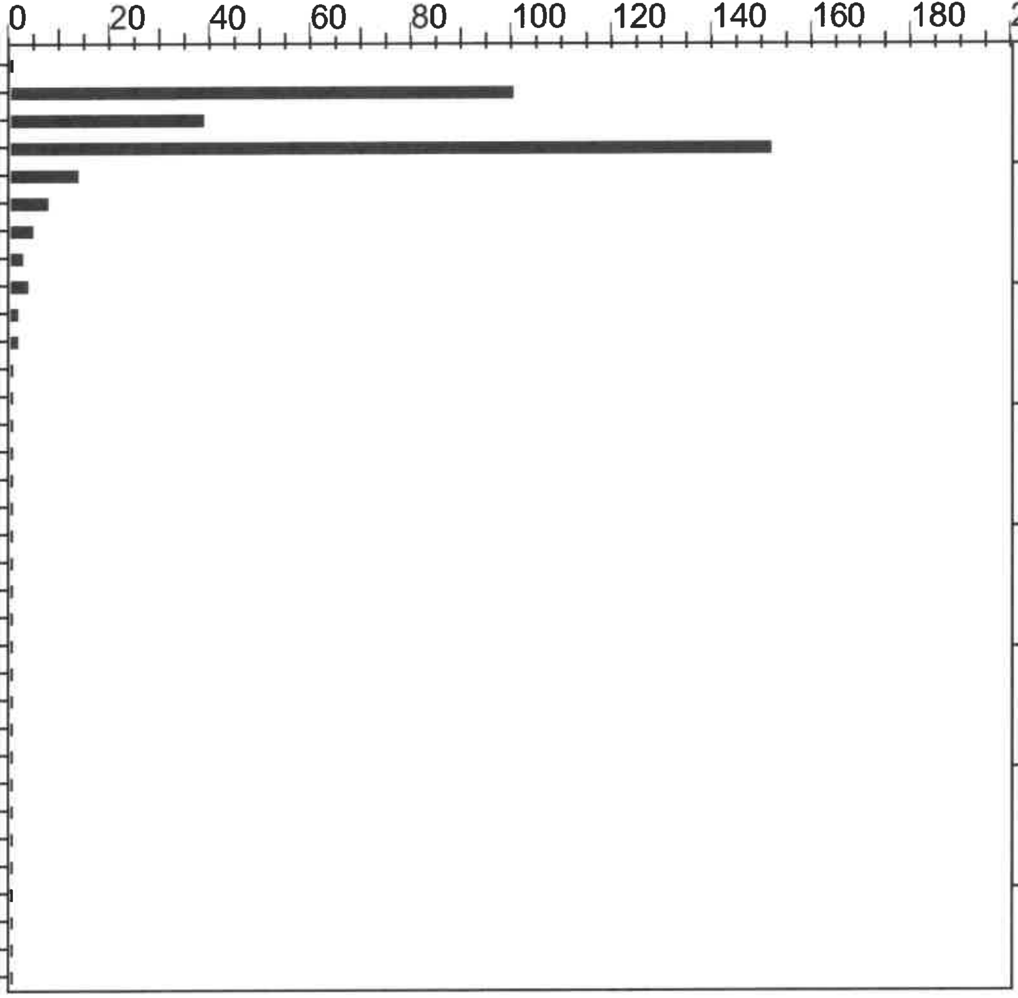
04/29/21
Fremont Analytical
2021040617-1
13CWS1-P67-1
Water

Bin	Size	Total counts /cc	Counts percent	Surface area percent	Volume percent	Mass/bin ppm
	<	0.00	0.00%	0.00%	0.00%	0.0000
1	1um	29,625.79	29.82%	2.75%	0.58%	0.0155
2	2um	35,338.13	35.57%	13.14%	4.65%	0.1245
3	3um	17,585.06	17.70%	14.71%	7.06%	0.1889
4	4um	7,448.45	7.50%	11.08%	6.60%	0.1765
5	5um	3,976.24	4.00%	9.24%	6.50%	0.1740
6	6um	1,792.11	1.80%	6.00%	4.84%	0.1295
7	7um	896.05	0.90%	4.08%	3.70%	0.0989
8	8um	784.05	0.79%	4.66%	4.67%	0.1250
9	9um	728.04	0.73%	5.48%	6.00%	0.1604
10	10um	448.03	0.45%	4.17%	4.93%	0.1319
11	11um	112.01	0.11%	1.26%	1.60%	0.0429
12	12um	0.00	0.00%	0.00%	0.00%	0.0000
13	13um	0.00	0.00%	0.00%	0.00%	0.0000
14	14um	0.00	0.00%	0.00%	0.00%	0.0000
15	15um	56.00	0.06%	1.17%	1.88%	0.0503
16	16um	0.00	0.00%	0.00%	0.00%	0.0000
17	17um	280.02	0.28%	7.52%	13.26%	0.3547
18	22um	186.68	0.19%	8.40%	17.96%	0.4806
19	27um	93.34	0.09%	6.33%	15.77%	0.4220
20	32um	0.00	0.00%	0.00%	0.00%	0.0000
21	37um	0.00	0.00%	0.00%	0.00%	0.0000
22	42um	0.00	0.00%	0.00%	0.00%	0.0000
23	47um	0.00	0.00%	0.00%	0.00%	0.0000
24	52um	0.00	0.00%	0.00%	0.00%	0.0000
25	57um	0.00	0.00%	0.00%	0.00%	0.0000
26	62um	0.00	0.00%	0.00%	0.00%	0.0000
27	67um	0.00	0.00%	0.00%	0.00%	0.0000
28	72um	0.00	0.00%	0.00%	0.00%	0.0000
29	77um	0.00	0.00%	0.00%	0.00%	0.0000
30	82um	0.00	0.00%	0.00%	0.00%	0.0000
31	87um	0.00	0.00%	0.00%	0.00%	0.0000
32	92um	0.00	0.00%	0.00%	0.00%	0.0000
	>	0.00	0.00%	0.00%	0.00%	0.0000
	TOTALS	99,350.00	100.00%	100.00%	100.00%	2.6757

04/29/21
NSF Blank

Spectrex Laser Particle Counter 800-822-3940 v12.5

#	um	%	Interim Count
	<	0.00	0
1	1	30.83	100
2	2	11.80	38
3	3	46.90	152
4	4	4.13	13
5	5	2.21	7
6	6	1.18	4
7	7	0.74	2
8	8	1.03	3
9	9	0.44	1
10	10	0.29	1
11	11	0.15	0
12	12	0.15	0
13	13	0.15	0
14	14	0.00	0
15	15	0.00	0
16	16	0.00	0
17	17	0.00	0
18	22	0.00	0
19	27	0.00	0
20	32	0.00	0
21	37	0.00	0
22	42	0.00	0
23	47	0.00	0
24	52	0.00	0
25	57	0.00	0
26	62	0.00	0
27	67	0.00	0
28	72	0.00	0
29	77	0.00	0
30	82	0.00	0
31	87	0.00	0
32	92	0.00	0
	>	0.00	0



Filter
0%

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S-T
32 s

Dilut'n
1.00:1

Offset
0.00V

Gain
5.55x

Counts
324

NSF
Groups

Bin	Size	Total counts /cc	Counts percent	Surface area percent	Volume percent	Mass/bin ppm
---	--------	---------	----------	----------	---------	-----------
	< 1	0.00	0.00%	0.00%	0.00%	0.0000
1	1-5	303.45	93.66%	63.22%	44.27%	0.0021
2	5-15	20.55	6.34%	36.78%	55.73%	0.0027
3	15-30	0.00	0.00%	0.00%	0.00%	0.0000
4	30-50	0.00	0.00%	0.00%	0.00%	0.0000
	50-100	0.00	0.00%	0.00%	0.00%	0.0000

Total counts: 324.00/cc
Total suspended solids: 0.00ppm (mg/liter)
Spec. gravity: 1.00
Mean size: 2.55um
Standard dev: 1.56um

Sample taken on April 29, 2021 at 09:41

04/29/21
NSF Blank

Bin	Size	Total counts /cc	Counts percent	Surface area percent	Volume percent	Mass/bin ppm
	<	0.00	0.00%	0.00%	0.00%	0.0000
1	1um	99.88	30.83%	3.44%	1.08%	0.0001
2	2um	38.23	11.80%	5.27%	2.79%	0.0001
3	3um	151.96	46.90%	47.13%	33.83%	0.0016
4	4um	13.38	4.13%	7.38%	6.57%	0.0003
5	5um	7.17	2.21%	6.18%	6.50%	0.0003
6	6um	3.82	1.18%	4.74%	5.73%	0.0003
7	7um	2.39	0.74%	4.03%	5.47%	0.0003
8	8um	3.35	1.03%	7.38%	11.05%	0.0005
9	9um	1.43	0.44%	4.00%	6.55%	0.0003
10	10um	0.96	0.29%	3.29%	5.83%	0.0003
11	11um	0.48	0.15%	1.99%	3.79%	0.0002
12	12um	0.48	0.15%	2.37%	4.81%	0.0002
13	13um	0.48	0.15%	2.78%	6.00%	0.0003
14	14um	0.00	0.00%	0.00%	0.00%	0.0000
15	15um	0.00	0.00%	0.00%	0.00%	0.0000
16	16um	0.00	0.00%	0.00%	0.00%	0.0000
17	17um	0.00	0.00%	0.00%	0.00%	0.0000
18	22um	0.00	0.00%	0.00%	0.00%	0.0000
19	27um	0.00	0.00%	0.00%	0.00%	0.0000
20	32um	0.00	0.00%	0.00%	0.00%	0.0000
21	37um	0.00	0.00%	0.00%	0.00%	0.0000
22	42um	0.00	0.00%	0.00%	0.00%	0.0000
23	47um	0.00	0.00%	0.00%	0.00%	0.0000
24	52um	0.00	0.00%	0.00%	0.00%	0.0000
25	57um	0.00	0.00%	0.00%	0.00%	0.0000
26	62um	0.00	0.00%	0.00%	0.00%	0.0000
27	67um	0.00	0.00%	0.00%	0.00%	0.0000
28	72um	0.00	0.00%	0.00%	0.00%	0.0000
29	77um	0.00	0.00%	0.00%	0.00%	0.0000
30	82um	0.00	0.00%	0.00%	0.00%	0.0000
31	87um	0.00	0.00%	0.00%	0.00%	0.0000
32	92um	0.00	0.00%	0.00%	0.00%	0.0000
	>	0.00	0.00%	0.00%	0.00%	0.0000
	TOTALS	324.00	100.00%	100.00%	100.00%	0.0048

Fremont Analytical

CHAIN OF CUSTODY RECORD

Omega COCID 1032	PAGE: 1	OF: 1

ADDRESS
Fremont Analytical, Inc.
3600 Fremont Ave. N.
Seattle, WA 98103
TEL: 206-352-3790
FAX: 206-352-7178
Website: www.fremontanalytical.com

21040617

SUB CONTRATOR: **Spectra**
COMPANY: **SPECTRA Laboratories**
ADDRESS: **2221 Ross Way**
CITY, STATE, ZIP: **Tacoma, WA 98421**
PHONE: **(253) 272-4850** FAX: **(253) 572-9838** EMAIL:
ACCOUNT #:

SPECIAL INSTRUCTIONS / COMMENTS:
2 Day TAT. Please email results to Brianna Barnes at bbarnes@fremontanalytical.com and Matt Langston : mlangston@fremontanalytical.com.

ITEM #	SAMPLE ID	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	DATE COLLECTED	NUMBER OF CONTAINERS	COMMENTS: Methanol Preserved Weights HOT Sample Notation, Additional Sample Description.
1	2104385-002C PHY-PART-W	13CWS1-P67-1	500 ml HDPE N	Water	4/27/2021 10:50:00 AM	1	PSD, 2 Day TAT (Due by 4:00pm, 4/30)

Relinquished By:	Date: 4/26/21	Time: 11:30	Received By:	Date: 4/28	Time: 7:50
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAT: Standard ☐ **RUSH** Next BD ☐ 2nd BD ☒ 3rd BD ☐

Note: RUSH requests will incur surcharges!

REPORT TRANSMITTAL DESIRED:
☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY
Temp of samples 4.4 °C Attempt to Cool ?
Comments:

Fremont ANALYTICAL

CHAIN OF CUSTODY RECORD

Omega COC ID 1031 | PAGE: 1 | OF: 1

ADDRESS
Fremont Analytical, Inc.
3600 Fremont Ave. N.
Seattle, WA 98103
TEL: 206-352-3790
FAX: 206-352-7178
Website: www.fremontanalytical.com

2021040618

SUBCONTRATOR: **Spectra**
COMPANY: **SPECTRA Laboratories**
ADDRESS: **2221 Ross Way**
CITY, STATE, ZIP: **Tacoma, WA 98421**
PHONE: **(253) 272-4850** FAX: **(253) 572-9838** EMAIL:
ACCOUNT #:

SPECIAL INSTRUCTIONS / COMMENTS:
Standard TAT for sample 001, ~~2 Day TAT for sample 2 (Results due by 4pm 4/30)~~ Please email results to Briana Barnes at bbarnes@fremontanalytical.com and Matt Langston at mlangston@fremontanalytical.com.

Edits per GAC 4/28/21

ITEM #	SAMPLE ID	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	DATE COLLECTED	NUMBER OF CONTAINERS	COMMENTS: Methanol Preserved Weights, HOLD Sample Notation, Additional Sample Description
1	2104385-001C PHY PART-W	13CWS1-P65-1	500 ml HDPE N	Water	4/27/2021 11:05:00 AM	1	PSD, Standard TAT
~~2~~	~~2104385-002C~~ ~~PHY PART-W~~	~~13CWS1-P67-1~~	~~500 ml HDPE N~~	~~Water~~	~~4/27/2021 [illegible] AM~~	~~1~~	~~PSD, 2-day TAT (Due by 400pm, 4/30)~~

Relinquished By:	Date: 4/28/21	Time: 1130	Received by:	Date: 4/28	Time: 1:50
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAT: Standard ☐ RUSH: 3 DAY ☐ 2 DAY ☐ 1 DAY

Note: RUSH requests will incur surcharges!

REPORT TRANSMITTAL DESIRED
☐ HARDCOPY (extra cost) ☐ FAX ☐ MAIL ☐ E-MAIL

FOR LAB USE ONLY
Temp. (Celsius): 4.4 Ambient: ☐
Comments:

Work Order: 2104385
CLIENT: Clear Water Compliance Services
Project: Dawn Foods

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **MB-32125FB** SampType: **MBLK** Units: **µg/L** Prep Date: **4/29/2021** RunNo: **66901**
Client ID: **MBLKW** Batch ID: **32126** Analysis Date: **4/30/2021** SeqNo: **1347583**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	ND	2.00									
Zinc	ND	3.80									

Sample ID: **MB-32126** SampType: **MBLK** Units: **µg/L** Prep Date: **4/29/2021** RunNo: **66901**
Client ID: **MBLKW** Batch ID: **32126** Analysis Date: **4/30/2021** SeqNo: **1347584**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	ND	2.00									
Zinc	ND	3.80									

Sample ID: **LCS-32126** SampType: **LCS** Units: **µg/L** Prep Date: **4/29/2021** RunNo: **66901**
Client ID: **LCSW** Batch ID: **32126** Analysis Date: **4/30/2021** SeqNo: **1347585**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	97.0	2.00	100.0	0	97.0	85	115				
Zinc	110	3.80	100.0	0	110	85	115				

Sample ID: **2104385-002BDUP** SampType: **DUP** Units: **µg/L** Prep Date: **4/29/2021** RunNo: **66901**
Client ID: **13CWS1-P67-1** Batch ID: **32126** Analysis Date: **4/30/2021** SeqNo: **1347587**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	ND	2.00						0		30	
Zinc	ND	3.80						0		30	

Work Order: 2104385
CLIENT: Clear Water Compliance Services
Project: Dawn Foods

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **2104385-002BMS** SampType: **MS** Units: **µg/L** Prep Date: **4/29/2021** RunNo: **66901**
Client ID: **13CWS1-P67-1** Batch ID: **32126** Analysis Date: **4/30/2021** SeqNo: **1347590**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	489	2.00	500.0	0	97.8	70	130				
Zinc	553	3.80	500.0	0	111	70	130				

Sample ID: **2104385-002BMSD** SampType: **MSD** Units: **µg/L** Prep Date: **4/29/2021** RunNo: **66901**
Client ID: **13CWS1-P67-1** Batch ID: **32126** Analysis Date: **4/30/2021** SeqNo: **1347591**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	507	2.00	500.0	0	101	70	130	488.8	3.56	30	
Zinc	576	3.80	500.0	0	115	70	130	552.6	4.16	30	

Work Order: 2104385
CLIENT: Clear Water Compliance Services
Project: Dawn Foods

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **MB-32124** SampType: **MBLK** Units: **µg/L** Prep Date: **4/29/2021** RunNo: **66878**
Client ID: **MBLKW** Batch ID: **32124** Analysis Date: **4/29/2021** SeqNo: **1346868**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	ND	2.00									
Zinc	ND	2.50									

Sample ID: **LCS-32124** SampType: **LCS** Units: **µg/L** Prep Date: **4/29/2021** RunNo: **66878**
Client ID: **LCSW** Batch ID: **32124** Analysis Date: **4/29/2021** SeqNo: **1346869**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	101	2.00	100.0	0	101	85	115				
Zinc	99.8	2.50	100.0	0	99.8	85	115				

Sample ID: **2104385-002ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **4/29/2021** RunNo: **66878**
Client ID: **13CWS1-P67-1** Batch ID: **32124** Analysis Date: **4/29/2021** SeqNo: **1346871**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	52.9	2.00						51.92	1.90	30	
Zinc	522	2.50						538.8	3.17	30	

Sample ID: **2104385-002AMS** SampType: **MS** Units: **µg/L** Prep Date: **4/29/2021** RunNo: **66878**
Client ID: **13CWS1-P67-1** Batch ID: **32124** Analysis Date: **4/29/2021** SeqNo: **1346872**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	557	2.00	500.0	51.92	101	70	130				
Zinc	1,010	2.50	500.0	538.8	93.5	70	130				

Work Order: 2104385
CLIENT: Clear Water Compliance Services
Project: Dawn Foods

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **2104385-002AMSD** SampType: **MSD** Units: **µg/L** Prep Date: **4/29/2021** RunNo: **66878**
Client ID: **13CWS1-P67-1** Batch ID: **32124** Analysis Date: **4/29/2021** SeqNo: **1346873**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	555	2.00	500.0	51.92	101	70	130	556.6	0.314	30	
Zinc	1,050	2.50	500.0	538.8	101	70	130	1,006	3.83	30	

Fremont Analytical

Sample Log-In Check List

Client Name: **CWCS**
Work Order Number: **2104385**
Logged by: **Gabrielle Coeuille**
Date Received: **4/28/2021 8:48:00 AM**

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Coolers are present? Yes ☑ No ☐ NA ☐
4. Shipping container/cooler in good condition? Yes ☑ No ☐
5. Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact) Yes ☑ No ☐ Not Present ☐
6. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
7. Were all items received at a temperature of >2°C to 6°C * Yes ☑ No ☐ NA ☐
8. Sample(s) in proper container(s)? Yes ☑ No ☐
9. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
10. Are samples properly preserved? Yes ☑ No ☐
11. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☑
13. Did all samples containers arrive in good condition(unbroken)? Yes ☑ No ☐
14. Does paperwork match bottle labels? Yes ☑ No ☐
15. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
16. Is it clear what analyses were requested? Yes ☑ No ☐
17. Were all holding times able to be met? Yes ☑ No ☐

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:
Date:
By Whom:
Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:
Client Instructions:

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample 1	4.9

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Fremont Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 4/28/21 **Page:** 1 **of:** 1

Laboratory Project No (internal): 2104385

Special Remarks:

Project Name: Northwest Recycling / Dawn Foods

Project No: 17NWR1 & 19DWMN1

Collected by: Josh Kirby

Location: Everett

Report To (PM): John Mandelin

PM Email: john.mandelin@clearwaterservices.com

Client: Clear water Services

Address: 2525 W Casino Rd #2a

City, State, Zip: Everett, WA 98204

Telephone: 425-412-5700

Fax:

Sample Disposal: ☐ Return to client ☑ Disposal by lab (after 30 days)

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	PSD				Comments
1	13CWS1-P65-1	4/27	1105	W	3									X	T/D			Y				Standard turn around time
2	13CWS1-P67-1	4/27	1050	W	3									X	T/D			Y				2-day Turnaround time
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						

***Matrix:** A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

****Metals (Circle):** MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr [✓ Cu] Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl V [✓ Zn]

*****Anions (Circle):** Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time:

☐ Standard ☐ Next Day

☐ 3 Day ☐ Same Day

☒ 2 Day _______ (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x	Josh Kirby	4/28/21 0800	x Claire Anderson	Claire Anderson	4/28/21 0948
x			x		

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Clear Water Compliance Services
John Mandelin
2525 West Casino Road, Suite 7A
Everett, WA 98204

RE: Dawn Foods
Work Order Number: 2104417

Attention John Mandelin:

Fremont Analytical, Inc. received 4 sample(s) on 4/29/2021 for the analyses presented in the following report.

Total Metals by EPA Method 200.8

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910

CLIENT: Clear Water Compliance Services
Project: Dawn Foods
Work Order: 2104417

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2104417-001	13CWS1-P68-1	04/29/2021 9:50 AM	04/29/2021 3:39 PM
2104417-002	13CWS1-P68-2	04/29/2021 10:25 AM	04/29/2021 3:39 PM
2104417-003	13CWS1-P68-3	04/29/2021 10:50 AM	04/29/2021 3:39 PM
2104417-004	13CWS1-P68-4	04/29/2021 12:45 PM	04/29/2021 3:39 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **2104417**

Date:

CLIENT: Clear Water Compliance Services

Project: Dawn Foods

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2104417**
Date Reported:

CLIENT: Clear Water Compliance Services
Project: Dawn Foods

Lab ID: 2104417-001 **Collection Date:** 4/29/2021 9:50:00 AM
Client Sample ID: **13CWS1-P68-1** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 200.8				Batch ID: 32140		Analyst: EH
Copper	4.99	2.00		µg/L	1	5/1/2021 12:38:00 AM
Zinc	4.58	2.50		µg/L	1	5/1/2021 12:38:00 AM

Lab ID: 2104417-002 **Collection Date:** 4/29/2021 10:25:00 AM
Client Sample ID: **13CWS1-P68-2** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 200.8				Batch ID: 32140		Analyst: EH
Copper	28.6	2.00		µg/L	1	5/1/2021 12:54:44 AM
Zinc	4.48	2.50		µg/L	1	5/1/2021 12:54:44 AM

Lab ID: 2104417-003 **Collection Date:** 4/29/2021 10:50:00 AM
Client Sample ID: **13CWS1-P68-3** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 200.8				Batch ID: 32140		Analyst: EH
Copper	9.70	2.00		µg/L	1	5/1/2021 1:00:18 AM
Zinc	4.14	2.50		µg/L	1	5/1/2021 1:00:18 AM

CLIENT: Clear Water Compliance Services
Project: Dawn Foods

Lab ID: 2104417-004
Client Sample ID: **13CWS1-P68-4**
Collection Date: 4/29/2021 12:45:00 PM
Matrix: Water

Analyses	**Result**	**RL**	**Qual**	**Units**	**DF**	**Date Analyzed**
Total Metals by EPA Method 200.8				Batch ID: 32140		Analyst: EH
Copper	3.97	2.00		µg/L	1	5/1/2021 1:05:52 AM
Zinc	2.71	2.50		µg/L	1	5/1/2021 1:05:52 AM

Work Order: 2104417
CLIENT: Clear Water Compliance Services
Project: Dawn Foods

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **MB-32140** SampType: **MBLK** Units: **µg/L** Prep Date: **4/30/2021** RunNo: **66915**
Client ID: **MBLKW** Batch ID: **32140** Analysis Date: **4/30/2021** SeqNo: **1347661**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	ND	2.00									
Zinc	ND	2.50									

Sample ID: **LCS-32140** SampType: **LCS** Units: **µg/L** Prep Date: **4/30/2021** RunNo: **66915**
Client ID: **LCSW** Batch ID: **32140** Analysis Date: **4/30/2021** SeqNo: **1347662**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	98.0	2.00	100.0	0	98.0	85	115				
Zinc	107	2.50	100.0	0	107	85	115				

Sample ID: **2104397-001CDUP** SampType: **DUP** Units: **µg/L** Prep Date: **4/30/2021** RunNo: **66915**
Client ID: **BATCH** Batch ID: **32140** Analysis Date: **4/30/2021** SeqNo: **1347680**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	ND	2.00						0		30	
Zinc	ND	2.50						0		30	

Sample ID: **2104397-001CMS** SampType: **MS** Units: **µg/L** Prep Date: **4/30/2021** RunNo: **66915**
Client ID: **BATCH** Batch ID: **32140** Analysis Date: **4/30/2021** SeqNo: **1347664**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	537	2.00	500.0	0.7635	107	70	130				
Zinc	560	2.50	500.0	1.012	112	70	130				

Work Order: 2104417
CLIENT: Clear Water Compliance Services
Project: Dawn Foods

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **2104397-001CMSD** SampType: **MSD** Units: **µg/L** Prep Date: **4/30/2021** RunNo: **66915**
Client ID: **BATCH** Batch ID: **32140** Analysis Date: **4/30/2021** SeqNo: **1347665**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	471	2.00	500.0	0.7635	94.0	70	130	537.4	13.2	30	
Zinc	506	2.50	500.0	1.012	101	70	130	560.5	10.2	30	

Fremont Analytical

Sample Log-In Check List

Client Name:	**CWCS**	Work Order Number:	**2104417**
Logged by:	**Clare Griggs**	Date Received:	**4/29/2021 3:39:00 PM**

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Coolers are present? Yes ☑ No ☐ NA ☐
4. Shipping container/cooler in good condition? Yes ☑ No ☐
5. Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact) Yes ☑ No ☐ Not Present ☐
6. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
7. Were all items received at a temperature of >2°C to 6°C * Yes ☑ No ☐ NA ☐
8. Sample(s) in proper container(s)? Yes ☑ No ☐
9. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
10. Are samples properly preserved? Yes ☑ No ☐
11. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☑
13. Did all samples containers arrive in good condition(unbroken)? Yes ☑ No ☐
14. Does paperwork match bottle labels? Yes ☑ No ☐
15. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
16. Is it clear what analyses were requested? Yes ☑ No ☐
17. Were all holding times able to be met? Yes ☑ No ☐

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date:
By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:
Client Instructions:

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample	5.2

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Fremont Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 4/24/21
Page: 2 of: 2
Laboratory Project No (internal): 2104417
Special Remarks:

Client: Clear Water Services
Address: 2525 W Casino Rd #7A
City, State, Zip: Everett, WA 98204
Telephone: 425-412-5200
Fax:

Project Name: Darn Foods
Project No: 19 DWN1
Collected by: Josh Kirby
Location: Everett
Report To (PM): John Mandelin
PM Email: john.mandelin@clear-waterservices.com

Sample Disposal: ☐ Return to client ☑ Disposal by lab (after 30 days)

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) / Dissolved (D)	Anions (IC)***	EDB (8011)					Comments
1 13CWSI-P68-1	4/24	0950	W										X	T/D							
2 13CWSI-P68-2	4/24	1025	W										X	T/D							
3 13CWSI-P68-3	4/24	1050	W										X	T/D							
4 13CWSI-P68-4	4/24	1245	W										X	T/D							
5																					
6																					
7																					
8																					
9																					
10																					

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr [✓ Cu] Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V [✓ Zn]

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time:
- ☐ Standard
- ☐ 3 Day
- ☑ 2 Day
- ☐ Next Day
- Same Day ________ (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x	4/24/21 1430	x	4/29/21 1539
x		x	

Historical Total Zinc and Total Copper Results

Year	Quarter	Sample Date	Monitoring Point	Copper (Total, ug/L)	Zinc (Total, ug/L)
2015	Q1	3/14/2015	CP	6.96	81.5
	Q3	9/1/2015	CP	**23.6**	114
	Q3	9/17/2015	CP	**56**	NM
	Q4	10/7/2015	CP	**23**	**142**
	Q4	11/17/2015	CP	6.74	109
	Q4	12/8/2015	CP	3.3	83
2016	Q1	2/19/2015	CP	4.78	69.6
	Q2	4/24/2016	CP	14	110
	Q3	7/22/2016	CP	**31.7**	**212**
	Q3	9/2/2016	CP	**33.5**	**201**
	Q4	10/4/2016	CP	**37.9**	**229**
	Q4	10/13/2016	CP	6	73.6
	Q4	10/31/2016	CP	6.12	69.2
2017	Q1	1/18/2017	CP	**16.4**	**130**
	Q1	2/9/2017	CP	6.23	65.8
	Q2	5/11/2017	CP	**15.2**	117
	Q2	6/8/2017	CP	**38**	NM
	Q4	10/18/2017	CP	**21.1**	**223**
2018	Q1	3/8/2018	CP	**26.4**	97.2
	Q2	6/8/2018	CP	**117**	**599**
	Q3	9/14/2018	CP	**29.9**	87.6
	Q4	10/5/2018	CP	**28.3**	**177**
	Q4	12/18/2018	CP	11.1	88.3
2019	Q1	3/12/2019	CP	**22.2**	**180**
	Q2	4/19/2019	CP	**36.1**	**223**
	Q3	9/9/2019	CP	**77.5**	**251**
	Q4	10/16/2019	CP	**20.5**	**143**
	Q4	12/19/2019	CP	7.26	73.1
2020	Q1	3/13/2020	CP	13.4	**239**
	Q1	3/27/2020	CP	NM	**466**
	Q2	5/21/2020	CP	**19.4**	**154**
	Q2	6/9/2020	CP	**25.4**	**200**
	Q3	9/18/2020	CP	**68.4**	**474**
	Q4	12/8/2020	CP	8.03	95.4
2021	Q1	2/1/2021	CP	3.98	44.9

Notes:

CP = Collection Point

NM = Not measuder

ug/L = micrograms per liter

BOLD denotes benchmark exceedence

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	Dawn
Site Name:	Dawn Foods
Site Address:	6901 Fox Ave South
City:	Seattle
Report Date:	5/7/2021
Gage:	SPU 158 Year 5min
Data Start:	10/01/1901
Data End:	09/18/2059
Timestep:	5 Minute
Precip Scale:	1.000
Version Date:	2018/10/10
Version:	4.2.16

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROADS FLAT	5
Impervious Total	5
Basin Total	5

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROADS FLAT	5
Impervious Total	5
Basin Total	5

Element Flows To:

Surface	Interflow	Groundwater

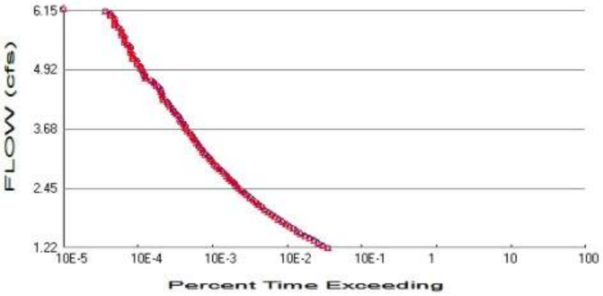
Routing Elements

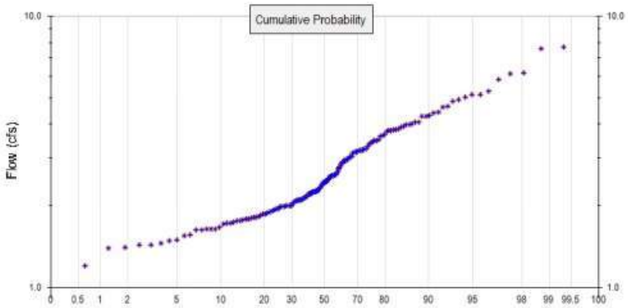
Predeveloped Routing

Mitigated Routing

Analysis Results

POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area:	0
Total Impervious Area:	5

Mitigated Landuse Totals for POC #1

Total Pervious Area:	0
Total Impervious Area:	5

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	2.515248
5 year	3.526268
10 year	4.270405
25 year	5.298482
50 year	6.130034
100 year	7.019512

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	2.515248
5 year	3.526268
10 year	4.270405
25 year	5.298482
50 year	6.130034
100 year	7.019512

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1902	1.987	1.987
1903	3.812	3.812
1904	2.742	2.742
1905	1.779	1.779
1906	1.896	1.896
1907	2.218	2.218
1908	1.884	1.884
1909	3.038	3.038
1910	1.865	1.865
1911	3.641	3.641

1912	3.455	3.455
1913	1.794	1.794
1914	7.596	7.596
1915	1.670	1.670
1916	5.129	5.129
1917	1.199	1.199
1918	1.997	1.997
1919	1.401	1.401
1920	2.095	2.095
1921	1.399	1.399
1922	1.812	1.812
1923	1.634	1.634
1924	4.393	4.393
1925	1.791	1.791
1926	3.150	3.150
1927	1.976	1.976
1928	1.431	1.431
1929	4.429	4.429
1930	4.942	4.942
1931	1.565	1.565
1932	2.147	2.147
1933	2.558	2.558
1934	2.335	2.335
1935	1.999	1.999
1936	2.486	2.486
1937	3.488	3.488
1938	2.443	2.443
1939	1.944	1.944
1940	3.246	3.246
1941	3.899	3.899
1942	1.926	1.926
1943	2.438	2.438
1944	3.979	3.979
1945	4.068	4.068
1946	2.257	2.257
1947	1.550	1.550
1948	2.081	2.081
1949	4.020	4.020
1950	1.455	1.455
1951	5.130	5.130
1952	3.924	3.924
1953	3.473	3.473
1954	1.636	1.636
1955	1.487	1.487
1956	3.760	3.760
1957	2.243	2.243
1958	3.234	3.234
1959	2.785	2.785
1960	1.916	1.916
1961	5.047	5.047
1962	3.661	3.661
1963	2.233	2.233
1964	5.277	5.277
1965	2.665	2.665
1966	1.792	1.792
1967	2.597	2.597
1968	2.105	2.105
1969	1.728	1.728

1970	2.952	2.952
1971	2.446	2.446
1972	7.722	7.722
1973	4.636	4.636
1974	2.963	2.963
1975	2.628	2.628
1976	3.784	3.784
1977	1.708	1.708
1978	2.383	2.383
1979	2.532	2.532
1980	3.809	3.809
1981	2.577	2.577
1982	1.741	1.741
1983	4.080	4.080
1984	2.161	2.161
1985	2.257	2.257
1986	2.451	2.451
1987	3.000	3.000
1988	1.492	1.492
1989	1.433	1.433
1990	2.209	2.209
1991	3.220	3.220
1992	3.128	3.128
1993	2.974	2.974
1994	2.008	2.008
1995	1.642	1.642
1996	1.860	1.860
1997	2.008	2.008
1998	2.477	2.477
1999	2.091	2.091
2000	2.599	2.599
2001	2.406	2.406
2002	2.925	2.925
2003	1.906	1.906
2004	4.272	4.272
2005	6.200	6.200
2006	2.568	2.568
2007	2.294	2.294
2008	2.115	2.115
2009	3.205	3.205
2010	2.268	2.268
2011	2.905	2.905
2012	2.132	2.132
2013	1.637	1.637
2014	2.851	2.851
2015	4.287	4.287
2016	2.241	2.241
2017	4.659	4.659
2018	1.942	1.942
2019	3.410	3.410
2020	2.103	2.103
2021	2.206	2.206
2022	3.388	3.388
2023	4.299	4.299
2024	5.823	5.823
2025	2.880	2.880
2026	2.760	2.760
2027	2.576	2.576

2028	1.758	1.758
2029	1.766	1.766
2030	3.192	3.192
2031	0.945	0.945
2032	1.990	1.990
2033	2.277	2.277
2034	1.723	1.723
2035	1.994	1.994
2036	3.167	3.167
2037	3.793	3.793
2038	2.060	2.060
2039	3.856	3.856
2040	3.509	3.509
2041	1.810	1.810
2042	3.048	3.048
2043	4.854	4.854
2044	2.255	2.255
2045	1.633	1.633
2046	1.834	1.834
2047	2.356	2.356
2048	2.162	2.162
2049	3.193	3.193
2050	2.314	2.314
2051	2.524	2.524
2052	2.105	2.105
2053	2.019	2.019
2054	6.125	6.125
2055	3.145	3.145
2056	3.315	3.315
2057	1.830	1.830
2058	3.604	3.604
2059	3.988	3.988

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	**Predeveloped**	**Mitigated**
1	7.7215	7.7215
2	7.5957	7.5957
3	6.2004	6.2004
4	6.1245	6.1245
5	5.8228	5.8228
6	5.2767	5.2767
7	5.1297	5.1297
8	5.1289	5.1289
9	5.0473	5.0473
10	4.9416	4.9416
11	4.8538	4.8538
12	4.6587	4.6587
13	4.6356	4.6356
14	4.4292	4.4292
15	4.3934	4.3934
16	4.2988	4.2988
17	4.2874	4.2874
18	4.2719	4.2719
19	4.0803	4.0803
20	4.0682	4.0682
21	4.0196	4.0196
22	3.9879	3.9879

23	3.9786	3.9786
24	3.9243	3.9243
25	3.8987	3.8987
26	3.8557	3.8557
27	3.8124	3.8124
28	3.8092	3.8092
29	3.7933	3.7933
30	3.7836	3.7836
31	3.7602	3.7602
32	3.6611	3.6611
33	3.6411	3.6411
34	3.6039	3.6039
35	3.5091	3.5091
36	3.4879	3.4879
37	3.4732	3.4732
38	3.4554	3.4554
39	3.4103	3.4103
40	3.3879	3.3879
41	3.3152	3.3152
42	3.2460	3.2460
43	3.2336	3.2336
44	3.2201	3.2201
45	3.2054	3.2054
46	3.1928	3.1928
47	3.1919	3.1919
48	3.1672	3.1672
49	3.1497	3.1497
50	3.1449	3.1449
51	3.1284	3.1284
52	3.0481	3.0481
53	3.0377	3.0377
54	3.0004	3.0004
55	2.9738	2.9738
56	2.9630	2.9630
57	2.9517	2.9517
58	2.9248	2.9248
59	2.9045	2.9045
60	2.8804	2.8804
61	2.8509	2.8509
62	2.7852	2.7852
63	2.7596	2.7596
64	2.7423	2.7423
65	2.6645	2.6645
66	2.6277	2.6277
67	2.5986	2.5986
68	2.5969	2.5969
69	2.5772	2.5772
70	2.5758	2.5758
71	2.5682	2.5682
72	2.5575	2.5575
73	2.5315	2.5315
74	2.5243	2.5243
75	2.4861	2.4861
76	2.4767	2.4767
77	2.4512	2.4512
78	2.4460	2.4460
79	2.4427	2.4427
80	2.4383	2.4383

81	2.4060	2.4060
82	2.3833	2.3833
83	2.3563	2.3563
84	2.3355	2.3355
85	2.3142	2.3142
86	2.2940	2.2940
87	2.2767	2.2767
88	2.2676	2.2676
89	2.2572	2.2572
90	2.2570	2.2570
91	2.2552	2.2552
92	2.2431	2.2431
93	2.2407	2.2407
94	2.2326	2.2326
95	2.2182	2.2182
96	2.2092	2.2092
97	2.2057	2.2057
98	2.1625	2.1625
99	2.1612	2.1612
100	2.1473	2.1473
101	2.1324	2.1324
102	2.1148	2.1148
103	2.1053	2.1053
104	2.1046	2.1046
105	2.1026	2.1026
106	2.0953	2.0953
107	2.0911	2.0911
108	2.0811	2.0811
109	2.0596	2.0596
110	2.0193	2.0193
111	2.0083	2.0083
112	2.0077	2.0077
113	1.9989	1.9989
114	1.9971	1.9971
115	1.9938	1.9938
116	1.9899	1.9899
117	1.9871	1.9871
118	1.9759	1.9759
119	1.9440	1.9440
120	1.9417	1.9417
121	1.9263	1.9263
122	1.9163	1.9163
123	1.9060	1.9060
124	1.8958	1.8958
125	1.8838	1.8838
126	1.8651	1.8651
127	1.8596	1.8596
128	1.8337	1.8337
129	1.8300	1.8300
130	1.8118	1.8118
131	1.8096	1.8096
132	1.7943	1.7943
133	1.7923	1.7923
134	1.7907	1.7907
135	1.7792	1.7792
136	1.7656	1.7656
137	1.7576	1.7576
138	1.7410	1.7410

139	1.7283	1.7283
140	1.7227	1.7227
141	1.7079	1.7079
142	1.6702	1.6702
143	1.6417	1.6417
144	1.6369	1.6369
145	1.6357	1.6357
146	1.6337	1.6337
147	1.6335	1.6335
148	1.5652	1.5652
149	1.5496	1.5496
150	1.4916	1.4916
151	1.4868	1.4868
152	1.4545	1.4545
153	1.4328	1.4328
154	1.4313	1.4313
155	1.4007	1.4007
156	1.3991	1.3991
157	1.1990	1.1990
158	0.9450	0.9450

Duration Flows

The Facility PASSED

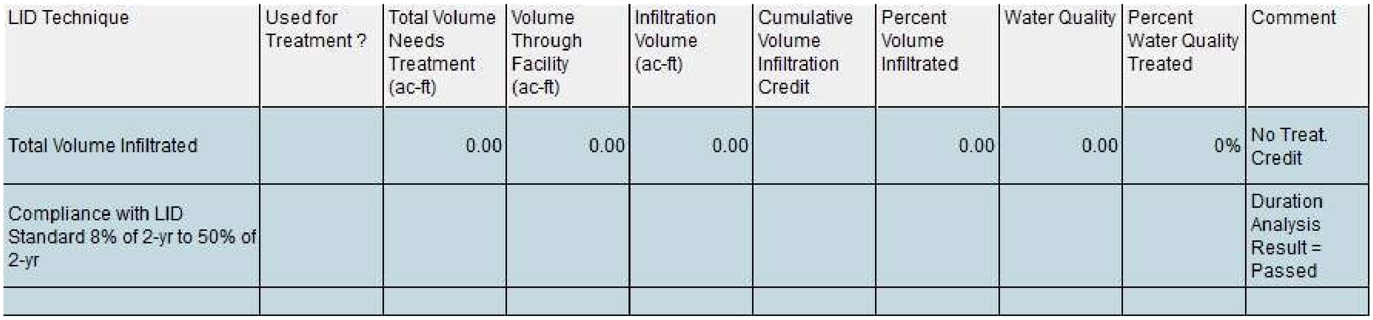
Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
1.2576	5799	5799	100	Pass
1.3068	4985	4985	100	Pass
1.3561	4330	4330	100	Pass
1.4053	3797	3797	100	Pass
1.4545	3310	3310	100	Pass
1.5037	2895	2895	100	Pass
1.5529	2527	2527	100	Pass
1.6021	2238	2238	100	Pass
1.6514	1994	1994	100	Pass
1.7006	1790	1790	100	Pass
1.7498	1588	1588	100	Pass
1.7990	1443	1443	100	Pass
1.8482	1279	1279	100	Pass
1.8974	1126	1126	100	Pass
1.9467	1022	1022	100	Pass
1.9959	924	924	100	Pass
2.0451	828	828	100	Pass
2.0943	763	763	100	Pass
2.1435	687	687	100	Pass
2.1927	641	641	100	Pass
2.2419	585	585	100	Pass
2.2912	533	533	100	Pass
2.3404	478	478	100	Pass
2.3896	440	440	100	Pass
2.4388	409	409	100	Pass
2.4880	373	373	100	Pass
2.5372	345	345	100	Pass
2.5865	325	325	100	Pass
2.6357	298	298	100	Pass
2.6849	279	279	100	Pass
2.7341	259	259	100	Pass
2.7833	240	240	100	Pass
2.8325	224	224	100	Pass
2.8818	205	205	100	Pass
2.9310	191	191	100	Pass
2.9802	176	176	100	Pass
3.0294	165	165	100	Pass
3.0786	155	155	100	Pass
3.1278	148	148	100	Pass
3.1771	135	135	100	Pass
3.2263	125	125	100	Pass
3.2755	120	120	100	Pass
3.3247	112	112	100	Pass
3.3739	107	107	100	Pass
3.4231	103	103	100	Pass
3.4724	96	96	100	Pass
3.5216	90	90	100	Pass
3.5708	88	88	100	Pass
3.6200	83	83	100	Pass
3.6692	77	77	100	Pass
3.7184	72	72	100	Pass
3.7677	71	71	100	Pass
3.8169	68	68	100	Pass

3.8661	63	63	100	Pass
3.9153	61	61	100	Pass
3.9645	58	58	100	Pass
4.0137	54	54	100	Pass
4.0630	51	51	100	Pass
4.1122	49	49	100	Pass
4.1614	44	44	100	Pass
4.2106	42	42	100	Pass
4.2598	41	41	100	Pass
4.3090	36	36	100	Pass
4.3582	36	36	100	Pass
4.4075	35	35	100	Pass
4.4567	34	34	100	Pass
4.5059	33	33	100	Pass
4.5551	32	32	100	Pass
4.6043	29	29	100	Pass
4.6535	27	27	100	Pass
4.7028	25	25	100	Pass
4.7520	21	21	100	Pass
4.8012	21	21	100	Pass
4.8504	20	20	100	Pass
4.8996	19	19	100	Pass
4.9488	18	18	100	Pass
4.9981	18	18	100	Pass
5.0473	16	16	100	Pass
5.0965	16	16	100	Pass
5.1457	14	14	100	Pass
5.1949	14	14	100	Pass
5.2441	14	14	100	Pass
5.2934	13	13	100	Pass
5.3426	13	13	100	Pass
5.3918	13	13	100	Pass
5.4410	12	12	100	Pass
5.4902	11	11	100	Pass
5.5394	11	11	100	Pass
5.5887	11	11	100	Pass
5.6379	10	10	100	Pass
5.6871	10	10	100	Pass
5.7363	10	10	100	Pass
5.7855	9	9	100	Pass
5.8347	8	8	100	Pass
5.8840	8	8	100	Pass
5.9332	8	8	100	Pass
5.9824	8	8	100	Pass
6.0316	7	7	100	Pass
6.0808	7	7	100	Pass
6.1300	6	6	100	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1
On-line facility volume: 0.3218 acre-feet
On-line facility target flow: 0.7981 cfs.
Adjusted for 15 min: 0.7981 cfs.
Off-line facility target flow: 0.4577 cfs.
Adjusted for 15 min: 0.4577 cfs.

LID Report



LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Total Volume Infiltrated		0.00	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

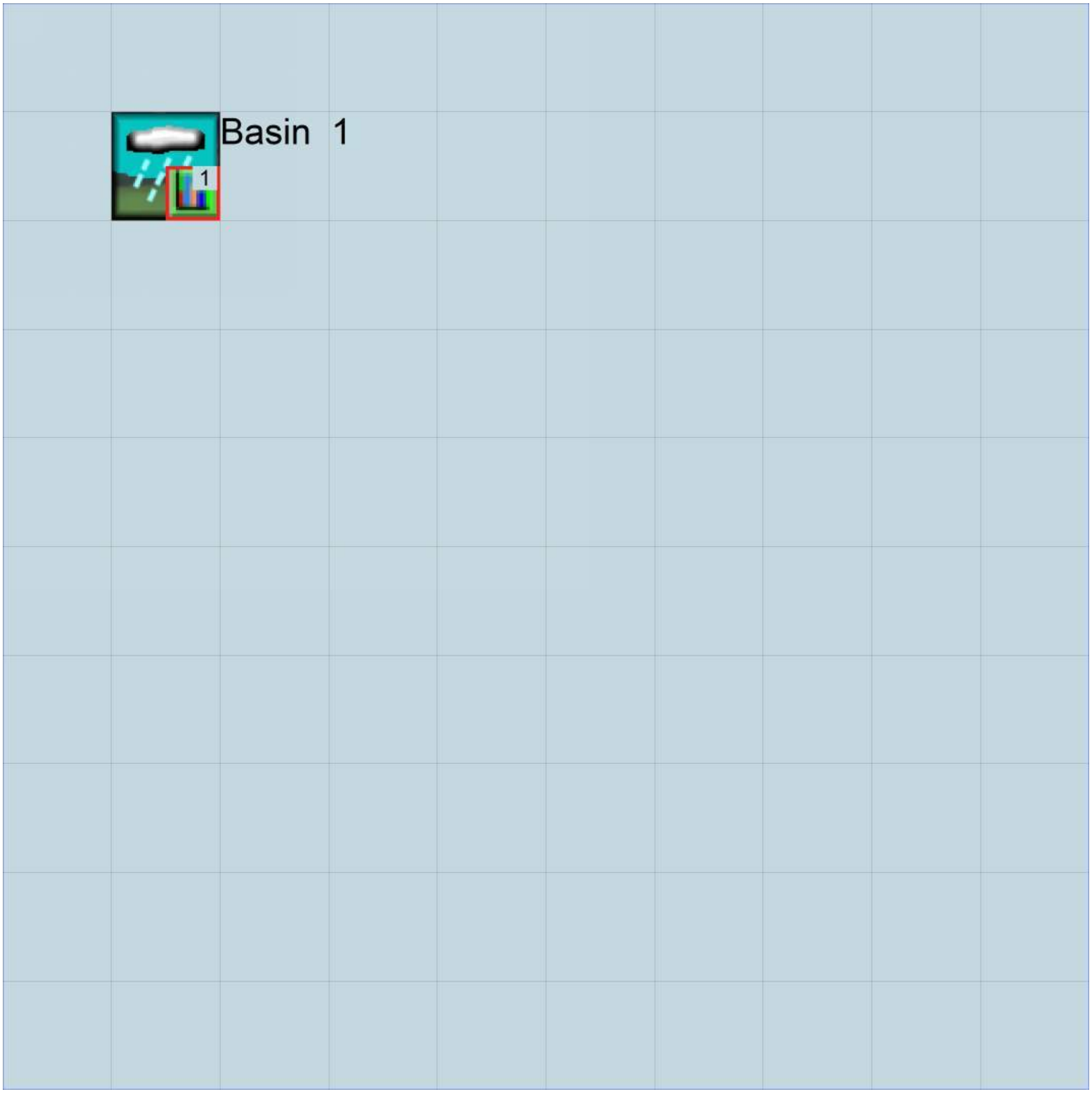
No PERLND changes have been made.

IMPLND Changes

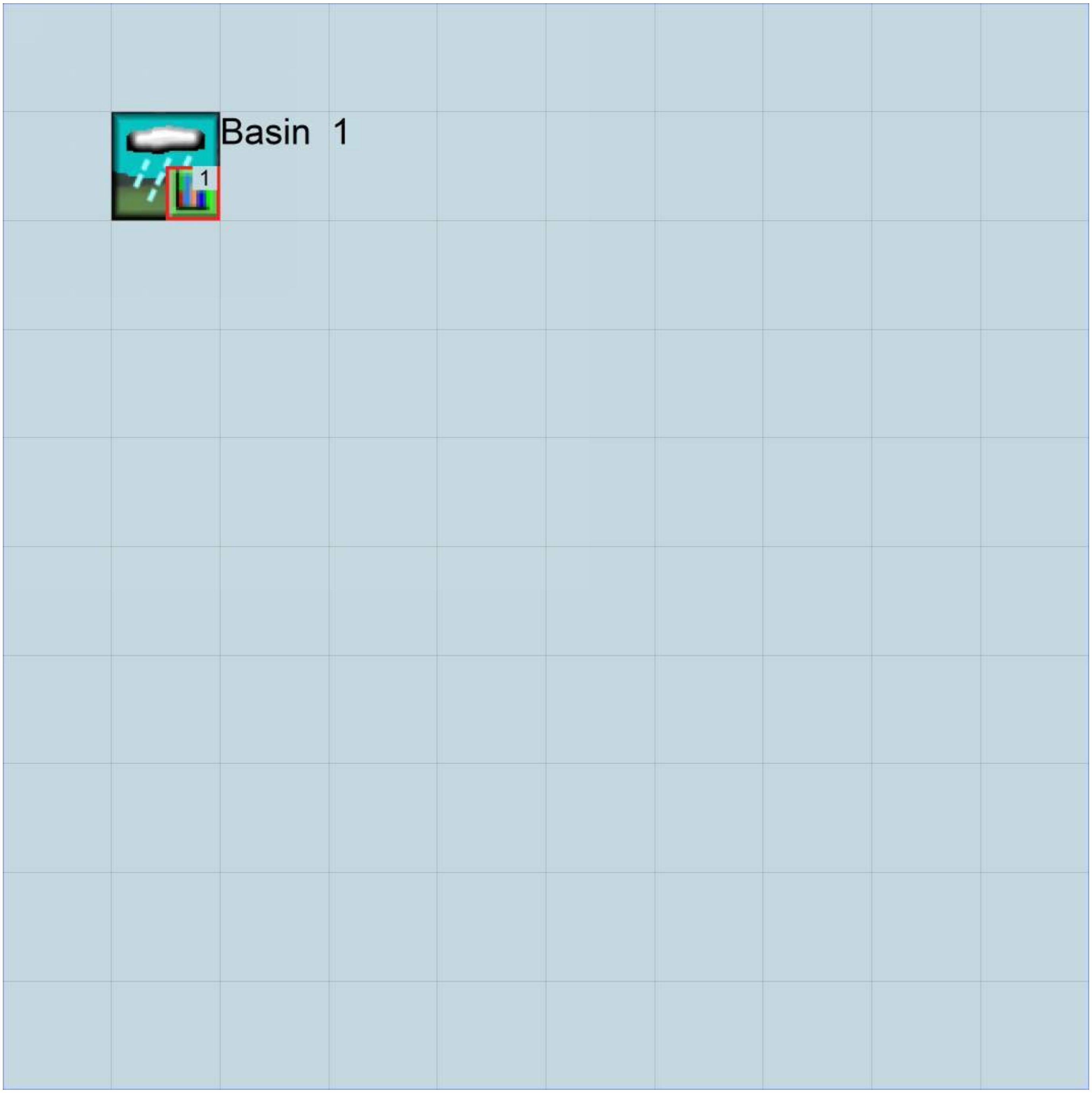
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

Mitigated UCI File

Predeveloped HSPF Message File

Mitigated HSPF Message File

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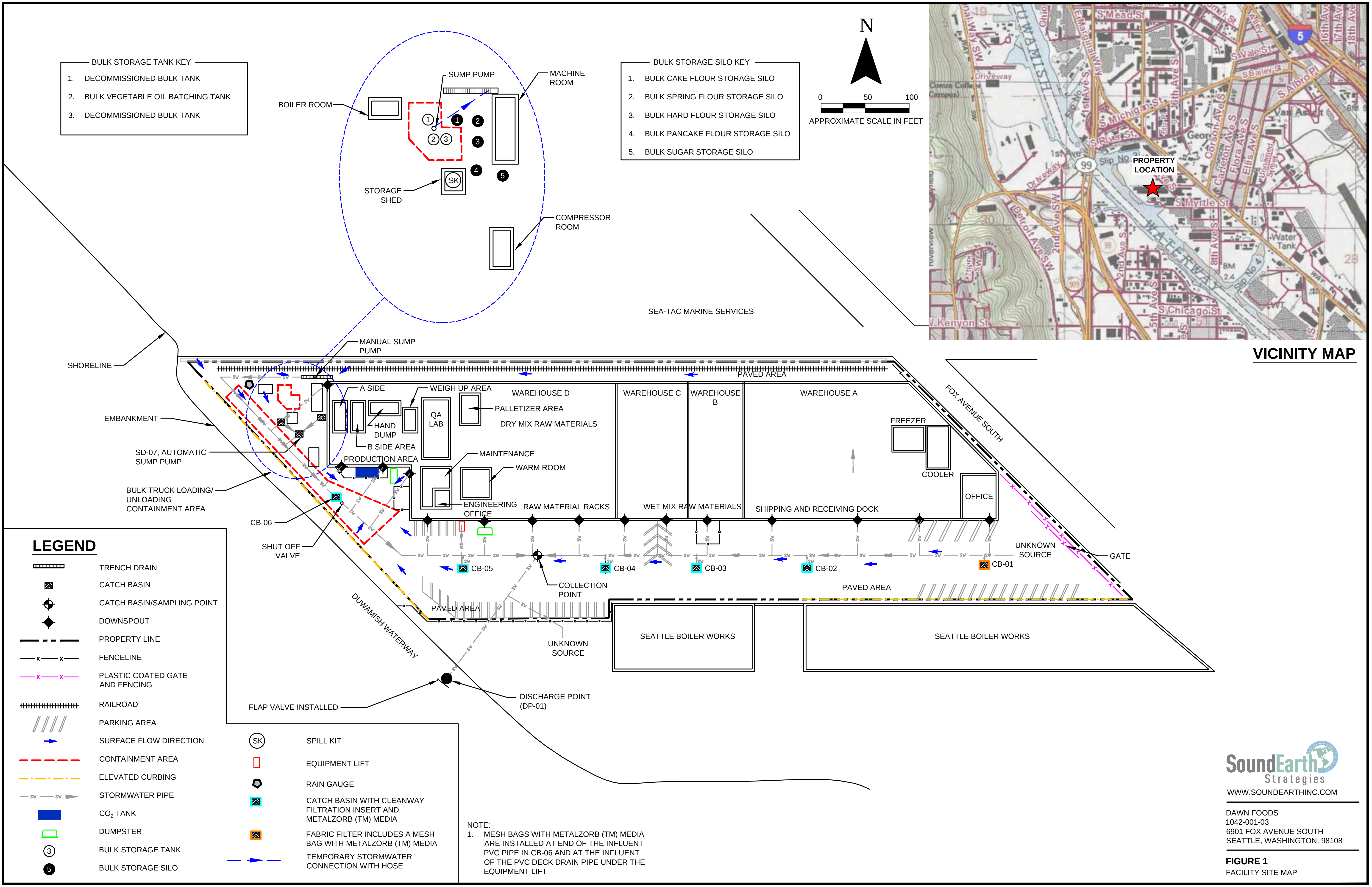
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

Figures

4/19/2017

P:\1042 DAWN FOODS\1042-001 DAWN FOODS STORMWATER MANAGEMENT SERVICES\TECHNICAL\CAD\2016 SWPPP\1042-001_2016SWPPP_FIG1.DWG



BULK STORAGE TANK KEY
1. DECOMMISSIONED BULK TANK
2. BULK VEGETABLE OIL BATCHING TANK
3. DECOMMISSIONED BULK TANK

BULK STORAGE SILO KEY
1. BULK CAKE FLOUR STORAGE SILO
2. BULK SPRING FLOUR STORAGE SILO
3. BULK HARD FLOUR STORAGE SILO
4. BULK PANCAKE FLOUR STORAGE SILO
5. BULK SUGAR STORAGE SILO

VICINITY MAP

LEGEND

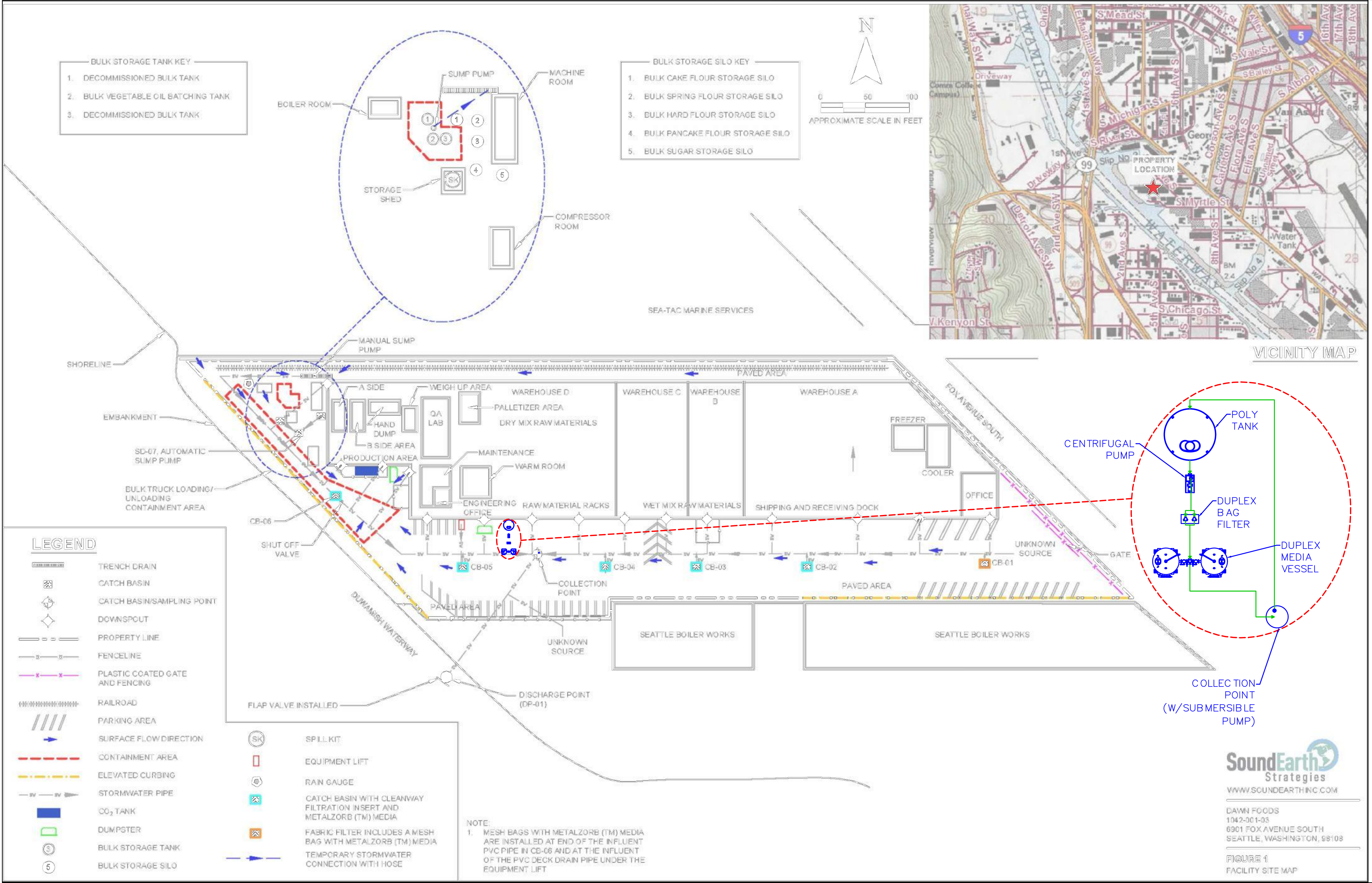
▥	TRENCH DRAIN
▨	CATCH BASIN
⊕	CATCH BASIN/SAMPLING POINT
◆	DOWNSPOUT
— · —	PROPERTY LINE
—x—x—	FENCELINE
—x—x—	PLASTIC COATED GATE AND FENCING
┼┼┼┼	RAILROAD
////	PARKING AREA
→	SURFACE FLOW DIRECTION
– – –	CONTAINMENT AREA
— · —	ELEVATED CURBING
— SV — SV →	STORMWATER PIPE
■	CO_2 TANK
☐	DUMPSTER
③	BULK STORAGE TANK
❺	BULK STORAGE SILO
SK	SPILL KIT
▯	EQUIPMENT LIFT
⬟	RAIN GAUGE
▨	CATCH BASIN WITH CLEANWAY FILTRATION INSERT AND METALZORB (TM) MEDIA
▨	FABRIC FILTER INCLUDES A MESH BAG WITH METALZORB (TM) MEDIA
— → —	TEMPORARY STORMWATER CONNECTION WITH HOSE

NOTE:
1. MESH BAGS WITH METALZORB (TM) MEDIA ARE INSTALLED AT END OF THE INFLUENT PVC PIPE IN CB-06 AND AT THE INFLUENT OF THE PVC DECK DRAIN PIPE UNDER THE EQUIPMENT LIFT

SoundEarth Strategies
WWW.SOUNDEARTHINC.COM

DAWN FOODS
1042-001-03
6901 FOX AVENUE SOUTH
SEATTLE, WASHINGTON, 98108

FIGURE 1
FACILITY SITE MAP



NOTE:
1. MESH BAGS WITH METALZORB (TM) MEDIA ARE INSTALLED AT END OF THE INFLUENT PVC PIPE IN CB-06 AND AT THE INFLUENT OF THE PVC DECK DRAIN PIPE UNDER THE EQUIPMENT LIFT

CWS LEGEND

―	CWS EQUIPMENT
―	SYSTEM PIPING
- - - -	CWS CALLOUT

NOTES

WILL ADD UPDATED SITE MAP.

CLEAR WATER SERVICES

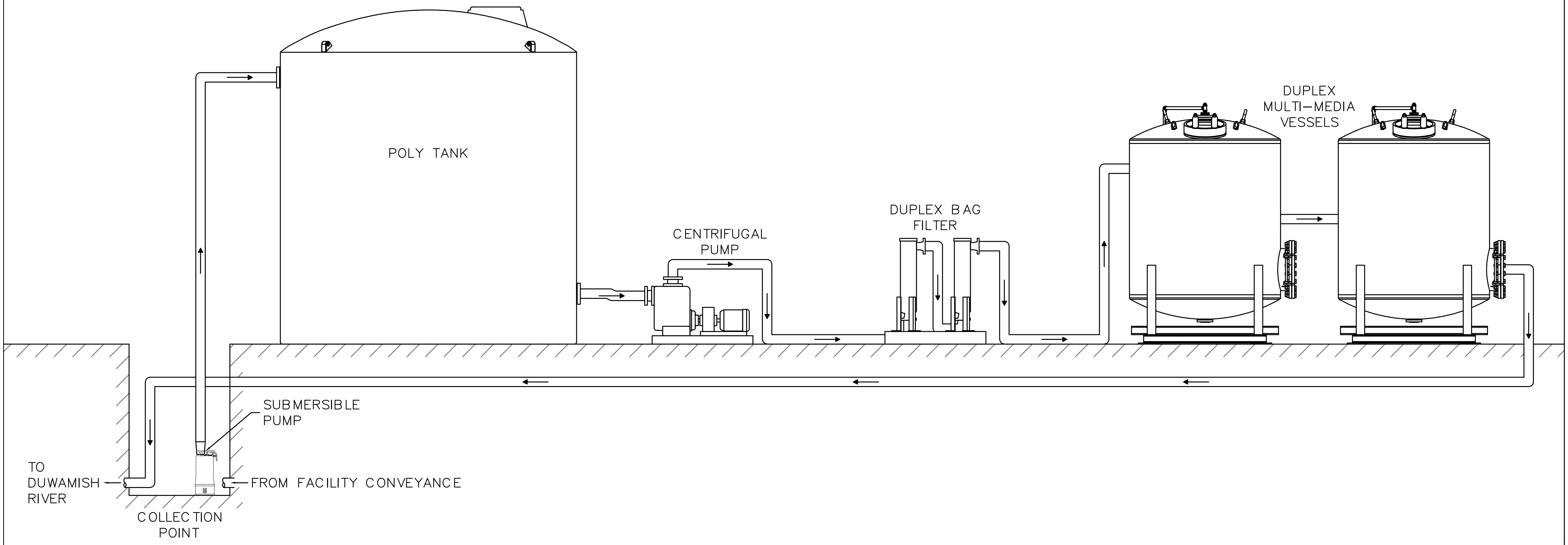
THESE FABRICATION DESIGNS ARE PROPRIETARY AND CONFIDENTIAL. NO PART OF THESE DESIGNS MAY BE DISCLOSED IN ANY MANNER TO A THIRD PARTY WITHOUT PRIOR WRITTEN CONSENT OF CLEAR WATER SERVICES, LLC.

DAWN FOODS
PROJECT NO. 19DWN1
206-GPM DESIGN FLOW
SITE LAYOUT

DATE	REVISIONS

SHEET
1
1 OF 2

DATE: 5/3/2021
DESIGNER: CWS
FILE NAME: 19DWN1_Site-Layout.dwg



CLEAR WATER SERVICES

THESE FABRICATION DESIGNS ARE PROPRIETARY AND CONFIDENTIAL. NO PART OF THESE DESIGNS MAY BE DISCLOSED IN ANY MANNER TO A THIRD PARTY WITHOUT PRIOR WRITTEN CONSENT OF CLEAR WATER SERVICES, LLC.

DAWN FOODS
PROJECT NO. 19DWN1
206–GPM DESIGN FLOW
PROCESS FLOW DIAGRAM – ELEVATION VIEW

DATE: 5/3/2021
DESIGNER: CWS
FILE NAME: 19DWN1_Elevation–View.dwg

DATE	REVISIONS

SHEET
2
2 OF 2

Dawn Foods
6901 FOX AVE S
Seattle, WA 98108

Inquiry Number: 5837180.8
October 21, 2019

The EDR Aerial Photo Decade Package

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Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

10/21/19

Site Name:

Dawn Foods
6901 FOX AVE S
Seattle, WA 98108
EDR Inquiry # 5837180.8

Client Name:

CRETE Consulting
108 S. Washington St. Suite 300
Seattle, WA 98104
Contact: Jamie Stevens

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2017	1"=500'	Flight Year: 2017	USDA/NAIP
2013	1"=500'	Flight Year: 2013	USDA/NAIP
2009	1"=500'	Flight Year: 2009	USDA/NAIP
2006	1"=500'	Flight Year: 2006	USDA/NAIP
1990	1"=500'	Acquisition Date: July 10, 1990	USGS/DOQQ
1985	1"=500'	Flight Date: May 21, 1985	NRWA
1980	1"=500'	Flight Date: July 08, 1980	USDA
1977	1"=500'	Flight Date: September 05, 1977	USGS
1969	1"=500'	Flight Date: June 30, 1969	USGS
1965	1"=500'	Flight Date: June 30, 1965	NRWA
1956	1"=500'	Flight Date: August 07, 1956	USC&GS
1953	1"=500'	Flight Date: September 09, 1953	U of WA
1943	1"=500'	Flight Date: March 05, 1943	DIA
1936	1"=500'	Flight Date: January 01, 1936	KCDOT

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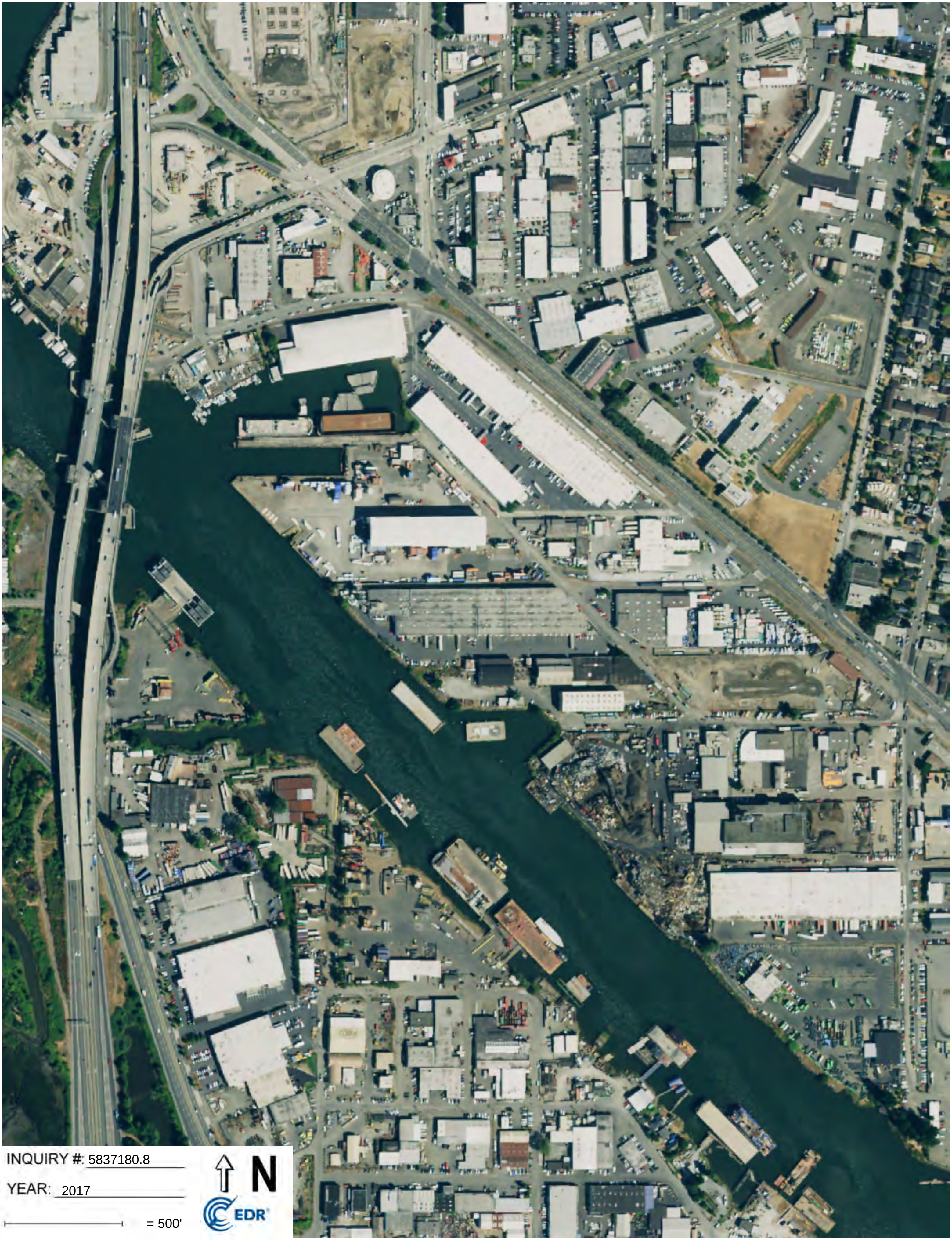


INQUIRY #: 5837180.8

YEAR: 2017

= 500'

INQUIRY #: 5837180.8

YEAR: 2013

= 500'

INQUIRY #: 5837180.8

YEAR: 2009

= 500'

INQUIRY #: 5837180.8

YEAR: 2006

= 500'

N

EDR

INQUIRY #: 5837180.8

YEAR: 1990

= 500'

N

INQUIRY #: 5837180.8

YEAR: 1985

= 500'

INQUIRY #: 5837180.8

YEAR: 1980

= 500'

N

INQUIRY #: 5837180.8

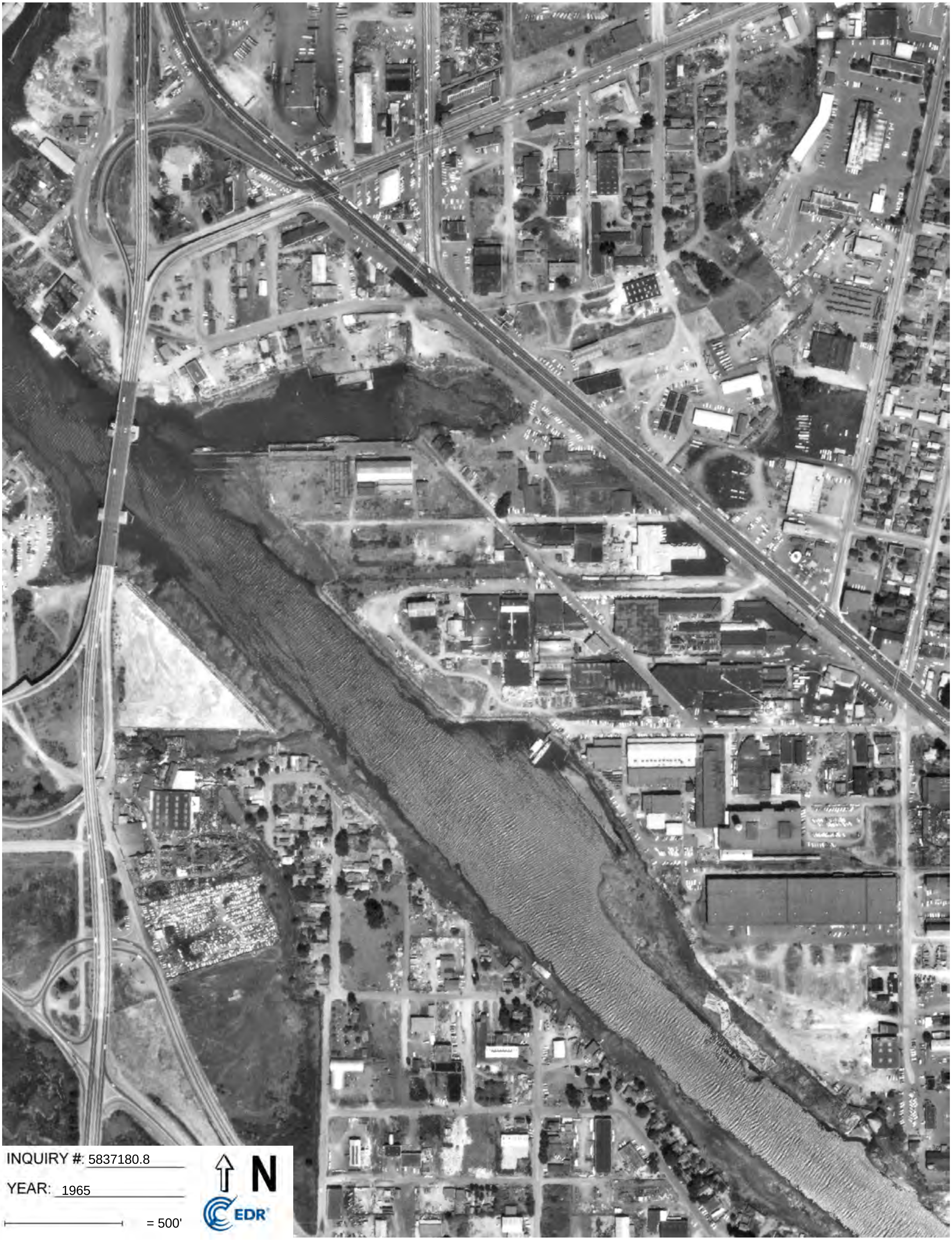
YEAR: 1977

= 500'

INQUIRY #: 5837180.8

YEAR: 1969

= 500'



INQUIRY #: 5837180.8

YEAR: 1965

= 500'

INQUIRY #: 5837180.8

YEAR: 1956

= 500'

INQUIRY #: 5837180.8

YEAR: 1953

= 500'

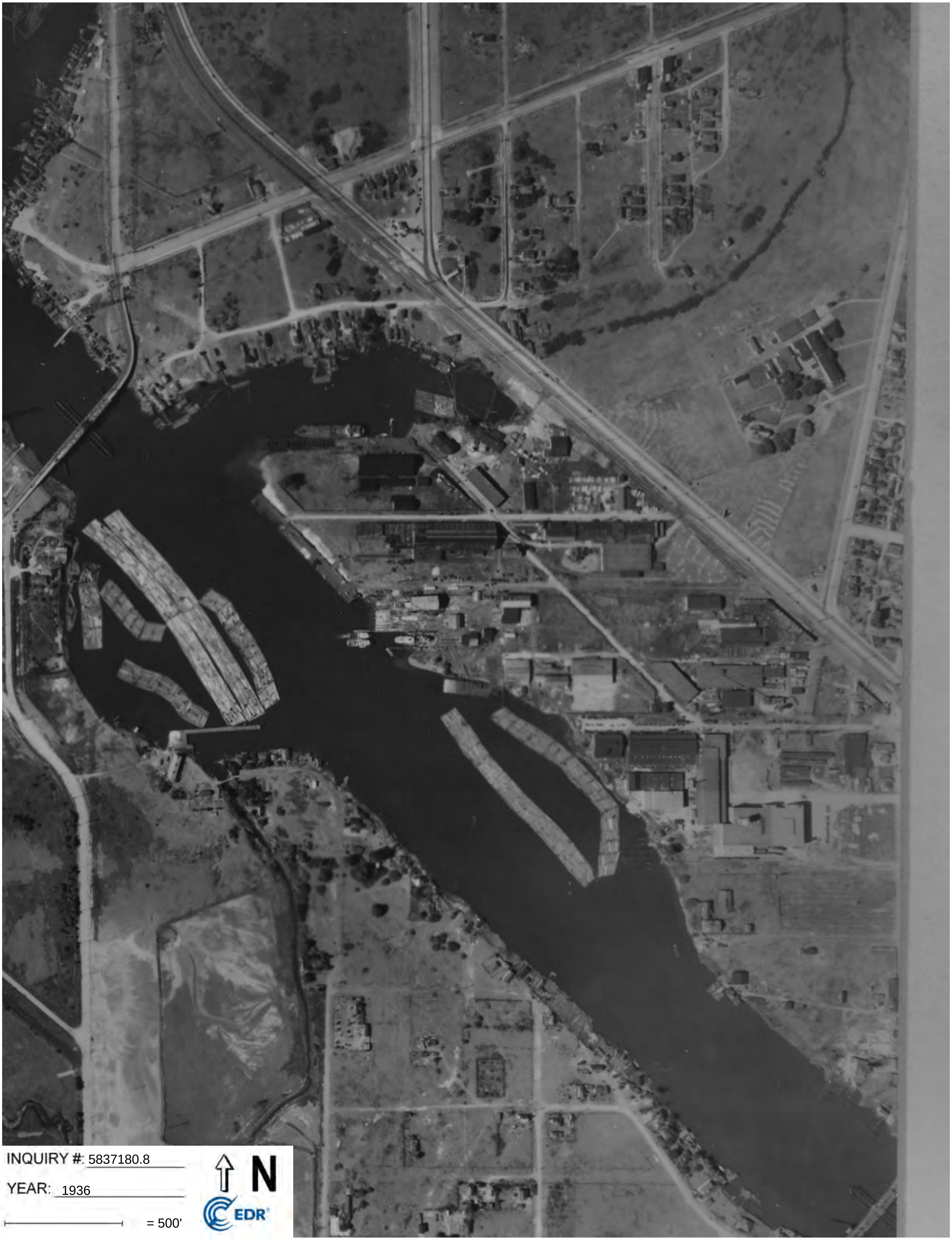
N

INQUIRY #: 5837180.8

YEAR: 1943

= 500'

N



INQUIRY #: 5837180.8

YEAR: 1936

= 500'

Dawn Foods
6901 FOX AVE S
Seattle, WA 98108

Inquiry Number: 5837180.3
October 21, 2019

Certified Sanborn® Map Report

EDR®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

10/21/19

Site Name:	Client Name:
Dawn Foods	CRETE Consulting
6901 FOX AVE S	108 S. Washington St. Suite 300
Seattle, WA 98108	Seattle, WA 98104
EDR Inquiry # 5837180.3	Contact: Jamie Stevens

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The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # 3CA7-4E53-BAAB

PO # Dawn Foods

Project Dawn Foods

Maps Provided:

1966
1949
1929
1917

Sanborn® Library search results

Certification #: 3CA7-4E53-BAAB

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

The Sanborn Library LLC Since 1866™

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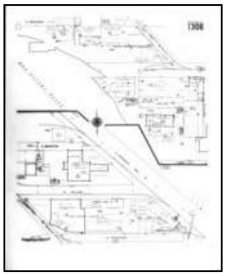
Sanborn Sheet Key

This Certified Sanborn Map Report is based upon the following Sanborn Fire Insurance map sheets.

1966 Source Sheets

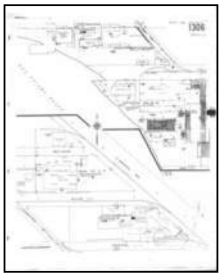
Volume 13, Sheet 1305
1966



Volume 13, Sheet 1306
1966

1949 Source Sheets

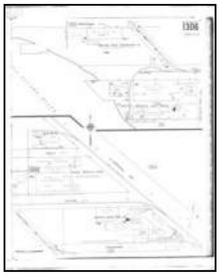
Volume 8, Sheet 1305
1949



Volume 8, Sheet 1306
1949

1929 Source Sheets

Volume 8, Sheet 1305
1929



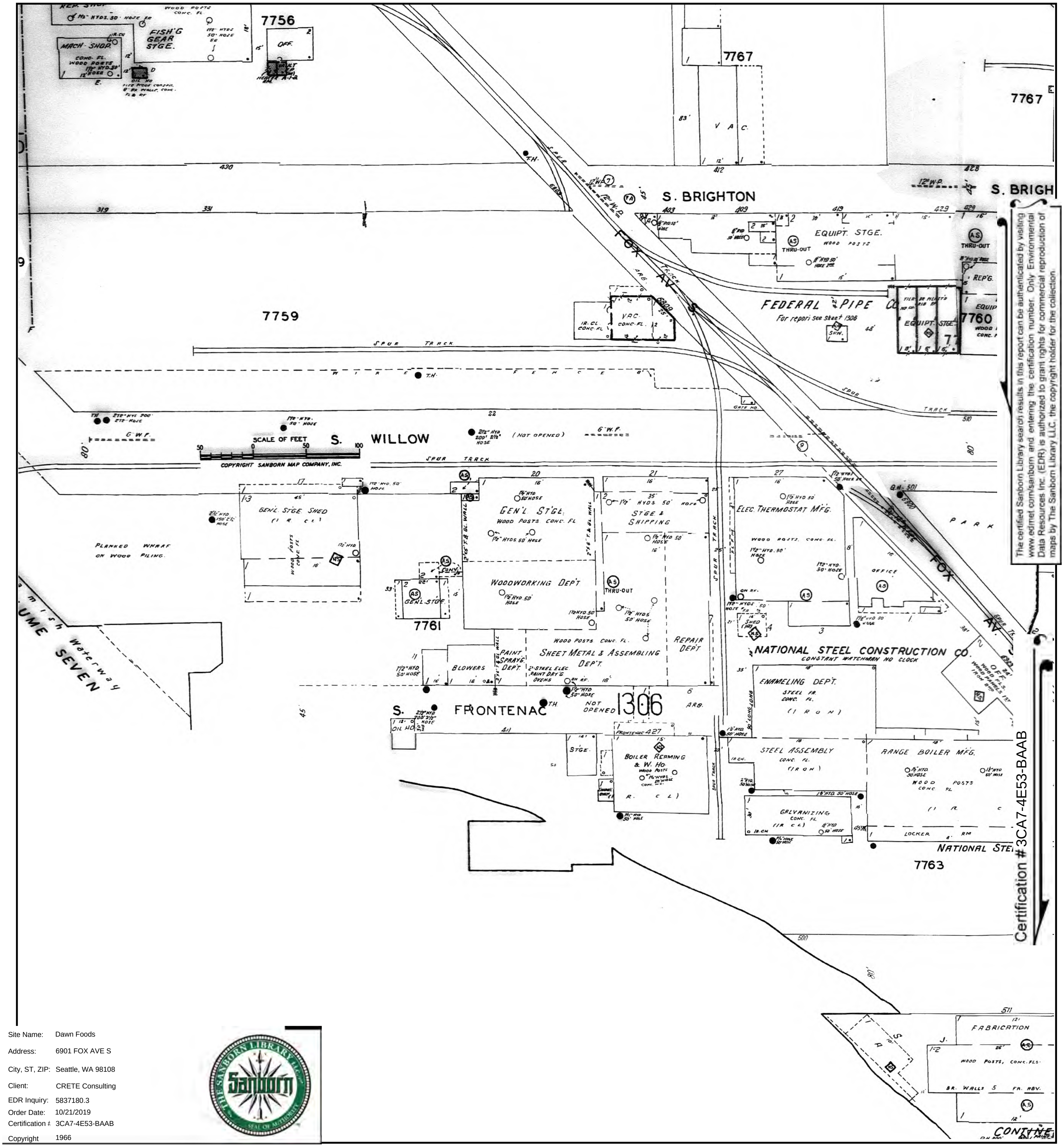
Volume 8, Sheet 1306
1929

1917 Source Sheets

Volume 3, Sheet 394
1917

Certified Sanborn® Map

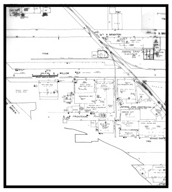
1966

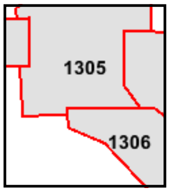


Site Name: Dawn Foods
Address: 6901 FOX AVE S
City, ST, ZIP: Seattle, WA 98108
Client: CRETE Consulting
EDR Inquiry: 5837180.3
Order Date: 10/21/2019
Certification # 3CA7-4E53-BAAB
Copyright 1966

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

0 Feet 150 300 600



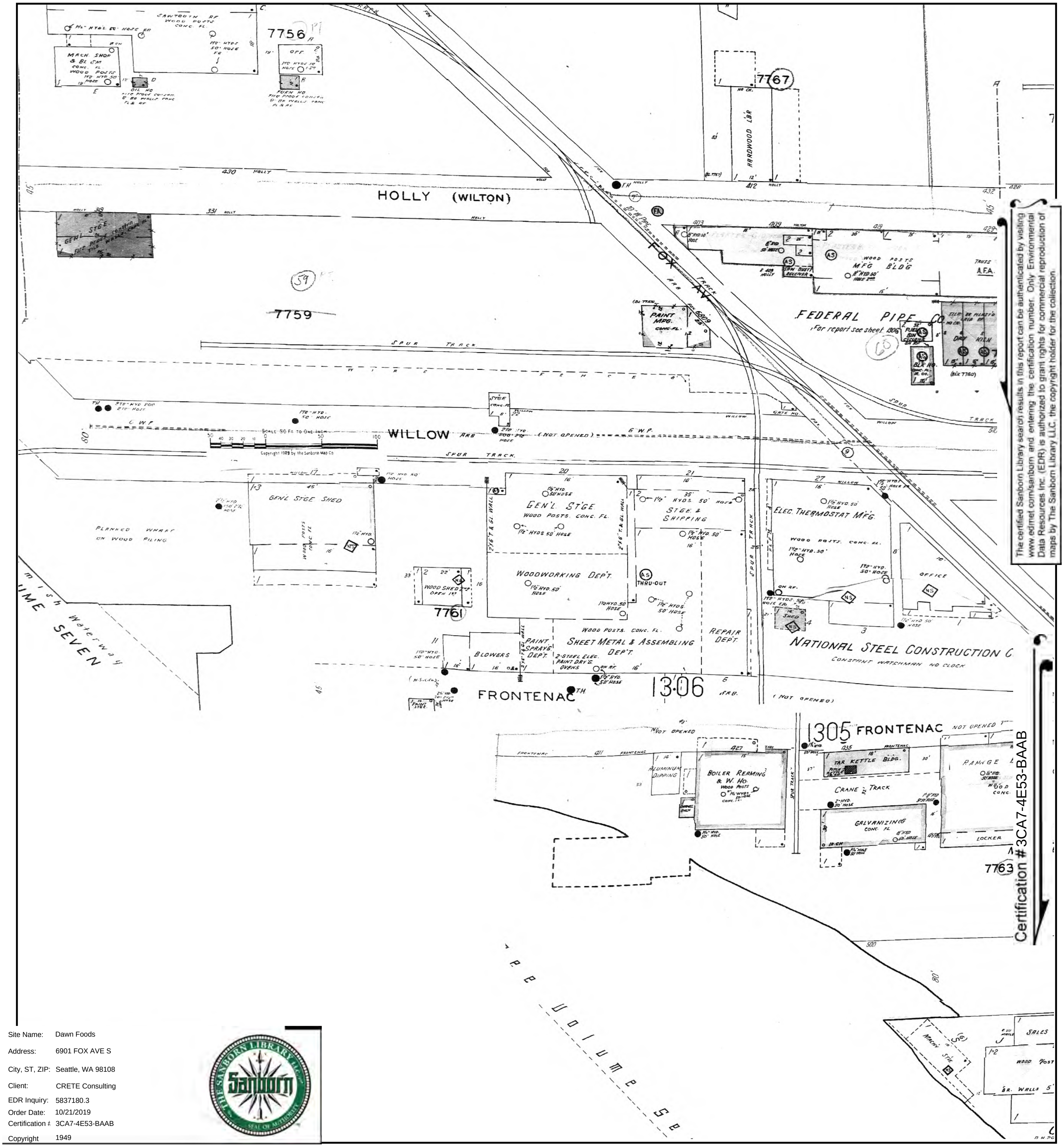


Volume 13, Sheet 1306
Volume 13, Sheet 1305

N

Certified Sanborn® Map

1949



Site Name: Dawn Foods
Address: 6901 FOX AVE S
City, ST, ZIP: Seattle, WA 98108
Client: CRETE Consulting
EDR Inquiry: 5837180.3
Order Date: 10/21/2019
Certification # 3CA7-4E53-BAAB
Copyright 1949

Certification # 3CA7-4E53-BAAB

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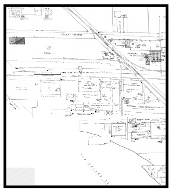
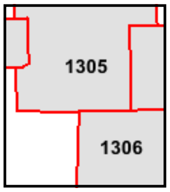


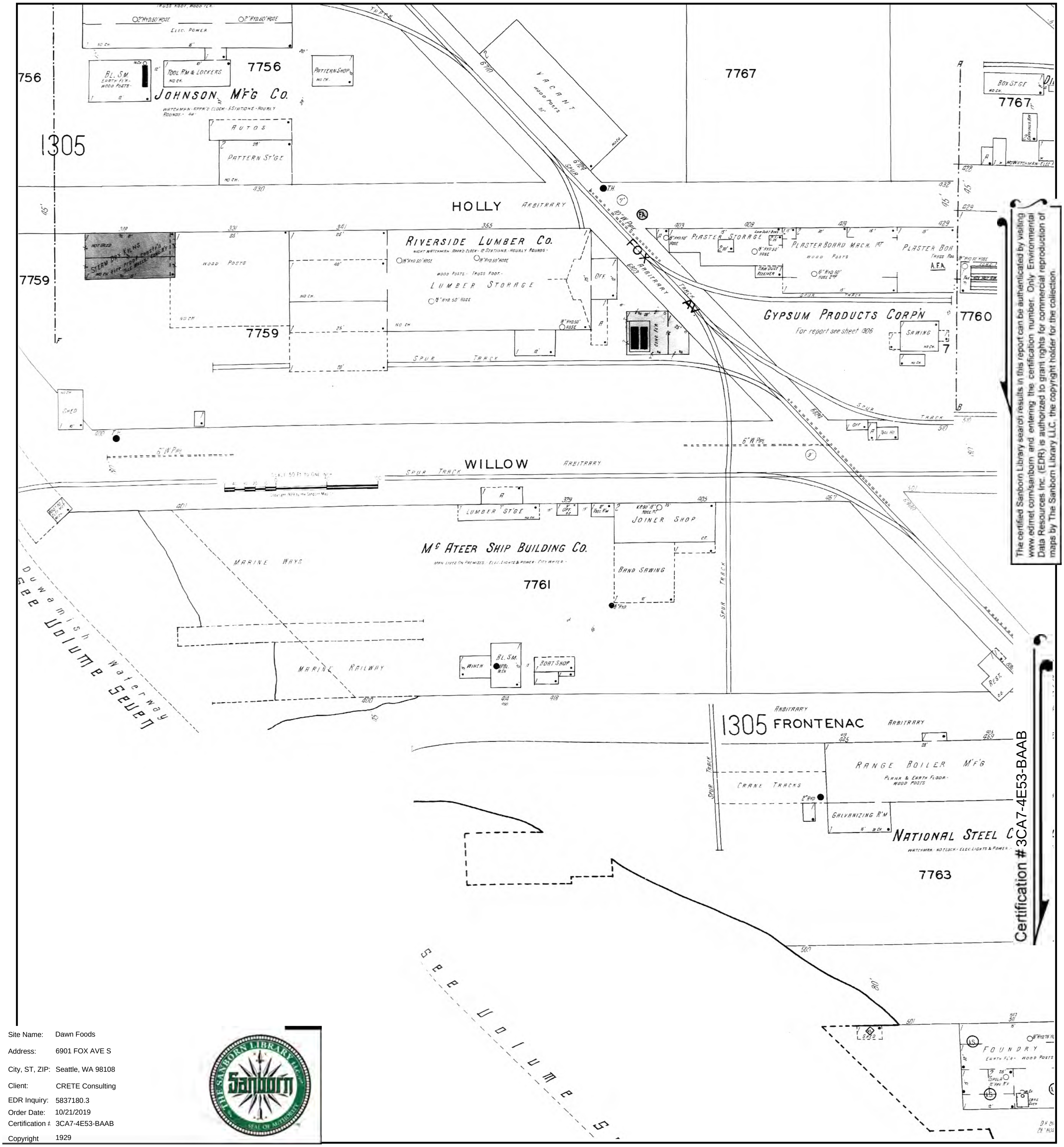


Volume 8, Sheet 1306
Volume 8, Sheet 1305

N

Certified Sanborn® Map

1929



Site Name:	Dawn Foods
Address:	6901 FOX AVE S
City, ST, ZIP:	Seattle, WA 98108
Client:	CRETE Consulting
EDR Inquiry:	5837180.3
Order Date:	10/21/2019
Certification #	3CA7-4E53-BAAB
Copyright	1929

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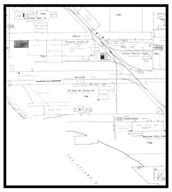
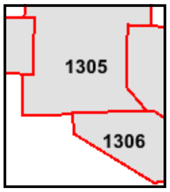




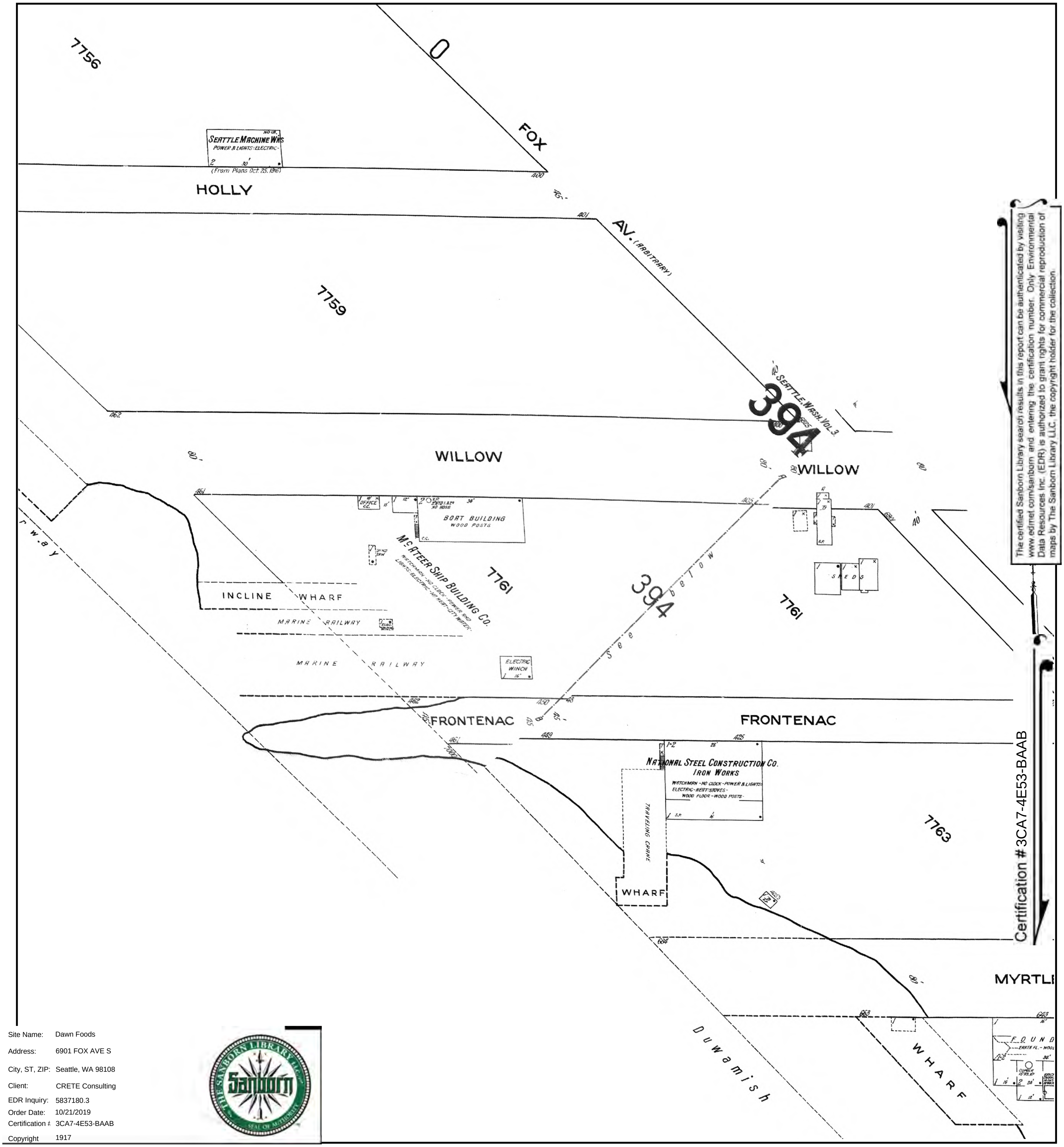
Volume 8, Sheet 1306
Volume 8, Sheet 1305

0 Feet 150 300 600

N

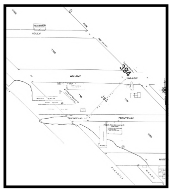
Certified Sanborn® Map

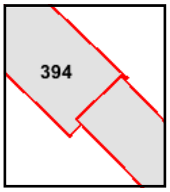
1917



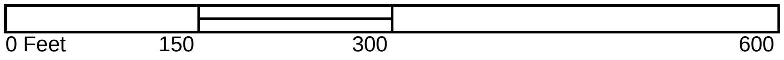
Site Name: Dawn Foods
Address: 6901 FOX AVE S
City, ST, ZIP: Seattle, WA 98108
Client: CRETE Consulting
EDR Inquiry: 5837180.3
Order Date: 10/21/2019
Certification # 3CA7-4E53-BAAB
Copyright 1917

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.





Volume 3, Sheet 394



Dawn Foods
6901 FOX AVE S
Seattle, WA 98108

Inquiry Number: 5837180.4
October 21, 2019

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

10/21/19

Site Name:	**Client Name:**
Dawn Foods	CRETE Consulting
6901 FOX AVE S	108 S. Washington St. Suite 300
Seattle, WA 98108	Seattle, WA 98104
EDR Inquiry # 5837180.4	Contact: Jamie Stevens

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by CRETE Consulting were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

P.O.#	Dawn Foods
Project:	Dawn Foods

Coordinates:

Latitude:	47.540478 47° 32' 26" North
Longitude:	-122.328946 -122° 19' 44" West
UTM Zone:	Zone 10 North
UTM X Meters:	550500.42
UTM Y Meters:	5265446.50
Elevation:	8.00' above sea level

Maps Provided:

2014
1983
1973
1968
1909
1908
1897
1895
1894

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Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2014 Source Sheets

Seattle South
2014
7.5-minute, 24000

1983 Source Sheets

Seattle South
1983
7.5-minute, 25000
Aerial Photo Revised 1977

1973 Source Sheets

Seattle South
1973
7.5-minute, 24000
Aerial Photo Revised 1973

1968 Source Sheets

Seattle South
1968
7.5-minute, 24000
Aerial Photo Revised 1968

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1909 Source Sheets


Seattle Special
1909
15-minute, 62500


Seattle
1909
15-minute, 62500

1908 Source Sheets


Seattle
1908
15-minute, 62500

1897 Source Sheets


Seattle
1897
30-minute, 125000


Snohomish
1897
30-minute, 125000

1895 Source Sheets


Snohomish
1895
30-minute, 125000

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1894 Source Sheets

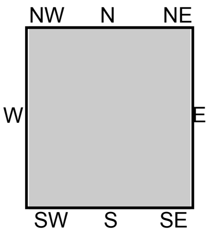
Seattle
1894
15-minute, 62500

Historical Topo Map

2014

This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

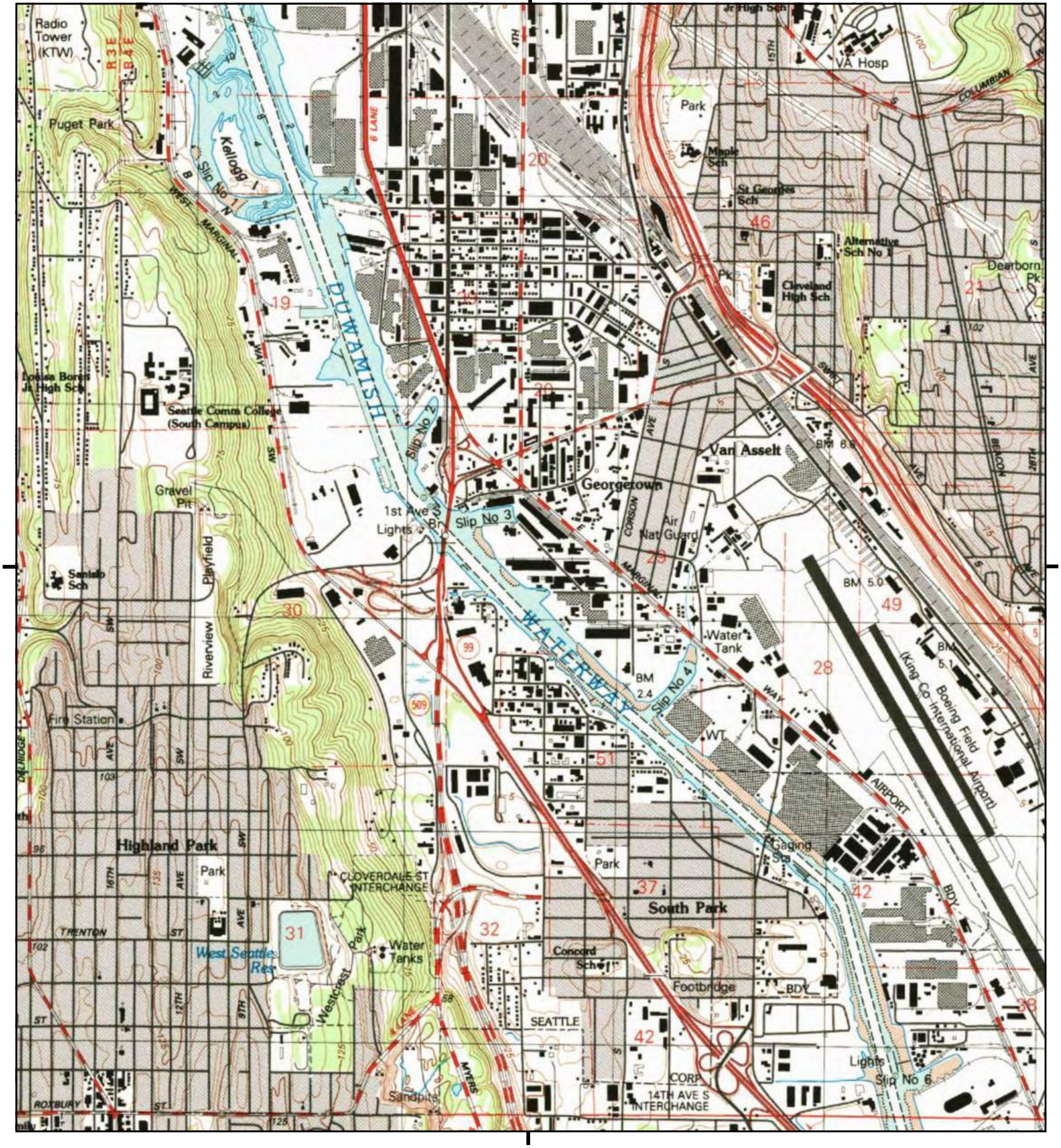


TP, Seattle South, 2014, 7.5-minute

SITE NAME: Dawn Foods
ADDRESS: 6901 FOX AVE S
Seattle, WA 98108
CLIENT: CRETE Consulting

Historical Topo Map

1983



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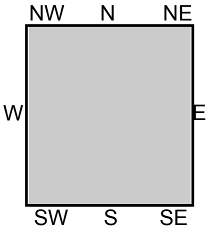


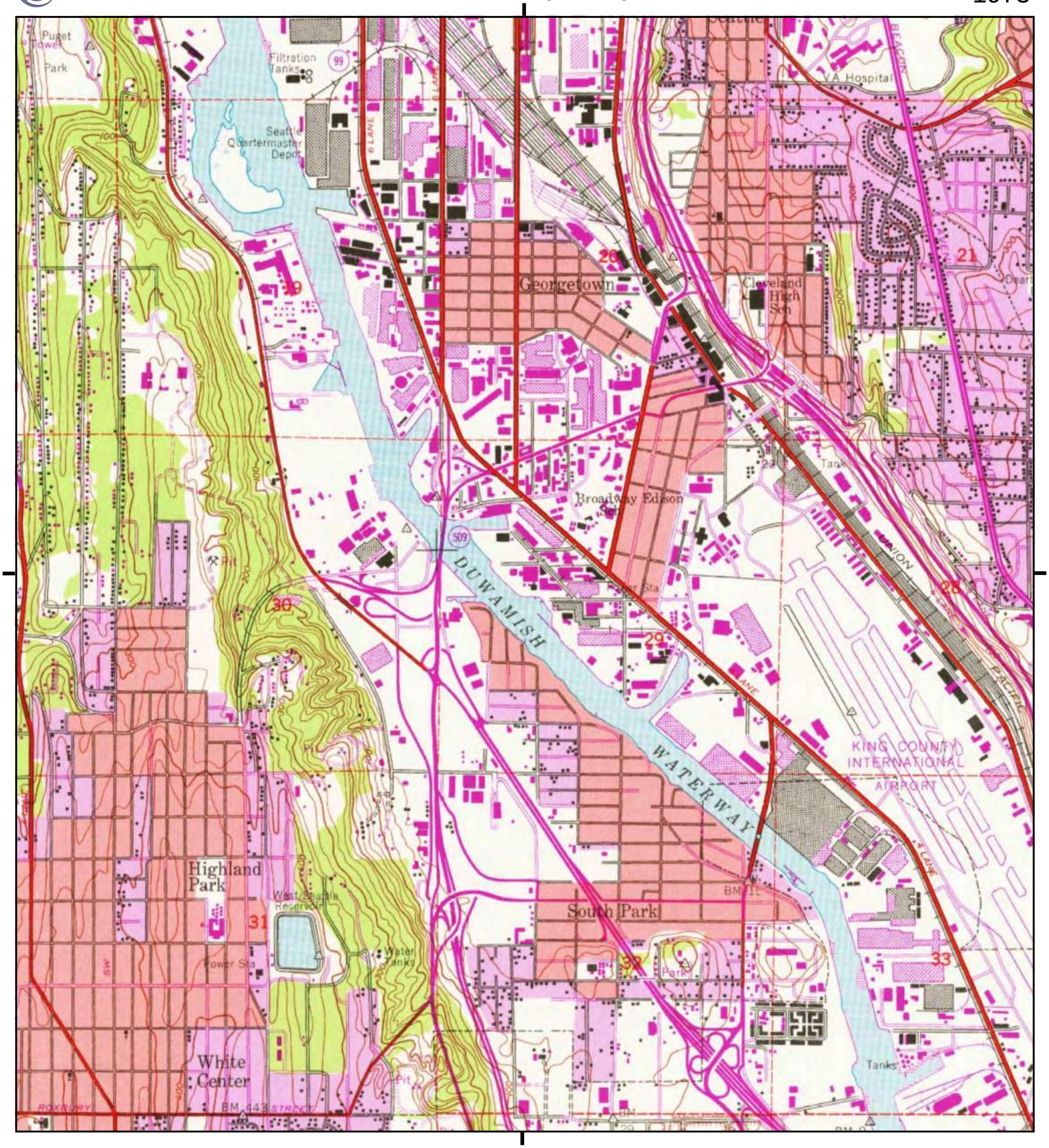
TP, Seattle South, 1983, 7.5-minute

SITE NAME: Dawn Foods
ADDRESS: 6901 FOX AVE S
Seattle, WA 98108
CLIENT: CRETE Consulting

N

Historical Topo Map

1973



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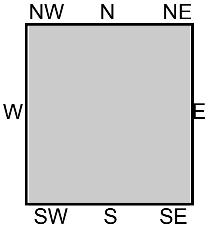
0 Miles 0.25 0.5 1 1.5



TP, Seattle South, 1973, 7.5-minute

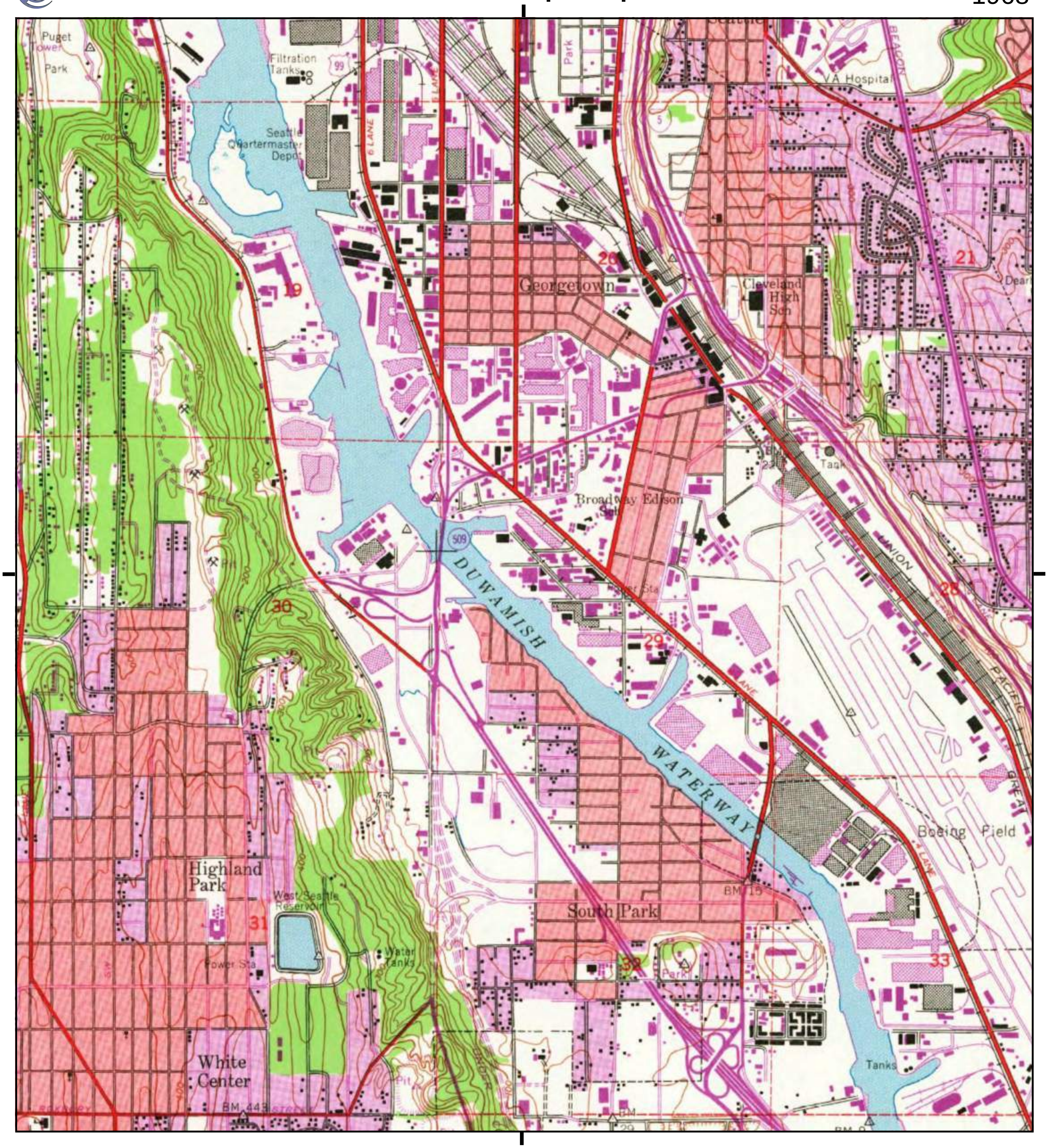
SITE NAME: Dawn Foods

ADDRESS: 6901 FOX AVE S
Seattle, WA 98108

CLIENT: CRETE Consulting

Historical Topo Map

1968



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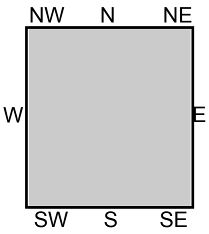
0 Miles 0.25 0.5 1 1.5

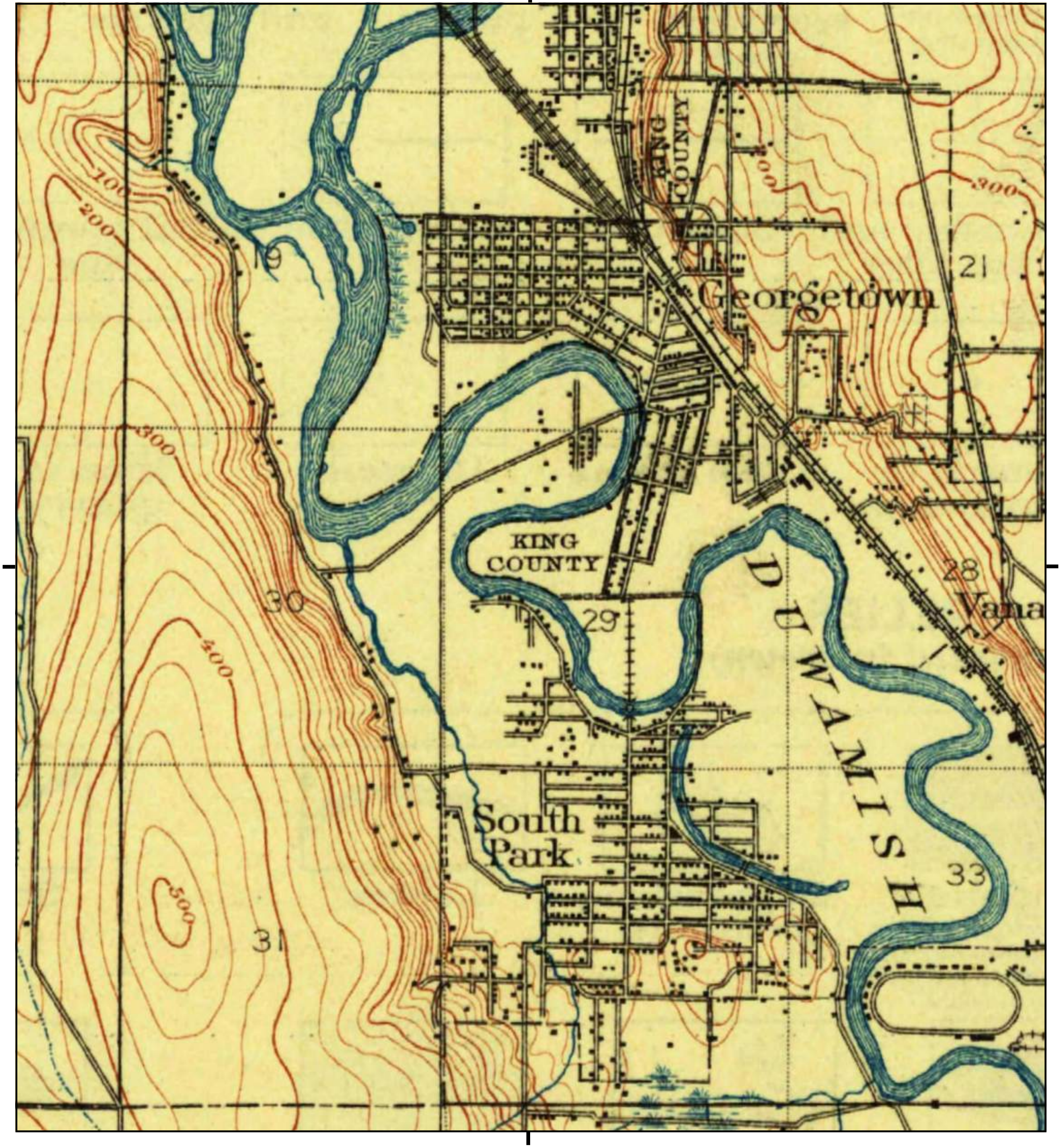


TP, Seattle South, 1968, 7.5-minute

SITE NAME: Dawn Foods
ADDRESS: 6901 FOX AVE S
Seattle, WA 98108
CLIENT: CRETE Consulting

Historical Topo Map

1909



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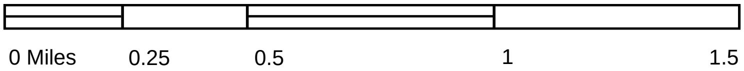
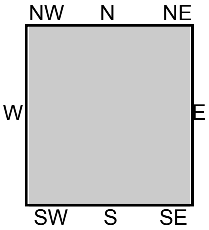


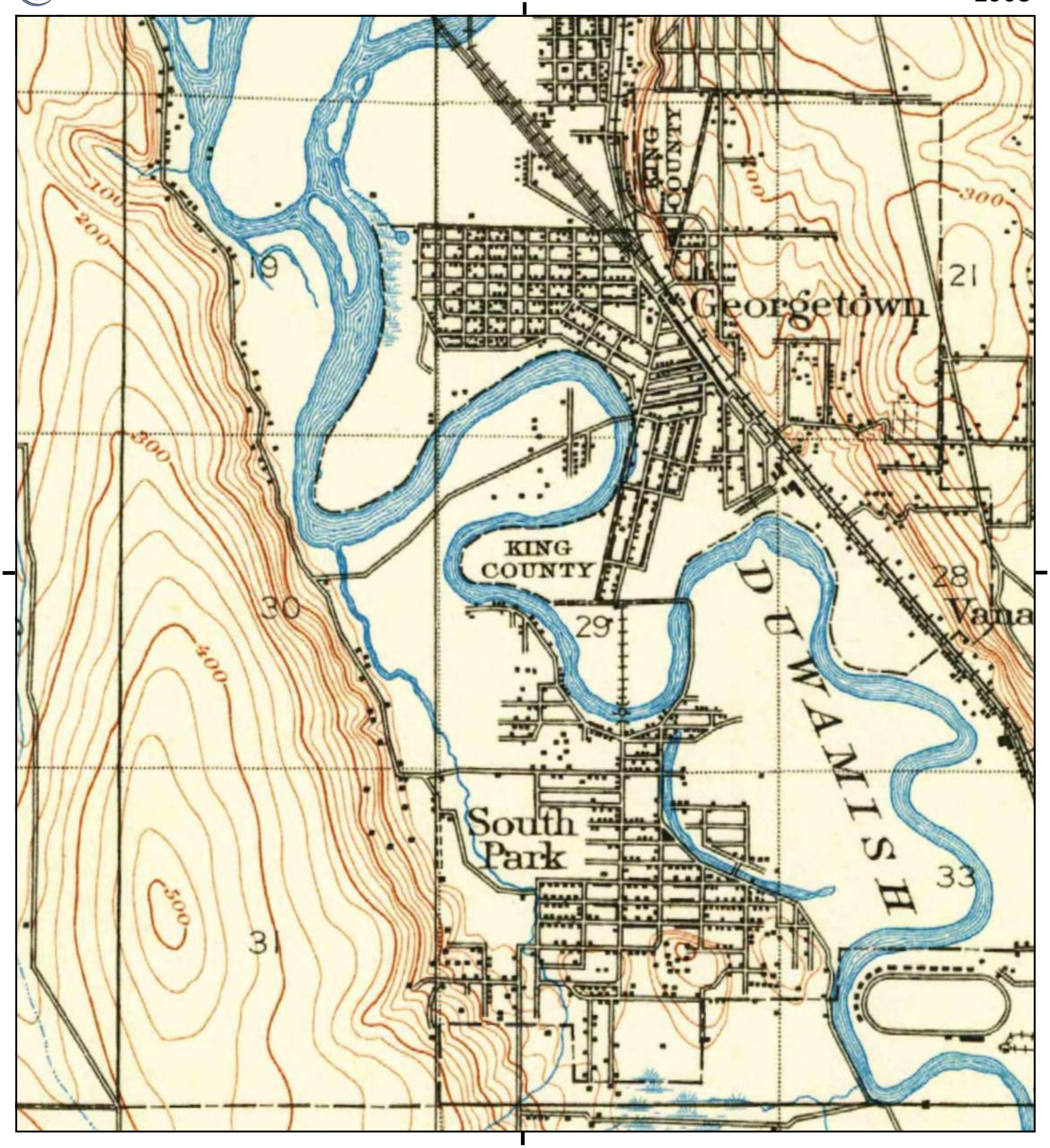


TP, Seattle Special, 1909, 15-minute
TP, Seattle, 1909, 15-minute

SITE NAME: Dawn Foods
ADDRESS: 6901 FOX AVE S
Seattle, WA 98108
CLIENT: CRETE Consulting

Historical Topo Map

1908



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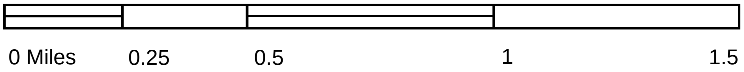
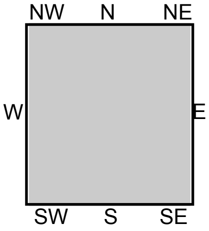


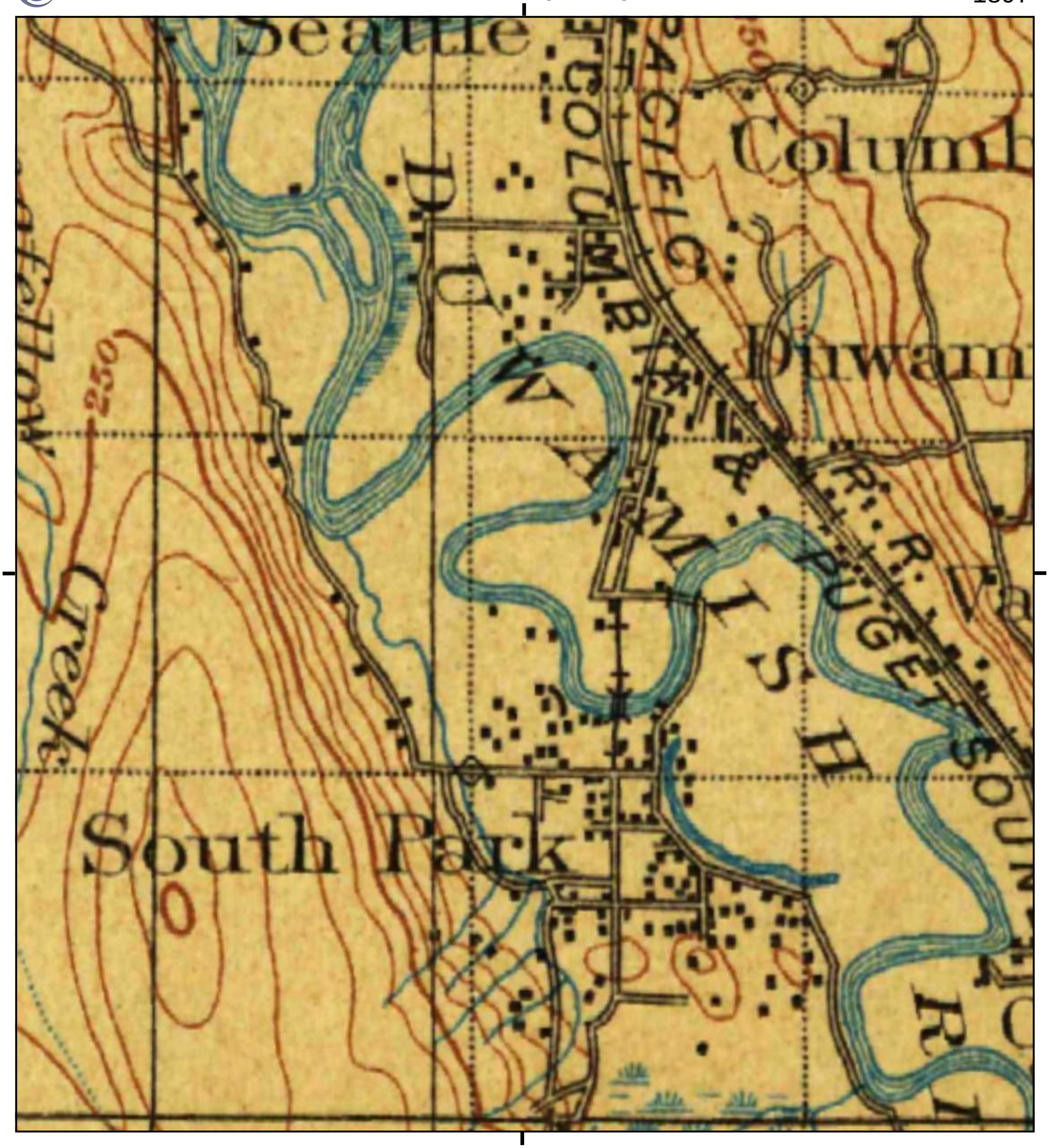


TP, Seattle, 1908, 15-minute

SITE NAME: Dawn Foods
ADDRESS: 6901 FOX AVE S
Seattle, WA 98108
CLIENT: CRETE Consulting

Historical Topo Map

1897



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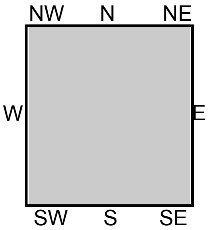
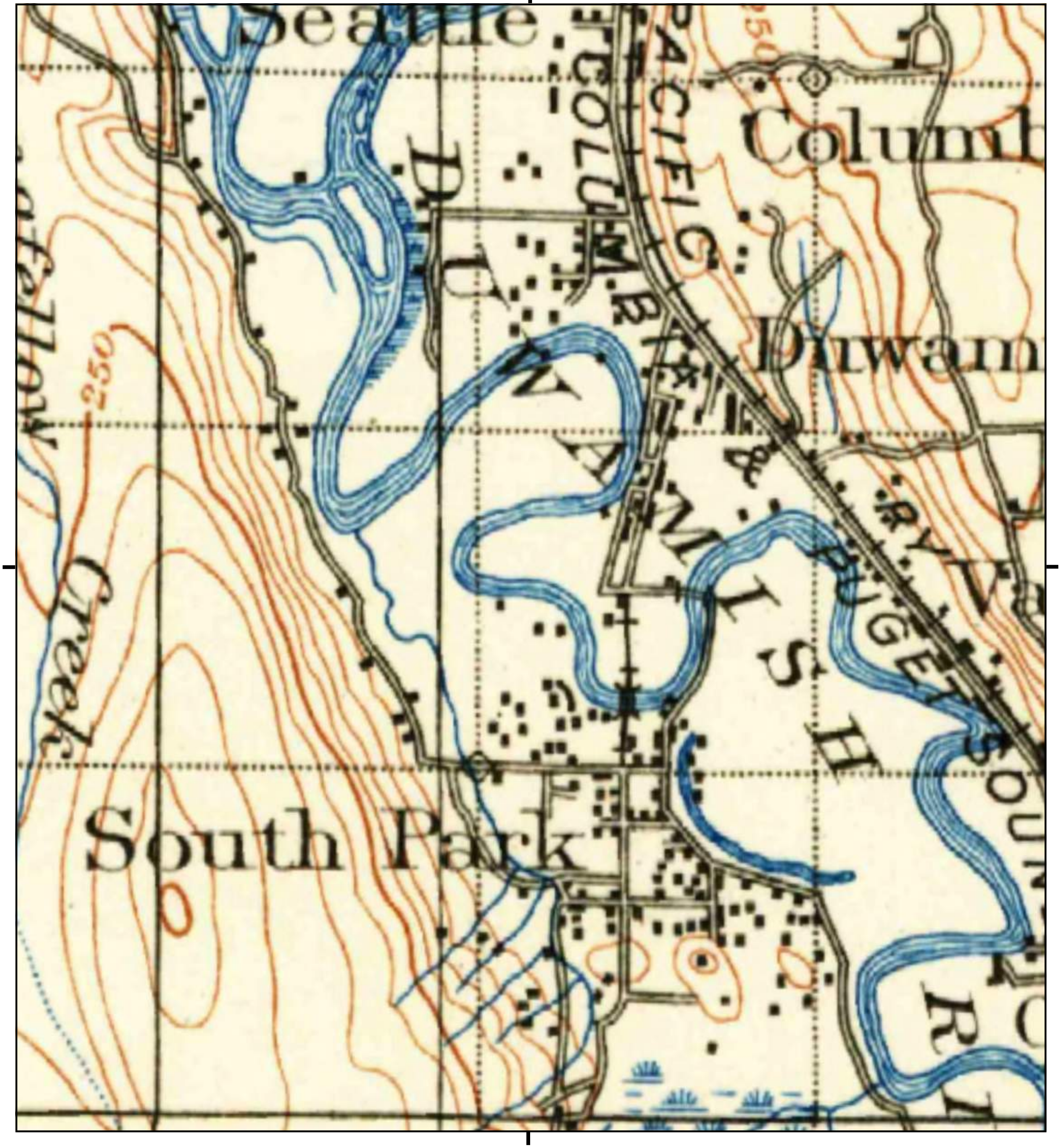


TP, Seattle, 1897, 30-minute
TP, Snohomish, 1897, 30-minute

SITE NAME: Dawn Foods
ADDRESS: 6901 FOX AVE S
Seattle, WA 98108
CLIENT: CRETE Consulting

Historical Topo Map

1895



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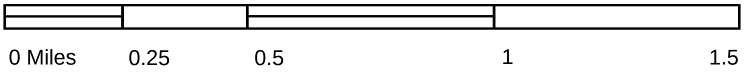
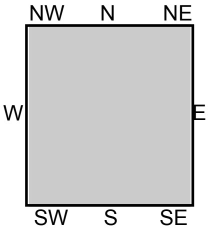




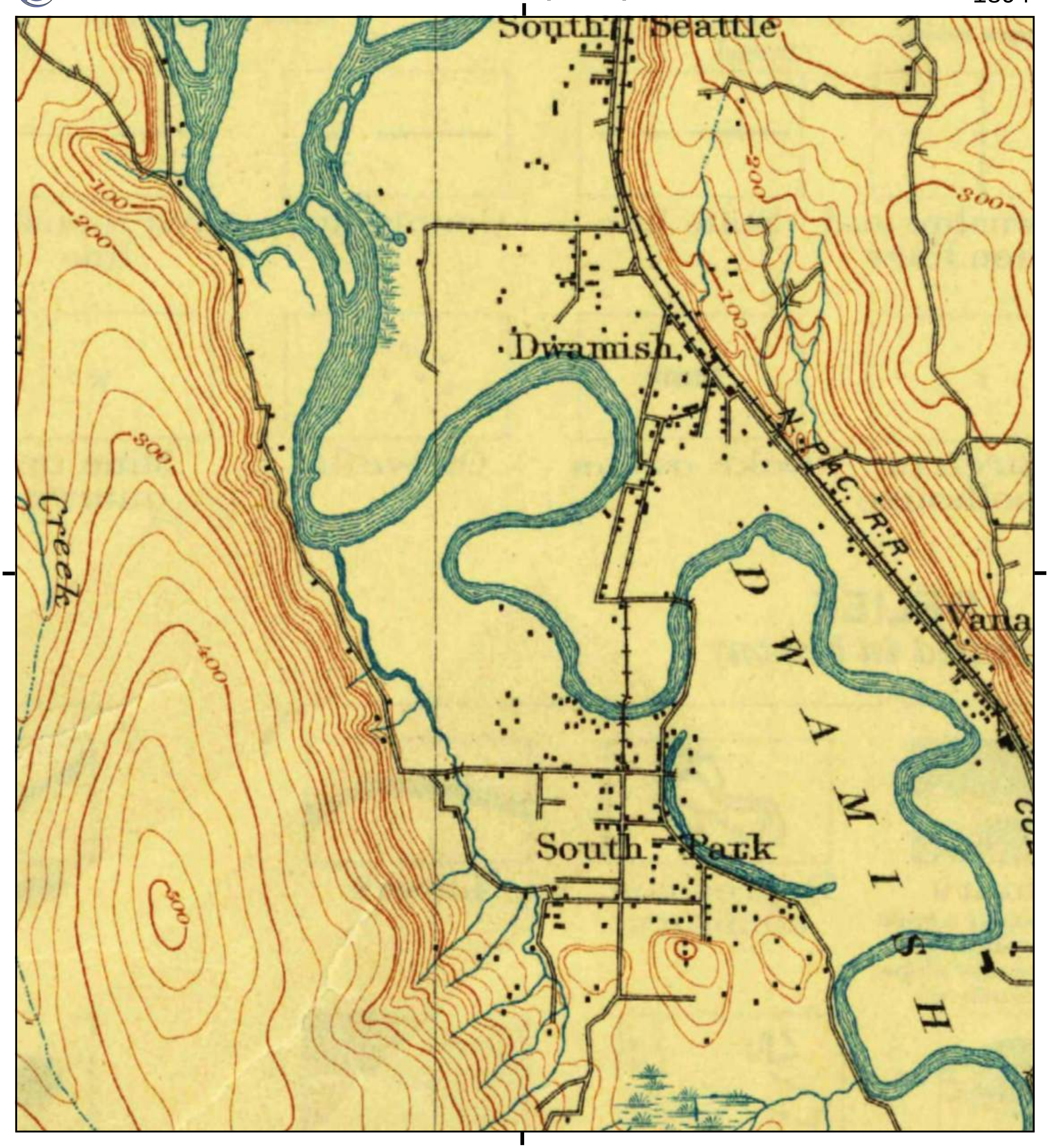
TP, Snohomish, 1895, 30-minute

SITE NAME: Dawn Foods
ADDRESS: 6901 FOX AVE S
Seattle, WA 98108
CLIENT: CRETE Consulting

EDR

Historical Topo Map

1894



This report includes information from the following map sheet(s).

TP, Seattle, 1894, 15-minute

SITE NAME: Dawn Foods
ADDRESS: 6901 FOX AVE S
Seattle, WA 98108
CLIENT: CRETE Consulting

LDWSF 12.3.187.1v.1
09/15/08

BRYAN CAVE

John R. Kindschuh
Direct: 314-259-2313
Fax: 314-259-2020
john.kindschuh@bryancave.com

September 15, 2008

RECEIVED
SEP 16 [illegible]
Environmental
Cleanup Office

VIA FEDEX

United States Environmental Protection Agency
Region 10
Claire Hong, Remedial Project Manager
Environmental Cleanup Office
ECL-111
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101

Re: Bunge Oils, Inc.'s Response to CERCLA Section 104(e) Request for the Lower Duwamish Waterway Superfund Site, Seattle, Washington

Dear Ms. Hong:

Enclosed please find the responses of Bunge Oils, Inc., on behalf of Bunge Foods Processing, L.L.C., to the EPA's July 17, 2008 Information Request regarding the Lower Duwamish Waterway Superfund Site in Seattle, Washington. Also enclosed are documents labeled BOI 00001 - BOI 01407.

Please do not hesitate to contact me if you have any questions.

Sincerely,

John R. Kindschuh
mlr
John R. Kindschuh

Enclosures

cc: Beverly Garner, Esq.

Bryan Cave LLP
One Metropolitan Square
211 North Broadway
Suite 3600
St. Louis, MO 63102-2750
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Kuwait
Los Angeles
New York
Phoenix
Shanghai
St. Louis
Washington, DC

And Bryan Cave,
A Multinational Partnership,
London

1. Respondent Information

a. Provide the full legal name and mailing address of the Respondent.

ANSWER: *Bunge Oils, Inc., 11720 Borman Drive, St. Louis, MO 63146. On June 1, 2004, Bunge Foods Corporation changed its name to Bunge Oils, Inc. On March 1, 2004, Bunge Foods Processing, L.L.C. was merged into Bunge Foods Corporation. Bunge Oils, Inc. and all of its predecessor companies will be referred to herein collectively as "Bunge."*

b. For each person answering these questions on behalf of Respondent, provide:

- i. Full name
- ii. Title
- iii. Business Address
- iv. Business Telephone Number and FAX machine number

ANSWER:
Beverly Garner, Esq.
Senior Corporate Counsel
Bunge North America, Inc.
11720 Borman Drive
St. Louis, MO 63146
Telephone: 314-292-2514
Fax: 314-292-2521

Loren Polak
Director of Environmental Management
Bunge North America, Inc.
11720 Borman Drive
St. Louis, MO 63146
Telephone: 314-292-2374
Fax: 314-292-2384

Steven J. Poplawski, Esq., Partner
Bryan Cave LLP
One Metropolitan Square
211 N. Broadway, Ste. 3600
St. Louis, MO 63102
Telephone: 314-259-2610
Fax: 314-259-2020

John R. Kindschuh, Esq., Associate Attorney
Bryan Cave LLP
One Metropolitan Square
211 N. Broadway, Ste. 3600
St. Louis, MO 63102
Telephone: 314-259-2313
Fax: 314-259-2020

c. If Respondent wishes to designate an individual for all future correspondence concerning this Site, please indicate here by providing that individual's name, address, telephone number, and fax number.

ANSWER: *John R. Kindschuh, Esq.*
Associate Attorney
Bryan Cave LLP
One Metropolitan Square
211 N. Broadway, Ste. 3600
St. Louis, MO 63102
Telephone: 314-259-2313
Fax: 314-259-2020

d. State the dates during which Respondent held any property interests at or within one-half mile of the above mentioned address.

ANSWER: *Bunge did not own or hold any property interests at or within one-half mile of 6901 Fox Avenue South, Seattle, WA 98108. Bunge leased the facility located at 6901 Fox Avenue South, Seattle, Washington, 98108 (herein the "Fox Avenue Site").*

e. State the dates during which Respondent conducted any business activity at or within one-half mile of the above mentioned address.

ANSWER: *Bunge operated its business at the Fox Avenue Site under a lease arrangement from approximately January 1, 1988 to December 31, 2003. The specific dates of Bunge's business activity at the Fox Avenue Site are as follows:*

On January 1, 1988, Industrial Indemnity Corporation, the lessor, and Carlin Foods Corporation, the lessee, entered into a lease agreement regarding the Fox Avenue Site.

From January 1, 1988 to September 29, 1989, Bunge Foods Corporation operated the Fox Avenue Site as Carlin Foods Corporation. On September 29, 1989, Carlin Foods Corporation changed its name to Bunge Foods Corporation.

On January 15, 1996, Fox Avenue Warehouse Corporation, the lessor, and Bunge Foods Corporation, the lessee, entered into the First Amendment to the 1988 Lease. Fox Avenue Warehouse was the successor in interest to Industrial Indemnity Corporation.

On January 1, 2001, Bunge Foods Corporation assigned all of its rights, title, interest and obligations to all tangible and intangible assets at the Fox Avenue Site to Bunge Foods Processing, L.L.C.

On July 10, 2002, William P. Guimont, the lessor, and Bunge Foods Processing, L.L.C. , the lessee, entered into the Second Amendment to the 1988 Lease. William P. Guimont, the successor trustee of the William P. Guimont Revocable Living Trust, was the successor to Fox Avenue Warehouse Corporation.

On December 31, 2003, Bunge Foods Processing, L.L.C., the assignor, and Dawn Food Products, Inc., the assignee, entered into an Assignment and Assumption Agreement. Bunge Foods Processing, L.L.C. assigned the lease dated January 1, 1988 to Dawn Food Products, Inc.

All of these documents listed above are enclosed with Bunge's response.

f. Describe the nature of Respondent's business activities at the above mentioned address or within one-half mile of that address.

ANSWER: *Bunge's business activities at the Fox Avenue Site involved producing dry bakery product mixes for shipment to customers. Bunge leased the Fox Avenue Site, which consisted of approximately 7.3 acres of land.*

g. In relation to your answer to the previous question, identify all materials used or created by your activities at the above mentioned address, including raw materials, commercial products, building debris, and other wastes.

ANSWER: *Bunge manufactured numerous dry bakery product mixes, including pancake and waffle mixes, at the Fox Avenue Site. The manufacturing facility includes production and packing areas, a warehouse area for raw materials and finished goods, a maintenance area, a quality control kitchen, a freezer, a cooler, a small print shop, truck loading docks, and office space. See Limited Environmental Compliance Assessment, p. 2; Phase I, pp. 2-1, 2-2. Raw materials used in the manufacturing process included bulk food grade vegetable oil, salad oil, flour, shortening, and sugar. Fuel oil, carbon dioxide, minimal amounts of petroleum-based lubricants, and refrigerant/Freon were also used by Bunge in the operation of the Fox Avenue Site. Bunge utilized twelve battery-operated fork lifts/hand jacks at the Fox Avenue Site, and the batteries contained sulfuric acid. See Phase I, p. 5-3. A tank farm on the west side of the mechanical room building included four 250,000 pound flour silos equipped with baghouses, one 220,000 pound sugar silo, a 21,430 gallon aboveground storage tank ("AST") for hydrogenated vegetable oil storage, a 7,070 gallon AST for vegetable oil batching, a 1,000 gallon salad oil tank, a 300 gallon fuel oil tank, and a 34 ton carbon dioxide tank. See Limited Environmental Compliance Assessment, p. 2; Phase I, p. 2-2.*

h. If Respondent, its parent corporation, subsidiaries or other related or associated companies have filed for bankruptcy, provide:

i. the U.S. Bankruptcy Court in which the petition was filed;

ii. the docket numbers of such petition;

iii. the date the bankruptcy petition was filed;

iv. whether the petition is under Chapter 7 (liquidation), Chapter 11 (reorganization), or other provision;

v. a brief description of the current status of the petition.

ANSWER: *Bunge Oils, Inc. is a wholly owned subsidiary of Bunge North America, Inc. Bunge Limited, a Bermuda corporation, through its subsidiaries, owns 100% of Bunge North America, Inc. These entities have not filed for bankruptcy.*

2. Site Activities and Interests

a. Provide all documents in your possession regarding the ownership or environmental conditions of the property mentioned above, including, but not limited to, copies of deeds, sales contracts, leases, blueprints, "as-builts" and photographs.

ANSWER: *To its knowledge, Bunge has enclosed herewith all responsive documents in its possession regarding the environmental conditions of the Fox Avenue Site. These documents include an October 21, 2003 Phase I Environmental Site Assessment of the Site by Burns & McDonnell (herein "Phase I"), an October 21, 2003 Limited Environmental Compliance Assessment for the Site by Burns & McDonnell (herein "Limited Environmental Compliance Assessment"), an October 2001 Spill Prevention, Control, and Countermeasures Plan (herein "SPCC 2001"), a July 13, 1998 Spill Prevention, Control, and Countermeasures Plan prepared by Hart Crowser (herein "SPCC 1998"), and all correspondence regarding the environmental conditions of the Fox Avenue Site that are not subject to the attorney-client privilege or the attorney-work product doctrine.*

According to the Phase I, the Great Western Chemical Company is located on the adjacent property to the east of the Fox Avenue Site. The Phase I report identified the Great Western Chemical Company facility as a concern due to the presence of confirmed groundwater and soil contamination by petroleum products, non-halogenated solvents and polynuclear aromatic hydrocarbons. Based upon the Phase I, remedial action was in process at the Great Western Chemical Company on or around October of 2003. See ES-2, 8-1.

To Bunge's knowledge, Bunge does not possess copies of any deeds of the Fox Avenue Site because Bunge leased the Fox Avenue Site and did not own it.

In addition to those documents identified above, Bunge encloses herein the following documents related to the Fox Avenue Site:

- *July 8, 1976 Lease between South Park Investment Company and Richardson & Holland*
- *October 7, 1983 Certificate of Incorporation of Carlin Foods Corporation*
- *November 9, 1986 Lease between Marine Power & Equipment and Carlin Foods Corporation*
- *July 31, 1987 Stock Purchase Agreement between Carlin Foods Corporation and Bunge Corporation*
- *January 1, 1988 Lease between Industrial Indemnity Corporation and Carlin Foods Corporation*
- *August 1, 1988 Tenant-Lender Agreement between Rainier National Bank and Fox Avenue Warehouse Corporation*
- *August 2, 1988 Assignment of Lease between Industrial Indemnity Corporation and Fox Avenue Warehouse Corporation*
- *August 26, 1988 Memorandum between Carlin Foods Corporation and Fox Avenue Warehouse Corporation*
- *December 12, 1988 Subordination, Non-Disturbance, and Attornment Agreement among Carlin Foods Corporation, Fox Avenue Warehouse Corporation, and Northwestern National Life Insurance Company*
- *December 12, 1988 Tenant's Certificate from Carlin Foods Corporation*
- *September 21, 1989 Certificate of Amendment of Certificate of Incorporation declaring the name of Carlin Foods Corporation to be Bunge Foods Corporation*
- *January 1, 1996 First Amendment to Lease between Fox Avenue Warehouse Corporation and Bunge Foods Corporation*
- *November 12, 1996 Estoppel Certificate*
- *November 14, 1996 Assignment of Lease by Fox Avenue Warehouse Corporation to The Guimont Revocable Living Trust*
- *May 19, 1998 Subordination, Non-Disturbance, and Attornment Agreement between Bunge Foods Corporation, William P. Guimont Revocable Living Trust, and IDS Life Insurance Company.*
- *December 20, 2000 Certificate of Formation of Bunge Foods Processing, L.L.C.*
- *December 20, 2000 Limited Liability Company Agreement of Bunge Foods Processing, L.L.C.*
- *January 1, 2001 Assignment of Leases to Bunge Foods Processing, L.L.C.*
- *March 6, 2001 Consent to Assignment of Lease*
- *July 10, 2002 Second Amendment to Lease between Bunge Foods Processing, L.L.C. and William P. Guimont*
- *August 1, 2002 Memorandum of Lease between William P. Guimont and Bunge Foods Processing, L.L.C.*
- *December 1, 2003 Asset Purchase and Sale Agreement of Bunge Foods Corporation's Bakery Division to Dawn Foods Products, Inc.*
- *December 16, 2003 Consent to Assignment of Lease*
- *December 31, 2003 Assignment and Assumption Agreement between Bunge Foods Processing, L.L.C. and Dawn Foods Products, Inc.*

- *March 1, 2004 Certificate of Merger of Bunge Foods Mix, L.L.C. and Bunge Foods Processing, L.L.C. into Bunge Foods Corporation*
- *May 13, 2004 Certificate of Amendment of Certificate of Incorporation of Bunge Foods Corporation declaring the name of Bunge Foods Corporation to be changed to Bunge Oils, Inc.*

Bunge has no blueprints or "as-builts" of the Fox Avenue Site in its possession.

Bunge produces herewith photographs of the Fox Avenue Site from a May 25, 1995 safety inspection by Criminology International Consultants ("CCI").

b. Provide all information on the condition of the property when purchased; describe the source, volume, and content of any fill material used during the construction of the buildings, including waterside structures such as seawalls, wharves, docks, or marine ways.

ANSWER: *To its knowledge, Bunge has enclosed all documents in its possession responsive to this request. Bunge leased the Fox Avenue Site and did not own it.*

Bunge applied for a shoreline permit on April 2, 1990, pursuant to the City of Seattle, Department of Construction and Land Use Permit for Shoreline Management Substantial Development Shoreline Management Act of 1971. Specifically, Bunge filed the shoreline permit for construction of a foundation for an additional storage silo approximately 54 feet to 62 feet in height. The City of Seattle conditionally approved the permit on June 17, 1991. All documentation in Bunge's possession regarding the 1990 shoreline permit is enclosed.

Bunge applied for a shoreline permit on July 29, 1993, pursuant to the Shoreline Management Act of 1971 Permit for Shoreline Management of Substantial Development, Conditional Use, or Variance. Bunge filed the shoreline permit to establish the use for future construction of two accessory metal structures to provide weather protection for machinery. The first structure was to serve as an addition to the existing food processing and distribution facility by providing a weather resistant enclosure housing machinery utilizing pre-manufactured metal building components. The second structure was to serve as a future, free-standing building which would consist of pre-fabricated metal building components, housing machinery required in food processing. The City of Seattle granted the permit on October 14, 1993. All documents in Bunge's possession regarding the 1993 shoreline permit are enclosed.

c. Provide information on past dredging or future planned dredging at this site.

ANSWER: *To its knowledge, Bunge has enclosed all documents in its possession responsive to this request. Bunge is not aware of any past dredging or future planned dredging at the Fox Avenue Site. See the Phase I for information on changes to the Duwamish River and the potential that the western portion of the property was filled. See Phase I, at 4-17, 5-5, 5-6.*

d. Provide a brief summary of the activities conducted at the Site while under Respondent's ownership or operation. Include process diagrams or flow charts of the industrial activities conducted at the Site.

ANSWER: *To its knowledge, Bunge has enclosed all documents in its possession responsive to this request. Bunge incorporates its responses to Request Nos. 1(f) and 1(g).*

e. Provide all documents pertaining to the sale, transfer, delivery, disposal, of any hazardous substances, scrap materials, and/or recyclable materials to the property.

ANSWER: *Through its investigation, Bunge did not discover any documents regarding the sale, transfer, delivery, and disposal of any hazardous substances, scrap materials, or recyclable materials to the Fox Avenue Site. Bunge incorporates its response to Request No. 2(g) for a discussion of how minimal amounts of petroleum-based lubricants and other substances were used during Bunge's operation of the Fox Avenue Site.*

Exhibit A to the December 16, 2003 Consent to Assignment of Lease between Bunge Foods Processing, L.L.C. and Dawn Food Products, Inc. states the following regarding Bunge's lack of use of hazardous substances: "Tenant [Bunge Foods Processing, L.L.C.] does not now, and has not at any time since the commencement of the lease, used the Premises for (a) the generation, manufacture, refining, transportation, treatment, storage, or disposal of any hazardous substance or waste except as reasonably needed for the normal conduct of the business of Tenant and in accordance with the Lease and any law, ordinance, rule, or regulation of any governmental authority having jurisdiction of the Premises or (b) for any purpose which poses a substantial risk of imminent damage to public health or safety or to the environment." See Exhibit A, item 10. Bunge has enclosed this document.

f. Provide all information on electrical equipment used at the facility, including transformers or other electrical equipment that may have contained polychlorinated biphenyls (PCBs).

ANSWER: *To its knowledge, Bunge has enclosed all documents in its possession responsive to this request. According to the Phase I, the Fox Avenue Site was served by a single pad-mounted transformer provided by the City of Seattle on the south side of the property near the west end of the building. See 2-2. The Phase I expressly states that there is no "non-PCB" sticker visible on the transformer. See 5-5. According to correspondence from Mark L'Esperance to Jane Lohry dated November 6, 2001, Bunge employees contacted Seattle City Light regarding the electrical transformer after a SPCC review. Seattle City Light acknowledged there were PCB's in the electrical transformer, but it was "at the lowest end of their monitoring/concern spectrum." Seattle City Light conceded that if there were any releases of PCB's from this single pad-mounted transformer, Seattle City Light would be responsible for the clean-up. Bunge has no knowledge of any releases of PCB's.*

g. Provide any information on the type(s) of oils or fluids used for lubrication of machinery or other industrial purposes, and any other chemicals or products which are or may contain hazardous substances which are or were used at the facility for facility operations.

ANSWER: *To its knowledge, Bunge has enclosed all documents in its possession responsive to this request. Bunge incorporates its response to Request No. 1(g).*

h. Provide any site drainage descriptions, plans or maps that include information about storm drainage which includes, but is not limited to, above or below surface piping, ditches, catch basins, manholes, and treatment/detention or related structures including outfalls. If available, also include information about connections to sanitary sewer.

ANSWER: *To its knowledge, Bunge has enclosed all documents in its possession responsive to this request. According to the Phase I, no pits, ponds or lagoons were located on the Fox Avenue Site or on the adjoining properties. See Phase I, p. 5-5. The Phase I reported that no dry wells, irrigation wells, injection wells, or potable water wells were observed at the Fox Avenue Site. See Phase I, p. 5-6. The Phase I indicated that there were no discharges of wastewater or other liquids, including storm water, into a drain, ditch or stream on or adjacent to the Fox Avenue Site. See Phase I, p. 5-6.*

Sanitary sewer wastewater was discharged from the restrooms and offices to the King County Metropolitan Sewerage System (METRO) at the Fox Avenue Site. See Limited Environmental Compliance Assessment, p. 5. The Fox Avenue Site did not generate wastewater from the dry mix manufacturing process.

i. With respect to past site activities, please provide copies of any stormwater or drainage studies, including data from sampling, conducted at these properties. Also provide copies of any Stormwater Pollution Prevention or Maintenance Plans or Spills Plans that may have been developed for different operations during the Respondent's occupation of the property.

ANSWER: *To its knowledge, Bunge has enclosed all documents in its possession responsive to this request, including the Limited Environmental Compliance Assessment, the SPCC 2001, and the SPCC 1998. According to the 2001 SPCC, the Fox Avenue Site did not experience a spill event in the twelve months prior to the date of certification. See SPCC 2001, p. 3. Similarly, according to the 1998 SPCC, the Fox Avenue Site did not experience a spill event in the twelve months prior to the date of certification. See SPCC 1998, p. 4.*

According to the Limited Environmental Site Assessment, the Fox Avenue Site did not have a storm water permit under the National Pollutant Discharge Elimination System ("NPDES") nor had it prepared a storm water pollution prevention plan ("SWPPP"). See Limited Environmental Site Assessment, p. 4. In 2003, the Fox Avenue Site intended to file for certification of non-exposure and obtain an exemption from the requirement to obtain a permit and develop an SWPPP because, under the exemption, material storage and usage areas that have secondary containment are protected from exposure to storm water. See p. 4.

3. Information About Others

a. Describe any business relationship you may have had regarding this property or operations thereon with the following entities:

i. Dawn Food Products, Inc.

ANSWER: *Bunge Foods Corporation sold its Bakery Division to Dawn Food Products, Inc., in an Asset Purchase and Sale Agreement on December 31, 2003. Specifically included in the transaction is the lease between Industrial Indemnity Company and Carlin Foods Corporation dated January 1, 1988, as amended. See Asset Purchase and Sale Agreement, p. 17, Disclosure Schedule 3.9(b). Also on December 31, 2003, Bunge Foods Processing, L.L.C., the assignor, and Dawn Food Products, Inc., the assignee, entered into an Assignment and Assumption Agreement. In this document, Bunge Foods Processing, L.L.C. assigned the lease dated January 1, 1988 to Dawn Food Products, Inc.*

ii. Fox Avenue Warehouse Corporation

ANSWER: *Bunge Foods Corporation entered into a contractual relationship with Fox Avenue Warehouse Corporation at the Site in 1996. On January 15, 1996, Fox Avenue Warehouse Corporation, the lessor, and Bunge Foods Corporation, the lessee, entered into the First Amendment to the 1988 Lease. Fox Avenue Warehouse was the successor in interest to Industrial Indemnity Corporation. Bunge Foods Corporation was the successor in interest to Carlin Foods Corporation.*

iii. (b) (6)

ANSWER: *Bunge Foods Processing, L.L.C. entered into a contractual relationship with William Guimont. On July 10, 2002, William P. Guimont, the lessor, and Bunge Foods Processing, L.L.C., the lessee, entered into the Second Amendment to the 1988 Lease.* (b) (6) *the successor trustee of the* (b) (6) (b) (6) *Revocable Living Trust, was the successor to Fox Avenue Warehouse Corporation. On December 16, 2003,* (b) (6) *consented to the assignment of the Lease to Dawn Food Products, Inc. by Bunge Foods Processing, L.L.C.*

iv. Indal Corporation

ANSWER: *Bunge is not aware of any business relationship it had with Indal Corporation.*

v. Industrial Indemnity Company

ANSWER: *Bunge Foods Corporation entered into a contractual relationship with Fox Avenue Warehouse Corporation at the Site in 1996. It is Bunge's understanding that Fox Avenue Warehouse Corporation was the successor in interest to Industrial Indemnity Corporation. On January 1, 1988, Industrial Indemnity Corporation, the lessor, and Carlin Foods Corporation, the lessee, entered into a lease agreement regarding the Fox Avenue Site.*

vi. (b) (6)

ANSWER: *According to numerous documents,* (b) (6) *received an undivided 25% tenancy in common interest under the* (b) (6) *Revocable Living Trust. As discussed above, Bunge Foods Processing, L.L.C. entered into a contractual relationship with* (b) (6) *On July 10, 2002,* (b) (6) *the lessor, and Bunge Foods Processing, L.L.C., the lessee, entered into the Second Amendment to the 1988 Lease.* (b) (6) *was the successor trustee of the* (b) (6) *Revocable Living Trust.*

vii. (b) (6)

ANSWER: *According to numerous documents,* (b) (6) *received an undivided 25% tenancy in common interest under the* (b) (6) *Revocable Living Trust. As discussed above, Bunge Foods Processing, L.L.C. entered into a contractual relationship with* (b) (6) *On July 10, 2002,* (b) (6) *the lessor, and Bunge Foods Processing, L.L.C., the lessee, entered into the Second Amendment to the 1988 Lease.* (b) (6) *was the successor trustee of the* (b) (6) *Revocable Living Trust.*

viii. Marine Power and Equipment Co., Inc.

ANSWER: *Based upon its review of the enclosed documents, Bunge believes that Marine Power & Equipment Company was the lessor in the November 19, 1986 Lease Agreement with Carlin Foods Corporation. Bunge is not aware of any business relationship it had with Marine Power and Equipment Co., Inc.*

ix. National Steel Construction Co.

ANSWER: *According to the Phase I, prior to the construction of the current building, the Fox Avenue Site was occupied by the National Steel Construction Company for at least 17 years. See ES-3, 8-1. The limited information available indicates that National Steel Construction Company conducted the following activities on the Fox Avenue Site: woodworking, electric thermostat manufacturing, painting, and sheet metal and assembling. According to the Phase I, the Fox Avenue Site was occupied by McAteer Ship Building Company prior to the National Steel Construction Company. Bunge is not aware of any business relationship it had with National Steel Construction Company.*

x. Seattle Iron & Metals Corporation

ANSWER: *Bunge is not aware of any business relationship it had with Seattle Iron & Metals Corporation. To Bunge's knowledge, Seattle Iron & Metals Corporation is a salvage and recycling storage facility located at 600 S. Garden Street, abutting the Duwamish Waterway.*

xi. Southpark Investment Company, and

ANSWER: *Based upon its review of the enclosed documents, Bunge believes that Southpark Investment Company was the lessor in the July 8, 1976 Lease with Richardson & Holland Corporation. Bunge is not aware of any business relationship it had with Southpark Investment Company.*

xii. Young Corporation

ANSWER: *Bunge is not aware of any business relationship it had with Young Corporation.*

b. Provide the names and last known address of any tenants or lessees, the dates of their tenancy and a brief description of the activities they conducted while operating on the above mentioned site including but not limited to the following entities:

i. Ener-G Foods, Inc.

ANSWER: *Bunge is in possession of a January 5, 1988 communication from Ragan Powers, Esq., of Helsell, Fetterman, Marin, Todd & Hokanson, attorney for Industrial Indemnity, to John Anton of Carlin Foods and Sam Wylde of Sam Wylde Flour. The letter outlines new lease rates for the tenants, including Ener-G Foods, Inc. The letter indicates that Ener-G Foods, Inc. shall remain a tenant in its present space until March 31, 1988, at which time its tenancy under its original leases shall terminate. Subsequently, Carlin Foods will execute a new lease, effective January 1, 1988. This document is enclosed with Bunge's response. Bunge is not aware of any information regarding Ener-G Foods, Inc.'s last known address, if Ener-G Foods, Inc. operated on the Site, the dates of Ener-G Foods, Inc.'s tenancy, or a description of the activities that Ener-G Foods, Inc. conducted while operating at the Fox Avenue Site.*

ii. Oroweat Foods Company, and

ANSWER: *Bunge is not aware of any information regarding Oroweat Foods Company's last known address, if Oroweat Foods Company operated at the Fox Avenue Site, the dates of Oroweat Foods Company's tenancy, or a description of the activities that Oroweat Foods Company conducted while operating at the Fox Avenue Site.*

iii. Sam Wylde Flour Co.

ANSWER: *Mr. Sam Wylde, Sam Wylde Flour, P.O. Box 84488, Seattle, Washington, 98124-5788. Bunge is in possession of a January 5, 1988 communication from Ragan Powers, Esq., of Helsell, Fetterman, Marin, Todd & Hokanson to John Anton of Carlin Foods and Sam Wylde of Sam Wylde Flour. The letter outlines new lease rates for the tenants, including Sam Wylde Flour. The letter indicates that Sam Wylde Flour shall remain a tenant in its present space until March 31, 1988, at which time its tenancy under its original leases shall terminate. Subsequently, Carlin Foods will execute a new lease, effective January 1, 1988. This document is enclosed with Bunge's response. Bunge is not aware of any information regarding the dates of Sam Wylde Flour's tenancy or a description of the activities that Sam Wylde Flour conducted while operating at the Fox Avenue Site.*

c. If not already provided, identify and provide a last known address or phone number for all persons, including Respondent's current and former employees or agents, other than attorneys, who have knowledge or information about the generation, use, purchase, storage, disposal, placement, or other handling of hazardous materials at, or transportation of hazardous materials to or from, the Site.

ANSWER: *Bunge incorporates its prior response to Request No. 1(e). Bunge also provides contact information for Loren Polak.*

Loren Polak
Director of Environmental Management
Bunge North America, Inc.
11720 Borman Drive
St. Louis, MO 63146
Telephone: 314-292-2374

4. Financial Information

a. Provide true and complete copies of all federal income tax documents, including all supporting schedules, for 2002, 2003, 2004, 2005, 2006 and 2007. Provide the federal Tax Identification Number and, if documentation is not available, explain why in detail.

ANSWER: *Bunge objects to this Request because it is overly broad. The federal tax identification number for Bunge Oils, Inc. is* (b) (6)

b. Provide the Respondent's financial interest in, control of, or that the Respondent is a beneficiary of any assets (in the U.S. or in another country) that have not been identified in your federal tax returns or other financial information to be presented to EPA. If there are such assets, please identify each asset by type of asset, estimated value, and location.

ANSWER: *Bunge objects to this Request because it is overly broad.*

c. If Respondent is, or was at any time, a subsidiary of, otherwise owned or controlled by, or otherwise affiliated with another corporation or entity, then describe the full nature of each such corporate relationship, including but not limited to:

i. a general statement of the nature of relationship, indicating whether or not the affiliated entity had, or exercised, any degree of control over the daily operations or decision-making of the Respondent's business operations at the Site;

ANSWER: *Bunge incorporates its response to Request Nos. 1(a), 1(e), and 1(b). The following timeline outlines Bunge's relationship as a tenant at the Fox Avenue Site.*

On January 1, 1988, Industrial Indemnity Corporation, the lessor, and Carlin Foods Corporation, the lessee, entered into a lease agreement regarding the Fox Avenue Site.

From July 31, 1987 to September 29, 1989, Bunge Foods Corporation operated the Fox Avenue Site as Carlin Foods Corporation. On September 29, 1989, Carlin Foods Corporation changed its name to Bunge Foods Corporation.

On January 15, 1996, Bunge Foods Corporation, the successor in interest to Carlin Foods Corporation, entered into the First Amendment to the 1988 Lease.

On January 1, 2001, Bunge Foods Corporation assigned all of its rights, title, interest and obligations to all tangible and intangible assets at the Site to Bunge Foods Processing, L.L.C.

On December 31, 2003, Bunge Foods Processing, L.L.C. and Dawn Food Products, Inc. entered into an Assignment and Assumption Agreement. Bunge Foods Processing, L.L.C. assigned the lease dated January 1, 1988 to Dawn Food Products, Inc.

On March 1, 2004, Bunge Foods Processing, L.L.C. was merged into Bunge Foods Corporation.

On May 13, 2004, Bunge Foods Corporation changed its name to Bunge Oils, Inc.

ii. the dates such relationship existed;

ANSWER: *Bunge refers to its response to Request No. 4(c)(i) for information regarding the dates.*

iii. the percentage of ownership of Respondent that is held by such other entity(ies);

ANSWER: *Bunge incorporates its response to Request No. 1(b).*

iv. for each such affiliated entity provide the names and complete addresses of its parent, subsidiary, and otherwise affiliated entities, as well as the names and addresses of each such affiliated entity's officers, directors, partners, trustees, beneficiaries, and/or shareholders owning more than five percent of that affiliated entity's stock;

ANSWER: *Bunge objects to this Request because it is overly broad. Bunge incorporates its response to Request No. 1(b). In response, Bunge Oils, Inc. directs EPA to Bunge Limited's 2007 Annual Report, a copy of which is enclosed.*

v. provide any and all insurance policies for such affiliated entity(ies) which may possibly cover the liabilities of the Respondent at the Site; and

ANSWER: *Bunge objects to this Request because it is overly broad. In response, Bunge incorporates its response to Request No. 5(a).*

vi. provide any and all corporate financial information of such affiliated entities, including but not limited to total revenue or total sales, net income, depreciation, total assets and total current assets, total liabilities and total current liabilities, net working capital (or net current assets) and net worth.

ANSWER: *Bunge objects to this Request because it is overly broad. Bunge incorporates its response to Request No. 1(h). In response, Bunge directs EPA to Bunge Limited's 2007 Annual Report, a copy of which is enclosed.*

5. Insurance Coverage

a. Provide copies of all property, casualty and/or liability insurance policies, and any other insurance contracts referencing the Site or facility and/or Respondent's business operations (including, but not limited to, Comprehensive General Liability, Environmental Impairment Liability, Pollution Legal Liability, Cleanup Cost Cap or Stop Loss Policies). Include, without limitation, all primary, excess, and umbrella policies which could be applicable to costs of environmental investigation and/or cleanup, and include the years such policies were in effect.

ANSWER: *Bunge objects to this Request because it is overly broad. In response, Bunge responds by producing a spreadsheet outlining its general liability policy schedule for 1987 to 2003. The spreadsheet identifies the primary, excess, and umbrella policies during the years that Bunge leased and operated at the Fox Avenue Site.*

b. If there are any such policies from question "5a" above which existed, but for which copies are not available, identify each such policy by providing as much of the following information as possible:

i. the name and address of each insurer and of the insured;

ii. the type of policy and policy numbers;

iii. the per occurrence policy limits of each policy; and

iv. the effective dates for each policy.

ANSWER: *Bunge objects to this Request because it is overly broad. Bunge is not aware of any policies where copies are not available at this time.*

c. Identify all insurance brokers or agents who placed insurance for the Respondent at any time during the period being investigated, as identified at the beginning of this request, and identify the time period during which such broker or agent acted in this regard.

ANSWER: *Bunge objects to this Request because it is overly broad. Bunge responds by directing EPA to the spreadsheet outlining the insurance brokers and agents who placed insurance for Bunge entities.*

d. Identify all communication and provide all documents that evidence, refer, or relate to claims made by or on behalf of the Respondent under any insurance policy in connection with the Site. Include any responses from the insurer with respect to any claims.

ANSWER: *Bunge attaches hereto and incorporates herein a letter dated September 4, 2008 from LeAnne Johnson Werner, Insurance Manager of Bunge North America, Inc., to Denise Lawrence of Aon Risk Services, placing relevant carriers on notice of a potential claim regarding this 104(e) request.*

e. Identify any previous settlements with any insurer in connection with the Site, or for any claims for environmental liabilities during the time period of under investigation. Include any policies surrendered or cancelled by the Respondent or insurer.

ANSWER: *Bunge objects to this Request because it is overly broad and unduly burdensome. Bunge has not received a response to the claim letter described in No. 5(d).*

f. Identify any and all insurance, accounts paid or accounting files that identify Respondent's insurance policies.

ANSWER: *Bunge objects to this Request because it is overly broad. In response, Bunge incorporates its response to Request No. 5(a).*

g. Identify Respondent's policy with respect to document retention.

ANSWER: *Bunge encloses its current policy entitled "Records Retention."*

6. Compliance with This Request

a. Describe all sources reviewed or consulted in responding to this request, including, but not limited to:

i. the name and current job title of all individuals consulted;

ANSWER: *Bunge responds that the following individuals were consulted in responding to this 104(e) Request: Beverly Garner, Esq., Senior Corporate Counsel, Bunge North America, Inc.; Loren Polak, Director of Environmental Management, Bunge North America, Inc.; LeAnne Johnson Werner, Insurance Manager, Bunge North America, Inc.; Steven J. Poplawski, Esq., of Bryan Cave LLP; and John R. Kindschuh, Esq., of Bryan Cave LLP.*

ii. the location where all documents reviewed are currently kept

ANSWER: *The documents that were reviewed and enclosed in response to this 104(e) request are currently held at Bunge North America, Inc.'s headquarters at 11720 Borman Drive, St. Louis, MO 63146.*

bcc: Steve Poplawski, Esq.

Phase 1 Environmental Site Assessment Report

6901 Fox Avenue South
Seattle, Washington

Project Number: 033-009

Prepared for:
Bridge Development Partners, LLC
10655 NE 4th Street, Suite 210
Bellevue, WA 98004

January 31, 2020

Prepared by:

CRETE
CONSULTING, INC.
Crete Consulting Incorporated, PC
108 South Washington St, Suite 300
Seattle, WA 98104
www.creteconsulting.com

Phase 1 Environmental Site Assessment Report

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Seattle, Washington

Prepared for:
Bridge Development Partners, LLC
10655 NE 4th Street, Suite 210
Bellevue, WA 98004

Prepared by:

Jamie C. Stevens

Jamie C. Stevens, P.E., Sr. Engineer

Reviewed by

Grant H

Grant Hainsworth, P.E., Principal

January 31, 2020

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1 Introduction

This report summarizes the results of a Phase I Environmental Site Assessment (Phase 1) performed by CRETE Consulting Incorporated (CRETE) for Bridge Development Partners, LLC (Bridge). This Phase 1 is for Parcel Number 000180-0113 located at 6901 Fox Ave South, Washington and is referenced in this document as the ‘subject property’. Figures 1 and 2 show the 5.42 acre parcel and adjacent properties.

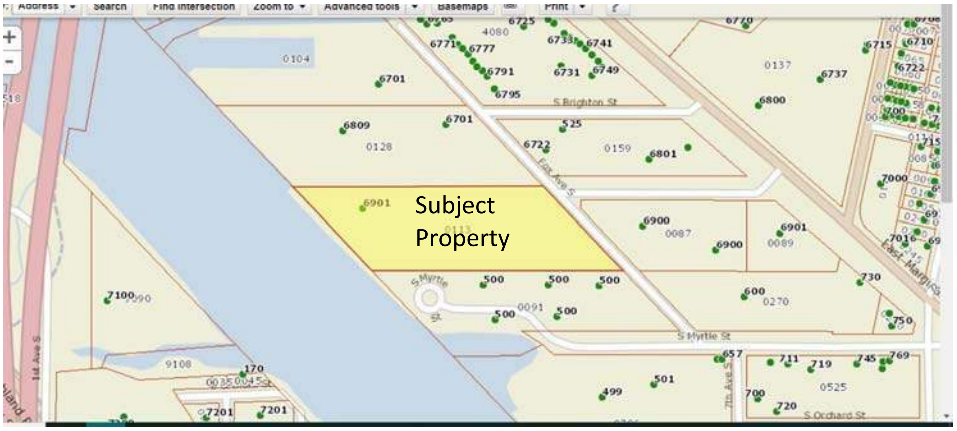
CRETE prepared this Phase 1 consistent with ASTM standard E 1527–18 for Phase 1 Environmental Site Assessments. This Phase 1 evaluates whether current or former land use on or near the subject properties may have released hazardous substances to the environment which may affect the property value and owner liability prior to purchase.

The document review portion of the Phase 1 included information about the property history, the environmental conditions of the subject properties and surrounding properties, and environmental and geologic information available for nearby properties. This information was acquired through the following sources:

- An EDR environmental database search (Appendix A)
- Polk Directory Search (Appendix A)
- Regional land-use information available through the King County Assessor Office and King County Planning and Land Services online webpage
- Physical property information including aerial photographs and USGS maps (Appendix B)
- Washington State Department of Ecology (Ecology) files for the subject properties and adjacent properties (Appendix C)

A site inspection to evaluate the current status of the subject property and verify information found during the documentation review was conducted on October 24, 2019.

Figure 1 6901 Fox Ave South Property Parcel Viewer



Notes:
Parcel numbers start with '000180'.
Source: https://gismaps.kingcounty.gov/parcelviewer2/?print=1

2 Property Background

2.1 Subject Property

The subject property covers 5.4-acres and is zoned for General Industrial IG1 U85 use (Figure 1). Historical records indicate that usage of the property appears to be generally consistent with its zoning. The property is located in the Georgetown neighborhood of Seattle adjacent to the Duwamish River.

The site includes a 1977 warehouse building that is approximately 2.96 acres/128,800 square feet. The building and the site are currently used by Dawn Foods to store dry foods/and cooking oils. Materials are delivered by rail and truck.

The history of the subject property was determined using information from the aerial photographs (Appendix B), Environmental Data Resources, Inc.'s (EDR's) state and federal environmental database searches (Appendix A), an online King County Assessor's Property Characteristics Report, Polk records (Appendix B), and the Washington State Department of Ecology (Ecology) central records (Appendix C).

The property is located in the Duwamish River Valley and is adjacent to the Duwamish River. The river formerly meandered throughout the area until the 1913 to 1916 dredging program provided a more straight channel through which the river follows today.

The 1917, 1929, 1949, and 1966 Sanborn maps (Appendix B) indicate that ship building occurred on the subject property. Tax records indicate that the buildings (at least 7 at one time) were constructed around 1929 and previous environmental documents state that operations included sheet metal and assembling, electric thermostat manufacturing plant, paint spraying, general storage and offices (Hart Crowser 1996A). Records reviewed indicate that National Steel Corporation, which occupied the southern parcel, expanded operations around 1929 and took over McAteer Ship Building Company. Anderson Ship Building Company was present on the western portion of the site from 1930-1940. Records reviewed indicate that ship building activities likely occurred between 1917 and 1966 after which time the property was leased and used by Emerson GM Diesel, a sheet metal fabrication and generator manufacturing company to the mid 1970's. Tax records indicate that the existing warehouse was constructed in 1977 and it appears all other buildings were demolished at that time. Records indicate that the building was used by various food companies, such as Bunge Foods (1988-2003), Ener-G Foods, Oroweat Foods Company, Sam Wylde Flour Company (EPA 2008).

Historical aerial photographs and Polk records suggest the following history:

- 1936: boat building present, areas to the north and south developed. Some areas to the west developed.

- 1943: boat building present, several buildings on the property, property appears to be unpaved. Areas to the north, south and west developed.
- 1953: Similar to the 1943 aerial photograph, with more development observed in the vicinity of the subject property.
- 1956: Subject property remains similar to 1953, property to the north appears to have been demolished, looks to be a vacant lot in the photograph.
- 1965: Scale of photo difficult to read but similar to the 1956 aerial photograph.
- 1969: The subject property and vicinity appear to be similar to the 1965 conditions
- 1977: The pervious smaller buildings (up to 7 different buildings) have been replaced with the existing warehouse, which appears to have the same footprint as today. The northern lot appears to be vacant with some yard storage.
- 1980: The subject property and vicinity appear to be similar to current conditions. Northern property's existing buildings are present.
- 1985: The subject property and vicinity appear to be similar to the 1980 conditions.
- 1990: The subject property and vicinity appear to be similar to the 1985 conditions.
- 2006 and 2009: The subject property and vicinity appear to be similar to present conditions.
- 2013 and 2017: The subject property and vicinity appear to be similar to present conditions.

2.2 Regional Geology and Hydrogeology

The area around the subject property is primarily alluvial sands and silts with discontinuous areas of recent fill. The fill soil is generally local, including dredging spoils from river channel improvements.

Below the fill are alluvial soils comprised of sand and silty sand with occasional silt interbeds. Groundwater is typically shallow, less than 10 feet below the surface. Regional groundwater flow direction is generally to the west-southwest with groundwater discharging to the Duwamish River. Tidal fluctuations are expected to affect groundwater which is also likely affected by fills from the Duwamish River channel straitening activities.

2.3 Adjacent Properties Historical Land Use

The subject property is bordered by:

- North – 6701 Fox Avenue (0001800128) – Records show that this property was developed as early as 1936 (1936 aerial photograph) and the 1949 Sanborn map shows a paint manufacturing company, Far West Paint occupying at least a portion of this property. Buildings are not present on the western portion of the parcel in the 1956 aerial photograph, but the paint building appears to have been enlarged. The 1985 aerial shows essentially the existing layout of buildings and may have been occupied by Marine Power Equipment Company. In 1996 the property was occupied by Northland

Services, Inc/Glacier Marine Transport. Currently the property is operated by Seatac Marine Properties Fox Avenue Terminal which is a transport/shipping and storage firm that includes warehouse storage and shipping container storage. Based on the company’s website, items stored include: heavy lift and oversized cargos, bulk and break, environmental products and waste (including hazardous waste), US government freights, and fish and fisheries.

- East – 6900 Fox Avenue (0001800087) – Seattle Chain and Manufacturing Company leased the property from King County, from 1918 until 1937 when it purchased the property. Seattle Chain and successor companies operated coke and oil fired furnaces and warehouses on the property. For the next 20 years, ownership of the property changed hands several times. In 1956, Marian Properties LLC Enterprises bought the property and leased a portion of it to Great Western Chemical, which operated a chemical and petroleum repackaging and distribution facility on the property through the 1980’s (Ecology 2020). In 2003 Cascade Columbia Distribution Company leased the property. They use the property as a warehouse and a chemical distribution facility which provides chemicals and related supplies and equipment for the aerospace, compounding, electronics, food manufacturing, metal plating, and water treatment industries.

- South – 500 S Myrtle Street (0001800091) – National Steel Corporation occupied this property from 1908 through 1966. Operations included ship building and metal fabrication. Operations expanded onto the subject property shortly after World War II, which is discussed in Section 2.1. Seattle Boiler Works purchased the property in 1966 and is currently at the location. Seattle Boiler Works provides fabrication and processing of boiler related products constructed mostly of metal.

- West – Duwamish River and The Lower Duwamish Waterway (LDW) Superfund site is a five mile segment of the Duwamish River. The river flows between the neighborhoods Georgetown and South Park and through the industrial core of Seattle into Elliott Bay. The LDW has served as Seattle’s major industrial corridor since the early 1900s.

2.4 Property Inspection

A property inspection was conducted on October 24, 2019 by Grant Hainsworth (CRETE). Grant Hainsworth inspected environmental site conditions of the subject property.

Dawn Foods Corporation uses the property to store, produce and ship dry food products, such as cake and pancake mixes. Bulk oils such as canola oil were received by truck or rail until the facility changed operations to focus on dry food products. Dry bulk items, such as sugar, are received by truck. The warehouse is divided into areas that mix products and office (the western half) and storage (eastern half). A small quantity of cleaning solvents are stored and used on sites for equipment maintenance.

There are five silos along the western end of the warehouse and three above ground storage tanks. These contain dry products (flour) and formerly contained oils and there is secondary containment system is present around the silos. There is a carbon dioxide tank (80,000-pound storage) which is used to cool agents in the mixes. There is also a propane tank at the south end of the warehouse used to fuel the fork lifts.

The condition of the building was observed to be good, with much of the building appearing to be original.

There are several stormwater drains along the southern portion of the property. Discharge at the facility occurs via a single outfall. The location of the outfall was not verified for this report. Visible catch basins were observed to have stormwater inserts. The site gently slopes east to west, towards the Duwamish Waterway. Sheet flow across the parking and storage area flows towards the Duwamish Waterway. There is a steep embankment on the western boundary with the Duwamish Waterway. The driving surfaces are mostly asphalt, which are in good repair. The site is very active with truck traffic, including trucks loading, unloading and idling.

3 Environmental Regulatory Records Review

A detailed review of available historical documents was completed to develop this Phase 1 report. An EDR environmental database and Polk directory search were conducted and are included in Appendix A. Public documents were requested and reviewed from Ecology for the subject property and surrounding properties. Electronic copies are included in Appendix C.

Regulatory agency lists reviewed included:

- National Priority List (NPL or Superfund Sites) - National Priorities List (Superfund). The NPL is a subset of Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) and identifies over 1,200 sites for priority cleanup under the Superfund Program.
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) – List of sites currently being reviewed for possible inclusion on the NPL.
- CERCLIS – No Further Action Planned (CERCLIS-NFRAP) - tracks sites that have no further interest under the Federal Superfund Program based on available information.
- Resource Conservation Recovery Act Information System (RCRA), (RCRA-TSD) and RCRA Treatment, Storage, or Disposal CORRACTS, Generators - is a list of handlers and generators with RCRA Corrective Action Activity. This report shows which nationally-defined corrective action core events have occurred for every handler that has had corrective action activity. This includes sites with violations or sites that are currently under investigation.
- Confirmed or Suspected Contaminated Sites List (CSCSL) and CSCSL No Further Action (NFA) – this includes sites being considered for investigation/actively investigated/or determined to be closed by the Washington Department of Ecology under the Model Toxic Control Act (MTCA).
- Underground Storage Tank (UST) List and Leaking Underground Storage Tank (LUST) List - The LUST sites are also commonly on the CSCSL and include sites with known USTs/above ground storage tanks or sites with leaking USTs.
- Ecology Toxic Cleanup Program Site Register (WA Site Register) and Ecology Solid Waste Facility List (SWFL) – List sites registered with Ecology Toxic Cleanup Program and Solid Waste Facilities.

3.1 Environmental Records for the Subject Property

A review of environmental records indicated the following for the subject site:

- WA Spills –
    - On May 29, 2010 an unknown diesel spill was reported for the subject property. The quantity, source, and extent were not detailed.

  - On May 13, 2011, 2-gallons of cake batter were reported spilled. Report indicates the material was contained to the parking area and was cleaned up by Aqua Clean (Ecology Incident# 82048, included in Appendix C). This spill was reported because it included a biological oil (which can be regulated depending on composition).
  - On April 25, 2017, 8-ounces of hydraulic oil from a broken hydraulic line were reported to be spilled into a storm drain (Ecology Incident# 93379, included in Appendix C).
- WA US National Pollutant Discharge Elimination System (NPDES) – the site (under Dawn Foods) has a NPDES permit (WAR011560) which may have expired on December 31, 2019; renewal copies were not found databases searched. A copy of the 2019 permit is included in Appendix C. Environmental concerns documented from Ecology inspections (completed on March 12, 2019) include: surface sheens in parking lot (from parked vehicles) and some concerns about older paint chipping off silos.

In 1996 Hart Crowser completed a limited subsurface investigation for the property. Results of this report include field observations of metal debris and petroleum like odor in one location (sample location HC-4) and TPH and metals detected at two locations in the western portion of the subject property (in sample locations HC-4 and HC-5). Lead was detected above MTCA direct contact values at one location (HC-4). Volatile organic compounds were detected in several sample locations, but the report concluded that insufficient data was available to determine the source of the solvents (Hart Crowser 1996B). Sample locations are shown on Figure 3. The 1996 Hart Crowser report recommended further investigation in the areas of HC-4 and HC-5 and additional soil and groundwater samples to determine extent and sources of contamination. CRETE was not able to determine if any additional environmental sampling or investigation efforts have been completed at the subject property. Based on the data available, soil and groundwater contamination is present at the subject property and the extent and sources have not been defined. Data was not reviewed related to other site media (vapor or sediments) which may also be contaminated.

There is a City of Seattle single pad-mounted transformer on the south side of the property near the west end of the buildings. A sticker is present that reads 'non-PCB', however documents reviewed indicate that the transfer may have low levels PCB (Bryan Cave LLP 2008). There is no known release of PCBs from this transformer and it is currently maintained and serviced by the City of Seattle.

3.2 Environmental Records for the Adjacent Properties

3.2.1 6701 Fox Avenue

Seatac Marine Properties Fox Avenue Terminal is located north of the subject property. No environmental records were found for this property and this property was not listed in any environmental databases searched.

3.2.2 6900 Fox Avenue

Great Western Chemical/Cascade Columbia Distribution Company (GWC) is located to the east of the subject property. Soil and groundwater contamination from petroleum and chlorinated solvent products have been identified at the property. In 2012, Ecology entered into an Agreed Order (legal agreement) with the current property owner, Fox Ave Building LLC, to require implementation of the Cleanup Action Plan.

GWC operated a chemical and petroleum repackaging and distribution facility on the property. GWC pumped bulk product through buried pipes as well as hoses on the surface. The facility had a number of underground and above ground storage tanks which stored chemical and petroleum products, including solvents, acids, and lube oils.

From the 1960s through the 1980s, GWC replaced and upgraded many of their warehouse structures. Several other companies leased parts of the property over the years. A number of chemicals and petroleum products were handled at the Site. In 2003, Fox Avenue Building LLC bought the GWC property. Cascade Columbia Distribution now leases the property and uses the warehouse as a chemical distribution facility.

The groundwater from the Site reaches the Lower Duwamish Waterway, making it a concern for source control to prevent recontamination of the Lower Duwamish Waterway Superfund site.

Based on information reported by Ecology, contamination at the site is the result of industrial use since 1918. The contaminants of concern in the soil and groundwater are:

- Chlorinated solvents
- Petroleum hydrocarbons
- Semi-volatile organic compounds (SVOCs)
- Dioxins and furans

The site has had numerous site investigations and ongoing cleanup actions started at least in 1991 when the GWC entered into an agreed order with Ecology. According to Ecology's website, the site is awaiting a supplemental feasibility study to determine a recommended site wide cleanup action and prepare a draft cleanup action plan. The site is listed in the several environmental databases, including ALLSITES, SPILLS, MANIFEST, NPDES, UST, RCRA NONGEN /NLR, FINDS, ECHO.

This site is located upgradient of the subject property and groundwater flows from this site to the subject property (in an east to west direction) with discharge to the Duwamish Waterway. Figure 4, from the Fox Avenue Site, shows the "Northwest Corner Plume CAA" and the "Loading Dock Area" overlapping with the subject property.

3.2.3 500 S Myrtle Street

Seattle Boiler Works provides fabrication and processing of boiler related products constructed mostly of metal. This property is located to the south of the subject property. This site is downgradient of the subject property. The site is listed in the following environmental databases: ALLSITES,SPILLS,NPDES, UST,FINDS,ECHO.

3.2.4 Duwamish Waterway

The subject property is bound on the western property boundary by the Duwamish Water. The river is part of the Lower Duwamish Waterway (LDW) Superfund Site which is a 5-mile stretch of the Duwamish River that flows north into Elliot Bay was added to the Superfund National Priorities List by the U.S. Environmental Protection Agency (EPA) in 2001. The sediments (mud) in the river contain a wide range of contaminants due to decades of industrial activity and runoff from urban areas. EPA is leading efforts to clean up the river sediments. The subject property is located between river mile 2.2 and 2.3. Surface and subsurface data available on the LDW Superfund Site website collected in close proximity to the subject property indicates that the sediments are not contaminated (Windward 2010). Sites immediately up and downgradient do have contaminated sediment which may migrate to the subject property. Efforts to remediate the Superfund Site would likely address these areas of concern.

Ecology is leading efforts to control sources of contamination from the surrounding land area. The long-term goal is to minimize recontamination of the river sediment and restore water quality in the river. The subject property would be part of any efforts to control sources of contamination.

3.3 Environmental Records for the Surrounding Properties

The EDR report (included in Appendix A) provides a detailed review of properties within a 1 mile radius of the site. The site is bounded on the western property boundary by the Duwamish Waterway. Sites that are west of this water body are not included in this summary. Below is a summary of sites that are on the eastern bank of the Duwamish Waterway and within in the search radius of the subject property and in multiple searched database.

ADDRESS	DATABASES	ELEV	DIST(mi)
1441 N NORTHLAKE WAY & 6901 FOX S	HIST FTTS	TP	TP
501 S MYRTLE ST	ALLSITES,RCRA NONGEN / NLR,FINDS,ECHO	Lower	0.053
6722 FOX AVE S	ALLSITES	Higher	0.071
FOX AVE S & S BRIGHTON ST	ALLSITES,RCRA NONGEN / NLR	Higher	0.071
550 S MYRTLE ST	ALLSITES	Higher	0.102

ADDRESS	**DATABASES**	**ELEV**	**DIST(mi)**
6701 E MARGINAL WAY S	ALLSITES,ASBESTOS	Higher	0.133
6731 E MARGINAL WAY S	ALLSITES	Higher	0.154
6705 E MARGINAL WAY S	ALLSITES,ASBESTOS	Higher	0.161
600 S MYRTLE ST	UST,ALLSITES,FINDS	Higher	0.163
601 S MYRTLE ST	SEMS,SPILLS,RCRA NONGEN / NLR,LEAD SMELTERS,FINDS,ECHO,MANIFEST, UST, SWF/LF,SWRCY,ALLSITES,MANIFEST	Higher	0.166
606 S MYRTLE ST	VCP, INST CONTROL,ALLSITES,CSCSL NFA	Higher	0.169
E. MARGINAL WAY S. & S. BRIGHTON ST.	ICR	Higher	0.173
6795 E MARGINAL WAY S	ALLSITES,RCRA NONGEN / NLR,FINDS,ECHO	Higher	0.174
6770 E MARGINAL WAY S BLDG D	ALLSITES,RCRA NONGEN / NLR,FINDS,ECHO	Higher	0.179
DUWAMISH APPRENTICESHIP &	UST,ALLSITES	Higher	0.179
701 S ORCHARD ST AT&T	ALLSITES	Higher	0.184
6715,6737 CORSON AVE. S. & 6800 E. MARGINAL WAY S.	ICR	Higher	0.19
711 S MYRTLE ST	ALLSITES,RCRA NONGEN / NLR,FINDS,ECHO	Higher	0.191
6800 E MARGINAL WAY & CORSON A	UST,ALLSITES,RCRA NONGEN / NLR,FINDS,ECHO	Higher	0.193
RK 2.5 TO RK 10.8	NPL,SEMS,PRP	Lower	0.193
6900 FOX AVE S	SEMS-ARCHIVE,CORRACTS,HSL,CSCSL,LUST,ICR,ALLSITES,RCRA NONGEN / NLR,FINANCIAL ASSURANCE,MANIFEST,MANIFEST, UST	Higher	0.206
6851 E MARGINAL WAY S	MANIFEST, RCRA-LQG,PADS, UST,ALLSITES,FINDS,ECHO,NPDES	Higher	0.209
6714 E MARGINAL WAY S	CSCSL,ALLSITES	Higher	0.213
171 S RIVER ST	ALLSITES	Higher	0.228
551 S RIVER ST	ALLSITES,CSCSL NFA,RCRA NONGEN / NLR, VCP	Higher	0.231
303 S RIVER ST	ALLSITES,SPILLS,FINDS	Higher	0.234
7245 2ND AVE S	ALLSITES	Higher	0.237
620 S OTHELLO ST	ALLSITES	Lower	0.238
4TH AVENUE & E. MARGINAL WAY	US BROWNFIELDS,FINDS	Higher	0.243
516 S RIVER ST	ALLSITES	Higher	0.243
6555 5TH AVE S	VCP	Higher	0.247
600 SOUTH GARDEN	RCRA NONGEN / NLR,PADS	Higher	0.249

ADDRESS	**DATABASES**	**ELEV**	**DIST(mi)**
STREET			
600 S GARDEN ST	ALLSITES, RCRA NONGEN / NLR,FINDS,ECHO	Higher	0.249
719 S MYRTLE ST	ALLSITES,CSCSL NFA	Higher	0.254
700 S ORCHARD ST	ALLSITES,FINDS	Higher	0.255

4 Recognized Environmental Conditions and Recommendations

CRETE has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-18 on the subject property located at 6901 Fox Ave South, Washington. (Parcel No. 000180-0113). This assessment has revealed the following recognized environmental conditions in connection with the property based on the historical records review, interviews, environmental databases reviewed, and the subject property walk:

- **Presence of Regulated Building Materials –** A site regulated building material survey should be completed to determine if there is the presence of regulated building materials, such as asbestos, lead, and universal wastes (including fluorescent bulbs and ballasts). Asbestos samples were collected in 1988 from wall insulation, acoustical ceiling tile, and floor tile (Earth Consultants 1988). Results indicated that no asbestos was present, but no documentation was provided to verify results or sampling methods.

- **Presence of Contaminated Groundwater Offsite Sources –** Groundwater flows from the east to the west, towards the Duwamish Waterway. Contaminated groundwater from the upgradient Great West Chemical Company Site may have contaminated groundwater at the subject property; contamination may include total petroleum hydrocarbons and/or chlorinated solvents.

- **Presence of Contaminated Soil and Groundwater Onsite Sources –** Environmental investigation work in 1996 indicated that soil contamination is present at the subject property and the extent and sources have not been defined (Hart Crowser 1996B). Sources are thought to be from the shipbuilding activities which occurred at the site from 1917 and 1966. Groundwater samples were not collected as part of the 1996 investigation work, groundwater may also be contaminated by historic activities.

4.1 Recommendations

The following recommendations are provided based on the data presented in this report.

- **Building Materials –** Based on the age and general common construction practices it is assumed that some level of regulated building materials exist on the property, such as fluorescent light ballasts and/or asbestos. A full building materials assessment is recommended. Under current conditions, any regulated building materials are likely sealed or intact and do not suggest a possible exposure route. If buildings are to be removed or remodeled, proper handling and disposal of regulated building materials and universal waste will be required. Though limited asbestos sampling was completed in 1988, lack of data was available to verify these results and it is recommended that these samples be confirmed (Earth Consultants 1988).

- **Presence of Contaminated Groundwater from Offsite Sources –** Groundwater flows from the east to the west, towards the Duwamish Waterway. Contaminated groundwater from the upgradient Great West Chemical Company Site may have contaminated groundwater at the subject property; contamination may include total petroleum hydrocarbons and/or chlorinated solvents. Additional groundwater samples are recommended along the eastern half of the subject property to determine if groundwater is contaminated. Because groundwater in this area of Seattle is shallow, typically less than 10 feet below ground surface, contaminated groundwater could pose a risk to indoor air. If volatile organic compounds are present at high enough levels, vapors can migrate from the water column through cracks and preferential pathways in the soil and building foundations, entering the building and working areas. Groundwater samples should be compared to Ecology screening levels for the protection of indoor air as well as protection of surface water screening levels.

- **Presence of Contaminated Groundwater and Soil from Onsite Sources –** Based on historical records it is known that previous industrial activities may have contaminated soil and groundwater. Additional soil and groundwater samples are recommended in the western half of the property to address this potential.

5 Preliminary Phase 2 ESA Results

In January 2, 2020 CRETE conducted a focused environmental investigation at the subject property. Sample locations are shown on Figure 5 and preliminary results are provided below. These preliminary results are provided to inform this Phase 1. Laboratory reports and a full summary of the field effort will be included in a separate document.

Vinyl chloride was detected in samples collected along the eastern portion of the subject property above screening levels. Results were compared to protection of surface water and protection of indoor air from groundwater contamination. Nickel and zinc were detected in groundwater samples from the western portion of the site above surface water screening levels. Results above screening levels are summarized on Table 1.

Table 1 Preliminary January 2020 Groundwater Sample Results

Result Parameter Name	**GP-SB-1**	**GP-SB-2**	**GP-SB-3**	**GP-SB-5**	**GP-SB-6**	**Screening Level**	**Screening Level Source**
Date Sample:	1/2/2020	1/2/2020	1/2/2020	1/2/2020	1/2/2020		
Sample Type:	Grab Groundwater Sample from Temporary Geoprobe Well						
Sample results are in ug/L							
Nickel - dissolved	NS	NS	5 U	5 U	**8.71**	8.2	1
Zinc - dissolved	NS	NS	25 U	25 U	**3,110**	81	2
Vinyl chloride	**44**	**72**	**0.31**	0.2 U	0.2 U	0.2/0.32/0.02	3
cis-1,2-Dichloroethene	**16**	**400**	1 U	1 U	1 U	16	4

Notes:

1 - Surface Water Aquatic Life Marine/Chronic

2 -Surface Water Aquatic Life Marine/Chronic

3 - MTCA Method A groundwater cleanup level, 0.2 ug/L. MTCA screening level for the protection of indoor air is 0.35 ug/L. Surface Water Human Health screening level is 0.02 ug/L.

4 - MTCA Method B protection of groundwater

TPH was not analyzed.

Shading denotes a screening level is exceeded.

Preliminary results, table shows the detections above the lowest possible screening level.

ug/L - microgram per liter

MTCA - model toxics control act

NS - not sampled

6 Limitations

This report describes the results of CRETE’s due diligence assessment to identify the presence of environmental liabilities materially affecting the subject property. In conducting this due diligence investigation, CRETE has attempted to independently assess the presence of such problems within the limits of the established scope of work. As with any due diligence evaluation, there is a certain degree of dependence upon oral information provided by subject property representatives which is not readily verifiable through visual observations or supported by any available written documentation.

CRETE shall not be held responsible for conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed by subject property representatives at the time this assessment was performed. In addition, the findings in the report are subject to certain conditions and assumptions. The conditions and assumptions are noted in the report, and any party reviewing the findings of the report must carefully review and consider all such conditions and assumptions.

This report and all field data and notes were gathered and/or prepared by CRETE in accordance with the agreed upon scope of work and generally accepted engineering and scientific practice in effect at the time of CRETE's assessment of the subject property. The statements, conclusions, and opinions contained in this report are only intended to give approximations of the environmental conditions at the subject property.

This report is prepared pursuant to an agreement between the client and CRETE and is for the exclusive use of the client. No other party is entitled to rely on the conclusions, observations, specifications, or data contained herein without first obtaining CRETE’s written consent and provided any such party signs a CRETE generated Reliance Letter. A third party’s signing of the CRETE Reliance Letter and CRETE’s written consent are conditions precedent to any additional use or reliance on this report.

The passage of time may result in changes in technology, economic conditions, subject property variations, or regulatory provisions which would render the report inaccurate. Reliance on the report after the date of issuance as an accurate representation of current subject property conditions shall be at the user’s sole risk.

7 References

Bryan Cave LLP 2008. Bunge Oils Response to CERCLA Section 104 (e) request for the Lower Duwamish Waterway Superfund Site, Seattle Washington. September 15, 2008.

Earth Consultants 1988. Preliminary Enviornmental Audit, letter dated May 31, 1988.

Ecology 2020. Washington Department of Ecology Site Page for Fox Ave Building, 6900 Fox Ave South, Seattle WA 98108. Cleanup Site ID 5082. Accessed on January 19, 2020. https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=5082

EPA 2008. Dawn Food Product response to CERCLA Section 104 (e) request for the Lower Duwamish Waterway Superfund Site, Seattle Washington. September 16, 2008.

Hart Crowser 1996A. Phase 1 Phase I Environmental Site Assessment Frozen Food Warehouse 6901 Fox Avenue South, Seattle Washington. June 19, 1996.

Hart Crowser 1996B. Limited Subsurface Investigation Fox Avenue Property 6901 Fox Avenue South, Seattle Washington. November 12, 1996.

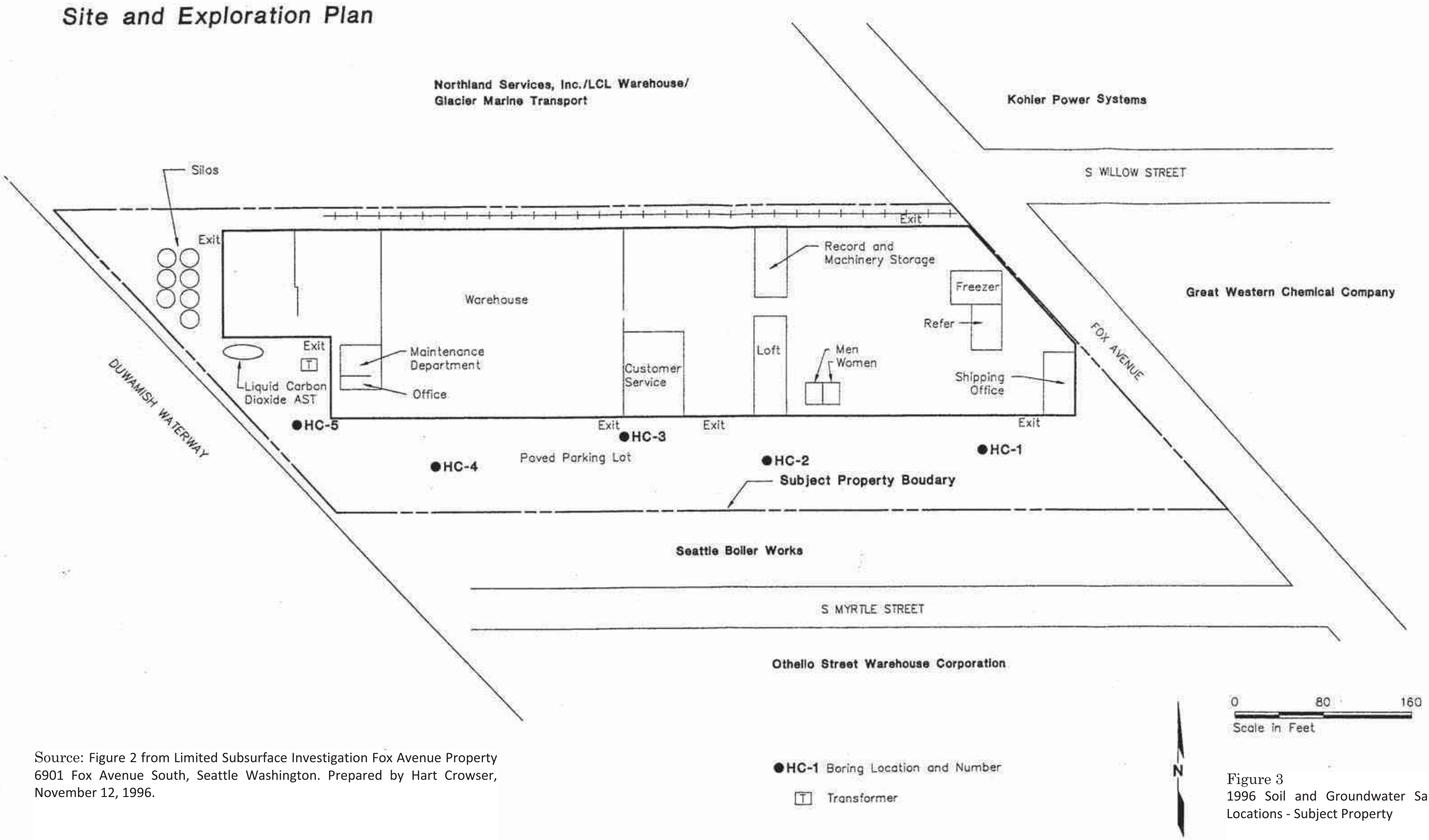
Windward 2010. Lower Duwamish Waterway Remedial Investigation. July 9, 2010.

Figures

CRETE CONSULTING, INC.

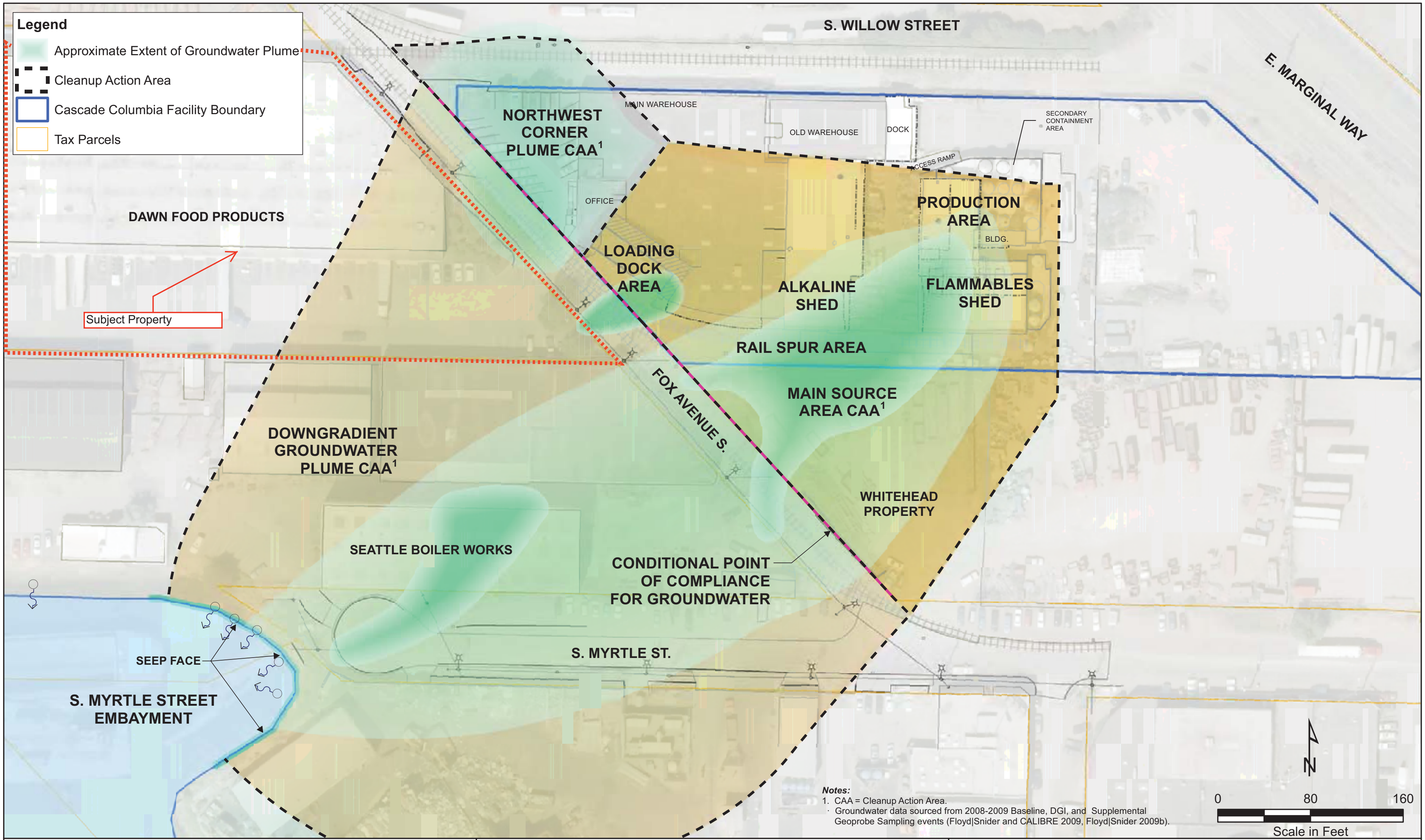
6901 Fox Ave South Phase 1 ESA
Bridge Development Partners, LLC
January 17, 2020

Figure 2
6901 Fox Ave South
Parcel Number 000180-0113



Source: Figure 2 from Limited Subsurface Investigation Fox Avenue Property 6901 Fox Avenue South, Seattle Washington. Prepared by Hart Crowser, November 12, 1996.

Figure 3
1996 Soil and Groundwater Sample Locations - Subject Property



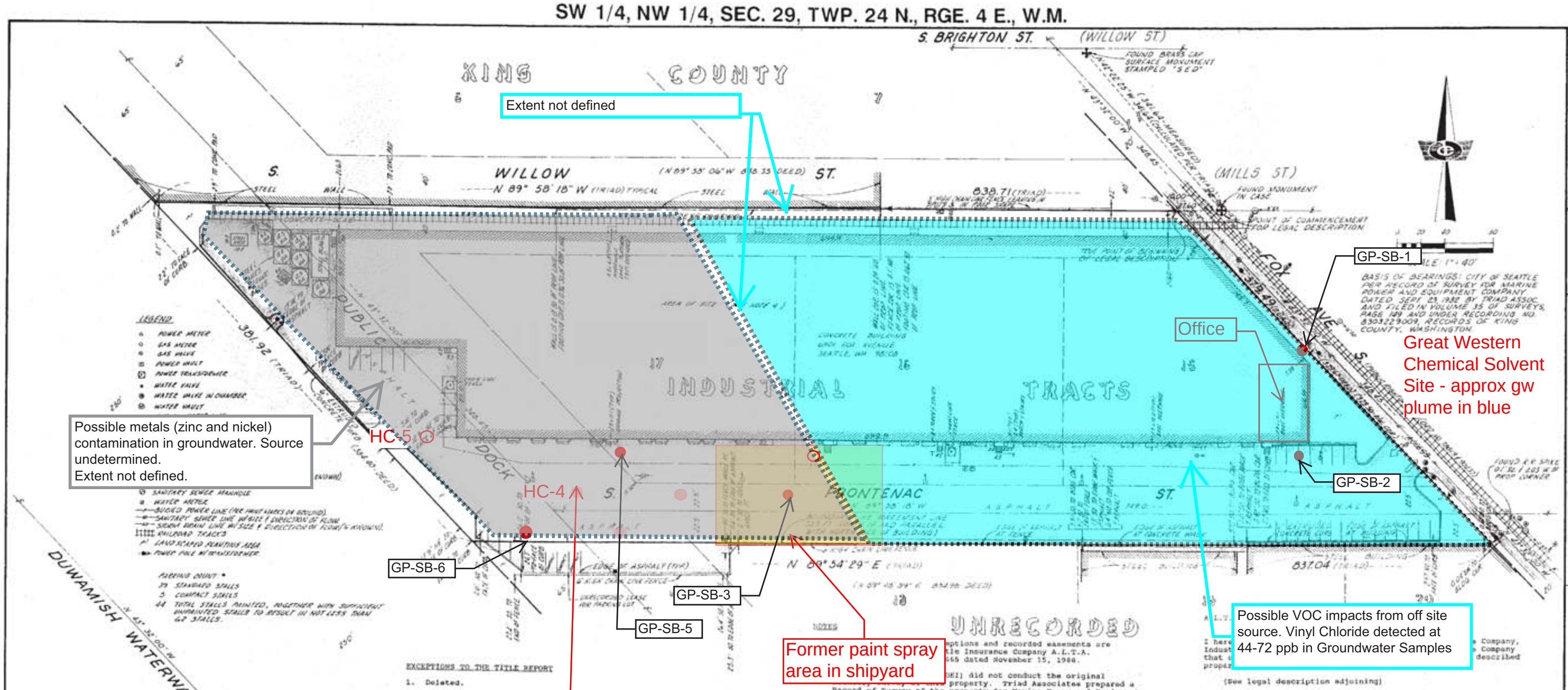
Notes:

1. CAA = Cleanup Action Area.
   - Groundwater data sourced from 2008-2009 Baseline, DGI, and Supplemental Geoprobe Sampling events (Floyd|Snider and CALIBRE 2009, Floyd|Snider 2009b).

Source of Figure:
Floyd Snider, 2012. Cleanup Action Plan.
Figure 2.3 Cleanup Action Areas.

Figure 4
Upgardient Groundwater Plume - Fox Avenue Cleanup Site

SW 1/4, NW 1/4, SEC. 29, TWP. 24 N., RGE. 4 E., W.M.



HC-4
Elevated metals and cVOCs in water table soil, PID hit in vadose soil, no gw sample

LEGAL DESCRIPTION

That portion of L. M. Collins Donation Claim Number 46 in the northwest quarter of Section 29, Township 24 North, Range 4 East, W.M., in King County and of the abandoned bed of the Duwamish Riv in Section 29, Township 24 North, Range 4 East, W.M., in King County, Washington, described as follows:

Commencing at a cased monument in the centerline of South Willow Street, 10.00 feet easterly of the centerline of Fox Avenue South as established by Ordinance Number 78819 and Number 90237 of the city of Seattle;
thence north 88°49'54" west along the said centerline of South Willow Street, 10.00 feet to the intersection of the centerline of said streets;
thence continuing north 88°49'54" west along the centerline of South Willow Street 27.60 feet to a point on the southwesterly margin of Fox Avenue South and the true point of beginning;
thence continuing north 88°49'54" west along the centerline of said South Willow Street 838.35 feet to the northeasterly line of Duwamish Waterway;
thence south 42°24'31" east along said northeasterly line, 384.40 feet to a line parallel with and 0.50 feet northerly of the north face of the boiler shop building of the National Steel Construction Company as it now exists;
thence south 89°03'52" east along said parallel line 834.98 feet to the southwesterly margin of Fox Avenue South;
thence north 42°23'30" west along said margin 379.61 feet to the true point of beginning;

(BEING KNOWN AS Tracts 15, 16 and 17, and portions of Tracts 18, 19 and 20, King County Industrial Tracts, according to the unrecorded plat thereof, and portions of Frontenac and Willow (Mills) Streets, and a portion of public dock as shown on said unrecorded plat, and a portion of the abandoned bed of the Duwamish River).

EXCEPTIONS TO THE TITLE REPORT

1. Deleted.

2. An easement affecting the portion of said premises and for the purposes stated herein, and incidental purposes:

For:	Railroad spur tracks
In favor of:	Owners of record of adjacent property
	Commissioners Journal of Proceedings, 21CR361 and 43CR41
	The description contained therein is not sufficient to determine its exact location within the property herein described

ccurately locate)

e due to shifting and changing in ver.

ington in and to that portion, if any, of the property herein described lying within the former bed of The Duwamish River.

5. Any prohibition of or limitation of use, occupancy or improvement of the land resulting from the rights of the public or riparian owners to use any portion which is now or has been formerly covered by water.

6 - 8. Not applicable to show on A.L.T.A. Survey Drawing.

NOTES

eptions and recorded easements are tle Insurance Company A.L.T.A. 655 dated November 15, 1988.

DEI) did not conduct the original property. Triad Associates prepared a Record of Survey of the property for Marine Power and Equipment in September of 1982. DEI has recovered a sufficient number of points set or found by the Triad survey to reconstruct the location of the boundary as shown thereon. The certification, bearings, distances and improvement locations shown on this survey are based entirely on the boundary lines as determined by the Triad survey.

3. This survey represents conditions as they existed on July 10, 1988.

4. AREA OF SITE = ± 231,374 sq. ft. = ± 5.3116 acres

5. Flood zone designation = C, area of minimal flooding, according to Flood Hazard Boundary Map No. H-29 and Flood Insurance Rate Map No. I-29, effective July 19, 1977, City of Seattle, King County, Washington.

6. A professional Land Surveyor's certification of conditions comprises a declaration of his professional judgement. It does not constitute a warranty or a guarantee, express or implied; nor does it relieve any other party of his responsibility to abide by contract documents, applicable codes, standards, regulations, and ordinances.

7. Building dimensions shown are exterior walls of building at grade.

8. Utilities other than those shown may exist on this site. Only those utilities visible (or where visible evidence of their location exists) have been shown.

BOUNDARY CERTIFICATE

I hereby certify to Northwestern National Life Insurance Company, Industrial Indemnity Company, and Stewart Title Insurance Company that the boundary survey shown hereon is identical to the boundary survey performed under my supervision for Marine Power and Equipment Company by Triad Associates in September 1982, as recorded under King County Recording No. 8303229009 in Volume 35 of surveys, page 149 and that the boundary is staked correctly on the ground as shown.

Date 12/12/88
Gustav B. Osterback
Certificate No. 18094

A.L.T.

I here Company, Indust Company that described proper

(See legal description adjoining)

and that:

(a) This survey was made on the ground as per the field notes shown on this survey and correctly shows (i) the boundaries and areas of the subject property and the size, location and type of any foundation, buildings and improvements thereon and the distance therefrom to the nearest facing exterior property lines of the subject property, (ii) the location of all rights-of-ways, easements and any other matters of record (or of which I have knowledge or have been advised, whether or not of record) affecting or benefiting the subject property, (iii) the location of the parking areas on the subject property showing the number of parking spaces provided thereby, (iv) all abutting dedicated public streets providing access to the subject property, together with the width and name thereof, and (v) all other significant items on the subject property;

(b) There are no (i) encroachments upon the subject property, (ii) encroachments on adjacent property, streets or alleys by any improvements on the subject property, (iii) party walls, (iv) conflicts or protrusions except as follows: Encroachment of parking area at southwest corner;

(c) Adequate ingress to and egress from the subject property is provided by (name of streets), the same being paved, dedicated public right(s)-of-ways maintained by City of

Notes:
"HC" Denotes a 1996 sample location completed by Hart Crowser
GP-SB-3 - typical - CRETE 1/2/2020 Geoprobe Groundwater Sample location.
Figure 5
Preliminary January 2020 Environmental Sample Locations and Results

A.L.T.A. SURVEY
FOX AVENUE WAREHOUSES
INDUSTRIAL INDEMNITY CO.

DODDS ENGINEERS, INC.
CIVIL ENGINEERING SURVEYING PLANNING
4205 - 148TH AVE NE - SUITE 200
BELLEVUE, WASHINGTON 98007
(206) 885-7877 OR 454-3743

APPROVED S.A. MERRYMAN
S.A. MERRYMAN PROJECT MANAGER
OF 1
88060

Appendix A

EDR Environmental Database and Polk Directory Search

(Included separately on the attached CD)

Appendix B

Historical Aerial Photographs and USGS Topographic Maps

(Included separately on the attached CD)

Appendix C

Historical Reports

(Included separately on the attached CD)

CRETE Consulting Incorporated
108 S. Washington St., Suite 300
Seattle, WA 98104

March 6, 2020

Jessica Burgess
Bridge Development Partners, LLC
10655 NE 4th Street, Suite 210
Bellevue, WA 98004

RE: Phase 2 ESA at 6901 Fox Avenue S (Tax Parcel 0001800113)

Dear Ms. Burgess,

This letter summarizes the results of a Phase 2 Environmental Site Assessment (Phase 2) performed by CRETE Consulting Incorporated (CRETE) for Bridge Development Partners, LLC (Bridge). This Phase 2 is for Parcel Number 000180-0113 located at 6901 Fox Ave South, Washington and is referenced in this document as the 'subject property' (Figure 1).

Subject Property Overview

The subject property covers 5.4-acres and is located in the Georgetown neighborhood of Seattle. The property is located in the Duwamish River Valley and is adjacent to the Duwamish River.

Documents reviewed for the Phase 1 ESA[1] indicate that ship building activities likely occurred between 1917 and 1966. The property was then leased and used until the mid-1970's by Emerson GM Diesel, a sheet metal fabrication and generator manufacturing company. Tax records indicate that the existing warehouse was constructed in 1977 and it appears all other buildings were demolished at that time. Records indicate that the building was used by various food companies, and the property is currently used by Dawn Foods to blend dry foods.

In 1996 Hart Crowser[2] completed a limited subsurface investigation for the property (Figure 2). Results included field observations of subsurface metal debris and petroleum-like odor in one location (sample location HC-4). TPH and metals were detected at two locations in the western portion of the subject property (sample locations HC-4 and HC-5). Lead was detected above the MTCA Method A value at one location (HC-4). Volatile organic compounds were detected in several sample locations, but the report concluded that insufficient data was available to determine the source of the solvents. The Hart Crowser report recommended further investigation in the areas of HC-4 and HC-5 and additional soil and groundwater samples to determine the extent and sources of contamination. Available documentation

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[1] CRETE 2020. Phase 1 Environmental Site Assessment Report – 6901 Fox Avenue South. Prepared by CRETE Consulting, January 31, 2020.

[2] Hart Crowser 1996. Limited Subsurface Investigation Fox Avenue Property 6901 Fox Avenue South, Seattle Washington. November 12, 1996.

indicates that no additional environmental sampling or investigation efforts have been completed at the subject property.

Great Western Chemical/Cascade Columbia Distribution Company (GWCC) is located to the east of the subject property, upgradient of the subject property at 6900 Fox Avenue is. Soil and groundwater contamination from petroleum and chlorinated solvent products have been identified at the property and the site is under a Washington Department of Ecology (Ecology) Agreed Order with the current property owner, Fox Ave Building LLC. The Agreed Order requires implementation of the Cleanup Action Plan to address documented contamination. Based on information reported by Ecology, contamination at the site is the result of industrial use since 1918. The soil and groundwater contaminants of concern listed in the Final Cleanup Action Plan[3] include: chlorinated solvents (volatile organic compounds [VOCs]), petroleum hydrocarbons, benzene, semi-volatile organic compounds (SVOCs), and dioxins and furans. This GWCC site is located upgradient of the subject property and groundwater flows from this site to the subject property (in an east to west direction) with discharge to the Duwamish Waterway. Documents for the GWCC project site show the “Northwest Corner Plume CAA” and the “Loading Dock Area” overlapping with the subject property (Figure 3). Data presented in the Cleanup Action Plan suggest that offsite contamination includes at least tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene, and vinyl chloride and that these contaminants are present in groundwater in the southeast corner of the subject property. No cleanup action is proposed on the subject property.

Recognized Environmental Conditions

The Phase 1 ESA identified the following recognized environmental conditions (REC) related to soil and groundwater conditions at the subject property:

- **Presence of Contaminated Groundwater from Offsite Sources –** Groundwater flows from east to west, toward the Duwamish Waterway. Contaminated groundwater from the upgradient Great Western Chemical Site has likely contaminated groundwater at the subject property with chlorinated solvents and may have contaminated the property with petroleum hydrocarbons.
- **Presence of Contaminated Soil and Groundwater from Onsite Sources –** Environmental investigation work in 1996 indicated that soil contamination is present at the subject property and the extent and sources have not been defined (Hart Crowser 1996). Sources are thought to be from the shipbuilding activities which occurred at the site from 1917 and 1966. Groundwater samples were not collected as part of the 1996 investigation work.

Based on the RECs identified in the Phase 1 ESA, a Phase 2 ESA was completed in January 2020.

Phase 2 ESA Scope of Work

Based on the RECs identified in the Phase 1 ESA, additional soil and groundwater samples were collected to assess the presence of contaminated groundwater and soil at the subject site from offsite and onsite sources. On January 2, 2020 CRETE conducted a focused environmental investigation at the subject property (Figure 4). Soil and groundwater samples were collected using a Geoprobe® drilling rig operated by ESN Northwest, a Washington State licensed driller. Soil samples were collected directly

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[3] Ecology 2012. Final Cleanup Action Plan, Fox Avenue Site. Washington State Department of Ecology, June 2012.

from the Geoprobe® soil cores and groundwater samples were collected from temporary wells installed at the boring location using a stainless steel well screen that was decontaminated between each location. Temporary wells were abandoned after sampling. All locations were backfilled with bentonite and an asphalt surface patch.

Phase 2 ESA Results

Geology and Hydrogeology Results

Geoprobe borings were advanced to a depth of 15 feet below ground surface (ft. bgs). The soil consisted of sand fill with some silt and gravel from around 9 to 12 ft. bgs. Odors were noted on soil from GP-SB-2 and GP-SB-5. A layer of wood waste was observed at GP-SB-5 at 6 to 6.5 and 10 to 13 ft. bgs. Copies of field logs are included in Attachment 1.

Groundwater was encountered at between 7.81 (GP-SB-5) and 12.04 (GP-SB-3) ft. bgs. The regional groundwater flow direction is generally to the west-southwest with groundwater discharging to the Duwamish River.

Soil and Groundwater Results

Soil samples from GP-SB-5 and GP-SB-6 (Figure 4) were submitted for metals analysis; samples were collected from the vadose and saturated zones. Samples were located in the vicinity of the historical ship building operations. Table 1 summarizes the results; laboratory reports are included in Attachment 2. Soil detections include the following compounds:

- Mercury in GP-SB-5 at 7 ft. bgs was detected at the MTCA Method A unrestricted land use value of 2 mg/kg. No metal compounds were detected above MTCA Method A or B soil screening levels.
- Arsenic, copper, nickel, zinc and mercury were detected above soil concentrations for protection of surface water calculated screening levels in GP-SB-5 and GP-SB-6. Arsenic, nickel and zinc were detected in dissolved groundwater above screening levels (see discussion below) in groundwater sampled from GP-SB-6, but not detected in the dissolved groundwater sample from GP-SB-5. Dissolved copper and dissolved mercury were not detected above laboratory reporting limits in the groundwater from GP-SB-5 or GP-SB-6.

Groundwater samples were collected from soil borings GP-SB-1 through GP-SB-7 (Figure 4). Select samples were analyzed for metals (total and dissolved), total petroleum hydrocarbons (TPH) gasoline range, and volatile organic compounds (VOCs). Results are shown on Tables 2 and 3; laboratory reports are included in Attachment 2. Groundwater detections include the following compounds:

- Dissolved arsenic was detected in groundwater from three locations (GP-SB-3, GP-SB-6 and GP-SB-7) above the surface water screening level (0.14 µg/L) and the MTCA Method A groundwater cleanup level (5 µg/L; Table 2).
- Dissolved nickel was detected above the surface water screening level (8.2 µg/L) in groundwater from GP-SB-6 and GP-SB-7 (Table 2).
- Dissolved zinc was detected above the surface water screening level (81 µg/L) in groundwater from GP-SB-6 and GP-SB-7 and above the MTCA Method B groundwater cleanup level (4,800 µg/L) from GP-SB-7 (Table 2).

- Vinyl chloride was detected in groundwater from GP-SB-1, GP-SB-2 and GP-SB-3 above surface water (0.026 µg/L) and Method A cleanup (0.2 µg/L) levels. Detections in GP-SB-1 and GP-SB-2 were also above the MTCA screening level for protection of indoor air (0.32 µg/L; Table 2).
- Cis-1,2-Dichloroethene was detected in groundwater from GP-SB-1 and GP-SB-2 at and above the Method B cleanup level (16 µg/L; Table 2).
- TPH-gasoline was detected in the groundwater from GP-SB-2, below the MTCA Method A screening level (1,000 µg/L; Table 2).

Conclusions

Work completed for this Phase 2 ESA included soil and groundwater samples collected throughout the site associated with potential onsite and offsite environmental soil and groundwater contamination sources. Based on the results of the Phase 2 ESA work, the following environmental concerns remain on the subject property:

- **Offsite sources:** Based on groundwater data from GP-SB-1 through GP-SB-3, a chlorinated solvent groundwater plume is located on the eastern portion of the property, including beneath the office portion of the structure triggering a potential vapor intrusion risk to office workers (based on groundwater data from GP-SB-1 and GP-SB-2). It is assumed that the solvents are from the upgradient Great Western Chemical (GWCC) site (6900 Fox Avenue South – Ecology Cleanup Site ID #5082). Cleanup of this property is being performed under an Agreed Order with Ecology. No investigation has been performed by GWCC on the Dawn Foods property.
- **Undetermined source:** Gasoline in groundwater is coincident with the chlorinated solvent detections at GP-SB-2. Concentrations are below cleanup levels but indicate a potential on-site source that may need to be investigated.
- **Onsite sources:** Based on soil data (GP-SB-5 and GP-SB-6) and groundwater data (GP-SB-5 through GP-SB-7) historical shipbuilding operations at the site have resulted in soil and groundwater contamination, primarily with metals (Zinc and nickel). Nickel and zinc are present in groundwater above cleanup levels at the sample location closest to the Duwamish (GP-SB-6). Additional investigation in this area is required to fully delineate the extent of contamination and potential sources.

Sincerely,

CRETE CONSULTING INCORPORATED, PC

Grant Hainsworth, P.E.
Principal, Senior Project Manager

Tables/Figures/Attachments

Tables and Figures

Table 1 Summary of Borehole Soil Data
Bridge - Dawn Foods
6-Mar-20

Sample ID	GP-SB-5-7	GP-SB-5-12	GP-SB-6-4	GP-SB-6-10	Screening Level MTCA Soil Method A/B	Screening Level MTCA Soil Protective of Groundwater Vadose (based on protection of surface water)	Screening Level MTCA Soil Protective of Groundwater Saturated (based on protection of surface water)
Date Sample	1/2/20	1/2/20	1/2/20	1/2/20			
Depth ft. bgs	7	12	4	10			
	Vadose	Saturated	Vadose	Saturated			
Units	mg/kg	mg/kg	mg/kg	mg/kg			
Arsenic	**5.09**	**2.48**	**4.98**	**2.37**	20	0.08	0.004
Copper	**213**	**19.1**	**26.9**	**12.7**	3,200	1.38	0.069
Lead	**222**	**3.09**	**25**	**2.17**	250	1620	81
Nickel	**6.84**	**9.08**	**10.6**	**5.32**	6.5	10.7	0.53535
Zinc	**180**	**24.9**	**78.7**	**26.7**	24,000	100.9	5.05
Cadmium	1 U	1 U	1 U	1 U	2	1.10	0.06
Mercury	**2**	1 U	1 U	1 U	2	0.03	0.001

Notes:

Bold = detection

MTCA Soil Protective of Groundwater Vadose/Saturated screening levels based on MTCA Eqn. 747-1 and the surface water values shown on Table 2.

Shading denotes an exceedance of a screening level

ft. bgs = feet below ground surface

mg/kg = milligrams per kilograms

U = laboratory detection limit

MTCA - Model Toxics Control Act

Table 2 Groundwater Samples from Temporary Site Wells - Detected Compounds
Bridge - Dawn Foods
6-Mar-20

Sample ID	GP-SB-1	GP-SB-2	GP-SB-3	GP-SB-5	GP-SB-6	GP-SB-7	Screening Level	Screening Level Source	Surface Water Screening Level Source
Date Sampled	1/2/2020	1/2/2020	1/2/2020	1/2/2020	1/2/2020	1/2/2020			
Sample results are in ug/L									
Metals Total/Dissolved									
Arsenic - total	NS	NS	**7.22**	**29**	**23**	**37.9**	See dissolved		NA
Cadmium - total	NS	NS	1 U	**2.87**	10 U	1 U	See dissolved		NA
Copper - total	NS	NS	25 U	**1,460**	**66.1**	5 U	See dissolved		NA
Lead - total	NS	NS	**24.2**	**632**	10 U	1 U	See dissolved		NA
Mercury - total	NS	NS	1 U	**4.29**	1 U	1 U	See dissolved		NA
Nickel - total	NS	NS	5 U	**66**	**42.4**	**24**	See dissolved		NA
Zinc - total	NS	NS	25 U	**1,070**	**3770**	**22,800**	See dissolved		NA
Arsenic - dissolved	NS	NS	**6.92**	1 U	**10.6**	**29.7**	0.14/5	Note 1/2	Surface Water Human Health Marine Waters 40 CFR 131.45
Cadmium - dissolved	NS	NS	1 U	1 U	5 U	1 U	7.9/NS	Note 1/2	Surface Water Aquatic Life Marine/Chronic CWA §304
Copper - dissolved	NS	NS	25 U	25 U	5 U	5 U	3.1/640	Note 1/2	Surface Water Aquatic Life Marine/Chronic CWA §304
Lead - dissolved	NS	NS	1 U	1 U	5 U	1 U	8.1/15	Note 1/2	Surface Water Aquatic Life Marine/Chronic 173-201A WAC
Mercury - dissolved	NS	NS	1 U	1 U	5 U	1 U	0.025/2	Note 1/2	Surface Water Aquatic Life Marine/Chronic 173-201A WAC
Nickel - dissolved	NS	NS	5 U	5 U	**8.71**	**22.7**	8.2/320	Note 1/2	Surface Water Aquatic Life Marine/Chronic 173-201A WAC
Zinc - dissolved	NS	NS	25 U	25 U	**3,110**	**22,300**	81/4,800	Note 1/2	Surface Water Aquatic Life Marine/Chronic 173-201A WAC
Total Petroleum Hydrocarbons									
Gasoline Range Organics	100 U	**800**	NS	NS	NS	NS	1,000	Note 2	NA
Volatile Organic Compounds									
Vinyl chloride	**44**	**72**	**0.31**	0.2 U	0.2 U	NS	0.026/0.2/0.32	Note 1/2/3	Surface Water Human Health Marine Waters 173-201A WAC
Methyl t-butyl ether	**1.1**	10 U	1 U	1 U	1 U	NS	20	Note 2	NA
cis-1,2-Dichloroethene	**16**	**400**	1 U	1 U	1 U	NS	16	Note 2	NA

Notes:
Note 1 - Lowest surface water standard (only marine water evaluated)
Note 2 - MTCA Method A or B Cleanup Value
Note 3 - MTCA Groundwater protection of indoor air screening level
Bold = detection
Shading denotes an exceedance of a screening level
ug/L - microgram per liter
MTCA - Model Toxics Control Act
NS - not sampled
NA - not applicable
U = laboratory detection limit

Table 3 Summary of Groundwater Samples from Temporary Site Wells
Bridge - Dawn Foods
6-Mar-20

Result Parameter Name	GP-SB-1	GP-SB-2	GP-SB-3	GP-SB-5	GP-SB-6	GP-SB-7
	1/2/2020	1/2/2020	1/2/2020	1/2/2020	1/2/2020	1/2/2020
Sample results are in ug/L						
Arsenic - total	NS	NS	**7.22**	**29**	**23**	**37.9**
Cadmium - total	NS	NS	1 U	**2.87**	10 U	1 U
Copper - total	NS	NS	25 U	**1460**	**66.1**	5 U
Lead - total	NS	NS	**24.2**	**632**	10 U	1 U
Mercury - total	NS	NS	1 U	**4.29**	1 U	1 U
Nickel - total	NS	NS	5 U	**66**	**42.4**	**24**
Zinc - total	NS	NS	25 U	**1070**	**3770**	**22800**
Arsenic - dissolved	NS	NS	**6.92**	1 U	**10.6**	**29.7**
Cadmium - dissolved	NS	NS	1 U	1 U	5 U	1 U
Copper - dissolved	NS	NS	25 U	25 U	5 U	5 U
Lead - dissolved	NS	NS	1 U	1 U	5 U	1 U
Mercury - dissolved	NS	NS	1 U	1 U	5 U	1 U
Nickel - dissolved	NS	NS	5 U	5 U	**8.71**	**22.7**
Zinc - dissolved	NS	NS	25 U	25 U	**3110**	**22300**
Gasoline Range Organics	100 U	**800**	NS	NS	NS	NS
Vinyl chloride	**44**	**72**	**0.31**	0.2 U	0.2 U	NS
Methyl t-butyl ether	**1.1**	10 U	1 U	1 U	1 U	NS
cis-1,2-Dichloroethene	**16**	**400**	1 U	1 U	1 U	NS
CFC-12	1 U	10 U	10 U	10 U	10 U	NS
1,3-Dichloropropane	1 U	100 U	1 U	1 U	1 U	NS
Chloromethane	10 U	10 U	1 U	1 U	1 U	NS
Tetrachloroethene	1 U	10 U	1 U	1 U	1 U	NS
Dibromochloromethane	1 U	10 U	1 U	1 U	1 U	NS
Bromomethane	1 U	10 U	1 U	1 U	1 U	NS
1,2-Dibromoethane	1 U	10 U	1 U	1 U	1 U	NS
Chloroethane	1 U	10 U	1 U	1 U	1 U	NS
Chlorobenzene	1 U	10 U	1 U	1 U	1 U	NS
CFC-11	1 U	10 U	50 U	50 U	50 U	NS
Ethylbenzene	1 U	500 U	1 U	1 U	1 U	NS
Acetone	50 U	10 U	1 U	1 U	1 U	NS
1,1,1,2-Tetrachloroethane	1 U	10 U	2 U	2 U	2 U	NS
1,1-Dichloroethene	1 U	20 U	1 U	1 U	1 U	NS
m, p-Xylene	2 U	10 U	1 U	1 U	1 U	NS
Hexane	1 U	10 U	5 U	5 U	5 U	NS
o-Xylene	1 U	50 U	1 U	1 U	1 U	NS
Methylene chloride	5 U	10 U	1 U	1 U	1 U	NS
Styrene	1 U	10 U	1 U	1 U	1 U	NS
Isopropylbenzene (Cumene)	1 U	10 U	1 U	1 U	1 U	NS
trans-1,2-Dichloroethene	1 U	10 U	1 U	1 U	1 U	NS
Bromoform	1 U	10 U	1 U	1 U	1 U	NS
1,1-Dichloroethane	1 U	10 U	1 U	1 U	1 U	NS
n-Propylbenzene	1 U	10 U	1 U	1 U	1 U	NS
2,2-Dichloropropane	1 U	10 U	1 U	1 U	1 U	NS

Table 3 Summary of Groundwater Samples from Temporary Site Wells
Bridge - Dawn Foods
6-Mar-20

Result Parameter Name	GP-SB-1	GP-SB-2	GP-SB-3	GP-SB-5	GP-SB-6	GP-SB-7
	1/2/2020	1/2/2020	1/2/2020	1/2/2020	1/2/2020	1/2/2020
Sample results are in ug/L						
Bromobenzene	1 U	10 U	1 U	1 U	1 U	NS
1,3,5-Trimethylbenzene	1 U	10 U	1 U	1 U	1 U	NS
Chloroform	1 U	10 U	1 U	1 U	1 U	NS
1,1,2,2-Tetrachloroethane	1 U	10 U	1 U	1 U	1 U	NS
2-Butanone	10 U	100 U	10 U	10 U	10 U	NS
1,2,3-Trichloropropane	1 U	10 U	1 U	1 U	1 U	NS
1,2-Dichloroethane	1 U	10 U	1 U	1 U	1 U	NS
2-Chlorotoluene	1 U	10 U	1 U	1 U	1 U	NS
1,1,1-Trichloroethane	1 U	10 U	1 U	1 U	1 U	NS
4-Chlorotoluene	1 U	10 U	1 U	1 U	1 U	NS
1,1-Dichloropropene	1 U	10 U	1 U	1 U	1 U	NS
tert-Butylbenzene	1 U	10 U	1 U	1 U	1 U	NS
Carbon tetrachloride	1 U	10 U	1 U	1 U	1 U	NS
1,2,4-Trimethylbenzene	1 U	10 U	1 U	1 U	1 U	NS
Benzene	0.35 U	3.5 U	0.35 U	0.35 U	0.35 U	NS
sec-Butylbenzene	1 U	10 U	1 U	1 U	1 U	NS
Trichloroethene	1 U	10 U	1 U	1 U	1 U	NS
p-Isopropyltoluene	1 U	10 U	1 U	1 U	1 U	NS
1,2-Dichloropropane	1 U	10 U	1 U	1 U	1 U	NS
1,3-Dichlorobenzene	1 U	10 U	1 U	1 U	1 U	NS
Dichlorobromomethane	1 U	10 U	1 U	1 U	1 U	NS
1,4-Dichlorobenzene	1 U	10 U	1 U	1 U	1 U	NS
Dibromomethane	1 U	10 U	1 U	1 U	1 U	NS
1,2-Dichlorobenzene	1 U	10 U	1 U	1 U	1 U	NS
Methyl isobutyl ketone	10 U	100 U	10 U	10 U	10 U	NS
1,2-Dibromo-3-chloropropane	10 U	100 U	10 U	10 U	10 U	NS
cis-1,3-Dichloropropene	1 U	10 U	1 U	1 U	1 U	NS
1,2,4-Trichlorobenzene	1 U	10 U	1 U	1 U	1 U	NS
Toluene	1 U	10 U	1 U	1 U	1 U	NS
Hexachlorobutadiene	1 U	10 U	1 U	1 U	1 U	NS
trans-1,3-Dichloropropene	1 U	10 U	1 U	1 U	1 U	NS
Naphthalene	1 U	10 U	1 U	1 U	1 U	NS
1,1,2-Trichloroethane	1 U	10 U	1 U	1 U	1 U	NS
1,2,3-Trichlorobenzene	1 U	10 U	1 U	1 U	1 U	NS
2-Hexanone	10 U	100 U	10 U	10 U	10 U	NS
Phenol	NS	NS	NS	NS	4 U	NS
2,6-Dinitrotoluene	NS	NS	NS	NS	2 U	NS
Bis(2-chloroethyl) ether	NS	NS	NS	NS	0.4 U	NS
3-Nitroaniline	NS	NS	NS	NS	40 U	NS
Acenaphthene	NS	NS	NS	NS	0.04 U	NS
1,3-Dichlorobenzene	NS	NS	NS	NS	0.4 U	NS
1,4-Dichlorobenzene	NS	NS	NS	NS	0.4 U	NS
Dibenzofuran	NS	NS	NS	NS	0.4 U	NS
1,2-Dichlorobenzene	NS	NS	NS	NS	0.4 U	NS
2,4-Dinitrotoluene	NS	NS	NS	NS	2 U	NS

Table 3 Summary of Groundwater Samples from Temporary Site Wells
Bridge - Dawn Foods
6-Mar-20

Result Parameter Name	**GP-SB-1**	**GP-SB-2**	**GP-SB-3**	**GP-SB-5**	**GP-SB-6**	**GP-SB-7**
	1/2/2020	1/2/2020	1/2/2020	1/2/2020	1/2/2020	1/2/2020
Sample results are in ug/L						
Benzyl alcohol	NS	NS	NS	NS	4 U	NS
4-Nitrophenol	NS	NS	NS	NS	12 U	NS
2,2’-Oxybis(1-chloropropane)	NS	NS	NS	NS	0.4 U	NS
Diethyl phthalate	NS	NS	NS	NS	4 U	NS
2-Methylphenol	NS	NS	NS	NS	4 U	NS
Fluorene	NS	NS	NS	NS	0.04 U	NS
Hexachloroethane	NS	NS	NS	NS	0.4 U	NS
4-Chlorophenyl phenyl ether	NS	NS	NS	NS	0.4 U	NS
N-Nitroso-di-n-propylamine	NS	NS	NS	NS	0.4 U	NS
N-Nitrosodiphenylamine	NS	NS	NS	NS	0.4 U	NS
4-Nitroaniline	NS	NS	NS	NS	40 U	NS
Nitrobenzene	NS	NS	NS	NS	0.4 U	NS
Isophorone	NS	NS	NS	NS	0.4 U	NS
4-Bromophenyl phenyl ether	NS	NS	NS	NS	0.4 U	NS
2-Nitrophenol	NS	NS	NS	NS	4 U	NS
Hexachlorobenzene	NS	NS	NS	NS	0.4 U	NS
2,4-Dimethylphenol	NS	NS	NS	NS	4 U	NS
Phenanthrene	NS	NS	NS	NS	0.04 U	NS
Bis(2-chloroethoxy)methane	NS	NS	NS	NS	0.4 U	NS
Anthracene	NS	NS	NS	NS	0.04 U	NS
Carbazole	NS	NS	NS	NS	0.4 U	NS
1,2,4-Trichlorobenzene	NS	NS	NS	NS	0.4 U	NS
Di-n-butyl phthalate	NS	NS	NS	NS	4 U	NS
Naphthalene	NS	NS	NS	NS	0.4 U	NS
Fluoranthene	NS	NS	NS	NS	0.04 U	NS
Hexachlorobutadiene	NS	NS	NS	NS	0.4 U	NS
Pyrene	NS	NS	NS	NS	0.04 U	NS
4-Chloroaniline	NS	NS	NS	NS	40 U	NS
Butylbenzyl phthalate	NS	NS	NS	NS	4 U	NS
4-Chloro-3-methylphenol	NS	NS	NS	NS	4 U	NS
Benz[a]anthracene	NS	NS	NS	NS	0.04 U	NS
2-Methylnaphthalene	NS	NS	NS	NS	0.4 U	NS
Chrysene	NS	NS	NS	NS	0.04 U	NS
1-Methylnaphthalene	NS	NS	NS	NS	0.4 U	NS
Bis(2-ethylhexyl) phthalate	NS	NS	NS	NS	6.4 U	NS
Hexachlorocyclopentadiene	NS	NS	NS	NS	1.2 U	NS
Di-n-octyl phthalate	NS	NS	NS	NS	4 U	NS
Benzo(a)pyrene	NS	NS	NS	NS	0.04 U	NS
Benzo(b)fluoranthene	NS	NS	NS	NS	0.04 U	NS
2-Chloronaphthalene	NS	NS	NS	NS	0.4 U	NS
Benzo(k)fluoranthene	NS	NS	NS	NS	0.04 U	NS
2-Nitroaniline	NS	NS	NS	NS	2 U	NS
Indeno(1,2,3-cd)pyrene	NS	NS	NS	NS	0.04 U	NS
Dimethyl phthalate	NS	NS	NS	NS	4 U	NS
Dibenzo(a,h)anthracene	NS	NS	NS	NS	0.04 U	NS

Table 3 Summary of Groundwater Samples from Temporary Site Wells
Bridge - Dawn Foods
6-Mar-20

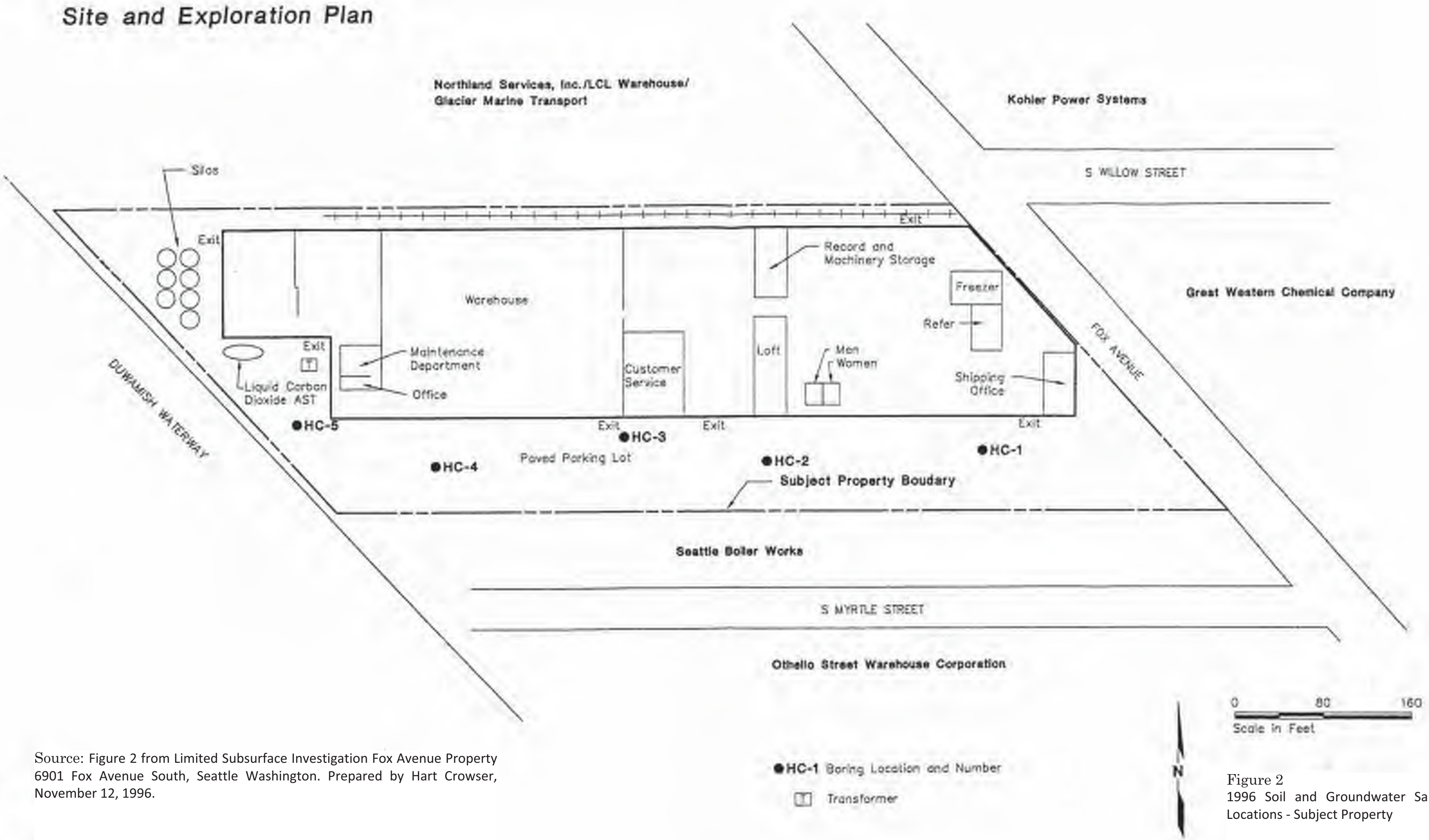
Result Parameter Name	GP-SB-1	GP-SB-2	GP-SB-3	GP-SB-5	GP-SB-6	GP-SB-7
	1/2/2020	1/2/2020	1/2/2020	1/2/2020	1/2/2020	1/2/2020
Sample results are in ug/L						
Acenaphthylene	NS	NS	NS	NS	0.04 U	NS
Benzo(ghi)perylene	NS	NS	NS	NS	0.08 U	NS
2-Chlorophenol	NS	NS	NS	NS	4 U J	NS
2,4-Dinitrophenol	NS	NS	NS	NS	12 U J	NS
3-Methylphenol + 4-Methylpheno	NS	NS	NS	NS	8 U J	NS
4,6-Dinitro-2-methylphenol	NS	NS	NS	NS	12 U J	NS
Pentachlorophenol	NS	NS	NS	NS	2 U J	NS
Benzoic acid	NS	NS	NS	NS	20 U J	NS
2,4-Dichlorophenol	NS	NS	NS	NS	4 U J	NS
2,4,6-Trichlorophenol	NS	NS	NS	NS	4 U J	NS
2,4,5-Trichlorophenol	NS	NS	NS	NS	4 U J	NS

Notes:
Bold = detection
ug/L - microgram per liter
MTCA - model toxics control act
NS - not sampled
U = laboratory detection limit
J = detection is estimated by the laboratory

CRETE CONSULTING, INC.

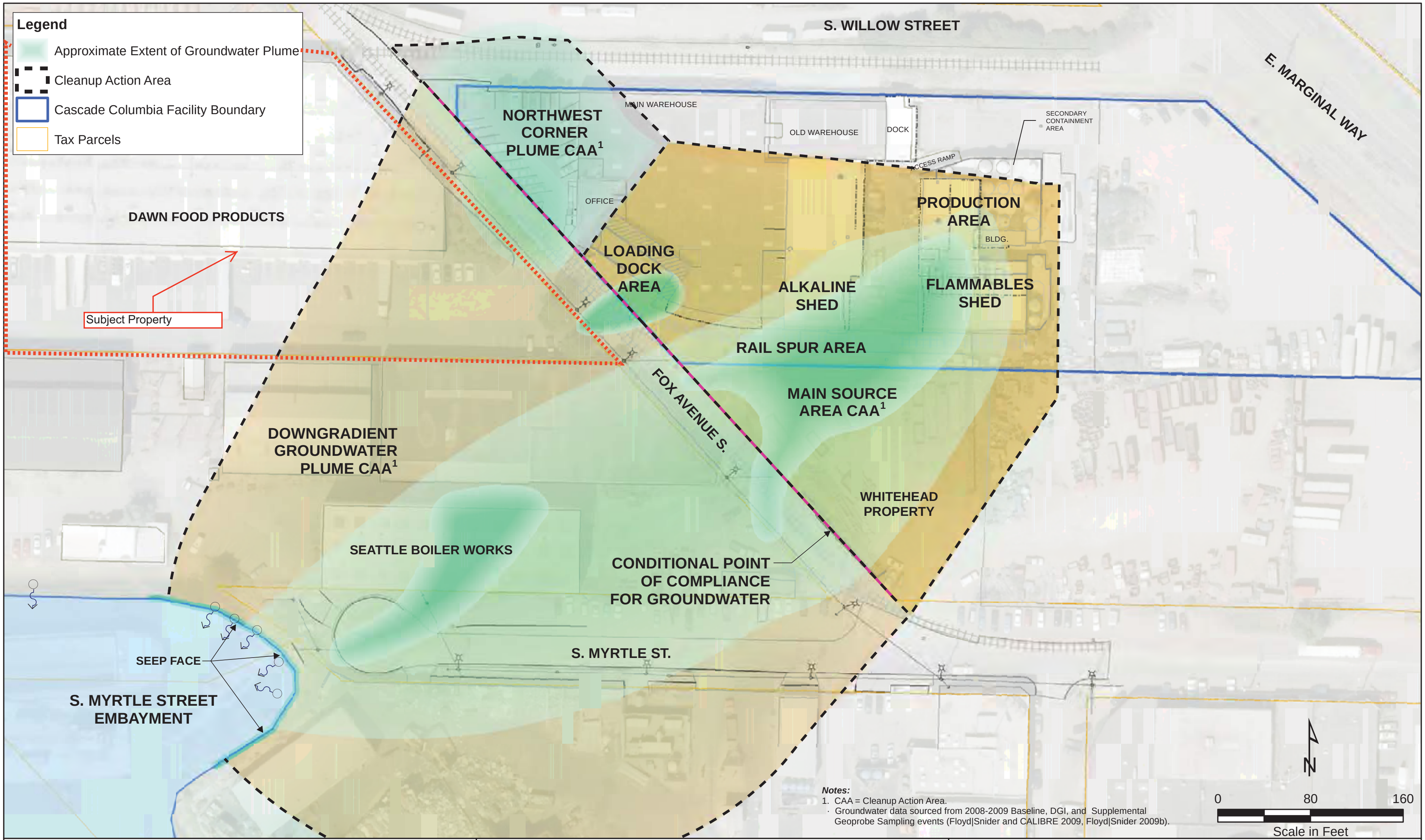
6901 Fox Ave South Phase 1 ESA
Bridge Development Partners, LLC
January 17, 2020

Figure 1
6901 Fox Ave South
Parcel Number 000180-0113



Source: Figure 2 from Limited Subsurface Investigation Fox Avenue Property 6901 Fox Avenue South, Seattle Washington. Prepared by Hart Crowser, November 12, 1996.

Figure 2
1996 Soil and Groundwater Sample Locations - Subject Property



Notes:

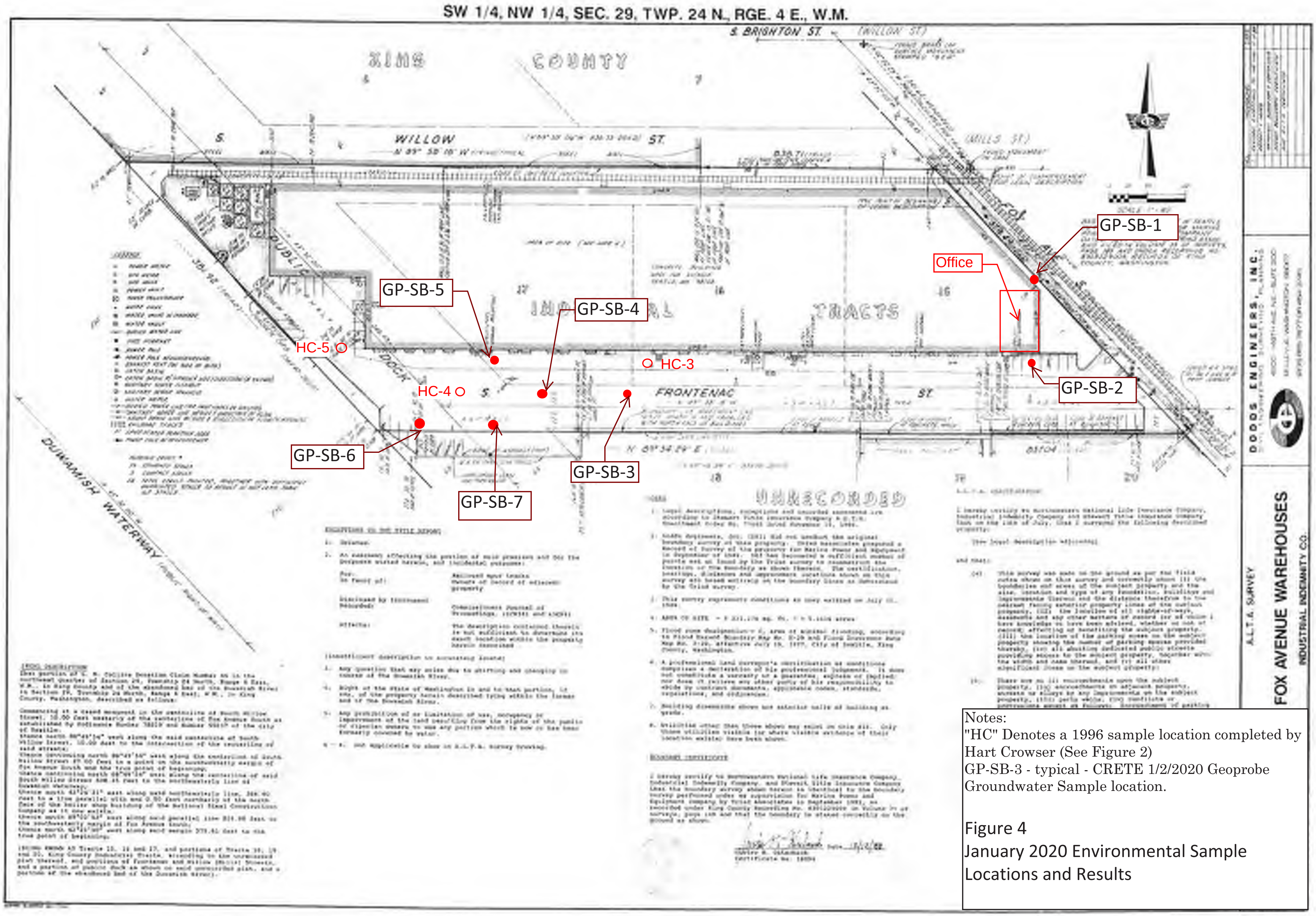
1. CAA = Cleanup Action Area.

- Groundwater data sourced from 2008-2009 Baseline, DGI, and Supplemental Geoprobe Sampling events (Floyd|Snider and CALIBRE 2009, Floyd|Snider 2009b).

Source of Figure:
Floyd Snider, 2012. Cleanup Action Plan.
Figure 2.3 Cleanup Action Areas.

Figure 3
Upgardient Groundwater Plume - Fox Avenue Cleanup Site

t
6



Notes:
"HC" Denotes a 1996 sample location completed by Hart Crowser (See Figure 2)
GP-SB-3 - typical - CRETE 1/2/2020 Geoprobe Groundwater Sample location.

Figure 4
January 2020 Environmental Sample Locations and Results

Attachment 1
Field Logs

CRETE CONSULTING, INC.

Project: Dawn Foods	Project Number:	Boring No. GP-SB-1	Sheet 1 of 1
Address, City, State		Client:	
Logged By: PB	Date Started: 8:30	Bit Type:	Drilling Contractor: ESN
Drill Crew: ESN	Date Completed: 9:10	Hammer Type:	Diameter:
USA Ticket Number:	Date Backfilled: Bent.	Hammer Weight:	Drill Rig Type: GP
	Groundwater Depth:	Elevation:	Total Depth of Boring: 15'

Depth (feet)	Sample Type	Sample Number	Blow Counts (blows/foot)	Graphic Log	Lithology **Soil Group Name:** modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifierm color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.	Dry Density (pcf)	PID (ppm)	Additional Test
5 10 15					6" Asphalt + gravel, trace sand. 5' Brown FINE sand, dry 0 ppm GP-SB-1-4' 1.2020, 8:44 10' SAND Light Brown, dry No odor WATER @ 9.35' Bgs GP-SB-1 1.2.20 8:55 15' DARK BROWN SAND DRY wet @ 14' BGS SAMPLE @ GP-SB-1-9 1.2.20 8:57			

Project: DAWN FOODS	Project Number:	Boring No. GP-SB-2	CRETE CONSULTING, INC. Sheet 1 of 1
Address, City, State		Client:	
Logged By: PB	Date Started: 9:23	Bit Type:	Drilling Contractor: ESN
Drill Crew:	Completed: 9:50	Hammer Type:	Diameter:
USA Ticket Number:	Backfilled: Bent.	Hammer Weight:	Drill Rig Type: GP
	Groundwater Depth:	Elevation:	Total Depth of Boring: 15'

Depth (feet)	Sample Type	Sample Number	Blow Counts (blows/foot)	Graphic Log	**Lithology** **Soil Group Name:** modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifierm color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.	Dry Density (pcf)	PID (ppm)	Additional Test
					0~6" Asphalt + Gravel			
					6"~5' FINE SAND, TAN DRY, NO ODOR 0.1 PPM SN: GP-SB-2-4 @ 9:25			
5					5'~10' SAND, DARK BROWN MOIST, NO ODOR GW @ 9.09' BGS SHEEN ON WATER GW SAMPLE GP-SB-2 @ 9:45			
					~~SAND~~ 10-13' SAND, ODOR, 1007 PPM DARK BROWN/BLACK! FUEL ODOR 13'~14. CLAY/FINE SAND MOIST			
10					14'~15' SAND DARK BROWN MOIST SAMPLE AT 12' BGS GP-SB-2-12 @ 9:40			
15								

Project: DAWN FOODS	Project Number:	Boring No. GP-SB-3	CRETE CONSULTING, INC.
Address, City, State		Client:	Sheet 1 of 1
Logged By: PB	Date — Started: 10:10	Bit Type:	Drilling Contractor: ESN
Drill Crew:	Date — Completed: 10:40	Hammer Type:	Diameter:
USA Ticket Number:	Date — Backfilled: Bent.	Hammer Weight:	Drill Rig Type: GP
	Groundwater Depth:	Elevation:	Total Depth of Boring: 15'

Depth (feet)	Sample Type	Sample Number	Blow Counts (blows/foot)	Graphic Log	Lithology **Soil Group Name:** modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifierm color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.	Dry Density (pcf)	PID (ppm)	Additional Test
					0~12' Asphalt + Gravel black + grey			
					1'~3' FINE SAND, TAN			
					3'~5' SAND, BLACK + TAN NO ODOR. DRY, 0.6 PPM,			
5					5'~8' SAME SAMPLE @ 4' @ 10:20			
					8'~9' FINE SAND, BROWN/TAN, MOIST NO ODOR 0 PPM			
					9'~10' CLAYEY			
					10'~12' SAND WITH GRAVEL TAN, NO ODOR			
10					GW = 12.04' BGS, Ran dry. GW SAMPLE GP-SB-3 @ 10:25			
					12'~15' CLAY/FINE SAND 0.1 PPM BROWN			
					SOIL SAMPLE FROM 11~12' BGS			
15								

Project: Dawn Foods	Project Number:	Boring No. GP-SB-4	CRETE CONSULTING, INC.
Address, City, State		Client:	Sheet 1 of 1
Logged By: PB	Date Started: 11:00	Bit Type:	Drilling Contractor: ESN
Drill Crew:	Date Completed: 11:40	Hammer Type:	Diameter:
USA Ticket Number:	Date Backfilled: Bent.	Hammer Weight:	Drill Rig Type: GP
	Groundwater Depth:	Elevation:	Total Depth of Boring: 15'

Depth (feet)	Sample Type	Sample Number	Blow Counts (blows/foot)	Graphic Log	Lithology **Soil Group Name:** modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifierm color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.	Dry Density (pcf)	PID (ppm)	Additional Test
					MOVED 1' FURTHER FROM BLDG.			
					Due to refusal @ 18".			
					0~6" Gravel asphalt SOIL SAMPLE AT 4' BGS @ 11:20			
					6"~5' sand, brown + Tan			
					Dry, No odor P.D = 0			
5					5~6' SAND with trace gravel			
					NO ODOR P.D = 0			
					6'~8' SAND BROWN & TAN			
					DRY, NO ODOR			
					8'~9.5' FINE SAND P.D = 0			
					9.5'~10' CLAYEY SAND, SILT.			
10					10'~12' SAND, FINE SAND BROWN			
					12'~14' SILT, BROWN MOIST			
					GW @ 8.22' BGS			
					SOIL SAMPLE @ 8'~8.5' bgS			
					GW sample @ 11:35			
15								

CRETE CONSULTING, INC.

Project: DAWN FOODS	Project Number:	Boring No. GP-SB-5	Sheet 1 of 1
Address, City, State		Client:	
Logged By: PB	Date — Started: 11:55	Bit Type:	Drilling Contractor: ESN
Drill Crew:	Date — Completed: 12:30	Hammer Type:	Diameter:
USA Ticket Number:	Date — Backfilled: Bent.	Hammer Weight:	Drill Rig Type: GP
	Groundwater Depth:	Elevation:	Total Depth of Boring: 15'

Depth (feet)	Sample Type	Sample Number	Blow Counts (blows/foot)	Graphic Log	Lithology	Dry Density (pcf)	PID (ppm)	Additional Test
					0~6" Asphalt			
					6"~4' SAND + GRAVEL			
					4'~5' concrete PID = 0			
					5'~6' SAND			
5					6~6.5' WOOD WASTE			
					6.5~8' SAND, ODOR (Petroleum?) ↳ collect sample PID = 0.1 ppm GP-SB-5-7 @ 12:~~45~~15			
					GW @ 7.81' Bgs COLLECT GW @ 12:20			
					8~10 NO Recovery			
10					10~11 GRAVEL/WASTE			
					11~13 SILT/CLAYEY TAN/BROWN			
					13~15' SAND BROWN NO ODOR 0 ppm			
					SOIL: GP-SB-5-12 @ 12:20			
15								

Lithology

Soil Group Name: modifier, color, moisture, density/consistency, grain size, other descriptors

Rock Description: modifierm color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.

Project: Dawn Foods	Project Number:	Boring No. GP-SB-6	**CRETE** CONSULTING, INC.
Address, City, State		Client:	Sheet 1 of 1
Logged By: PB	Date — Started: 12:45	Bit Type:	Drilling Contractor: ESN
Drill Crew:	Date — Completed: 13:45	Hammer Type:	Diameter:
USA Ticket Number:	Date — Backfilled: Bent.	Hammer Weight:	Drill Rig Type: GP
	Groundwater Depth:	Elevation:	Total Depth of Boring: 15'

Depth (feet)	Sample Type	Sample Number	Blow Counts (blows/foot)	Graphic Log	Lithology **Soil Group Name:** modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifierm color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.	Dry Density (pcf)	PID (ppm)	Additional Test
					0~6" Asphalt			
					6"~5' SAND + Gravel, Dry			
					Brown, Trace waste (Brick)			
					PID=0 ppm			
					5'~10' BROWN SAND WITH			
5					GRAVEL DRY, No odor			
					PID= 0 ppm			
					collect soil sample			
					@ 4' (GP-SB-6-4) @ 12:56			
					10~11' Brown sand with gravel No odor			
					11'~14' Brown silt No odor PID = 0.0			
10					14'~15' SAND Brown No odor PID = 0.0			
					GW @ 8.73' BGS.			
					Collect soil sample @ 10'			
					(GP-SB-6-10) @ 13:15			
15								

Project: DAWN FOODS	Project Number:	Boring No. GP-SB-7	CRETE CONSULTING, INC. Sheet 1 of 1
Address, City, State		Client:	
Logged By: PB	Date Started: 14:00	Bit Type:	Drilling Contractor: ESN
Drill Crew:	Date Completed: 15:00	Hammer Type:	Diameter:
USA Ticket Number:	Date Backfilled: Bent.	Hammer Weight:	Drill Rig Type: GP
	Groundwater Depth:	Elevation:	Total Depth of Boring: 15'

Depth (feet)	Sample Type	Sample Number	Blow Counts (blows/foot)	Graphic Log	Lithology **Soil Group Name:** modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifierm color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.	Dry Density (pcf)	PID (ppm)	Additional Test
5 10 15					0~6" ASPHALT SOIL SAMPLE @ 4' @ 14:10 6"~5' SAND, TAN, DRY, No odor P.D = 0.0 5'~9.5' SAND TAN DRY, No odor PID = 0.0 9.5'~10' SILT, MOIST BROWN 1" Rust above silt 10'~13' SAND with some silt. DARK Brown, moist No odor PID = 0.0 13~15' SILTY, CLAYEY BROWN, NO odor PID=0.0 GW @ 8.63' bgs SOIL SAMPLE @ 8' bgs @ 14:20 PID = 0.0 GW sample GP-SB-7 @ 14:25 DUPLICATE = GP-SB-99 @ 14:45		0	

Attachment 2
Laboratory Data Report

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

January 16, 2020

Jamie Stevens, Project Manager
Crete Consulting
108 S. Washington St., Suite 300
Seattle, WA 98104

Dear Ms Stevens:

Included is the amended report from the testing of material submitted on January 3, 2020 from the Dawn Food, F&BI 001037 project. The total and dissolved metals report headers have been amended.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
CTC0114R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
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January 14, 2020

Jamie Stevens, Project Manager
Crete Consulting
108 S. Washington St., Suite 300
Seattle, WA 98104

Dear Ms Stevens:

Included are the results from the testing of material submitted on January 3, 2020 from the Dawn Food, F&BI 001037 project. There are 42 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
CTC0114R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 3, 2020 by Friedman & Bruya, Inc. from the Crete Consulting Dawn Food, F&BI 001037 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Crete Consulting
001037 -01	GP-SB-5-12
001037 -02	GP-SB-1-9
001037 -03	GP-SB-4-4
001037 -04	GP-SB-5-7
001037 -05	GP-SB-6-4
001037 -06	GP-SB-4-8
001037 -07	GP-SB-2-4
001037 -08	GP-SB-6-10
001037 -09	GP-SB-7-8
001037 -10	GP-SB-7-4
001037 -11	GP-SB-1-4
001037 -12	Drum-1-0120
001037 -13	GP-SB-3-12
001037 -14	GP-SB-2-12
001037 -15	GP-SB-3-4
001037 -16	GP-SB-1
001037 -17	GP-SB-1-Filter
001037 -18	GP-SB-2
001037 -19	GP-SB-2-Filter
001037 -20	GP-SB-3
001037 -21	GP-SB-3-Filter
001037 -22	GP-SB-4
001037 -23	GP-SB-4-Filter
001037 -24	GP-SB-5
001037 -25	GP-SB-5-Filter
001037 -26	GP-SB-6
001037 -27	GP-SB-6-Filter
001037 -28	GP-SB-7
001037 -29	GP-SB-7-Filter
001037 -30	GP-SB-99
001037 -31	GP-SB-99-Filter

A 6020B internal standard failed the acceptance criteria for several samples. The samples were diluted and reanalyzed with acceptable results. Both data sets were reported.

Methylene chloride was detected in the 8260D analysis of sample GP-SB-2. The data were flagged as due to laboratory contamination.

CASE NARRATIVE (continued)

The 8260D calibration standard failed the acceptance criteria for 2-butanone. The data were flagged accordingly.

The 8260D laboratory control sample and laboratory control sample duplicate failed the relative percent difference for acetone. Acetone was not detected therefore the data were acceptable.

All other quality control requirements were acceptable.

Date of Report: 01/14/20
Date Received: 01/03/20
Project: Dawn Food, F&BI 001037
Date Extracted: 01/07/20
Date Analyzed: 01/07/20

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

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

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
Drum-1-0120 001037-12	120	113
Method Blank 00-7 MB	<5	82

Date of Report: 01/14/20
Date Received: 01/03/20
Project: Dawn Food, F&BI 001037
Date Extracted: 01/06/20
Date Analyzed: 01/06/20

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

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

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 53-144)
Drum-1-0120 001037-12	78 x	<250	74
Method Blank 00-59 MB	<50	<250	85

Analysis For Total Metals By EPA Method 6020B

Client ID:	GP-SB-3	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-20
Date Analyzed:	01/07/20	Data File:	001037-20.102
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	7.22
Cadmium	<1
Copper	<5 J
Lead	24.2
Mercury	<1
Nickel	2.17 J
Zinc	12.6 J

Analysis For Total Metals By EPA Method 6020B

Client ID:	GP-SB-3	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-20 x5
Date Analyzed:	01/08/20	Data File:	001037-20 x5.033
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<25
Nickel	<5
Zinc	<25

Analysis For Total Metals By EPA Method 6020B

Client ID:	GP-SB-5	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-24
Date Analyzed:	01/07/20	Data File:	001037-24.110
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	29.0
Cadmium	2.87
Copper	669 J ve
Lead	535 ve
Mercury	4.29
Nickel	29.4 J
Zinc	461 J

Analysis For Total Metals By EPA Method 6020B

Client ID:	GP-SB-5	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-24 x10
Date Analyzed:	01/07/20	Data File:	001037-24 x10.097
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	1,460
Lead	632
Nickel	66.0
Zinc	1,070

Analysis For Total Metals By EPA Method 6020B

Client ID:	GP-SB-6	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-26
Date Analyzed:	01/07/20	Data File:	001037-26.105
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	21.7 J
Cadmium	<1 J
Copper	33.6 J
Lead	3.40
Mercury	<1
Nickel	22.4 J
Zinc	1,800 J ve

Analysis For Total Metals By EPA Method 6020B

Client ID:	GP-SB-6	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-26 x10
Date Analyzed:	01/07/20	Data File:	001037-26 x10.098
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	23.0
Cadmium	<10
Copper	66.1
Lead	<10
Nickel	42.4
Zinc	3,770

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/08/20	Lab ID:	I0-012 mb
Date Analyzed:	01/08/20	Data File:	I0-012 mb.030
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Cadmium	<1
Copper	<5
Lead	<1
Mercury	<1
Nickel	<1
Zinc	<5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	GP-SB-3-Filter	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-21
Date Analyzed:	01/07/20	Data File:	001037-21.103
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	6.92
Cadmium	<1
Copper	<5 J
Lead	<1
Mercury	<1
Nickel	1.13 J
Zinc	<5 J

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	GP-SB-3-Filter	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-21 x5
Date Analyzed:	01/08/20	Data File:	001037-21 x5.034
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<25
Nickel	<5
Zinc	<25

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	GP-SB-5-Filter	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-25
Date Analyzed:	01/07/20	Data File:	001037-25.104
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Cadmium	<1
Copper	<5 J
Lead	<1
Mercury	<1
Nickel	2.13 J
Zinc	6.95 J

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	GP-SB-5-Filter	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-25 x5
Date Analyzed:	01/08/20	Data File:	001037-25 x5.035
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<25
Nickel	<5
Zinc	<25

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	GP-SB-6-Filter	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-27
Date Analyzed:	01/07/20	Data File:	001037-27.106
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	15.0 J
Cadmium	<1 J
Copper	<5
Lead	<1 J
Mercury	<1 J
Nickel	8.71
Zinc	1,870 ve

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	GP-SB-6-Filter	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-27 x5
Date Analyzed:	01/08/20	Data File:	001037-27 x5.036
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	10.6
Cadmium	<5
Lead	<5
Mercury	<5
Zinc	3,110

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/08/20	Lab ID:	I0-012 mb
Date Analyzed:	01/08/20	Data File:	I0-012 mb.030
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Cadmium	<1
Copper	<5
Lead	<1
Mercury	<1
Nickel	<1
Zinc	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	Drum-1-0120	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-12
Date Analyzed:	01/07/20	Data File:	001037-12.051
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	1.97
Cadmium	<1
Copper	10.1
Lead	1.48
Mercury	<1
Nickel	3.98
Zinc	15.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	I0-011 mb2
Date Analyzed:	01/07/20	Data File:	I0-011 mb2.049
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Cadmium	<1
Copper	<5
Lead	<1
Mercury	<1
Nickel	<1
Zinc	<5

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Drum-1-0120	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-12
Date Analyzed:	01/11/20	Data File:	011040.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	62	145
Toluene-d8	91	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<0.5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Hexane	<0.25	o-Xylene	<0.05
Methylene chloride	<0.5	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.05	Bromoform	<0.05
1,1-Dichloroethane	<0.05	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.05	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<0.5	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.05	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.05	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	0.25
Benzene	<0.03	sec-Butylbenzene	0.25
Trichloroethene	<0.02	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.05	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.05
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	00-027 mb
Date Analyzed:	01/07/20	Data File:	010713.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	50	150
Toluene-d8	105	50	150
4-Bromofluorobenzene	104	50	150

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<0.5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Hexane	<0.25	o-Xylene	<0.05
Methylene chloride	<0.5	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.05	Bromoform	<0.05
1,1-Dichloroethane	<0.05	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.05	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<0.5	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.05	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.05	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.03	sec-Butylbenzene	<0.05
Trichloroethene	<0.02	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.05	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.05
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	GP-SB-1	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-16
Date Analyzed:	01/08/20	Data File:	010846.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	50	150
Toluene-d8	96	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	44
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	16
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	GP-SB-2	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-18
Date Analyzed:	01/08/20	Data File:	010847.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	89	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	84
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	5.3 lc
trans-1,2-Dichloroethene	7.3
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	540 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	GP-SB-2	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-18 1/10
Date Analyzed:	01/11/20	Data File:	011041.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	57	121
Toluene-d8	87	63	127
4-Bromofluorobenzene	98	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	72
Chloroethane	<10
1,1-Dichloroethene	<10
Methylene chloride	<50
trans-1,2-Dichloroethene	<10
1,1-Dichloroethane	<10
cis-1,2-Dichloroethene	400
1,2-Dichloroethane (EDC)	<10
1,1,1-Trichloroethane	<10
Trichloroethene	<10
Tetrachloroethene	<10

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	GP-SB-3	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-20
Date Analyzed:	01/08/20	Data File:	010840.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	101	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	0.31	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<1	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10 ca	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	GP-SB-5	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-24
Date Analyzed:	01/08/20	Data File:	010841.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<1	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10 ca	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	GP-SB-6	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-26
Date Analyzed:	01/08/20	Data File:	010842.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	97	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<1	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10 ca	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	00-026 mb
Date Analyzed:	01/08/20	Data File:	010835.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<1	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10 ca	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Drum-1-0120	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/06/20	Lab ID:	001037-12 1/5
Date Analyzed:	01/07/20	Data File:	010715.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	73	31	163
Benzo(a)anthracene-d12	80	24	168

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

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/06/20	Lab ID:	00-061 mb 1/5
Date Analyzed:	01/06/20	Data File:	010615.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	77	31	163
Benzo(a)anthracene-d12	88	24	168

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

Date of Report: 01/14/20
Date Received: 01/03/20
Project: Dawn Food, F&BI 001037

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 001057-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	15	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	95	71-131

Date of Report: 01/14/20
Date Received: 01/03/20
Project: Dawn Food, F&BI 001037

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

Laboratory Code: 001045-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	100	108	64-133	8

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	106	58-147

Date of Report: 01/14/20
Date Received: 01/03/20
Project: Dawn Food, F&BI 001037

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

Laboratory Code: 001056-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	<1	116	115	75-125	1
Cadmium	ug/L (ppb)	5	<1	96	94	75-125	2
Copper	ug/L (ppb)	20	27.3	92	87	75-125	6
Lead	ug/L (ppb)	10	1.62	98	97	75-125	1
Mercury	ug/L (ppb)	5	<1	98	98	75-125	0
Nickel	ug/L (ppb)	20	5.40	93	89	75-125	4
Zinc	ug/L (ppb)	50	43.7	90	79	75-125	13

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	100	80-120
Cadmium	ug/L (ppb)	5	104	80-120
Copper	ug/L (ppb)	20	97	80-120
Lead	ug/L (ppb)	10	98	80-120
Mercury	ug/L (ppb)	5	94	80-120
Nickel	ug/L (ppb)	20	97	80-120
Zinc	ug/L (ppb)	50	99	80-120

Date of Report: 01/14/20
Date Received: 01/03/20
Project: Dawn Food, F&BI 001037

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 6020B

Laboratory Code: 001056-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	<1	116	115	75-125	1
Cadmium	ug/L (ppb)	5	<1	96	94	75-125	2
Copper	ug/L (ppb)	20	27.3	92	87	75-125	6
Lead	ug/L (ppb)	10	1.62	98	97	75-125	1
Mercury	ug/L (ppb)	5	<1	98	98	75-125	0
Nickel	ug/L (ppb)	20	5.40	93	89	75-125	4
Zinc	ug/L (ppb)	50	43.7	90	79	75-125	13

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	100	80-120
Cadmium	ug/L (ppb)	5	104	80-120
Copper	ug/L (ppb)	20	97	80-120
Lead	ug/L (ppb)	10	98	80-120
Mercury	ug/L (ppb)	5	94	80-120
Nickel	ug/L (ppb)	20	97	80-120
Zinc	ug/L (ppb)	50	99	80-120

Date of Report: 01/14/20
Date Received: 01/03/20
Project: Dawn Food, F&BI 001037

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

Laboratory Code: 001043-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	1.75	87	90	75-125	3
Cadmium	mg/kg (ppm)	10	<1	96	97	75-125	1
Copper	mg/kg (ppm)	50	11.1	75	78	75-125	4
Lead	mg/kg (ppm)	50	6.51	105	94	75-125	11
Mercury	mg/kg (ppm	5	<1	93	89	75-125	4
Nickel	mg/kg (ppm)	25	16.5	80	89	75-125	11
Zinc	mg/kg (ppm)	50	26.1	95	91	75-125	4

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	85	80-120
Cadmium	mg/kg (ppm)	10	97	80-120
Copper	mg/kg (ppm)	50	96	80-120
Lead	mg/kg (ppm)	50	100	80-120
Mercury	mg/kg (ppm)	5	81	80-120
Nickel	mg/kg (ppm)	25	97	80-120
Zinc	mg/kg (ppm)	50	101	80-120

Date of Report: 01/14/20
Date Received: 01/03/20
Project: Dawn Food, F&BI 001037

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 001067-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	2.5	<0.5	18	19	10-142	5
Chloromethane	mg/kg (ppm)	2.5	<0.5	49	50	10-126	2
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	49	50	10-138	2
Bromomethane	mg/kg (ppm)	2.5	<0.5	72	71	10-163	1
Chloroethane	mg/kg (ppm)	2.5	<0.5	67	67	10-176	0
Trichlorofluoromethane	mg/kg (ppm)	2.5	<0.5	61	61	10-176	0
Acetone	mg/kg (ppm)	12.5	<0.5	87	87	10-163	0
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	71	72	10-160	1
Hexane	mg/kg (ppm)	2.5	<0.25	57	56	10-137	2
Methylene chloride	mg/kg (ppm)	2.5	<0.5	88	89	10-156	1
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	<0.05	89	89	21-145	0
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	80	80	14-137	0
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	83	83	19-140	0
2,2-Dichloropropane	mg/kg (ppm)	2.5	<0.05	87	86	10-158	1
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	89	89	25-135	0
Chloroform	mg/kg (ppm)	2.5	<0.05	88	87	21-145	1
2-Butanone (MEK)	mg/kg (ppm)	12.5	<0.5	87	88	19-147	1
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	89	87	12-160	2
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	85	85	10-156	0
1,1-Dichloropropene	mg/kg (ppm)	2.5	<0.05	83	81	17-140	2
Carbon tetrachloride	mg/kg (ppm)	2.5	<0.05	85	84	9-164	1
Benzene	mg/kg (ppm)	2.5	<0.03	86	85	29-129	1
Trichloroethene	mg/kg (ppm)	2.5	<0.02	87	86	21-139	1
1,2-Dichloropropane	mg/kg (ppm)	2.5	<0.05	88	87	30-135	1
Bromodichloromethane	mg/kg (ppm)	2.5	<0.05	90	90	23-155	0
Dibromomethane	mg/kg (ppm)	2.5	<0.05	87	87	23-145	0
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	<0.5	92	90	24-155	2
cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	<0.05	91	90	28-144	1
Toluene	mg/kg (ppm)	2.5	<0.05	82	81	35-130	1
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	<0.05	82	82	26-149	0
1,1,2-Trichloroethane	mg/kg (ppm)	2.5	<0.05	84	83	10-205	1
2-Hexanone	mg/kg (ppm)	12.5	<0.5	87	84	15-166	4
1,3-Dichloropropane	mg/kg (ppm)	2.5	<0.05	85	84	31-137	1
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	87	86	20-133	1
Dibromochloromethane	mg/kg (ppm)	2.5	<0.05	85	84	28-150	1
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	<0.05	83	82	28-142	1
Chlorobenzene	mg/kg (ppm)	2.5	<0.05	84	83	32-129	1
Ethylbenzene	mg/kg (ppm)	2.5	<0.05	84	83	32-137	1
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	<0.05	90	89	31-143	1
m,p-Xylene	mg/kg (ppm)	5	<0.1	86	85	34-136	1
o-Xylene	mg/kg (ppm)	2.5	<0.05	84	83	33-134	1
Styrene	mg/kg (ppm)	2.5	<0.05	86	85	35-137	1
Isopropylbenzene	mg/kg (ppm)	2.5	<0.05	87	86	31-142	1
Bromoform	mg/kg (ppm)	2.5	<0.05	86	83	21-156	4
n-Propylbenzene	mg/kg (ppm)	2.5	<0.05	85	84	23-146	1
Bromobenzene	mg/kg (ppm)	2.5	<0.05	82	80	34-130	2
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	<0.05	86	85	18-149	1
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	<0.05	86	82	28-140	5
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	<0.05	86	84	25-144	2
2-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	86	84	31-134	2
4-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	82	80	31-136	2
tert-Butylbenzene	mg/kg (ppm)	2.5	<0.05	88	85	30-137	3
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	<0.05	83	82	10-182	1
sec-Butylbenzene	mg/kg (ppm)	2.5	<0.05	86	84	23-145	2
p-Isopropyltoluene	mg/kg (ppm)	2.5	<0.05	85	84	21-149	1
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	<0.05	84	82	30-131	2
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	<0.05	85	82	29-129	4
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	<0.05	86	84	31-132	2
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	<0.5	82	81	11-161	1
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	<0.25	96	92	22-142	4
Hexachlorobutadiene	mg/kg (ppm)	2.5	<0.25	83	82	10-142	1
Naphthalene	mg/kg (ppm)	2.5	<0.05	93	90	14-157	3
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	<0.25	84	83	20-144	1

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QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	2.5	45	45	10-146	0
Chloromethane	mg/kg (ppm)	2.5	75	75	27-133	0
Vinyl chloride	mg/kg (ppm)	2.5	74	74	22-139	0
Bromomethane	mg/kg (ppm)	2.5	90	90	38-114	0
Chloroethane	mg/kg (ppm)	2.5	88	88	9-163	0
Trichlorofluoromethane	mg/kg (ppm)	2.5	90	90	10-196	0
Acetone	mg/kg (ppm)	12.5	93	93	52-141	0
1,1-Dichloroethene	mg/kg (ppm)	2.5	89	89	47-128	0
Hexane	mg/kg (ppm)	2.5	93	93	43-142	0
Methylene chloride	mg/kg (ppm)	2.5	103	103	42-132	0
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	98	98	60-123	0
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	95	95	67-129	0
1,1-Dichloroethane	mg/kg (ppm)	2.5	95	95	68-115	0
2,2-Dichloropropane	mg/kg (ppm)	2.5	99	99	52-170	0
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	99	99	72-127	0
Chloroform	mg/kg (ppm)	2.5	98	98	66-120	0
2-Butanone (MEK)	mg/kg (ppm)	12.5	98	98	72-127	0
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	99	99	56-135	0
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	98	98	62-131	0
1,1-Dichloropropene	mg/kg (ppm)	2.5	96	96	69-128	0
Carbon tetrachloride	mg/kg (ppm)	2.5	98	98	60-139	0
Benzene	mg/kg (ppm)	2.5	96	96	68-114	0
Trichloroethene	mg/kg (ppm)	2.5	97	97	64-117	0
1,2-Dichloropropane	mg/kg (ppm)	2.5	98	98	72-127	0
Bromodichloromethane	mg/kg (ppm)	2.5	99	99	72-130	0
Dibromomethane	mg/kg (ppm)	2.5	95	95	70-120	0
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	98	98	45-145	0
cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	100	100	75-136	0
Toluene	mg/kg (ppm)	2.5	91	91	66-126	0
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	90	90	72-132	0
1,1,2-Trichloroethane	mg/kg (ppm)	2.5	91	91	75-113	0
2-Hexanone	mg/kg (ppm)	12.5	95	95	33-152	0
1,3-Dichloropropane	mg/kg (ppm)	2.5	94	94	72-130	0
Tetrachloroethene	mg/kg (ppm)	2.5	96	96	72-114	0
Dibromochloromethane	mg/kg (ppm)	2.5	94	94	74-125	0
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	91	91	74-132	0
Chlorobenzene	mg/kg (ppm)	2.5	91	91	76-111	0
Ethylbenzene	mg/kg (ppm)	2.5	93	93	64-123	0
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	98	98	69-135	0
m,p-Xylene	mg/kg (ppm)	5	93	93	78-122	0
o-Xylene	mg/kg (ppm)	2.5	90	90	77-124	0
Styrene	mg/kg (ppm)	2.5	95	95	74-126	0
Isopropylbenzene	mg/kg (ppm)	2.5	95	95	76-127	0
Bromoform	mg/kg (ppm)	2.5	93	93	56-132	0
n-Propylbenzene	mg/kg (ppm)	2.5	92	92	74-124	0
Bromobenzene	mg/kg (ppm)	2.5	87	87	72-122	0
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	92	92	76-126	0
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	90	90	56-143	0
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	91	91	61-137	0
2-Chlorotoluene	mg/kg (ppm)	2.5	92	92	74-121	0
4-Chlorotoluene	mg/kg (ppm)	2.5	88	88	75-122	0
tert-Butylbenzene	mg/kg (ppm)	2.5	92	92	73-130	0
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	88	88	76-125	0
sec-Butylbenzene	mg/kg (ppm)	2.5	92	92	71-130	0
p-Isopropyltoluene	mg/kg (ppm)	2.5	91	91	70-132	0
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	90	90	75-121	0
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	89	89	74-117	0
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	92	92	76-121	0
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	86	86	58-138	0
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	100	100	64-135	0
Hexachlorobutadiene	mg/kg (ppm)	2.5	89	89	50-153	0
Naphthalene	mg/kg (ppm)	2.5	98	98	63-140	0
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	90	90	63-138	0

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QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 001056-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Dichlorodifluoromethane	ug/L (ppb)	50	<1	76	55-137
Chloromethane	ug/L (ppb)	50	<10	77	57-129
Vinyl chloride	ug/L (ppb)	50	<0.2	91	61-139
Bromomethane	ug/L (ppb)	50	<1	79	20-265
Chloroethane	ug/L (ppb)	50	<1	78	55-149
Trichlorofluoromethane	ug/L (ppb)	50	<1	90	65-137
Acetone	ug/L (ppb)	250	<50	84	48-149
1,1-Dichloroethene	ug/L (ppb)	50	<1	87	71-123
Hexane	ug/L (ppb)	50	<1	95	44-139
Methylene chloride	ug/L (ppb)	50	<5	106	61-126
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	103	68-125
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	97	72-122
1,1-Dichloroethane	ug/L (ppb)	50	<1	98	79-113
2,2-Dichloropropane	ug/L (ppb)	50	<1	102	48-157
cis-1,2-Dichloroethene	ug/L (ppb)	50	<1	99	63-126
Chloroform	ug/L (ppb)	50	<1	99	77-117
2-Butanone (MEK)	ug/L (ppb)	250	<10	74	70-135
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	103	70-119
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	103	75-121
1,1-Dichloropropene	ug/L (ppb)	50	<1	98	67-121
Carbon tetrachloride	ug/L (ppb)	50	<1	107	70-132
Benzene	ug/L (ppb)	50	<0.35	97	75-114
Trichloroethene	ug/L (ppb)	50	2.4	100	73-122
1,2-Dichloropropane	ug/L (ppb)	50	<1	99	80-111
Bromodichloromethane	ug/L (ppb)	50	<1	108	78-117
Dibromomethane	ug/L (ppb)	50	<1	94	73-125
4-Methyl-2-pentanone	ug/L (ppb)	250	<10	104	79-140
cis-1,3-Dichloropropene	ug/L (ppb)	50	<1	114	76-120
Toluene	ug/L (ppb)	50	<1	103	73-117
trans-1,3-Dichloropropene	ug/L (ppb)	50	<1	98	75-122
1,1,2-Trichloroethane	ug/L (ppb)	50	<1	110	81-116
2-Hexanone	ug/L (ppb)	250	<10	104	74-127
1,3-Dichloropropane	ug/L (ppb)	50	<1	108	80-113
Tetrachloroethene	ug/L (ppb)	50	<1	96	40-155
Dibromochloromethane	ug/L (ppb)	50	<1	99	69-129
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	<1	97	79-120
Chlorobenzene	ug/L (ppb)	50	<1	99	75-115
Ethylbenzene	ug/L (ppb)	50	<1	101	66-124
1,1,1,2-Tetrachloroethane	ug/L (ppb)	50	<1	112	76-130
m,p-Xylene	ug/L (ppb)	100	<2	101	63-128
o-Xylene	ug/L (ppb)	50	<1	105	64-129
Styrene	ug/L (ppb)	50	<1	106	56-142
Isopropylbenzene	ug/L (ppb)	50	<1	100	74-122
Bromoform	ug/L (ppb)	50	<1	111	49-138
n-Propylbenzene	ug/L (ppb)	50	<1	105	65-129
Bromobenzene	ug/L (ppb)	50	<1	103	70-121
1,3,5-Trimethylbenzene	ug/L (ppb)	50	<1	109	60-138
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	<1	114	77-120
1,2,3-Trichloropropane	ug/L (ppb)	50	<1	102	62-125
2-Chlorotoluene	ug/L (ppb)	50	<1	104	40-159
4-Chlorotoluene	ug/L (ppb)	50	<1	105	76-122
tert-Butylbenzene	ug/L (ppb)	50	<1	107	74-125
1,2,4-Trimethylbenzene	ug/L (ppb)	50	<1	105	59-136
sec-Butylbenzene	ug/L (ppb)	50	<1	109	69-127
p-Isopropyltoluene	ug/L (ppb)	50	<1	107	64-132
1,3-Dichlorobenzene	ug/L (ppb)	50	<1	99	77-113
1,4-Dichlorobenzene	ug/L (ppb)	50	<1	84	75-110
1,2-Dichlorobenzene	ug/L (ppb)	50	<1	99	70-120
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	<10	119	69-129
1,2,4-Trichlorobenzene	ug/L (ppb)	50	<1	107	66-123
Hexachlorobutadiene	ug/L (ppb)	50	<1	93	53-136
Naphthalene	ug/L (ppb)	50	<1	109	60-145
1,2,3-Trichlorobenzene	ug/L (ppb)	50	<1	112	59-130

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QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	ug/L (ppb)	50	105	117	50-157	11
Chloromethane	ug/L (ppb)	50	98	101	62-130	3
Vinyl chloride	ug/L (ppb)	50	112	117	70-128	4
Bromomethane	ug/L (ppb)	50	91	93	60-143	2
Chloroethane	ug/L (ppb)	50	93	95	66-149	2
Trichlorofluoromethane	ug/L (ppb)	50	103	111	65-138	7
Acetone	ug/L (ppb)	250	84	118	44-145	34 vo
1,1-Dichloroethene	ug/L (ppb)	50	102	111	72-121	8
Hexane	ug/L (ppb)	50	96	94	51-153	2
Methylene chloride	ug/L (ppb)	50	127	119	63-132	7
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	111	108	70-122	3
trans-1,2-Dichloroethene	ug/L (ppb)	50	110	106	76-118	4
1,1-Dichloroethane	ug/L (ppb)	50	111	108	77-119	3
2,2-Dichloropropane	ug/L (ppb)	50	108	104	62-141	4
cis-1,2-Dichloroethene	ug/L (ppb)	50	111	107	76-119	4
Chloroform	ug/L (ppb)	50	110	107	78-117	3
2-Butanone (MEK)	ug/L (ppb)	250	67	74	48-150	10
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	106	107	75-116	1
1,1,1-Trichloroethane	ug/L (ppb)	50	114	107	80-116	6
1,1-Dichloropropene	ug/L (ppb)	50	103	101	78-119	2
Carbon tetrachloride	ug/L (ppb)	50	116	113	72-128	3
Benzene	ug/L (ppb)	50	101	99	75-116	2
Trichloroethene	ug/L (ppb)	50	100	103	72-119	3
1,2-Dichloropropane	ug/L (ppb)	50	92	99	79-121	7
Bromodichloromethane	ug/L (ppb)	50	104	111	76-120	7
Dibromomethane	ug/L (ppb)	50	92	96	79-121	4
4-Methyl-2-pentanone	ug/L (ppb)	250	102	105	54-153	3
cis-1,3-Dichloropropene	ug/L (ppb)	50	102	109	76-128	7
Toluene	ug/L (ppb)	50	108	102	79-115	6
trans-1,3-Dichloropropene	ug/L (ppb)	50	98	95	76-128	3
1,1,2-Trichloroethane	ug/L (ppb)	50	112	109	78-120	3
2-Hexanone	ug/L (ppb)	250	106	105	49-147	1
1,3-Dichloropropane	ug/L (ppb)	50	109	105	81-111	4
Tetrachloroethene	ug/L (ppb)	50	102	96	78-109	6
Dibromochloromethane	ug/L (ppb)	50	102	104	63-140	2
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	102	103	82-118	1
Chlorobenzene	ug/L (ppb)	50	100	101	80-113	1
Ethylbenzene	ug/L (ppb)	50	105	103	83-111	2
1,1,1,2-Tetrachloroethane	ug/L (ppb)	50	119	117	76-125	2
m,p-Xylene	ug/L (ppb)	100	98	102	81-112	4
o-Xylene	ug/L (ppb)	50	104	108	81-117	4
Styrene	ug/L (ppb)	50	101	105	83-121	4
Isopropylbenzene	ug/L (ppb)	50	106	109	78-118	3
Bromoform	ug/L (ppb)	50	108	113	40-161	5
n-Propylbenzene	ug/L (ppb)	50	99	102	81-115	3
Bromobenzene	ug/L (ppb)	50	96	100	80-113	4
1,3,5-Trimethylbenzene	ug/L (ppb)	50	105	106	83-117	1
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	105	111	79-118	6
1,2,3-Trichloropropane	ug/L (ppb)	50	94	101	74-116	7
2-Chlorotoluene	ug/L (ppb)	50	100	102	79-112	2
4-Chlorotoluene	ug/L (ppb)	50	99	102	80-116	3
tert-Butylbenzene	ug/L (ppb)	50	109	109	81-119	0
1,2,4-Trimethylbenzene	ug/L (ppb)	50	108	107	81-121	1
sec-Butylbenzene	ug/L (ppb)	50	113	111	83-123	2
p-Isopropyltoluene	ug/L (ppb)	50	111	109	81-117	2
1,3-Dichlorobenzene	ug/L (ppb)	50	101	101	80-115	0
1,4-Dichlorobenzene	ug/L (ppb)	50	87	85	77-112	2
1,2-Dichlorobenzene	ug/L (ppb)	50	107	100	79-115	7
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	119	120	62-133	1
1,2,4-Trichlorobenzene	ug/L (ppb)	50	113	103	75-119	9
Hexachlorobutadiene	ug/L (ppb)	50	95	88	70-116	8
Naphthalene	ug/L (ppb)	50	115	109	72-131	5
1,2,3-Trichlorobenzene	ug/L (ppb)	50	118	109	74-122	8

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QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 001043-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Acceptance Criteria
Naphthalene	mg/kg (ppm)	0.17	<0.01	77	44-129
Acenaphthylene	mg/kg (ppm)	0.17	<0.01	73	52-121
Acenaphthene	mg/kg (ppm)	0.17	<0.01	79	51-123
Fluorene	mg/kg (ppm)	0.17	<0.01	79	37-137
Phenanthrene	mg/kg (ppm)	0.17	<0.01	80	34-141
Anthracene	mg/kg (ppm)	0.17	<0.01	75	32-124
Fluoranthene	mg/kg (ppm)	0.17	<0.01	78	16-160
Pyrene	mg/kg (ppm)	0.17	<0.01	74	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	<0.01	78	23-144
Chrysene	mg/kg (ppm)	0.17	<0.01	83	32-149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	<0.01	66	23-176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	<0.01	67	42-139
Benzo(a)pyrene	mg/kg (ppm)	0.17	<0.01	59	21-163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	<0.01	64	23-170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	<0.01	70	31-146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	<0.01	65	37-133

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	mg/kg (ppm)	0.17	85	84	58-121	1
Acenaphthylene	mg/kg (ppm)	0.17	82	79	54-121	4
Acenaphthene	mg/kg (ppm)	0.17	86	85	54-123	1
Fluorene	mg/kg (ppm)	0.17	85	83	56-127	2
Phenanthrene	mg/kg (ppm)	0.17	87	86	55-122	1
Anthracene	mg/kg (ppm)	0.17	82	79	50-120	4
Fluoranthene	mg/kg (ppm)	0.17	81	79	54-129	2
Pyrene	mg/kg (ppm)	0.17	86	82	53-127	5
Benz(a)anthracene	mg/kg (ppm)	0.17	84	84	51-115	0
Chrysene	mg/kg (ppm)	0.17	90	91	55-129	1
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	69	67	56-123	3
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	70	70	54-131	0
Benzo(a)pyrene	mg/kg (ppm)	0.17	64	63	51-118	2
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	73	75	49-148	3
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	78	83	50-141	6
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	73	78	52-131	7

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

001037

SAMPLE CHAIN OF CUSTODY

ME 01-04-20 VS2/AIG/4AV4/VW1

Report To Ms. Jamie Stevens
Company Crete Consulting
Address 108 S. WASHINGTON ST., Suite 300
City, State, ZIP Seattle, WA 98104
Phone 206-799-2744 Email jamie.stevens@creteconsulting.com

SAMPLERS (*signature*)

PROJECT NAME Dawn Foods	PO #
REMARKS Project specific RLs? - Yes / No	INVOICE TO Crete

Page # 1 of 4

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
GP-SB-5-12	01A-E	1.2.20	12:20	SOIL	5												ARCHIVE
GP-SB-1-9	02	↓	8:57	↓	↓												↓
GP-SB-4-4	03	↓	11:20	↓	↓												↓
GP-SB-5-7	04	↓	12:15	↓	↓												↓
GP-SB-6-4	05	↓	12:56	↓	↓												↓
GP-SB-4-8	06	↓	11:35	↓	↓												↓
GP-SB-2-4	07	↓	9:25	↓	↓												↓
GP-SB-6-10	08	↓	13:15	↓	↓												↓
GP-SB-7-8	09	↓	14:20	↓	↓												↓
GP-SB-7-4	10	↓	14:10	↓	↓												↓

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

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Paul V. Bianco	Crete	1.3.20	13:43
Received by:	VINH	FBI	1/3/20	13:43
Relinquished by:				
Received by:		Samples received at 2 °C		

001037
[redacted]

SAMPLE CHAIN OF CUSTODY ME 01-04-20

VS2/AI6/AI4/VW4

Report To Ms. Jamie Stevens
Company Crete Consulting
Address 108 S. Washington St., Suite 300
City, State, ZIP Seattle, WA 98104
Phone 206.799.2744 Email jamie.stevens@creteconsulting.com

SAMPLERS (signature) P V B [redacted]

PROJECT NAME Dawn Foods	PO #
REMARKS Project specific RLs? - Yes / No	INVOICE TO Crete

Page # 2 of 4

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	METALS As Cd Cu Hg Ni Pb Zn				ⓨ-pr SS 1/6/20 ni Notes
GP-SB-1-4	11 A-E	1.2.20	8:44	SOIL	5												ARCHIVE
DRUM-1-0120	12	1.2.20	14:45	SOIL	5	ⓧ	ⓧ			ⓧ	ⓨ		ⓨ				~~ARCHIVE~~
GP-SB-3-12	13	1.2.20	10:30	SOIL	5												ARCHIVE
GP-SB-2-12	14	1.2.20	9:40	SOIL	5												ARCHIVE
GP-SB-3-4	15	1.2.20	10:20	SOIL	5												ARCHIVE
GP-SB-1	16	1.2.20	8:55	WATER	5					X							cVOCs only
GP-SB-1-FILTER	17	1.2.20	8:55	WATER	1												ARCHIVE
GP-SB-2	18 A-E	1.2.20	9:45	WATER	5					X							cVOCs only
GP-SB-2 FILTER	19	1.2.20	9:45	WATER	1												ARCHIVE
GP-SB-3	20 A-E	1.2.20	10:25	WATER	5					X			X				

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

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: P V B	Paul Bianco	Crete	1.3.20	13:43
Received by:	VINH	FBI	1/3/20	13:43
Relinquished by:				
Received by:		Samples received at 2 °C		

001037

SAMPLE CHAIN OF CUSTODY

ME 01-04-20 VS2/AI6/AV4/VW4

Page # 3 of 4

Report To Ms. Jamie Stevens
Company Crete Consulting
Address 108 S. Washington St., Suite 300
City, State, ZIP Seattle, WA 98104
Phone 206-799.2744 Email jamie.stevens@creteconsulting.com

SAMPLERS (*signature*)

PROJECT NAME
Dawn Foods

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO
Crete

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

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

						ANALYSES REQUESTED										
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	METALS, As Cd Cu Hg Ni Pb Zn				Notes
GP-SB-3-FILTER	21	1.2.20	10:25	WATER	1								X				DISSOLVED METALS
GP-SB-4	22A-E		11:35		5												ARCHIVE
GP-SB-4-FILTER	23		11:35		1												ARCHIVE
GP-SB-5	24A-E		12:15		5					X			X				
GP-SB-5-FILTER	25		12:15		1								X				DISSOLVED METALS
GP-SB-6	26A-E		13:15		5					X			X				
GP-SB-6-FILTER	27		13:15		1								X				DISSOLVED METALS
GP-SB-7	28A-E		14:25		5												ARCHIVE
GP-SB-7-FILTER	29		14:25		1												ARCHIVE
GP-SB-99	30 AE		14:45		5												ARCHIVE

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

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Paul Bianco	Crete	1.3.20	13:43
Received by:	VINH	FBI	1/3/20	1343
Relinquished by:				
Received by:		Samples received at 2 °C		

001037

SAMPLE CHAIN OF CUSTODY ME 01-04-20

VS2/AD6/AO4/VW4

Page # 4 of 4

Report To Ms. Jamie Stevens
Company Crete Consulting
Address 108 S. Washington St. Suite 300
City, State, ZIP Seattle, WA 98104
Phone 206-799-2744 Email jamie.stevens@ ~~consult~~ creteconsulting.com

SAMPLERS (signature)

PROJECT NAME	PO #
Dawn Foods	

REMARKS	INVOICE TO
Project specific RLs? - Yes / No	Crete

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
GP-SB-99-FILTER	31	1.2.20	14:45	WATER	1												ARCHIVE

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

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Paul Bianco	Crete	1.3.20	13:43
Received by:	VINH	FBI	1/3/20	13:43
Relinquished by:				
Received by:		Samples received at 2 °C		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

January 28, 2020

Jamie Stevens, Project Manager
Crete Consulting
108 S. Washington St., Suite 300
Seattle, WA 98104

Dear Ms Stevens:

Included are the additional results from the testing of material submitted on January 3, 2020 from the Dawn Food, F&BI 001037 project. There are 33 pages included in this report.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
CTC0128R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 3, 2020 by Friedman & Bruya, Inc. from the Crete Consulting Dawn Food, F&BI 001037 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Crete Consulting
001037 -01	GP-SB-5-12
001037 -02	GP-SB-1-9
001037 -03	GP-SB-4-4
001037 -04	GP-SB-5-7
001037 -05	GP-SB-6-4
001037 -06	GP-SB-4-8
001037 -07	GP-SB-2-4
001037 -08	GP-SB-6-10
001037 -09	GP-SB-7-8
001037 -10	GP-SB-7-4
001037 -11	GP-SB-1-4
001037 -12	Drum-1-0120
001037 -13	GP-SB-3-12
001037 -14	GP-SB-2-12
001037 -15	GP-SB-3-4
001037 -16	GP-SB-1
001037 -17	GP-SB-1-Filter
001037 -18	GP-SB-2
001037 -19	GP-SB-2-Filter
001037 -20	GP-SB-3
001037 -21	GP-SB-3-Filter
001037 -22	GP-SB-4
001037 -23	GP-SB-4-Filter
001037 -24	GP-SB-5
001037 -25	GP-SB-5-Filter
001037 -26	GP-SB-6
001037 -27	GP-SB-6-FIlter
001037 -28	GP-SB-7
001037 -29	GP-SB-7-Filter
001037 -30	GP-SB-99
001037 -31	GP-SB-99-Filter

A 6020B internal standard failed the acceptance criteria for samples GP-SB-7 and GP-SB-7-Filter. The samples were diluted and reanalyzed with acceptable results. Both data sets were reported.

CASE NARRATIVE (Continued)

The 8270E calibration standard failed the acceptance criteria for 2,4-dinitrophenol and 4,6-dinitro-2-methylphenol. In addition, several compounds in the laboratory control samples failed the acceptance criteria. The data were flagged accordingly.

The 8260D calibration standard failed the acceptance criteria for methylene chloride and 2-butanone. The data were flagged accordingly. In addition, methylene chloride was detected in sample GP-SB-2. The data were flagged as due to laboratory contamination.

All other quality control requirements were acceptable.

Date of Report: 01/28/20
Date Received: 01/03/20
Project: Dawn Food, F&BI 001037
Date Extracted: 01/16/20
Date Analyzed: 01/16/20

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
GP-SB-1 001037-16	<100	97
GP-SB-2 001037-18	800	108
Method Blank 00-034 MB	<100	100

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	GP-SB-7-Filter	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/16/20	Lab ID:	001037-29
Date Analyzed:	01/16/20	Data File:	001037-29.039
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	31.8 J
Cadmium	<1 J
Copper	<5
Lead	<1 J
Mercury	<1 J
Nickel	12.4
Zinc	9,790 ve

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	GP-SB-7-Filter	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/16/20	Lab ID:	001037-29 x10
Date Analyzed:	01/20/20	Data File:	001037-29 x10.061
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	29.7
Cadmium	<10
Copper	<50
Lead	<10
Mercury	<10
Nickel	22.7

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	GP-SB-7-Filter	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/16/20	Lab ID:	001037-29 x100
Date Analyzed:	01/17/20	Data File:	001037-29 x100.123
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Zinc	22,300

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/16/20	Lab ID:	I0-031 mb2
Date Analyzed:	01/16/20	Data File:	I0-031 mb2.038
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Cadmium	<1
Copper	<5
Lead	<1
Mercury	<1
Nickel	<1
Zinc	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	GP-SB-5-12	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/16/20	Lab ID:	001037-01
Date Analyzed:	01/16/20	Data File:	001037-01.109
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.48
Cadmium	<1
Copper	19.1
Lead	3.09
Mercury	<1
Nickel	9.08
Zinc	24.9

Analysis For Total Metals By EPA Method 6020B

Client ID:	GP-SB-5-7	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/16/20	Lab ID:	001037-04
Date Analyzed:	01/16/20	Data File:	001037-04.110
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	5.09
Cadmium	<1
Copper	213
Lead	222
Mercury	2.00
Nickel	6.84
Zinc	180

Analysis For Total Metals By EPA Method 6020B

Client ID:	GP-SB-6-4	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/16/20	Lab ID:	001037-05
Date Analyzed:	01/16/20	Data File:	001037-05.111
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.98
Cadmium	<1
Copper	26.9
Lead	25.0
Mercury	<1
Nickel	10.6
Zinc	78.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	GP-SB-6-10	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/16/20	Lab ID:	001037-08
Date Analyzed:	01/16/20	Data File:	001037-08.112
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.37
Cadmium	<1
Copper	12.7
Lead	2.17
Mercury	<1
Nickel	5.32
Zinc	26.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/16/20	Lab ID:	I0-032 mb2
Date Analyzed:	01/16/20	Data File:	I0-032 mb2.053
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Cadmium	<1
Copper	<5
Lead	<1
Mercury	<1
Nickel	<1
Zinc	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	GP-SB-7	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/16/20	Lab ID:	001037-28
Date Analyzed:	01/16/20	Data File:	001037-28.069
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	34.5 J
Cadmium	<1 J
Copper	<5 ca
Lead	<1 J
Mercury	<1 J
Nickel	11.9 ca
Zinc	8,840 ve ca

Analysis For Total Metals By EPA Method 6020B

Client ID:	GP-SB-7	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/16/20	Lab ID:	001037-28 x10
Date Analyzed:	01/16/20	Data File:	001037-28 x10.116
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	37.9
Cadmium	<10
Copper	<50
Lead	<10
Mercury	<10
Nickel	24.0

Analysis For Total Metals By EPA Method 6020B

Client ID:	GP-SB-7	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/16/20	Lab ID:	001037-28 x100
Date Analyzed:	01/17/20	Data File:	001037-28 x100.045
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Zinc	22,800

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/16/20	Lab ID:	I0-033 mb
Date Analyzed:	01/16/20	Data File:	I0-033 mb.040
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Cadmium	<1
Copper	<5
Lead	<1
Mercury	<1
Nickel	<1
Zinc	<10

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	GP-SB-6	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/16/20	Lab ID:	001037-26 1/2
Date Analyzed:	01/16/20	Data File:	011628.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	26	15	99
Phenol-d6	17	11	65
Nitrobenzene-d5	43 ip	50	150
2-Fluorobiphenyl	42 ip	50	150
2,4,6-Tribromophenol	42	34	132
Terphenyl-d14	41 ip	45	138

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Phenol	<4	2,6-Dinitrotoluene	<2
Bis(2-chloroethyl) ether	<0.4	3-Nitroaniline	<40
2-Chlorophenol	<4 jl	Acenaphthene	<0.04
1,3-Dichlorobenzene	<0.4	2,4-Dinitrophenol	<12 ca jl
1,4-Dichlorobenzene	<0.4	Dibenzofuran	<0.4
1,2-Dichlorobenzene	<0.4	2,4-Dinitrotoluene	<2
Benzyl alcohol	<4	4-Nitrophenol	<12
2,2'-Oxybis(1-chloropropane)	<0.4	Diethyl phthalate	<4
2-Methylphenol	<4	Fluorene	<0.04
Hexachloroethane	<0.4	4-Chlorophenyl phenyl ether	<0.4
N-Nitroso-di-n-propylamine	<0.4	N-Nitrosodiphenylamine	<0.4
3-Methylphenol + 4-Methylphenol	<8 jl	4-Nitroaniline	<40
Nitrobenzene	<0.4	4,6-Dinitro-2-methylphenol	<12 ca jl
Isophorone	<0.4	4-Bromophenyl phenyl ether	<0.4
2-Nitrophenol	<4	Hexachlorobenzene	<0.4
2,4-Dimethylphenol	<4	Pentachlorophenol	<2 jl
Benzoic acid	<20 jl	Phenanthrene	<0.04
Bis(2-chloroethoxy)methane	<0.4	Anthracene	<0.04
2,4-Dichlorophenol	<4 jl	Carbazole	<0.4
1,2,4-Trichlorobenzene	<0.4	Di-n-butyl phthalate	<4
Naphthalene	<0.4	Fluoranthene	<0.04
Hexachlorobutadiene	<0.4	Pyrene	<0.04
4-Chloroaniline	<40	Benzyl butyl phthalate	<4
4-Chloro-3-methylphenol	<4	Benz(a)anthracene	<0.04
2-Methylnaphthalene	<0.4	Chrysene	<0.04
1-Methylnaphthalene	<0.4	Bis(2-ethylhexyl) phthalate	<6.4
Hexachlorocyclopentadiene	<1.2	Di-n-octyl phthalate	<4
2,4,6-Trichlorophenol	<4 jl	Benzo(a)pyrene	<0.04
2,4,5-Trichlorophenol	<4 jl	Benzo(b)fluoranthene	<0.04
2-Chloronaphthalene	<0.4	Benzo(k)fluoranthene	<0.04
2-Nitroaniline	<2	Indeno(1,2,3-cd)pyrene	<0.04
Dimethyl phthalate	<4	Dibenz(a,h)anthracene	<0.04
Acenaphthylene	<0.04	Benzo(g,h,i)perylene	<0.08

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/16/20	Lab ID:	00-161 mb
Date Analyzed:	01/16/20	Data File:	011627.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	24	15	99
Phenol-d6	15	11	65
Nitrobenzene-d5	94	50	150
2-Fluorobiphenyl	87	50	150
2,4,6-Tribromophenol	67	34	132
Terphenyl-d14	102	45	138

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Phenol	<2	2,6-Dinitrotoluene	<1
Bis(2-chloroethyl) ether	<0.2	3-Nitroaniline	<20
2-Chlorophenol	<2 jl	Acenaphthene	<0.02
1,3-Dichlorobenzene	<0.2	2,4-Dinitrophenol	<6 ca jl
1,4-Dichlorobenzene	<0.2	Dibenzofuran	<0.2
1,2-Dichlorobenzene	<0.2	2,4-Dinitrotoluene	<1
Benzyl alcohol	<2	4-Nitrophenol	<6
2,2'-Oxybis(1-chloropropane)	<0.2	Diethyl phthalate	<2
2-Methylphenol	<2	Fluorene	<0.02
Hexachloroethane	<0.2	4-Chlorophenyl phenyl ether	<0.2
N-Nitroso-di-n-propylamine	<0.2	N-Nitrosodiphenylamine	<0.2
3-Methylphenol + 4-Methylphenol	<4 jl	4-Nitroaniline	<20
Nitrobenzene	<0.2	4,6-Dinitro-2-methylphenol	<6 ca jl
Isophorone	<0.2	4-Bromophenyl phenyl ether	<0.2
2-Nitrophenol	<2	Hexachlorobenzene	<0.2
2,4-Dimethylphenol	<2	Pentachlorophenol	<1 jl
Benzoic acid	<10 jl	Phenanthrene	<0.02
Bis(2-chloroethoxy)methane	<0.2	Anthracene	<0.02
2,4-Dichlorophenol	<2 jl	Carbazole	<0.2
1,2,4-Trichlorobenzene	<0.2	Di-n-butyl phthalate	<2
Naphthalene	<0.2	Fluoranthene	<0.02
Hexachlorobutadiene	<0.2	Pyrene	<0.02
4-Chloroaniline	<20	Benzyl butyl phthalate	<2
4-Chloro-3-methylphenol	<2	Benz(a)anthracene	<0.02
2-Methylnaphthalene	<0.2	Chrysene	<0.02
1-Methylnaphthalene	<0.2	Bis(2-ethylhexyl) phthalate	<3.2
Hexachlorocyclopentadiene	<0.6	Di-n-octyl phthalate	<2
2,4,6-Trichlorophenol	<2 jl	Benzo(a)pyrene	<0.02
2,4,5-Trichlorophenol	<2 jl	Benzo(b)fluoranthene	<0.02
2-Chloronaphthalene	<0.2	Benzo(k)fluoranthene	<0.02
2-Nitroaniline	<1	Indeno(1,2,3-cd)pyrene	<0.02
Dimethyl phthalate	<2	Dibenz(a,h)anthracene	<0.02
Acenaphthylene	<0.02	Benzo(g,h,i)perylene	<0.04

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	GP-SB-1	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-16
Date Analyzed:	01/08/20	Data File:	010846.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	50	150
Toluene-d8	96	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	44	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<1	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	1.1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	16	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10 ca	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	GP-SB-2	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-18
Date Analyzed:	01/08/20	Data File:	010847.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	89	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	84	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	4.1	o-Xylene	<1
Methylene chloride	5.3 lc ca	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	7.3	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	540 ve	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10 ca	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	5.4
Benzene	<0.35	sec-Butylbenzene	2.4
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	GP-SB-2	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-18 1/10
Date Analyzed:	01/11/20	Data File:	011041.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	57	121
Toluene-d8	87	63	127
4-Bromofluorobenzene	98	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<10	1,3-Dichloropropane	<10
Chloromethane	<100	Tetrachloroethene	<10
Vinyl chloride	72	Dibromochloromethane	<10
Bromomethane	<10	1,2-Dibromoethane (EDB)	<10
Chloroethane	<10	Chlorobenzene	<10
Trichlorofluoromethane	<10	Ethylbenzene	<10
Acetone	<500	1,1,1,2-Tetrachloroethane	<10
1,1-Dichloroethene	<10	m,p-Xylene	<20
Hexane	<10	o-Xylene	<10
Methylene chloride	<50	Styrene	<10
Methyl t-butyl ether (MTBE)	<10	Isopropylbenzene	<10
trans-1,2-Dichloroethene	<10	Bromoform	<10
1,1-Dichloroethane	<10	n-Propylbenzene	<10
2,2-Dichloropropane	<10	Bromobenzene	<10
cis-1,2-Dichloroethene	400	1,3,5-Trimethylbenzene	<10
Chloroform	<10	1,1,2,2-Tetrachloroethane	<10
2-Butanone (MEK)	<100	1,2,3-Trichloropropane	<10
1,2-Dichloroethane (EDC)	<10	2-Chlorotoluene	<10
1,1,1-Trichloroethane	<10	4-Chlorotoluene	<10
1,1-Dichloropropene	<10	tert-Butylbenzene	<10
Carbon tetrachloride	<10	1,2,4-Trimethylbenzene	<10
Benzene	<3.5	sec-Butylbenzene	<10
Trichloroethene	<10	p-Isopropyltoluene	<10
1,2-Dichloropropane	<10	1,3-Dichlorobenzene	<10
Bromodichloromethane	<10	1,4-Dichlorobenzene	<10
Dibromomethane	<10	1,2-Dichlorobenzene	<10
4-Methyl-2-pentanone	<100	1,2-Dibromo-3-chloropropane	<100
cis-1,3-Dichloropropene	<10	1,2,4-Trichlorobenzene	<10
Toluene	<10	Hexachlorobutadiene	<10
trans-1,3-Dichloropropene	<10	Naphthalene	<10
1,1,2-Trichloroethane	<10	1,2,3-Trichlorobenzene	<10
2-Hexanone	<100		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	GP-SB-3	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-20
Date Analyzed:	01/08/20	Data File:	010840.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	101	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	0.31	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<1	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10 ca	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	GP-SB-5	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-24
Date Analyzed:	01/08/20	Data File:	010841.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<1	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10 ca	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	GP-SB-6	Client:	Crete Consulting
Date Received:	01/03/20	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	001037-26
Date Analyzed:	01/08/20	Data File:	010842.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	97	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<1	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10 ca	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn Food, F&BI 001037
Date Extracted:	01/07/20	Lab ID:	00-026 mb
Date Analyzed:	01/08/20	Data File:	010835.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<1	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10 ca	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Date of Report: 01/28/20
Date Received: 01/03/20
Project: Dawn Food, F&BI 001037

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 001196-06 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	110	160	34 a

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	99	69-134

Date of Report: 01/28/20
Date Received: 01/03/20
Project: Dawn Food, F&BI 001037

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 6020B

Laboratory Code: 001113-04 x10 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	18.4	75	90	75-125	18
Cadmium	ug/L (ppb)	5	<10	98	99	75-125	1
Copper	ug/L (ppb)	20	<50	84	90	75-125	7
Lead	ug/L (ppb)	10	23.5	98	116	75-125	17
Mercury	ug/L (ppb)	5	<10	87	88	75-125	1
Nickel	ug/L (ppb)	20	12.5	76	76	75-125	0
Zinc	ug/L (ppb)	50	<50	73 vo	74 vo	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	100	80-120
Cadmium	ug/L (ppb)	5	95	80-120
Copper	ug/L (ppb)	20	97	80-120
Lead	ug/L (ppb)	10	95	80-120
Mercury	ug/L (ppb)	5	94	80-120
Nickel	ug/L (ppb)	20	98	80-120
Zinc	ug/L (ppb)	50	98	80-120

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Project: Dawn Food, F&BI 001037

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

Laboratory Code: 001179-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	1.94	81	83	75-125	2
Cadmium	mg/kg (ppm)	10	<1	90	94	75-125	4
Copper	mg/kg (ppm)	50	9.37	80	85	75-125	6
Lead	mg/kg (ppm)	50	10.4	93	99	75-125	6
Mercury	mg/kg (ppm	5	<1	88	87	75-125	1
Nickel	mg/kg (ppm)	25	6.74	84	92	75-125	9
Zinc	mg/kg (ppm)	50	16.0	86	94	75-125	9

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	86	80-120
Cadmium	mg/kg (ppm)	10	97	80-120
Copper	mg/kg (ppm)	50	97	80-120
Lead	mg/kg (ppm)	50	99	80-120
Mercury	mg/kg (ppm)	5	89	80-120
Nickel	mg/kg (ppm)	25	102	80-120
Zinc	mg/kg (ppm)	50	104	80-120

Date of Report: 01/28/20
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Project: Dawn Food, F&BI 001037

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

Laboratory Code: 001037-28 x10 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	37.9	108	118	75-125	9
Cadmium	ug/L (ppb)	5	<10	93	92	75-125	1
Copper	ug/L (ppb)	20	111	85	79	75-125	7
Lead	ug/L (ppb)	10	<10	82	80	75-125	2
Mercury	ug/L (ppb)	5	<10	88	88	75-125	0
Nickel	ug/L (ppb)	20	24.0	134 b	84 b	75-125	46 b
Zinc	ug/L (ppb)	50	19,700	1,690 b	1,590 b	75-125	6 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	95	80-120
Cadmium	ug/L (ppb)	5	95	80-120
Copper	ug/L (ppb)	20	96	80-120
Lead	ug/L (ppb)	10	89	80-120
Mercury	ug/L (ppb)	5	92	80-120
Nickel	ug/L (ppb)	20	97	80-120
Zinc	ug/L (ppb)	50	83	80-120

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Project: Dawn Food, F&BI 001037

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

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Phenol	ug/L (ppb)	5	20	17	10-86	16
Bis(2-chloroethyl) ether	ug/L (ppb)	5	106	92	65-121	14
2-Chlorophenol	ug/L (ppb)	5	57 vo	59	58-123	3
1,3-Dichlorobenzene	ug/L (ppb)	5	80	81	66-113	1
1,4-Dichlorobenzene	ug/L (ppb)	5	80	81	62-114	1
1,2-Dichlorobenzene	ug/L (ppb)	5	82	82	63-115	0
Benzyl alcohol	ug/L (ppb)	5	64	52	37-125	21 vo
2,2'-Oxybis(1-chloropropane)	ug/L (ppb)	5	105	93	70-130	12
2-Methylphenol	ug/L (ppb)	5	59	50	38-119	17
Hexachloroethane	ug/L (ppb)	5	80	83	64-117	4
N-Nitroso-di-n-propylamine	ug/L (ppb)	5	115	98	70-130	16
3-Methylphenol + 4-Methylphenol	ug/L (ppb)	5	49	41 vo	44-110	18
Nitrobenzene	ug/L (ppb)	5	103	91	70-130	12
Isophorone	ug/L (ppb)	5	115	98	70-130	16
2-Nitrophenol	ug/L (ppb)	5	64	75	61-141	16
2,4-Dimethylphenol	ug/L (ppb)	5	96	79	12-127	19
Benzoic acid	ug/L (ppb)	32.5	5 vo	10	10-102	67 vo
Bis(2-chloroethoxy)methane	ug/L (ppb)	5	109	94	70-130	15
2,4-Dichlorophenol	ug/L (ppb)	5	68 vo	72	70-130	6
1,2,4-Trichlorobenzene	ug/L (ppb)	5	83	84	70-130	1
Naphthalene	ug/L (ppb)	5	89	85	65-111	5
Hexachlorobutadiene	ug/L (ppb)	5	78	81	65-115	4
4-Chloroaniline	ug/L (ppb)	10	104	81	24-146	25 vo
4-Chloro-3-methylphenol	ug/L (ppb)	5	85	74	58-133	14
2-Methylnaphthalene	ug/L (ppb)	5	94	89	70-130	5
1-Methylnaphthalene	ug/L (ppb)	5	93	87	70-130	7
Hexachlorocyclopentadiene	ug/L (ppb)	5	69	81	36-112	16
2,4,6-Trichlorophenol	ug/L (ppb)	5	39 vo	64 vo	70-130	49 vo
2,4,5-Trichlorophenol	ug/L (ppb)	5	57 vo	71	70-130	22 vo
2-Chloronaphthalene	ug/L (ppb)	5	96	91	70-130	5
2-Nitroaniline	ug/L (ppb)	5	107	94	64-143	13
Dimethyl phthalate	ug/L (ppb)	5	108	95	64-140	13
Acenaphthylene	ug/L (ppb)	5	111	100	70-130	10
2,6-Dinitrotoluene	ug/L (ppb)	5	110	100	70-130	10
3-Nitroaniline	ug/L (ppb)	10	106	90	53-134	16
Acenaphthene	ug/L (ppb)	5	99	91	65-122	8
2,4-Dinitrophenol	ug/L (ppb)	5	29 vo	58	58-139	67 vo
Dibenzofuran	ug/L (ppb)	5	104	96	70-130	8
2,4-Dinitrotoluene	ug/L (ppb)	5	105	96	70-130	9
4-Nitrophenol	ug/L (ppb)	5	16	22	10-89	32 vo
Diethyl phthalate	ug/L (ppb)	5	113	102	56-141	10
Fluorene	ug/L (ppb)	5	107	98	70-130	9
4-Chlorophenyl phenyl ether	ug/L (ppb)	5	102	93	70-130	9
N-Nitrosodiphenylamine	ug/L (ppb)	5	106	95	70-130	11
4-Nitroaniline	ug/L (ppb)	10	108	94	66-134	14
4,6-Dinitro-2-methylphenol	ug/L (ppb)	5	26 vo	60 vo	69-138	79 vo
4-Bromophenyl phenyl ether	ug/L (ppb)	5	106	95	70-130	11
Hexachlorobenzene	ug/L (ppb)	5	103	93	70-130	10
Pentachlorophenol	ug/L (ppb)	5	27 vo	64 vo	70-130	81 vo
Phenanthrene	ug/L (ppb)	5	108	95	70-130	13
Anthracene	ug/L (ppb)	5	108	99	70-130	9
Carbazole	ug/L (ppb)	5	125	112	70-130	11
Di-n-butyl phthalate	ug/L (ppb)	5	114	104	70-130	9
Fluoranthene	ug/L (ppb)	5	117	105	70-130	11
Pyrene	ug/L (ppb)	5	113	100	70-130	12
Benzyl butyl phthalate	ug/L (ppb)	5	116	104	70-130	11
Benz(a)anthracene	ug/L (ppb)	5	113	99	70-130	13
Chrysene	ug/L (ppb)	5	110	97	70-130	13
Bis(2-ethylhexyl) phthalate	ug/L (ppb)	5	108	97	63-139	11
Di-n-octyl phthalate	ug/L (ppb)	5	100	90	67-147	11
Benzo(a)pyrene	ug/L (ppb)	5	110	96	70-130	14
Benzo(b)fluoranthene	ug/L (ppb)	5	101	90	70-130	12
Benzo(k)fluoranthene	ug/L (ppb)	5	100	87	70-130	14
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	5	105	90	57-141	15
Dibenz(a,h)anthracene	ug/L (ppb)	5	96	84	57-137	13
Benzo(g,h,i)perylene	ug/L (ppb)	5	97	84	50-143	14

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Project: Dawn Food, F&BI 001037

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 001056-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Dichlorodifluoromethane	ug/L (ppb)	50	<1	76	55-137
Chloromethane	ug/L (ppb)	50	<10	77	57-129
Vinyl chloride	ug/L (ppb)	50	<0.2	91	61-139
Bromomethane	ug/L (ppb)	50	<1	79	20-265
Chloroethane	ug/L (ppb)	50	<1	78	55-149
Trichlorofluoromethane	ug/L (ppb)	50	<1	90	65-137
Acetone	ug/L (ppb)	250	<50	84	48-149
1,1-Dichloroethene	ug/L (ppb)	50	<1	87	71-123
Hexane	ug/L (ppb)	50	<1	95	44-139
Methylene chloride	ug/L (ppb)	50	<5	106	61-126
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	103	68-125
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	97	72-122
1,1-Dichloroethane	ug/L (ppb)	50	<1	98	79-113
2,2-Dichloropropane	ug/L (ppb)	50	<1	102	48-157
cis-1,2-Dichloroethene	ug/L (ppb)	50	<1	99	63-126
Chloroform	ug/L (ppb)	50	<1	99	77-117
2-Butanone (MEK)	ug/L (ppb)	250	<10	74	70-135
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	103	70-119
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	103	75-121
1,1-Dichloropropene	ug/L (ppb)	50	<1	98	67-121
Carbon tetrachloride	ug/L (ppb)	50	<1	107	70-132
Benzene	ug/L (ppb)	50	<0.35	97	75-114
Trichloroethene	ug/L (ppb)	50	2.4	100	73-122
1,2-Dichloropropane	ug/L (ppb)	50	<1	99	80-111
Bromodichloromethane	ug/L (ppb)	50	<1	108	78-117
Dibromomethane	ug/L (ppb)	50	<1	94	73-125
4-Methyl-2-pentanone	ug/L (ppb)	250	<10	104	79-140
cis-1,3-Dichloropropene	ug/L (ppb)	50	<1	114	76-120
Toluene	ug/L (ppb)	50	<1	103	73-117
trans-1,3-Dichloropropene	ug/L (ppb)	50	<1	98	75-122
1,1,2-Trichloroethane	ug/L (ppb)	50	<1	110	81-116
2-Hexanone	ug/L (ppb)	250	<10	104	74-127
1,3-Dichloropropane	ug/L (ppb)	50	<1	108	80-113
Tetrachloroethene	ug/L (ppb)	50	<1	96	40-155
Dibromochloromethane	ug/L (ppb)	50	<1	99	69-129
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	<1	97	79-120
Chlorobenzene	ug/L (ppb)	50	<1	99	75-115
Ethylbenzene	ug/L (ppb)	50	<1	101	66-124
1,1,1,2-Tetrachloroethane	ug/L (ppb)	50	<1	112	76-130
m,p-Xylene	ug/L (ppb)	100	<2	101	63-128
o-Xylene	ug/L (ppb)	50	<1	105	64-129
Styrene	ug/L (ppb)	50	<1	106	56-142
Isopropylbenzene	ug/L (ppb)	50	<1	100	74-122
Bromoform	ug/L (ppb)	50	<1	111	49-138
n-Propylbenzene	ug/L (ppb)	50	<1	105	65-129
Bromobenzene	ug/L (ppb)	50	<1	103	70-121
1,3,5-Trimethylbenzene	ug/L (ppb)	50	<1	109	60-138
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	<1	114	77-120
1,2,3-Trichloropropane	ug/L (ppb)	50	<1	102	62-125
2-Chlorotoluene	ug/L (ppb)	50	<1	104	40-159
4-Chlorotoluene	ug/L (ppb)	50	<1	105	76-122
tert-Butylbenzene	ug/L (ppb)	50	<1	107	74-125
1,2,4-Trimethylbenzene	ug/L (ppb)	50	<1	105	59-136
sec-Butylbenzene	ug/L (ppb)	50	<1	109	69-127
p-Isopropyltoluene	ug/L (ppb)	50	<1	107	64-132
1,3-Dichlorobenzene	ug/L (ppb)	50	<1	99	77-113
1,4-Dichlorobenzene	ug/L (ppb)	50	<1	84	75-110
1,2-Dichlorobenzene	ug/L (ppb)	50	<1	99	70-120
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	<10	119	69-129
1,2,4-Trichlorobenzene	ug/L (ppb)	50	<1	107	66-123
Hexachlorobutadiene	ug/L (ppb)	50	<1	93	53-136
Naphthalene	ug/L (ppb)	50	<1	109	60-145
1,2,3-Trichlorobenzene	ug/L (ppb)	50	<1	112	59-130

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Project: Dawn Food, F&BI 001037

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	ug/L (ppb)	50	105	117	50-157	11
Chloromethane	ug/L (ppb)	50	98	101	62-130	3
Vinyl chloride	ug/L (ppb)	50	112	117	70-128	4
Bromomethane	ug/L (ppb)	50	91	93	60-143	2
Chloroethane	ug/L (ppb)	50	93	95	66-149	2
Trichlorofluoromethane	ug/L (ppb)	50	103	111	65-138	7
Acetone	ug/L (ppb)	250	84	118	44-145	34 vo
1,1-Dichloroethene	ug/L (ppb)	50	102	111	72-121	8
Hexane	ug/L (ppb)	50	96	94	51-153	2
Methylene chloride	ug/L (ppb)	50	127	119	63-132	7
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	111	108	70-122	3
trans-1,2-Dichloroethene	ug/L (ppb)	50	110	106	76-118	4
1,1-Dichloroethane	ug/L (ppb)	50	111	108	77-119	3
2,2-Dichloropropane	ug/L (ppb)	50	108	104	62-141	4
cis-1,2-Dichloroethene	ug/L (ppb)	50	111	107	76-119	4
Chloroform	ug/L (ppb)	50	110	107	78-117	3
2-Butanone (MEK)	ug/L (ppb)	250	67	74	48-150	10
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	106	107	75-116	1
1,1,1-Trichloroethane	ug/L (ppb)	50	114	107	80-116	6
1,1-Dichloropropene	ug/L (ppb)	50	103	101	78-119	2
Carbon tetrachloride	ug/L (ppb)	50	116	113	72-128	3
Benzene	ug/L (ppb)	50	101	99	75-116	2
Trichloroethene	ug/L (ppb)	50	100	103	72-119	3
1,2-Dichloropropane	ug/L (ppb)	50	92	99	79-121	7
Bromodichloromethane	ug/L (ppb)	50	104	111	76-120	7
Dibromomethane	ug/L (ppb)	50	92	96	79-121	4
4-Methyl-2-pentanone	ug/L (ppb)	250	102	105	54-153	3
cis-1,3-Dichloropropene	ug/L (ppb)	50	102	109	76-128	7
Toluene	ug/L (ppb)	50	108	102	79-115	6
trans-1,3-Dichloropropene	ug/L (ppb)	50	98	95	76-128	3
1,1,2-Trichloroethane	ug/L (ppb)	50	112	109	78-120	3
2-Hexanone	ug/L (ppb)	250	106	105	49-147	1
1,3-Dichloropropane	ug/L (ppb)	50	109	105	81-111	4
Tetrachloroethene	ug/L (ppb)	50	102	96	78-109	6
Dibromochloromethane	ug/L (ppb)	50	102	104	63-140	2
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	102	103	82-118	1
Chlorobenzene	ug/L (ppb)	50	100	101	80-113	1
Ethylbenzene	ug/L (ppb)	50	105	103	83-111	2
1,1,1,2-Tetrachloroethane	ug/L (ppb)	50	119	117	76-125	2
m,p-Xylene	ug/L (ppb)	100	98	102	81-112	4
o-Xylene	ug/L (ppb)	50	104	108	81-117	4
Styrene	ug/L (ppb)	50	101	105	83-121	4
Isopropylbenzene	ug/L (ppb)	50	106	109	78-118	3
Bromoform	ug/L (ppb)	50	108	113	40-161	5
n-Propylbenzene	ug/L (ppb)	50	99	102	81-115	3
Bromobenzene	ug/L (ppb)	50	96	100	80-113	4
1,3,5-Trimethylbenzene	ug/L (ppb)	50	105	106	83-117	1
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	105	111	79-118	6
1,2,3-Trichloropropane	ug/L (ppb)	50	94	101	74-116	7
2-Chlorotoluene	ug/L (ppb)	50	100	102	79-112	2
4-Chlorotoluene	ug/L (ppb)	50	99	102	80-116	3
tert-Butylbenzene	ug/L (ppb)	50	109	109	81-119	0
1,2,4-Trimethylbenzene	ug/L (ppb)	50	108	107	81-121	1
sec-Butylbenzene	ug/L (ppb)	50	113	111	83-123	2
p-Isopropyltoluene	ug/L (ppb)	50	111	109	81-117	2
1,3-Dichlorobenzene	ug/L (ppb)	50	101	101	80-115	0
1,4-Dichlorobenzene	ug/L (ppb)	50	87	85	77-112	2
1,2-Dichlorobenzene	ug/L (ppb)	50	107	100	79-115	7
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	119	120	62-133	1
1,2,4-Trichlorobenzene	ug/L (ppb)	50	113	103	75-119	9
Hexachlorobutadiene	ug/L (ppb)	50	95	88	70-116	8
Naphthalene	ug/L (ppb)	50	115	109	72-131	5
1,2,3-Trichlorobenzene	ug/L (ppb)	50	118	109	74-122	8

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

001037

SAMPLE CHAIN OF CUSTODY

ME 01-04-20 VS2/AIG/4AV4/VW1

Report To Ms. Jamie Stevens
Company Crete Consulting
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SAMPLERS (*signature*) Pl VB

PROJECT NAME	PO #
Dawn Foods	

REMARKS	INVOICE TO
Project specific RLs? - Yes / No	Crete

Page # ____ of ____

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

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
GP-SB-5-12	01A-E	1.2.20	12:20	SOIL	5												ARCHIVE
GP-SB-1-9	02		8:57														
GP-SB-4-4	03		11:20														
GP-SB-5-7	04		12:15														
GP-SB-6-4	05		12:56														
GP-SB-4-8	06		11:35														
GP-SB-2-4	07		9:25														
GP-SB-6-10	08		13:15														
GP-SB-7-8	09		14:20														
GP-SB-7-4	10		14:10														

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

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Pl VB	Paul V. Bianco	Crete	1.3.20	13:43
Received by:	VINH	FBI	1/3/20	13:43
Relinquished by:				
Received by:		Samples received at 2 °C		

001037

SAMPLE CHAIN OF CUSTODY ME 01-04-20

VS2/AI6/A24/UW4

Page # 2 of 4

Report To Ms. Jamie Stevens
Company Crete Consulting
Address 108 S. Washington St., Suite 300
City, State, ZIP Seattle, WA 98104
Phone 206.799.2744 Email jamie.stevens@cretecorsulting.com

SAMPLERS (signature) P V B

PROJECT NAME	PO #
Dawn Foods	

REMARKS	INVOICE TO
Project specific RLs? - Yes / No	Crete

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	METALS As Cd Cu Hg Ni Pb Zn				Ⓨ-pr SS 1/6/20 mi Notes
GP-SB-1-4	11 A-E	1.2.20	8:44	SOIL	5												ARCHIVE
DRUM-1-0120	12	1.2.20	14:45	SOIL	5	Ⓧ	Ⓧ			Ⓧ	Ⓨ		Ⓨ				~~ARCHIVE~~
GP-SB-3-12	13	1.2.20	10:30	SOIL	5												ARCHIVE
GP-SB-2-12	14	1.2.20	9:40	SOIL	5												ARCHIVE
GP-SB-3-4	15	1.2.20	10:20	SOIL	5												ARCHIVE
GP-SB-1	16	1.2.20	8:55	WATER	5					X							cVOCs only
GP-SB-1-FILTER	17	1.2.20	8:55	WATER	1												ARCHIVE
GP-SB-2	18 A-E	1.2.20	9:45	WATER	5					X							cVOCs only
GP-SB-2 FILTER	19	1.2.20	9:45	WATER	1												ARCHIVE
GP-SB-3	20 A-E	1.2.20	10:25	WATER	5					X			X				

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Received by:	VINH	FBI	1/3/20	13:43
Relinquished by:				
Received by:		Samples received at 2 °C		

001037

SAMPLE CHAIN OF CUSTODY

ME 01-04-20 VS2/AI6/AV4/VW4

Page # 3 of 4

Report To Ms. Jamie Stevens
Company Crete Consulting
Address 108 S. Washington St., Suite 300
City, State, ZIP Seattle, WA 98104
Phone 206-799-2744 Email jamie.stevens@creteconsulting.com

SAMPLERS (*signature*)

PROJECT NAME Dawn Foods

PO #

REMARKS

INVOICE TO Crete

Project specific RLs? - Yes / No

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	METALS, As Cd Cu Hg Ni Pb Zn				Notes
GP-SB-3-FILTER	21	1.2.20	10:25	WATER	1								X				DISSOLVED METALS
GP-SB-4	22A-E		11:35		5												ARCHIVE
GP-SB-4-FILTER	23		11:35		1												ARCHIVE
GP-SB-5	24A-E		12:15		5					X			X				
GP-SB-5-FILTER	25		12:15		1								X				DISSOLVED METALS
GP-SB-6	26A-E		13:15		5					X			X				
GP-SB-6-FILTER	27		13:15		1								X				DISSOLVED METALS
GP-SB-7	28A-E		14:25		5												ARCHIVE
GP-SB-7-FILTER	29		14:25		1												ARCHIVE
GP-SB-99	30AE		14:45		5												ARCHWE

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Received by:		VINH	FBI	1/3/20	1343
Relinquished by:					
Received by:			Samples received at 2 °C		

001037

SAMPLE CHAIN OF CUSTODY ME 01-04-20

VS4/AD6/AO4/VW4

Page # 4 of 4

Report To Ms. Jamie Stevens
Company Crete Consulting
Address 108 S. Washington St. Suite 300
City, State, ZIP Seattle, WA 98104
Phone 206-799-2744 Email ~~consult~~ jamie.stevens@ crete consulting.com

SAMPLERS (*signature*)	
PROJECT NAME Dawn Foods	PO #
REMARKS Project specific RLs? - Yes / No	INVOICE TO Crete

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

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
GP-SB-99-FILTER	31	1.2.20	14:45	WATER	1												ARCHIVE

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SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Paul Bianco	Crete	1.3.20	13:43
Received by:	VINH	FBI	1/3/20	13:43
Relinquished by:				
Received by:		Samples received at 2 °C		

TO: Matt Gladney, Bridge Development Partners

FROM: Grant Hainsworth – CRETE Consulting Inc., PC

PROJECT: Dawn Food Products – Seattle, WA

SUBJECT: Summary of Soil and Groundwater Conditions

DATE: February 5, 2021

This memorandum presents a summary of soil and groundwater conditions at the Dawn Food Products property located at 6901 Fox Avenue South in Seattle, Washington (Property). Soil and groundwater conditions were previously summarized in the Phase II Environmental Site Assessment dated March 6, 2020 (Crete 2020). The Phase II recommended additional site characterization. Additional soil and groundwater data were collected in June 2020 and subslab vapor and indoor air data were also collected in June 2020. Bridge Development Partners, LCC (Bridge) hired TRC Engineering Corporation to perform a third-party review of environmental site conditions and that review was summarized in a memorandum dated October 6, 2020. Based on the dated collected in June and the third-party review input, additional soil and groundwater data were collected in December 2020. This memorandum provides a summary of environmental site conditions based on the data collected at the property through December 2020 and provides a brief discussion of remedial investigation, feasibility study, and cleanup approaches.

The locations of boreholes advanced to collect soil and groundwater samples are identified on Figure 1. Figure 1 also illustrates historical structures and former shoreline and shipway locations for reference. Historical industrial activities and potential sources were described in previous documents and are not repeated herein. Table 1 provides a summary of groundwater analytical results and Tables 2 and 3 provide a summary of soil analytical results. Screening levels were developed based on the relevant exposure pathways at the site, consistent with how screening and cleanup levels would be developed for the property under the State cleanup regulation, the Model Toxics Control Action (MTCA). Specifically, the groundwater screening levels developed were consistent with the "most stringent surface water preliminary cleanup levels" according to Ecology Interim Policy 730: Taking into Account Federal Human Health Surface Water Quality Criteria under MTCA (Ecology January 11, 2021). Where a chemical concentration exceeds a screening level, the result is shaded to highlight the exceedance in the tables.

Extent of Groundwater and Soil Impacts

Figure 2 illustrates the estimated extent of groundwater concentrations that exceed screening levels. These impacts are grouped for discussion into three categories.

GWCC Groundwater Impacts

The light blue shaded area on Figure 2 identifies the estimate extent of groundwater contamination due to chlorinated solvent releases from the upgradient Great Western Chemical (GWCC) site. This area is primarily the result of vinyl chloride that exceeds both the groundwater screening level for vapor intrusion (not shown in Table 1) and for discharge to surface water. The vinyl chloride is the result of anaerobic degradation of chlorinated solvents such as trichlorethene (TCE) and tetrachloroethene (PCE). The presence of cis-1,2-dichloroethene (cis-1,2-DCE) in most of these samples provides support for the biodegradation pathway source. PCE is detected at one location (SB-15), the same location where gasoline exceeds the groundwater screening level. This suggests that a minor release may have occurred on the property.

Gasoline Impacts
As mentioned above, gasoline exceeds the screening level in groundwater at 1 location (SB-15). Additional testing has confirmed that this area is limited in extent.

Metals Impacts
Groundwater samples were analyzed for both total and dissolved metals. Ecology typically accepts that groundwater is evaluated based on dissolved metals results and that the total metals results are biased high due to turbidity in the groundwater samples. As a result, this discussion focusses on the dissolved metals results. Arsenic, copper, nickel, and zinc exceed screening levels at multiple locations on the property (Figure 2). The bulk of these exceedances are concentrated near the waterfront in the vicinity of the former shipways. The isolated exceedances closer to Fox Avenue could be due to reducing groundwater conditions that are caused by the anaerobic degradation of the GWCC impacts.

For the waterfront area, arsenic and copper are often quantified in groundwater due to interference from sea water. The analytical methods used for this analysis were intended to account for some level of interference; however, the specific conductance data (7,000 to 24,000 µS/cm) collected at the four temporary wells along the shoreline indicated that the seawater influence on groundwater was more significant than expected. More sophisticated analysis during the remedial investigation process may be warranted to assess this possibility.

Cadmium, lead, and mercury will continue to be assessed during the remedial investigation process since they were detected at a concentration exceeding the screening level in at least one sample, for either total or dissolved metals.

Soil Impacts
Figure 3 provides an estimate of the extent of soil with contamination exceeding screening levels. These impacts are focused in the waterfront area and are primarily due to arsenic, copper, nickel, and zinc, consistent with groundwater impacts. One soil sample exceeded a screening level for each of cadmium, chromium, mercury, and carcinogenic PAHs. These samples also had a concentration of nickel or zinc that exceeded screening levels except for the sample with chromium (SB-22 along the shoreline).

Investigation and Cleanup Approach

As part of the remedial investigation process, approximately 6 groundwater monitoring wells will likely be required by Ecology, 3 to 4 along the shoreline and 2 to 3 further upland in the area of gasoline and GWCC impacts. A tidal study will be performed for wells within about 100 to 200 feet of the shoreline to determine an appropriate tidal lag for groundwater sampling at the tidally influenced wells. Additional subslab vapor and indoor air samples will likely be required as well.

GWCC Groundwater Impacts
Groundwater impacts exceed screening levels and trigger the need to perform a vapor intrusion assessment under Ecology guidance. Subslab vapor and indoor air samples do not establish a clear link between groundwater impacts and subslab or indoor air quality; this is a common issue when assessing vapor intrusion. As part of the remedial investigation and feasibility study (RI/FS) process with Ecology, the goal will be to further evaluate this pathway. Even if the data indicate that the vapor intrusion pathway is not complete, Ecology may require such a significant amount of monitoring data that it may

more cost-effective to install a vapor mitigation system. As a result, the prior assumption that a subslab vapor depressurizations system may be required to address potential vapor mitigation is still relevant for planning purposes.

Gasoline Impacts

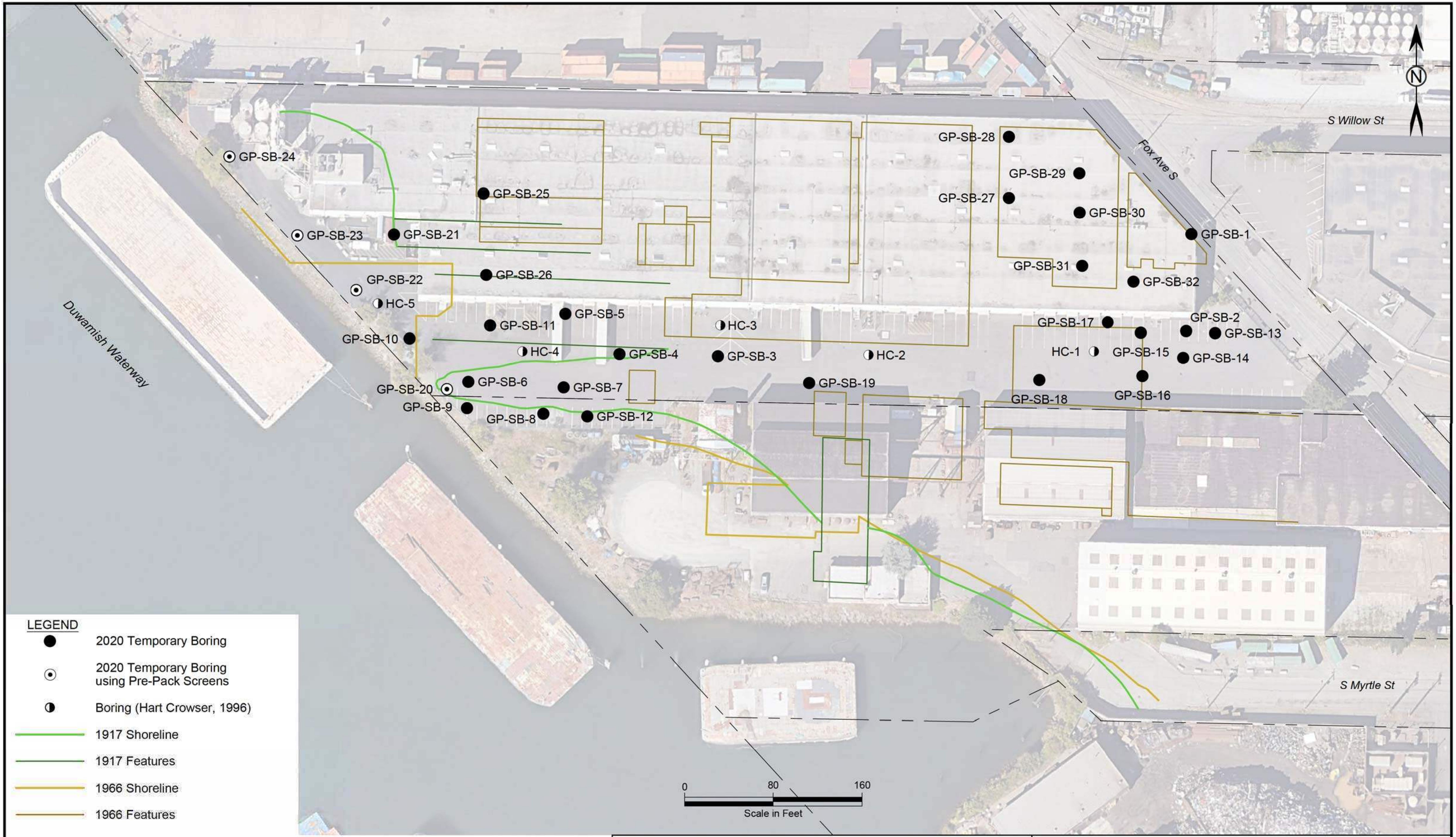
Additional data collection has determined that the gasoline impacted area is limited. This area is within the GWCC impacted groundwater area and it does not represent a risk to vapor intrusion or surface water. As a result, there is no driver for cleanup this area. A monitoring well will likely by placed in the vicinity as part of the remedial investigation and long-term groundwater monitoring program for the property.

Metals Impacts

As mentioned above, it is estimated that 3 to 5 groundwater monitoring wells will be placed in the nearshore area with metals impacts in soil and groundwater. During the remedial investigation process, monitoring approaches will be evaluated that could help reduce or eliminate the need for implementation of a significant cleanup process. These monitoring approaches could include using a more sophisticated analytical method or evaluating attenuation of metals in groundwater between the upland and the mudline, using either empirical sediment pore water sampling or attenuation modelling. During the feasibility study process, more passive cleanup approaches such as injecting amendments to reduce the solubiliization of metals into groundwater will be evaluated using bench-scale testing. For planning purposes, the current assumption of the installation of a bioslurry permeable reactive barrier for about 450 to 500 feet along the shoreline and the Seattle Boiler property line is appropriate. It is currently assumed that the permeable reactive barrier will use a compound such as Enviroblend CS to limit discharge of metals in groundwater to surface water.

Enclosures:

Figures 1 and 2
Tables 1 to 3



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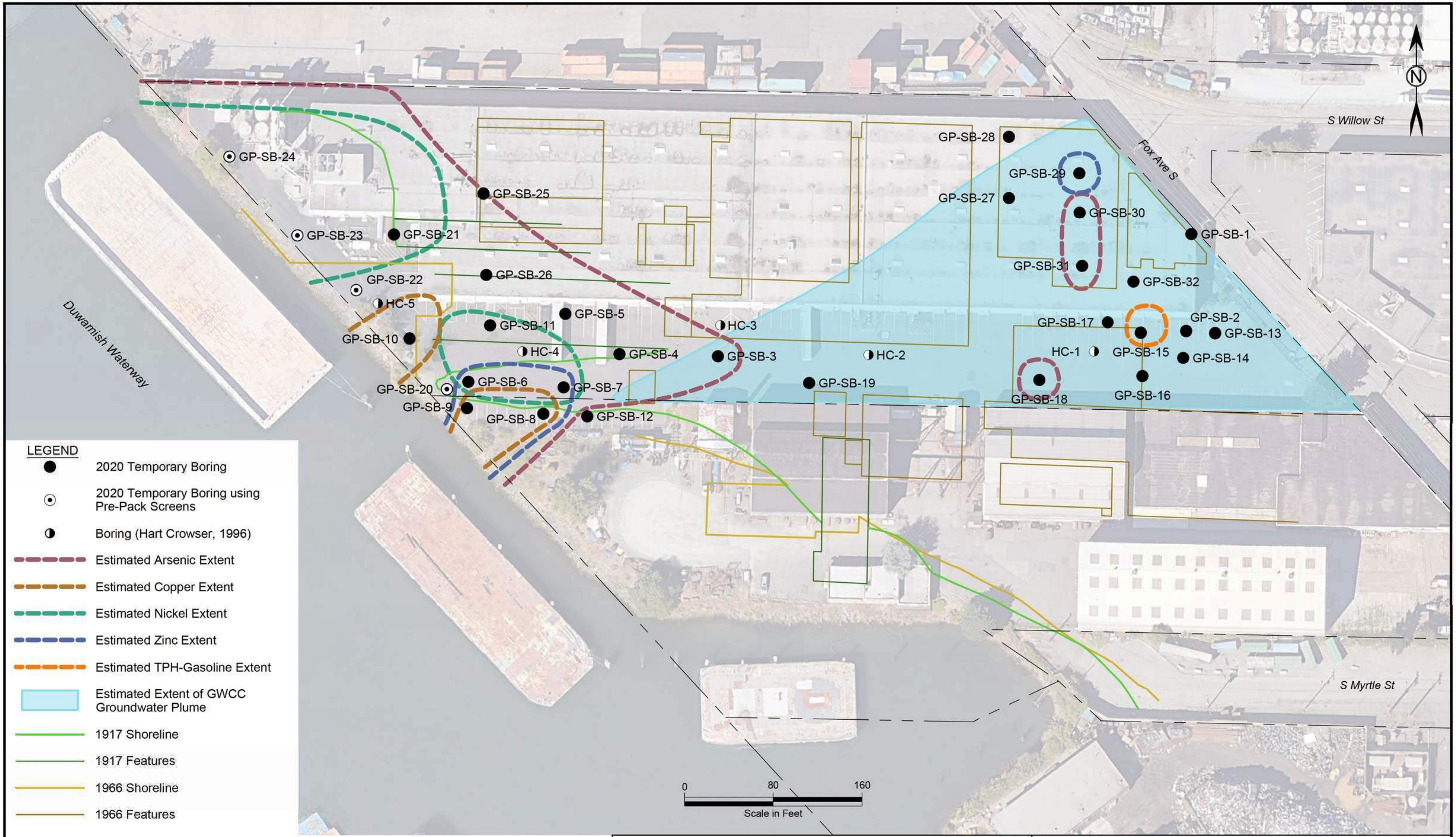
Dawn Food Products
6901 South Fox Avenue, Seattle, Washington
January 2021

Figure 1
Phase 2 ESA
Soil and Groundwater Sample Locations



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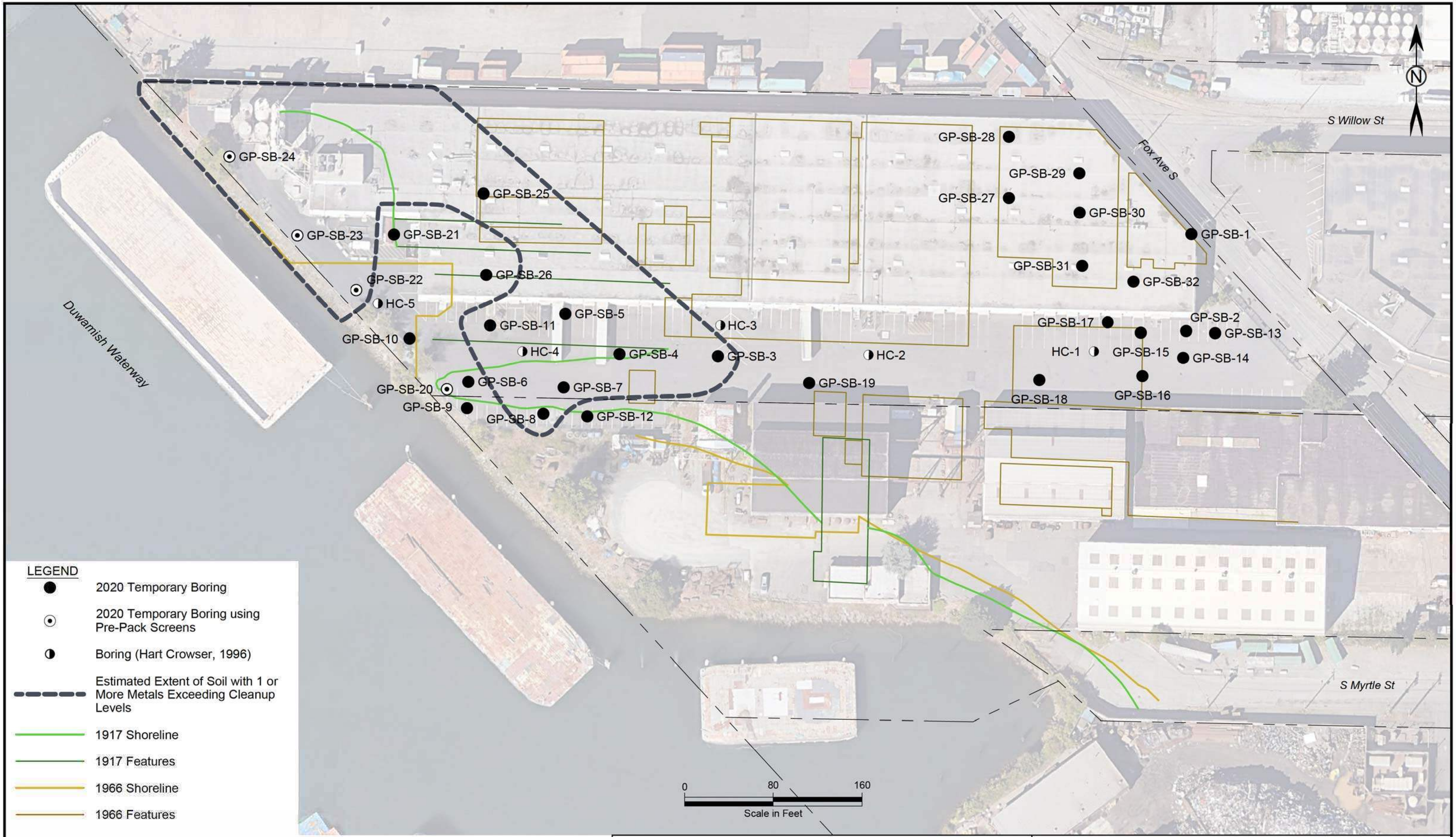
CONSULTING, INC.

Dawn Food Products
6901 South Fox Avenue, Seattle, Washington
January 2021

Figure 2
Estimated Extent of Groundwater Exceeding Screening Levels



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Dawn Food Products
6901 South Fox Avenue, Seattle, Washington
January 2021

Figure 3
Estimated Extent of Soil Exceeding
Screening Levels

Table 1 Groundwater Analytical Data - Direct Push Borehole Groundwater Samples - Detected Compounds Only
Bridge - Dawn Foods

Sample ID	Screening Level	Marine Water Screening	Fresh Water Screening Level	Screening Level Source	GP-SB-1	GP-SB-2	GP-SB-3	GP-SB-5	GP-SB-6	GP-SB-7	GP-SB-08	GP-SB-09	Dup (GP-SB-09	GP-SB-10	GP-SB-11	GP-SB-12	GP-SB-13	GP-SB-14
Date Sampled					1/2/2020	1/2/2020	1/2/2020	1/2/2020	1/2/2020	1/2/2020	6/9/2020	6/9/2020	6/9/2020	6/9/2020	6/9/2020	6/9/2020	6/9/2020	6/9/2020
																Sample results are in ug/L		
																Metals Total/Dissolved		
Aluminum - total	See dissolved			See dissolved	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic - total	See dissolved			See dissolved	NA	NA	**7.22**	**29**	**23**	**37.9**	**14.0**	**10.2**	**10.7**	**48.7**	**3.68**	1 U	NA	NA
Cadmium - total	See dissolved			See dissolved	NA	NA	1 U	**2.87**	10 U	1 U	1 UJ	1 UJ	1 U	1 UJ	1 U	1 U	NA	NA
Chromium - total	See dissolved			See dissolved	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper - total	See dissolved			See dissolved	NA	NA	25 U	**1,460**	**66.1**	5 U	**8.84**	**4.65**	**3.68 J**	**53.5**	**4.01**	2.4 UJ	NA	NA
Lead - total	See dissolved			See dissolved	NA	NA	**24.2**	**632**	10 U	1 U	**12.6**	1 U	1 U	**63.9**	**1.11**	1 U	NA	NA
Mercury - total	See dissolved			See dissolved	NA	NA	1 U	**4.29**	1 U	1 U	0.2 UJ	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U	NA	NA
Nickel - total	See dissolved			See dissolved	NA	NA	5 U	**66**	**42.4**	**24**	**6.11**	**4.24**	**4.74 J**	**18.2**	**10.8**	**2.23 J**	NA	NA
Zinc - total	See dissolved			See dissolved	NA	NA	25 U	**1,070**	**3770**	**22,800**	**562**	**342**	**502**	**104**	**32.2**	**17.9 J**	NA	NA
Aluminum - dissolved	NC	NC	NC	No Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic - dissolved	5	0.14	0.018	MTCA Method A - Natural Background	NA	NA	**6.92**	1 U	**10.6**	**29.7**	**13.1**	**10.2**	**10.7**	**25.2**	**4.61 ca**	1 Uca	NA	NA
Cadmium - dissolved	1	7.9	0.72	Practical Quantitation Limit	NA	NA	1 U	1 U	5 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	NA	NA
Chromium - dissolved	10	50	10	Surface Water Aquatic Life Fresh/Chronic 173-201A WAC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper - dissolved	3.1	3.1	11	Surface Water Aquatic Life Marine/Chronic CWA §306	NA	NA	25 U	25 U	5 U	5 U	**7.00**	**5.58**	**2.97**	**5.29**	**2.73**	2.4 UJ	NA	NA
Lead - dissolved	2.5	8.1	2.5	Surface Water Aquatic Life Fresh/Chronic CWA §304	NA	NA	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA
Mercury - dissolved	0.2	0.025	0.012	Practical Quantitation Limit	NA	NA	1 U	1 U	5 U	1 U	0.2 U	0.2 U	**2 J**	0.2 UJ	0.2 U	0.2 U	NA	NA
Nickel - dissolved	8.2	8.2	52	Surface Water Aquatic Life Marine/Chronic 173-201A WAC	NA	NA	5 U	5 U	**8.71**	**22.7**	**6.35**	**4.88**	**4.14**	**5.74**	**10.9**	**2.37 J**	NA	NA
Zinc - dissolved	81	81	100	Surface Water Aquatic Life Marine/Chronic 173-201A WAC	NA	NA	25 U	25 U	**3,110**	**22,300**	**574**	**378**	**317**	5 U	**18.8**	**16.5 J**	NA	NA
Gasoline Range Organics	1,000	---	---	MTCA Method A	100 U	**800**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**100**	**380**
																Volatile Organic Compounds		
Benzene	0.44	1.6	0.44	Surface Water Human Health Fresh/Chronic 173-201A WAC	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	NC	NC	NC	No Criteria	**16**	**400**	1 U	1 U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA
Ethylbenzene	29	31	29	Surface Water Human Health Fresh/Chronic 173-201A WAC	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	NA	NA	NA	1 U	**3.1**
Phenanthrene	NC	NC	NC	No Criteria	NA	NA	NA	NA	0.04 U	NA	NS	0.02 U	**0.039**	NA	NA	NA	NA	NA
Methyl t-butyl ether	600	NC	NC	Groundwater Vapor Intrusion Method B	**1.1**	10 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA
m, p-Xylene	330	NC	NC	Groundwater Vapor Intrusion Method B	2 U	2 U	2 U	2 U	2 U	NA	2 U	2 U	2 U	NA	NA	NA	1 U	**5.6**
Tetrachloroethene	2.4	2.9	2.4	Surface Water Human Health Fresh/Chronic CWA §304	1 U	10 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA
Toluene	57	130	57	Surface Water Human Health Fresh/Chronic CWA §304	1 U	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	0.1	0.18	0.02	Practical Quantitation Limit	**44**	**72**	**0.31**	0.2 U	0.2 U	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA
Xylenes, Total	330	NC	NC	Groundwater Vapor Intrusion Method B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Bold = detection

Shading denotes an exceedance of a screening level

ug/L - microgram per liter

MTCA - Model Toxics Control Act

NC - No Criterion

NA - Not Analyzed

U = concentration below laboratory detection limit (non-detect value)

J = reported concentration is an estimate.

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

Table 1 Groundwater Analytical Data - Direct Push Borehole Groundwater Samples - Bridge - Dawn Foods

Sample ID	Screening Level	Marine Water Screening	Fresh Water Screening Level	Screening Level Source	GP-SB-15	GP-SB-16	GP-SB-17	GP-SB-18	GP-SB-19	GP-SB-20	GP-SB-21	GP-SB-22	GP-SB-23	GP-SB-24	GP-SB-25	GP-SB-27	GP-SB-28	GP-SB-29	GP-SB-30	GP-SB-31	GP-SB-32
Date Sampled					6/9/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/5/2020	12/5/2020	12/5/2020	12/5/2020	12/12/2020	12/12/2020	12/12/2020
Aluminum - total	See dissolved			See dissolved	NA	NA	NA	NA	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic - total	See dissolved			See dissolved	NA	NA	NA	**16.3**	**10 U**	**21.6**	**25**	**20**	**38.4**	**26.6**	**15.7**	**2.76**	**5.07**	**1.15**	**15.1**	**17.5**	NA
Cadmium - total	See dissolved			See dissolved	NA	NA	NA	1 U	1 U	1 UJ	5 UJ	1 UJ	5 UJ	5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	NA
Chromium - total	See dissolved			See dissolved	NA	NA	NA	**12.1**	**4.25**	**13.7**	10 U	10 U	**13.8**	10 U	**18.6**	10 U	**23.7**	1 U	**11.4**	**3.19**	NA
Copper - total	See dissolved			See dissolved	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead - total	See dissolved			See dissolved	NA	NA	NA	**1.55**	**1.08**	**5.85**	10 U	1 U	**11.1**	10 U	**12.4**	10 U	10 U	1 U	**3.44**	1 U	NA
Mercury - total	See dissolved			See dissolved	NA	NA	NA	1 U	1 U	1 U	10 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	NA
Nickel - total	See dissolved			See dissolved	NA	NA	NA	**9.65**	**6.54**	**8.30**	**12.8**	10 U	**15.4**	10 U	**18.6**	10 U	**12.2**	**3.10**	**12.0**	**5.77**	NA
Zinc - total	See dissolved			See dissolved	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	**52.7**	50 U	**95.5**	50 U	**91.9**	**210**	**67.6**	**17.4**	NA
Aluminum - dissolved	NC	NC	NC	No Criteria	NA	NA	NA	NA	429	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic - dissolved	5	0.14	0.018	MTCA Method A - Natural Background	NA	NA	NA	**14.8**	**1.85**	**11.9**	**20**	**18.4**	**27.2**	**27.1**	**5.05**	1 U	1 U	1 U	**11.3**	**16.4**	NA
Cadmium - dissolved	1	7.9	0.72	Practical Quantitation Limit	NA	NA	NA	1 U	1 U	1 U	1 UJ	1 U	1 UJ	1 UJ	1U	1 U	1 U	1 U	1 U	1 U	NA
Chromium - dissolved	10	50	10	Surface Water Aquatic Life Fresh/Chronic 173-201A WAC	NA	NA	NA	**1.72**	10 U	**4.06**	10 U	**2.14**	10 U	10 U	1 U	1 U	1 U	1 U	1 U	**1.19**	NA
Copper - dissolved	3.1	3.1	11	Surface Water Aquatic Life Marine/Chronic CWA §306	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead - dissolved	2.5	8.1	2.5	Surface Water Aquatic Life Fresh/Chronic CWA §304	NA	NA	NA	1 U	1 U	1 U	1 UJ	1 U	1 UJ	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	NA
Mercury - dissolved	0.2	0.025	0.012	Practical Quantitation Limit	NA	NA	NA	1 U	1 U	1 U	1 UJ	1 U	1 UJ	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	NA
Nickel - dissolved	8.2	8.2	52	Surface Water Aquatic Life Marine/Chronic 173-201A WAC	NA	NA	NA	**5.30**	10 U	**4.26**	**14.8**	10U	10 U	**11.3**	**1.62**	**2.33**	**3.28**	**3.41**	**2.96**	**4.49**	NA
Zinc - dissolved	81	81	100	Surface Water Aquatic Life Marine/Chronic 173-201A WAC	NA	NA	NA	**7.01**	50U	5 U	50U	5 U	50U	50U	**14.6**	5 U	**6.36**	**209**	**33.0**	**12.3**	NA
Gasoline Range Organics	1,000	---	---	MTCA Method A	**3300**	100 U	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	100 U	100 U
Benzene	0.44	1.6	0.44	Surface Water Human Health Fresh/Chronic 173-201A WAC	1 U	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U
cis-1,2-Dichloroethene	NC	NC	NC	No Criteria	**11**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	29	31	29	Surface Water Human Health Fresh/Chronic 173-201A WAC	**5.1**	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U
Phenanthrene	NC	NC	NC	No Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl t-butyl ether	600	NC	NC	Groundwater Vapor Intrusion Method B	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m, p-Xylene	330	NC	NC	Groundwater Vapor Intrusion Method B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	2.4	2.9	2.4	Surface Water Human Health Fresh/Chronic CWA §304	**2.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	57	130	57	Surface Water Human Health Fresh/Chronic CWA §304	**8.1**	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U
Vinyl chloride	0.1	0.18	0.02	Practical Quantitation Limit	**1.8**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes, Total	330	NC	NC	Groundwater Vapor Intrusion Method B	**8.3**	3 U	3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3 U	3 U

Notes:

Bold = detection

Shading denotes an exceedance of a screening level

ug/L - microgram per liter

MTCA - Model Toxics Control Act

NC - No Criterion

NA - Not Analyzed

U = concentration below laboratory detection limit (non-detect value)

J = reported concentration is an estimate.

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

Table 2 Summary of Borehole Soil Data - Metals
Bridge - Dawn Foods

Sample ID	Date Sampled	Sample Depth (feet bgs)	Vadose or Saturated	Units	Aluminum	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
GP-SB-5-7	1/2/20	7	Vadose	mg/kg	NA	**5.09**	1 U	NA	**213**	**222**	**2**	**6.84**	**180**
GP-SB-5-12	1/2/20	12	Saturated	mg/kg	NA	**2.48**	1 U	NA	**19.1**	**3.09**	1 U	**9.08**	**24.9**
GP-SB-6-4	1/2/20	4	Vadose	mg/kg	NA	**4.98**	1 U	NA	**26.9**	**25**	1 U	**10.6**	**78.7**
GP-SB-6-10	1/2/20	10	Saturated	mg/kg	NA	**2.37**	1 U	NA	**12.7**	**2.17**	1 U	**5.32**	**26.7**
GP-SB-08	6/9/2020	9 to 10	Vadose	mg/kg	NA	**11.6**	**2.76**	NA	**78**	**227**	1 U	**62.1**	**7110**
GP-SB-09	6/9/2020	9 to 10	Vadose	mg/kg	NA	**5.32**	1 U	NA	25 U	**4.23**	1 U	**11.8**	**71.9**
GP-SB-10	6/9/2020	8 to 10	Vadose	mg/kg	NA	5 U	1 U	NA	**35**	**18.6**	1 U	**14.2**	**57.6**
GP-SB-11	6/9/2020	4 to 5	Vadose	mg/kg	NA	5 U	1 U	NA	**83.1**	**48.2**	1 U	**174**	**459**
GP-SB-12	6/9/2020	8.5 to 9.5	Saturated	mg/kg	NA	5 U	1 U	NA	25 U	**1.04**	1 U	**5.40**	**34.5**
GP-SB-18-03	12/1/2020	2 to 3	Vadose	mg/kg	NA	**4.81**	1 U	**15.9 J / 15.7**	NA	**13.5**	1 U	**4.71 J / 5.05**	**46.3 J / 55.3**
GP-SB-18-09.5	12/1/2020	9 to 9.5	Vadose	mg/kg	NA	1 U	1 U	**7.66**	NA	**1 U**	1 U	**3.00**	**24.2**
GP-SB-19-03.5	12/1/2020	3 to 3.5	Vadose	mg/kg	**6790**	**3.56**	1 U	**9.41**	NA	**49.1**	1 U	**5.04**	**40.1**
GP-SB-19-08.5	12/1/2020	8 to 8.5	Vadose	mg/kg	**14500**	**3.48**	1 U	**9.91**	NA	**2.27**	1 U	**9.19**	**57.1**
GP-SB-20-04.5	12/1/2020	3.5 to 4.5	Vadose	mg/kg	NA	**3.41**	1 U	**8.53**	NA	**6.36**	1 U	**8.16**	**29.7**
GP-SB-20-09	12/1/2020	7 to 9	Vadose	mg/kg	NA	**2.49**	1 U	**8.34**	NA	**2.96**	1 U	**6.79**	**26.8**
GP-SB-21-05	12/1/2020	3 to 5	Vadose	mg/kg	NA	**1.75**	1 U	**9.89**	NA	**2.04**	1 U	**11.5**	**19.3**
GP-SB-21-10	12/1/2020	7.5 to 10	Saturated	mg/kg	NA	**6.11**	1 U	**7.63**	NA	**5.41**	1 U	**5.18**	**27.7**
GP-SB-22-07	12/1/2020	5 to 7	Vadose	mg/kg	NA	**4.87**	1 U	**98.4**	NA	**3.41**	1 U	**17.4**	**30.2**
GP-SB-22-09	12/1/2020	9 to 10	Saturated	mg/kg	NA	**2.09**	1 U	**9.35**	NA	**2.42**	1 U	**12.4**	**19.4**
GP-SB-23-05	12/1/2020	3 to 5	Vadose	mg/kg	NA	**13.6**	1 U	**11.6 J / 12.8**	NA	**7.66**	1 U	**15.2 J / 17.1**	**67.1 J / 77.5**
GP-SB-23-11	12/1/2020	10 to 11	Saturated	mg/kg	NA	**8.31**	1 U	**12.2**	NA	**7.16**	1 U	**14.2**	**55.4**
GP-SB-24-10	12/1/2020	7.5 to 10	Saturated	mg/kg	NA	**10.4**	1 U	**11.2**	NA	**6.27**	1 U	**15.0**	**51.7**
GP-SB-24-12	12/1/2020	10 to 12	Saturated	mg/kg	NA	**8.53**	1 U	**11.7**	NA	**4.35**	1 U	**12.4**	**43.3**
GP-SB-25-08	12/5/2020	6 to 8	Vadose	mg/kg	NA	**5.44**	1 U	**9.67**	NA	**48.3**	1 U	**6.49**	**140**
GP-SB-25-13.5	12/5/2020	12 to 13.5	Saturated	mg/kg	NA	**5.07**	1 U	**9.10**	NA	**3.37**	1 U	**11.4**	**29.2**
GP-SB-26-06	12/5/2020	4 to 6	Vadose	mg/kg	NA	**4.13**	1 U	**20.3**	NA	**20.0**	1 U	**14.7**	**39.8**
GP-SB-26-12	12/5/2020	10 to 12	Vadose	mg/kg	NA	**2.48**	1 U	**8.91**	NA	**3.01**	1 U	**9.48**	**22.8**
GP-SB-27-08	12/5/2020	6 to 8	Vadose	mg/kg	NA	**2.03**	1 U	**6.61**	NA	**1.08**	1 U	**5.45**	**18.5**
GP-SB-27-12	12/5/2020	11 to 12	Vadose	mg/kg	NA	**3.05**	1 U	**9.13**	NA	**6.60**	1 U	**7.43**	**32.3**
GP-SB-27-14.5	12/5/2020	12 to 14.5	Saturated	mg/kg	NA	**4.79**	1 U	**11.3**	NA	**3.83**	1 U	**7.00**	**20.7**
GP-SB-28-04	12/5/2020	2 to 4	Vadose	mg/kg	NA	**2.31**	1 U	**18.4**	NA	**34.0**	1 U	**22.9**	**36.9**
GP-SB-28-08	12/5/2020	6 to 8	Vadose	mg/kg	NA	**1.81**	1 U	**6.53**	NA	**1.04**	1 U	**5.68**	**17.5**
GP-SB-28-12	12/5/2020	11.2 to 12	Saturated	mg/kg	NA	**6.91**	1 U	**11.6**	NA	**5.49**	1 U	**12.8**	**39.5**
GP-SB-28-13	12/5/2020	12 to 13	Saturated	mg/kg	NA	**3.26**	1 U	**11.3**	NA	**2.81**	1 U	**7.09**	**16.5**
GP-SB-29-06.5	12/5/2020	5.2 to 6.5	Vadose	mg/kg	NA	**3.87**	1 U	**9.71**	NA	**3.31**	1 U	**6.13**	**19.9**
GP-SB-29-10.5	12/5/2020	9.5 to 10.5	Vadose	mg/kg	NA	**1.85**	1 U	**10.6**	NA	**1.83**	1 U	**3.88**	**28.1**
GP-SB-29-12	12/5/2020	11 to 12	Saturated	mg/kg	NA	**1.33**	1 U	**8.60**	NA	**1.42**	1 U	**3.93**	**18.4**
GP-SB-30-05.5	12/12/2020	4 to 5.5	Vadose	mg/kg	NA	**6.06**	1 U	**9.67**	NA	**24.8**	1 U	**7.62**	**58.6**
GP-SB-30-08	12/12/2020	7 to 8	Vadose	mg/kg	NA	**1.40**	1 U	**5.74**	NA	1 U	1 U	**4.2**	**12.1**
GP-SB-30-13.3	12/12/2020	12.5 to 13.3	Saturated	mg/kg	NA	**3.56**	1 U	**17.5**	NA	**5.90**	1 U	**12.4**	**54.6**
GP-SB-31-06	12/12/2020	4.5 to 6	Vadose	mg/kg	NA	**4.50**	1 U	**9.68**	NA	**16.5**	1 U	**6.97**	**99.8**
GP-SB-31-08	12/12/2020	7 to 8	Vadose	mg/kg	NA	**3.85**	1 U	**12.9**	NA	**2.50**	1 U	**6.59**	**22.8**
GP-SB-31-14	12/12/2020	12.5 to 14	Saturated	mg/kg	NA	**1.08**	1 U	**9.36**	NA	**1.79**	1 U	**4.82**	**23.2**
Screening Level MTCA Soil Method A/B					80000	20	2	19	3,200	250	2	1600	24,000
Screening Level MTCA Soil Protective of Groundwater Vadose (based on protection of surface water)					NC	7.3^1	1.10	180	36.4^1	1620	0.07^1	48^1	100.9
Screening Level MTCA Soil Protective of Groundwater Saturated (based on protection of surface water)					NC	7.3^1	0.055	48.2^1	36.4^1	81	0.07^1	48^1	85^1

Notes:

Bold = detection

Shading indicates an exceedance of a screening level

MTCA Soil Protective of Groundwater Vadose/Saturated screening levels based on MTCA Eqn. 747-1 and the surface water values shown on Table 2.

1. Indicates that the calculated screening level has been adjusted up to natural background

feet bgs = feet below ground surface

mg/kg = milligrams per kilograms

U = laboratory detection limit

J = reported concentration is an estimate.

Table 3 Summary of Borehole Soil Data - All Data Other Than Metals
Bridge - Dawn Foods

Sample ID	Screening Level MTCA Soil Method A/B Unrestricted	GP-SB-15	GP-SB-1510 (Duplicate)	GP-SB-16-07	GP-SB-16-11	GP-SB-17-05	GP-SB-17-10	GP-SB-21-05	GP-SB-21-10	GP-SB-22-07	GP-SB-22-09	GP-SB-23-05	GP-SB-23-11	GP-SB-24-10	GP-SB-24-12	GP-SB-25-08	GP-SB-25-13.5	GP-SB-26-06
Date Sample		6/9/2020	6/9/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/5/2020	12/5/2020	12/5/2020
Depth ft. bgs		10 to 11	10 to 11	6 to 7	10 to 11	4 to 5	9 to 10	3 to 5	7.5 to 10	5 to 7	9 to 10	3 to 5	10 to 11	7.5 to 10	10 to 12	6 to 8	12 to 13.5	4 to 6
		Saturated	Saturated	Vadose	Saturated	Vadose	Saturated	Vadose	Saturated	Vadose	Saturated	Vadose	Saturated	Saturated	Saturated	Vadose	Saturated	Vadose
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BTEX/GRO				BTEX/GRO														
Benzene	Not Detected	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	Not Detected	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl Benzene	Not Detected	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	Not Detected	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range	100^A	5 U	6 U	5 U	5 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CVOCs				CVOCs														
Vinyl chloride	Not Detected	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	Not Detected	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	Not Detected	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	Not Detected	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	Not Detected	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	Not Detected	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	Not Detected	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane (EDC)	Not Detected	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	Not Detected	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	Not Detected	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	Not Detected	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	Not Detected	0.025 U	0.025 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs				SVOCs														
Naphthalene	Not Detected	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01
2-Methylnaphthalene	320	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.28**	<0.01	<0.01
1-Methylnaphthalene	34	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**1.8**	<0.01	<0.01
Acenaphthylene	Not Detected	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01
Acenaphthene	4800	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.43**	<0.01	<0.01
Fluorene	3200	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.67**	<0.01	<0.01
Phenanthrene	No Criterion	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**1.0**	<0.01	<0.01
Anthracene	Not Detected	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01
Fluoranthene	3200	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.21**	<0.01	**0.016**
Pyrene	2400	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	**0.062**	<0.05	<0.05	<0.05	<0.05	**0.24**	<0.01	**0.017**
Benz(a)anthracene	see CPAH	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.11**	<0.01	<0.01
Chrysene	see CPAH	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.14**	<0.01	**0.012**
Benzo(a)pyrene	see CPAH	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05 J	<0.05	<0.05	<0.05 J	<0.05 J	**0.15**	<0.01	**0.015**
Benzo(b)fluoranthene	see CPAH	NA	NA	NA	NA	NA	NA	<0.05	<0.01	**0.060**	**0.12 J**	<0.05	<0.05	**0.064 J**	**0.060 J**	**0.19**	<0.01	**0.019**
Benzo(k)fluoranthene	see CPAH	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05 J	<0.05	<0.05	<0.05 J	<0.05 J	**0.063**	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	see CPAH	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05 J	<0.05	<0.05	<0.05 J	<0.05 J	**0.11**	<0.01	**0.010**
Dibenz(a,h)anthracene	see CPAH	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05 J	<0.05	<0.05	<0.05 J	<0.05 J	<0.05	<0.01	<0.01
Benzo(g,h,i)perylene	---	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	**0.01 J**	<0.05	<0.05	**0.064 J**	**0.051 J**	**0.10**	<0.01	**0.010**
Total CPAHs	0.1	NA	NA	NA	NA	NA	NA	<0.05	<0.01	**0.006**	**0.012**	<0.05	<0.05	**0.0064**	**0.006**	**0.199**	<0.01	**0.018**
PCBs				PCBs														
Aroclor 1221	See Aroclors	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1232	See Aroclors	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1016	See Aroclors	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1242	See Aroclors	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1248	See Aroclors	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1254	See Aroclors	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1260	See Aroclors	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1262	See Aroclors	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor 1268	See Aroclors	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Total Aroclors	1	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

Notes:

Bold = detection

Shading denotes an exceedance of a screening level

feet bgs = feet below ground surface

mg/kg = milligrams per kilograms

U = laboratory detection limit

J = reported concentration is an estimate.

MTCA - Model Toxics Control Act

^{A} - No benzene present in soil

Table 3 Summary of Borehole Soil Data
Bridge - Dawn Foods

Sample ID	Screening Level MTCA Soil Method A/B Unrestricted	GP-SB-26-12	GP-SB-27-08	GP-SB-27-12	GP-SB-28-08	GP-SB-28-13	GP-SB-29-10.5	GP-SB-30-05.5	GP-SB-30-13.3	GP-SB-31-06	GP-SB-31-14	GP-SB-32-04	GP-SB-32-12
Date Sample		12/5/2020	12/5/2020	12/5/2020	12/5/2020	12/5/2020	12/5/2020	12/12/2020	12/12/2020	12/12/2020	12/12/2020	12/12/2020	12/12/2020
Depth ft. bgs		10 to 12	6 to 8	11 to 12	6 to 8	12 to 13	9.5 to 10.5	4 to 5.5	12.5 to 13.3	4.5 to 6	12.5 to 14	2 to 4	10.3 to 12
		Vadose	Vadose	Vadose	Vadose	Saturated	Vadose	Vadose	Saturated	Vadose	Saturated	Vadose	Vadose
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BTEX/GRO			BTEX/GRO							BTEX/GRO			
Benzene	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U
Toluene	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U
Ethyl Benzene	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U
Total Xylenes	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	0.06 U	0.06 U	0.06 U	0.06 U
Gasoline Range	100^A	NA	NA	NA	NA	NA	NA	NA	NA	5 U	5 U	**5.6**	5 U
CVOCs			CVOCs							CVOCs			
Vinyl chloride	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane (EDC)	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	Not Detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs			SVOCs							SVOCs			
Naphthalene	Not Detected	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	320	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	34	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	Not Detected	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	4800	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	3200	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	No Criterion	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	Not Detected	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	3200	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	2400	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	see CPAH	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	see CPAH	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	see CPAH	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	see CPAH	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	see CPAH	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	see CPAH	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	see CPAH	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	---	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total CPAHs	0.1	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs			**PCBs**							PCBs			
Aroclor 1221	See Aroclors	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
Aroclor 1232	See Aroclors	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
Aroclor 1016	See Aroclors	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
Aroclor 1242	See Aroclors	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
Aroclor 1248	See Aroclors	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
Aroclor 1254	See Aroclors	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
Aroclor 1260	See Aroclors	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.057**	0.02 U	0.02 U	NA	NA
Aroclor 1262	See Aroclors	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
Aroclor 1268	See Aroclors	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
Total Aroclors	1	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.057**	0.02 U	0.02 U	NA	NA

Notes:

Bold = detection

Shading denotes an exceedance of a screening level

feet bgs = feet below ground surface

mg/kg = milligrams per kilograms

U = laboratory detection limit

J = reported concentration is an estimate.

MTCA - Model Toxics Control Act

^A - No benzene present in soil

Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

May 31, 1988 E-3915

Larco Development Group
c/o Alston, Courtnage, MaCaulay, and Proctor
1000 Second Avenue, Suite 3900
Seattle, Washington 98104

Attention: Thaddas L. Alston

Subject: Preliminary Environmental Audit
Industrial Building and Property
6901 Fox Avenue South,
Seattle, Washington

Dear Mr. Alston:

In response to your recent request the Environmental Services Division of Earth Consultants, Inc. (ECI) has completed a preliminary environmental audit of the property at 6901 Fox Avenue South, in Seattle, Washington. This brief report summarizes our approach to the project along with preliminary findings.

METHODOLOGY/SCOPE OF WORK

The scope of work for this audit consisted of the following tasks:

- Review of available information from various sources with respect to historical use of the property and its surroundings.
- Visual reconnaissance of the subject property including building interiors and grounds along with photo-documentation of selected points of interest.
- Sampling of selected building materials from building interiors and laboratory analysis for asbestos.
- Review of the RCRA Notifiers and CERCLIS Lists (EPA), and King County Landfill publications.
- Preparation of the written report.

1805 - 136th Place N.E., Suite 201, Bellevue, Washington 98005
Bellevue (206) 643-3780 Seattle (206) 464-1584 FAX (206) 746-0860 Tacoma (206) 272-6608

cc: Will Grimmit

FINDINGS

Site Use History

Information regarding the history of land use on the subject site was gathered through interviews with persons having knowledge of past site utilization, and through interpretation of aerial photographs of the site locality dating 1969 and 1979. Based on these sources the following chronology of site use has been established:

Interpretation of a series of aerial photographs dating back to 1969 indicates that the properties surrounding the subject site were established industrial sites. During a telephone interview with Mr. Fred Hopkins of the adjacent Seattle Boiler Works Company, ECI's environmental staff was informed that the site as well as the surrounding area had been used for coal loading and unloading operations along the Duwamish Waterway in the early 1900's. Mr. Hopkins also mentioned that the site had been the location of the National Steel Construction Company which began activity around 1927. During the National Steel Construction Company's occupancy of the site, several steel structures were erected on the property. Mr. Hopkins indicated that National Steel vacated the premises in approximately 1967, and the site was used for storage but was uncertain as to what had been stored on the site.

Mr. Hugh Ferguson, contractor of the existing building located on the subject site, indicated in a telephone conversation that an office building, and either a saw mill or fabricating shop were located on the property prior to 1975. They were removed from the site when the existing building was constructed in 1976.

In 1976, the Sam Wylde Flour Company, Carlin Foods, and Marine Power occupied the building. Marine Power, the owners of the property at that time, occupied the warehouse for a short period of time before relocating their office. Since 1976, both Sam Wylde Flour Company Inc. and Carlin Foods have occupied the entire building. It is our understanding that Sam Wylde Flour Company will be vacating their portion of the building at the end of May, 1988, and Carlin Foods will eventually occupy the vacant space.

In summary for this section of the report, and on the basis of our review of records and information pertaining to historical use of the site, nothing in the apparent history of the site use during Sam Wyldes Flour Company or Carlin Foods occupancy, would suggest that hazardous, toxic, or dangerous substances had been manufactured, stored, or disposed of on the subject site. ✓

Site Reconnaissance

On May 19th, 1988 an environmental scientist from ECI visited the subject site to look for evidence of past or ongoing contamination. The visit included a visual reconnaissance of the site and surrounding area.

The subject site is located along the Duwamish Waterway directly south of Slip #3, and approximately one mile northwest of Boeing Field King County Airport. The site is bordered on the south by Seattle Boiler Works, on the north by Marine Power, on the east by Great Western Chemical Company and on the west by the Duwamish Waterway. The approximately five (5) acre property hosts a 123,325 square foot, concrete tilt-up, warehouse occupied by Sam Wylde Flour Company Inc. and Carlin Foods. The building is bounded on the south by paved parking facilities, on the north by railroad spur lines, on the west by storage silos which hold flour, sugar, and shortening for Carlin Foods, and on the east by a landscaped portion of property and Fox Avenue. The north and south sides of the building have dock high loading facilities.

The Sam Wylde Flour Company occupies the eastern portion of the building, and Carlin Foods is located in the western portion of the building as well as the western most portion of the property. Both companies specialize as wholesale outlets of bulk baking ingredients including flour, sugar, shortening, bakery supplies, and prepackaged mixes. The majority of building space is used for storage although both companies also have in-house bakeries on site. Carlin Foods manufactures, premixes, processes, and packages bakery food products, bulk yogurt fruit mixes, cake and ice cream toppings and other miscellaneous baking items.

An above ground 300 gallon diesel storage tank is located on the west end of the property adjacent to the steam boiler owned by Carlin foods. The diesel powered steam boiler was installed in 1986. When asked by ECI environmental staff, Mr. Craig Anderson, Production Manager of Carlin Foods, indicated that he was not aware of any spills from the diesel fuel storage tank.

Oil staining on the ground surface was noted in several locations along the north side of the property between the railroad tracks and the building.

Asbestos: Sampling and Analysis

In an effort to enhance the thoroughness of our review, samples of wall insulation, acoustical ceiling tile, and floor tile were collected for asbestos analysis from various interior areas. Results of analyses using polarized light microscopy with dispersion staining of samples confirmed that none of the samples contained asbestos.

Polychlorinated Biphenyls (PCBs)

PCBs belong to a broad family of organic chemicals known as chlorinated hydrocarbons. PCBs are produced by the combination of one or more chlorine atoms and a biphenyl molecule. PCBs range from heavy oily liquids to waxy solids. Prior to 1979, PCBs were widely used in electrical equipment such as transformers, capacitors, switches, and voltage regulators for their "cooling" properties.
In 1976 the EPA regulated PCBs through issues pursuant to the Toxic Substances Control Act of 1976. These regulations generally control the use, marking, storage, records, and disposal of PCBs. Before EPA banned the manufacture of PCBs in 1978, PCBs were widely used in the manufacture of fluorescent light fixtures and in electrical transformers. PCB material was used as a "cooling" agent in the capacitors of the light ballasts and transformers. Enactment of the Toxic Substances Control Act (TSCA Public Law 94-469) in 1979 prohibited any further manufacture of PCBs in the United States.

Ms. Shirli M. Axelrod from the Environmental Affairs Division of City Electric, Seattle, informed ECI that four transformers are located on the subject site which were tested August 10, 1987 and are labeled showing they are not PCB-contaminated. Three of the transformers tested contained less that 1 ppm PCB; and the fourth contained 4 ppm.

The Environmental Protection Agency (EPA) regulates PCBs at 50 ppm and above. Shirli Axelrod confirmed that the concentration of PCB's in the transformers is below the regulatory threshold of concern.

Subsurface soil sampling and testing

On May 24, 1988, ECI conducted soil sampling activities on the subject site. Supplemental laboratory analyses were conducted to evaluate soils for the presence of petroleum hydrocarbons and heavy metals. Conclusions presented in ECI's report to Larco Development dated May 31, 1988 acknowledged the presence of relatively small, localized surficial spillages of oil along the railroad tracks north of the existing building. The report concluded that the data suggested that the concentration of petroleum (oil) was below current environmental regulatory agency "action levels" and that no remedial measures would be required under existing law. No heavy metals were detected in the referenced study. ✓

Conclusions

Based on our review of development and use history along with an examination of existing conditions at the subject site, it would appear that the subject site is free from hazardous or toxic substances, and that such substances as defined under the Resource Conservation and Recovery Act (RCRA-42 USC-6901, et. seq.), the Federal Water Pollution Control Act (33 USC-1257, et. seq.), the Clean Air Compensation and Liability Act (42 USC-2001, et seq.), the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA: 42 USC-9601, et seq.), have not been generated, used, stored, or disposed of on the property. #/ ✓

Limitations

This report has been prepared for specific application to this project in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our proposal dated May 16, 1988. This report is for the exclusive use of Larco Development Group and their representatives. No other warranty, expressed or implied, is made. If new information is developed in future site work, which may include excavations, borings, studies, etc., Earth Consultants, Inc. should be allowed to reevaluate the conclusions of this report, and to provide amendments as required.

We appreciate the opportunity to be of service to you on this project. If you have any questions regarding our findings or recommendations, please do not hesitate to contact us.

Respectfully submitted,

EARTH CONSULTANTS, INC.

Donna L. Hewitt
Environmental Scientist

Don W. Spencer

Don W. Spencer, M.Sc.
Director -- Environmental Services

DWS/dlh

DEPARTMENT OF
ECOLOGY
State of Washington

Lower Duwamish Waterway
River Mile 2.0-2.3 East
(Slip 3 to Seattle Boiler Works)
Source Control Area

Summary of Existing Information and Identification of Data Gaps

Final Report

June 2008

Waterbody No. WA-09-1010

Printed on Recycled Paper

Lower Duwamish Waterway
River Mile 2.0-2.3 East
(Slip 3 to Seattle Boiler Works)
Source Control Area

Summary of Existing Information and Identification of Data Gaps

Final Report

Contract No. C0700036
Work Assignment No. EANE001

June 2008

Prepared for:

WASHINGTON DEPARTMENT OF ECOLOGY
Toxics Cleanup Program
3190 160th Avenue SE
Bellevue, WA 98008

Prepared by:

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Figure 50 TCE in 1st WBZ Groundwater (Fox Avenue Pilot Study) – Cascade Columbia Distribution

Figure 51 PCE in 1st WBZ Groundwater (Fox Avenue Pilot Study) – Cascade Columbia Distribution

Figure 52 1,2-DCE in 1st WBZ Groundwater (Fox Avenue Pilot Study) – Cascade Columbia Distribution

Figure 53 VC in 1st WBZ Groundwater (Fox Avenue Pilot Study) – Cascade Columbia Distribution

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Figure 54 TCE in 2nd WBZ Groundwater (Fox Avenue Pilot Study) – Cascade Columbia Distribution

Figure 55 PCE in 2nd WBZ Groundwater (Fox Avenue Pilot Study) – Cascade Columbia Distribution

Figure 56 1,2-DCE in 2nd WBZ Groundwater (Fox Avenue Pilot Study) – Cascade Columbia Distribution

Figure 57 VC in 2nd WBZ Groundwater (Fox Avenue Pilot Study) – Cascade Columbia Distribution

Acronyms/Abbreviations

2LAET	Second Lowest Apparent Effects Threshold
Adapt	LSI Adapt, Inc.
AET	Apparent Effects Threshold
AGI	AGI Technologies, Inc.
AOC	area of concern
AST	aboveground storage tank
BEHP	bis(2-ethylhexyl) phthalate
bgs	below ground surface
BMP	best management practice
BTEX	benzene, toluene, ethylbenzene and xylene
City	City of Seattle
COC	contaminant of concern
County	King County
CSCSL	Confirmed and Suspected Contaminated Site List
CSL	Cleanup Screening Level
CSO	combined sewer overflow
CVOC	chlorinated volatile organic compound
DCB	dichlorobenzene
DCA	dichloroethane
DCE	dichloroethene/dichloroethylene
DMR	discharge monitoring report
DNAPL	dense non-aqueous phase liquid
EAI	Environmental Associates, Inc.
ECHO	Enforcement and Compliance History Online
Ecology	Washington State Department of Ecology
E & E	Ecology and Environment, Inc.
EOF	emergency overflow
EPA	U.S. Environmental Protection Agency
ERM	Environmental Resources Management
ESA	Environmental Site Assessment
FS	Feasibility Study
GIS	Geographic Information System
gpm	gallons per minute
GWC	Great Western Chemical Company
GWI	Great Western International
ISIS	Integrated Site Information System
JPHC	James P. Hurley Co.
KCIA	King County International Airport
KCIWP	King County Industrial Waste Program
LAET	Lowest Apparent Effects Threshold
LDW	Lower Duwamish Waterway
LDWG	Lower Duwamish Waterway Group
LNAPL	light non-aqueous phase liquids

Acronyms/Abbreviations (Cont.)

LUST	leaking underground storage tank
µg/L	micrograms per liter
MDL	method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mgy	million gallons per year
MOU	Memorandum of Understanding
MP&E	Marine Power & Equipment
MTCA	Model Toxics Control Act
MW	monitoring well
NAPL	non-aqueous phase liquids
NDPES	National Pollutant Discharge Elimination System
NFA	No Further Action
NOAA	National Oceanographic and Atmospheric Administration
NTU	nephelometric turbidity units
OC	organic carbon
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene/tetrachloroethylene/perchloroethylene
PCP	pentachlorophenol/penta
ppb	parts per billion
ppm	parts per million
PSCAA	Puget Sound Clean Air Agency
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RM	river mile
ROW	right-of-way
SCAP	Source Control Action Plan
SCS	Seattle Cold Storage
SD	storm drain
SH	silt horizon
SPU	Seattle Public Utilities
SMS	Sediment Management Standards
SQS	Sediment Quality Standards
SVE	soil vapor extraction
SVOC	semi-volatile organic compound
SWPPP	Stormwater Pollution Prevention Plan
TAL	Target Analyte List
TCA	trichloroethane
TCE	trichloroethene/trichloroethylene
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TPH-D	total petroleum hydrocarbons in the diesel range
TPH-G	total petroleum hydrocarbons in the gasoline range
TPH-O	total petroleum hydrocarbons in the heavy-oil range

Acronyms/Abbreviations (Cont.)

TRI	Toxics Release Inventory
UNIMAR	United Marine Shipbuilding, Inc.
UST	underground storage tank
VC	vinyl chloride
VCP	Voluntary Cleanup Program
VOC	volatile organic compound
WBZ	water bearing zone
WWTP	wastewater treatment plant

1.0 Introduction

1.1 Background and Purpose

This Summary of Existing Information and Identification of Data Gaps Report (Data Gaps Report) pertains to a section of the Lower Duwamish Waterway (LDW) referred to as River Mile 2.0-2.3 East (Slip 3 to Seattle Boiler Works). This area is one of several source control areas identified as part of the overall cleanup process for the LDW Superfund Site.[1] Figure 1 illustrates the LDW sediment areas that correspond to each source control area. The RM 2.0-2.3 East sediment area extends north-south between river miles 2.0 and 2.3, and east-west from the eastern shoreline to the eastern limit of the LDW navigational channel. The RM 2.0-2.3 East Source Control Area (RM 2.0-2.3 East) is defined by the portion of the overall LDW drainage basin[2] that corresponds to this sediment area (Figure 2). RM 2.0-2.3 East consists of the adjacent and other upland properties within the RM 2.0-2.3 East drainage basin, and it includes embankment areas fronting the properties at the shoreline.

This report summarizes readily available information regarding properties within the RM 2.0-2.3 East drainage basin. The summary is necessary:

- to identify potential upland sources of sediment recontamination;
- to identify any potential contaminant migration pathways into the LDW;
- to identify any data gaps needing attention before effective source control can be accomplished; and
- to determine what, if any, effective source control is already in place.

The LDW consists approximately of the lower 5.5 miles of the Duwamish River as it flows into Elliott Bay in Seattle, Washington. In September 2001, the U.S. Environmental Protection Agency (EPA) added this site to the National Priorities List due to chemical contaminants in sediments. The Washington State Department of Ecology (Ecology) added the site to the Washington State Hazardous Sites List on February 26, 2002.

The key parties involved in the LDW Superfund site are the Lower Duwamish Waterway Group (LDWG; comprised of the city of Seattle (city), King County (County), the Port of Seattle, and The Boeing Company), EPA, and Ecology. LDWG is conducting a Remedial Investigation/Feasibility Study (RI/FS) for the LDW Superfund site.

EPA is leading the effort to determine the most effective clean-up strategies for the LDW through a RI/FS process. Ecology was granted the authority[3] to investigate upland sources of

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[1] This Data Gaps Report incorporates data published through May 2008.

[2] The area referred to herein as the "RM 2.0-2.3 East drainage basin" is actually a sub-drainage basin of the LDW valley. The LDW valley drainage basin has been divided into the sub-drainage basins, defined tentatively by storm water collection systems and outfalls, as shown in Figure 1.

[3] EPA and Ecology signed an interagency Memorandum of Understanding (MOU) in April 2002 and updated the MOU in April 2004. The MOU divides responsibilities for the site. EPA is the lead agency for the sediment

contamination and to develop plans to reduce contaminant migration to waterway sediments (to the maximum extent practicable). The Lower Duwamish Waterway Source Control Strategy (Ecology 2004) describes the process for identifying source control issues and implementing effective controls. The plan is to identify and manage sources of potential recontamination in coordination with sediment cleanups.

The focus of the Source Control Strategy is to identify and control contamination that could affect LDW sediments. This will be achieved using existing administrative and legal authorities to perform inspections and require necessary source control actions (Ecology 2007). It is based primarily on the principles of source control for sediment sites described in EPA's Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites (EPA 2002), and the Washington State Sediment Management Standards (SMS) (WAC 173-340-3707(7) and WAC 173-204-400).

The Source Control Strategy involves developing and implementing a series of detailed, area-specific Source Control Action Plans (SCAPs). Several areas, often defined by drainage basins, have been identified and prioritized for SCAP development as described in the LDW Source Control Status Report (Ecology 2007). Before developing each SCAP, Ecology often prepares a Data Gaps Report for the specific area. Findings from the Data Gaps Report are reviewed by LDW stakeholders and are incorporated into the SCAP. This process helps ensure that the action items in the SCAP will be effective, implementable, and enforceable.

Further information about the LDW can be found at:

- Ecology's LDW website: http://www.ecy.wa.gov/programs/tcp/sites/lower_duwamish/lower_duwamish_hp.html
- EPA's LDW website: http://yosemite.epa.gov/r10/cleanup.nsf/sites/lduwamish
- The LDWG website: http://www.ldwg.org.

1.2 Organization of Document

Section 2 of this report provides background information on the LDW Superfund Site. Section 3 provides a summary of background information on RM 2.0-2.3 East, including a description of the RM 2.0-2.3 East drainage basin, COCs to LDW sediments, and potential migration pathways of contaminants to LDW sediments. Section 4 describes potential sources of contaminants to RM 2.0-2.3 East sediments, including adjacent and upland facilities of concern, groundwater, stormwater, bank erosion, spills, and atmospheric deposition. Section 4 also summarizes data gaps that will be incorporated into the Source Control Action Plan for RM 2.0-2.3 East. Section 5 provides a list of documents cited in the report.

Information presented in this report was obtained from the following sources:

Remedial Investigation/Feasibility Study, while Ecology is the lead agency for source control issues (EPA and Ecology 2002, 2004).

- Ecology Northwest Regional Office Central Records;
- Washington State Archives;
- King County Waste Discharge Permits and Authorizations;
- Seattle Public Utilities (SPU) Business Inspection Reports;[4]
- Ecology Facility/Site Database (Ecology 2007a);
- Ecology Industrial Stormwater General Permits (Ecology 2007b);
- Ecology National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge Permit Database (Ecology 2007c);
- Ecology Hazardous Waste Facility Search Database (Ecology 2007d);
- Ecology Integrated Site Information System (ISIS; Ecology 2007e)
    - Confirmed and Suspected Contaminated Sites List (CSCSL)
    - Underground Storage Tank (UST) List
    - Leaking Underground Storage Tank (LUST) List
    - No Further Action (NFA) Sites List;
- Ecology Washington Coastal Atlas Database (Ecology 2008a);
- EPA Toxics Release Inventory (TRI) Explorer Database (EPA 2007a);
- EPA Envirofacts Data Warehouse Database (EPA 2007b);
- EPA Enforcement and Compliance History Online (ECHO) Database (EPA 2007c);
- King County Geographic Information System (GIS) Center Parcel Viewer and Property Tax Records (King County 2007a);
- LDWG Draft Phase 2 Remedial Investigation (RI) Report (November 2007) Database (LDWG 2008);
- Puget Sound Clean Air Agency (PSCAA) Approved Air Operating Permits Database (PSCAA 2007); and
- Washington Secretary of State Corporations Online Database (Washington Secretary of State 2007).

1.3 Scope of Document

The scope of the document research conducted for this Data Gaps Report is limited, geographically, to the upland area within the RM 2.0-2.3 East drainage basin (Figure 2) and discharge points into the LDW along the waterfronts of the properties within this boundary. There are other potential sources of recontamination upstream of RM 2.0-2.3 East that might, via the LDW, impact the sediments of RM 2.0-2.3 East. However, they have been, or will be, addressed in other studies.

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[4] SPU inspection reports were requested, but not all were available before this report was completed.

This report includes review of seven facilities within the RM 2.0-2.3 East drainage basin: SCS Refrigerated Services, Seattle Distribution Center, Glacier Marine Services, V. Van Dyke, Riverside Industrial Park, Shultz Distributing, and Cascade Columbia Distribution. The potential for any existing contamination to migrate to the LDW was examined for each of these facilities. However, it is possible that contamination from outside of the RM 2.0-2.3 East drainage basin may be migrating via unknown groundwater pathways into RM 2.0-2.3 East sediments. This report does not identify or assess the possibility of migration from sources outside of the RM 2.0-2.3 East drainage basin.

Similarly, air pollution is a potential source of contamination to RM 2.0-2.3 East sediments with origins outside of the RM 2.0-2.3 East drainage basin. Although some limited discussion of atmospheric deposition is provided in Section 3, the scope of work for this report did not include an assessment of data gaps pertaining to air pollution effects on RM 2.0-2.3 East sediments.

Data on existing sediment contamination in RM 2.0-2.3 East are available. However, this report focuses only on upland sources that could recontaminate RM 2.0-2.3 East sediments if sediment remediation is required. This focus does not preclude the potential for recontamination from capped sediments, if sediment-capping is the remedial option selected. Source control needed or any contaminated sediments left in place will be important to address as part of the remedial option selection process for RM 2.0-2.3 East.

Ecology & Environment, Inc., (E & E) did not conduct QA/QC on reported data as part of the scope of this report. Data published in previous reports approved by EPA and/or Ecology are assumed to have been validated and to be accurate. Information from reports by others that have not been approved by EPA or Ecology is included only for summary purposes.

2.0 Lower Duwamish Waterway Superfund Site

The Duwamish River originates at the confluence of the Black and Green Rivers, near Tukwila, Washington. From the confluence, the Duwamish River flows approximately 12 miles (19 kilometers) before splitting at the southern end of Harbor Island to form the East and West Waterways, which discharge into Elliott Bay. The LDW study area consists of the downstream portion of the Duwamish River, excluding the East and West Waterways (just south of Harbor Island).

The LDW is a receiving water body for different types of industrial and municipal stormwater and periodic overflow discharges from combined sewer systems during high rainfall events. Industrial and municipal stormwater discharges to the LDW are discussed in Sections 2.3 and 4.0. There are currently no permitted discharges of industrial wastewater directly into the LDW.

2.1 Site History

General background and site description of the LDW Superfund site is provided in the *Lower Duwamish Waterway Phase I Remedial Investigation Report* (Windward 2003), which describes the history of dredging, filling, and industrialization of the Duwamish River and it environs, as well as the physiography, physical characteristics, hydrogeology, and hydrology of the area. In the late 1800s and early 1900s, extensive topographic modifications were made to the river, including the filling of tideflats and floodplains to create a straightened river channel. Current side slips are frequently remnants of old river bed meanders. The channel was dredged for navigational purposes and the excavated waterway material was used to fill the old channel areas and the lowlands above flood levels. Because the dredge fill materials were similar to the native deposits, they are typically difficult to distinguish from the native silts and sands. Subsequent filling for land development purposes has resulted in a surficial layer of fill over most of the lower Duwamish Valley. This material is typically more granular because it was generally placed to allow for stable construction conditions and/or building foundations (Windward 2003).

Most of the upland areas adjacent to the LDW have been heavily industrialized for many decades. Historical and current commercial and industrial operations include cargo handling and storage, marine construction, boat manufacturing, marina operations, concrete manufacturing, paper and metals fabrication, food processing, and airplane parts manufacturing. Two mixed commercial and residential communities, Georgetown and South Park, are also located near the LDW (Windward 2003).

2.2 Site Geology and Hydrogeology

Groundwater within the Duwamish Valley alluvium is typically encountered under unconfined conditions within approximately 10 feet (3 meters) of ground surface. Groundwater in this unconfined aquifer is found within fill and native alluvial deposits. The direction of groundwater flow in the unconfined aquifer is generally toward the LDW. However, the direction may vary locally depending on subsurface material, proximity to the LDW and tidal influence. Tidal fluctuations generally affect groundwater flow direction within 300 to 500 feet (100 to 150 meters) of the LDW, depending on location (Windward 2003). A confined groundwater zone is present beneath the unconfined aquifer. Flow in this confined zone is to the north toward Elliott Bay. The bottom of the unconfined aquifer is located on top of a layer of marine sediment at a depth of 45 to 50 feet (13 to 15 meters) (Cook 2001).

2.3 Storm Drain and Sanitary Sewer Systems

Separated storm drain and sanitary sewer systems and combined sewer systems serve properties within the LDW drainage basin. Storm drain systems convey stormwater runoff collected from streets, paved areas, and roof drains from residential, commercial, and industrial properties. Many properties directly adjacent to the LDW are served by private storm drain systems that discharge directly to the LDW. A combination of private and city storm drain systems serve upland areas of the LDW drainage basin.

Some areas in the vicinity of the LDW are served by combined sewer systems, which carry both stormwater and municipal/industrial wastewater in a single pipe. These systems were generally constructed before about 1970 because it was less expensive to install a single pipe rather than separate storm and sanitary systems. Under normal rainfall conditions, wastewater and stormwater are conveyed through this combined sewer pipe to a wastewater treatment facility. During large storm events, however, the total volume of wastewater and stormwater can sometimes exceed the conveyance and treatment capacity of the combined sewer system. When this occurs, the combined sewer system is designed to overflow through relief points, called combined sewer overflows (CSOs). The CSOs prevent the combined sewer system from backing up and creating flooding.

Untreated municipal/industrial wastewater and stormwater can be discharged during CSOs to the LDW during these storm events. The city owns and operates the local sanitary sewer collectors and trunk lines, while King County owns and operates the larger interceptor lines that transport flow from the local systems to the West Point Wastewater Treatment Plant (WWTP). The city's combined sewer network has its own NPDES permit for CSOs; CSOs from the County's interceptor lines are administered under the NPDES permit established for the West Point WWTP.

An Emergency Overflow (EOF) is a discharge that can occur from either the combined or sanitary sewer systems that is not necessarily related to storm conditions and/or system capacity limitations. EOF discharges typically occur as a result of mechanical issues such as pump station failures or when transport lines are blocked; pump stations are operated by both the city and County. Pressure relief points are provided in the drainage network to discharge flow to an existing storm drain or CSO pipe under emergency conditions to prevent sewer backups. EOF events are not covered under the city's or County's existing CSO wastewater permits.

CSO/EOF outfalls that discharge to the LDW are listed in Table 1. Of the County CSO outfalls along the LDW, the Michigan CSO, South Brandon Street CSO, and Hanford No. 1 (discharging via the city's Diagonal Avenue South CSO/SD) outfalls had the highest average combined sewer overflow volumes between 1999 and 2005. Annual stormwater discharge volumes are usually substantially higher than annual CSO discharge volumes because storm drains discharge whenever it rains, while CSOs only occur when storm events exceed the system capacity. Annual stormwater discharges to the LDW have been estimated at approximately 4,000 million gallons per year (mgy) compared to less than 65 mgy from the County CSOs and less than 10 mgy from the city CSOs (Windward 2007a)[5].

To minimize the frequency and volume of CSO events, the County uses different CSO control strategies to maximize system capacity. An automated control system manages flows through the King County interceptor system so that the maximum amount of flow is contained in pipelines and storage facilities until it can be conveyed to a regional wastewater treatment plant for secondary treatment. In some areas of the system, where flows cannot be conveyed to the plant, the flows are sent to CSO treatment facilities for primary treatment and disinfection prior to discharge. County CSOs discharge untreated wastewater only when flows exceed the capacity of these systems (King County 2007b)[6].

As a result, some areas of the CSO drainage basins may discharge to different outfalls at different times, depending on the route that the combined stormwater/wastewater has taken through the County conveyance system. Furthermore, some industrial facilities in the LDW basin may discharge stormwater to a separated system and industrial wastewater to a combined system, or a conveyance that begins as a separated system may discharge to a combined system further downstream along the flow path.

When preparing a Data Gaps Report for a source control area, all properties that potentially discharge to that source control area (whether through a CSO/EOF or a separated storm drain outfall) are identified to the extent that the boundaries of the drainage basin are known. However, for areas where drainage basins overlap, a property review is performed only if the property has not already been included in a previously published Data Gaps Report. Exceptions include situations in which contaminants may be transported to the current source control area via a transport pathway that was not applicable for the earlier evaluation.

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[5] Stormwater discharges are regulated under a separate NPDES permit.

[6] City CSOs are generally smaller and flows are not treated prior to discharge.

3.0 RM 2.0-2.3 East Source Control Area

Seven facilities of concern within the RM 2.0-2.3 East drainage basin have been identified for inclusion within this report: SCS Refrigerated Services, Seattle Distribution Center, Glacier Marine Services, V. Van Dyke, Riverside Industrial Park, Shultz Distributing, and Cascade Columbia Distribution. These facilities have confirmed or suspected contamination of various upland media, or conduct activities that threaten LDW sediments. These seven facilities are discussed in detail in Section 4.

3.1 RM 2.0-2.3 East Drainage Basin

The RM 2.0-2.3 East drainage basin encompasses stormwater drainage under normal conditions for approximately 37 acres of commercial and industrial properties between the LDW and East Marginal Way South (Figure 3). Figures 3 and 4 also illustrate the portion of the RM 2.0-2.3 East drainage basin east of East Marginal Way South. That portion, referred to as the South Brighton Street CSO drainage basin, or combined sewer service area, encompasses 34.4 acres. The Brighton CSO/SD serves as both a storm drain and a combined sewer outfall. Stormwater and wastewater from this basin normally discharge to the King County sanitary system. However, in the event of a combined sewer overflow, this basin can discharge to the LDW through the South Brighton Street combined sewer overflow/storm drain (CSO/SD). Under normal conditions, some stormwater from areas west of East Marginal Way South discharges through the South Brighton Street CSO/SD. The South Brighton Street CSO/SD is discussed in further detail in Section 4. Storm drain and combined sewer systems are discussed in Section 2.3.

In addition to the main seven facilities of concern identified for RM 2.0-2.3 East discussed in Section 4, four former facilities of concern were identified within the South Brighton Street CSO basin portion of the RM 2.0-2.3 East drainage basin: Arrow Transportation, Inland Transportation Company, Ben’s Truck Parts, and the Hat n’ Boots Gas Station. These four facilities have been removed and the property is now occupied by a new South Seattle Community College Campus (Figure 4). It is unclear whether any residual contamination from these four facilities exists or whether contamination could be a threat to LDW sediments. Potential pathways for such contamination could be either directly by groundwater to the LDW or by groundwater to a combined sewer to the LDW during a CSO event. The South Brighton Street CSO/SD system and the four former facilities of concern identified within its basin are described in further detail in Section 4.

Figure 4 illustrates known storm drain system lines and outfalls within RM 2.0-2.3 East. Private properties may or may not have supplied information to the city pertaining to their storm drain systems. Facilities within the RM 2.0-2.3 East drainage basin, but outside of the South Brighton Street CSO basin, may discharge stormwater into the city storm drain system, which ultimately discharges into the LDW. Facilities adjacent to the LDW may discharge directly into the LDW.

3.2 National Pollution Discharge Elimination System Permits

In 2005, the city of Seattle conducted a comprehensive survey of outfalls (or outfall-like structures) terminating in the LDW. The survey identified 227 outfalls or structures. Of these, 42 are municipally-owned, 101 were identified as privately-owned, and 84 are of unknown ownership. Discharges from many of these outfalls are permitted under NPDES. Six types of NPDES permits cover discharges to the LDW: the Phase I Municipal Stormwater General Permit (applies to city of Seattle, Port of Seattle, and King County discharges), Phase II Municipal Stormwater General Permit (applies to city of Tukwila discharges), Individual Permit, Industrial Stormwater General Permit, Sand and Gravel General Permit, and Boatyard General Permit. Three of the six types of NPDES permits apply to discharges from RM 2.0-2.3 East and are described below.

The **Phase I Municipal Stormwater General Permit** covers stormwater discharges from outfalls owned by the city of Seattle, the Port of Seattle, and King County. The South River Street SD, at the north end of the SR509 bridge (Figures 3 and 4), is covered by this type of permit.

The Phase I Municipal Stormwater General Permit requires more monitoring than does the industrial stormwater general permit, including monitoring of the solids portion (sediments). Monitoring requirements are detailed in Special Conditions, S8, in the Phase I permit. The permit was issued on January 17, 2007. The analyte list is tiered, depending on how much sediment is collected in a sample. The stormwater monitoring portion of the permit does not require monitoring of all outfalls, but only of three basins or sub-basins considered representative of residential, commercial, and industrial use. Any monitoring required under this permit is of limited value to the LDW source control effort. The Phase 1 Municipal Stormwater Permit is heavily dependent on the best management practices of the permittee, such as street sweeping and catch basin cleaning.

Another key component of the permit is the requirement placed on permit holders to detect, remove, and prevent illicit connections and illicit discharges, including spills into the municipal separate storm drains (Special Condition 5.8). This condition has led the city of Seattle and King County to initiate programs and ordinances governing stormwater and surface water within their jurisdictions.

An **Individual Permit** is written for a specific discharge at a specific location. The individual permit is highly tailored to regulate the pollutants specific to the process that generates the discharge. An individual permit may be a NPDES permit for discharges to surface waters or a county permit for discharge to the combined sewer system. NPDES individual permits may be issued to an industry or to a municipality. Of the four individual permits issued within the LDW, two are for the city of Seattle and King County combined sewer system. Coming from a different combined sewer system, the South Brighton Street CSO/SD outfall (shown in Figures 3 and 4) is covered by a different individual permit issued to the city of Seattle.

The **Industrial Stormwater General Permit** covers 112 industries within the drainage basin of the LDW. Facilities of concern within RM 2.0-2.3 East covered under this permit include SCS

Refrigerated Services, Glacier Marine Services, V. Van Dyke, and Shultz Distributing. Coverage under the Industrial Stormwater General Permit requires whole water monitoring of stormwater discharge for pH, turbidity, oil & grease, copper, and zinc. If stormwater is discharged to a 303(d)-listed surface water body, monitoring for total suspended solids is also required. Additional monitoring is required for timber products, air transportation, chemical, food, and metal industries. Development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) is also required under the Industrial Stormwater General Permit.

3.3 Contaminants of Concern

Although the scope of this report does not include a detailed review of existing sediment conditions in the RM 2.0-2.3 East portion of the LDW, results from LDW sediment studies provide guidance in assessing source control requirements for the upland areas. Several contaminants in LDW sediments within the vicinity of RM 2.0-2.3 East have been documented to be at levels of concern based on results of sampling conducted between 1998 and 2006. The SMS (Chapter 173-204 WAC) establish Marine Sediment Quality Standards (SQS) and Cleanup Screening Levels (CSL) for some contaminants that may be found in sediments. When contaminant concentrations in sediments are less than the SQS, it is assumed there will be no adverse effects on biological resources and no significant health risk to humans. CSLs represent "minor adverse effects" levels used as an upper regulatory threshold for deciding about source control and cleanup.

For this report, "Contaminant of Concern" (COC) is defined as a contaminant that may recontaminate the LDW sediments of RM 2.0-2.3 East if sediment remediation is performed. To be identified as a COC for RM 2.0-2.3 East sediments, a contaminant must have met either of the following criteria:

A. The detected concentration in one or more RM 2.0-2.3 East sediment samples as reported in the November 2007 *Lower Duwamish Waterway Phase 2 Remedial Investigation Draft Report* (Windward 2007a) exceeded the SQS or CSL value. Section 3.2.1 summarizes the separate sediment investigations performed in the vicinity of RM 2.0-2.3 East, and the COCs identified as a result of those investigations.

B. The contaminant was detected above an applicable screening level in one or more samples of upland media (including stormwater, groundwater, soil, seeps, and storm drain solids), even if not detected in RM 2.0-2.3 East sediment samples. Section 3.2.2 summarizes the COCs identified at the facilities of concern through a review of available information and a comparison of sampling data to applicable screening levels.

3.3.1 Contaminants of Concern Identified through Sediment Sampling

Figure 5 depicts surface and subsurface sediment sampling locations within the RM 2.0-2.3 East sediment area, as identified in the November 2007 *Lower Duwamish Waterway Phase 2 Remedial Investigation Draft Report* (Windward 2007a). Appendix A summarizes contaminants detected in surface and subsurface sediment samples collected through the sediment investigations described below; samples with contaminant concentrations exceeding SQS and CSL values are presented in Tables 2 and 3.

Contaminants of Concern Identified through Sediment Sampling				
Contaminant of Concern (COC)	**Surface Sediment**		**Subsurface Sediment**	
	> SQS	**> CSL**	**> SQS**	**> CSL**
Metals				
Arsenic	●		●	●
Copper			●	●
Lead			●	●
Mercury			●	
Zinc			●	●
PAHs				
Acenaphthene			●	
Benzo(a)anthracene			●	
Benzo(a)pyrene			●	
Benzo(g,h,i)perylene			●	
Benzofluoranthenes (total)			●	
Chrysene			●	
Dibenzo(a,h,)anthracene			●	
Dibenzofuran			●	
Fluoranthene	●		●	
Fluorene			●	
Indeno(1,2,3-cd)pyrene			●	
Phenanthrene			●	
Total HPAH			●	
PCBs				
PCBs (total)	●		●	
TPHs				
1,2,4-Trichlorobenzene			●	●
1,2-Dichlorobenzene			●	●
Other SVOCs				
Benzyl alcohol	●	●		

Sediment Investigations

Surface and subsurface sediment samples have been collected from the RM 2.0-2.3 East sediment area as part of the following investigations:

Duwamish Waterway Characterization Study (NOAA 1998)

September through November 1997, as part of the Duwamish Waterway Characterization Study, surface sediment samples were collected from eight locations (EST 187, EST 188, EST 189, EST 190, EST 191, EST 192, EST 193, and EST 194) within the RM 2.0-2.3 East sediment area.

For all eight samples, polychlorinated biphenyls (PCBs) were detected at concentrations below SQS and CSL values.

EPA Site Inspection, Lower Duwamish River (Weston 1999)

In August 1998, as part of the EPA Site Inspection, surface sediment samples were collected from 12 locations (DR105, DR106, DR107, DR108, DR109, DR110, DR111, DR112, DR114, DR115, DR148, and DR149) and subsurface sediment samples were collected from two locations (DR106 and DR112) within the RM 2.0-2.3 East sediment area. All samples were analyzed for Target Analyte List (TAL) metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc), polycyclic aromatic hydrocarbons (PAHs), phthalates, and PCBs. In addition, surface sediment samples collected from DR109, DR110, DR111, DR112, and DR115 and subsurface sediment samples collected from DR112 were analyzed for organotins (including butyltins); the surface sediment sample collected from DR111 was analyzed for volatile organic compounds (VOCs) and pesticides; and surface sediment samples collected from DR111 and DR115 were analyzed for dioxins/furans.

LDW Phase 2 Remedial Investigation, Benthic Invertebrate, Clam Tissue, and Co-located Sediment Sampling (Windward 2005a)

August through September 2004, as part of the Phase 2 Remedial Investigation, benthic invertebrate tissue and co-located sediment samples were collected. Within the RM 2.0-2.3 East sediment area, one sample was collected from B6b and analyzed for TAL metals, PAHs, phthalates, other semi-volatile organic compounds (SVOCs), organochlorine pesticides, PCBs, and butyltins.

LDW Phase 2 Remedial Investigation, Round 1, 2, and 3 Sediment Sampling (Windward 2005b, 2005c, 2007b)

Three rounds of sediment sampling were performed in 2005-2006 as part of the Phase 2 Remedial Investigation; eight surface sediment samples were collected within the RM 2.0-2.3 East sediment area. In Round 1 (January 2005), one sample was collected at LDW-SS76; in Round 2 (March 2005), samples were collected at LDW-SS73, LDW-SS74, LDW-SS77, LDW-SS78, and LDW-SS81; in Round 3 (October 2006), samples were collected at LDW-SS329 and LDW-SS330. All samples were analyzed for SMS compounds; in addition, LDW-SS76, LDW-SS73, LDW-SS74, and LDW-SS81 were analyzed for organochlorine pesticides; LDW-SS74 was analyzed for PCB congeners; and LDW-SS74 and LDW-SS78 were analyzed for butyltins.

LDW Remedial Investigation, Subsurface Sediment Sampling (Windward 2007c)

February 2006, as part of the Phase 2 Remedial Investigation, subsurface sediment samples were collected from three locations (LDW-SC36, LDW-SC37, and LDW-SC202) within the RM 2.0-2.3 East sediment area. All samples were analyzed for SMS compounds; in addition, LDW-SC36 and LDW-SC202 were analyzed for butyltins.

Contaminants of Concern Identified

The November 2007 Lower Duwamish Waterway Phase 2 Remedial Investigation Draft Report Online Database (LDWG 2007), which summarizes all LDW sediment investigation sample results, was queried by sample location for surface and subsurface sediment samples in which contaminants were detected. Contaminant concentrations in sediment samples within the RM 2.0-2.3 East sediment area were compared to SQS and CSL values in Appendix A; contaminant concentrations exceeding SQS and CSL values are presented in Tables 2 and 3.

To allow for comparison of applicable SMS compounds to SQS and CSL values, organic compounds were organic carbon (OC) normalized. Detected concentrations (dry weight basis) were normalized to the total organic carbon (TOC) concentration in the samples. However, comparison to TOC-normalized concentrations is only effective at predicting adverse effects in sediments with TOC content within the range of 0.5 to 4.0 percent. For samples with TOC concentrations outside of the applicable range, concentrations of organic compounds were compared with Puget Sound Apparent Effects Threshold (AET) values. The AET values are the functional equivalent of the SQS and CSL values, only they are expressed on a dry-weight basis. The lowest AET (LAET) was used as the equivalent of the SQS, and the second lowest AET (2LAET) was used in place of the CSL.

Contaminants that exceeded the SQS or CSL values were identified as COCs and are listed in the table below. COCs were identified in surface sediment at several locations, including LDW-SS73, LDW-SS77, LDW-SS329, DR111, DR148, DR112, and B6b. COCs were identified in subsurface sediment at only one location, LDW-SS37. In general, COCs were present in sediment samples at concentrations only slightly above SQS or CSL values, with the greatest exceedances observed in subsurface sediment (2-4 foot depth) at LDW-SC37 for arsenic, copper, lead, and zinc. PCBs, total petroleum hydrocarbons (TPHs), and several PAHs were also found in exceedance of SQS and CSL values at LDW-SC37.

3.3.2 Contaminants of Concern Identified in Upland Media

Available information, including sampling results from environmental investigations, was reviewed for the seven facilities of concern identified within the RM 2.0-2.3 East source control area: SCS Refrigerated Services, Seattle Distribution Center, Glacier Marine Services, V. Van Dyke, Riverside Industrial Park, Shultz Distributing, and Cascade Columbia Distribution. Environmental investigations and sampling results are described in further detail for each facility of concern in Section 4.

In general, a COC was identified in upland media at a facility of concern when the contaminant was detected above an applicable screening level in one or more samples of upland media (including stormwater, groundwater, soil, seeps, and storm drain solids). Screening level criteria used included MTCA Method A cleanup levels for soil and groundwater; Ecology stormwater compliance benchmark levels for facilities covered under the Industrial Stormwater General Permit for stormwater discharge; SMS criteria for both sediments sampled within the LDW in association with a facility of concern and storm drain solids; and a recently developed screening tool to help determine when a detected contaminant is not a concern to LDW sediments (SAIC 2006a).

Contaminants of Concern Identified in Upland Media			
Facility of Concern	**Contaminant of Concern (COC)**	**Media Identified In**	**Potential Pathway to LDW Sediments**
Adjacent Facilities of Concern			
SCS Refrigerated Services	Copper and zinc	Stormwater discharge	Stormwater
Glacier Marine Services	Arsenic, chromium, cadmium, copper, mercury, lead, zinc and oil & grease	Storm drain solids, surface runoff and sediment	Stormwater
Upland Facilities of Concern			
V. Van Dyke	Zinc and oil & grease	Stormwater discharge	Stormwater
	Petroleum hydrocarbons (TPH-G and benzene)	Soil and groundwater	Stormwater and groundwater
Riverside Industrial Park	Petroleum hydrocarbons (TPH-G, benzene, ethylbenzene and xylenes)	Groundwater	Stormwater and groundwater
Shultz Distributing	Chlorinated solvents (primarily PCE and TCE)	Groundwater	Stormwater and groundwater
Cascade Columbia Distribution	Chlorinated solvents (PCE, TCE, VC, and cis-1,2-DCE); petroleum hydrocarbons (TPH, benzene, and toluene); PCP; chlorinated dioxins and furans; and methylene chloride	Soil	Groundwater discharging to RM 2.3-2.8 East and stormwater
	Chlorinated solvents (PCE, TCE, VC, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, 1,1,1-TCA, and 1,2-DCA); petroleum hydrocarbons (TPH, benzene, toluene, and ethylbenzene); PCP; chlorinated dioxins and furans; methylene chloride; and 1,4-DCB	Groundwater	Stormwater; and groundwater discharging to RM 2.3-2.8 East

Contaminants that were no longer detected above applicable screening levels in upland media following completion of remedial actions at potential upland sources were not included. In some instances it was not feasible to determine whether a contaminant was a COC because either applicable screening levels have not been established for the particular contaminant or media, or applicable screening levels could not be applied due to inadequate data. Whenever these situations occurred a data gap was identified to indicate where further study may be required.

Application of Sediment Management Standards to the Identification of Contaminants of Concern in Upland Media

Section 3.2.1 discusses COCs identified through sediment sampling, for which SMS can be directly applied. However, there are no existing standard methods to determine which contaminants detected in upland media (including stormwater, groundwater, soil, seeps, and storm drain solids) are potential COCs for LDW sediments.

There are no established cleanup levels or management standards for storm drain solids. Technically the SMS criteria do not apply to storm drain solids. However, SMS criteria and LAET values provide a conservative basis to evaluate contaminant concentrations in storm drain solids samples. Any contaminants found in storm drain solids above SMS or LAET/2LAET screening levels are considered to be COCs with regard to LDW sediments because if the solids migrated to the LDW they would become sediments. Although it is conservative to ignore mixing and dilution effects, SMS and LAET/2LAET criteria are considered a reasonable measure of contamination for storm drain solids. When feasible, contaminant concentrations detected in samples of storm drain solids were also compared to SQS/CSL and/or LAET/2LAET values to provide a rough indication of contaminant exceedances.

Recently, Ecology developed a screening tool to help determine when a detected contaminant is not a concern to LDW sediments (SAIC 2006a). Using conservative assumptions, the screening tool translates marine sediment concentration limits defined by SMS into upland soil and groundwater concentrations or screening levels. These screening levels were calculated by applying partitioning coefficients and other factors to the SMS criteria. These screening tool levels are referred to as either "soil-to-sediment screening levels" or "groundwater-to-sediment screening levels." Concentrations less than the screening tool levels provide an indication that SMS compounds in upland groundwater and soil are not likely to pose a risk to LDW sediments. The screening levels calculated for this tool incorporate a number of conservative assumptions, including the absence of contaminant dilution and ample time for contaminant concentrations in soil, sediment, and groundwater to achieve equilibrium. In addition, the screening levels do not address issues of contaminant mass flux from upland to sediments, nor do they address the area or volume of sediment that might be affected by upland contaminants. Because of these assumptions and uncertainties, these screening levels are most appropriately used for ruling out, but not establishing, a concern. If contaminant concentrations in upland soil or groundwater are below these screening levels, it is unlikely they will exceed marine sediment SQS. The use of this tool to screen out contaminants in the presence of non-aqueous phase liquids is inappropriate. However, upland concentrations that exceed these screening levels may or may not pose a threat to marine sediments. Additional site-specific information must be considered in order to make such an assessment.

Where feasible, these screening tool levels were compared to the most recent upland groundwater and soil results for a given property or study area. Generally, if a contaminant is not detected above the applicable screening tool level, given appropriate reporting limits, then the contaminant is not considered to be a COC for the given location. However, in some instances site-specific criteria may be more stringent than the screening tool levels. In this case if a detected contaminant concentration is below a screening tool level, but above a site-specific criterion, then it cannot be ruled out as a COC. In other cases the method detection limit (MDL) or reporting limit may be greater than a screening tool level. In these cases it cannot be determined if the concentration is below the screening tool level, so the contaminant cannot be ruled out as a COC unless other factors prevail.

Contaminants of Concern Identified

Contaminants identified in upland media that exceeded an applicable screening level were identified as COCs and are listed in the table below. The upland media the COC was found in, as well as the potential pathways identified for the COCs to reach LDW sediments, are also summarized in the table. Detailed information pertaining to the COCs identified is included in Section 4 for each facility of concern.

Each COC identified in upland media was considered for screening against levels defined by Ecology's screening tool, discussed above, to determine whether the potential COC could be ruled out. However, the screening tool did not apply either because the COCs identified for RM 2.0-2.3 East were not SMS compounds, or because the compound was found in media other than soil or groundwater (e.g., storm drain solids, storm water).

3.4 Potential Pathways of Contamination to Sediment

To assess whether contamination in upland media is a potential source of LDW sediment recontamination, potential pathways between the potential source and the LDW must be evaluated. Pathways can lead to either point or non-point discharges. Point discharges include direct stormwater discharges via outfalls, spills, combined sewer overflow outfalls and direct wastewater discharges. Non-point discharges include groundwater migration, erosion or leaking from bank soils, and atmospheric deposition. In some cases a pathway is not known to have, historically or currently, any contamination. However, this report considers all pathways that may provide a conduit for upland contaminants to reach LDW sediments. The potential contaminant migration pathways evaluated for RM 2.0-2.3 East are described below and are discussed in more detail in Section 4.

Stormwater

Stormwater discharges directly to the LDW via outfalls or as surface runoff from properties adjacent to the LDW. Stormwater from urban areas may contain a wide variety of substances including bacteria, metals, oil, detergents, pesticides, fertilizers, and other chemicals that are washed off the land during rain events. These pollutants are transported in dissolved and particulate phases to the LDW by a combination of public and private storm drain systems. Storm drains can also convey materials from businesses with NPDES-permitted discharges, vehicle washing, runoff from landscaped areas, erosion of contaminated soil, infiltration of contaminated groundwater through breaks in conveyance lines, and materials illegally disposed of into the system.

Storm drain and combined sewer systems in the LDW area are discussed in Section 2.3, and more specifically within the RM 2.0-2.3 East stormwater drainage basin in Section 3.1. Outfalls that discharge directly to the LDW within RM 2.0-2.3 East are shown in Figures 3 and 4, and include one public CSO/SD, one public storm drain, and two private storm drains. These outfalls, discussed in detail in Section 4, are:

- South Brighton Street CSO/SD, owned by city of Seattle
- South River Street SD, owned by city of Seattle
- Outfall No. 2025, owned by SCS Refrigerated Services
- Outfall No. 2024, owned by Glacier Marine Services (Fox Avenue Building LLC)

Groundwater

Contaminated groundwater may enter the LDW directly via groundwater discharge to surface water, tidal fluctuation, seeps, or infiltration into storm drains/pipes, ditches, or creeks that discharge to the LDW. Contaminants from spills and releases to soils on properties in the RM 2.0-2.3 East drainage basin area may migrate to groundwater and subsequently be transported to RM 2.0-2.3 East sediments.

In general, shallow groundwater in the Duwamish Valley is typically encountered within about 10 feet (3 meters) of the ground surface and exists under unconfined conditions. The general direction of shallow groundwater flow in the Duwamish Valley is toward the LDW, although the direction may vary locally depending on the nature of the subsurface material, proximity to the LDW, and tidal action. High tides can cause temporary groundwater flow reversals, generally within 300 to 500 feet (100 to 150 meters) of the LDW (SAIC 2006b).

Spills

Spills of waste materials containing contaminants of concern may occur directly to the LDW through in-water activities or onto the ground within the RM 2.0-2.3 East drainage basin. Activities occurring in the RM 2.0-2.3 East upland areas at this time may result in spills if adequate containment procedures are not followed.

Bank Erosion

Waterway bank soil, contaminated fill, waste piles, landfills, and surface impoundments may release contaminants directly into RM 2.0-2.3 East waters through soil erosion, soil erosion to stormwater, leaching to groundwater, or leaching from banks to the LDW.

Atmospheric Deposition

Atmospheric deposition occurs when air pollution deposits enter the LDW directly or through stormwater. Such deposits can become a possible source of contamination to RM 2.0-2.3 East sediments. Air pollution is generated from point source or widely dispersed air emissions. Examples of point source emissions include paint overspray, sand-blasting, industrial smokestacks, and fugitive dust and particulates from loading/unloading of raw materials (for example, sand, gravel, and concrete). Examples of widely dispersed emissions include vehicle emissions and aircraft exhaust.

None of the facilities of concern identified for RM 2.0-2.3 East have current operations that have known point source emissions of air pollution that may contribute contaminants to RM 2.0-2.3

East sediments. Air traffic at King County International Airport (KCIA) may result in significant emissions, but this pertains to the entire airfield operations and lies outside the scope of this report.

The Washington State Department of Health hired a consultant to model air emissions from multiple sources in south Seattle. The objective of the multiple-source air modeling project in the Duwamish valley was to identify (1) air pollutants, (2) key air pollution sources affecting residential areas of south Seattle, and (3) the geographic areas of south Seattle affected by air pollutants. This effort is an initial step to identify priorities for future work in the area. The modeling report will summarize key findings of the modeling effort and recommend future actions. Ecology understands the report will be published in 2008. A study on atmospheric deposition planned by the Puget Sound Partnership has not been funded yet and no schedule has been developed. Ecology will continue to monitor these efforts (Ecology 2008b).

Out of concern for phthalate recontamination at sediment cleanup sites in the larger Puget Sound region, the Sediment Phthalates Work Group was formed in 2006. One of the group's accomplishments was reviewing existing information to explore the potential for phthalate recontamination via atmospheric pathways. The group concluded that phthalates reach sediments through a complex pathway involving off-gassing to air followed by attachment to particulates, deposition to the ground, and transport to sediments through stormwater (Sediment Phthalates Work Group 2007).

King County conducted air monitoring in the LDW area to assess whether atmospheric deposition is a potential source of phthalates, particularly bis(2-ethylhexyl)phthalate (BEHP), in stormwater runoff (KCDNRP 2008). The most significant finding is that BEHP concentrations were up to three times greater in the Duwamish valley stations than in the Beacon Hill station. Results were similar to results from other studies conducted within the same airshed and within other regions.

Based on a comparison with results from other atmospheric deposition networks that employed high-volume air sampling techniques to collect gaseous and particulate phase air samples, the total deposition results from this study are likely to be biased low for the lighter phthalates, low- to mid-range PAH compounds, and low- to mid-range PCB congeners. Since side-by-side comparison sampling of the passive atmospheric deposition samplers with high-volume air samplers was not conducted, it is not possible to assess the degree of bias (KCDNRP 2008).

The sampling stations were located at Beacon Hill, Duwamish Valley, Georgetown, KCIA, and South Park Community Center. The following range of air deposition flux values was observed (KCDNRP 2008):

Analyte	Range of Air Deposition Flux (µg/m2/day)	Location of Highest Values
Butyl benzyl phthalate	0.163 to 7.007	South Park
Bis(2-ethylhexyl)phthalate	0.261 to 12.240	Duwamish Valley
Benzo(a)pyrene	0.008 to 2.225	KCIA
Pyrene	0.035 to 4.652	KCIA
Aroclor 1254	<0.011 to 0.044	Georgetown
Aroclor 1260	<0.011 to 0.034	Georgetown

Detailed results are provided in King County's *Monitoring Report – October 2005 to April 2007* (KCDNRP 208).

4.0 Potential Sources of Sediment Recontamination

This section summarizes available information on potential contaminant sources and pathways. This summary was evaluated to identify any potential for contaminant migration and recontamination of LDW sediments. In some instances, data or lack of data indicates a source or pathway may be present. A data gap is identified when available data are insufficient to confirm or rule out the presence of contamination or any significant potential for contaminant migration to LDW sediments.

Within RM 2.0-2.3 East, potential sources of sediment recontamination include direct discharges via outfalls and direct and/or indirect discharges from facilities of concern that are within the RM 2.0-2.3 East source control area, both adjacent to and upland from the LDW. These outfalls and facilities of concern are illustrated in Figures 3 and 4 and are discussed in the following sub-sections. Information on the four outfalls known to discharge directly to the LDW from RM 2.0-2.3 East is summarized in Section 4.1.

Within the scope of this report, facilities within RM 2.0-2.3 East were identified as facilities of concern if Ecology's files showed the facilities as contaminated sites or permitted facilities, the facilities were shown to be within RM 2.0-2.3 East in Ecology's Facility/Site Database, or the facilities were listed as primary upland properties in the vicinity of RM 2.0-2.3 East in the November 2007 *Lower Duwamish Waterway Phase 2 Remedial Investigation Draft Report* (Windward 2007a). Table 4 summarizes all the facilities of concern that were identified, the source of identification, whether the facility was included as a facility of concern in this report, and errors that may have been identified in Ecology's Facility/Site Database during the review.

Facilities of concern are categorized in Sections 4.2 and 4.3 as adjacent or upland facilities of concern, and are discussed in order from north to south and west to east, as shown in Figures 2 through 4. The facilities of concern were evaluated for the following means of potential recontamination of LDW sediments:

- Existing upland contamination of soil, groundwater, stormwater, or storm drain solids;
- Migration pathways that may exist between the potential sources and the LDW; and
- Activities that could lead to an accidental release of a contaminant of concern.

Current and historical land uses, environmental investigations and cleanup activities, and facility inspections were summarized for each facility of concern where information was available. More detail is provided for facilities where more information was available for review. Property ownership information was obtained from King County tax records and from existing reports. Current land use information was obtained from existing reports and Ecology online databases. The Ecology online databases were searched for information on current NPDES permit numbers, USTs, LUST release incidents, and hazardous waste facilities, and for inclusion of the property on the CSCSL. Reports and miscellaneous information in Ecology's files were also reviewed for relevant information. Section 1.2 lists all the sources reviewed for this report.

4.1 Stormwater Outfalls

4.1.1 South Brighton Street CSO/SD

The South Brighton Street CSO/SD outfall and CSO drainage basin are shown in Figures 3 and 4. Combined sewer systems in the LDW area are discussed in Section 2.3, and the RM 2.0-2.3 East drainage basin is discussed in Section 3.1. As shown in Table 1, the South Brighton Street CSO/SD discharges at approximately RM 2.1 East.

The storm drain lines shown in Figure 4 indicate that the following facilities of concern may connect to the city storm drain system and discharge to the LDW under normal conditions via the South Brighton Street CSO/SD: Seattle Distribution Center, Glacier Marine Services, and Shultz Distributing. Furthermore, the function of the connection between the South Brighton Street CSO/SD and the South Myrtle Street SD to the south is not clear from the available storm drain mapping data (Figure 4). This conduit may be a pathway for stormwater, and potentially contaminants, to flow from RM 2.0-2.3 East into the adjacent Source Control Area or vice versa. Table 4 summarizes these facilities of concern and the seven main facilities of concern discussed in Sections 4.2 and 4.3.

SPU records show that the South Brighton Street CSO/SD has not overflowed since monitoring began in March 2000 (see Table 1). According to SPU, land use within the 34.4-acre South Brighton Street CSO drainage basin as of 2001 was 10% residential, 65% industrial and 25% parks (SPU 2001).

In 2000, the city of Seattle conducted a study to predict the chemical quality of Seattle’s CSO discharges based on data from CSOs in other municipalities in the Northwest, and to determine whether there is any evidence that chemicals in sediment adjacent to outfalls can be attributed to CSOs. At the South Brighton Street CSO/SD, polychlorinated biphenyl (PCB) concentrations exceeded the CSL in one of five sediment samples collected within 250 feet (76 meters) of the outfall. However, PCB concentrations were below the CSL at the four stations located closest to the outfall (Windward 2003).

4.1.1.1 Facilities of Concern

South Seattle Community College

The South Seattle Community College facility is within the South Brighton Street CSO drainage basin at the intersection of East Marginal Way South and Corson Avenue South (see Figure 3).

According to King County tax records, Washington State Department of Transportation purchased the property from Washington State Department of Natural Resources on April 29, 2004. The current taxpayer is listed as Buttleman, Kurt R./South Seattle Community College. There are two buildings on the property: a 54,035-square-foot building built in 2007 (called "Building E" with predominant use listed as "Vocational School"), and a 13,450-square-foot building built in 2007 (predominant use listed as "College") (King County 2007a).

Facility Summary: South Seattle Community College	
Address	6737 Corson Avenue South
Property Owner	Buttleman, Kurt R./South Seattle Community College
Former/Alternative Property Names	Arrow Transportation Inland Transportation Company Ben's Truck Parts Hat n' Boots Gas Station
Former/Alternative Addresses	See Ben's Truck Parts and Hat n' Boots Gas Station sections below
Former/Alternative Lessee/Operator Names	N/A
Tax Parcel No.	0001800137
Parcel Size	7.03 acres
NPDES Permit No.	N/A
EPA RCRA ID No.	See Arrow Transportation section below
EPA TRI Facility ID No.	N/A
Ecology Facility/Site ID No.	See each former facility section below
Ecology UST Site ID No.	See Arrow Transportation, Ben's Truck Parts and Hat n' Boots Gas Station sections below
Ecology LUST Release ID No.	N/A
Listed on Ecology CSCSL	No

The four former facilities of concern identified within the South Brighton Street CSO drainage basin are Arrow Transportation, Inland Transportation, Ben's Truck Parts, and Hat n' Boots Gas Station. All four facilities were formerly on tax parcel no. 0001800137. The new South Seattle Community College Campus now occupies the entire property. Table 4 summarizes these facilities of concern along with the seven main facilities of concern discussed in Sections 4.2 and 4.3.

Available information from the online databases listed in Section 1.3 is summarized in the following sub-sections for the four former facilities of concern. In addition to online database information, one file was available for review in Ecology's files pertaining to Inland Transportation Company (see below). In general, very little information was available pertaining to site use or potential residual contamination at the four former facilities.

Arrow Transportation

Arrow Transportation is listed on Ecology's Facility/Site Database at 6737 Corson Avenue South, with Facility/Site ID No. 69693852 (Ecology 2007a). The facility is also listed on Ecology's Hazardous Waste Facility Search Database with Resource Conservation and Recovery Act (RCRA) Site ID No. WAD007942733 (inactive since 12/31/1991) (Ecology 2007d).

Arrow Transportation is on Ecology's UST List with UST Site ID No. 1940. Four USTs were removed from the site; one contained used oil/waste oil, and contents of the other three are not known. UST removal dates are not listed (Ecology 2007e).

Inland Transportation Company

Inland Transportation Company is in the Ecology Facility/Site Database with an address of 6737 Corson South and Facility/Site ID No. 2134 (Ecology 2007a).

On March 12, 1985, Ecology performed a "Potential Hazardous Waste Site Preliminary Assessment." According to Ecology, Inland Transportation was a contract hauler of petroleum and chemical products and wastes, and the facility was used for truck storage, maintenance, and washing. Offices were also present at the facility. The facility handled many different chemicals and petroleum wastes, none stored on-site except the wastes remaining in trucks after deliveries. Other wastes at the site, mainly oils and pre-treatment sludges, resulted from truck maintenance and repair. According to Ecology, all wastes appeared to be properly handled and disposed. Runoff was collected and treated by an oil/water separator prior to discharge to the sanitary sewer, and trucks were kept in "dedicated service," carrying only one type of chemical to lessen the frequency of tank cleaning (Ecology 1985).

According to Ecology, past practices at the Inland Transportation Company facility in the 1970s had resulted in contaminant discharges to the LDW. Apparently an inspection performed by King County (known as "Metro" at that time) observed truck cleaning at the site, during which 5-10 gallons of waste oil, some perchloroethylene, and other materials were discharged to the LDW. According to the 1985 inspection performed by Ecology, wastes were managed appropriately in 1985, and Ecology concluded it unlikely that any residual contamination remained on-site (Ecology 1985).

Ben's Truck Parts

Ben's Truck Parts is in Ecology's Facility/Site Database with an address of 6655 Corson Avenue South and Facility/Site ID No. 74169521 (Ecology 2007a).

The facility is on Ecology's UST List with UST Site ID No. 396593. One UST that had stored leaded gasoline was removed from the site. The UST removal date is not listed (Ecology 2007e).

Hat n' Boots Gas Station

Hat n' Boots Gas Station is in Ecology's Facility/Site Database as "WA DNR Corson Ave Site Hat Boots" at 6800 East Marginal Way South, with Facility/Site ID No. 61845527 (Ecology

2007a). The actual location was determined to be southeast of the address listed, at approximately the intersection of East Marginal Way South and Corson Avenue South.

The Hat n' Boots Gas Station is on Ecology's UST List with UST Site ID No. 8914. Three USTs containing diesel oil, unleaded gasoline, and leaded gasoline were removed from the site on unlisted dates (Ecology 2007e).

4.1.1.2 Data Gaps

The following data gaps have been identified for the South Brighton Street CSO/SD. These must be addressed before effective source control can be accomplished for the RM 2.0-2.3 East source control area.

- Source tracing and sampling is needed in the South Brighton Street CSO/SD drainage basin to identify additional potential sources of LDW sediment recontamination.
- Dye testing should be performed to determine if any properties west of East Marginal Way are discharging stormwater to the South Brighton Street CSO/SD.
- The possible connection between South Brighton Street CSO/SD and South Myrtle Street SD needs to be examined to understand any potential interfaces between the adjacent Source Control Areas.
- According to Ecology's files, a memo was written by the National Atmospheric and Oceanographic Administration (NOAA) dated July 19, 1993, and named "Fox Avenue South CSO/SD." Available information indicates that "Fox Avenue South CSO/SD" most likely refers to the South Brighton Street CSO/SD. The memo discussed high levels of arsenic, zinc, copper, and lead in Slip 3 and within the storm drain system. The Marine Power & Equipment (MP&E) facility's sandblasting operations were discussed as the possible contamination source. The memo also stated that high levels of high and low molecular weight polyaromatic hydrocarbons, dibenzofuran, phthalates, phenols, vinyl chloride, and similar chemicals were found in the drainage system. Mention of this memo was not discovered until very late in the report-writing process. The memo was not available at the time but should be reviewed.
- The four former facilities of concern (Arrow Transportation, Inland Transportation Company, Ben's Truck Repair, and Hat n' Boots Gas Station) are no longer present on the property now occupied by South Seattle Community College. Very little information was available for review pertaining to historical site use at these four facilities. The historical records should be further investigated for potential sources of sediment recontamination.

4.1.2 South River Street SD

The South River Street SD is shown in Figures 3 and 4. Storm drain systems in the LDW area are discussed in Section 2.3, and the RM 2.0-2.3 East stormwater drainage basin is discussed in Section 3.1.

The drainage lines depicted in Figure 4 indicate that V. Van Dyke and Riverside Industrial Park may connect to the city storm drain system and discharge to the LDW via the South River Street SD. SCS Refrigerated Services, Muckleshoot Seafood Products, and Rainier Petroleum may discharge to the LDW through the South River Street SD, although connections to the storm drain system are not shown. Also, Figure 4 shows a drain line on the west side of V. Van Dyke that appears to connect to the 1st Avenue South Bridge SD. The function of this line is not clear from the available storm drain mapping data. This conduit may be a pathway for stormwater, and potentially contaminants, to flow from RM 2.0-2.3 East into the adjacent Source Control Area.

4.1.2.1 Data Gaps

The following data gaps have been identified for the South River Street SD. These data gaps must be addressed before effective source control can be accomplished for the RM 2.0-2.3 East source control area.

- Dye testing should be performed to confirm the connection of the facilities of concern listed above to the South River Street SD.
- The overlap of drainage lines in RM 2.0-2.3 East that may discharge to the 1st Avenue South Bridge storm drain line should be examined to understand any interfaces between the adjacent Source Control Areas.
- The city storm drain system should be further investigated to determine whether additional facilities of concern might discharge stormwater to the LDW through the South River Street SD.

4.1.3 Private Stormwater Outfalls

Known private stormwater outfalls that discharge to the LDW from RM 2.0-2.3 East include one private stormwater outfall belonging to SCS Refrigerated Services and one belonging to Glacier Marine Services. These two outfalls can be seen in Figures 3 and 4, and are discussed in Sections 4.2.1 and 4.2.3.

4.2 Adjacent Facilities of Concern

4.2.1 SCS Refrigerated Services

Facility Summary: SCS Refrigerated Services	
Address	303 South River Street
Property Owner	SCS Holdings LLC
Former/Alternative Property Names	Seattle Cold Storage (SCS) SCS Industries SCS Holdings FEI Refrigerated Services
Former/Alternative Addresses	173 South River Street 203 South River Street 315 South River Street 205 South River Street
Former/Alternative Lessee/Operator Names	Northland Services Puget Sound Ice Manufacturing
Tax Parcel No.	5367204100
Parcel Size	3.58 acres
NPDES Permit No.	SO3005565
EPA RCRA ID No.	N/A
EPA TRI Facility ID No.	N/A
Ecology Facility/Site ID No.	34383748
Ecology UST Site ID No.	N/A
Ecology LUST Release ID No.	N/A
Listed on Ecology CSCSL	No

SCS Refrigerated Services is adjacent to the LDW on the east side between RM 2.0 and 2.1. The property is bordered on the south by the Slip 3 Inlet. The Seattle Distribution Center facility is adjacent to the property to the east and the Rainier Petroleum facility is adjacent to the property to the west. The SCS Refrigerated Services property is bordered on the north by South River Street. The Riverside Industrial Park property is across South River Street from SCS Refrigerated Services.

According to King County tax records, SCS Holdings LLC purchased the property from Schnitzer Investment Corporation on January 15, 1998. The one building on the property is a 71,718-square-foot cold storage warehouse built in 1969 (King County 2007a).

According to Ecology's Facility/Site Database, the SCS Refrigerated Services facility, listed as SCS Industries, operates under Industrial Stormwater General Permit No. SO3005565 (Ecology 2007a); however, no SWPPP was found on file with Ecology. According to the November 2007 *Lower Duwamish Waterway Phase 2 Remedial Investigation Draft Report* (Windward 2007a), the facility discharges to the LDW through a private storm drain designated Outfall No. 2024, depicted in Figure 4. The outfall is 12 inches in diameter and has a flow rate of 10 gallons per minute (gpm). Three outfalls are covered under the facility's NPDES permit; they may all discharge to the LDW through Outfall No. 2024, or some may discharge to the city storm drain system (Windward 2007a).

4.2.1.1 Current Operations

According to the SCS Refrigerated Services webpage, the SCS Refrigerated Services facility provides cold storage in a refrigerated warehouse space and distribution in the Puget Sound area. The facility is currently for sale and relocation to the company's Terminal 25 facility is anticipated by summer 2008 (SCS 2008). The facility can be seen in Figure 6, an aerial photo of the Slip 3 Inlet area taken in July 2006.

4.2.1.2 Historical Use

According to King County tax records, residences were constructed on the SCS Refrigerated Services property beginning in 1908. In 1919, a boat shop and shed were constructed on a portion of the property with an address of 314 South River Street, and in 1937 the sign on the boat shop read Paragon Boat Company; this portion of the property was purchased by S.S. Mullen, Inc., in 1956 and portions of the buildings were still standing in 1964.

In 1939, a shed was constructed to cover a drag saw, used to saw large logs, on the portion of the property that had an address of 177 South River Street. A log chute on piling extending into the LDW was also present on this portion of the property, but was removed by 1950. A concrete block factory was constructed on the 177 South River Street portion of the property in the 1940s and was torn down in 1967. A new shed was added to this portion of the property in the 1950s.

In 1958, a shop was moved by E.C. Perkins to the portion of the property with an address of 215 South River Street.

In 1967, Farwest Capitol Company moved an office building onto the portion of the property that had an address of 173 South River Street; the office building was moved off the property in 1969. The existing warehouse building was constructed in 1968 and 1969, and according to the SCS Refrigerated Services webpage, the SCS Refrigerated Services facility began operations in 1969 under the name of Seattle Cold Storage (SCS 2008).

According to King County tax records, Farwest Capitol Company sold the property to Schnitzer Investment Corporation on October 10, 1969. Under Schnitzer Investment Corporation, lessees and operators at the facility included Puget Sound Ice Manufacturing 1992-1993, Northland Services 1996-2001, and SCS Holdings beginning in January 1998. SCS Refrigerated Services changed its name to FEI Refrigerated Services in December 1997.

4.2.1.3 Facility Inspections

Stormwater Compliance Inspection, SCS Refrigerated Services (May 2007)

On May 30, 2007, Ecology conducted a Stormwater Compliance Inspection, prompted by zinc, copper, and turbidity monitoring data that exceeded benchmark and/or action levels, according to the Industrial Stormwater General Permit requirements. In 2005, discharge monitoring reports (DMRs) from the facility showed that zinc, copper, and turbidity exceeded the benchmark values and action levels. The benchmark values and action levels in micrograms per liter (µg/L) are, respectively, 117 and 372 for zinc, and 15 and 30 for copper; the benchmark value and action level for turbidity in NTUs are 25 and 50. Zinc was measured at 495 µg/L n the first quarter of 2005 and at 785 µg/L in the third quarter. Copper was not reported in the first quarter, and measured at 77.1 µg/L in the third quarter. Turbidity was less than the benchmark value in the first quarter, but exceeded both the benchmark value and action level in the third quarter at 110 NTUs. "No qualifying storm event" was entered for the second quarter monitoring data (Ecology 2007f).

During the inspection, Ecology made the following recommendations (Ecology 2007f):

1. Clean up all areas that have an accumulation of sediment and other material.
2. Submit a "Level 2 Source Control Report" to Ecology for zinc.
3. Complete the actions required for a "Level 1 Response" for copper and turbidity.
4. Inspect, clean, and remove sediment from all catch basins.
5. Conduct quarterly visual monitoring, summarize observations and include a report or checklist in the facility's SWPPP.

4.2.1.4 Potential Pathways of Contamination

Stormwater

The SCS Refrigerated Services facility discharges untreated stormwater to the LDW through a private storm drain, designated as Outfall No. 2024 and shown in Figure 4. Three outfalls are covered under the facility's NPDES permit; they may all discharge to the LDW through Outfall No. 2024, or some may discharge to the city storm drain system. Figure 4 shows that stormwater from the eastern portion of the SCS Refrigerated Services facility discharges through Outfall No. 2024, and that stormwater along the northern edge of the facility discharges elsewhere. Perhaps stormwater drainage from the northern edge of the facility connects to the city storm drain system and discharges to the LDW through the South River Street SD, but the connection is not shown and its existence should be confirmed.

The SCS Refrigerated Services facility stormwater discharge is authorized under the Industrial Stormwater General Permit. Compliance with the SWPPP maintained by the facility will minimize the potential for contaminants to migrate to the LDW via stormwater. However, the facility's stormwater discharge has exceeded permit benchmark values for zinc, copper, and turbidity in the past, and a Stormwater Compliance Inspection conducted in May 2007 identified catch basins with accumulations of sediment requiring cleaning. Information was not available for review to determine whether benchmark values are no longer exceeded or whether catch basins are now kept clean.

Additionally, in 2006, LDW sediment sampling identified benzyl alcohol in surface sediment above SQS and CSL values at LDW-SS73, depicted in Figure 5. Benzyl alcohol was identified as a COC for RM 2.0-2.3 East, and is discussed in Section 3.2.1. Because LDW-SS73 is close to Outfall No. 2024, the source of benzyl alcohol at this location could be stormwater discharge from SCS Refrigerated Services.

Spills

Although no spills are known to have occurred at the facility, spills may be a potential pathway of contamination through both the facility's storm drain system as described above and through surface runoff, since the facility is directly adjacent to the LDW. Whether any spills have been documented at the facility is unknown.

Groundwater

Groundwater from the SCS Refrigerated Services facility likely flows toward the LDW. However, the file review revealed no reports of known soil or groundwater contamination at the SCS Refrigerated Services facility.

Bank Erosion

The SCS Refrigerated Services facility is on the east bank of the LDW; however, the information reviewed gave no indication as to whether or not there is a potential for bank erosion or leaching of near-bank soils to recontaminate LDW sediments. This potential needs to be assessed.

Atmospheric Deposition

The information reviewed gave no indication that any activities at the SCS Refrigerated Services facility may result in atmospheric deposition.

4.2.1.5 Data Gaps

The following data gaps have been identified for the SCS Refrigerated Services property. These data gaps must be addressed before effective source control can be accomplished for the RM 2.0-2.3 East source control area.

- Detailed information regarding current operations at the SCS Refrigerated Services facility is needed to determine the threat facility operations may pose to LDW sediments.
- Ecology should obtain a copy of the facility's SWPPP. Information is needed that describes the facility's storm drain system to determine whether stormwater discharge from the SCS Refrigerated Services facility could lead to sediment recontamination.
- The discharge point of storm drain lines along the northern edge of the facility is not known and should be determined.
- A Stormwater Compliance Inspection was performed at the facility on May 30, 2007. Ecology specified actions to be taken in response to zinc, copper, and turbidity exceedances of benchmark values in the facility's 2005 DMRs. Ecology also required that accumulated sediment be cleaned from catch basins and other areas. Ecology should verify whether SCS Refrigerated Services complied with Ecology's requests.
- More information on historical site use, such as dates of operation under the Paragon Boat Company or the concrete block factory, is needed to determine whether operations may have led to contamination of concern to LDW sediment recontamination.
- The possibility that bank erosion may be a pathway of contamination to LDW sediments should be investigated.

4.2.2 Seattle Distribution Center

The Seattle Distribution Center is adjacent to the LDW on the east side at approximately RM 2.2. The property is bordered on the west by the SCS Refrigerated Services facility, the Slip 3 Inlet and the Glacier Marine Services facility. The property is bordered on the northeast by East Marginal Way South and on the south by South Brighton Street. Seattle Distribution Center is across South Brighton Street from the Shultz Distributing facility.

According to King County tax records, CLPF-Seattle Distribution Center LP purchased the property from Schnitzer Investment Corporation on August 25, 2004. The two buildings on the property are a 124,472-square-foot and a 50,065-square-foot distribution warehouse, both built in 1967 (King County 2007a).

Facility Summary: Seattle Distribution Center	
Address	6701 East Marginal Way South
Property Owner	CLPF-Seattle Distribution Center LP
Former/Alternative Property Names	N/A
Former/Alternative Addresses	6749 East Marginal Way South 6797 East Marginal Way South
Former/Alternative Lessee/Operator Names	See Section 4.2.2.1 below
Tax Parcel No.	5367204080
Parcel Size	6.96 acres
NPDES Permit No.	N/A
EPA RCRA ID No.	N/A
EPA TRI Facility ID No.	N/A
Ecology Facility/Site ID No.	N/A
Ecology UST Site ID No.	N/A
Ecology LUST Release ID No.	N/A
Listed on Ecology CSCSL	No

4.2.2.1 Current Operations

The Seattle Distribution Center facility provides warehouses for distribution of products and houses a number of different tenants. The facility can be seen in Figure 6, an aerial photo of the Slip 3 Inlet area taken in July 2006. According to Ecology, in April 2002, the sign posted outside the Seattle Distribution Center listed tenants as Fujitec America, FSI (a Division of MBI Systems), Longview Fibre, Kasen Motorsports, Food Buying Service, Rosella's Fruit & Produce, Summit Brokerage, Hoa Ying Trading Corp., SCS Refrigerated Services, and Campbell Chain/Cooper Tools.

4.2.2.2 Historical Use

According to King County tax records, a two-story warehouse owned by Seattle Retail Lumber Company was constructed on the Seattle Distribution Center property in 1915. Seattle Retail Lumber Company also used a small house and garage constructed in 1937 and an existing frame warehouse remodeled in 1944. A three-story mill was also built in the 1940s. In 1969, all the above-mentioned buildings were torn down.

According to King County tax records, the Seattle Distribution Center property was owned by King County 1943 through 1945; lessees and operators at the property included B.W. Lockwood and Seattle Lumber Retail Company. Entities listed in association with the Seattle Distribution Center property include Alice L. Lockwood and Nellum Investment Corporation in 1966, and Schnitzer Investment Company apparently purchased the property from Farwest Capitol Company on October 10, 1969. Under Schnitzer Investment Company, Puget Sound Ice Manufacturing is listed in 1992-1993 records and D&J Property LLC is listed in 2004 in association with the property. CLPF-Seattle Distribution Center purchased the property from Schnitzer Investment Company in 2004.

4.2.2.3 Potential Pathways of Contamination

Stormwater

Figure 4 shows that the Seattle Distribution Center facility storm drain system discharges stormwater from the facility in multiple locations. In the northern portion of the property, the Seattle Distribution Center storm drain system connects to the SCS Refrigerated Services storm drain system and discharges to the LDW through the SCS Refrigerated Services' permitted private storm drain, Outfall No. 2024, discussed in Section 4.2.1. Although Figure 4 is not clear, to the south of Outfall No. 2024, it appears that the Seattle Distribution Center storm drain system may discharge to the Slip 3 Inlet through the facility's own private storm drain. Finally, at the southern end of the property, it appears that the Seattle Distribution Center storm drain system connects to the city's storm drain system and discharges to the LDW through the South Brighton Street CSO/SD. Figure 4 apparently shows that stormwater from the Seattle Distribution Center facility migrates to the LDW via multiple storm drain lines; however, information on existing contamination or operations at the facility that may create stormwater pollution was not found in the files for review.

Spills

Little is known about current operations at the Seattle Distribution Center facility. Since distribution of products requires trafficking by truck and railcar, spills may be a pathway of contamination. Furthermore, spills could migrate to the LDW both through the facility's storm drain system and through surface runoff, since the facility is directly adjacent to the LDW. However, no documentation pertaining to spills was found in the files for review.

Groundwater

Groundwater in the vicinity of the Seattle Distribution Center facility likely flows toward the LDW. However, no information was found in the files for review regarding known soil or groundwater contamination at the Seattle Distribution Center facility.

Bank Erosion

The northern end of the Seattle Distribution facility is on the east bank of the LDW; however, the information reviewed gave no indication as to whether or not there is a potential for bank erosion or leaching of near-bank soils to recontaminate LDW sediments. This potential needs to be assessed.

Atmospheric Deposition

The information reviewed gave no indication that any activities at the Seattle Distribution facility may result in atmospheric deposition.

4.2.2.4 Data Gaps

The following data gaps have been identified for the Seattle Distribution Center property. These data gaps must be addressed before effective source control can be accomplished for the RM 2.0-2.3 East source control area.

- Detailed information on current operations at the Seattle Distribution Center is needed to determine whether operations at the facility may pose a threat to LDW sediments.
- A description of the facility's storm drain system is needed to determine whether stormwater discharge from the Seattle Distribution facility could be of concern to sediment recontamination; most importantly, storm drain lines discharging to the LDW from the facility must be verified.
- Information on historical site use, particularly when the facility was in operation under Seattle Lumber Retail Company, is needed to determine whether historical operations at the property may have resulted in contamination of concern to LDW sediment recontamination.
- No environmental investigation, cleanup activities, or facility inspections are known to have been conducted at the Seattle Distribution Center facility. A facility inspection should be conducted to ensure that operations at the facility are not of concern to LDW sediments.
- Figure 4 apparently shows that the Seattle Distribution Center facility may discharge some of its stormwater through a private storm drain. The presence of this storm drain should be confirmed.
- Requiring the Seattle Distribution Center facility to have a NPDES permit should be investigated.
- The potential for bank erosion as a pathway of contamination to LDW sediments should be investigated.

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4.2.3 Glacier Marine Services

Facility Summary: Glacier Marine Services	
Address	6701 Fox Avenue South
Property Owner	Seatac Marine Properties LLC
Former/Alternative Property Names	Northland Services United Marine International United Marine Shipbuilding (UNIMAR) Evergreen Marine Leasing Marine Power & Equipment (MP&E) Reliable Transfer & Storage Peter Pan Seafoods
Former/Alternative Lessee/Operator Names	Johnson Manufacturing
Tax Parcel No.	0001800104 (north) 0001800128 (south)
Parcel Size	5.85 acres (north) 5.24 acres (south)
Former/Alternative Addresses	6751 Fox Avenue South (Parcel 0001800104) 6809 Fox Avenue South (Parcel 0001800128) 6803 Fox Avenue South (Parcel 0001800128)
NPDES Permit No.	SO3000962
EPA RCRA ID No.	WAD980977128 (inactive since 12/31/2004)
EPA TRI Facility ID No.	98108NTDMR6701F
Ecology Facility/Site ID No.	22653378
Ecology UST Site ID No.	11256
Ecology LUST Release ID No.	N/A
Listed on Ecology CSCSL	No

Glacier Marine Services is adjacent to the LDW on the east side, at approximately RM 2.2. The property is bordered on the north by the Slip 3 Inlet and on the west by the main channel of the LDW. Bunge Foods is immediately adjacent to the Glacier Marine Services property to the south. Fox Avenue South bounds the property on the east. East of Fox Avenue South is the Seattle Distribution Center and the Shultz Distributing facility. South Brighton Street intersects Fox Avenue South on the east side of the property; the South Brighton Street CSO/SD runs beneath the Glacier Marine Services property along the dividing line between the north and south parcels of the property, and discharges to the LDW below the dock of the Glacier Marine Services property.

According to King County tax records, the Glacier Marine Services property encompasses two tax parcels, 0001800104 and 0001800128. An address is not listed for parcel 0001800104; parcel 0001800128 is listed under the facility address of 6701 Fox Avenue South. Seatac Marine Properties LLC purchased both parcels from Fox Avenue LLC on December 29, 2004. Two structures are listed as located on tax parcel 0001800128, including a 44,100-square-foot industrial manufacturing building built in 1976 and a 2,112-square-foot office building built in 1994. No structures are listed for tax parcel 001800104 (King County 2007a).

The Glacier Marine Services facility, owned and operated by Seatac Marine Properties LLC operates under Industrial Stormwater General Permit No. SO3000962. Ownership of the permit was transferred from Northland Services to Seatac Marine Properties LLC effective January 1, 2005. The most recent available SWPPP for review was for Northland Services in 2001.

According to Ecology's files, both United Marine Shipbuilding and Northland Services operated under RCRA ID No. WAD980977128.

According to EPA's TRI database, in the 1988 Release Report and Waste Transfer Report, United Marine International disposed of 1,086,851 pounds of "copper compounds" off-site for solidification/stabilization (EPA 2007a).

According to Ecology's UST List, under Northland Services, two USTs have been removed from the Glacier Marine Services property. One UST stored between 111 and 1,100 gallons of unleaded gasoline; the capacity and contents of the second UST were not specified. In addition, a third UST was listed as exempt. UST removal dates are not listed (Ecology 2007e).

4.2.3.1 Current Operations

The facility currently in operation at the Seatac Marine Properties LLC-owned property is Glacier Marine Services. The most current facility layout is illustrated in Figure 8. The facility can also be seen in Figures 6 and 7, aerial photos of the Slip 3 Inlet area taken in July 2006.

The most recent information reviewed that describes current operations at the facility is from the 2001 SWPPP and Ecology's February 2002 Hazardous Waste Compliance Inspection Report. The SWPPP and inspection report were written when the facility was in operation as Northland Services. Ownership of Industrial Stormwater General Permit No. SO3000962 was transferred from Northland Services to Seatac Marine Services LLC in 2005. An updated SWPPP for Glacier Marine Services was not found in the files for review; however, information reviewed indicated that operations under Glacier Marine Services may be similar to Northland Services' past operations, which are summarized below in Section 4.2.3.2.

4.2.3.2 Historical Use

According to King County tax records, a shop building was constructed on tax parcel 0001800104 in 1926, and an office building was constructed in 1944. A machine shop was constructed on parcel 0001800104 in 1943 and remodeled in 1970. Ownership of the property at the time is not known; however, the office building and machine shop were leased by Johnson Manufacturing Company starting in 1944 and ending sometime in the late 1960s or early 1970s.

According to King County tax records, a concrete and aluminum building was constructed on tax parcel 0001800128 in 1910. The building had an address of 6809 Fox Avenue South, and served as a paint factory; an addition was added in 1955. An industrial manufacturing building was built on the parcel in 1976, and in 1994, an office building was built.

MP&E purchased parcel 0001800104 from Peter Pan Seafoods on October 6, 1977. Available information does not indicate when ownership under Peter Pan Seafoods began. At the time of purchase by MP&E, old shipways, a dock, an old manufacturing building and cranes were present on-site. Parcel 0001800128 was purchased from Reliable Transfer & Storage by MP&E on February 16, 1978. At the time of purchase, an old brick building was on-site (DMC 1979).

MP&E repaired and constructed ships on the property. According to Ecology, between 1981 and 1985, while MP&E was in operation at the property, at least 10 complaints were received in response to the facility shoveling, washing, or dumping sandblasting grit (possibly containing copper) into the river. The design of the drydock allowed blasting grit to enter the water regardless of tarping.

According to Ecology, in 1985, EPA Criminal Investigators conducted an investigation into practices at the MP&E facility. Surveillance was conducted over several months, which identified deliberate disposal of sandblasting grit into the LDW. On April 10, 1987, MP&E, its president and two vice presidents were sentenced in federal court. Information about this criminal investigation was not discovered until very late in the report-writing process, and the criminal investigation report was not available in the files for review; therefore, review of this report will be included as a data gap.

According to reports from Hazardous Waste Compliance Inspections conducted at the facility by Ecology in 1989, ownership of the property changed from MP&E to United Marine Shipbuilding (UNIMAR; also known as Evergreen Marine Leasing) on August 23, 1988. UNIMAR was in the process of ceasing operations during the inspections conducted March through May, 1989, and in May 1989, ownership of the property transferred from UNIMAR to First Interstate Bank due to defaulted loan payments (Cargill 1989).

According to King County tax records, Northland Services purchased both tax parcels from Evergreen Marine Leasing (otherwise known as UNIMAR, apparently under control of First Interstate Bank) on June 16, 1992 (King County 2007a).

Northland Services - Facility Operations

The Northland Services facility operated a marine shipping business, which moved cargo to and from destinations in southeastern Alaska, Anchorage, and western Alaska. The facility operations commonly included transporting fishing industry supplies, construction materials and equipment, and general re-supply items such as groceries, hardware, and vehicles. The facility also shipped frozen fish products from Alaska to Northland Services. The facility operations seldom included the transportation of hazardous waste. Northland Services also provided stevedore support for Samson Tug and Barge Company (Ecology 2002).

According to the 2001 SWPPP, most of the 9-acre site was concrete-covered. A 43,000-square-foot building housed most of the vehicle maintenance activities conducted on-site. As part of its operations, Northland Services conducted on-site fueling for its forklifts, which moved containers to and from the barges. Northland Services' fuel station was in the north central portion of the site and was supplied by two, single-compartment, 550-gallon aboveground storage tanks (ASTs) containing diesel fuel. Kerosene was also stored at the fuel island in a 55-gallon aboveground drum (Anchor 2001).

Northland Services - Storm Drain System

Figure 8 illustrates the Northland Services facility layout in 2001 with approximate catch basin locations depicted. Figure 9 illustrates the site layout in 1989, when the facility was owned and operated by MP&E; the MP&E storm drain and the city storm drain (South Brighton Street CSO/SD) lines are depicted. In 2001, most of the 9-acre site was concrete-covered and a portion of the facility was built over the LDW. Site topography was fairly level. According to the 2001

SWPPP, stormwater drainage from the western portion of the site flowed into numerous discharge points on-site and discharged directly into the LDW (apparently through the South Brighton Street CSO/SD line shown in Figures 9 and 4). These discharge points consisted of openings in the concrete surface that were covered with grates. Stormwater drainage from the eastern portion of the site was collected in catch basins that channeled the stormwater directly into the LDW (apparently through the South Brighton Street CSO/SD line shown in Figures 9 and 4, and through the MP&E storm drain line labeled "003" in Figure 9). Figure 4 shows that Outfall No. 2025 may correlate to the "003" storm drain line; however, this has not been confirmed. Northland Services' standard indoor plumbing and water discharge from its oil/water separator were connected to the local sanitary sewer system (Anchor 2001).

Northland Services - Potential Sources of Stormwater Pollutants

According to the 2001 SWPPP, potential sources of pollution at the Northland Services facility included (Anchor 2001):

- **Vehicle Fluids Handling and Cleaning:** Vehicle fluids were regularly changed at Northland Services. All vehicle maintenance work, including fluids changing, was conducted over one of two pits in the maintenance building. Each pit contained a sump into which fluids drained. Fluids were then pumped into the coalescing oil/water separator at the wash rack, where the oil and other contaminants were removed before the water was pumped into the sanitary sewer system. The oil/water separator was serviced routinely and records were kept on file for at least three years.
- **Refrigerator Container Repair and Maintenance:** Northland Services conducted on-site refrigeration maintenance service to repair and maintain its refrigerated containers. All container repair and maintenance was done inside the maintenance building and all materials used, such as Freon, were contained and recycled.
- **Generator Repair:** Generators were repaired immediately south of the maintenance building inside a container that had been converted into a workshop. Repair involved use of oils and solvents and may have included cleaning the generators. Oils and solvents were captured within the closed container.
- **Touch-up Painting of Barges and Containers:** Touch-up painting of small portions of barges was done in the dock area using rollers during dry weather only. Touch-up painting of containers using rollers was done in the maintenance building. No spray painting was done at the facility. Solvents were used to clean the paint materials, and this was generally done in the maintenance building.
- **Welding Handrails on Barges:** As part of Northland Services' general maintenance program, barge handrails were welded as needed.
- **Fueling:** Diesel was stored on-site in ASTs to fuel the forklifts and other support vehicles. The ASTs were located at the north-central portion of the site. An aboveground kerosene tank, consisting of a 55-gallon drum and 5-gallon pail containers, were also in this area. A propane tank was outside near the southeastern corner of the maintenance building. Spill response kits were kept near the fueling station at all times, and inventories were verified monthly. Because propane is a gas, any accidental release would have emitted pollutants to the air and not to storm or groundwater.

According to King County tax records, on April 7, 2004, Northland Services sold the two tax parcels to Fox Avenue LLC, and on December 29, 2004, Fox Avenue LLC sold both tax parcels to Seatac Marine Properties LLC (King County 2007a).

4.2.3.3 Environmental Investigations and Cleanup Activities

Fox Street/Slip 3 Sampling and Analysis, Marine Power & Equipment (1984)

On April 5, 1984, Metro sampled storm drain solids (referred to as sediment in the report) within the "Fox Street Drainage System." The sampling occurred at the "Fox Street storm drain," which from Figure 10 appears to contribute to the South Brighton Street CSO/SD line upland of the MP&E facility, and at the South Brighton Street CSO/SD outfall, from which MP&E and several other facilities within the South Brighton Street CSO Basin discharge stormwater. On April 18, 1984, Metro collected sediment and water samples from the LDW and sampled dock runoff from MP&E. Metro performed this sampling as part of the Duwamish Monitoring Program, to investigate heavy metal contamination in the vicinity of Slip 3. Figure 10 illustrates the sample locations: "Fox Street" (storm drain upland of MP&E facility), "below drain" (South Brighton Street CSO/SD and discharge from MP&E facility to the LDW), "east drydock" and "west drydock" (in Slip 3 adjacent to the MP&E facility to the north), "downstream" (at the synchrolift, downstream of the MP&E facility), "upriver" (upstream of the MP&E facility) and "dock runoff." Sample results are included in Appendix B; samples were analyzed for lead, arsenic, zinc, copper, cadmium, nickel, chromium, mercury, and oil & grease (Hubbard 1984).

The *Fox Street/Slip 3 Sampling and Analysis Report* (Hubbard 1984) includes hand-drawn locations on Figure 10 and hand-written sample results (Appendix B); the sample results are difficult to read and are unclear about which media was sampled at each location (river sediment or water), and contaminant concentration units are not provided. Sample results were compared to Four-Mile Rock Dredge Spoil Disposal Criteria throughout the report, apparently because sandblasting was known to occur at the MP&E facility, and sediment contaminated with sandblast waste normally exceeded Four-Mile Rock Dredge Spoil Disposal Criteria. Due to unclear data presentation in the report, sampling results are discussed qualitatively and in reference to the Four-Mile Rock Dredge Spoil Disposal Criteria as in the *Fox Street/Slip 3 Sampling and Analysis Report*; further analysis of the data or comparison of sample results to SMS values could not be performed with available information.

The *Fox Street/Slip 3 Sampling and Analysis Report* stated that concentrations of arsenic, cadmium, copper, lead, and zinc found in the storm drain system were among the highest found so far in the Duwamish Monitoring Program. The following conclusions were drawn (Hubbard 1984):

- Very high concentrations of heavy metals were found in storm drain solids collected from the facility storm drain system. Relatively elevated concentrations were also found immediately below its discharge to the LDW, compared to upstream and downstream LDW sediment samples. Very high concentrations of oil & grease were also found in the Fox Street storm drain.

- High concentrations of heavy metals were found in the sediment under both ends of the drydock and at the synchrolift.
- The relative concentrations of lead, arsenic, zinc, and copper in the sediment and water below the synchrolift corresponded very closely with runoff samples collected from the synchrolift.
- The relative concentrations in the Fox Street storm drain did not correspond to sediment samples at the "outfall" (presumably the South Brighton Street CSO/SD outfall), indicating additional inputs between the Fox Street storm drain and the outfall.
- All the samples taken in the facility storm drain system and in the river exceeded the Four-Mile Rock Dredge Spoil Disposal Criteria, but the upriver sample only slightly exceeded the criteria for arsenic.
- Small amounts of drydock material escaping into Slip 3 can cause the sediment to exceed the EPA criteria; almost any amount of drydock solids can cause arsenic and lead violations.

Metro recommended the following (Hubbard 1984):

- Further sampling of water and sediment of the "Fox Street drainage system" is necessary to determine sources of heavy metals and oil & grease.
- Sediment sampling results at the drydock and synchrolift should be evaluated, as it appears that MP&E runoff and drydock material are adversely impacting LDW sediments.

Storm Drain and Sediment Sampling, Marine Power & Equipment (1986)

In March 1986, Metro sampled storm drain solids (referred to as sediment in the report) from storm drains in the vicinity of the MP&E facility, and sediment from the LDW. Available information does not specify whether this sampling was performed specifically to supplement sampling performed in April 1984, discussed above. However, Metro supplied sampling results to EPA for use in its proceedings against MP&E (MP&E was under Federal indictment at the time of this sampling). Figure 11 illustrates sample locations #1 through #19. Sample location #1 appears to correlate with the "Fox Street" location on Figure 10, #2 is at a River Street storm drain, #3 is at a storm drain at the intersection of Fox Street and Willow Street; and #4 through # 8 appear to correlate with "below drain," "upriver," "downstream," "west drydock," and "east drydock," respectively, on Figure 10. Sample locations #9 and #10 appear to have been omitted, as they are not included in the sample results, which are included in Appendix B, and they are not visible on Figure 11. Sample locations #11 through #19 appear to be at catch basins across the MP&E facility. Samples were analyzed for arsenic, cadmium, chromium, copper, mercury, nickel, lead, and zinc; sample results at each location are included in Appendix B (Sample 1986).

An analysis of sample results was not included in available information, but Metro determined that sample results indicated that the MP&E facility was the main source of contamination to storm drains and sediment in the vicinity of Slip 3 (Sample 1986).

As follows, storm drain solids and sediment sample results are compared to SQS values. In order to make the comparison it is assumed that the concentrations provided in the report, and included in Appendix B, are in milligrams per kilogram (mg/kg) dry weight, as appropriate for heavy metals. Units are shown as "mg/kg", but are not specified as dry weight. SMS values are technically not applicable to storm drain solids since they are not considered sediments until washed out into the LDW; however, the comparison is made to put the sample results into context. In mg/kg DW, the SQS values are arsenic (57), cadmium (5.1), chromium (260), copper (390), mercury (0.41), lead (450) and zinc (410); there are no SMS values for nickel.

Storm drain sample locations upland from where the MP&E facility discharges to the storm drain system include sample location #2 (River Street storm drain, which was apparently sampled for "background" since it appears to discharge to the LDW through the South River Street SD, not through the South Brighton Street CSO/SD) and sample location #3, which does discharge to the LDW through the South Brighton Street CSO/SD. Sample location #1 is directly upland of the MP&E facility and downgradient of sample location #3, and discharges to the LDW through the South Brighton Street CSO/SD; MP&E stormwater appears to drain to this storm drain. Sample locations #11 through #19 are on MP&E property.

Results from sample location #2 exceeded SQS values for all of the heavy metals analyzed that are SMS compounds. Results in mg/kg were arsenic (183.3), cadmium (7.5), chromium (266.7), copper (466.7), mercury (0.45), lead (683.3), and zinc (1,300). Results (in mg/kg) from sample location #3 exceeded SQS values for arsenic (111.8), cadmium (6.2), mercury (0.56), lead (617.6), and zinc (852.9). From these sample results, it appears that the storm drain system is contaminated by heavy metals in the Slip 3 area in general; however, heavy metals concentrations detected in catch basins on MP&E property exceeded the SQS values by a considerably larger margin. At sample location #1, and at #11 through #19, concentrations that exceeded SQS values, with ranges in mg/kg, were arsenic (1,045.5 to 3,871), cadmium (6.7 to 18.6), copper (711.5 to 7,627), mercury (0.63 to 0.75), lead (730.8 to 1,891.3), and zinc (2,266.7 to 15,323). Chromium is the only heavy metal included in SMS that was not found in MP&E storm drains at concentrations exceeding SQS values.

Sediment sample locations include #4 (below the South Brighton Street CSO/SD), #5 (upriver of the MP&E facility), #6 (downstream of the MP&E facility), and #7 and #8 (at the west and east ends of the drydock). Arsenic and zinc exceeded SQS values at sample location #4, mercury exceeded the SQS value at sample location #5, arsenic and mercury exceeded SQS values at sample location #7, and arsenic and zinc exceeded SQS values at sample location #8. Samples from location # 6 did not exceed SQS values.

EPA Dive Survey and Sediment Sampling, Marine Power & Equipment (1987)

On February 6, 1987, EPA divers collected sediment samples from the LDW in the vicinity of the MP&E facility. On April 6, 1987, the EPA dive team investigated the amount and extent of sandblasting debris on the river bottom in the vicinity of the MP&E facility. Sediment sample locations are shown in Figure 12: 87060043 (south of synchrolift), 87060044 (lift end of synchrolift) and 87060045 (northwest corner of synchrolift). Sediment samples were analyzed for arsenic, cadmium, chromium, copper, lead, zinc, tin, iron, and mercury. In addition, a bioassay was conducted on sediments collected at each sample location (Matta 1987).

Laboratory analytical results were provided, but an analysis or conclusions were not provided in available information; therefore, sediment sample results are compared to SQS values. In mg/kg DW, the SQS values are arsenic (57), cadmium (5.1), chromium (260), copper (390), lead (450), zinc (410), and mercury (0.41). There are no SMS values for tin or iron. At sample location 87060043, copper at 410 mg/kg and zinc at 1,250 mg/kg exceeded the respective SQS values. At sample location 87060044, cadmium (11.6 mg/kg), copper (1,340 mg/kg), lead (539 mg/kg), and zinc (3,790 mg/kg) all exceeded the respective SQS values. At sample location 87060045, zinc (700 mg/kg) exceeded the SQS value.

The bioassay measured the response of the marine amphipod, *Rhepoxynius abronius*, to sediments collected from each of the three sample locations (87060043, 87060044, and 87060045). The test is not standard compared to current methods, and an interpretation of the raw data was not provided in available information. However, over the ten-day test period, amphipods placed in the LDW sediments had a survival rate ranging from 73 to 83 percent, compared to the 89 to 91.7 percent survival rate of amphipods placed in the control sediments (Matta 1987).

Results from the EPA dive survey of the river bottom in the vicinity of the MP&E facility stated that over the entire area investigated, only a light "dusting" of sandblasting grit was found near the west end of the synchrolift and drydock. The areas underneath the synchrolift and drydock were not investigated. EPA determined that, given the small amount of sandblasting grit found, removal was not necessary (Matta 1987).

UST Removal and Site Assessment, Northland Services (1993)

In October 1993, West Pac Environmental removed three USTs from the Northland Services facility and James P. Hurley Company (JPHC) prepared a *UST Site Assessment Report*. A 1,000-gallon gasoline UST, a 1,000-gallon diesel UST and a 500-gallon heating fuel UST were removed from the north yard of the property because they were no longer needed for operations. Thirteen soil samples were collected from the UST excavations and spoil piles and analyzed for total petroleum hydrocarbons. Locations of the three former USTs, two spoil piles, and soil sample locations are depicted in Figure 13 (JPHC 1993).

Total petroleum hydrocarbons were not detected in 11 of the 13 soil samples. Total petroleum hydrocarbons in the diesel-range (TPH-D) were found to be below the MTCA Method A cleanup level in one soil sample (Sample 3-2 collected from the southwest sidewall of UST 3, shown in Figure 13). One soil sample collected from the excavated spoil pile in the vicinity of the gasoline and diesel USTs (Sample SP1-1 in Figure 13) yielded a TPH concentration in the heavy-oil-range (TPH-O) of 220 parts per million (ppm), which was above the 1993 MTCA Method A cleanup level for TPH-O of 200 ppm (the current MTCA Method A cleanup level for industrial soil for TPH-O is 2,000 ppm) (JPHC 1993).

Since Sample SP1-1 exceeded the MTCA Method A cleanup level for TPH-O, West Pac Environmental isolated approximately 10 cubic yards of impacted soil for off-site disposal. The remaining stockpile soil was used to backfill the excavation. JPHC stated that the source of the TPH-O contamination was unknown; due to the condition of the USTs and the absence of free product or petroleum staining in the soil surrounding the former USTs, JPHC concluded that the source of contamination was unrelated to the USTs. Groundwater was not encountered within the limits of the UST excavation (JPHC 1993).

4.2.3.4 Facility Inspections

Hazardous Waste Compliance Inspections, United Marine Shipbuilding (March through May 1989)

On March 28, 1989, Ecology performed a Hazardous Waste Compliance Inspection at the Glacier Marine Services facility. At that time, the facility was in operation as UNIMAR, and Glacier Marine Services was in the process of ceasing operations; ownership of the property was being transferred from UNIMAR to First Interstate Bank. A layout of the facility in 1989 is illustrated in Figure 9. Ecology noted the following NPDES permit violations (Cargill 1989):

1. Sandblast grit was allowed to accumulate in an unacceptable manner; piles of sandblast grit were found on the north craneway adjacent to the synchrolift and not stored with the spent grit.

2. Liquid products, including potential hazardous substances and dangerous wastes, were not stored to prevent entry to waters of the state; unsealed drums and 5-gallon containers were not stored under cover behind dikes.

3. Stormwater contaminated with oil was found ponded and flowing to a catch basin that did not direct water through an oil/water separator for treatment.

4. Oil was spilled in the following locations:

    a) Onto land adjacent to the fuel pumps with no cleanup efforts apparent;

    b) From an Ingersoll-Rand air compressor between the synchrolift and north craneway;

    c) From a bilge slop tank to the paved area near the catch basin for discharge #007; and

    d) On land on the perimeter of the air compressor located at the southeast end of the large steel fabrication shop (appears to be referred to as "Maintenance Building" in Figure 8).

5. Dust and overspray from abrasive blasting of the barge on the synchrolift on March 28, 1989 was not controlled with structures or drapes.

6. Leaking water piping was noted in one of the synchrolift motor pits and at the fire station on the outfitting pier near the west end of the central craneway.

7. Spent sandblast debris and spent grit were not stored in a manner that prevented their entry or entry of leachate into receiving waters.

8. Solid waste, specifically oils and lubricants, were not handled in a manner that would prevent their entry into state ground and surface waters.

In addition, Ecology noted that the catch basin maintenance log stated that sorbent pads had been placed in all catch basins; however, during the inspection, three catch basins were observed with no pads in place. Ecology brought the above discrepancies to the attention of UNIMAR (Cargill 1989).

On April 26, 1989, Ecology performed a follow-up inspection to ensure that the violations had been addressed, but conditions indicated in Items 1, 2, 3, 6, 7, and 8 above remained the same. Additionally, Ecology noted the following violations (Cargill 1989):

9. The catch basin had not been inspected or cleaned since February; and

10. Hydraulic fluid and oil had been spilled near the northwest corner of the large steel fabrication shop on or about April 25, and had not yet been cleaned.

On May 2, 1989, Ecology conducted a second follow-up inspection; no changes were found in site conditions from the previous inspection. Ecology stenciled 59 full or partially full drums with a tracking number for laboratory analysis (Cargill 1989).

On May 23, 1989, a third follow-up inspection performed by Ecology found that the yard had been swept clean; however, there were still accumulations of sandblast grit in the synchrolift motor wells, as well as between and under conex boxes. While many of the drums and waste oil containers had been consolidated near the center craneway, 15 to 20 drums were still located in areas without dikes and without cover along the south craneway. There were still several 5-gallon containers of waste oils without covers. There was also a spill of heavy oil on the southern side of the new drum storage area near the center craneway. The oil was floating on ponded stormwater and in the tracks for the crane. No effort to contain or remove the oil was underway at the time of the inspection. The placement of the drums and the spill was discussed with the facility personnel, who stated that the spill would be cleaned immediately and the drums would be relocated under cover (Cargill 1989).

On May 24, 1989, a fourth follow-up inspection by Ecology confirmed that most of the spilled oil had been removed and that the drums located in the central yard had been moved into the large steel fabrication shop (Cargill 1989).

During the five inspections, Ecology documented numerous drums and pails of product and waste scattered across the facility. A few of the containers were labeled and appeared to contain useable product; however, the remainder were not labeled to indicate contents, risks, or accumulation date. Some drums were not closed, many were rusting, and some were bulging or punctured. The drums and pails that lacked adequate contents labels were assumed to be dangerous waste until laboratory analysis could confirm otherwise. Ecology provided the facility with steps to take to satisfy dangerous waste requirements and identified the following actions to be taken immediately (Cargill 1989):

1. Materials in containers with severe rusting, apparent structural defects, or leaking must be transferred to a container in good condition or overpacked.

2. Containers must be labeled with the material's major risks.
3. Containers not in use must be kept closed.
4. Containers must be stored in a covered area so they are protected from the elements, and containment (berms or dikes) must be sufficient to contain spills or leaks.
5. Ignitable or reactive wastes must be maintained in container storage equal to the Uniform Fire Code.

Ecology provided the facility with a list of actions required to preclude discharge of pollutants to waters of the state and to identify contaminated areas that may have required remedial action under MTCA. The following actions were ordered to be taken by the facility on April 26, 1989 (Cargill 1989):

1. All catch basins shall be cleaned of grit, dirt, and oily residue.
2. Storm sewer lines, including that portion of the municipal storm sewer which runs through the facility, should be cleaned in accordance with best industry practice, which may entail use of an eductor truck to flush sediments and oily residue from the lines. Dams should be placed in line downstream from the area being cleaned to prevent any discharge of sediments or wash water to surface waters of the state. All wastes generated should be collected, characterized, and properly disposed. If the waste solids do not classify as dangerous or extremely hazardous waste, they should be disposed of in a conforming, lined landfill, subject to the approval of the local health department with jurisdiction. Waste liquids should be disposed of to the sanitary sewer, subject to the approval, terms, and conditions of Metro.
3. Synchrolift hoist pits and other areas below the synchrolift deck where grit and dirt accumulate should be swept or vacuumed clean.
4. The yard, including areas between and under conex boxes and under and around other movable equipment and structures, should be swept or vacuumed clean of all grit, paint chips, and oil & grease.
5. Oils on paved surfaces should be cleaned with sorbent materials.
6. Soils contaminated with spent sandblast grit and debris, as well as petroleum, should be collected, characterized, and properly disposed in the same manner as wastes generated from storm sewer cleaning.
7. Fuel tanks must be pumped out and decommissioned in accordance with the requirements of the Seattle Fire Code.
8. Exposed soils near Slip 3 should be sampled, and, if necessary, remediated. Sampling and analysis must be in accordance with EPA and Ecology guidelines for collection, preservation, analysis, and quality assurance/quality control. A minimum of four soil samples should be taken and analyzed separately. Analysis of the samples should

include, but not be limited to, priority pollutant metals, organic and inorganic tin, TPHs, and polynuclear aromatic compounds.

9. Waste oils and lubricants must be stored and labeled, according to Ecology's specifications. Waste oils and lubricants must be disposed of in a manner that does not allow release or discharge of these materials to the environment.
10. Dangerous and extremely hazardous wastes must be handled and disposed of in accordance with WAC 173-303, Dangerous Waste Regulations.

Hazardous Waste Compliance Inspection, United Marine Shipbuilding (July 1989)

According to Ecology's files, an additional inspection was performed on July 6, 1989, at the Request of First Interstate Bank to determine what had been done to address the issues identified during the inspections described above and what remained to be accomplished. Hart Crowser had been hired to dispose of wastes left on-site and to perform a site assessment; Hart Crowser had planned to install a downgradient well to check for soil and groundwater contamination. Some oil-contaminated soil, small piles of grit, and improperly stored drums containing petroleum products remained at the property. First Interstate Bank and Ecology discussed cleaning the storm drains and catch basins, and methods of collecting sediment and wastewater to prevent discharge to the LDW. Information about this inspection was not discovered until very late in the report-writing process, and the inspection report was not available in the files for review; therefore, review of this report and any subsequent reports will be included as a data gap.

Hazardous Waste Compliance Inspection, Northland Services (February 2002)

On February 21, 2002, Ecology performed a Hazardous Waste Compliance Inspection at the former Northland Services facility. There was no hazardous waste on-site at the time; the facility infrequently handled hazardous waste. According to the Facility Manager, containers with regulated waste were moved to a designated hazardous waste storage area as they arrived. Pickup was arranged before the shipment was offloaded from ships. Generally the waste remained on-site two to three days before being picked up by the next transporter. Few issues were identified by Ecology during the inspection. Ecology recommended that efforts be made regularly to refresh employees on proper procedures (Ecology 2002).

4.2.3.5 Potential Pathways of Contamination

Stormwater

Figure 8 illustrates facility catch basin locations in 2001, when the facility was in operation as Northland Services, and Figure 9 illustrates storm drain lines at the facility in 1989, when the facility was in operation as MP&E. Figure 9 apparently shows that the facility discharged most of its stormwater directly to the LDW through the South Brighton Street CSO/SD, and some stormwater through the storm drain line labeled "003." Figure 4 indicates that "Outfall 2025 and Seep" may correlate to MP&E's storm drain 003.

Environmental investigations at the facility in operation as MP&E identified high concentrations of heavy metals (arsenic, chromium, cadmium, copper, mercury, lead and zinc), oil & grease in the facility's storm drain system. High concentrations of the same heavy metals were also present in dock runoff and sediments beneath the drydock and synchrolift. Inspections conducted following MP&E's operations at the facility identified several environmental concerns, including accumulations of sandblast grit, contaminated stormwater, spilled oil, improperly stored and labeled drums and containers, etc. These findings illustrate the significant role that stormwater pathways have had in the past for contaminants at the site to reach LDW sediments.

Ecology identified several cleanup actions to be taken at the site in 1989, including storm drain system cleaning. Although no major issues were identified during the February 2002 Hazardous Waste Compliance Inspection, documentation pertaining to the completion of the cleanup actions was not available in the files for review; most notably, it is not known whether the facility's storm drain system was cleaned.

GIS data provided by SPU from September 9, 2003, identified a seep at the location in Figure 4 labeled "Outfall 2025 and Seep," which is in the vicinity of the historical drydock and may correlate to the outfall from the storm drain line labeled "003" on Figure 9. In 2006, LDW sediment sampling identified contamination in the vicinity of Glacier Marine Services. COCs identified through sediment sampling within RM 2.0-2.3 East are discussed in Section 3.2.1; sediment sampling locations are shown in Figure 5 and samples with contaminant concentrations exceeding SQS and CSL values are presented in Tables 2 and 3. Most of the COCs identified for RM 2.0-2.3 East were found in subsurface sediment at LDW-SC37, which is adjacent to the Glacier Marine Services facility to the north. This area is in the vicinity of the historical drydock, the outfall from the storm drain line labeled as "003" on Figure 9, and the "Outfall 2025 and Seep" location shown in Figure 4. Heavy metal COCs identified at LDW-SC37 during environmental investigations conducted at MP&E included arsenic, lead, mercury, copper, and zinc. PCBs and several PAHs were also identified at LDW-SC37. Arsenic was also found in exceedance in surface sediment at LDW-SS77, also in the vicinity of the historical drydock, at the outfall from the storm drain line labeled "003" on Figure 9, and from the "Outfall 2025 and Seep" shown in Figure 4.

Based on available information, the Glacier Marine Services storm drain system does not pass through areas of known or suspected subsurface soil or groundwater contamination; however, the storm drain system has been known to contain high concentrations of heavy metals and oil & grease that discharged and may continue to discharge directly to the LDW. Although a current SWPPP was not available for review, Glacier Marine Services discharges stormwater under the Industrial Stormwater General Permit, and stormwater pollutants could still contribute to sediment recontamination within RM 2.0-2.3 East via the stormwater pathway.

Spills

Operations at the Glacier Marine Services facility could result in spills. Contaminated solids such as sandblasting grit and drydock solids could also migrate from the facility's surface directly into the LDW; this has happened historically. Spills or solids generated from facility operations could migrate to the LDW both through the facility's storm drain system and through surface runoff, since the facility is directly adjacent to the LDW.

Groundwater

Groundwater in the vicinity of the Glacier Marine Services facility likely flows to the north-northwest, toward the LDW. However, no information was available in the files for review regarding known soil or groundwater contamination at the Glacier Marine Services facility.

Bank Erosion

The Glacier Marine Services facility is on the east bank of the LDW; however, the information reviewed gave no indication as to whether or not there is a potential for bank erosion or leaching of near-bank soils to recontaminate LDW sediments. This potential needs to be assessed.

Atmospheric Deposition

The information reviewed gave no indication that any activities at the Glacier Marine Services facility may result in atmospheric deposition.

4.2.3.6 Data Gaps

The following data gaps have been identified for the Glacier Marine Services property. These data gaps must be addressed before effective source control can be accomplished for the RM 2.0-2.3 East source control area.

- Additional information detailing historical use at the Glacier Marine Services property is needed to determine whether past operations at the property would be of concern to sediment recontamination.
- Information regarding current operations at the Glacier Marine Services property is needed. The most recent available information regarding operations at the Glacier Marine Services facility is taken from the 2001 SWPPP and Ecology's February 2002 Hazardous Waste Compliance Inspection Report, when the facility was in operation as Northland Services. Ecology should obtain an updated SWPPP from Glacier Marine Services.
- The facility's storm drain system is not clearly described in the 2001 SWPPP. From Figure 9, it appears that the storm drain labeled "003" discharged to the Slip 3 Inlet in 1989, and from Figure 4, it appears that this discharge point may be the storm drain labeled "Outfall No. 2025 and Seep." A clear description of the facility's storm drain system is needed, and whether the facility discharges through "Outfall No. 2025" should be clarified.
- According to the 2001 SWPPP, vehicle maintenance work such as fluids changing is conducted over pits in the maintenance building. Fluids are then pumped through an oil/water separator and discharged to the sanitary sewer system. The facility's connection to the sanitary sewer system is not indicated in the files available for review and should be clarified.
- According to the 2001 SWPPP, touch-up painting of barges is conducted at the facility. Historically, sandblasting was performed at the property and was illegally disposed of in the LDW. Whether sanding, scraping, or sandblasting is currently performed at the

facility to prepare barges and ships for painting is not mentioned in the SWPPP and should be clarified.

- In 1985, EPA conducted a criminal investigation into the practices at the MP&E facility, which put MP&E under federal indictment in 1987. The criminal investigation report, referenced in Ecology's files as "U.S. EPA Office of Criminal Investigation, Report of Investigation 1985-1987," was not available in the files for review and should be reviewed. The outcome of the federal indictment should also be reviewed.
- The *Fox Street/Slip 3 Sampling and Analysis* was conducted in 1984, wherein sampling was conducted in the MP&E facility's storm drain system, and dock runoff and drydock solids were sampled. Heavy metals and oil & grease were found in the storm drain system, and runoff and drydock materials were found to be adversely impacting the LDW. However, due to the unclear presentation of data in the report, an appropriate analysis of the sample results could not be performed. The *Fox Street/Slip 3 Sampling and Analysis* data should be re-reviewed and it should be determined whether an appropriate follow-up investigation was conducted.
- The *Fox Street/Slip 3 Sampling and Analysis Report* stated that the U.S. Coast Guard collected drydock solids from the MP&E drydock in 1983. Heavy metal concentrations from these solids correlated closely with concentrations in sediment found below the west end of the drydock. The 1983 U.S. Coast Guard sampling data were not available in the files for review.
- Hazardous Waste Compliance Inspections conducted at the MP&E facility March through May 1989 identified numerous cleanup actions to be taken at the facility to address accumulations of sandblast grit, contaminated stormwater, spilled oil, and so forth. Although no major issues were identified during the February 2002 Hazardous Waste Compliance Inspection (the facility was in operation as Northland Services at the time), documentation pertaining to the completion of the cleanup actions was not available in the files for review. According to Ecology's files, an additional inspection was performed at the facility in July 1989 to evaluate cleanup that remained to be accomplished at the facility. This inspection report was not available for review in Ecology's files and should be reviewed to determine what cleanup actions were performed by MP&E.
- According to Ecology's files, after First Interstate Bank assumed control of the MP&E facility, Hart Crowser was hired to dispose of wastes left on-site and to perform a site assessment, including installation of a downgradient well to check for soil and groundwater contamination. Information pertaining to the work performed by Hart Crowser was not available in the files for review.
- According to Ecology's files, in a 1993 memo NOAA stated that in addition to high levels of arsenic, zinc, copper, and lead; high levels of high and low molecular weight polyaromatic hydrocarbons, dibenzofuran, phthalates, phenols, vinyl chloride, and so forth were found in the "Fox Street Drainage System." The memo, referenced in Ecology's files as "NOAA Memo Dated July 19, 1993, Subject: Fox Avenue South CSO/SD," was not available for review in Ecology's files and should be reviewed to identify potential additional sources of contamination to LDW sediments through the storm drain system.

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- The potential for bank erosion as a pathway of contamination to LDW sediments should be investigated.

4.3 Upland Facilities of Concern

4.3.1 V. Van Dyke

Facility Summary: V. Van Dyke	
Address	150 South River Street
Property Owner	V. Van Dyke, Inc./Doris Van Dyke
Former/Alternative Property Names	N/A
Former/Alternative Lessee/Operator Names	Mitchell Bros. Terminal Co. Pile Contractors, Inc. (gravel lot)
Former/Alternative Addresses	N/A
Tax Parcel No.	5367202270 5367202400 (gravel lot)
Parcel Size	0.77 acres 0.21 acres (gravel lot)
NPDES Permit No.	SO3000453
EPA RCRA ID No.	WAD988516779
EPA TRI Facility ID No.	N/A
Ecology Facility/Site ID No.	68427684
Ecology UST Site ID No.	12577
Ecology LUST Release ID No.	N/A
Listed on Ecology CSCSL	No

V. Van Dyke is located upland, on the east side of the LDW, at approximately RM 2.0. The property is bordered on the north by South Michigan Street, on the east by a building on the adjacent P.F. Industries property, on the south by South River Street, and on the west by Occidental Avenue; on the south side of South River Street is a gravel lot under the 1st Avenue South Bridge; the lot is also used by V. Van Dyke.

According to King County tax records, Doris Van Dyke has owned the property since at least 1989; however, property ownership information is unclear. According to King County tax records there are only two structures on the property: a 1,100-square-foot office building built in 1955 and a 2,800-square-foot equipment shed built in 1974. There are no structures on the gravel lot across Occidental Avenue under the 1st Avenue South Bridge (King County 2007a). The gravel lot is owned by V. Van Dyke, Inc., and is sub-leased to Pile Contractors (SPU 2007c).

The V. Van Dyke facility operates under Industrial Stormwater General Permit No. SO3002346, which was originally issued on December 18, 1992, and was last scheduled to expire on November 18, 2005. Permit renewal information was not available and the most current available SWPPP for review was from 1993, stamped as received from Ecology in 2001.

According to Ecology's UST List, six USTs have been removed from the property. Two of the USTs stored used/waste oil, one stored unleaded gasoline, and the remaining three stored unspecified substances. UST removal dates are not listed (Ecology 2007e).

4.3.1.1 Current Operations

V. Van Dyke is a trucking facility, mainly providing heavy hauling, truck storage, and maintenance. The most current available facility layout is illustrated in Figure 14, and a portion of the facility can be seen in Figure 6, which is an aerial photo of the Slip 3 Inlet area taken in July 2006. The property has an office building, two shop buildings, and a vehicle wash pad area. The large shop building is used for vehicle maintenance and repair, and the small shop building is used as a welding shop, sub-leased by Pile Contractors. The small shop building had been used to store waste, such as used oil (labeled “haz mat area” in Figure 15, and as storing used oil in Figure 16, referenced below). Scrap metal is stored outside in containment and under cover (Buss 1993 and SPU 2006).

V. Van Dyke stores trailers and other equipment, and conducts some maintenance in a gravel lot under 1st Avenue South Bridge, on the south side of Occidental Avenue South. Pile Contractors also sub-leases a portion of the gravel lot to store equipment parts and perform some repairs (Ecology 2006b and SPU 2007d).

Storm Drain System

V. Van Dyke’s 1993 SWPPP does not include a description of the facility’s storm drain system; however, a facility map and a sketch titled “Site Discharge Points” (provided as Figures 15 and 16) are included that illustrate four storm drains and a vehicle wash pad drain. Figure 16 provides a minimal illustration of the facility storm drain system, and notes that the “east drain” and the “southeast drain” have unknown discharge points (Buss 1993). The vehicle wash pad drain, shown in Figures 15 and 16, drains to the sanitary sewer (Ecology 1999). An additional drain was discovered on the west side of the “Haz Mat Area” (small shop building; see Figure 15) (Ecology 2007c). SPU gave V. Van Dyke permission to cap the drain (SPU 2007d), but whether the drain was actually capped is not known.

Potential Sources of Stormwater Pollutants

V. Van Dyke’s 1993 SWPPP identifies potential stormwater pollutants, their locations of use within the facility, and their associated activity. Potential stormwater pollutants used in the “garage for vehicle maintenance” (apparently the large shop building) include acid and water, alkaline or corrosive battery fluid, antifreeze, battery acid, catalyst, cleaning solvents, lubricating oils, oil and water, paint (or varnish) remover or stripper, and paint thinner. Detergent is a potential stormwater pollutant used inside the “storage shed for vehicle maintenance.” A potential stormwater pollutant used outside the shop for vehicle maintenance is waste (or slop) oil. Finally, a potential stormwater pollutant stored inside the “storage shed for facility maintenance” is weed killer (Buss 1993). However, the information reviewed did not indicate what type of weed killer was stored in the shed.

Activities that require use of BMPs include uncovered vehicle parking for 20 or more vehicles; washing or steam cleaning vehicles or equipment; fueling vehicles or equipment; storing raw materials, byproducts, or products of a manufacturing process outdoors; using pesticides, herbicides, or fertilizers; accumulating or managing used oil; and maintaining storm drains (Buss 1993).

4.3.1.2 Historical Use

A trucking facility has occupied the site since approximately 1955 (Adapt 2002). Mitchell Bros. Terminal Co. occupied the property until 2002, but the years of tenancy are not known (King County 2007a). Review of available information did not identify uses or ownership of the property prior to 1955.

4.3.1.3 Environmental Investigations and Cleanup Activities

Phase I Environmental Site Assessment, V. Van Dyke, Inc. (2002)

In September 2002, LSI Adapt (Adapt) conducted a *Phase I Environmental Site Assessment* (ESA). The *Phase I ESA* revealed that three USTs (mentioned in the introduction of Section 4.3.1) were reportedly removed from the V. Van Dyke property in 1988. The approximate location of the former USTs is shown in Figure 14. The company that removed the USTs reportedly did not observe any contamination and no soil sampling was conducted. The USTs were removed prior to current regulation requiring soil sampling to confirm a clean closure. Adapt stated that an undocumented release from the former USTs could have occurred unobserved during removal. Adapt also noted that there was an oil/water separator in the vehicle wash area, and that workers discovered heavy staining adjacent to the catch basin in the northeastern portion of the site. Adapt recommended that additional subsurface information be collected to evaluate the environmental liability associated with the former USTs, oil/water separator, and observed stained area near the catch basin (Adapt 2002).

Limited Phase II Environmental Site Assessment, V. Van Dyke, Inc. (2002)

In October 2002, Adapt conducted a *Limited Phase II ESA* to screen soil and groundwater beneath the property to verify the observed contaminants associated with past activities from former USTs and the fueling system and oil/water separator, and to verify the staining adjacent to the catch basin. Adapt advanced five borings (P-1 through P-5) to a depth of approximately 7 to 10 feet below ground surface (bgs) at locations shown in Figure 14. Soil and groundwater samples were collected at each location and analyzed for TPH in the gasoline-, diesel- and heavy-oil-range (TPH-G, TPH-D and TPH-O, respectively), with additional analysis for benzene, toluene, ethylbenzene, and total xylenes (BTEX) gasoline constituents. One soil sample (collected from P-3) was also analyzed for lead. Groundwater samples were additionally analyzed for VOCs (Adapt 2002).

Soil sampling results are shown in Figure 17. TPH-G and benzene were detected above MTCA Method A cleanup levels for industrial soil in a soil sample collected from P-3 at 4.5-5 feet; results were TPH-G (1,300 mg/kg) and benzene (0.097 mg/kg). In addition, toluene, ethylbenzene, and xylenes were detected above the standard laboratory reporting limits, but below MTCA Method A cleanup levels (Adapt 2002).

Groundwater was encountered from approximately 5 feet bgs in P1 to 8 feet in P3 and P5. Groundwater sampling results are shown in Figure 18. Gasoline-range petroleum hydrocarbons were found in groundwater beneath the former dispenser island and USTs pit above MTCA Method A cleanup levels for groundwater. At 7-11 feet in P-3, TPH-G was detected at 7,100 μg/L; also, at 7-11 feet in P-4, TPH-G was detected at 1,200 μg/L. Benzene (15 μg/L) was detected above MTCA Method A cleanup levels in P-3, collected from beneath the former dispenser island at 7-11 feet. Benzene beneath the former USTs was above laboratory reporting levels, but below MTCA Method A cleanup levels. Ethylbenzene and xylenes were found in groundwater samples collected from P-3 and P-4 above standard laboratory detection limits, but below MTCA Method A cleanup levels. In addition, acetone and 1,2,4-trimethylbenzene were identified in a groundwater sample collected from P-5 above standard laboratory detection limits, but below MTCA Method A cleanup levels. No petroleum hydrocarbons were exhibited in groundwater samples collected from P-1 and P-2, which were in the vicinity of the catch basin and oil/water separator, respectively (Adapt 2002).

During the *Limited Phase II ESA,* Adapt was given anecdotal information about two additional USTs that were closed in place beneath the southern shop building, and Adapt observed two holes in the floor of the southern shop building. According to V. Van Dyke, the two USTs were closed in place beneath the shop building by Glacier Environmental on September 24, 2002. The USTs were reportedly used for lube and waste oil storage. Analytical results from the soil sampling beneath the USTs after they were cleaned and rinsed indicated that diesel- and heavy oil-range petroleum hydrocarbons and noncarcinogenic polynuclear hydrocarbons were detected in the soil samples, but the concentrations did not exceed MTCA Method A cleanup levels. Adapt concluded that no further actions were warranted regarding the two decommissioned USTs (Adapt 2002).

The results of the *Limited Phase II ESA* indicated a historical release of petroleum hydrocarbons to on-site soil and groundwater in the vicinity of the former USTs and fueling island shown in Figure 14. Adapt concluded that contamination appeared limited; however, possible down-gradient-impacted areas remained undefined. Based on existing data, the impacted soil zone appeared to extend from approximately 4 feet to 10 feet beneath the former dispenser island, and from approximately 7 feet to 8.5 feet beneath the former USTs. Adapt stated that the lateral extent of the impacted soil was unknown and that it was possible, based on existing data, that some contamination was present beneath the existing office or carport approximately 20 feet to the southwest. Contaminated groundwater appeared to be present beneath the former dispenser island and USTs and appeared to extend to the south and southwest at least 15 to 20 feet. Adapt determined that impacted groundwater appeared to be localized to the vicinity of the former dispenser island and USTs; however, it was possible that impacted groundwater had migrated beneath the office and carport. Adapt recommended additional subsurface characterization to evaluate downgradient migration of petroleum-impacted groundwater off-site (Adapt 2002).

Groundwater Monitoring Well Installation and 1st Quarter Groundwater Quality Monitoring Report, V. Van Dyke Inc. (2003)

In December 2002, groundwater monitoring wells were installed and sampled in an attempt to evaluate the potential for observed on-site petroleum hydrocarbons in soil and groundwater to migrate off-site, and to delineate the lateral extent of the observed petroleum impacts. Four monitoring wells (MW-1 through MW-4) were installed to depths ranging from 14 to 15 feet bgs at locations depicted in Figure 14. Soil and groundwater samples were collected at each location and analyzed for gasoline-range petroleum hydrocarbons and BTEX (Adapt 2003).

Groundwater was encountered at depths ranging from approximately 6.5 feet bgs in MW-4 to 7.5 feet bgs in MW-2 at the time of drilling. Subsequent groundwater measurements indicated groundwater levels at approximately 4 to 5 feet below the top of casing. Based on observed water levels, groundwater flow direction appeared to fluctuate toward the north, northeast, and east. Adapt determined that, based on observed water levels and the close proximity to the LDW, groundwater flow directions beneath the property may be tidally influenced (Adapt 2003).

Gasoline-range hydrocarbons and BTEX compounds were not exhibited above laboratory detection levels in any of the soil samples collected. In addition, no gasoline-range hydrocarbons or BTEX compounds were detected above standard laboratory reporting limits in any of the four monitoring well groundwater samples. Adapt concluded that the petroleum hydrocarbon contamination identified in the vicinity of the former UST pit did not appear to have migrated off-site. Adapt suggested continued quarterly groundwater monitoring to develop a remediation strategy and to prepare for requesting site closure from Ecology (Adapt 2003).

4.3.1.4 Facility Inspections

Stormwater Compliance Inspection, V. Van Dyke Facility (June 1999)

On June 15, 1999, Ecology conducted a Stormwater Compliance Inspection, prompted by a diesel/oil-water mixture spill that had been discovered at the unfenced gravel lot across Occidental Avenue on June 2, 1999. The spill was presumably overnight dumping. Approximately 31 gallons of spilled material at the surface was placed in drums and disposed of off-site. Absorbents were used to soak up remaining spilled material. Contaminated ground material was hauled and disposed of off-site. To prevent stormwater contact, adjacent storm drains were cleaned (Ecology 1999).

Ecology noted that the “truck area” (which appears to be the “vehicle wash” area in Figure 16) was covered and drained to the sanitary sewer. In general the property was orderly with the following exceptions (Ecology 1999):

1. A number of 55-gallon drums containing vegetable oil on the east side of the “storage shed” (appears to be “storage” in Figure 15 and “tool shed” in Figure 16)
2. Two 5-gallon buckets of hydraulic oil in the same area
3. Two 5-gallon buckets of hydraulic oil south of the “storage shed”
4. Two 55-gallon drums of used engine oil under the roof attached to the south side of the storage shed
5. Two 55-gallon drums of unused lube oil also under the roof (spillage was apparent)
6. A 75-gallon portable fuel tank placed such that it was not under the roof
7. Two grout pumps, each of which were leaking hydraulic oil
8. A track crane belonging to “the piling company” (apparently Pile Contractors) was parked across the street and was leaking hydraulic oil

Based on the above observations, Ecology noted the following concerns and recommendations (Ecology 1999):

1. To prevent oil contamination of stormwater, the basic BMP of cover and containment must be implemented. Ecology stated that the containers listed in Items 1, 2, and 6 (above) were not under cover but should have been. Also, oil stains were evident in the area around the "storage shed." Ecology recommended that some of the contaminated soils near the southeast corner of the storage shed be cleaned up and legally disposed.

2. Ecology stated that the equipment listed in Items 7 and 8 was leaking and advised a designated parking area. Absorbent pads were in use, but were not performing adequately; Ecology suggested using drip pans for better control.

Joint Inspection and Stormwater Compliance Inspection, V. Van Dyke Facility (December 2006)

On December 1, 2006, SPU conducted a Joint Inspection as part of an SPU and King County Industrial Waste (KCIW) joint program that aims to help businesses reduce the amount of pollutants discharged to the LDW via the storm drain system and CSOs. Ecology conducted a Stormwater Compliance Inspection, prompted mainly by questionable reporting in the facility's DMRs.

Ecology was concerned about the frequent use of "No Qualifying Event" classifiers on the facility's DMRs, as the permit now allows for sampling during storm events of any size. V. Van Dyke said they had recently become aware of the modification and had begun sampling in accordance with the new condition. During the review of the facility's files, and contrary to the DMRs on Ecology's database, there were actual data for the first quarter of 2005, showing that zinc exceeded the benchmark value of 117 µg/L with a reading of 147 µg/L, oil & grease exceeded the benchmark value of 15 milligrams per liter (mg/L) with a reading of 20.2 mg/L, and turbidity exceeded the benchmark value of 25 NTUs with a reading of 64 NTUs. Also, according to the DMRs in Ecology's database, in the second quarter of 2004, zinc and oil & grease exceeded the benchmark values with readings of 351 µg/L and 55 NTUs, respectively (Ecology 2006c).

V. Van Dyke was questioned about complaints SPU had received about vehicle washing at the gravel lot across the street. V. Van Dyke assured SPU that vehicles are only washed on the vehicle wash pad on the main property. V. Van Dyke stated that it had repeatedly reported to the city of Seattle that drivers of unidentified trucks were changing their oil on South River Street, allowing oil to discharge to V. Van Dyke's stormwater monitoring location (Ecology 2006c). The following observations were made by Ecology during the Stormwater Compliance Inspection at the main V. Van Dyke property (Ecology 2006c):

1. The covered vehicle wash pad seemed appropriately graded and bermed to prevent stormwater contamination.

2. Oil sheens and caked oily buildup were noted in several locations on the property.

3. The “southeastern storm drain” (appears to be “southeast drain” in Figure 16) was fitted with filter fabric, but the fabric needed replacement because it was surrounded by a large buildup of sediment.

4. The “northeastern storm drain” (appears to be “east drain” in Figure 16) was near the door to the “Haz Mat Area” (as labeled in Figure 15; also labeled as “Shop #2” in Figure 14, and as “Used Oil” in Figure 16). Although an awning extended from the “Haz Mat Area” door, it covered only half of the equipment stored below (hoses, metal cable, assorted metal parts, and oily equipment). Additionally, multiple 55-gallon drums were stored exposed, and their contents were unobvious. The “northeastern storm drain” had no filter fabric, was partially blocked by a metal weight, and was surrounded by a large buildup of sediment.

5. The storm drain along the western perimeter (appears to be “west drain” in Figure 16, since the drain located in the vehicle wash pad area connects to the sanitary sewer) was fitted with filter fabric. A large buildup of sediment was observed surrounding the catch basin.

6. Another drain, with a grate similar to the monitoring point storm drain, was on the west side of the “Haz Mat Area.” This drain was not labeled on the SWPPP figure (Figure 15). Ecology stated that the facility should identify the drainage on-site and document the discharge location.

7. Some on-site equipment had evidence of leaking fluids.

8. There was exposed metal equipment stored along the base of the “Haz Mat Area” and along the eastern perimeter of the property. One outdoor storage rack had been covered with a tarp, which was heavily weathered.

The following additional observations were made by Ecology during the Stormwater Compliance Inspection at the gravel lot across Occidental Avenue, used by V. Van Dyke mainly for trailer storage (Ecology 2006c):

1. There was evidence of minor leaking from equipment throughout the lot. Specifically, a large piece of equipment whose leaking fluids were noted in the report from the last Stormwater Compliance Inspection performed on June 15, 1999 (described above) continued to leak fluids.

2. A sheen was observed in the stormwater flowing from the parcel into a catch basin along Occidental Avenue.

Based on the above observations, Ecology made the following recommendations (Ecology 2006c):

1. Change the stormwater sampling location to the “southeastern storm drain” because it would better represent stormwater associated with the facility’s operations.

2. Identify where the drain on the west side of the “Haz Mat Area” discharges, and update that information in the SWPPP.

3. Barrels and other liquid chemicals should be stored in secondary containment and under cover to prevent accidental spills.
4. DMRs submitted from the third quarter of 2004 through the third quarter of 2006 show that no samples were taken due to "no qualifying storm event." Although V. Van Dyke's industrial stormwater permit requires that a quarterly sample be taken based on specific storm criteria, if the specific storm criteria cannot be met that quarter, a sample must still be taken. If it did not rain in a quarter, a DMR must still be submitted with an explanation of why a sample was not taken.
5. Sample results above benchmark values prompt a Level One Response by the permittee. Copies of the results of these Level One Responses should be included with the DMR, as well as kept with the SWPPP.
6. Good housekeeping practices should be implemented on-site to reduce stormwater pollution potential from items such as stored leaky barrels and equipment. Monitor, maintain, and cover machinery stored outdoors to make sure fluid leaks are not contaminating soils or stormwater.
7. Maintain all catch basin socks to reduce contaminants entering the storm drains. Ecology also suggested removing the sediment buildup from around the storm drains, since the buildup could reduce turbidity of the facility's discharge, which past DMRs have shown to be above benchmark levels.

SPU identified the following required corrective actions to be addressed by V. Van Dyke (SPU 2006e):

1. Obtain spill containment and clean-up materials, state the location of the materials in the spill plan, and place the materials in an easily accessible location, clearly marked "Spill Kit."
2. Clean the catch basins identified for cleaning (appear to be "east drain" and "southeast drain" in Figure 16). Accumulated material within 18 inches of the bottom of the lowest pipe entering or exiting the structure must be removed and disposed of properly.
3. Label drums and containers that are stored outside. If the drum is empty, indicate so on the outside of the drum.
4. Use absorbent pads, granular sorbent, or rags to clean up leaks and spills as they occur. During the inspection, leaking equipment was observed in the leased space across from the V. Van Dyke property.

Joint Inspection (Follow-Up), V. Van Dyke Facility (February 2007)

On February 16, 2007, SPU conducted a follow-up Joint Inspection to ensure that the required corrective actions identified above had been completed. The following observations were made (SPU 2007b):

1. Catch basins were cleaned and filter fabric was installed.

2. A spill kit was placed in the shed next to the vehicle wash pad with a sign outside informing workers of the spill kit inside.

3. Drums that were next to the "welding shed" (assumed to be the "Haz Mat Area" referred to during previous inspection) were removed.

4. There was an "inlet" by the "welding shed" that did not seem to connect to anything (assumed to be the additional storm drain discovered on the west side of the "Haz Mat Area" during the previous inspection); SPU gave V. Van Dyke permission to cap it.

Joint Inspection (Follow-Up), V. Van Dyke Facility (March 2007)

On March 7, 2007, SPU conducted another follow-up Joint Inspection to ensure that the remaining corrective actions identified during previous inspections had been completed. The V. Van Dyke facility was then concluded by SPU to be in compliance (SPU 2007c).

Joint Inspection, Pile Contractors (March 2007)

Also on March 7, 2007, SPU conducted a Joint Inspection of Pile Contractors, following discovery during the Joint Inspection at V. Van Dyke that in addition to Pile Contractors sub-leasing space in the gravel lot under 1st Avenue South Bridge to store equipment parts and perform some repairs, Pile Contractors also sub-leased the small shop building on V. Van Dyke's main property for welding. SPU identified the following required corrective actions to be addressed by V. Van Dyke (SPU 2007d):

1. As a sub-leaser from V. Van Dyke, Inc., Pile Contractors must comply with the same operational source control requirement under V. Van Dyke's Department of Ecology Stormwater Permit.

2. Complete a written spill plan and post at appropriate locations at the facility (repair shop and outside equipment storage areas). Pile Contractors' operations include one or more of the high-risk pollution-generating activities listed in SMC 22.800. Accordingly, Pile Contractors must implement a spill plan.

3. Obtain spill containment and clean-up materials, state the location of the materials in the spill plan, and set out the materials in an easily accessible location, clearly marked "Spill Kit."

4. Educate employees about the spill plan and kit.

Joint Inspection (Follow-Up), Pile Contractors (April 2007)

On April 13, 2007, SPU conducted another follow-up Joint Inspection to ensure that the remaining corrective actions identified during previous inspections had been completed. Pile Contractors submitted a spill plan and stated that it will be using V. Van Dyke's spill kit, in the storage shed on the property. SPU concluded that Pile Contractors was now in compliance (SPU 2007e).

4.3.1.5 Potential Pathways of Contamination

Stormwater

V. Van Dyke's storm drain system is shown in Figures 15 and 16. Figure 4 apparently shows the storm drain system connects to the city's storm drain system and discharges to the LDW via the South River Street SD.

The V. Van Dyke facility discharges to the city storm drain system under the Industrial Stormwater General Permit. Although facility operations could be a source of stormwater pollution, a SWPPP is implemented, BMPs are employed to minimize the potential, and discharge monitoring is conducted. In addition, several inspections have been performed at the facility as discussed in Section 4.3.1.4 to address multiple stormwater pollution concerns at the property. However, the facility's stormwater discharge has exceeded permit benchmark values for zinc, oil & grease, and turbidity in the past, and stormwater pollutants could still discharge to the LDW within RM 2.0-2.3 East via the stormwater pathway.

V. Van Dyke's storm drain system does not appear to pass through petroleum hydrocarbon soil and groundwater contamination that exists in the vicinity of the former dispenser island and USTs (Figure 14). Figure 4 apparently shows storm drain lines at the facility pass to the east and north of the former dispenser island and USTs; however, according to the *Limited Phase II ESA*, the extent of soil and groundwater contamination is not clearly defined, and the facility's storm drain system is not clearly understood; at least two storm drains have unknown discharge points, and one storm drain may or may not have been taken offline. Therefore, soil and groundwater contamination at the property could infiltrate the storm drain system and discharge to the LDW within RM 2.0-2.3 East via the stormwater pathway.

Groundwater

In December 2002, Adapt determined that the groundwater flow direction at the V. Van Dyke property fluctuated toward the north, northeast, and east, and that groundwater flow directions appeared to be tidally influenced by the LDW.

In November 2002, Adapt discovered that soil and groundwater in the vicinity of the former dispenser island and USTs (Figure 14) contained concentrations of benzene and gasoline-range petroleum hydrocarbons above MTCA Method A cleanup levels. In December 2002, four monitoring wells were installed downgradient of the existing contamination on the property. Soil and groundwater samples from these wells indicated that the contamination had not migrated off-site. Continued quarterly groundwater monitoring was recommended, but whether it was completed and what the results were are not known.

Groundwater at the property has not been documented to flow toward the LDW, but groundwater has been documented to flow toward the LDW at nearby properties. Groundwater flowing from the V. Van Dyke property then most likely migrates to the LDW at least occasionally depending on tidal influences. Therefore, groundwater contamination could discharge to the LDW within RM 2.0-2.3 East via the groundwater pathway. Although the sampling from the monitoring well installations in 2002 did not indicate that groundwater contamination is migrating off-site, it is not certain this remains true. Quarterly groundwater monitoring is necessary to assess overall concentration stability and trends.

Spills

Operations at the V. Van Dyke facility could result in spills. However, since the facility is not adjacent to the LDW, spills could only reach the LDW via the stormwater pathway, discussed above. As discussed in Section 4.3.1.4 a spill of a diesel/oil-water mixture was discovered at the gravel lot across from the main V. Van Dyke property in June of 1999. However, the spill was apparently from overnight dumping, and existing information indicated the spill was handled properly.

Bank Erosion

The V. Van Dyke facility is not located along the banks of the LDW; therefore, bank erosion/leaching is not a potential pathway for contamination to reach LDW sediments.

Atmospheric Deposition

The information reviewed gave no indication that any activities at the V. Van Dyke facility may result in atmospheric deposition; therefore, atmospheric deposition is not considered to be a potential pathway for contamination to reach LDW sediments.

4.3.1.6 Data Gaps

The following data gaps have been identified for the V. Van Dyke property. These data gaps should be addressed before effective source control can be accomplished for the RM 2.0-2.3 East source control area.

- King County tax records show Doris Van Dyke has owned the property since at least 1989, but property ownership information is unclear; it appears that Doris Van Dyke owned the property before 1989, but it is not known for how long. Mitchell Bros. Terminal Co. was a tenant and may have owned the property for an unknown time ending in 2002. A trucking facility, presumably V. Van Dyke, has been thought to occupy the property since 1955; however, research for additional historical use information is needed to determine if site operations in the past may have been of concern to sediment recontamination.
- According to Ecology's UST List, six USTs have been removed from the V. Van Dyke property; however, only five USTs were documented as removed from the property based on information available for review, three in 1988, and two (by Glacier Environmental) in 2002. This discrepancy should be resolved to assure an additional UST was not removed from the property without clean closure.
- According to the SWPPP available for review (from 1993), two storm drains had unknown discharge points; in addition, storm drain lines and connections to the city storm drain system were not identified. Furthermore, SPU reportedly gave V. Van Dyke permission to cap an additional drain discovered on the west side of the small shop building, but whether this was completed is not known. Finally, Figure 4 apparently

shows that storm drain lines at the facility pass to the east and north of the petroleum hydrocarbon soil and groundwater contamination that exists in the vicinity of the former dispenser island and USTs, and discharge to the LDW via the South River Street SD. More information is needed regarding the V. Van Dyke storm drain system and connection to the city storm drain system to determine whether contamination could pose a threat to LDW sediments via the stormwater pathway. In addition, Ecology should obtain an updated SWPPP from V. Van Dyke. The updated SWPPP should include more detailed information (e.g., Material Safety Data Sheets) about the types of fluids and products stored which may pose a threat to LDW sediments in the event of a spill.

- Discharge monitoring at the facility has been of concern to Ecology in the past, with numerous "No Qualifying Event" classifiers listed, and exceedances of permit benchmark values for zinc, oil & grease, and turbidity. DMRs for V. Van Dyke facility should be reviewed to ensure the facility has remained in compliance.
- In-line storm drain sampling may be needed within the V. Van Dyke storm drain system to determine whether contamination at the property could migrate to the LDW via the stormwater pathway.
- Adapt determined groundwater contaminated with petroleum hydrocarbons located in the vicinity of the former dispenser island and USTs was not likely migrating offsite; however, the extent of soil and groundwater contamination remains undefined. The extent of contamination is important in considering whether contaminants could possibly infiltrate the facility's storm drain system and migrate to the LDW via the stormwater pathway.
- Although Adapt determined groundwater contamination was not migrating off-site based on the first quarter of groundwater monitoring, Adapt suggested continued quarterly monitoring to characterize overall groundwater quality stability and trends. Whether quarterly monitoring was continued is unknown, but monitoring is important to ensure groundwater contamination is not migrating off-site.
- Adapt stated that groundwater flow direction at the V. Van Dyke property appeared to fluctuate toward the north, northwest, and east. Groundwater flow direction is important in considering whether groundwater contamination might migrate to the LDW. Adapt suggested that additional monitoring may be needed to document tidal effects on the groundwater flow beneath the property. Whether additional monitoring was performed to characterize tidal effects on groundwater flow direction is not known.

4.3.2 Riverside Industrial Park

Facility Summary: Riverside Industrial Park	
Address	6533 3rd Avenue South (shop building) 220 South River Street (office building)
Property Owner	Riverside Industrial Park LLC
Former/Alternative Property Names	Carmody Property
Former/Alternative Lessee/Operator Names (Shop Building)	LK Comstock Lion Trucking Dispatch (mezzanine) Big John's Truck Repair Highway Enterprises Royal Truck Repair Kurt's Enterprises Vacuum Truck Services
Former/Alternative Addresses	N/A
Tax Parcel No.	5367202200
Parcel Size	0.54 acres
NPDES Permit No.	N/A
EPA RCRA ID No.	WAD988519781 (inactive since 12/31/1998) and WAD021817796 (inactive since 4/18/1988)
EPA TRI Facility ID No.	N/A
Ecology Facility/Site ID No.	44383713 and 37289288
Ecology UST Site ID No.	97212
Ecology LUST Release ID No.	499583
Listed on Ecology CSCSL	Yes
Ecology VCP ID No.	NW1946 NW0350 (old)

The Riverside Industrial Park property is upland on the east side of the LDW at approximately RM 2.0. The property is bordered on the north by an asphalt-paved, fenced-in parking lot; Rosa's Apparel Manufacturing is north of the parking lot. An unpaved extension of 3rd Avenue South bounds the property to the east; across this road is a fenced-in storage yard containing truck trailers and steel beams. South River Street bounds the property to the south; across this road is the SCS Refrigerated Services property. A warehouse occupied by Elegant Stone, a building stone distributor, is immediately west of the southern portion of the Riverside Industrial Park property and south of the northwestern portion of the property. The northwestern portion of the property is bounded by 2nd Avenue South; across this road is a warehouse occupied by P.F. Industries and the J. L. Henderson Company (EAI 1999c).

According to King County tax records, Riverside Industrial Park LLC purchased the property from Carmody, W.F. and Patricia B. on January 5, 2000. The two structures on the property include a 6,764-square-foot manufacturing (shop) building and an 8,640-square-foot office building, both built in 1957 (King County 2007a).

The Riverside Industrial Park office building is listed under the 220 South River Street address, while the shop building is listed under the 6533 3rd Avenue South address. The shop building is the building of concern on the property. The most recent occupant of the shop building (not including the mezzanine) was Big John's Truck Repair, with similar businesses before that.

Big John's Truck Repair was first known to occupy the shop building in 1994; however, the year Big John's Truck Repair began operations is not known. Big John's Truck Repair occupied the shop building until sometime between November 1997 (when the *Phase I Environmental Audit and Limited Sampling* was performed) and May 1999 (when the *Tank Removal, Site Assessment and Cleanup Report* was completed). The latter of these two reports indicated the shop area was vacant at that time. As of May 1999, Lion Trucking Dispatch occupied the mezzanine of the shop building, and residents of the office building included the manufacturer's representatives of Carmody Co. and Hardesty & Co. (EAI 1999c). According to Ecology, LK Comstock, a subcontractor for Seattle's Sound Transit Light Rail System Project, currently occupies the shop building at 6533 3rd Avenue South (most likely the mezzanine) as of May 2008.

The Riverside Industrial Park property tax parcel is listed on the King County Property Tax Records Database (King County 2007a) under the 220 South River Street address. In the Facility/Site Database (Ecology 2007a), Big John's Truck Repair (Facility Site ID No. 44383713) is listed under the 6533 3rd Avenue South address, and Vacuum Truck Services (Facility Site ID No. 37289288) is listed under the 220 South River Street address. Apparently the shop building was occupied by Vacuum Truck Services prior to Big John's Truck Repair, and the office building address was used for site identification, rather than the shop building address.

Big John's Truck Repair is listed on Ecology's Hazardous Waste Facility Search Database (Ecology 2007d) with RCRA Site ID No. WAD988519781 (inactive since 12/31/1998) and Vacuum Truck Services is listed with RCRA Site ID No. WAD021817796 (inactive since 4/18/1988).

Vacuum Truck Services (Facility Site ID No. 37289288) is listed on Ecology's UST List with UST Site ID No. 97212. Three USTs were closed in place, discussed in Section 4.3.2.2 below. Vacuum Truck Services is also listed on Ecology's LUST List with Release ID No. 499583. Cleanup following the LUST release started on October 26, 1998 (Ecology 2007e).

Big John's Truck Repair (Facility Site ID No. 44383713) was entered onto Ecology's CSCSL on October 18, 1999, and is listed as having confirmed groundwater and soil contamination. Contaminants in groundwater are identified as non-halogenated solvents. Contaminants in soil are identified as petroleum products. Ecology's status on this site is listed as "awaiting site hazard assessment" (Ecology 2007e).

Big John's Truck Repair (Facility Site ID No. 44383713) is registered in the Voluntary Cleanup Program (VCP) (EPA 2007b).

4.3.2.1 Current Operations

The most current available facility map and surrounding area is illustrated in Figure 19, and a portion of the facility can be seen in Figure 6, which is an aerial photo of the Slip 3 Inlet area taken in July 2006. As of May 1999, the shop building was vacant, other than commercial use by Lion Trucking Dispatch in the mezzanine. The office building was used commercially by the manufacturing representatives of Carmody Co. and Hardesty & Co. (EAI 1999c).

According to Ecology, LK Comstock, a subcontractor for Seattle's Sound Transit Light Rail System Project, currently occupies the shop building at 6533 3rd Avenue South (most likely the mezzanine) as of May 2008. Whether the main area of the shop building is still vacant, or if the office building is still used commercially by the manufacturing representatives of Carmody Co. and Hardesty & Co., is not known.

According to the *Phase I Environmental Audit and Limited Sampling Report*, storm drain service is provided to the office building at 220 South River Street, but not to the shop building at 6533 3rd Avenue South, which reportedly connected to the sanitary sewer when the shop building was in operation (EAI 1997).

4.3.2.2 Historical Use

Environmental Associates, Inc., (EAI) completed a *Phase I Environmental Audit and Limited Sampling* of the Riverside Industrial Park property in December 1997. Aerial photographs were reviewed from 1936 through 1995. Residential dwellings were visible on the property from 1936 through 1956. The Riverside Industrial Park property was commercially developed in 1957, the year that the office building and manufacturing (shop) building were built (EAI 1997).

According to the *Phase I Environmental Audit and Limited Sampling Report,* Theodore B. Mullen purchased the property in 1956 and ownership changed in 1974, when W.F. and Patricia B. Carmody purchased the property. Several businesses have operated out of the shop building and/or office building since 1957, and are summarized in the table below through 1999. Property use since 1999 is not known, other than LK Comstock's current occupation of the mezzanine of the shop building. In the table below, some businesses listed under the office address appear to have actually operated out of the shop building; the shop building appears to have been vacant until at least 1981-1983, when apparently Kurt's Enterprises (truck repair) and/or Vacuum Truck Services (cleaner of ships) occupied the property. Kurt's Enterprises was listed as occupying the property in 1986, Royal Truck Repair was listed in 1990, and Highway Enterprises was listed in 1994 (EAI 1997).

Also according to the *Phase I Environmental Audit and Limited Sampling Report,* three 1,000-gallon diesel fuel USTs were closed in place east of the shop building in 1988. In February 1994, Big John's Truck Repair (formerly Highway Enterprises) was a registered generator of mineral spirits, oil, cadmium, and lead, and the estimated quantity of wastes generated was 134 pounds per month (EAI 1997).

Review of the above-mentioned reports indicates that Big John's Truck Repair was in operation at the Riverside Industrial Park shop building beginning in 1994 and vacated the building sometime in 1998.

Historical Businesses: Riverside Industrial Park

Year	Address	Businesses Listed
1958 and 1960	6533 3rd Avenue South	Vacant
	220 South River Street	S.S. Mullen, Inc., building contractors
1965 and 1970	220 South River Street	S.S. Mullen, Inc.
1975	220 South River Street	Carmody Company, manufacturer's representative
1980	220 South River Street	Carmody Co. Hardesty & Company, manufacturer's representative Pacer Corporation, manufacturer's representative
1981 and 1983	220 South River Street	Carmody Co. Hardesty & Co. Kurt's Enterprises, truck repair H.R. Zilmer Distributors, manufacturer's representative Stars on the Sea, fire alarm sales Vacuum Truck Service, cleaner of ships McGrane Electrical, sales Cassidy Associates, Inc., manufacturer's representative
1986	220 South River Street	Carmody Co. Hardesty & Co. Kurt's Enterprises H.R. Zilmer Distributors Tool Engineering Company Jackson Willis Company
1990	220 South River Street	Carmody Co. Hardesty & Co. H.R. Zilmer Distributors Gifford and Associates, food manufacturers B.A. Barnes, Inc., accounting M.D. Fabre & Associates, architects and engineering Royal Truck Repair, Inc.
1994	6533 3rd Avenue South	Highway Enterprises, Inc., trucking company Big John's Truck Repair
	220 South River Street	Carmody Co. Hardesty & Co. Gifford and Associates
1999	6533 3rd Avenue South	Vacant (shop area) Lion Trucking Dispatch (mezzanine)
	220 South River Street	Carmody Co. Hardesty & Co.

4.3.2.3 Environmental Investigations and Cleanup Activities

Environmental investigations and cleanup activities were conducted at the Riverside Industrial Park property from 1997 through 1999 to address petroleum contamination discovered in soil and groundwater. Past releases from three USTs and an associated fuel dispenser island appear to be the main source of contamination at the property; these sources were removed in 1998. Quarterly groundwater monitoring was performed at the property in 1999.

Phase I Environmental Audit and Limited Sampling, Carmody Property (1997)

In December 1997, EAI conducted a *Phase I Environmental Audit and Limited Sampling* of the property to evaluate its potential sale. To make a preliminary evaluation of subsurface conditions at the property, three soil/floor drain solids samples were obtained, one from each of the floor drains in the shop building (north and south drain) and one from approximately 4 feet northwest of the diesel fuel AST on the west side of the shop building at a depth of approximately 6 inches. Figure 19 illustrates the three sample locations (7472-1 through 7472-3). Each sample was analyzed for TPH-G, TPH-D, TPH-O, and BTEX gasoline constituents. Analysis was also conducted for the presence of halogenated VOCs (also referred to as chlorinated solvents) in each sample (EAI 1997).

Sample results identified concentrations of TPH-D and TPH-O above MTCA Level A cleanup levels for industrial soil in all three samples. TPH-G was also detected at concentrations exceeding the MTCA Method A cleanup levels in each of the floor drain solids samples (7472-1 and 7472-2). Sample 7472-1 also yielded concentrations of ethylbenzene and total xylenes that exceeded MTCA Method A cleanup levels. Trichloroethene was detected at a concentration equivalent to the MTCA Method A cleanup level in sample 7472-1 and tetrachloroethene was detected above the MTCA Method A cleanup level in sample 7472-2 (EAI 1997).

In addition to the diesel fuel AST and two floor drains, EAI identified several other concerns at the property, including three diesel fuel USTs closed in place east of the shop building, several 55-gallon drums, and surficial oil stains on soil and on the concrete floor in the shop building. EAI concluded that the extent of contamination was unknown and suggested additional subsurface sampling to define lateral and vertical extents of contamination (EAI 1997).

Phase II Subsurface Exploration, Carmody Property (1998)

In April 1998, Geotech Consultants conducted a *Phase II Subsurface Exploration* of the property for the property owner at the time (Mr. Thomas Carmody) to further assess contamination discovered during the *Phase I Environmental Audit and Limited Sampling*. Geotech Consultants completed seven soil borings across the property (B1 through B7) at locations shown in Figure 20. Soil samples were collected at each location and groundwater samples were collected where groundwater was encountered. Each sample was analyzed for TPH-G, TPH-D, TPH-O, and BTEX gasoline constituents (Geotech 1998).

Sample results indicated soil downgradient from the three inactive USTs (B1 and B3) contained TPH-G, TPH-D, and TPH-O as well as BTEX compounds (benzene and xylenes) above MTCA Method A cleanup levels for industrial soil. Groundwater was discovered in this area at approximately 7 feet bgs and appeared to be similarly contaminated. Geotech Consultants determined that the contaminated soil extended from near the ground surface to approximately 7 to 9 feet in depth, covered roughly 30 feet (north-south) wide, and might extend beneath the shop building. Geotech Consultants recommended excavating contaminated soils and disposing them off-site (Geotech 1998).

Soil analyzed in the vicinity of the two floor drains (B4 and B5) and in the outdoor storage area (B6 and B7) contained no detectable concentrations of petroleum or halogenated hydrocarbons. Geotech Consultants noted that previously identified contamination was most likely limited to solids inside the floor drains and to stained soils near the surface in the outdoor storage area. Geotech Consultants recommended the floor drains be cleaned out by a licensed disposal company, and that an inspection be completed to check for ruptures or breaks in the drain walls, as well as to confirm the drains connection to the sanitary sewer (Geotech 1998).

Tank Removal, Site Assessment, and Cleanup Report, Carmody Property (1999)

In October 1998, to address the contamination discovered through the Phase I and II investigations described above, EAI completed removal of the three approximately 1,000-gallon capacity gasoline and diesel fuel USTs, an associated fuel dispenser island, the two shop floor drains, a floor drain outfall, and the approximately 500-gallon heating-oil AST. Petroleum-contaminated soil was excavated and disposed of off-site, and excavation floor and sidewall sampling was performed. In February 1999, EAI completed four groundwater monitoring wells (MW1 through MW-4) and performed groundwater sampling. Figure 21 illustrates the extent of each of the excavations and the locations of soil samples and groundwater monitoring wells (EAI 1999c).

While the USTs did not appear to contain any leakage points, physical evidence (odors and soil discoloration) indicated past releases of gasoline and diesel fuel into soils adjacent to the filler pipes and tanks. In addition, field screening and later laboratory analysis indicated that soils beneath the fuel-dispenser island contained gasoline and diesel fuel contaminants. Field screening indicated that oils near the heating-oil AST did not contain petroleum contaminants; this was later confirmed through laboratory analysis of soil adjacent to the tank (EAI 1999c).

Approximately 425 cy of soil contaminated with gasoline, gasoline-associated BTEX, and diesel/heavy oil was excavated from the tank pits, floor drain areas, floor drain outfall area, and surficial (extending from ground surface to approximately 2.5 feet bgs) release areas near the northwest and northeast corners of the shop building. An undetermined volume of petroleum-contaminated soil was left in-place below the east and west foundations of the shop structure and below the northeast corner of the adjacent “Elegant Stone” warehouse structure due to concerns about the proximity of the excavation sidewalls to the building foundation walls. EAI determined that the remaining contaminated soil posed little or no threat to human health or the environment due to current site use and because the soil was encapsulated by the shop building and warehouse structure and quarterly groundwater monitoring was planned (EAI 1999c).

Following contaminated soil excavation and additional excavation performed within the two shop building floor drain excavations in March 1999, results of samples obtained from the floor and sidewall areas of the cleanup excavations indicated that soil remaining in the excavation areas contained no detectable concentrations of petroleum contaminants exceeding MTCA Method A cleanup levels for industrial soil for gasoline, BTEX, diesel & oil, total lead, or halogenated organic compounds (EAI 1999c).

In February 1999, EAI returned to the property and installed groundwater monitoring wells MW-1 through MW-4 (shown in Figure 21), each to a depth of approximately 15 feet. Groundwater samples were collected from each well and sampled for TPH-G, BTEX gasoline constituents, TPH-D, and TPH-O.

Measurements of the groundwater table following the installation of monitoring wells revealed that shallow groundwater was present at approximately 5 to 6 feet bgs, and the gradient was very gentle (approximately 0.2 percent) with inferred groundwater flow being from the north-northeast toward the south-southwest, as shown in Figure 21 (EAI 1999c).

Concentrations of TPH-G, benzene, ethylbenzene, and xylenes were detected above Method A cleanup levels for groundwater at MW-1; results in parts per billion (ppb) were 2,700, 5.5, 46, and 137, respectively. EAI determined that gasoline-contaminated groundwater detected at MW-1 most likely would not migrate off-site, as groundwater sampled from MW-2 (downgradient from MW-1) did not reveal the presence of gasoline-range petroleum hydrocarbons or gasoline-associated BTEX constituents. However, EAI recommended sampling and testing groundwater for at least three more quarters to assess overall stability and trends (EAI 1999c).

Phase II Subsurface Soil and Groundwater Investigation, Carmody Property (1999)

In June 1999, PBS Environmental, Inc., completed a subsurface investigation of the property to identify the approximate lateral and vertical extent of potential petroleum-contaminated soil and groundwater remaining beneath the concrete slab of the shop building. PBS Environmental completed seven borings (SB-1 through SB-7) from 9 to 12 feet bgs at locations shown in Figure 22. Soil samples were collected at each location and two groundwater samples were collected (from SB-3 and SB-6). Each sample was analyzed for gasoline, stoddard solvent/mineral spirits, kensol (a series of refined petroleum products), kerosene/jet fuel, diesel/fuel oil, bunker C, and heavy oil (PBS 1999).

Groundwater was encountered in three borings from 11 to 12 feet bgs. Petroleum hydrocarbons were not detected in any soil or groundwater sample. PBS Environmental stated that the residual diesel-range contamination that remained in the sidewall of the former UST pit adjacent to the building did not appear to have migrated a significant distance beneath the shop building, and that continued quarterly monitoring of the existing wells would assess the groundwater quality for overall stability and trends (PBS 1999).

2nd and 3rd Quarter Groundwater Sampling and Testing, Carmody Property (1999)

In May and October 1999, EAI sampled the four existing monitoring wells in a second and third quarter of groundwater sampling, as was recommended during the *Tank Removal, Site Assessment, and Cleanup* to assess the groundwater quality for overall stability and trends. As in the first quarter (conducted during the *Tank Removal, Site Assessment, and Cleanup)*, groundwater samples were collected from each well (MW-1 through MW-4, see Figure 21) and analyzed for TPH-G, BTEX gasoline constituents, TPH-D, and TPH-O (EAI 1999b and EAI 1999a).

Shallow groundwater was encountered at approximately 3 feet bgs during both the second and third quarters. Groundwater appeared to be flowing generally from the north-northeast toward the south-southwest during both quarters, as was found during the first quarter.

During the second quarter, benzene was detected at 11 ppb at MW-2, which exceeded the MTCA Method A cleanup level (EAI 1999b). During the third quarter, no concentrations of gasoline-range petroleum hydrocarbons or associated BTEX constituents or diesel/oil-range petroleum contaminants were detected in groundwater from monitoring wells MW-1 through MW-4 at levels exceeding the MTCA Method A cleanup levels (EAI 1999a).

No Further Action Determination Review (2000)

In December 1999, Ecology visited the Riverside Industrial Park property to observe site conditions and reviewed the reports discussed above. Ecology determined that an NFA could be issued for soil and groundwater if two additional rounds of groundwater samples collected from MW-2 showed that contaminant levels are below MTCA Method A groundwater cleanup levels, demonstrating that groundwater has not been adversely affected by the soil contamination remaining near the former fuel USTs and dispenser island. A restrictive covenant prepared by Ecology would also need to be filed with the King County Tax Assessor's Office. In addition to the groundwater sampling and restrictive covenant, the owners of the adjacent "Elegant Stone" warehouse would need to be notified that contaminant concentrations above MTCA Method A cleanup levels for petroleum hydrocarbons were discovered below the northern portion of their warehouse (Trejo 2000).

4.3.2.4 Potential Pathways of Contamination

Stormwater

During the December 1997, *Phase I Environmental Audit and Limited Sampling* of the Riverside Industrial Park property, discussed in detail in Section 4.3.2.3, two floor drains (north and south) were identified in the shop building that lacked oil/water separators. A floor drain solid sample was collected from the 6 inches of solids buildup in each drain, and concentrations of TPH-G, TPH-D, TPH-O, ethylbenzene, total xylenes, trichloroethene, and tetrachloroethene were found in exceedance of MTCA Method A cleanup levels for industrial soil in one or both samples. EAI stated that the shop building was reportedly connected to the sanitary sewer system rather than to the storm drain system; however, Big John's Truck Repair could not confirm that the two floor drains were connected to the sanitary sewer. Reportedly, storm drain service was provided to the office building at 220 South River Street, but not to the shop building at 6533 3rd Avenue South (EAI 1997).

During the April 1998 *Phase II Subsurface Exploration* of the property, soil near the two floor drains (B4 and B5) and in the outdoor storage area (B6 and B7) was analyzed and found to contain no detectable concentrations of petroleum or halogenated hydrocarbons. Geotech Consultants noted that previously identified contamination was most likely limited to solids inside the floor drains and to stained soils near the surface in the outdoor storage area. Geotech Consultants recommended the floor drains be cleaned out by a licensed disposal company and that an inspection be completed to check for rupture or breaks in the drain walls and to confirm the drains' connection to the sanitary sewer (Geotech 1998).

During the October 1998 *Tank Removal, Site Assessment, and Cleanup* of the property, EAI removed and over-excavated the two shop floor drains. Results of samples obtained from the floor and sidewall areas of the cleanup excavations indicated that soil remaining in the excavation areas contained no detectable concentrations of petroleum contaminants exceeding MTCA Method A cleanup levels for industrial soil for gasoline, BTEX, diesel & oil, total lead, or halogenated organic compounds (EAI 1999c).

To fully assess the potential for sediment recontamination via the stormwater pathway, more information is needed describing Riverside Industrial Park's storm drain system. Operations have discontinued at the shop building, but petroleum contamination was found in former storm drain solids. These contaminated solids may have migrated to the LDW within RM 2.0-2.3 East if the former shop building floor drains were not connected to the sanitary sewer system. In addition, the city storm drain system is known to serve the office building at 220 South River Street. Figure 4 indicates that storm drain lines might run between the shop building and the office building, possibly through areas where contaminated soil has been excavated (Figure 21), and discharge to the LDW via the South River Street SD. Petroleum contaminated soil and groundwater remaining at the property could infiltrate the storm drain system and discharge to the LDW within RM 2.0-2.3 East via the stormwater pathway.

Groundwater

The topography near the Riverside Industrial Park property is level, with site elevations about 10 feet above mean sea level. Published geologic literature indicates the site is underlain by glacial till, which is a dense mixture of silt, sand, and gravel. During the April 1998 *Phase II Subsurface Exploration* of the property, soils consisting of dark brown, silty, medium- to fine-grained sand with gravel were found at depths from 2 to 7 feet bgs. Wet to saturated soils were encountered at approximately 6 to 7 feet bgs, with native, dense, silty sand encountered at 9 feet bgs (PBS 1999). Through several investigations described in Section 4.3.2.3, groundwater was typically encountered between 3 and 7 feet bgs flowing generally from the north-northeast to the south-southwest.

Quarterly groundwater monitoring was conducted at the Riverside Industrial Park property in February, May, and June 1999. In February 1999, following the October 1998 *Tank Removal, Site Assessment, and Cleanup* of the property, and included within that report, the first quarter of groundwater sampling was performed. Concentrations of TPH-G, benzene, ethylbenzene, and xylenes were detected above MTCA Method A cleanup levels for groundwater at MW-1. EAI determined that gasoline-contaminated groundwater detected at MW-1 (associated with the former three USTs and fuel dispenser island) most likely would not migrate off-site, as groundwater sampled from MW-2 (downgradient from MW-1) did not reveal the presence of gasoline-range petroleum hydrocarbons or gasoline-associated BTEX constituents. However, in May 1999 during the second quarter of groundwater sampling, benzene was detected at a concentration above MTCA Method A cleanup levels for groundwater at MW-2. In June 1999, no concentrations of gasoline-range petroleum hydrocarbons or associated BTEX constituents or diesel/oil-range petroleum contaminants were detected in groundwater from monitoring wells MW-1 through MW-4 at levels exceeding the MTCA Method A cleanup levels.

In December 1999, Ecology determined that an NFA could be issued for soil and groundwater if two additional rounds of groundwater samples collected from MW-2 showed contaminant levels below MTCA Method A groundwater cleanup levels.

To fully assess the potential for sediment recontamination via the groundwater pathway, additional groundwater monitoring data are needed, as determined by Ecology during the NFA review. Groundwater has been documented to flow directly toward the Slip 3 Inlet of the LDW (Figures 21 and 22), within RM 2.0-2.3 East; therefore, potential petroleum groundwater contamination remaining at the property could discharge to the LDW within RM 2.0-2.3 East via the groundwater pathway.

Spills

Spills are not considered a potential pathway for contamination to reach LDW sediments since the shop building is vacant. No activities are known to occur at the Riverside Industrial Park property that may result in spills.

Bank Erosion

The Riverside Industrial Park property is not located along the banks of the LDW; therefore, bank erosion/leaching is not a potential pathway for contamination to reach LDW sediments.

Atmospheric Deposition

The information reviewed gave no indication that any activities at the Riverside Industrial Park property may result in atmospheric deposition. Therefore, atmospheric deposition is not considered a potential pathway for contamination to reach LDW sediments within RM 2.0-2.3 East since the shop building is vacant.

4.3.2.5 Data Gaps

The following data gaps have been identified for the Riverside Industrial Park property. These should be addressed to facilitate effective source control for the RM 2.0-2.3 East source control area.

- Big John’s Truck Repair occupied the Riverside Industrial Park property shop building from 1994 to 1998. Prior lessees of the shop building included Highway Enterprises, Royal Truck Repair, Kurt’s Enterprises, and Vacuum Truck Services. However, site addresses for the shop and office buildings have been intermixed and the years of operation under each lessee is unclear. Little information was available describing facility operations by Big John’s Truck Repair or any other lessee. Research on additional historical use information is needed to determine if lessees other than Big John’s Truck Repair may have conducted activities at the property that concern sediment recontamination.
- Other than LK Comstock’s current occupation of the shop building, businesses in operation at the Riverside Industrial Park property since 1999 are not known. Presumably LK Comstock conducts business out of the mezzanine of the shop building, and the main area of the shop building has remained vacant since Big John’s Truck Repair ended operations around 1998, but this should be confirmed. Operations at the Riverside Industrial Park property since 1999 should be investigated and clarified.

- An undetermined volume of petroleum-contaminated soil was left in-place below the northeast corner of the Elegant Stone warehouse building (on the adjacent parcel to the west) due to concerns about the proximity of the excavation sidewalls at the Riverside Industrial Park property to the warehouse building foundation walls. It is unknown whether the former property owner, Mr. Carmody, has notified the Elegant Stone facility of the contamination that was discovered beneath the warehouse, or whether investigations have addressed the contamination. This data gap needs to be filled to determine whether remaining contamination poses a threat to LDW sediments through the groundwater or stormwater pathways.
- Apparently the shop building was formerly connected to the sanitary sewer. Storm drain solids were found in the two floor drains that have since been excavated. The facility should be inspected to confirm that the shop building was not connected to the city storm drain system. If it was connected to the city storm drain system, it is not clear whether any contamination remaining in the abandoned drain could still pose a threat to LDW sediments through the stormwater or groundwater pathway.
- While the office building itself was connected to the sanitary sewer, apparently the office building portion of the property connects to the city storm drain system. Figure 4 appears to show that storm drain lines run between the shop building and the office building, possibly through areas where contaminated soil has been excavated (Figure 21), and discharge to the LDW via the South River Street SD. More information is needed about the Riverside Industrial Park storm drain system to determine whether contamination could pose a threat to LDW sediments through the stormwater pathway.
- Ecology determined that an NFA could be issued for soil and groundwater at the Riverside Industrial Park property if two additional rounds of groundwater samples collected from MW-2 show that contaminant levels are below MTCA Method A groundwater cleanup levels. Whether this sampling was performed is unknown, but sampling is important to properly assess the potential of contaminated groundwater discharge from the property to LDW sediments.
- Additional information was received from Ecology late in the report-writing process, indicating that the former owner of the facility, Mr. Leon Cohen, submitted a new VCP application for LK Comstock, the business currently in operation at the shop building. The new VCP application created the new VCP ID No. NW1946, and is currently in review by Ecology. Follow-up should be conducted on the outcome of the VCP application review.

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4.3.3 Shultz Distributing

The Shultz Distributing property is upland on the east side of the LDW at approximately RM 2.3. The property is bordered on the north by South Brighton Street; north of which is the Seattle Distribution Center property, and on the south by South Willow Street, across from which is the Cascade Columbia Distribution property. East Marginal Way South bounds the property to the east, and Fox Avenue South bounds the property to the west. Railroad tracks run adjacent to the facility to the east and west. The Glacier Marine Services property is west of the Shultz Distributing facility, separating the Shultz Distributing facility from the LDW.

Facility Summary: Shultz Distributing	
Address	6851 East Marginal Way South
Property Owner	Emerson Enterprises LLC
Former/Alternative Property Names	Emerson GM Diesel
Former/Alternative Lessee/Operator Names	N/A
Former/Alternative Addresses	N/A
Tax Parcel No.	0001800159
Parcel Size	2.79 acres
NPDES Permit No.	SO3002346
EPA RCRA ID No.	WAD009492877 (inactive since 12/31/2003)
EPA TRI Facility ID No.	N/A
Ecology Facility/Site ID No.	95498891
Ecology UST Site ID No.	1391
Ecology LUST Release ID No.	N/A
Listed on Ecology CSCSL	No

The property was leased to Shultz Distributing in 1996. Shultz Distributing installed multiple ASTs on the property (Terra Vac and Floyd & Snider 2000). According to King County tax records, Emerson Enterprises LLC purchased the property from Delbert M. and Veronica Emerson on May 22, 1998. Four structures are on the property: a 27,800-square-foot industrial manufacturing building built in 1965, a 9,585-square-foot industrial manufacturing building built in 1940, a 19,092-square-foot industrial manufacturing building built in 1922, and a 3,750-square-foot industrial manufacturing building built in 1974 (King County 2007a).

The Shultz Distributing facility operates under Industrial Stormwater General Permit No. SO3002346, originally issued on December 18, 1995 and last scheduled to expire on November 18, 2005. Permit renewal information was not available and the most current SWPPP available for review was from 2001.

According to Ecology's UST List, one UST has been removed from the property. The UST stored between 111 and 1,100 gallons of an unspecified substance. The UST removal date was not listed (Ecology 2007e).

4.3.3.1 Current Operations

Shultz Distributing is a bulk oil storage and distributing company. The most current available facility layout is illustrated in Figure 23, and a portion of the facility can be seen in Figure 7, which is an aerial photo of the Slip 3 Inlet area taken in July 2006. Petroleum products, solvents, and antifreeze are delivered to the facility by truck and railcar and are either transferred to storage tanks or stored in the warehouse facility in 55-gallon drums. There are 26 ASTs with a total storage capacity of 250,900 gallons; 21 tanks are in the recessed tank farm on the south side of the property and five are in the northwest corner of the property. The tanks range from 6,000 to 11,900 gallons and most contain lube oil; one tank contains diesel. Tank locations are illustrated in Figure 24 (Shultz Distributing 2001).

Storm Drain System

Stormwater is collected in catch basins at various locations throughout the facility (Figures 23 and 24) (Shultz Distributing 2001). All stormwater from the tank area, rail tank car area, and loading dock area discharges to the impound basin, and in August 2006, it was pumped and disposed of by an outside company. A locked valve was in place and could be used to discharge the stormwater in the impound basin to an oil/water separator, from which stormwater could discharge to the city storm drain system. Conversely, a sump pump in the oil/water separator could be used to pump stormwater to the sanitary system (Ecology 2006b and SPU 2007a). In August 2006, SPU told Shultz Distributing to remove the pump from the oil/water separator because it had no use and was not allowing proper settling; reportedly the pump had been used to discharge vehicle wash water to the sanitary sewer system in the past, but vehicles were no longer washed at the property. With proper settling occurring in the oil/water separator, the stormwater could be discharged to the city storm drain system (Ecology 2006b and SPU 2006d). The review of files did not find any confirmation that the pump was removed from the oil/water separator and that stormwater now discharges to the city storm drain system.

According to Ecology, stormwater from areas other than the tank, rail tank car, and loading dock areas also drain to the city storm drain system (Ecology 2006b). In the recessed truck unloading area in the north central portion of the site is a catch basin. According to the 2001 SWPPP, it is not known where this basin discharges to. The discharge from the oil/water separator located “near the offices,” however, was confirmed by review of the city of Seattle’s Department of Engineering records to be connected to the sanitary sewer (Shultz Distributing 2001). Figure 23 shows the oil/water separator “near the offices” to be the catch basin and oil/water separator shown above the “Will Call Loading” area. Stormwater from the remaining western and eastern ends of the site appears to discharge to the city’s storm drain system.

Potential Sources of Stormwater Pollution

According to the 2001 SWPPP, potential sources of pollution at the Shultz Distributing facility include (Shultz Distributing 2001):

- **Hazardous and Non-Hazardous Materials Storage:** Most of the hazardous and non-hazardous materials are stored in ASTs where contact with stormwater would be made only if a spill or leak occurred. Drums of finished product are either stored inside a covered building where they cannot contact stormwater or on wooden pallets on the asphalt loading area that is drained to the sanitary sewer system.
- **Loading/Unloading Operations:** The facility has three truck loading areas and a railcar loading area. The truck loading/unloading areas are either fully or partially covered. Facility personnel supervise all loading/unloading operations in case a spill occurs and to

ensure that proper handling procedures are used. Figures 23 and 24 show the location of the loading/unloading areas at the facility. These areas are potential sources of pollutant migration from the facility; however, any spill would be observed and immediate control measures would be taken.

- **Potential for Equipment Failure:** Routine operations at the facility are not prone to equipment failures sufficient to release a significant quantity of hazardous material. Secondary containment, site grading, drainage channels, and management practices all minimize the potential for discharge from the facility. In addition, facility personnel are trained to conduct daily inspections of the tanks for leaks and periodic tank integrity testing is conducted.
- **Potential Pollutants:** The potential pollutants present at this facility include multiple types of chemicals stored in the warehouse facility, such as solvents, blanket wash, lacquer thinner, paint remover, and so forth. Unless an uncontrolled spill occurs, none of these pollutants have a reasonable potential to be present in significant quantities in stormwater discharged from the facility.
- **Reportable and/or Significant Spills:** The facility has not had a reportable spill within the past three years. Information on any previous or future spills will be recorded by the facility.

The Shultz Distributing facility employs a variety of BMPs to minimize and control the potential sources of stormwater pollution described above. BMPs employed at the Shultz Distributing facility include (Shultz Distributing 2001):

- **Inspections:** Annual site compliance inspections, monthly inspections of oil/water separator systems, and semi-annual inspections of designated equipment and site areas (material storage and handling areas, spill response equipment, erosion and stormwater management controls) are performed.
- **Training:** Annual training to review the SWPPP and training in various hazardous materials management and emergency response is provided to employees.
- **Record Keeping and Reporting:** Inspection records and semi-annual sampling reports are maintained at the facility.
- **Housekeeping:** Housekeeping measures are employed to minimize release to the storm drain system.
- **Preventative Maintenance:** Preventative maintenance includes equipment inspections and testing.
- **Spill Prevention and Response:** A Spill Prevention, Countermeasures, and Control (SPCC) plan has been developed and is implemented at the facility; secondary containment systems for tanks have been constructed, and spill response equipment and materials are readily accessible.
- **Runoff Management:** Secondary containment is provided for all tanks, there are roofs over all loading/unloading areas, and stormwater is diverted from the material storage areas.

- **Sediment and Erosion Prevention:** Most of the facility is paved; erosion control is provided in the southern unpaved areas by the graded surface, which drains runoff to the center of the area.

4.3.3.2 Historical Use

The Shultz Distributing property was developed in the 1920s for the Gypsum Products Corporation. From the late 1930s until the 1960s, Federal Pipe manufactured wood pipes and tanks on the property. Its operations included a dip tank, drying kilns, and warehouse space. In 1964, a group of individuals, including members of the Emerson family, purchased the property. Emerson GM Diesel leased the property in the 1960s and performed maintenance and repair of diesel motors and trucks on the property. Pacific Detroit Diesel occupied the property between 1989 and 1997 (Terra Vac and Floyd & Snider 2000).

4.3.3.3 Environmental Investigations and Cleanup Activities

Environmental Consultation, Shultz Distributing Site (1999)

In November 1999, AGI Technologies (AGI) provided environmental consultation to Shultz Distributing regarding an accusation by the adjacent Cascade Columbia Distribution (formerly Great Western Chemical Company) property that the Shultz Distributing property was the source of a chlorinated solvent plume discovered on Cascade Columbia Distribution's property. The plume was confirmed to have migrated from the Shultz Distributing property during the *Northwest Corner Investigation* conducted at the Cascade Columbia Distribution property in 1999 and discussed in further detail in Section 4.3.4.4. AGI reviewed available information on the two properties and concluded that Shultz Distributing was unlikely the source of the plume for the following reasons (AGI 1999):

1. No chlorinated solvents such as perchloroethylene (PCE) or trichloroethylene (TCE) have been stored or used on the Shultz Distributing property, and no evidence exists suggesting they have been released to the environment on the property.

2. The *Northwest Corner Investigation* report stated that the investigation was undertaken to investigate the source of chlorinated solvents detected in wells B-13 and B-22, which can be seen on the west side of the Cascade Columbia Distribution property in Figure 25. A groundwater sample collected from well B-13 in 1990 contained 9,000 ppb PCE. This result indicated that the "secondary source" was present in 1990, and therefore was not the result of a recent release. The contamination was not previously identified as a separate source in 1990 and not investigated as such until the *Northwest Corner Investigation* in 1999. Furthermore, the highest groundwater concentrations were at well B-13 and not in any of the wells closer to the Shultz Distributing property; thus, the data indicated that the chlorinated solvent plume did not originate from the Shultz Distributing property.

3. AGI developed a groundwater elevation contour map using data from the *Northwest Corner Investigation* report and determined a westerly groundwater flow direction, which suggested that the contamination identified in the investigation was from a source west of well B-13.

AGI's review indicated that groundwater contamination from the Cascade Columbia Distribution property could have contaminated the Shultz Distributing property. However, no evidence was provided to indicate that the chlorinated solvents plume could have originated from a source on the Shultz Distributing property. AGI recommended installing monitoring wells and collecting groundwater samples on the property to determine the extent of groundwater contamination (AGI 1999).

Monitoring Well Installation, Shultz Distributing Site (2000)

In December 1999, AGI installed three monitoring wells to investigate groundwater contamination at the Shultz Distributing property and to support AGI's conclusion that Shultz Distributing property could not have been the source of the chlorinated solvent plume discovered on the adjacent Cascade Columbia Distribution property, discussed in Section 4.3.4. Monitoring wells MW-1 through MW-3 were installed at locations shown in Figure 26. One soil sample collected above the water table from each soil boring, and groundwater samples collected from each well, were analyzed for halogenated VOCs including trans-1,2-dichloroethene (trans-1,2-DCE), 1,1-dichloroethane (1,1-DCA), cis-1,2-DCE, 1,1,1-trichloroethane (1,1,1-TCA), TCE, and PCE (AGI 2000).

In all three borings, groundwater was encountered at approximately 10 feet bgs; the groundwater flow direction was to the southwest (Figure 26). No VOCs at or above laboratory detection limits were found in the soil samples with the exception of the soil sample collected at 5 feet bgs in the boring for MW-2, which contained PCE at 0.1 ppm, below the 1999 MTCA Method A cleanup level of 0.5 ppm for PCE in industrial soil. The groundwater samples collected from all three wells contained chlorinated solvents, primarily TCE and PCE. The MTCA Method A cleanup level of 5.0 µg/L for PCE was exceeded in the groundwater samples collected from all three monitoring wells: 7.4 µg/L at MW-1, 110 µg/L at MW-2, and 62 µg/L at MW-3 (AGI 2000).

Based on sample results, AGI concluded that groundwater contamination beneath the Shultz Distributing property was part of the chlorinated solvent plume emanating from the adjacent Cascade Columbia Distribution property. AGI determined that both the absence of chlorinated solvents in soil above the water table and the relatively low concentrations in groundwater at the Shultz Distributing property indicated that Shultz Distributing was not the source of the chlorinated solvents plume (AGI 2000).

Storm Drain System Investigation, Shultz Distributing (2001)

According to the 2001 SWPPP for Shultz Distributing, a "September 2001 Site Investigation" was performed by Shultz Distributing, which involved a review of the city of Seattle's Department of Engineering records on storm drain and/or sanitary sewer system connections at the facility, investigation of the piping in catch basins, and a dye tracer test. The dye tracer test was inconclusive because the city sewer and storm drain lines could not be accessed during the test. A request was made to the city of Seattle to confirm connections to the sanitary sewer and/or storm drain system (Shultz Distributing 2001).

According to the 2001 SWPPP, stormwater that fell in the area of the tank farm was collected in the impound basin and routed through the oil/water separator system west of the tank farm. The oil/water separator system was believed to discharge to the sanitary sewer system. However, the point of discharge from the catch basin in the recessed truck unloading area in the north central portion of the site could not be determined. The discharge from the oil/water separator near the offices, however, had been confirmed to be connected to the sanitary sewer by review of the city of Seattle's Department of Engineering records (Shultz Distributing 2001).

4.3.3.4 Facility Inspections

Joint Inspection, Shultz Distributing Facility (January 2006)

On January 27, 2006, SPU and Ecology conducted a Joint Inspection as part of an SPU and KCIW joint program that aims to assist businesses in reducing the amount of pollutants discharged to the LDW via the storm drain system and CSOs. SPU identified the following required corrective actions to be addressed by Shultz Distributing (SPU 2006a):

1. Clean the catch basin located at the northwest corner of the building in the loading area. Accumulated material within 18 inches of the bottom of the lowest pipe entering or exiting the catch basin must be removed and disposed of in accordance with state and local regulations. Inspect and maintain all catch basins regularly and keep records.
2. Install an outlet trap in the sump structure.
3. Clean both oil/water separators.
4. Provide secondary containment for the five 10,000-gallon tanks at the northwest corner of the yard. The pump for the oil transfer should be inside the secondary containment. Accumulated oil-contaminated runoff must be discharged to the sanitary sewer or disposed of properly in an alternative way. No overflow of the secondary containment or discharge of contaminated water should reach the storm drain system.
5. During the inspection, several areas of oil-contaminated soil were found between the rail and the concrete pad at the railroad car unloading area and underneath the two truck cisterns east of the railroad car unloading area. Clean these areas and dispose of the contaminated soil properly. Provide large drip/leak pans to place underneath the railroad cars and cisterns to avoid soil contamination during oil transfers.
6. Berm the covered oil transfer area east of the truck cisterns to prevent oil spills from reaching the soil.
7. Sweep the back yard on a regular basis and contain all small drips and spills to prevent runoff contamination.

Joint Inspection (Follow-Up), Shultz Distributing Facility (March 2006)

On March 31, 2006, SPU conducted a follow-up Joint Inspection to ensure that the required corrective actions identified above had been completed. The remaining corrective actions to be addressed were identified as follows (SPU 2006b):

1. Obtain spill containment and clean-up materials for the five oil-transfer tanks located outside.
2. Clean up and prevent any further contamination of soil on the ground beside the loading/unloading area by the railroad tracks. Install a trench drip pan between the loading/unloading area cement slab and the railroad tracks to prevent oil from leaking on the ground.

Joint Inspection (Follow-Up), Shultz Distributing Facility (July 2006)

On July 5, 2006, SPU conducted another follow-up Joint Inspection to ensure that the required corrective actions identified above had been completed. The inspectors were pleased with the work Shultz Distributing had completed to address the corrective actions outlined above. However, SPU became concerned about the sump pump outside of the tank area, which apparently pumped to an oil/water separator and then to a catch basin that discharged to the sanitary system during low flows and the storm drain system during high flows (SPU 2006c).

Joint Inspection (Follow-Up) and Stormwater Compliance Inspection, Shultz Distributing Facility (August 2006)

On August 21, 2006, SPU and KCIW conducted a follow-up Joint Inspection, which coincided with a Stormwater Compliance Inspection conducted by Ecology. The Shultz Distributing facility is covered under the Industrial Stormwater General Permit and had not been previously inspected by Ecology. The inspections were performed to address the uncertainty of the facility's connection to the storm drain and/or sanitary sewer system.

According to Ecology, all stormwater from the tank area, rail tank car area, and loading dock area entered a large concrete vault (impound basin as shown Figures 23 and 24). A locked valve could be used to discharge the stormwater in the vault to an oil/water separator, which was no longer operational. A sump pump in the oil/water separator could be used to pump stormwater from the oil/water separator to a manhole near the street (Ecology 2006b).

SPU performed a dye test to determine whether stormwater from the facility discharged to the LDW. Dye was added to the oil/water separator, the sump pump was turned on, and dye was seen entering the manhole near the street. The dye was then observed in the street storm drain system, which discharges to the LDW. Stormwater from areas other than the tank, rail, and loading dock areas also drain to the street storm drain system (Ecology 2006b).

A pump was observed in the manhole on the street, but it was no longer operational. The pump appeared to discharge to the sanitary sewer. Shultz Distributing stated that the pump was probably used to discharge vehicle wash water to the sanitary sewer, but vehicles were no longer washed at the property (Ecology 2006b).

Because the oil/water separator was no longer operational and the stormwater could be very contaminated with oil & grease from the tank area, Ecology informed Shultz Distributing never to discharge stormwater from the vault to the street storm drain system. Shultz Distributing replied that it used a company to pump the contaminated stormwater out and dispose of it properly. KCIW told Shultz Distributing that it could obtain a permit from King County to discharge the vault stormwater to the sanitary sewer, but Shultz Distributing would need to repair the oil/water separator. Shultz Distributing opted to continue pumping and disposing of the vault stormwater (Ecology 2006b).

SPU identified the following required corrective actions to be addressed by Shultz Distributing (SPU 2006d):

1. Have the pump removed from the oil/water separator because it is not allowing proper settling and is thus negating the intended beneficial effects of the treatment system.

2. Fix the pump by the yard entrance to allow confirmation of discharge to the sanitary sewer system.

Ecology noted the following concerns and recommendations (Ecology 2006b):

1. According to Ecology's database, no stormwater DMRs were submitted for 2005 or for the first quarter of 2006. Ecology requested that Shultz Distributing submit the required DMRs as soon as possible.

2. Ecology stated that 2005 and 2006 DMRs must be reviewed to determine if any sampling results were above benchmark values or action levels.

3. Ecology required that the valve not be opened to discharge stormwater from the vault to the manhole near the street.

Joint Inspection (Follow-Up), Shultz Distributing Facility (January 2007)

On January 4, 2007, SPU conducted another follow-up Joint Inspection to ensure that the required corrective actions identified above had been completed. The pump by the yard entrance had been fixed and it was confirmed that when the pump turned on, water discharged to the sanitary system. When the pump was not on, water was discharged to the storm drain system. It was concluded that the Shultz Distributing facility had achieved compliance (SPU 2007a).

4.3.3.5 Potential Pathways of Contamination

Stormwater

Shultz Distributing's storm drain system is shown in Figures 23 and 24. Figure 4 apparently shows that the storm drain system connects to the city's storm drain system and discharges to the LDW via the South Brighton Street CSO/SD.

The Shultz Distributing facility discharges to the city storm drain system under the Industrial Stormwater General Permit, and although facility operations could be a source of stormwater pollution, a SWPPP is implemented, BMPs are employed to minimize the potential, and discharge monitoring is conducted. In addition, several inspections have been performed at the facility as discussed in Section 4.3.3.4 to address multiple stormwater pollution concerns. However, stormwater pollutants could discharge to the LDW within RM 2.0-2.3 East via the stormwater pathway.

Shultz Distributing's storm drain system appears to pass through an area of chlorinated solvent groundwater contamination near the tank farm (Figures 25 and 26) that purportedly emanates from the Cascade Columbia Distribution property to the south. Groundwater contamination at the property could infiltrate the storm drain system and discharge to the LDW within RM 2.0-2.3 East via the stormwater pathway.

Groundwater

Groundwater flow direction at the Shultz Distributing property was found to be to the west in November 1999 using existing data and to the southwest in December 1999 through AGI's groundwater investigation.

In December 1999, groundwater samples collected from monitoring wells MW-1 through MW-3 (Figure 26) contained chlorinated solvents, primarily TCE and PCE. The MTCA Method A cleanup level for PCE was exceeded in all three wells. Since groundwater has been documented to flow toward the LDW, groundwater contamination could discharge to the LDW within RM 2.0-2.3 East via the groundwater pathway.

Spills

Operations at the Shultz Distributing facility could result in spills. However, since the facility is not adjacent to the LDW, spills could only reach the LDW via the stormwater pathway, discussed above. According to the 2001 SWPPP, the Shultz Distributing facility had not had a reportable spill within the last three years (Shultz Distributing 2001).

Bank Erosion

The Shultz Distributing facility is not located along the banks of the LDW; therefore, bank erosion/leaching is not a potential pathway for contamination to reach LDW sediments.

Atmospheric Deposition

The information reviewed gave no indication that any activities at the Shultz Distributing facility may result in atmospheric deposition; therefore, atmospheric deposition is not considered a potential pathway for contamination to reach LDW sediments.

4.3.3.6 Data Gaps

The following data gaps have been identified for the Shultz Distributing property. These data gaps should be addressed before source control efforts begin for the RM 2.0-2.3 East source control area.

- Information on site history and operations before 1996 is needed to be sure chlorinated solvents were never used at the site, potentially contributing to groundwater contamination.
- According to the 2001 SWPPP available for review some uncertainties remain regarding the facility's storm drain system and connection to the city storm drain and sanitary sewer

system. Figures 4, 25, and 26 apparently show that storm drain lines at the facility pass through an area of chlorinated solvent groundwater contamination near the tank farm that purportedly emanates from the Cascade Columbia Distribution property to the south, and discharge to the LDW via the South Brighton Street CSO/SD. More information is needed on the Shultz Distributing storm drain system and connection to the city storm drain and sanitary sewer systems to determine whether contamination could pose a threat to LDW sediments via the stormwater pathway. In addition, Ecology should obtain an updated SWPPP from Shultz Distributing.

- During the Joint Inspection performed at the facility on August 21, 2006, SPU told Shultz Distributing to remove the pump from the oil/water separator because it was no longer of any use and was not allowing proper settling. Because Shultz Distributing was listed as "in compliance" after the January 4, 2007 Joint Follow-Up Inspection, it is believed that the pump was removed as required; however, the inspection notes did not confirm this specifically. Whether the pump was removed from the oil/water separator, and stormwater now discharges to the city storm drain system, needs to be confirmed to be sure stormwater is discharged as cleanly as possible to the city storm drain system.
- A Stormwater Compliance Inspection was performed at the facility on August 21, 2006. The Stormwater Compliance Inspection Report stated that no stormwater DMRs had been submitted for 2005 or for the first quarter of 2006. Whether Shultz Distributing submitted the DMRs to Ecology, and whether the sampling results were above benchmark values or action levels, is unknown; having this information is important for ensuring stormwater pollutants do not pose a threat to LDW sediments. DMRs for the Shultz Distributing facility should be reviewed to ensure the facility has remained in compliance.
- In-line storm drain sampling may be needed within the Shultz Distributing storm drain system to determine whether contamination at the site may migrate to the LDW via the stormwater pathway.
- AGI reviewed existing information, installed monitoring wells, and performed soil and groundwater sampling in response to the accusation that the Shultz Distributing property contributed to chlorinated solvent-contaminated groundwater at the Cascade Columbia Distribution property. AGI concluded that Shultz Distributing did have groundwater contamination on-site, but that the contamination was part of the chlorinated solvents plume emanating from the Cascade Columbia Distribution property. Based on available information, only three monitoring wells were installed, and groundwater direction appeared to flow toward, not away from, the Cascade Columbia Distribution property. Relatively high concentrations of PCE, TCE, and vinyl chloride (VC) were also found at the eastern end of the Shultz Distributing property in well B-1, as shown in Figure 26. Whether additional sampling or investigations were performed at the Shultz Distributing property following AGI's December 1999 investigation is not known. AGI's results and conclusions should be reviewed, and/or additional investigations should be performed to be certain that groundwater contamination at the property is emanating from the Cascade Columbia Distribution property.

4.3.4 Cascade Columbia Distribution

Facility Summary: Cascade Columbia Distribution	
Address	6900 Fox Avenue South
Property Owner	Fox Avenue Building LLC
Former/Alternative Property Names	Fox Avenue Building Great Western International (GWI) Great Western Chemical Company (GWC) Republic Steel Round-Seattle Chain Company Seattle Chain and Manufacturing Co.
Former/Alternative Lessee/Operator Names	Tyee Lumber Company Campbell Chain Company Western Salvage Company (Lot 11) Nelson Trucking (Lot 11)
Former/Alternative Addresses	N/A
Tax Parcel No.	0001800087 0001800089 (Lot 11; no longer considered part of main property)
Parcel Size	2.53 acres 1.19 acres (Lot 11)
NPDES Permit No.	N/A
EPA RCRA ID No.	WAD008957961
EPA TRI Facility ID No.	98108CSCDC69FXA (2005) 98108GRTWS6900F (1998 and 1999)
Ecology Facility/Site ID No.	2282
Ecology UST Site ID No.	3803
Ecology LUST Release ID No.	N/A
Listed on Ecology CSCSL	Yes

Cascade Columbia Distribution is located upland, on the east side of the LDW, between RM 2.3 and 2.4. The property is bordered on the east by an empty lot referred to as “Lot 11.” East of Lot 11 is East Marginal Way South. South Willow Street borders the property to the north. North of South Willow Street is Shultz Distributing. The property is bounded on the west by Fox Avenue South. West of Fox Avenue South is the Bunge Foods property. Finally, the Cascade Columbia Distribution property is bordered on the south by the former South Frontenac Street and the “Whitehead Property,” which historically was occupied by the Tyee Lumber Company.

According to King County tax records, Fox Avenue Building LLC purchased the Cascade Columbia Distribution property shown in Figures 2 through 4 from Marian Properties LLC on May 8, 2003, after Great Western Chemical (GWC) Company filed for bankruptcy protection in 2001. It is unclear whether “Fox Avenue Building LLC” is the same entity as “Fox Avenue LLC”, the current owner of the Glacier Marine Services property, discussed in Section 4.2.3. The two structures on the property include a 38,650-square-foot distribution warehouse built in 1959 and a 4,000-square-foot distribution warehouse built in 1929 (King County 2007a).

Fox Avenue Building LLC also purchased “Lot 11” (shown in Figures 2 through 4) from GWC Properties LLC on February 18, 2005 (King County 2007a). Buildings on Lot 11 were demolished in 1969, and since that time the property has been used by a truck and heavy equipment recycler and as parking and container storage area (Terra Vac and Floyd & Snider 2000).

According to EPA's TRI database, Cascade Columbia Distribution is listed under TRI Facility ID No. 98108CSCDC69FXA in 2005, but no release or waste transfer information is provided. GWC is listed under TRI Facility ID No. 98108GRTWS6900F in 1998 and 1999. According to the 1998 Release Report, GWC released 250 pounds of methanol in air emissions. The 1999 Release Report indicates GWC released another 250 pounds of methanol in air emissions. According to the 1998 Waste Transfer Report, GWC had 250 pounds of methanol transferred to energy recovery and 250 pounds transferred to treatments, for a total of 500 pounds transferred off-site for further waste management. According to the 1998 Waste Quantity Report, GWC had 73 pounds of methanol disposed of or otherwise released on- and off-site, for a total of 73 pounds of total production-related waste managed. According to the 1999 Waste Quantity Report, GWC had 35 pounds of methanol transferred to energy recovery on-site, 50 pounds treated on-site, and 16 pounds disposed of or otherwise released on- and off-site, for a total of 101 pounds of total production-related waste managed (EPA 2007a).

According to Ecology's UST List, 20 USTs were removed and 6 USTs were closed in place when the facility was in operation as GWC. UST removal dates are not listed (Ecology 2007e).

The Cascade Columbia Distribution property was entered onto Ecology's CSCSL on October 11, 1990 under the facility name Fox Avenue Building, and is listed as having confirmed groundwater and soil contamination. Contaminants in groundwater and soil are identified as halogenated organic compounds, petroleum products, non-halogenated solvents, and PAHs. A site discovery/report, early notice letter, and initial investigation were completed in 1990. A hazardous sites listing and site hazard assessment were completed in 1994. An interim action is listed as in progress; apparently the interim action began in December 1993 and is to be completed by January 2010. Ecology's status on this site is remedial action in progress (Ecology 2007e).

GWC entered into Agreed Order No. DE TC91-N203 with Ecology effective September 30, 1991 (Terra Vac and Floyd & Snider 2000). Under the Agreed Order with Ecology, GWI agreed to conduct a RI/FS, and a *Remedial Investigation and Preliminary Risk Assessment Report* (RI/PRA) was completed in 1993. In 2000, a *Supplemental Remedial Investigation and Feasibility Study* (SRI/FS) (Terra Vac and Floyd & Snider 2000) was completed to document information gathered and work conducted at the site since the RI/PRA.

GWC was issued Minor Discharge Authorization No. 319 from the King County Industrial Waste Program (KCIWP) to discharge contaminated stormwater to the sanitary sewer and the West Point WWTP. This authorization was effective November 4, 1996 through November 4, 2001.

GWC was issued Major Discharge Authorization No. 498 to discharge wastewater generated from a groundwater remediation system installed at the site under a MTCA Consent Order with Ecology. Approximately 6 gallons per minute were to be removed from the subsurface, pre-treated through an air stripper, biological treatment, and carbon polish, and then discharged to the sanitary sewer in compliance with local discharge limits. This authorization was effective March 13, 1997 through March 13, 2002.

The facility names GWC and GWI appear to refer to the same facility, and are used interchangeably in various documents and databases.

4.3.4.1 Current Operations

A chemical distribution facility called Cascade Columbia Distribution currently occupies the property, which is owned and operated by Fox Avenue Building LLC (ERM 2003). The most current available facility map is included as Figure 27, from 2003, under Fox Avenue Building LLC ownership.

4.3.4.2 Historical Use

The Cascade Columbia Distribution property and the property labeled “Lot 11” in Figures 2 through 4 were first developed for industrial use in 1918 by the Seattle Chain and Manufacturing Company, which leased the property from King County from 1918 until purchasing the property in 1937. Seattle Chain and Manufacturing Company and its successor companies operated coke-fired and oil-fired furnaces and warehouses. Ownership of Seattle Chain and Manufacturing Company was transferred in the late 1940s and the company was renamed the Round-Seattle Chain Company. This company was purchased in 1954 by Republic Steel. Republic Steel sold the property to Marian Enterprises in 1956, though Republic Steel continued operations in a warehouse on the northern part of the facility via a lease-back agreement (Terra Vac and Floyd & Snider 2000).

GWI began leasing property from Marian Enterprises in 1956. Initially, GWI operations took place in portions of the former Seattle Chain and Manufacturing Company main building, and at a drumming dock located parallel to a road spur along the former South Frontenac Street (shown in Figures 2 through 4), which had originally served Seattle Chain and Manufacturing Company. GWI constructed a new warehouse and office building on the west end of the property in 1959. A sump in the drumming area was connected to a subsurface drain pipe that ran to the southern edge of the dock (Terra Vac and Floyd & Snider 2000).

Other lessees of the property during the 1950s and 1960s included Campbell Chain Company, which leased and used a warehouse in the northern part of the facility abutting South Willow Street, and Tyee Lumber Company, which leased parts of Lot 11 and the Seattle Chain and Manufacturing Company building for storage and product assembly (Terra Vac and Floyd & Snider 2000).

GWI completed major facility modifications in the 1960s and 1970s, including replacement of and upgrades to existing structures; installation of a concrete AST pad east of the warehouse/office; and replacement of the sump and drain system in the drumming area. In 1976, both the tank and the drumming facilities were expanded considerably, including the construction in the dock area of two concrete and metal sheds for drum storage. The dock area itself was also enlarged at that time, to the configuration that existed in 2000, which is shown in Figure 28 (Terra Vac and Floyd & Snider 2000).

In 1969, the former Seattle Chain and Manufacturing Company buildings present on “Lot 11” were demolished, and Tyee Lumber Company’s operations terminated. The property was cleared and leased in the 1970s and early 1980s by Western Salvage Company, a truck and heavy equipment recycler. The property was subsequently leased to Nelson Trucking as a parking area, and in 2000 it was used for container storage (Terra Vac and Floyd & Snider 2000).

In 1989, GWI began renovations to the GWI facility. These renovations included decommissioning and closure of all USTs, reconditioning of ASTs, a partial demolition of the north warehouse, and a subsequent repaving of the north warehouse area for use as a truck loading and unloading area. In 1990, the main tank farm area USTs were removed (see Figure 28).

Materials Handled at the Facility

The GWI facility had been used since 1956 for storage, repackaging, and distribution of chemical and petroleum products. Until the late 1980s, GWI supplied chemicals and supplies to the laundry and dry cleaning industry. This aspect, as well as most of its petroleum product handling, was phased out by 1990 (Terra Vac and Floyd & Snider 2000).

Materials at GWI were received, handled, and shipped in drums, in bulk for storage tank transfer, and as packaged dry chemical products. Both rail and truck transport was used at the facility. GWI transferred and drummed products principally in the vicinity of the drum shed (see Figure 28). Pump lines from USTs and ASTs in the drumming area ran above and under the ground. GWI handled the following chemical classes and product types at the property (Terra Vac and Floyd & Snider 2000):

- Ketones: methyl ethyl ketone, methyl *iso*-butyl ketone, and acetone;
- Monocyclic Aromatic Solvents: toluene and xylenes;
- Alcohols and glycols: isopropyl alcohol, ethyl alcohol, methyl alcohol, ethylene glycol, and propylene glycol;
- Mineral Spirits/Petroleum Solvents: kerosene and Chevron solvents 325, 350-B, 410, and 450;
- Chlorinated Compounds: methylene chloride, PCE, pentachlorophenol (PCP or penta), TCE, and 1,1,1-TCE;
- Acids: nitric, sulfuric, and muriatic (hydrochloric) acids;
- Dry Products: phosphates, soda ash, titanium dioxide, borax, and boric acid; and
- Miscellaneous: ferric and ammonium chloride etchants, phenols, hydrogen peroxide, and linseed oil.

GWI began handling PCP (penta) on the property in 1966. Product was stored in one of the 12,000-gallon tank compartments. For one to two years, penta was blended with Stoddard solvents or mineral spirits in a small AST north and west of the drum shed. From 1969 until the late 1970s or early 1980s, GWI purchased mixed penta in drums from outside vendors. Product was delivered to customers in vendor-packaged drums or transferred to a tanker truck and delivered in bulk (Terra Vac and Floyd & Snider 2000).

In 2000, GWI warehoused liquid and dry products, including vendor pre-packaged containers and GWI-packaged containers. Inventory included hazardous products and non-hazardous products, including food products. Products were stored according to hazard class, product type, and chemical compatibility. The facility packaged liquid chemical products into containers (drums or totes) from tanker trucks. Products transferred in this manner included the following (Terra Vac and Floyd & Snider 2000):

- Sodium chlorate
- Sulfuric acid
- Hydrochloric acid
- methyl iso-butyl ketone
- Ferric chloride
- Potassium carbonate
- Caustic soda

GWI transferred hydrogen peroxide from drums to totes. The facility also transferred liquid chemical product from rail cars, including transferring methanol to common carrier tanker trucks. The facility transferred dry product, such as calcium chloride and calcium sulfate, from rail car to the warehouse for storage and delivery to customers by truck or customer Will Call pick-up (Terra Vac and Floyd & Snider 2000).

Facility Underground and Aboveground Storage Tanks

GWI had historically used a variety of USTs and ASTs at the facility. Figure 28 identifies the sizes and locations of all known USTs in 2000 and the dates of their installation, decommissioning, and removal (where known). Most USTs and ASTs were used for a variety of products, depending on demand (Terra Vac and Floyd & Snider 2000).

The six original USTs at the facility, installed in 1956, were 10,000-gallon, single-compartment tanks, located beneath the drum shed along the former South Frontenac Street. These tanks, referred to as the "old" tank farm, were decommissioned in 1989. They remain in place beneath a concrete pad under the drum shed in the southeastern corner of the facility. In 1976, 10 double-compartment USTs, each with a 12,000-gallon capacity, were installed in the central part of the facility. These tanks, which formed the "main" tank farm, remained in use until they were decommissioned in 1989 and removed in the fall of 1990. A 1,000-gallon UST near the Fox Avenue South loading dock area was used for storage of diesel fuel; it was decommissioned in place in 1989. A 500-gallon heating oil UST, installed in the northwestern portion of the property during the early years of GWI's operations, remained in use in 2000 (Terra Vac and Floyd & Snider 2000).

In 1959, GWI installed an AST in the southwestern corner of the loading dock area to store sulfuric acid. Two smaller 1,000-gallon, aboveground "wing tanks" were also used historically on the loading dock: one contained PCE and the other stored methanol. Portable, vertical ASTs called "tote bins" used for product storage were stored on pallets in the vicinity of the old tank farm. In 1976, GWI constructed a bermed AST acid storage area, with sumps, adjacent to the warehouse/office. Five ASTs were installed in this area by 1980. In the 1970s and 1980s, GWI used three blending and/or storage ASTs located near the main tank farm (Terra Vac and Floyd & Snider 2000).

4.3.4.3 Summary of Site Geology and Hydrology

The Cascade Columbia Distribution facility is underlain by fill, with depths ranging from 5 to 10 feet bgs. Underlying the fill material are younger alluvial channel and floodplain deposits laid down by the LDW. Underlying the younger alluvial deposits are older sedimentary alluvial deposits typical of deltaic and estuarine environments. These two primary, low-permeability alluvial deposits have been observed at depths ranging from 10 to 50 feet bgs, and are named the 1st silt horizon (SH) (uppermost silt horizon) and the 2nd SH (Terra Vac and Floyd & Snider 2000).

The 1st SH and 2nd SH contain what have been designated regionally as the upper groundwater zone (contained in both the 1st SH and 2nd SH) and the lower groundwater zone (found only in the 2nd SH). Locally, beneath the Cascade Columbia Distribution facility, these groundwater-bearing zones play an important role in groundwater flow direction and contaminant transport, and are referred to, respectively, as the 1st water-bearing zone (WBZ) and the 2nd WBZ. The 1st WBZ is unconfined, with a depth to the water table ranging from 7 to 13 feet bgs; it is the most vulnerable to impacts from surface activities. The 2nd WBZ ranges in depth from 15 to 45 feet bgs, and is contained within a semi-confined (locally unconfined) aquifer (Terra Vac and Floyd & Snider 2000).

Where present, the 1st SH separates the 1st WBZ and the 2nd WBZ. The 2nd SH, where present, is located at depths of 30 to 40 feet beneath the 1st SH. Where persistent, the 1st SH and 2nd SH can serve as shallow aquitards, impeding contaminant transport to lower aquifers (Terra Vac and Floyd & Snider 2000).

The 1st SH is present beneath a majority of the Cascade Columbia Distribution facility, with the exception of a small area northwest of the former main UST farm. The thickness of the 1st SH ranges between 0.5 and 2.5 feet. The 1st SH is absent in B-1, and is thickest in the area of B-16/B-17 (see Figure 16). Based on available data, the 1st SH appears to be absent or discontinuous south and east of the Cascade Columbia Distribution facility; however, detailed subsurface information is lacking in these areas. The absence of the 1st SH south of the Cascade Columbia Distribution facility has been defined as a hole in the unit, which allows groundwater and contaminants to move between the 1st WBZ and 2nd WBZ. Southwest of the hole, the 1st SH has been encountered in B-35/B-36 and B-64/B-65. B-34, located southwest of B-64/B-65, indicates that the 1st SH terminates at the South Myrtle Street Embayment. West of B-34, the 1st SH is absent because the unit was excavated during installation of underground utilities. The 1st SH appears to be present west of Fox Avenue and acts as a confining layer (Terra Vac and Floyd & Snider 2000).

The 2nd SH, where present, forms the base of the 2nd WBZ. The thickness of the 2nd SH ranges between 1 and 5 feet. The 2nd SH is discontinuous and has primarily been encountered east of Fox Avenue. Based on available data, the 2nd SH appears to be absent or discontinuous west of Fox Avenue; however, detailed subsurface information is lacking in these areas. Available data suggest that it is unlikely that contaminants would reach deeper sections of the regional groundwater-bearing zones (Terra Vac and Floyd & Snider 2000).

4.3.4.4 Summary of Environmental Investigations and Cleanup Activities (1989-2000)

Site investigation activities completed since 1989 have identified several contaminants in soil and groundwater at the Cascade Columbia Distribution property and at locations to the south and west. This contamination is attributed to GWI's handling and storage of materials at the site, prior to the Fox Avenue Building LLC ownership. The primary contaminants found in soil and groundwater are the chlorinated volatile organic compounds (CVOCs) PCE, TCE, and their associated degradation products, 1,2-DCE and VC, and PCP and petroleum hydrocarbons (ERM 2003).

Soil contamination was discovered in the main tank farm area of the facility from 1989 to 1990 during GWI facility renovations and the removal of USTs from the main tank farm area (see Figure 28). Subsequent soil and groundwater borings encountered contamination near the loading dock UST and the USTs under the drum shed, as well as at other locations around the facility. Additional investigations were undertaken to determine the nature and extent of contamination at the GWI property; adjacent and nearby properties have also been investigated to determine the nature and extent of contamination beyond the GWI property. Several interim remedial measures have been conducted at and around the Cascade Columbia Distribution property since 1989. Figure 28 illustrates where interim remedial measures have been performed, and Figure 29 depicts locations of soil sampling, a groundwater monitoring well, and soil vapor sampling. A timeline showing approximate periods for major events at the GWI facility, such as environmental investigations and cleanup activities, is included as Figure 30.

Investigations performed at adjacent properties outside of the RM 2.0-2.3 East source control area have been provided or will be provided in other reports. A supplemental investigation known to have been performed at the Whitehead Property (former Tyee Lumber Company; shown in Figures 2 through 4), will be included in the Data Gaps Report for RM 2.3-2.8 East (Seattle Boiler Works to Slip 4).

Furthermore, groundwater contamination migrating from the GWI property has been determined to reach LDW sediments near the Myrtle Street Embayment (shown in Figures 2 through 4) where South Myrtle Street intersects the LDW. The Myrtle Street Embayment is in the adjacent RM 2.3-2.8 East source control area, so additional groundwater investigations and data gaps are identified in the Data Gaps Report for that area. Groundwater investigation information is summarized in this report only to the extent necessary to provide an overall picture of the investigations performed, to describe the nature and extent of contamination, and to identify data gaps for RM 2.0-2.3 East.

Following the initial UST removal in 1990, Hart Crowser conducted multiple investigations at the GWI facility and surrounding area to establish the nature and extent of contamination. GWI retained Terra Vac in 1997 to conduct interim remedial measures, evaluate remedial alternatives, and assist GWI in selecting a preferred alternative for site cleanup. Terra Vac continued the annual groundwater, surface water, and mussel tissue monitoring program initiated by Hart Crowser and initiated a number of additional, discreet investigations to collect additional data needed to fill critical data gaps concerning the nature and extent of contamination and evaluate remedial alternatives (Terra Vac and Floyd & Snider 2000).

A summary of the purpose and scope of each investigation or cleanup activity conducted at the GWI facility from 1989 to 2000 is provided in the following sections. Due to the large quantity of data from these investigations, numerical results are provided in the figures accompanying the summary of the nature and extent of contamination section that follows. Since the locations and values of the data points together are more descriptive of the extents of contamination than the numerical concentrations alone, concentration values are only presented in the figures.

Decommissioning of the Main Tank Farm (1990)

The main tank farm was located in the central part of the GWI property, as shown in Figure 28. It consisted of 10 double-compartment product USTs with a nominal capacity of 12,000 gallons per tank (6,000-gallon capacity in each compartment). These tanks were identified by the numbering of compartments (UST 1/2, UST 3/4, and so forth) and were designated as USTs 1/2 through 19/20. These tanks were installed in 1976, taken out of service in the late 1980s, and formally decommissioned in September 1990. Decommissioning of the main tank farm included the activities summarized in the following subsections (Terra Vac and Floyd & Snider 2000).

Approximately 9,000 gallons of residual liquids were removed from the main tank farm USTs and stored in two Baker tanks prior to disposal. The tanks were cleaned and all residuals, including liquids, rinse water, and sludges, were disposed of off-site. The ten double-compartment USTs and associated vent and product piping were removed following tank cleaning. The USTs and piping were comprised of steel and were transported off-site for scrap metal salvage (Terra Vac and Floyd & Snider 2000).

Concrete pavement and the concrete UST hold-down devices that were removed during decommissioning were demolished on-site with a hydraulic breaker. The majority of the concrete debris was hauled off-site for salvage. Approximately 25 cubic yards of concrete was stained or contained VOC contamination, based on photo ionization detection readings. This concrete was stockpiled on-site in a Visqueen-lined and covered stockpile prior to disposal off-site (Terra Vac and Floyd & Snider 2000).

Soil excavated during removal of the USTs was placed in two separate bermed, lined, and covered stockpiles. Soils were distinguished based on field observations of visual staining and soil vapor screening levels measured using a hand-held photo ionization detector. One stockpile contained approximately 75 cubic yards of soil, the other approximately 200 cubic yards of soil. Additional excavation of soil was not attempted during removal of the USTs because of the presence of existing structures in close proximity to the excavation, ongoing facility operations, and the apparent need for additional remediation outside of the main tank farm area. The soil from the two stockpiles was disposed of off-site. Sampling and analysis were performed on soil remaining after the main tank farm excavation to characterize contaminant concentrations upon completion of tank removal activities (Terra Vac and Floyd & Snider 2000).

At the time of the main tank farm closure, soil vapor extraction was identified as a reasonable means of remediating unsaturated zone soil contamination; therefore, components of a soil vapor extraction system were installed in the main tank farm excavation for future remediation use. A series of perforated soil vapor extraction pipes with non-perforated riser pipes was installed at the base of the main tank farm excavation. The perforated pipes were placed horizontally on approximately 10-foot centers running north-south, with a single riser (4-inch diameter schedule 80 PVC) for each pair of horizontal vapor extraction pipes. The soil vapor extraction piping was covered with clean gravelly sand and a layer of visqueen was placed across the excavation to restrict the downward inflow of air. The main tank farm excavation was then backfilled with clean compacted soil imported by barge (Terra Vac and Floyd & Snider 2000).

Removal of Product Piping West of the Drum Shed (1990)

During the decommissioning of the main tank farm in September 1990, three pipelines were removed from the western side of the drum shed (Figure 28). Soil removed during the excavation of these lines was stained and/or had a solvent-like odor. The excavated soil and concrete pavement that was removed to provide access to the piping were placed in bermed, visqueen-lined, and covered stockpiles. Approximately six to eight cy of soil was removed during the pipe trench excavations and placed in a stockpile. No attempt was made to excavate all the contaminated soil in the pipe trench area west of the drum shed because additional investigation was being performed to evaluate the extent of contamination at the site. Following removal of the piping, the trench excavations west of the drum shed were lined with visqueen and backfilled with imported soil. The soil excavated from west of the drum shed was disposed of off-site. Sampling and analysis were performed on soil remaining in the pipe trench excavations to characterize contaminant concentrations upon completion of pipe removal (Terra Vac and Floyd & Snider 2000).

Initial Site Assessment (1989-1990)

Soil contamination was discovered in the main tank farm area of the facility during 1989 and 1990, during GWI facility renovations and the removal of USTs from the main tank farm area (see Figure 28). Before the renovations began, Hart Crowser advanced an exploratory boring (B-1) west of the central UST area to obtain soil data and groundwater elevations. Samples from this boring were screened for VOCs and results indicated the presence of benzene, toluene, PCE, and TCE. This boring was subsequently completed as a groundwater monitoring well, shown in Figure 29 (Terra Vac and Floyd & Snider 2000).

In May 1990, Hart Crowser completed three additional borings (B-2, B-3, and B-4) in the area of the Fox Avenue South loading dock (see Figure 29). Sampling of these borings also confirmed the presence of soil impacted by VOCs (Terra Vac and Floyd & Snider 2000).

In August 1990, GWI began removing USTs in the central part of the GWI facility. The area was backfilled with clean fill in October 1990. Following the UST removal, Hart Crowser sampled six test pits, nine additional monitoring wells (B-5, B-6, B-8, B-9, B-10, B-11, B-12, B-13, and B-14) and 10 additional soil borings (B-7 and SB-1 through SB-9). Four of the nine additional monitoring wells (B-5, B-6, B-8, and B-9) were installed into the 2nd WBZ, while the remainder (B-10, B-11, B-12, B-13 and B-14) were installed into the 1st WBZ. Soil boring and monitoring well locations are shown in Figure 29 (Terra Vac and Floyd & Snider 2000).

Stormwater Investigation (1991)

In 1992, Hart Crowser prepared a technical memorandum for stormwater management at the GWI facility. Information was presented on existing and proposed storm drains and sanitary sewers to be used for management and disposal of stormwater following the discovery of soil contamination at the site. Hart Crowser documented areas of overland flow, ponding, and apparent infiltration. Dye was used to investigate whether drainage from on-site catch basins went into adjacent storm and sanitary sewers during a dry period in September 1991 (Hart Crowser 1992).

Principal stormwater discharge from the facility was found to be surface water runoff, primarily toward the west, at least part of which entered city of Seattle storm sewer catch basins in Fox Avenue South. Most of the site was paved or roofed. Infiltration primarily occurred in limited areas on the north and east sides of the facility not used for chemical storage. Infiltration also occurred in the area near the center of the facility and west of the drum shed, where USTs and piping were removed in 1990, and in limited areas of deteriorated pavement along the southern side of the facility (Hart Crowser 1992).

Precipitation falling into an existing AST bermed area was discharged into a King County sanitary sewer under a stormwater discharge authorization dated November 4, 1991. GWI planned to implement engineering plans for future stormwater management at the facility, including discharge of runoff from chemical storage and handling areas to the sanitary sewer, and discharge of runoff from other areas to the storm sewer (Hart Crowser 1992).

In 1992, GWI hired the engineering firm Olympic Associates Co. to provide civil engineering services for renovation of the facility. Part of this work included on-site drainage improvement and connection to an existing storm sewer and a new sanitary sewer to be located in South Willow Street on the north side of the facility. The engineering plans showed runoff control and separate drainage to the sanitary and storm sewers for areas where chemicals were and were not handled or stored, respectively. Both the proposed storm and sanitary sewer discharge systems included manholes at the property line where discharge sampling could be accomplished if necessary. Drainage improvements at the facility to have been constructed in the summer of 1992 consisted of paving the area between the main elevated dock and South Willow Street to provide truck access to the recently remodeled wood warehouse building on the north side of the facility. This paved area would also be used for unloading tanker trucks handling bulk liquids when the new AST farm was to begin operation in the central part of the facility. Stormwater from these areas would be discharged to the sanitary sewer. Construction of new drains and containment areas on the main elevated dock, future truck unloading area on the west and east side of the facility, and elsewhere was anticipated to occur as part of the cleanup action plan following completion of the 1993 RI/FS (Hart Crowser 1992).

Remedial Investigation/Preliminary Risk Assessment (1992)

Hart Crowser conducted several sampling activities for the *RI/PRA*, including well installation and soil sampling, groundwater and surface water sampling, and soil vapor sampling, as described below (Terra Vac and Floyd & Snider 2000).

Well Installation and Soil Sampling

In 1991, Hart Crowser installed soil borings and monitoring wells along South Frontenac Street and in the interior portion of the GWI facility, as depicted in Figure 29. Three soil borings (SB-10 through SB-12) and a monitoring well (B-15) were installed in the vicinity of South Frontenac Street and the drum shed. Two observation well borings (B-16 in the 1st WBZ and B-17 in the 2nd WBZ) were also installed to assess chemical contaminant concentrations in the main tank farm area. In addition, Hart Crowser collected surface soil samples and samples from two shallow hand auger borings in a proposed truck unloading area along South Willow Street, and tests were performed on soil excavated from the pipe trench area after SVOCs were identified as potential contaminants (Terra Vac and Floyd & Snider 2000).

In March and April 1992, additional wells were installed to assess upgradient water quality (B-24 through B-27) and downgradient groundwater quality (B-18 through B-23) and to further assess groundwater quality and gradients in the center of the facility (B-28 through B-31).

In September and October 1992, eleven additional monitoring wells were installed. Three monitoring well clusters (1st WBZ Wells B-34, B-36, and B-38; 2nd WBZ Wells B-33A, B-35, and B-37) were installed outside the GWI facility boundary and five additional 1st WBZ Wells (B-38 through B-42) were installed at the facility (Terra Vac and Floyd & Snider 2000).

Groundwater and Surface Water Sampling

Throughout 1992, groundwater samples were collected across the site to provide data on seasonal variations in groundwater quality. In addition to groundwater sampling, LDW surface and stormwater samples were collected near the South Myrtle Street Embayment (Terra Vac and Floyd & Snider 2000).

Soil Vapor Sampling

From April through September 1992, Hart Crowser obtained information on soil vapor in the vadose zone from various locations at or near the GWI facility, shown in Figure 29. Two vapor probes (SVP-1 and SVP-2) were installed in the GWI warehouse to assess the potential for a vadose zone pathway beneath structures. Three vapor probes (P-1, P-2, and P-3) were completed near MW B-30 for use in an air injection test. Five vapor probes (VP-2, VP-6, VP-7, VP-9, and VP-11) were completed in sewer backfill to test for potential preferential off-site migration of VOCs through sewer trench backfill. VP-2 and VP-6 were installed in the sanitary sewer backfill in Fox Avenue South and VP-7, VP-9, and VP-11 were installed in the storm sewer backfill in Fox Avenue South (Terra Vac and Floyd & Snider 2000).

Post RI/PRA Investigations (1993-1999)

Following submittal of the RI/PRA to Ecology in 1993, Hart Crowser performed three additional investigations described below.

Extent of Contamination Near Monitoring Well B-12

In 1993, Hart Crowser installed 10 monitoring wells (B-43 through B-52) with 2-inch diameters in the immediate vicinity of MW B-12, shown in Figure 29. These wells were intended to define both site stratigraphy and the extent of dense non-aqueous phase liquid (DNAPL) at this location. Of the 10 new monitoring wells, nine (all except MW B-45) were installed in the 1st WBZ, and none of the wells encountered DNAPL (Terra Vac and Floyd & Snider 2000).

Surface Water, Seep, and Mussel Tissue Sampling

In 1994, Hart Crowser resumed collecting samples of LDW surface water seeps and mussel tissue. Sample collection was conducted both in the LDW and at the South Myrtle Street Embayment located directly downgradient of the GWI facility. Mussel tissue, surface water, and seep sampling continued at these locations annually through 1999 (Terra Vac and Floyd & Snider 2000).

Annual Soil Vapor and Groundwater Sampling

From 1993 through 1996, following the installation of monitoring wells B-43 through B-52, Hart Crowser began an annual soil vapor and groundwater sampling program in select wells both on and off the GWI facility property (Terra Vac and Floyd & Snider 2000).

Decommissioning of the Old Tank Farm (1995)

The old tank farm is located beneath the drum shed on the southeastern portion of the GWI property, shown in Figure 28. The old tank farm consisted of six single-compartment USTs with a nominal capacity of 10,000 gallons each, numbered UST 21 through UST 26 (see Figure 28). These tanks were installed in 1956, taken out of service and formally decommissioned in 1989, and closed in place in 1995 (Terra Vac and Floyd & Snider 2000).

Hart Crowser determined that significant structural underpinning would have been required to remove the tanks from beneath the existing drum shed, and substantial over-excavation of contaminated soil to remove contaminant source material would not likely have been possible; therefore, the USTs comprising the old tank farm were closed in place (Terra Vac and Floyd & Snider 2000).

Approximately 2,500 gallons of residual liquids were removed from the old tank farm USTs and stored in two Baker tanks prior to disposal. The tanks were cleaned and all residuals, including liquids, rinse water, and sludges, were disposed of off-site (Terra Vac and Floyd & Snider 2000).

Permanent closure of the USTs in the old tank farm was performed as part of the source control interim remedial measure. The USTs were perforated and piping and controls were installed so that the tank shells would function as part of the soil vapor extraction system (Terra Vac and Floyd & Snider 2000).

Source Control Intermediate Remedial Measure (1995-1996)

A soil vapor and groundwater extraction and treatment system was installed on the GWI facility property as an interim source control measure while final cleanup plans were being evaluated for the remainder of the site. The system consisted of components installed during decommissioning of the main tank farm and when modifications were made to the old tank farm USTs and additional extraction and treatment equipment (Terra Vac and Floyd & Snider 2000).

Two horizontal groundwater extraction wells and three horizontal soil vapor extraction wells were installed where DNAPL was present beneath the southwest portion of the GWI facility. Additionally, a monitoring well (B-12) installed during the site investigation was modified for use in the soil vapor and groundwater extraction system. These system components were designed to lower the groundwater elevation near monitoring well B-12 and expose the DNAPL present in the first silt layer to make it responsive to treatment by vapor extraction. Interim remedial measure system components are shown in Figure 28 (Terra Vac and Floyd & Snider 2000).

The soil vapor extraction system was designed to use a regenerative blower to extract contaminated soil vapor from the following system components and areas (Terra Vac and Floyd & Snider 2000):

- Five horizontal vents installed in the former main tank farm area.
- Six perforated USTs under the drum shed.
- Two horizontal vents (believed to be HC-1 and HC-2 in Figure 28) under South Frontenac Street in the vicinity of monitoring well B-12 as well as through monitoring well B-12 itself.
- One horizontal “trench” vent in the monitoring well B-31 “catch basin” area.

Groundwater was to be extracted using dual diaphragm pumps from the following components (Terra Vac and Floyd & Snider 2000):

- Two horizontal extraction wells (believed to be HGW-1 and HGW-2 in Figure 28) under South Frontenac Street in the vicinity of monitoring well B-12.
- The converted monitoring well B-12.

Soil vapor from the extraction points was to be piped to a treatment facility where a vapor/liquid separator, or knockout pot, would remove entrained water droplets. After leaving the knockout pot, vapor would be mixed with vapor from a groundwater air stripping tower and would enter a catalytic oxidizer for treatment. Combustion of chlorinated compounds by the oxidizer would produce hydrochloric acid, carbon dioxide, and water. Hydrochloric acid would be removed from the vapor stream by a conventional scrubber before the treated vapor was discharged to the atmosphere. The water effluent from the scrubber, containing sodium chloride, would be discharged to the sanitary sewer under permit from King County (Terra Vac and Floyd & Snider 2000).

The water that accumulated in the knockout pot would be pumped to a DNAPL separator tank, and then routed to an air-stripping tower. Water from the stripping tower would then be routed to a series of bio-treatment tanks designed to remove ketones and penta not removed by air stripping. Upon exiting the bio-treatment tanks, water would be sent through a set of activated carbon filters for polishing. Treated water was to be discharged to the sanitary sewer under permit from King County (Terra Vac and Floyd & Snider 2000).

Following the initial start-up of the system in spring 1996, a number of problems developed related to vapor destruction efficiency. The soil vapor extraction and groundwater treatment system was unable to meet long-term air quality discharge standards. Consequently, the system was unable to operate on a routine basis. Efforts to correct the problem ended in April 1997 (Terra Vac and Floyd & Snider 2000).

Pilot Study (1998)

In spring1998, Terra Vac conducted a successful dual vacuum extraction/OxyVac pilot test at the GWI facility to evaluate the system's effectiveness in remediating soil and groundwater contaminated with VOCs and SVOCs. The OxyVac process combines injection of concentrated oxidants (in-situ oxidant injection) with vacuum extraction to distribute oxidants in the subsurface better and then capture the off-gasses that result from the exothermic reaction. Terra Vac also tested the efficacy of injecting hydrogen peroxide to reduce VOC and SVOC concentrations in groundwater at the facility. Hydrogen peroxide was injected into three GWI monitoring wells (B-12, B-31, and B-39) and analytical samples were taken one day and one week after the injection. Groundwater analytical results indicated a dramatic decrease in both VOC and SVOC concentrations (Terra Vac and Floyd & Snider 2000).

South Myrtle Street Embayment Study (1998)

October through December 1998, Terra Vac conducted an investigation to determine whether groundwater was discharging into the South Myrtle Street Embayment through a finite number of seeps, such as those already identified in the RI, or through broad areas of groundwater upwelling through the South Myrtle Street Embayment sediments. The goal was to distinguish between the two types of discharge and identify areas of considerable discharge so the discharge points could be sampled during other SRI activities. Terra Vac sampled three separate times between October and December 1998 to measure and map the distribution of chlorinated ethenes in sediment porewater (Terra Vac and Floyd & Snider 2000).

Decommissioning of a 1,000-Gallon UST at the Fox Avenue South Loading Dock (1998)

In November 1998, a 1,000-gallon gasoline UST and pump dispenser adjacent to the main warehouse loading dock structural footings (Figure 28) along Fox Avenue South were decommissioned. They had been in operation since the 1970s. Substantial underpinning would have been required to for removal, so instead the UST and associated piping were permanently closed in place (Terra Vac and Floyd & Snider 2000).

Excavation uncovered the top of the tank. Approximately 500 gallons of residual fuel and water were pumped from the tank into 55-gallon drums. The top of the tank was cut off, the tank was cleaned to remove about 20 gallons of residual sludge, and the tank and associated piping were filled with concrete. The excavation was backfilled with concrete from the top of the tank to the ground surface. The soil and asphalt that had been removed and the recovered liquids and sludge were disposed of off-site. Soil sampling and analysis was performed prior to tank decommissioning (Terra Vac and Floyd & Snider 2000).

Northwest Corner Investigation (1999)

During the annual groundwater monitoring in 1998 and subsequent resampling in early 1999, elevated concentrations of PCE and moderate concentrations of TCE and DCE were detected at monitoring wells B-13 and B-22, shown in Figure 29. These wells are cross-gradient of the GWI original source area. The source area corresponds generally to the former main UST area and the location of the drum shed, old tank farm, and associated underground piping near South Frontenac Street. Further analysis of the data revealed that the plume signature at monitoring wells B-13 and B-22 was not consistent with the ratios of chlorinated VOCs seen in the GWI original source area (Terra Vac and Floyd & Snider 2000).

Terra Vac performed the "Northwest Corner Investigation" in early 1999 to evaluate the source of the elevated PCE concentrations in monitoring wells B-13 and B-22. The purpose of the investigation was to assess existing soil and groundwater quality upgradient of wells in the northwestern corner of the GWI facility. The following tasks were performed as part of the investigation (Terra Vac and Floyd & Snider 2000):

- Four soil borings were advanced and completed as temporary monitoring wells in January 1999. Results from samples collected from the temporary wells indicated that shallow groundwater was impacted by chlorinated solvents.
- Five additional borings were advanced and completed as permanent groundwater monitoring wells B-53 through B-57, shown in Figure 29. These wells were sampled 48 hours following installation and again in April 1999. Groundwater samples confirmed the presence of chlorinated solvents in shallow groundwater to the south of Shultz Distributing and across the northwest corner of GWI's property.
- The 12-inch sewer line running parallel to South Willow Street between Shultz Distributing and GWI was visually inspected and was determined not to be leaking.

Tidal Influence Study (1999)

In March 1999, Terra Vac performed a "Tidal Influence Study" of the area adjacent to the GWI facility. The purpose of this study was to assess and document the impact of LDW tidal fluctuations on groundwater flow direction and hydraulic gradients at the South Myrtle Street Embayment and the hole in 1st SH and to provide information relevant to contaminant transport in both the upper and lower subsurface water-bearing zones (1st and 2nd WBZs) identified previously (Terra Vac and Floyd & Snider 2000).

As part of the study, Terra Vac conducted a site survey to measure relative elevations of five existing monitoring wells and the location and elevation of seeps where groundwater entered the South Myrtle Street Embayment. Terra Vac also installed six pressure transducers, five in existing groundwater monitoring wells and one in a temporary embayment stilling well. This transducer data indicated relative fluctuations in groundwater elevations in relation to LDW surface level changes with the tide (Terra Vac and Floyd & Snider 2000).

Fox/Myrtle Street Investigation (1999)

Previous investigations, conducted off-property and downgradient of the GWI facility, identified the presence of a hole in the 1st SH separating the 1st WBZ and 2nd WBZ and a connection between the two water-bearing zones near the intersection of Fox Avenue South and South Frontenac Street, in the vicinity of monitoring wells B-20 and B-45 (locations are shown in Figure 29). The goal of the Fox/Myrtle Street Investigation was to determine the extent of connection between the 1st and 2nd WBZ and the size of the hole in the 1st SH (Terra Vac and Floyd & Snider 2000).

In July 1999, as part of the investigation, Terra Vac installed eight permanent and six temporary monitoring wells along the Fox Avenue South and South Myrtle Street right-of-ways. Soil and groundwater samples were collected for VOC analysis for lithologic characterization (Terra Vac and Floyd & Snider 2000).

1999 Annual Groundwater Monitoring

Terra Vac sampled all monitoring well, seep/surface water and mussel tissue locations during the annual groundwater monitoring event in October and November 1999. This sampling was performed to provide a site-wide synoptic view of groundwater contaminant concentrations (Terra Vac and Floyd & Snider 2000).

4.3.4.5 Summary of Nature and Extent of Contamination Based on Investigations Conducted from 1989 to 2000

The *SRI/FS*, completed by Terra Vac and Floyd & Snider in October 2000, extensively describes the nature and extent of contamination at the former GWI facility and is summarized here by medium, including soil (and soil vapor) and groundwater, as well as by the COCs that could affect one or both of these media.

In the *SRI/FS*, initial screening was performed to identify potential COCs or specific chemicals to further investigate for possible presence at concentrations requiring cleanup. Initial screening included comparing chemical concentrations to background concentrations for metals and inorganics; evaluating detection frequencies and evaluating risk; and, for soil and groundwater, screening against MTCA Method B cleanup levels.

Following the initial screening, fate and transport were evaluated for each potential COC and site-specific cleanup levels were derived under MTCA. Potential COCs with concentrations exceeding site-specific cleanup levels were retained as COCs for the site.

Refer to the *SRI/FS* (Terra Vac and Floyd & Snider 2000) for more detailed information on the nature and extent of contamination.

Nature and Extent of Contamination Summarized by Medium and Identification of Potential Chemicals of Concern

Soil

Over 200 soil samples were collected from 99 sample stations at the GWI facility and on adjacent properties during the GWI site investigation. Most of the samples were collected on the GWI facility in the original and secondary source areas. The original source area refers generally to the former main UST area and the location of the drum shed, old tank farm, and associated underground piping near South Frontenac Street. The secondary source area refers generally to the area beneath the facility in the vicinity of MW B-12. Sample locations are shown in Figure 29. Soil samples were analyzed for EPA's target analyte list of compounds including VOCs and SVOCs, metals, and petroleum hydrocarbons. A small number of soil samples in the areas with the highest concentrations were also analyzed for glycols, alcohols, and chlorinated dioxins/furans. The following chemicals or classes of chemicals were detected in soil samples (Terra Vac and Floyd & Snider 2000):

- Chlorinated solvents: PCE and TCA and their degradation products
- Volatile aromatic hydrocarbons (the BTEX family)
- Other volatile solvents, such as methylene chloride
- Chlorinated benzenes and phenols, including PCP (penta)
- Dioxins and furans
- Petroleum fuels and solvents and their constituents
- PAHs
- Other SVOCs, including phthalates and glycols
- Metals

The following chemicals were identified as potential COCs for soil at the GWI facility (Terra Vac and Floyd & Snider 2000):

- Chlorinated solvents and their degradation products: PCE and TCE (soil samples) and VC and cis-1,2-DCE (soil vapor samples)
- PCP (penta)
- Chlorinated dioxins and furans
- Total petroleum hydrocarbons (TPHs) (solvent-range)
- BTEX family: benzene and toluene (soil vapor samples)
- Methylene chloride

The following chemicals were retained as COCs for soil at the GWI facility (Terra Vac and Floyd & Snider 2000):

- PCE, TCE, VC, and cis-1,2-DCE
- Benzene and TPH
- Methylene chloride
- PCP

Groundwater

A total of 57 groundwater monitoring wells have been installed at the GWI facility property. Locations of monitoring wells are shown in Figure 29. Extensive sampling has included analyses for EPA's target analyte list chemicals including metals, VOCs, and SVOCs. Additionally, several rounds of sampling have included TPHs. The following chemicals or classes of chemicals were detected in groundwater in more than five percent of samples (Terra Vac and Floyd & Snider 2000):

- Chlorinated solvents and their degradation products
- Volatile aromatics (the BTEX family) and petroleum hydrocarbons
- Chlorinated benzenes
- PCP (penta)
- Dioxins and furans
- SVOCs, specifically PAHs associated with the petroleum products, phthalates (common plasticizers), and phenols
- Metals

The following chemicals were identified as potential COCs for groundwater at the GWI facility (Terra Vac and Floyd & Snider 2000):

- Chlorinated solvents and their degradation products: PCE, TCE, VC, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, 1,1,1-TCA, and 1,2-DCA
- PCP
- TPHs (solvent-range)
- BTEX family: benzene, toluene, and ethyl benzene
- Methylene chloride
- 1,4-dichlorobenzene (DCB; exceedances are in central area wells only)

The following chemicals were retained as COCs for groundwater at the GWI facility (Terra Vac and Floyd & Snider 2000):

- PCE, TCE, VC, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, 1,1,1-TCA, and 1,2-DCA

- PCP
- 1,4-DCB
- TPH
- BTEX family: benzene, toluene, and ethyl benzene

Nature and Extent of Contamination Summarized by Potential Chemicals of Concern

Most contaminants at the GWI facility are co-located in a few source areas and in plumes that extend from the source areas. "Original source area" corresponds generally to the former main UST area and the location of the drum shed, old tank farm, and associated underground piping near South Frontenac Street; the "secondary source area" refers generally to the area beneath the facility in the vicinity of MW B-12. However, in the following sections, original and secondary source areas are sometimes defined differently depending on the potential COC.

Volatile and mobile contaminants, such as the chlorinated ethenes, have migrated in groundwater to the South Myrtle Street Embayment. Less mobile contaminants, such as penta, remain localized near their source areas. The following sections describe the extent of the potential COCs at the GWI property (Terra Vac and Floyd & Snider 2000). Each potential COC section is further divided into the relevant media components (including the original source area, soil, soil vapor, and groundwater).

Chlorinated Solvents

Many cleanup decisions at the site will involve chlorinated solvents. Chlorinated solvents and their degradation products present at the site include PCE, TCE, and VC in soil; cis-1,2-DCE in soil vapor; and PCE, TCE, VC, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, 1,1,1-TCA, and 1,2-DCA in groundwater.

Original Source Area

The GWI Facility Source Area. The original source area for the chlorinated solvents at the GWI facility corresponds generally to the former main UST area and the location of the drum shed, old tank farm, and associated underground piping near South Frontenac Street, as shown in Figure 31. Operational releases, including UST and line leaks, appear to have contributed significant contamination to the surrounding soil and groundwater in these areas. As discussed above, these areas have undergone significant interim remedial measures, including decommissioning of USTs and piping, removal of portions of the contaminated soil, and a partially successful interim action to remove VOCs from the original source area. Although residual contamination remains in the vadose zone and the underlying saturated soil, there is no ongoing operational source of these compounds, as all of the USTs in the former main tank farm have been decommissioned and the handling of chemical products for the dry cleaning business (the principal PCE source) was discontinued in 1992 (Terra Vac and Floyd & Snider 2000).

The Secondary Source Area in the 1st SH. Historical releases at the facility appear to have contributed to a secondary source area beneath the facility in the vicinity of MW B-12. This source area is shown in Figure 31. Solvent leaks from the original source area on the property appear to have resulted in "streamers" of residual DNAPL sinking through the 1st WBZ and encountering the 1st SH. The product slowly saturated parts of the silt horizon, especially in the topographic depression in the silt horizon near MW B-12 (Terra Vac and Floyd & Snider 2000).

Recoverable DNAPL has been encountered only in MW B-12 and not in the adjacent wells; however, it is likely that the silt in this area is partially saturated with solvent and acts as an ongoing source. This source is referred to as the "secondary source area" to distinguish it from the original source area at the facility. As Figure 31 shows, this secondary source area extends from the southern part of the GWI facility beneath the railroad tracks on South Frontenac Street and under a small northern section of the former Tyee Lumber facility. The secondary source area represents the principal ongoing source of chlorinated solvents to groundwater at the GWI facility (Terra Vac and Floyd & Snider 2000).

Methylene chloride is found associated with the chlorinated solvents. This association is probably due to similar historical handling and storage practices on-site and to methylene chloride's chemical properties and behavior in the environment. It is not a parent or a product of PCE degradation, but it is co-located with the plume of PCE and its degradation products (Terra Vac and Floyd & Snider 2000).

The Northwest Corner Source Area. More recently, a second plume of chlorinated solvents was identified in the 1st WBZ, referred to as the "NW Corner Plume" because it is in the northwest corner of the GWI facility. Existing data indicates the plume is limited to the 1st WBZ. Its source area appears to be near or upgradient of MW B-54. The source itself is unknown; however, it appears to be unrelated to the plume originating around MW B-12 (Terra Vac and Floyd & Snider 2000).

Soil

Most of the soil data were collected during the remedial investigation and interim remedial measures from 1988 to 1993, so this summary may overstate the current concentrations of chemicals remaining in soil because site releases stopped in the late 1980s, the interim remedial measure has been in operation, and natural degradation has been occurring (Terra Vac and Floyd & Snider 2000). Historical and recent soil data are shown in Figure 32.

The highest concentrations of PCE (18,000 mg/kg) and TCE (1,100 mg/kg) were detected in samples collected from Station SB-10 at the former location of the pump sheds. The concentrations of PCE and TCE that exceeded MTCA Method B screening levels were found in an area around the old tank farm beneath the drum shed and the former location of the pump sheds. Only PCE concentrations exceeded the MTCA Method B screening level outside of the original source area (Terra Vac and Floyd & Snider 2000).

Soil Vapor

Soil vapor samples have been collected from numerous stations at the GWI facility to evaluate chemical concentrations in soil vapor. Soil vapor was most recently monitored in 1995 and 1996. Soil vapor samples were analyzed for specific chlorinated solvents and their degradation products including PCE, TCE, 1,1-DCE, and VC. Soil vapor results are shown in Figure 33. The highest concentrations were found near the GWI facility original source area associated with the main tank farm and associated piping and the secondary source area in the 1st SH. In general, results were consistent with the following conceptual model: soil vapor concentrations will be influenced by residual contamination in the vadose soil by off-gassing from the 1st WBZ into the vadose and by degradation (both biotic in the capillary fringe and abiotic) within the vadose zone. Therefore, the highest concentrations in soil vapor should be in areas with vadose zone soil contamination and/or the highest groundwater concentrations (Terra Vac and Floyd & Snider 2000).

Groundwater

Figures 31 and 34 show the degradation and migration of PCE in groundwater at the site in the 1st and 2nd WBZs. In both the 1st and 2nd WBZs the highest concentrations coincide with the secondary source area. However, the highest concentrations in the 1st WBZ are approximately 35 times greater than the highest concentrations in the 2nd WBZ.

Petroleum Hydrocarbons and Their Constituents

Original Source Area

The original source area for petroleum hydrocarbons and their constituents at the GWI facility has been identified as the old tank farm area. Gasoline, diesel, and a variety of petroleum solvents were stored in the USTs in this area at various times prior to their decommissioning. Additionally, a small leaking heating oil tank was located near B-10A. All the USTs in the former tank farm areas have been removed or decommissioned. Based on product usage, the most likely petroleum products released would have been heating oil (a light-end petroleum product similar to kerosene) and various petroleum solvents. In addition to the petroleum products, toluene and xylenes were handled at the GWI facility and stored in various USTs. Consequently, they may be present in soil and/or groundwater either because they were stored and handled as products themselves or because of their presence in light-end petroleum products (Terra Vac and Floyd & Snider 2000).

In 1999, groundwater monitoring uncovered a petroleum light non-aqueous phase liquid (LNAPL) in MW B-38, located south of the GWI facility along South Myrtle Street, just south of where Tyee Lumber Company operated a PCP dip tank. The historical Tyee Lumber Company facility, now known as the Whitehead Property, is shown in Figure 2 and is addressed in the Data Gaps Report for RM 2.3-2.8 East. The LNAPL was analyzed despite weathering and seemed to be a mixture of mineral spirits and diesel No. 2 (Terra Vac and Floyd & Snider 2000).

Most petroleum hydrocarbon contamination has been found within the old tank farm area. Petroleum contamination of groundwater at the GWI facility follows a pattern similar to that seen for chlorinated solvents (Terra Vac and Floyd & Snider 2000).

Chlorinated Phenols

Penta was the chlorinated phenol detected most frequently at the GWI facility. It was detected in both soil and groundwater (Figures 35 and 36). Several other chlorinated phenols have been detected, but at much lower concentrations and frequencies. They are co-located with penta, which is consistent with their presence in technical grade penta and their formation as degradation products of penta. The occurrence of penta at the facility is consistent with its mixing and sale at the GWI facility and with its use for wood treatment at the adjacent historical Tyee Lumber Company facility (Terra Vac and Floyd & Snider 2000).

Original Source Areas

Two original source areas were identified for penta. The first is in the south central portion of the GWI facility adjacent to the South Frontenac Street right-of-way (Figure 35). The source includes the penta storage and handling areas at GWI and the adjacent swale along South Frontenac Street. Penta handling at the GWI facility began in approximately 1966 and ended in the early 1980s. The second penta source area is outside of the GWI site and was identified during installation of the groundwater wells B-38 and B-39. This second area is near the dip tank that was present at the former Tyee Lumber facility adjacent to South Myrtle Street (Figure 35). The area includes the previous location of a wood-treating dip-tank in which lumber was “dipped” into the penta/mineral spirits treating solution to preserve the wood. Additionally, the area included a UST for stored penta that was removed from the former Tyee Lumber facility in 1986 (Terra Vac and Floyd & Snider 2000).

Soil

Analyses for chlorinated phenols (penta, 2,4-dichlorophenol, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, and tetrachlorophenol) were performed on 60 soil samples. Another 50 soil samples were analyzed for penta only. Three soil samples collected from within the penta original source areas were analyzed for dioxins and furans. Dioxins and furans are by-products of penta manufacturing (Terra Vac and Floyd & Snider 2000).

Pentachlorophenol. Penta was detected in approximately 40 percent of soil samples analyzed for penta. Penta sampling results are shown in Figure 35. Penta concentrations detected in soil samples collected in the original source areas ranged from 0.00047 to 29 mg/kg. The highest penta concentration was detected in near-surface soil collected from SB-10, located at the southern end of the site between the west shed and the drum shed (Terra Vac and Floyd & Snider 2000).

Other Chlorinated Phenols. Chlorinated phenols other than penta include 2,4-dichlorophenol, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, and tetrachlorophenol. 2,4-dichlorophenol was detected in 16 of 60 soil samples. The other chlorinated phenols were each detected in a range of three to five soil samples. All detected concentrations of other chlorinated phenols were between two and five orders of magnitude less than the MTCA Method B screening levels (Terra Vac and Floyd & Snider 2000).

Dioxins and Furans. Two samples collected from Station B-30 and one sample from Station B-31 were analyzed for dioxin and furan. The 2,3,7,8-TCDD and the 2,3,7,8-TCDF equivalences were calculated for each sample. The 2,3,7,8-TCDD equivalence concentrations at Station B-30 exceeded the Method B cleanup level, but the other two equivalence concentrations were either less than the Method B cleanup level or less than the Method B and Method C cleanup levels (Terra Vac and Floyd & Snider 2000).

Groundwater

Groundwater samples were analyzed for chlorinated phenols with some selected samples analyzed only for penta. Results are shown in Figure 36 for the 1st WBZ. The locations of two source areas are evident in the figure. The first source area exists along the South Frontenac Street right-of-way from B-11 by the drum shed to the edge of the 1st SH at MW B-45. Subsequent movement of the penta in groundwater has followed the direction of groundwater flow. The second source area by the former Tyee dip tank is also evident in both groundwater concentrations and in the presence of LNAPL containing approximately five percent penta. Contamination from the two source areas is separated by an area of unimpacted groundwater defined by B-19, B-62, B-63, B-20A, and B-21 (Terra Vac and Floyd & Snider 2000).

Dichlorobenzenes

Original Source Areas

The source for DCBs at the facility is unknown, but likely was associated with the location of the drum shed and associated underground piping near South Frontenac Street. These areas have undergone significant interim remedial measures, including decommissioning of USTs and piping and removal of portions of the contaminated soil (Terra Vac and Floyd & Snider 2000).

Soil

Although residual contamination exists on the vadose zone and the underlying saturated soil, there is no ongoing operational source of these compounds, as all of the USTs in the former main tank farm have been decommissioned. None of the residual contamination exceeds MTCA Method B screening levels (Terra Vac and Floyd & Snider 2000).

Groundwater

One of the DCBs, 1,4-DCB, exceeded the MTCA Method B screening level in groundwater. Its maximum concentration was in MW B-42, in the central section of the secondary source area in the 1st SH. It is assumed that the area near B-42 represents a residual source of 1,4-DCB to groundwater (Terra Vac and Floyd & Snider 2000).

Summary of the Nature and Extent of Contamination for Remediation Alternative Selection

This section summarizes the VOC and SVOC impacts to soil and groundwater that have resulted from historic releases of COCs within the GWI facility areas of concern (AOCs) as it pertains to remediation alternative selection for the entire GWI facility.

Area of VOC Impacts

The source of the VOCs at the GWI facility includes DNAPL-impacted soil with local free DNAPL in and above the 1st SH. The free DNAPL was located primarily on the 1st SH in the vicinity of MW B-12. The residual DNAPL was composed of chlorinated solvents, penta, and petroleum solvents. DNAPL has leached into groundwater from contaminated soil. Most soil impact in the source area occurred beneath the "elevated pad" and beneath the former South Frontenac Street (Terra Vac and Floyd & Snider 2000).

Data from comprehensive groundwater monitoring performed in the fall 1999 indicates that groundwater plumes have formed two distinct ongoing solvent sources (Figures 37 through 44). The area with the highest groundwater concentrations of VOCs resulted from releases associated with historical GWI facility operations and originates primarily from below the elevated pad, the drum shed, and the former South Frontenac Street (Figure 45). This area is referred to as the "VOC AOC" and it includes both vadose soil (0-8 feet bgs) and saturated soil (8-15 feet bgs). The VOC AOC covers approximately 45,000 square feet and includes at least 5,000 square feet south of the GWI property line. In 2000, this area was owned by the Whitehead Corporation. A second, smaller area of groundwater impact is present near the northwestern corner of the GWI property (Terra Vac and Floyd & Snider 2000).

The VOC AOC contains over 26,000 cubic yards of soil when measured to a depth of 15 feet bgs, with concentrations of the primary VOCs (PCE, TCE, cis-1,2-DCE, and VC) up to 18,000 mg/kg. The source area also contains groundwater within the 1st WBZ with VOC concentrations up to 69,000 µg/L PCE, 21,000 µg/L TCE, 33,000 µg/L DCE, and 3,100 µg/L VC (Terra Vac and Floyd & Snider 2000).

Area of SVOC Impacts

The area of soil and groundwater impacted by SVOCs is depicted in Figure 46. Included in this area is a portion of the 1st SH presumed to contain penta commingled with chlorinated solvent DNAPL. Soil contaminated by SVOCs (primarily penta) exceeding the cleanup level for penta (0.79 mg/kg to protect surface water) is present beneath the elevated pad and the former South Frontenac Street (that is, contaminated soil beneath South Frontenac Street is primarily under the containment swale of the rail spur, along the southern edge of the elevated pad). Additional penta-impacted soil is present beneath the elevated pad and in the unpaved lot south of South Frontenac Street. In 2000, this lot was leased to Seattle Iron and Metals Corporation and was owned by Whitehead Corporation (Terra Vac and Floyd & Snider 2000).

The source area leaches contaminants to groundwater within the SVOC AOC, with limited downgradient impacts, based on the results of the 1999 groundwater sampling event referred to above. The principal groundwater impacts from the GWI facility originated near the rail spur swale, South Frontenac Street, and near MW B-12. Contamination in these areas may also be associated with site operations at the former Tyee Lumber facility (Terra Vac and Floyd & Snider 2000).

A separate penta source appears to be near well B-38 on South Myrtle Street. This well is adjacent to the former location of a dip tank operated by Tyee Lumber Company. The tank is known to have contained 5 percent penta in mineral spirits. An LNAPL was discovered in this well during the 1999 groundwater sampling event, confirming the presence of penta and mineral spirits. Remediation of this LNAPL is not included in the *SRI/FS* because it appears to be from a source off the GWI property and does not appear to be commingled with the GWI plume. Contamination at the Tyee Lumber Company (Whitehead Property) will be discussed further in the Data Gaps Report for RM 2.3-2.8 East (Terra Vac and Floyd & Snider 2000).

In 2000, the penta source area covered approximately 31,000 square feet (including approximately 10,000 square feet south of South Frontenac Street) and contained groundwater (within the 1st WBZ) and approximately 17,000 cubic yards of soil to a depth of 15 feet bgs. The groundwater contained up to 1,900 µg/L penta (based on 1999 data) and the upper 15 feet of soil contained up to 29 mg/kg penta (based on 1992 data) (Terra Vac and Floyd & Snider 2000).

Downgradient Groundwater VOC Impacts

A plume containing VOCs at concentrations exceeding the cleanup levels is present in the 2nd WBZ between the GWI property and the South Myrtle Street Embayment of the LDW. The area of downgradient impact in the 2nd WBZ is shown in Figure 47. This downgradient area is outside of RM 2.0-2.3 East and will be addressed in greater detail in the Data Gaps Report for RM 2.3-2.8 East; however, it is discussed here to provide an overall picture of the contamination migrating from the GWI facility (Terra Vac and Floyd & Snider 2000).

The downgradient plume results from groundwater transport and biological breakdown of VOCs from the VOC AOC. PCE enters the 2nd WBZ through the hole in the 1st SH. Reductive dechlorination of PCE in the 2nd WBZ forms the daughter products TCE, DCE, and VC as the groundwater flows toward the South Myrtle Street Embayment (Terra Vac and Floyd & Snider 2000).

Complete destruction of DCE and VC is inhibited due to the reducing conditions in the 2nd WBZ between Fox Avenue South and South Myrtle Street. As a result, high concentrations of DCE and VC exceeding cleanup levels remain in the 2nd WBZ groundwater and discharge into the South Myrtle Street Embayment (Terra Vac and Floyd & Snider 2000).

The plume is present in the 2nd WBZ, which is located approximately 14 to 45 feet bgs. The off-property plume underlies approximately 190,000 square feet of pervious and impervious surfaces. The plume impacts approximately 1.8 million cubic feet of groundwater within the 2nd WBZ with one or more of the VOCs at concentrations greater than the cleanup levels. The concentrations of VOCs in this plume are up to 1,400 µg/L for PCE, up to 4,000 µg/L for TCE, up to 40,000 µg/L for DCE, and up to 23,000 µg/L for VC (Terra Vac and Floyd & Snider 2000).

4.3.4.6 Summary of Post-SRI/FS Investigations and Interim Remedial Actions (After 2000)

Section 4.3.4.4 summarizes investigations and cleanup activities conducted at the GWI facility from 1989 through 2000, and Section 4.3.4.5 summarizes the nature and extent of contamination at the GWI facility based on the results of the investigations and cleanup activities conducted through 2000. This section summarizes investigations and interim remedial actions conducted after 2000, in order to highlight supplemental information to be used in conjunction with the nature and extent of contamination as it was described in 2000.

Supplemental Investigation of the South Willow Street Right-of-Way (2000)

In July 2000, Terra Vac performed this supplemental investigation to further assess and document the nature and extent of VOCs in soil and groundwater within the South Willow Street right-of-way, north of the GWI facility property. Twelve temporary wells (NW-1 through NW-12, shown in Figure 48) were installed in the South Willow Street right-of-way; 33 soil samples and 21 groundwater samples were collected during the investigation and selected samples were analyzed for VOCs, TPHs, and non-aqueous phase liquid (NAPL). PCE concentrations found in soil and groundwater are presented in Figures 48 and 49 (Terra Vac and Floyd & Snider 2001).

Consistent with the results of previous investigations, results of the South Willow Street right-of-way investigation concluded that most of the total VOC load in soil was from PCE. Although the chemical signatures of PCE and its breakdown products in this supplemental investigation area differ from those observed in GWI source areas, the nature and extent of VOCs in the supplemental investigation area do not indicate an off-site source but instead support the likelihood of a more localized release. The shallow depth at which these impacts were detected indicates surface releases may have occurred. None of the soil samples collected contained COCs with concentrations that exceed cleanup levels proposed in the SRI/FS. Groundwater data collected during this supplemental investigation indicate VOC impacts present in groundwater beneath the South Willow Street right-of-way are connected to a source within the GWI property or the South Willow Street right-of-way (Terra Vac and Floyd & Snider 2001).

Fox Avenue Pilot Study (2003)

In accordance with the Agreed Order No. DE TC91-N203 between the Fox Avenue Building LLC and Ecology, Environmental Resources Management, Inc., (ERM) produced a work plan for the *Fox Avenue Pilot Study* in 2003. The pilot study was for *in situ* chemical oxidation, to evaluate the effectiveness of potassium permanganate injection as a remedy for CVOCs in groundwater at the Fox Avenue Building property (ERM 2003).

After performing an initial pilot study at the site from December 2003 through March 2004, ERM outlined a program to implement *in situ* chemical oxidation on an expanded scale, to test and possibly install a soil vapor extraction (SVE) system, and to evaluate the results of these activities to better define key design parameters for the full-scale groundwater remediation program. The expanded pilot study was designed to ensure that the full-scale groundwater remediation program results in sustained reduction in contaminant concentrations (ERM 2004).

An SVE pilot study was conducted by ERM in November 2004. The pilot study showed that SVE is a technically feasible approach for remediation of the CVOCs in the unsaturated soil and has the potential to remove a significant mass of CVOCs from the unsaturated zone (ERM 2005).

In May 2005, ERM outlined a program to implement an expanded SVE pilot study to reduce contaminant mass in the unsaturated zone during the expanded *in situ* chemical oxidation pilot test, thereby removing a secondary source of groundwater contamination and increasing the likelihood of sustained reductions in groundwater contaminant concentrations. A successful expanded SVE pilot study would verify that a combination of SVE and a large-scale permanganate injection program could produce sustained reductions in groundwater contaminant concentrations at the site, and that the combination of systems is a feasible cleanup method (ERM 2005).

Summary of Contamination for the Fox Avenue Pilot Study

Site background and contamination information pertaining to the Fox Avenue Pilot Study was summarized as follows (ERM 2003):

- The current distribution of contaminants in soil and groundwater consist primarily of CVOCs adsorbed to soil in the vadose and saturated zones and as a dissolved phase in groundwater;
- The current distribution of DNAPL in the Secondary Source Area is minimal as defined in the *SRI/FS*. Only slight evidence of DNAPL was encountered based on various field screening methods;
- Concentrations of CVOCs were highest in the 1st WBZ to the south and southeast of the West Shed (Figure 27). Concentrations were as high as 74 mg/L in this area; and
- The highest concentrations of CVOCs in the 2nd WBZ were encountered off-site on the Whitehead property south of the Secondary Source Area.

Approximate lateral distribution of CVOC concentrations in the 1st WBZ is shown in Figures 50 through 53. Approximate lateral distribution of CVOC concentrations in the 2nd WBZ is shown in Figures 54 through 57.

4.3.4.7 Facility Inspections

Dangerous Waste Compliance Inspection, Great Western Chemical (April 2001)

On April 11, 2001, Ecology conducted a Dangerous Waste Compliance Inspection at the Cascade Columbia Distribution facility, which at the time was in operation as GWC. Ecology noted that 108 55-gallon drums of Dangerous Waste (soil borings and water samples from monitoring wells) from the facility's MTCA cleanup were being stored on-site, apparently from as far back as 1992. Ecology's Area of Contamination policy allows for storage of contaminated soil and debris on-site without triggering Dangerous Waste regulations as long as the wastes are stored within the Area of Contamination (the portion of the site that contains continuous contamination) (Ecology 2001).

4.3.4.8 Potential Pathways of Contamination

Stormwater

Figure 27 illustrates the most current site configuration and depicts the sanitary sewer line, the storm drain line, and some manholes, but a description of the Cascade Columbia Distribution facility's current storm drain system was not found in the files. Figure 4 indicates that the facility's storm drain system may connect to the city's storm drain system; some stormwater from the Cascade Columbia Distribution facility may also discharge to the LDW via the South Brighton Street CSO/SD.

In 1992, GWI planned to improve stormwater drainage at the facility and connect to an existing storm sewer and a new sanitary sewer to be located in South Willow Street on the north side of the facility; however, information documenting the completion of drainage improvements at the facility was not found in files.

The Cascade Columbia Distribution facility is not covered under the Industrial Stormwater General Permit. From 1996 through 2001, GWC was authorized to discharge contaminated stormwater to the sanitary sewer, and from 1997 through 2002, GWC was authorized to discharge wastewater generated from a groundwater remediation system to the sanitary sewer. Therefore, facility stormwater potentially discharges to the sanitary sewer system, in which case stormwater would not be a potential pathway of contamination to the LDW within RM 2.0-2.3 East. However, if the facility does discharge to the city's storm drain system, extensive soil and groundwater contamination at the property could infiltrate the storm drain system and discharge to the LDW within RM 2.0-2.3 East. Furthermore, stormwater pollutants from facility operations could enter the storm drain system and discharge to the LDW.

Groundwater

Extensive groundwater contamination exists at the Cascade Columbia Distribution facility and has been determined to reach LDW sediments in the vicinity of the Myrtle Street Embayment (shown in Figures 2 through 4) where South Myrtle Street intersects the LDW. Since the Myrtle Street Embayment is located in the RM 2.3-2.8 East source control area, groundwater investigations, the groundwater pathway, and relevant data gaps are summarized in the Data Gaps Report for that source control area.

Spills

Operations at the Cascade Columbia Distribution facility could result in spills. However, since the facility is not adjacent to the LDW, spills could only reach the LDW via the stormwater pathway, and then only if the facility discharges to the city storm drain system rather than the sanitary sewer.

Bank Erosion

The Cascade Columbia Distribution facility is not located along the banks of the LDW; therefore, bank erosion/leaching is not considered a potential pathway for contamination to reach LDW sediments.

Atmospheric Deposition

The information reviewed gave no indication that any activities at the Cascade Columbia Distribution facility may result in atmospheric deposition; therefore, atmospheric deposition is not considered a potential pathway for contamination to reach LDW sediments.

4.3.4.9 Data Gaps

The following data gaps have been identified for the Cascade Columbia Distribution property. Since it has been determined that groundwater reaches LDW sediments in the vicinity of the Myrtle Street Embayment south of RM 2.0-2.3 East, data gaps pertaining to the groundwater pathway are identified in the Data Gaps Report for the RM 2.3-2.8 East source control area. The following data gaps should be addressed before effective source control can be accomplished for the RM 2.0-2.3 East source control area.

- Cascade Columbia Distribution is a chemical distribution facility, but its specific site operations and differences between its operations and GWC operations should be identified.
- Information pertaining to historical operations at the site allowed identification of a sump GWI installed in the “drumming area” in 1959 that connected to a subsurface drain pipe running to the southern edge of “the dock.” Apparently GWI replaced the sump and drain system in the “drumming area” during facility modifications in the 1960s and 1970s. The location of the former sump and subsurface drain pipe was not identified on a figure in the information reviewed. The former location should be determined. Depending on facility operations, these structures could have contributed contamination to LDW sediments in the past and may require further demolition.
- A second plume of chlorinated solvents was identified in the 1st WBZ in the northwestern corner of the GWI facility and is referred to as the “NW Corner Plume.” The source appears to be near or upgradient of MW B-54, but as of 2000, the source was still unknown. Further investigation of the “NW Corner Plume” is needed.
- Limited information was found pertaining to dioxin and furan contamination at the property; more information is needed to determine the threat of dioxin and furan contamination to LDW sediments.
- Limited information was found pertaining to the facility’s current storm drain system. Evidence suggests the facility discharges its stormwater to the sanitary sewer. However, no documentation was found to confirm this. The facility’s storm drain system should be evaluated to confirm it is only discharging to the sanitary sewer system and not to a storm drain that discharges to the LDW.
- If the facility discharges to the city’s storm drain system, in-line storm drain solids should be sampled within the Cascade Columbia Distribution facility storm drain system to determine whether contamination at the site could migrate to the LDW via the stormwater pathway.
- According to Hart Crowser, GWI planned to make drainage improvements at the facility in 1992; information is needed to determine what, if any, improvements were actually made at the facility.
- An SVE pilot study was designed in May 2005 that, if successful, would have verified that a combination of an SVE and a large-scale permanganate injection program was a feasible cleanup method. Information is needed to determine whether the study was performed, whether it was successful, and what has occurred at the site since 2005.

4.4 Other Data Gaps

The following data gaps have been identified for the RM 2.0-2.3 East source control area in general, in addition to the data gaps identified specifically for the South Brighton Street CSO/SD, South River Street SD, and facilities of concern. The following data gaps should be addressed before effective source control can be accomplished for the RM 2.0-2.3 East source control area:

- GIS data provided by SPU from September 9, 2003, identified “LDW Outfall Locations,” shown in Figure 4. The location “Outfall #2025 and Seep” appeared to mark both an outfall and a seep at this location, but the data are unclear. This information should be confirmed.
- Three facilities of concern were identified in Table 4 and are depicted on Figure 4. No information pertaining to these sites was found within the scope of this report. The facilities are Bunge Foods, Muckleshoot Seafood Products (identified in the November 2007 *Lower Duwamish Waterway Phase 2 Remedial Investigation Draft Report* as Silver Bay Logging), and Rainier Petroleum Products. These facilities should be investigated for potential sources of sediment recontamination.
- Additional information was received from Ecology and reviewed late in the report-writing process. This information included an informal summary of available information pertaining to the Glacier Marine Services facility. Within this summary, additional possible sources of sediment contamination in Slip 3 were identified, but could not be further evaluated for inclusion within this report, so they are included here as a data gap. The summary identified the following:
    - Morton Marine Equipment/Workboats Northwest was on the northwest shore of Slip 3. This facility repaired steel and aluminum hulls and removed and installed engines. Complaint files for MP&E included an oil spill complaint at Morton Marine. The location of the Morton Marine facility and the time period of their operations are not known; the facility should be further investigated as a potential source of sediment recontamination.
    - South River Street SD, which discharges to RM 2.0-2.3 East (shown in Figure 4 and discussed in Section 4.1.2), was identified as serving Morton Marine and R.A. Barnes, Inc., a facility that supplied sandblasting materials (“Tuff-Kut”) to shipyards and other industries. R.A. Barnes received at least three complaints of sandblast grit being spilled or washed into catch basins. “Tuff-Kut” is a copper slag grit with metals levels of 90-120 mg/kg arsenic, 3200-7000 mg/kg chromium, 4400-5000 mg/kg copper, 400-1000 mg/kg lead, and 7000-12000 mg/kg zinc. The location of the R.A. Barnes facility and the time period of their operations are not known; the facility should be further investigated as a potential source of sediment recontamination.
- The shoreline within RM 2.0-2.3 East should be investigated to confirm existing outfall locations and to determine whether additional private outfalls to the LDW may exist that have not yet been documented.
- Storm water runoff from rooftops has not been investigated for potential contamination. If rooftop runoff goes to storm drains discharging to the LDW and if roofing material is unknown then building owners need to supply records verifying their roofs are constructed with non-hazardous material. If roofing material is known to consist of hazardous material (for example, paints containing PCBs) and its runoff drains to the LDW, then samples of rooftop runoff should be analyzed for potential COCs.

- Surface runoff, bank erosion/leaching, and atmospheric deposition should be further investigated as potential pathways for sediment recontamination from facilities directly adjacent to the LDW.

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6.0 Tables

Table 1
CSO/EOF Discharges to the LDW

Outfall	Type/Owner	Discharge Serial Number	Location	Average Overflow Frequency (events/year) 1999 to 2005	Annual Average Volume (mgy) 1999 to 2005
Diagonal Avenue S.[1]	CSO (SPU/King County)	NA	RM 0.5 E	20.1	15.82
	SD (SPU)				
Hanford No. 1[3]	CSO (King County)	31	RM 0.5 E	5.5	10.4
Duwamish pump station East	CSO (King County)	35	RM 0.5 E	0.2	0.67
Duwamish pump station West	CSO (King County)	34	RM 0.5 W	1	0.58
S. Brandon Street	CSO (King County)	41	RM 1.1 E	26.3	31
Terminal 115	CSO (King County)	38	RM 1.9 W	2	3.17
S. Brighton Street	CSO (SPU)	NA	RM 2.1 E	NA[7]	NA
	SD (SPU)				
King County Airport SD#3/PS44 EOF[4]	SD (King County)	NA	RM 2.8 E	NA	NA
	EOF (SPU)				
E. Marginal Way S. pump station	EOF (King County)	43	RM 2.8 E	None recorded	NA
8th Avenue S.	CSO (King County)	40	RM 2.8 W	0	0
King County Airport SD#2/PS78 EOF[5]	SD (King County)	NA	RM 3.8 E	NA	NA
	EOF (SPU)				
Michigan	CSO (King County)	39	RM 1.9 E	8.1	19
W. Michigan	CSO (King County)	42	RM 2.0 W	3.6	0.98
Norfolk	CSO (King County)	44	RM 4.8 E	1.1	0.28
	SD (King County)				
	EOF (SPU)[6]				

Key:

CSO - combined sewer overflow
EOF - emergency overflow
mgy - million gallons per year
NA - Not available
SD - storm drain

Notes:

1. The Diagonal Avenue S. SD outfall is shared by stormwater and seven separate overflow points, including the City's Diagonal CSOs and the County's Hanford No. 1 CSO. The overflow frequency and volume listed are for the Diagonal CSOs only.
2. This average volume does not include the contribution from King County's Hanford No. 1 CSO, but does include the remaining seven overflow points that discharge through the Diagonal Avenue S. CSO/SD.
3. Hanford No. 1 discharges to the LDW through the Diagonal Avenue S. SD.
4. SPU Pump Station 44 discharges via EOF No. 117 to King County Airport SD#3 at Slip 4.
5. SPU Pump Station 78 discharges via EOF No. 156 to King County Airport SD#2, near Boeing Isaacson.
6. SPU Pump Station 17 discharges to the Norfolk CSO/SD.
7. Has not overflowed since monitoring began in March 2000.

Table 2
Contaminants Above Screening Levels in Surface Sediment
RM 2.0-2.3 East

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
Metals and Trace Elements														
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Arsenic	80.9	mg/kg dw		2.08		57	93	mg/kg dw	1.4	
PAHs														
DR112	2.1	EPA SI	8/19/1998	Fluoranthene	5.3	mg/kg dw		2.64	200	160	1200	mg/kg OC	1.3	
PCBs														
DR111	2.1	EPA SI	8/19/1998	PCBs (total calc'd)	0.311	mg/kg dw		2.26	13.8	12	65	mg/kg OC	1.2	
DR148	2.1	EPA SI	8/18/1998	PCBs (total calc'd)	279	ug/kg dw	J	4.51		130	1000	ug/kg dw	2.1	
B6b	2.2	LDWRI-Benthic	9/18/2004	PCBs (total calc'd)	0.42	mg/kg dw		2.96	14	12	65	mg/kg OC	1.2	
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	PCBs (total calc'd)	0.124	mg/kg dw		0.972	12.8	12	65	mg/kg OC	1.1	
Other SVOCs														
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzyl alcohol	150	ug/kg dw		2.43		57	73	ug/kg dw	2.6	2.1

Key:

DW - Dry weight
CSL - Cleanup Screening Level
PAH - Polynuclear aromatic hydrocarbon
PCB - Polychlorinated biphenyl
OC - Organic carbon
TOC - Total organic carbon
SQS - Sediment Quality Standard
SVOC - Semivolatile organic compound

Notes:

1. SQS and CSL values are substituted with AET values for dry weight comparison where organic compounds are not OC-normalized (when TOC % DW is outside of the 0.5-4.0% range).
2. Exceedance factors are the ratio of the detected concentration to the CSL or SQS (or to AET values where applicable); exceedance factors are shown only if they are greater than 1.

Source:

Lower Duwamish Waterway Group, 2007. Online Lower Duwamish Waterway Group Draft Remedial Investigation Report (November 2007) Database. http://www.ldwg.org.

Table 3
Contaminants Above Screening Levels in Subsurface Sediment
RM 2.0-2.3 East

Sample Location Name	Sample River Mile Location	Sample Depth Interval (feet)	Sampling Event	Sampling Event Year	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^1	CSL^1	SQS/CSL Units	SQS Exceedance Factor^2	CSL Exceedance Factor^2
Metals and Trace Elements															
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Arsenic	150	mg/kg dw		2.25		57	93	mg/kg dw	2.6	1.6
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Arsenic	121	mg/kg dw		2.67		57	93	mg/kg dw	2.1	1.3
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Arsenic	2000	mg/kg dw		2.24		57	93	mg/kg dw	35	22
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Copper	2940	mg/kg dw		2.24		390	390	mg/kg dw	7.5	7.5
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Lead	3520	mg/kg dw	J	2.24		450	530	mg/kg dw	7.8	6.6
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Mercury	0.45	mg/kg dw	J	2.67		0.41	0.59	mg/kg dw	1.1	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Zinc	490	mg/kg dw		2.67		410	960	mg/kg dw	1.2	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Zinc	4720	mg/kg dw		2.24		410	960	mg/kg dw	12	4.9
PAHs															
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Acenaphthene	0.62	mg/kg dw		2.24	28	16	57	mg/kg OC	1.8	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(a)anthracene	3.1	mg/kg dw		2.67	120	110	270	mg/kg OC	1.1	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzo(a)anthracene	4.5	mg/kg dw		2.24	200	110	270	mg/kg OC	1.8	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(a)pyrene	5.3	mg/kg dw		2.67	200	99	210	mg/kg OC	2.0	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzo(a)pyrene	4	mg/kg dw		2.24	180	99	210	mg/kg OC	1.8	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(g,h,i)perylene	1	mg/kg dw		2.67	37	31	78	mg/kg OC	1.2	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzo(g,h,i)perylene	0.83	mg/kg dw		2.24	37	31	78	mg/kg OC	1.2	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzofluoranthenes (total-calc'd)	10.2	mg/kg dw		2.67	380	230	450	mg/kg OC	1.7	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzofluoranthenes (total-calc'd)	9.1	mg/kg dw		2.24	410	230	450	mg/kg OC	1.8	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Chrysene	4.8	mg/kg dw		2.67	180	110	460	mg/kg OC	1.6	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Chrysene	5	mg/kg dw		2.24	220	110	460	mg/kg OC	2.0	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Dibenzo(a,h)anthracene	0.36	mg/kg dw		2.67	13	12	33	mg/kg OC	1.1	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Dibenzofuran	0.57	mg/kg dw		2.24	25	15	58	mg/kg OC	1.7	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Fluoranthene	4.5	mg/kg dw		2.67	170	160	1200	mg/kg OC	1.1	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Fluoranthene	13	mg/kg dw		2.24	580	160	1200	mg/kg OC	3.6	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Fluorene	0.75	mg/kg dw		2.24	33	23	79	mg/kg OC	1.4	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Indeno(1,2,3-cd)pyrene	1.5	mg/kg dw		2.67	56	34	88	mg/kg OC	1.6	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Indeno(1,2,3-cd)pyrene	1.2	mg/kg dw		2.24	54	34	88	mg/kg OC	1.6	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Phenanthrene	7.5	mg/kg dw		2.24	330	100	480	mg/kg OC	3.3	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	40	mg/kg dw		2.67	1500	960	5300	mg/kg OC	1.6	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	47	mg/kg dw		2.24	2100	960	5300	mg/kg OC	2.2	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Total LPAH (calc'd)	10.5	mg/kg dw	J	2.24	470	370	780	mg/kg OC	1.3	
PCBs															
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.45	mg/kg dw		2.25	20	12	65	mg/kg OC	1.7	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.95	mg/kg dw	J	2.67	36	12	65	mg/kg OC	3.0	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.55	mg/kg dw		2.24	25	12	65	mg/kg OC	2.1	
TPHs															
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	1,2,4-Trichlorobenzene	0.046	mg/kg dw		2.24	2.1	0.81	1.8	mg/kg OC	2.6	1.2
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	1,2-Dichlorobenzene	0.15	mg/kg dw		2.24	6.7	2.3	2.3	mg/kg OC	2.9	2.9

Key:

DW - Dry weight
CSL - Cleanup Screening Level
PAH - Polynuclear aromatic hydrocarbon
PCB - Polychlorinated biphenyl
OC - Organic carbon
TOC - Total organic carbon
TPH - Total petroleum hydrocarbon
SQS - Sediment Quality Standard
SVOC - Semivolatile organic compound

Notes:

1. SQS and CSL values are substituted with AET values for dry weight comparison where organic compounds are not OC-normalized (when TOC % DW is outside of the 0.5-4.0% range).
2. Exceedance factors are the ratio of the detected concentration to the CSL or SQS (or to AET values where applicable); exceedance factors are shown only if they are greater than 1.

Source:

Lower Duwamish Waterway Group, 2007. Online Lower Duwamish Waterway Group Draft Remedial Investigation Report (November 2007) Database. http://www.ldwg.org.

Table 4
Facilities of Concern Identification
RM 2.0-2.3 East

Facility Identified	Identification Source	Facility Address[1]	Facility/Site ID No.	Included/Excluded	Updates and Corrections Needed
Big John's Truck Repair	Ecology's files and Facility/Site Database	6533 3rd Ave. S, Seattle, WA, 98108	44383713	Included as Riverside Industrial Park.	
Evergreen Marine Leasing - Parcel E	Ecology's files and Facility/Site Database	7343 E Marginal Way S, Seattle, WA, 98108	2462	Excluded because located outside of RM 2.0-2.3 East, at approximately RM 2.9.	The map location shown in the Facility/Site Database appears to be incorrect. The facility was determined to be located on tax parcel 2924049043, owned by Emerald Services. Ecology's files for this facility were intermixed with files for Northland Services because Evergreen Marine Leasing is a former owner of the Northland Services property.
Fox Avenue Building	Ecology's files and Facility/Site Database	6900 Fox Ave. S, Seattle, WA, 98108	2282	Included as Cascade Columbia Distribution.	The map location shown in the Facility/Site Database appears to be incorrect. Cascade Columbia Distribution was determined to be located south of S Willow Street and east of Fox Avenue S, on tax parcel 0001800087.
Northland Services	Ecology's files and Facility/Site Database	6701 Fox Ave. S, Seattle, WA, 98108	22653378	Included as Glacier Marine Services.	
Shultz Distributing	Ecology's files and Facility/Site Database	6851 E Marginal Way S, Seattle, WA, 98108	95498891	Included.	The map location shown in the Facility/Site Database appears to be incorrect. Shultz Distributing was determined to be located between S Brighton Street and S Willow Street, with Fox Avenue S bordering the facility to the west and East Marginal Way S bordering the property to the east.
United Marine Shipbuilding	Ecology's files and Facility/Site Database	5055 E Marginal Way, Seattle, WA, 98108	1523145	Excluded because located outside of RM 2.0-2.3 East, between RM 0.6 and 0.9.	
V. Van Dyke	Ecology's files and Facility/Site Database	150 S River St., Seattle, WA, 98108	68427684	Included.	The map location shown in the Facility/Site Database appears to be incorrect. V. Van Dyke was determined to be located just east of Occidental Avenue S and north of S River Street, on tax parcel 5367202270.
Bunge Foods	Based on vicinity to LDW from figures and maps reviewed			Included as a data gap in Section 4.4 because no information pertaining to the site was found for review.	
Silver Bay Logging (now known as Muckleshoot Seafood Products)	Nov 2007 LDW RI Report			Included as a data gap in Section 4.4 because no information pertaining to the site was found for review.	
Rainier Petroleum Corporation	Nov 2007 LDW RI Report			Included as a data gap in Section 4.4 because no information pertaining to the site was found for review.	
Seattle Cold Storage Company	Nov 2007 LDW RI Report			Included as SCS Refrigerated Services.	
Seattle Distribution Center	Nov 2007 LDW RI Report			Included.	
Glacier Marine Services	Nov 2007 LDW RI Report			Included.	
Seatac Marine Services	Nov 2007 LDW RI Report			Included as Glacier Marine Services; also same facility as Northland Services.	
Remarkable Tire	Facility/Site Database	7115 East Marginal Way S, Seattle, WA, 98108	65141181	Excluded because actually located south of RM 2.0-2.3 East.	The map location shown in the Facility/Site Database appears to be incorrect. Remarkable Tire was determined to be located at approximately the intersection of S Myrtle Street and East Marginal Way S.

Table 4
Facilities of Concern Identification
RM 2.0-2.3 East

Facility Identified	Identification Source	Facility Address[1]	Facility/Site ID No.	Included/Excluded	Updates and Corrections Needed
Vacuum Truck Services	Facility/Site Database	220 S River Street, Seattle, WA, 98108	37289288	Included as Riverside Industrial Park; also same facility as Big John's Truck Repair.	Vacuum Truck Services and Big John's Truck Repair appear to be the same facility, entered into the Facility/Site Database twice; the facility was formerly known as Vacuum Truck Services and appeared to be listed under the office building address rather than the shop building address, as Big John's Truck Repair was.
WA DNR Corson Ave Site Hat Boots	Facility/Site Database	6800 East Marginal Way S, Seattle, WA 98108	61845527	Included as Hat n' Boots, but as a facility of concern located within the South Brighton Street CSO Basin.	The map location shown in the Facility/Site Database appears to be incorrect. Hat n' Boots was determined to actually be located within the South Brighton Street CSO Basin, at approximately the intersection of East Marginal Way S and Corson Ave. S.
South Brighton Street CSO Basin Facilities of Concern					
Arrow Transportation	Facility/Site Database	6737 Corson Ave. S, Seattle, WA, 98108	69693852	Included as former facility at South Seattle Community College Property.	
Ben's Truck Parts	Facility/Site Database	6655 Corson Ave. S, Seattle, WA, 98108	74169521	Included as former facility at South Seattle Community College Property.	Ben's Truck Parts appeared to be located on the same tax parcel as Arrow Transportation and Inland Transportation Company, which is now occupied by South Seattle Community College.
Inland Transportation Company	Facility/Site Database	6737 Corson S, Seattle, WA, 98108	2134	Included as former facility at South Seattle Community College Property.	Inland Transportation Company and Arrow Transportation appear to have the same address and to be located on the same tax parcel, which is now occupied by South Seattle Community College; whether they are the same facility or were just located on the same tax parcel is unknown.
Hat n' Boots Gas Station	Facility/Site Database	6800 East Marginal Way S, Seattle, WA 98108	61845527	Included as former facility at South Seattle Community College Property.	The map location shown in the Facility/Site Database appears to be incorrect. Hat n' Boots was determined to actually be located within the South Brighton Street CSO Basin, at approximately the intersection of East Marginal Way S and Corson Ave. S.

Notes:

1. Addresses were not provided in the November 2007 Lower Duwamish Waterway Phase 2 Remedial Investigation Draft Report (Windward 2007) for facilities that were listed as primary upland properties in the vicinity of RM 2.0-2.3 East.

7.0 Figures

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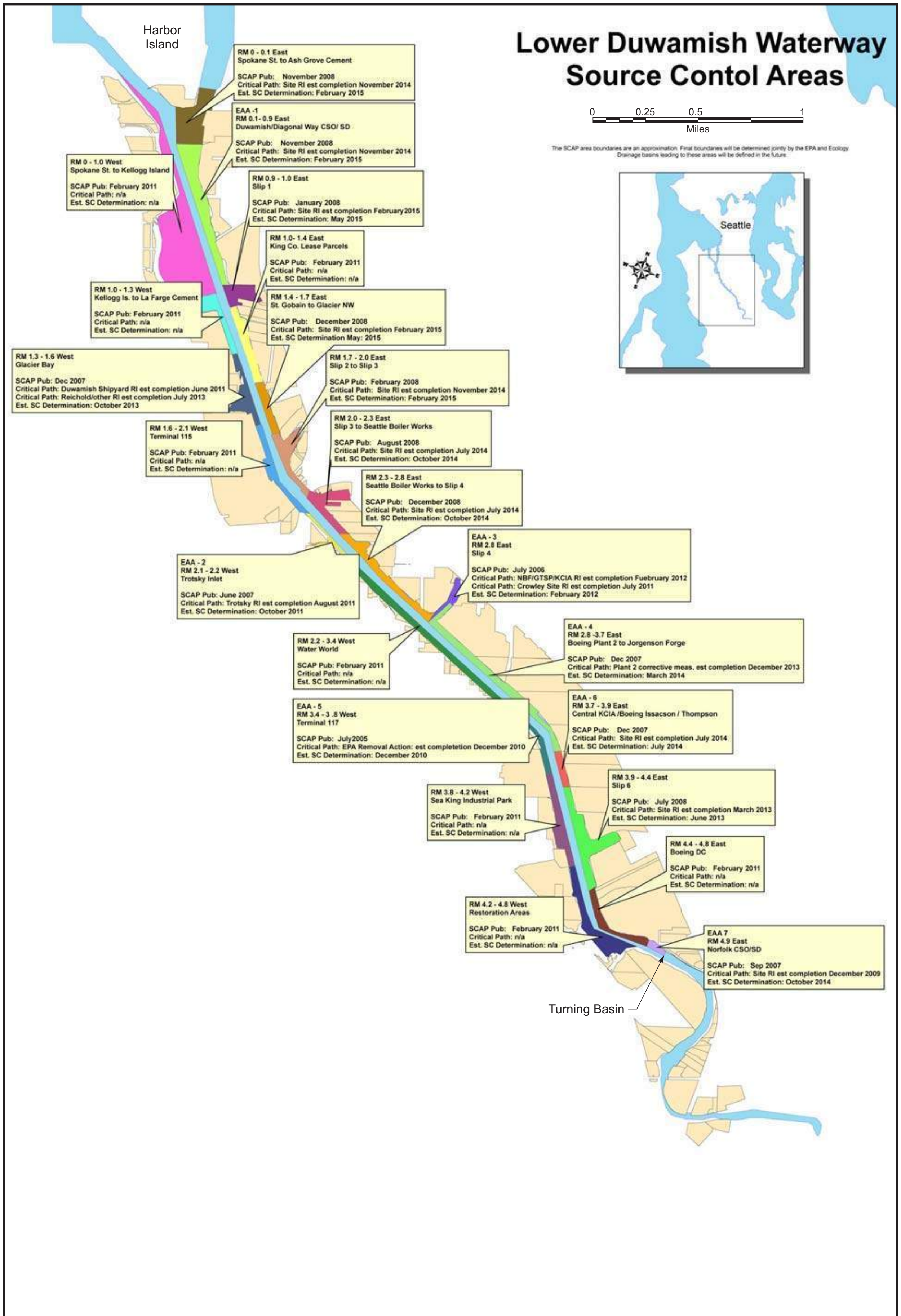

Base Map Reference: Department of Ecology, 2008.

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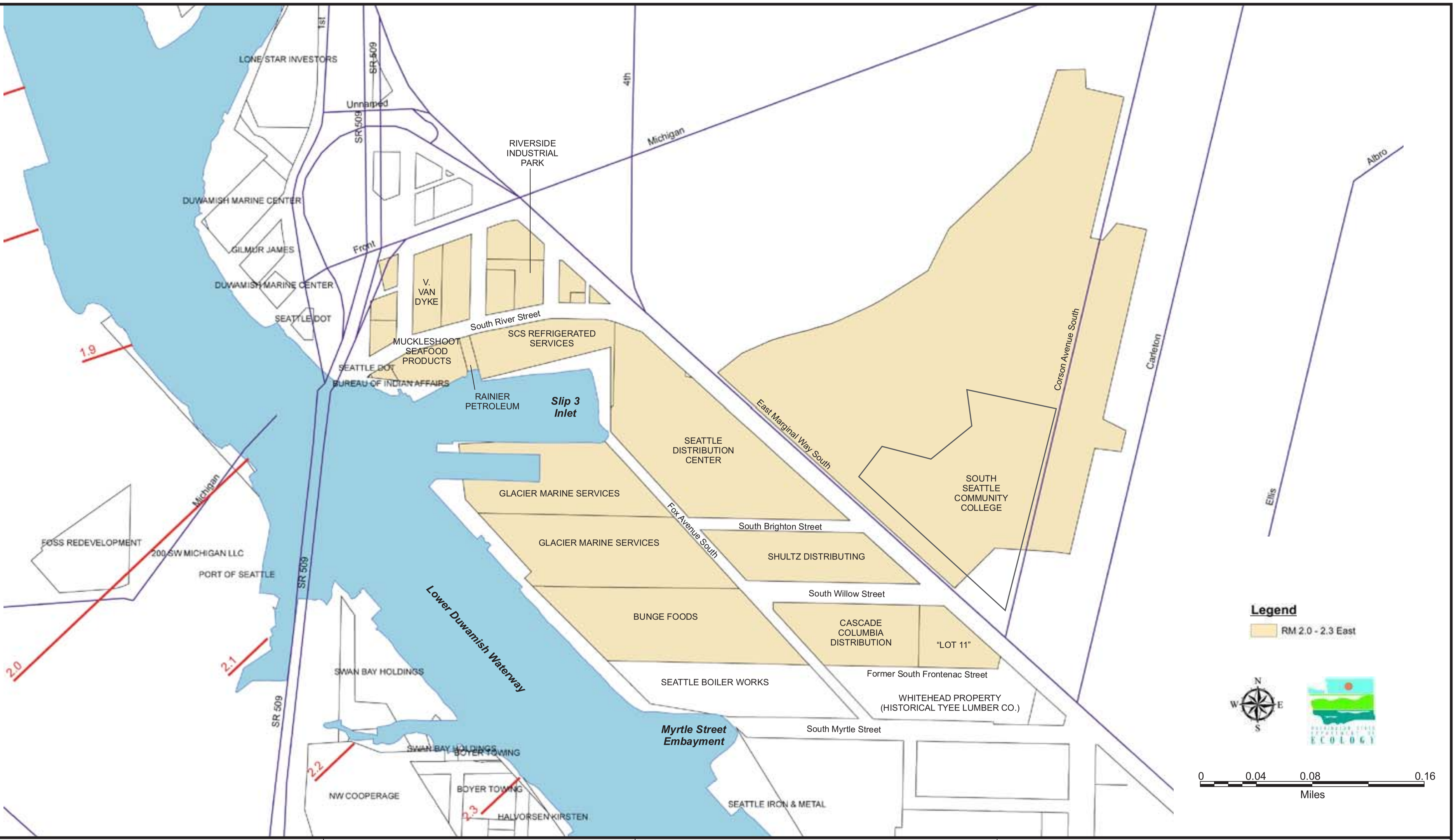
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 1

LOWER DUWAMISH WATERWAY
SOURCE CONTROL AREAS

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig 1



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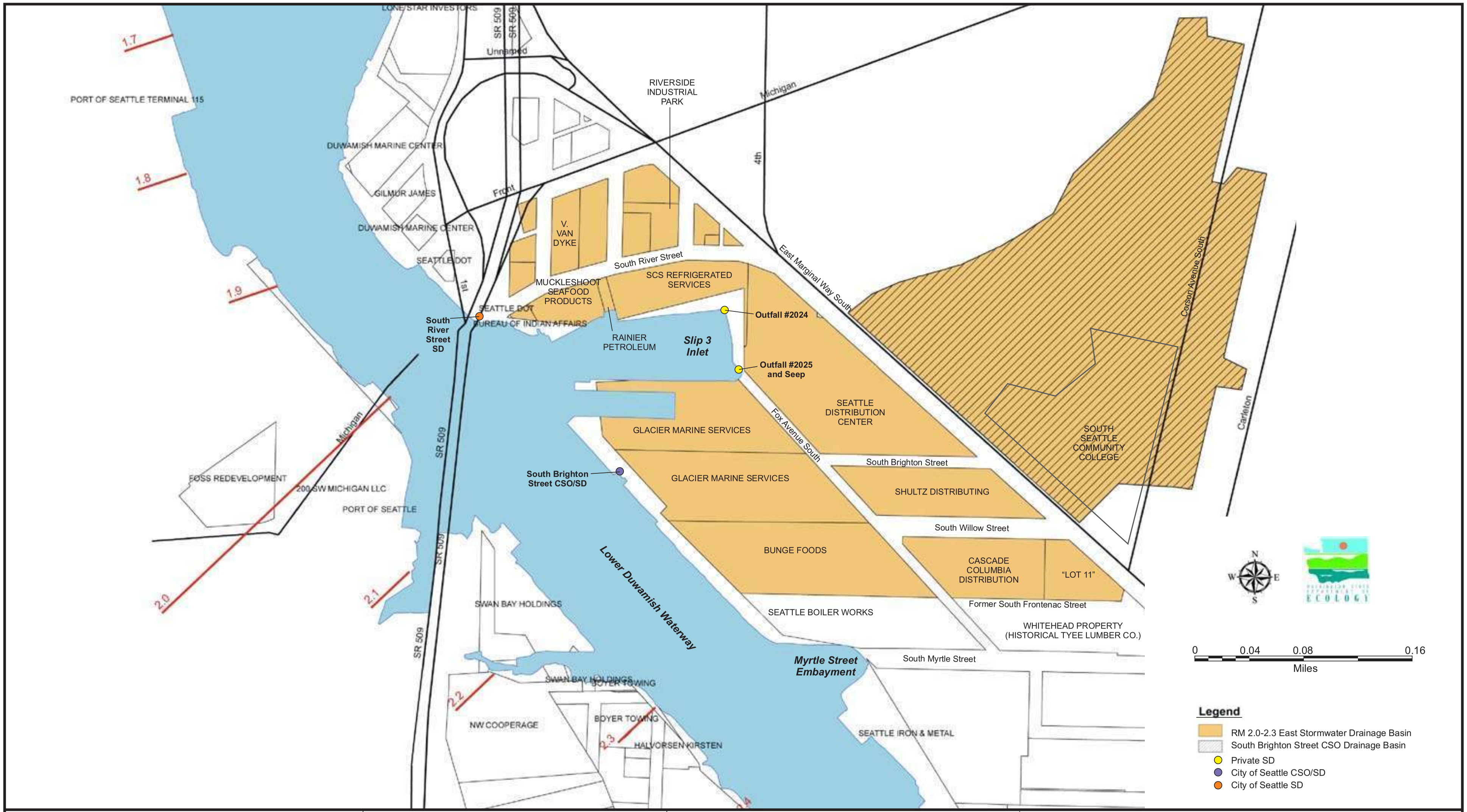
Base Map Reference: Department of Ecology, 2008.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 2

RM 2.0-2.3 EAST SOURCE CONTROL AREA

Date:	Drawn by:	
6/10/08	AES	10:002330WD1403\fig 2



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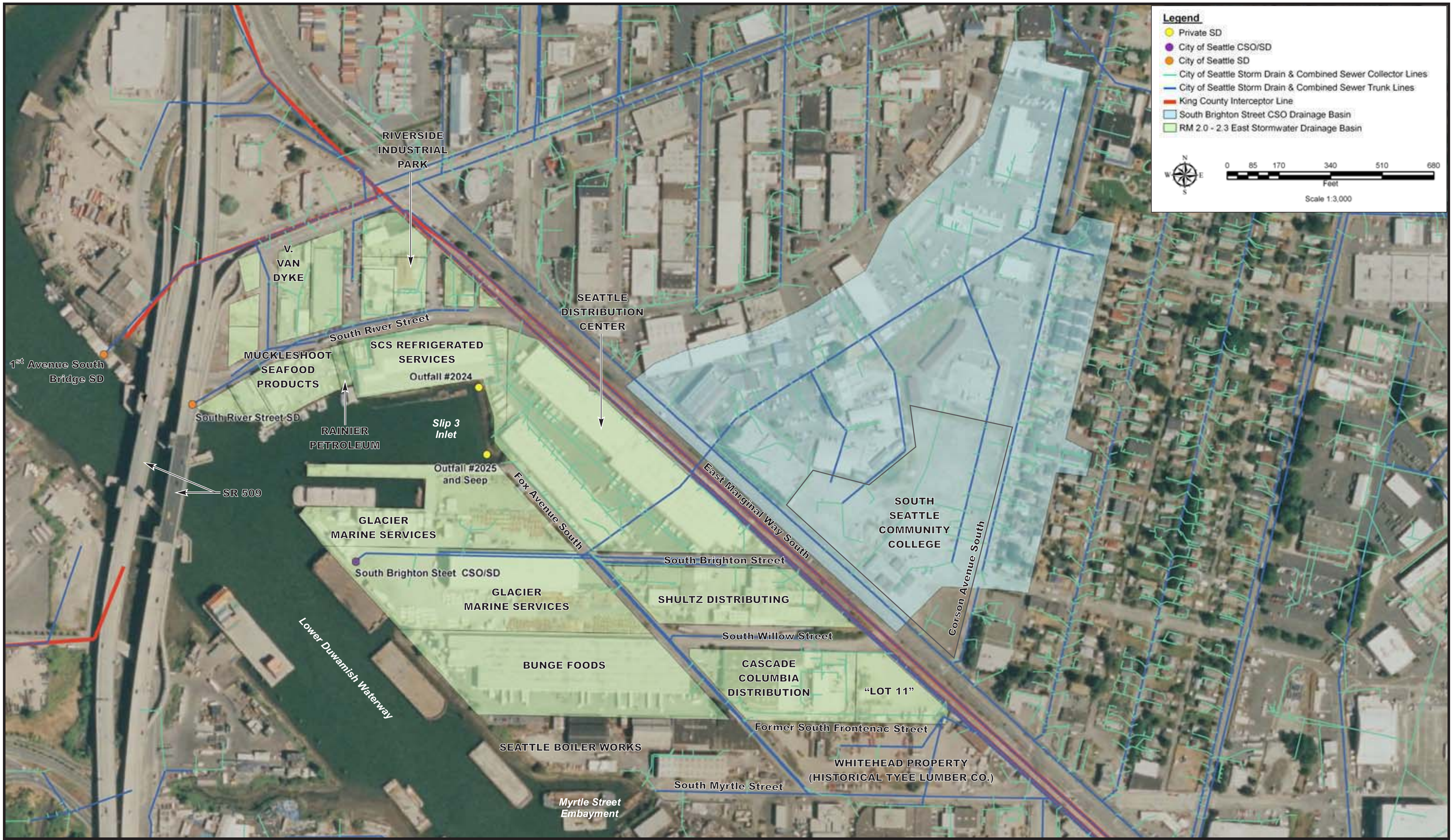
Base Map Reference: Department of Ecology, 2008.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 3

RM 2.0-2.3 EAST STORMWATER DRAINAGE BASIN WITH SOUTH BRIGHTON STREET CSO DRAINAGE BASIN IDENTIFIED

Date:	Drawn by:	
6/10/08	AES	10:002330WD1403\fig 3



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Base Map Reference: Ecology and Environment, Inc., GIS department, 2008.

GIS layer depicting LDW outfalls and "seep" location provided by Seattle Public Utilities, dated September 9, 2003.

GIS layers depicting storm drain and sewer lines provided by Seattle Public Utilities and King County.

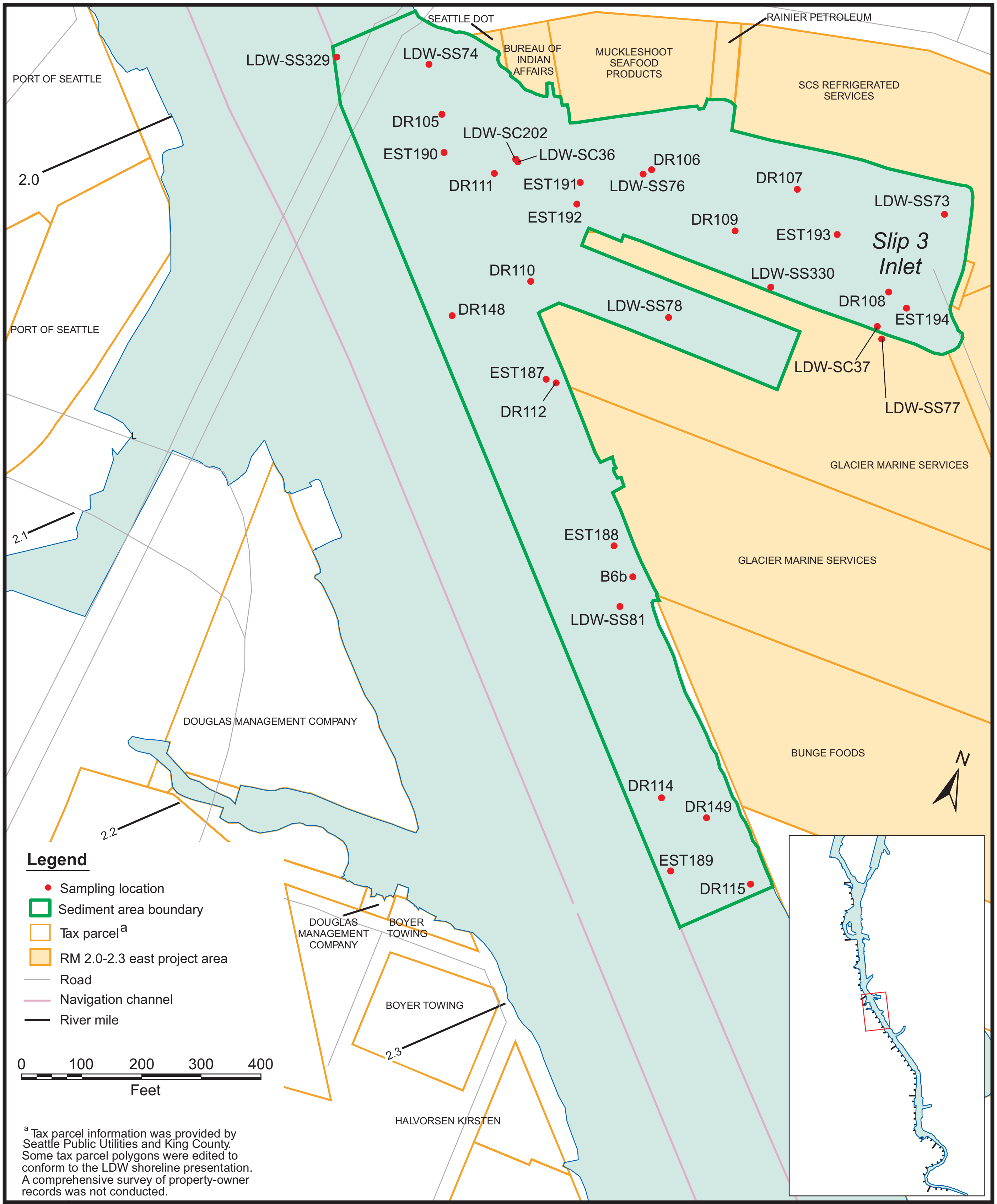
GIS layers depicting tax parcels and drainage basins provided by Seattle Public Utilities and King County. Some tax parcel polygons were edited to conform to the LDW shoreline presentation.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 4

STORM DRAIN SYSTEM WITHIN RM 2.0-2.3 EAST

Date:	Drawn by:	
5/30/08	AES	10:002330WD1403\fig 4



[a] Tax parcel information was provided by Seattle Public Utilities and King County. Some tax parcel polygons were edited to conform to the LDW shoreline presentation. A comprehensive survey of property-owner records was not conducted.

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LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

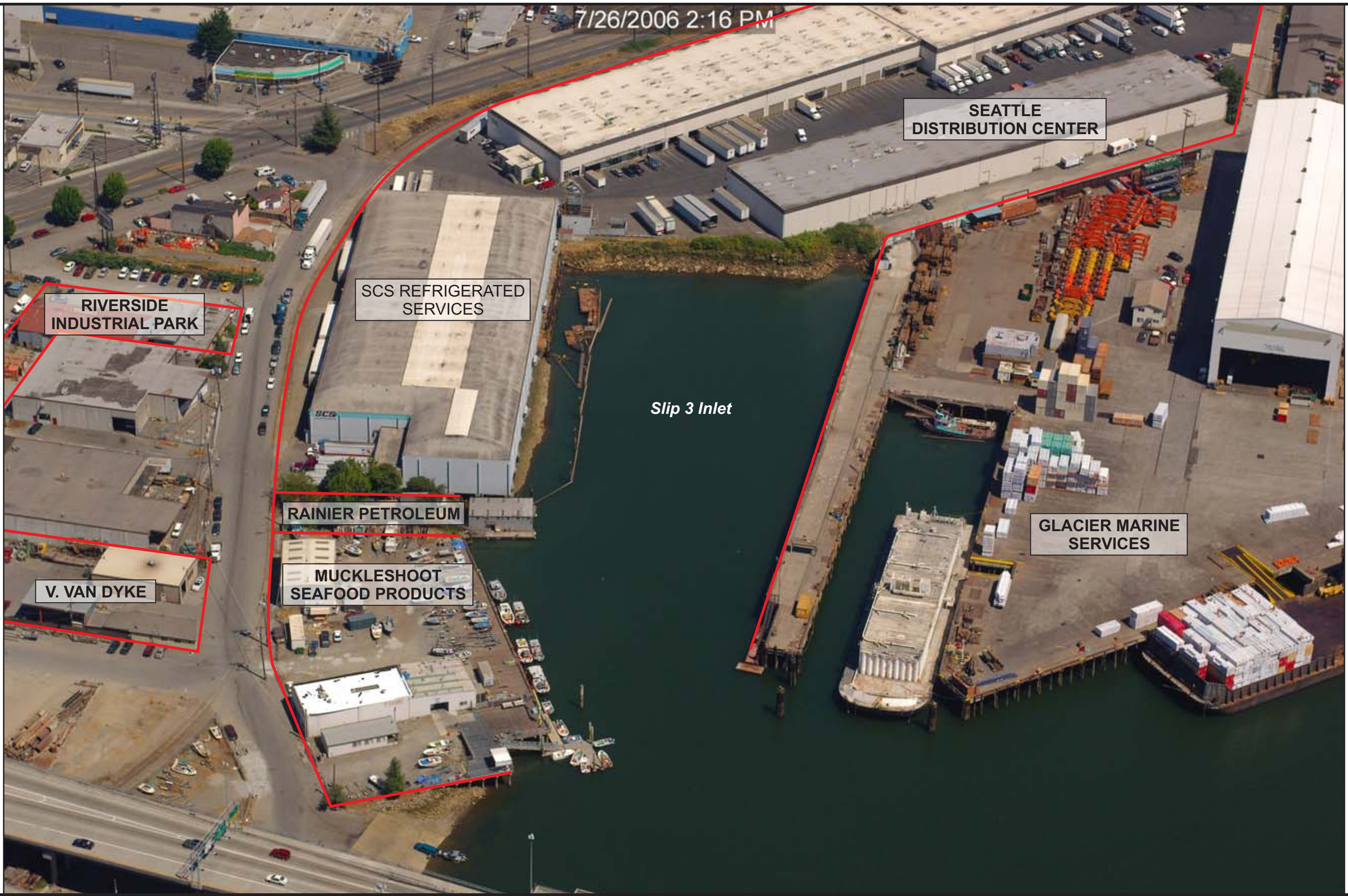
Figure 5
RM 2.0-2.3 EAST
SEDIMENT SAMPLING LOCATIONS

Base Map Reference: Windward 2007.

Date: 5-21-08

Drawn by: AES

10:002330WD1403\fig 5



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Aerial Photograph Reference: Department of Ecology.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 6
AERIAL PHOTO OF THE SLIP 3 INLET AREA (NORTH)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig 6

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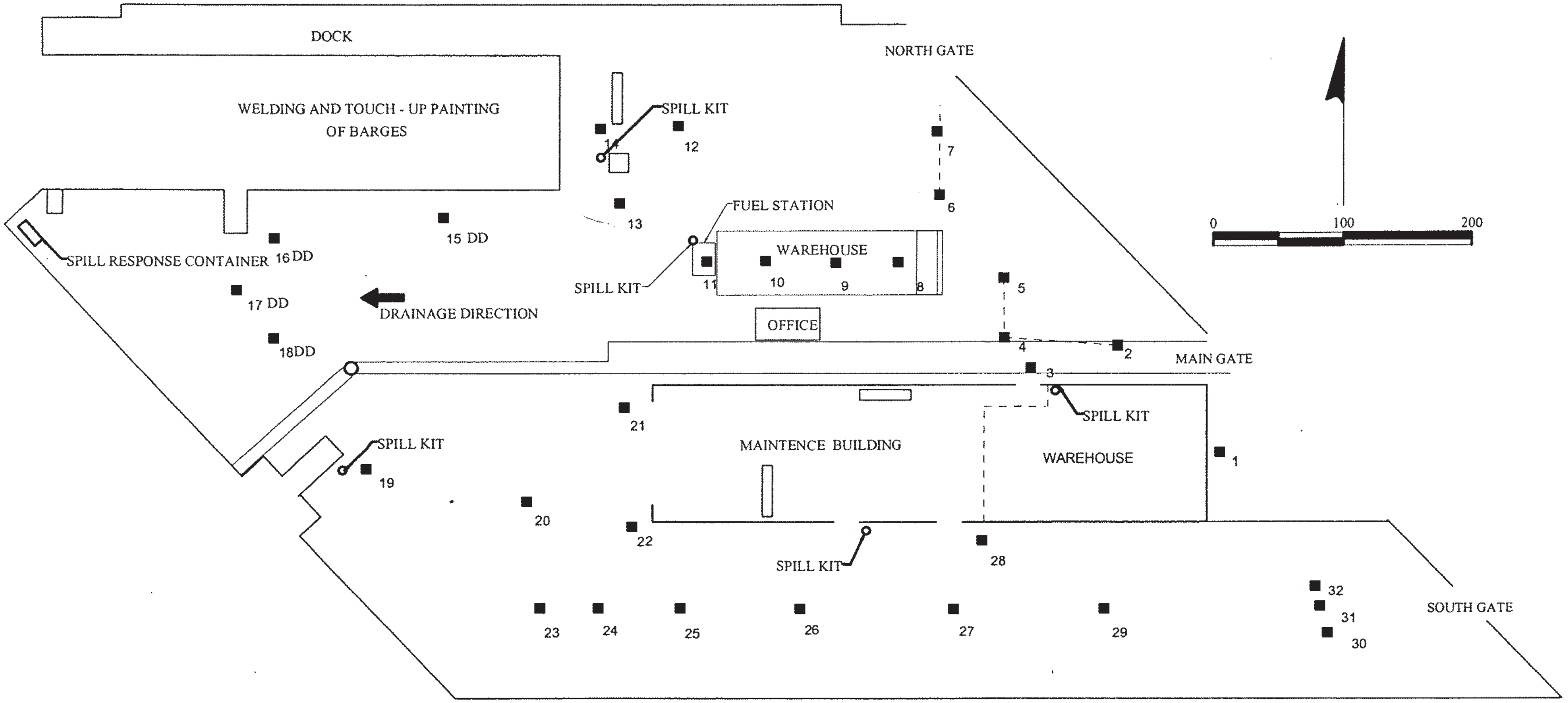
Aerial Photograph Reference: Department of Ecology.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 7
AERIAL PHOTO OF THE SLIP 3 INLET AREA (SOUTH)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig 7



Northland Services Terminal
6701 Fox Ave. South

NOTE: CATCH BASIN LOCATIONS ARE NOT EXACT

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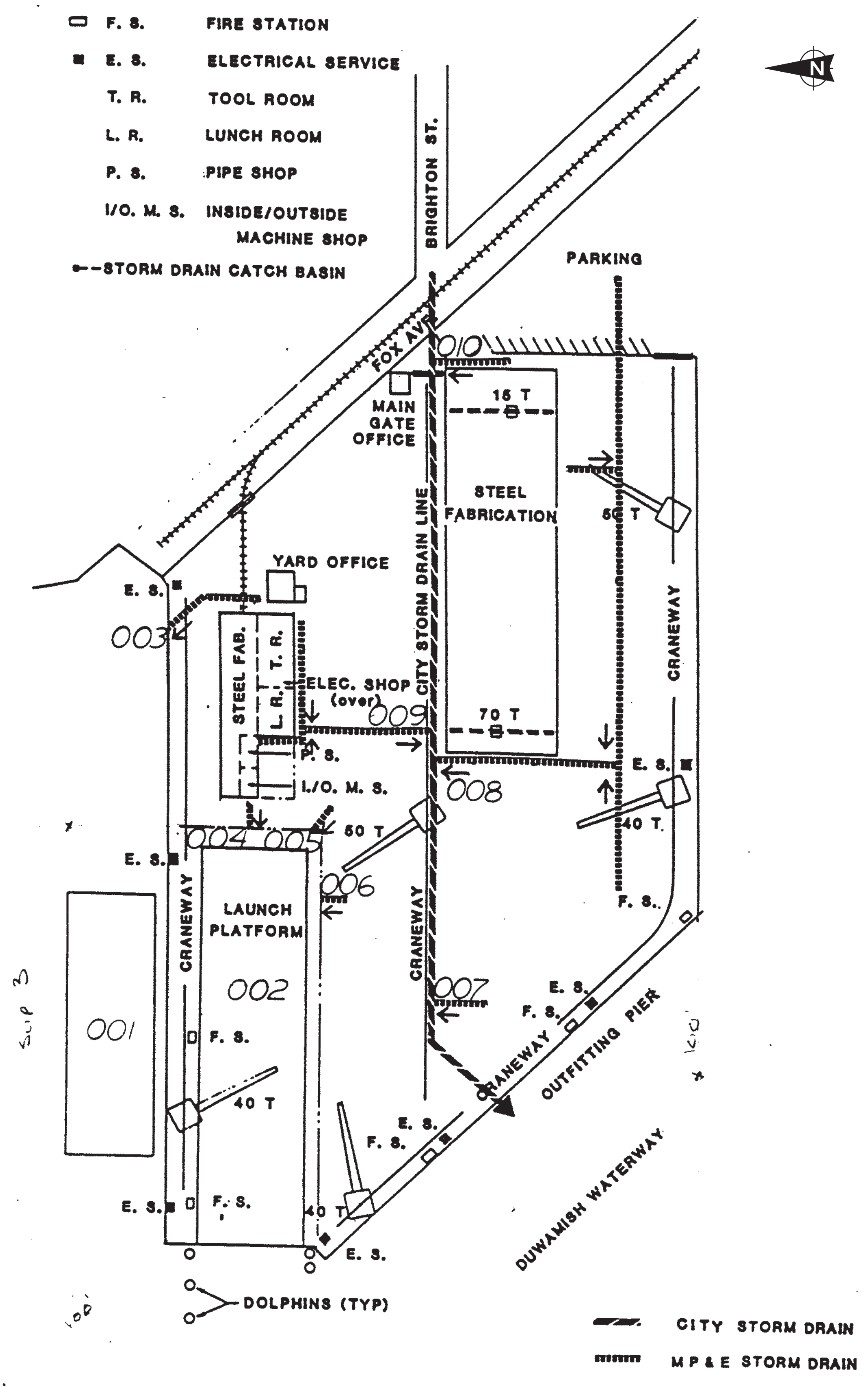
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Base Map Reference: Northland Services, Inc., 2001.

Figure 8
FACILITY MAP - GLACIER MARINE SERVICES
(IN OPERATION AS NORTHLAND SERVICES)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig8



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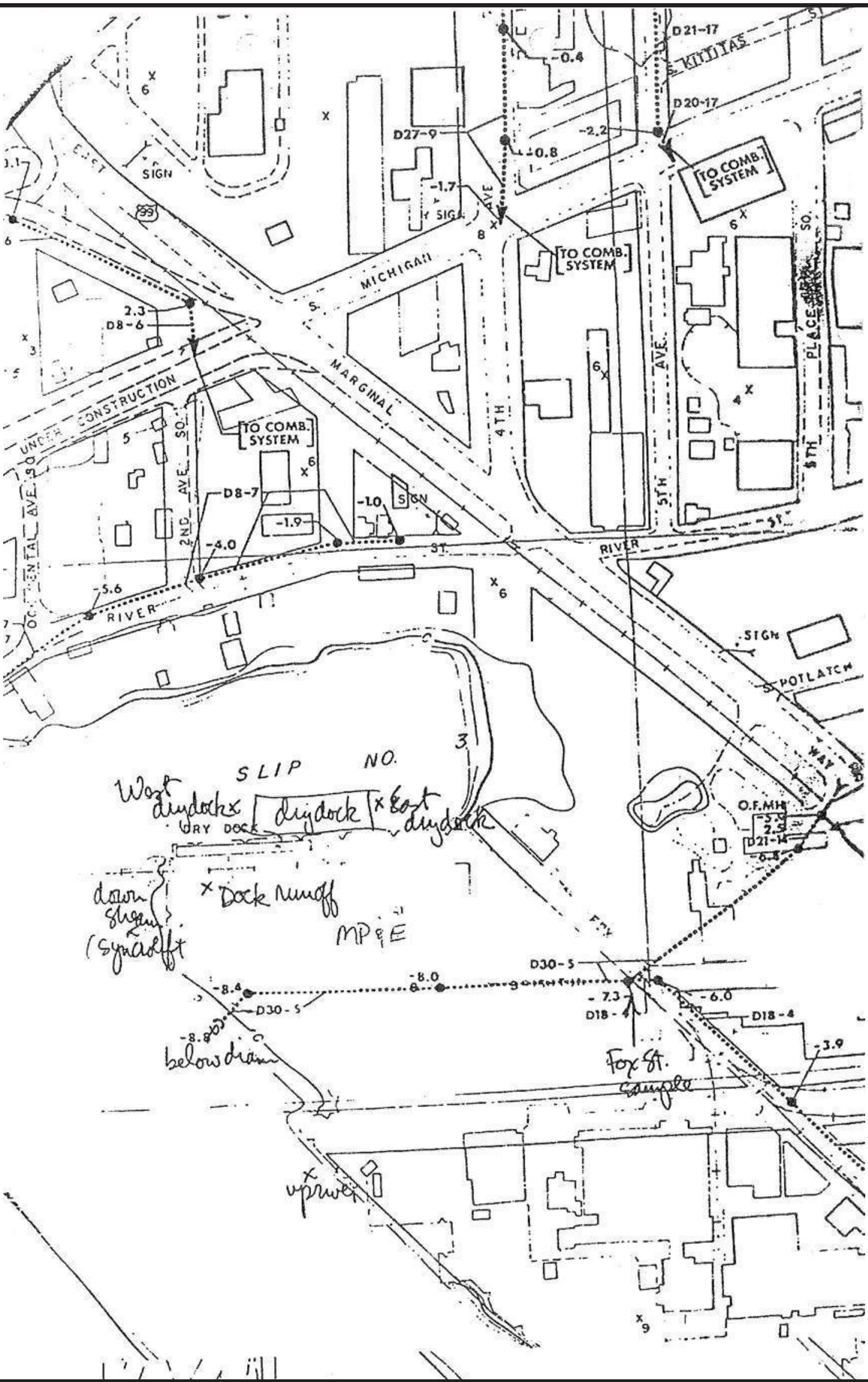
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 9

FACILITY MAP - GLACIER MARINE SERVICES
(IN OPERATION AS MARINE POWER & EQUIPMENT)

Base Map Reference: Washington State Department of Ecology, 1989.

Date:	Drawn by:	
5-21-08	AES	10:002330WD1403\fig 9



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LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

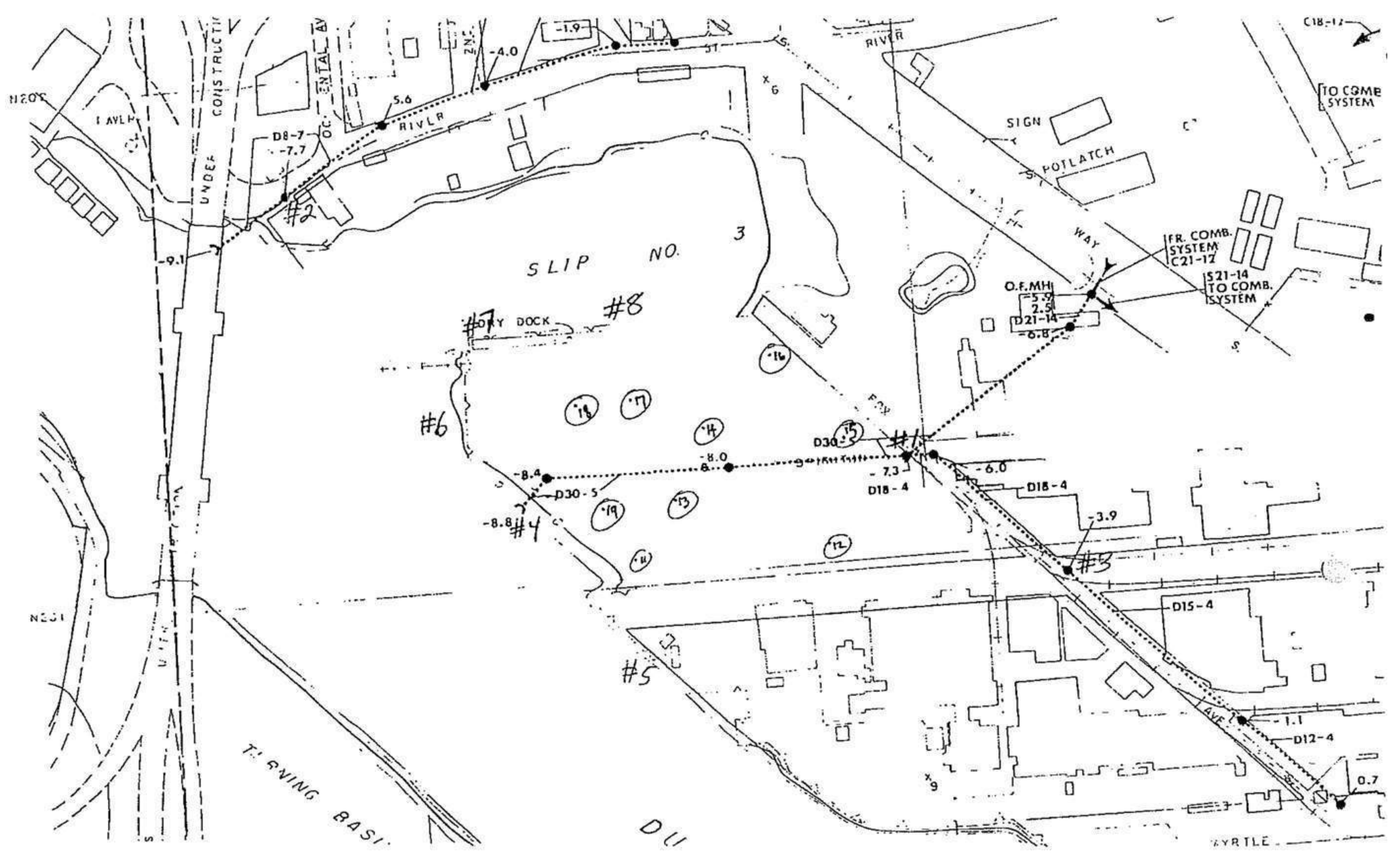
Figure 10
FOX STREET/SLIP 3 SAMPLING LOCATIONS - GLACIER MARINE SERVICES
(IN OPERATION AS MARINE POWER & EQUIPMENT)

Base Map Reference: Hubbard 1984.

Date: 5-21-08

Drawn by: AES

10:002330WD1403\fig 10



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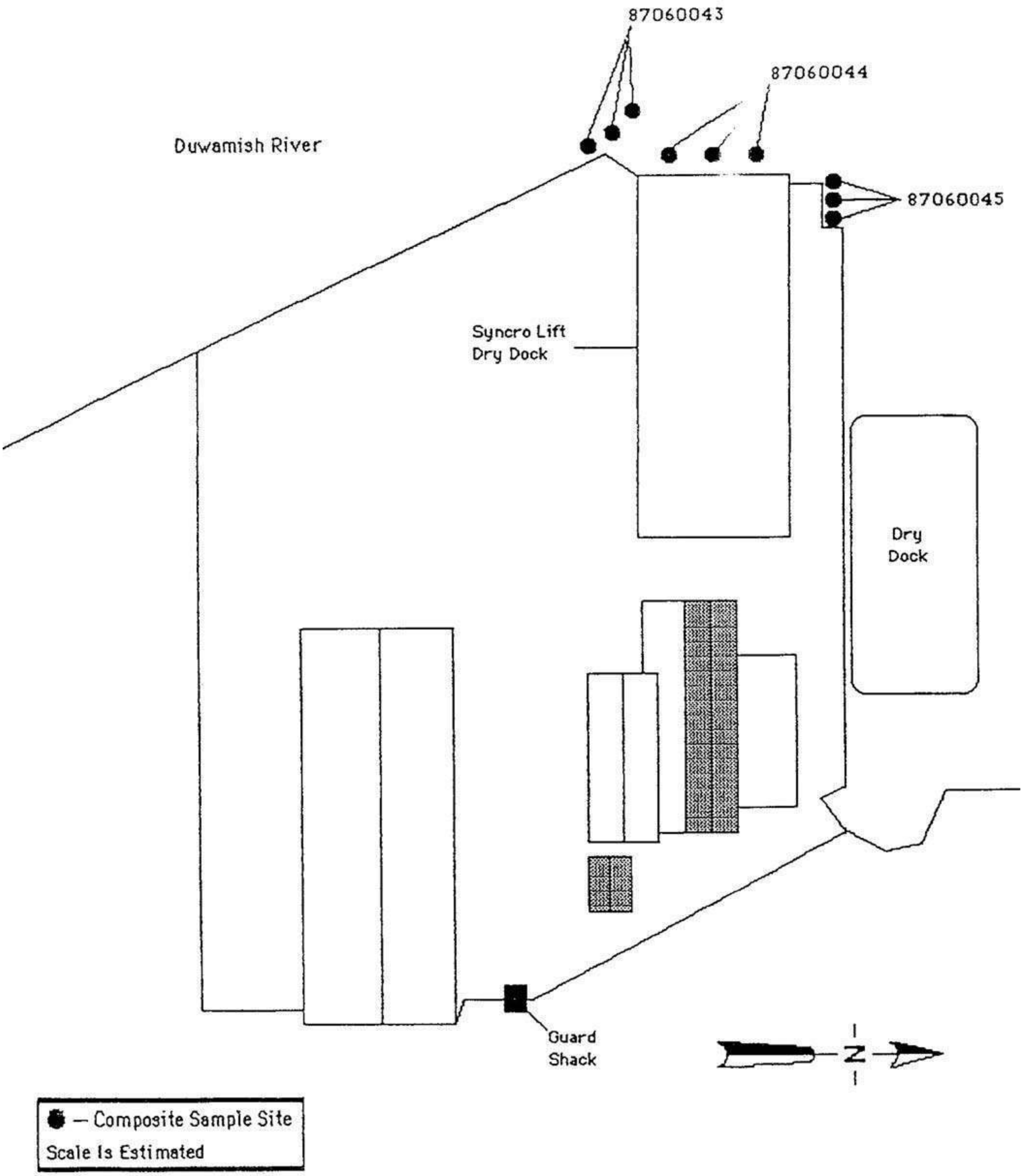
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 11

STORM DRAIN AND SEDIMENT SAMPLING LOCATIONS - GLACIER MARINE SERVICES (IN OPERATION AS MARINE POWER & EQUIPMENT)

Base Map Reference: Sample 1986.

Date:	Drawn by:	
5/22/08	AES	10:002330WD1403\fig11



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LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 12

EPA DIVE SURVEY AND SEDIMENT SAMPLING LOCATIONS - GLACIER MARINE SERVICES
(IN OPERATION AS MARINE POWER & EQUIPMENT)

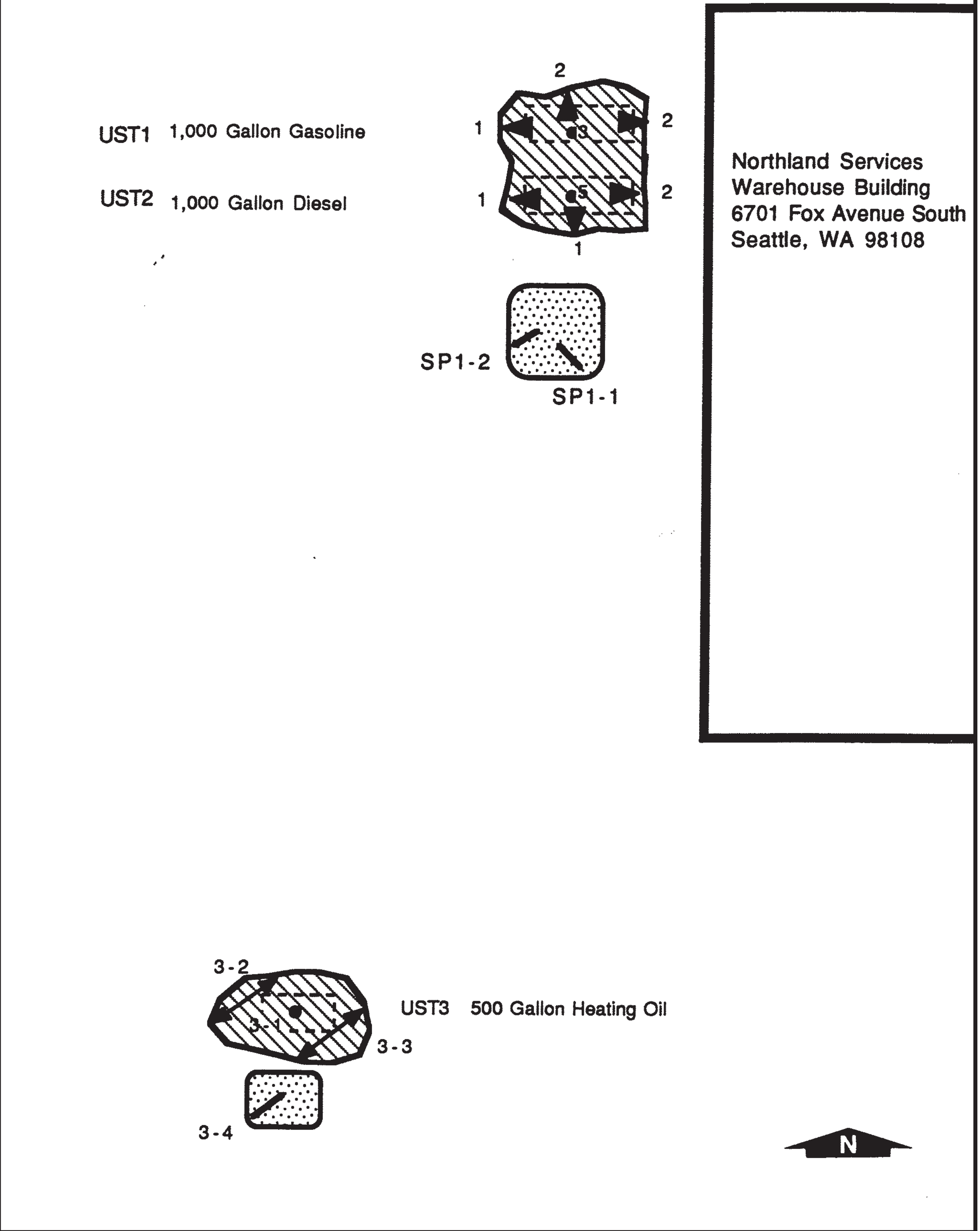
Base Map Reference: Matta 1987.

Date: 5-22-08

Drawn by: AES

10:002330WD1403\fig 12

Base Map Reference:
James P Hurley Co. Environmental Risk Management Consultants



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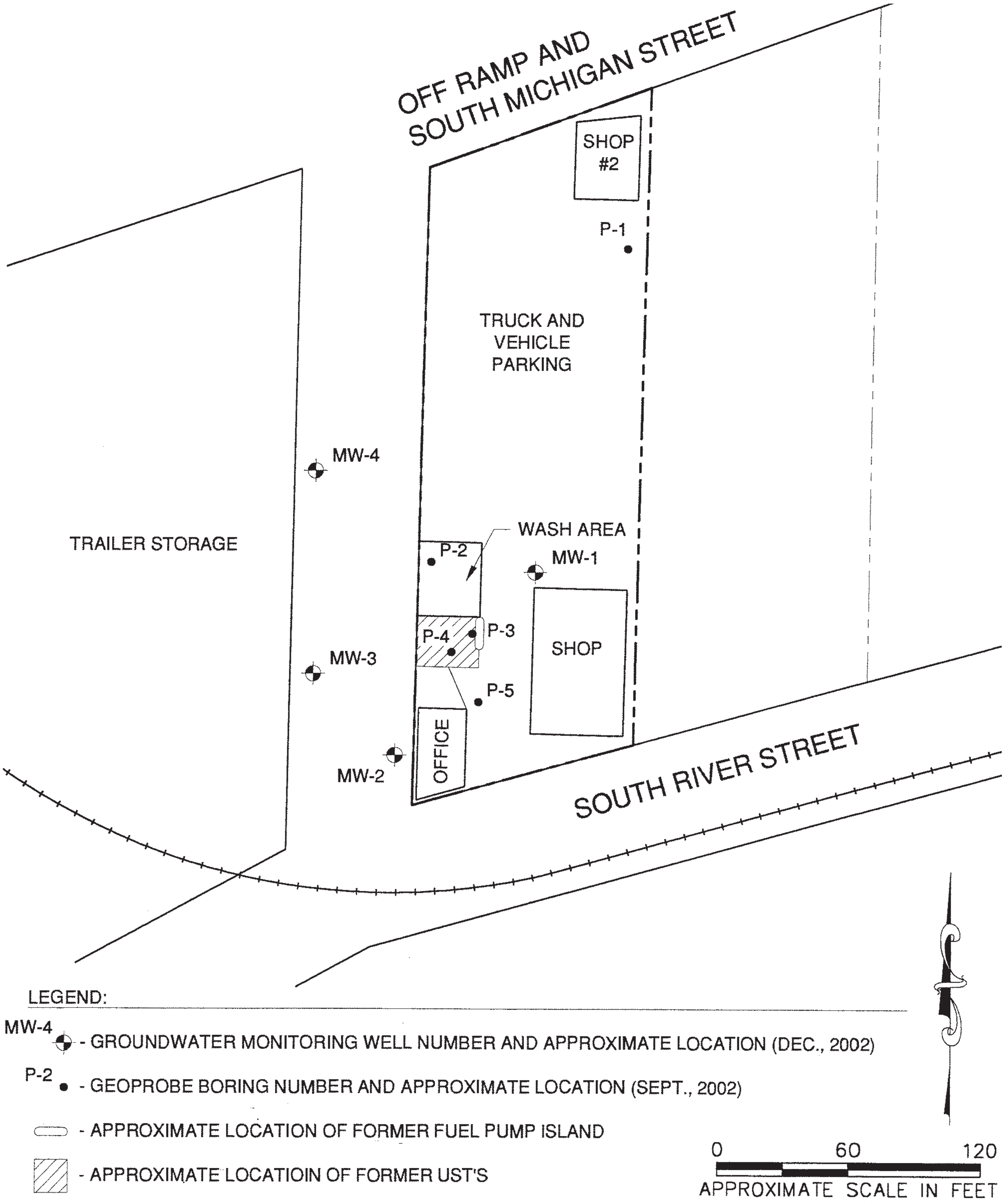
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 13
UST REMOVAL MAP -
GLACIER MARINE SERVICES
(IN OPERATION AS NORTHLAND SERVICES)

Date:	Drawn by:	
5-21-08	AES	10:002330WD1403\fig 13



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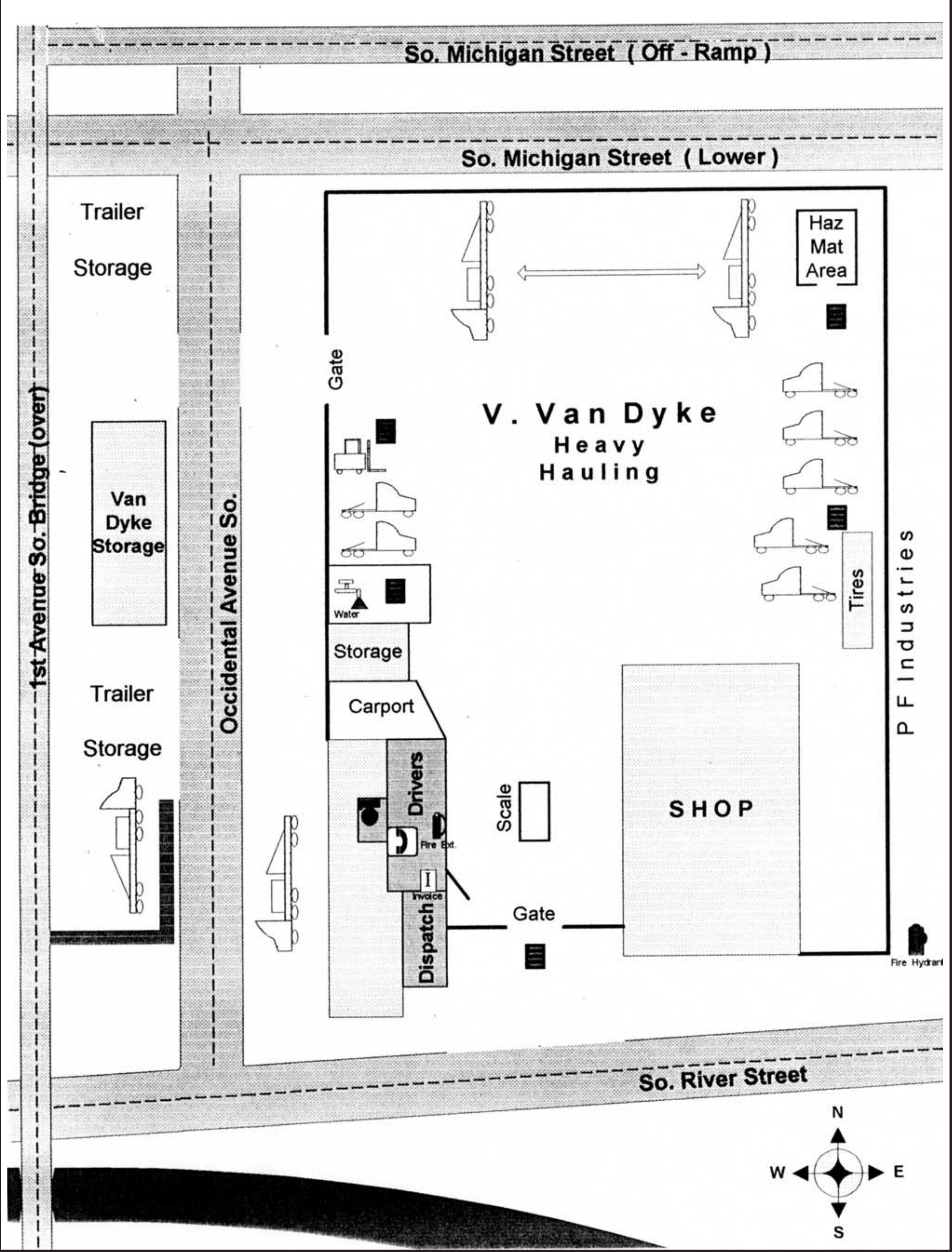
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 14
FACILITY MAP AND GROUNDWATER MONITORING WELL LOCATIONS - V. VAN DYKE

Base Map Reference: LSI Adapt 2003.

Date:	Drawn by:	
5-21-08	AES	10:002330WD1403\fig 14



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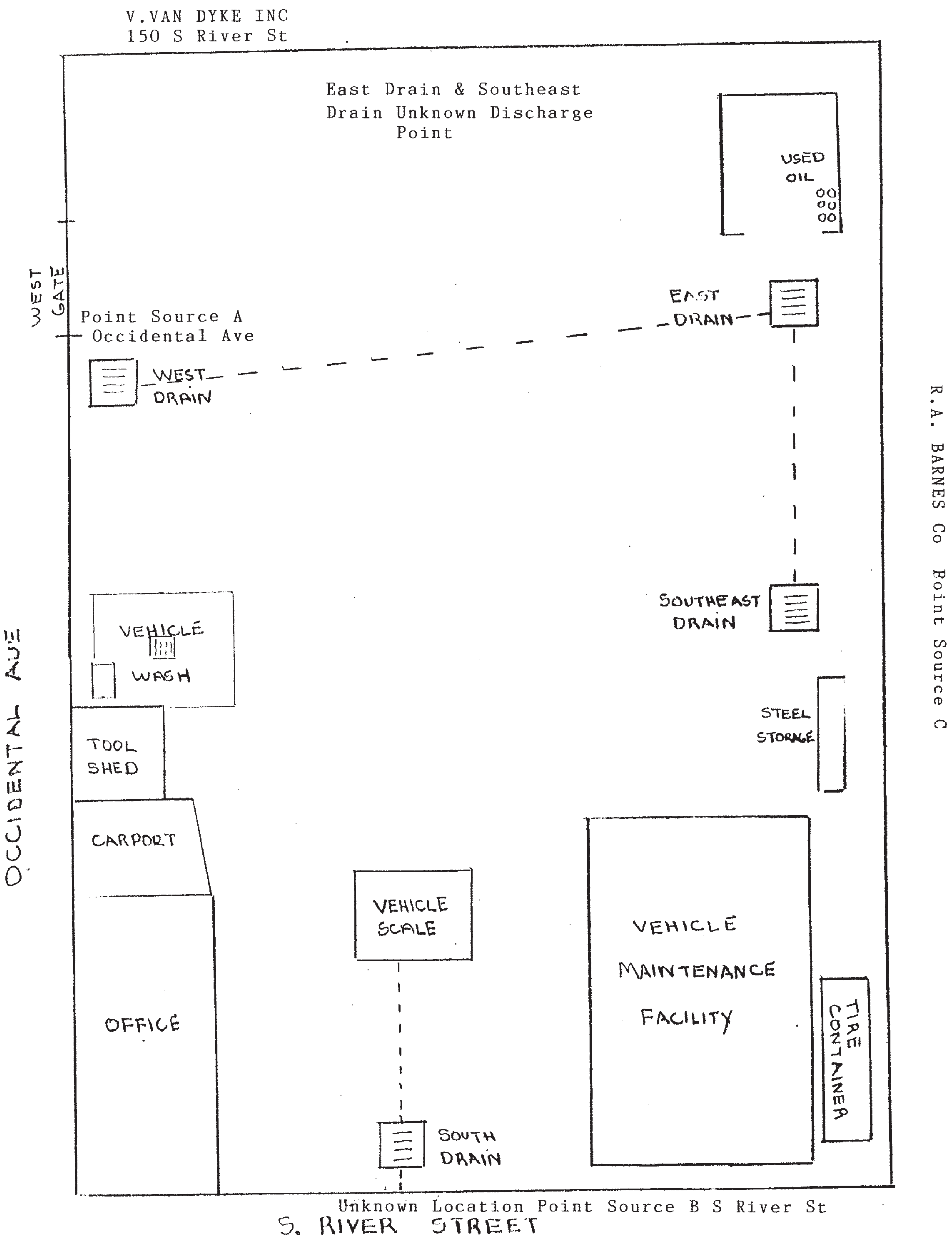
LOWER DUWAMISH WATERWAY RM 2.0-2.3 EAST Seattle, Washington	Figure 15 FACILITY MAP - V. VAN DYKE		
Base Map Reference: V. Van Dyke, Inc., 1993.	Date: 5-21-08	Drawn by: AES	10:002330WD1403\fig 15



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LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 16

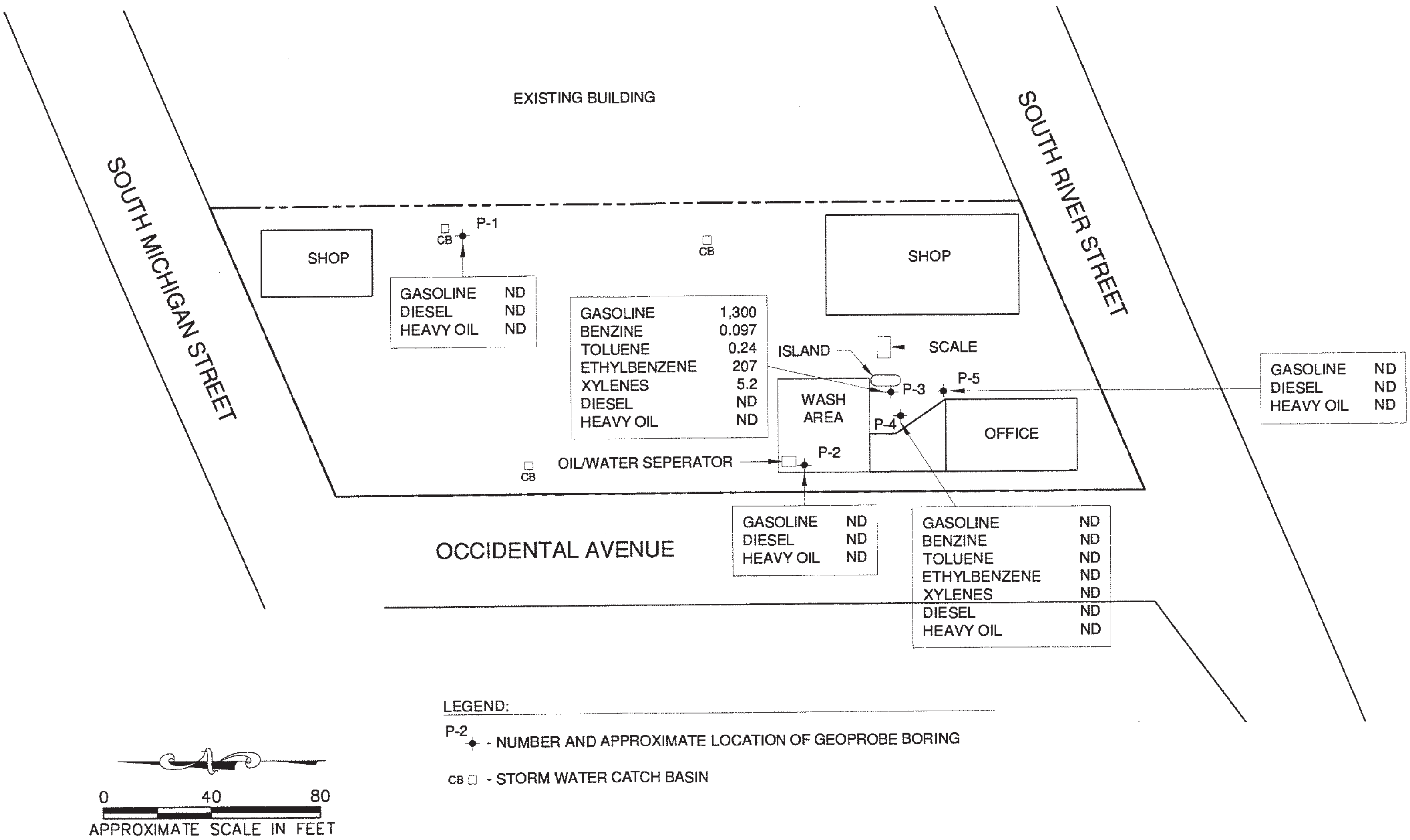
FACILITY STORM DRAIN LOCATIONS -
V. VAN DYKE

Base Map Reference:
V. Van Dyke, Inc., 1993.

Date:
5-21-08

Drawn by:
AES

10:002330WD1403\fig 16



LEGEND:

P-2 ✦ - NUMBER AND APPROXIMATE LOCATION OF GEOPROBE BORING

CB ☐ - STORM WATER CATCH BASIN

NOTE:

CONCENTRATIONS ARE IN PARTS PER MILLION

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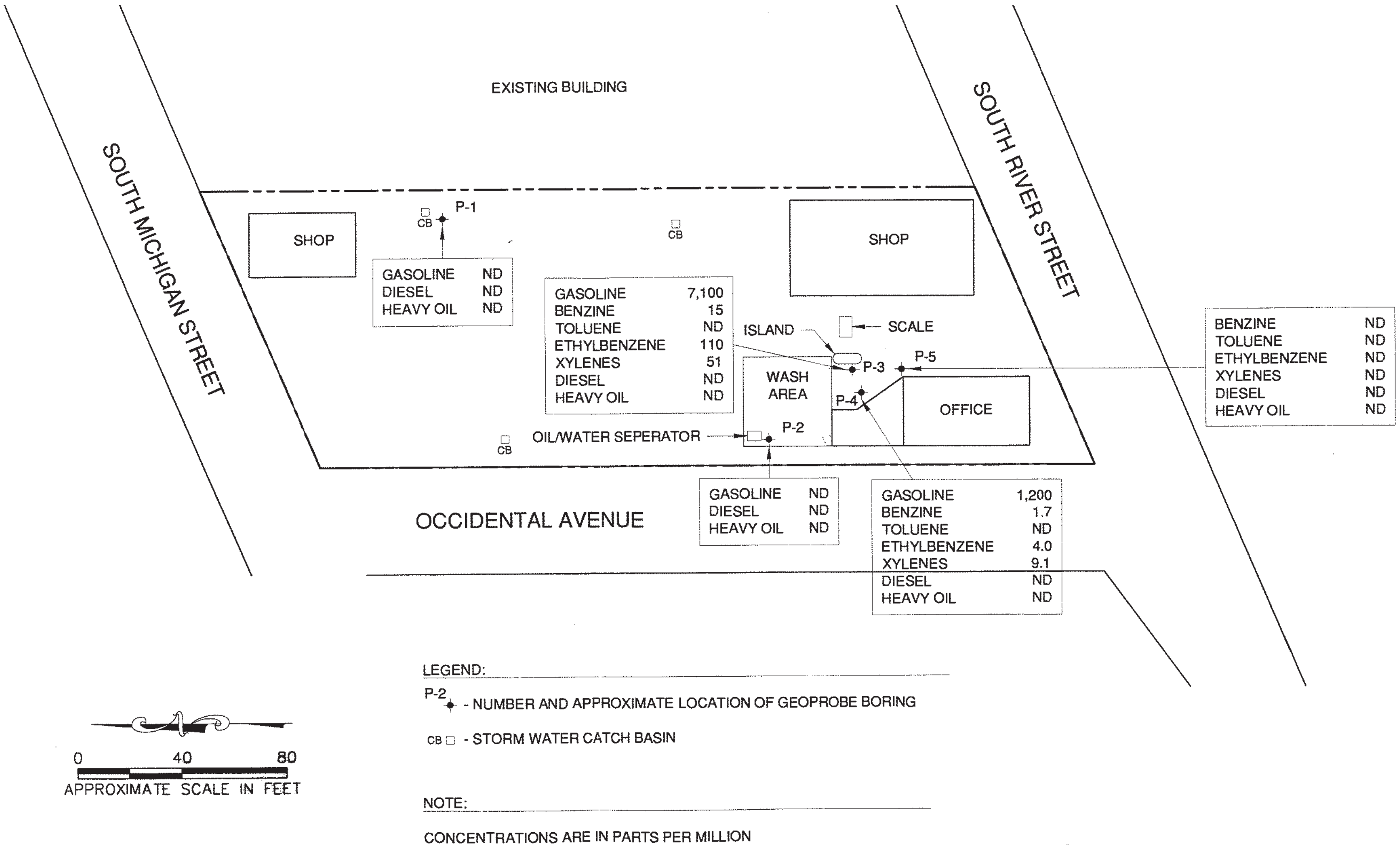
Base Map Reference: LSI Adapt 2002.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 17

PHASE II SITE ASSESSMENT SOIL SAMPLING RESULTS - V. VAN DYKE

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig17



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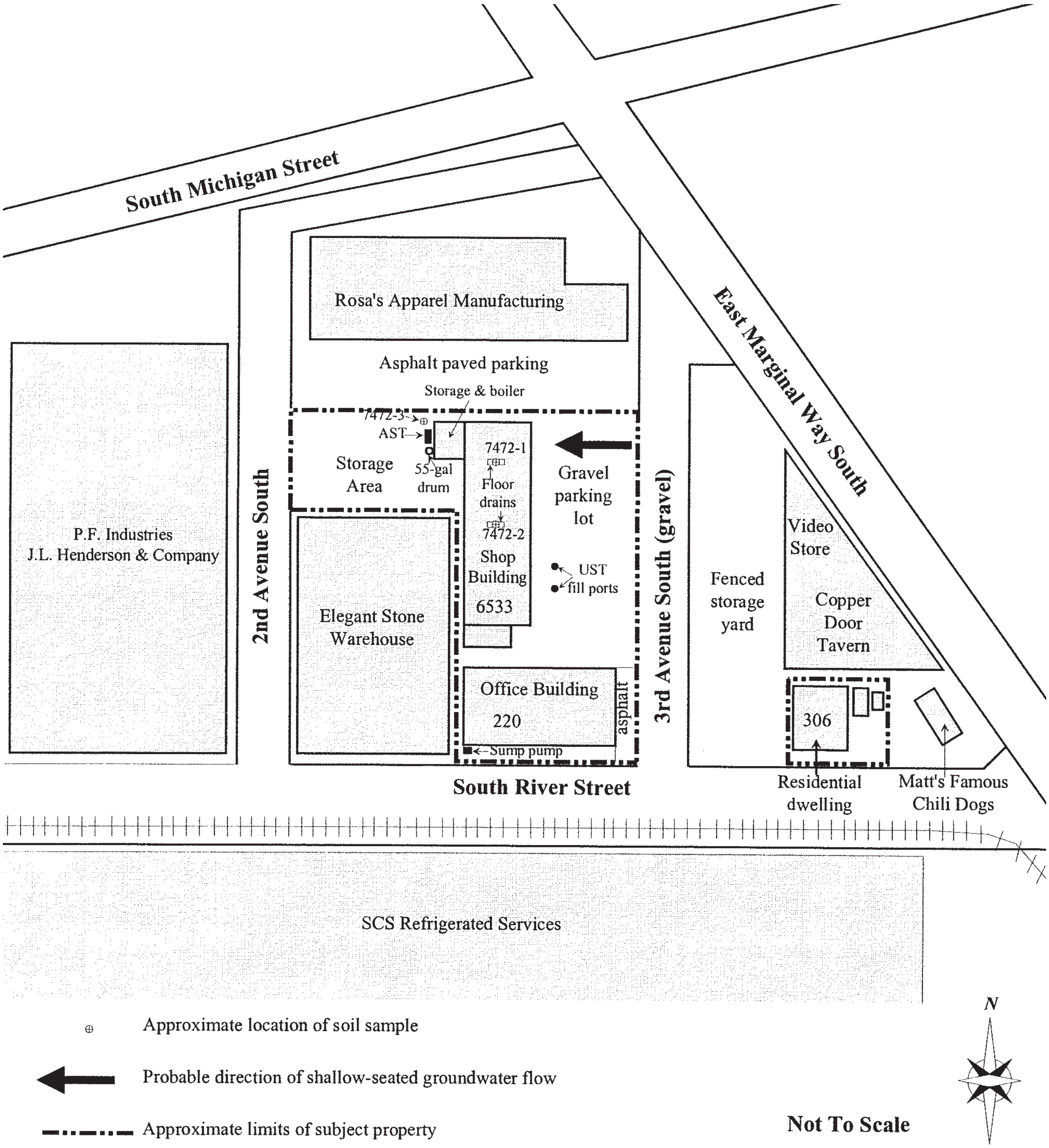
Base Map Reference: LSI Adapt 2002.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 18

PHASE II SITE ASSESSMENT GROUNDWATER SAMPLING RESULTS - V. VAN DYKE

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig18



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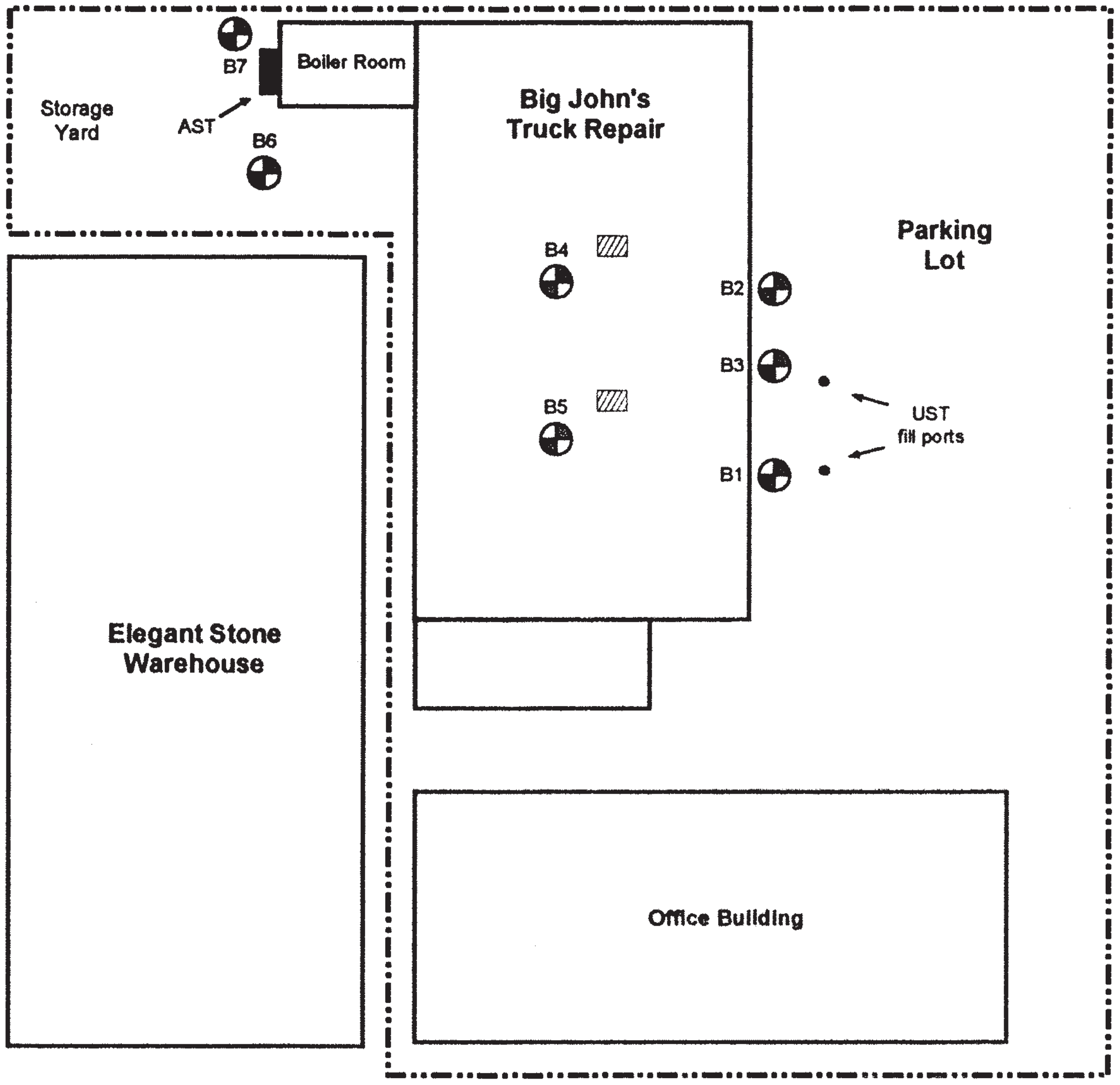
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 19
FACILITY AND PHASE I SITE EXPLORATION MAP - RIVERSIDE INDUSTRIAL PARK
(IN OPERATION AS BIG JOHN'S TRUCK REPAIR)

Base Map Reference:
Environmental Associates, Inc. 1999.

Date:	Drawn by:	
5-21-08	AES	10:002330WD1403\fig 19



Legend:

⊕ Approximate Location of Test Borings.

▨ Approximate Location of Floor Drains.

← Probable Direction of Shallow-Seated Groundwater.

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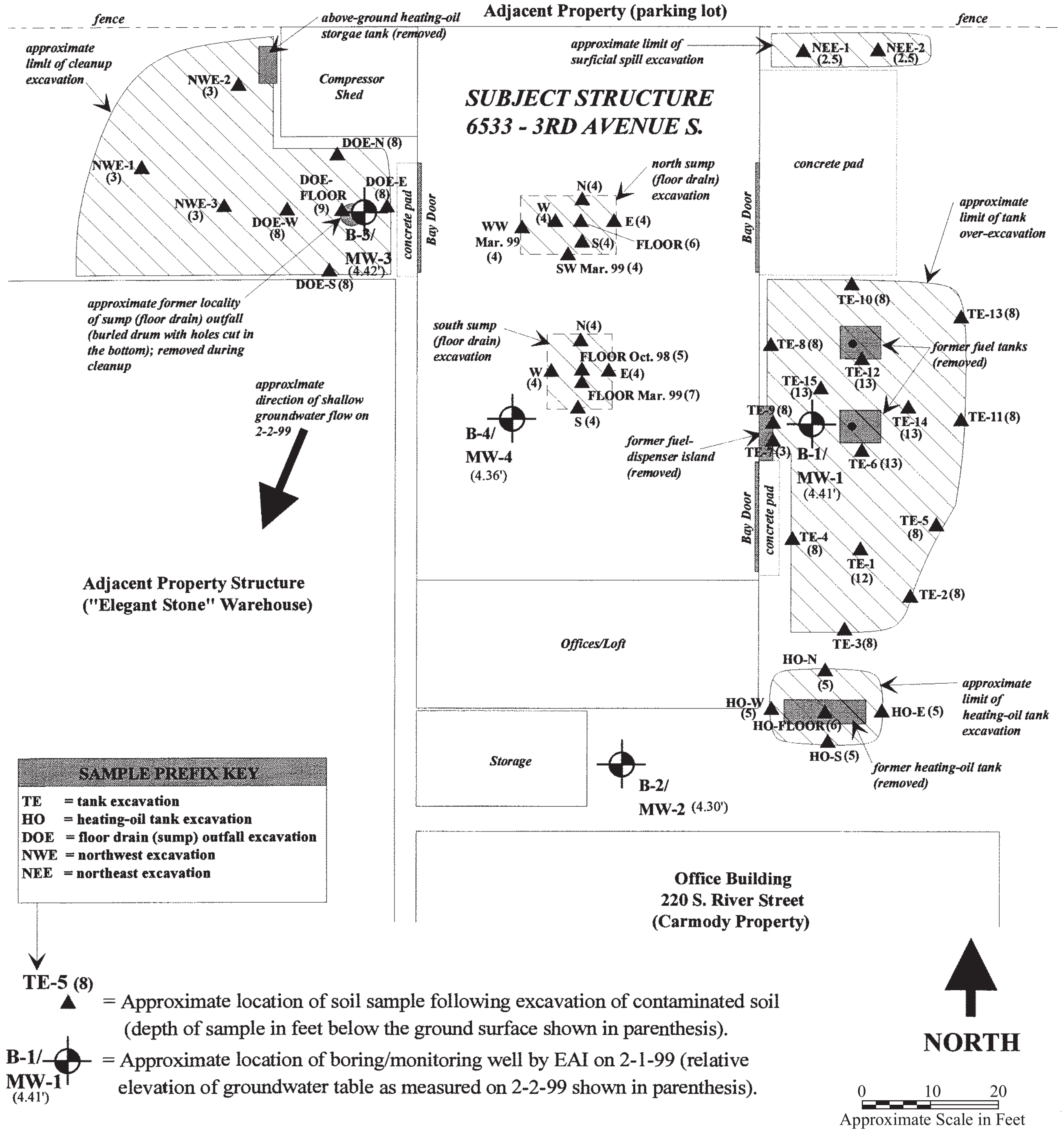
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 20
1998 PHASE II SUBSURFACE EXPLORATION MAP - RIVERSIDE INDUSTRIAL PARK
(IN OPERATION AS BIG JOHN'S TRUCK REPAIR)

Base Map Reference:
Geotech Consultants 1998.

Date:	Drawn by:	
5-21-08	AES	10:002330WD1403\fig 20



SAMPLE PREFIX KEY

TE = tank excavation
HO = heating-oil tank excavation
DOE = floor drain (sump) outfall excavation
NWE = northwest excavation
NEE = northeast excavation

TE-5 (8) ▲ = Approximate location of soil sample following excavation of contaminated soil (depth of sample in feet below the ground surface shown in parenthesis).

B-1/ MW-1 (4.41') = Approximate location of boring/monitoring well by EAI on 2-1-99 (relative elevation of groundwater table as measured on 2-2-99 shown in parenthesis).

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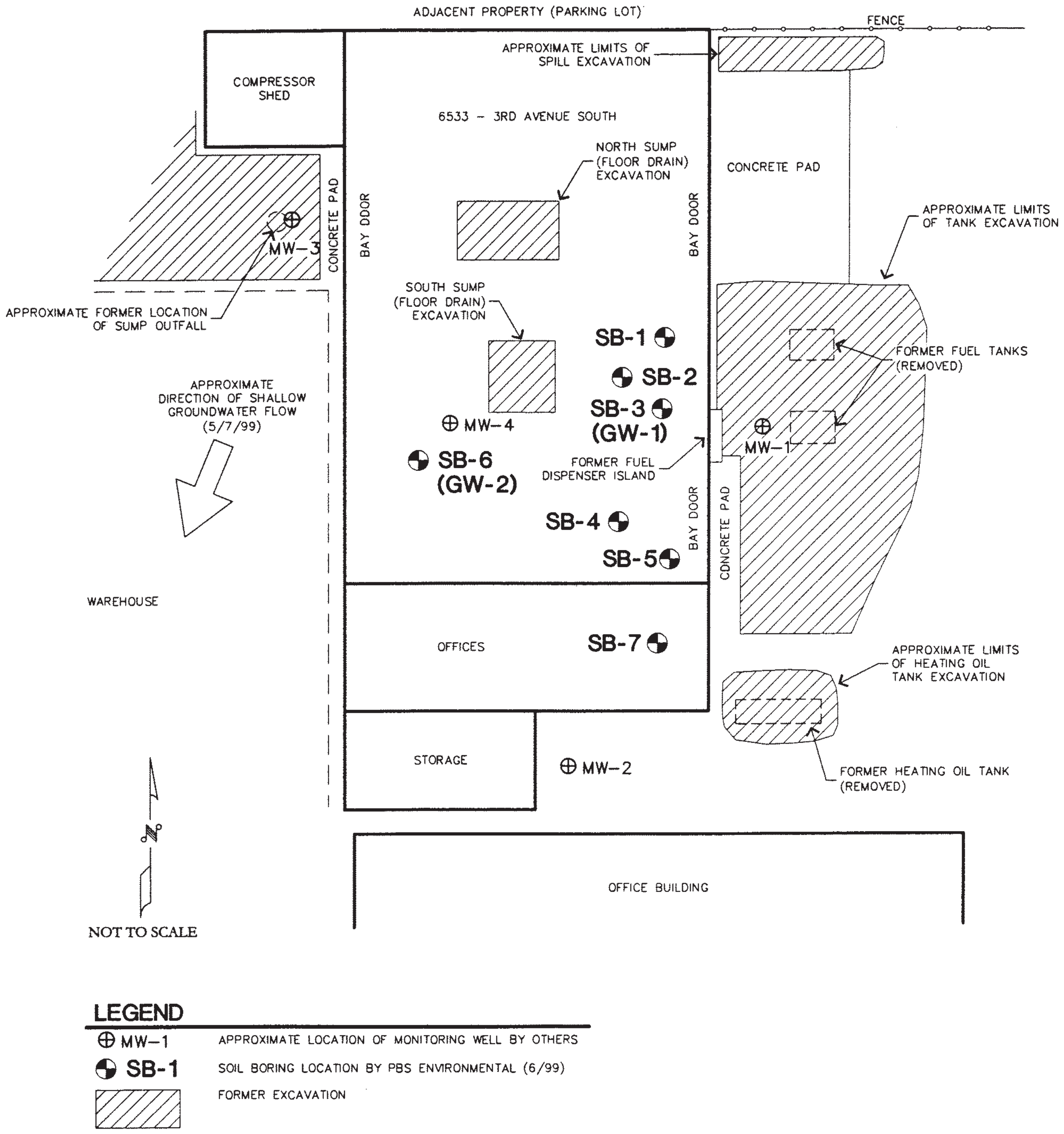
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 21
TANK REMOVAL AND SAMPLING LOCATIONS - RIVERSIDE INDUSTRIAL PARK
(IN OPERATION AS BIG JOHN'S TRUCK REPAIR)

Base Map Reference:
Environmental Associates, Inc. 1999.

Date:	Drawn by:	
5-21-08	AES	10:002330WD1403\fig 21



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LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

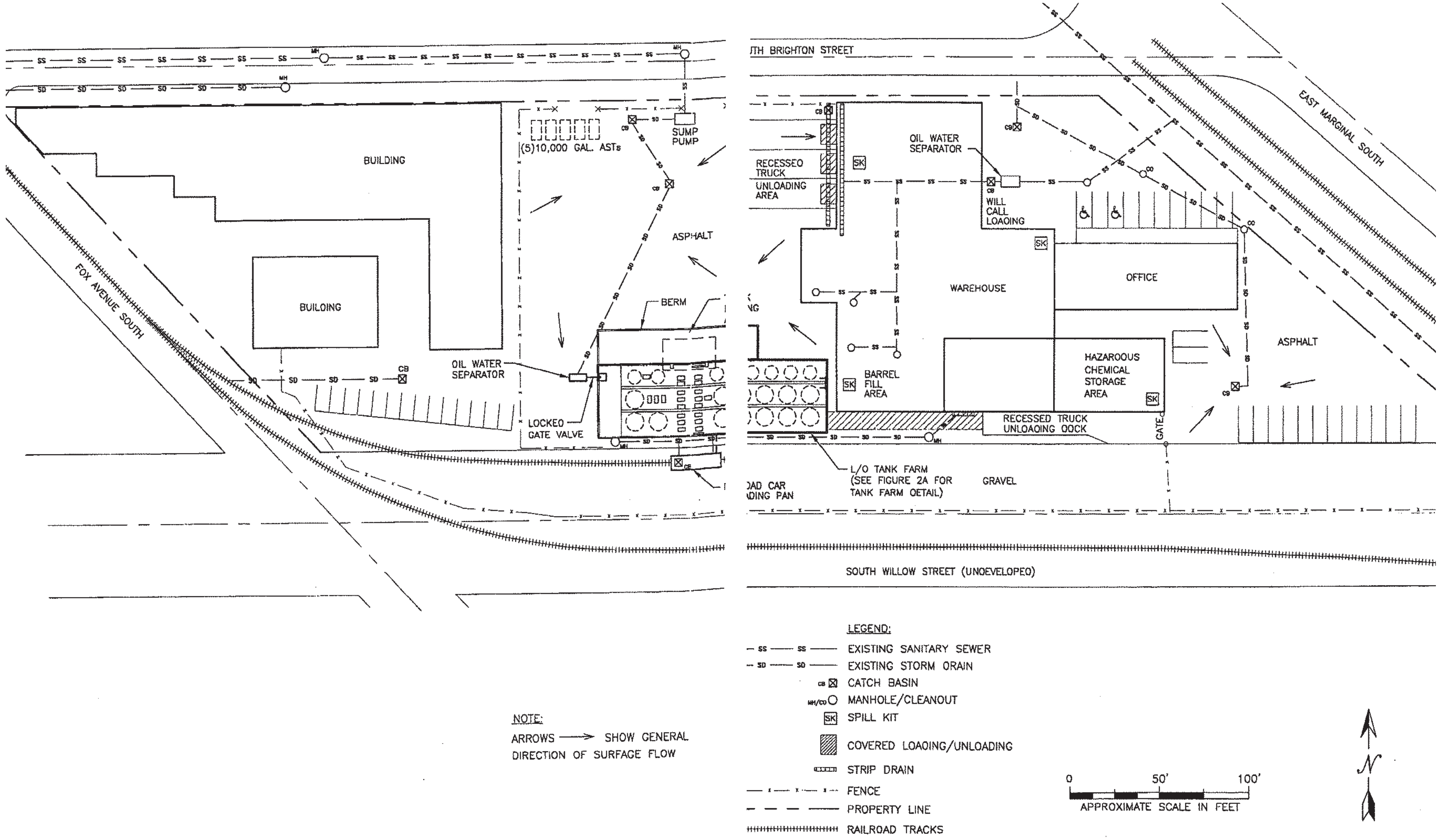
Figure 22
1999 PHASE II SUBSURFACE EXPLORATION MAP - RIVERSIDE INDUSTRIAL PARK
(IN OPERATION AS BIG JOHN'S TRUCK REPAIR)

Base Map Reference:
PBS Environmental 1999.

Date:
5-21-08

Drawn by:
AES

10:002330WD1403\fig 22



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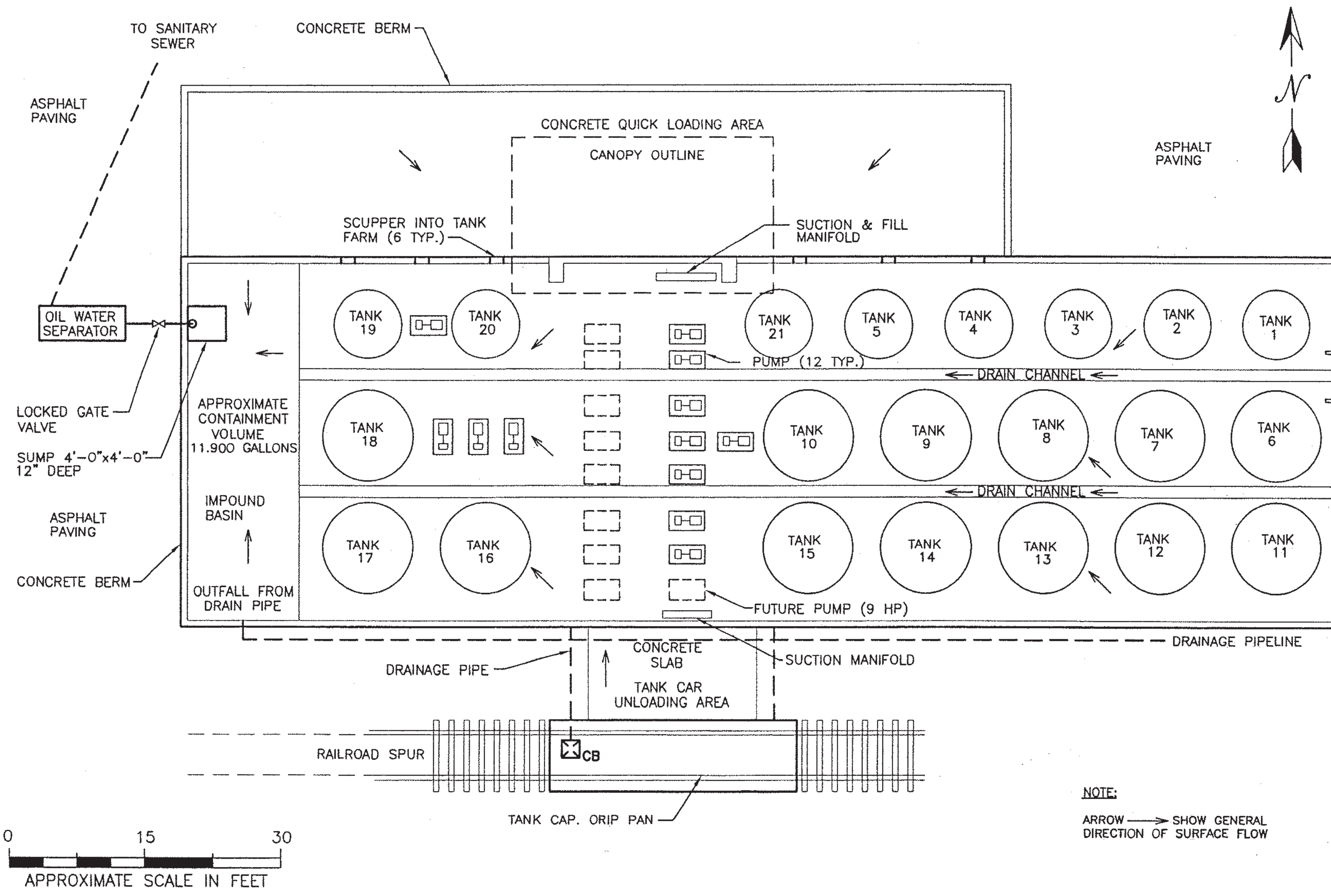
Base Map Reference: EMR Incorporated

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 23

FACILITY MAP AND STORM DRAIN SYSTEM - SHULTZ DISTRIBUTING

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig23



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LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

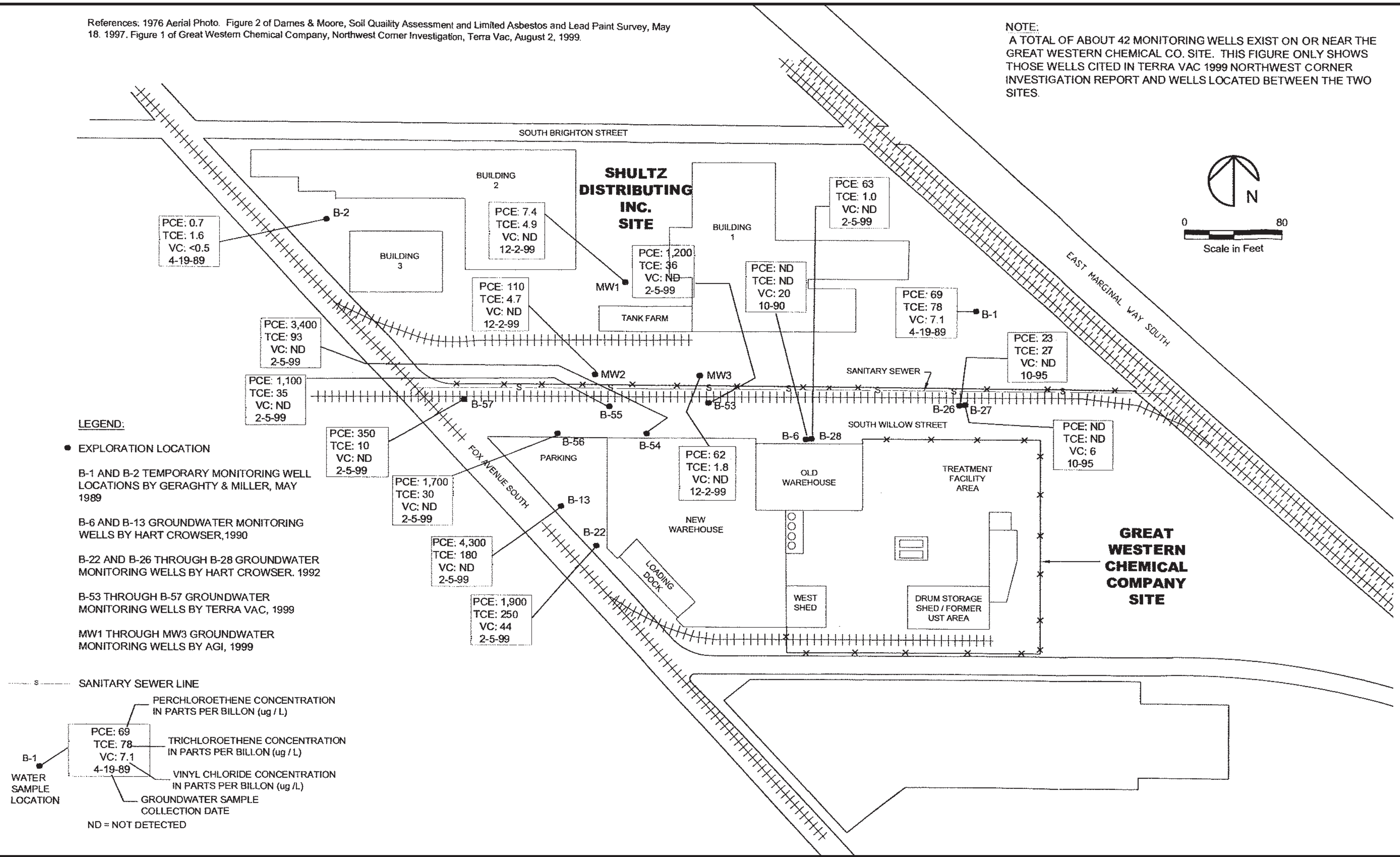
Figure 24
STORM DRAIN SYSTEM AND TANK LOCATIONS - SHULTZ DISTRIBUTING

Base Map Reference: EMR Incorporated

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig24

References: 1976 Aerial Photo. Figure 2 of Dames & Moore, Soil Quality Assessment and Limited Asbestos and Lead Paint Survey, May 18. 1997. Figure 1 of Great Western Chemical Company, Northwest Corner Investigation, Terra Vac, August 2, 1999.

NOTE:
A TOTAL OF ABOUT 42 MONITORING WELLS EXIST ON OR NEAR THE GREAT WESTERN CHEMICAL CO. SITE. THIS FIGURE ONLY SHOWS THOSE WELLS CITED IN TERRA VAC 1999 NORTHWEST CORNER INVESTIGATION REPORT AND WELLS LOCATED BETWEEN THE TWO SITES.



LEGEND:

● EXPLORATION LOCATION

B-1 AND B-2 TEMPORARY MONITORING WELL LOCATIONS BY GERAGHTY & MILLER, MAY 1989

B-6 AND B-13 GROUNDWATER MONITORING WELLS BY HART CROWSER,1990

B-22 AND B-26 THROUGH B-28 GROUNDWATER MONITORING WELLS BY HART CROWSER. 1992

B-53 THROUGH B-57 GROUNDWATER MONITORING WELLS BY TERRA VAC, 1999

MW1 THROUGH MW3 GROUNDWATER MONITORING WELLS BY AGI, 1999

S SANITARY SEWER LINE

PCE: 69 — PERCHLOROETHENE CONCENTRATION IN PARTS PER BILLON (ug / L)

TCE: 78 — TRICHLOROETHENE CONCENTRATION IN PARTS PER BILLON (ug / L)

VC: 7.1 — VINYL CHLORIDE CONCENTRATION IN PARTS PER BILLON (ug /L)

4-19-89 — GROUNDWATER SAMPLE COLLECTION DATE

B-1 — WATER SAMPLE LOCATION

ND = NOT DETECTED

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Base Map Reference: AGI Technologies, 1999.

LOWER DUWAMISH WATERWAY
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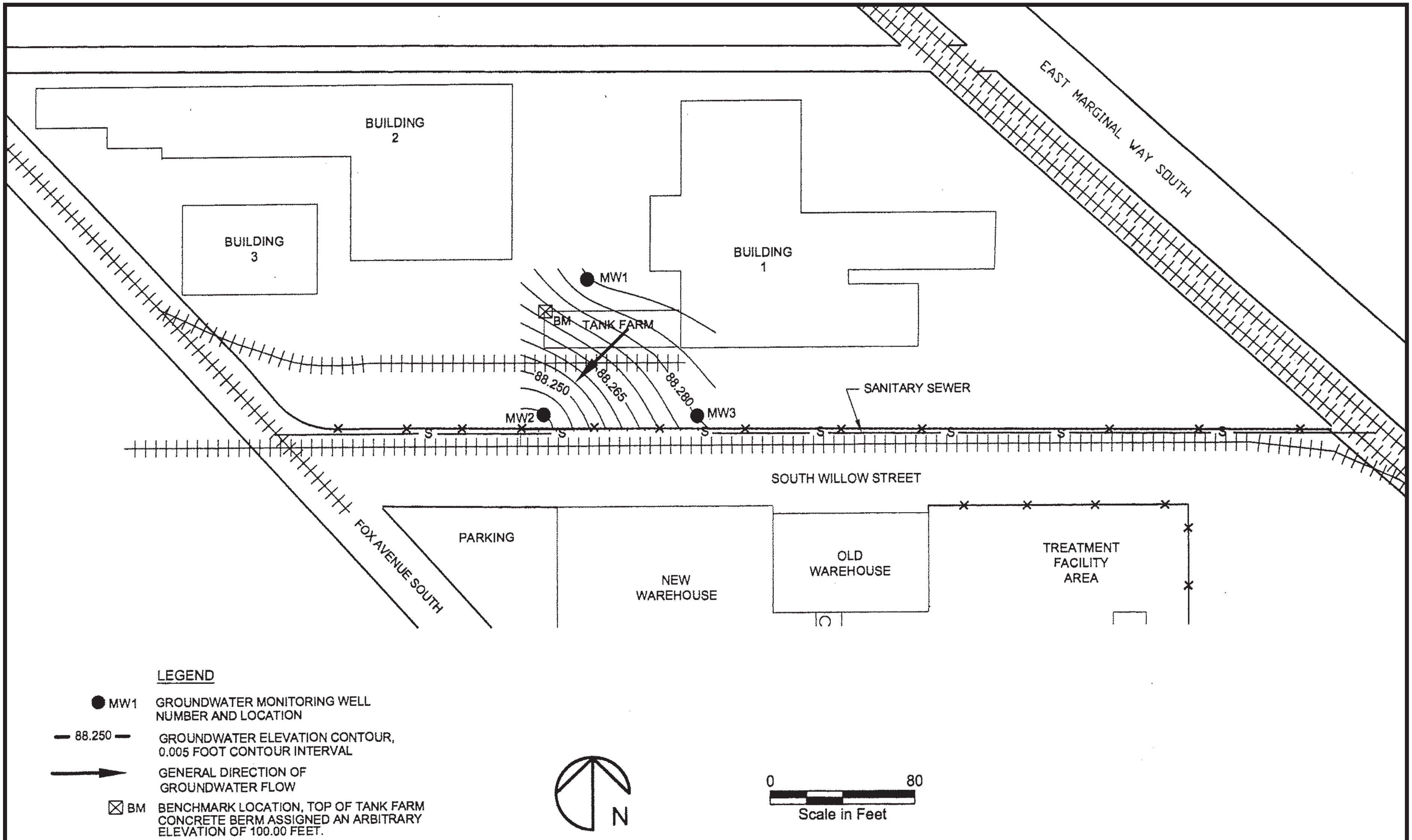
Figure 25

GROUNDWATER CHEMICAL CONCENTRATION MAP - SHULTZ DISTRIBUTING

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig25



LEGEND

● MW1	GROUNDWATER MONITORING WELL NUMBER AND LOCATION
— 88.250 —	GROUNDWATER ELEVATION CONTOUR, 0.005 FOOT CONTOUR INTERVAL
→	GENERAL DIRECTION OF GROUNDWATER FLOW
☒ BM	BENCHMARK LOCATION, TOP OF TANK FARM CONCRETE BERM ASSIGNED AN ARBITRARY ELEVATION OF 100.00 FEET.
—— s ——	SANITARY SEWER LINE

Note:
Contour map generated using Surfer (Win 3.2) version 6.04.

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LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
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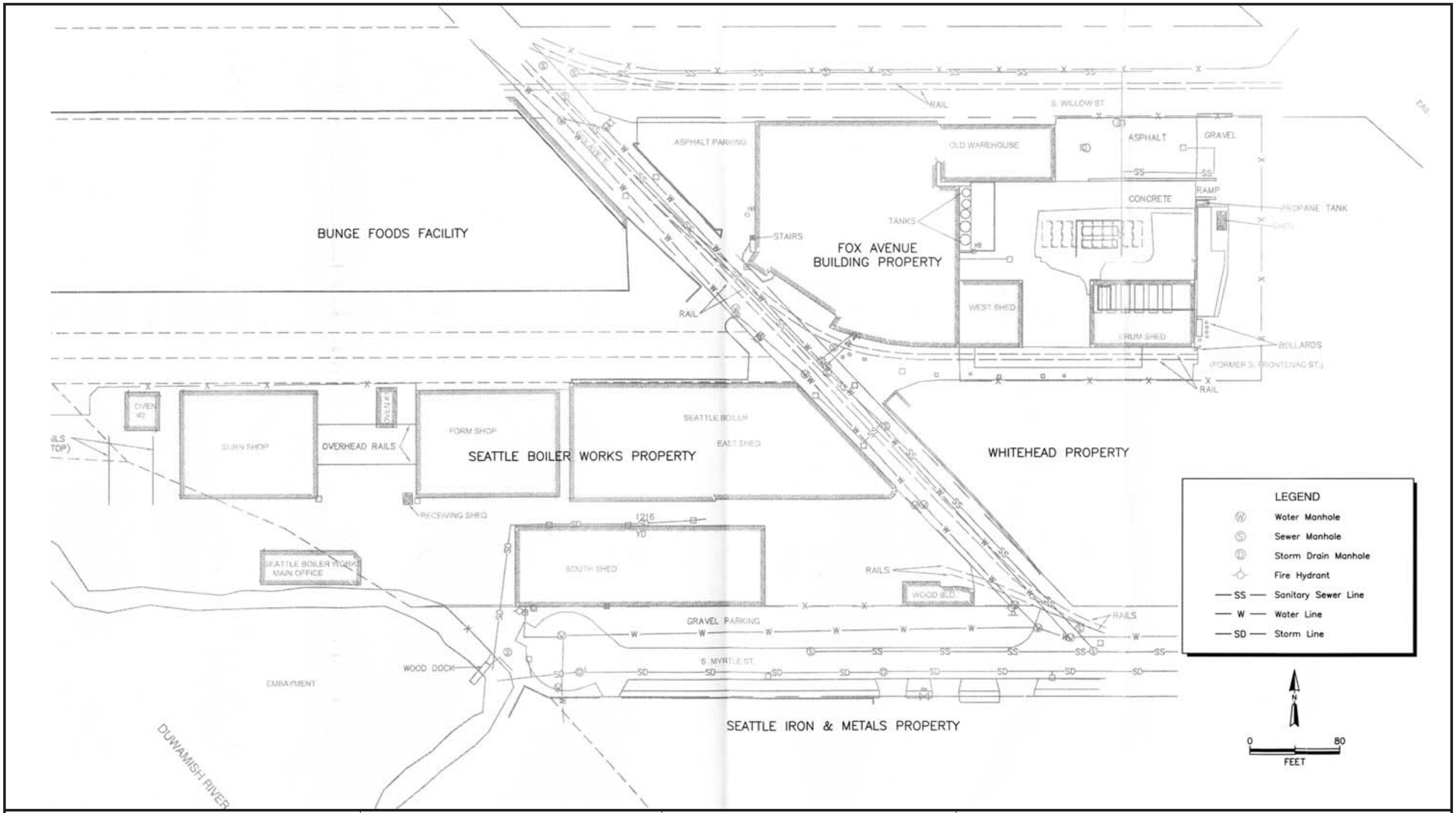
Figure 26
GROUNDWATER ELEVATION CONTOUR MAP
(DECEMBER 1999) - SHULTZ DISTRIBUTING

Base Map Reference: AGI Technologies, 1999.

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig26



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Base Map Reference:
Environmental Resources Management (ERM), 2003.

LOWER DUWAMISH WATERWAY
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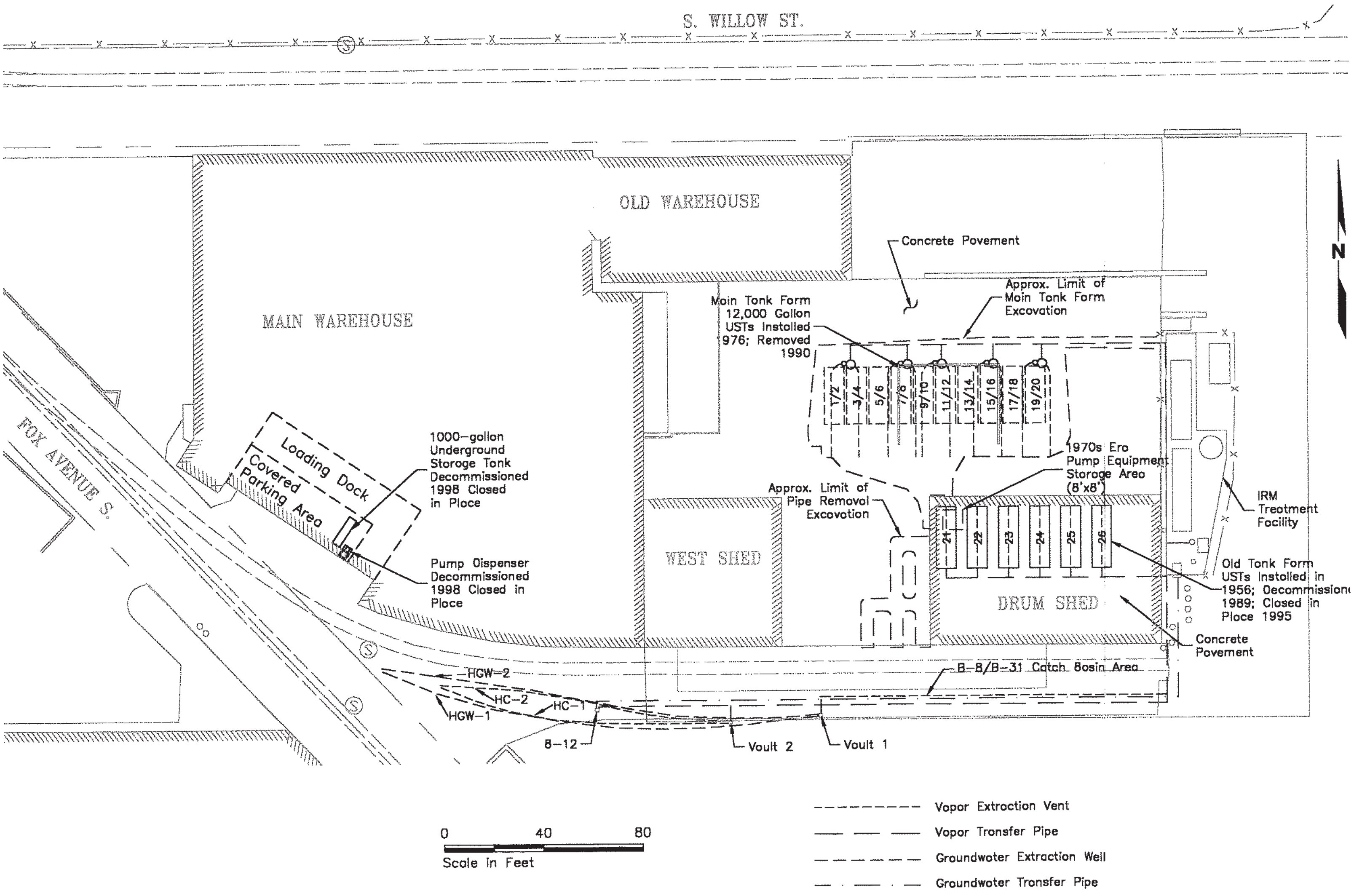
Seattle, Washington

Figure 27

FACILITY MAP - CASCADE COLUMBIA DISTRIBUTION

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig27



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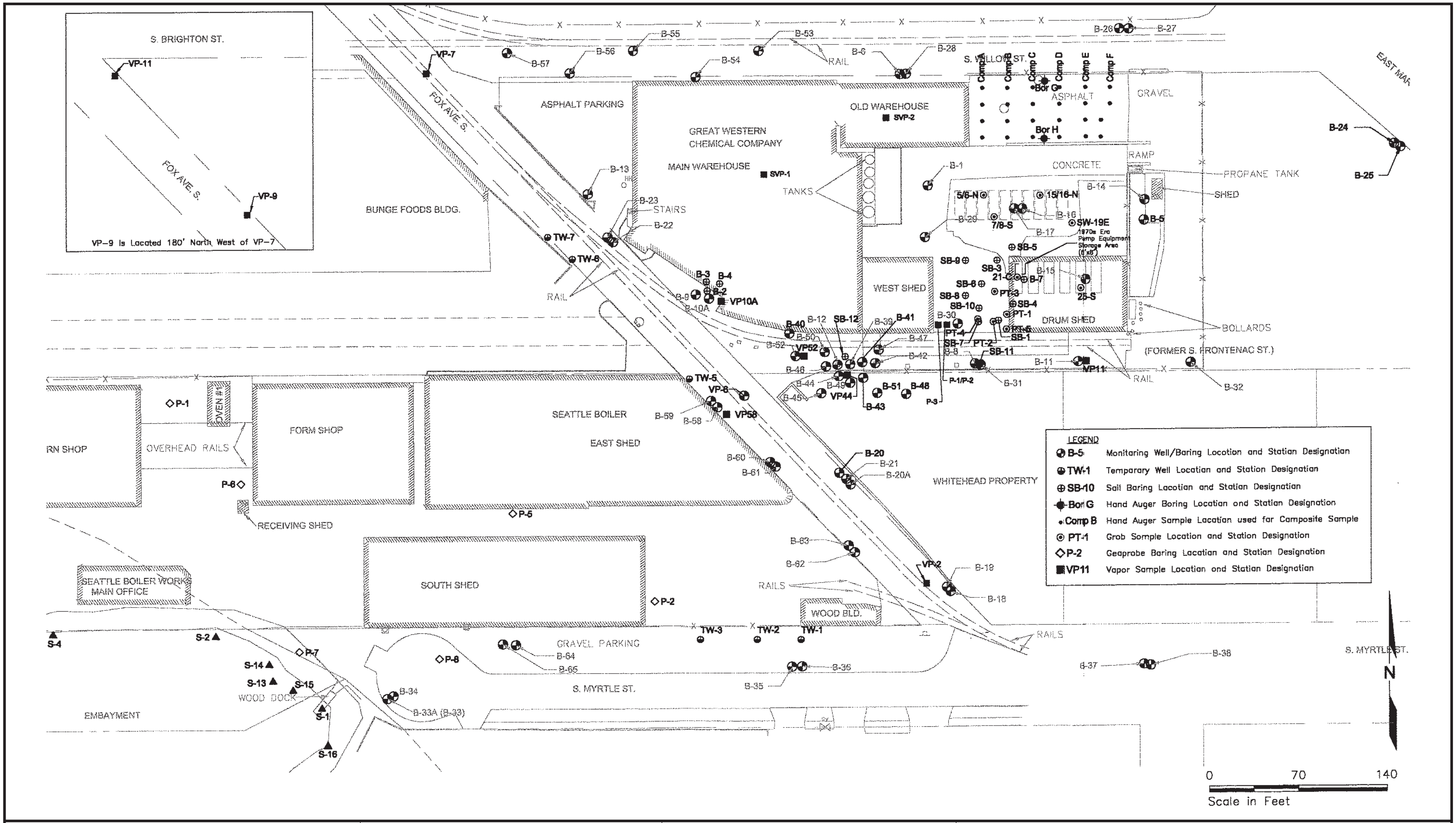
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 28
INTERIM REMEDIAL MEASURES - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig28



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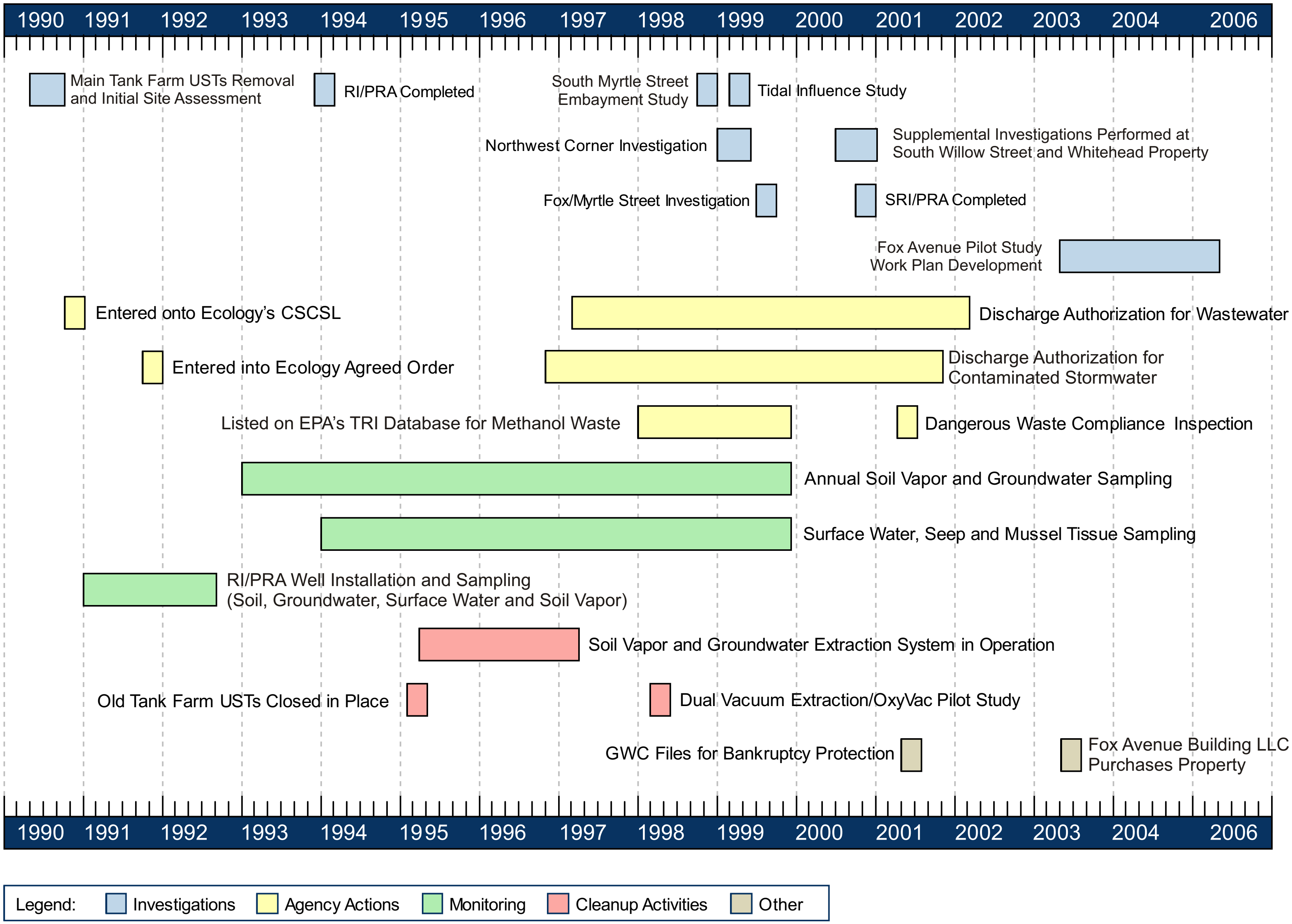
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 29
SOIL SAMPLING, GROUNDWATER MONITORING WELL AND SOIL VAPOR SAMPLING LOCATIONS - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig29



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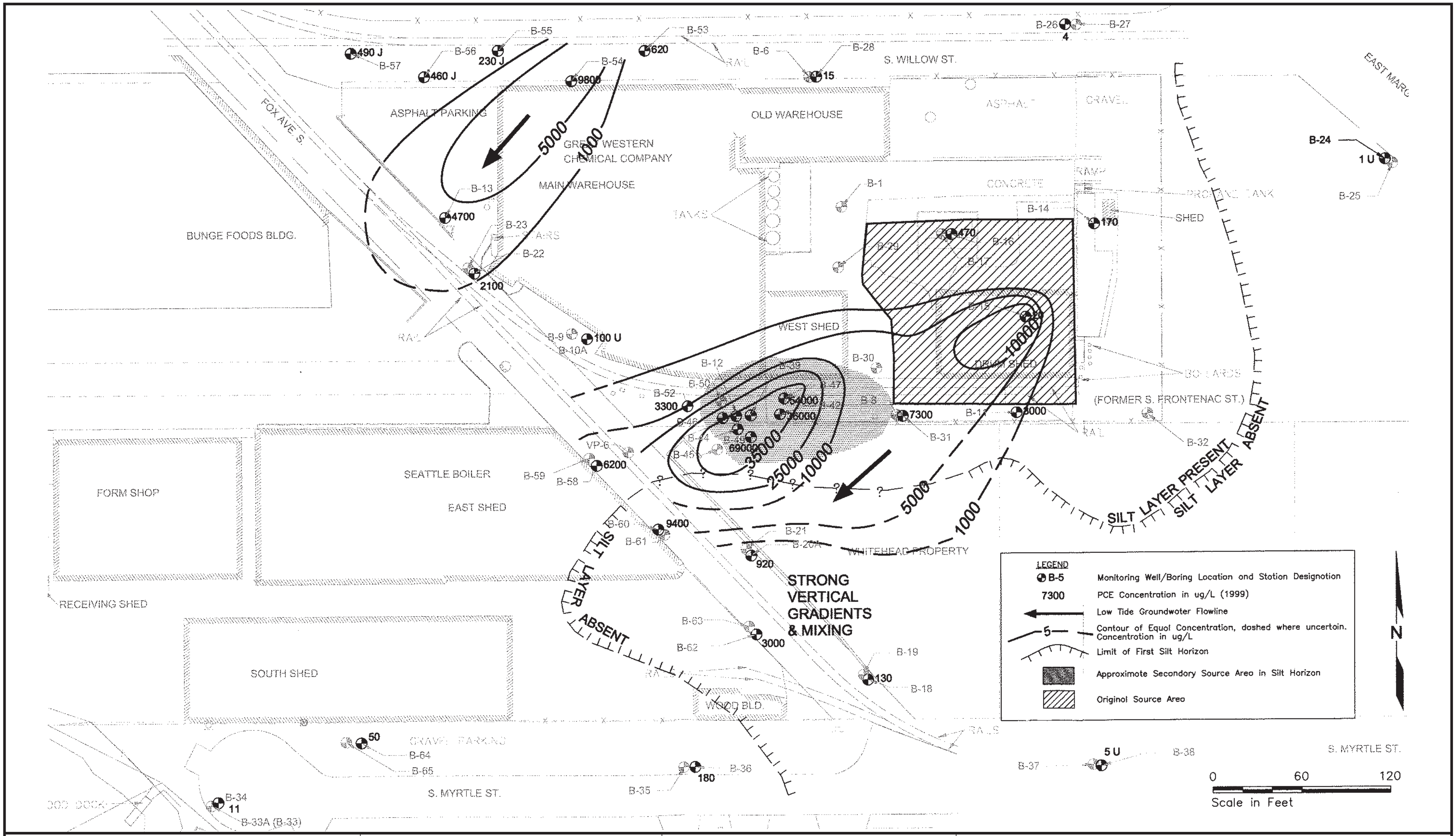
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 30
TIMELINE - CASCADE COLUMBIA
DISTRIBUTION PROPERTY

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig30



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Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
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Figure 31
PCE IN 1st WBZ (1999 SAMPLING EVENT) - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig31

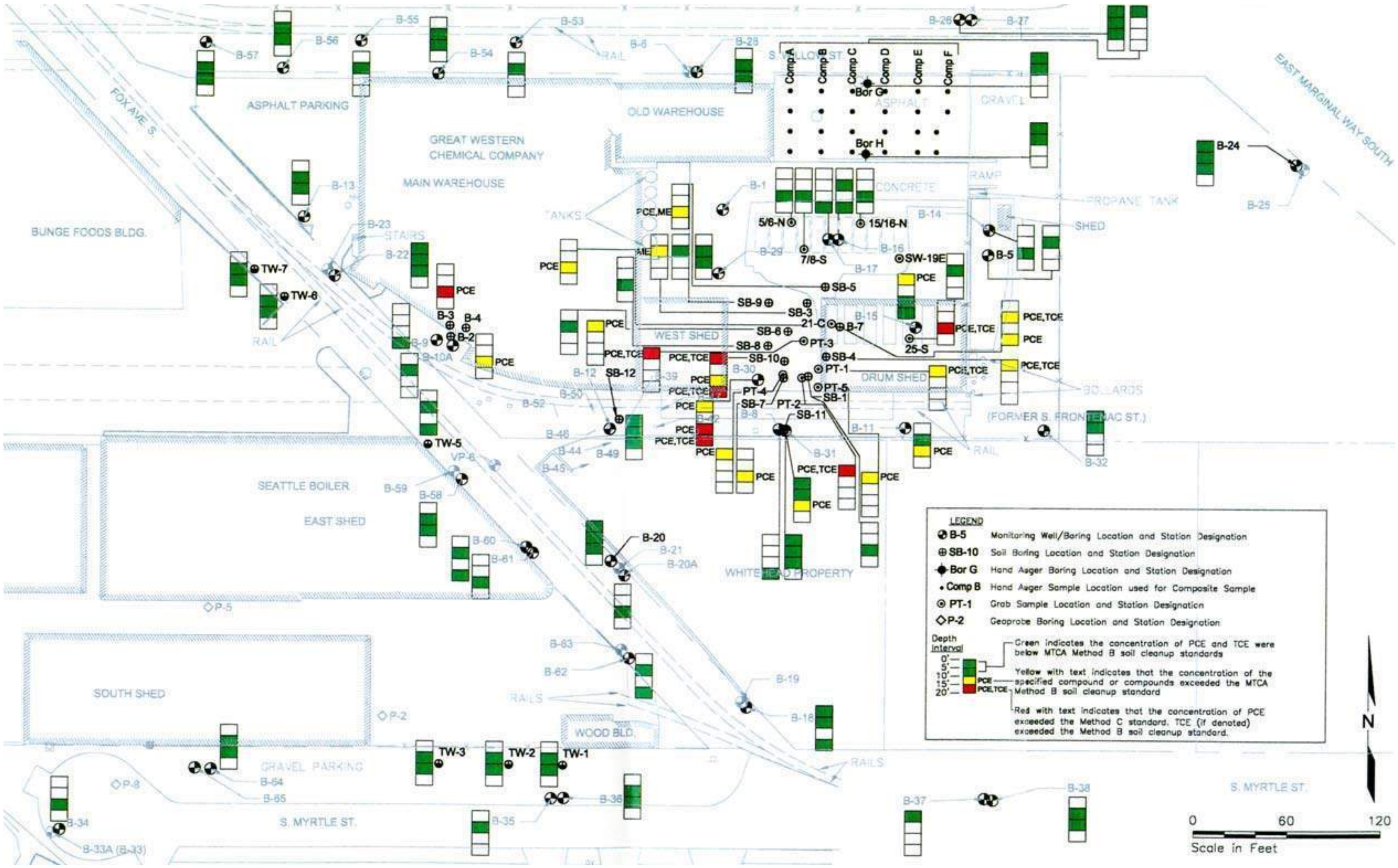

Figure 32

PCE, TCE, AND METHYLENE CHLORIDE RESULTS FOR SOIL - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

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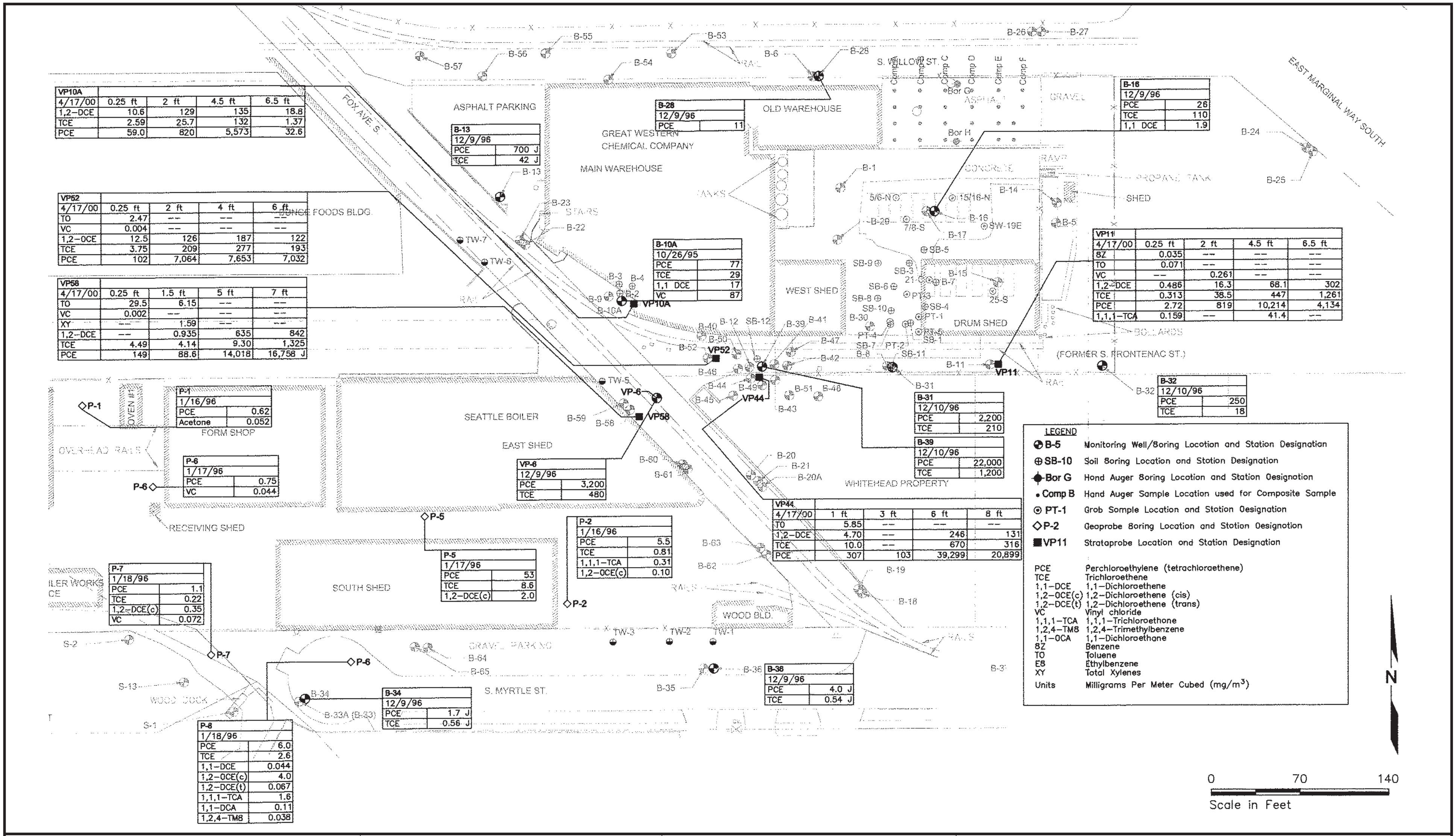
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig32



VP10A				
4/17/00	0.25 ft	2 ft	4.5 ft	6.5 ft
1,2-DCE	10.6	129	135	18.8
TCE	2.59	25.7	132	1.37
PCE	59.0	820	5,573	32.6

VP52				
4/17/00	0.25 ft	2 ft	4 ft	6 ft
TO	2.47	--	--	--
VC	0.004	--	--	--
1,2-DCE	12.5	126	187	122
TCE	3.75	209	277	193
PCE	102	7,064	7,653	7,032

VP58				
4/17/00	0.25 ft	1.5 ft	5 ft	7 ft
TO	29.5	6.15	--	--
VC	0.002	--	--	--
XY	--	1.59	--	--
1,2-DCE	--	0.935	635	842
TCE	4.49	4.14	9.30	1,325
PCE	149	88.6	14,018	16,758 J

B-13	
12/9/96	
PCE	700 J
TCE	42 J

B-28	
12/9/96	
PCE	11

B-16	
12/9/96	
PCE	26
TCE	110
1,1 DCE	1.9

B-10A	
10/26/95	
PCE	77
TCE	29
1,1 DCE	17
VC	87

VP11				
4/17/00	0.25 ft	2 ft	4.5 ft	6.5 ft
BZ	0.035	--	--	--
TO	0.071	--	--	--
VC	--	0.261	--	--
1,2-DCE	0.486	16.3	68.1	302
TCE	0.313	38.5	447	1,261
PCE	2.72	819	10,214	4,134
1,1,1-TCA	0.159	--	41.4	--

P-1	
1/16/96	
PCE	0.62
Acetone	0.052

B-32	
12/10/96	
PCE	250
TCE	18

B-31	
12/10/96	
PCE	2,200
TCE	210

B-39	
12/10/96	
PCE	22,000
TCE	1,200

P-6	
1/17/96	
PCE	0.75
VC	0.044

VP-6	
12/9/96	
PCE	3,200
TCE	480

VP44				
4/17/00	1 ft	3 ft	6 ft	8 ft
TO	5.85	--	--	--
1,2-DCE	4.70	--	246	131
TCE	10.0	--	670	316
PCE	307	103	39,299	20,899

P-2	
1/16/96	
PCE	5.5
TCE	0.81
1,1,1-TCA	0.31
1,2-DCE(c)	0.10

P-5	
1/17/96	
PCE	53
TCE	8.6
1,2-DCE(c)	2.0

P-7	
1/18/96	
PCE	1.1
TCE	0.22
1,2-DCE(c)	0.35
VC	0.072

B-36	
12/9/96	
PCE	4.0 J
TCE	0.54 J

B-34	
12/9/96	
PCE	1.7 J
TCE	0.56 J

P-8	
1/18/96	
PCE	6.0
TCE	2.6
1,1-DCE	0.044
1,2-DCE(c)	4.0
1,2-DCE(t)	0.067
1,1,1-TCA	1.6
1,1-DCA	0.11
1,2,4-TMB	0.038

LEGEND

B-5	Monitoring Well/Boring Location and Station Designation
⊕SB-10	Soil Boring Location and Station Designation
Bor G	Hand Auger Boring Location and Station Designation
• Comp B	Hand Auger Sample Location used for Composite Sample
⊙ PT-1	Grab Sample Location and Station Designation
◇P-2	Geoprobe Boring Location and Station Designation
■VP11	Strataprobe Location and Station Designation

PCE	Perchloroethylene (tetrachloroethene)
TCE	Trichloroethene
1,1-DCE	1,1-Dichloroethene
1,2-DCE(c)	1,2-Dichloroethene (cis)
1,2-DCE(t)	1,2-Dichloroethene (trans)
VC	Vinyl chloride
1,1,1-TCA	1,1,1-Trichloroethane
1,2,4-TMB	1,2,4-Trimethylbenzene
1,1-DCA	1,1-Dichloroethane
BZ	Benzene
TO	Toluene
EB	Ethylbenzene
XY	Total Xylenes
Units	Milligrams Per Meter Cubed (mg/m^3)

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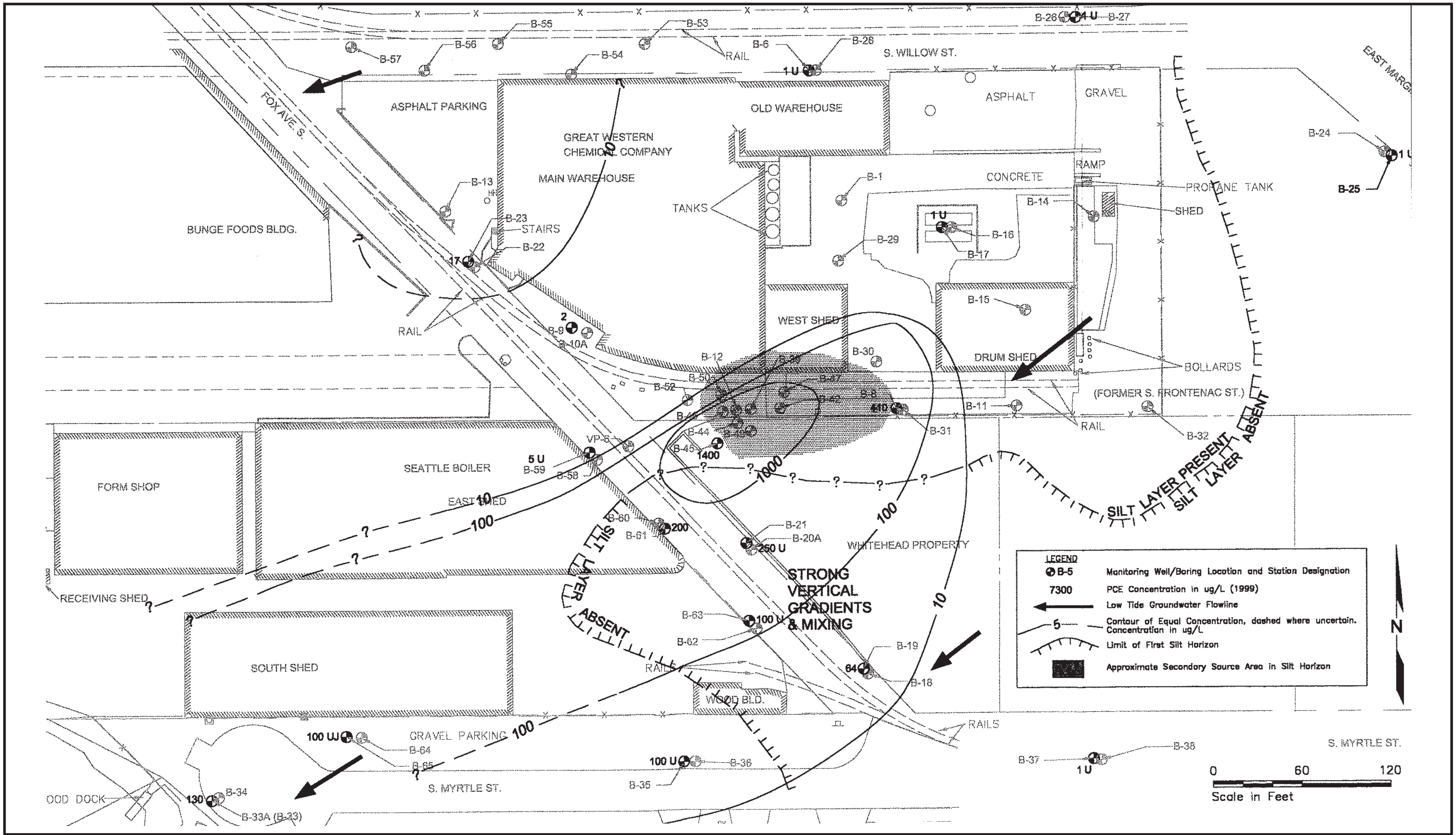
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 33

SOIL VAPOR RESULTS - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig33



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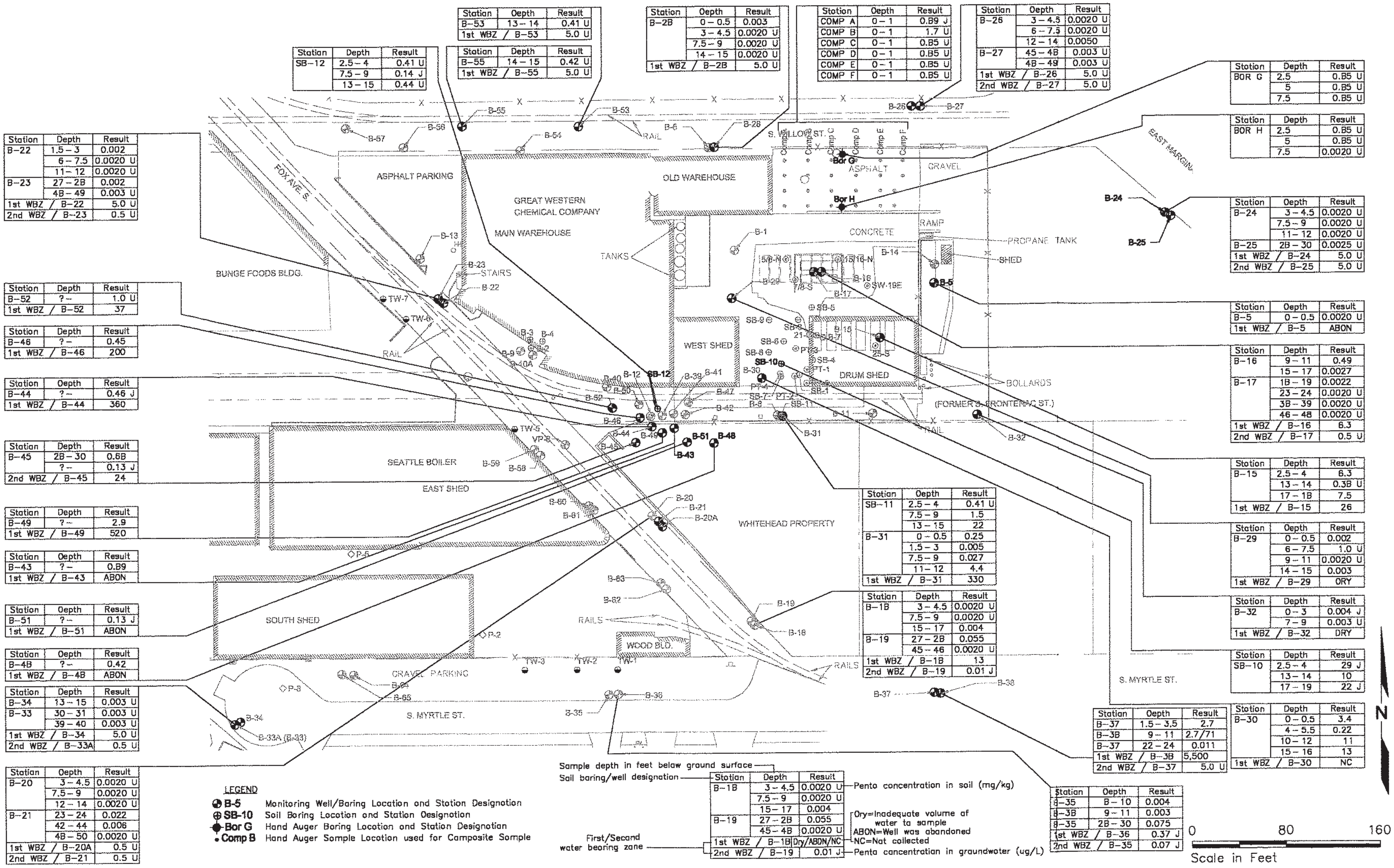
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 34
PCE IN 2nd WBZ (1999 SAMPLING EVENT) - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig34



Station	Depth	Result
SB-12	2.5 – 4	0.41 U
	7.5 – 9	0.14 J
	13 – 15	0.44 U

Station	Depth	Result
B-53	13 – 14	0.41 U
1st WBZ / B-53		5.0 U

Station	Depth	Result
B-55	14 – 15	0.42 U
1st WBZ / B-55		5.0 U

Station	Depth	Result
B-28	0 – 0.5	0.003
	3 – 4.5	0.0020 U
	7.5 – 9	0.0020 U
	14 – 15	0.0020 U
1st WBZ / B-28		5.0 U

Station	Depth	Result
COMP A	0 – 1	0.89 J
COMP B	0 – 1	1.7 U
COMP C	0 – 1	0.85 U
COMP D	0 – 1	0.85 U
COMP E	0 – 1	0.85 U
COMP F	0 – 1	0.85 U

Station	Depth	Result
B-26	3 – 4.5	0.0020 U
	6 – 7.5	0.0020 U
	12 – 14	0.0050
B-27	45 – 48	0.003 U
	48 – 49	0.003 U
1st WBZ / B-26		5.0 U
2nd WBZ / B-27		5.0 U

Station	Depth	Result
BOR G	2.5	0.85 U
	5	0.85 U
	7.5	0.85 U

Station	Depth	Result
BOR H	2.5	0.85 U
	5	0.85 U
	7.5	0.0020 U

Station	Depth	Result
B-22	1.5 – 3	0.002
	6 – 7.5	0.0020 U
	11 – 12	0.0020 U
B-23	27 – 28	0.002
	48 – 49	0.003 U
1st WBZ / B-22		5.0 U
2nd WBZ / B-23		0.5 U

Station	Depth	Result
B-24	3 – 4.5	0.0020 U
	7.5 – 9	0.0020 U
	11 – 12	0.0020 U
B-25	28 – 30	0.0025 U
1st WBZ / B-24		5.0 U
2nd WBZ / B-25		5.0 U

Station	Depth	Result
B-52	? –	1.0 U
1st WBZ / B-52		37

Station	Depth	Result
B-5	0 – 0.5	0.0020 U
1st WBZ / B-5		ABON

Station	Depth	Result
B-46	? –	0.45
1st WBZ / B-46		200

Station	Depth	Result
B-16	9 – 11	0.49
	15 – 17	0.0027
B-17	18 – 19	0.0022
	23 – 24	0.0020 U
	38 – 39	0.0020 U
	46 – 48	0.0020 U
1st WBZ / B-16		6.3
2nd WBZ / B-17		0.5 U

Station	Depth	Result
B-44	? –	0.46 J
1st WBZ / B-44		360

Station	Depth	Result
B-45	28 – 30	0.68
	? –	0.13 J
2nd WBZ / B-45		24

Station	Depth	Result
B-15	2.5 – 4	6.3
	13 – 14	0.38 U
	17 – 18	7.5
1st WBZ / B-15		26

Station	Depth	Result
SB-11	2.5 – 4	0.41 U
	7.5 – 9	1.5
	13 – 15	22
B-31	0 – 0.5	0.25
	1.5 – 3	0.005
	7.5 – 9	0.027
	11 – 12	4.4
1st WBZ / B-31		330

Station	Depth	Result
B-49	? –	2.9
1st WBZ / B-49		520

Station	Depth	Result
B-29	0 – 0.5	0.002
	6 – 7.5	1.0 U
	9 – 11	0.0020 U
	14 – 15	0.003
1st WBZ / B-29		DRY

Station	Depth	Result
B-43	? –	0.89
1st WBZ / B-43		ABON

Station	Depth	Result
B-18	3 – 4.5	0.0020 U
	7.5 – 9	0.0020 U
	15 – 17	0.004
B-19	27 – 28	0.055
	45 – 46	0.0020 U
1st WBZ / B-18		13
2nd WBZ / B-19		0.01 J

Station	Depth	Result
B-32	0 – 3	0.004 J
	7 – 9	0.003 U
1st WBZ / B-32		DRY

Station	Depth	Result
B-51	? –	0.13 J
1st WBZ / B-51		ABON

Station	Depth	Result
B-48	? –	0.42
1st WBZ / B-48		ABON

Station	Depth	Result
SB-10	2.5 – 4	29 J
	13 – 14	10
	17 – 19	22 J

Station	Depth	Result
B-34	13 – 15	0.003 U
B-33	30 – 31	0.003 U
	39 – 40	0.003 U
1st WBZ / B-34		5.0 U
2nd WBZ / B-33A		0.5 U

Station	Depth	Result
B-37	1.5 – 3.5	2.7
B-38	9 – 11	2.7/71
B-37	22 – 24	0.011
1st WBZ / B-38		5,500
2nd WBZ / B-37		5.0 U

Station	Depth	Result
B-30	0 – 0.5	3.4
	4 – 5.5	0.22
	10 – 12	11
	15 – 16	13
1st WBZ / B-30		NC

Station	Depth	Result
B-20	3 – 4.5	0.0020 U
	7.5 – 9	0.0020 U
	12 – 14	0.0020 U
B-21	23 – 24	0.022
	42 – 44	0.006
	48 – 50	0.0020 U
1st WBZ / B-20A		0.5 U
2nd WBZ / B-21		0.5 U

Station	Depth	Result
B-35	8 – 10	0.004
B-38	9 – 11	0.003
B-35	28 – 30	0.075
1st WBZ / B-36		0.37 J
2nd WBZ / B-35		0.07 J

LEGEND

- B-5 Monitoring Well/Boring Location and Station Designation
- SB-10 Soil Boring Location and Station Designation
- Bor G Hand Auger Boring Location and Station Designation
- Comp B Hand Auger Sample Location used for Composite Sample

Sample depth in feet below ground surface
Soil boring/well designation
First/Second water bearing zone

Station	Depth	Result
B-18	3 – 4.5	0.0020 U
	7.5 – 9	0.0020 U
	15 – 17	0.004
B-19	27 – 28	0.055
	45 – 48	0.0020 U
1st WBZ / B-18		Dry/ABON/NC
2nd WBZ / B-19		0.01 J

Pento concentration in soil (mg/kg)
Dry=Inadequate volume of water to sample
ABON=Well was abandoned
NC=Not collected
Penta concentration in groundwater (ug/L)

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LOWER DUWAMISH WATERWAY
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Figure 35

PENTA RESULTS FOR SOIL - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date: 5/21/08
Drawn by: AES
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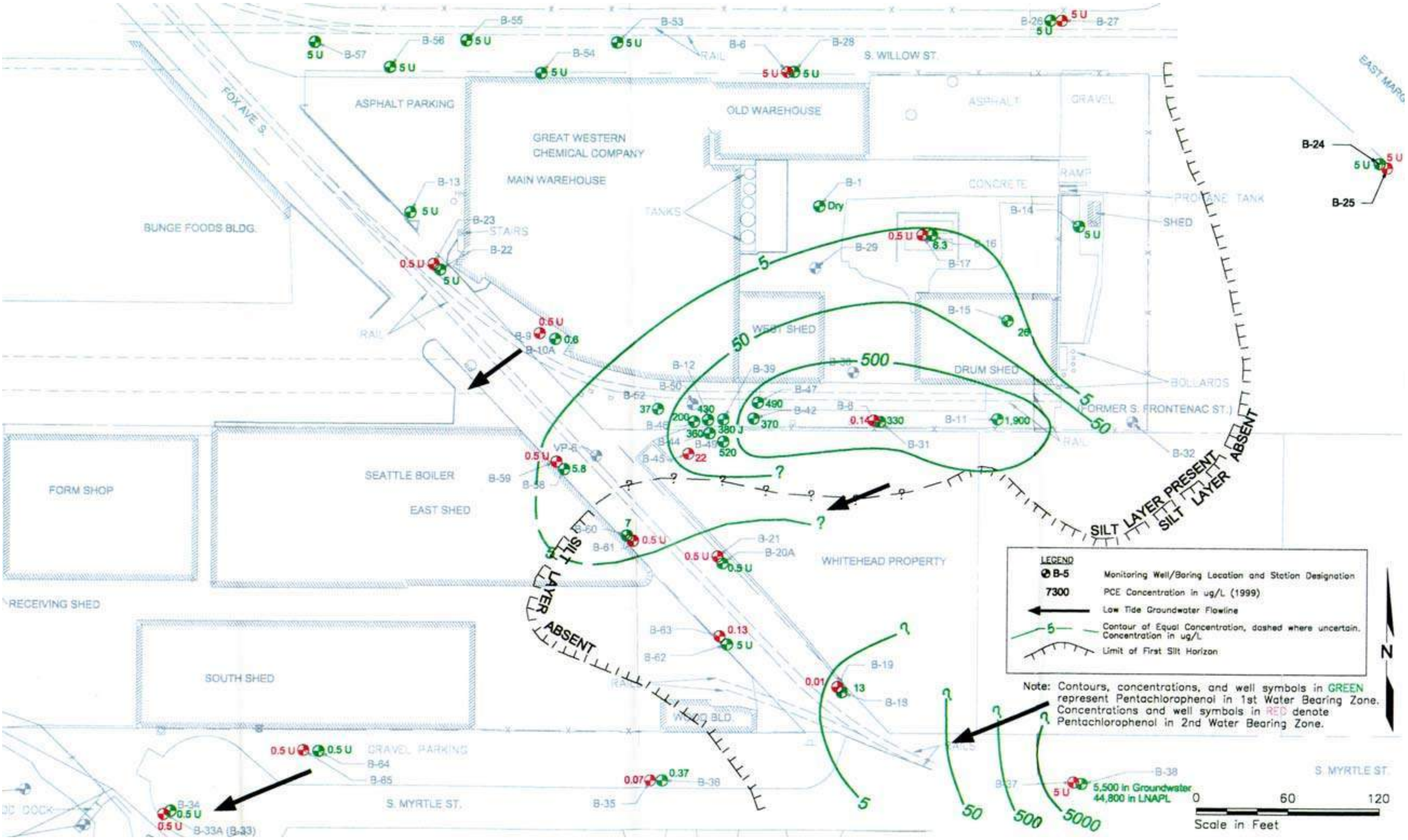
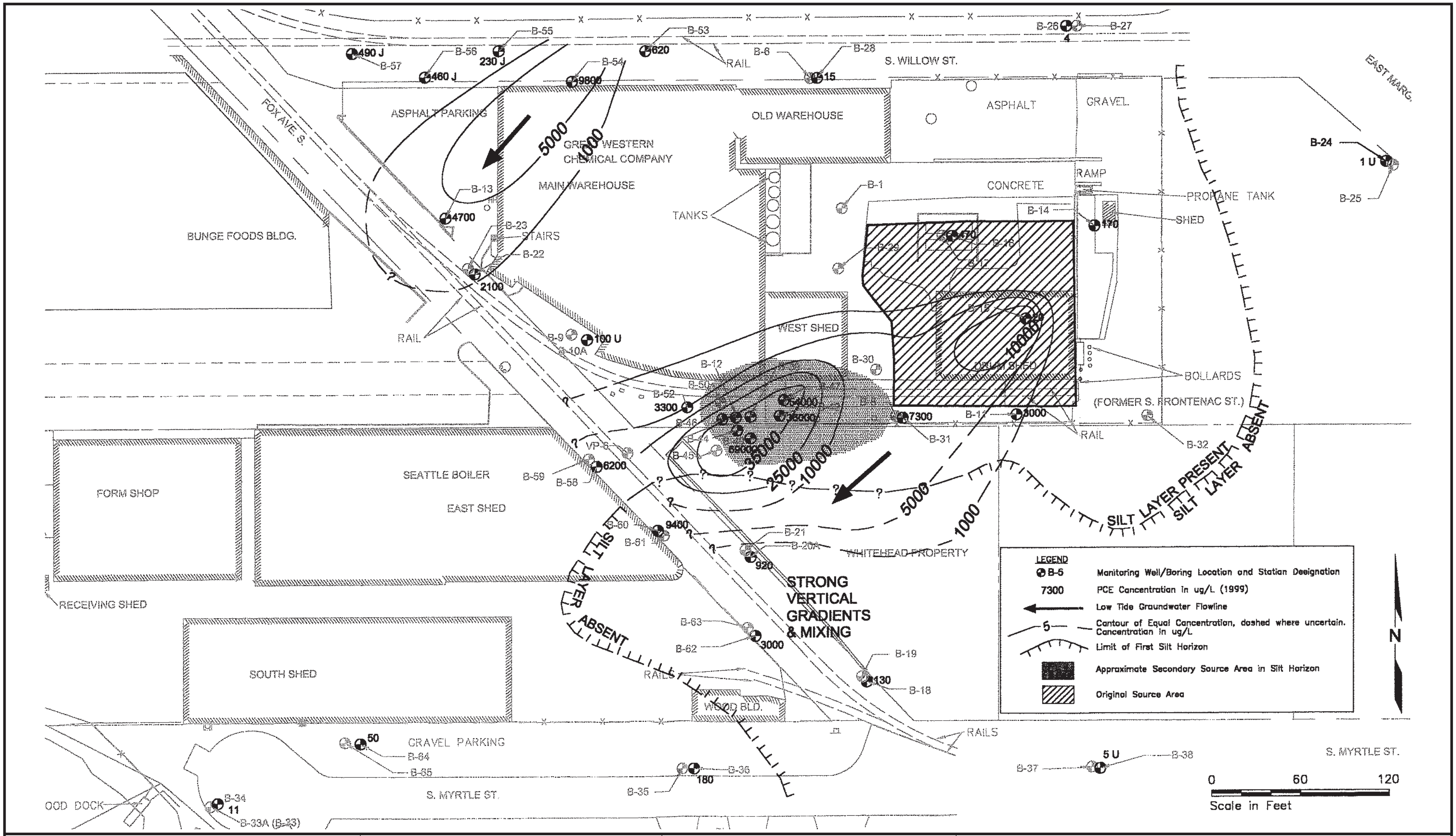


Note: Contours, concentrations, and well symbols in GREEN represent Pentachlorophenol in 1st Water Bearing Zone. Concentrations and well symbols in RED denote Pentachlorophenol in 2nd Water Bearing Zone.

ecology and environment, inc. International Specialists in the Environment Seattle, Washington	**Base Map Reference:** Floyd & Snider Inc. 2000.	LOWER DUWAMISH WATERWAY RM 2.0-2.3 EAST Seattle, Washington	Figure 36 PENTA IN 1st AND 2nd WBZ (1999 SAMPLING EVENT) - CASCADE COLUMBIA DISTRIBUTION (IN OPERATION AS GREAT WESTERN CHEMICAL)
			Date: 5/21/08 · Drawn by: AES · 10:002330WD1403\fig36



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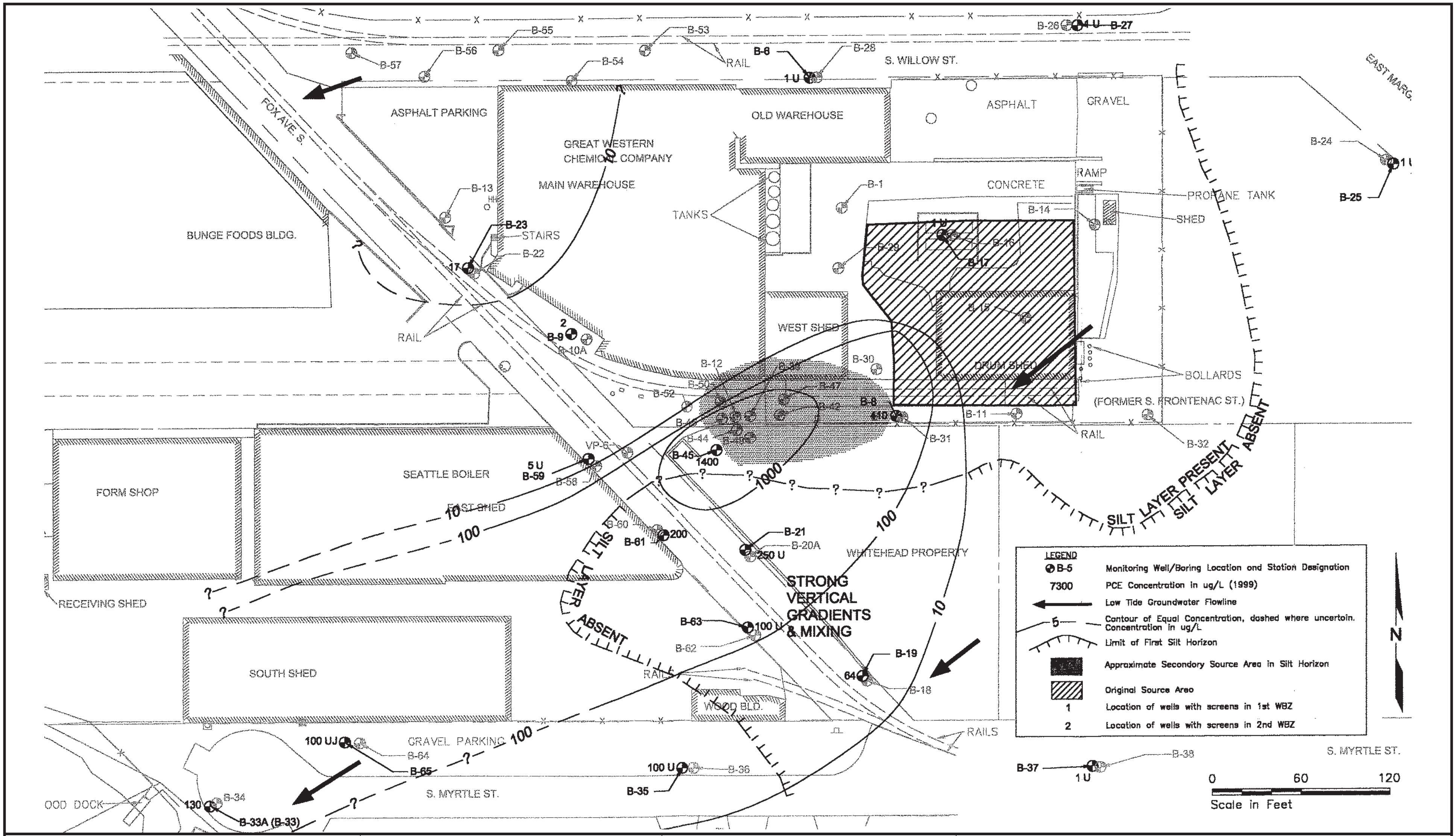
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 37

PCE IN 1st WBZ (1999 SAMPLING EVENT) - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig37



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Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
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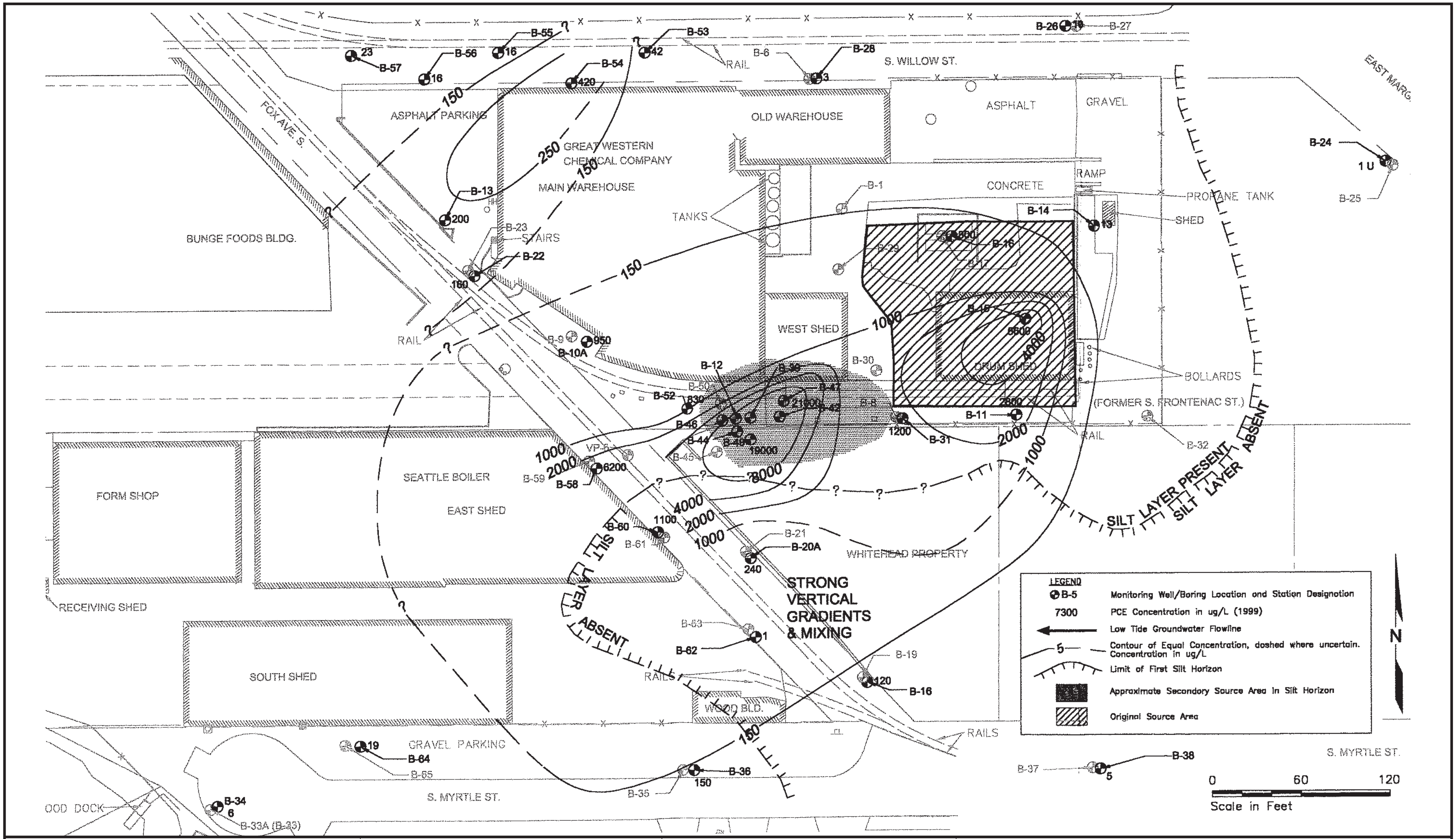
Figure 38

PCE IN 2nd WBZ (1999 SAMPLING EVENT) - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig38



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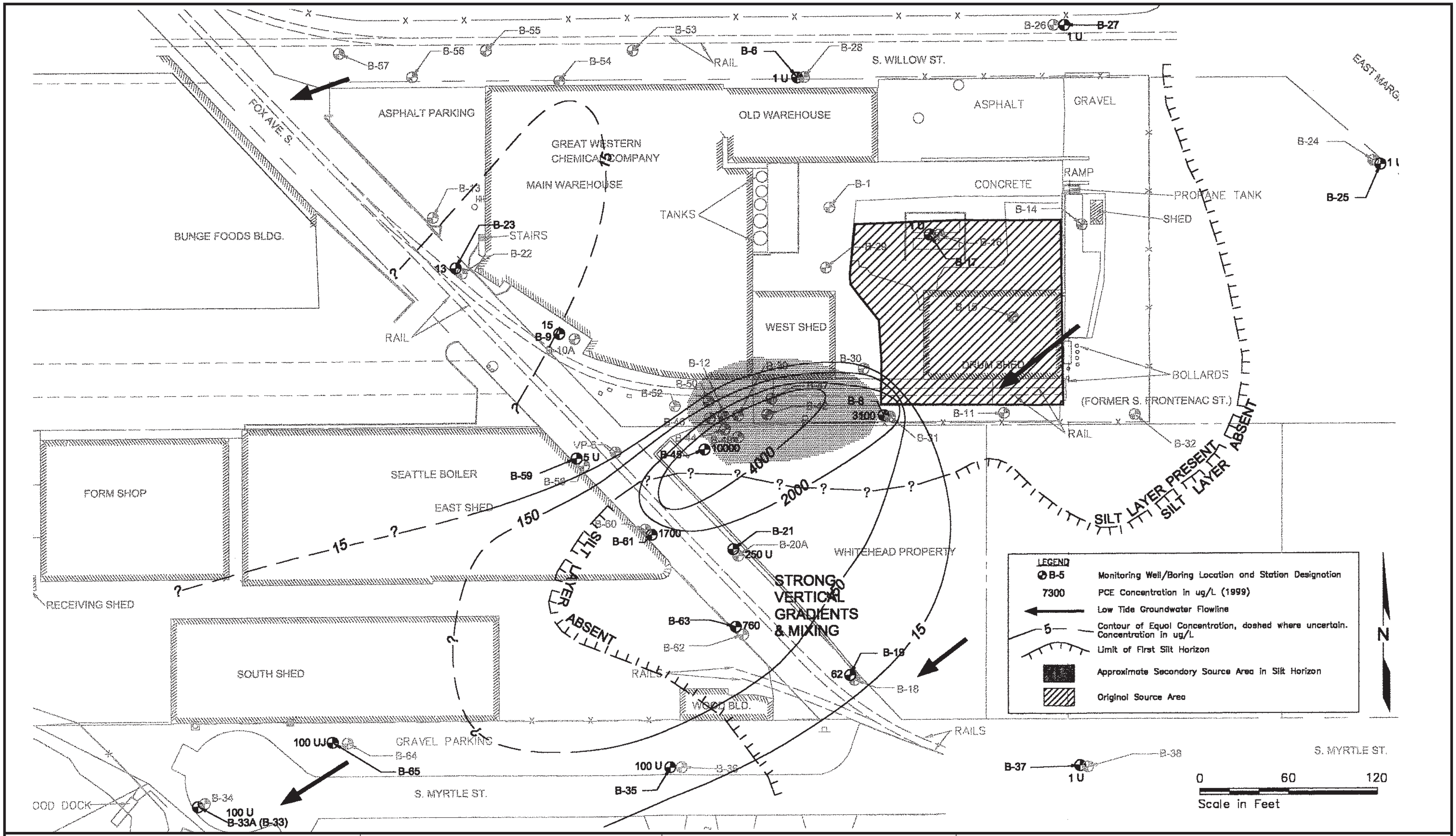
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 39
TCE IN 1st WBZ (1999 SAMPLING EVENT) - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig39



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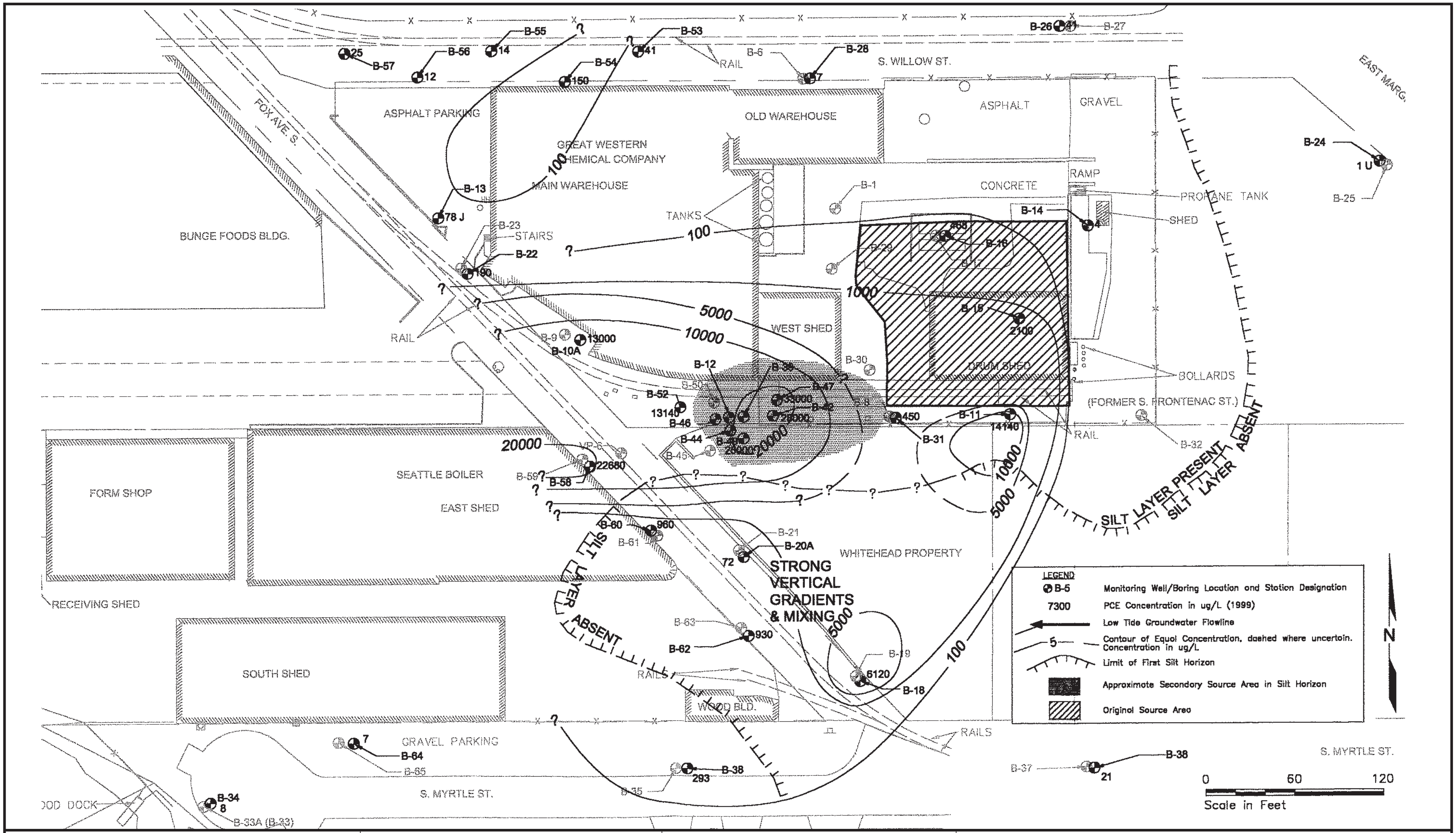
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 40
TCE IN 2nd WBZ (1999 SAMPLING EVENT) - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig40



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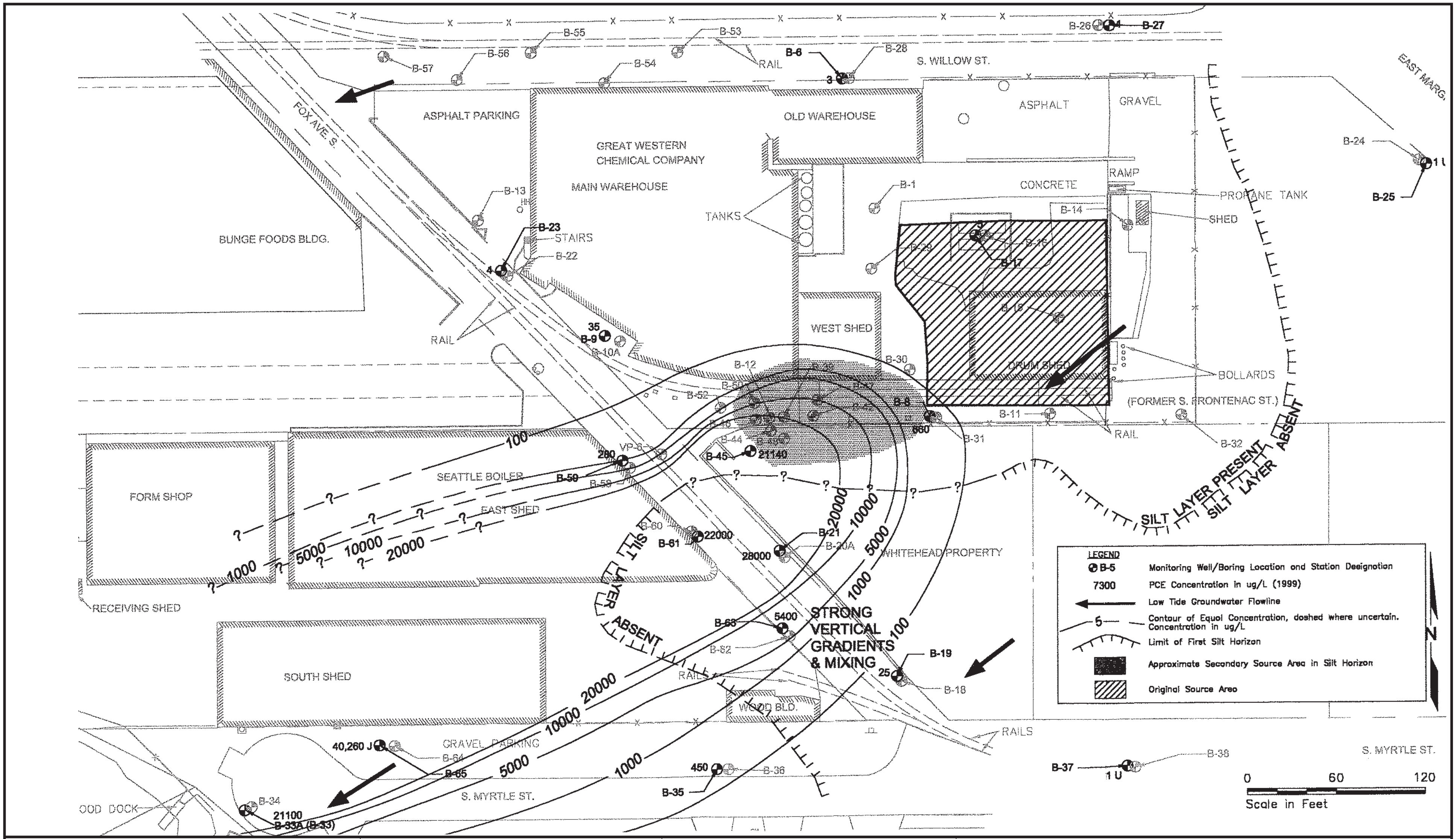
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 41
1,2-DCE IN 1st WBZ (1999 SAMPLING EVENT) -
CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig41



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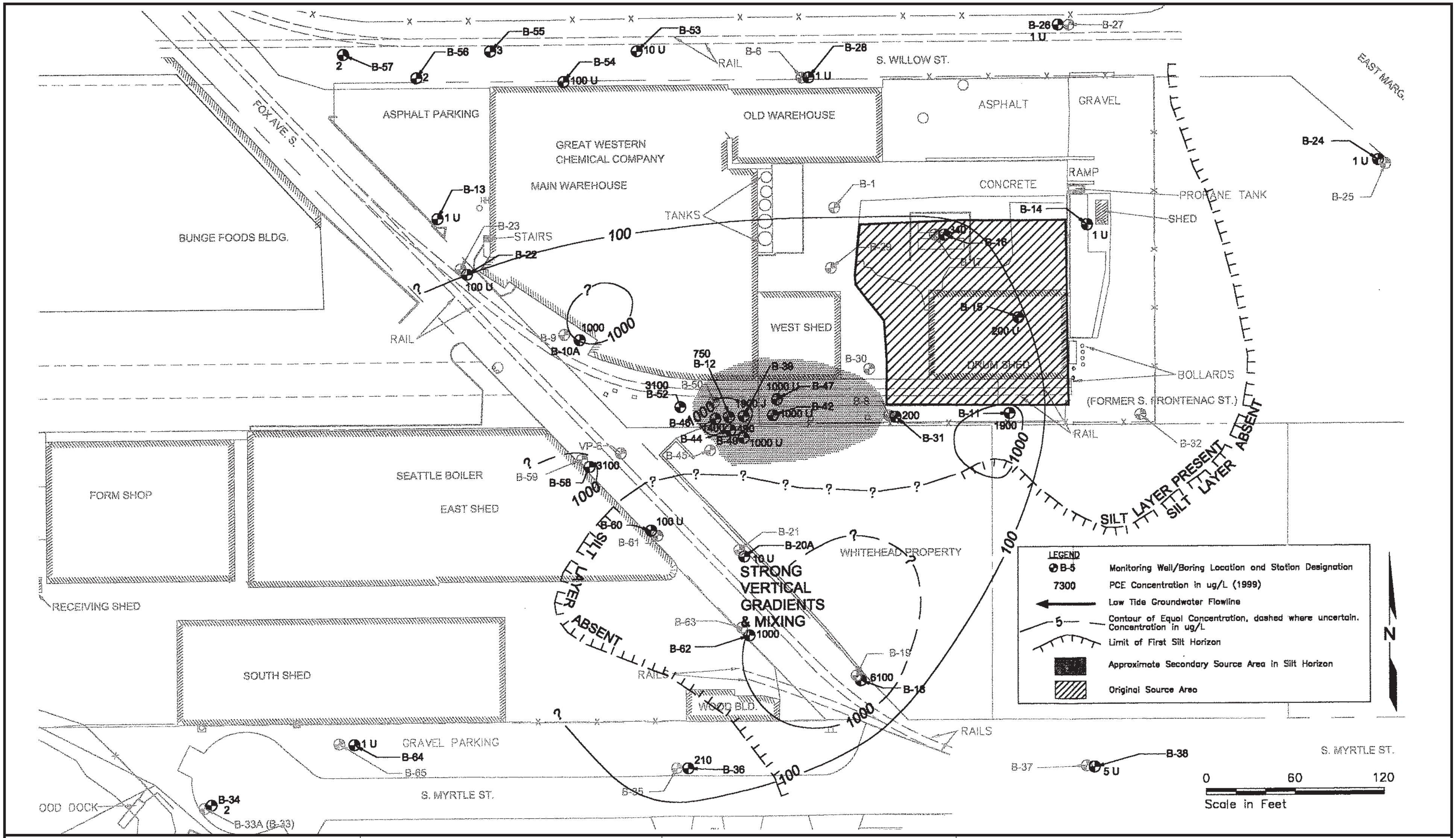
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 42
1,2-DCE IN 2nd WBZ (1999 SAMPLING EVENT) -
CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig42



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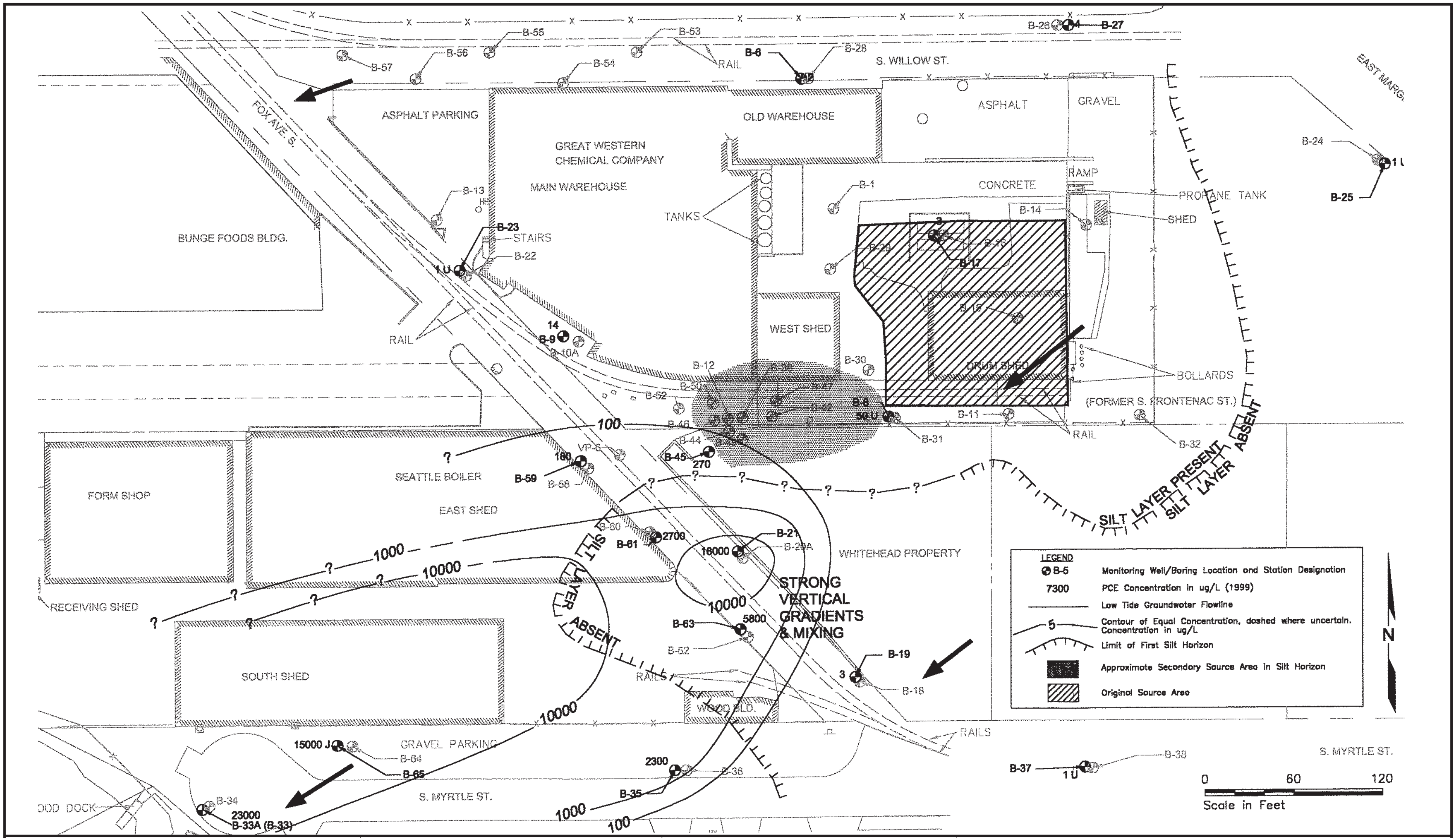
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 43
VC IN 1st WBZ (1999 SAMPLING EVENT) - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date: 5/21/08
Drawn by: AES
10:002330WD1403\fig43



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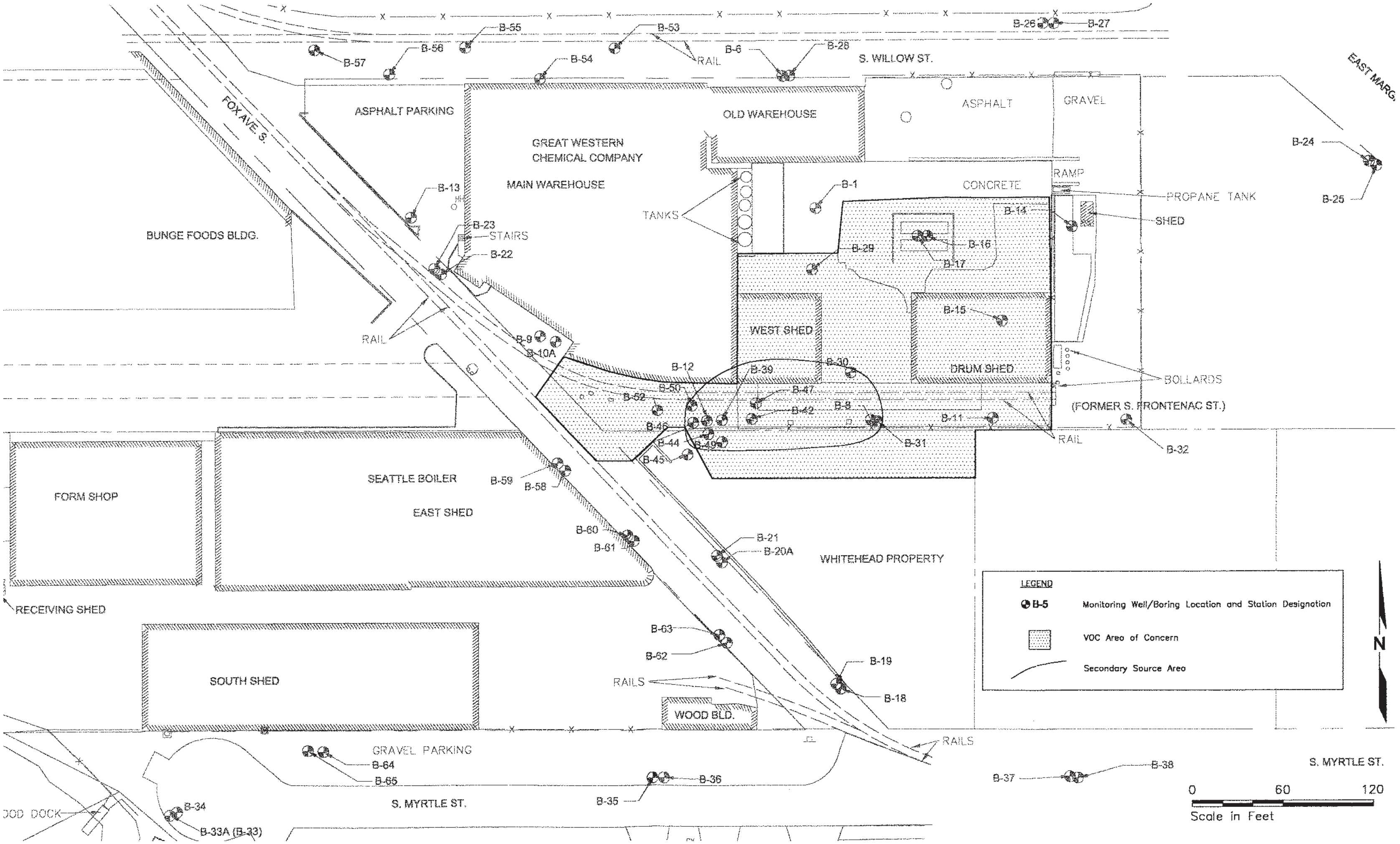
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 44
VC IN 2nd WBZ (1999 SAMPLING EVENT) - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig44



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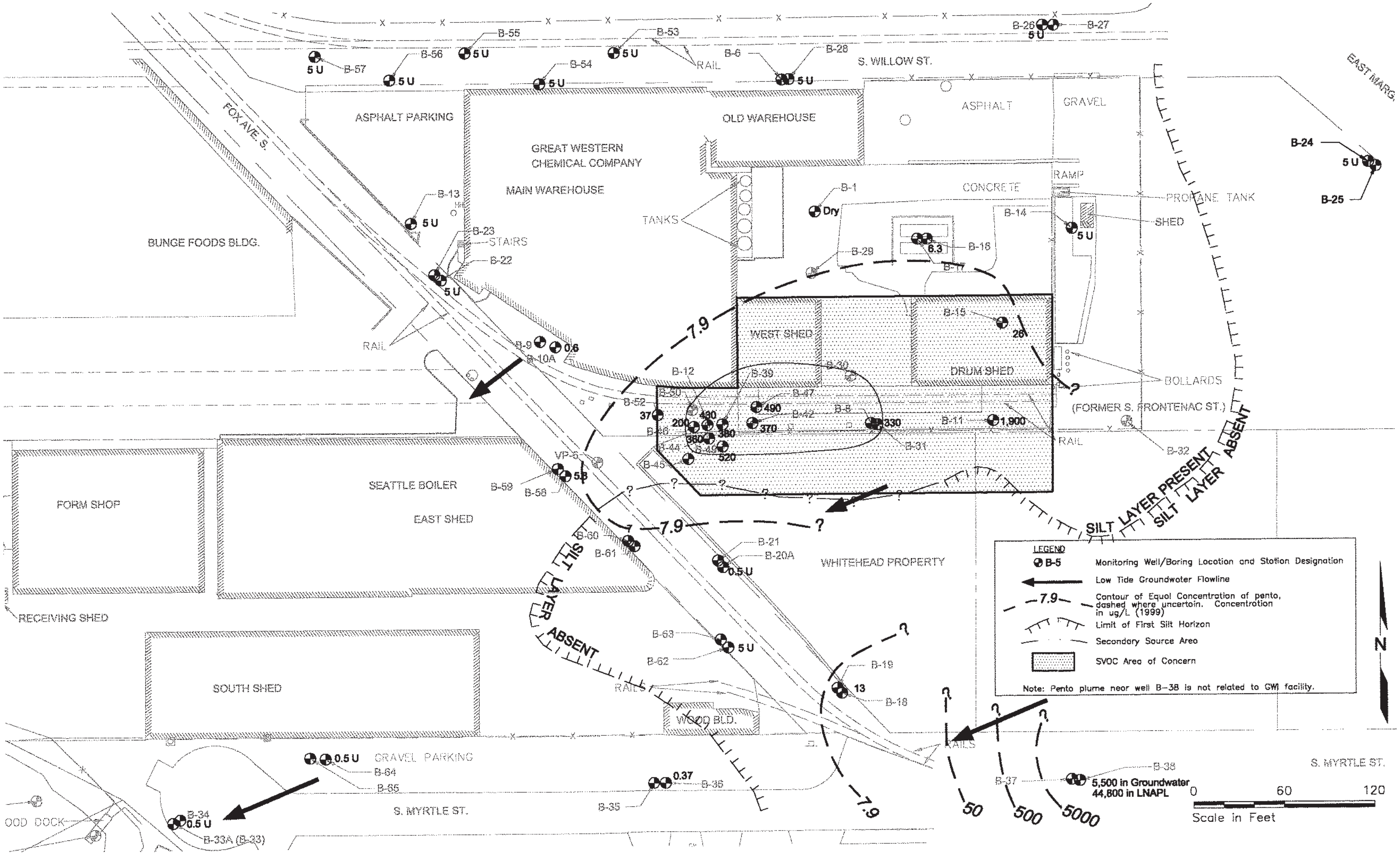
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 45
VOC AREA OF CONCERN - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig45



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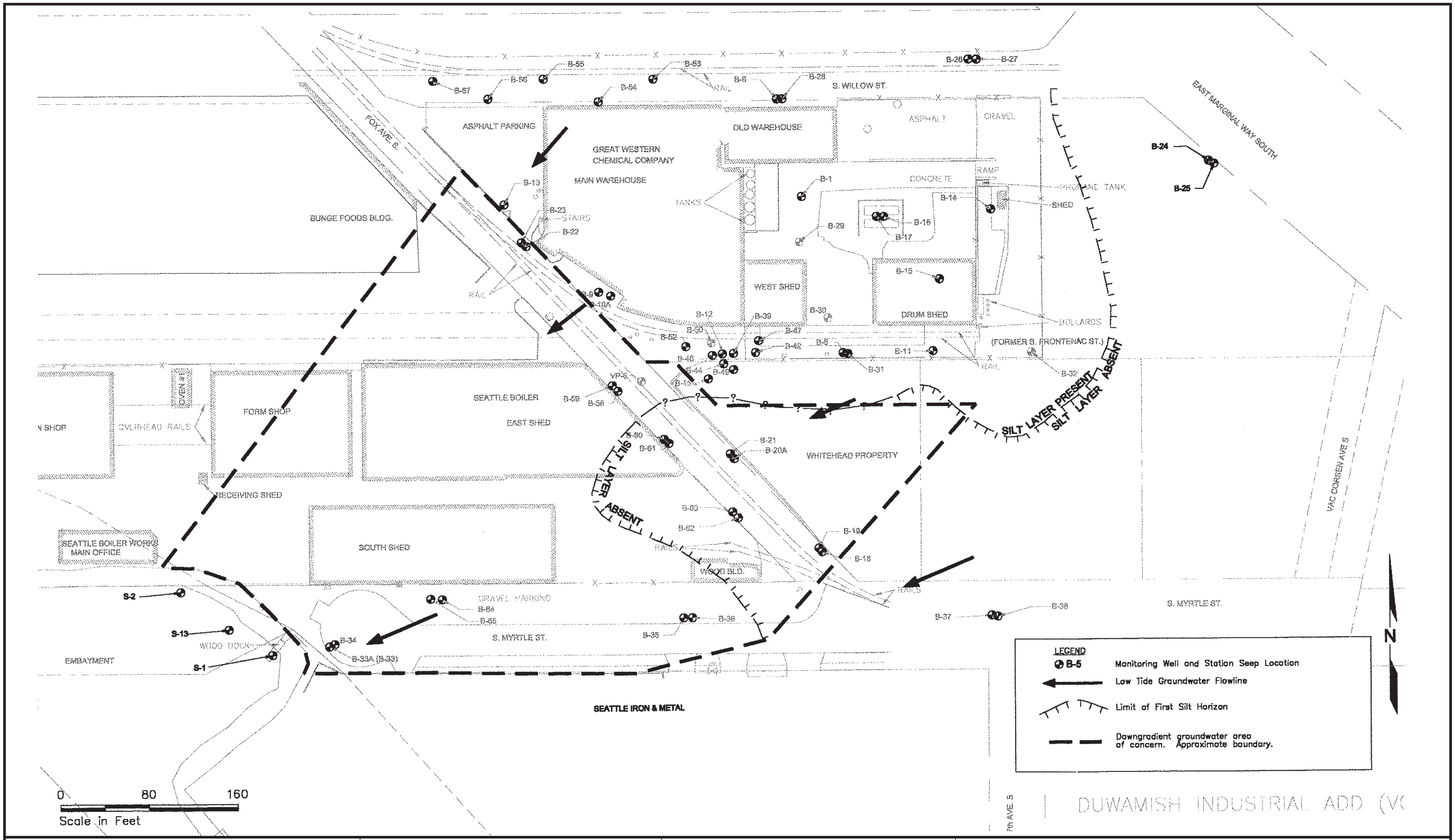
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 46
SVOC AREA OF CONCERN - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date: 5/21/08
Drawn by: AES
10:002330WD1403\fig46



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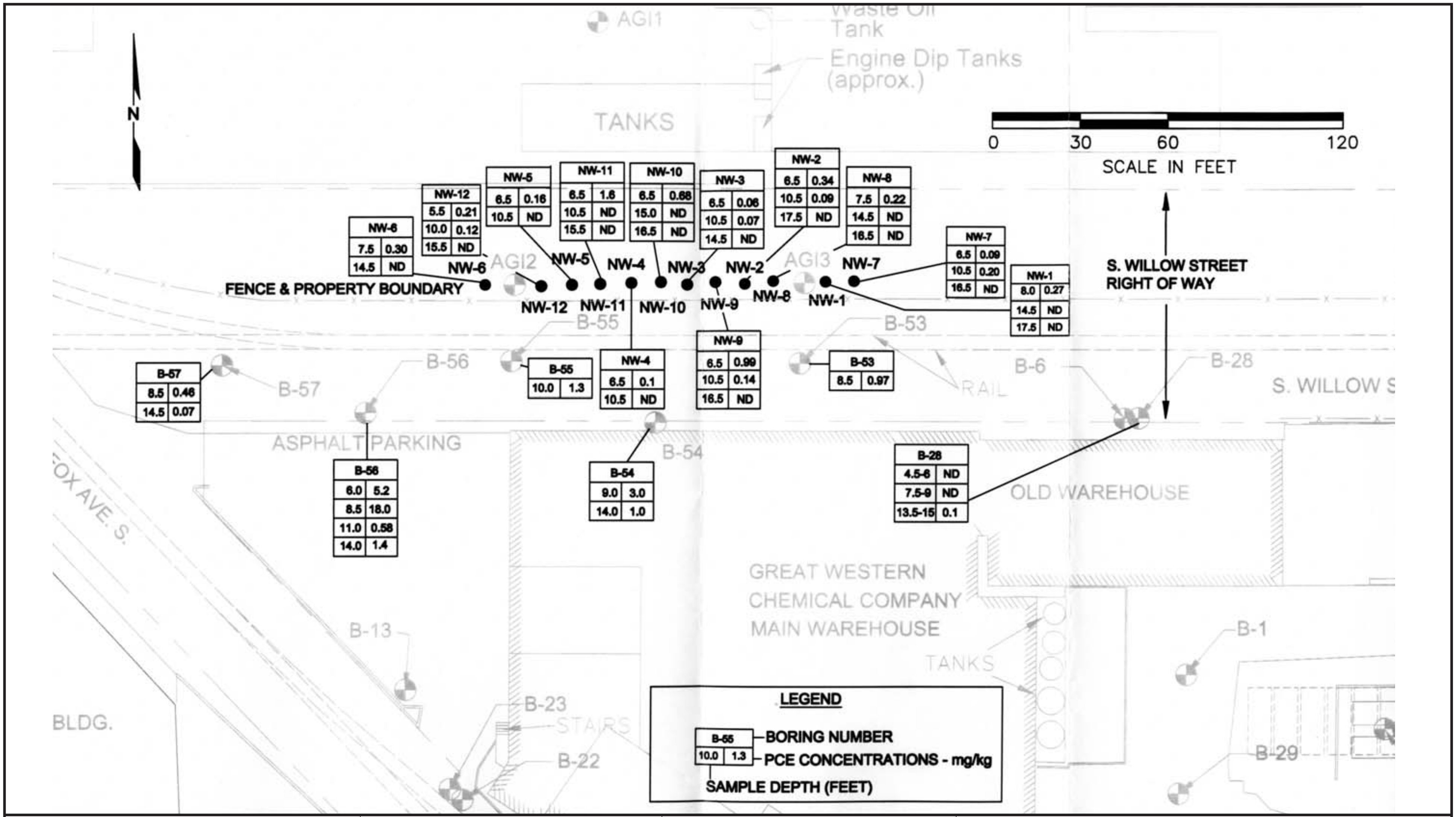
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 47
EXTENT OF DOWNGRADIENT AREA OF CONCERN IN 2nd WBZ -
CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig47



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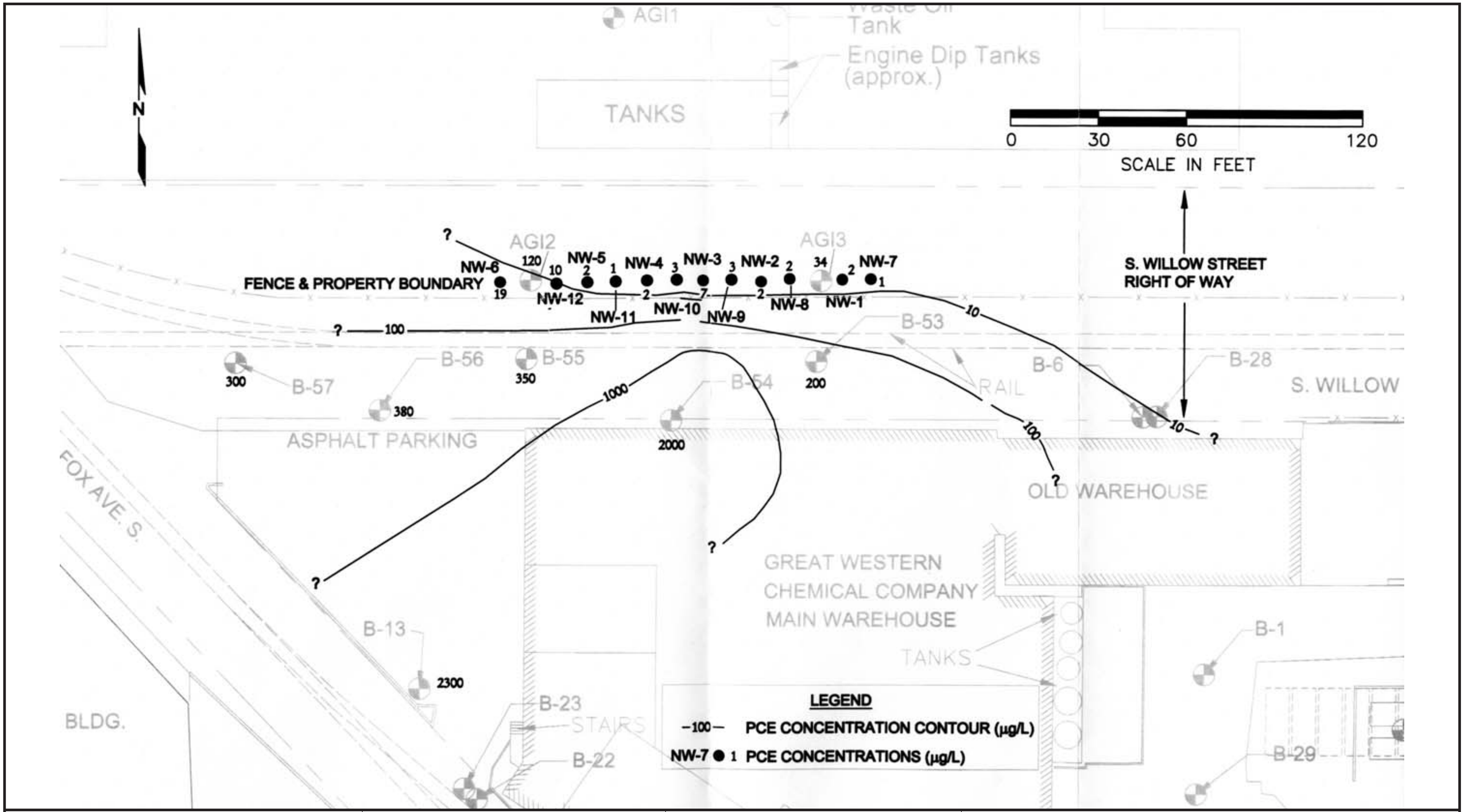
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 48
PCE IN SOIL IN SOUTH WILLOW STREET ROW -
CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig48



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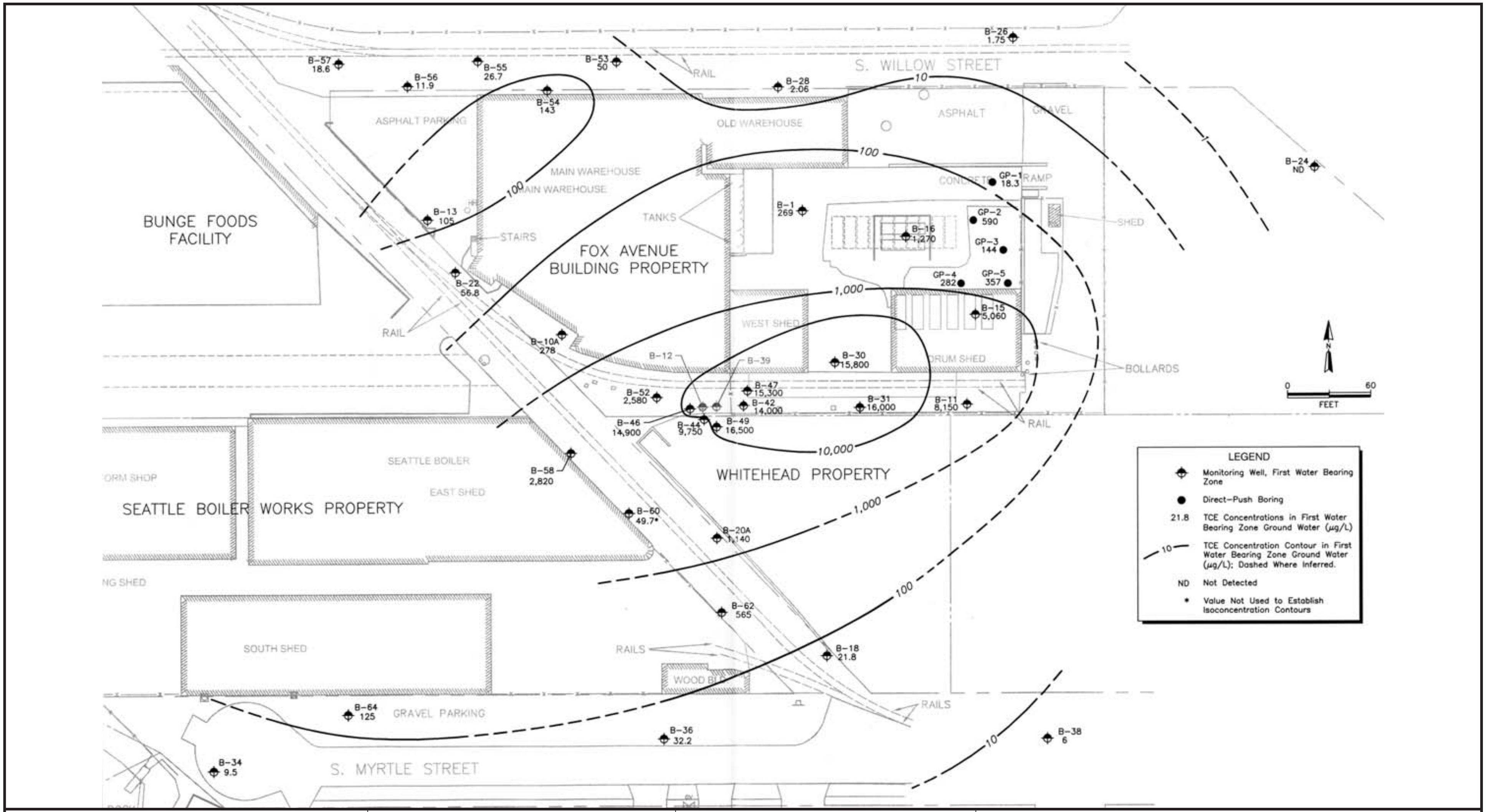
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 49
PCE IN GROUNDWATER IN SOUTH WILLOW STREET ROW - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig49



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Base Map Reference:
Environmental Resources Management (ERM), 2003.

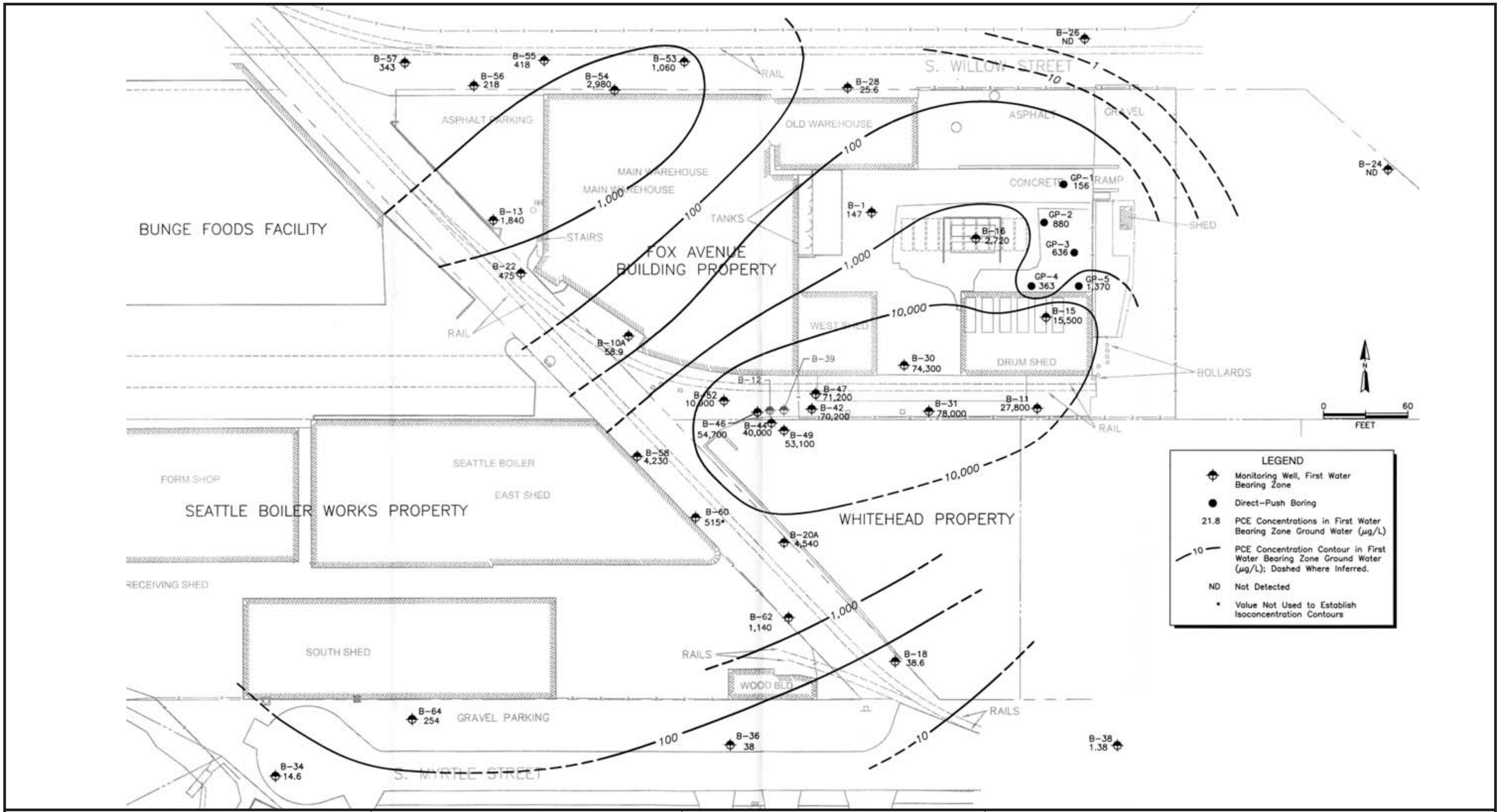
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 50
TCE IN 1st WBZ GROUNDWATER (FOX AVENUE PILOT STUDY) -
CASCADE COLUMBIA DISTRIBUTION

Date:
5/21/08

Drawn by:
AES

10:002330WD1403\fig50



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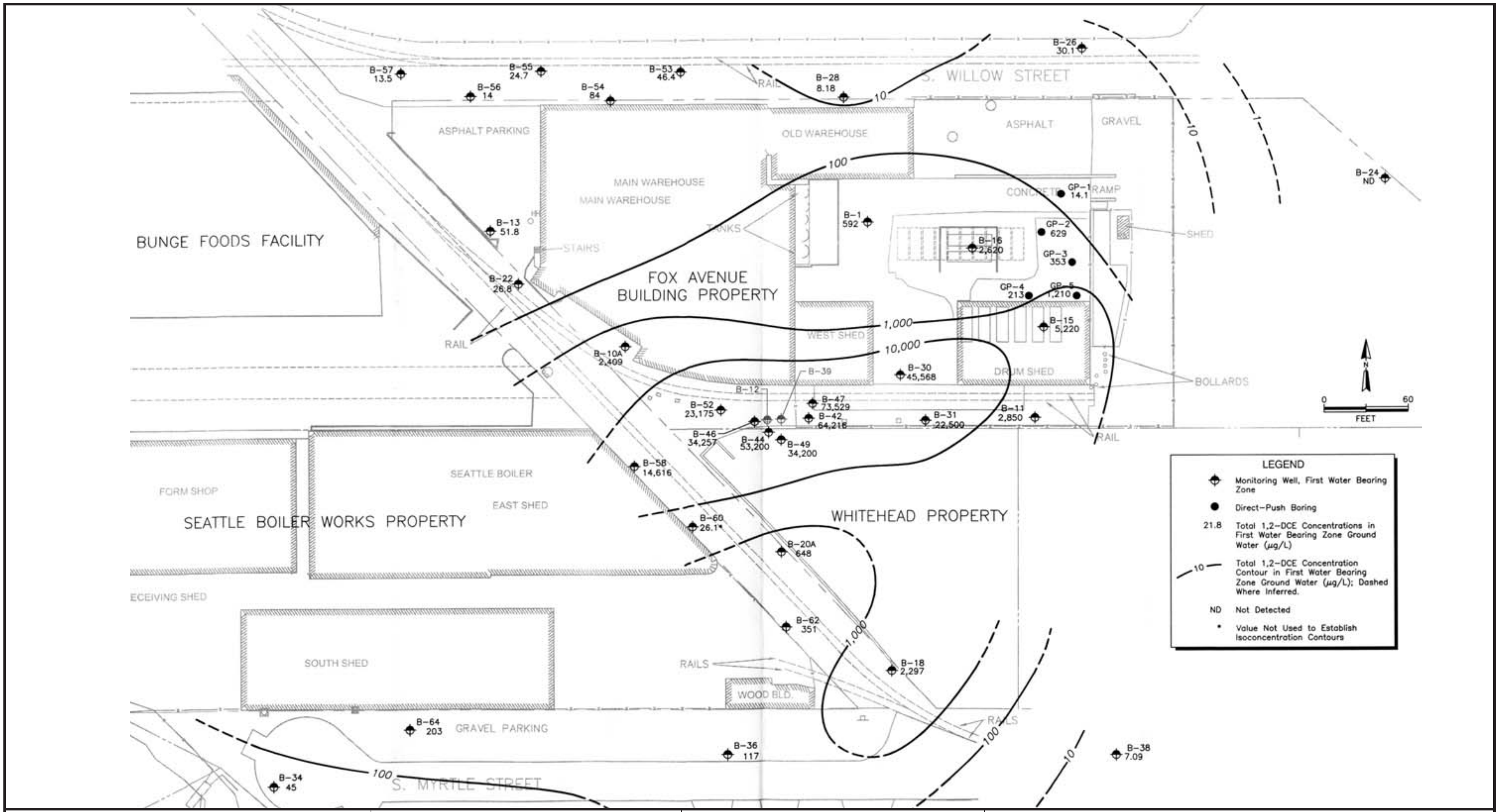
Base Map Reference:
Environmental Resources Management (ERM), 2003.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 51
PCE IN 1st WBZ GROUNDWATER (FOX AVENUE PILOT STUDY) -
CASCADE COLUMBIA DISTRIBUTION

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig51



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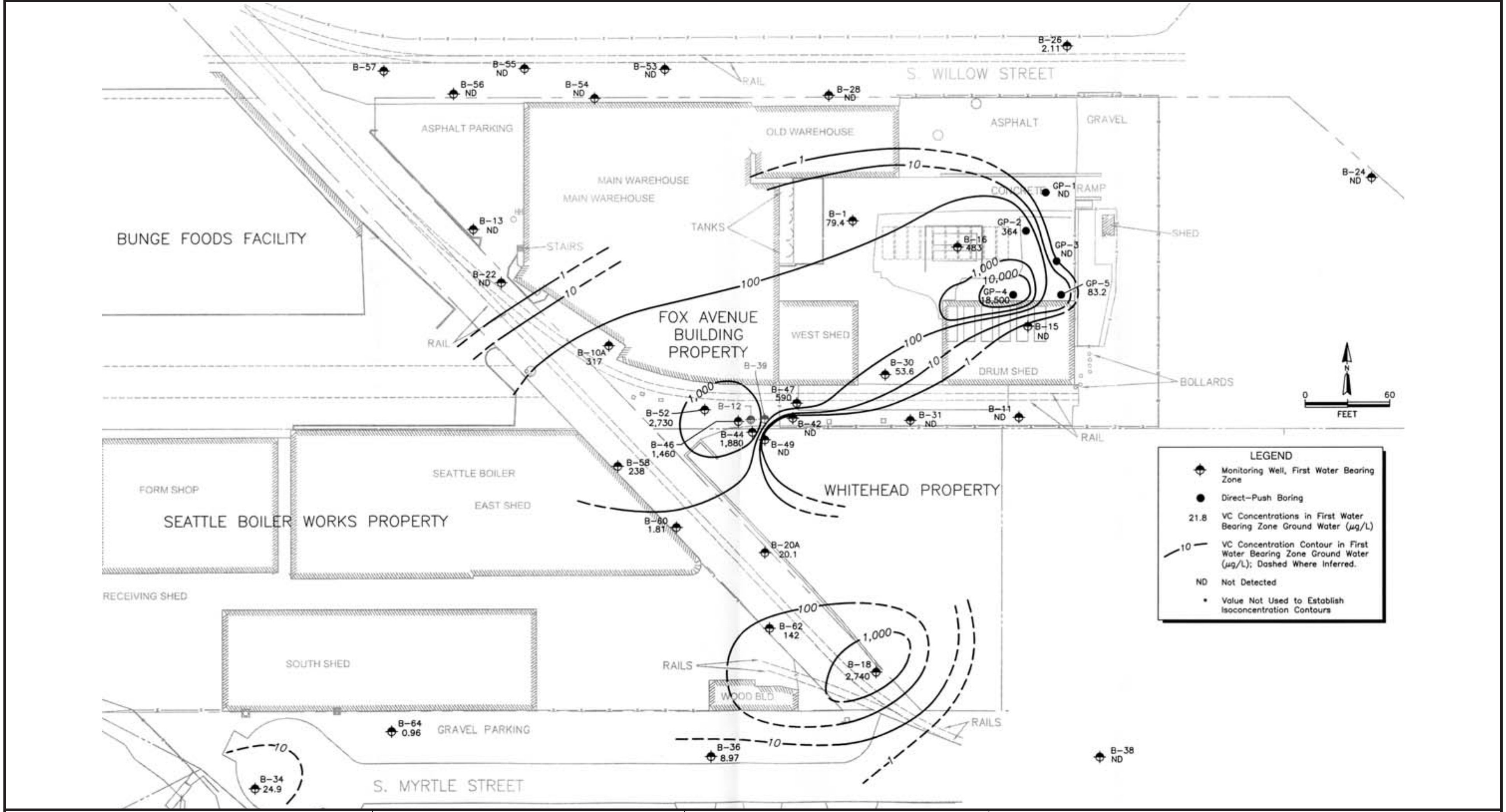
Base Map Reference:
Environmental Resources Management (ERM), 2003.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 52
1,2-DCE IN 1st WBZ GROUNDWATER (FOX AVENUE PILOT STUDY) -
CASCADE COLUMBIA DISTRIBUTION

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig52



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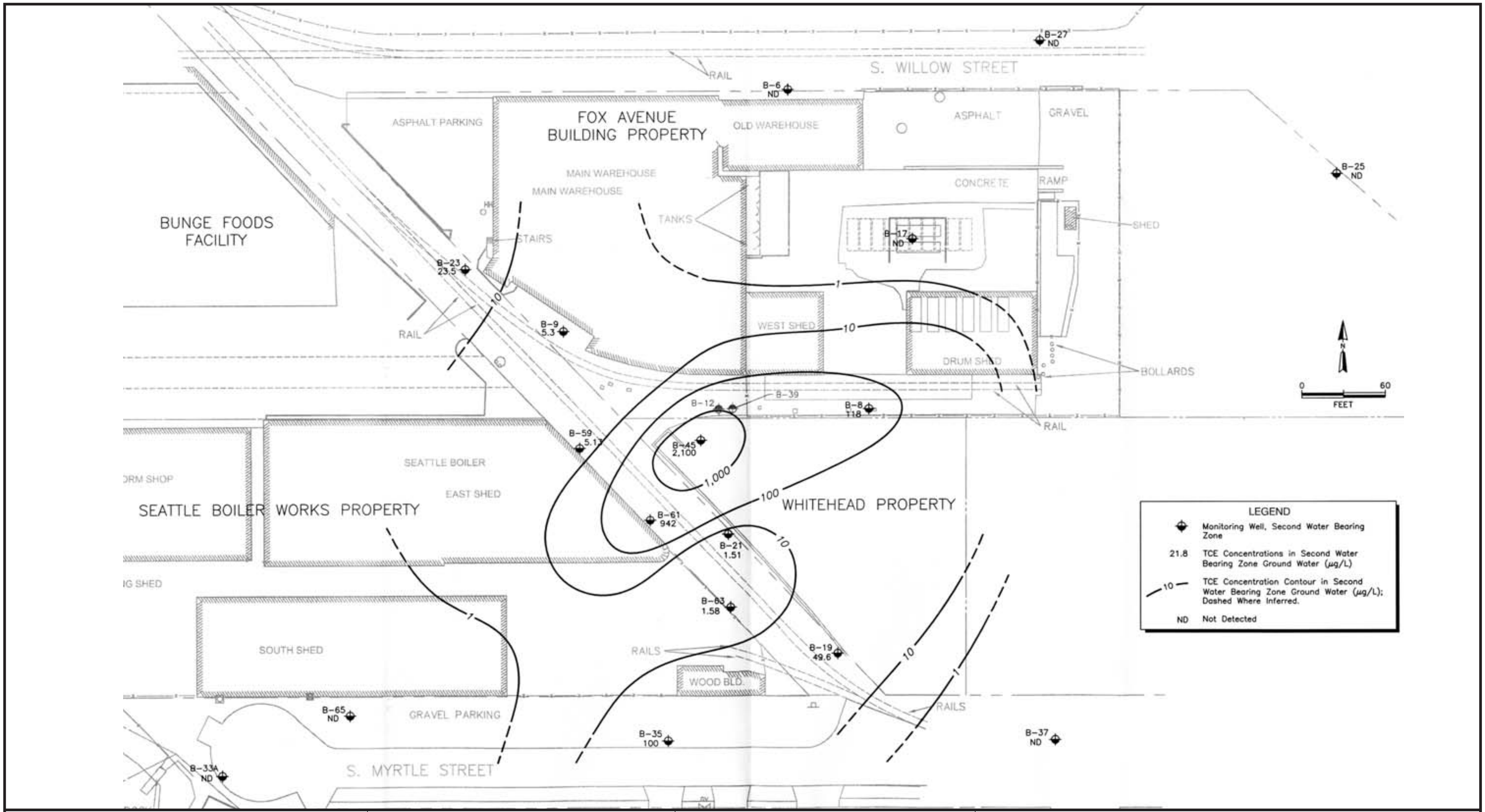
Seattle, Washington

Base Map Reference:
Environmental Resources Management (ERM), 2003.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 53
VC IN 1st WBZ GROUNDWATER (FOX AVENUE PILOT STUDY) - CASCADE COLUMBIA DISTRIBUTION

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig53



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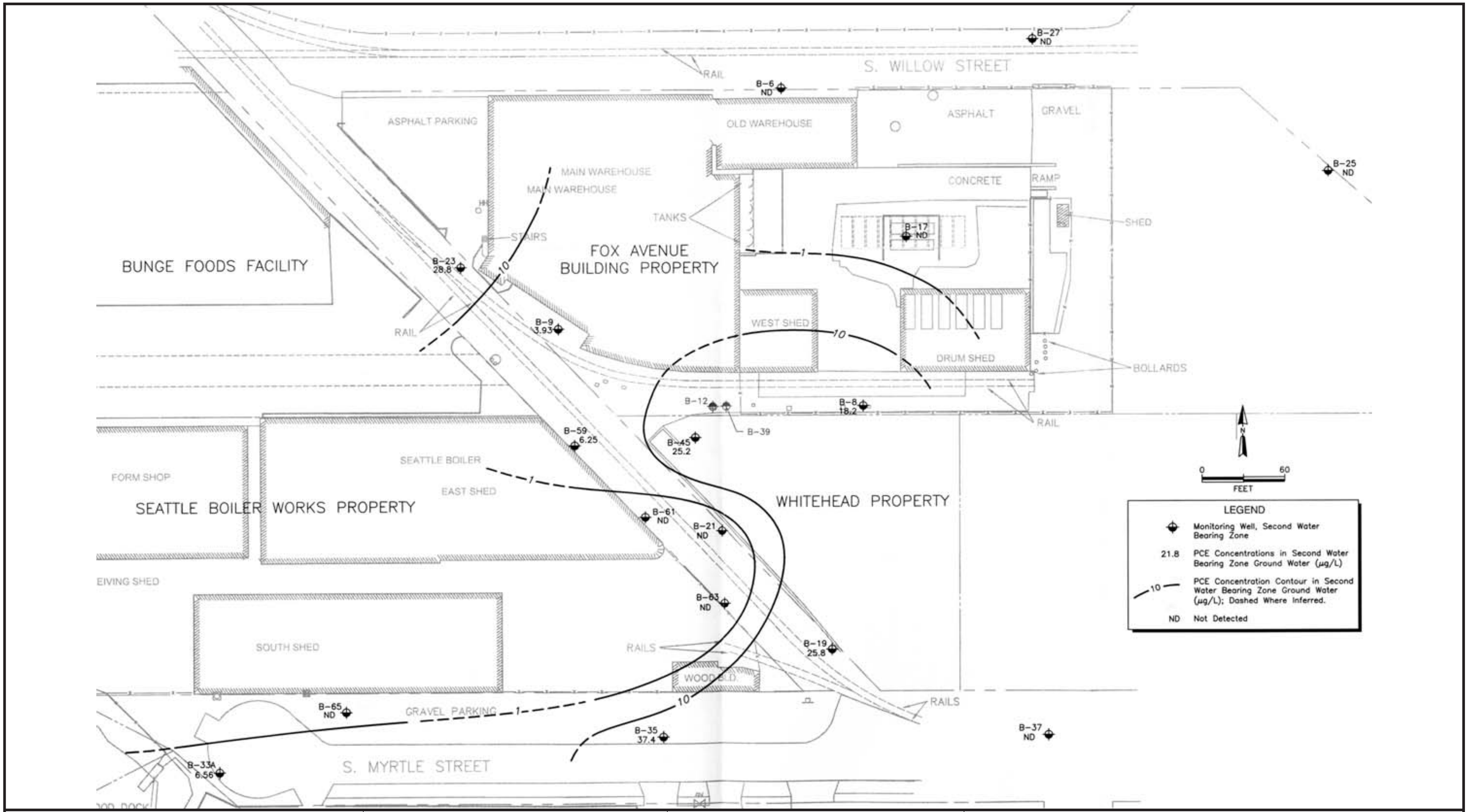
Base Map Reference:
Environmental Resources Management (ERM), 2003.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 54

TCE IN 2nd WBZ GROUNDWATER (FOX AVENUE PILOT STUDY) - CASCADE COLUMBIA DISTRIBUTION

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig54



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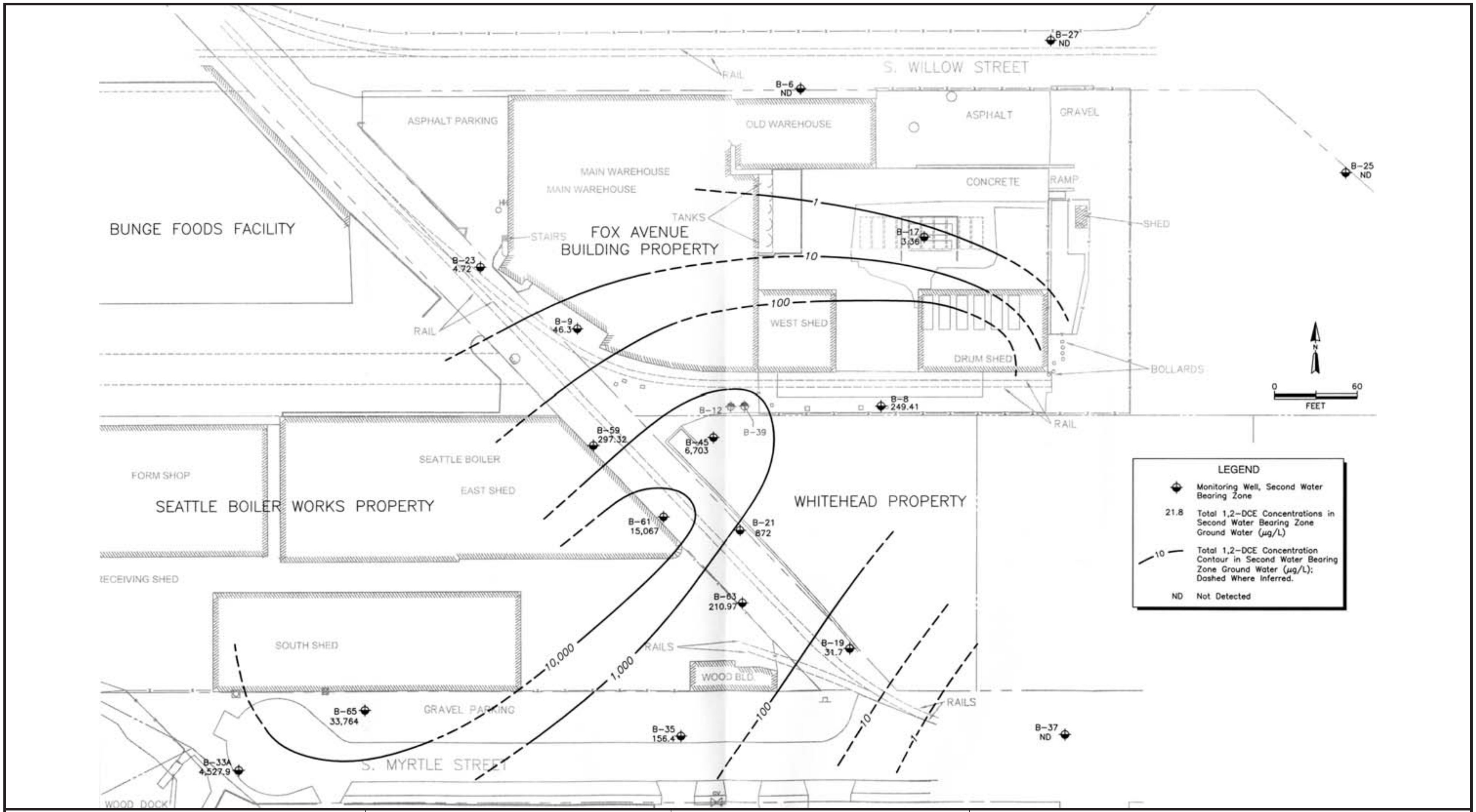
Seattle, Washington

Base Map Reference:
Environmental Resources Management (ERM), 2003.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 55
PCE IN 2nd WBZ GROUNDWATER (FOX AVENUE PILOT STUDY) - CASCADE COLUMBIA DISTRIBUTION

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig55



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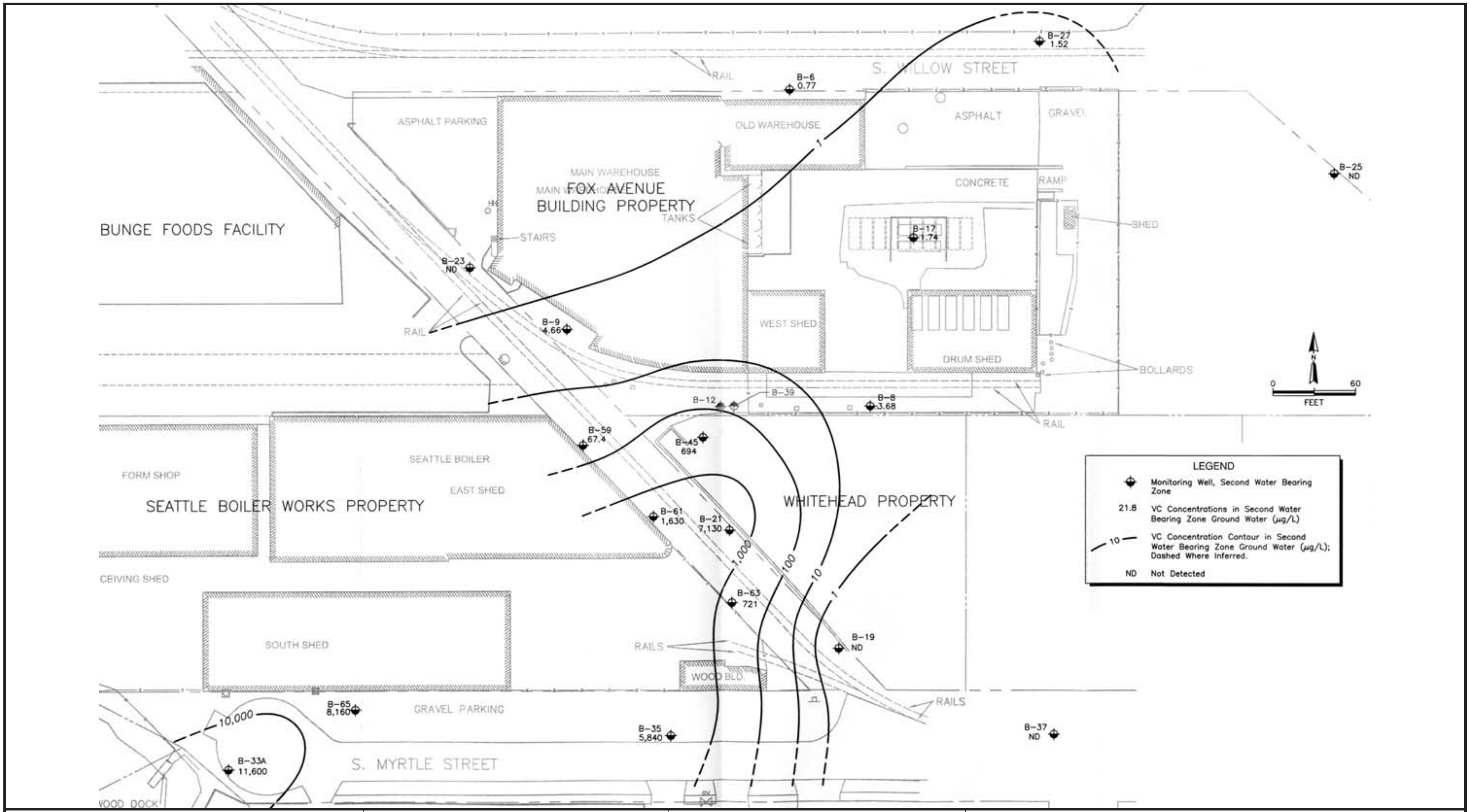
Seattle, Washington

Base Map Reference:
Environmental Resources Management (ERM), 2003.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 56
1,2-DCE IN 2nd WBZ GROUNDWATER (FOX AVENUE PILOT STUDY) - CASCADE COLUMBIA DISTRIBUTION

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig56



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Seattle, Washington

Base Map Reference:
Environmental Resources Management (ERM), 2003.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 57
VC IN 2nd WBZ GROUNDWATER (FOX AVENUE PILOT STUDY) -
CASCADE COLUMBIA DISTRIBUTION

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig57

Appendix A

RM 2.0-2.3 East Sediment Sampling Data

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Table A-1
Contaminants Detected in Surface Sediment
RM 2.0-2.3 East

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
DR111	2.1	EPA SI	8/19/1998	1,2,3,4,6,7,8-HpCDD	0.00041	mg/kg dw		2.26						
DR115	2.3	EPA SI	9/14/1998	1,2,3,4,6,7,8-HpCDD	0.00026	mg/kg dw		1.3						
DR111	2.1	EPA SI	8/19/1998	1,2,3,4,6,7,8-HpCDF	0.000054	mg/kg dw		2.26						
DR115	2.3	EPA SI	9/14/1998	1,2,3,4,6,7,8-HpCDF	0.000025	mg/kg dw		1.3						
DR111	2.1	EPA SI	8/19/1998	1,2,3,4,7,8,9-HpCDF	0.0000051	mg/kg dw	J	2.26						
DR111	2.1	EPA SI	8/19/1998	1,2,3,4,7,8-HxCDF	0.0000061	mg/kg dw	J	2.26						
DR111	2.1	EPA SI	8/19/1998	1,2,3,6,7,8-HxCDD	0.000016	mg/kg dw		2.26						
DR115	2.3	EPA SI	9/14/1998	1,2,3,6,7,8-HxCDD	0.0000086	mg/kg dw		1.3						
DR111	2.1	EPA SI	8/19/1998	1,2,3,7,8,9-HxCDD	0.0000091	mg/kg dw	J	2.26						
DR115	2.3	EPA SI	9/14/1998	1,2,3,7,8,9-HxCDD	0.0000069	mg/kg dw	J	1.3						
B6b	2.2	LDWRI-Benthic	9/18/2004	1-Methylnaphthalene	0.0057	mg/kg dw		2.96						
DR111	2.1	EPA SI	8/19/1998	2,3,7,8-TCDF	0.0000023	mg/kg dw		2.26						
DR115	2.3	EPA SI	9/14/1998	2,3,7,8-TCDF	0.00000099	mg/kg dw	J	1.3						
B6b	2.2	LDWRI-Benthic	9/18/2004	2,4'-DDT	0.0084	mg/kg dw	JN	2.96						
B6b	2.2	LDWRI-Benthic	9/18/2004	2-Methylnaphthalene	0.0081	mg/kg dw		2.96	0.27	38	64	mg/kg OC	0.0071	0.0042
DR112	2.1	EPA SI	8/19/1998	2-Methylnaphthalene	0.02	mg/kg dw		2.64	0.76	38	64	mg/kg OC	0.02	0.012
DR114	2.3	EPA SI	8/19/1998	2-Methylnaphthalene	0.02	mg/kg dw		2.51	0.8	38	64	mg/kg OC	0.021	0.013
DR148	2.1	EPA SI	8/18/1998	2-Methylnaphthalene	20	ug/kg dw		4.51		670	1400	ug/kg dw	0.03	0.014
B6b	2.2	LDWRI-Benthic	9/18/2004	4,4'-DDD	0.002	mg/kg dw	JN	2.96						
DR111	2.1	EPA SI	8/19/1998	4,4'-DDD	0.067	mg/kg dw	J	2.26						
DR111	2.1	EPA SI	8/19/1998	4,4'-DDE	0.005	mg/kg dw		2.26						
B6b	2.2	LDWRI-Benthic	9/18/2004	4,4'-DDT	0.012	mg/kg dw	JN	2.96						
DR111	2.1	EPA SI	8/19/1998	4,4'-DDT	0.003	mg/kg dw		2.26						
B6b	2.2	LDWRI-Benthic	9/18/2004	4-Methylphenol	6.2	ug/kg dw	J	2.96		670	670	ug/kg dw	0.0093	0.0093
B6b	2.2	LDWRI-Benthic	9/18/2004	Acenaphthene	0.012	mg/kg dw		2.96	0.41	16	57	mg/kg OC	0.026	0.0072
DR107	2.1	EPA SI	8/19/1998	Acenaphthene	0.02	mg/kg dw		2.5	0.8	16	57	mg/kg OC	0.05	0.014
DR109	2.1	EPA SI	9/1/1998	Acenaphthene	0.02	mg/kg dw		2.35	0.85	16	57	mg/kg OC	0.053	0.015
DR110	2.1	EPA SI	8/19/1998	Acenaphthene	0.08	mg/kg dw		2.67	3	16	57	mg/kg OC	0.19	0.053
DR111	2.1	EPA SI	8/19/1998	Acenaphthene	0.03	mg/kg dw		2.26	1.3	16	57	mg/kg OC	0.081	0.023
DR112	2.1	EPA SI	8/19/1998	Acenaphthene	0.05	mg/kg dw		2.64	1.9	16	57	mg/kg OC	0.12	0.033
DR114	2.3	EPA SI	8/19/1998	Acenaphthene	0.02	mg/kg dw		2.51	0.8	16	57	mg/kg OC	0.05	0.014
DR115	2.3	EPA SI	9/14/1998	Acenaphthene	0.03	mg/kg dw		1.3	2.3	16	57	mg/kg OC	0.14	0.04
DR148	2.1	EPA SI	8/18/1998	Acenaphthene	20	ug/kg dw		4.51		500	730	ug/kg dw	0.04	0.027
DR149	2.3	EPA SI	8/19/1998	Acenaphthene	0.09	mg/kg dw		2.01	4.5	16	57	mg/kg OC	0.28	0.079
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Acenaphthene	0.034	mg/kg dw	J	2.57	1.3	16	57	mg/kg OC	0.081	0.023
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Acenaphthene	0.033	mg/kg dw		2.08	1.6	16	57	mg/kg OC	0.1	0.028
B6b	2.2	LDWRI-Benthic	9/18/2004	Acenaphthylene	0.019	mg/kg dw		2.96	0.64	66	66	mg/kg OC	0.0097	0.0097
DR112	2.1	EPA SI	8/19/1998	Acenaphthylene	0.03	mg/kg dw		2.64	1.1	66	66	mg/kg OC	0.017	0.017
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Acenaphthylene	0.045	mg/kg dw		2.08	2.2	66	66	mg/kg OC	0.033	0.033
B6b	2.2	LDWRI-Benthic	9/18/2004	alpha-Chlordane	0.00024	mg/kg dw	JN	2.96						
DR105	2	EPA SI	8/19/1998	Aluminum	19500	mg/kg dw		2.07						
DR107	2.1	EPA SI	8/19/1998	Aluminum	18600	mg/kg dw		2.5						
DR108	2.1	EPA SI	8/19/1998	Aluminum	19800	mg/kg dw		2.33						
DR109	2.1	EPA SI	9/1/1998	Aluminum	26400	mg/kg dw		2.35						
DR110	2.1	EPA SI	8/19/1998	Aluminum	19300	mg/kg dw		2.67						
DR111	2.1	EPA SI	8/19/1998	Aluminum	18000	mg/kg dw		2.26						
DR112	2.1	EPA SI	8/19/1998	Aluminum	19400	mg/kg dw		2.64						
DR114	2.3	EPA SI	8/19/1998	Aluminum	19100	mg/kg dw		2.51						
DR115	2.3	EPA SI	9/14/1998	Aluminum	18100	mg/kg dw		1.3						

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^1	CSL^1	SQS/CSL Units	SQS Exceedance Factor^2	CSL Exceedance Factor^2
DR148	2.1	EPA SI	8/18/1998	Aluminum	20400	mg/kg dw		4.51						
DR149	2.3	EPA SI	8/19/1998	Aluminum	18800	mg/kg dw		2.01						
B6b	2.2	LDWRI-Benthic	9/18/2004	Aniline	0.013	mg/kg dw	J	2.96						
B6b	2.2	LDWRI-Benthic	9/18/2004	Anthracene	0.073	mg/kg dw		2.96	2.5	220	1200	mg/kg OC	0.011	0.0021
DR105	2	EPA SI	8/19/1998	Anthracene	0.04	mg/kg dw		2.07	1.9	220	1200	mg/kg OC	0.0086	0.0016
DR107	2.1	EPA SI	8/19/1998	Anthracene	0.18	mg/kg dw		2.5	7.2	220	1200	mg/kg OC	0.033	0.006
DR108	2.1	EPA SI	8/19/1998	Anthracene	0.1	mg/kg dw		2.33	4.3	220	1200	mg/kg OC	0.02	0.0036
DR109	2.1	EPA SI	9/1/1998	Anthracene	0.08	mg/kg dw		2.35	3.4	220	1200	mg/kg OC	0.015	0.0028
DR110	2.1	EPA SI	8/19/1998	Anthracene	0.14	mg/kg dw		2.67	5.2	220	1200	mg/kg OC	0.024	0.0043
DR111	2.1	EPA SI	8/19/1998	Anthracene	0.08	mg/kg dw		2.26	3.5	220	1200	mg/kg OC	0.016	0.0029
DR112	2.1	EPA SI	8/19/1998	Anthracene	0.32	mg/kg dw		2.64	12	220	1200	mg/kg OC	0.055	0.01
DR114	2.3	EPA SI	8/19/1998	Anthracene	0.4	mg/kg dw		2.51	16	220	1200	mg/kg OC	0.073	0.013
DR115	2.3	EPA SI	9/14/1998	Anthracene	0.1	mg/kg dw		1.3	7.7	220	1200	mg/kg OC	0.035	0.0064
DR148	2.1	EPA SI	8/18/1998	Anthracene	30	ug/kg dw		4.51		960	4400	ug/kg dw	0.031	0.0068
DR149	2.3	EPA SI	8/19/1998	Anthracene	0.22	mg/kg dw		2.01	11	220	1200	mg/kg OC	0.05	0.0092
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Anthracene	0.036	mg/kg dw	J	0.972	3.7	220	1200	mg/kg OC	0.017	0.0031
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Anthracene	0.29	mg/kg dw		2.57	11	220	1200	mg/kg OC	0.05	0.0092
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Anthracene	0.12	mg/kg dw		2.43	4.9	220	1200	mg/kg OC	0.022	0.0041
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Anthracene	0.21	mg/kg dw		2.08	10	220	1200	mg/kg OC	0.045	0.0083
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Anthracene	0.059	mg/kg dw	J	2.55	2.3	220	1200	mg/kg OC	0.01	0.0019
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Anthracene	0.043	mg/kg dw		2.47	1.7	220	1200	mg/kg OC	0.0077	0.0014
B6b	2.2	LDWRI-Benthic	9/18/2004	Antimony	0.72	mg/kg dw	J	2.96						
DR108	2.1	EPA SI	8/19/1998	Antimony	6	mg/kg dw	J	2.33						
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Antimony	0.6	mg/kg dw	J	1.46						
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Antimony	3	mg/kg dw		2.08						
B6b	2.2	LDWRI-Benthic	9/18/2004	Arsenic	13.6	mg/kg dw	J	2.96		57	93	mg/kg dw	0.24	0.15
DR105	2	EPA SI	8/19/1998	Arsenic	9.1	mg/kg dw		2.07		57	93	mg/kg dw	0.16	0.098
DR107	2.1	EPA SI	8/19/1998	Arsenic	23.1	mg/kg dw		2.5		57	93	mg/kg dw	0.41	0.25
DR108	2.1	EPA SI	8/19/1998	Arsenic	21.4	mg/kg dw		2.33		57	93	mg/kg dw	0.38	0.23
DR109	2.1	EPA SI	9/1/1998	Arsenic	14.3	mg/kg dw		2.35		57	93	mg/kg dw	0.25	0.15
DR110	2.1	EPA SI	8/19/1998	Arsenic	13.9	mg/kg dw		2.67		57	93	mg/kg dw	0.24	0.15
DR111	2.1	EPA SI	8/19/1998	Arsenic	16.5	mg/kg dw		2.26		57	93	mg/kg dw	0.29	0.18
DR112	2.1	EPA SI	8/19/1998	Arsenic	11.8	mg/kg dw		2.64		57	93	mg/kg dw	0.21	0.13
DR114	2.3	EPA SI	8/19/1998	Arsenic	13.2	mg/kg dw		2.51		57	93	mg/kg dw	0.23	0.14
DR115	2.3	EPA SI	9/14/1998	Arsenic	8.2	mg/kg dw		1.3		57	93	mg/kg dw	0.14	0.088
DR148	2.1	EPA SI	8/18/1998	Arsenic	12.4	mg/kg dw		4.51		57	93	mg/kg dw	0.22	0.13
DR149	2.3	EPA SI	8/19/1998	Arsenic	10.8	mg/kg dw		2.01		57	93	mg/kg dw	0.19	0.12
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Arsenic	8.4	mg/kg dw		0.972		57	93	mg/kg dw	0.15	0.09
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Arsenic	8.9	mg/kg dw		1.59		57	93	mg/kg dw	0.16	0.096
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Arsenic	23.1	mg/kg dw		2.57		57	93	mg/kg dw	0.41	0.25
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Arsenic	17.5	mg/kg dw		2.43		57	93	mg/kg dw	0.31	0.19
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Arsenic	47.3	mg/kg dw		1.46		57	93	mg/kg dw	0.83	0.51
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Arsenic	14.5	mg/kg dw		2.17		57	93	mg/kg dw	0.25	0.16
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Arsenic	80.9	mg/kg dw		2.08		57	93	mg/kg dw	1.4	0.87
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Arsenic	14	mg/kg dw		2.55		57	93	mg/kg dw	0.25	0.15
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Arsenic	18.1	mg/kg dw		2.47		57	93	mg/kg dw	0.32	0.19
DR105	2	EPA SI	8/19/1998	Barium	80	mg/kg dw		2.07						
DR107	2.1	EPA SI	8/19/1998	Barium	77	mg/kg dw		2.5						
DR108	2.1	EPA SI	8/19/1998	Barium	78	mg/kg dw		2.33						
DR109	2.1	EPA SI	9/1/1998	Barium	93	mg/kg dw		2.35						
DR110	2.1	EPA SI	8/19/1998	Barium	79	mg/kg dw		2.67						
DR111	2.1	EPA SI	8/19/1998	Barium	78	mg/kg dw		2.26						
DR112	2.1	EPA SI	8/19/1998	Barium	82	mg/kg dw		2.64						

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
DR114	2.3	EPA SI	8/19/1998	Barium	80	mg/kg dw		2.51						
DR115	2.3	EPA SI	9/14/1998	Barium	77	mg/kg dw		1.3						
DR148	2.1	EPA SI	8/18/1998	Barium	84	mg/kg dw		4.51						
DR149	2.3	EPA SI	8/19/1998	Barium	66	mg/kg dw		2.01						
B6b	2.2	LDWRI-Benthic	9/18/2004	Benzo(a)anthracene	0.17	mg/kg dw		2.96	5.7	110	270	mg/kg OC	0.052	0.021
DR105	2	EPA SI	8/19/1998	Benzo(a)anthracene	0.19	mg/kg dw		2.07	9.2	110	270	mg/kg OC	0.084	0.034
DR107	2.1	EPA SI	8/19/1998	Benzo(a)anthracene	0.45	mg/kg dw		2.5	18	110	270	mg/kg OC	0.16	0.067
DR108	2.1	EPA SI	8/19/1998	Benzo(a)anthracene	0.38	mg/kg dw		2.33	16	110	270	mg/kg OC	0.15	0.059
DR109	2.1	EPA SI	9/1/1998	Benzo(a)anthracene	0.34	mg/kg dw		2.35	14	110	270	mg/kg OC	0.13	0.052
DR110	2.1	EPA SI	8/19/1998	Benzo(a)anthracene	0.46	mg/kg dw		2.67	17	110	270	mg/kg OC	0.15	0.063
DR111	2.1	EPA SI	8/19/1998	Benzo(a)anthracene	0.48	mg/kg dw	J	2.26	21	110	270	mg/kg OC	0.19	0.078
DR112	2.1	EPA SI	8/19/1998	Benzo(a)anthracene	1.1	mg/kg dw		2.64	42	110	270	mg/kg OC	0.38	0.16
DR114	2.3	EPA SI	8/19/1998	Benzo(a)anthracene	0.35	mg/kg dw		2.51	14	110	270	mg/kg OC	0.13	0.052
DR115	2.3	EPA SI	9/14/1998	Benzo(a)anthracene	0.38	mg/kg dw		1.3	29	110	270	mg/kg OC	0.26	0.11
DR148	2.1	EPA SI	8/18/1998	Benzo(a)anthracene	60	ug/kg dw		4.51		1300	1600	ug/kg dw	0.046	0.038
DR149	2.3	EPA SI	8/19/1998	Benzo(a)anthracene	0.6	mg/kg dw		2.01	30	110	270	mg/kg OC	0.27	0.11
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzo(a)anthracene	0.097	mg/kg dw		0.972	10	110	270	mg/kg OC	0.091	0.037
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzo(a)anthracene	0.049	mg/kg dw	J	1.59	3.1	110	270	mg/kg OC	0.028	0.011
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzo(a)anthracene	0.5	mg/kg dw		2.57	19	110	270	mg/kg OC	0.17	0.07
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzo(a)anthracene	0.39	mg/kg dw		2.43	16	110	270	mg/kg OC	0.15	0.059
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzo(a)anthracene	0.077	mg/kg dw	J	1.46	5.3	110	270	mg/kg OC	0.048	0.02
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Benzo(a)anthracene	0.068	mg/kg dw		2.17	3.1	110	270	mg/kg OC	0.028	0.011
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Benzo(a)anthracene	0.63	mg/kg dw		2.08	30	110	270	mg/kg OC	0.27	0.11
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzo(a)anthracene	0.21	mg/kg dw		2.55	8.2	110	270	mg/kg OC	0.075	0.03
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Benzo(a)anthracene	0.16	mg/kg dw		2.47	6.5	110	270	mg/kg OC	0.059	0.024
B6b	2.2	LDWRI-Benthic	9/18/2004	Benzo(a)pyrene	0.16	mg/kg dw		2.96	5.4	99	210	mg/kg OC	0.055	0.026
DR105	2	EPA SI	8/19/1998	Benzo(a)pyrene	0.24	mg/kg dw		2.07	12	99	210	mg/kg OC	0.12	0.057
DR107	2.1	EPA SI	8/19/1998	Benzo(a)pyrene	0.44	mg/kg dw		2.5	18	99	210	mg/kg OC	0.18	0.086
DR108	2.1	EPA SI	8/19/1998	Benzo(a)pyrene	0.41	mg/kg dw		2.33	18	99	210	mg/kg OC	0.18	0.086
DR109	2.1	EPA SI	9/1/1998	Benzo(a)pyrene	0.34	mg/kg dw		2.35	14	99	210	mg/kg OC	0.14	0.067
DR110	2.1	EPA SI	8/19/1998	Benzo(a)pyrene	0.45	mg/kg dw		2.67	17	99	210	mg/kg OC	0.17	0.081
DR111	2.1	EPA SI	8/19/1998	Benzo(a)pyrene	0.46	mg/kg dw	J	2.26	20	99	210	mg/kg OC	0.2	0.095
DR112	2.1	EPA SI	8/19/1998	Benzo(a)pyrene	0.79	mg/kg dw		2.64	30	99	210	mg/kg OC	0.3	0.14
DR114	2.3	EPA SI	8/19/1998	Benzo(a)pyrene	0.28	mg/kg dw		2.51	11	99	210	mg/kg OC	0.11	0.052
DR115	2.3	EPA SI	9/14/1998	Benzo(a)pyrene	0.36	mg/kg dw		1.3	28	99	210	mg/kg OC	0.28	0.13
DR148	2.1	EPA SI	8/18/1998	Benzo(a)pyrene	60	ug/kg dw		4.51		1600	3000	ug/kg dw	0.038	0.02
DR149	2.3	EPA SI	8/19/1998	Benzo(a)pyrene	0.39	mg/kg dw		2.01	19	99	210	mg/kg OC	0.19	0.09
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzo(a)pyrene	0.097	mg/kg dw		0.972	10	99	210	mg/kg OC	0.1	0.048
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzo(a)pyrene	0.063	mg/kg dw		1.59	4	99	210	mg/kg OC	0.04	0.019
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzo(a)pyrene	0.52	mg/kg dw		2.57	20	99	210	mg/kg OC	0.2	0.095
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzo(a)pyrene	0.52	mg/kg dw		2.43	21	99	210	mg/kg OC	0.21	0.1
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzo(a)pyrene	0.1	mg/kg dw		1.46	6.8	99	210	mg/kg OC	0.069	0.032
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Benzo(a)pyrene	0.08	mg/kg dw		2.17	3.7	99	210	mg/kg OC	0.037	0.018
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Benzo(a)pyrene	0.64	mg/kg dw		2.08	31	99	210	mg/kg OC	0.31	0.15
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzo(a)pyrene	0.26	mg/kg dw		2.55	10	99	210	mg/kg OC	0.1	0.048
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Benzo(a)pyrene	0.18	mg/kg dw		2.47	7.3	99	210	mg/kg OC	0.074	0.035
B6b	2.2	LDWRI-Benthic	9/18/2004	Benzo(b)fluoranthene	0.19	mg/kg dw		2.96						
DR105	2	EPA SI	8/19/1998	Benzo(b)fluoranthene	0.27	mg/kg dw		2.07						
DR107	2.1	EPA SI	8/19/1998	Benzo(b)fluoranthene	0.59	mg/kg dw		2.5						
DR108	2.1	EPA SI	8/19/1998	Benzo(b)fluoranthene	0.55	mg/kg dw		2.33						
DR109	2.1	EPA SI	9/1/1998	Benzo(b)fluoranthene	0.46	mg/kg dw		2.35						
DR110	2.1	EPA SI	8/19/1998	Benzo(b)fluoranthene	0.6	mg/kg dw		2.67						
DR111	2.1	EPA SI	8/19/1998	Benzo(b)fluoranthene	0.62	mg/kg dw	J	2.26						

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
DR112	2.1	EPA SI	8/19/1998	Benzo(b)fluoranthene	1.3	mg/kg dw		2.64						
DR114	2.3	EPA SI	8/19/1998	Benzo(b)fluoranthene	0.33	mg/kg dw		2.51						
DR115	2.3	EPA SI	9/14/1998	Benzo(b)fluoranthene	0.41	mg/kg dw		1.3						
DR148	2.1	EPA SI	8/18/1998	Benzo(b)fluoranthene	0.07	mg/kg dw		4.51						
DR149	2.3	EPA SI	8/19/1998	Benzo(b)fluoranthene	0.48	mg/kg dw		2.01						
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzo(b)fluoranthene	0.11	mg/kg dw		0.972						
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzo(b)fluoranthene	0.1	mg/kg dw		1.59						
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzo(b)fluoranthene	0.77	mg/kg dw		2.57						
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzo(b)fluoranthene	0.88	mg/kg dw		2.43						
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzo(b)fluoranthene	0.13	mg/kg dw		1.46						
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Benzo(b)fluoranthene	0.12	mg/kg dw		2.17						
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Benzo(b)fluoranthene	1.1	mg/kg dw		2.08						
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzo(b)fluoranthene	0.38	mg/kg dw		2.55						
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Benzo(b)fluoranthene	0.27	mg/kg dw		2.47						
B6b	2.2	LDWRI-Benthic	9/18/2004	Benzo(e)pyrene	0.15	mg/kg dw		2.96						
B6b	2.2	LDWRI-Benthic	9/18/2004	Benzo(g,h,i)perylene	0.1	mg/kg dw		2.96	3.4	31	78	mg/kg OC	0.11	0.044
DR105	2	EPA SI	8/19/1998	Benzo(g,h,i)perylene	0.16	mg/kg dw		2.07	7.7	31	78	mg/kg OC	0.25	0.099
DR107	2.1	EPA SI	8/19/1998	Benzo(g,h,i)perylene	0.22	mg/kg dw		2.5	8.8	31	78	mg/kg OC	0.28	0.11
DR108	2.1	EPA SI	8/19/1998	Benzo(g,h,i)perylene	0.22	mg/kg dw		2.33	9.4	31	78	mg/kg OC	0.3	0.12
DR109	2.1	EPA SI	9/1/1998	Benzo(g,h,i)perylene	0.23	mg/kg dw		2.35	9.8	31	78	mg/kg OC	0.32	0.13
DR110	2.1	EPA SI	8/19/1998	Benzo(g,h,i)perylene	0.21	mg/kg dw		2.67	7.9	31	78	mg/kg OC	0.25	0.1
DR111	2.1	EPA SI	8/19/1998	Benzo(g,h,i)perylene	0.22	mg/kg dw	J	2.26	9.7	31	78	mg/kg OC	0.31	0.12
DR112	2.1	EPA SI	8/19/1998	Benzo(g,h,i)perylene	0.35	mg/kg dw		2.64	13	31	78	mg/kg OC	0.42	0.17
DR114	2.3	EPA SI	8/19/1998	Benzo(g,h,i)perylene	0.14	mg/kg dw		2.51	5.6	31	78	mg/kg OC	0.18	0.072
DR115	2.3	EPA SI	9/14/1998	Benzo(g,h,i)perylene	0.17	mg/kg dw		1.3	13	31	78	mg/kg OC	0.42	0.17
DR148	2.1	EPA SI	8/18/1998	Benzo(g,h,i)perylene	40	ug/kg dw		4.51		670	720	ug/kg dw	0.06	0.056
DR149	2.3	EPA SI	8/19/1998	Benzo(g,h,i)perylene	0.18	mg/kg dw		2.01	9	31	78	mg/kg OC	0.29	0.12
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzo(g,h,i)perylene	0.068	mg/kg dw		0.972	7	31	78	mg/kg OC	0.23	0.09
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzo(g,h,i)perylene	0.053	mg/kg dw	J	1.59	3.3	31	78	mg/kg OC	0.11	0.042
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzo(g,h,i)perylene	0.28	mg/kg dw		2.57	11	31	78	mg/kg OC	0.35	0.14
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzo(g,h,i)perylene	0.17	mg/kg dw		2.43	7	31	78	mg/kg OC	0.23	0.09
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Benzo(g,h,i)perylene	0.028	mg/kg dw		2.17	1.3	31	78	mg/kg OC	0.042	0.017
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Benzo(g,h,i)perylene	0.16	mg/kg dw		2.08	7.7	31	78	mg/kg OC	0.25	0.099
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzo(g,h,i)perylene	0.094	mg/kg dw	J	2.55	3.7	31	78	mg/kg OC	0.12	0.047
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Benzo(g,h,i)perylene	0.095	mg/kg dw		2.47	3.8	31	78	mg/kg OC	0.12	0.049
B6b	2.2	LDWRI-Benthic	9/18/2004	Benzo(k)fluoranthene	0.18	mg/kg dw		2.96						
DR105	2	EPA SI	8/19/1998	Benzo(k)fluoranthene	0.22	mg/kg dw		2.07						
DR107	2.1	EPA SI	8/19/1998	Benzo(k)fluoranthene	0.38	mg/kg dw		2.5						
DR108	2.1	EPA SI	8/19/1998	Benzo(k)fluoranthene	0.36	mg/kg dw		2.33						
DR109	2.1	EPA SI	9/1/1998	Benzo(k)fluoranthene	0.33	mg/kg dw		2.35						
DR110	2.1	EPA SI	8/19/1998	Benzo(k)fluoranthene	0.39	mg/kg dw		2.67						
DR111	2.1	EPA SI	8/19/1998	Benzo(k)fluoranthene	0.45	mg/kg dw	J	2.26						
DR112	2.1	EPA SI	8/19/1998	Benzo(k)fluoranthene	0.8	mg/kg dw		2.64						
DR114	2.3	EPA SI	8/19/1998	Benzo(k)fluoranthene	0.32	mg/kg dw		2.51						
DR115	2.3	EPA SI	9/14/1998	Benzo(k)fluoranthene	0.38	mg/kg dw		1.3						
DR148	2.1	EPA SI	8/18/1998	Benzo(k)fluoranthene	0.06	mg/kg dw		4.51						
DR149	2.3	EPA SI	8/19/1998	Benzo(k)fluoranthene	0.43	mg/kg dw		2.01						
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzo(k)fluoranthene	0.099	mg/kg dw		0.972						
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzo(k)fluoranthene	0.059	mg/kg dw	J	1.59						
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzo(k)fluoranthene	0.45	mg/kg dw		2.57						
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzo(k)fluoranthene	0.41	mg/kg dw		2.43						
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzo(k)fluoranthene	0.12	mg/kg dw		1.46						
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Benzo(k)fluoranthene	0.07	mg/kg dw		2.17						

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Benzo(k)fluoranthene	0.57	mg/kg dw		2.08						
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzo(k)fluoranthene	0.24	mg/kg dw		2.55						
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Benzo(k)fluoranthene	0.17	mg/kg dw		2.47						
B6b	2.2	LDWRI-Benthic	9/18/2004	Benzofluoranthenes (total-calc'd)	0.37	mg/kg dw		2.96	13	230	450	mg/kg OC	0.057	0.029
DR105	2	EPA SI	8/19/1998	Benzofluoranthenes (total-calc'd)	0.49	mg/kg dw		2.07	24	230	450	mg/kg OC	0.1	0.053
DR107	2.1	EPA SI	8/19/1998	Benzofluoranthenes (total-calc'd)	0.97	mg/kg dw		2.5	39	230	450	mg/kg OC	0.17	0.087
DR108	2.1	EPA SI	8/19/1998	Benzofluoranthenes (total-calc'd)	0.91	mg/kg dw		2.33	39	230	450	mg/kg OC	0.17	0.087
DR109	2.1	EPA SI	9/1/1998	Benzofluoranthenes (total-calc'd)	0.79	mg/kg dw		2.35	34	230	450	mg/kg OC	0.15	0.076
DR110	2.1	EPA SI	8/19/1998	Benzofluoranthenes (total-calc'd)	0.99	mg/kg dw		2.67	37	230	450	mg/kg OC	0.16	0.082
DR111	2.1	EPA SI	8/19/1998	Benzofluoranthenes (total-calc'd)	1.07	mg/kg dw	J	2.26	47.3	230	450	mg/kg OC	0.21	0.11
DR112	2.1	EPA SI	8/19/1998	Benzofluoranthenes (total-calc'd)	2.1	mg/kg dw		2.64	80	230	450	mg/kg OC	0.35	0.18
DR114	2.3	EPA SI	8/19/1998	Benzofluoranthenes (total-calc'd)	0.65	mg/kg dw		2.51	26	230	450	mg/kg OC	0.11	0.058
DR115	2.3	EPA SI	9/14/1998	Benzofluoranthenes (total-calc'd)	0.79	mg/kg dw		1.3	61	230	450	mg/kg OC	0.27	0.14
DR148	2.1	EPA SI	8/18/1998	Benzofluoranthenes (total-calc'd)	130	ug/kg dw		4.51		3200	3600	ug/kg dw	0.041	0.036
DR149	2.3	EPA SI	8/19/1998	Benzofluoranthenes (total-calc'd)	0.91	mg/kg dw		2.01	45	230	450	mg/kg OC	0.2	0.1
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzofluoranthenes (total-calc'd)	0.21	mg/kg dw		0.972	22	230	450	mg/kg OC	0.096	0.049
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzofluoranthenes (total-calc'd)	0.16	mg/kg dw	J	1.59	10	230	450	mg/kg OC	0.043	0.022
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Benzofluoranthenes (total-calc'd)	1.22	mg/kg dw		2.57	47.5	230	450	mg/kg OC	0.21	0.11
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzofluoranthenes (total-calc'd)	1.29	mg/kg dw		2.43	53.1	230	450	mg/kg OC	0.23	0.12
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzofluoranthenes (total-calc'd)	0.25	mg/kg dw		1.46	17	230	450	mg/kg OC	0.074	0.038
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Benzofluoranthenes (total-calc'd)	0.19	mg/kg dw		2.17	8.8	230	450	mg/kg OC	0.038	0.02
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Benzofluoranthenes (total-calc'd)	1.7	mg/kg dw		2.08	82	230	450	mg/kg OC	0.36	0.18
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzofluoranthenes (total-calc'd)	0.62	mg/kg dw		2.55	24	230	450	mg/kg OC	0.1	0.053
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Benzofluoranthenes (total-calc'd)	0.44	mg/kg dw		2.47	18	230	450	mg/kg OC	0.078	0.04
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Benzoic acid	66	ug/kg dw		2.17		650	650	ug/kg dw	0.1	0.1
B6b	2.2	LDWRI-Benthic	9/18/2004	Benzyl alcohol	13	ug/kg dw		2.96		57	73	ug/kg dw	0.23	0.18
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzyl alcohol	150	ug/kg dw		2.43		57	73	ug/kg dw	2.6	2.1
DR105	2	EPA SI	8/19/1998	Beryllium	0.4	mg/kg dw		2.07						
DR107	2.1	EPA SI	8/19/1998	Beryllium	0.46	mg/kg dw		2.5						
DR108	2.1	EPA SI	8/19/1998	Beryllium	0.49	mg/kg dw		2.33						
DR109	2.1	EPA SI	9/1/1998	Beryllium	0.45	mg/kg dw		2.35						
DR110	2.1	EPA SI	8/19/1998	Beryllium	0.47	mg/kg dw		2.67						
DR111	2.1	EPA SI	8/19/1998	Beryllium	0.45	mg/kg dw		2.26						
DR112	2.1	EPA SI	8/19/1998	Beryllium	0.46	mg/kg dw		2.64						
DR114	2.3	EPA SI	8/19/1998	Beryllium	0.42	mg/kg dw		2.51						
DR115	2.3	EPA SI	9/14/1998	Beryllium	0.33	mg/kg dw	J	1.3						
DR148	2.1	EPA SI	8/18/1998	Beryllium	0.55	mg/kg dw		4.51						
DR149	2.3	EPA SI	8/19/1998	Beryllium	0.4	mg/kg dw		2.01						
B6b	2.2	LDWRI-Benthic	9/18/2004	Biphenyl	0.0038	mg/kg dw	J	2.96						
B6b	2.2	LDWRI-Benthic	9/18/2004	Bis(2-ethylhexyl)phthalate	0.16	mg/kg dw	J	2.96	5.4	47	78	mg/kg OC	0.11	0.069
DR105	2	EPA SI	8/19/1998	Bis(2-ethylhexyl)phthalate	0.37	mg/kg dw		2.07	18	47	78	mg/kg OC	0.38	0.23
DR107	2.1	EPA SI	8/19/1998	Bis(2-ethylhexyl)phthalate	0.42	mg/kg dw		2.5	17	47	78	mg/kg OC	0.36	0.22
DR108	2.1	EPA SI	8/19/1998	Bis(2-ethylhexyl)phthalate	0.4	mg/kg dw		2.33	17	47	78	mg/kg OC	0.36	0.22
DR109	2.1	EPA SI	9/1/1998	Bis(2-ethylhexyl)phthalate	0.41	mg/kg dw		2.35	17	47	78	mg/kg OC	0.36	0.22
DR110	2.1	EPA SI	8/19/1998	Bis(2-ethylhexyl)phthalate	0.52	mg/kg dw		2.67	19	47	78	mg/kg OC	0.4	0.24
DR111	2.1	EPA SI	8/19/1998	Bis(2-ethylhexyl)phthalate	0.41	mg/kg dw		2.26	18	47	78	mg/kg OC	0.38	0.23
DR112	2.1	EPA SI	8/19/1998	Bis(2-ethylhexyl)phthalate	0.44	mg/kg dw		2.64	17	47	78	mg/kg OC	0.36	0.22
DR114	2.3	EPA SI	8/19/1998	Bis(2-ethylhexyl)phthalate	0.33	mg/kg dw		2.51	13	47	78	mg/kg OC	0.28	0.17
DR148	2.1	EPA SI	8/18/1998	Bis(2-ethylhexyl)phthalate	100	ug/kg dw		4.51		1300	1900	ug/kg dw	0.077	0.053
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Bis(2-ethylhexyl)phthalate	0.14	mg/kg dw		0.972	14	47	78	mg/kg OC	0.3	0.18
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Bis(2-ethylhexyl)phthalate	0.18	mg/kg dw		1.59	11	47	78	mg/kg OC	0.23	0.14
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Bis(2-ethylhexyl)phthalate	0.31	mg/kg dw		2.57	12	47	78	mg/kg OC	0.26	0.15
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Bis(2-ethylhexyl)phthalate	0.37	mg/kg dw		2.43	15	47	78	mg/kg OC	0.32	0.19

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Bis(2-ethylhexyl)phthalate	0.12	mg/kg dw		1.46	8.2	47	78	mg/kg OC	0.17	0.11
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Bis(2-ethylhexyl)phthalate	0.059	mg/kg dw		2.17	2.7	47	78	mg/kg OC	0.057	0.035
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Bis(2-ethylhexyl)phthalate	0.2	mg/kg dw		2.08	9.6	47	78	mg/kg OC	0.2	0.12
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Bis(2-ethylhexyl)phthalate	0.26	mg/kg dw		2.55	10	47	78	mg/kg OC	0.21	0.13
B6b	2.2	LDWRI-Benthic	9/18/2004	Butyl benzyl phthalate	0.023	mg/kg dw		2.96	0.78	4.9	64	mg/kg OC	0.16	0.012
DR105	2	EPA SI	8/19/1998	Butyl benzyl phthalate	0.03	mg/kg dw		2.07	1.4	4.9	64	mg/kg OC	0.29	0.022
DR107	2.1	EPA SI	8/19/1998	Butyl benzyl phthalate	0.03	mg/kg dw		2.5	1.2	4.9	64	mg/kg OC	0.24	0.019
DR108	2.1	EPA SI	8/19/1998	Butyl benzyl phthalate	0.04	mg/kg dw		2.33	1.7	4.9	64	mg/kg OC	0.35	0.027
DR109	2.1	EPA SI	9/1/1998	Butyl benzyl phthalate	0.03	mg/kg dw		2.35	1.3	4.9	64	mg/kg OC	0.27	0.02
DR110	2.1	EPA SI	8/19/1998	Butyl benzyl phthalate	0.03	mg/kg dw		2.67	1.1	4.9	64	mg/kg OC	0.22	0.017
DR111	2.1	EPA SI	8/19/1998	Butyl benzyl phthalate	0.03	mg/kg dw		2.26	1.3	4.9	64	mg/kg OC	0.27	0.02
DR112	2.1	EPA SI	8/19/1998	Butyl benzyl phthalate	0.03	mg/kg dw		2.64	1.1	4.9	64	mg/kg OC	0.22	0.017
DR114	2.3	EPA SI	8/19/1998	Butyl benzyl phthalate	0.02	mg/kg dw		2.51	0.8	4.9	64	mg/kg OC	0.16	0.013
DR115	2.3	EPA SI	9/14/1998	Butyl benzyl phthalate	0.03	mg/kg dw		1.3	2.3	4.9	64	mg/kg OC	0.47	0.036
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Butyl benzyl phthalate	0.012	mg/kg dw		0.972	1.2	4.9	64	mg/kg OC	0.24	0.019
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Butyl benzyl phthalate	0.012	mg/kg dw		1.59	0.75	4.9	64	mg/kg OC	0.15	0.012
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Butyl benzyl phthalate	0.044	mg/kg dw		2.57	1.7	4.9	64	mg/kg OC	0.35	0.027
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Butyl benzyl phthalate	0.0099	mg/kg dw		2.17	0.46	4.9	64	mg/kg OC	0.094	0.0072
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Butyl benzyl phthalate	0.024	mg/kg dw		2.08	1.2	4.9	64	mg/kg OC	0.24	0.019
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Butyl benzyl phthalate	0.042	mg/kg dw		2.47	1.7	4.9	64	mg/kg OC	0.35	0.027
B6b	2.2	LDWRI-Benthic	9/18/2004	Cadmium	0.492	mg/kg dw		2.96		5.1	6.7	mg/kg dw	0.096	0.073
DR105	2	EPA SI	8/19/1998	Cadmium	0.4	mg/kg dw		2.07		5.1	6.7	mg/kg dw	0.078	0.06
DR107	2.1	EPA SI	8/19/1998	Cadmium	0.38	mg/kg dw		2.5		5.1	6.7	mg/kg dw	0.075	0.057
DR108	2.1	EPA SI	8/19/1998	Cadmium	0.39	mg/kg dw		2.33		5.1	6.7	mg/kg dw	0.076	0.058
DR109	2.1	EPA SI	9/1/1998	Cadmium	0.48	mg/kg dw		2.35		5.1	6.7	mg/kg dw	0.094	0.072
DR110	2.1	EPA SI	8/19/1998	Cadmium	0.42	mg/kg dw		2.67		5.1	6.7	mg/kg dw	0.082	0.063
DR111	2.1	EPA SI	8/19/1998	Cadmium	0.48	mg/kg dw		2.26		5.1	6.7	mg/kg dw	0.094	0.072
DR112	2.1	EPA SI	8/19/1998	Cadmium	0.36	mg/kg dw		2.64		5.1	6.7	mg/kg dw	0.071	0.054
DR114	2.3	EPA SI	8/19/1998	Cadmium	0.6	mg/kg dw		2.51		5.1	6.7	mg/kg dw	0.12	0.09
DR115	2.3	EPA SI	9/14/1998	Cadmium	0.2	mg/kg dw		1.3		5.1	6.7	mg/kg dw	0.039	0.03
DR148	2.1	EPA SI	8/18/1998	Cadmium	0.5	mg/kg dw		4.51		5.1	6.7	mg/kg dw	0.098	0.075
DR149	2.3	EPA SI	8/19/1998	Cadmium	0.4	mg/kg dw		2.01		5.1	6.7	mg/kg dw	0.078	0.06
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Cadmium	0.4	mg/kg dw		2.43		5.1	6.7	mg/kg dw	0.078	0.06
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Cadmium	0.5	mg/kg dw		1.46		5.1	6.7	mg/kg dw	0.098	0.075
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Cadmium	0.4	mg/kg dw		2.08		5.1	6.7	mg/kg dw	0.078	0.06
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Cadmium	0.7	mg/kg dw		2.55		5.1	6.7	mg/kg dw	0.14	0.1
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Cadmium	0.7	mg/kg dw		2.47		5.1	6.7	mg/kg dw	0.14	0.1
B6b	2.2	LDWRI-Benthic	9/18/2004	Carbazole	0.041	mg/kg dw		2.96						
DR105	2	EPA SI	8/19/1998	Carbazole	0.02	mg/kg dw		2.07						
DR107	2.1	EPA SI	8/19/1998	Carbazole	0.05	mg/kg dw		2.5						
DR108	2.1	EPA SI	8/19/1998	Carbazole	0.03	mg/kg dw		2.33						
DR109	2.1	EPA SI	9/1/1998	Carbazole	0.03	mg/kg dw		2.35						
DR110	2.1	EPA SI	8/19/1998	Carbazole	0.04	mg/kg dw		2.67						
DR111	2.1	EPA SI	8/19/1998	Carbazole	0.02	mg/kg dw		2.26						
DR112	2.1	EPA SI	8/19/1998	Carbazole	0.1	mg/kg dw		2.64						
DR114	2.3	EPA SI	8/19/1998	Carbazole	0.1	mg/kg dw		2.51						
DR115	2.3	EPA SI	9/14/1998	Carbazole	0.03	mg/kg dw		1.3						
DR149	2.3	EPA SI	8/19/1998	Carbazole	0.04	mg/kg dw		2.01						
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Carbazole	0.073	mg/kg dw		2.08						
DR111	2.1	EPA SI	8/19/1998	Carbon disulfide	0.0012	mg/kg dw	J	2.26						
B6b	2.2	LDWRI-Benthic	9/18/2004	Chromium	33.8	mg/kg dw		2.96		260	270	mg/kg dw	0.13	0.13
DR105	2	EPA SI	8/19/1998	Chromium	33	mg/kg dw		2.07		260	270	mg/kg dw	0.13	0.12
DR107	2.1	EPA SI	8/19/1998	Chromium	27	mg/kg dw		2.5		260	270	mg/kg dw	0.1	0.1

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^1	CSL^1	SQS/CSL Units	SQS Exceedance Factor^2	CSL Exceedance Factor^2
DR108	2.1	EPA SI	8/19/1998	Chromium	28	mg/kg dw		2.33		260	270	mg/kg dw	0.11	0.1
DR109	2.1	EPA SI	9/1/1998	Chromium	38	mg/kg dw		2.35		260	270	mg/kg dw	0.15	0.14
DR110	2.1	EPA SI	8/19/1998	Chromium	29	mg/kg dw		2.67		260	270	mg/kg dw	0.11	0.11
DR111	2.1	EPA SI	8/19/1998	Chromium	26	mg/kg dw		2.26		260	270	mg/kg dw	0.1	0.096
DR112	2.1	EPA SI	8/19/1998	Chromium	27	mg/kg dw		2.64		260	270	mg/kg dw	0.1	0.1
DR114	2.3	EPA SI	8/19/1998	Chromium	26	mg/kg dw		2.51		260	270	mg/kg dw	0.1	0.096
DR115	2.3	EPA SI	9/14/1998	Chromium	29	mg/kg dw		1.3		260	270	mg/kg dw	0.11	0.11
DR148	2.1	EPA SI	8/18/1998	Chromium	30	mg/kg dw		4.51		260	270	mg/kg dw	0.12	0.11
DR149	2.3	EPA SI	8/19/1998	Chromium	26	mg/kg dw		2.01		260	270	mg/kg dw	0.1	0.096
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Chromium	26.5	mg/kg dw		0.972		260	270	mg/kg dw	0.1	0.098
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Chromium	38.8	mg/kg dw		1.59		260	270	mg/kg dw	0.15	0.14
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Chromium	36	mg/kg dw		2.57		260	270	mg/kg dw	0.14	0.13
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Chromium	28.6	mg/kg dw		2.43		260	270	mg/kg dw	0.11	0.11
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Chromium	36.5	mg/kg dw		1.46		260	270	mg/kg dw	0.14	0.14
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Chromium	36	mg/kg dw	J	2.17		260	270	mg/kg dw	0.14	0.13
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Chromium	28.7	mg/kg dw		2.08		260	270	mg/kg dw	0.11	0.11
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Chromium	36	mg/kg dw		2.55		260	270	mg/kg dw	0.14	0.13
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Chromium	35	mg/kg dw		2.47		260	270	mg/kg dw	0.13	0.13
B6b	2.2	LDWRI-Benthic	9/18/2004	Chrysene	0.26	mg/kg dw		2.96	8.8	110	460	mg/kg OC	0.08	0.019
DR105	2	EPA SI	8/19/1998	Chrysene	0.29	mg/kg dw		2.07	14	110	460	mg/kg OC	0.13	0.03
DR107	2.1	EPA SI	8/19/1998	Chrysene	0.59	mg/kg dw		2.5	24	110	460	mg/kg OC	0.22	0.052
DR108	2.1	EPA SI	8/19/1998	Chrysene	0.46	mg/kg dw		2.33	20	110	460	mg/kg OC	0.18	0.043
DR109	2.1	EPA SI	9/1/1998	Chrysene	0.46	mg/kg dw		2.35	20	110	460	mg/kg OC	0.18	0.043
DR110	2.1	EPA SI	8/19/1998	Chrysene	0.57	mg/kg dw		2.67	21	110	460	mg/kg OC	0.19	0.046
DR111	2.1	EPA SI	8/19/1998	Chrysene	0.45	mg/kg dw		2.26	20	110	460	mg/kg OC	0.18	0.043
DR112	2.1	EPA SI	8/19/1998	Chrysene	1.5	mg/kg dw		2.64	57	110	460	mg/kg OC	0.52	0.12
DR114	2.3	EPA SI	8/19/1998	Chrysene	0.43	mg/kg dw		2.51	17	110	460	mg/kg OC	0.15	0.037
DR115	2.3	EPA SI	9/14/1998	Chrysene	0.61	mg/kg dw		1.3	47	110	460	mg/kg OC	0.43	0.1
DR148	2.1	EPA SI	8/18/1998	Chrysene	90	ug/kg dw		4.51		1400	2800	ug/kg dw	0.064	0.032
DR149	2.3	EPA SI	8/19/1998	Chrysene	0.74	mg/kg dw		2.01	37	110	460	mg/kg OC	0.34	0.08
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Chrysene	0.17	mg/kg dw		0.972	17	110	460	mg/kg OC	0.15	0.037
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Chrysene	0.073	mg/kg dw		1.59	4.6	110	460	mg/kg OC	0.042	0.01
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Chrysene	0.81	mg/kg dw		2.57	32	110	460	mg/kg OC	0.29	0.07
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Chrysene	0.71	mg/kg dw		2.43	29	110	460	mg/kg OC	0.26	0.063
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Chrysene	0.12	mg/kg dw		1.46	8.2	110	460	mg/kg OC	0.075	0.018
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Chrysene	0.13	mg/kg dw		2.17	6	110	460	mg/kg OC	0.055	0.013
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Chrysene	0.82	mg/kg dw		2.08	39	110	460	mg/kg OC	0.35	0.085
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Chrysene	0.34	mg/kg dw		2.55	13	110	460	mg/kg OC	0.12	0.028
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Chrysene	0.26	mg/kg dw		2.47	11	110	460	mg/kg OC	0.1	0.024
B6b	2.2	LDWRI-Benthic	9/18/2004	Cobalt	11.2	mg/kg dw		2.96						
DR105	2	EPA SI	8/19/1998	Cobalt	10	mg/kg dw		2.07						
DR107	2.1	EPA SI	8/19/1998	Cobalt	10	mg/kg dw		2.5						
DR108	2.1	EPA SI	8/19/1998	Cobalt	10	mg/kg dw		2.33						
DR109	2.1	EPA SI	9/1/1998	Cobalt	13	mg/kg dw		2.35						
DR110	2.1	EPA SI	8/19/1998	Cobalt	9	mg/kg dw		2.67						
DR111	2.1	EPA SI	8/19/1998	Cobalt	9	mg/kg dw		2.26						
DR112	2.1	EPA SI	8/19/1998	Cobalt	10	mg/kg dw		2.64						
DR114	2.3	EPA SI	8/19/1998	Cobalt	8	mg/kg dw		2.51						
DR115	2.3	EPA SI	9/14/1998	Cobalt	8	mg/kg dw		1.3						
DR148	2.1	EPA SI	8/18/1998	Cobalt	11	mg/kg dw		4.51						
DR149	2.3	EPA SI	8/19/1998	Cobalt	10	mg/kg dw		2.01						
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Cobalt	6.1	mg/kg dw		0.972						
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Cobalt	6.4	mg/kg dw		1.59						

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Cobalt	10.3	mg/kg dw		2.57						
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Cobalt	8.6	mg/kg dw		2.43						
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Cobalt	7	mg/kg dw		1.46						
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Cobalt	10.8	mg/kg dw		2.17						
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Cobalt	8.4	mg/kg dw		2.08						
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Cobalt	10.8	mg/kg dw		2.55						
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Cobalt	10.7	mg/kg dw		2.47						
B6b	2.2	LDWRI-Benthic	9/18/2004	Copper	80.8	mg/kg dw		2.96		390	390	mg/kg dw	0.21	0.21
DR105	2	EPA SI	8/19/1998	Copper	59	mg/kg dw		2.07		390	390	mg/kg dw	0.15	0.15
DR107	2.1	EPA SI	8/19/1998	Copper	82	mg/kg dw		2.5		390	390	mg/kg dw	0.21	0.21
DR108	2.1	EPA SI	8/19/1998	Copper	84	mg/kg dw		2.33		390	390	mg/kg dw	0.22	0.22
DR109	2.1	EPA SI	9/1/1998	Copper	93	mg/kg dw		2.35		390	390	mg/kg dw	0.24	0.24
DR110	2.1	EPA SI	8/19/1998	Copper	65	mg/kg dw		2.67		390	390	mg/kg dw	0.17	0.17
DR111	2.1	EPA SI	8/19/1998	Copper	62	mg/kg dw		2.26		390	390	mg/kg dw	0.16	0.16
DR112	2.1	EPA SI	8/19/1998	Copper	56	mg/kg dw		2.64		390	390	mg/kg dw	0.14	0.14
DR114	2.3	EPA SI	8/19/1998	Copper	59	mg/kg dw		2.51		390	390	mg/kg dw	0.15	0.15
DR115	2.3	EPA SI	9/14/1998	Copper	83	mg/kg dw		1.3		390	390	mg/kg dw	0.21	0.21
DR148	2.1	EPA SI	8/18/1998	Copper	51	mg/kg dw		4.51		390	390	mg/kg dw	0.13	0.13
DR149	2.3	EPA SI	8/19/1998	Copper	53	mg/kg dw		2.01		390	390	mg/kg dw	0.14	0.14
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Copper	62.9	mg/kg dw		0.972		390	390	mg/kg dw	0.16	0.16
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Copper	41.9	mg/kg dw		1.59		390	390	mg/kg dw	0.11	0.11
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Copper	100	mg/kg dw		2.57		390	390	mg/kg dw	0.26	0.26
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Copper	70.1	mg/kg dw		2.43		390	390	mg/kg dw	0.18	0.18
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Copper	132	mg/kg dw		1.46		390	390	mg/kg dw	0.34	0.34
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Copper	75.3	mg/kg dw		2.17		390	390	mg/kg dw	0.19	0.19
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Copper	98.4	mg/kg dw	J	2.08		390	390	mg/kg dw	0.25	0.25
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Copper	82.8	mg/kg dw		2.55		390	390	mg/kg dw	0.21	0.21
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Copper	89.4	mg/kg dw		2.47		390	390	mg/kg dw	0.23	0.23
B6b	2.2	LDWRI-Benthic	9/18/2004	DDTs (total-calc'd)	0.022	mg/kg dw	JN	2.96						
DR111	2.1	EPA SI	8/19/1998	DDTs (total-calc'd)	0.075	mg/kg dw	J	2.26						
B6b	2.2	LDWRI-Benthic	9/18/2004	Dibenzo(a,h)anthracene	0.024	mg/kg dw		2.96	0.81	12	33	mg/kg OC	0.068	0.025
DR105	2	EPA SI	8/19/1998	Dibenzo(a,h)anthracene	0.04	mg/kg dw		2.07	1.9	12	33	mg/kg OC	0.16	0.058
DR107	2.1	EPA SI	8/19/1998	Dibenzo(a,h)anthracene	0.07	mg/kg dw		2.5	2.8	12	33	mg/kg OC	0.23	0.085
DR108	2.1	EPA SI	8/19/1998	Dibenzo(a,h)anthracene	0.07	mg/kg dw		2.33	3	12	33	mg/kg OC	0.25	0.091
DR109	2.1	EPA SI	9/1/1998	Dibenzo(a,h)anthracene	0.07	mg/kg dw		2.35	3	12	33	mg/kg OC	0.25	0.091
DR110	2.1	EPA SI	8/19/1998	Dibenzo(a,h)anthracene	0.05	mg/kg dw		2.67	1.9	12	33	mg/kg OC	0.16	0.058
DR111	2.1	EPA SI	8/19/1998	Dibenzo(a,h)anthracene	0.05	mg/kg dw		2.26	2.2	12	33	mg/kg OC	0.18	0.067
DR112	2.1	EPA SI	8/19/1998	Dibenzo(a,h)anthracene	0.11	mg/kg dw		2.64	4.2	12	33	mg/kg OC	0.35	0.13
DR114	2.3	EPA SI	8/19/1998	Dibenzo(a,h)anthracene	0.05	mg/kg dw		2.51	2	12	33	mg/kg OC	0.17	0.061
DR115	2.3	EPA SI	9/14/1998	Dibenzo(a,h)anthracene	0.05	mg/kg dw		1.3	3.8	12	33	mg/kg OC	0.32	0.12
DR149	2.3	EPA SI	8/19/1998	Dibenzo(a,h)anthracene	0.05	mg/kg dw		2.01	2.5	12	33	mg/kg OC	0.21	0.076
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Dibenzo(a,h)anthracene	0.013	mg/kg dw		0.972	1.3	12	33	mg/kg OC	0.11	0.039
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Dibenzo(a,h)anthracene	0.0092	mg/kg dw		1.59	0.58	12	33	mg/kg OC	0.048	0.018
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Dibenzo(a,h)anthracene	0.11	mg/kg dw		2.57	4.3	12	33	mg/kg OC	0.36	0.13
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Dibenzo(a,h)anthracene	0.084	mg/kg dw		2.08	4	12	33	mg/kg OC	0.33	0.12
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Dibenzo(a,h)anthracene	0.042	mg/kg dw		2.47	1.7	12	33	mg/kg OC	0.14	0.052
B6b	2.2	LDWRI-Benthic	9/18/2004	Dibenzofuran	0.013	mg/kg dw		2.96	0.44	15	58	mg/kg OC	0.029	0.0076
DR107	2.1	EPA SI	8/19/1998	Dibenzofuran	0.03	mg/kg dw		2.5	1.2	15	58	mg/kg OC	0.08	0.021
DR109	2.1	EPA SI	9/1/1998	Dibenzofuran	0.02	mg/kg dw		2.35	0.85	15	58	mg/kg OC	0.057	0.015
DR110	2.1	EPA SI	8/19/1998	Dibenzofuran	0.05	mg/kg dw		2.67	1.9	15	58	mg/kg OC	0.13	0.033
DR111	2.1	EPA SI	8/19/1998	Dibenzofuran	0.02	mg/kg dw		2.26	0.88	15	58	mg/kg OC	0.059	0.015
DR112	2.1	EPA SI	8/19/1998	Dibenzofuran	0.04	mg/kg dw		2.64	1.5	15	58	mg/kg OC	0.1	0.026
DR114	2.3	EPA SI	8/19/1998	Dibenzofuran	0.04	mg/kg dw		2.51	1.6	15	58	mg/kg OC	0.11	0.028

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^1	CSL^1	SQS/CSL Units	SQS Exceedance Factor^2	CSL Exceedance Factor^2
DR115	2.3	EPA SI	9/14/1998	Dibenzofuran	0.02	mg/kg dw		1.3	1.5	15	58	mg/kg OC	0.1	0.026
DR149	2.3	EPA SI	8/19/1998	Dibenzofuran	0.07	mg/kg dw		2.01	3.5	15	58	mg/kg OC	0.23	0.06
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Dibenzofuran	0.021	mg/kg dw		2.08	1	15	58	mg/kg OC	0.067	0.017
B6b	2.2	LDWRI-Benthic	9/18/2004	Dibenzothiophene	0.0076	mg/kg dw		2.96						
B6b	2.2	LDWRI-Benthic	9/18/2004	Dibutyltin as ion	0.012	mg/kg dw		2.96						
DR109	2.1	EPA SI	9/1/1998	Dibutyltin as ion	0.026	mg/kg dw	J	2.35						
DR110	2.1	EPA SI	8/19/1998	Dibutyltin as ion	0.021	mg/kg dw	J	2.67						
DR111	2.1	EPA SI	8/19/1998	Dibutyltin as ion	0.051	mg/kg dw	J	2.26						
DR112	2.1	EPA SI	8/19/1998	Dibutyltin as ion	0.012	mg/kg dw	J	2.64						
DR115	2.3	EPA SI	9/14/1998	Dibutyltin as ion	0.009	mg/kg dw	J	1.3						
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Dibutyltin as ion	0.049	mg/kg dw	J	1.46						
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Dibutyltin as ion	0.0038	mg/kg dw	J	2.55						
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Diethyl phthalate	0.014	mg/kg dw		2.55	0.55	61	110	mg/kg OC	0.009	0.005
B6b	2.2	LDWRI-Benthic	9/18/2004	Dimethyl phthalate	0.0064	mg/kg dw	J	2.96	0.22	53	53	mg/kg OC	0.0042	0.0042
DR107	2.1	EPA SI	8/19/1998	Dimethyl phthalate	0.02	mg/kg dw		2.5	0.8	53	53	mg/kg OC	0.015	0.015
DR110	2.1	EPA SI	8/19/1998	Dimethyl phthalate	0.02	mg/kg dw		2.67	0.75	53	53	mg/kg OC	0.014	0.014
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Dimethyl phthalate	0.0062	mg/kg dw	J	0.972	0.64	53	53	mg/kg OC	0.012	0.012
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Dimethyl phthalate	0.016	mg/kg dw	J	2.57	0.62	53	53	mg/kg OC	0.012	0.012
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Dimethyl phthalate	0.083	mg/kg dw		1.46	5.7	53	53	mg/kg OC	0.11	0.11
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Dimethyl phthalate	0.0071	mg/kg dw		2.47	0.29	53	53	mg/kg OC	0.0055	0.0055
B6b	2.2	LDWRI-Benthic	9/18/2004	Di-n-butyl phthalate	0.037	mg/kg dw		2.96	1.3	220	1700	mg/kg OC	0.0059	0.00076
DR108	2.1	EPA SI	8/19/1998	Di-n-butyl phthalate	0.03	mg/kg dw		2.33	1.3	220	1700	mg/kg OC	0.0059	0.00076
DR114	2.3	EPA SI	8/19/1998	Di-n-butyl phthalate	0.02	mg/kg dw		2.51	0.8	220	1700	mg/kg OC	0.0036	0.00047
DR148	2.1	EPA SI	8/18/1998	Di-n-butyl phthalate	20	ug/kg dw		4.51		1400	5100	ug/kg dw	0.014	0.0039
B6b	2.2	LDWRI-Benthic	9/18/2004	Endrin ketone	0.0014	mg/kg dw	JN	2.96						
B6b	2.2	LDWRI-Benthic	9/18/2004	Fluoranthene	0.4	mg/kg dw		2.96	14	160	1200	mg/kg OC	0.088	0.012
DR105	2	EPA SI	8/19/1998	Fluoranthene	0.4	mg/kg dw		2.07	19	160	1200	mg/kg OC	0.12	0.016
DR107	2.1	EPA SI	8/19/1998	Fluoranthene	1.3	mg/kg dw		2.5	52	160	1200	mg/kg OC	0.33	0.043
DR108	2.1	EPA SI	8/19/1998	Fluoranthene	0.94	mg/kg dw		2.33	40	160	1200	mg/kg OC	0.25	0.033
DR109	2.1	EPA SI	9/1/1998	Fluoranthene	0.65	mg/kg dw		2.35	28	160	1200	mg/kg OC	0.18	0.023
DR110	2.1	EPA SI	8/19/1998	Fluoranthene	1.3	mg/kg dw		2.67	49	160	1200	mg/kg OC	0.31	0.041
DR111	2.1	EPA SI	8/19/1998	Fluoranthene	0.88	mg/kg dw	J	2.26	39	160	1200	mg/kg OC	0.24	0.033
DR112	2.1	EPA SI	8/19/1998	Fluoranthene	5.3	mg/kg dw		2.64	200	160	1200	mg/kg OC	1.3	0.17
DR114	2.3	EPA SI	8/19/1998	Fluoranthene	0.8	mg/kg dw		2.51	32	160	1200	mg/kg OC	0.2	0.027
DR115	2.3	EPA SI	9/14/1998	Fluoranthene	1	mg/kg dw		1.3	77	160	1200	mg/kg OC	0.48	0.064
DR148	2.1	EPA SI	8/18/1998	Fluoranthene	140	ug/kg dw		4.51		1700	2500	ug/kg dw	0.082	0.056
DR149	2.3	EPA SI	8/19/1998	Fluoranthene	2.2	mg/kg dw		2.01	110	160	1200	mg/kg OC	0.69	0.092
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Fluoranthene	0.17	mg/kg dw		0.972	17	160	1200	mg/kg OC	0.11	0.014
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Fluoranthene	0.094	mg/kg dw		1.59	5.9	160	1200	mg/kg OC	0.037	0.0049
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Fluoranthene	1.5	mg/kg dw		2.57	58	160	1200	mg/kg OC	0.36	0.048
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Fluoranthene	0.56	mg/kg dw		2.43	23	160	1200	mg/kg OC	0.14	0.019
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Fluoranthene	0.16	mg/kg dw		1.46	11	160	1200	mg/kg OC	0.069	0.0092
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Fluoranthene	0.13	mg/kg dw		2.17	6	160	1200	mg/kg OC	0.038	0.005
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Fluoranthene	1.2	mg/kg dw		2.08	58	160	1200	mg/kg OC	0.36	0.048
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Fluoranthene	0.39	mg/kg dw		2.55	15	160	1200	mg/kg OC	0.094	0.013
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Fluoranthene	0.3	mg/kg dw		2.47	12	160	1200	mg/kg OC	0.075	0.01
B6b	2.2	LDWRI-Benthic	9/18/2004	Fluorene	0.018	mg/kg dw		2.96	0.61	23	79	mg/kg OC	0.027	0.0077
DR107	2.1	EPA SI	8/19/1998	Fluorene	0.05	mg/kg dw		2.5	2	23	79	mg/kg OC	0.087	0.025
DR108	2.1	EPA SI	8/19/1998	Fluorene	0.03	mg/kg dw		2.33	1.3	23	79	mg/kg OC	0.057	0.016
DR109	2.1	EPA SI	9/1/1998	Fluorene	0.03	mg/kg dw		2.35	1.3	23	79	mg/kg OC	0.057	0.016
DR110	2.1	EPA SI	8/19/1998	Fluorene	0.09	mg/kg dw		2.67	3.4	23	79	mg/kg OC	0.15	0.043
DR111	2.1	EPA SI	8/19/1998	Fluorene	0.04	mg/kg dw		2.26	1.8	23	79	mg/kg OC	0.078	0.023
DR112	2.1	EPA SI	8/19/1998	Fluorene	0.09	mg/kg dw		2.64	3.4	23	79	mg/kg OC	0.15	0.043

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
DR114	2.3	EPA SI	8/19/1998	Fluorene	0.09	mg/kg dw		2.51	3.6	23	79	mg/kg OC	0.16	0.046
DR115	2.3	EPA SI	9/14/1998	Fluorene	0.03	mg/kg dw		1.3	2.3	23	79	mg/kg OC	0.1	0.029
DR148	2.1	EPA SI	8/18/1998	Fluorene	30	ug/kg dw		4.51		540	1000	ug/kg dw	0.056	0.03
DR149	2.3	EPA SI	8/19/1998	Fluorene	0.11	mg/kg dw		2.01	5.5	23	79	mg/kg OC	0.24	0.07
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Fluorene	0.086	mg/kg dw		2.57	3.3	23	79	mg/kg OC	0.14	0.042
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Fluorene	0.044	mg/kg dw		2.08	2.1	23	79	mg/kg OC	0.091	0.027
B6b	2.2	LDWRI-Benthic	9/18/2004	Hexachlorobenzene	0.0019	mg/kg dw	JN	2.96	0.064	0.38	2.3	mg/kg OC	0.17	0.028
B6b	2.2	LDWRI-Benthic	9/18/2004	Indeno(1,2,3-cd)pyrene	0.11	mg/kg dw		2.96	3.7	34	88	mg/kg OC	0.11	0.042
DR105	2	EPA SI	8/19/1998	Indeno(1,2,3-cd)pyrene	0.2	mg/kg dw		2.07	9.7	34	88	mg/kg OC	0.29	0.11
DR107	2.1	EPA SI	8/19/1998	Indeno(1,2,3-cd)pyrene	0.3	mg/kg dw		2.5	12	34	88	mg/kg OC	0.35	0.14
DR108	2.1	EPA SI	8/19/1998	Indeno(1,2,3-cd)pyrene	0.28	mg/kg dw		2.33	12	34	88	mg/kg OC	0.35	0.14
DR109	2.1	EPA SI	9/1/1998	Indeno(1,2,3-cd)pyrene	0.25	mg/kg dw		2.35	11	34	88	mg/kg OC	0.32	0.13
DR110	2.1	EPA SI	8/19/1998	Indeno(1,2,3-cd)pyrene	0.29	mg/kg dw		2.67	11	34	88	mg/kg OC	0.32	0.13
DR111	2.1	EPA SI	8/19/1998	Indeno(1,2,3-cd)pyrene	0.3	mg/kg dw	J	2.26	13	34	88	mg/kg OC	0.38	0.15
DR112	2.1	EPA SI	8/19/1998	Indeno(1,2,3-cd)pyrene	0.47	mg/kg dw		2.64	18	34	88	mg/kg OC	0.53	0.2
DR114	2.3	EPA SI	8/19/1998	Indeno(1,2,3-cd)pyrene	0.19	mg/kg dw		2.51	7.6	34	88	mg/kg OC	0.22	0.086
DR115	2.3	EPA SI	9/14/1998	Indeno(1,2,3-cd)pyrene	0.21	mg/kg dw		1.3	16	34	88	mg/kg OC	0.47	0.18
DR148	2.1	EPA SI	8/18/1998	Indeno(1,2,3-cd)pyrene	50	ug/kg dw		4.51		600	690	ug/kg dw	0.083	0.072
DR149	2.3	EPA SI	8/19/1998	Indeno(1,2,3-cd)pyrene	0.24	mg/kg dw		2.01	12	34	88	mg/kg OC	0.35	0.14
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Indeno(1,2,3-cd)pyrene	0.053	mg/kg dw	J	0.972	5.5	34	88	mg/kg OC	0.16	0.063
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Indeno(1,2,3-cd)pyrene	0.038	mg/kg dw	J	1.59	2.4	34	88	mg/kg OC	0.071	0.027
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Indeno(1,2,3-cd)pyrene	0.26	mg/kg dw		2.57	10	34	88	mg/kg OC	0.29	0.11
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Indeno(1,2,3-cd)pyrene	0.22	mg/kg dw		2.43	9.1	34	88	mg/kg OC	0.27	0.1
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Indeno(1,2,3-cd)pyrene	0.1	mg/kg dw		1.46	6.8	34	88	mg/kg OC	0.2	0.077
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Indeno(1,2,3-cd)pyrene	0.032	mg/kg dw		2.17	1.5	34	88	mg/kg OC	0.044	0.017
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Indeno(1,2,3-cd)pyrene	0.26	mg/kg dw		2.08	13	34	88	mg/kg OC	0.38	0.15
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Indeno(1,2,3-cd)pyrene	0.12	mg/kg dw		2.55	4.7	34	88	mg/kg OC	0.14	0.053
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Indeno(1,2,3-cd)pyrene	0.11	mg/kg dw		2.47	4.5	34	88	mg/kg OC	0.13	0.051
DR105	2	EPA SI	8/19/1998	Iron	25600	mg/kg dw	J	2.07						
DR107	2.1	EPA SI	8/19/1998	Iron	29200	mg/kg dw	J	2.5						
DR108	2.1	EPA SI	8/19/1998	Iron	31300	mg/kg dw	J	2.33						
DR109	2.1	EPA SI	9/1/1998	Iron	42900	mg/kg dw	J	2.35						
DR110	2.1	EPA SI	8/19/1998	Iron	28400	mg/kg dw	J	2.67						
DR111	2.1	EPA SI	8/19/1998	Iron	25400	mg/kg dw	J	2.26						
DR112	2.1	EPA SI	8/19/1998	Iron	27500	mg/kg dw	J	2.64						
DR114	2.3	EPA SI	8/19/1998	Iron	25800	mg/kg dw	J	2.51						
DR115	2.3	EPA SI	9/14/1998	Iron	28500	mg/kg dw		1.3						
DR148	2.1	EPA SI	8/18/1998	Iron	30500	mg/kg dw	J	4.51						
DR149	2.3	EPA SI	8/19/1998	Iron	25800	mg/kg dw	J	2.01						
B6b	2.2	LDWRI-Benthic	9/18/2004	Lead	40.9	mg/kg dw	J	2.96		450	530	mg/kg dw	0.091	0.077
DR105	2	EPA SI	8/19/1998	Lead	365	mg/kg dw		2.07		450	530	mg/kg dw	0.81	0.69
DR107	2.1	EPA SI	8/19/1998	Lead	52.3	mg/kg dw		2.5		450	530	mg/kg dw	0.12	0.099
DR108	2.1	EPA SI	8/19/1998	Lead	49.3	mg/kg dw		2.33		450	530	mg/kg dw	0.11	0.093
DR109	2.1	EPA SI	9/1/1998	Lead	43.9	mg/kg dw		2.35		450	530	mg/kg dw	0.098	0.083
DR110	2.1	EPA SI	8/19/1998	Lead	40.8	mg/kg dw		2.67		450	530	mg/kg dw	0.091	0.077
DR111	2.1	EPA SI	8/19/1998	Lead	39.3	mg/kg dw		2.26		450	530	mg/kg dw	0.087	0.074
DR112	2.1	EPA SI	8/19/1998	Lead	33	mg/kg dw		2.64		450	530	mg/kg dw	0.073	0.062
DR114	2.3	EPA SI	8/19/1998	Lead	30.7	mg/kg dw		2.51		450	530	mg/kg dw	0.068	0.058
DR115	2.3	EPA SI	9/14/1998	Lead	29.8	mg/kg dw	J	1.3		450	530	mg/kg dw	0.066	0.056
DR148	2.1	EPA SI	8/18/1998	Lead	24.5	mg/kg dw		4.51		450	530	mg/kg dw	0.054	0.046
DR149	2.3	EPA SI	8/19/1998	Lead	23.1	mg/kg dw		2.01		450	530	mg/kg dw	0.051	0.044
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Lead	303	mg/kg dw		0.972		450	530	mg/kg dw	0.67	0.57
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Lead	44	mg/kg dw		1.59		450	530	mg/kg dw	0.098	0.083

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Lead	50	mg/kg dw		2.57		450	530	mg/kg dw	0.11	0.094
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Lead	48	mg/kg dw		2.43		450	530	mg/kg dw	0.11	0.091
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Lead	75	mg/kg dw		1.46		450	530	mg/kg dw	0.17	0.14
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Lead	41	mg/kg dw		2.17		450	530	mg/kg dw	0.091	0.077
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Lead	81	mg/kg dw		2.08		450	530	mg/kg dw	0.18	0.15
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Lead	41	mg/kg dw		2.55		450	530	mg/kg dw	0.091	0.077
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Lead	52	mg/kg dw		2.47		450	530	mg/kg dw	0.12	0.098
DR105	2	EPA SI	8/19/1998	Magnesium	7520	mg/kg dw		2.07						
DR107	2.1	EPA SI	8/19/1998	Magnesium	7730	mg/kg dw		2.5						
DR108	2.1	EPA SI	8/19/1998	Magnesium	8140	mg/kg dw		2.33						
DR109	2.1	EPA SI	9/1/1998	Magnesium	9800	mg/kg dw		2.35						
DR110	2.1	EPA SI	8/19/1998	Magnesium	7690	mg/kg dw		2.67						
DR111	2.1	EPA SI	8/19/1998	Magnesium	7100	mg/kg dw		2.26						
DR112	2.1	EPA SI	8/19/1998	Magnesium	7720	mg/kg dw		2.64						
DR114	2.3	EPA SI	8/19/1998	Magnesium	7480	mg/kg dw		2.51						
DR115	2.3	EPA SI	9/14/1998	Magnesium	6510	mg/kg dw		1.3						
DR148	2.1	EPA SI	8/18/1998	Magnesium	7750	mg/kg dw		4.51						
DR149	2.3	EPA SI	8/19/1998	Magnesium	7660	mg/kg dw		2.01						
DR105	2	EPA SI	8/19/1998	Manganese	266	mg/kg dw		2.07						
DR107	2.1	EPA SI	8/19/1998	Manganese	367	mg/kg dw		2.5						
DR108	2.1	EPA SI	8/19/1998	Manganese	367	mg/kg dw		2.33						
DR109	2.1	EPA SI	9/1/1998	Manganese	404	mg/kg dw		2.35						
DR110	2.1	EPA SI	8/19/1998	Manganese	337	mg/kg dw		2.67						
DR111	2.1	EPA SI	8/19/1998	Manganese	265	mg/kg dw		2.26						
DR112	2.1	EPA SI	8/19/1998	Manganese	305	mg/kg dw		2.64						
DR114	2.3	EPA SI	8/19/1998	Manganese	284	mg/kg dw		2.51						
DR115	2.3	EPA SI	9/14/1998	Manganese	294	mg/kg dw		1.3						
DR148	2.1	EPA SI	8/18/1998	Manganese	377	mg/kg dw		4.51						
DR149	2.3	EPA SI	8/19/1998	Manganese	257	mg/kg dw		2.01						
B6b	2.2	LDWRI-Benthic	9/18/2004	Mercury	0.178	mg/kg dw		2.96		0.41	0.59	mg/kg dw	0.43	0.3
DR105	2	EPA SI	8/19/1998	Mercury	0.15	mg/kg dw		2.07		0.41	0.59	mg/kg dw	0.37	0.25
DR107	2.1	EPA SI	8/19/1998	Mercury	0.22	mg/kg dw		2.5		0.41	0.59	mg/kg dw	0.54	0.37
DR108	2.1	EPA SI	8/19/1998	Mercury	0.25	mg/kg dw		2.33		0.41	0.59	mg/kg dw	0.61	0.42
DR109	2.1	EPA SI	9/1/1998	Mercury	0.29	mg/kg dw		2.35		0.41	0.59	mg/kg dw	0.71	0.49
DR110	2.1	EPA SI	8/19/1998	Mercury	0.19	mg/kg dw		2.67		0.41	0.59	mg/kg dw	0.46	0.32
DR111	2.1	EPA SI	8/19/1998	Mercury	0.2	mg/kg dw		2.26		0.41	0.59	mg/kg dw	0.49	0.34
DR112	2.1	EPA SI	8/19/1998	Mercury	0.17	mg/kg dw		2.64		0.41	0.59	mg/kg dw	0.41	0.29
DR114	2.3	EPA SI	8/19/1998	Mercury	0.16	mg/kg dw		2.51		0.41	0.59	mg/kg dw	0.39	0.27
DR115	2.3	EPA SI	9/14/1998	Mercury	0.1	mg/kg dw		1.3		0.41	0.59	mg/kg dw	0.24	0.17
DR148	2.1	EPA SI	8/18/1998	Mercury	0.26	mg/kg dw		4.51		0.41	0.59	mg/kg dw	0.63	0.44
DR149	2.3	EPA SI	8/19/1998	Mercury	0.13	mg/kg dw		2.01		0.41	0.59	mg/kg dw	0.32	0.22
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Mercury	0.06	mg/kg dw		0.972		0.41	0.59	mg/kg dw	0.15	0.1
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Mercury	0.1	mg/kg dw		1.59		0.41	0.59	mg/kg dw	0.24	0.17
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Mercury	0.26	mg/kg dw		2.57		0.41	0.59	mg/kg dw	0.63	0.44
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Mercury	0.13	mg/kg dw		2.43		0.41	0.59	mg/kg dw	0.32	0.22
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Mercury	0.11	mg/kg dw		1.46		0.41	0.59	mg/kg dw	0.27	0.19
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Mercury	0.2	mg/kg dw		2.17		0.41	0.59	mg/kg dw	0.49	0.34
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Mercury	0.08	mg/kg dw		2.08		0.41	0.59	mg/kg dw	0.2	0.14
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Mercury	0.3	mg/kg dw		2.55		0.41	0.59	mg/kg dw	0.73	0.51
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Mercury	0.2	mg/kg dw		2.47		0.41	0.59	mg/kg dw	0.49	0.34
DR111	2.1	EPA SI	8/19/1998	Methyl ethyl ketone	0.0101	mg/kg dw		2.26						
B6b	2.2	LDWRI-Benthic	9/18/2004	Molybdenum	0.731	mg/kg dw		2.96						
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Molybdenum	0.5	mg/kg dw		0.972						

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Molybdenum	0.6	mg/kg dw		1.59						
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Molybdenum	0.9	mg/kg dw		2.57						
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Molybdenum	1.8	mg/kg dw		2.43						
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Molybdenum	2.3	mg/kg dw		1.46						
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Molybdenum	1	mg/kg dw		2.17						
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Molybdenum	7.7	mg/kg dw		2.08						
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Molybdenum	2	mg/kg dw		2.55						
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Molybdenum	2	mg/kg dw		2.47						
B6b	2.2	LDWRI-Benthic	9/18/2004	Monobutyltin as ion	0.0082	mg/kg dw		2.96						
DR109	2.1	EPA SI	9/1/1998	Monobutyltin as ion	0.017	mg/kg dw	J	2.35						
DR110	2.1	EPA SI	8/19/1998	Monobutyltin as ion	0.026	mg/kg dw	J	2.67						
DR111	2.1	EPA SI	8/19/1998	Monobutyltin as ion	0.066	mg/kg dw	J	2.26						
DR112	2.1	EPA SI	8/19/1998	Monobutyltin as ion	0.017	mg/kg dw	J	2.64						
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Monobutyltin as ion	0.003	mg/kg dw	J	1.46						
B6b	2.2	LDWRI-Benthic	9/18/2004	Naphthalene	0.011	mg/kg dw		2.96	0.37	99	170	mg/kg OC	0.0037	0.0022
DR111	2.1	EPA SI	8/19/1998	Naphthalene	0.0043	mg/kg dw		2.26	0.19	99	170	mg/kg OC	0.0019	0.0011
DR112	2.1	EPA SI	8/19/1998	Naphthalene	0.02	mg/kg dw		2.64	0.76	99	170	mg/kg OC	0.0077	0.0045
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Naphthalene	0.038	mg/kg dw	J	2.57	1.5	99	170	mg/kg OC	0.015	0.0088
B6b	2.2	LDWRI-Benthic	9/18/2004	Nickel	23.8	mg/kg dw		2.96						
DR105	2	EPA SI	8/19/1998	Nickel	20.3	mg/kg dw		2.07						
DR107	2.1	EPA SI	8/19/1998	Nickel	20.3	mg/kg dw		2.5						
DR108	2.1	EPA SI	8/19/1998	Nickel	21.6	mg/kg dw		2.33						
DR109	2.1	EPA SI	9/1/1998	Nickel	23.4	mg/kg dw		2.35						
DR110	2.1	EPA SI	8/19/1998	Nickel	20.7	mg/kg dw		2.67						
DR111	2.1	EPA SI	8/19/1998	Nickel	20.5	mg/kg dw		2.26						
DR112	2.1	EPA SI	8/19/1998	Nickel	20	mg/kg dw		2.64						
DR114	2.3	EPA SI	8/19/1998	Nickel	19.6	mg/kg dw		2.51						
DR115	2.3	EPA SI	9/14/1998	Nickel	20.9	mg/kg dw		1.3						
DR148	2.1	EPA SI	8/18/1998	Nickel	17.9	mg/kg dw		4.51						
DR149	2.3	EPA SI	8/19/1998	Nickel	20.6	mg/kg dw		2.01						
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Nickel	18.9	mg/kg dw		0.972						
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Nickel	16.9	mg/kg dw		1.59						
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Nickel	29	mg/kg dw		2.57						
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Nickel	21	mg/kg dw		2.43						
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Nickel	21	mg/kg dw		1.46						
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Nickel	26	mg/kg dw		2.17						
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Nickel	22	mg/kg dw		2.08						
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Nickel	24	mg/kg dw		2.55						
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Nickel	23	mg/kg dw		2.47						
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	N-Nitrosodiphenylamine	0.0072	mg/kg dw		2.17	0.33	11	11	mg/kg OC	0.03	0.03
DR111	2.1	EPA SI	8/19/1998	OCDD	0.0033	mg/kg dw		2.26						
DR115	2.3	EPA SI	9/14/1998	OCDD	0.0026	mg/kg dw		1.3						
DR111	2.1	EPA SI	8/19/1998	OCDF	0.00016	mg/kg dw		2.26						
DR115	2.3	EPA SI	9/14/1998	OCDF	0.000095	mg/kg dw		1.3						
B6b	2.2	LDWRI-Benthic	9/18/2004	PCBs (total calc'd)	0.42	mg/kg dw		2.96	14	12	65	mg/kg OC	1.2	0.22
DR105	2	EPA SI	8/19/1998	PCBs (total calc'd)	0.124	mg/kg dw	J	2.07	5.99	12	65	mg/kg OC	0.5	0.092
DR107	2.1	EPA SI	8/19/1998	PCBs (total calc'd)	0.296	mg/kg dw		2.5	11.8	12	65	mg/kg OC	0.98	0.18
DR108	2.1	EPA SI	8/19/1998	PCBs (total calc'd)	0.258	mg/kg dw		2.33	11.1	12	65	mg/kg OC	0.93	0.17
DR109	2.1	EPA SI	9/1/1998	PCBs (total calc'd)	0.28	mg/kg dw	J	2.35	12	12	65	mg/kg OC	1	0.18
DR110	2.1	EPA SI	8/19/1998	PCBs (total calc'd)	0.28	mg/kg dw		2.67	10	12	65	mg/kg OC	0.83	0.15
DR111	2.1	EPA SI	8/19/1998	PCBs (total calc'd)	0.311	mg/kg dw		2.26	13.8	12	65	mg/kg OC	1.2	0.21
DR112	2.1	EPA SI	8/19/1998	PCBs (total calc'd)	0.243	mg/kg dw		2.64	9.2	12	65	mg/kg OC	0.77	0.14
DR114	2.3	EPA SI	8/19/1998	PCBs (total calc'd)	0.189	mg/kg dw	J	2.51	7.53	12	65	mg/kg OC	0.63	0.12

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^1	CSL^1	SQS/CSL Units	SQS Exceedance Factor^2	CSL Exceedance Factor^2
DR115	2.3	EPA SI	9/14/1998	PCBs (total calc'd)	0.142	mg/kg dw		1.3	10.9	12	65	mg/kg OC	0.91	0.17
DR148	2.1	EPA SI	8/18/1998	PCBs (total calc'd)	279	ug/kg dw	J	4.51		130	1000	ug/kg dw	2.1	0.28
DR149	2.3	EPA SI	8/19/1998	PCBs (total calc'd)	0.095	mg/kg dw	J	2.01	4.7	12	65	mg/kg OC	0.39	0.072
EST187	2.1	NOAA SiteChar	10/10/1997	PCBs (total calc'd)	0.14	mg/kg dw		2.34	6	12	65	mg/kg OC	0.5	0.092
EST188	2.2	NOAA SiteChar	10/17/1997	PCBs (total calc'd)	0.17	mg/kg dw		2.25	7.6	12	65	mg/kg OC	0.63	0.12
EST189	2.3	NOAA SiteChar	10/17/1997	PCBs (total calc'd)	0.14	mg/kg dw		2.24	6.3	12	65	mg/kg OC	0.53	0.097
EST190	2	NOAA SiteChar	10/16/1997	PCBs (total calc'd)	0.14	mg/kg dw		1.86	7.5	12	65	mg/kg OC	0.63	0.12
EST191	2.1	NOAA SiteChar	10/22/1997	PCBs (total calc'd)	0.12	mg/kg dw		2.22	5.4	12	65	mg/kg OC	0.45	0.083
EST192	2.1	NOAA SiteChar	10/16/1997	PCBs (total calc'd)	0.17	mg/kg dw		2.18	7.8	12	65	mg/kg OC	0.65	0.12
EST193	2.1	NOAA SiteChar	10/10/1997	PCBs (total calc'd)	0.2	mg/kg dw		1.86	10	12	65	mg/kg OC	0.83	0.15
EST194	2.1	NOAA SiteChar	10/14/1997	PCBs (total calc'd)	0.19	mg/kg dw		1.91	9.9	12	65	mg/kg OC	0.83	0.15
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	PCBs (total calc'd)	0.124	mg/kg dw		0.972	12.8	12	65	mg/kg OC	1.1	0.2
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	PCBs (total calc'd)	0.122	mg/kg dw		1.59	7.67	12	65	mg/kg OC	0.64	0.12
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	PCBs (total calc'd)	0.25	mg/kg dw		2.57	9.7	12	65	mg/kg OC	0.81	0.15
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	PCBs (total calc'd)	0.23	mg/kg dw		2.43	9.5	12	65	mg/kg OC	0.79	0.15
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	PCBs (total calc'd)	0.166	mg/kg dw		1.46	11.4	12	65	mg/kg OC	0.95	0.18
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	PCBs (total calc'd)	0.117	mg/kg dw		2.17	5.39	12	65	mg/kg OC	0.45	0.083
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	PCBs (total calc'd)	0.07	mg/kg dw		2.08	3.4	12	65	mg/kg OC	0.28	0.052
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	PCBs (total calc'd)	0.11	mg/kg dw		2.55	4.31	12	65	mg/kg OC	0.36	0.066
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	PCBs (total calc'd)	0.21	mg/kg dw		2.47	8.5	12	65	mg/kg OC	0.71	0.13
DR111	2.1	EPA SI	8/19/1998	p-Cymene	0.025	mg/kg dw		2.26						
B6b	2.2	LDWRI-Benthic	9/18/2004	Perylene	0.066	mg/kg dw		2.96						
B6b	2.2	LDWRI-Benthic	9/18/2004	Phenanthrene	0.13	mg/kg dw		2.96	4.4	100	480	mg/kg OC	0.044	0.0092
DR105	2	EPA SI	8/19/1998	Phenanthrene	0.14	mg/kg dw		2.07	6.8	100	480	mg/kg OC	0.068	0.014
DR107	2.1	EPA SI	8/19/1998	Phenanthrene	0.28	mg/kg dw		2.5	11	100	480	mg/kg OC	0.11	0.023
DR108	2.1	EPA SI	8/19/1998	Phenanthrene	0.21	mg/kg dw		2.33	9	100	480	mg/kg OC	0.09	0.019
DR109	2.1	EPA SI	9/1/1998	Phenanthrene	0.19	mg/kg dw		2.35	8.1	100	480	mg/kg OC	0.081	0.017
DR110	2.1	EPA SI	8/19/1998	Phenanthrene	0.5	mg/kg dw		2.67	19	100	480	mg/kg OC	0.19	0.04
DR111	2.1	EPA SI	8/19/1998	Phenanthrene	0.25	mg/kg dw		2.26	11	100	480	mg/kg OC	0.11	0.023
DR112	2.1	EPA SI	8/19/1998	Phenanthrene	0.8	mg/kg dw		2.64	30	100	480	mg/kg OC	0.3	0.063
DR114	2.3	EPA SI	8/19/1998	Phenanthrene	0.3	mg/kg dw		2.51	12	100	480	mg/kg OC	0.12	0.025
DR115	2.3	EPA SI	9/14/1998	Phenanthrene	0.24	mg/kg dw		1.3	18	100	480	mg/kg OC	0.18	0.038
DR148	2.1	EPA SI	8/18/1998	Phenanthrene	80	ug/kg dw		4.51		1500	5400	ug/kg dw	0.053	0.015
DR149	2.3	EPA SI	8/19/1998	Phenanthrene	0.82	mg/kg dw		2.01	41	100	480	mg/kg OC	0.41	0.085
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Phenanthrene	0.072	mg/kg dw		0.972	7.4	100	480	mg/kg OC	0.074	0.015
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Phenanthrene	0.039	mg/kg dw	J	1.59	2.5	100	480	mg/kg OC	0.025	0.0052
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Phenanthrene	0.43	mg/kg dw		2.57	17	100	480	mg/kg OC	0.17	0.035
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Phenanthrene	0.22	mg/kg dw		2.43	9.1	100	480	mg/kg OC	0.091	0.019
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Phenanthrene	0.071	mg/kg dw	J	1.46	4.9	100	480	mg/kg OC	0.049	0.01
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Phenanthrene	0.045	mg/kg dw		2.17	2.1	100	480	mg/kg OC	0.021	0.0044
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Phenanthrene	0.39	mg/kg dw		2.08	19	100	480	mg/kg OC	0.19	0.04
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Phenanthrene	0.12	mg/kg dw		2.55	4.7	100	480	mg/kg OC	0.047	0.0098
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Phenanthrene	0.09	mg/kg dw		2.47	3.6	100	480	mg/kg OC	0.036	0.0075
B6b	2.2	LDWRI-Benthic	9/18/2004	Phenol	35	ug/kg dw		2.96		420	1200	ug/kg dw	0.083	0.029
DR105	2	EPA SI	8/19/1998	Phenol	20	ug/kg dw		2.07		420	1200	ug/kg dw	0.048	0.017
DR107	2.1	EPA SI	8/19/1998	Phenol	230	ug/kg dw		2.5		420	1200	ug/kg dw	0.55	0.19
DR108	2.1	EPA SI	8/19/1998	Phenol	140	ug/kg dw		2.33		420	1200	ug/kg dw	0.33	0.12
DR109	2.1	EPA SI	9/1/1998	Phenol	400	ug/kg dw		2.35		420	1200	ug/kg dw	0.95	0.33
DR110	2.1	EPA SI	8/19/1998	Phenol	120	ug/kg dw		2.67		420	1200	ug/kg dw	0.29	0.1
DR111	2.1	EPA SI	8/19/1998	Phenol	30	ug/kg dw		2.26		420	1200	ug/kg dw	0.071	0.025
DR112	2.1	EPA SI	8/19/1998	Phenol	20	ug/kg dw		2.64		420	1200	ug/kg dw	0.048	0.017
DR114	2.3	EPA SI	8/19/1998	Phenol	20	ug/kg dw		2.51		420	1200	ug/kg dw	0.048	0.017
DR148	2.1	EPA SI	8/18/1998	Phenol	20	ug/kg dw		4.51		420	1200	ug/kg dw	0.048	0.017

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Phenol	280	ug/kg dw	J	1.46		420	1200	ug/kg dw	0.67	0.23
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Phenol	90	ug/kg dw		2.47		420	1200	ug/kg dw	0.21	0.075
B6b	2.2	LDWRI-Benthic	9/18/2004	Pyrene	0.31	mg/kg dw		2.96	10	1000	1400	mg/kg OC	0.01	0.0071
DR105	2	EPA SI	8/19/1998	Pyrene	0.37	mg/kg dw		2.07	18	1000	1400	mg/kg OC	0.018	0.013
DR107	2.1	EPA SI	8/19/1998	Pyrene	0.88	mg/kg dw		2.5	35	1000	1400	mg/kg OC	0.035	0.025
DR108	2.1	EPA SI	8/19/1998	Pyrene	0.67	mg/kg dw		2.33	29	1000	1400	mg/kg OC	0.029	0.021
DR109	2.1	EPA SI	9/1/1998	Pyrene	0.61	mg/kg dw		2.35	26	1000	1400	mg/kg OC	0.026	0.019
DR110	2.1	EPA SI	8/19/1998	Pyrene	0.96	mg/kg dw		2.67	36	1000	1400	mg/kg OC	0.036	0.026
DR111	2.1	EPA SI	8/19/1998	Pyrene	0.89	mg/kg dw	J	2.26	39	1000	1400	mg/kg OC	0.039	0.028
DR112	2.1	EPA SI	8/19/1998	Pyrene	2.8	mg/kg dw		2.64	110	1000	1400	mg/kg OC	0.11	0.079
DR114	2.3	EPA SI	8/19/1998	Pyrene	0.68	mg/kg dw		2.51	27	1000	1400	mg/kg OC	0.027	0.019
DR115	2.3	EPA SI	9/14/1998	Pyrene	0.76	mg/kg dw		1.3	58	1000	1400	mg/kg OC	0.058	0.041
DR148	2.1	EPA SI	8/18/1998	Pyrene	130	ug/kg dw		4.51		2600	3300	ug/kg dw	0.05	0.039
DR149	2.3	EPA SI	8/19/1998	Pyrene	1.5	mg/kg dw		2.01	75	1000	1400	mg/kg OC	0.075	0.054
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Pyrene	0.21	mg/kg dw		0.972	22	1000	1400	mg/kg OC	0.022	0.016
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Pyrene	0.14	mg/kg dw		1.59	8.8	1000	1400	mg/kg OC	0.0088	0.0063
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Pyrene	0.95	mg/kg dw		2.57	37	1000	1400	mg/kg OC	0.037	0.026
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Pyrene	0.54	mg/kg dw		2.43	22	1000	1400	mg/kg OC	0.022	0.016
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Pyrene	0.13	mg/kg dw		1.46	8.9	1000	1400	mg/kg OC	0.0089	0.0064
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Pyrene	0.12	mg/kg dw		2.17	5.5	1000	1400	mg/kg OC	0.0055	0.0039
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Pyrene	1	mg/kg dw		2.08	48	1000	1400	mg/kg OC	0.048	0.034
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Pyrene	0.42	mg/kg dw		2.55	16	1000	1400	mg/kg OC	0.016	0.011
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Pyrene	0.22	mg/kg dw		2.47	8.9	1000	1400	mg/kg OC	0.0089	0.0064
B6b	2.2	LDWRI-Benthic	9/18/2004	Selenium	0.9	mg/kg dw	J	2.96						
DR105	2	EPA SI	8/19/1998	Selenium	5	mg/kg dw	J	2.07						
DR107	2.1	EPA SI	8/19/1998	Selenium	9	mg/kg dw		2.5						
DR108	2.1	EPA SI	8/19/1998	Selenium	9	mg/kg dw		2.33						
DR109	2.1	EPA SI	9/1/1998	Selenium	26	mg/kg dw		2.35						
DR110	2.1	EPA SI	8/19/1998	Selenium	9	mg/kg dw		2.67						
DR111	2.1	EPA SI	8/19/1998	Selenium	9	mg/kg dw		2.26						
DR112	2.1	EPA SI	8/19/1998	Selenium	8	mg/kg dw		2.64						
DR114	2.3	EPA SI	8/19/1998	Selenium	5	mg/kg dw	J	2.51						
DR148	2.1	EPA SI	8/18/1998	Selenium	8	mg/kg dw		4.51						
DR149	2.3	EPA SI	8/19/1998	Selenium	5	mg/kg dw	J	2.01						
B6b	2.2	LDWRI-Benthic	9/18/2004	Silver	0.46	mg/kg dw		2.96		6.1	6.1	mg/kg dw	0.075	0.075
DR105	2	EPA SI	8/19/1998	Silver	0.4	mg/kg dw		2.07		6.1	6.1	mg/kg dw	0.066	0.066
DR107	2.1	EPA SI	8/19/1998	Silver	0.46	mg/kg dw		2.5		6.1	6.1	mg/kg dw	0.075	0.075
DR108	2.1	EPA SI	8/19/1998	Silver	0.5	mg/kg dw		2.33		6.1	6.1	mg/kg dw	0.082	0.082
DR109	2.1	EPA SI	9/1/1998	Silver	0.38	mg/kg dw		2.35		6.1	6.1	mg/kg dw	0.062	0.062
DR110	2.1	EPA SI	8/19/1998	Silver	0.41	mg/kg dw		2.67		6.1	6.1	mg/kg dw	0.067	0.067
DR111	2.1	EPA SI	8/19/1998	Silver	0.41	mg/kg dw		2.26		6.1	6.1	mg/kg dw	0.067	0.067
DR112	2.1	EPA SI	8/19/1998	Silver	0.36	mg/kg dw		2.64		6.1	6.1	mg/kg dw	0.059	0.059
DR114	2.3	EPA SI	8/19/1998	Silver	0.39	mg/kg dw		2.51		6.1	6.1	mg/kg dw	0.064	0.064
DR115	2.3	EPA SI	9/14/1998	Silver	0.19	mg/kg dw		1.3		6.1	6.1	mg/kg dw	0.031	0.031
DR148	2.1	EPA SI	8/18/1998	Silver	0.49	mg/kg dw		4.51		6.1	6.1	mg/kg dw	0.08	0.08
DR149	2.3	EPA SI	8/19/1998	Silver	0.29	mg/kg dw		2.01		6.1	6.1	mg/kg dw	0.048	0.048
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Silver	0.7	mg/kg dw	J	2.57		6.1	6.1	mg/kg dw	0.11	0.11
B6b	2.2	LDWRI-Benthic	9/18/2004	Tetrabutyltin as ion	0.00046	mg/kg dw	J	2.96						
B6b	2.2	LDWRI-Benthic	9/18/2004	Thallium	0.121	mg/kg dw		2.96						
DR105	2	EPA SI	8/19/1998	Thallium	0.09	mg/kg dw	J	2.07						
DR107	2.1	EPA SI	8/19/1998	Thallium	0.12	mg/kg dw		2.5						
DR108	2.1	EPA SI	8/19/1998	Thallium	0.12	mg/kg dw		2.33						
DR109	2.1	EPA SI	9/1/1998	Thallium	0.13	mg/kg dw		2.35						

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^1	CSL^1	SQS/CSL Units	SQS Exceedance Factor^2	CSL Exceedance Factor^2
DR110	2.1	EPA SI	8/19/1998	Thallium	0.13	mg/kg dw		2.67						
DR111	2.1	EPA SI	8/19/1998	Thallium	0.12	mg/kg dw		2.26						
DR112	2.1	EPA SI	8/19/1998	Thallium	0.12	mg/kg dw		2.64						
DR114	2.3	EPA SI	8/19/1998	Thallium	0.09	mg/kg dw	J	2.51						
DR115	2.3	EPA SI	9/14/1998	Thallium	0.09	mg/kg dw	J	1.3						
DR148	2.1	EPA SI	8/18/1998	Thallium	0.12	mg/kg dw		4.51						
DR149	2.3	EPA SI	8/19/1998	Thallium	0.08	mg/kg dw	J	2.01						
DR105	2	EPA SI	8/19/1998	Tin	5	mg/kg dw		2.07						
DR107	2.1	EPA SI	8/19/1998	Tin	5	mg/kg dw	J	2.5						
DR108	2.1	EPA SI	8/19/1998	Tin	5	mg/kg dw	J	2.33						
DR109	2.1	EPA SI	9/1/1998	Tin	6	mg/kg dw		2.35						
DR110	2.1	EPA SI	8/19/1998	Tin	5	mg/kg dw	J	2.67						
DR111	2.1	EPA SI	8/19/1998	Tin	4.09	mg/kg dw	J	2.26						
DR112	2.1	EPA SI	8/19/1998	Tin	4	mg/kg dw	J	2.64						
DR114	2.3	EPA SI	8/19/1998	Tin	4	mg/kg dw		2.51						
DR148	2.1	EPA SI	8/18/1998	Tin	3	mg/kg dw	J	4.51						
DR149	2.3	EPA SI	8/19/1998	Tin	3	mg/kg dw		2.01						
DR111	2.1	EPA SI	8/19/1998	Toluene	0.001	mg/kg dw	J	2.26						
B6b	2.2	LDWRI-Benthic	9/18/2004	Total Chlordane (calc'd)	0.00024	mg/kg dw	JN	2.96						
B6b	2.2	LDWRI-Benthic	9/18/2004	Total HPAH (calc'd)	1.9	mg/kg dw		2.96	64.2	960	5300	mg/kg OC	0.067	0.012
DR105	2	EPA SI	8/19/1998	Total HPAH (calc'd)	2.38	mg/kg dw		2.07	115	960	5300	mg/kg OC	0.12	0.022
DR107	2.1	EPA SI	8/19/1998	Total HPAH (calc'd)	5.2	mg/kg dw		2.5	210	960	5300	mg/kg OC	0.22	0.04
DR108	2.1	EPA SI	8/19/1998	Total HPAH (calc'd)	4.34	mg/kg dw		2.33	186	960	5300	mg/kg OC	0.19	0.035
DR109	2.1	EPA SI	9/1/1998	Total HPAH (calc'd)	3.74	mg/kg dw		2.35	159	960	5300	mg/kg OC	0.17	0.03
DR110	2.1	EPA SI	8/19/1998	Total HPAH (calc'd)	5.3	mg/kg dw		2.67	200	960	5300	mg/kg OC	0.21	0.038
DR111	2.1	EPA SI	8/19/1998	Total HPAH (calc'd)	4.8	mg/kg dw	J	2.26	212	960	5300	mg/kg OC	0.22	0.04
DR112	2.1	EPA SI	8/19/1998	Total HPAH (calc'd)	14.5	mg/kg dw		2.64	549	960	5300	mg/kg OC	0.57	0.1
DR114	2.3	EPA SI	8/19/1998	Total HPAH (calc'd)	3.57	mg/kg dw		2.51	142	960	5300	mg/kg OC	0.15	0.027
DR115	2.3	EPA SI	9/14/1998	Total HPAH (calc'd)	4.3	mg/kg dw		1.3	330	960	5300	mg/kg OC	0.34	0.062
DR148	2.1	EPA SI	8/18/1998	Total HPAH (calc'd)	700	ug/kg dw		4.51		12000	17000	ug/kg dw	0.058	0.041
DR149	2.3	EPA SI	8/19/1998	Total HPAH (calc'd)	6.8	mg/kg dw		2.01	340	960	5300	mg/kg OC	0.35	0.064
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Total HPAH (calc'd)	1.09	mg/kg dw	J	0.972	112	960	5300	mg/kg OC	0.12	0.021
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Total HPAH (calc'd)	0.68	mg/kg dw	J	1.59	43	960	5300	mg/kg OC	0.045	0.0081
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Total HPAH (calc'd)	6.2	mg/kg dw		2.57	240	960	5300	mg/kg OC	0.25	0.045
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Total HPAH (calc'd)	4.4	mg/kg dw		2.43	181	960	5300	mg/kg OC	0.19	0.034
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Total HPAH (calc'd)	0.94	mg/kg dw	J	1.46	64	960	5300	mg/kg OC	0.067	0.012
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Total HPAH (calc'd)	0.78	mg/kg dw		2.17	36	960	5300	mg/kg OC	0.038	0.0068
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Total HPAH (calc'd)	6.5	mg/kg dw		2.08	310	960	5300	mg/kg OC	0.32	0.058
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Total HPAH (calc'd)	2.45	mg/kg dw	J	2.55	96.1	960	5300	mg/kg OC	0.1	0.018
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Total HPAH (calc'd)	1.81	mg/kg dw		2.47	73.3	960	5300	mg/kg OC	0.076	0.014
DR111	2.1	EPA SI	8/19/1998	Total HpCDD	0.00095	mg/kg dw		2.26						
DR115	2.3	EPA SI	9/14/1998	Total HpCDD	0.0009	mg/kg dw		1.3						
DR111	2.1	EPA SI	8/19/1998	Total HpCDF	0.00021	mg/kg dw		2.26						
DR115	2.3	EPA SI	9/14/1998	Total HpCDF	0.00011	mg/kg dw		1.3						
DR111	2.1	EPA SI	8/19/1998	Total HxCDD	0.0001	mg/kg dw		2.26						
DR115	2.3	EPA SI	9/14/1998	Total HxCDD	0.000097	mg/kg dw		1.3						
DR111	2.1	EPA SI	8/19/1998	Total HxCDF	0.000068	mg/kg dw		2.26						
DR115	2.3	EPA SI	9/14/1998	Total HxCDF	0.000028	mg/kg dw		1.3						
B6b	2.2	LDWRI-Benthic	9/18/2004	Total LPAH (calc'd)	0.26	mg/kg dw		2.96	8.8	370	780	mg/kg OC	0.024	0.011
DR105	2	EPA SI	8/19/1998	Total LPAH (calc'd)	0.18	mg/kg dw		2.07	8.7	370	780	mg/kg OC	0.024	0.011
DR107	2.1	EPA SI	8/19/1998	Total LPAH (calc'd)	0.53	mg/kg dw		2.5	21	370	780	mg/kg OC	0.057	0.027
DR108	2.1	EPA SI	8/19/1998	Total LPAH (calc'd)	0.34	mg/kg dw		2.33	15	370	780	mg/kg OC	0.041	0.019
DR109	2.1	EPA SI	9/1/1998	Total LPAH (calc'd)	0.32	mg/kg dw		2.35	14	370	780	mg/kg OC	0.038	0.018

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^1	CSL^1	SQS/CSL Units	SQS Exceedance Factor^2	CSL Exceedance Factor^2
DR110	2.1	EPA SI	8/19/1998	Total LPAH (calc'd)	0.81	mg/kg dw		2.67	30	370	780	mg/kg OC	0.081	0.038
DR111	2.1	EPA SI	8/19/1998	Total LPAH (calc'd)	0.4	mg/kg dw		2.26	18	370	780	mg/kg OC	0.049	0.023
DR112	2.1	EPA SI	8/19/1998	Total LPAH (calc'd)	1.31	mg/kg dw		2.64	49.6	370	780	mg/kg OC	0.13	0.064
DR114	2.3	EPA SI	8/19/1998	Total LPAH (calc'd)	0.81	mg/kg dw		2.51	32	370	780	mg/kg OC	0.086	0.041
DR115	2.3	EPA SI	9/14/1998	Total LPAH (calc'd)	0.4	mg/kg dw		1.3	31	370	780	mg/kg OC	0.084	0.04
DR148	2.1	EPA SI	8/18/1998	Total LPAH (calc'd)	160	ug/kg dw		4.51		5200	13000	ug/kg dw	0.031	0.012
DR149	2.3	EPA SI	8/19/1998	Total LPAH (calc'd)	1.24	mg/kg dw		2.01	61.7	370	780	mg/kg OC	0.17	0.079
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Total LPAH (calc'd)	0.108	mg/kg dw	J	0.972	11.1	370	780	mg/kg OC	0.03	0.014
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Total LPAH (calc'd)	0.039	mg/kg dw	J	1.59	2.5	370	780	mg/kg OC	0.0068	0.0032
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Total LPAH (calc'd)	0.88	mg/kg dw	J	2.57	34	370	780	mg/kg OC	0.092	0.044
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Total LPAH (calc'd)	0.34	mg/kg dw		2.43	14	370	780	mg/kg OC	0.038	0.018
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Total LPAH (calc'd)	0.071	mg/kg dw	J	1.46	4.9	370	780	mg/kg OC	0.013	0.0063
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Total LPAH (calc'd)	0.045	mg/kg dw		2.17	2.1	370	780	mg/kg OC	0.0057	0.0027
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Total LPAH (calc'd)	0.72	mg/kg dw		2.08	35	370	780	mg/kg OC	0.095	0.045
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Total LPAH (calc'd)	0.18	mg/kg dw	J	2.55	7.1	370	780	mg/kg OC	0.019	0.0091
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Total LPAH (calc'd)	0.133	mg/kg dw		2.47	5.38	370	780	mg/kg OC	0.015	0.0069
B6b	2.2	LDWRI-Benthic	9/18/2004	Total PAH (calc'd)	2.17	mg/kg dw		2.96						
DR105	2	EPA SI	8/19/1998	Total PAH (calc'd)	2.56	mg/kg dw		2.07						
DR107	2.1	EPA SI	8/19/1998	Total PAH (calc'd)	5.8	mg/kg dw		2.5						
DR108	2.1	EPA SI	8/19/1998	Total PAH (calc'd)	4.68	mg/kg dw		2.33						
DR109	2.1	EPA SI	9/1/1998	Total PAH (calc'd)	4.06	mg/kg dw		2.35						
DR110	2.1	EPA SI	8/19/1998	Total PAH (calc'd)	6.1	mg/kg dw		2.67						
DR111	2.1	EPA SI	8/19/1998	Total PAH (calc'd)	5.2	mg/kg dw	J	2.26						
DR112	2.1	EPA SI	8/19/1998	Total PAH (calc'd)	15.8	mg/kg dw		2.64						
DR114	2.3	EPA SI	8/19/1998	Total PAH (calc'd)	4.38	mg/kg dw		2.51						
DR115	2.3	EPA SI	9/14/1998	Total PAH (calc'd)	4.7	mg/kg dw		1.3						
DR148	2.1	EPA SI	8/18/1998	Total PAH (calc'd)	0.86	mg/kg dw		4.51						
DR149	2.3	EPA SI	8/19/1998	Total PAH (calc'd)	8.1	mg/kg dw		2.01						
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Total PAH (calc'd)	1.2	mg/kg dw	J	0.972						
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Total PAH (calc'd)	0.72	mg/kg dw	J	1.59						
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Total PAH (calc'd)	7	mg/kg dw	J	2.57						
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Total PAH (calc'd)	4.74	mg/kg dw		2.43						
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Total PAH (calc'd)	1.01	mg/kg dw	J	1.46						
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Total PAH (calc'd)	0.82	mg/kg dw		2.17						
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Total PAH (calc'd)	7.2	mg/kg dw		2.08						
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Total PAH (calc'd)	2.63	mg/kg dw	J	2.55						
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Total PAH (calc'd)	1.94	mg/kg dw		2.47						
DR111	2.1	EPA SI	8/19/1998	Total PeCDF	0.000031	mg/kg dw		2.26						
DR115	2.3	EPA SI	9/14/1998	Total PeCDF	0.000023	mg/kg dw		1.3						
DR111	2.1	EPA SI	8/19/1998	Total TCDD	0.0000052	mg/kg dw		2.26						
DR115	2.3	EPA SI	9/14/1998	Total TCDD	0.0000016	mg/kg dw		1.3						
DR111	2.1	EPA SI	8/19/1998	Total TCDF	0.000036	mg/kg dw		2.26						
DR115	2.3	EPA SI	9/14/1998	Total TCDF	0.000013	mg/kg dw		1.3						
B6b	2.2	LDWRI-Benthic	9/18/2004	Tributyltin as ion	0.02	mg/kg dw		2.96						
DR109	2.1	EPA SI	9/1/1998	Tributyltin as ion	0.077	mg/kg dw	J	2.35						
DR110	2.1	EPA SI	8/19/1998	Tributyltin as ion	0.13	mg/kg dw		2.67						
DR111	2.1	EPA SI	8/19/1998	Tributyltin as ion	0.24	mg/kg dw	J	2.26						
DR112	2.1	EPA SI	8/19/1998	Tributyltin as ion	0.071	mg/kg dw		2.64						
DR115	2.3	EPA SI	9/14/1998	Tributyltin as ion	0.031	mg/kg dw	J	1.3						
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Tributyltin as ion	0.11	mg/kg dw		1.46						
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Tributyltin as ion	0.019	mg/kg dw		2.55						
B6b	2.2	LDWRI-Benthic	9/18/2004	Vanadium	70.7	mg/kg dw		2.96						
DR105	2	EPA SI	8/19/1998	Vanadium	60	mg/kg dw		2.07						

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
DR107	2.1	EPA SI	8/19/1998	Vanadium	51	mg/kg dw		2.5						
DR108	2.1	EPA SI	8/19/1998	Vanadium	54	mg/kg dw		2.33						
DR109	2.1	EPA SI	9/1/1998	Vanadium	83	mg/kg dw		2.35						
DR110	2.1	EPA SI	8/19/1998	Vanadium	54	mg/kg dw		2.67						
DR111	2.1	EPA SI	8/19/1998	Vanadium	52	mg/kg dw		2.26						
DR112	2.1	EPA SI	8/19/1998	Vanadium	54	mg/kg dw		2.64						
DR114	2.3	EPA SI	8/19/1998	Vanadium	56	mg/kg dw		2.51						
DR115	2.3	EPA SI	9/14/1998	Vanadium	61	mg/kg dw		1.3						
DR148	2.1	EPA SI	8/18/1998	Vanadium	75	mg/kg dw		4.51						
DR149	2.3	EPA SI	8/19/1998	Vanadium	56	mg/kg dw		2.01						
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Vanadium	39	mg/kg dw		0.972						
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Vanadium	41.1	mg/kg dw		1.59						
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Vanadium	71.9	mg/kg dw		2.57						
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Vanadium	65.3	mg/kg dw		2.43						
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Vanadium	52.3	mg/kg dw		1.46						
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Vanadium	78.3	mg/kg dw		2.17						
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Vanadium	44.3	mg/kg dw		2.08						
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Vanadium	78	mg/kg dw		2.55						
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Vanadium	76.5	mg/kg dw		2.47						
B6b	2.2	LDWRI-Benthic	9/18/2004	Zinc	157	mg/kg dw		2.96		410	960	mg/kg dw	0.38	0.16
DR105	2	EPA SI	8/19/1998	Zinc	115	mg/kg dw		2.07		410	960	mg/kg dw	0.28	0.12
DR107	2.1	EPA SI	8/19/1998	Zinc	148	mg/kg dw		2.5		410	960	mg/kg dw	0.36	0.15
DR108	2.1	EPA SI	8/19/1998	Zinc	153	mg/kg dw		2.33		410	960	mg/kg dw	0.37	0.16
DR109	2.1	EPA SI	9/1/1998	Zinc	175	mg/kg dw		2.35		410	960	mg/kg dw	0.43	0.18
DR110	2.1	EPA SI	8/19/1998	Zinc	126	mg/kg dw		2.67		410	960	mg/kg dw	0.31	0.13
DR111	2.1	EPA SI	8/19/1998	Zinc	120	mg/kg dw		2.26		410	960	mg/kg dw	0.29	0.13
DR112	2.1	EPA SI	8/19/1998	Zinc	111	mg/kg dw		2.64		410	960	mg/kg dw	0.27	0.12
DR114	2.3	EPA SI	8/19/1998	Zinc	124	mg/kg dw		2.51		410	960	mg/kg dw	0.3	0.13
DR115	2.3	EPA SI	9/14/1998	Zinc	111	mg/kg dw		1.3		410	960	mg/kg dw	0.27	0.12
DR148	2.1	EPA SI	8/18/1998	Zinc	93	mg/kg dw		4.51		410	960	mg/kg dw	0.23	0.097
DR149	2.3	EPA SI	8/19/1998	Zinc	100	mg/kg dw		2.01		410	960	mg/kg dw	0.24	0.1
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Zinc	75	mg/kg dw		0.972		410	960	mg/kg dw	0.18	0.078
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	Zinc	74	mg/kg dw		1.59		410	960	mg/kg dw	0.18	0.077
LDW-SS330	2.1	LDWRI-SurfaceSedimentRound3	10/2/2006	Zinc	170	mg/kg dw		2.57		410	960	mg/kg dw	0.41	0.18
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Zinc	133	mg/kg dw		2.43		410	960	mg/kg dw	0.32	0.14
LDW-SS74	2	LDWRI-SurfaceSedimentRound2	3/7/2005	Zinc	401	mg/kg dw		1.46		410	960	mg/kg dw	0.98	0.42
LDW-SS76	2.1	LDWRI-SurfaceSedimentRound1	1/20/2005	Zinc	134	mg/kg dw		2.17		410	960	mg/kg dw	0.33	0.14
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Zinc	259	mg/kg dw	J	2.08		410	960	mg/kg dw	0.63	0.27
LDW-SS78	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Zinc	142	mg/kg dw		2.55		410	960	mg/kg dw	0.35	0.15
LDW-SS81	2.2	LDWRI-SurfaceSedimentRound2	3/8/2005	Zinc	159	mg/kg dw		2.47		410	960	mg/kg dw	0.39	0.17

Key:

DW - Dry weight
CSL - Cleanup Screening Level
OC - Organic carbon
TOC - Total organic carbon
SQS - Sediment Quality Standard

Notes:

1. SQS and CSL values are substituted with AET values for dry weight comparison where organic compounds are not OC-normalized (when TOC % DW is outside of the 0.5-4.0% range).
2. Exceedance factors are the ratio of the detected concentration to the CSL or SQS (or to AET values where applicable); chemicals with one or more exceedance factors greater than 1 are highlighted.

Source:

Lower Duwamish Waterway Group, 2007. Online Lower Duwamish Waterway Group Draft Remedial Investigation Report (November 2007) Database. http://www.ldwg.org.

Table A-2
Contaminants Detected in Subsurface Sediment
RM 2.0-2.3 East

Sample Location Name	Sample River Mile Location	Sample Depth Interval (feet)	Sampling Event	Sampling Event Year	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^1	CSL^1	SQS/CSL Units	SQS Exceedance Factor^2	CSL Exceedance Factor^2
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	1,2,4-Trichlorobenzene	0.0042	mg/kg dw	J	2.67	0.16	0.81	1.8	mg/kg OC	0.2	0.089
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	1,2,4-Trichlorobenzene	0.046	mg/kg dw		2.24	2.1	0.81	1.8	mg/kg OC	2.6	1.2
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	1,2-Dichlorobenzene	0.0042	mg/kg dw	J	2.25	0.19	2.3	2.3	mg/kg OC	0.083	0.083
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	1,2-Dichlorobenzene	0.0096	mg/kg dw		2.67	0.36	2.3	2.3	mg/kg OC	0.16	0.16
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	1,2-Dichlorobenzene	0.15	mg/kg dw		2.24	6.7	2.3	2.3	mg/kg OC	2.9	2.9
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	1,4-Dichlorobenzene	0.0054	mg/kg dw	J	2.25	0.24	3.1	9	mg/kg OC	0.077	0.027
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	1,4-Dichlorobenzene	0.021	mg/kg dw		2.24	0.94	3.1	9	mg/kg OC	0.3	0.1
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	1-Methylnaphthalene	0.27	mg/kg dw		2.24						
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	2,4-Dimethylphenol	11	ug/kg dw	J	2.67		29	29	ug/kg dw	0.38	0.38
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	2-Methylnaphthalene	0.33	mg/kg dw		2.24	15	38	64	mg/kg OC	0.39	0.23
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	2-Methylphenol	16	ug/kg dw	J	2.67		63	63	ug/kg dw	0.25	0.25
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	2-Methylphenol	5.7	ug/kg dw	J	2.24		63	63	ug/kg dw	0.09	0.09
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	4-Methylphenol	110	ug/kg dw	J	2.24		670	670	ug/kg dw	0.16	0.16
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Acenaphthene	0.12	mg/kg dw		2.67	4.5	16	57	mg/kg OC	0.28	0.079
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Acenaphthene	0.62	mg/kg dw		2.24	28	16	57	mg/kg OC	1.8	0.49
DR106	2.1	2 to 4	EPA SI	1998	Acenaphthylene	0.03	mg/kg dw		1.9	1.6	66	66	mg/kg OC	0.024	0.024
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Acenaphthylene	0.077	mg/kg dw	J	2.25	3.4	66	66	mg/kg OC	0.052	0.052
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Acenaphthylene	0.16	mg/kg dw		2.67	6	66	66	mg/kg OC	0.091	0.091
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Acenaphthylene	0.064	mg/kg dw	J	2.24	2.9	66	66	mg/kg OC	0.044	0.044
DR106	2.1	0 to 2	EPA SI	1998	Aluminum	22000	mg/kg dw		2.1						
DR106	2.1	2 to 4	EPA SI	1998	Aluminum	23000	mg/kg dw		1.9						
DR112	2.1	0 to 2	EPA SI	1998	Aluminum	26000	mg/kg dw		2.47						
DR112	2.1	2 to 4	EPA SI	1998	Aluminum	26000	mg/kg dw		2.93						
DR106	2.1	0 to 2	EPA SI	1998	Anthracene	0.03	mg/kg dw		2.1	1.4	220	1200	mg/kg OC	0.0064	0.0012
DR106	2.1	2 to 4	EPA SI	1998	Anthracene	0.04	mg/kg dw		1.9	2.1	220	1200	mg/kg OC	0.0095	0.0018
DR112	2.1	0 to 2	EPA SI	1998	Anthracene	0.12	mg/kg dw		2.47	4.9	220	1200	mg/kg OC	0.022	0.0041
DR112	2.1	2 to 4	EPA SI	1998	Anthracene	0.09	mg/kg dw		2.93	3.1	220	1200	mg/kg OC	0.014	0.0026
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Anthracene	0.014	mg/kg dw	J	1.27	1.1	220	1200	mg/kg OC	0.005	0.00092
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Anthracene	0.029	mg/kg dw	J	1.42	2	220	1200	mg/kg OC	0.0091	0.0017
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Anthracene	0.22	mg/kg dw		2.25	9.8	220	1200	mg/kg OC	0.045	0.0082
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Anthracene	0.67	mg/kg dw		2.67	25	220	1200	mg/kg OC	0.11	0.021
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Anthracene	1.2	mg/kg dw		2.24	54	220	1200	mg/kg OC	0.25	0.045
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Antimony	30	mg/kg dw	J	2.25						
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Antimony	30	mg/kg dw	J	2.67						
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Antimony	590	mg/kg dw	J	2.24						
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Antimony	8	mg/kg dw	J	0.543						
DR106	2.1	0 to 2	EPA SI	1998	Arsenic	12	mg/kg dw		2.1		57	93	mg/kg dw	0.21	0.13
DR106	2.1	2 to 4	EPA SI	1998	Arsenic	11	mg/kg dw		1.9		57	93	mg/kg dw	0.19	0.12
DR112	2.1	0 to 2	EPA SI	1998	Arsenic	13	mg/kg dw		2.47		57	93	mg/kg dw	0.23	0.14
DR112	2.1	2 to 4	EPA SI	1998	Arsenic	14	mg/kg dw		2.93		57	93	mg/kg dw	0.25	0.15
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Arsenic	13	mg/kg dw		1.27		57	93	mg/kg dw	0.23	0.14
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Arsenic	12	mg/kg dw		1.75		57	93	mg/kg dw	0.21	0.13
LDW-SC202	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Arsenic	9	mg/kg dw		1.24		57	93	mg/kg dw	0.16	0.097
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Arsenic	12	mg/kg dw		1.42		57	93	mg/kg dw	0.21	0.13
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Arsenic	11	mg/kg dw		1.46		57	93	mg/kg dw	0.19	0.12
LDW-SC36	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Arsenic	10	mg/kg dw		1.32		57	93	mg/kg dw	0.18	0.11
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Arsenic	150	mg/kg dw		2.25		57	93	mg/kg dw	2.6	1.6
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Arsenic	121	mg/kg dw		2.67		57	93	mg/kg dw	2.1	1.3
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Arsenic	2000	mg/kg dw		2.24		57	93	mg/kg dw	35	22

Sample Location Name	Sample River Mile Location	Sample Depth Interval (feet)	Sampling Event	Sampling Event Year	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^1	CSL^1	SQS/CSL Units	SQS Exceedance Factor^2	CSL Exceedance Factor^2
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Arsenic	21	mg/kg dw		0.543		57	93	mg/kg dw	0.37	0.23
DR106	2.1	0 to 2	EPA SI	1998	Barium	81	mg/kg dw		2.1						
DR106	2.1	2 to 4	EPA SI	1998	Barium	65	mg/kg dw		1.9						
DR112	2.1	0 to 2	EPA SI	1998	Barium	92	mg/kg dw		2.47						
DR112	2.1	2 to 4	EPA SI	1998	Barium	110	mg/kg dw		2.93						
DR106	2.1	0 to 2	EPA SI	1998	Benzo(a)anthracene	0.08	mg/kg dw		2.1	3.8	110	270	mg/kg OC	0.035	0.014
DR106	2.1	2 to 4	EPA SI	1998	Benzo(a)anthracene	0.17	mg/kg dw		1.9	8.9	110	270	mg/kg OC	0.081	0.033
DR112	2.1	0 to 2	EPA SI	1998	Benzo(a)anthracene	0.23	mg/kg dw		2.47	9.3	110	270	mg/kg OC	0.085	0.034
DR112	2.1	2 to 4	EPA SI	1998	Benzo(a)anthracene	0.3	mg/kg dw		2.93	10	110	270	mg/kg OC	0.091	0.037
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzo(a)anthracene	0.051	mg/kg dw		1.27	4	110	270	mg/kg OC	0.036	0.015
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(a)anthracene	0.028	mg/kg dw	J	1.75	1.6	110	270	mg/kg OC	0.015	0.0059
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzo(a)anthracene	0.081	mg/kg dw		1.42	5.7	110	270	mg/kg OC	0.052	0.021
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(a)anthracene	0.03	mg/kg dw	J	1.46	2.1	110	270	mg/kg OC	0.019	0.0078
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzo(a)anthracene	1.1	mg/kg dw		2.25	49	110	270	mg/kg OC	0.45	0.18
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(a)anthracene	3.1	mg/kg dw		2.67	120	110	270	mg/kg OC	1.1	0.44
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzo(a)anthracene	4.5	mg/kg dw		2.24	200	110	270	mg/kg OC	1.8	0.74
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Benzo(a)anthracene	0.039	mg/kg dw	J	0.543	7.2	110	270	mg/kg OC	0.065	0.027
DR106	2.1	0 to 2	EPA SI	1998	Benzo(a)pyrene	0.09	mg/kg dw		2.1	4.3	99	210	mg/kg OC	0.043	0.02
DR106	2.1	2 to 4	EPA SI	1998	Benzo(a)pyrene	0.19	mg/kg dw		1.9	10	99	210	mg/kg OC	0.1	0.048
DR112	2.1	0 to 2	EPA SI	1998	Benzo(a)pyrene	0.24	mg/kg dw		2.47	9.7	99	210	mg/kg OC	0.098	0.046
DR112	2.1	2 to 4	EPA SI	1998	Benzo(a)pyrene	0.4	mg/kg dw		2.93	14	99	210	mg/kg OC	0.14	0.067
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzo(a)pyrene	0.056	mg/kg dw		1.27	4.4	99	210	mg/kg OC	0.044	0.021
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(a)pyrene	0.02	mg/kg dw	J	1.75	1.1	99	210	mg/kg OC	0.011	0.0052
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzo(a)pyrene	0.074	mg/kg dw		1.42	5.2	99	210	mg/kg OC	0.053	0.025
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(a)pyrene	0.02	mg/kg dw	J	1.46	1.4	99	210	mg/kg OC	0.014	0.0067
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzo(a)pyrene	2	mg/kg dw		2.25	89	99	210	mg/kg OC	0.9	0.42
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(a)pyrene	5.3	mg/kg dw		2.67	200	99	210	mg/kg OC	2	0.95
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzo(a)pyrene	4	mg/kg dw		2.24	180	99	210	mg/kg OC	1.8	0.86
DR106	2.1	0 to 2	EPA SI	1998	Benzo(b)fluoranthene	0.09	mg/kg dw		2.1						
DR106	2.1	2 to 4	EPA SI	1998	Benzo(b)fluoranthene	0.14	mg/kg dw		1.9						
DR112	2.1	0 to 2	EPA SI	1998	Benzo(b)fluoranthene	0.31	mg/kg dw		2.47						
DR112	2.1	2 to 4	EPA SI	1998	Benzo(b)fluoranthene	0.45	mg/kg dw		2.93						
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzo(b)fluoranthene	0.12	mg/kg dw		1.27						
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(b)fluoranthene	0.029	mg/kg dw	J	1.75						
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzo(b)fluoranthene	0.092	mg/kg dw		1.42						
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(b)fluoranthene	0.025	mg/kg dw	J	1.46						
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzo(b)fluoranthene	3	mg/kg dw		2.25						
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(b)fluoranthene	6.4	mg/kg dw		2.67						
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzo(b)fluoranthene	5	mg/kg dw		2.24						
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Benzo(b)fluoranthene	0.033	mg/kg dw	J	0.543						
DR106	2.1	0 to 2	EPA SI	1998	Benzo(g,h,i)perylene	0.07	mg/kg dw		2.1	3.3	31	78	mg/kg OC	0.11	0.042
DR106	2.1	2 to 4	EPA SI	1998	Benzo(g,h,i)perylene	0.11	mg/kg dw		1.9	5.8	31	78	mg/kg OC	0.19	0.074
DR112	2.1	0 to 2	EPA SI	1998	Benzo(g,h,i)perylene	0.16	mg/kg dw		2.47	6.5	31	78	mg/kg OC	0.21	0.083
DR112	2.1	2 to 4	EPA SI	1998	Benzo(g,h,i)perylene	0.23	mg/kg dw		2.93	7.8	31	78	mg/kg OC	0.25	0.1
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzo(g,h,i)perylene	0.016	mg/kg dw	J	1.27	1.3	31	78	mg/kg OC	0.042	0.017
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzo(g,h,i)perylene	0.031	mg/kg dw	J	1.42	2.2	31	78	mg/kg OC	0.071	0.028
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzo(g,h,i)perylene	0.53	mg/kg dw		2.25	24	31	78	mg/kg OC	0.77	0.31
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(g,h,i)perylene	1	mg/kg dw		2.67	37	31	78	mg/kg OC	1.2	0.47
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzo(g,h,i)perylene	0.83	mg/kg dw		2.24	37	31	78	mg/kg OC	1.2	0.47
DR106	2.1	0 to 2	EPA SI	1998	Benzo(k)fluoranthene	0.08	mg/kg dw		2.1						
DR106	2.1	2 to 4	EPA SI	1998	Benzo(k)fluoranthene	0.15	mg/kg dw		1.9						
DR112	2.1	0 to 2	EPA SI	1998	Benzo(k)fluoranthene	0.23	mg/kg dw		2.47						
DR112	2.1	2 to 4	EPA SI	1998	Benzo(k)fluoranthene	0.41	mg/kg dw		2.93						

Sample Location Name	Sample River Mile Location	Sample Depth Interval (feet)	Sampling Event	Sampling Event Year	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^{1}	CSL^{1}	SQS/CSL Units	SQS Exceedance Factor^{2}	CSL Exceedance Factor^{2}
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzo(k)fluoranthene	0.091	mg/kg dw		1.27						
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(k)fluoranthene	0.027	mg/kg dw	J	1.75						
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzo(k)fluoranthene	0.096	mg/kg dw		1.42						
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(k)fluoranthene	0.028	mg/kg dw	J	1.46						
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzo(k)fluoranthene	2.1	mg/kg dw		2.25						
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(k)fluoranthene	3.8	mg/kg dw		2.67						
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzo(k)fluoranthene	4.1	mg/kg dw		2.24						
DR106	2.1	0 to 2	EPA SI	1998	Benzofluoranthenes (total-calc'd)	0.17	mg/kg dw		2.1	8.1	230	450	mg/kg OC	0.035	0.018
DR106	2.1	2 to 4	EPA SI	1998	Benzofluoranthenes (total-calc'd)	0.29	mg/kg dw		1.9	15	230	450	mg/kg OC	0.065	0.033
DR112	2.1	0 to 2	EPA SI	1998	Benzofluoranthenes (total-calc'd)	0.54	mg/kg dw		2.47	22	230	450	mg/kg OC	0.096	0.049
DR112	2.1	2 to 4	EPA SI	1998	Benzofluoranthenes (total-calc'd)	0.86	mg/kg dw		2.93	29	230	450	mg/kg OC	0.13	0.064
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzofluoranthenes (total-calc'd)	0.21	mg/kg dw		1.27	17	230	450	mg/kg OC	0.074	0.038
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzofluoranthenes (total-calc'd)	0.056	mg/kg dw	J	1.75	3.2	230	450	mg/kg OC	0.014	0.0071
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzofluoranthenes (total-calc'd)	0.188	mg/kg dw		1.42	13	230	450	mg/kg OC	0.057	0.029
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzofluoranthenes (total-calc'd)	0.053	mg/kg dw	J	1.46	3.6	230	450	mg/kg OC	0.016	0.008
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzofluoranthenes (total-calc'd)	5.1	mg/kg dw		2.25	230	230	450	mg/kg OC	1	0.51
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzofluoranthenes (total-calc'd)	10.2	mg/kg dw		2.67	380	230	450	mg/kg OC	1.7	0.84
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzofluoranthenes (total-calc'd)	9.1	mg/kg dw		2.24	410	230	450	mg/kg OC	1.8	0.91
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Benzofluoranthenes (total-calc'd)	0.033	mg/kg dw	J	0.543	6.1	230	450	mg/kg OC	0.027	0.014
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzoic acid	140	ug/kg dw		2.25		650	650	ug/kg dw	0.22	0.22
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzoic acid	130	ug/kg dw		2.67		650	650	ug/kg dw	0.2	0.2
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzoic acid	230	ug/kg dw		2.24		650	650	ug/kg dw	0.35	0.35
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Benzyl alcohol	22	ug/kg dw	J	2.25		57	73	ug/kg dw	0.39	0.3
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzyl alcohol	22	ug/kg dw	J	2.67		57	73	ug/kg dw	0.39	0.3
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzyl alcohol	34	ug/kg dw	J	2.24		57	73	ug/kg dw	0.6	0.47
DR106	2.1	0 to 2	EPA SI	1998	Beryllium	0.33	mg/kg dw		2.1						
DR106	2.1	2 to 4	EPA SI	1998	Beryllium	0.33	mg/kg dw		1.9						
DR112	2.1	0 to 2	EPA SI	1998	Beryllium	0.37	mg/kg dw		2.47						
DR112	2.1	2 to 4	EPA SI	1998	Beryllium	0.41	mg/kg dw		2.93						
DR106	2.1	0 to 2	EPA SI	1998	Bis(2-ethylhexyl)phthalate	0.08	mg/kg dw		2.1	3.8	47	78	mg/kg OC	0.081	0.049
DR112	2.1	0 to 2	EPA SI	1998	Bis(2-ethylhexyl)phthalate	0.38	mg/kg dw		2.47	15	47	78	mg/kg OC	0.32	0.19
DR112	2.1	2 to 4	EPA SI	1998	Bis(2-ethylhexyl)phthalate	0.57	mg/kg dw		2.93	19	47	78	mg/kg OC	0.4	0.24
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Bis(2-ethylhexyl)phthalate	0.054	mg/kg dw	J	1.27	4.3	47	78	mg/kg OC	0.091	0.055
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Bis(2-ethylhexyl)phthalate	0.073	mg/kg dw		1.42	5.1	47	78	mg/kg OC	0.11	0.065
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Bis(2-ethylhexyl)phthalate	0.85	mg/kg dw		2.25	38	47	78	mg/kg OC	0.81	0.49
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Bis(2-ethylhexyl)phthalate	1.1	mg/kg dw	J	2.67	41	47	78	mg/kg OC	0.87	0.53
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Bis(2-ethylhexyl)phthalate	0.54	mg/kg dw	J	2.24	24	47	78	mg/kg OC	0.51	0.31
DR112	2.1	0 to 2	EPA SI	1998	Butyl benzyl phthalate	0.06	mg/kg dw		2.47	2.4	4.9	64	mg/kg OC	0.49	0.038
DR112	2.1	2 to 4	EPA SI	1998	Butyl benzyl phthalate	0.05	mg/kg dw		2.93	1.7	4.9	64	mg/kg OC	0.35	0.027
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Butyl benzyl phthalate	0.0095	mg/kg dw		1.27	0.75	4.9	64	mg/kg OC	0.15	0.012
LDW-SC36	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Butyl benzyl phthalate	0.0058	mg/kg dw	J	1.32	0.44	4.9	64	mg/kg OC	0.09	0.0069
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Butyl benzyl phthalate	0.041	mg/kg dw	J	2.25	1.8	4.9	64	mg/kg OC	0.37	0.028
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Butyl benzyl phthalate	0.051	mg/kg dw		2.67	1.9	4.9	64	mg/kg OC	0.39	0.03
DR106	2.1	0 to 2	EPA SI	1998	Cadmium	0.3	mg/kg dw		2.1		5.1	6.7	mg/kg dw	0.059	0.045
DR106	2.1	2 to 4	EPA SI	1998	Cadmium	0.3	mg/kg dw		1.9		5.1	6.7	mg/kg dw	0.059	0.045
DR112	2.1	0 to 2	EPA SI	1998	Cadmium	0.3	mg/kg dw		2.47		5.1	6.7	mg/kg dw	0.059	0.045
DR112	2.1	2 to 4	EPA SI	1998	Cadmium	0.4	mg/kg dw		2.93		5.1	6.7	mg/kg dw	0.078	0.06
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Cadmium	0.3	mg/kg dw		1.42		5.1	6.7	mg/kg dw	0.059	0.045
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Cadmium	0.7	mg/kg dw		2.67		5.1	6.7	mg/kg dw	0.14	0.1
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Cadmium	4	mg/kg dw		2.24		5.1	6.7	mg/kg dw	0.78	0.6
DR112	2.1	0 to 2	EPA SI	1998	Carbazole	0.03	mg/kg dw		2.47						
DR112	2.1	2 to 4	EPA SI	1998	Carbazole	0.03	mg/kg dw		2.93						
DR106	2.1	0 to 2	EPA SI	1998	Chromium	29	mg/kg dw		2.1		260	270	mg/kg dw	0.11	0.11

Sample Location Name	Sample River Mile Location	Sample Depth Interval (feet)	Sampling Event	Sampling Event Year	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
DR106	2.1	2 to 4	EPA SI	1998	Chromium	28	mg/kg dw		1.9		260	270	mg/kg dw	0.11	0.1
DR112	2.1	0 to 2	EPA SI	1998	Chromium	33	mg/kg dw		2.47		260	270	mg/kg dw	0.13	0.12
DR112	2.1	2 to 4	EPA SI	1998	Chromium	34	mg/kg dw		2.93		260	270	mg/kg dw	0.13	0.13
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Chromium	24.8	mg/kg dw		1.27		260	270	mg/kg dw	0.095	0.092
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Chromium	23.3	mg/kg dw		1.75		260	270	mg/kg dw	0.09	0.086
LDW-SC202	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Chromium	17.7	mg/kg dw		1.24		260	270	mg/kg dw	0.068	0.066
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Chromium	24.4	mg/kg dw		1.42		260	270	mg/kg dw	0.094	0.09
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Chromium	25.2	mg/kg dw		1.46		260	270	mg/kg dw	0.097	0.093
LDW-SC36	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Chromium	17.3	mg/kg dw		1.32		260	270	mg/kg dw	0.067	0.064
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Chromium	48	mg/kg dw		2.25		260	270	mg/kg dw	0.18	0.18
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Chromium	44.7	mg/kg dw		2.67		260	270	mg/kg dw	0.17	0.17
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Chromium	126	mg/kg dw		2.24		260	270	mg/kg dw	0.48	0.47
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Chromium	10.3	mg/kg dw		0.543		260	270	mg/kg dw	0.04	0.038
DR106	2.1	0 to 2	EPA SI	1998	Chrysene	0.09	mg/kg dw		2.1	4.3	110	460	mg/kg OC	0.039	0.0093
DR106	2.1	2 to 4	EPA SI	1998	Chrysene	0.18	mg/kg dw		1.9	9.5	110	460	mg/kg OC	0.086	0.021
DR112	2.1	0 to 2	EPA SI	1998	Chrysene	0.31	mg/kg dw		2.47	13	110	460	mg/kg OC	0.12	0.028
DR112	2.1	2 to 4	EPA SI	1998	Chrysene	0.47	mg/kg dw		2.93	16	110	460	mg/kg OC	0.15	0.035
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Chrysene	0.072	mg/kg dw		1.27	5.7	110	460	mg/kg OC	0.052	0.012
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Chrysene	0.03	mg/kg dw	J	1.75	1.7	110	460	mg/kg OC	0.015	0.0037
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Chrysene	0.11	mg/kg dw		1.42	7.7	110	460	mg/kg OC	0.07	0.017
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Chrysene	0.036	mg/kg dw	J	1.46	2.5	110	460	mg/kg OC	0.023	0.0054
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Chrysene	1.6	mg/kg dw		2.25	71	110	460	mg/kg OC	0.65	0.15
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Chrysene	4.8	mg/kg dw		2.67	180	110	460	mg/kg OC	1.6	0.39
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Chrysene	5	mg/kg dw		2.24	220	110	460	mg/kg OC	2	0.48
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Chrysene	0.04	mg/kg dw	J	0.543	7.4	110	460	mg/kg OC	0.067	0.016
DR106	2.1	0 to 2	EPA SI	1998	Cobalt	9	mg/kg dw		2.1						
DR106	2.1	2 to 4	EPA SI	1998	Cobalt	9	mg/kg dw		1.9						
DR112	2.1	0 to 2	EPA SI	1998	Cobalt	11	mg/kg dw		2.47						
DR112	2.1	2 to 4	EPA SI	1998	Cobalt	11	mg/kg dw		2.93						
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Cobalt	8.1	mg/kg dw		1.27						
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Cobalt	8	mg/kg dw		1.75						
LDW-SC202	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Cobalt	6.5	mg/kg dw		1.24						
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Cobalt	7.6	mg/kg dw		1.42						
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Cobalt	7.8	mg/kg dw		1.46						
LDW-SC36	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Cobalt	6.2	mg/kg dw		1.32						
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Cobalt	18	mg/kg dw		2.25						
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Cobalt	12.2	mg/kg dw		2.67						
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Cobalt	100	mg/kg dw		2.24						
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Cobalt	4.9	mg/kg dw		0.543						
DR106	2.1	0 to 2	EPA SI	1998	Copper	50	mg/kg dw		2.1		390	390	mg/kg dw	0.13	0.13
DR106	2.1	2 to 4	EPA SI	1998	Copper	46	mg/kg dw		1.9		390	390	mg/kg dw	0.12	0.12
DR112	2.1	0 to 2	EPA SI	1998	Copper	57	mg/kg dw		2.47		390	390	mg/kg dw	0.15	0.15
DR112	2.1	2 to 4	EPA SI	1998	Copper	72	mg/kg dw		2.93		390	390	mg/kg dw	0.18	0.18
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Copper	56.3	mg/kg dw		1.27		390	390	mg/kg dw	0.14	0.14
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Copper	37.6	mg/kg dw		1.75		390	390	mg/kg dw	0.096	0.096
LDW-SC202	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Copper	25.6	mg/kg dw		1.24		390	390	mg/kg dw	0.066	0.066
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Copper	45.8	mg/kg dw		1.42		390	390	mg/kg dw	0.12	0.12
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Copper	36.9	mg/kg dw		1.46		390	390	mg/kg dw	0.095	0.095
LDW-SC36	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Copper	24.5	mg/kg dw		1.32		390	390	mg/kg dw	0.063	0.063
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Copper	236	mg/kg dw		2.25		390	390	mg/kg dw	0.61	0.61
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Copper	330	mg/kg dw		2.67		390	390	mg/kg dw	0.85	0.85
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Copper	2940	mg/kg dw		2.24		390	390	mg/kg dw	7.5	7.5
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Copper	21.3	mg/kg dw		0.543		390	390	mg/kg dw	0.055	0.055

Sample Location Name	Sample River Mile Location	Sample Depth Interval (feet)	Sampling Event	Sampling Event Year	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^1	CSL^1	SQS/CSL Units	SQS Exceedance Factor^2	CSL Exceedance Factor^2
DR106	2.1	2 to 4	EPA SI	1998	Dibenzo(a,h)anthracene	0.03	mg/kg dw		1.9	1.6	12	33	mg/kg OC	0.13	0.048
DR112	2.1	0 to 2	EPA SI	1998	Dibenzo(a,h)anthracene	0.04	mg/kg dw		2.47	1.6	12	33	mg/kg OC	0.13	0.048
DR112	2.1	2 to 4	EPA SI	1998	Dibenzo(a,h)anthracene	0.07	mg/kg dw		2.93	2.4	12	33	mg/kg OC	0.2	0.073
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Dibenzo(a,h)anthracene	0.17	mg/kg dw		2.25	7.6	12	33	mg/kg OC	0.63	0.23
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Dibenzo(a,h)anthracene	0.36	mg/kg dw		2.67	13	12	33	mg/kg OC	1.1	0.39
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Dibenzo(a,h)anthracene	0.27	mg/kg dw		2.24	12	12	33	mg/kg OC	1	0.36
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Dibenzo(a,h)anthracene	0.014	mg/kg dw		0.543	2.6	12	33	mg/kg OC	0.22	0.079
DR112	2.1	0 to 2	EPA SI	1998	Dibenzofuran	0.02	mg/kg dw		2.47	0.81	15	58	mg/kg OC	0.054	0.014
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Dibenzofuran	0.088	mg/kg dw	J	2.67	3.3	15	58	mg/kg OC	0.22	0.057
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Dibenzofuran	0.57	mg/kg dw		2.24	25	15	58	mg/kg OC	1.7	0.43
DR112	2.1	0 to 2	EPA SI	1998	Dibutyltin as ion	0.017	mg/kg dw		2.47						
DR112	2.1	2 to 4	EPA SI	1998	Dibutyltin as ion	0.057	mg/kg dw		2.93						
DR106	2.1	2 to 4	EPA SI	1998	Di-n-butyl phthalate	0.03	mg/kg dw		1.9	1.6	220	1700	mg/kg OC	0.0073	0.00094
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Di-n-butyl phthalate	0.014	mg/kg dw	J	1.27	1.1	220	1700	mg/kg OC	0.005	0.00065
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Di-n-butyl phthalate	0.024	mg/kg dw	J	1.42	1.7	220	1700	mg/kg OC	0.0077	0.001
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Di-n-octyl phthalate	0.079	mg/kg dw	J	2.67	3	58	4500	mg/kg OC	0.052	0.00067
DR106	2.1	0 to 2	EPA SI	1998	Fluoranthene	0.16	mg/kg dw		2.1	7.6	160	1200	mg/kg OC	0.048	0.0063
DR106	2.1	2 to 4	EPA SI	1998	Fluoranthene	0.23	mg/kg dw		1.9	12	160	1200	mg/kg OC	0.075	0.01
DR112	2.1	0 to 2	EPA SI	1998	Fluoranthene	0.55	mg/kg dw		2.47	22	160	1200	mg/kg OC	0.14	0.018
DR112	2.1	2 to 4	EPA SI	1998	Fluoranthene	0.47	mg/kg dw		2.93	16	160	1200	mg/kg OC	0.1	0.013
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Fluoranthene	0.11	mg/kg dw		1.27	8.7	160	1200	mg/kg OC	0.054	0.0073
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Fluoranthene	0.069	mg/kg dw		1.75	3.9	160	1200	mg/kg OC	0.024	0.0033
LDW-SC202	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Fluoranthene	0.042	mg/kg dw		1.24	3.4	160	1200	mg/kg OC	0.021	0.0028
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Fluoranthene	0.16	mg/kg dw		1.42	11	160	1200	mg/kg OC	0.069	0.0092
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Fluoranthene	0.065	mg/kg dw		1.46	4.5	160	1200	mg/kg OC	0.028	0.0038
LDW-SC36	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Fluoranthene	0.034	mg/kg dw	J	1.32	2.6	160	1200	mg/kg OC	0.016	0.0022
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Fluoranthene	1.6	mg/kg dw		2.25	71	160	1200	mg/kg OC	0.44	0.059
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Fluoranthene	4.5	mg/kg dw		2.67	170	160	1200	mg/kg OC	1.1	0.14
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Fluoranthene	13	mg/kg dw		2.24	580	160	1200	mg/kg OC	3.6	0.48
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Fluoranthene	0.094	mg/kg dw		0.543	17	160	1200	mg/kg OC	0.11	0.014
DR112	2.1	0 to 2	EPA SI	1998	Fluorene	0.03	mg/kg dw		2.47	1.2	23	79	mg/kg OC	0.052	0.015
DR112	2.1	2 to 4	EPA SI	1998	Fluorene	0.02	mg/kg dw		2.93	0.68	23	79	mg/kg OC	0.03	0.0086
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Fluorene	0.17	mg/kg dw		2.67	6.4	23	79	mg/kg OC	0.28	0.081
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Fluorene	0.75	mg/kg dw		2.24	33	23	79	mg/kg OC	1.4	0.42
DR106	2.1	0 to 2	EPA SI	1998	Indeno(1,2,3-cd)pyrene	0.07	mg/kg dw		2.1	3.3	34	88	mg/kg OC	0.097	0.038
DR106	2.1	2 to 4	EPA SI	1998	Indeno(1,2,3-cd)pyrene	0.12	mg/kg dw		1.9	6.3	34	88	mg/kg OC	0.19	0.072
DR112	2.1	0 to 2	EPA SI	1998	Indeno(1,2,3-cd)pyrene	0.18	mg/kg dw		2.47	7.3	34	88	mg/kg OC	0.21	0.083
DR112	2.1	2 to 4	EPA SI	1998	Indeno(1,2,3-cd)pyrene	0.27	mg/kg dw		2.93	9.2	34	88	mg/kg OC	0.27	0.1
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Indeno(1,2,3-cd)pyrene	0.019	mg/kg dw	J	1.27	1.5	34	88	mg/kg OC	0.044	0.017
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Indeno(1,2,3-cd)pyrene	0.035	mg/kg dw	J	1.42	2.5	34	88	mg/kg OC	0.074	0.028
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Indeno(1,2,3-cd)pyrene	0.75	mg/kg dw		2.25	33	34	88	mg/kg OC	0.97	0.38
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Indeno(1,2,3-cd)pyrene	1.5	mg/kg dw		2.67	56	34	88	mg/kg OC	1.6	0.64
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Indeno(1,2,3-cd)pyrene	1.2	mg/kg dw		2.24	54	34	88	mg/kg OC	1.6	0.61
DR106	2.1	0 to 2	EPA SI	1998	Iron	29000	mg/kg dw	J	2.1						
DR106	2.1	2 to 4	EPA SI	1998	Iron	30000	mg/kg dw	J	1.9						
DR112	2.1	0 to 2	EPA SI	1998	Iron	32000	mg/kg dw	J	2.47						
DR112	2.1	2 to 4	EPA SI	1998	Iron	33000	mg/kg dw	J	2.93						
DR106	2.1	0 to 2	EPA SI	1998	Lead	30	mg/kg dw		2.1		450	530	mg/kg dw	0.067	0.057
DR106	2.1	2 to 4	EPA SI	1998	Lead	23	mg/kg dw		1.9		450	530	mg/kg dw	0.051	0.043
DR112	2.1	0 to 2	EPA SI	1998	Lead	29	mg/kg dw		2.47		450	530	mg/kg dw	0.064	0.055
DR112	2.1	2 to 4	EPA SI	1998	Lead	51	mg/kg dw		2.93		450	530	mg/kg dw	0.11	0.096
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Lead	19	mg/kg dw		1.27		450	530	mg/kg dw	0.042	0.036
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Lead	16	mg/kg dw		1.75		450	530	mg/kg dw	0.036	0.03

Sample Location Name	Sample River Mile Location	Sample Depth Interval (feet)	Sampling Event	Sampling Event Year	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^1	CSL^1	SQS/CSL Units	SQS Exceedance Factor^2	CSL Exceedance Factor^2
LDW-SC202	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Lead	6	mg/kg dw		1.24		450	530	mg/kg dw	0.013	0.011
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Lead	26	mg/kg dw		1.42		450	530	mg/kg dw	0.058	0.049
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Lead	16	mg/kg dw		1.46		450	530	mg/kg dw	0.036	0.03
LDW-SC36	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Lead	7	mg/kg dw		1.32		450	530	mg/kg dw	0.016	0.013
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Lead	121	mg/kg dw	J	2.25		450	530	mg/kg dw	0.27	0.23
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Lead	247	mg/kg dw	J	2.67		450	530	mg/kg dw	0.55	0.47
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Lead	3520	mg/kg dw	J	2.24		450	530	mg/kg dw	7.8	6.6
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Lead	16	mg/kg dw		0.543		450	530	mg/kg dw	0.036	0.03
DR106	2.1	0 to 2	EPA SI	1998	Magnesium	7200	mg/kg dw		2.1						
DR106	2.1	2 to 4	EPA SI	1998	Magnesium	6900	mg/kg dw		1.9						
DR112	2.1	0 to 2	EPA SI	1998	Magnesium	8200	mg/kg dw		2.47						
DR112	2.1	2 to 4	EPA SI	1998	Magnesium	8300	mg/kg dw		2.93						
DR106	2.1	0 to 2	EPA SI	1998	Manganese	280	mg/kg dw		2.1						
DR106	2.1	2 to 4	EPA SI	1998	Manganese	260	mg/kg dw		1.9						
DR112	2.1	0 to 2	EPA SI	1998	Manganese	360	mg/kg dw		2.47						
DR112	2.1	2 to 4	EPA SI	1998	Manganese	340	mg/kg dw		2.93						
DR106	2.1	0 to 2	EPA SI	1998	Mercury	0.24	mg/kg dw		2.1		0.41	0.59	mg/kg dw	0.59	0.41
DR106	2.1	2 to 4	EPA SI	1998	Mercury	0.25	mg/kg dw		1.9		0.41	0.59	mg/kg dw	0.61	0.42
DR112	2.1	0 to 2	EPA SI	1998	Mercury	0.17	mg/kg dw		2.47		0.41	0.59	mg/kg dw	0.41	0.29
DR112	2.1	2 to 4	EPA SI	1998	Mercury	0.17	mg/kg dw		2.93		0.41	0.59	mg/kg dw	0.41	0.29
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Mercury	0.14	mg/kg dw		1.27		0.41	0.59	mg/kg dw	0.34	0.24
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Mercury	0.21	mg/kg dw		1.75		0.41	0.59	mg/kg dw	0.51	0.36
LDW-SC202	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Mercury	0.11	mg/kg dw		1.24		0.41	0.59	mg/kg dw	0.27	0.19
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Mercury	0.28	mg/kg dw		1.42		0.41	0.59	mg/kg dw	0.68	0.47
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Mercury	0.33	mg/kg dw		1.46		0.41	0.59	mg/kg dw	0.8	0.56
LDW-SC36	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Mercury	0.13	mg/kg dw		1.32		0.41	0.59	mg/kg dw	0.32	0.22
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Mercury	0.26	mg/kg dw	J	2.25		0.41	0.59	mg/kg dw	0.63	0.44
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Mercury	0.45	mg/kg dw	J	2.67		0.41	0.59	mg/kg dw	1.1	0.76
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Mercury	0.37	mg/kg dw	J	2.24		0.41	0.59	mg/kg dw	0.9	0.63
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Molybdenum	0.9	mg/kg dw		1.42						
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Molybdenum	9	mg/kg dw		2.25						
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Molybdenum	9.3	mg/kg dw		2.67						
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Molybdenum	113	mg/kg dw		2.24						
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Molybdenum	1.6	mg/kg dw		0.543						
DR112	2.1	0 to 2	EPA SI	1998	Monobutyltin as ion	0.008	mg/kg dw	J	2.47						
DR112	2.1	2 to 4	EPA SI	1998	Monobutyltin as ion	0.018	mg/kg dw	J	2.93						
DR106	2.1	0 to 2	EPA SI	1998	Naphthalene	0.02	mg/kg dw		2.1	0.95	99	170	mg/kg OC	0.0096	0.0056
DR106	2.1	2 to 4	EPA SI	1998	Naphthalene	0.02	mg/kg dw		1.9	1.1	99	170	mg/kg OC	0.011	0.0065
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Naphthalene	0.087	mg/kg dw	J	2.67	3.3	99	170	mg/kg OC	0.033	0.019
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Naphthalene	0.4	mg/kg dw		2.24	18	99	170	mg/kg OC	0.18	0.11
DR106	2.1	0 to 2	EPA SI	1998	Nickel	22	mg/kg dw		2.1						
DR106	2.1	2 to 4	EPA SI	1998	Nickel	21	mg/kg dw		1.9						
DR112	2.1	0 to 2	EPA SI	1998	Nickel	25	mg/kg dw		2.47						
DR112	2.1	2 to 4	EPA SI	1998	Nickel	25	mg/kg dw		2.93						
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Nickel	21	mg/kg dw		1.27						
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Nickel	18	mg/kg dw		1.75						
LDW-SC202	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Nickel	14	mg/kg dw		1.24						
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Nickel	19	mg/kg dw		1.42						
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Nickel	22	mg/kg dw		1.46						
LDW-SC36	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Nickel	13	mg/kg dw		1.32						
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Nickel	35	mg/kg dw		2.25						
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Nickel	20	mg/kg dw		2.67						
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Nickel	48	mg/kg dw		2.24						

Sample Location Name	Sample River Mile Location	Sample Depth Interval (feet)	Sampling Event	Sampling Event Year	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^{1}	CSL^{1}	SQS/CSL Units	SQS Exceedance Factor^{2}	CSL Exceedance Factor^{2}
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Nickel	7	mg/kg dw		0.543						
DR106	2.1	0 to 2	EPA SI	1998	PCBs (total calc'd)	0.061	mg/kg dw		2.1	2.9	12	65	mg/kg OC	0.24	0.045
DR112	2.1	0 to 2	EPA SI	1998	PCBs (total calc'd)	0.24	mg/kg dw		2.47	9.7	12	65	mg/kg OC	0.81	0.15
DR112	2.1	2 to 4	EPA SI	1998	PCBs (total calc'd)	0.33	mg/kg dw		2.93	11	12	65	mg/kg OC	0.92	0.17
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.03	mg/kg dw		1.27	2.4	12	65	mg/kg OC	0.2	0.037
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.075	mg/kg dw		1.42	5.3	12	65	mg/kg OC	0.44	0.082
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.45	mg/kg dw		2.25	20	12	65	mg/kg OC	1.7	0.31
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.95	mg/kg dw	J	2.67	36	12	65	mg/kg OC	3.0	0.55
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.55	mg/kg dw		2.24	25	12	65	mg/kg OC	2.1	0.38
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Pentachlorophenol	28	ug/kg dw	J	2.25		360	690	ug/kg dw	0.078	0.041
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Pentachlorophenol	74	ug/kg dw		2.67		360	690	ug/kg dw	0.21	0.11
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Pentachlorophenol	190	ug/kg dw		2.24		360	690	ug/kg dw	0.53	0.28
DR106	2.1	0 to 2	EPA SI	1998	Phenanthrene	0.1	mg/kg dw		2.1	4.8	100	480	mg/kg OC	0.048	0.01
DR106	2.1	2 to 4	EPA SI	1998	Phenanthrene	0.07	mg/kg dw		1.9	3.7	100	480	mg/kg OC	0.037	0.0077
DR112	2.1	0 to 2	EPA SI	1998	Phenanthrene	0.17	mg/kg dw		2.47	6.9	100	480	mg/kg OC	0.069	0.014
DR112	2.1	2 to 4	EPA SI	1998	Phenanthrene	0.18	mg/kg dw		2.93	6.1	100	480	mg/kg OC	0.061	0.013
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Phenanthrene	0.037	mg/kg dw		1.27	2.9	100	480	mg/kg OC	0.029	0.006
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Phenanthrene	0.027	mg/kg dw	J	1.75	1.5	100	480	mg/kg OC	0.015	0.0031
LDW-SC202	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Phenanthrene	0.024	mg/kg dw	J	1.24	1.9	100	480	mg/kg OC	0.019	0.004
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Phenanthrene	0.051	mg/kg dw		1.42	3.6	100	480	mg/kg OC	0.036	0.0075
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Phenanthrene	0.024	mg/kg dw	J	1.46	1.6	100	480	mg/kg OC	0.016	0.0033
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Phenanthrene	0.35	mg/kg dw		2.25	16	100	480	mg/kg OC	0.16	0.033
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Phenanthrene	1.4	mg/kg dw		2.67	52	100	480	mg/kg OC	0.52	0.11
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Phenanthrene	7.5	mg/kg dw		2.24	330	100	480	mg/kg OC	3.3	0.69
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Phenanthrene	0.046	mg/kg dw	J	0.543	8.5	100	480	mg/kg OC	0.085	0.018
DR106	2.1	0 to 2	EPA SI	1998	Pyrene	0.34	mg/kg dw		2.1	16	1000	1400	mg/kg OC	0.016	0.011
DR106	2.1	2 to 4	EPA SI	1998	Pyrene	0.31	mg/kg dw		1.9	16	1000	1400	mg/kg OC	0.016	0.011
DR112	2.1	0 to 2	EPA SI	1998	Pyrene	0.58	mg/kg dw		2.47	23	1000	1400	mg/kg OC	0.023	0.016
DR112	2.1	2 to 4	EPA SI	1998	Pyrene	0.74	mg/kg dw		2.93	25	1000	1400	mg/kg OC	0.025	0.018
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Pyrene	0.093	mg/kg dw		1.27	7.3	1000	1400	mg/kg OC	0.0073	0.0052
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Pyrene	0.078	mg/kg dw		1.75	4.5	1000	1400	mg/kg OC	0.0045	0.0032
LDW-SC202	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Pyrene	0.028	mg/kg dw	J	1.24	2.3	1000	1400	mg/kg OC	0.0023	0.0016
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Pyrene	0.15	mg/kg dw		1.42	11	1000	1400	mg/kg OC	0.011	0.0079
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Pyrene	0.07	mg/kg dw		1.46	4.8	1000	1400	mg/kg OC	0.0048	0.0034
LDW-SC36	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Pyrene	0.022	mg/kg dw	J	1.32	1.7	1000	1400	mg/kg OC	0.0017	0.0012
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Pyrene	2.9	mg/kg dw		2.25	130	1000	1400	mg/kg OC	0.13	0.093
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Pyrene	9.2	mg/kg dw		2.67	340	1000	1400	mg/kg OC	0.34	0.24
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Pyrene	8.9	mg/kg dw		2.24	400	1000	1400	mg/kg OC	0.4	0.29
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Pyrene	0.13	mg/kg dw		0.543	24	1000	1400	mg/kg OC	0.024	0.017
DR106	2.1	0 to 2	EPA SI	1998	Silver	0.28	mg/kg dw		2.1		6.1	6.1	mg/kg dw	0.046	0.046
DR106	2.1	2 to 4	EPA SI	1998	Silver	0.17	mg/kg dw		1.9		6.1	6.1	mg/kg dw	0.028	0.028
DR112	2.1	0 to 2	EPA SI	1998	Silver	0.21	mg/kg dw		2.47		6.1	6.1	mg/kg dw	0.034	0.034
DR112	2.1	2 to 4	EPA SI	1998	Silver	0.45	mg/kg dw		2.93		6.1	6.1	mg/kg dw	0.074	0.074
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Silver	0.9	mg/kg dw		2.67		6.1	6.1	mg/kg dw	0.15	0.15
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Silver	3	mg/kg dw		2.24		6.1	6.1	mg/kg dw	0.49	0.49
DR106	2.1	0 to 2	EPA SI	1998	Thallium	0.04	mg/kg dw	J	2.1						
DR106	2.1	2 to 4	EPA SI	1998	Thallium	0.05	mg/kg dw	J	1.9						
DR106	2.1	0 to 2	EPA SI	1998	Tin	4	mg/kg dw		2.1						
DR106	2.1	2 to 4	EPA SI	1998	Tin	4	mg/kg dw		1.9						
DR112	2.1	0 to 2	EPA SI	1998	Tin	5	mg/kg dw		2.47						
DR112	2.1	2 to 4	EPA SI	1998	Tin	7	mg/kg dw		2.93						
DR106	2.1	0 to 2	EPA SI	1998	Total HPAH (calc'd)	1.07	mg/kg dw		2.1	51	960	5300	mg/kg OC	0.053	0.0096
DR106	2.1	2 to 4	EPA SI	1998	Total HPAH (calc'd)	1.63	mg/kg dw		1.9	86	960	5300	mg/kg OC	0.09	0.016

Sample Location Name	Sample River Mile Location	Sample Depth Interval (feet)	Sampling Event	Sampling Event Year	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^1	CSL^1	SQS/CSL Units	SQS Exceedance Factor^2	CSL Exceedance Factor^2
DR112	2.1	0 to 2	EPA SI	1998	Total HPAH (calc'd)	2.83	mg/kg dw		2.47	110	960	5300	mg/kg OC	0.11	0.021
DR112	2.1	2 to 4	EPA SI	1998	Total HPAH (calc'd)	3.81	mg/kg dw		2.93	130	960	5300	mg/kg OC	0.14	0.025
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	0.63	mg/kg dw	J	1.27	50	960	5300	mg/kg OC	0.052	0.0094
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	0.281	mg/kg dw	J	1.75	16	960	5300	mg/kg OC	0.017	0.003
LDW-SC202	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	0.07	mg/kg dw	J	1.24	5.6	960	5300	mg/kg OC	0.0058	0.0011
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	0.83	mg/kg dw	J	1.42	58	960	5300	mg/kg OC	0.06	0.011
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	0.274	mg/kg dw	J	1.46	19	960	5300	mg/kg OC	0.02	0.0036
LDW-SC36	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	0.056	mg/kg dw	J	1.32	4.2	960	5300	mg/kg OC	0.0044	0.00079
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	15.8	mg/kg dw		2.25	700	960	5300	mg/kg OC	0.73	0.13
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	40	mg/kg dw		2.67	1500	960	5300	mg/kg OC	1.6	0.28
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	47	mg/kg dw		2.24	2100	960	5300	mg/kg OC	2.2	0.4
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	0.35	mg/kg dw	J	0.543	64	960	5300	mg/kg OC	0.067	0.012
DR106	2.1	0 to 2	EPA SI	1998	Total LPAH (calc'd)	0.15	mg/kg dw		2.1	7.1	370	780	mg/kg OC	0.019	0.0091
DR106	2.1	2 to 4	EPA SI	1998	Total LPAH (calc'd)	0.16	mg/kg dw		1.9	8.4	370	780	mg/kg OC	0.023	0.011
DR112	2.1	0 to 2	EPA SI	1998	Total LPAH (calc'd)	0.32	mg/kg dw		2.47	13	370	780	mg/kg OC	0.035	0.017
DR112	2.1	2 to 4	EPA SI	1998	Total LPAH (calc'd)	0.29	mg/kg dw		2.93	9.9	370	780	mg/kg OC	0.027	0.013
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Total LPAH (calc'd)	0.051	mg/kg dw	J	1.27	4	370	780	mg/kg OC	0.011	0.0051
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Total LPAH (calc'd)	0.027	mg/kg dw	J	1.75	1.5	370	780	mg/kg OC	0.0041	0.0019
LDW-SC202	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Total LPAH (calc'd)	0.024	mg/kg dw	J	1.24	1.9	370	780	mg/kg OC	0.0051	0.0024
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Total LPAH (calc'd)	0.08	mg/kg dw	J	1.42	5.6	370	780	mg/kg OC	0.015	0.0072
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Total LPAH (calc'd)	0.024	mg/kg dw	J	1.46	1.6	370	780	mg/kg OC	0.0043	0.0021
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Total LPAH (calc'd)	0.65	mg/kg dw	J	2.25	29	370	780	mg/kg OC	0.078	0.037
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Total LPAH (calc'd)	2.6	mg/kg dw	J	2.67	97	370	780	mg/kg OC	0.26	0.12
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Total LPAH (calc'd)	10.5	mg/kg dw	J	2.24	470	370	780	mg/kg OC	1.3	0.6
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Total LPAH (calc'd)	0.046	mg/kg dw	J	0.543	8.5	370	780	mg/kg OC	0.023	0.011
DR106	2.1	0 to 2	EPA SI	1998	Total PAH (calc'd)	1.22	mg/kg dw		2.1						
DR106	2.1	2 to 4	EPA SI	1998	Total PAH (calc'd)	1.79	mg/kg dw		1.9						
DR112	2.1	0 to 2	EPA SI	1998	Total PAH (calc'd)	3.15	mg/kg dw		2.47						
DR112	2.1	2 to 4	EPA SI	1998	Total PAH (calc'd)	4.1	mg/kg dw		2.93						
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Total PAH (calc'd)	0.68	mg/kg dw	J	1.27						
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Total PAH (calc'd)	0.308	mg/kg dw	J	1.75						
LDW-SC202	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Total PAH (calc'd)	0.094	mg/kg dw	J	1.24						
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Total PAH (calc'd)	0.91	mg/kg dw	J	1.42						
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Total PAH (calc'd)	0.298	mg/kg dw	J	1.46						
LDW-SC36	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Total PAH (calc'd)	0.056	mg/kg dw	J	1.32						
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Total PAH (calc'd)	16.4	mg/kg dw	J	2.25						
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Total PAH (calc'd)	42.6	mg/kg dw	J	2.67						
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Total PAH (calc'd)	57	mg/kg dw	J	2.24						
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Total PAH (calc'd)	0.4	mg/kg dw	J	0.543						
DR112	2.1	0 to 2	EPA SI	1998	Tributyltin as ion	0.039	mg/kg dw		2.47						
DR112	2.1	2 to 4	EPA SI	1998	Tributyltin as ion	0.17	mg/kg dw		2.93						
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Tributyltin as ion	0.0055	mg/kg dw		1.27						
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Tributyltin as ion	0.028	mg/kg dw		1.42						
DR106	2.1	0 to 2	EPA SI	1998	Vanadium	71	mg/kg dw		2.1						
DR106	2.1	2 to 4	EPA SI	1998	Vanadium	76	mg/kg dw		1.9						
DR112	2.1	0 to 2	EPA SI	1998	Vanadium	76	mg/kg dw		2.47						
DR112	2.1	2 to 4	EPA SI	1998	Vanadium	77	mg/kg dw		2.93						
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Vanadium	65.2	mg/kg dw		1.27						
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Vanadium	64	mg/kg dw		1.75						
LDW-SC202	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Vanadium	58.2	mg/kg dw		1.24						
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Vanadium	63.2	mg/kg dw		1.42						
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Vanadium	63.4	mg/kg dw		1.46						
LDW-SC36	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Vanadium	56.5	mg/kg dw		1.32						

Sample Location Name	Sample River Mile Location	Sample Depth Interval (feet)	Sampling Event	Sampling Event Year	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^1	CSL^1	SQS/CSL Units	SQS Exceedance Factor^2	CSL Exceedance Factor^2
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Vanadium	85	mg/kg dw		2.25						
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Vanadium	58.8	mg/kg dw		2.67						
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Vanadium	55	mg/kg dw		2.24						
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Vanadium	39	mg/kg dw		0.543						
DR106	2.1	0 to 2	EPA SI	1998	Zinc	90	mg/kg dw		2.1		410	960	mg/kg dw	0.22	0.094
DR106	2.1	2 to 4	EPA SI	1998	Zinc	79	mg/kg dw		1.9		410	960	mg/kg dw	0.19	0.082
DR112	2.1	0 to 2	EPA SI	1998	Zinc	120	mg/kg dw		2.47		410	960	mg/kg dw	0.29	0.13
DR112	2.1	2 to 4	EPA SI	1998	Zinc	140	mg/kg dw		2.93		410	960	mg/kg dw	0.34	0.15
LDW-SC202	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Zinc	74	mg/kg dw		1.27		410	960	mg/kg dw	0.18	0.077
LDW-SC202	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Zinc	65.2	mg/kg dw		1.75		410	960	mg/kg dw	0.16	0.068
LDW-SC202	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Zinc	42	mg/kg dw		1.24		410	960	mg/kg dw	0.1	0.044
LDW-SC36	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Zinc	81.2	mg/kg dw		1.42		410	960	mg/kg dw	0.2	0.085
LDW-SC36	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Zinc	67.1	mg/kg dw		1.46		410	960	mg/kg dw	0.16	0.07
LDW-SC36	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Zinc	40.6	mg/kg dw		1.32		410	960	mg/kg dw	0.099	0.042
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Zinc	386	mg/kg dw		2.25		410	960	mg/kg dw	0.94	0.4
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Zinc	490	mg/kg dw		2.67		410	960	mg/kg dw	1.2	0.51
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Zinc	4720	mg/kg dw		2.24		410	960	mg/kg dw	12	4.9
LDW-SC37	2.1	5 to 7	LDW Subsurface Sediment 2006	2006	Zinc	78.5	mg/kg dw		0.543		410	960	mg/kg dw	0.19	0.082

Key:

DW - Dry weight
CSL - Cleanup Screening Level
OC - Organic carbon
TOC - Total organic carbon
SQS - Sediment Quality Standard

Notes:

1. SQS and CSL values are substituted with AET values for dry weight comparison where organic compounds are not OC-normalized (when TOC % DW is outside of the 0.5-4.0% range).
2. Exceedance factors are the ratio of the detected concentration to the CSL or SQS (or to AET values where applicable); chemicals with one or more exceedance factors greater than 1 are highlighted.

Source:

Lower Duwamish Waterway Group, 2007. Online Lower Duwamish Waterway Group Draft Remedial Investigation Report (November 2007) Database. http://www.ldwg.org.

Appendix B

Glacier Marine Services Sampling Results

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Appendix B–1

Fox Street/Slip 3 Sampling and Analysis
Marine Power & Equipment
1984
Sample Results

	FOX ST.	UPSTREAM	DRAIN	DOWN STREAM SYNCRO	BWEST DRY DOCK	EAST DRY DOCK	EPA Slip 3	APCC runoff (water)	dry dock solids	MICHIGAN ST DUST	4 MILE ROCK
)	1389**	59.8	148**	82.6	117	148**	.157**	6.16*	125	460	126
NIC	3709**	21.1**	212**	26.5**	317**	215**	60**	6.5*	1481	41	15
JC	5583**	159	996**	248	220	580**	375**	43*	1124	540	35?
PPER	1245**	60.5	284**	195**	140**	287**	2.73**	39.2*	456	117	92
DMIUM	4.88**	ND	.521	ND	.684	.422	.8**	.031	.526	1.5	.7
CKEL	48.4	31.7	33.0	33.0	27.3	35.7	29	.37	1049	36	
HROMIUM	92.6	29.3	40.1	31.1	37.7	47.5	35	.71	769	50	
ERCURY	.109	.480	.140	.148	.719	.285	.18		.024	.05	1.1
L&GREASE	33,000**	1,100	1,600	840	3,800	3,500					

.37

* Exceeds EPA acute criteria for water

** Exceeds EPA criteria for 4 mile Rock disposal Sediment

Relative concentrations of heavy metals

	upriver	Fox St drain	below ~~drain~~ drain	dock runoff	Syncro lift (sediment)	Syncrolift (water)	dry dock solids	west drydock	Go dr (
Pb	.17	.12	.09	.06	.10	.06	.03	.15	.1
As	.07	.31	.13	.07	.05	.06	.46	.39	.
Zn	.54	.46	.61	.45	.48	.46	.35	.27	.
Cu	.21	.10	.17	.41	.37	.41	.14	.17	.
total metal concentrations	292	11926	1640	94.8	522	110	3185	794	1

Leave

Appendix B–2

Storm Drain and Sediment Sampling
Marine Power & Equipment
1986
Sample Results

Table

	MPE #1			River St #1	Fox St #1	
Parameter (mg/kg)	#1 4/84	#1 2/85	#1 3/86	#2	#3	#4
As	3,766.2	1,200	1,153.8	183.3	111.8	211.5
Cd	4.4	6.7	5.38	7.5	6.2	.5
Cr	92.2	113.3	101.9	266.7	120.6	40.4
Cu	1246.8	900	711.5	466.7	382.4	288.5
Hg	.11	1.0	.65	.45	.56	.14
Ni	48.1	53.3	36.5	41.7	50	32.7
Pb	1428.6	900	730.8	683.3	617.6	148.1
Zn	5,584.4	2,266.7	2,307.7	1,300	852.9	1,000
Parameter	#5	#6	#7	#8	#11	#12
As	20.8	26.1	326.5	212.8	1814.8	1,152
Cd	<.3	<.3	.69	.43	13.1	17.9
Cr	28.3	30.4	38.8	48.9	203.7	239.4
Cu	60.4	195.7	140.9	297.9	4,814.8	6,061
Hg	.5	.15	.71	.28	.63	.68
Ni	32.1	32.6	26.5	36.2	64.8	60.6
Pb	50.9	52.2	118.4	148.9	1,093	1,485
Zn	158.5	239.1	224.5	595.7	8,333	13,939
Parameter	#13	#14	#15	#16	#17	#18
As	2,043.5	2,597.4	2,564.1	1,045.5	2,373	3,871
Cd	11.5	14.3	9.5	13.2	18.6	17.7
Cr	184.8	207.8	166.7	140.9	237.3	225.8
Cu	4,565.2	4,155.8	3,333.3	2,272.7	7,627	7,258
Hg	.26	.25	.31	.75	.13	.09
Ni	82.6	105.2	58.9	70.5	67.8	37.1
Pb	1,891.3	1,129.9	1,538.5	954.5	1,525	1,774
Zn	6,956.5	10,779	6,153.8	5,454.5	13,559	15,323

Parameter	#19
As	2,181.8
Cd	13.2
Cr	236.4
Cu	5,272.7
Hg	.32
Ni	69.1
Pb	1,381.8
Zn	9,818.2

DEPARTMENT OF
ECOLOGY
State of Washington

Lower Duwamish Waterway
RM 2.0–2.3 East
(Slip 3 to Seattle Boiler Works)

Source Control Action Plan
Final Report

April 2009

Publication No. 09-09-081

Printed on recycled paper

For a printed copy of this report, contact:

Department of Ecology
Toxics Cleanup Program
Phone: (360) 407-7170

Refer to Publication No. 09-09-081

DEPARTMENT OF
ECOLOGY
State of Washington

Lower Duwamish Waterway RM 2.0–2.3 East (Slip 3 to Seattle Boiler Works)

Source Control Action Plan Final Report

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Toxics Cleanup Program
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Washington State Department of Ecology
Bellevue, Washington

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Executive Summary

The purpose of this Source Control Action Plan (SCAP) is to identify potential contamination sources and the actions necessary to keep sediments along the Lower Duwamish Waterway (LDW) from becoming contaminated again after any cleanup occurs. This SCAP focuses on the River Mile (RM) 2.0–2.3 East Source Control Area and it is based on a thorough review of information pertinent to sediment recontamination as presented in *Lower Duwamish Waterway, RM 2.0–2.3 East (Slip 3 to Seattle Boiler Works), Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008).

The LDW, located in Seattle, Washington, was added to the National Priorities List (Superfund) by the U.S. Environmental Protection Agency (EPA) on September 13, 2001. The Washington State Department of Ecology (Ecology) added the site to the Washington State Hazardous Sites List on February 26, 2002. Contaminants of concern (COCs) found in LDW sediments include polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), mercury and other metals, and phthalates. These COCs may pose threats to people, fish, and wildlife.

In December 2000, EPA and Ecology entered into an order with King County, the Port of Seattle, the city of Seattle, and The Boeing Company to perform a Remedial Investigation (RI) and Feasibility Study (FS) of sediment contamination in the waterway. EPA is the lead agency for the RI/FS. Ecology is the lead agency for controlling current sources of pollution to the site, in cooperation with the city of Seattle, King County, the Port of Seattle, the city of Tukwila, and EPA.

Phase 1 of the RI/FS, published in July 2003 (Windward 2003a), used existing data to identify potential human health and ecological risks, information needs, and high priority areas for cleanup. Seven candidate early action areas (EAAs, or "Tier 1" source control areas) were identified (Windward 2003b). Data collected during Phase 2 of the RI were used to identify additional sites where long-term cleanup actions may be necessary. The RM 2.0–2.3 East Source Control Area was identified as one of these "Tier 2" source control areas.

As part of the source control efforts in the LDW, Ecology works with other members of the Source Control Work Group (SCWG) and its consultants to develop SCAPs for areas of sediment contamination that will or may require cleanup (Figure 1). The SCAP for each of these sediment areas identifies potential sources of sediment contaminants that could recontaminate sediments after cleanup. In addition, the SCAPs describe source control actions that are planned or currently underway, and sampling and monitoring that will be conducted to identify possible additional sources.

Sections 1 and 2 of this SCAP provide background information about the LDW site and the RM 2.0–2.3 East Source Control Area (Figure 2). Metals, PAHs, PCBs, total petroleum hydrocarbons (TPHs), and semi-volatile organic compounds (SVOCs) are the main COCs in sediments adjacent to the RM 2.0–2.3 East Source Control Area. In upland media, COCs include metals, TPHs, chlorinated solvents, pentachlorophenol (PCP), chlorinated dioxins and furans, methylene chloride, and 1,4-dichlorobenzene (1,4-DCB) in addition to the COCs found in sediments.[1] While this SCAP focuses on these COCs, other contaminants that could result in sediment recontamination will be addressed as sources are identified.

Section 3 describes potential upland sources of contaminants that may affect sediments adjacent to the RM 2.0–2.3 East Source Control Area, including direct discharge of stormwater and/or storm drain solids from outfalls, discharge of groundwater, soil erosion from the shoreline banks, surface runoff, and contamination that may result from spills. Section 3 also describes the significance of these potential sources and identifies actions that are planned or are underway to control potential contaminant sources. Section 4 discusses monitoring activities that will be conducted to observe known sources, identify additional sources, support remedial action decisions, and assess progress. Section 5 describes how source control efforts will be tracked and reported.

A notable feature of the RM 2.0–2.3 East Source Control Area is the Brighton Street Combined Sewer Overflow (CSO) and Storm Drain (SD), owned by the city of Seattle. Under normal conditions this CSO/SD only serves as a stormwater discharge point for a portion of the RM 2.0–2.3 East Source Control Area on the West side of East Marginal Way South (Figure 3). In the case of a large storm event, the Brighton Street CSO/SD can also discharge combined sanitary sewage and stormwater from the King County interceptor that conveys untreated sanitary and stormwater to the West Point Waste Water Treatment Plant (WWTP). Further details about the Brighton Street CSO/SD are discussed in Sections 2 and 3.

The Executive Summary Table lists the source control actions that have been identified for the RM 2.0–2.3 East Source Control Area. The table describes potential contaminant sources for each property, source control activities to be conducted, priority level for each action item, parties involved in source control actions for each property or task, and milestone/target dates for completion of the identified actions. The milestones and targets are best-case scenarios based on consultation with the identified agencies or facilities. They reflect reasonably achievable schedules, and include the time required for planning, contracting, field work, laboratory analysis, and activities dependent on weather.

---

[1] Although not explicitly addressed in the SMS, VOCs in pore water may cause adverse effects on benthic invertebrates and other aquatic biota, and are therefore considered COCs for source control efforts in the LDW.

Executive Summary Table

Source Control Facility/Outfall	**Action Item**	**Priority**	**Responsible Party**	**Status**	**Estimated Completion Date**
South Brighton Street CSO/SD	Conduct in-line storm drain sampling to evaluate whether COCs are migrating to sediments associated with the RM 2.0–2.3 East Source Control Area via the South Brighton Street CSO/SD.	High	SPU	Planned	June 2009
	If COCs are found within the South Brighton Street CSO/SD, conduct source tracing to identify sources of contaminants.	High	SPU and Ecology	As Necessary	October 2009
	Review any available Voluntary Cleanup Program (VCP) files pertaining to the four former facilities of concern (Arrow Transportation, Inland Transportation Company, Ben's Truck Repair, and Hat n' Boots Gas Station).	Medium	Ecology	Planned	June 2009
	Based on the review of VCP files investigate, if necessary, the South Seattle Community College property to determine what cleanup actions may have been conducted during development, and whether potential sources of sediment recontamination may remain onsite from the four former facilities of concern.	Medium	Ecology	As Necessary	August 2011
South River Street SD	Conduct in-line storm drain sampling in the South River Street SD to evaluate whether COCs are migrating to sediments associated with the RM 2.0–2.3 East Source Control Area via the South River Street SD.	High	SPU	Planned	June 2009
	If COCs are found within the South River Street SD, conduct source tracing to identify sources of contaminants.	High	SPU and Ecology	As Necessary	October 2009
Adjacent Facilities					
SCS Refrigerated Services	Review the PRP response to the 104(e) letters sent to "SCS Holding LLC" and "SCS Refrigerated Services LLC" on March 25, 2008, and evaluate whether further site investigation is necessary.	Low	Ecology	Planned	June 2010
	Conduct a source control inspection at the facility, to include the following: • Confirm that the NPDES permit and SWPPP are up-to-date. A SWPPP was not available in Ecology's files. • Confirm that the SWPPP includes a clear description of the facility storm drain system. • Determine the discharge point of storm drain lines located along the northern and western edges of the facility. • Confirm whether the facility discharges to the LDW through Outfall #2024. • Ensure that concerns and recommendations identified during the May 2007 Stormwater Compliance Inspection have been addressed.	High	SPU and Ecology	Planned	June 2009

Source Control Facility/Outfall	Action Item	Priority	Responsible Party	Status	Estimated Completion Date
Seattle Distribution Center	Review the PRP response to the 104(e) letter sent to "CLPF Seattle Distribution" on March 25, 2008, and evaluate whether further site investigation is necessary.	Low	Ecology	Planned	June 2010
	Conduct a source control inspection at the facility, to include the following: • Because this facility does not operate under a NPDES permit, but discharges stormwater to the LDW, determine whether the Seattle Distribution Center should be required to operate under a NPDES permit. • Confirm that the facility discharges to the LDW in multiple locations, including Outfall #2025 and an additional private storm drain, as depicted in Figure 3. Confirm or rule out the presence of these storm drains.	High	SPU and Ecology	Planned	June 2009
Glacier Marine Services	Review the PRP response to the 104(e) letter sent to "Northland Services, Inc." on March 25, 2008; and to the 104(e) letters sent to "Fox Avenue LLC," "Seatac Marine Properties," "Evergreen Marine Leasing," and Fox Avenue Warehouse" on July 17, 2008. Following review of the PRP response, evaluate whether further site investigation is necessary.	Low	Ecology	Planned	September 2010
	Conduct a source control inspection at the facility, to include the following: • Confirm that the NPDES permit and SWPPP are up-to-date. A SWPPP was not available in Ecology's files. • Confirm that the SWPPP includes a clear description of the facility storm drain system. • Determine whether the facility currently discharges through the historical storm drain lines labeled "004," "005," and "006" in Figure 8. • Determine if the storm drain labeled "003" in Figure 8 correlates with Outfall #2025, shown in Figure 3. • Investigate the location in Figure 3 referred to as "Outfall #2025 and Seep," and determine whether Glacier Marine Services is the source of the seep. • Verify the facility's connection to the sanitary sewer system. According to the 2001 SWPPP, vehicle maintenance work such as fluids changing is conducted over pits in the maintenance building. Fluids are then pumped through an oil/water separator and discharged to the sanitary sewer system. The facility's connection to the sanitary	High	SPU and Ecology	Planned	September 2009

Source Control Facility/Outfall	Action Item	Priority	Responsible Party	Status	Estimated Completion Date
	sewer system is not indicated in the files available for review and should be clarified. • Determine whether Glacier Marine Services currently performs sanding, scraping, or sandblasting to prepare barges and ships for painting, and whether waste materials are handled and disposed of properly. According to the 2001 SWPPP, touch-up painting of barges is conducted at the facility. Historically, sandblasting was performed at the property and sandblast grit was illegally disposed of in the LDW. Whether sanding, scraping, or sandblasting is currently performed at the facility is not mentioned in the SWPPP and should be clarified. • Conduct in-line storm drain sampling to evaluate whether COCs are migrating to sediments associated with the RM 2.0–2.3 East Source Control Area via the Glacier Marine Services storm drain system.				
Upland Facilities					
V. Van Dyke	Review the PRP response to the 104(e) letter sent to "V. Van Dyke, Inc." on March 25, 2008, and evaluate whether further site investigation is necessary.	Low	Ecology	Planned	October 2010
	Determine whether a UST may have been removed from the property without a proper closure. According to Ecology's UST List, six USTs have been removed from the V. Van Dyke property; however, only five USTs were documented as removed from the property based on information available for review, three in 1988, and two (by Glacier Environmental) in 2002. This discrepancy should be resolved to assure an additional UST was not removed from the property without clean closure.	Medium	Ecology	Planned	October 2009

Source Control Facility/Outfall	Action Item	Priority	Responsible Party	Status	Estimated Completion Date
	Conduct a source control inspection at the facility, to include the following: • Confirm that the NPDES permit and SWPPP are up-to-date. • Confirm that the SWPPP includes a clear description of the facility storm drain system. • Ensure that the facility has remained in compliance. Stormwater concerns have been identified at the facility in the past. • Investigate the facility's connection to the city storm drain system. Only one catch basin is depicted in Figure 3, and according to the 1993 SWPPP, there are four stormwater catch basins, and one catch basin that discharges to the sanitary sewer system. • Conduct in-line storm drain sampling to evaluate whether COCs are migrating to sediments associated with the RM 2.0–2.3 East Source Control Area via the V. Van Dyke storm drain system.	High	SPU and Ecology	Planned	October 2009
	Obtain any additional reports from V. Van Dyke that may be missing from Ecology's files. Available information does not confirm that the extent of soil and groundwater contamination has been defined, or that the additional groundwater and tidal monitoring suggested by Adapt has been completed.	Medium	Ecology	Planned	October 2011
	Work with V. Van Dyke to complete quarterly groundwater or other monitoring suggested by Adapt, if needed.	Medium	Ecology	Planned	October 2013
Riverside Industrial Park	Review the PRP response to the 104(e) letters sent to "Riverside Industrial Park" on March 25, 2008, and "Big John's Truck Repair" on July 17, 2008, and evaluate whether further site investigation is necessary.	Low	Ecology	Planned	October 2010
	Conduct a source control inspection at the facility, to include the following: • Confirm that the former two shop building floor drains were connected to the sanitary sewer rather than the city storm drain system. • Determine whether the storm drain lines shown in Figure 3, between the shop building and office building, pass through areas where contaminated soil has been excavated. • Conduct in-line storm drain sampling to evaluate whether COCs are migrating to sediments associated with the RM 2.0–2.3 East Source Control Area via the Riverside Industrial Park storm drain system.	High	SPU and Ecology	Planned	October 2009

Source Control Facility/Outfall	Action Item	Priority	Responsible Party	Status	Estimated Completion Date
	Determine the status of cleanup at the facility and determine whether to pursue additional investigation and cleanup under administrative order. Available information indicates that additional groundwater monitoring is needed.	Medium	Ecology	Planned	November 2009
Shultz Distributing	Conduct a source control inspection at the facility, to include the following: • Confirm that the NPDES permit and SWPPP are up-to-date. • Confirm that the SWPPP includes a clear description of the facility storm drain system. • Investigate the facility's connection to the city storm drain and sanitary sewer systems. • Determine whether the storm drain lines shown in Figures 3 and 14 pass through the area of chlorinated solvent groundwater contamination near the tank farm, and discharge to the LDW via the South Brighton Street CSO/SD. • Confirm that the pump was removed from the oil/water separator, and that stormwater now discharges to the city storm drain system. • Ensure that the facility has remained in compliance. Stormwater concerns have been identified at the facility in the past. • Conduct in-line storm drain sampling to evaluate whether COCs are migrating to sediments associated with the RM 2.0–2.3 East Source Control Area via the Shultz Distributing storm drain system.	High	SPU and Ecology	Planned	November 2009
	Review AGI's results and conclusions and determine whether additional investigations should be conducted at the Shultz Distributing property.	Medium	Ecology	Planned	November 2009
Cascade Columbia Distribution	Review the PRP response to the 104(e) letter sent to "Great Western Chemical Company" on July 17, 2008, and evaluate whether further site investigation is necessary.	Low	Ecology	Planned	November 2010
	Coordinate any source control to be implemented at Cascade Columbia Distribution with the work that is to be conducted under the new 2009 Agreed Order.	Medium	Ecology	Planned	November 2009
	Verify that the source of the "NW Corner Plume" will be investigated under the new Agreed Order. The source of the plume was unknown in 2000, but appeared to be near or upgradient of MW B-54.	Medium	Ecology	Planned	November 2009

Source Control Facility/Outfall	Action Item	Priority	Responsible Party	Status	Estimated Completion Date
Potential Additional Facilities					
Bunge Foods	Review the PRP response to the 104(e) letter sent to “Bunge Foods Processing LLC” on July 17, 2008, and evaluate whether the Bunge Foods facility should be investigated for potential sources of sediment recontamination. Bunge Foods is identified as a facility of concern in Table 1, and its location is depicted in Figure 2. No information pertaining to this facility was found within the scope of this report.	Medium	Ecology	Planned	November 2009
Muckleshoot Seafood Products	Review the PRP response to the 104(e) letter sent to “Silver Bay Logging” on March 25, 2008, and evaluate whether this facility should be investigated for potential sources of sediment recontamination. This facility is currently in operation as Muckleshoot Seafood Products. The Muckleshoot Seafood Products facility is identified as a facility of concern in Table 1, and its location is depicted in Figure 2. No information pertaining to this facility was found within the scope of this report.	Medium	Ecology	Planned	November 2009
Rainier Petroleum	Review the PRP response to the 104(e) letter sent to “Rainier Petroleum Corporation” on July 17, 2008, and evaluate whether the Rainier Petroleum facility should be investigated for potential sources of sediment recontamination. Rainier Petroleum is identified as a facility of concern in Table 1, and its location is depicted in Figure 2. No information pertaining to this facility was found within the scope of this report.	Medium	Ecology	Planned	November 2009
Morton Marine Equipment	Review the PRP response to the 104(e) letter sent to “Morton Marine Equipment, Inc.” on March 25, 2008, and evaluate whether the Morton Marine Equipment facility should be investigated for potential sources of sediment recontamination. Morton Marine Equipment was identified as a possible source of sediment recontamination through the review of an informal summary of available information pertaining to the Glacier Marine Services facility. This informal summary of information was received by Ecology and reviewed late in the report-writing process; therefore, the Morton Marine Equipment facility could not be further evaluated for inclusion in this report. According to the informal summary of information, the Morton Marine Equipment facility was located on the northwest shore of Slip 3, and facility stormwater was discharged to the LDW through the South River Street SD, which discharges within RM 2.0–2.3 East (shown in Figure 3 and discussed in Section 3.1.2).	Medium	Ecology	Planned	November 2009

Source Control Facility/Outfall	Action Item	Priority	Responsible Party	Status	Estimated Completion Date
	The Morton Marine Equipment facility repaired steel and aluminum hulls and removed and installed engines. Complaint files for MP&E included an oil spill complaint at Morton Marine Equipment. The location of the Morton Marine Equipment facility and its period of operation are not clearly known.				
R.A. Barnes	Evaluate whether the R.A. Barnes facility should be investigated for potential sources of sediment recontamination. R.A. Barnes was identified as a possible source of sediment recontamination through the review of an informal summary of available information pertaining to the Glacier Marine Services facility. This informal summary of information was received by Ecology and reviewed late in the report-writing process; therefore, the R.A Barnes facility could not be further evaluated for inclusion in this report. According to the informal summary of information, the R.A. Barnes facility discharged its stormwater to the LDW through the South River Street SD, which discharges within RM 2.0–2.3 East (shown in Figure 3 and discussed in Section 3.1.2). The informal summary of information stated that the R.A. Barnes facility supplied sandblasting materials ("Tuff-Kut") to shipyards and other industries. R.A. Barnes received at least three complaints of sandblast grit being spilled or washed into catch basins. "Tuff-Kut" is a copper slag grit with metals levels of 90-120 mg/kg arsenic, 3,200-7,000 mg/kg chromium, 4,400-5,000 mg/kg copper, 400-1,000 mg/kg lead, and 7,000-12,000 mg/kg zinc. The location of the R.A. Barnes facility and its period of operation are not known; the facility should be further investigated as a potential source of sediment recontamination.	Medium	Ecology	Planned	November 2009
General					
	On the basis of Ecology's recommendation, once the Remedial Investigation report is finalized, Risk Based Threshold Concentrations (RBTCs) and Applicable or Relevant and Appropriate Requirements (ARARs) will be reviewed for any relevant impacts on the RM 2.0–2.3 East Source Control Area upland contaminant concentrations.	Medium	Ecology	Planned	March 2011

Priority:

High = High priority action item – to be completed prior to sediment cleanup.

Medium = Medium priority action item – to be completed prior to or concurrent with sediment cleanup.

Low = Low priority action item – ongoing actions or actions to be completed as resources become available.

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Acronyms/Abbreviations

Adapt	LSI Adapt
AET	Apparent Effects Threshold
AGI	AGI Technologies, Inc.
ARAR	Applicable or Relevant and Appropriate Requirement
AST	aboveground storage tank
BEHP	bis(2-ethylhexyl)phthalate
bgs	below ground surface
BMP	best management practice
BTEX	benzene, toluene, ethylbenzene and total xylenes
city	city of Seattle
COC	contaminant of concern
county	King County
CSCSL	Confirmed and Suspected Contaminated Site List
CSL	Cleanup Screening Level
CSO	combined sewer overflow
DCA	dichloroethane
DCB	dichlorobenzene
DCE	dichloroethene
DMR	discharge monitoring report
DNAPL	dense non-aqueous phase liquid
DW	dry weight
EAA	Early Action Area
EAI	Environmental Associates, Inc.
Ecology	Washington Department of Ecology
E & E	Ecology and Environment, Inc.
EF	exceedance factor
EOF	emergency overflow
EPA	U.S. Environmental Protection Agency
ERD	Enhanced Reductive Dechlorination
ERM	Environmental Resources Management, Inc.
ESA	Environmental Site Assessment
FS	Feasibility Study
GIS	Geographic Information System
GWC	Great Western Chemical
GWI	Great Western International
JPHC	James P. Hurley Company
KCIA	King County International Airport
KCIWP	King County Industrial Waste Program
LAET	Lowest Apparent Effects Threshold
2LAET	Second Lowest Apparent Effects Threshold
LDW	Lower Duwamish Waterway
LDWG	Lower Duwamish Waterway Group
LUST	leaking underground storage tank
METRO	Municipality of Metropolitan Seattle

Acronyms/Abbreviations (Cont.)

mg/kg	milligrams per kilogram
mgy	million gallons per year
MH	manhole
MP&E	Marine Power & Equipment
MTCA	Model Toxics Control Act
MW	monitoring wells
NFA	No Further Action
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
OC	organic carbon
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PCP	pentachlorophenol
ppb	parts per billion
ppm	parts per million
PRA	Preliminary Risk Assessment
RBTC	Risk Based Threshold Concentration
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RM	river mile
ROD	Record of Decision
SCAP	Source Control Action Plan
SCS	Seattle Cold Storage
SCWG	Source Control Work Group
SD	storm drain
SH	silt horizon
SMS	Washington State Sediment Management Standards
SPU	Seattle Public Utilities
SQS	Sediment Quality Standards
SRI/FS	Supplemental Remedial Investigation/Feasibility Study
SVE	soil vapor extraction
SVOC	semi-volatile organic compound
SWPPP	Stormwater Pollution Prevention Plan
TCA	trichloroethane
TCE	trichloroethene
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TPH-D	total petroleum hydrocarbons in the diesel range
TPH-G	total petroleum hydrocarbons in the gasoline range
TPH-O	total petroleum hydrocarbons in the heavy-oil range
TRI	Toxics Release Inventory
UNIMAR	United Marine Shipbuilding
UST	underground storage tank
VC	vinyl chloride

Acronyms/Abbreviations (Cont.)

VCP	Voluntary Cleanup Program
VOC	volatile organic compound
WBZ	water bearing zone
WSDOH	Washington State Department of Health
WWTP	wastewater treatment plant

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1.0 Introduction

This Source Control Action Plan (SCAP) describes potential sources of contaminants that may affect sediments adjacent to the River Mile (RM) 2.0–2.3 East Source Control Area.[2] This area is one of several source control areas identified as part of the overall cleanup process for the Lower Duwamish Waterway (LDW) Superfund Site (Figure 1). The Washington State Department of Ecology (Ecology) defined the properties within the RM 2.0–2.3 East Source Control Area as properties that can discharge stormwater to the sediments associated with the RM 2.0–2.3 East Source Control Area. The properties within this source control area are collectively referred to as the "RM 2.0–2.3 East Drainage Basin"[3] (Figures 1 and 2).

The purpose of this plan is to evaluate the significance of these sources and to determine what actions are needed to minimize the potential for recontamination of sediments adjacent to the RM 2.0–2.3 East Source Control Area after any proposed cleanup. In addition, this SCAP describes:

- Source control actions/programs that are planned or currently underway,
- Sampling and monitoring activities that will be conducted to identify additional sources and assess progress, and
- How these source control efforts will be tracked and reported.

The information in this document was obtained from various sources, including the following documents:

- *Lower Duwamish Waterway, RM 2.0–2.3 East (Slip 3 to Seattle Boiler Works), Summary of Existing Information and Identification of Data Gaps Report*, Ecology and Environment, Inc. (E & E), June 2008, on the Washington State Department of Ecology (Ecology) website at: http://www.ecy.wa.gov/programs/tcp/sites/lower_duwamish/sites/slip3_rm2-0_2-3/slip3.htm
- *Lower Duwamish Waterway Source Control Strategy*, Washington State Department of Ecology, January 2004, on the Ecology website at: http://www.ecy.wa.gov/pubs/0409043.pdf

1.1 Organization of Document

Section 1 of this SCAP describes the LDW Superfund Site, the strategy for source control, the responsibilities of the public agencies involved in source control for the LDW, and the scope and limitations of this report. Section 2 provides background information on the RM 2.0–2.3 East Source Control Area, including a description of the contaminants of concern (COCs) for sediments associated with this Source Control Area. Section 3 provides an overview of potential sources of contaminants that may affect sediments adjacent to the RM 2.0–2.3 East Source Control Area, including storm drain (SD) and combined sewer overflow (CSO) outfalls and

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[2] This SCAP incorporates data published through July 1, 2008. Section 5, Tracking and Reporting of Source Control Activities, describes how newer data will be disseminated.

[3] The area referred to herein as the "RM 2.0-2.3 East Drainage Basin" is actually a sub-drainage basin of the LDW valley. The LDW valley drainage basin has been divided into the sub-drainage basins, defined tentatively by storm water collection systems and outfalls, as shown in Figure 1.

properties within the RM 2.0–2.3 East Source Control Area. Section 3 also describes actions planned or currently underway to control potential sources of contaminants. Sections 4 and 5 describe monitoring and tracking/reporting, respectively. References are listed in Section 6, and figures and tables are presented at the end of the document.

As new information about the sites and potential sources discussed in this document becomes available and as source control progress is made, Ecology will update the information in this SCAP as needed. The status of source control actions is summarized in the LDW Source Control Status Reports (Ecology 2007a, Ecology 2008a, Ecology 2008c, and as updated).

1.2 Lower Duwamish Waterway Site

The LDW is the downstream portion of the Duwamish River, extending from the southern tip of Harbor Island to just south of Turning Basin 3 (Figure 1). It is a major shipping route for bulk and containerized cargo. Most of the upland areas adjacent to the LDW have been developed for industrial and commercial operations. These include cargo handling and storage, marine construction, boat manufacturing, marina operations, concrete manufacturing, paper and metals fabrication, food processing, and airplane parts manufacturing. In addition to industrial uses, the river is also used for fishing, recreation, and wildlife habitat. Residential areas near the LDW include the South Park and Georgetown neighborhoods. Beginning in 1913, this portion of the Duwamish River was dredged and straightened to promote navigation and industrial development, resulting in the river's current form. Shoreline features within the LDW include constructed bulkheads, piers, wharves, buildings extending over the water, and steeply sloped banks armored with riprap or other fill materials (Weston 1999). This development left intertidal habitats dispersed in relatively small patches, with the exception of Kellogg Island, which is the largest contiguous area of intertidal habitat remaining along the Duwamish River (Tanner 1991). Over the past 20 years, public agencies and volunteer organizations have worked to restore intertidal and subtidal habitat within the river. Some of the largest restoration projects are at Herring House Park/Terminal 107, Turning Basin 3, Hamm Creek, and Terminal 105.

The presence of chemical contamination in the LDW has been recognized since the 1970s (Windward 2003a). In 1988, the United States Environmental Protection Agency (EPA) investigated sediments in the LDW as part of the Elliott Bay Action Program. Contaminants identified by the EPA study included metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), phthalates, and other organic compounds. In 1999, EPA completed a study of approximately 6 miles of the LDW, from the southern tip of Harbor Island to just south of the turning basin near the Norfolk CSO (Weston 1999). This study confirmed the presence of PCBs, PAHs, phthalates, mercury, and other metals that may pose threats to people, fish, and wildlife.

In December 2000, EPA and Ecology signed an agreement with King County (county), the Port of Seattle, the city of Seattle (city), and The Boeing Company, collectively known as the Lower Duwamish Waterway Group (LDWG). Under the agreement, the LDWG is conducting a Remedial Investigation (RI) and Feasibility Study (FS) of the LDW to assess risks to human health and the environment and to evaluate cleanup alternatives. The RI for the site is being done in two phases. Results of Phase 1 were published in July 2003 (Windward 2003a). The Phase 1 RI used existing data to describe the nature and extent of chemical distributions in LDW sediments, develop preliminary risk estimates, and identify candidate sites for early cleanup action. The Phase 2 RI is currently underway and is designed to fill critical data gaps identified in Phase 1. Based on the results of the Phase 2 RI, additional areas for cleanup may be identified. During Phase 2, an FS is being conducted that will address cleanup options for contaminated sediments in the LDW.

On September 13, 2001, EPA added the LDW to the National Priorities List. This is EPA's list of hazardous waste sites that warrant further investigation and cleanup under Superfund. Ecology added the site to the Washington State Hazardous Sites List on February 26, 2002.

An interagency Memorandum of Understanding, signed by EPA and Ecology in April 2002 and updated in April 2004, divides responsibilities for the site (EPA and Ecology 2002; EPA and Ecology 2004). EPA leads the RI/FS, while Ecology leads source control issues.

In June 2003, the *Technical Memorandum: Data Analysis and Candidate Site Identification* (Windward 2003b) was issued. Seven candidate sites for early action [Early Action Areas (EAAs), or "Tier 1" sites] were recommended (Figure 1). The "Tier 1" source control areas include:

- EAA-1: Duwamish/Diagonal CSO and SD
- EAA-2: West side of the LDW, just south of the First Avenue S. Bridge, approximately 2.2 miles from the south end of Harbor Island
- EAA-3: Slip 4, approximately 2.8 miles from the south end of Harbor Island
- EAA-4: South of Slip 4, on the east side of the LDW, just offshore of the Boeing Plant 2 and Jorgensen Forge properties, approximately 2.9 to 3.7 miles from the south end of Harbor Island
- EAA-5: Terminal 117 and adjacent properties, approximately 3.6 miles from the south end of Harbor Island, on the west side of the LDW
- EAA-6: East side of the LDW, approximately 3.8 miles from the south end of Harbor Island
- EAA-7: Norfolk CSO/SD, on the east side of the LDW, approximately 4.9 to 5.5 miles from the south end of Harbor Island

Of the seven recommended EAAs, five either had sponsors to begin investigations or were already under investigation by an LDWG member or group of members. These five sites are EAAs 1, 3, 4, 5, and 7. EPA leads cleanup at two areas, EAAs 3 and 5. The other three EAA cleanup projects were begun before the current LDW RI/FS was initiated. Cleanup at EAA-4, under EPA Resource Conservation and Recovery Act (RCRA) management, is in the planning stage. The EAA-1 and EAA-7 cleanups are under King County management as part of the Elliott Bay–Duwamish Restoration Program. Cleanup at EAA-1 was partially completed in March 2004, and a partial sediment cleanup was conducted at EAA-7 in 1999. Early action cleanups may involve members of the LDWG or other parties as appropriate. Planning and implementation of early action cleanups are concurrent with the Phase 2 investigation.

Further information about the LDW can be found on Ecology's website:

http://www.ecy.wa.gov/programs/tcp/sites/lower_duwamish/lower_duwamish_hp.html

and on EPA's website: http://yosemite.epa.gov/r10/cleanup.nsf/sites/lduwamish.

1.3 Lower Duwamish Waterway Source Control Strategy

The Lower Duwamish Waterway Source Control Strategy (Ecology 2004) describes the process for identifying source control issues and implementing effective source controls for the LDW.

The goal of the strategy is to minimize the potential for recontamination of sediments to levels exceeding the LDW sediment cleanup goals and the Washington State Sediment Management Standards (SMS). The goal is based on the principles of source control for sediment sites described in EPA's *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites; February 12, 2002* (EPA 2002), and the Washington State SMS (WAC 173-204). The first principle is to control sources early, starting with identifying all ongoing sources of contaminants to the site. EPA's Record of Decision (ROD) for the site will require that sources of sediment contamination to the entire LDW site be evaluated, investigated, and controlled as necessary. Dividing source control work into specific SCAPs and prioritizing those plans to coordinate with sediment cleanups will address the guidance and regulations and will be consistent with the selected remedial actions in the EPA ROD.

The source control work will be identified in a series of detailed, area-specific SCAPs, which will be prioritized to coordinate with sediment cleanups. The SCAPs will document what is known about each source control area, the potential sources of recontamination, past cleanup actions taken to address them, and actions necessary to achieve adequate source control for an area. Because the scope of source control for each site will vary, it will be necessary to adapt each plan to its respective area.

The success of this strategy depends on the coordination and cooperation of all public agencies with responsibility for source control in the LDW area, as well as prompt compliance by the businesses and property owners that must make changes necessary to control releases from their properties. Existing Administrative and legal authorities will be used to perform inspections and require necessary source control actions. Source control priorities are divided into four tiers. Tier 1 consists of source control actions associated with the EAAs. Tier 2 consists of source control actions associated with any final, long-term sediment cleanup actions identified through the Phase 2 RI and the EPA ROD. Tier 3 consists of source identification and potential source control actions in areas of the LDW that are not identified for cleanup, but where source control may be needed to prevent future contamination. Tier 4 consists of source control work identified by post-cleanup sediment monitoring (Ecology 2004). This document is a SCAP for a Tier 2 source control area.

The Lower Duwamish Waterway Source Control Strategy can be found on Ecology's website:

http://www.ecy.wa.gov/programs/TCP/sites/lower_duwamish/source_control/sc.html

Further information about Lower Duwamish Waterway source control can be found at Ecology's

Lower Duwamish Source Control website:

http://www.ecy.wa.gov/programs/tcp/sites/lower_duwamish/lower_duwamish_hp.html

and at the King County/Seattle Public Utilities (SPU) Joint Business Inspection website:

http://www.dnr.metrokc.gov/wlr/indwaste/duwamish.htm.

1.4 Source Control Work Group

The primary public agencies responsible for source control for the LDW are Ecology, the city of Seattle, King County, the Port of Seattle, the city of Tukwila, and EPA. All of these agencies, except for the Port of Seattle and the city of Tukwila, are directly involved in source control for the RM 2.0–2.3 East Source Control Area.

To coordinate among these agencies, Ecology formed the Source Control Work Group (SCWG) in January 2002. The purpose of the SCWG is to share information, discuss strategy, actively participate in developing SCAPs, jointly implement source control measures, and share progress reports on source control activities for the LDW area. Ecology chairs the monthly SCWG meetings. All final decisions on source control actions and completeness will be made by Ecology, in consultation with EPA, as outlined in the April 2004 Ecology/EPA Lower Duwamish Waterway Memorandum of Understanding (EPA and Ecology 2004).

Other public agencies with relevant source control responsibilities include the Washington State Department of Transportation, Puget Sound Clean Air Agency, and the Seattle/King County Department of Public Health. These agencies are invited to participate in source control with the SCWG as appropriate (Ecology 2004).

1.5 Scope of Document

The scope of this document is geographically limited to the upland area within the RM 2.0–2.3 East Source Control Area (Figure 2) and discharge points into the LDW along the waterfronts of the properties within this boundary.

This report addresses seven main facilities of concern within the RM 2.0–2.3 East Drainage Basin: SCS Refrigerated Services, Seattle Distribution Center, Glacier Marine Services, V. Van Dyke, Riverside Industrial Park, Shultz Distributing, and Cascade Columbia Distribution. Table 1 lists the potential facilities of concern within the RM 2.0–2.3 East Source Control Area and summarizes why each was included or excluded for analysis in this report.

This report summarizes the COCs that have been identified in the sediments adjacent to the RM 2.0–2.3 East Source Control Area and identifies potential sources of recontamination within upland media. Atmospheric deposition of air pollution, although a potential source of contamination, is discussed here only briefly (Section 3.4); it is a concern for the wider LDW region. Ecology will review atmospheric deposition work being conducted by the Washington State Department of Health (WSDOH) and planned by the Puget Sound Partnership. Ecology plans to hire a contractor to develop options and recommendations for addressing actions relating to air pollution.

Data on existing sediment contamination associated with the RM 2.0–2.3 East Source Control Area are summarized in Section 2. However, source control actions in this report focus only on upland sources within the RM 2.0–2.3 East Source Control Area that have the potential to recontaminate sediments in the vicinity of the RM 2.0–2.3 East Source Control Area if sediment remediation is required. Other potential sources of recontamination upstream of the RM 2.0–2.3 East Source Control Area might, via the LDW, impact sediments adjacent to the RM 2.0–2.3 East Source Control Area, but these have been or will be addressed in other reports. This report does not include actions that may be necessary to prevent contaminants in capped sediments from contaminating capping material if this remedial option is selected. It will be important to address any contaminated sediments left in place or upstream contaminants as part of remedial option selection for sediments in the vicinity of the RM 2.0–2.3 EastSource Control Area.

2.0 RM 2.0–2.3 East Source Control Area

The RM 2.0–2.3 East Source Control Area is located along the eastern side of the LDW Superfund Site between 2.0 and 2.3 miles from the southern tip of Harbor Island (Figure 2). This section describes the history and current conditions of the RM 2.0–2.3 East Source Control Area. Sediments located adjacent to the RM 2.0–2.3 East Source Control Area have accumulated chemical contaminants from numerous sources, both historical and potentially ongoing. These chemicals may have entered the LDW through direct discharges, spills, bank erosion, groundwater discharges, surface water runoff, atmospheric deposition, or other non-point source discharges.

Historically, the Duwamish River meandered through the mud flats of the river delta. In the late 1800s and early 1900s, extensive modifications were made to straighten the Duwamish River to create a navigable channel. Many of the current slips are remnants of old river meanders. Dredged material, in addition to imported fill, was likely used to fill in the upland areas near the Slip 3 inlet.

The RM 2.0–2.3 East Source Control Area has been industrialized since the 1920s. Historical and current commercial and industrial operations within the RM 2.0–2.3 East Source Control Area include cargo transport, barge berthing, general warehousing, cold storage, shipbuilding, auto repair, and boat storage.

Seven main facilities of concern were identified within the RM 2.0–2.3 East Source Control Area. Facilities adjacent to the LDW include SCS Refrigerated Services, Seattle Distribution Center and Glacier Marine Services; these facilities are discussed in Section 3.2. Facilities upland of the LDW include V. Van Dyke, Riverside Industrial Park, Shultz Distributing, and Cascade Columbia Distribution; these facilities are discussed in Section 3.3.

The RM 2.0–2.3 East Source Control Area shoreline consists of various materials, including sheet pile bulkheads, riprap, fill material, and natural vegetation. As described further in Section 3, three storm drain outfalls and one CSO/SD outfall currently discharge to sediments associated with the RM 2.0–2.3 East Source Control Area. Two of these storm drains discharge within the Slip 3 inlet, one discharges north of the inlet, and the CSO/SD discharges south of the inlet.

Groundwater within the Duwamish Valley alluvium is typically encountered under unconfined conditions within approximately 10 feet (3 meters) of the ground surface. Groundwater in this unconfined aquifer is found within the fill material and native alluvial deposits. The direction of groundwater flow in the unconfined aquifer is generally toward the LDW. However, the direction may vary locally depending on the nature of subsurface material, and temporally due to tidal influence of the LDW. The upland area affected by tidal fluctuations is generally within 300 to 500 feet (100 to 150 meters) of the LDW (Windward 2003a) and varies depending on location.

2.1 RM 2.0–2.3 East Drainage Basin

The RM 2.0–2.3 East Source Control Area is made up of the drainage basin for this area. This drainage basin encompasses stormwater drainage under normal conditions for approximately 40 acres of commercial and industrial properties between the LDW and East Marginal Way South. The RM 2.0–2.3 East Source Control Area also includes the 34-acre South Brighton Street CSO

Drainage Basin. This combined sewer service area, which is east of East Marginal Way South, is a potential source area whenever a CSO event occurs. However, there have been no CSO events from this area since recording began in March of 2000 (see Table 2). Both the stormwater drainage basin and the CSO drainage basin are shown in Figure 3.

The seven main facilities of concern identified for the RM 2.0–2.3 East Source Control Area, discussed in Sections 3.2 and 3.3, discharge some or all of their stormwater to the LDW under normal conditions. In addition to the main seven facilities of concern, four former facilities of concern were identified within the South Brighton Street CSO Drainage Basin: Arrow Transportation, Inland Transportation Company, Ben's Truck Parts, and the Hat n' Boots Gas Station. These four facilities have been removed and the property is now occupied by a new South Seattle Community College Campus (Figures 2 and 3). As discussed in Section 2.1.1, facilities within the South Brighton Street CSO Drainage Basin only discharge stormwater to the LDW in the event of a CSO. The South Brighton Street CSO/SD system and the four former facilities of concern identified within its drainage basin are described in further detail in Section 3.1. Table 1 summarizes the identification process for these facilities of concern and for the seven main facilities of concern outlined above.

2.1.1 Lower Duwamish Waterway Drainage Basin Storm Drain, Sanitary Sewer, and Combined Sewer Systems

The LDW area is served by both combined sewer systems and separated storm drain/sanitary sewer systems. Storm drains in separated areas convey stormwater runoff directly to the LDW. Most of the waterfront properties are served by separated storm drain/sanitary systems that discharge stormwater directly to the Duwamish Waterway, while sanitary sewage and industrial wastewater are discharged into the combined system that normally discharges to Puget Sound after being treated at a regional waste water treatment plant. Both private and city storm drain systems serve upland areas of the LDW drainage basin.

Some areas in the vicinity of the LDW are served by combined sewer systems, which carry both stormwater and municipal/industrial wastewater in a single pipe. These systems were generally constructed before about 1970 because it was less expensive to install a single pipe than separate storm and sanitary systems. Under normal rainfall conditions, wastewater and stormwater are conveyed through this combined sewer pipe to the West Point Wastewater Treatment Plant (WWTP). During large storms, however, the total volume of wastewater and stormwater can exceed the conveyance and treatment capacity of the combined sewer system. When this occurs, the combined sewer system is designed to overflow through relief points, called CSO outfalls. Although CSO outfalls prevent the combined sewer system from backing up and creating flooding, untreated municipal/industrial wastewater and stormwater can be discharged during CSOs to the LDW.

Typically the city of Seattle owns and operates the local sanitary sewer collectors and main lines, while King County owns and operates the larger interceptor lines that transport flow from the local systems to the West Point WWTP. The city's combined sewer network has its own National Pollution Discharge Elimination System (NPDES) permit for CSO outfalls; CSO outfalls from the county's interceptor lines are administered under the NPDES permit established for the West Point WWTP.

An Emergency Overflow (EOF) is a discharge that can occur from either the combined or sanitary sewer systems. EOFs are not necessarily related to storm conditions and/or system capacity limitations. They typically occur as a result of mechanical issues such as pump station failures or when transport lines are blocked; pump stations are operated by both the city and county. Pressure relief points are provided in the drainage network to discharge flow to an existing storm drain or CSO pipe under emergency conditions to prevent sewer backups. EOF events are not covered under the city's or county's existing CSO wastewater permits.

CSO/EOF outfalls that discharge to the LDW are listed in Table 2. Of the county CSO outfalls along the LDW, the Michigan CSO, South Brandon Street CSO, and Hanford No. 1 (discharging via the city's Diagonal Avenue South CSO/SD) outfalls had the highest average combined sewer overflow volumes between 1999 and 2005. Annual stormwater discharge volumes are usually substantially higher than annual CSO discharge volumes because storm drains discharge whenever it rains, while CSOs only occur when storm events exceed the system capacity. Annual stormwater discharges to the LDW have been estimated at approximately 4,000 million gallons per year (mgy) compared to less than 65 mgy from the county CSOs and less than 10 mgy from the city CSOs (Windward 2007a)[4].

To minimize the frequency and volume of CSO events, the county uses various CSO control strategies to maximize system capacity. An automated control system manages flows through the King County interceptor system so the maximum amount is contained in pipelines and storage facilities until it can be conveyed to a regional wastewater treatment plant for secondary treatment. In some areas of the system, when flows cannot be conveyed to the plant they are sent to CSO treatment facilities for primary treatment and disinfection prior to discharge. County CSOs discharge untreated wastewater only when flows exceed the capacity of these systems (King County 2007b)[5].

As a result, some areas of the CSO drainage basins may discharge to different outfalls at different times, depending on the route the combined stormwater/wastewater has taken through the county conveyance system. Furthermore, some industrial facilities in the LDW basin may discharge stormwater to a separated system and industrial wastewater to a combined system, or a conveyance that begins as a separated system may discharge to a combined system further downstream along the flow path.

2.1.2 RM 2.0–2.3 East Drainage Basin Storm Drain System

The RM 2.0–2.3 East Source Control Area is served by a combination of separated storm drain and sanitary sewer systems as well as a combined sewer system. There are both public and private storm drain systems. Within the RM 2.0–2.3 East Source Control Area, most of the facilities adjacent to the LDW are served by privately owned systems that discharge directly to the LDW. The upland facilities are served by a combination of private and publicly owned systems.

Figure 3 illustrates known storm drain system lines and outfalls within the RM 2.0–2.3 East Drainage Basin. The South Brighton Street CSO/SD and South River Street SD are owned and operated by the city of Seattle. Private storm drain outfalls include Outfall #2024 and Outfall #2025 (referred to collectively as the "Slip 3 Outfalls"). Figure 3 depicts the drainage areas that make up the RM 2.0–2.3 East Drainage Basin: Direct Drainage to LDW, Drainage to Slip 3

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[4] Stormwater discharges are regulated under a separate NPDES permit.
[5] City of Seattle CSOs are generally smaller and flows are not treated prior to discharge.

Outfalls, South River Street Stormwater Drainage Basin, South Brighton Street Stormwater Drainage Basin, and the South Brighton Street CSO Drainage Basin.

The South Brighton Street CSO/SD outfall serves as both a storm drain and a CSO outfall. Stormwater and wastewater from the South Brighton Street CSO Drainage Basin normally discharge to the King County sanitary sewer system. However, if a CSO occurs, this basin can discharge to the LDW through the South Brighton Street CSO/SD. Under normal conditions, stormwater from the South Brighton Street Stormwater Drainage Basin, west of East Marginal Way South, discharges through the South Brighton Street CSO/SD.

2.1.3 National Pollution Discharge Elimination System Permits

Six types of NPDES permits cover various discharges to the LDW. However, only three types apply to the RM 2.0–2.3 East Source Control Area: the Phase I Municipal Stormwater Permit, the Industrial Stormwater General Permit, and an individual NPDES permit. Permits that do not apply to the RM 2.0–2.3 East Source Control Area include the Phase II Municipal Stormwater Permit, the Boatyard General Permit, and the Sand and Gravel General Permit.

Phase I Municipal Stormwater Permit

Stormwater runoff into municipal separated storm sewers that discharge to surface waters must have a NPDES permit under the Federal Clean Water Act. Phase I of the municipal stormwater program went into effect in 1990 and applies to municipalities with populations of more than 100,000, including the city of Seattle and King County. Within the RM 2.0–2.3 East Source Control Area, this permit covers the South River Street SD outfall, at the north end of the 1st Avenue South Bridge (Figures 2 and 3).

The original Phase I permit was issued in 1995 and reissued on January 17, 2007. The new permit represents a significant shift in approach to stormwater monitoring. The new permit requires monitoring of in-line water and storm drain solids, during both wet and dry seasons. Contaminants to be monitored include the state's SMS list of compounds, as well as toxicity testing for effluent and receiving sediments. The permit requires that all permittees characterize stormwater quality at three different locations within their storm drain system. Each location is designed to represent a unique land use (e.g., commercial, industrial, and high or low density residential). Different permittees have been assigned different land use types. Monitoring may be conducted at an outfall or within the drainage basin to isolate the specific type of land use. Complete monitoring requirements are in Special Condition S.8 of the permit, which is available online at:

http://www.ecy.wa.gov/programs/wq/stormwater/municipal/phase_I_permit/ph_i-permit.html.

In addition to the expanded monitoring described above, the Phase I permit also contains more traditional requirements such as system maintenance, best management practices (BMPs), and business inspections. In addition, the Phase I permit contains programmatic requirements in the areas of education/outreach, illicit discharge detection and elimination, and development of municipal stormwater regulations/code.

Before this permit was reissued, the city of Seattle and King County formed a joint program to conduct source control inspection throughout the 20,000 acres of the LDW drainage basin. The city's source control authority comes from the city's Stormwater, Grading, and Drainage Control Code (SMC 22.800), which was established in part to meet the requirements of its NPDES municipal stormwater permit. King County's source control authority, associated with the joint program, stems from its authorized pretreatment program and attendant industrial and hazardous waste management programs. Source control authority for King County storm drain outfalls comes from the county's Water Quality Code (Chapter 9.12 KCC).

There are a number of ongoing source control programs that help reduce the amount of pollution entering public storm drains and sanitary/combined sewer systems that discharge to the LDW. These programs are conducted by the city, county, and Ecology (for example, the 2003-2005 city/county joint inspection program, ongoing SPU program, ongoing King County Industrial Waste Program (KCIWP), Ecology Urban Waters Initiative, and coordination with city/county). LDW source control generally goes beyond what is required under the NPDES program. In particular, the source tracing and characterization these programs conduct exceeds NPDES requirements.

Industrial Stormwater General Permit

The Industrial Stormwater General Permit covers 112 industries within the LDW drainage basin. Coverage under the Industrial Stormwater General Permit requires a facility to monitor its stormwater discharge for copper, zinc, oils, and total suspended solids. Development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) is also required under the permit. Within the RM 2.0–2.3 East Source Control Area, facilities covered under the Industrial Stormwater General Permit include SCS Refrigerated Services, Glacier Marine Services, V. Van Dyke, and Shultz Distributing.

Individual Permits

An individual NPDES permit covers a specific discharge to surface waters at a specific location. This kind of NPDES permit is highly tailored to regulate the pollutants specific to the process that generates the discharge. Within the RM 2.0–2.3 East Source Control Area, the city of Seattle's South Brighton Street CSO/SD outfall (Figures 2 and 3) is covered by an individual NPDES permit issued by Ecology to the city.

King County also individually permits businesses that connect to the sanitary sewer system. This arrangement can be confusing but is important to keep in mind. Ecology authorized this function to King County in 1981 as part of the "pre-treatment" program for the Municipality of Metropolitan Seattle (METRO) treatment works (e.g., West Point WWTP). The King County pre-treatment permits are generally known as "local permits" and are meant to control contamination of the sanitary sewer flow going into the publicly-owned sewage treatment plant.

2.2 Contaminants of Concern

2.2.1 Contaminants of Concern in Sediments

Several environmental investigations from 1998 to 2006 have included sampling in sediments adjacent to the RM 2.0–2.3 East Source Control Area. These investigations include the National Oceanic and Atmospheric Administration (NOAA) Duwamish Waterway Characterization Study in 1998 (NOAA 1998), the EPA Site Inspection of the Lower Duwamish River in 1999 (Weston 1999), and investigations conducted between 2005 and 2007 for the Lower Duwamish Waterway Phase 2 RI (Windward 2005a, 2005b, 2007a, 2007b, and 2007c). Analytical results from these investigations are compiled in a sediment database created by the LDWG and can be accessed at www.ldwg.org.

A total of 29 surface sediment samples and five subsurface sediment samples have been collected within sediments associated with the RM 2.0–2.3 East Source Control Area at the locations depicted in Figure 4. Appendix A of the *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008) summarizes all of the data from each location.

Analytical results from the sediment investigations were compared to SMS, which include both the Sediment Quality Standards (SQS) and Cleanup Screening Levels (CSL) (WAC 173-204). Sediments that meet the SQS criteria have a low likelihood of adverse effects on benthic organisms. However, exceeding the SQS criteria does not necessarily lead to adverse effects or toxicity, and the SQS exceedance factor does not correspond to the level of sediment toxicity. The CSL is defined as the maximum chemical concentration and level of biological effects permissible at a cleanup site, to be achieved by year 10 after cleanup has been completed. The CSL is greater than or equal to the SQS and represents a higher level of risk to benthic organisms than SQS levels. SQS and CSL values provide a basis for identifying sediments that may pose a risk to some ecological receptors. The SMS for most organic compounds are based on total organic carbon (TOC)-normalized concentrations. However, comparison to TOC-normalized concentrations is only effective at predicting adverse effects in sediments with TOC content within the range of 0.5 to 4.0 percent. For samples with TOC concentrations outside of the applicable range, concentrations of organic compounds were compared to Puget Sound Apparent Effects Threshold (AET) values. The AET values are the functional equivalent of the SQS and CSL values, only they are expressed on a dry-weight basis. The lowest AET (LAET) was used as the equivalent of the SQS, and the second-lowest AET (2LAET) was used in place of the CSL. Analytical results that exceed SQS and CSL are presented in Tables 3 and 4.

COCs in sediments were identified from analyses of samples collected from the sediments associated with the RM 2.0–2.3 East Source Control Area. The sediment COCs are those contaminants that exceed the SQS in at least one sample. At each sediment sampling location for which a contaminant was detected with an SQS Exceedance Factor (EF) ≥ 1, Figure 4 lists the contaminants and the associated maximum SQS EF out of all samples collected at that location. The following are the COCs identified in sediments adjacent to the RM 2.0–2.3 East Source Control Area:

Contaminant of Concern (COC)	**Surface Sediment**		**Subsurface Sediment**	
	> SQS	**> CSL**	**> SQS**	**> CSL**
Metals				
Arsenic	●		●	●
Copper			●	●
Lead			●	●
Mercury			●	
Zinc			●	●
PAHs				
Acenaphthene			●	
Benzo(a)anthracene			●	
Benzo(a)pyrene			●	
Benzo(g,h,i)perylene			●	
Benzofluoranthenes (total)			●	
Chrysene			●	
Dibenzo(a,h)anthracene			●	
Dibenzofuran			●	
Fluoranthene	●		●	
Fluorene			●	
Indeno(1,2,3-cd)pyrene			●	
Phenanthrene			●	
Total HPAH			●	
PCBs				
PCBs (total)	●		●	
TPHs				
1,2,4-trichlorobenzene			●	●
1,2-dichlorobenzene			●	●
Other SVOCs				
Benzyl alcohol	●	●		

Key:
Shaded cells indicate the COCs exceeded both SQS and CSL.

Note:
This table includes data published through March 12, 2007.
Source: Lower Duwamish Waterway Group Website sediment database (www.ldwg.org).

2.2.1.1 Metals

Metals exceeded SQS at one surface sediment sampling location (LDW-SS77) and one subsurface sediment sampling location (LDW-SC37), both located in the Slip 3 inlet adjacent to Glacier Marine Services. Arsenic was detected at LDW-SS77 at 80.9 milligrams per kilogram (mg/kg) dry weight (DW), which exceeded SQS by a factor of 1.4. Arsenic was also detected at LDW-SC37 at concentrations ranging from 121 to 2,000 mg/kg DW, with SQS exceedance factors ranging from 2.1 to 35, and CSL exceedance factors ranging from 1.3 to 22. Additionally, copper, lead, mercury, and zinc exceeded SQS at LDW-SC37. Copper was detected at 2,940 mg/kg DW, with an SQS exceedance factor of 7.5 and a CSL exceedance factor of 7.5. Lead was detected at 3,520 mg/kg DW, with an SQS exceedance factor of 7.8 and a CSL exceedance factor of 6.6. Mercury was detected at 0.45 mg/kg DW, which exceeded SQS by a factor of 1.1. Zinc was detected at 490 mg/kg DW (SQS exceedance factor of 1.2) at a 1-2 foot depth, and 4,720 mg/kg DW at a 2-4 foot depth (SQS exceedance factor of 12 and CSL exceedance factor of 4.9).

2.2.1.2 PAHs

One PAH exceedance was detected in surface sediment at DR112, adjacent to Glacier Marine Services to the west; and several PAHs exceeded SQS in subsurface sediment at LDW-SC37, located in the Slip 3 inlet adjacent to Glacier Marine Services. At DR112, fluoranthene exceeded SQS by a factor of 1.3 at 5.3 mg/kg DW [200 mg/kg organic carbon (OC)]. At LDW-SC37, the highest exceedances included fluoranthene at 13 mg/kg DW (580 mg/kg OC), which exceeded SQS by a factor of 3.6, and phenanthrene at 7.5 mg/kg DW (330 mg/kg OC), which exceeded SQS by a factor of 3.3.

2.2.1.3 PCBs

Total PCBs exceeded SQS at four surface sediment sampling locations (DR111, DR148, B6b and LDW-SS329) and one subsurface sediment sampling location (LDW-SC37). DR111, DR148, B6b and LDW-SC37 are near Glacier Marine Services, and LDW-SS329 is at the northern edge of the sediments associated with the RM 2.0–2.3 East Source Control Area. Total PCBs were detected in surface sediment at concentrations ranging from 0.124 mg/kg DW (12.8 mg/kg OC) at LDW-SS329 to 0.42 mg/kg DW (14 mg/kg OC) at B6b. These concentrations exceeded SQS by factors of 1.1 and 1.2, respectively.

2.2.1.4 TPHs

TPHs exceeded SQS in subsurface sediment at LDW-SC37, located in the Slip 3 inlet adjacent to Glacier Marine Services. 1,2,4-trichlorobenzene was detected at 0.046 mg/kg DW (2.1 mg/kg OC), with an SQS exceedance factor of 2.6 and a CSL exceedance factor of 1.2. In addition, 1,2-dichlorobenzene was detected at 0.15 mg/kg DW (6.7 mg/kg OC), with an SQS exceedance factor of 2.9 and a CSL exceedance factor of 2.9.

2.2.1.5 Other SVOCs

One semi-volatile organic compound (SVOC) exceedance was detected in surface sediment at LDW-SS73, which is in the Slip 3 inlet adjacent to SCS Refrigerated Services. Benzyl alcohol was detected at 150 µg/kg DW, which exceeded LAET by a factor of 2.6 and 2LAET by a factor of 2.1.

2.2.2 Contaminants of Concern in Upland Media

Several environmental investigations and cleanup activities have been conducted at facilities of concern within the RM 2.0–2.3 East Source Control Area to address contamination of upland media (including stormwater, storm drain solids, groundwater, seeps, and soil). These investigations are summarized in Section 3.

Facility of Concern	Contaminant of Concern[6] (COC)	Media	Potential Pathway to LDW Sediments
Adjacent Facilities of Concern			
SCS Refrigerated Services	Copper and zinc	Stormwater discharge	Stormwater
Glacier Marine Services	Arsenic, chromium, cadmium, copper, mercury, lead, zinc, and oil & grease	Storm drain solids, surface runoff, and sediment	Stormwater
Upland Facilities of Concern			
V. Van Dyke	Petroleum hydrocarbons (TPH-G and benzene)	Soil and groundwater	Stormwater and groundwater
	Zinc and oil & grease	Stormwater discharge	Stormwater
Riverside Industrial Park	Petroleum hydrocarbons (TPH-G, benzene, ethylbenzene, and xylenes)	Groundwater	Stormwater and groundwater
Shultz Distributing	Chlorinated solvents (PCE)	Groundwater	Stormwater and groundwater
Cascade Columbia Distribution	Chlorinated solvents (PCE, TCE, VC, cis-1,2-DCE); petroleum hydrocarbons (TPH, benzene, and toluene); PCP; chlorinated dioxins and furans; and methylene chloride	Soil	Stormwater and groundwater
	Chlorinated solvents (PCE, TCE, VC, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, 1,1,1-TCA, and 1,2-DCA); petroleum hydrocarbons (TPH, benzene, toluene, and ethylbenzene); PCP; chlorinated dioxins and furans; methylene chloride; and 1,4-DCB	Groundwater	Stormwater and groundwater

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[6] Although not explicitly addressed in the SMS, VOCs in pore water may cause adverse effects on benthic invertebrates and other aquatic biota, and are therefore considered COCs for source control efforts in the LDW.

A COC was identified in upland media whenever a contaminant was detected above an applicable screening level in one or more samples of upland media, even if not detected in samples collected from the sediments adjacent to the RM 2.0–2.3 East Source Control Area. Applicable screening level criteria included Model Toxics Control Act (MTCA) Method A cleanup levels for soil and groundwater, Ecology stormwater compliance benchmark levels for facilities covered under the Industrial Stormwater General Permit for stormwater discharge, and SMS criteria for both storm drain solids and sediments sampled within the LDW in association with a facility of concern.

Following the identification of COCs in upland media, a screening tool developed by Ecology was used in an attempt to rule out COCs that may have been identified in upland media, but are not considered a concern to LDW sediments. However, the screening tool did not apply to any of the COCs identified for the RM 2.0–2.3 Source Control Area, either because the COCs were not SMS compounds, or because the compound was found in media other than soil or groundwater (e.g., storm drain solids, storm water). Ecology's screening tool is described in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008).

The potential pathways for contamination to reach LDW sediments, as described in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008), were evaluated for each facility of concern where COCs were identified in upland media. The table above summarizes COCs in upland media determined on the basis of the applicable screening level criteria, and identifies potential pathways for these COCs to reach LDW sediments.

3.0 Potential Sources of Sediment Recontamination

Potential sources of sediment recontamination include discharges from public and private storm drain systems and direct and/or indirect discharges from facilities that are within the RM 2.0–2.3 East Source Control Area, both adjacent to and upland from the LDW. These outfalls and facilities of concern are illustrated in Figures 2 and 3. The four outfalls known to discharge directly to the LDW from the RM 2.0–2.3 East Source Control Area (South Brighton Street CSO/SD, South River Street SD, Outfall #2024, and Outfall #2025) are discussed in Section 3.1. For each of the seven main facilities of concern within the RM 2.0–2.3 East Source Control Area (SCS Refrigerated Services, Seattle Distribution Center, Glacier Marine Services, V. Van Dyke, Riverside Industrial Park, Shultz Distributing, and Cascade Columbia Distribution), Sections 3.2 and 3.3 summarize current and historical land uses, the results of environmental investigations and cleanup activities, and actions necessary to achieve reasonable source control. Atmospheric deposition is discussed in Section 3.4.

3.1 Storm Drain and Combined Sewer Overflow Outfalls

A wide range of contaminants may become dissolved or suspended in runoff as rain or snow melt flows over the land. Urban areas may accumulate particulates, dust, oil, asphalt, rust, rubber, metals, exposed soil, fertilizers, pesticides, detergents, or other materials as a result of urban activities. In addition to rain or snow melt storm drains can also convey contaminants in runoff from businesses or residences resulting from vehicle washing or illegally dumped materials. Runoff can discharge directly to the LDW via outfalls from properties adjacent to the river or from municipal storm drain systems. Some of these direct discharges are authorized by Ecology through various types of NPDES permits, discussed in Section 2.1.3. Stormwater from businesses, roads, and residential areas upland of the river is typically regulated by the public utilities agencies of Seattle, Tukwila, or King County, depending on the exact location and type of land use.

As discussed in Section 2.1.1 combined sewer systems carry both stormwater and municipal/industrial wastewater in a single pipe. During large storm events, the volume of stormwater can sometimes exceed the capacity of the combined sewer system, resulting in a release of mixed of stormwater and sanitary sewage to the LDW. While Ecology-issues NDPES permits for discharges to surface waters of the state, KCIWP permits limit the contaminants a user may contribute to the sanitary sewer system. These permits also authorize King County to conduct regular business inspections.

3.1.1 South Brighton Street CSO/SD

The South Brighton Street CSO/SD system is shown in Figure 3. The South Brighton Street CSO/SD outfall serves both as a combined sewer overflow and as a storm drain. As noted in Table 2, the South Brighton Street CSO/SD discharges at approximately RM 2.1 East. The RM 2.0–2.3 East Drainage Basin and combined sewer systems are discussed in Section 2.1.

The South Brighton Street CSO Drainage Basin, or combined sewer service area, is east of East Marginal Way South, and covers approximately 34 acres. During normal conditions, stormwater and sanitary sewage are collected in the city trunk lines, then discharged to the King County interceptor and transported to the West Point WWTP. Under CSO conditions, excess flow from the South Brighton Street CSO Drainage Basin can be discharged to the LDW via the South Brighton Street CSO/SD outfall. However, no overflows have been recorded at the South Brighton Street CSO/SD since SPU began monitoring the system in 1999.

The South Brighton Street Stormwater Drainage Basin is on the west side of East Marginal Way South and covers approximately 18 acres. This system collects stormwater from Fox Avenue South and South Brighton Street as well as adjacent private properties. Stormwater from portions of the following properties discharges to the South Brighton Street storm drain system: Seattle Distribution Center, Glacier Marine Services, Shultz Distributing, and Cascade Columbia Distribution. Other areas that may drain to the South Brighton Street storm drain system include portions of Bunge Foods, Seattle Boiler Works, and the Whitehead Property. Further investigation of the onsite drainage systems on these properties is needed to confirm whether they discharge stormwater to the South Brighton Street storm drain system, to private drainage systems with separate outfalls to the LDW, to the nearby combined sewer system, or some combination of these pathways.

Land use in the South Brighton Street CSO and stormwater drainage basins is summarized in the following table:

Land Use	**CSO Drainage Basin**		**Stormwater Drainage Basin**	
	(Acres)	**(%)**	**(Acres)**	**(%)**
Commercial	6.5	18	0.005	≤ 1
Industrial	17.3	48	13.3	75
Multi-family	1.7	5	-	-
Single Family	1.7	5	-	-
Right-of-Way	8.8	24	4.5	25
Total	36	100	17.8	100

3.1.1.1 Sampling

In 1988, the EPA evaluated potential contaminant sources to the Elliott Bay through the Elliot Bay Action Program. The primary objective of the Elliott Bay Action Program was to identify contamination and appropriate corrective actions in the Elliott Bay and LDW. Evaluation of potential contaminant sources included identifying and ranking CSOs and storm drains based on the concentrations of chemical contaminants measured in solids collected from the storm drains (Tetra Tech 1988).

Storm drain solids sampling was conducted in September and October of 1985. Problem chemicals in each drain were identified using the following criteria (Tetra Tech 1988):

- Exceedance of highest AET value for chemicals where AET values have been derived, or
- Exceedance of the 90th percentile concentration (the concentration above which 10 percent of the observations fall) measured during the source survey.

Storm drains for which solids exceeded a high AET value or a 90th percentile concentration for at least one chemical were identified as potential problem drains (Tetra Tech 1988).

Out of the 7 CSOs, 20 storm drains, and 15 CSO/SDs sampled, the largest number of problem chemicals was observed in the "Fox Street CSO/SD," now referred to as the South Brighton Street CSO/SD. The problem chemicals identified in this CSO/SD are listed in the following table (Tetra Tech 1988). Chemical concentrations from this study are not provided here since the data is considerably dated. E & E compared the 1988 problem chemicals with the COCs identified in either sediments or upland media in Section 2.2; the 1988 problem chemicals shown below in italics have also been identified as COCs for the RM 2.0–2.3 East Source Control Area. There are no known detections of the remaining problem chemicals shown below in any other media, including sediments or upland media; therefore, these chemicals are not presently considered to be COCs for the RM 2.0–2.3 East Source Control Area.

arsenic	anthracene	*indeno(1,2,3-cd)pyrene*
copper	*fluoranthene*	*benzofluoranthenes*
lead	*benzo(a)anthracene*	*chrysene*
zinc	*benzo(a)pyrene*	1-methylphenanthrene
antimony	*acenapthene*	2-methylphenanthrene
4-methylphenol	*dibenzo(a,h)anthracene*	3-methylphenanthrene
napthalene	*dibenzofuran*	1,1-dichloroethane
fluorene	2-methylnapthalene	*vinyl chloride*
phenanthrene	1,1-biphenyl	*trans-1,2-dichloroethene*

The city of Seattle has only recently begun to characterize the quality of discharges from its CSOs as required by its NPDES permit; however, the South Brighton Street CSO/SD is not included in the city's ongoing CSO characterization program. In 2000, as part of its CSO program, the city compiled existing sediment chemistry data in areas near its CSOs to evaluate potential impacts on sediment quality. The study identified five sediment sampling stations located within 250 feet of the South Brighton Street CSO/SD. None of the stations closest to the outfall exceeded the CSL for any chemical. Only the PCBs concentration at the farthest station (75 mg/kg OC), located 249 feet from the outfall, exceeded the CSL for total PCBs (65 mg/kg OC) (EVS 2000).

3.1.1.2 Facilities of Concern

The sub-sections below summarize the information available for review pertaining to the four facilities of concern associated with the South Brighton Street CSO Drainage Basin (see Section 2.1). It is unclear whether any residual contamination from these four facilities exists or whether such contamination could be a threat to LDW sediments. Potential pathways for such contamination could be either directly by groundwater to the LDW or by groundwater to a combined sewer to the LDW during a CSO event.

South Seattle Community College

The South Seattle Community College facility is on the east side of East Marginal Way South at the corner of Corson Avenue South and East Marginal Way South, in the South Brighton Street CSO Drainage Basin (see Figure 3).

Facility Summary: South Seattle Community College	
Address	6737 Corson Avenue South
Property Owner	Buttleman, Kurt R./South Seattle Community College
Former/Alternative Property Names	Arrow Transportation Inland Transportation Company Ben's Truck Parts Hat n' Boots Gas Station
Former/Alternative Addresses	See Ben's Truck Parts and Hat n' Boots Gas Station sections below
Former/Alternative Lessee/Operator Names	N/A
Tax Parcel No.	0001800137
Parcel Size	7.03 acres
NPDES Permit No.	N/A
EPA RCRA ID No.	See Arrow Transportation section below
EPA TRI Facility ID No.	N/A
Ecology Facility/Site ID No.	See each former facility section below
Ecology UST Site ID No.	See Arrow Transportation, Ben's Truck Parts, and Hat n' Boots Gas Station sections below
Ecology LUST Release ID No.	N/A
Listed on CSCSL	No

According to King County tax records, Washington State Department of Transportation purchased the property from Washington State Department of Natural Resources on April 29, 2004. The current taxpayer is listed as Buttleman, Kurt R./South Seattle Community College. There are two buildings on the property: a 54,035-square-foot building built in 2007 (called "Building E" with predominant use listed as "Vocational School"), and a 13,450-square-foot building built in 2007 (predominant use listed as "College") (King County 2007a).

The four former facilities of concern identified within the South Brighton Street CSO Drainage Basin are Arrow Transportation, Inland Transportation, Ben's Truck Parts, and Hat n' Boots Gas Station. All four facilities were formerly on tax parcel no. 0001800137. The new South Seattle Community College Campus now occupies the entire property.

Site information from Ecology, EPA, and King County online databases and permits is summarized in the table below for South Seattle Community College. This site information and further details are described in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008).

Available information from Ecology, EPA, and King County online databases and permits is summarized in the following sub-sections for the four former facilities of concern. In addition to online database information, one file was available for review in Ecology's files pertaining to Inland Transportation Company (see below). In general, very little information was available pertaining to site use or potential residual contamination at the four former facilities.

Arrow Transportation

Arrow Transportation, at 6737 Corson Avenue South, is listed in Ecology's Facility/Site Database, with Facility/Site ID No. 69693852 (Ecology 2007b). The facility is also listed on Ecology's Hazardous Waste Facility Search Database with RCRA Site ID No. WAD007942733 (inactive since 12/31/1991) (Ecology 2007d).

Arrow Transportation is on Ecology's Underground Storage Tank (UST) List with UST Site ID No. 1940. Four USTs were removed from the site; one contained used oil/waste oil, and contents of the other three are not known. UST removal dates are not listed (Ecology 2007e).

Inland Transportation Company

Inland Transportation Company is listed in the Ecology Facility/Site Database with an address of 6737 Corson South and Facility/Site ID No. 2134 (Ecology 2007b).

On March 12, 1985, Ecology performed a "Potential Hazardous Waste Site Preliminary Assessment" for the property. According to Ecology, Inland Transportation was a contract hauler of petroleum and chemical products and wastes, and the facility was used for truck storage, maintenance, and washing. Offices were also present at the facility. The facility handled many different chemicals and petroleum wastes, none stored on-site except the wastes remaining in trucks after deliveries. Other wastes at the site, mainly oils and pre-treatment sludges, resulted from truck maintenance and repair. According to Ecology, all wastes appeared to be properly handled and disposed. Runoff was collected and treated by an oil/water separator prior to discharge to the sanitary sewer, and trucks were kept in "dedicated service," carrying only one type of chemical to lessen the frequency of tank cleaning (Ecology 1985).

According to Ecology, past practices at the Inland Transportation Company facility in the 1970s had resulted in contaminant discharges to the LDW. Apparently an inspection performed by King County METRO observed truck cleaning at the site, during which 5-10 gallons of waste oil, some perchloroethylene, and other materials were discharged to the LDW. According to the 1985 inspection performed by Ecology, wastes were managed appropriately in 1985, and Ecology concluded it unlikely that any residual contamination remained on-site (Ecology 1985).

Ben's Truck Parts

Ben's Truck Parts is listed in Ecology's Facility/Site Database with an address of 6655 Corson Avenue South and Facility/Site ID No. 74169521 (Ecology 2007b).

The facility is on Ecology's UST List with UST Site ID No. 396593. One UST that had stored leaded gasoline was removed from the site. The UST removal date is not listed (Ecology 2007e).

Hat n’ Boots Gas Station

Hat n’ Boots Gas Station is listed in Ecology’s Facility/Site Database as “WA DNR Corson Ave Site Hat Boots” at 6800 East Marginal Way South, with Facility/Site ID No. 61845527 (Ecology 2007b). The actual location was determined to be southeast of the address listed, at approximately the intersection of East Marginal Way South and Corson Avenue South.

The Hat n’ Boots Gas Station is on Ecology’s UST List with UST Site ID No. 8914. Three USTs containing diesel oil, unleaded gasoline, and leaded gasoline were removed from the site on unlisted dates (Ecology 2007e).

3.1.1.3 Source Control Actions

Regular stormwater discharge, and the infrequent sanitary sewage discharge from the South Brighton Street CSO Drainage Basin, through the South Brighton Street CSO/SD may be a source of COCs to sediments associated with the RM 2.0–2.3 East Source Control Area. To minimize the potential for discharge of COCs from the South Brighton Street CSO/SD, the following source control actions will be conducted:

- SPU will conduct in-line storm drain sampling to evaluate whether COCs are migrating to sediments associated with the RM 2.0–2.3 East Source Control Area via the South Brighton Street CSO/SD.
- If COCs are found within the South Brighton Street CSO/SD, SPU and Ecology will conduct source tracing to identify sources of contaminants. The most current data are from 1985.
- Ecology will review any available Voluntary Cleanup Program (VCP) files pertaining to the four former facilities of concern (Arrow Transportation, Inland Transportation Company, Ben’s Truck Repair, and Hat n’ Boots Gas Station).
- Based on the review of VCP files, if necessary, Ecology will investigate the South Seattle Community College property to determine what cleanup actions may have been conducted during development, and whether potential sources of sediment recontamination may remain onsite from the four former facilities of concern.

3.1.2 South River Street SD

The South River Street storm drain system is shown in Figure 3. The storm drain system within the RM 2.0–2.3 East Drainage Basin is discussed in Section 2.1.2. The approximately 7.6-acre South River Street Stormwater Drainage Basin collects stormwater from South River Street, Occidental Avenue South, 2nd Avenue South, and 3rd Avenue South, as well as from the properties north of South River Street, including V. Van Dyke and Riverside Industrial Park. Properties south of South River Street, including SCS Refrigerated Services, Muckleshoot Seafood Products, and Rainier Petroleum are indicated in Figure 3 as discharging either directly to the LDW or through a private storm drain system.

3.1.2.1 Sampling

Storm drain solids were also sampled within the South River Street SD during the sampling performed for the EPA’s Elliott Bay Action Program described in Section 3.1.1.1. Lead was the only problem chemical identified for the South River Street SD (Tetra Tech 1988).

3.1.2.2 Source Control Actions

Stormwater discharge from the South River Street SD may represent an ongoing source of COCs to sediments associated with the RM 2.0–2.3 East Source Control Area. To minimize the potential for discharge of COCs from the South River Street SD, the following source control actions will be conducted:

- SPU will conduct in-line storm drain sampling in the South River Street SD to evaluate whether COCs are migrating to sediments associated with the RM 2.0–2.3 East Source Control Area via the South River Street SD.
- If COCs are found within the South River Street SD, SPU and Ecology will conduct source tracing to identify sources of contaminants.

3.1.3 Private Storm Drain Outfalls and Direct Drainage

Properties directly adjacent to the LDW (discussed in Section 3.2) generally discharge to the LDW via private storm drain systems or direct drainage (sheet flow). Known private storm drains that discharge to the LDW from the RM 2.0–2.3 East Source Control Area include one private storm drain belonging to SCS Refrigerated Services (Outfall #2024) and one belonging to Glacier Marine Services (Outfall #2025). These two outfalls can be seen in Figures 2 and 3, and are discussed in Sections 3.2.1 and 3.2.3. Figure 3 illustrates areas of direct drainage to the LDW (approximately 2.8 acres) and drainage to Slip 3 Outfalls #2024 and #2025 (approximately 4.4 acres).

3.2 Adjacent Facilities of Concern

3.2.1 SCS Refrigerated Services

SCS Refrigerated Services is adjacent to the LDW on the east side between RM 2.0 and 2.1. The property is bordered on the south by the Slip 3 inlet. The Seattle Distribution Center facility is adjacent to the property to the east and the Rainier Petroleum facility is adjacent to the property to the west. The SCS Refrigerated Services property is bordered on the north by South River Street. The Riverside Industrial Park property is across South River Street from SCS Refrigerated Services.

According to King County tax records, SCS Holdings LLC purchased the property from Schnitzer Investment Corporation on January 15, 1998. The one building on the property is a 71,718-square-foot cold storage warehouse built in 1969 (King County 2007a).

According to Ecology's Facility/Site Database, the SCS Refrigerated Services facility, listed as SCS Industries, operates under Industrial Stormwater General Permit No. SO3005565 (Ecology 2007b). According to the November 2007 *Lower Duwamish Waterway Phase 2 Remedial Investigation Draft Report* (Windward 2007a), the facility discharges to the LDW through a private storm drain designated Outfall #2024, depicted in Figures 2 and 3. The outfall is 12 inches in diameter. Three outfalls are covered under the facility's NPDES permit; from Figure 3, it appears that the three outfalls discharge to the LDW through Outfall #2024 (Windward 2007a).

Facility Summary: SCS Refrigerated Services	
Address	303 South River Street
Property Owner	SCS Holdings LLC
Former Property Owners	Schnitzer Investment Corporation Farwest Capitol Company E.C. Perkins S.S. Mullen, Inc.
Former/Alternative Property Names	Seattle Cold Storage (SCS) SCS Industries SCS Holdings FEI Refrigerated Services
Former/Alternative Addresses	173 South River Street 203 South River Street 315 South River Street 205 South River Street
Former/Alternative Lessee/Operator Names	Paragon Boat Company Northland Services Puget Sound Ice Manufacturing
Tax Parcel No.	5367204100
Parcel Size	3.58 acres
NPDES Permit No.	SO3005565
EPA RCRA ID No.	N/A
EPA TRI Facility ID No.	N/A
Ecology Facility/Site ID No.	34383748
Ecology UST Site ID No.	N/A
Ecology LUST Release ID No.	N/A
Listed on CSCSL	No

Available information from Ecology, EPA, and King County online databases and permits is summarized in the table below. This site information and further details are described in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008).

3.2.1.1 Current Site Use

According to the SCS Refrigerated Services website, the SCS Refrigerated Services facility provides cold storage in a refrigerated warehouse space and distribution in the Puget Sound area (SCS 2009). The facility can be seen in Figure 5, an aerial photo of the Slip 3 inlet area taken in July 2006.

Storm Drain System

As shown in Figure 3, stormwater from the SCS Refrigerated Services property is collected in a private storm drain system. Stormwater discharges to the LDW from the eastern portion of the SCS Refrigerated Services facility through Outfall #2024. Figure 3 depicts storm drain lines around the northern and western edges of the facility, but the discharge point is not shown. The facility may connect to the city storm drain system and discharge to the LDW through the South River Street SD. Also, from Figure 3 it appears there may be an outfall to Slip 3 on the west side of the SCS Refrigerated Services property; the existence of this outfall should be confirmed.

3.2.1.2 Past Site Use

According to King County tax records, a boat shop and shed were constructed on the property in 1919, and in 1937 the sign on the boat shop read “Paragon Boat Company.” In 1939, a shed was constructed on the property to cover a drag saw (used to saw large logs). A log chute on piling extending into the LDW was also present on this portion of the property, but was removed by 1950. A concrete block factory was constructed on the property in the 1940s and was torn down in 1967.

The existing warehouse building was constructed in 1968 and 1969. According to the SCS Refrigerated Services webpage, the SCS Refrigerated Services facility began operations in 1969 under the name of Seattle Cold Storage (SCS 2009).

According to King County tax records, Farwest Capitol Company sold the property to Schnitzer Investment Corporation on October 10, 1969. Under Schnitzer Investment Corporation, lessees and operators at the facility included Puget Sound Ice Manufacturing 1992-1993, Northland Services 1996-2001, and SCS Holdings beginning in January 1998. SCS Refrigerated Services changed its name to FEI Refrigerated Services in December 1997.

3.2.1.3 Environmental Investigations and Cleanup Activities

No environmental investigations or cleanup activities are known to have occurred at the SCS Refrigerated Services facility.

3.2.1.4 Facility Inspections

Ecology conducted a Stormwater Compliance Inspection at the SCS Refrigerated Services facility on May 30, 2007 prompted by 2005 zinc, copper, and turbidity monitoring data that exceeded benchmark and/or action levels, according to the Industrial Stormwater General Permit requirements. The monitoring data are described in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008).

As a result of the inspection, Ecology recommended that the SCS Refrigerated Services facility clean up all areas that had an accumulation of solids and inspect, clean, and remove solids from all catch basins.

EPA sent 104(e) (Request for Information) letters to “SCS Holding LLC” and “SCS Refrigerated Services LLC” on March 25, 2008 (EPA 2008d and 2008e).

3.2.1.5 Potential Contaminant Sources

No soil or groundwater contamination is known to exist at the SCS Refrigerated Services facility. However, as discussed in Section 2.2.2, copper and zinc were found in stormwater discharge at the SCS Refrigerated Services facility; stormwater is the potential pathway for these COCs to reach LDW sediments.

The following potential contaminant sources have been identified for SCS Refrigerated Services:

Stormwater

As indicated in Figure 3, stormwater discharges to the LDW from SCS Refrigerated Services via Outfall #2024. The facility may also discharge stormwater from the South River Street SD or from a potential private storm drain outfall on the west side of the SCS Refrigerated Services property. The SCS Refrigerated Services facility's stormwater discharge is authorized under the Industrial Stormwater General Permit. Compliance with the facility's SWPPP should minimize the potential for contaminants to migrate to the LDW via stormwater; however, a SWPPP was not on file. The facility's stormwater discharge has exceeded permit benchmark values for copper, zinc and turbidity in the past; and a Stormwater Compliance Inspection conducted in May 2007 identified catch basins with accumulations of solids requiring cleaning. It is not clear from the information reviewed if benchmark values are no longer exceeded or catch basins are now kept clean; therefore, copper and zinc are included in Section 2.2.2 as COCs.

Spills

Little is known about current operations at the SCS Refrigerated Services facility and no documentation pertaining to spills was found in the files available for review; however, since distribution of products requires trafficking by truck and railcar, spills are a potential contaminant source. Spills could migrate to the LDW both through the facility's storm drain system and through surface runoff, since the facility is directly adjacent to the LDW.

3.2.1.6 Source Control Actions

The following source control actions will be conducted for SCS Refrigerated Services:

- Ecology will review the PRP response to the 104(e) letters sent to "SCS Holding LLC" and "SCS Refrigerated Services LLC" on March 25, 2008, and evaluate whether further site investigation is necessary.
- SPU and Ecology will conduct a source control inspection at the facility, to include the following:
    - Confirm that the NPDES permit and SWPPP are up-to-date. A SWPPP was not available in Ecology's files.
    - Confirm that the SWPPP includes a clear description of the facility storm drain system.
    - Determine the discharge point of storm drain lines located along the northern and western edges of the facility.
    - Confirm whether the facility discharges to the LDW through Outfall #2024.
    - Ensure that concerns and recommendations identified during the May 2007 Stormwater Compliance Inspection have been addressed.

3.2.2 Seattle Distribution Center

The Seattle Distribution Center is adjacent to the LDW on the east side at approximately RM 2.2. The property is bordered on the west by the SCS Refrigerated Services facility, the Slip 3 inlet, and the Glacier Marine Services facility; on the northeast by East Marginal Way South; and on the south by South Brighton Street. The property is across South Brighton Street from the Shultz Distributing facility.

Facility Summary: Seattle Distribution Center	
Address	6701 East Marginal Way South
Property Owner	CLPF-Seattle Distribution Center LP
Former Property Owners	Schnitzer Investment Company Farwest Capitol Company King County Seattle Retail Lumber Company
Former/Alternative Property Names	N/A
Former/Alternative Addresses	6749 East Marginal Way South 6797 East Marginal Way South
Former/Alternative Lessee/Operator Names	See Sections 3.2.2.1 and 3.2.2.2
Tax Parcel No.	5367204080
Parcel Size	6.96 acres
NPDES Permit No.	N/A
EPA RCRA ID No.	N/A
EPA TRI Facility ID No.	N/A
Ecology Facility/Site ID No.	N/A
Ecology UST Site ID No.	N/A
Ecology LUST Release ID No.	N/A
Listed on CSCSL	No

According to King County tax records, CLPF-Seattle Distribution Center LP purchased the property from Schnitzer Investment Corporation on August 25, 2004. The two buildings on the property are a 124,472-square-foot and a 50,065-square-foot distribution warehouse, both built in 1967 (King County 2007a).

Available information from Ecology, EPA, and King County online databases and permits is summarized in the table below. This site information and further details are described in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008).

3.2.2.1 Current Site Use

The Seattle Distribution Center facility provides warehouses for distribution of products and houses a number of different tenants. The facility can be seen in Figure 5. According to Ecology's records, in April 2002, a sign posted outside the Seattle Distribution Center listed tenants as Fujitec America, FSI (a Division of MBI Systems), Longview Fibre, Kasen Motorsports, Food Buying Service, Rosella's Fruit & Produce, Summit Brokerage, Hoa Ying Trading Corp., SCS Refrigerated Services, and Campbell Chain/Cooper Tools.

Storm Drain System

As shown in Figure 3, stormwater from the Seattle Distribution Center property is collected in a private storm drain system. The northwest end of the property appears to discharge to the Slip 3 inlet via the private storm drain Outfall #2024. Roof drains from the westernmost building on the property appear to drain to another private storm drain outfall in Slip 3; the existence of this outfall should be confirmed. The southeast end of the property discharges to the South Brighton Street CSO/SD.

3.2.2.2 Past Site Use

According to King County tax records, a two-story warehouse owned by Seattle Retail Lumber Company was constructed on the Seattle Distribution Center property in 1915. Seattle Retail Lumber Company also used a small house and garage constructed in 1937 and an existing frame warehouse remodeled in 1944. A three-story mill was also built in the 1940s. In 1969, all of these buildings were torn down.

According to King County tax records, the Seattle Distribution Center property was owned by King County 1943 through 1945; lessees and operators at the property included B.W. Lockwood and Seattle Lumber Retail Company. Entities listed in association with the Seattle Distribution Center property include Alice L. Lockwood and Nellum Investment Corporation in 1966, and Schnitzer Investment Company apparently purchased the property from Farwest Capitol Company on October 10, 1969. Under Schnitzer Investment Company, Puget Sound Ice Manufacturing is listed in 1992–1993 records and D&J Property LLC is listed in 2004 in association with the property. CLPF-Seattle Distribution Center purchased the property from Schnitzer Investment Company in 2004.

3.2.2.3 Environmental Investigations and Cleanup Activities

No environmental investigations or cleanup activities are known to have occurred at the Seattle Distribution Center facility.

3.2.2.4 Facility Inspections

No facility inspections are known to have been conducted at the Seattle Distribution Center facility.

EPA sent a 104(e) (Request for Information) letter to "CLPF Seattle Distribution" on March 25, 2008 (EPA 2008a).

3.2.2.5 Potential Contaminant Sources

No soil or groundwater contamination is known to exist at the Seattle Distribution Center facility. The facility does not operate under a Industrial Stormwater General Permit and is not required to maintain a SWPPP; therefore, the facility's operations presumably are not of concern to stormwater discharge. However, since little is known regarding the facility's operations, the following potential contaminant sources have been identified for the Seattle Distribution Center:

Stormwater

As indicated in Figure 3, stormwater discharges to the LDW via three outfalls: Outfall #2024, an additional private storm drain outfall, and the South Brighton Street CSO/SD outfall. However, information on existing contamination or operations at the facility that may create stormwater pollution was not found in the files available for review.

Spills

Little is known about current operations at the Seattle Distribution Center facility and no documentation pertaining to spills was found in the files available for review; however, since distribution of products requires trafficking by truck and railcar, spills are a potential contaminant source. Spills could migrate to the LDW both through the facility's storm drain system and through surface runoff, since the facility is directly adjacent to the LDW.

3.2.2.6 Source Control Actions

The following source control actions will be conducted for the Seattle Distribution Center:

- Ecology will review the PRP response to the 104(e) letter sent to "CLPF Seattle Distribution" on March 25, 2008, and evaluate whether further site investigation is necessary.
- SPU and Ecology will conduct a source control inspection at the facility, to include the following:
    - Because this facility does not operate under a NPDES permit, but discharges stormwater to the LDW, determine whether the Seattle Distribution Center should be required to operate under a NPDES permit.
    - Confirm that the facility discharges to the LDW in multiple locations, including Outfall #2025 and an additional private storm drain, as depicted in Figure 3. Confirm or rule out the presence of these storm drains.

3.2.3 Glacier Marine Services

Glacier Marine Services is adjacent to the LDW on the east side, at approximately RM 2.2. The property is bordered on the north by the Slip 3 inlet and on the west by the main channel of the LDW. Bunge Foods is immediately adjacent to the Glacier Marine Services property to the south. Fox Avenue South bounds the property on the east. East of Fox Avenue South is the Seattle Distribution Center and the Shultz Distributing facility. South Brighton Street intersects Fox Avenue South on the east side of the property; the South Brighton Street CSO/SD runs beneath the Glacier Marine Services property along the dividing line between the north and south parcels of the property, and discharges to the LDW below the dock of the Glacier Marine Services property.

Facility Summary: Glacier Marine Services	
Address	6701 Fox Avenue South
Property Owner	Seatac Marine Properties LLC
Former Property Owners	See Section 3.2.3.2
Former/Alternative Property Names	Northland Services United Marine International (UNIMAR) United Marine Shipbuilding United Marine Tug & Barge Evergreen Marine Leasing Marine Power & Equipment (MP&E) Reliable Transfer & Storage Peter Pan Seafoods
Former/Alternative Lessee/Operator Names	Johnson Manufacturing
Tax Parcel No.	0001800104 (north) 0001800128 (south)
Parcel Size	5.85 acres (north) 5.24 acres (south)
Former/Alternative Addresses	6751 Fox Avenue South (Parcel 0001800104) 6809 Fox Avenue South (Parcel 0001800128) 6803 Fox Avenue South (Parcel 0001800128)
NPDES Permit No.	SO3000962
EPA RCRA ID No.	WAD980977128 (inactive since 12/31/2004)
EPA TRI Facility ID No.	98108NTDMR6701F
Ecology Facility/Site ID No.	22653378
Ecology UST Site ID No.	11256
Ecology LUST Release ID No.	N/A
Listed on CSCSL	No

According to King County tax records, the Glacier Marine Services property encompasses two tax parcels, 0001800104 and 0001800128. An address is not listed for parcel 0001800104; parcel 0001800128 is listed under the facility address of 6701 Fox Avenue South. Seatac Marine Properties LLC purchased both parcels from Fox Avenue LLC on December 29, 2004. Two structures are listed as located on tax parcel 0001800128: a 44,100-square-foot industrial manufacturing building built in 1976 and a 2,112-square-foot office building built in 1994. No structures are listed for tax parcel 001800104 (King County 2007a).

Available information from Ecology, EPA, and King County online databases and permits is summarized in the table below. This site information and further details are described in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008).

Relevant current site use, past site use, environmental investigation, cleanup action, and facility inspection information is summarized in the sections below to provide background for potential contaminant sources and source control actions identified for the Glacier Marine Services facility.

3.2.3.1 Current Site Use

Glacier Marine Services currently operates at the Seatac Marine Properties LLC-owned property. The facility can be seen in Figures 5 and 6- aerial photos of the Slip 3 inlet area taken in July 2006. The most current facility layout is illustrated in Figure 7.

The most recent information reviewed that describes current site use at the facility is from the 2001 SWPPP and Ecology's February 2002 Hazardous Waste Compliance Inspection Report. The SWPPP and inspection report were written when the facility was in operation as Northland Services. Ownership of Industrial Stormwater General Permit No. SO3000962 was transferred from Northland Services to Seatac Marine Services LLC in 2005. An updated SWPPP for Glacier Marine Services was not found in the files available for review; however, information reviewed indicated that operations under Glacier Marine Services may be similar to Northland Services' past operations, which are summarized below in Section 3.2.3.2.

3.2.3.2 Past Site Use

According to King County tax records, a shop building was constructed on tax parcel 0001800104 in 1926, and an office building was constructed in 1944. A machine shop was constructed on parcel 0001800104 in 1943 and remodeled in 1970. Ownership of the property at the time is not known; however, the office building and machine shop were leased by Johnson Manufacturing Company starting in 1944 and ending sometime in the late 1960s or early 1970s.

According to King County tax records, a concrete and aluminum building was constructed on tax parcel 0001800128 in 1910. The building had an address of 6809 Fox Avenue South, and served as a paint factory. An industrial manufacturing building was built on the parcel in 1976.

MP&E purchased parcel 0001800104 from Peter Pan Seafoods on October 6, 1977. Available information does not indicate when ownership under Peter Pan Seafoods began. At the time of purchase by MP&E, old shipways, a dock, an old manufacturing building, and cranes were present on-site. Parcel 0001800128 was purchased from Reliable Transfer & Storage by MP&E on February 16, 1978. At the time of purchase, an old brick building was on-site (DMC 1979).

MP&E repaired and constructed ships on the property. According to Ecology's records, between 1981 and 1985, while MP&E was in operation at the property, at least 10 complaints were received in response to the facility shoveling, washing, or dumping sandblasting grit (possibly containing copper) into the river. The design of the drydock allowed blasting grit to enter the water regardless of tarping.

According to Ecology's records, in 1985, EPA Criminal Investigators conducted an investigation into practices at the MP&E facility. Surveillance was conducted over several months, and deliberate disposal of sandblasting grit into the LDW was identified. On April 10, 1987, MP&E,

its president, and two vice presidents were sentenced in Federal court. The criminal investigation report was not in the files available for review.

According to Ecology, MP&E filed for bankruptcy in 1986, and was reorganized by WFI Industries in August 1988. Under the reorganization plan, United Marine International, Inc. (UNIMAR) became the new parent company of and successor in interest to WFI Industries. All former subsidiaries, including MP&E, were consolidated into two new subsidiaries of UNIMAR: United Marine Shipbuilding, Inc. and United Marine Tug & Barge (Cargill 2000).

In 1991, the Federal Maritime Administration repossessed the assets of United Marine Tug & Barge when the company defaulted on its bonds. First Interstate Bank managed the assets repossessed from UNIMAR. United Marine Shipbuilding, Inc. filed for bankruptcy on January 21, 1994 (Cargill 2000). According to King County tax records, Northland Services purchased both tax parcels 0001800104 and 0001800128, on June 16, 1992. On April 7, 2004, Northland Services sold the two tax parcels to Fox Avenue LLC, and on December 29, 2004, Fox Avenue LLC sold both tax parcels to Seatac Marine Properties LLC (King County 2007a).

Northland Services – Facility Operations

The Northland Services facility operated a marine shipping business, which moved cargo to and from destinations in southeastern Alaska, Anchorage, and western Alaska. The facility operations commonly included transporting fishing industry supplies, construction materials and equipment, and general re-supply items such as groceries, hardware, and vehicles. The facility also shipped frozen fish products from Alaska to Northland Services (Ecology 2002).

According to the 2001 SWPPP, most of the 9-acre site was paved. A 43,000-square-foot building housed most of the vehicle maintenance activities conducted on-site. As part of its operations, Northland Services conducted on-site fueling for its forklifts, which moved containers to and from the barges. Northland Services' fuel station was in the north central portion of the site and was supplied by two, single-compartment, 550-gallon aboveground storage tanks (ASTs) containing diesel fuel. Kerosene was also stored at the fuel island in a 55-gallon aboveground drum (Anchor 2001).

According to the 2001 SWPPP, facility operations that were a potential source of stormwater pollutants included vehicle fluids handling and cleaning, refrigerator repair and maintenance, generator repair, touch-up painting of barges and containers, barge handrail welding, and fueling (Anchor 2001).

Northland Services – Storm Drain System

Figure 8 illustrates the site layout, including facility storm drains and the city storm drain (South Brighton Street CSO/SD) lines, when the facility was owned and operated by MP&E (between 1977 and 1988). Catch basin locations are shown in Figure 7. In 2001, a portion of the facility was built over the LDW. According to the 2001 SWPPP, stormwater from the western and eastern portions of the site flows into numerous collection points on-site and discharges directly into the LDW through the South Brighton Street CSO/SD line shown in Figures 3 and 8. Stormwater from the eastern portion of the site is also channeled directly into the LDW through the MP&E storm drain line labeled "003" in Figure 8. Figure 8 also shows stormwater from the northeastern portion of the site discharging directly to the LDW through the MP&E storm drain lines labeled "004," "005," and "006," at the eastern end of the synchrolift. The labels "001" and

"002" on the lower left apparently indicate general sheet runoff into the LDW (not storm drain lines). Figure 3 shows that Outfall #2025 may correlate with the "003" storm drain line; however, this has not been confirmed. Northland Services' standard indoor plumbing and water discharge from its oil/water separator were known to connect to the local sanitary sewer system (Anchor 2001).

3.2.3.3 Environmental Investigations and Cleanup Activities

The following investigations have been conducted at the Glacier Marine Services facility:

- Fox Street/Slip 3 Sampling and Analysis, conducted in 1984 by METRO (Hubbard 1984)
- Storm Drain and Sediment Sampling, conducted in 1986 by METRO (Sample 1986)
- EPA Dive Survey and Sediment Sampling, conducted in 1987 by EPA (Matta 1987)
- UST Removal and Site Assessment, conducted in 1993 by James P. Hurley Company for Northland Services (JPHC 1993)

These investigations are described in detail in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008). That report includes (1) analytical results for storm drain solids, dock runoff, drydock solids, and soil at the facility; (2) analytical results for sediment and water from the LDW next to the facility; and (3) figures showing sample locations.

In 1984, Coast Guard personnel sampled storm drain solids, dock runoff, and drydock solids at the MP&E facility, and sediment and water from the LDW next to the MP&E facility, as part of the Duwamish Monitoring Program to investigate heavy metal contamination in the vicinity of Slip 3. Samples were turned over to Tom Hubbard of METRO to be analyzed for lead, arsenic, zinc, copper, cadmium, nickel, chromium, mercury, and oil & grease (Hubbard 1984).

Due to unclear data presentation in the *Fox Street/Slip 3 Sampling and Analysis Report*, sampling results from that report are discussed here only qualitatively; further analysis of the data or comparison of sample results to SMS values could not be performed with available information. Heavy metals and oil & grease were found in the storm drain system, and runoff and drydock materials were found to be adversely impacting the LDW. The report stated that further sampling was necessary to determine the source of heavy metals and oil & grease (Hubbard 1984).

In 1986, METRO sampled storm drain solids from storm drains in the vicinity of the MP&E facility, and sediment from the LDW. Storm drain solids were collected at 12 locations and sediment was sampled at five locations. Samples were analyzed for arsenic, cadmium, chromium, copper, mercury, nickel, lead, and zinc (Sample 1986).

An analysis of the 1986 storm drain solids and sediment sampling results was not included in available information, but available information indicated that the MP&E facility was determined to be the main source of contamination to storm drains and sediment in the vicinity of Slip 3. Based on METRO's conclusions about the 1986 sampling results, this report compares those results to SQS values (SMS values are technically not applicable to storm drain solids since they are not considered sediments until washed out into the LDW, but the comparison puts the sample results into context). Arsenic, cadmium, copper, mercury, lead, and zinc were found in MP&E storm drains at concentrations exceeding SQS values. Arsenic, mercury, and zinc were found at concentrations above SQS values in sediment samples collected adjacent to MP&E.

In 1987, EPA divers collected sediment samples from the LDW in the vicinity of the MP&E facility, and investigated the amount and extent of sandblasting debris on the river bottom in the vicinity of the MP&E facility. Sediment samples were collected at four locations, and analyzed for arsenic, cadmium, chromium, copper, lead, zinc, tin, iron, and mercury. In addition, a bioassay was conducted on sediments collected at each sample location (Matta 1987).

Laboratory analytical results were provided for the 1987 sediment samples, but an analysis or conclusions were not provided in available information; therefore, sediment sample results are compared to SQS values. Cadmium, copper, lead, and zinc were detected at concentrations that exceed the SQS values.

The 1987 bioassay test is not standard compared to current methods, and an interpretation of the raw data was not provided in available information. Results from the EPA dive survey of the river bottom in the vicinity of the MP&E facility stated that over the entire area investigated, only a light "dusting" of sandblasting grit was found near the west end of the synchrolift and drydock. EPA determined that, given the small amount of sandblasting grit found, removal was not necessary (Matta 1987).

In 1993, West Pac Environmental removed three USTs from the Northland Services facility and James P. Hurley Company (JPHC) prepared a *UST Site Assessment Report*. A 1,000-gallon gasoline UST, a 1,000-gallon diesel UST, and a 500-gallon heating fuel UST were removed from the north yard of the property because they were no longer needed for operations. Thirteen soil samples were collected from the UST excavations and spoil piles and analyzed for TPH.

One soil sample collected from the excavated spoil pile in the vicinity of the gasoline and diesel USTs yielded a TPH concentration in the heavy oil range (TPH-O) of 220 parts per million (ppm), which was above the 1993 MTCA Method A cleanup level for TPH-O of 200 ppm (the current MTCA Method A cleanup level for industrial soil for TPH-O is 2,000 ppm). As a result, West Pac Environmental isolated approximately 10 cubic yards of impacted soil for off-site disposal. The remaining stockpiled soil was used to backfill the excavation. JPHC stated that the source of the TPH-O contamination was unknown; due to the condition of the USTs and the absence of free product or petroleum staining in the soil surrounding the former USTs, JPHC concluded that the source of contamination was unrelated to the USTs. Groundwater was not encountered within the limits of the UST excavation (JPHC 1993).

3.2.3.4 Facility Inspections

Ecology performed a Hazardous Waste Compliance Inspection at the Glacier Marine Services facility (UNIMAR at that time) on March 28, 1989. Follow-up inspections were conducted on April 26, May 2, May 23, and May 24 of 1989. The 1989 Hazardous Waste Compliance Inspections identified numerous cleanup actions to be taken at the facility to address accumulations of sandblast grit, contaminated stormwater, spilled oil, improperly stored drums, and so forth.

Ecology conducted another Hazardous Waste Compliance Inspection at the facility on July 6, 1989, at the request of First Interstate Bank to determine what had been done to address the issues identified during the inspections described above and what remained to be accomplished. Apparently some oil-contaminated soil, small piles of grit, and improperly stored drums containing petroleum products remained at the property. First Interstate Bank and Ecology discussed cleaning the storm drains and catch basins, and methods of collecting sediment and wastewater to prevent discharge to the LDW. The inspection report was not found in the files available for review.

On February 21, 2002, Ecology performed another Hazardous Waste Compliance Inspection at the facility. No major issues were identified by Ecology during the inspection.

EPA sent both 107(a) (General Notice) and 104(e) (Request for Information) letters to "Northland Services, Inc." on March 25, 2008 (EPA 2008c). EPA also sent 107(a) and 104(e) letters to "Fox Avenue LLC," "Seatac Marine Properties," and "Evergreen Marine Leasing" on July 17, 2008 (EPA 2008j, EPA 2008k and EPA 2008p). In addition, EPA sent a 104(e) letter only to "Fox Avenue Warehouse" on July 17, 2008 (EPA 2008l).

3.2.3.5 Potential Contaminant Sources

Historical and potentially ongoing storm drain solids contamination has been identified within the Glacier Marine Services facility storm drain system. Arsenic, chromium, cadmium, copper, mercury, lead, zinc, and oil & grease are identified in Section 2.2.2 as COCs found in storm drain solids, surface runoff, and sediment at the Glacier Marine Services facility; stormwater is listed as the potential pathway for these COCs to reach LDW sediments.

Geographic Information System (GIS) data provided by SPU from September 9, 2003, identified a seep at the location in Figure 3 labeled "Outfall 2025 and Seep," which is in the vicinity of the historical drydock at the facility and may correlate to the outfall from the storm drain line labeled "003" in Figure 8.

LDW sediment sampling (discussed in Section 2.2.1) identified several COCs in the vicinity of Glacier Marine Services (LDW-SC37 and LDW-SS77, depicted in Figure 4). Most of the COCs identified for the RM 2.0–2.3 East Source Control Area were found in subsurface sediment at LDW-SC37, which is adjacent to the Glacier Marine Services facility to the north. This area is in the vicinity of the historical drydock, the outfall from the storm drain line labeled as "003" on Figure 8, and the "Outfall 2025 and Seep" location shown in Figure 3. COCs identified at LDW-SC37 include arsenic, copper, lead, mercury, and zinc, which were also identified in the Glacier Marine Services storm drain system, suggesting that the source of heavy metals at this location could be stormwater discharge from Glacier Marine Services. Furthermore, arsenic was also found in exceedance in surface sediment at LDW-SS77, in the vicinity of the historical drydock, at the outfall from the storm drain line labeled as "003" on Figure 8, and at the "Outfall 2025 and Seep" location shown in Figure 3.

The following potential contaminant sources have been identified for Glacier Marine Services:

Storm Drain Solids Contamination

Environmental investigations conducted at the facility while in operation as MP&E identified high concentrations of heavy metals (arsenic, chromium, cadmium, copper, mercury, lead, and zinc), and oil & grease in the facility's storm drain system. High concentrations of the same heavy metals were also present in dock runoff and sediments beneath the drydock and synchrolift. Inspections conducted following MP&E's operations at the facility identified several environmental concerns, including accumulations of sandblast grit, contaminated stormwater, spilled oil, improperly stored and labeled drums and containers, and so forth. These findings illustrate the significant role that stormwater pathways have had in the past for contaminants at the site to reach LDW sediments.

Ecology identified several cleanup actions to be taken at the site in 1989, including storm drain system cleaning. Although no major issues were identified during the February 2002 Hazardous

Waste Compliance Inspection, documentation pertaining to the completion of the cleanup actions was not found in the files available for review; most notably, it is not known whether the facility's storm drain system was cleaned.

Unless the storm drain system has been cleaned, this storm drain solids contamination could reach LDW sediments via the stormwater pathway. Figure 7 illustrates facility catch basin locations in 2001, when the facility was in operation as Northland Services, and Figure 8 illustrates storm drain lines at the facility in 1989, when the facility was in operation as MP&E. Figure 8 shows that the facility discharged most of its stormwater directly to the LDW through the South Brighton Street CSO/SD, and some stormwater through the storm drain lines labeled "003," "004," "005," and "006." Figure 3 indicates that "Outfall 2025 and Seep" may correlate to MP&E's storm drain "003."

Stormwater

As indicated in Figure 3, stormwater discharges to the LDW from Glacier Marine Services via the South Brighton Street CSO/SD and direct drainage (i.e., sheet flow and potentially through historical storm drains). Glacier Marine Services discharges stormwater under the Industrial Stormwater General Permit. Compliance with the SWPPP maintained by the facility will minimize the potential for contaminants to migrate to the LDW via stormwater; however, a current SWPPP was not available for review. Even if the storm drain solids contamination discussed above has been cleaned from the storm drain system, current facility operations could generate spills or solids that could migrate to the LDW via stormwater.

Spills

Little is known about current operations at the Glacier Marine Services facility and no documentation pertaining to spills was found in the files available for review; however, the most recent operations known to have taken place at the facility (2001) included vehicle fluids handling and cleaning, refrigerator repair and maintenance, generator repair, touch-up painting of barges and containers, welding of handrails on barges, and fueling, all of which have the potential to generate spills that could migrate to the LDW both through the facility's storm drain system and through surface runoff, since the facility is directly adjacent to the LDW.

3.2.3.6 Source Control Actions

The following source control actions will be conducted for Glacier Marine Services:

- Ecology will review the PRP response to the 104(e) letter sent to "Northland Services, Inc." on March 25, 2008; and to the 104(e) letters sent to "Fox Avenue LLC," "Seatac Marine Properties," "Evergreen Marine Leasing," and Fox Avenue Warehouse" on July 17, 2008. Following review of the PRP response, Ecology will evaluate whether further site investigation is necessary.
- SPU and Ecology will conduct a source control inspection at the facility, to include the following:
    - Confirm that the NPDES permit and SWPPP are up-to-date. A SWPPP was not available in Ecology's files.
    - Confirm that the SWPPP includes a clear description of the facility storm drain system.

- Determine whether the facility currently discharges through the historical storm drain lines labeled “004,” “005,” and “006” in Figure 8.
- Determine if the storm drain labeled “003” in Figure 8 correlates with Outfall #2025, shown in Figure 3.
- Investigate the location in Figure 3 referred to as “Outfall #2025 and Seep,” and determine whether Glacier Marine Services is the source of the seep.
- Verify the facility’s connection to the sanitary sewer system. According to the 2001 SWPPP, vehicle maintenance work such as fluids changing is conducted over pits in the maintenance building. Fluids are then pumped through an oil/water separator and discharged to the sanitary sewer system. The facility’s connection to the sanitary sewer system is not indicated in the files available for review and should be clarified.
- Determine whether Glacier Marine Services currently performs sanding, scraping, or sandblasting to prepare barges and ships for painting, and whether waste materials are handled and disposed of properly. According to the 2001 SWPPP, touch-up painting of barges is conducted at the facility. Historically, sandblasting was performed at the property and sandblast grit was illegally disposed of in the LDW. Whether sanding, scraping, or sandblasting is currently performed at the facility is not mentioned in the SWPPP and should be clarified.
- Conduct in-line storm drain sampling to evaluate whether COCs are migrating to sediments associated with the RM 2.0–2.3 East Source Control Area via the Glacier Marine Services storm drain system.

3.3 Upland Facilities of Concern

3.3.1 V. Van Dyke

V. Van Dyke is located upland, on the east side of the LDW, at approximately RM 2.0. The property is bordered on the north by South Michigan Street, on the east by a building on the adjacent P.F. Industries property, on the south by South River Street, and on the west by Occidental Avenue. On the south side of South River Street is a gravel lot under the 1st Avenue South Bridge; the lot is also used by V. Van Dyke.

According to King County tax records, Doris Van Dyke has owned the property since at least 1989. According to King County tax records there are only two structures on the property: a 1,100-square-foot office building built in 1955 and a 2,800-square-foot equipment shed built in 1974. There are no structures on the gravel lot across Occidental Avenue under the 1st Avenue South Bridge (King County 2007a). The gravel lot is owned by V. Van Dyke, Inc., and is sub-leased to Pile Contractors (SPU 2007b).

Available information from Ecology, EPA, and King County online databases and permits is summarized in the table below. This site information and further details are described in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008).

Facility Summary: V. Van Dyke	
Address	150 South River Street
Property Owner	V. Van Dyke, Inc./Doris Van Dyke
Former Property Owners	N/A
Former/Alternative Property Names	N/A
Former/Alternative Lessee/Operator Names	Mitchell Bros. Terminal Co. Pile Contractors, Inc. (gravel lot)
Tax Parcel No.	N/A
Parcel Size	5367202270 5367202400 (gravel lot)
Former/Alternative Addresses	0.77 acres 0.21 acres (gravel lot)
NPDES Permit No.	SO3000453
EPA RCRA ID No.	WAD988516779
EPA TRI Facility ID No.	N/A
Ecology Facility/Site ID No.	68427684
Ecology UST Site ID No.	12577
Ecology LUST Release ID No.	N/A
Listed on CSCSL	No

Relevant current site use, past site use, environmental investigation, cleanup action, and facility inspection information is summarized in the sections below to provide background for potential contaminant sources and source control actions identified for the V. Van Dyke facility.

3.3.1.1 Current Site Use

V. Van Dyke is a trucking facility, mainly providing heavy hauling, truck storage, and maintenance. The most current available facility layout is illustrated in Figure 9, and a portion of the facility can be seen in Figure 5- an aerial photo of the Slip 3 inlet area taken in July 2006. The property has an office building, two shop buildings, and a vehicle wash pad area. The large shop building is used for vehicle maintenance and repair, and the small shop building is used as a welding shop, sub-leased by Pile Contractors. The small shop building had been used to store waste, such as used oil (labeled "haz mat area" in Figure 10). Scrap metal is stored outside in containment and under cover (V. Van Dyke 1993 and SPU 2006c).

V. Van Dyke stores trailers and other equipment, and conducts some maintenance in a gravel lot under 1st Avenue South Bridge, on the south side of Occidental Avenue South. Pile Contractors also sub-leases a portion of the gravel lot to store equipment parts and perform some repairs (Ecology 2006b and SPU 2007c).

V. Van Dyke's 1993 SWPPP identifies potential stormwater pollutants, their locations of use within the facility, and their associated activity. Potential stormwater pollutants used at the facility include acid, alkaline or corrosive battery fluid, antifreeze, battery acid, catalyst, cleaning solvents, lubricating oils, paint (or varnish) remover or stripper, paint thinner, detergent, waste (or slop) oil, and weed killer. Activities that require use of BMPs include uncovered vehicle parking for 20 or more vehicles; washing or steam cleaning vehicles or equipment; fueling vehicles or equipment; storing raw materials, byproducts, or products of a manufacturing process outdoors; using pesticides, herbicides, or fertilizers; accumulating or managing used oil; and maintaining storm drains (V. Van Dyke 1993).

Storm Drain System

V. Van Dyke's 1993 SWPPP does not include a description of the facility's storm drain system; however, Figure 10 depicts four catch basins (referred to as "storm drains" in the SWPPP) and a vehicle wash pad catch basin (referred to as a "drain" in the SWPPP). These five catch basins are depicted in Figure 10 as dark rectangles. The vehicle wash pad catch basin is directly north of "Storage," in the mid-western portion of the facility. According to V. Van Dyke's 1993 SWPPP, the two catch basins on the eastern portion of the site have unknown discharge points (V. Van Dyke 1993). The vehicle wash pad catch basin drains to the sanitary sewer system (Ecology 1999). SPU discovered an additional catch basin on the west side of the "Haz Mat Area" (small shop building; see Figure 10) (Ecology 2007c). SPU gave V. Van Dyke permission to cap the catch basin (SPU 2007c), but whether the catch basin was actually capped is not known. Figure 3 indicates that the facility storm drain system connects to the city's storm drain system and discharges to the LDW via the South River Street SD. According to SPU, although stormwater from most of the property is collected and discharged to the storm drain on South River Street, one catch basin on the north side of the property is connected to the storm drain on South Michigan Street, which discharges to the LDW underneath the 1st Avenue South Bridge.

3.3.1.2 Past Site Use

A trucking facility has occupied the site since approximately 1955 (Adapt 2002). King County tax records show Doris Van Dyke has owned the property since at least 1989; it appears that Doris Van Dyke owned the property before 1989, but it is not known for how long. Mitchell Bros. Terminal Co. occupied the property until 2002, but the years of tenancy are not known (King County 2007a). Review of available information did not identify uses or ownership of the property prior to 1955.

3.3.1.3 Environmental Investigations and Cleanup Activities

The following investigations have been conducted at the V. Van Dyke facility:

- Phase I Environmental Site Assessment, conducted in 2002 by LSI Adapt (described in Adapt 2002)
- Limited Phase II Environmental Site Assessment, conducted in 2002 by LSI Adapt (Adapt 2002)
- Groundwater Monitoring Well Installation and 1st Quarter Groundwater Quality Monitoring, conducted in 2003 by LSI Adapt (Adapt 2003)

These investigations are described in detail in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008); the report includes analytical results for soil and groundwater at the facility and figures showing sample locations with associated analytical results.

In September 2002, LSI Adapt (Adapt) conducted a *Phase I Environmental Site Assessment* (ESA). The *Phase I ESA* revealed that three USTs were reportedly removed from the V. Van Dyke property in 1988. The approximate location of the former USTs is shown in Figure 9. The company that removed the USTs reportedly did not observe any contamination, and no soil sampling was conducted. The USTs were removed prior to current regulations requiring soil sampling to confirm a clean closure. Adapt stated that an undocumented release from the former USTs could have occurred unobserved during removal. Adapt also noted that there was an oil/water separator in the vehicle wash area, and that workers discovered heavy staining adjacent to the catch basin in the northeastern portion of the site. Adapt recommended that additional subsurface information be collected to evaluate the environmental liability associated with the former USTs, oil/water separator, and observed stained area near the catch basin (Adapt 2002).

In October 2002, Adapt conducted a *Limited Phase II ESA* to screen soil and groundwater beneath the property to verify the observed contaminants associated with past activities from former USTs and the fueling system and oil/water separator, and to verify the staining adjacent to the catch basin. Adapt advanced five borings (P-1 through P-5) at locations shown in Figure 9. Soil and groundwater samples were collected at each location and analyzed for TPH in the gasoline-, diesel- and heavy-oil-range (TPH-G, TPH-D and TPH-O, respectively), with additional analysis for benzene, toluene, ethylbenzene, and total xylenes (BTEX) gasoline constituents. One soil sample (collected from P-3) was also analyzed for lead. Groundwater samples were additionally analyzed for volatile organic compounds (VOCs) (Adapt 2002).

Limited Phase II ESA sampling results revealed TPH-G and benzene at concentrations above MTCA Method A cleanup levels in soil and groundwater samples collected from P-3, which is in the area of the former dispenser island and USTs. Adapt concluded it likely that petroleum hydrocarbons had been released to on-site soil and groundwater in the vicinity of the former dispenser island and USTs. Impacted groundwater appeared to be localized to the vicinity of the former dispenser island and USTs; however, impacted groundwater may have migrated beneath the office and carport. Adapt recommended additional subsurface characterization to evaluate downgradient migration of petroleum-impacted groundwater off-site (Adapt 2002).

During the *Limited Phase II ESA,* Adapt was given anecdotal information about two additional USTs that were closed in place beneath the southern shop building, and Adapt observed two holes in the floor of the southern shop building. According to V. Van Dyke, the two USTs were closed in place beneath the shop building by Glacier Environmental on September 24, 2002. The USTs were reportedly used for lubricating and waste oil storage. Analytical results from the soil sampling beneath the USTs after they were cleaned and rinsed indicated that diesel- and heavy-oil-range petroleum hydrocarbons and noncarcinogenic polynuclear hydrocarbons were detected in the soil samples, but the concentrations did not exceed MTCA Method A cleanup levels. Adapt concluded that no further actions were warranted regarding the two decommissioned USTs (Adapt 2002).

In December 2002, Adapt installed groundwater monitoring wells (MWs) MW-1 through MW-4 at locations depicted in Figure 9. Adapt sampled the wells to evaluate the potential for observed on-site petroleum hydrocarbons in soil and groundwater to migrate off-site, and to delineate the lateral extent of the observed petroleum impacts. Soil and groundwater samples were collected at each location and analyzed for gasoline-range petroleum hydrocarbons and BTEX (Adapt 2003).

Gasoline-range hydrocarbons and BTEX compounds were not exhibited above laboratory detection levels in any of the soil samples collected. In addition, no gasoline-range hydrocarbons or BTEX compounds were detected above standard laboratory reporting limits in any of the four monitoring well groundwater samples. The petroleum hydrocarbon contamination identified in the vicinity of the former UST pit did not appear to have migrated off-site. Adapt suggested continued quarterly groundwater monitoring to develop a remediation strategy and to prepare for requesting site closure from Ecology. Also as a result of the 2002 groundwater monitoring, Adapt determined that the groundwater flow direction appeared to fluctuate toward the north, northeast, and east. Based on observed water levels and the close proximity to the LDW, Adapt determined the groundwater flow direction to likely be tidally influenced (Adapt 2003).

3.3.1.4 Facility Inspections

Ecology performed a Stormwater Compliance Inspection at the V. Van Dyke facility on June 15, 1999. Ecology noted that the property was orderly in general; however, some improperly stored drums, leaking equipment, and oil-stained soil were identified. Ecology directed V. Van Dyke to address its concerns.

On December 1, 2006, SPU performed a Joint Inspection and Ecology performed a Stormwater Compliance Inspection. Follow-up inspections were conducted on February 16 and March 7 of 2007. As part of the Stormwater Compliance Inspection, Ecology reviewed the facility’s discharge monitoring reports (DMRs) and discovered that in 2005, zinc, oil & grease, and turbidity had exceeded benchmark and/or action levels designated in the Industrial Stormwater General Permit requirements. Additionally, V. Van Dyke had improperly used the “No Qualifying Event” classifier in some of its DMRs. The inspections identified multiple stormwater concerns such as unkempt storm drains, oil sheens, accumulations of solids, improperly stored drums, and leaking equipment. SPU and Ecology identified several corrective actions to address stormwater concerns, and during the March 7 follow-up inspection, SPU concluded that the V. Van Dyke facility was in compliance.

On March 7, 2007, SPU performed a Joint Inspection of Pile Contractors, following discovery during the Joint Inspection at V. Van Dyke that in addition to sub-leasing space in the gravel lot under 1st Avenue South Bridge to store equipment parts and perform some repairs, Pile Contractors also sub-leased the small shop building on V. Van Dyke’s main property for welding. A follow-up inspection was conducted on April 13, 2007. A few administrative concerns were identified by SPU at Pile Contractors, none of which affected stormwater quality.

EPA sent 107(a) (General Notice) and 104(e) (Request for Information) letters to “V. Van Dyke, Inc.” on March 25, 2008 (EPA 2008g).

3.3.1.5 Potential Contaminant Sources

Historical petroleum hydrocarbon (TPH-G and benzene) contamination has been identified in soil and groundwater near the former dispenser island and USTs at the V. Van Dyke facility; therefore, TPH-G and benzene are identified in Section 2.2.2 as COCs, with potential pathways to reach LDW sediments via stormwater and groundwater.

In addition, zinc and oil & grease are identified in Section 2.2.2 as COCs found in stormwater discharge at the V. Van Dyke facility; stormwater is the potential pathway for these COCs to reach LDW sediments.

The following potential contaminant sources have been identified for V. Van Dyke:

Soil and Groundwater Contamination

Environmental investigations at the V. Van Dyke facility identified petroleum hydrocarbon contamination (TPH-G and benzene) in soil and groundwater near the former dispenser island and USTs (Figure 9). Although groundwater monitoring in 2002 did not indicate that groundwater contamination is migrating off-site, it is not certain this remains true. Continued quarterly groundwater monitoring was recommended by Adapt in 2003, but whether it was completed and what the results were are not known.

Groundwater at the property has not been documented to flow toward the LDW, but groundwater has been documented to flow toward the LDW at nearby properties. Groundwater flowing from the V. Van Dyke property most likely migrates to the LDW at least occasionally depending on tidal influences. Therefore, groundwater contamination could discharge to the LDW within RM 2.0–2.3 East via the groundwater pathway.

V. Van Dyke facility catch basins are illustrated in Figure 10. Figure 3 indicates that the storm drain system connects to the city's storm drain system and discharges to the LDW via the South River Street SD. V. Van Dyke's storm drain system does not appear to pass through the petroleum hydrocarbon soil and groundwater contamination that exists in the vicinity of the former dispenser island and USTs (Figure 9). Figure 3 indicates that storm drain lines at the facility pass to the east and north of the former dispenser island and USTs; however, according to the *Limited Phase II ESA*, the extent of soil and groundwater contamination is not clearly defined, and the facility's storm drain system is not clearly understood; at least two storm drains have unknown discharge points, and one storm drain may or may not have been taken offline. Therefore, soil and groundwater contamination at the property could infiltrate the storm drain system and discharge to the LDW within RM 2.0–2.3 East via the stormwater pathway.

Stormwater

As indicated in Figure 3, stormwater discharges to the LDW from the V. Van Dyke facility via the South River Street SD. The V. Van Dyke facility's stormwater discharge is authorized under the Industrial Stormwater General Permit. Compliance with the SWPPP maintained by the facility will minimize the potential for contaminants to migrate to the LDW via stormwater. However, a current SWPPP was not on file, and the facility's stormwater discharge has exceeded permit benchmark values for zinc, oil & grease and turbidity in the past. In addition, inspections conducted at the facility in 1999 and 2007 identified several stormwater concerns. The last inspection conducted at the facility in March 2007 determined that V. Van Dyke was in compliance; however, information was not available for review to determine whether benchmark values are no longer exceeded. Therefore, zinc and oil & grease are included in Section 2.2.2 as COCs. Current facility operations could generate spills or solids that could migrate to the LDW via stormwater.

Spills

Operations at the V. Van Dyke facility could result in spills. However, since the facility is not adjacent to the LDW, spills could only reach the LDW via stormwater or groundwater. As discussed in the June 15, 1999, Stormwater Compliance Inspection report, a spill of a diesel/oil-water mixture was discovered at the gravel lot across from the main V. Van Dyke property.

However, the spill was apparently from overnight dumping, and existing information indicates the spill was handled properly.

3.3.1.6 Source Control Actions

The following source control actions will be conducted for V. Van Dyke:

- Ecology will review the PRP response to the 104(e) letter sent to "V. Van Dyke, Inc." on March 25, 2008, and evaluate whether further site investigation is necessary.
- V. Van Dyke and Ecology will determine whether a UST may have been removed from the property without a proper closure. According to Ecology's UST List, six USTs have been removed from the V. Van Dyke property; however, only five USTs were documented as removed from the property based on information available for review, three in 1988, and two (by Glacier Environmental) in 2002. This discrepancy should be resolved to assure an additional UST was not removed from the property without clean closure.
- SPU and Ecology will conduct a source control inspection at the facility, to include the following:
    - Confirm that the NPDES permit and SWPPP are up-to-date.
    - Confirm that the SWPPP includes a clear description of the facility storm drain system.
    - Ensure that the facility has remained in compliance. Stormwater concerns have been identified at the facility in the past.
    - Investigate the facility's connection to the city storm drain system. Only one catch basin is depicted in Figure 3, and according to the 1993 SWPPP, there are four stormwater catch basins, and one catch basin that discharges to the sanitary sewer system.
    - Conduct in-line storm drain sampling to evaluate whether COCs are migrating to sediments associated with the RM 2.0–2.3 East Source Control Area via the V. Van Dyke storm drain system.
- Ecology will obtain any additional reports from V. Van Dyke that may be missing from Ecology's files. Available information does not confirm that the extent of soil and groundwater contamination has been defined, or that the additional groundwater and tidal monitoring suggested by Adapt has been completed.
- Ecology will work with V. Van Dyke to complete quarterly groundwater or other monitoring suggested by Adapt, if needed.

3.3.2 Riverside Industrial Park

The Riverside Industrial Park property is upland on the east side of the LDW at approximately RM 2.0. The property is bordered on the north by an asphalt-paved, fenced-in parking lot, and Rosa's Apparel Manufacturing is north of the parking lot. An unpaved extension of 3rd Avenue South bounds the property to the east; across this road is a fenced-in storage yard containing truck trailers and steel beams. South River Street bounds the property to the south; across this road is the SCS Refrigerated Services property. A warehouse occupied by Elegant Stone, a building stone distributor, is immediately west of the southern portion of the Riverside Industrial Park property and south of the northwestern portion of the property. The northwestern portion of the property is bounded by 2nd Avenue South; across this road is a warehouse occupied by P.F. Industries and the J. L. Henderson Company (EAI 1999c).

According to King County tax records, Riverside Industrial Park LLC purchased the property from Carmody, W.F. and Patricia B., on January 5, 2000. The two structures on the property include a 6,764-square-foot manufacturing (shop) building and an 8,640-square-foot office building, both built in 1957 (King County 2007a).

Facility Summary: Riverside Industrial Park	
Address	6533 3rd Avenue South (shop building) 220 South River Street (office building)
Property Owner	Riverside Industrial Park LLC
Former Property Owners	Leon Cohen W.F. and Patricia B. Carmody Theodore B. Mullen
Former/Alternative Property Names	Carmody Property
Former/Alternative Lessee/Operator Names	LK Comstock Lion Trucking Dispatch (mezzanine) Big John's Truck Repair Highway Enterprises Royal Truck Repair Kurt's Enterprises Vacuum Truck Services
Tax Parcel No.	N/A
Parcel Size	5367202200
Former/Alternative Addresses	0.54 acres
NPDES Permit No.	N/A
EPA RCRA ID No.	WAD988519781 (inactive since 12/31/1998) and WAD021817796 (inactive since 4/18/1988)
EPA TRI Facility ID No.	N/A
Ecology Facility/Site ID No.	44383713 and 37289288
Ecology UST Site ID No.	97212
Ecology LUST Release ID No.	499583
Listed on CSCSL	Yes
Ecology VCP ID No.	NW1946 NW0350 (old)

Big John's Truck Repair (Facility Site ID No. 44383713) was entered into Ecology's Confirmed and Suspected Contaminated Site List (CSCSL) on October 18, 1999, and has confirmed groundwater and soil contamination (Ecology 2007e). The Big John's Truck Repair facility was registered in the Voluntary Cleanup Program (VCP), and an Opinion Letter was issued by

Ecology in 2000. However, under revised guidelines, Ecology has since rescinded the letter, resulting in further action required at the facility (EPA 2007 and Trejo 2000).

Available information from Ecology, EPA, and King County online databases and permits is summarized in the table below. This site information and further details are described in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008).

Relevant current site use, past site use, environmental investigation, cleanup action, and facility inspection information is summarized in the sections below to provide background for potential contaminant sources and source control actions identified for the Riverside Industrial Park facility.

3.3.2.1 Current Site Use

The most current available facility map, including excavation and monitoring well locations, is illustrated in Figure 11. A portion of the facility can be seen in Figure 5- an aerial photo of the Slip 3 inlet area taken in July 2006. As of May 1999, the shop building was vacant, other than commercial use by Lion Trucking Dispatch in the mezzanine. The office building was used commercially by the manufacturing representatives of Carmody Co. and Hardesty & Co. (EAI 1999c).

LK Comstock, a subcontractor for Seattle's Sound Transit Light Rail System Project, occupied the shop building at 6533 3rd Avenue South (presumably the mezzanine portion) as of May 2008. The former owner of the facility, Mr. Leon Cohen, submitted a new VCP application for LK Comstock, which created the new VCP ID No. NW1946. The VCP application is currently in review by Ecology (Hickey 2008). Whether the main area of the shop building is still vacant or the office building is still used commercially by the manufacturing representatives of Carmody Co. and Hardesty & Co. is not known.

According to the *Phase I Environmental Audit and Limited Sampling Report*, storm drain service is provided to the office building at 220 South River Street, but not to the shop building at 6533 3rd Avenue South, which reportedly connected to the sanitary sewer when the shop building was in operation (EAI 1997).

Storm Drain System

As shown in Figure 3, the southern portion of the Riverside Industrial Park property is served by a private storm drain system that connects to the city's storm drain system and discharges to the LDW via the South River Street SD.

3.3.2.2 Past Site Use

The Riverside Industrial Park property was commercially developed in 1957, the year that the office building and manufacturing (shop) building were built (EAI 1997).

According to the *Phase I Environmental Audit and Limited Sampling Report,* Theodore B. Mullen purchased the property in 1956 and ownership changed in 1974, when W.F. and Patricia B. Carmody purchased the property. Several businesses have operated out of the shop building and/or office building since 1957, and are summarized in the table below through 1999. As of May 1999, Lion Trucking Dispatch occupied the mezzanine of the shop building, and residents of the office building included the manufacturer's representatives of Carmody Co. and Hardesty

& Co. Property use since 1999 is not known, other than LK Comstock's current occupation of the the shop building (presumably the mezzanine). In the table below, some businesses listed under the office address appear to have actually operated out of the shop building. The shop building appears to have been vacant until at least 1981-1983, when apparently Kurt's Enterprises (truck repair) and/or Vacuum Truck Services (cleaner of ships) occupied the property. Kurt's Enterprises was listed as occupying the property in 1986, Royal Truck Repair was listed in 1990, and Highway Enterprises was listed in 1994 (EAI 1997).

Historical Businesses: Riverside Industrial Park

Year	Address	Businesses Listed
1958 and 1960	6533 3rd Avenue South	Vacant
	220 South River Street	S.S. Mullen, Inc., building contractors
1965 and 1970	220 South River Street	S.S. Mullen, Inc.
1975	220 South River Street	Carmody Company, manufacturer's representative
1980	220 South River Street	Carmody Co. Hardesty & Company, manufacturer's representative Pacer Corporation, manufacturer's representative
1981 and 1983	220 South River Street	Carmody Co. Hardesty & Co. Kurt's Enterprises, truck repair H.R. Zilmer Distributors, manufacturer's representative Stars on the Sea, fire alarm sales Vacuum Truck Service, cleaner of ships McGrane Electrical, sales Cassidy Associates, Inc., manufacturer's representative
1986	220 South River Street	Carmody Co. Hardesty & Co. Kurt's Enterprises H.R. Zilmer Distributors Tool Engineering Company Jackson Willis Company
1990	220 South River Street	Carmody Co. Hardesty & Co. H.R. Zilmer Distributors Gifford and Associates, food manufacturers B.A. Barnes, Inc., accounting M.D. Fabre & Associates, architects and engineering Royal Truck Repair, Inc.
1994	6533 3rd Avenue South	Highway Enterprises, Inc., trucking company Big John's Truck Repair
	220 South River Street	Carmody Co. Hardesty & Co. Gifford and Associates
1999	6533 3rd Avenue South	Vacant (shop area) Lion Trucking Dispatch (mezzanine)
	220 South River Street	Carmody Co. Hardesty & Co.

Also according to the *Phase I Environmental Audit and Limited Sampling Report,* three 1,000-gallon diesel fuel USTs were closed in place east of the shop building in 1988. In February 1994, Big John's Truck Repair (formerly Highway Enterprises) was a registered generator of mineral spirits, oil, cadmium, and lead, and the estimated quantity of wastes generated was 134 pounds per month (EAI 1997).

Review of available reports indicates that Big John's Truck Repair was in operation at the Riverside Industrial Park shop building beginning in 1994 and vacated the building sometime in 1998. According to the table below, prior lessees of the shop building included Highway Enterprises, Royal Truck Repair, Kurt's Enterprises, and Vacuum Truck Services. However, site addresses for the shop and office buildings have been intermixed and the years of operation under each lessee is unclear. Other than LK Comstock's current occupation of the shop building, businesses in operation at the Riverside Industrial Park property since 1999 are not known.

3.3.2.3 Environmental Investigations and Cleanup Activities

The following investigations and cleanup actions have been conducted at the Riverside Industrial Park facility:

- Phase I Environmental Audit and Limited Sampling, conducted in 1997 by Environmental Associates, Inc. (EAI 1997)
- Phase II Subsurface Exploration, conducted in 1998 by Geotech Consultants (Geotech 1998)
- Tank Removal, Site Assessment, and Cleanup, conducted 1998 through 1999 by Environmental Associates, Inc. (EAI 1999c)
- Phase II Subsurface Soil and Groundwater Investigation, conducted in 1999 by PBS Environmental, Inc. (PBS 1999)
- 2nd and 3rd Quarter Groundwater Sampling and Testing, conducted in 1999 by Environmental Associates, Inc. (EAI 1999b and EAI 1999a)

These investigations are described in detail in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008). This report includes analytical results for soil and groundwater at the facility and figures showing sample locations.

In December 1997, Environmental Associates, Inc. (EAI) conducted a *Phase I Environmental Audit and Limited Sampling* of the Riverside Industrial Park property to evaluate its potential sale. To make a preliminary evaluation of subsurface conditions at the property, three soil/floor drain solids samples were obtained, one from each of the two floor drains in the shop building, and one from approximately 4 feet northwest of the diesel fuel AST on the west side of the shop building at a depth of approximately 6 inches. Each sample was analyzed for TPH-G, TPH-D, TPH-O, and BTEX gasoline constituents. Analysis was also conducted for the presence of halogenated VOCs (also referred to as chlorinated solvents) in each sample (EAI 1997).

Sample results identified concentrations of TPH-D and TPH-O above MTCA Level A cleanup levels for industrial soil in all three samples. TPH-G, ethylbenzene, total xylenes, trichloroethene (TCE), and tetrachloroethene (PCE) were also detected in the floor drain solids at concentrations above or equivalent to MTCA Method A cleanup levels[7]. In addition to the diesel fuel AST and two floor drains, EAI identified several other concerns at the property, including three diesel fuel USTs closed in place east of the shop building, several 55-gallon drums, and surficial oil stains on soil and on the concrete floor in the shop building. EAI concluded that the extent of

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[7] Although MTCA Method A clean up levels technically do not apply to catch basin solids they provide an indication of concern for the detected analytes.

contamination was unknown and suggested additional subsurface sampling to define lateral and vertical extents of contamination (EAI 1997).

In April 1998, Geotech Consultants conducted a *Phase II Subsurface Exploration* of the property for the property owner at the time (Mr. Thomas Carmody) to further assess contamination discovered during the *Phase I Environmental Audit and Limited Sampling*. Geotech Consultants completed seven soil borings across the property. Soil samples were collected at each location and groundwater samples were collected where groundwater was encountered. Each sample was analyzed for TPH-G, TPH-D, TPH-O, and BTEX gasoline constituents (Geotech 1998).

Sample results indicated that soil downgradient from the three inactive USTs contained TPH-G, TPH-D, and TPH-O as well as BTEX compounds (benzene and xylenes) above MTCA Method A cleanup levels for industrial soil. Groundwater was discovered in this area at approximately 7 feet below ground surface (bgs) and appeared to be similarly contaminated. Geotech Consultants determined that the contaminated soil extended from near the ground surface to approximately 7 to 9 feet in depth, covered roughly 30 feet (north-south) wide, and might extend beneath the shop building. Geotech Consultants recommended excavating contaminated soils and disposing them off-site (Geotech 1998).

Soil analyzed in the vicinity of the two floor drains and in the outdoor storage area contained no detectable concentrations of petroleum or halogenated hydrocarbons. Geotech Consultants noted that previously identified contamination was most likely limited to solids inside the floor drains and to stained soils near the surface in the outdoor storage area. Geotech Consultants recommended the floor drains be cleaned out by a licensed disposal company, and that an inspection be completed to check for ruptures or breaks in the drain walls and to confirm the drains' connection to the sanitary sewer (Geotech 1998).

In October 1998, to address the contamination discovered through the Phase I and II investigations described above, EAI completed removal of the three approximately 1,000-gallon gasoline and diesel fuel USTs, an associated fuel dispenser island, the two shop floor drains, a floor drain outfall, and the approximately 500-gallon heating oil AST. Petroleum-contaminated soil was excavated and disposed of off-site, and excavation floor and sidewall sampling was performed. Figure 11 illustrates the extent of each of the excavations. Samples collected from the floors and sidewalls of the excavations indicated that the soil remaining in the excavations contained no detectable concentrations of petroleum contaminants exceeding MTCA Method A cleanup levels for gasoline, BTEX, diesel & oil, total lead, or halogenated organic compounds (EAI 1999c).

An undetermined volume of petroleum-contaminated soil was left in-place below the east and west foundations of the shop structure and below the northeast corner of the adjacent Elegant Stone warehouse structure due to concerns about the proximity of the excavation sidewalls to the building foundation walls. EAI determined that the remaining contaminated soil posed little or no threat to human health or the environment because current site use did not permit exposure, the soil was encapsulated by the shop building and warehouse building, and groundwater monitoring was planned (EAI 1999c).

In February 1999, EAI completed four groundwater monitoring wells (MW-1 through MW-4) and performed groundwater sampling. Groundwater samples were collected from each well and sampled for TPH-G, BTEX gasoline constituents, TPH-D, and TPH-O. Figure 11 illustrates the locations of the groundwater monitoring wells (EAI 1999c).

Measurements of the groundwater table following the installation of monitoring wells revealed that shallow groundwater was present at approximately 5 to 6 feet bgs, and that the gradient was very gentle (approximately 0.2 percent) with inferred groundwater flow from the north-northeast toward the south-southwest. Concentrations of TPH-G, benzene, ethylbenzene, and xylenes were detected above MTCA Method A cleanup levels for groundwater at MW-1. EAI determined that this gasoline-contaminated groundwater most likely would not migrate off-site, as groundwater sampled from MW-2 (downgradient from MW-1) did not reveal the presence of gasoline-range petroleum hydrocarbons or gasoline-associated BTEX constituents. However, EAI recommended sampling and testing groundwater for at least three more quarters to assess overall stability and trends (EAI 1999c).

In June 1999, PBS Environmental, Inc., completed a subsurface investigation of the property to identify the approximate lateral and vertical extent of potential petroleum-contaminated soil and groundwater remaining beneath the concrete slab of the shop building. PBS Environmental completed seven borings (SB-1 through SB-7) shown in Figure 11. Soil samples were collected at each location and two groundwater samples were collected (from SB-3 and SB-6). Each sample was analyzed for gasoline, stoddard solvent/mineral spirits, kensol (a series of refined petroleum products), kerosene/jet fuel, diesel/fuel oil, bunker C, and heavy oil. Petroleum hydrocarbons were not detected in any soil or groundwater sample. PBS Environmental stated that the residual diesel-range contamination that remained in the sidewall of the former UST pit adjacent to the building did not appear to have migrated a significant distance beneath the shop building, and that continued quarterly monitoring of the existing wells would assess the groundwater quality for overall stability and trends (PBS 1999).

In May and October 1999, EAI sampled the four existing monitoring wells in a second and third quarter of groundwater sampling, as was recommended during the Tank Removal, Site Assessment, and Cleanup to assess the groundwater quality for overall stability and trends. As in the first quarter (conducted during the Tank Removal, Site Assessment, and Cleanup), groundwater samples were collected from each well (MW-1 through MW-4) and analyzed for TPH-G, BTEX gasoline constituents, TPH-D, and TPH-O (EAI 1999b and EAI 1999a).

Shallow groundwater was encountered at approximately 3 feet bgs during both the second and third quarters. Groundwater appeared to be flowing generally from the north-northeast toward the south-southwest during both quarters, as was found during the first quarter. During the second quarter, a concentration of benzene was detected above the MTCA Method A cleanup level for groundwater at MW-2. During the third quarter, no concentrations of gasoline-range petroleum hydrocarbons or associated BTEX constituents or diesel/oil-range petroleum contaminants were detected in groundwater from monitoring wells MW-1 through MW-4 at concentration levels exceeding the MTCA Method A cleanup levels (EAI 1999b and EAI 1999a).

In December 1999, Ecology visited the Riverside Industrial Park property to observe site conditions and reviewed the reports discussed above. Ecology determined that a No Further Action (NFA) determination could be issued for soil and groundwater if two additional rounds of groundwater samples collected from MW-2 showed that contaminant levels were below MTCA Method A groundwater cleanup levels, demonstrating that groundwater had not been adversely affected by the soil contamination remaining near the former fuel USTs and dispenser island. A restrictive covenant prepared by Ecology would also need to be filed with the King County Tax Assessor's Office. In addition to the groundwater sampling and restrictive covenant, the owners of the adjacent Elegant Stone warehouse would need to be notified that contaminant concentrations above MTCA Method A cleanup levels for petroleum hydrocarbons were discovered underneath the northern portion of their warehouse (Trejo 2000). According to Ecology, an NFA has not been issued, and further action is required at the facility (EPA 2007).

3.3.2.4 Facility Inspections

No facility inspections are known to have been conducted at the Riverside Industrial Park facility.

EPA sent 107(a) (General Notice) and 104(e) (Request for Information) letters to "Riverside Industrial Park" on July 17, 2008 (EPA 2008o). EPA also sent a 104(e) letter to "Big John's Truck Repair" on July 17, 2008 (EPA 2008h).

3.3.2.5 Potential Contaminant Sources

Historical petroleum hydrocarbon contamination was identified in soil and groundwater near the three former USTs and fuel dispenser island in 1997. The contaminated soil was excavated in 1998 where possible; however, groundwater contamination (TPH-G, benzene, ethylbenzene, and xylenes) appears to remain. TPH-G, benzene, ethylbenzene, and xylenes are identified in Section 2.2.2 as COCs, with potential pathways to reach LDW sediments listed as stormwater and groundwater.

The following potential contaminant sources have been identified for Riverside Industrial Park:

Soil and Groundwater Contamination

Environmental investigations at the Riverside Industrial Park facility identified petroleum hydrocarbon contamination in soil and groundwater. Contaminated soil was excavated in October 1998 from the locations shown in Figure 11. However, an undetermined volume of petroleum-contaminated soil was left in-place below the east and west foundations of the shop structure and below the northeast corner of the adjacent "Elegant Stone" warehouse structure.

Concentrations of TPH-G, benzene, ethylbenzene, and xylenes were detected above MTCA Method A cleanup levels at MW-1 in the first quarter of groundwater monitoring performed in February 1999. In May 1999, benzene was detected at a concentration above MTCA Method A cleanup levels at MW-2. However, in June 1999, no concentrations of petroleum hydrocarbons were detected in groundwater from monitoring wells MW-1 through MW-4 at levels exceeding the MTCA Method A cleanup levels.

In December 1999, Ecology determined that an NFA could be issued for soil and groundwater if two additional rounds of groundwater samples collected from MW-2 showed contaminant levels below MTCA Method A cleanup levels. Whether this groundwater monitoring was conducted is not known.

Groundwater was typically encountered at the Riverside Industrial Park facility between 3 and 7 feet bgs, flowing generally from the north-northeast to the south-southwest. Therefore, groundwater contamination could discharge to the LDW within RM 2.0–2.3 East via the groundwater pathway.

The city storm drain system is known to serve the Riverside Industrial Park office building at 220 South River Street. Figure 3 indicates that storm drain lines run between the shop building and the office building, possibly through areas where contaminated soil has been excavated, and discharge to the LDW via the South River Street SD. Petroleum-contaminated soil and groundwater remaining at the property could infiltrate the storm drain system and discharge to the LDW within RM 2.0–2.3 East via the stormwater pathway.

Floor Drains

As discussed above, in 1997, two floor drains were identified in the shop building that lacked oil/water separators. Floor drain solids samples were collected from each floor drain, and concentrations of TPH-G, TPH-D, TPH-O, ethylbenzene, total xylenes, TCE and PCE were found in exceedance of MTCA Method A cleanup levels for industrial soil in one or both samples. Reportedly, the shop building was connected to the sanitary sewer system rather than the storm drain system; however, Big John's Truck Repair could not confirm that the two floor drains were connected to the sanitary sewer.

The floor drains were excavated, and soil samples collected from the excavation indicated that the previously identified contamination was most likely limited to solids inside the floor drains. Geotech Consultants recommended the floor drains be cleaned out by a licensed disposal company and that an inspection be completed to check for rupture or breaks in the drain walls and to confirm the drains' connection to the sanitary sewer.

Contaminated floor drain solids may have migrated to the LDW within RM 2.0–2.3 East if the former shop building floor drains were connected to the storm drain system rather than the sanitary sewer system. If the floor drains were not cleaned out and confirmed to connect to the sanitary sewer as recommended, contaminated floor drain solids could discharge to the LDW within RM 2.0–2.3 East via the stormwater pathway.

3.3.2.6 Source Control Actions

The following source control actions will be conducted for Riverside Industrial Park:

- Ecology will review the PRP response to the 104(e) letters sent to "Riverside Industrial Park" on March 25, 2008, and "Big John's Truck Repair" on July 17, 2008, and evaluate whether further site investigation is necessary.
- SPU and Ecology will conduct a source control inspection at the facility, to include the following:
    - Confirm that the former two shop building floor drains were connected to the sanitary sewer rather than the city storm drain system.
    - Determine whether the storm drain lines shown in Figure 3, between the shop building and office building, pass through areas where contaminated soil has been excavated.
    - Conduct in-line storm drain sampling to evaluate whether COCs are migrating to sediments associated with the RM 2.0–2.3 East Source Control Area via the Riverside Industrial Park storm drain system.

Ecology will determine the status of cleanup at the facility and determine whether to pursue additional investigation and cleanup under administrative order. Available information indicates that additional groundwater monitoring is needed.

3.3.3 Shultz Distributing

The Shultz Distributing property is upland on the east side of the LDW at approximately RM 2.3. The property is bordered on the north by South Brighton Street, north of which is the Seattle Distribution Center property, and on the south by South Willow Street, across from which is the Cascade Columbia Distribution property. East Marginal Way South bounds the property to the east, and Fox Avenue South bounds the property to the west. Railroad tracks run adjacent to the facility to the east and west. The Glacier Marine Services property is west of the Shultz Distributing facility, separating the Shultz Distributing facility from the LDW.

Facility Summary: Shultz Distributing	
Address	6851 East Marginal Way South
Property Owner	Emerson Enterprises LLC
Former Property Owners	Delbert M. and Veronica Emerson
Former/Alternative Property Names	Emerson GM Diesel
Former/Alternative Lessee/Operator Names	N/A
Tax Parcel No.	N/A
Parcel Size	0001800159
Former/Alternative Addresses	2.79 acres
NPDES Permit No.	SO3002346
EPA RCRA ID No.	WAD009492877 (inactive since 12/31/2003)
EPA TRI Facility ID No.	N/A
Ecology Facility/Site ID No.	95498891
Ecology UST Site ID No.	1391
Ecology LUST Release ID No.	N/A
Listed on CSCSL	No

The property was leased to Shultz Distributing in 1996. Shultz Distributing installed multiple ASTs on the property (Terra Vac and Floyd|Snider 2000). According to King County tax records, Emerson Enterprises LLC purchased the property from Delbert M. and Veronica Emerson on May 22, 1998. Four structures are on the property: a 27,800-square-foot industrial manufacturing building built in 1965, a 9,585-square-foot industrial manufacturing building built in 1940, a 19,092-square-foot industrial manufacturing building built in 1922, and a 3,750-square-foot industrial manufacturing building built in 1974 (King County 2007a).

Available information from Ecology, EPA, and King County online databases and permits is summarized in the table below. This site information and further details are described in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008).

Relevant current site use, past site use, environmental investigation, cleanup action, and facility inspection information is summarized in the sections below to provide background for potential contaminant sources and source control actions identified for the Shultz Distributing facility.

3.3.3.1 Current Site Use

Shultz Distributing is a bulk oil storage and distributing company. The most current available facility layout is illustrated in Figure 12, and a portion of the facility can be seen in Figure 6- an aerial photo of the Slip 3 inlet area taken in July 2006. Petroleum products, solvents, and antifreeze are delivered to the facility by truck and railcar and are either transferred to storage tanks or stored in the warehouse facility in 55-gallon drums. There are 26 ASTs with a total storage capacity of 250,900 gallons; 21 tanks are in the recessed tank farm on the south side of the property and five are in the northwest corner of the property. The tanks range from 6,000 to 11,900 gallons and most contain lube oil; one tank contains diesel. Tank locations are illustrated in Figure 13 (ERM 2001).

Shultz Distributing's 2001 SWPPP identifies potential sources of pollution at the facility and the BMPs employed to control them. Potential sources of pollution include hazardous and non-hazardous materials storage, loading/unloading operations, equipment failure, and spills. BMPs employed at the Shultz Distributing facility include inspections, training, record keeping and reporting, housekeeping, preventive maintenance, spill prevention and response, runoff management, and sediment and erosion prevention (ERM 2001).

Storm Drain System

Stormwater is collected in catch basins at various locations throughout the facility (Figures 12 and 13) (ERM 2001). Figure 3 indicates that the Shultz Distributing storm drain system connects to the city's storm drain system and discharges to the LDW via the South Brighton Street CSO/SD. SPU inspectors confirmed that most stormwater from the property is discharged to the LDW via the South Brighton Street CSO/SD. However, stormwater from the tank area, rail tank car area, and loading dock area discharges to the impound basin, from which stormwater can discharge to either the city storm drain system or the sanitary sewer system. In August 2006, the impound basin was pumped and the material was disposed of by an outside company. A locked valve was in place and could be used to discharge the stormwater in the impound basin to an oil/water separator, from which stormwater could discharge to the city storm drain system. Conversely, a sump pump in the oil/water separator could be used to pump stormwater to the sanitary sewer system (Ecology 2006a and SPU 2007a). In August 2006, SPU told Shultz Distributing to remove the pump from the oil/water separator because it had no use and was not allowing proper settling; reportedly the pump had been used to discharge vehicle wash water to the sanitary sewer system in the past, but vehicles were no longer washed at the property. According to Ecology and SPU, with proper settling occurring in the oil/water separator, the stormwater could be discharged to the city storm drain system (Ecology 2006a and SPU 2006b). The review of files did not find any confirmation that the pump was removed from the oil/water separator or that stormwater now discharges to the city storm drain system.

3.3.3.2 Past Site Use

The Shultz Distributing property was developed in the 1920s for the Gypsum Products Corporation. From the late 1930s until the 1960s, Federal Pipe manufactured wood pipes and tanks on the property. Operations included a dip tank, drying kilns, and warehouse space. In 1964, a group of individuals, including members of the Emerson family, purchased the property. Emerson GM Diesel leased the property in the 1960s and maintained and repaired diesel motors and trucks on the property. Pacific Detroit Diesel occupied the property between 1989 and 1997 (Terra Vac and Floyd|Snider 2000).

3.3.3.3 Environmental Investigations and Cleanup Activities

The following investigations have been conducted at the Shultz Distributing facility:

- Environmental Consultation, conducted in 1999 by AGI Technologies (AGI 1999)
- Monitoring Well Installation and Sampling, conducted in 1999 by AGI Technologies (AGI 2000)
- Storm Drain System Investigation, conducted in 2001 by Shultz Distributing (described in ERM 2001)

These investigations are described in detail in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008); the report includes analytical results for soil and groundwater at the facility and figures showing sample locations.

In November 1999, AGI Technologies (AGI) provided environmental consultation to Shultz Distributing regarding an accusation by the owners of the adjacent Cascade Columbia Distribution (formerly Great Western Chemical Company) property that the Shultz Distributing property was the source of a chlorinated solvent plume discovered on Cascade Columbia Distribution's property. The *Northwest Corner Investigation,* conducted at the Cascade Columbia Distribution property in 1999 and discussed in Section 3.3.4, confirmed the plume had migrated from the Shultz Distributing property. However, AGI reviewed available information on the two properties and concluded that Shultz Distributing was unlikely to be the source of the plume for the following reasons (AGI 1999):

1. No chlorinated solvents such as PCE or TCE had been stored or used on the Shultz Distributing property, and no evidence existed suggesting they had been released to the environment on the property.
2. The *Northwest Corner Investigation* report stated that the investigation was undertaken to investigate the source of chlorinated solvents detected in wells B-13 and B-22, which can be seen in Figure 14 on the west side of the Cascade Columbia Distribution property (labeled "Great Western Chemical Company Site" in Figure 14). A groundwater sample collected from well B-13 in 1990 contained 9,000 parts per billion (ppb) PCE. This result indicated that the "secondary source" was present in 1990, and therefore was not the result of a recent release. The contamination was not previously identified as a separate source in 1990 and not investigated as such until the *Northwest Corner Investigation* in 1999. Furthermore, the highest groundwater concentrations were at well B-13 and not in any of the wells closer to the Shultz Distributing property; thus, the data indicated that the chlorinated solvent plume did not originate from the Shultz Distributing property.
3. AGI developed a groundwater elevation contour map using data from the *Northwest Corner Investigation* report and determined a westerly groundwater flow direction, which suggested that the contamination identified in the investigation was from a source west of well B-13.

AGI's review indicated that groundwater contamination from the Cascade Columbia Distribution property could have contaminated the Shultz Distributing property. However, no evidence was provided to indicate that the chlorinated solvents plume could have originated from a source on the Shultz Distributing property. AGI recommended installing monitoring wells and collecting groundwater samples on the property to determine the extent of groundwater contamination (AGI 1999).

In December 1999, AGI installed three monitoring wells to investigate groundwater contamination at the Shultz Distributing property and to support AGI's conclusion that the Shultz Distributing property could not have been the source of the chlorinated solvent plume discovered on the adjacent Cascade Columbia Distribution property. Monitoring wells MW-1 through MW-3 were installed at locations shown in Figure 14. One soil sample collected above the water table from each soil boring, and groundwater samples collected from each well, were analyzed for halogenated VOCs including trans-1,2-dichloroethene (trans-1,2-DCE), 1,1-dichloroethane (1,1-DCA), cis-1,2-DCE, 1,1,1-trichloroethane (1,1,1-TCA), TCE, and PCE (AGI 2000).

In all three borings, groundwater was encountered at approximately 10 feet bgs; the groundwater flow direction was to the southwest (Figure 15). Contaminants were not detected above MTCA Method A cleanup levels in any of the soil samples. However, all three groundwater samples contained chlorinated solvents, primarily PCE and TCE. The MTCA Method A cleanup level for PCE was exceeded in all three groundwater samples. Based on sample results, AGI concluded that groundwater contamination beneath the Shultz Distributing property was part of the chlorinated solvent plume emanating from the adjacent Cascade Columbia Distribution property. AGI determined that both the absence of chlorinated solvents in soil above the water table and the relatively low concentrations in groundwater at the Shultz Distributing property indicated that Shultz Distributing was not the source of the chlorinated solvents plume (AGI 2000).

According to the 2001 SWPPP for Shultz Distributing, a "September 2001 Site Investigation" was performed by Shultz Distributing, which involved a review of the city of Seattle Department of Engineering records on storm drain and/or sanitary sewer system connections at the facility, investigation of the piping in catch basins, and a dye tracer test. The dye tracer test was inconclusive because the city sewer and storm drain lines could not be accessed during the test. A request was made to the city of Seattle to confirm connections to the sanitary sewer and/or storm drain system (ERM 2001).

According to the 2001 SWPPP, stormwater that fell in the area of the tank farm was collected in the impound basin and routed through the oil/water separator system west of the tank farm. The oil/water separator system was believed to discharge to the sanitary sewer system. However, the point of discharge from the catch basin in the recessed truck unloading area in the north central portion of the site could not be determined. The discharge from the oil/water separator near the offices, however, had been confirmed to be connected to the sanitary sewer by review of the city of Seattle's Department of Engineering records (ERM 2001).

3.3.3.4 Facility Inspections

On January 27, 2006, SPU and King County performed a Joint Inspection. Follow-up inspections were conducted on March 31, July 5, and August 21 of 2006, and on January 4, 2007. A Stormwater Compliance Inspection performed by Ecology coincided with the follow-up Joint Inspection conducted on August 21. Several stormwater concerns were identified at the Shultz Distributing property, including accumulations of solids in catch basins, oil/water separators requiring cleaning, oil-stained soil, and so forth. During the July 5 inspection, SPU found that

Shultz Distributing had complied with the corrective actions outlined to address the stormwater concerns; however, SPU became concerned about the sump pump outside of the tank area, which apparently pumped to an oil/water separator and then to a catch basin that discharged to the sanitary system during low flows and the storm drain system during high flows (SPU 2006a).

The Joint and Stormwater Compliance Inspections performed on August 21 were to address the uncertainty of the facility's connection to the storm drain and/or sanitary sewer system. According to Ecology, all stormwater from the tank area, rail tank car area, and loading dock area entered a large concrete vault (labeled "impound basin" in Figures 12 and 13). A locked valve could be used to discharge the stormwater in the vault to an oil/water separator, which was no longer operational. A sump pump in the oil/water separator could be used to pump stormwater from the oil/water separator to a manhole near the street (Ecology 2006a).

SPU performed a dye test to determine whether stormwater from the facility discharged to the LDW. The dye test was performed at the connection between the sump pump and the manhole (MH) located in South Brighton Street (top of Figure 12). Dye was added to the oil/water separator, the sump pump was turned on, and dye was seen entering the manhole near the street. The dye was then observed in the street storm drain system, which ultimately discharges to the LDW through the South Brighton Street CSO/SD. Stormwater from areas other than the tank, rail, and loading dock areas also drain to the street storm drain system (Ecology 2006a).

A pump was observed in the manhole on the street, but it was no longer operational. The pump appeared to discharge to the sanitary sewer. Shultz Distributing stated that the pump was probably used to discharge vehicle wash water to the sanitary sewer, but vehicles were no longer washed at the property. Because the oil/water separator was no longer operational and the stormwater could be contaminated with oil & grease from the tank area, Ecology informed Shultz Distributing it was never to discharge stormwater from the vault to the street storm drain system with the oil/water separator in that condition. Shultz Distributing replied that it used a company to pump the contaminated stormwater out and dispose of it properly. King County told Shultz Distributing that it could obtain a permit from King County to discharge the vault stormwater to the sanitary sewer, but Shultz Distributing would need to repair the oil/water separator. Shultz Distributing opted to continue pumping and disposing of the vault stormwater (Ecology 2006a).

SPU directed Shultz Distributing to have the pump removed from the oil/water separator because it is not allowing proper settling and is thus negating the intended beneficial effects of the treatment system. SPU also asked that Shultz Distributing fix the pump by the yard entrance to allow confirmation of discharge to the sanitary sewer system (SPU 2006b). Ecology required that the valve not be opened to discharge stormwater from the vault to the manhole near the street (Ecology 2006a). During the January 4 follow-up inspection, SPU concluded that Shultz Distributing was in compliance. The pump by the yard entrance had been fixed and it was confirmed that when the pump turned on, water discharged to the sanitary system. When the pump was not on, water discharged to the storm drain system (SPU 2007a).

During the August 21 Stormwater Compliance Inspection, Ecology stated that no stormwater DMRs were submitted for 2005 or for the first quarter of 2006, and requested that Shultz Distributing submit the required DMRs as soon as possible (Ecology 2006a).

3.3.3.5 Potential Contaminant Sources

Chlorinated solvents contamination (PCE) was identified in groundwater at the southern portion of the property in the vicinity of the tank farm. This contamination has been concluded to be part of the chlorinated solvent plume emanating from the adjacent Cascade Columbia Distribution property. PCE was identified in Section 2.2.2 as a COC, with potential pathways to reach LDW sediments listed as stormwater and groundwater.

The following potential contaminant sources have been identified for Shultz Distributing:

Groundwater Contamination

Environmental investigations at the Shultz Distributing facility identified chlorinated-solvent-contaminated groundwater.

Concentrations of PCE above MTCA Method A cleanup levels were detected in groundwater collected from MW-1, MW-2, and MW-3 (locations shown in Figure 14) in December 1999. TCE was also detected in each well, but at concentrations below MTCA Method A cleanup levels. Based on sampling results and a review of existing information on Shultz Distributing and Cascade Columbia Distribution, AGI determined that this groundwater contamination was most likely part of the chlorinated solvent plume emanating from the adjacent Cascade Columbia Distribution property. However, only three monitoring wells were installed at the property, and groundwater direction appeared to flow toward, not away from, the Cascade Columbia Distribution property (Figure 15). Relatively high concentrations of PCE, TCE, and vinyl chloride (VC) were also found at the eastern end of the Shultz Distributing property in well B-1, as shown in Figure 14.

Since groundwater was encountered at the Shultz Distributing facility at approximately 10 feet bgs, flowing toward the southwest, groundwater contamination could discharge to the LDW via the groundwater pathway.

Shultz Distributing's storm drain system is shown in Figures 12 and 13. Figure 3 shows that the storm drain system connects to the city's storm drain system and discharges to the LDW via the South Brighton Street CSO/SD. Shultz Distributing's storm drain system appears to pass through the area of chlorinated solvent groundwater contamination near the tank farm (Figure 14). Therefore, groundwater contamination at the property could infiltrate the storm drain system and discharge to the LDW within RM 2.0–2.3 East via the stormwater pathway.

Stormwater

As indicated in Figure 3, stormwater discharges to the LDW from Shultz Distributing via the South Brighton Street CSO/SD. The Shultz Distributing facility's stormwater discharge is authorized under the Industrial Stormwater General Permit. Compliance with the SWPPP maintained by the facility will minimize the potential for contaminants to migrate to the LDW via stormwater. In addition, several inspections performed at the facility by SPU in 2006 addressed multiple stormwater concerns. However, a current SWPPP was not available for review, and whether the facility's discharge has been in compliance with permit benchmark values since 2005 has not been confirmed. Current facility operations could generate spills or solids that could migrate to the LDW via stormwater.

3.3.3.6 Source Control Actions

The following source control actions will be conducted for Shultz Distributing:

- SPU and Ecology will conduct a source control inspection at the facility, to include the following:
  - Confirm that the NPDES permit and SWPPP are up-to-date.
  - Confirm that the SWPPP includes a clear description of the facility storm drain system.
  - Investigate the facility's connection to the city storm drain and sanitary sewer systems.
  - Determine whether the storm drain lines shown in Figures 3 and 14 pass through the area of chlorinated solvent groundwater contamination near the tank farm, and discharge to the LDW via the South Brighton Street CSO/SD.
  - Confirm that the pump was removed from the oil/water separator, and that stormwater now discharges to the city storm drain system.
  - Ensure that the facility has remained in compliance. Stormwater concerns have been identified at the facility in the past.
  - Conduct in-line storm drain sampling to evaluate whether COCs are migrating to sediments associated with the RM 2.0–2.3 East Source Control Area via the Shultz Distributing storm drain system.
- Ecology will review AGI's results and conclusions and determine whether additional investigations should be conducted at the Shultz Distributing property.

3.3.4 Cascade Columbia Distribution

Cascade Columbia Distribution is located upland on the east side of the LDW between RM 2.3 and 2.4. The property is bordered on the east by an empty lot referred to as "Lot 11" (shown in Figure 2). East of Lot 11 is East Marginal Way South. South Willow Street borders the property to the north. North of South Willow Street is Shultz Distributing. The property is bounded on the west by Fox Avenue South. West of Fox Avenue South is the Bunge Foods property. Finally, the Cascade Columbia Distribution property is bordered on the south by the former South Frontenac Street and the "Whitehead Property," which historically was occupied by the Tyee Lumber Company.

According to King County tax records, Fox Avenue Building LLC purchased the Cascade Columbia Distribution property from Marian Properties LLC on May 8, 2003, after Great Western Chemical (GWC) Company filed for bankruptcy protection in 2001. The two structures on the property include a 38,650-square-foot distribution warehouse built in 1959 and a 4,000-square-foot distribution warehouse built in 1929 (King County 2007a).

Fox Avenue Building LLC purchased Lot 11 from GWC Properties LLC on February 18, 2005 (King County 2007a). Buildings on Lot 11 were demolished in 1969, and since that time the property has been used by a truck and heavy equipment recycler and for parking and container storage (Terra Vac and Floyd|Snider 2000).

According to Ecology's UST List, 20 USTs were removed and six USTs were closed in-place when the facility was in operation as GWC. UST removal dates are not listed (Ecology 2007e).

The Cascade Columbia Distribution property was entered into Ecology's CSCSL on October 11, 1990, and is listed as having confirmed groundwater and soil contamination. Contaminants in groundwater and soil are identified as halogenated organic compounds, petroleum products, non-halogenated solvents, and PAHs (Ecology 2007e).

Facility Summary: Cascade Columbia Distribution	
Address	6900 Fox Avenue South
Property Owner	Fox Avenue Building LLC
Former Property Owners	Marian Properties LLC GWC Properties LLC
Former/Alternative Property Names	Fox Avenue Building Great Western International (GWI) Great Western Chemical Company (GWC) Republic Steel Round-Seattle Chain Company Seattle Chain and Manufacturing Co.
Former/Alternative Lessee/Operator Names	Tyee Lumber Company Campbell Chain Company Western Salvage Company (Lot 11) Nelson Trucking (Lot 11)
Tax Parcel No.	N/A
Parcel Size	0001800087 0001800089 (Lot 11; no longer considered part of main property)
Former/Alternative Addresses	2.53 acres 1.19 acres (Lot 11)
NPDES Permit No.	N/A
EPA RCRA ID No.	WAD008957961
EPA TRI Facility ID No.	98108CSCDC69FXA (2005) 98108GRTWS6900F (1998 and 1999)
Ecology Facility/Site ID No.	2282
Ecology UST Site ID No.	3803
Ecology LUST Release ID No.	N/A
Listed on CSCSL	Yes

GWC entered into Agreed Order No. DE TC91-N203 with Ecology effective September 30, 1991 (Terra Vac and Floyd|Snider 2000). GWI agreed to conduct a RI/FS, and the resulting document, *Remedial Investigation and Preliminary Risk Assessment Report* (RI/PRA), was completed in 1993. In 2000, a document titled *Supplemental Remedial Investigation and Feasibility Study* (SRI/FS) (Terra Vac and Floyd|Snider 2000) was completed to document information gathered and work conducted at the site since the RI/PRA.

Ecology entered into a new Agreed Order with Fox Avenue Building LLC, the current owner of the facility, in January 2009. The new Agreed Order requires Fox Avenue Building LLC to implement an interim action, conduct a supplemental evaluation of remediation alternatives, prepare and submit a Supplemental Feasibility Study, and prepare and submit a draft Cleanup Action Plan (Ecology 2009a and 2009b). The new Agreed Order is discussed in further detail in Section 3.3.4.3.

Available information from Ecology, EPA, and King County online databases and permits is summarized in the table below. This site information and further details are described in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008).

Relevant current site use, past site use, environmental investigation, cleanup action, and facility inspection information is summarized in the sections below to provide background for potential contaminant sources and source control actions identified for the Cascade Columbia Distribution facility.

3.3.4.1 Current Site Use

A chemical distribution facility called Cascade Columbia Distribution currently occupies the property, which is owned and operated by Fox Avenue Building LLC (ERM 2003). The most current available facility map, which is from 2003, is included as Figure 16.

During the July 17, 2008 Dangerous Waste Compliance Inspection, Ecology observed that the chemical storage pad at the facility had been rebuilt with a secondary containment system throughout the liquid product storage, product repackaging, and product tanker delivery areas. All drains had shutoff valves to isolate one section of storage from another and prevent acids from mixing with caustics if a spill occurred. Ecology noted that the chemical storage pad was rebuilt with a secondary containment barrier below the concrete to ensure nothing would penetrate the ground (Jeffers 2008).

The inspection report noted that the facility has a water treatment system used to neutralize drum washing wastewater, stormwater collected within the secondary containment, and product tank spillage. The neutralization wastewater is contained in a below-ground vault that discharges to the sanitary sewer system. KCIWP is updating its discharge authorization for this wastewater discharge to the sanitary sewer; the facility has notified Ecology that the wastewater is being treated in accordance with the Permit-by-Rule in the Dangerous Waste Regulations WAC 173-303-802 (Jeffers 2008).

Storm Drain System

Figure 16 illustrates the most current site configuration. A storm drain system is not depicted and a description of the facility's current storm drain system was not found in the files reviewed. Figure 3 indicates that the facility's storm drain system connects to the city's storm drain system in the southwest corner of the property, and discharges to the LDW via the South Brighton Street CSO/SD. The onsite drainage system on the east side of the property ties into the sanitary sewer system on South Willow Street. According to Ecology and Floyd|Snider, all of the facility's stormwater is discharged to the sanitary sewer system, with the exception of a single catch basin located in the southwest corner of the property (Cargill 2009 and Floyd|Snider 2008).

3.3.4.2 Past Site Use

The Cascade Columbia Distribution property and the property labeled “Lot 11” in Figure 2 were first developed for industrial use in 1918 by the Seattle Chain and Manufacturing Company, which leased the property from King County from 1918 until purchasing the property in 1937. Seattle Chain and Manufacturing Company and its successor companies operated coke-fired and oil-fired furnaces and warehouses. Ownership of Seattle Chain and Manufacturing Company was transferred in the late 1940s and the company was renamed the Round-Seattle Chain Company. This company was purchased in 1954 by Republic Steel. Republic Steel sold the property to Marian Enterprises in 1956, though Republic Steel continued operations in a warehouse on the northern part of the facility via a lease-back agreement (Terra Vac and Floyd|Snider 2000).

GWI began leasing property from Marian Enterprises in 1956. Initially, GWI operations took place in portions of the former Seattle Chain and Manufacturing Company main building, and at a drumming dock located parallel to a road spur along the former South Frontenac Street (shown in Figure 2), which had originally served Seattle Chain and Manufacturing Company. GWI constructed a new warehouse and office building on the west end of the property in 1959. A sump in the drumming area was connected to a subsurface drain pipe that ran to the southern edge of the dock (Terra Vac and Floyd|Snider 2000).

Other lessees of the property during the 1950s and 1960s included Campbell Chain Company, which leased and used a warehouse in the northern part of the facility abutting South Willow Street, and Tyee Lumber Company, which leased parts of Lot 11 and the Seattle Chain and Manufacturing Company building for storage and product assembly (Terra Vac and Floyd|Snider 2000).

GWI completed major facility modifications in the 1960s and 1970s, including replacement of and upgrades to existing structures, installation of a concrete AST pad east of the warehouse/office, and replacement of the sump and drain system in the drumming area. In 1976, both the tank and the drumming facilities were expanded considerably, including the construction in the dock area of two concrete and metal sheds for drum storage. The dock area itself was also enlarged at that time, to the configuration that existed in 2000, which is shown in Figure 17 (Terra Vac and Floyd|Snider 2000).

In 1969, the former Seattle Chain and Manufacturing Company buildings present on Lot 11 were demolished, and Tyee Lumber Company’s operations terminated. The property was cleared and leased in the 1970s and early 1980s by Western Salvage Company, a truck and heavy equipment recycler. The property was subsequently leased to Nelson Trucking as a parking area, and in 2000 it was used for container storage (Terra Vac and Floyd|Snider 2000).

In 1989, GWI began renovations to the GWI facility. These renovations included decommissioning and closure of all USTs, reconditioning of ASTs, a partial demolition of the north warehouse, and a subsequent repaving of the north warehouse area for use as a truck loading and unloading area. In 1990, the main tank farm area USTs were removed (see Figure 17) (Terra Vac and Floyd|Snider 2000).

Materials Handled at the Facility

The GWI facility had been used since 1956 for storage, repackaging, and distribution of chemical and petroleum products. Until the late 1980s, GWI supplied chemicals and supplies to the laundry and dry cleaning industry. This aspect, as well as most of its petroleum product handling, was phased out by 1990 (Terra Vac and Floyd|Snider 2000).

Materials at GWI were received, handled, and shipped in drums, in bulk for storage tank transfer, and as packaged dry chemical products. Both rail and truck transport was used at the facility. GWI transferred and drummed products principally in the vicinity of the drum shed (see Figure 17). Pump lines from USTs and ASTs in the drumming area ran above and under the ground. GWI handled the following chemical classes and product types at the property: ketones (methyl ethyl ketone, methyl *iso*-butyl ketone, and acetone), monocyclic aromatic solvents (toluene and xylenes), alcohols and glycols (isopropyl alcohol, ethyl alcohol, methyl alcohol, ethylene glycol, and propylene glycol), mineral spirits/petroleum solvents (kerosene and Chevron solvents 325, 350-B, 410, and 450), chlorinated compounds [methylene chloride, PCE, pentachlorophenol (PCP), TCE, and 1,1,1-TCE], acids [nitric, sulfuric, and muriatic (hydrochloric) acids], dry products (phosphates, soda ash, titanium dioxide, borax, and boric acid), and miscellaneous (ferric and ammonium chloride etchants, phenols, hydrogen peroxide, and linseed oil) (Terra Vac and Floyd|Snider 2000).

GWI began handling PCP on the property in 1966. Product was stored in one of the 12,000-gallon tank compartments. For one to two years, PCP was blended with Stoddard solvents or mineral spirits in a small AST north and west of the drum shed. From 1969 until the late 1970s or early 1980s, GWI purchased mixed PCP in drums from outside vendors. Product was delivered to customers in vendor-packaged drums or transferred to a tanker truck and delivered in bulk (Terra Vac and Floyd|Snider 2000).

In 2000, GWI warehoused liquid and dry products, including vendor pre-packaged containers and GWI-packaged containers. Inventory included hazardous products and non-hazardous products, including food products. Products were stored according to hazard class, product type, and chemical compatibility. The facility packaged liquid chemical products into containers (drums or totes) from tanker trucks. Products transferred in this manner included sodium chlorate, sulfuric acid, hydrochloric acid, methyl iso-butyl ketone, ferric chloride, potassium carbonate, and caustic soda (Terra Vac and Floyd|Snider 2000).

Facility Underground and Aboveground Storage Tanks

GWI had historically used a variety of USTs and ASTs at the facility. Figure 17 identifies the sizes and locations of all known USTs in 2000 and the dates of their installation, decommissioning, and removal (where known). Most USTs and ASTs were used for a variety of products, depending on demand (Terra Vac and Floyd|Snider 2000).

The six original USTs at the facility, installed in 1956, were 10,000-gallon, single-compartment tanks, located beneath the drum shed along the former South Frontenac Street. These tanks, referred to as the “old” tank farm, were decommissioned in 1989. They remain in place beneath a concrete pad under the drum shed in the southeastern corner of the facility. In 1976, 10 double-compartment USTs, each with a 12,000-gallon capacity, were installed in the central part of the facility. These tanks, which formed the “main” tank farm, remained in use until they were decommissioned in 1989 and removed in fall 1990. A 1,000-gallon UST near the Fox Avenue South loading dock area was used for storing diesel fuel; it was decommissioned in-place in 1989. A 500-gallon heating oil UST, installed in the northwestern portion of the property during the early years of GWI’s operations, remained in use in 2000 (Terra Vac and Floyd|Snider 2000).

In 1959, GWI installed an AST in the southwestern corner of the loading dock area to store sulfuric acid. Two smaller 1,000-gallon aboveground "wing tanks" were also used historically on the loading dock; one contained PCE and the other stored methanol. Portable vertical ASTs called "tote bins" used for product storage were stored on pallets in the vicinity of the old tank farm. In 1976, GWI constructed a bermed AST acid storage area, with sumps, adjacent to the warehouse/office. Five ASTs were installed in this area by 1980. In the 1970s and 1980s, GWI used three blending and/or storage ASTs located near the main tank farm (Terra Vac and Floyd|Snider 2000).

3.3.4.3 Environmental Investigations and Cleanup Activities

Several environmental investigations and cleanup activities have been conducted at the Cascade Columbia Distribution property since 1989. Major investigations and cleanup activities are summarized in a timeline provided as Figure 18. Environmental investigations and cleanup activities are described in detail in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008); the report includes analytical results for soil and groundwater at the facility, and figures showing sample locations. A summary of site geology and hydrology is also provided, including descriptions of the silt horizons and water bearing zones, which is necessary for understanding contaminant migration at the site.

Environmental investigations conducted at the property have identified several contaminants in soil and groundwater at the Cascade Columbia Distribution property and at locations to the south and west. This contamination is attributed to GWI's handling and storage of materials at the site, prior to the Fox Avenue Building LLC ownership. The primary contaminants found in soil and groundwater are chlorinated solvents (PCE and TCE), their associated degradation products (1,2-DCE and VC), PCP, and petroleum hydrocarbons (ERM 2003).

Soil contamination was discovered in the main tank farm area of the facility from 1989 to 1990 during GWI facility renovations and the removal of USTs from the main tank farm area (see Figure 17). Subsequent soil and groundwater borings encountered contamination near the loading dock UST and the USTs under the drum shed, as well as at other locations around the facility. Additional investigations were undertaken to determine the nature and extent of contamination at the GWI property; adjacent and nearby properties have also been investigated to determine the nature and extent of contamination beyond the GWI property. Several interim remedial measures have been conducted at and around the Cascade Columbia Distribution property since 1989. Figure 17 illustrates where interim remedial measures have been performed, and Figure 19 depicts locations of soil sampling, a groundwater monitoring well, and soil vapor sampling.

Following the initial UST removal in 1990, Hart Crowser conducted multiple investigations at the GWI facility and surrounding area to establish the nature and extent of contamination. GWI retained Terra Vac in 1997 to conduct interim remedial measures, evaluate remedial alternatives, and assist GWI in selecting a preferred alternative for site cleanup. Terra Vac continued the annual groundwater, surface water, and mussel tissue monitoring program initiated by Hart Crowser and initiated additional discreet investigations to fill critical data gaps concerning the nature and extent of contamination and evaluate remedial alternatives (Terra Vac and Floyd|Snider 2000).

Environmental Resources Management, Inc., (ERM) performed *in situ* chemical oxidation and soil vapor extraction (SVE) system pilot studies from 2003 through 2004 for groundwater remediation of chlorinated solvents (ERM 2003 and 2004). An expanded SVE pilot study was designed in May 2005. The study examined whether or not a combination of an SVE and a large-scale permanganate injection program was a feasible cleanup method for the site (ERM 2005).

In December 2007, ERM, on behalf of Fox Avenue Building LLC, submitted to Ecology the *Draft Fox Avenue Expanded Pilot Study Phase III Memorandum*. Ecology reviewed the memorandum and accepted it as concluding the expanded SVE pilot study in a letter dated January 30, 2008. In the letter, Ecology agreed that the three year long pilot test demonstrated that the in situ chemical oxidation technology was not likely to be effective in permanently reducing to the maximum extent practicable the solvent concentration and would not be selected as the permanent cleanup alternative for the site (Ecology 2009b).

In March 2008, Ecology and Fox Avenue Building LLC, with its environmental consultant Floyd|Snider, met and discussed how to proceed at the Fox Avenue Building Site. Ecology agreed that Fox Avenue Building LLC would proceed with a groundwater Enhanced Reductive Dechlorination (ERD) interim action and would conduct additional evaluation of source controls in a Supplemental Feasibility Study (Ecology 2009b).

In January 2009, Ecology entered into a new Agreed Order with Fox Avenue Building LLC, as mentioned previously. The new Agreed Order requires Fox Avenue Building LLC to perform the following actions, as outlined on Ecology’s website (Ecology 2009a):

1. Conduct an interim cleanup action (ERD) to address contamination reaching the LDW.
2. Do a source area silts data gap investigation.
3. Collect vapor samples to find whether PCE vapors from the subsurface are reaching the office portion of the facility at concentrations of concern.
4. Evaluate restarting the existing SVE system if a vapor pathway into the facility warehouse still exists.
5. Prepare a Supplemental Feasibility Study to evaluate cleanup action alternatives for the Site and enable Ecology to select a cleanup action that will attain cleanup levels under state law within a reasonable restoration time frame.
6. Prepare a draft Cleanup Action Plan for Ecology approval that details the proposed cleanup actions to address the contamination at the Site.

3.3.4.4 Facility Inspections

On April 11, 2001, Ecology performed a Dangerous Waste Compliance Inspection at the Cascade Columbia Distribution facility, which at the time was in operation as GWC. Ecology noted that 108 55-gallon drums of Dangerous Waste (soil borings and water samples from monitoring wells) from the facility’s MTCA cleanup were being stored on-site, apparently from as far back as 1992. Ecology’s Area of Contamination policy allows for storage of contaminated soil and debris on-site without triggering Dangerous Waste regulations as long as the wastes are stored within the Area of Contamination (the portion of the site that contains continuous contamination). No major concerns were identified (Ecology 2001).

On July 17, 2008, Ecology performed a Dangerous Waste Compliance Inspection at the Cascade Columbia Distribution facility. Ecology noted that two pallets of hazardous materials/waste were located outside of the concrete secondary containment system. Ecology directed the facility to keep liquid dangerous wastes within secondary containment. Additionally, Ecology directed the facility to keep bungs in drums and caps on containers when dispensing or filling is not in process, to prevent accidental spills and exposure to harmful and flammable vapors. No major concerns were identified (Ecology 2008b).

EPA sent 107(a) (General Notice) and 104(e) (Request for Information) letters to “Great Western Chemical Company” on July 17, 2008 (EPA 2008m).

3.3.4.5 Potential Contaminant Sources

Extensive contamination (primarily chlorinated solvents) was identified in soil and groundwater across the site, as described below. COCs identified in Section 2.2.2 as a result of this contamination include chlorinated solvents (PCE, TCE, VC, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, 1,1,1-TCA, and 1,2-DCA); petroleum hydrocarbons (TPH, benzene, toluene, and ethylbenzene); PCP; chlorinated dioxins and furans; methylene chloride; and 1,4-dichlorobenzene (1,4-DCB). Potential pathways for these COCs to reach LDW sediments are listed as stormwater (discharging within RM 2.0–2.3 East or RM 2.3-2.8 East) and groundwater (discharging within RM 2.3-2.8 East).

The following potential contaminant sources have been identified for Cascade Columbia Distribution:

Soil and Groundwater Contamination

Chlorinated solvents contamination appears to have originated in the area of the former main USTs and the location of the drum shed, old tank farm, and associated underground piping near South Frontenac Street, illustrated as the “original source area” in Figure 20. Historical releases at the facility appear to have contributed to a secondary source area beneath the facility in the vicinity of MW B-12 (Figure 20). Solvent leaks from the original source area on the property appear to have resulted in “streamers” of residual dense non-aqueous phase liquid (DNAPL) sinking through the 1st water bearing zone (WBZ) and encountering the 1st silt horizon (SH). The product slowly saturated parts of the silt horizon, especially in the topographic depression in the SH near MW B-12 (Terra Vac and Floyd|Snider 2000).

More recently, a second plume of chlorinated solvents was identified at the site, referred to as the “NW Corner Plume” because it is in the northwest corner of the GWI facility. Existing data indicate the plume is limited to the 1st WBZ. Its source area appears to be near or upgradient of MW B-54. The source itself is unknown; however, it appears to be unrelated to the plume originating around MW B-12 (Terra Vac and Floyd|Snider 2000).

Figures 21 and 22 show the migration and degradation of PCE in groundwater at the site in the 1st and 2nd WBZs. These figures are taken from *Fox Avenue Pilot Study* (ERM 2003), and are more recent than the concentration maps provided in *SRI/FS*. Concentration maps from both *Fox Avenue Pilot Study* and the SRI/FS are provided in *RM 2.0–2.3 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2008) for PCE, TCE, 1,2-DCE, and VC, in the 1st and 2nd WBZs. In general, the TCE, 1,2-DCE and VC plumes follow a pattern similar to the PCE plume pattern.

Methylene chloride is found associated with the chlorinated solvents. This association is probably due to similar historical handling and storage practices on-site and to methylene chloride’s chemical properties and behavior in the environment. It is not a parent or a product of PCE degradation, but it is co-located with the plume of PCE and its degradation products (Terra Vac and Floyd|Snider 2000).

Petroleum hydrocarbon contamination appears to have originated in the old tank farm area. Gasoline, diesel, and a variety of petroleum solvents were stored in the USTs in this area at various times prior to their decommissioning. Additionally, a small leaking heating oil tank was located near B-10A. All the USTs in the former tank farm areas have been removed or decommissioned. Based on product usage, the most likely petroleum products released would have been heating oil (a light-end petroleum product similar to kerosene) and various petroleum solvents. In addition to the petroleum products, toluene and xylenes were handled at the GWI facility and stored in various USTs. Consequently, they may be present in soil and/or groundwater either because they were stored and handled as products themselves or because of their presence in light-end petroleum products. Petroleum contamination of groundwater at the GWI facility follows a pattern similar to that seen for chlorinated solvents (Terra Vac and Floyd|Snider 2000).

Two original source areas were identified for PCP. The first is in the south central portion of the GWI facility adjacent to the South Frontenac Street right-of-way. The source includes the PCP storage and handling areas at GWI and the adjacent swale along South Frontenac Street. PCP handling at the GWI facility began in approximately 1966 and ended in the early 1980s. The second PCP source area is outside of the GWI site and was identified during installation of the groundwater wells B-38 and B-39. This second area is near the dip tank that was present at the former Tyee Lumber facility adjacent to South Myrtle Street (Figure 2). The area includes the previous location of a wood-treating dip-tank in which lumber was "dipped" into the PCP/mineral spirits treating solution to preserve the wood. Additionally, the area included a UST for stored PCP that was removed from the former Tyee Lumber facility in 1986 (Terra Vac and Floyd|Snider 2000).

Three soil samples collected from within the PCP original source areas were analyzed for dioxins and furans, by-products of PCP manufacturing. PCP was detected above the MTCA Method B screening level in one of the soil samples (Terra Vac and Floyd|Snider 2000). However, according to Floyd|Snider, PCP and dioxins and furans have only been detected in subsurface soil beneath paved areas, and there is no known pathway for these contaminants to reach the LDW (Floyd|Snider 2008).

The source for DCBs at the facility is unknown, but likely was associated with the location of the drum shed and associated underground piping near South Frontenac Street. 1,4-DCB exceeded the MTCA Method B screening level in groundwater at MW B-42; it is assumed that the area near MW B-42 represents a residual source of 1,4-DCB to groundwater (Terra Vac and Floyd|Snider 2000).

In 1959, during the construction of a new warehouse and office building on the west end of the property, GWI connected a sump in the drumming area to a subsurface drain pipe that ran to the southern edge of the dock. According to the 2000 *SRI/FS*, during facility modifications that were made in the 1960s and 1970s, the sump and drain system in the drumming area was replaced (Terra Vac and Floyd|Snider 2000). However, the historical location of the sump and drain system was not identified, and details pertaining to the replacement of this system were not provided in the files reviewed. According to Floyd|Snider, since the drumming area was located near the old warehouse, and the old warehouse was completely rebuilt, it is likely that the sump and drain system were abandoned during reconstruction. In addition, extensive exploration in the old warehouse did not reveal any contamination; therefore, it is unlikley that the historical sump and drain system serves as a conduit for contamination to reach LDW sediments. Floyd|Snider added that in general, the potential for buried utilities to act as conduits or preferential pathways for groundwater or soil vapor is not likely, based on elevation data, tests and inspections (Floyd|Snider 2008).

Groundwater contamination at the Cascade Columbia Distribution facility has been determined to reach LDW sediments in the vicinity of the Myrtle Street Embayment (shown in Figure 2). The Myrtle Street Embayment is within the RM 2.3-2.8 East Source Control Area, so the groundwater pathway and relevant source control actions are summarized in that area's SCAP.

According to Floyd|Snider, under the new Agreed Order, the Supplemental Feasibility Study will examine the degree to which the technologies to be evaluated can reduce all of the site contaminants of concern (Floyd|Snider 2008).

Stormwater

According to Ecology and Floyd|Snider, all of the facility's stormwater is discharged to the sanitary sewer system, with the exception of the single catch basin (depicted in Figure 3) located in the southwest corner of the property; therefore, stormwater is not a likely pathway for contamination to reach the LDW within RM 2.0–2.3 East.

3.3.4.6 Source Control Actions

The following source control actions will be conducted for Cascade Columbia Distribution. Since it has been determined that groundwater reaches LDW sediments in the vicinity of the Myrtle Street Embayment south of the RM 2.0–2.3 East Source Control Area, source control actions pertaining to the groundwater pathway are identified in that source control area's SCAP.

- Ecology will review the PRP response to the 104(e) letter sent to "Great Western Chemical Company" on July 17, 2008, and evaluate whether further site investigation is necessary.
- Ecology will coordinate any source control to be implemented at Cascade Columbia Distribution with the work that is to be conducted under the new 2009 Agreed Order.
- Ecology will verify that the source of the "NW Corner Plume" will be investigated under the new Agreed Order. The source of the plume was unknown in 2000, but appeared to be near or upgradient of MW B-54.

3.4 Atmospheric Deposition

Atmospheric deposition occurs when air pollution deposits enter the LDW directly or through stormwater. Such deposits can become a possible source of contamination to sediments associated with the RM 2.0–2.3 East Source Control Area. Air pollution is generated from air emissions that can be either from a point source or widely dispersed. Examples of point source emissions include paint overspray, sand-blasting, industrial smokestacks, and fugitive dust and particulates from loading/unloading of raw materials (sand, gravel, and concrete). Examples of widely dispersed emissions include vehicle emissions and aircraft exhaust.

None of the properties within the RM 2.0–2.3 East Source Control Area have current operations with known point source emissions of air pollution that may contribute contaminants to sediments adjacent to the RM 2.0–2.3 East Source Control Area. Air traffic at KCIA may result in significant emissions, but this pertains to the entire airfield operations and lies outside the scope of this report.

WSDOH hired a consultant to model air emissions from multiple sources in south Seattle. The objective of the multiple-source air modeling project in the Duwamish valley was to identify air pollutants, key air pollution sources affecting residential areas of south Seattle, and the geographic areas of south Seattle that are affected by air pollutants. This effort is an initial step to identify priorities for future work in the area. A report was published by WSDOH in 2008, summarizing key findings of the modeling effort and recommending future actions (WSDOH 2008). A study on atmospheric deposition planned by the Puget Sound Partnership has not been funded yet and no schedule has been developed. Ecology will continue to monitor these efforts (Cargill 2008).

Out of concern for phthalate recontamination at sediment cleanup sites in the larger Puget Sound region, the Sediment Phthalates Work Group was formed in 2006. To meet its goal of better understanding the sources of phthalates in sediments, the work group reviewed existing information about all possible pathways to sediments, including stormwater and atmospheric deposition. The group concluded that phthalates reach sediments via a complex pathway involving off-gassing to air followed by attachment to particulates, deposition to the ground, and transport to sediments through stormwater (Sediment Phthalates Work Group 2007).

King County conducted atmospheric deposition sampling in the LDW area to assess whether atmospheric deposition is a potential source of phthalates and selected PAHs and PCBs (King County 2008).

Analyte	Range of Air Deposition Flux (ug/m^2/day)	Location of Highest Values
Butyl benzyl phthalate	0.163 to 7.007	South Park
Bis(2-ethylhexyl)phthalate	0.261 to 12.240	Duwamish Valley
Benzo(a)pyrene	0.008 to 2.225	KCIA
Pyrene	0.035 to 4.652	KCIA
Aroclor 1254	<0.011 to 0.044	Georgetown
Aroclor 1260	<0.011 to 0.034	Georgetown

Based on comparison to results from other atmospheric deposition networks that employed high-volume air sampling techniques to collect gaseous and particulate phase air samples, the total deposition results from this study are likely to be biased low for the lighter phthalates, low- to mid-range PAH compounds, and low- to mid-range PCB congeners. Because side-by-side comparison sampling of the passive atmospheric deposition samplers with high-volume air samplers was not conducted, it is not possible to assess the degree of bias (King County 2008).

The sampling stations were located at Beacon Hill, Duwamish Valley, Georgetown, KCIA, and South Park Community Center. The following range of atmospheric deposition flux values was observed (King County 2008):

Detailed results are provided in King County's *Monitoring Report – October 2005 to April 2007* (King County 2008).

3.4.1 Source Control Actions

Atmospheric deposition should be further evaluated to assess this pathway as a potential source of phthalates (particularly BEHP) and other contaminants, such as PCBs, in stormwater discharge. However, at this time, there are no available resources to address this issue.

Because air pollution is a concern for the greater Puget Sound region, Ecology is planning to review work being conducted by and/or planned by WSDOH and the Puget Sound Partnership regarding atmospheric deposition. Based on their actions or recommendations, the LDW source control team will develop options for addressing air pollution.

3.5 General Source Control Actions

The following source control actions will be conducted for the RM 2.0–2.3 East Source Control Area in general, in addition to the source control actions identified specifically for the South Brighton Street CSO/SD, South River Street SD, and facilities of concern. The following source control actions will be completed:

- Ecology will review the PRP response to the 104(e) letter sent to “Bunge Foods Processing LLC” on July 17, 2008 (EPA 2008i), and evaluate whether the Bunge Foods facility should be investigated for potential sources of sediment recontamination. Bunge Foods is identified as a facility of concern in Table 1, and its location is depicted in Figure 2. No information pertaining to this facility was found within the scope of this report.
- Ecology will review the PRP response to the 104(e) letter sent to “Silver Bay Logging” on March 25, 2008 (EPA 2008f), and evaluate whether this facility should be investigated for potential sources of sediment recontamination. This facility is currently in operation as Muckleshoot Seafood Products. The Muckleshoot Seafood Products facility is identified as a facility of concern in Table 1, and its location is depicted in Figure 2. No information pertaining to this facility was found within the scope of this report.
- Ecology will review the PRP response to the 104(e) letter sent to “Rainier Petroleum Corporation” on July 17, 2008 (EPA 2008n), and evaluate whether the Rainier Petroleum facility should be investigated for potential sources of sediment recontamination. Rainier Petroleum is identified as a facility of concern in Table 1, and its location is depicted in Figure 2. No information pertaining to this facility was found within the scope of this report.
- Ecology will review the PRP response to the 104(e) letter sent to “Morton Marine Equipment, Inc.” on March 25, 2008 (EPA 2008b), and evaluate whether the Morton Marine Equipment facility should be investigated for potential sources of sediment recontamination. Morton Marine Equipment was identified as a possible source of sediment recontamination through the review of an informal summary of available information pertaining to the Glacier Marine Services facility. This informal summary of information was received by Ecology and reviewed late in the report-writing process; therefore, the Morton Marine Equipment facility could not be further evaluated for inclusion in this report. According to the informal summary of information, the Morton Marine Equipment facility was located on the northwest shore of Slip 3, and facility stormwater was discharged to the LDW through the South River Street SD, which discharges within RM 2.0–2.3 East (shown in Figure 3 and discussed in Section 3.1.2). The Morton Marine Equipment facility repaired steel and aluminum hulls and removed

and installed engines. Complaint files for MP&E included an oil spill complaint at Morton Marine Equipment. The location of the Morton Marine Equipment facility and its period of operation are not known.

- Ecology will evaluate whether the R.A. Barnes facility should be investigated for potential sources of sediment recontamination. R.A. Barnes was identified as a possible source of sediment recontamination through the review of an informal summary of available information pertaining to the Glacier Marine Services facility. This informal summary of information was received by Ecology and reviewed late in the report-writing process; therefore, the R.A Barnes facility could not be further evaluated for inclusion in this report. According to the informal summary of information, the R.A. Barnes facility discharged its stormwater to the LDW through the South River Street SD, which discharges within RM 2.0–2.3 East (shown in Figure 3 and discussed in Section 3.1.2). The informal summary of information stated that the R.A. Barnes facility supplied sandblasting materials ("Tuff-Kut") to shipyards and other industries. R.A. Barnes received at least three complaints of sandblast grit being spilled or washed into catch basins. "Tuff-Kut" is a copper slag grit with metals levels of 90-120 mg/kg arsenic, 3,200-7,000 mg/kg chromium, 4,400-5,000 mg/kg copper, 400-1,000 mg/kg lead, and 7,000-12,000 mg/kg zinc. The location of the R.A. Barnes facility and its period of operation are not known; the facility should be further investigated as a potential source of sediment recontamination.
- On the basis of Ecology's recommendation, once the Remedial Investigation report is finalized, Risk Based Threshold Concentrations (RBTCs) and Applicable or Relevant and Appropriate Requirements (ARARs) will be reviewed for any relevant impacts on the RM 2.0–2.3 East Source Control Area upland contaminant concentrations.

4.0 Monitoring

Monitoring efforts by SPU, Ecology, KCIWP, and Puget Sound Clean Air Agency will continue to assist in identifying and tracing ongoing sources of COCs present in LDW sediments or in upland media. This information will be used to focus source control efforts on specific problem areas within the RM 2.0–2.3 East Source Control Area and to track the progress of the source control program. The following types of samples will continue to be collected:

- in-line sediment trap samples from storm drain systems,
- on-site catch basin sediment samples, and
- soil and groundwater samples as necessary.

If monitoring data indicate that additional sources of sediment recontamination are present, then Ecology will identify additional source control activities as appropriate.

Because source control is an iterative process, monitoring is necessary to identify trends in concentrations of COCs. Monitoring is anticipated to continue for some years. Any decisions to discontinue monitoring will be made jointly by Ecology and EPA, based on the evidence. At this time, Ecology plans to review the progress and data associated with the source control actions for each SCAP annually, and this information will be updated in the Source Control Status Report, which is scheduled for publication twice a year. In addition, Ecology may prepare Technical Memoranda to update the SCAPs, as needed.

5.0 Tracking and Reporting of Source Control Activities

Ecology will lead tracking, documenting, and reporting the status of source control to EPA and the public. Each agency performing source control work will document its source control activities and provide regular updates to Ecology. Ecology will update information in the SCAPs in the Source Control Status Reports that are published twice a year.

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7.0 Tables

Table 1
Facilities of Concern Identification
RM 2.0-2.3 East Source Control Area

Facility Identified	Identification Source	Facility Address[1]	Facility/Site ID No.	Included/Excluded	Updates and Corrections Needed
Big John's Truck Repair	Ecology's files and Facility/Site Database	6533 3rd Ave. S, Seattle, WA, 98108	44383713	Included as Riverside Industrial Park.	
Evergreen Marine Leasing - Parcel E	Ecology's files and Facility/Site Database	7343 E Marginal Way S, Seattle, WA, 98108	2462	Excluded because located outside of RM 2.0-2.3 East, at approximately RM 2.9.	The map location shown in the Facility/Site Database appears to be incorrect. The facility was determined to be located on tax parcel 2924049043, owned by Emerald Services. Ecology's files for this facility were intermixed with files for Northland Services because Evergreen Marine Leasing is a former owner of the Northland Services property.
Fox Avenue Building	Ecology's files and Facility/Site Database	6900 Fox Ave. S, Seattle, WA, 98108	2282	Included as Cascade Columbia Distribution.	The map location shown in the Facility/Site Database appears to be incorrect. Cascade Columbia Distribution was determined to be located south of S Willow Street and east of Fox Avenue S, on tax parcel 0001800087.
Northland Services	Ecology's files and Facility/Site Database	6701 Fox Ave. S, Seattle, WA, 98108	22653378	Included as Glacier Marine Services.	
Shultz Distributing	Ecology's files and Facility/Site Database	6851 E Marginal Way S, Seattle, WA, 98108	95498891	Included.	The map location shown in the Facility/Site Database appears to be incorrect. Shultz Distributing was determined to be located between S Brighton Street and S Willow Street, with Fox Avenue S bordering the facility to the west and East Marginal Way S bordering the property to the east.
United Marine Shipbuilding	Ecology's files and Facility/Site Database	5055 E Marginal Way, Seattle, WA, 98108	1523145	Excluded because located outside of RM 2.0-2.3 East, between RM 0.6 and 0.9.	
V. Van Dyke	Ecology's files and Facility/Site Database	150 S River St., Seattle, WA, 98108	68427684	Included.	The map location shown in the Facility/Site Database appears to be incorrect. V. Van Dyke was determined to be located just east of Occidental Avenue S and north of S River Street, on tax parcel 5367202270.
Bunge Foods	Based on vicinity to LDW from figures and maps reviewed			Included as a data gap in Section 4.4 because no information pertaining to the site was found for review.	
Silver Bay Logging (now known as Muckleshoot Seafood Products)	Nov 2007 LDW RI Report			Included as a data gap in Section 4.4 because no information pertaining to the site was found for review.	
Rainier Petroleum Corporation	Nov 2007 LDW RI Report			Included as a data gap in Section 4.4 because no information pertaining to the site was found for review.	
Seattle Cold Storage Company	Nov 2007 LDW RI Report			Included as SCS Refrigerated Services.	
Seattle Distribution Center	Nov 2007 LDW RI Report			Included.	
Glacier Marine Services	Nov 2007 LDW RI Report			Included.	
Seatac Marine Services	Nov 2007 LDW RI Report			Included as Glacier Marine Services; also same facility as Northland Services.	
Remarkable Tire	Facility/Site Database	7115 East Marginal Way S, Seattle, WA, 98108	65141181	Excluded because actually located south of RM 2.0-2.3 East.	The map location shown in the Facility/Site Database appears to be incorrect. Remarkable Tire was determined to be located at approximately the intersection of S Myrtle Street and East Marginal Way S.
Vacuum Truck Services	Facility/Site Database	220 S River Street, Seattle, WA, 98108	37289288	Included as Riverside Industrial Park; also same facility as Big John's Truck Repair.	Vacuum Truck Services and Big John's Truck Repair appear to be the same facility, entered into the Facility/Site Database twice; the facility was formerly known as Vacuum Truck Services and appeared to be listed under the office building address rather than the shop building address, as Big John's Truck Repair was.

Table 1
Facilities of Concern Identification
RM 2.0-2.3 East Source Control Area

Facility Identified	Identification Source	Facility Address[1]	Facility/Site ID No.	Included/Excluded	Updates and Corrections Needed
WA DNR Corson Ave Site Hat Boots	Facility/Site Database	6800 East Marginal Way S, Seattle, WA 98108	61845527	Included as Hat n' Boots, but as a facility of concern located within the South Brighton Street CSO Basin.	The map location shown in the Facility/Site Database appears to be incorrect. Hat n' Boots was determined to actually be located within the South Brighton Street CSO Basin, at approximately the intersection of East Marginal Way S and Corson Ave. S.
South Brighton Street CSO Basin Facilities of Concern					
Arrow Transportation	Facility/Site Database	6737 Corson Ave. S, Seattle, WA, 98108	69693852	Included as former facility at South Seattle Community College Property.	
Ben's Truck Parts	Facility/Site Database	6655 Corson Ave. S, Seattle, WA, 98108	74169521	Included as former facility at South Seattle Community College Property.	Ben's Truck Parts appeared to be located on the same tax parcel as Arrow Transportation and Inland Transportation Company, which is now occupied by South Seattle Community College.
Inland Transportation Company	Facility/Site Database	6737 Corson S, Seattle, WA, 98108	2134	Included as former facility at South Seattle Community College Property.	Inland Transportation Company and Arrow Transportation appear to have the same address and to be located on the same tax parcel, which is now occupied by South Seattle Community College; whether they are the same facility or were just located on the same tax parcel is unknown.
Hat n' Boots Gas Station	Facility/Site Database	6800 East Marginal Way S, Seattle, WA 98108	61845527	Included as former facility at South Seattle Community College Property.	The map location shown in the Facility/Site Database appears to be incorrect. Hat n' Boots was determined to actually be located within the South Brighton Street CSO Basin, at approximately the intersection of East Marginal Way S and Corson Ave. S.

Notes:

1. Addresses were not provided in the November 2007 Lower Duwamish Waterway Phase 2 Remedial Investigation Draft Report (Windward 2007) for facilities that were listed as primary upland properties in the vicinity of the RM 2.0-2.3 East Source Control Area.

Table 2
CSO/EOF Discharges to the Lower Duwamish Waterway
RM 2.0-2.3 East Source Control Area

Outfall	Type (Owner)	Discharge Serial Number	Location	Average Overflow Frequency (events/year) 2000 to 2007	Annual average volume (mgy) 2000 to 2007
Diagonal Avenue S.[a]	CSO (SPU) SD (SPU)	NA	RM 0.5 E	20.1	15.8[b]
Hanford No. 1[c]	CSO (King County)	31	RM 0.5 E	9	18.75
Duwamish pump station East	CSO (King County)	35	RM 0.5 E	<1.0	0.51
Duwamish pump station West	CSO (King County)	34	RM 0.5 W	<1.0	0.6
S. Brandon Street	CSO (King County)	41	RM 1.1 E	23	31.63
Terminal 115	CSO (King County)	38	RM 1.9 W	3	3.52
S. Brighton Street	CSO (SPU) SD (SPU)	NA	RM 2.1 E	NA[g]	NA
King County Airport SD#3/PS44 EOF[d]	SD (King County) EOF (SPU)	NA	RM 2.8 E	NA	NA
E. Marginal Way S. pump station	EOF (King County)	43	RM 2.8 E	None recorded	NA
8th Avenue S.	CSO (King County)	40	RM 2.8 W	0	0
King County Airport SD#2/PS78 EOF[e]	SD (King County) EOF (SPU)	NA	RM 3.8 E	NA	NA
Michigan Street	CSO (King County)	39	RM 1.9 E	11	17.58
W. Michigan	CSO (King County)	42	RM 2.0 W	4	1.23
Norfolk	CSO (King County) SD (King County) EOF (SPU)[f]	44	RM 4.8 E	4	0.28

Notes:

a - The Diagonal Avenue S. SD outfall is shared by stormwater and seven separate overflow points, including the City's Diagonal CSOs and the County's Hanford No. 1 CSO. The overflow frequency and volume listed are for the Diagonal CSOs only.

b - This average volume does not include the contribution from King County's Hanford No. 1 CSO, but does include the remaining seven overflow points that discharge through the Diagonal Avenue S. CSO/SD.

c - Hanford No. 1 discharges to the LDW through the Diagonal Avenue S. SD.

d – SPU Pump Station 44 discharges via EOF No. 117 to King County Airport SD#3 at Slip 4.

e – SPU Pump Station 78 discharges via EOF No. 156 to King County Airport SD#2, near Boeing Isaacson.

f – SPU Pump Station 17 discharges to the Norfolk CSO/SD.

g – Has not overflowed since monitoring began in March 2000.

mgy – million gallons per year

NA – Not available

Table 3
Contaminants Above Screening Levels in Surface Sediment
RM 2.0-2.3 East Source Control Area

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
Metals and Trace Elements														
LDW-SS77	2.2	LDWRI-SurfaceSedimentRound2	3/14/2005	Arsenic	80.9	mg/kg dw		2.08		57	93	mg/kg dw	1.4	
PAHs														
DR112	2.1	EPA SI	8/19/1998	Fluoranthene	5.3	mg/kg dw		2.64	200	160	1200	mg/kg OC	1.3	
PCBs														
DR111	2.1	EPA SI	8/19/1998	PCBs (total calc'd)	0.311	mg/kg dw		2.26	13.8	12	65	mg/kg OC	1.2	
DR148	2.1	EPA SI	8/18/1998	PCBs (total calc'd)	279	ug/kg dw	J	4.51		130	1000	ug/kg dw	2.1	
B6b	2.2	LDWRI-Benthic	9/18/2004	PCBs (total calc'd)	0.42	mg/kg dw		2.96	14	12	65	mg/kg OC	1.2	
LDW-SS329	2	LDWRI-SurfaceSedimentRound3	10/2/2006	PCBs (total calc'd)	0.124	mg/kg dw		0.972	12.8	12	65	mg/kg OC	1.1	
Other SVOCs														
LDW-SS73	2.1	LDWRI-SurfaceSedimentRound2	3/7/2005	Benzyl alcohol	150	ug/kg dw		2.43		57	73	ug/kg dw	2.6	2.1

Key:

DW - Dry weight
CSL - Cleanup Screening Level
PAH - Polynuclear aromatic hydrocarbon
PCB - Polychlorinated biphenyl
OC - Organic carbon
TOC - Total organic carbon
SQS - Sediment Quality Standard
SVOC - Semivolatile organic compound

Notes:

1. SQS and CSL values are substituted with AET values for dry weight comparison where organic compounds are not OC-normalized (when TOC % DW is outside of the 0.5-4.0% range).
2. Exceedance factors are the ratio of the detected concentration to the CSL or SQS (or to AET values where applicable); exceedance factors are shown only if they are greater than 1.

Source:

Lower Duwamish Waterway Group, 2007. Online Lower Duwamish Waterway Group Draft Remedial Investigation Report (November 2007) Database. http://www.ldwg.org.

Table 4
Contaminants Above Screening Levels in Subsurface Sediment
RM 2.0-2.3 East Source Control Area

Sample Location Name	Sample River Mile Location	Sample Depth Interval (ft)	Sampling Event	Sampling Event Year	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS^1	CSL^1	SQS/CSL Units	SQS Exceedance Factor^2	CSL Exceedance Factor^2
Metals and Trace Elements															
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	Arsenic	150	mg/kg dw		2.25		57	93	mg/kg dw	2.6	1.6
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Arsenic	121	mg/kg dw		2.67		57	93	mg/kg dw	2.1	1.3
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Arsenic	2000	mg/kg dw		2.24		57	93	mg/kg dw	35	22
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Copper	2940	mg/kg dw		2.24		390	390	mg/kg dw	7.5	7.5
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Lead	3520	mg/kg dw	J	2.24		450	530	mg/kg dw	7.8	6.6
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Mercury	0.45	mg/kg dw	J	2.67		0.41	0.59	mg/kg dw	1.1	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Zinc	490	mg/kg dw		2.67		410	960	mg/kg dw	1.2	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Zinc	4720	mg/kg dw		2.24		410	960	mg/kg dw	12	4.9
PAHs															
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Acenaphthene	0.62	mg/kg dw		2.24	28	16	57	mg/kg OC	1.8	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(a)anthracene	3.1	mg/kg dw		2.67	120	110	270	mg/kg OC	1.1	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzo(a)anthracene	4.5	mg/kg dw		2.24	200	110	270	mg/kg OC	1.8	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(a)pyrene	5.3	mg/kg dw		2.67	200	99	210	mg/kg OC	2.0	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzo(a)pyrene	4	mg/kg dw		2.24	180	99	210	mg/kg OC	1.8	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzo(g,h,i)perylene	1	mg/kg dw		2.67	37	31	78	mg/kg OC	1.2	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzo(g,h,i)perylene	0.83	mg/kg dw		2.24	37	31	78	mg/kg OC	1.2	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Benzofluoranthenes (total-calc'd)	10.2	mg/kg dw		2.67	380	230	450	mg/kg OC	1.7	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Benzofluoranthenes (total-calc'd)	9.1	mg/kg dw		2.24	410	230	450	mg/kg OC	1.8	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Chrysene	4.8	mg/kg dw		2.67	180	110	460	mg/kg OC	1.6	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Chrysene	5	mg/kg dw		2.24	220	110	460	mg/kg OC	2.0	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Dibenzo(a,h)anthracene	0.36	mg/kg dw		2.67	13	12	33	mg/kg OC	1.1	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Dibenzofuran	0.57	mg/kg dw		2.24	25	15	58	mg/kg OC	1.7	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Fluoranthene	4.5	mg/kg dw		2.67	170	160	1200	mg/kg OC	1.1	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Fluoranthene	13	mg/kg dw		2.24	580	160	1200	mg/kg OC	3.6	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Fluorene	0.75	mg/kg dw		2.24	33	23	79	mg/kg OC	1.4	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Indeno(1,2,3-cd)pyrene	1.5	mg/kg dw		2.67	56	34	88	mg/kg OC	1.6	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Indeno(1,2,3-cd)pyrene	1.2	mg/kg dw		2.24	54	34	88	mg/kg OC	1.6	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Phenanthrene	7.5	mg/kg dw		2.24	330	100	480	mg/kg OC	3.3	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	40	mg/kg dw		2.67	1500	960	5300	mg/kg OC	1.6	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	47	mg/kg dw		2.24	2100	960	5300	mg/kg OC	2.2	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	Total LPAH (calc'd)	10.5	mg/kg dw	J	2.24	470	370	780	mg/kg OC	1.3	
PCBs															
LDW-SC37	2.1	0 to 1	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.45	mg/kg dw		2.25	20	12	65	mg/kg OC	1.7	
LDW-SC37	2.1	1 to 2	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.95	mg/kg dw	J	2.67	36	12	65	mg/kg OC	3.0	
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.55	mg/kg dw		2.24	25	12	65	mg/kg OC	2.1	
TPHs															
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	1,2,4-Trichlorobenzene	0.046	mg/kg dw		2.24	2.1	0.81	1.8	mg/kg OC	2.6	1.2
LDW-SC37	2.1	2 to 4	LDW Subsurface Sediment 2006	2006	1,2-Dichlorobenzene	0.15	mg/kg dw		2.24	6.7	2.3	2.3	mg/kg OC	2.9	2.9

Key:

DW - Dry weight	TOC - Total organic carbon
CSL - Cleanup Screening Level	TPH - Total petroleum hydrocarbon
PAH - Polynuclear aromatic hydrocarbon	SQS - Sediment Quality Standard
PCB - Polychlorinated biphenyl	SVOC - Semivolatile organic compound
OC - Organic carbon	

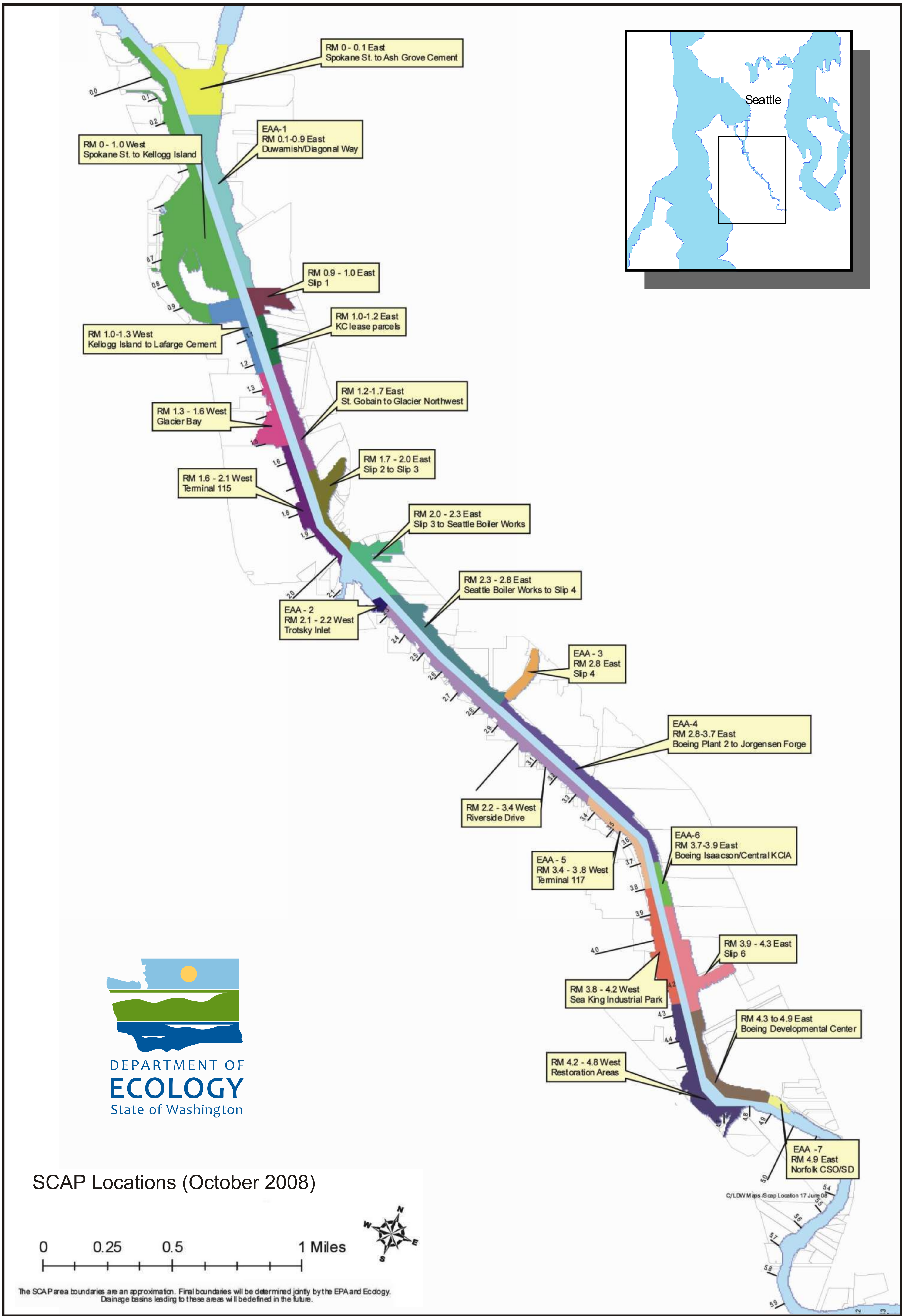
Notes:

1. SQS and CSL values are substituted with AET values for dry weight comparison where organic compounds are not OC-normalized (when TOC % DW is outside of the 0.5-4.0% range).
2. Exceedance factors are the ratio of the detected concentration to the CSL or SQS (or to AET values where applicable); exceedance factors are shown only if they are greater than 1.

Source:

Lower Duwamish Waterway Group, 2007. Online Lower Duwamish Waterway Group Draft Remedial Investigation Report (November 2007) Database. http://www.ldwg.org.

8.0 Figures



SCAP Locations (October 2008)

The SCAP area boundaries are an approximation. Final boundaries will be determined jointly by the EPA and Ecology. Drainage basins leading to these areas will be defined in the future.

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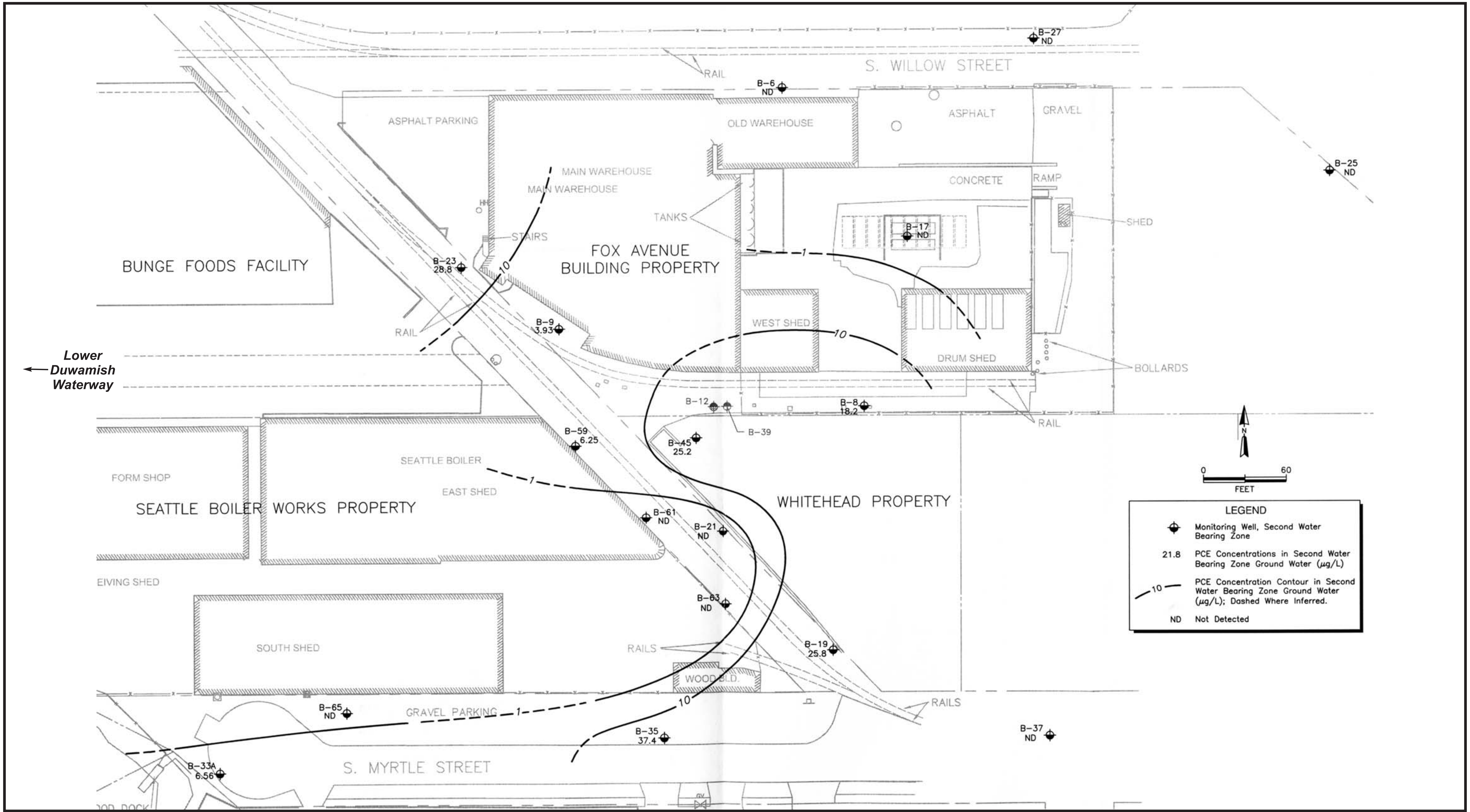
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Tukwila, Washington

Figure 1

SOURCE CONTROL AREAS

Base Map Reference: Department of Ecology, 2008.

Date:	Drawn by:	
3/16/09	AES	10:002330WD1403\fig 1



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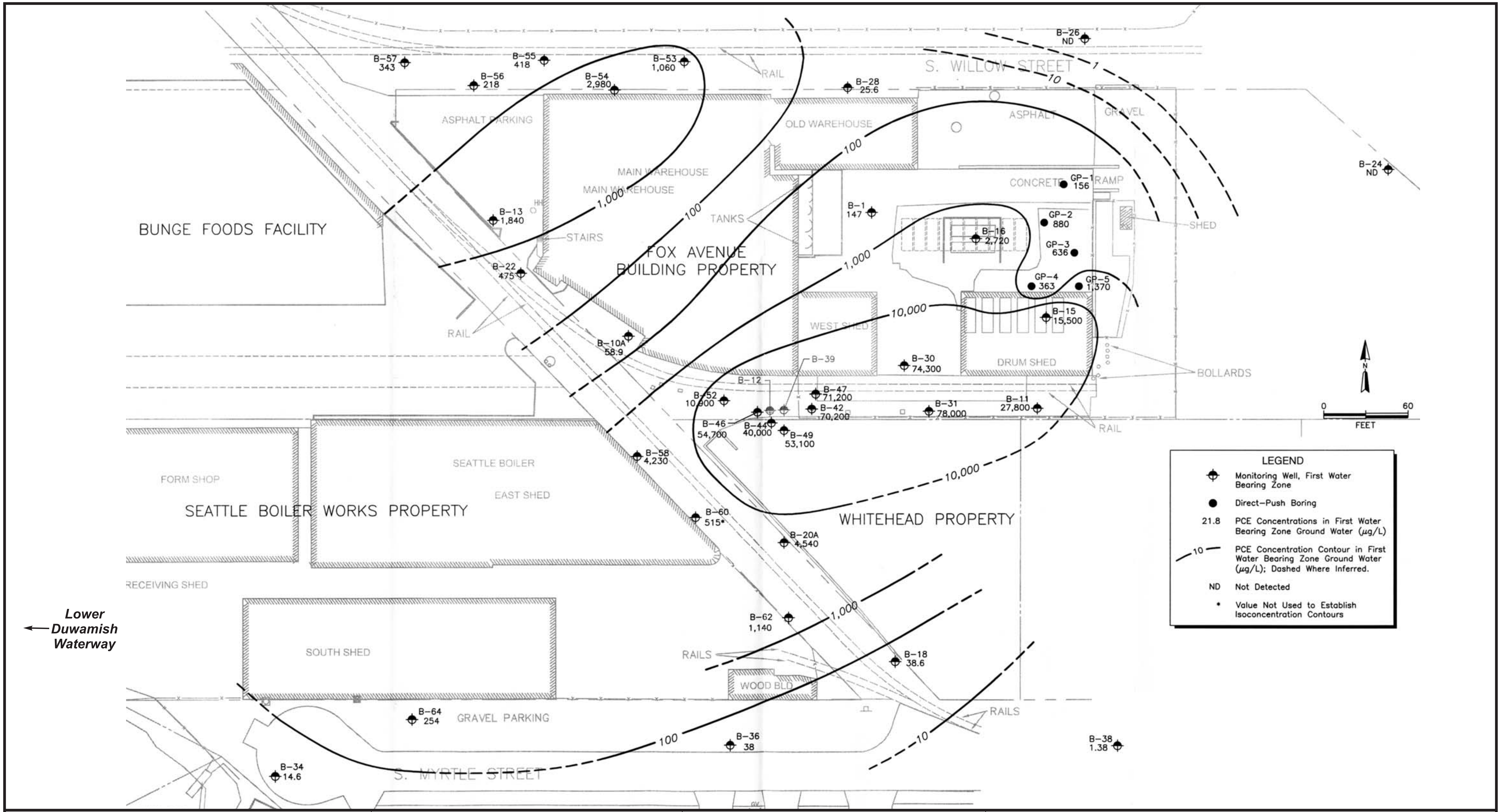
Base Map Reference:
Environmental Resources Management (ERM), 2003.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 22
PCE IN 2nd WBZ GROUNDWATER (FOX AVENUE PILOT STUDY) -
CASCADE COLUMBIA DISTRIBUTION

Date:	Drawn by:	
3/16/09	AES	10:002330WD1403\fig22



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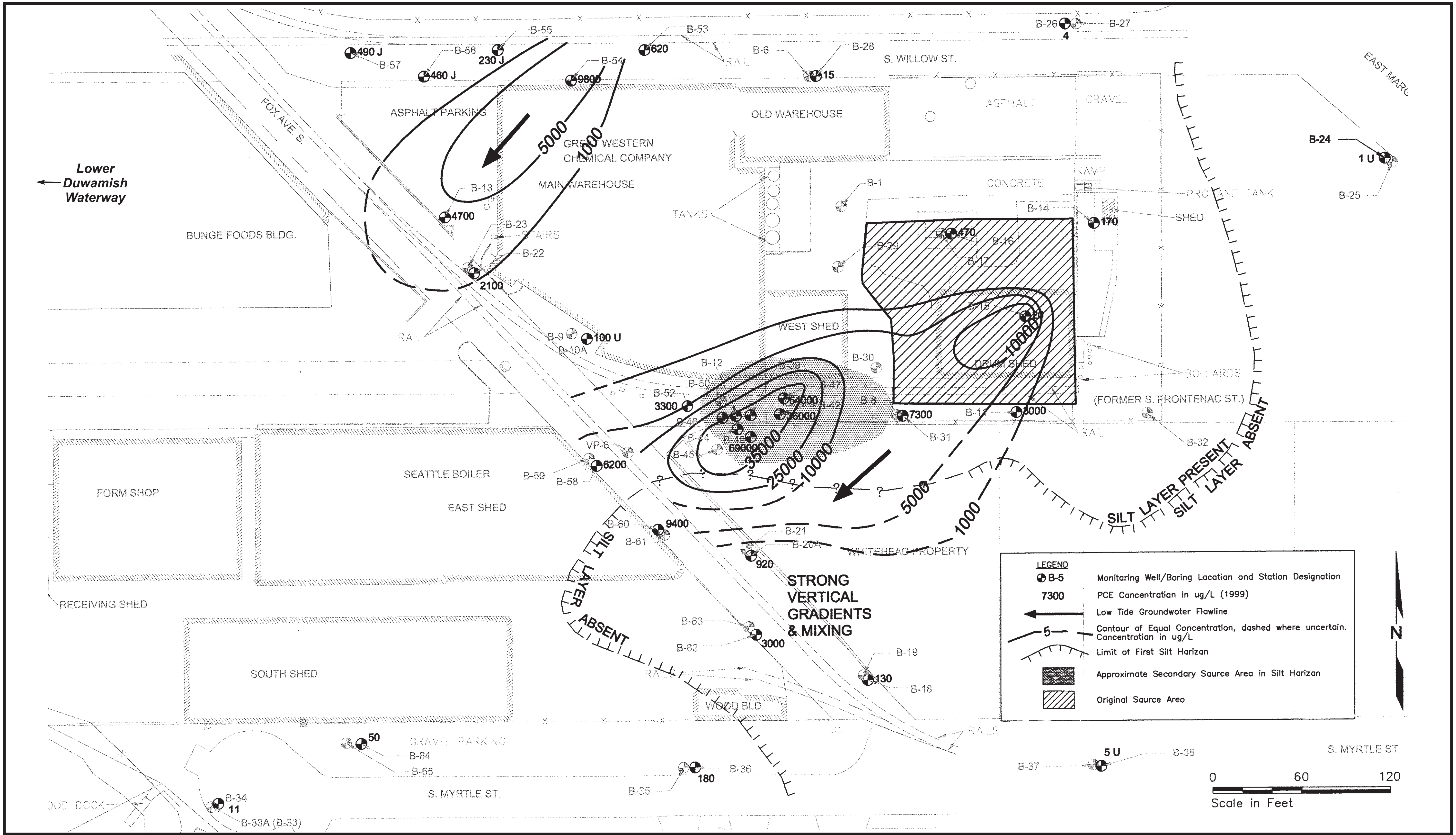
Base Map Reference:
Environmental Resources Management (ERM), 2003.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 21
PCE IN 1st WBZ GROUNDWATER (FOX AVENUE PILOT STUDY) -
CASCADE COLUMBIA DISTRIBUTION

Date:	Drawn by:	
3/16/09	AES	10:002330WD1403\Fig21



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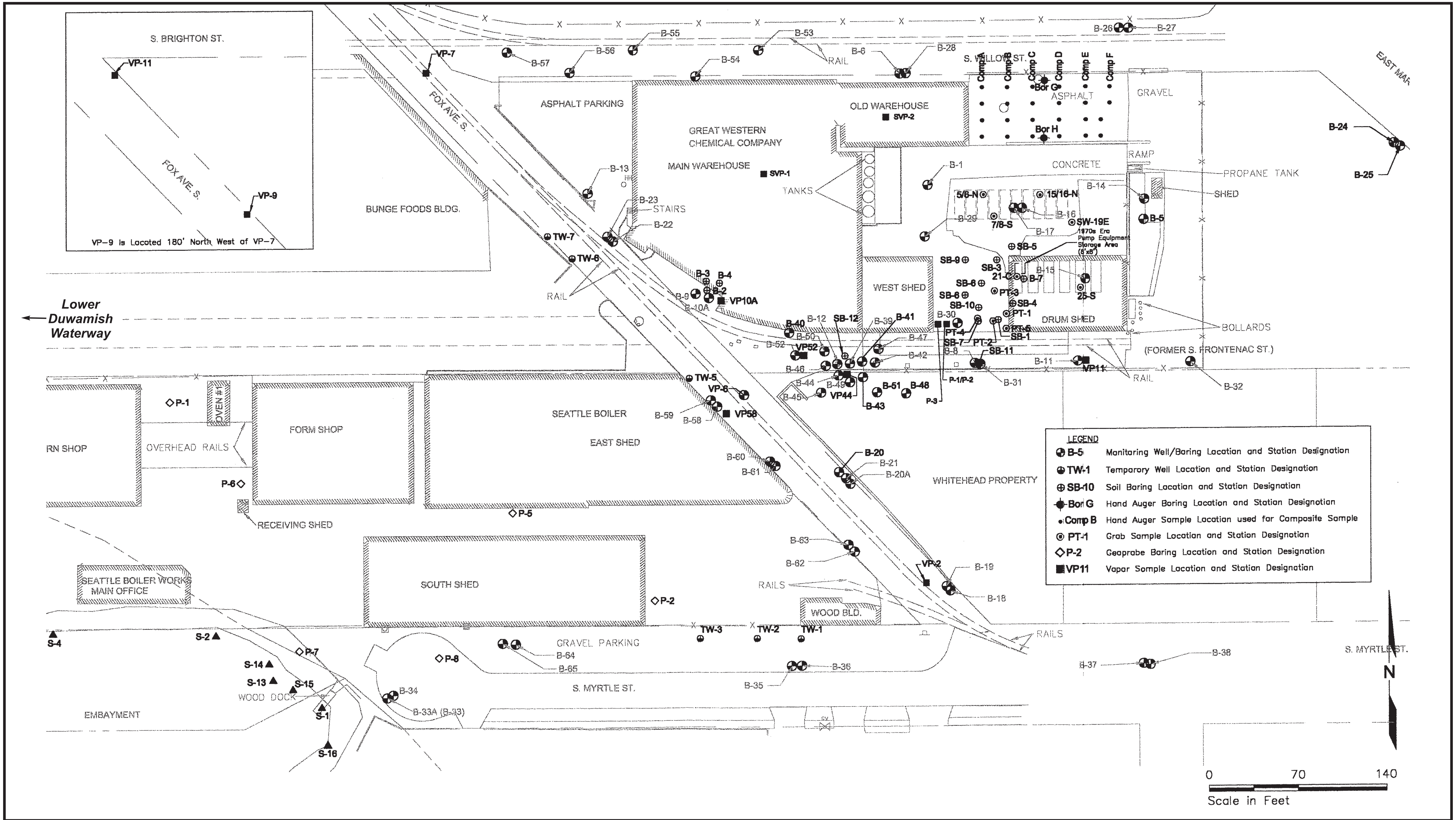
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 20
PCE IN 1st WBZ (1999 SAMPLING EVENT) - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
3/16/09	AES	10:002330WD1403\fig20



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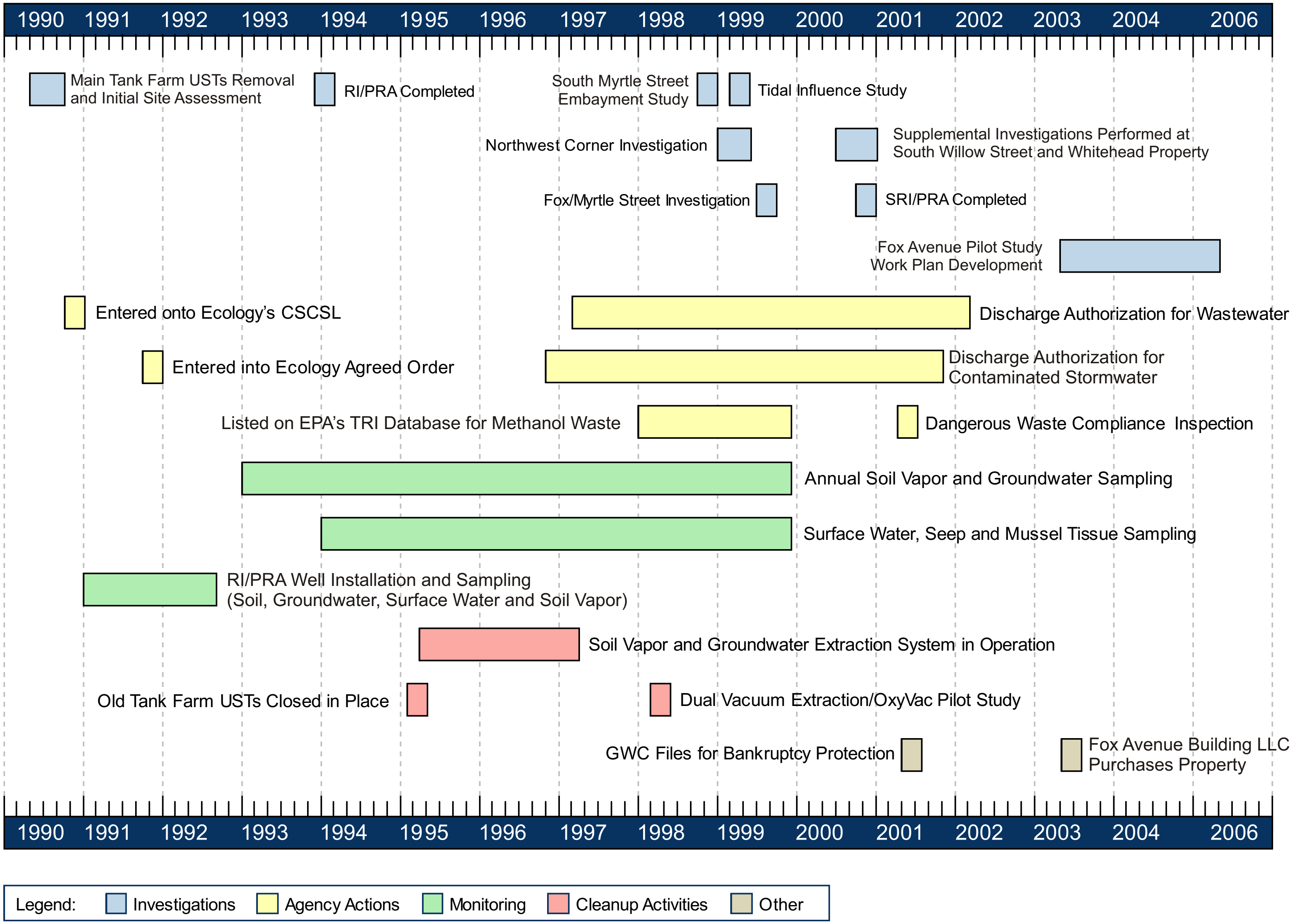
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 19

SOIL SAMPLING, GROUNDWATER MONITORING WELL AND SOIL VAPOR SAMPLING LOCATIONS - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
3/16/09	AES	10:002330WD1403\fig19



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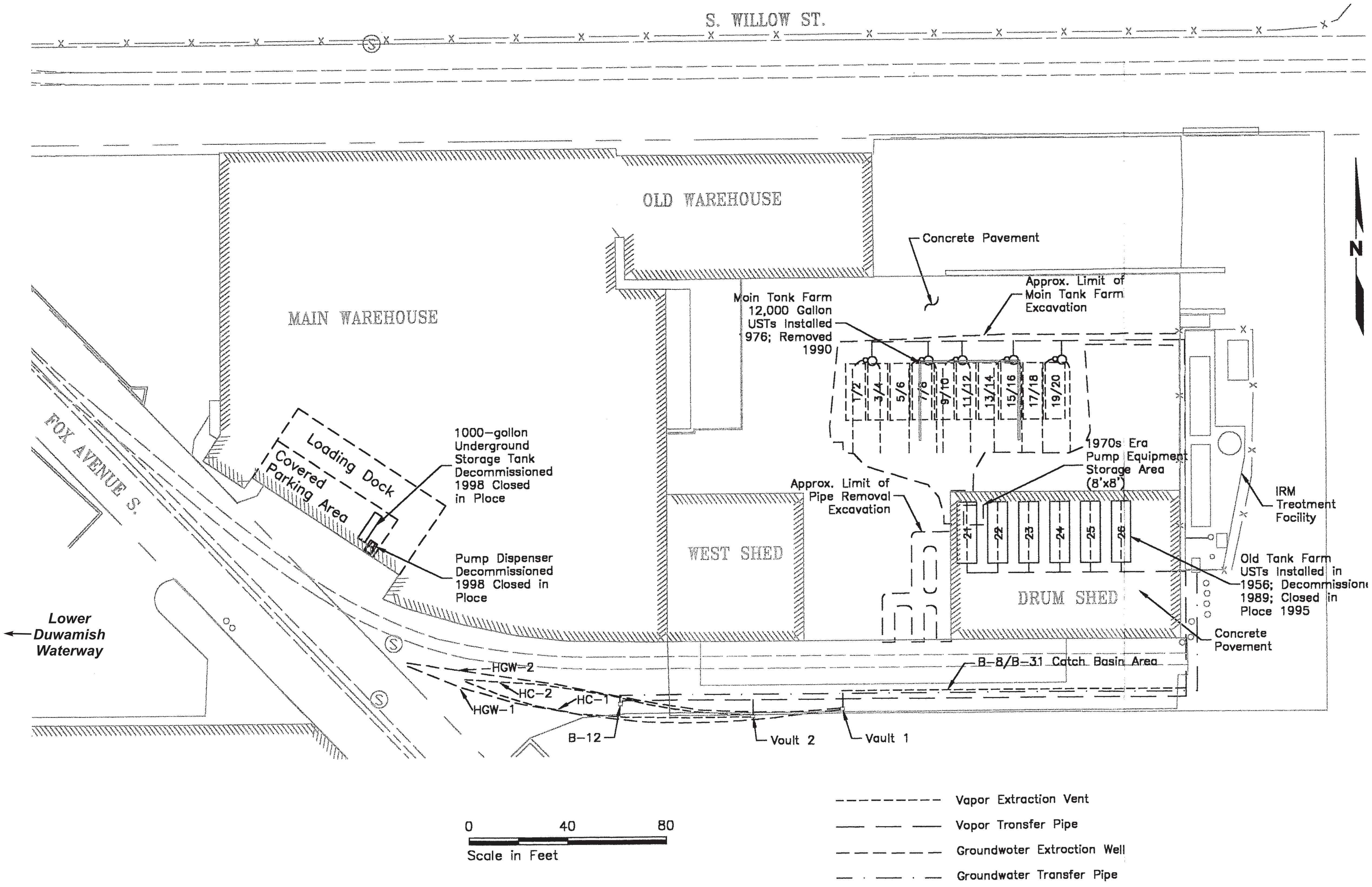
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 18
TIMELINE - CASCADE COLUMBIA
DISTRIBUTION PROPERTY

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig18



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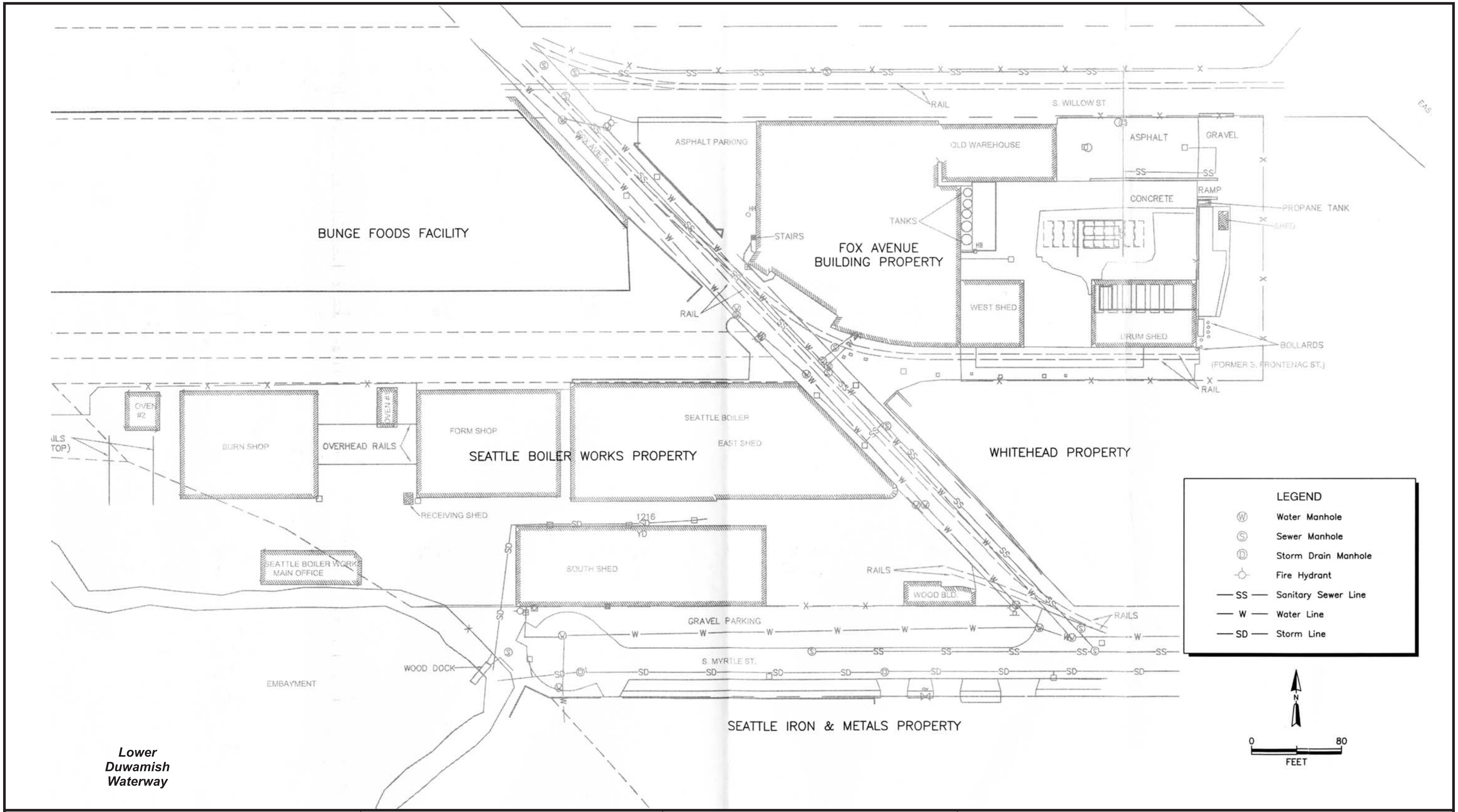
Base Map Reference: Floyd & Snider Inc. 2000.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 17
INTERIM REMEDIAL MEASURES - CASCADE COLUMBIA DISTRIBUTION
(IN OPERATION AS GREAT WESTERN CHEMICAL)

Date:	Drawn by:	
3/16/09	AES	10:002330WD1403\fig17



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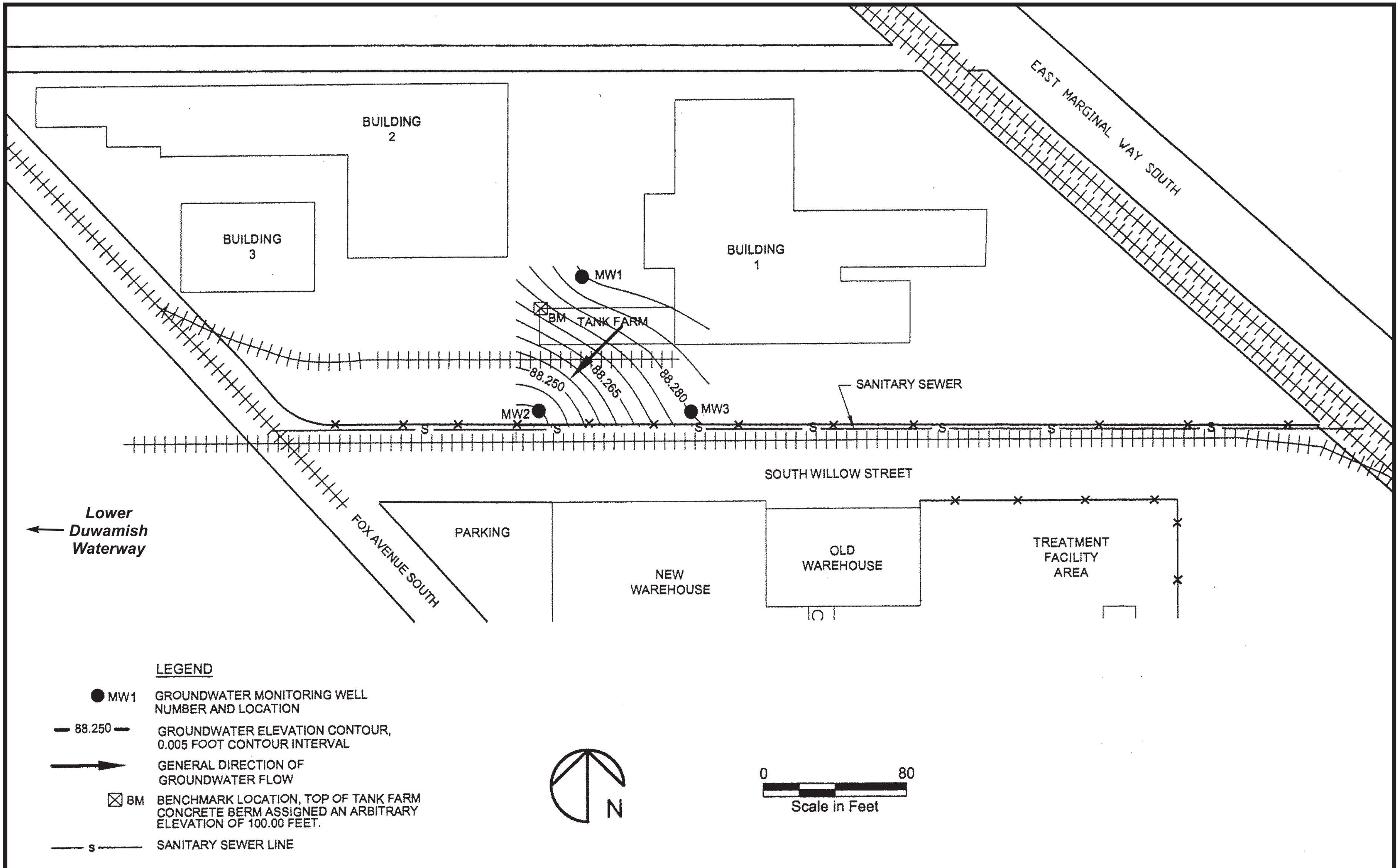
Base Map Reference:
Environmental Resources Management (ERM), 2003.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 16

FACILITY MAP - CASCADE COLUMBIA DISTRIBUTION

Date: 3/16/09
Drawn by: AES
10:002330WD1403\fig16



Note:
Contour map generated using Surfer (Win 3.2) version 6.04.

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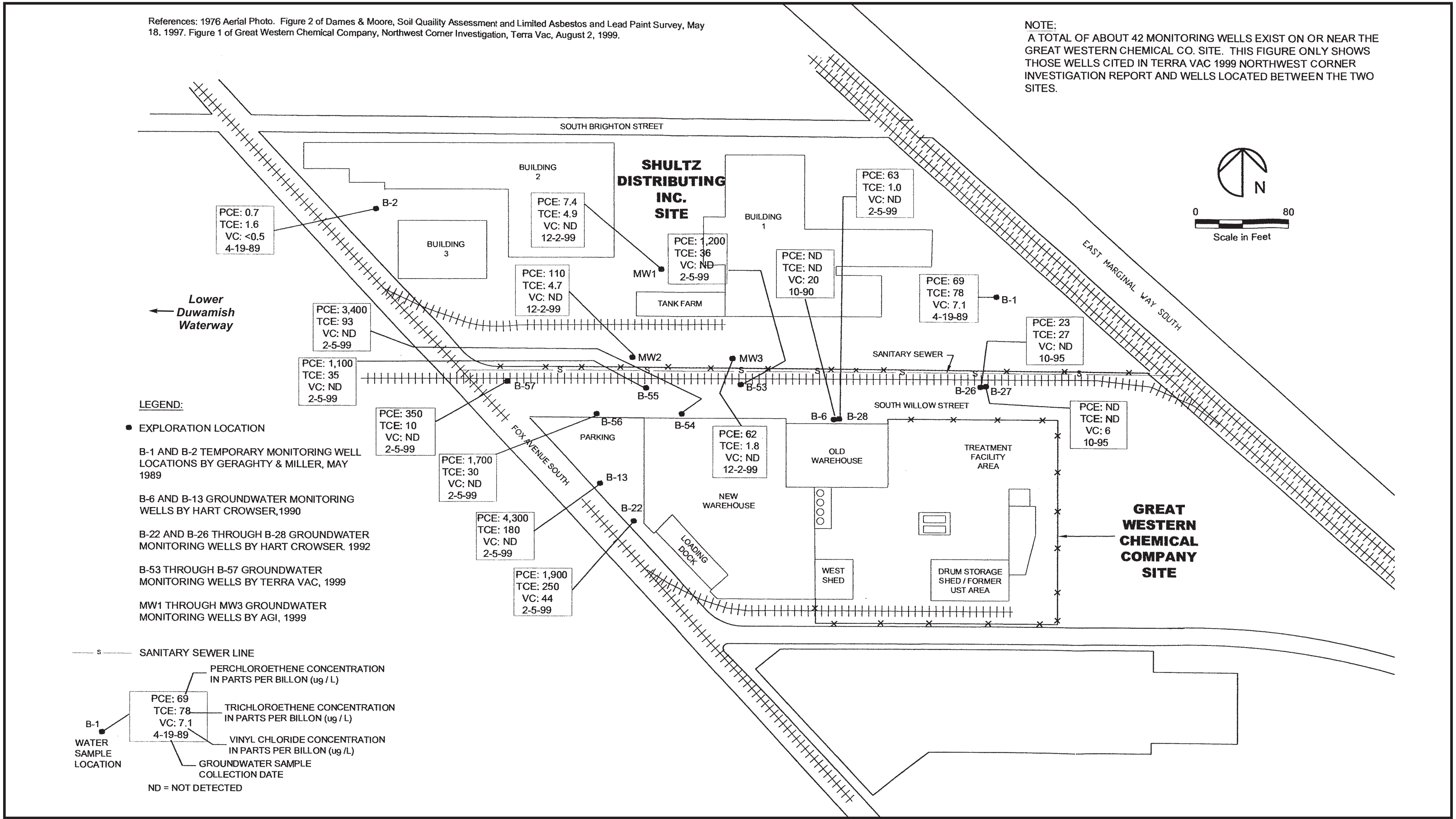
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 15
GROUNDWATER ELEVATION CONTOUR MAP
(DECEMBER 1999) - SHULTZ DISTRIBUTING

Base Map Reference: AGI Technologies, 1999.

Date:	Drawn by:	
3/16/09	AES	10:002330WD1403\fig15



References: 1976 Aerial Photo. Figure 2 of Dames & Moore, Soil Quaility Assessment and Limited Asbestos and Lead Paint Survey, May 18. 1997. Figure 1 of Great Western Chemical Company, Northwest Corner Investigation, Terra Vac, August 2, 1999.

NOTE:
A TOTAL OF ABOUT 42 MONITORING WELLS EXIST ON OR NEAR THE GREAT WESTERN CHEMICAL CO. SITE. THIS FIGURE ONLY SHOWS THOSE WELLS CITED IN TERRA VAC 1999 NORTHWEST CORNER INVESTIGATION REPORT AND WELLS LOCATED BETWEEN THE TWO SITES.

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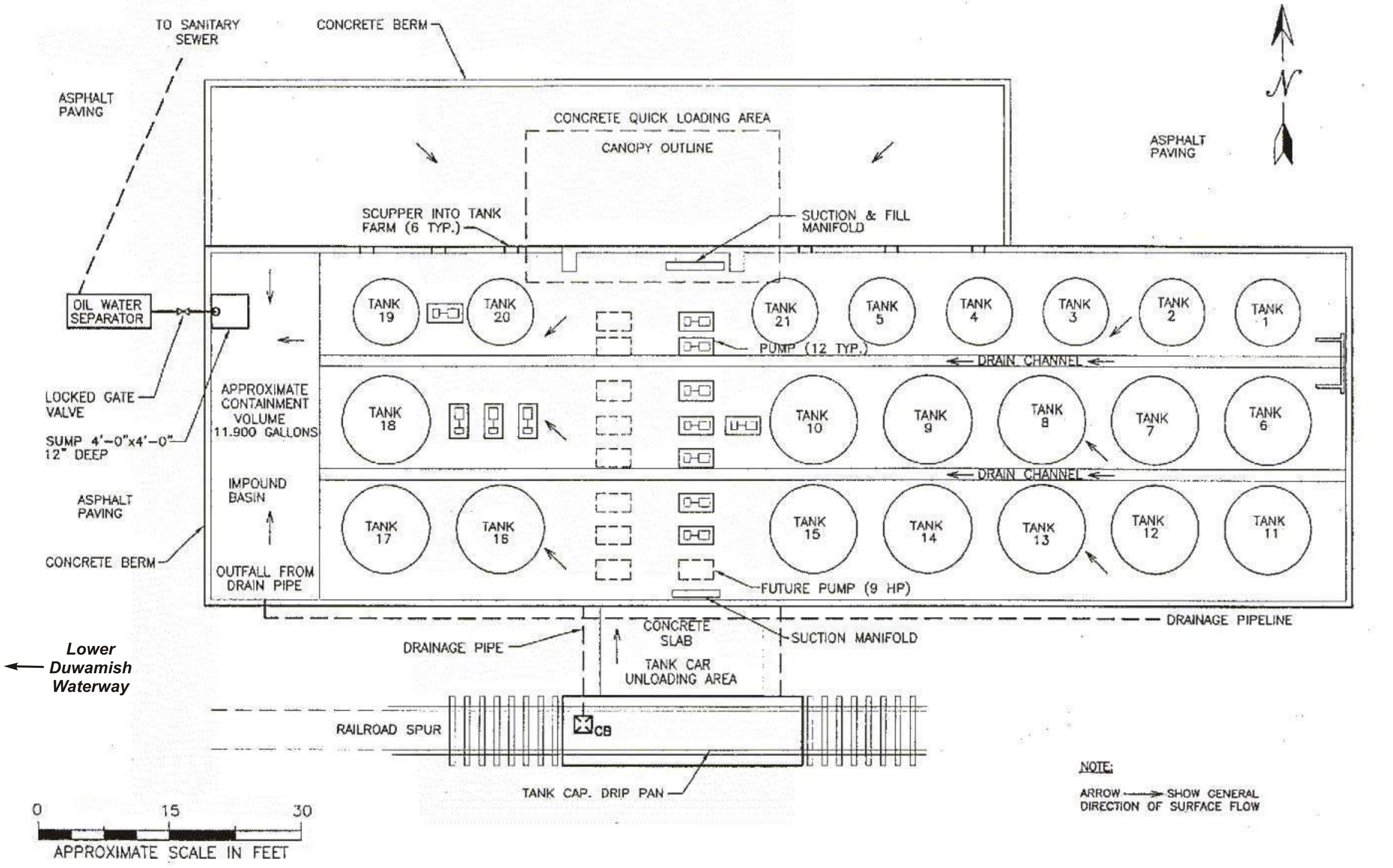
Base Map Reference: AGI Technologies, 1999.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 14

GROUNDWATER CHEMICAL CONCENTRATION MAP - SHULTZ DISTRIBUTING

Date: 3/16/09
Drawn by: AES
10:002330WD1403\fig14



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LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

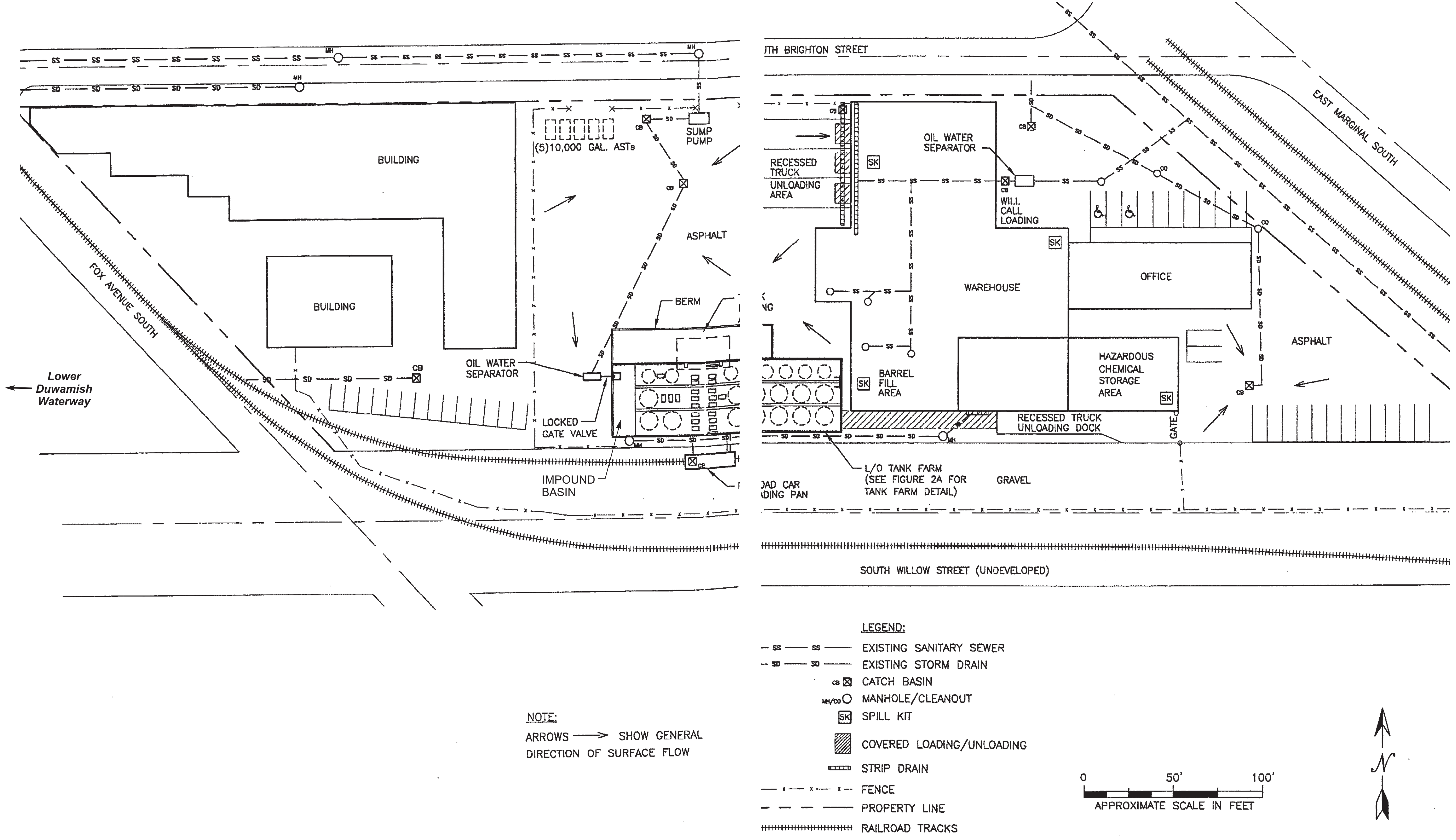
Figure 13
STORM DRAIN SYSTEM AND TANK LOCATIONS - SHULTZ DISTRIBUTING

Base Map Reference: EMR Incorporated.

Date: 3/16/09

Drawn by: AES

10:002330WD1403\fig13



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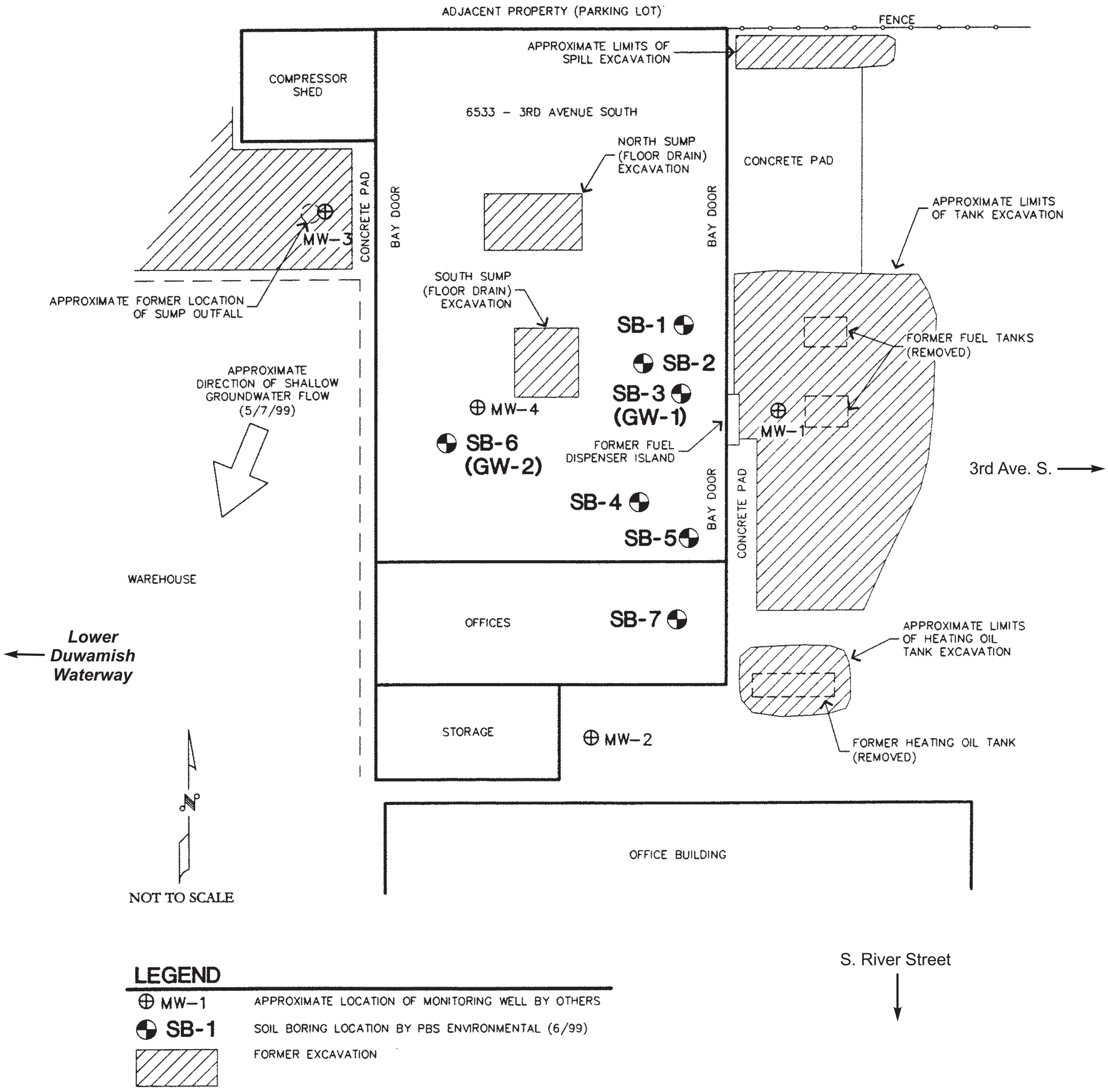
Base Map Reference: EMR Incorporated

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 12

FACILITY MAP AND STORM DRAIN SYSTEM - SHULTZ DISTRIBUTING

Date:	Drawn by:	
3/16/09	AES	10:002330WD1403\fig12



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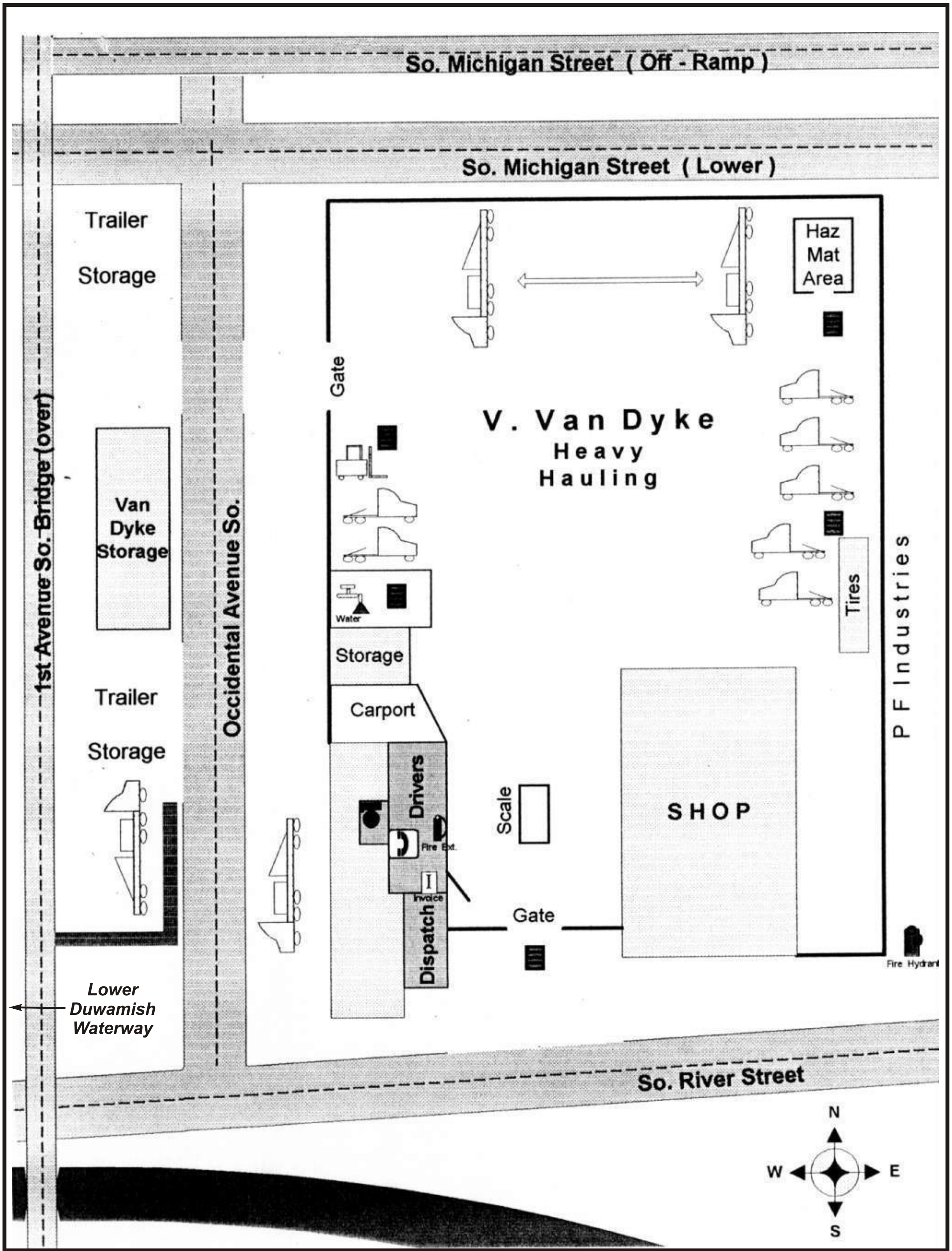
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 11
1999 PHASE II SUBSURFACE EXPLORATION MAP - RIVERSIDE INDUSTRIAL PARK
(IN OPERATION AS BIG JOHN'S TRUCK REPAIR)

Base Map Reference:	Date:	Drawn by:	
PBS Environmental 1999.	3-16-09	AES	10:002330WD1403\fig 11



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LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 10

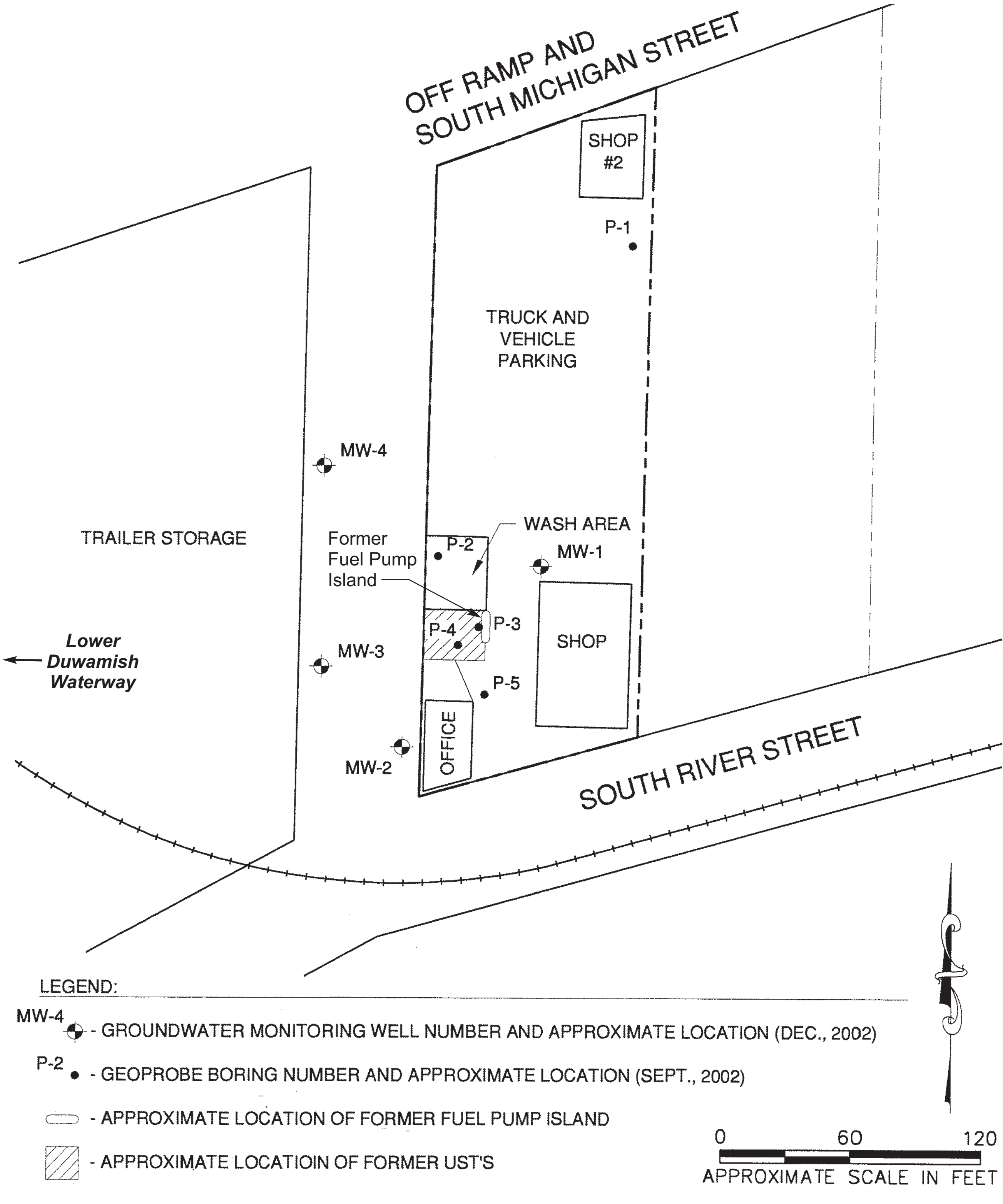
FACILITY MAP - V. VAN DYKE

Base Map Reference:
V. Van Dyke, Inc., 1993.

Date:
3-16-09

Drawn by:
AES

10:002330WD1403\fig 10



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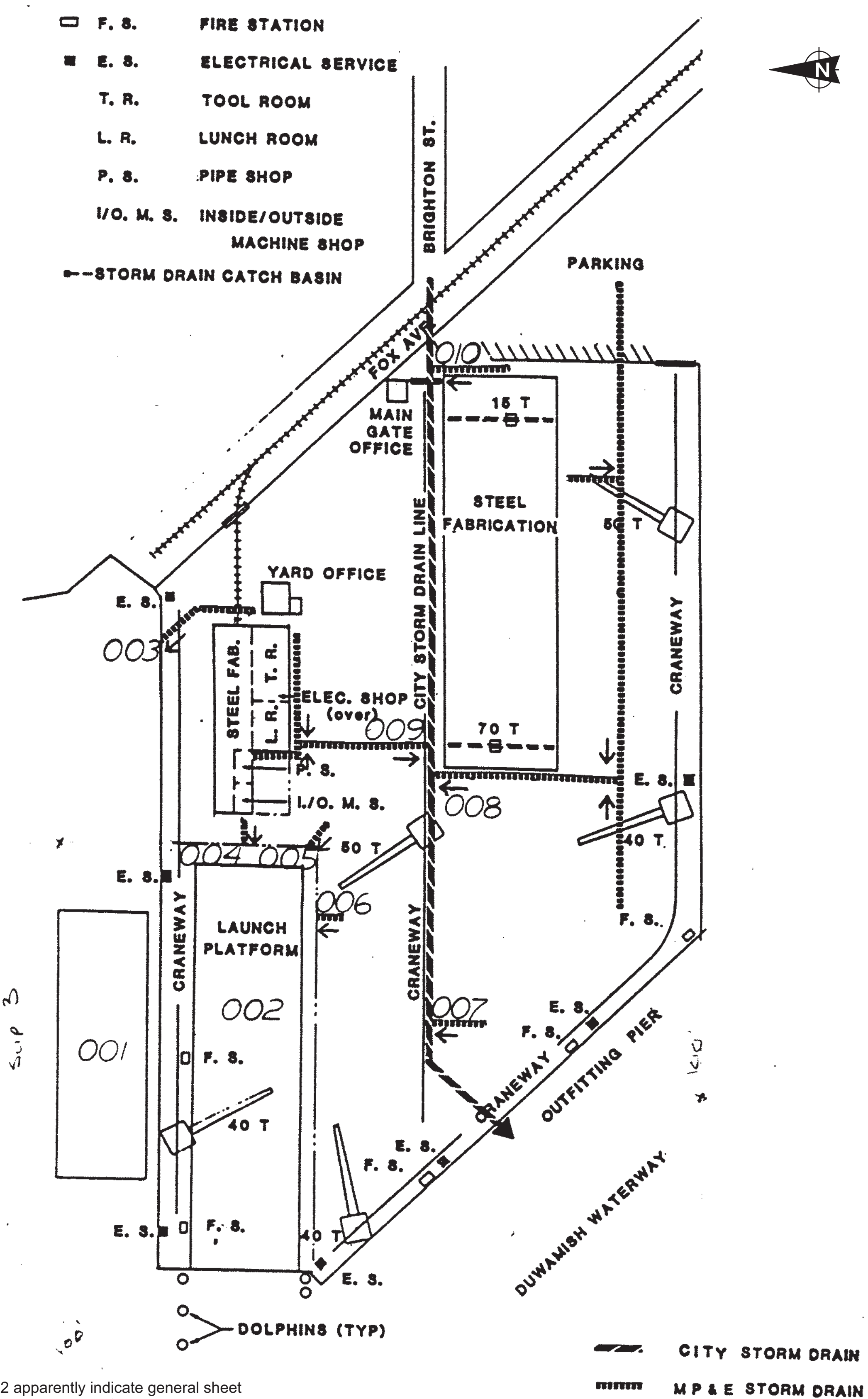
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 9
FACILITY MAP AND GROUNDWATER
MONITORING WELL LOCATIONS -
V. VAN DYKE

Base Map Reference: LSI Adapt 2003.

Date:	Drawn by:	
3-16-09	AES	10:002330WD1403\fig 9



Note: 001 and 002 apparently indicate general sheet runoff (not storm drain lines).

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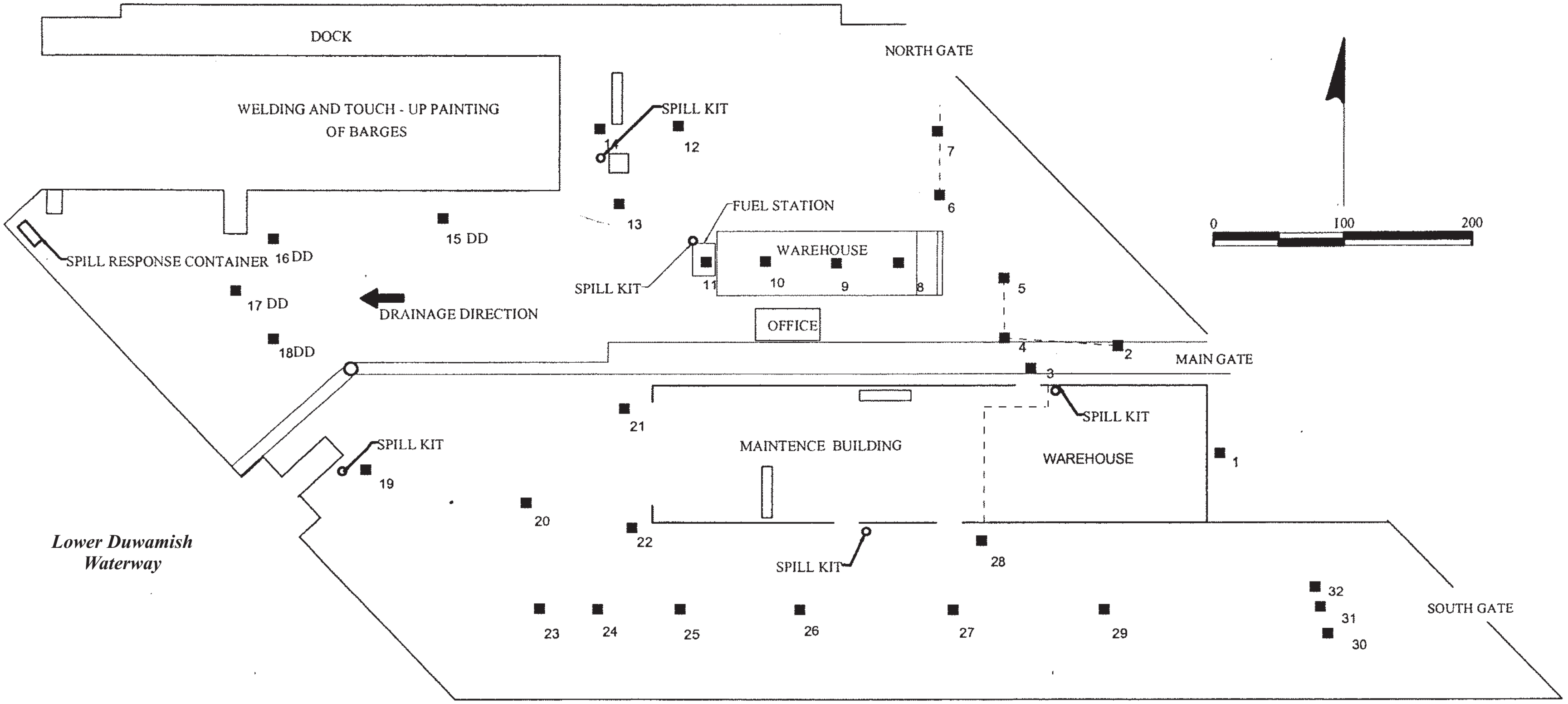
LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 8

FACILITY MAP - GLACIER MARINE SERVICES
(IN OPERATION AS MARINE POWER & EQUIPMENT)

Base Map Reference: Washington State Department of Ecology, 1989.

Date:	Drawn by:	
3-16-09	AES	10:002330WD1403\fig 8



Northland Services Terminal
6701 Fox Ave. South

NOTE: CATCH BASIN LOCATIONS ARE NOT EXACT

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LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Base Map Reference: Northland Services, Inc., 2001.

Figure 7
FACILITY MAP - GLACIER MARINE SERVICES
(IN OPERATION AS NORTHLAND SERVICES)

Date:	Drawn by:	
3/16/09	AES	10:002330WD1403\fig7

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Aerial Photograph Reference: Department of Ecology.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 6

AERIAL PHOTO OF THE SLIP 3 INLET AREA (SOUTH)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig 6

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Seattle, Washington

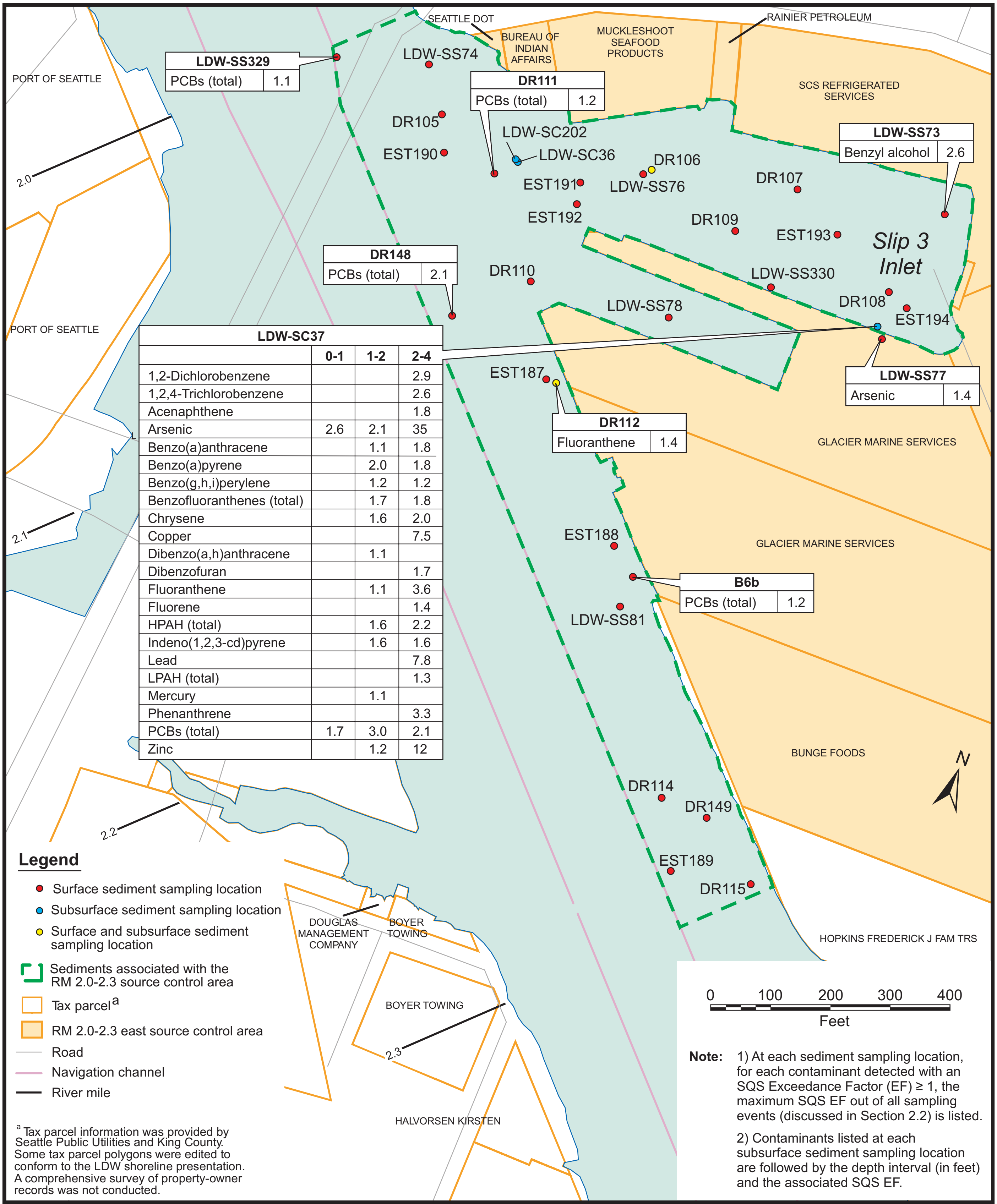
Aerial Photograph Reference: Department of Ecology.

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 5

AERIAL PHOTO OF THE SLIP 3 INLET AREA (NORTH)

Date:	Drawn by:	
5/21/08	AES	10:002330WD1403\fig5



LDW-SS329	
PCBs (total)	1.1

DR111	
PCBs (total)	1.2

LDW-SS73	
Benzyl alcohol	2.6

DR148	
PCBs (total)	2.1

LDW-SS77	
Arsenic	1.4

DR112	
Fluoranthene	1.4

B6b	
PCBs (total)	1.2

LDW-SC37

	0-1	1-2	2-4
1,2-Dichlorobenzene			2.9
1,2,4-Trichlorobenzene			2.6
Acenaphthene			1.8
Arsenic	2.6	2.1	35
Benzo(a)anthracene		1.1	1.8
Benzo(a)pyrene		2.0	1.8
Benzo(g,h,i)perylene		1.2	1.2
Benzofluoranthenes (total)		1.7	1.8
Chrysene		1.6	2.0
Copper			7.5
Dibenzo(a,h)anthracene		1.1	
Dibenzofuran			1.7
Fluoranthene		1.1	3.6
Fluorene			1.4
HPAH (total)		1.6	2.2
Indeno(1,2,3-cd)pyrene		1.6	1.6
Lead			7.8
LPAH (total)			1.3
Mercury		1.1	
Phenanthrene			3.3
PCBs (total)	1.7	3.0	2.1
Zinc		1.2	12

Legend

- ● Surface sediment sampling location
- ● Subsurface sediment sampling location
- ● Surface and subsurface sediment sampling location
- ⌜⌟ Sediments associated with the RM 2.0-2.3 source control area
- ☐ Tax parcel[a]
- ▨ RM 2.0-2.3 east source control area
- — Road
- — Navigation channel
- — River mile

[a] Tax parcel information was provided by Seattle Public Utilities and King County. Some tax parcel polygons were edited to conform to the LDW shoreline presentation. A comprehensive survey of property-owner records was not conducted.

Note: 1) At each sediment sampling location, for each contaminant detected with an SQS Exceedance Factor (EF) ≥ 1, the maximum SQS EF out of all sampling events (discussed in Section 2.2) is listed.

2) Contaminants listed at each subsurface sediment sampling location are followed by the depth interval (in feet) and the associated SQS EF.

ecology and environment, inc.
International Specialists in the Environment
Seattle, Washington

LOWER DUWAMISH WATERWAY
RM 2.0-2.3 EAST
Seattle, Washington

Figure 4
SEDIMENT SAMPLING LOCATIONS AND ASSOCIATED CONTAMINANTS DETECTED IN EXCEEDANCE OF SQS

Base Map Reference: Windward 2007.

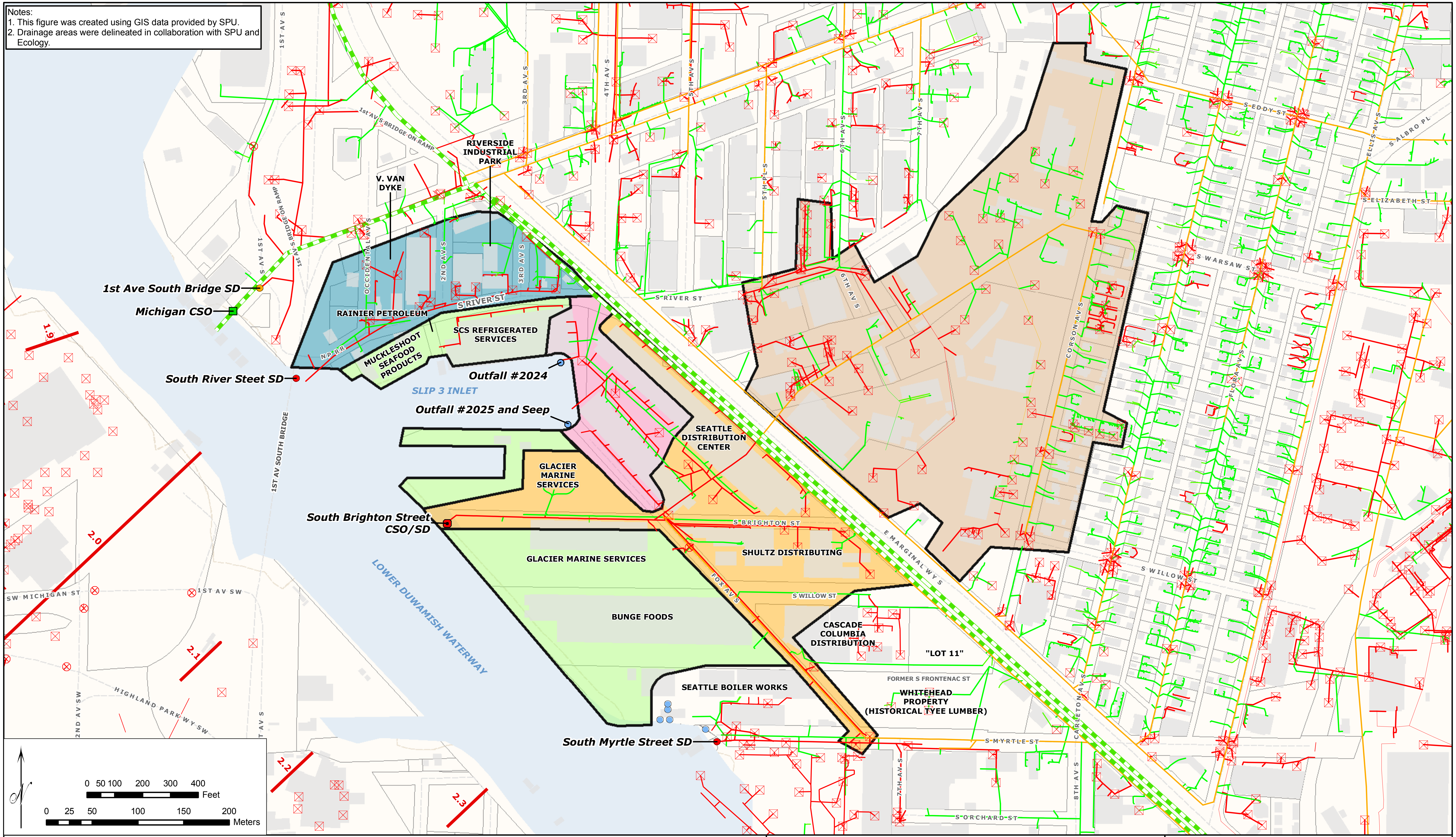
Date: 3-16-09

Drawn by: AES

10:002330WD1403\fig 4

© Ecology & Environment, Inc. GIS Department L:\Seattle\Drainage_Basin_Mapping\Maps\Mxds\RM_2-0_2-3_East\Figure 3 RM 2.0-2.3 East Drainage Basin.mxd

Notes:
1. This figure was created using GIS data provided by SPU.
2. Drainage areas were delineated in collaboration with SPU and Ecology.



Outfall Type
- 🟩 CSO-KC
- ■ CSO/SD-City
- ● Private SD
- ● SD-City
- ● SD-WSDOT/City

- ☒ Catch Basin
- ⊗ Catch Basin - Lg. Inlet
- ⊟ Inlet (Street Drain)
- ■ Sand Box

- Drainage Mainline
- Sanitary Mainline
- Combined Mainlines
- King County Mainline

- Culverts, Inlets and Laterals
- Building
- Parcel Boundary
- Street Centerline
- River Mile Marker

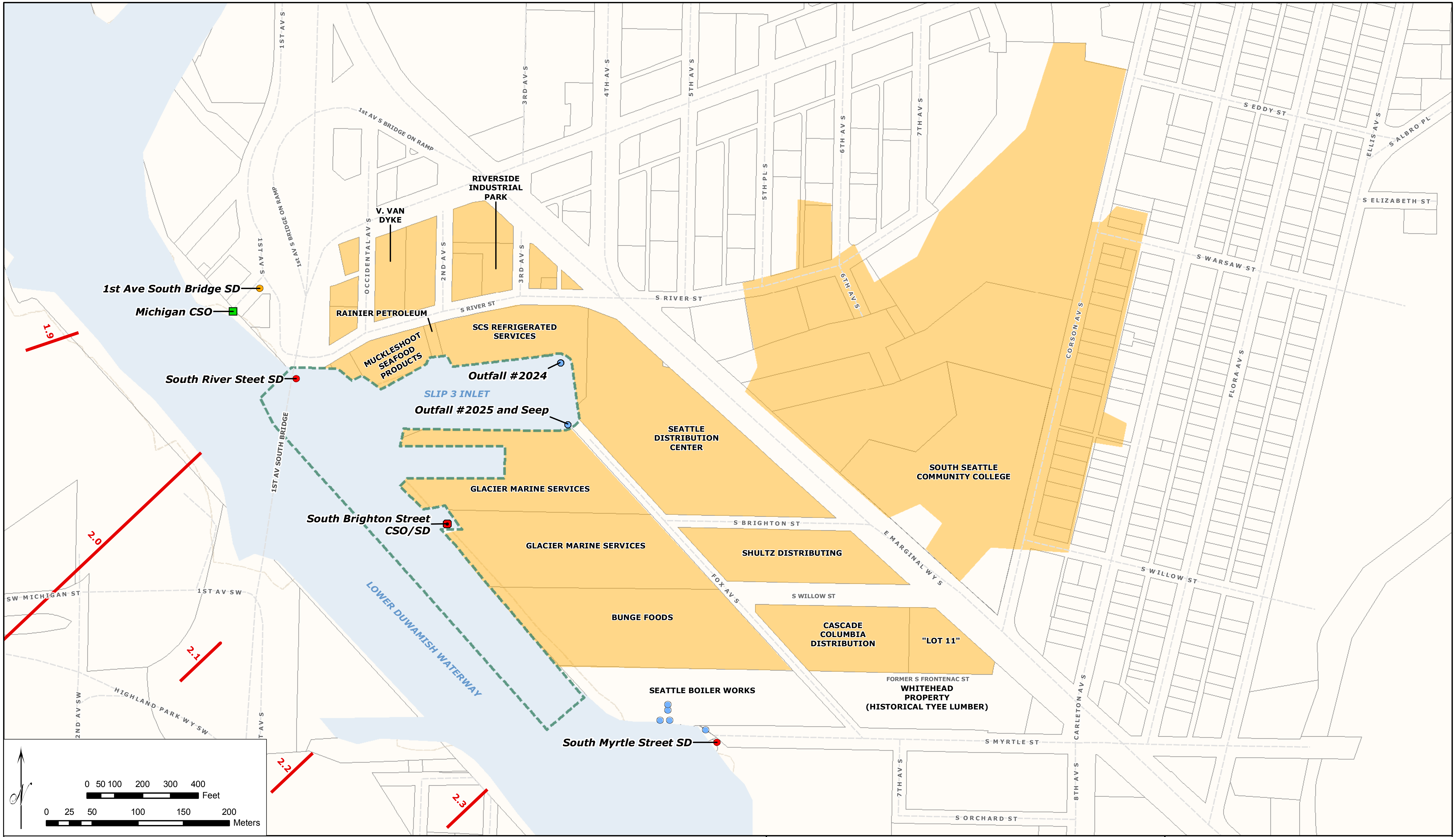
- 🟧 South Brighton Street Stormwater Drainage Basin
- 🟪 Drainage to Slip 3 Outfalls
- 🟫 South Brighton Street CSO Drainage Basin
- 🟦 South River Street Stormwater Drainage Basin
- 🟩 Direct Drainage to LDW

LOWER DUWAMISH WATERWAY
RM 2.0 - 2.3 EAST
Seattle, Washington

FIGURE 3
RM 2.0-2.3 EAST DRAINAGE BASIN AND STORM DRAIN SYSTEM

Date: 10/15/2008
Drawn by: RLS
Figure 3 RM 2.0-2.3
East Drainage Basin.mxd

© Ecology & Environment, Inc. GIS Department L:\Seattle\Drainage_Basin_Mapping\Maps\Mxds\
RM_2-0_2-3_East\Figure 3 RM 2.0-2.3 East Drainage Basin.mxd



Outfall Type

- 🟩 CSO-KC
- 🟥 CSO/SD-City
- ● Private SD
- ● SD-City
- ● SD-WSDOT/City

- ☐ Parcel Boundary
- Street Centerline
- River Mile Marker
- 🟧 RM 2.0 - 2.3 East Source Control Area
- Sediments Associated with the RM 2.0-2.3Source Control Area

LOWER DUWAMISH WATERWAY
RM 2.0 - 2.3 EAST
Seattle, Washington

FIGURE 2
RM 2.0-2.3 EAST SOURCE CONTROL AREA

Date: 10/15/2008	Drawn by: RLS	Figure 2 RM 2.0-2.3 East Control Area.mxd

DEPARTMENT OF ECOLOGY State of Washington http://www.ecy.wa.gov

Ecology home > Toxics Cleanup > Sites > Fox Ave Building

Fox Ave Building

6900 Fox Ave S, Seattle, WA 98108

CURRENT STATUS

Updated February 2020

Cleanup is underway.

In 2012, Ecology entered into an Agreed Order (legal agreement) with the current property owner, Fox Ave Building LLC, to require implementation of the Cleanup Action Plan. The Agreed Order was amended in 2013 to reflect new cleanup levels.

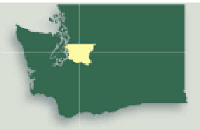
Why this cleanup matters

This site is part of Ecology's Lower Duwamish Waterway source control efforts, because it is contributing pollution to the Lower Duwamish Waterway (LDW) Superfund Site. The 5-mile stretch of the Duwamish River that flows north into Elliot Bay was added to the Superfund National Priorities List by the U.S. Environmental Protection Agency (EPA) in 2001.

The sediments (mud) in the river contain a wide range of contaminants due to decades of industrial activity and runoff from urban areas. EPA is leading efforts to clean up the river sediments.

Ecology is leading efforts to control sources of contamination from the surrounding land area. The long-term goal is to minimize recontamination of the river sediment and restore water quality in the river.

The Fox Ave Building Site is one of several sites that will be cleaned up as part of Ecology's Source Control Strategy – controlling sources of pollution to the river. Contaminants in the soil and groundwater around the river pose a risk to human health and the environment. They can also find their way into the river through storm runoff and other pathways. For more information, visit our Source Control page.



SITE INFORMATION

Map

View Electronic Documents

Cleanup Site Details Report

Facility Site ID: # 2282

Cleanup Site ID: 5082

Location:
Seattle, King County

Status: Cleanup Started ?

Contacts:
Brad Petrovich
Project Planner and Public Involvement Coordinator
(425) 649-4486

Document Repositories:

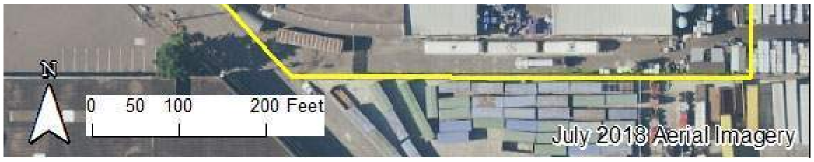
Northwest Regional Office
3190 160th Ave SE
Bellevue, 98008-5452
(425)649-7190

SITE INFORMATION

Site history

Seattle Chain and Manufacturing Company leased the property from King County, from 1918 until 1937 when it purchased the property. Seattle Chain and successor companies operated coke and oil fired furnaces and warehouses on the property.

For the next 20 years, ownership of the property changed hands several times. In 1956, Marian Properties LLC Enterprises bought the property and leased a portion of it to Great Western



Chemical (GWC). GWC operated a chemical and petroleum repackaging and distribution facility on the property. GWC pumped bulk product through buried pipes as well as hoses on the surface. The facility had a number of underground and above ground storage tanks which stored chemical and petroleum products, including solvents, acids, and lube oils.

From the 1960s through the 1980s, GWC replaced and upgraded many of their warehouse structures. Several other companies leased parts of the property over the years. A number of chemicals and petroleum products were handled at the Site.

In 2003, Fox Avenue Building LLC bought the GWC property. Cascade Columbia Distribution now leases the property and uses the warehouse as a chemical distribution facility.

The groundwater from the Site reaches the Lower Duwamish Waterway, making it a concern for source control to prevent recontamination of the Lower Duwamish Waterway Superfund site.

Contamination

Contamination at the site is the result of industrial use since 1918. The contaminants of concern in the soil and groundwater are:

- Chlorinated solvents
- Petroleum hydrocarbons
- Semi-volatile organic compounds (SVOCs)
- Dioxins and furans

Previous cleanup work

In 1989, Great Western Chemical (GWC) closed six underground storage tanks (USTs) in place which still remain under a concrete pad. The same year, GWC also decommissioned ten other USTs, and removed these from the property in 1990. As part of an overall remodel, GWC retained the services of Hart-Crowser to provide engineering assistance in the removal of the tanks.

In 1991, GWC entered into an Agreed Order with Ecology. Under this agreement, GWC agreed to do a Remedial Investigation/Feasibility Study.

In 1993 GWC finished the Remedial Investigation and Preliminary Risk Assessment Report (RI/PRA). More work was done following this report and summarized in a Supplemental Remedial Investigation and Feasibility Study report in 2000. Previous investigations and cleanup work performed by GWC and Fox Avenue Building since 2000 include:

- Soil and groundwater sampling
- Seep and soil vapor sampling
- Installation of groundwater monitoring wells
- Various other investigations to define the nature and extent of contamination
- Operation of a soil vapor extraction system
- Pilot testing of various remediation technologies, including injections of chemical oxidants into groundwater
- Underground and above ground storage tank removals

In 2009, Ecology entered into an Agreed Order with Fox Avenue Building requiring them to do the following:

- Perform an interim cleanup measure to control the discharge of tetrachloroethylene (PCE) to the Lower Duwamish Waterway. This used Enhanced Reductive Dechlorination (ERD) to stimulate naturally-occurring bacteria to degrade contaminants

- Perform a pilot test to see how effective ERD may be in degrading contaminants in soils in the source area for the plume

- Do a source area data gap investigation to better identify the measures and cost needed to clean up this area

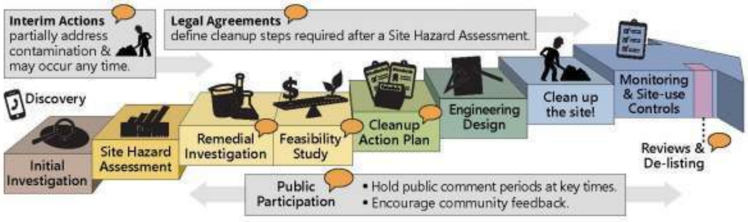
- Collect air samples to find whether PCE vapors are reaching the office part of the Fox Avenue Building facility. If so, evaluate restarting the existing soil vapor extraction (SVE) system to control vapor intrusion

- Do a Supplemental Feasibility Study to evaluate cleanup alternatives and enable Ecology to select a cleanup action that will achieve cleanup levels under state law within a reasonable time frame

- Prepare a draft Cleanup Action Plan (CAP) that documents the cleanup action selected by Ecology

GENERAL CLEANUP PROCESS

The Model Toxics Control Act (MTCA; Chapter 70.105D RCW is Washington's environmental cleanup law). It provides requirements for contaminated site cleanup and sets standards that protect human health and the environment. Ecology enacts the MTCA and oversees cleanups. The MTCA site cleanup process is completed in steps (see graphic below) over a variable timeline.



RELATED INFORMATION

- Main Ecology website for Lower Duwamish Waterway

ADDITIONAL RESOURCES

- Acronyms used by the Toxics Cleanup Program
- Cleanup Process: Major Steps & Definitions
- Data Submittal Requirements for All Cleanup Sites
- Toxics Cleanup publications

LDWSF 123.193.1 v.1
09/15/08

RECEIVED
SEP 16 [illegible]
Environmental
Cleanup Office

LOWER DUWAMISH WATERWAY SUPERFUND SITE
DAWN FOOD PRODUCTS, INC.'s 104(e) RESPONSES

1. Respondent Information

a) *Provide the full legal name and mailing address of the Respondent.*

Dawn Food Products, Inc.
3333 Sargent Road
Jackson, Michigan 49201

b) *For each person answering these questions on behalf of Respondent, provide:*

- *i. full name;*
- *ii. title;*
- *iii. business address; and*
- *iv. business telephone number and FAX machine number.*

Max Waagner was the person responsible for, and under whose direction, the search for relevant documents and information was performed.

Max Waagner, Director for Global Safety
3333 Sargent Road, Jackson, Michigan 49201
Telephone: 517-789-4473 Facsimile: 517-789-4501

c) *If Respondent wishes to designate an individual for all future correspondence concerning this Site, please indicate here by providing that individual's name, address, telephone number, and fax number.*

E. Sean Griggs, Esquire
Barnes & Thornburg LLP
11 South Meridian Street
Indianapolis, Indiana 46204
Telephone: (317) 231-7793
Facsimile: (317) 231-7433

d) *State the dates during which Respondent held any property interests at or within one-half mile of the above mentioned address.*

Dawn Food Products ("Dawn") has been the lessee-in-possession of the property at 6901 Fox Avenue South, Seattle, Washington since January 2004. Dawn has never owned this property nor any other land within one-half mile of this Site. Dawn acquired its leasehold interest in the property in conjunction with an asset purchase between Dawn and Bunge Foods Corporation.

e) *State the dates during which Respondent conducted any business activity at or within one-half mile of the above mentioned address.*

January 2004 to present.

f) *Describe the nature of Respondent's business activities at the above mentioned address or within one-half mile of that address.*

Dawn's business activities at the Fox Avenue plant involve the manufacture and distribution of dry mix food ingredients for commercial sale to bakeries and confectionaries. Dawn does not produce finished food products for retail sale to individual consumers at the Fox Avenue plant.

g) *In relation to you answer to the previous question, identify all materials used or created by your activities at the above mentioned address, including raw materials, commercial products, building debris, and other wastes.*

Finished goods produced at the Fox Avenue plant are food grade products use in commercial baking applications.

Waste streams generated at Fox Avenue includes food waste, oily wastewater, used oil, spent parts washer fluid, used lamps, cardboard, and general office trash.

Waste type	**Waste volume**
Food waste	**1,200 pounds/day: 5 days/week**
Oily wastewater from washing operations (inside and outside)	**20 gallons/month**
Used oil (maintenance oils)	**< 10 gallons/year**
Used oil (edible oils)	**440 gallons/year**
Spent parts washer fluid	**1 gallon/year**
Used lamps	**20 bulbs/year**
Cardboard	**10,000 pounds/month**
General office trash (dumpster)	**14 tons/month**

Supporting documents:

1) Raw materials used and stock-on-hand for goods produced at Fox Avenue are shown on the enclosed list entitled for Stock Status Report.

2) Sanitary Sewer Discharge to King County POTW. Approved for a discharge of up to 300 gallons per day. (April 18, 2008 approval letter.)

3) Grease Trap Cleanout. (Invoices from Baker Commodities, Inc.)

4) Expired Dessicant. (Waste Characterization Decision 0411021.)

h) *If Respondent, its parent corporation, subsidiaries or other related or associated companies have filed bankruptcy, provide:*

i. *the U.S. Bankruptcy Court in which the petition was filed;*
ii. *the docket numbers of such petition;*
iii. *the date the bankruptcy petition was filed;*
iv. *whether the petition is under Chapter 7 (liquidation), Chapter 11 (reorganization), or other provision; and*
v. *a brief description of the current status of the petition.*

Not applicable.

2. <u>Site Activities and Interests</u>

a) *Provide all documents in your possession regarding the ownership or environmental conditions of the property mentioned above, including, but not limited to, copies of deeds, sales contracts, leases, blueprints, "as builts" and photographs.*

Dawn has only been a tenant at the Fox Avenue property since January 2004.

Dawn provides the following documents in response to this request:

1) Lease and subsequent amendments.

2) Asset Purchase and Sale Agreement (on a CD-ROM) [pricing information has been redacted]

3) Dawn had a Puget Sound Clean Air Agency (PSCAA) 2005 Annual Registration Certificate. The Registration number was 28406, which was effective from January 1, 2004 until December 31, 2005. Based on an email from Melissa McAfee (an Inspector for the PSCAA) dated July 30, 2008, equipment at the facility does not currently require registration.

b) *Provide information on the condition of the property when purchased; describe the source, volume, and content of any fill material used during the construction of the buildings, including waterside structures such as seawalls, wharves, docks, or marine ways.*

Dawn provides the following documents in response to this request:

1) October 2003 Phase I Environmental Site Assessment.

2) October 21, 2003 Limited Environmental Compliance Assessment.

3) June 19, 1996 Preliminary Environmental Assessment prepared by Hart Crowser.

4) November 12, 1996 Limited Subsurface Investigation prepared by Hart Crowser.

5) September 16, 1996 Building/Site Inspection by Falkin Associates, Inc.

6) May 16, 2001 Seismic Evaluation.

7) April 12, 2001 Structural Engineering Recommendations.

c) Provide information on past dredging or future planned dredging at this site.

Respondent is not aware of any past dredging or future planned dredging at the site.

d) Provide a brief summary of the activities conducted at the site while under Respondent's ownership or operation. Include process diagrams or flow charts of the industrial activities conducted at the site.

Dawn operates various tanks, hoppers, vats, pumps, mixers, and refrigeration equipment to produce food products for sale to commercial bakeries. All finished products produced at the Fox Avenue plant are food grade.

Dawn cleans equipment and surfaces with pressurized water as part of the food products manufacturing operations, including equipment and areas outside the building. Outside drains are closed using drain mats before cleaning the equipment and surfaces outside. Wastewater generated from cleaning outside is pumped into a 55-gallon drum for disposal offsite. Wastewater generated from cleaning inside passes through a grease trap before discharging to the sanitary sewer system.

Dawn receives and stores in bulk food-grade vegetable oil and salad oil for processing and stove oil for combustion in the facility boiler. The oil and stove oil are stored in a secondary containment area, which includes: a vertical aboveground storage tank (AST) containing salad oil, two vertical ASTs containing vegetable oil, and one horizontal AST containing stove oil. Dawn operates a boiler with the stove oil in order to periodically heat the vegetable oil during pumping operations.

Dawn provides the following documents in response to this request:

1) Warehouse Flow Chart and Production Flow Chart.

e) *Provide all documents pertaining to sale, transfer, delivery, disposal, of any hazardous substances, scrap materials, and/or recyclable materials to this property.*

OBJECTION. This request is overbroad and unduly burdensome. Notwithstanding the foregoing objection, Dawn provides the following documents in response to this request:

1) See supporting documents listed in response to 1.g. above.

2) See supporting document listed in response to 2.a.3. above.

3) See generally supporting documents listed in response to 2.i. below.

f) *Provide all information on electric equipment used at the facility, including transformers or other electrical equipment that may have contained polychlorinated biphenyls (PCBs).*

All electrical transformers on the premises are owned by Seattle City Light. Three of the four transformers are marked as containing non-PCB fluid. Dawn's environmental consultant, Advanced Environmental Management Group, has been in contact with Seattle City Light regarding the need for written confirmation that the fourth transformer also contains non-PCB fluid. To date, Dawn has received no reply to its request.

g) *Provide information on the type(s) of oils or fluids used for lubrication of machinery or other industrial purposes, and any other chemicals or products which are or may contain hazardous substances which are or where used at the facility for facility operations.*

Attached is information on the type(s) of oils or fluids used for lubrication of machinery or other industrial purposes, and any other chemicals or products which are or may contain hazardous substances which are used (or have been used since 2004) at the Fox Avenue plant for facility operations. Dawn provides the following document in response to this request:

1) List of Shop, Lab, & Plant Chemicals.

h) *Provide any site drainage descriptions, plans or maps that include information about storm drainage which includes, but is not limited to, above or below surface piping, ditches, catch basins, manholes, and treatment/detention or related structures including outfalls. If available, also include information about connections to sanitary sewer.*

Site sanitary flow

The water supply and sanitary sewerage services for the facility are provided by the City of Seattle. Wastewater from cleaning in the manufacturing area passes through a grease trap before being discharged to the sanitary sewer system. The

grease trap is pumped out on a periodic basis. Wastewater from lab operations, utensil cleaning, and domestic use does not pass through the grease trap.

Site stormwater flow

Based on the best information available, it is believed that stormwater discharges to a stormwater main that discharges to the Duwamish Waterway from an outfall located one parcel north of the facility. Stormwater may also discharge to a sanitary sewer line. The facility is looking to perform a camera test in order to verify where the stormwater discharges from the site.

The site topography gently slopes from east to west towards the Duwamish Waterway. The embankment at the waterline of the Duwamish Waterway is severe. Based on facility personnel onservations, stormwater sheet flow moves generally from east to west towards the Duwamish River. Stormwater that collects in catch basins generally flows from west to east toward Fox Avenue South.

Secondary containment

The secondary containment area for the food and stove oil bulk storage tanks is equipped with a manually operated sump pump. As needed, trained facility personnel visually check stormwater that has collected in the secondary containment area to confirm that oil is not present. If oil is not present in the secondary containment area, the sump pump is manually activated to discharge the stormwater into a trench drain in the railcar unloading area. This trench drain flows to a sump that pumps liquid to the storm drain located southwest of the secondary containment area. From there, the liquid flows to a storm drain located southwest of the facility. If oil were present, a commercial waste-hauling services provider would remove the stormwater for disposal offsite.

i) *With respect to past site activities, please provide copies of any stormwater or drainage studies, including data from sampling, conducted at these properties. Also provide copies of any Stormwater Pollution Prevention or Maintenance Plans or Spill Plans that may have been developed for different operations during the Respondent's occupation of the property.*

The following plans related to Dawn's operations are provided:

1) Spill Prevention Control and Countermeasure Plan.

2) Environmental Management System binder.

3) Various Health, Safety and Environmental program documents.

3. Information About Others

a) *Describe any business relationship you may have had regarding this property or operations thereon with the following entities:*

i. *Fox Avenue Warehouse Corporation,*
ii. (b) (6)
iii. *Indal Corporation,*
iv. *Industrial Indemnity Company,*
v. (b) (6)
vi.
vii. *Marine Power and Equipment Co., Inc.*
viii. *National Steel Corporation Co.,*
ix. *Seattle Iron & Metals Corporation,*
x. *Southpark Investment Company, and*
xi. *Young Corporation.*

(b) (6) **is the owner of the property and landlord to Dawn. To the best of Dawn's knowledge and information, Dawn has no business relationship with any of the other entities listed in this request.**

b) *Provide the names and last known address of any tenants or lessees, the dates of their tenancy and a brief description of the activities they conducted while operating on the above mentioned site including but not limited to the following entities:*

i. *Bunge Foods Processing LLC,*
ii. *Ener-G Foods, Inc.*
iii. *Oroweat Foods Company, and*
iv. *Sam Wylde Flour Co.*

Bunge Foods was the lessee-in-possession and operator of the Plant immediately prior to Dawn. The last known address for Bunge Foods is: Bunge Foods Corporation, 11720 Borman Drive, St. Louis, Missouri 63146-1000. Dawn has no information regarding the other entities listed in this request.

c) *If not already provided, identify and provide a last known address or phone number for all persons, including Respondent's current and former employees or agents, other than attorneys, who have knowledge or information about the generation, use, purchase, storage, disposal, placement, or other handling of hazardous materials at, or transportation of hazardous materials to or from, the site.*

Dawn has no information responsive to this request which has not already been provided in response to other requests.

4. **Financial Information**

a) *Provide true and complete copies of all federal income tax documents, including all supporting schedules, for 2002, 2003, 2004, 2005, 2006 and 2007. Provide the federal Tax Identification Number and, if documentation is not available, explain why in detail.*

OBJECTION: Based on a good faith belief that no factual or legal basis exists upon which Dawn could be adjudged a potentially responsible party for the conditions at the Lower Duwamish Waterway Superfund Site, this request is premature. Furthermore, this request exceeds the scope and authority of EPA set forth in 42 U.S.C. § 9604(e).
Without waiving the foregoing objection, Dawn states that its federal Tax Identification Number is (b) (6)

b) *Provide the Respondent's financial interest in, control of, or that the Respondent is a beneficiary of any assets (in the U.S. or in another country) that have not been identified in your federal tax returns or other financial information to be presented to EPA. If there are such assets, please identify each asset by type of asset, estimated value, and location.*

Not applicable.

c) *If Respondent is, or was at any time, a subsidiary of, otherwise owned or controlled by, or otherwise affiliated with another corporation or entity, then describe the full nature of each such corporate relationship, including but not limited to:*

- i. *a general statement of the nature of relationship, indicating whether or not the affiliated entity had, or exercised, any degree of control over the daily operations or decision-making of the Respondent's business operations at the Site;*
- ii. *the dates such relationship existed;*
- iii. *the percentage of ownership of Respondent that is held by such other entity(ies);*
- iv. *for each such affiliated entity provide the names and complete addresses of its parent, subsidiary, and otherwise affiliated entities, as well as the names and addresses of each such affiliated entity's officers, directors, partners, trustees, beneficiaries, and/or shareholders owning more than five percent of that affiliated entity's stock;*
- v. *provide any and all insurance policies for such affiliated entity(ies) which may possibly cover the liabilities of the Respondent at the Site; and*
- vi. *provide any and all corporate financial information of such affiliated entities, including but not limited to total revenue or total sales, net income, depreciation, total assets and total current assets, total liabilities and total current liabilities, net working capital (or net current assets), and net worth.*

Dawn Food Products, Inc. is the ultimate parent company and the lessee of the Fox Avenue property. Dawn has no information responsive to the remaining subparts of this request.

5. Insurance Coverage

a) *Provide copies of all property, casualty and/or liability insurance policies, and any other insurance contracts referencing the site or facility and/or Respondent's business operations (including, but not limited to, Comprehensive General Liability, Environmental Impairment Liability, Pollution Legal Liability, Cleanup Cost Cap or Stop Loss Policies). Include, without limitation, all primary, excess, and umbrella policies which could be applicable to costs of environmental investigation and/or cleanup, and include the years such policies were in effect.*

Insurance policies that potentially provide coverage for the Fox Avenue plant between 2004-2008 are provided (on a CD-ROM).

b) *If there are any such policies from question "5a" above which existed, but for which copies are not available, identify each such policy by providing as much of the following information as possible:*

i. the name and address of each insurer and of the insured;
ii. the type of policy and policy numbers;
iii. the per occurrence policy limits of each policy; and
iv. the effective dates for each policy.

Not applicable.

c) *Identify all insurance brokers or agents who placed insurance for the Respondent at any time during the period being investigated, as identified at the beginning of this request, and identify the time period during which such broker or agent acted in this regard.*

Insurance brokers or agents who sold insurance products to Dawn covering the Fox Avenue plant are identified in the insurance paperwork produced in response to Request 5.a. above.

d) *Identify all communication and provide all documents that evidence, refer, or relate to claims made by or on behalf of the Respondent under any insurance policy in connection with the site. Include all responses from the insurer with respect to any claims.*

Not applicable.

6. Compliance with This Request

a) Describe all sources reviewed or consulted in responding to this request, including, but not limited to:

i. the name and current job title of all individuals consulted;

In addition to legal counsel, the following persons were consulted during the search for information responsive to these requests:

Arnie Eilertsen, Safety and Environmental Manager, Seattle facility.

Mark L'Esperance, General Manager, Seattle facility.

Stuart Smith, Corporate Safety and Environmental Manager.

Max Waagner, Corporate Director of Global Safety.

Loren Polak, Environmental Manager, Bunge Foods.

William Guimont, landlord and Fox Avenue facility owner.

Stephen Gorham, P.E., Advanced Environmental Management Group, LLC, consultant for Dawn.

Amarjit "Sid" Sidhu, Director of Management Services, Advanced Environmental Management Group, LLC, consultant for Dawn.

Any current employees or consultants of Dawn should be contacted through Dawn's legal counsel.

ii. the location where all documents reviewed are currently kept.

Any documents referenced or reviewed in preparing this information response are maintained at the Fox Avenue plant (Seattle, Washington), Dawn's corporate headquarters (Jackson, Michigan), or at the offices of Dawn's legal counsel (Indianapolis, Indiana).

AS TO OBJECTIONS:

E. Sean Griggs

E. Sean Griggs, Esquire
BARNES & THORNBURG LLP
11 South Meridian Street
Indianapolis, Indiana 46204
Telephone: (317) 236-1313

CERTIFICATION

I hereby certify that the foregoing responses are true and correct to the best of my knowledge and belief based upon the information and records available to me.

Signature

Stuart Smith
Printed Name

Assistant Secretary
Title

STATE OF MICHIGAN)
) SS:
COUNTY OF JACKSON)

Before me, a Notary Public, in and for said County and State, personally appeared Stuart Smith, and acknowledged the execution of the foregoing instrument, this 15 day of September, 2008.

Witness my hand and Notarial Seal this 15 day of September, 2008.

Darlene R Wallace
Notary Public
Residing in Jackson County, Michigan.

My Commission Expires:

3-10-12

DARLENE R. WALLACE
NOTARY PUBLIC, STATE OF MI
COUNTY OF JACKSON
MY COMMISSION EXPIRES Mar 10, 2012
ACTING IN COUNTY OF Jackson

SNA32

FedEx. USA Airbill FedEx Tracking Number 809897240920 | 0210 Form I.D. No. **FedEx Retrieval Copy**

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Company BARNES & THORNBURG ETAL

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Dept./Floor/Suite/Room

City INDIANAPOLIS State IN ZIP 46204

2 Your Internal Billing Reference Information

3 To

Recipient's Name Claire Hong Phone ( )

Company U.S. Environmental Protection Agency, Region 10

Environmental Cleanup Office, ECL-111

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4b Express Freight Service *Packages over 150 lbs.* Delivery commitment may be later in some areas.

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CA ☐ Cargo Aircraft Only

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Form I.D. No. 0210 SNA32

Recipient's Copy

1 From
Date 9/15/08 [redacted]
Sender's Name E. Sean Griggs Phone (317) 231-7404
Company BARNES & THORNBURG ETAL
Address 11 S MERIDIAN ST STE 815
Dept./Floor/Suite/Room
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☐ Check here if residence (Extra charge applies for FedEx Express Saver)
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(To "HOLD" at FedEx location, print FedEx address here) Dept./Floor/Suite/Room
City Seattle State WA ZIP 98101

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Declared value limit $500.
☒ FedEx Box
☐ FedEx Tube
☒ Other Pkg.

6 Special Handling
Does this shipment contain dangerous goods?* (One box must be checked)
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☐ Yes (As per attached Shipper's Declaration)
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☐ Cargo Aircraft Only
*Dangerous Goods cannot be shipped in FedEx packaging.

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Total Packages	Total Weight	Total Declared Value*	Total Charges
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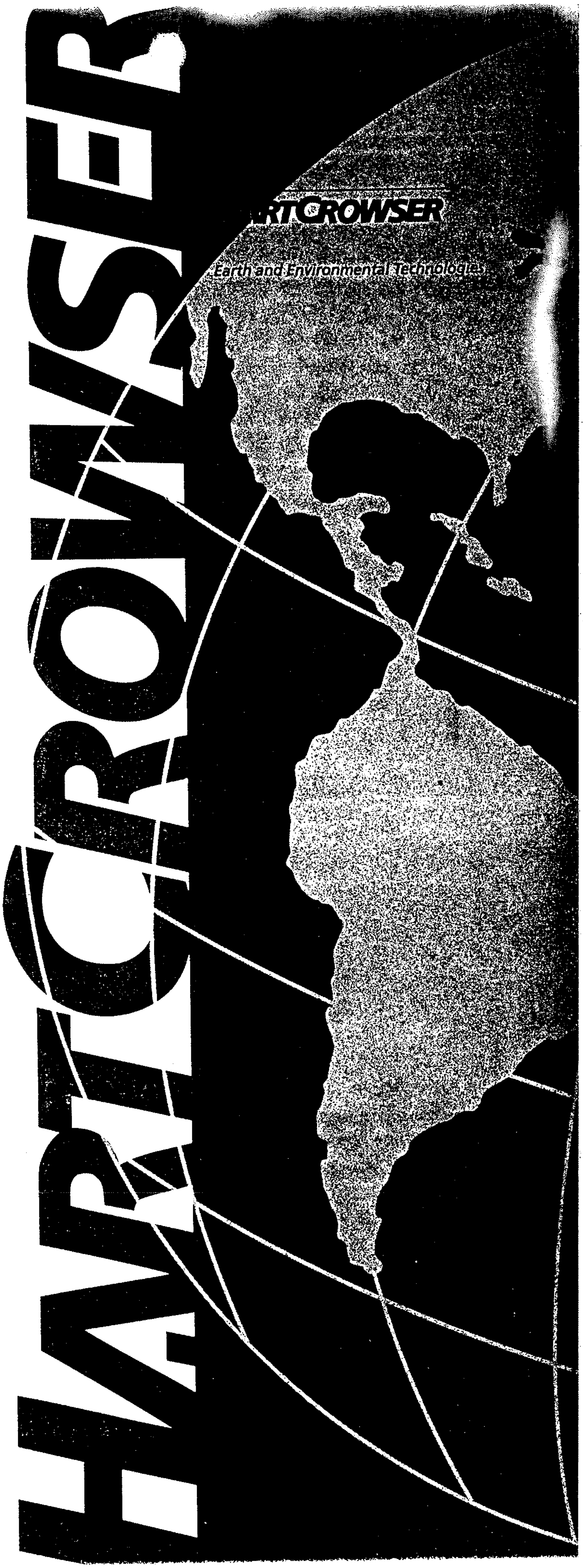
Preliminary Environmental Assessment
6901 Fox Avenue South
Seattle, Washington

Prepared for
Maple Leaf Property
Management

June 19, 1996
J-4548(B)

original with all
appendices to
Will Guimont
10/23/96



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POTENTIAL FOR ENVIRONMENTAL EFFECTS

PRELIMINARY ENVIRONMENTAL ASSESSMENT
6901 FOX AVENUE SOUTH
MAPLE LEAF PROPERTY
SEATTLE, WASHINGTON

1.0 EXECUTIVE SUMMARY AND RECOMMENDATIONS

The following summarizes our findings and recommendations concerning potential adverse environmental conditions resulting from current and past activities at the subject property and neighboring properties.

1.1 Potential On-Site Environmental Concerns

Historical Industrial Operations

The potential on-site environmental concerns that were identified are primarily associated with historical industrial operations on the subject property. Operations such as ship repairs, sheet metal fabrication, and electric thermostat manufacturing may have had associated releases of lead-based and copper-based paint, mercury, solvents, greases, and oils. The area of the subject property most likely to have been impacted from these operations is located at the southwest side of the property.

Recommendation. A limited subsurface investigation of soil and groundwater conditions in the southwestern area of the subject property and near shore sediments is recommended to identify the existence of potential chemicals of concerns. Recommended analyses include total petroleum hydrocarbons (TPH), heavy metals (particularly lead, mercury, and copper), and volatile organic compounds (EPA Priority Pollutant List). The electric manufacturing operation was located at the northeastern side of the subject property and is currently covered by the warehouse. A limited subsurface investigation of soil is recommended at the north and east side of the warehouse. Soil samples from these areas should be submitted for analysis of mercury.

Asbestos

There may be asbestos-containing material in the warehouse given the date of its construction.

Recommendation. An asbestos survey is recommended in the event that suspect ACM is observed in a deteriorated condition and/or prior to building demolition or renovations.

Fluorescent Light Ballasts and Tubes

Some fluorescent lights were observed at the subject property. Fluorescent light ballasts often contain polychlorinated biphenyls (PCBs), a toxic chemical strictly controlled in terms of disposal by the U.S. Environmental Protection Agency (EPA). Also, the fluorescent light tubes contain mercury vapor, which can be released if the tubes are damaged or broken in an uncontrolled manner, such as during demolition or renovation.

Recommendation. All fluorescent light ballasts should be removed by experienced workers prior to building demolition or renovations to the lighting system, and either recycled (method preferred by King County) or disposed of at an approved PCB-waste handling facility. Removal of the ballasts does not involve a chemical or health hazard to the workers, so regular demolition labor may be used for this task. The ballasts should be accumulated into proper disposal containers, however, for pickup and transport to the disposal/recycling facility. Those ballasts that are labeled "PCB free" may be disposed of at a sanitary landfill.

The fluorescent light tubes should be removed from the fixtures, and other areas where they are currently stored and recycled by a vendor specializing in that task.

1.2 Potential Off-Site Sources of Environmental Concern

The subject property is located in an industrialized portion of Georgetown located in South Seattle (Figure 1). There are twenty sites within a 5/8-mile radius of the subject property that are on the Washington State Register of Toxic Sites and thirty-five sites within the same radius with confirmed releases from USTs. The primary potential off-site source of environmental concern that was identified by this review is the Great Western Chemical Company (GWCC) located directly to the east of the subject property. Results from a Hart Crowser report dated June 7, 1996, indicated a groundwater plume of chlorinated solvents originating from GWCC, crosses the southeast corner of the subject property onto the Seattle Boiler Works located directly south of the subject property. Data indicate that concentrations of chlorinated solvents have been attenuating naturally over time. The sources of these contaminants have been removed.

Recommendation. The findings of the GWCC-funded sampling effort at the subject property should be evaluated to further assess potential impacts, if any, from this contaminated plume. An ongoing dialogue with GWCC should be established to keep informed of remediation efforts at GWCC.

2.0 INTRODUCTION

This report presents the results of our preliminary environmental assessment at the property located at 6901 Fox Avenue South in Seattle, Washington (Figure 1). This project was completed in accordance with our proposal (96-47-1080), dated February 14, 1996. Our preliminary environmental assessment provides information on the current conditions and the past practices at the property to evaluate whether it is likely that potentially adverse environmental conditions may be present on the subject property. We understand that Maple Leaf Property Management is interested in selling the subject property and that a preliminary environmental assessment is necessary to assist in the evaluation of the subject property.

Hart Crowser's assessment of the subject property included the following:

- Researching and reviewing historical background records for the subject property and immediately adjacent areas;
- Reviewing regulatory agency database lists for the subject property and adjacent sites;
- Contacting the Region 10 Office of the Environmental Protection Agency (EPA) in Seattle, and the Ecology Northwest Regional Office in Bellevue, to review current available files for the subject property and adjacent properties identified during the database list review;
- Interviewing individuals with knowledge of past and current site activities;
- Reviewing available King County tax records;
- Reviewing City of Seattle building department records;
- Conducting a site reconnaissance to observe the subject property and a walk-by reconnaissance to observe surrounding properties; and
- Preparing this report presenting the findings of our work.

3.0 SITE DESCRIPTION/SITE RECONNAISSANCE

On April 30, 1996, Holly Sawin of Hart Crowser conducted a site reconnaissance to observe the subject property and current business/land use in a two-block radius. Ms. Sawin was accompanied by Jane Lohry, Plant Manager for Bunge Food Corporation, a tenant at the subject property.

3.1 Location and Description

Subject Property

The subject property is located in Georgetown adjacent to the Duwamish Waterway (Figure 1). The subject property is approximately 5 acres in area and over 50 percent of the property is covered by a 123,500-square-foot concrete tilt-up warehouse (Figure 2, Photograph 1 in Appendix B).

Approximately 200 dry products are produced by Bunge Corporation at the subject property such as cake and pancake mixes. Bulk oils such as canola oil are received by rail, and dry bulk items, such as flour and sugar are received by truck.

The different operations were observed inside the plant. The west side of the warehouse is the area where products are mixed. Different recipes are programmed into a Programmable Logic Controller (PLM) and exact quantities of ingredients are electronically released from different storage silos and distributed to large capacity blenders located on the third floor of this area. Dust is controlled by a baghouse, and filters are placed on the blenders.

A small quantity of solvents is used for cleaning equipment in the maintenance department.

To the south of the exterior of the warehouse is a paved parking lot. Truck docks are also located on the south side of the warehouse. A rail spur is located along the north side of the warehouse which is used to bring in raw materials used in producing various food products.

Toward the western end of the warehouse are seven silos. The contents and capacity of these silos are as follows: one sugar silo with a 225,000-pound capacity; four flour silos each with a 225,000-pound capacity; one salad oil silo with a 30,000-pound capacity; and one bulk vegetable silo with a 100,000-pound capacity. This area has a cement curb to prevent spillage of materials into the Duwamish Waterway. A carbon dioxide tank is also located in this area with a 80,000-pound storage capacity. Carbon dioxide is used as a cooling agent in mixes. There is also a propane tank at the south end of the warehouse which is used to fill propane tanks for powering fork lifts. These features are shown in Photograph 2 and on Figure 2.

A City of Seattle Transformer was also observed in this area and was labeled PCB-free. These features are depicted on Figure 2.

No signs of underground storage tanks were observed. No staining was observed in the parking lot which is paved.

Electric service, and storm water/sewer service are provided by the City of Seattle. Lighting throughout the office and associated warehouse are fluorescent.

Surrounding Sites

The surrounding land use is generally industrial. The property is bounded to the north by Northland Services, Inc./ Glacier Marine Transport, to the east by GWCC, to the south by the Seattle Boiler Works, and to the west by the Duwamish Waterway.

The Northland Services, Inc. and Glacier Marine Transport property is primarily comprised of a large warehouse. Containers are stored in the yard. Northland Services is a shipping and receiving transport firm.

The only feature visible from the street at the GWCC property is a large concrete building.

To the south is the Seattle Boiler Works. There are several buildings on this property primarily constructed of corrugated metal. A smokestack was observed in the yard at the north side of its property adjacent to the subject property.

A more extensive review of surrounding land-use is provided in the **REGULATORY AGENCY LIST AND FILE REVIEW** and **SITE HISTORY** sections.

4.0 GEOLOGY AND HYDROGEOLOGY

4.1 Regional Geology and Hydrogeology

Soils in the area are primarily alluvial sands and silts with discontinuous ares of recent fill. The fill soils generally appear to be of local origin, including some debris and dredge spoils from river channel improvements, but mainly local soils disturbed by construction.

Below the fill are alluvial soils comprised of sand and silty sand with occasional silt interbeds. Reports by others indicate that alluvial deposits extend to greater that 60 feet. Hart Crowser explorations in the vicinity of the subject property encountered considerable variation in apparent density or consistency of these soils.

Groundwater is typically encountered below about 10 feet below the surface. Regional groundwater flow direction generally appears to be in a southwestern direction and reflects the Duwamish Waterway drainage pattern. Tidal fluctuations appear to affect groundwater in the vicinity of the subject property. Fill in old meander channels also may affect the local groundwater flow patterns in this area.

5.0 REGULATORY AGENCY LIST AND FILE REVIEW

The purpose of this review is to acquire regulatory agency file information for the subject property and to identify potential sources of contamination or activities of environmental concern. The review is limited to current files and does not include a review of archived information.

VISTA Information Solutions, Inc. (VISTA) conducted a review of the regulatory agency database lists defined below. The report of the database search provided by VISTA included a list of databases searched, a statistical profile indicating the number of listed properties within 1½ mile of the subject property, selected detailed information from federal and state lists, and an overview map illustrating the identifiable and mappable sites within 1 ½ mile of the subject property. The report generated by VISTA, which includes maps illustrating the agency-listed sites, is provided in Appendix B.

Regulatory agency lists reviewed and search distances are detailed below:

- U.S. Environmental Protection Agency (EPA) National Priorities List (NPL) (September 1995) - List of "Superfund" sites (search radius of 1½ mile);

- EPA Region 10 CERCLIS (December 1995) - List of sites currently being reviewed for possible inclusion on the NPL (search radius of 1½ mile);

- EPA Region 10 RCRA-TSD (February 1996) - List of facilities which report generation, storage, transportation, treatment or disposal of hazardous waste (search radius of 1½ mile);

- EPA Region 10 RCRA Corrective Action Sites (CORRACTS) (February, 1996) - List of RCRA facilities which are undergoing corrective action (search radius of 1½ mile);
- EPA Region 10 RCRA Violators (RCRA-Viols/En) (February 1996) - List of RCRA facilities that have been cited for RCRA violations at least once since 1980 (search radius of 3/4 mile);
- EPA Region 10 Toxic Release Inventory System (TRIS) (May 1995) - Inventory of toxic chemicals emissions from certain facilities (search radius of 1/4 mile);
- EPA Emergency Response Notification System (ERNS) List (December 1995) - List of reported CERCLA hazardous substance releases or spills (search radius of 1/8 mile);
- NFRAP List (December 1995) - List of sites where, following an initial investigation, no contamination was found, contamination was removed quickly, or the contamination was not serious enough to require Federal Superfund action or NPL consideration (search radius of 1 mile);
- Ecology Confirmed and Suspected Contaminated Sites Report (SPL and SCL) (November 1995) - List of sites currently being investigated by Ecology under the Model Toxic Control Act (MTCA) (search radius of 1½ mile);
- Ecology Leaking Underground Storage Tank (LUST) List (November 1995) - List of registered leaking USTs in Washington (search radius of 1 mile);
- Ecology Underground Storage Tank (UST) Registration List (April 1996) - List of USTs registered in Washington (search radius of 1/4 mile);
- Ecology Solid Waste Facility List (SWFL) (December 1995) - List of permitted solid waste landfills operating in Washington (search radius of 1½ mile); and
- Ecology Toxic Cleanup Program Site Register (WA Site Register) (December 1995) - List of sites registered with Ecology Toxics Cleanup Program and being cleaned up under the Model Toxics Control Act (MTCA) (search radius 1 mile).

On April 10, 1996, we made Freedom of Information Act (FOIA) requests to Ecology and EPA Region 10 to inquire about the availability of regulatory file information for the subject property and any identified nearby properties regarding potential sources of contamination or activities of environmental concern to the subject property. No additional information was provided by the EPA FOIA.

5.1 Regulatory List Review

Subject Property

The subject property did not appear on the lists that VISTA reviewed.

Surrounding Properties

Surrounding sites identified on one or more regulatory agency database lists and located sufficiently close to the subject property, that are in the inferred upgradient or cross-gradient groundwater flow direction from the subject property are listed below. Below is a summary of the VISTA report listings.

- **Great Western Chemical Company** (VISTA Site 3), located at 6900 Fox Avenue South, which is approximately 100 feet to the east of the subject property in the inferred cross gradient groundwater direction, appears on the SPL, LUST, and UST lists and is noted because of its known contamination which may be migrating toward the subject property.

- **Northland Services Inc.** (VISTA Site 11), located at 6701 Fox Avenue South is approximately 100 feet to the north of the subject property in the inferred upgradient groundwater flow direction, appears on the UST/AST and RCRA Violations list. VISTA reports this facility as having two USTs removed and one UST which is exempt. The RCRA violation pertained to this facilities status as a small generator of hazardous materials and the VISTA report indicates that this facility came into compliance in 1994.

- **Kemp Pacific Seafoods** (VISTA Site 11), located at 6701 Fox Avenue South, same location as Northland Services, Inc., is listed on ERNS. A release of 20 gallons of diesel fuel to the Duwamish Waterway was reported in 1988.

A number of facilities on the VISTA report appear on the RCRA, UST, and TRIS lists. Appearance on these lists indicates hazardous waste generation, registration of underground storage tanks, and use of an EPA-listed toxic chemical in manufacturing, respectively, and does not necessarily indicate releases to soils and/or groundwater.

5.2 Regulatory File Review

Subject Property

Ecology and EPA did not have any files for the subject property. However, during the site visit a Puget Sound Air Quality Authority (PSAPCA) Permit No. 28406 was observed which pertained to dust control requirements on the subject property.

Surrounding Properties

On April 22 1996, Holly Sawin of Hart Crowser reviewed available agency files at Northwest Regional Office of Ecology in Bellevue, Washington for the Great Western Chemical Company facility.

Great Western Chemical Company has operated a chemical and petroleum repackaging and distribution facility at 6900 Fox Avenue South since the mid-1950s. Soil and groundwater contamination from petroleum and solvent products have been identified and currently are under investigation under a Consent Decree process between the Ecology and GWCC. A Remedial Investigation and Preliminary Risk Assessment, prepared by Hart Crowser, dated December 1993, reports that a variety of chemical constituents have been found beneath and downgradient of the site. Hart Crowser reports that of the seventy-four chemicals or chemical groups of interest detected at this site, tetrachloroethene (PCE) represent the primary risk to human health and the environment. PCE and other constituents are reported as having migrated to the southwest toward the Duwamish Waterway.

On July 27, 1994, Ecology agreed to modify the Agreed Order as proposed by GWCC to approve construction of interim remedial measures which include soil vapor and groundwater treatment and the permanent closure of the six remaining chemical product storage USTs.

A Hart Crowser report, Technical Memorandum No. 11 Off-Site GeoProbe Study and Baseline and Analysis Results, Great Western Chemical Company Facility, Seattle, Washington, dated June 7, 1996, presents results from soil vapor and groundwater sampling that was conducted to define the extent of the contaminated groundwater plume originating on the GWCC site. Samples taken at the GWCC site and the Seattle Boiler Works property, located to the south of the subject property, indicate that the chlorinated solvent plume crosses the southeast corner of the subject property. Tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (cis-1,2-DCE) were the primary volatile organic compounds detected. No samples were collected on the subject property.

6.0 SITE HISTORY

We researched the history of land use activities on the subject property and adjacent properties to identify and evaluate potential sources of contamination or activities that could impact the subject property.

Historical characterization was developed from the following sources:

- Aerial Photographs (Walker & Associates, 1956, 1960, 1985, and 1990; Pacific Aerial Surveys, 1981, 1982, and 1985; H.G. Chickering, 1965; and Washington State Department of Natural Resources, 1970);
- USGS Topographic Maps (7½ minute quadrangle Seattle South, Washington, 1973 and 1994);
- Sanborn Fire Insurance Maps (South Seattle, 1917, 1929, 1949, and 1950);
- County Directories (Polk's - Seattle, 1938, 1948, 1959, 1969, 1979, and 1989);
- County Atlas (Kroll - Seattle, 1920, 1950, 1966, and 1987);
- Washington State Tax Assessor's Records; and
- Interview with Ken Griffin, former Vice President of National Steel Corporation.

No title documents were available for review.

Dates in the text refer to historical occupancy records and interviews, and provide an approximate indication of the period of operation for each business or activity identified, except where explicitly stated.

6.1 Subject Property

The subject property is located in the lower Duwamish Waterway Valley near Georgetown. The river formerly meandered through the area until a 1913 to 1916 dredging program provided a straightened channel. The 1917 and 1929 Sanborn maps depict the subject property as the location of the McAteer Ship Building Company.

Tax assessor records indicate that buildings were constructed in 1929 at the subject property by the National Steel Corporation (NSC) which began operations on the parcel to the south of the subject property in approximately 1908. According to Ken Griffin, former Vice President of NSC, NSC was originally a ship building company and apparently its operations were expanded to encompass the McAteer Ship Building Company in 1929. Features at the NSC property include a general storage area, an electric thermostat manufacturing plant, a sheet metal and assembling department, a woodworking department, a paint spraying department and a triangle-shaped office on the east end of the property adjacent to Fox Avenue South. Operations included metal fabrication, spray painting, and electric thermostat manufacturing. A 1946 aerial photograph of the subject property shows seven buildings and the land appears to be unpaved.

Another ship building company, the Anderson Ship Building Company was located at the western side of the subject property during the 1930-1950 time period. Operations included ship repair and painting. A 1949 Sanborn map depicts a planned wharf on wood piling at the west end of the subject property.

Mr. Griffin stated that Mr. Wilson, one of the original owners of this company sold NSC to the Eisinga family in approximately 1945 which managed the company up until about 1966 when their operations were moved to California. In the 1950s NSC operations located to the southern parcel. Issacson Steel Structural Steel, a distribution warehouse, leased the western portion of the subject property during the 1970s. Emerson GM Diesel Inc., a sheet metal fabrication and generator manufacturing company, is listed in the Polk Directories as an occupant at the subject property until at least 1969.

According to King County Tax Assessor records the existing tilt-up concrete warehouse on the subject property was constructed in 1977 and all of the other buildings were presumably demolished at that time. Fox Avenue Warehouse Corporation is listed as the owner of the subject property. Carlin Foods and Sam Wild Flour and Energy Foods occupied the building up until approximately 1987 when Bunge Foods became the tenant.

6.2 Surrounding Properties

A listing of firms, historically located in the surrounding area of the subject property, with the potential for environmental effects is presented in Appendix D. The history of immediately adjacent properties are discussed below.

North

A 1946 aerial photograph shows a building at the western side of this adjacent property and the paint company building at the eastern side. A 1949 Sanborn map shows a paint manufacturing company, Far West Paint Company, at the eastern portion of this parcel and a spur track which runs along its southern border. A 1956 aerial photograph does not show the building to the west and an addition to the paint building has been added to its west side. This property appears undeveloped in a 1982 aerial photograph. A 1985 aerial photograph shows the existing warehouse, which covers the majority of the parcel, which is labeled as occupied by Marine Power Equipment company. This is the current location of Northland Services, Inc./ Glacier Marine Transport. Northland Services, Inc. is a tug and shipping company primarily providing services to Alaska.

Northeast and East

To the northeast of the subject property is the location of the former Federal Pipe Company, a wood pipe and tank manufacturing company, as depicted on a 1949 Sanborn map. The majority of this parcel was covered by buildings as also observed in 1946 and 1956 aerial photographs. It is shown on a 1985 aerial photograph as the location of Emerson G.M. Diesel Inc and several of the older buildings appear to have been demolished and new buildings constructed. Emerson G.M. Diesel Inc. had a rebuild shop for generators at this location. **Kohler Power Systems** is the current business at this location.

The **Great Western Chemical Company (GWCC)**, located to the northeast of the subject property, was developed in 1918 by the Seattle Chain & Manufacturing Co. The company held a land lease from King County from 1918 to 1937, when they purchased the property (Lots 11 through 14) outright. The majority of the chain manufacturing facilities were located adjacent to and east of the current GWCC operation. Seattle Chain forged industrial chain using at least ten oil- and coke-fired furnaces. The furnaces were located at the north and south wings of the main structure, which was adjacent to East Marginal Way South. During the chain manufacturing period, most of the western portion of the property was undeveloped.

In the late-1940s, ownership of Seattle Chain apparently transferred to interests headed by a Raymond Round of Ohio. The corporation subsequently was renamed Round-Seattle Chain Co. City of Seattle building permits indicate that Round-Seattle Chain constructed a small brick industrial incinerator on Lot 14 in 1954. In August 1954, however, the chain company was sold to Republic Steel. Republic then sold all lots to Marian Enterprises two years later in November 1956 and Great Western Chemical Company established a lease for operations. GWCC has been at this location since that time. Developments included the installation of USTs in 1956, and additional USTs were installed in the 1970s. In 1989, plant renovations were implemented including the closure of all chemical product USTs on the site. Closure of the main UST tank farm was completed in 1990. Since 1990, ongoing remedial activities as discussed in the ***Regulatory File Review*** section have occurred on this site.

South

The **National Steel Corporation Company** was established to the immediate south of the subject property, north of Myrtle Street and west of Fox Avenue in approximately 1908, according to Ken Griffin, former Vice President of National Steel Corporation. Tax assessor records indicate that buildings were constructed in 1921 and 1942. Originally the National Steel Corporation was a ship building company and its operations expanded to the north, the subject property parcel, shortly after World War II. The operations at the subject property are discussed above in the ***Subject Property*** section. A review of aerial photographs and historical documents indicates a wide range of metal fabrication activities associated with the NSC operation. The tank and boiler operations included boiler reaming, galvanizing, and aluminum dipping facilities. Tar kettles are also present.

Mr. Griffin stated that Mr. Wilson, one of the original owners of this company, sold to the National Steel Corporation Company to the Eisinga family in approximately 1945 which managed the company up until about 1966 when operations were moved to California. The Seattle Boiler Works purchased this property in approximately 1966 and is currently at this location. Seattle Boiler manufactures boilers, refuse burners, and incinerators.

7.0 RESULTS OF ASSESSMENT

7.1 Subject Property

Potential environmental concerns were assessed in terms of past and current activities at the subject property. Based on information collected during our historical review there is a potential that the subject property has been impacted by historical on-site operations. Potential concerns include impacts to soil and potential groundwater and nearshore sediments from boat repair operations with lead, copper, and possibly mercury as the constituents of concern. A potential concern associated with electric thermostat manufacturing would be the release of mercury. Later operations such as metal fabrication would be associated with grease and oils, paints, and solvents.

Recent potential environmental concerns are limited to the possible existence of asbestos-containing materials (ACM) within the on-site building given the date of construction of the warehouse and to historical on-site operations.

The transformer on the subject property, owned by Seattle City Light is labeled PCB free. Other transformers in the vicinity of the subject property were identified as containing 1 or less than 1 ppb of PCBs.

7.2 Adjacent Properties

Several nearby properties have documented releases to soil and groundwater. However, the only upgradient off-site source of concern identified was GWCC. GWCC has removed or closed the known sources of releases on its property. Data presented in the Hart Crowser Technical Memorandum No. 11 indicate that the groundwater plume of chlorinated ethanes that is centered on the GWCC property has migrated to the southeast corner of the subject property and onto the Seattle Boiler Works property located directly south of the subject property. Tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (cis-1,2-DCE) were the primary volatile organic compounds detected. Data also indicate that concentrations of these chlorinated solvents have attenuated naturally over time.

8.0 LIMITATIONS

Work for this project was performed, and this report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of Maple Leaf Property Management, for specific application to the subject property. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

It should be noted that Hart Crowser relied on information provided by the individuals indicated above. Hart Crowser can only relay this information and cannot be responsible for its accuracy or completeness.

Our work did not include sampling or testing of drinking water for lead content, sampling for indoor air quality, assessment of ventilation and sewer systems, sampling for radon vapor, identification of PCB transformers, a "good-faith" survey of asbestos and lead, and other items not the standard of practice for our time, unless otherwise noted herein.

Any questions regarding our work and this report, the presentation of the information and the interpretation of the data are welcome, and should be referred to Holly Sawin or Julie Wukelic.

We trust this report meets your needs.

Sincerely,

HART CROWSER, INC.

Holly S. Sawin

HOLLY S. SAWIN
Staff Environmental Scientist

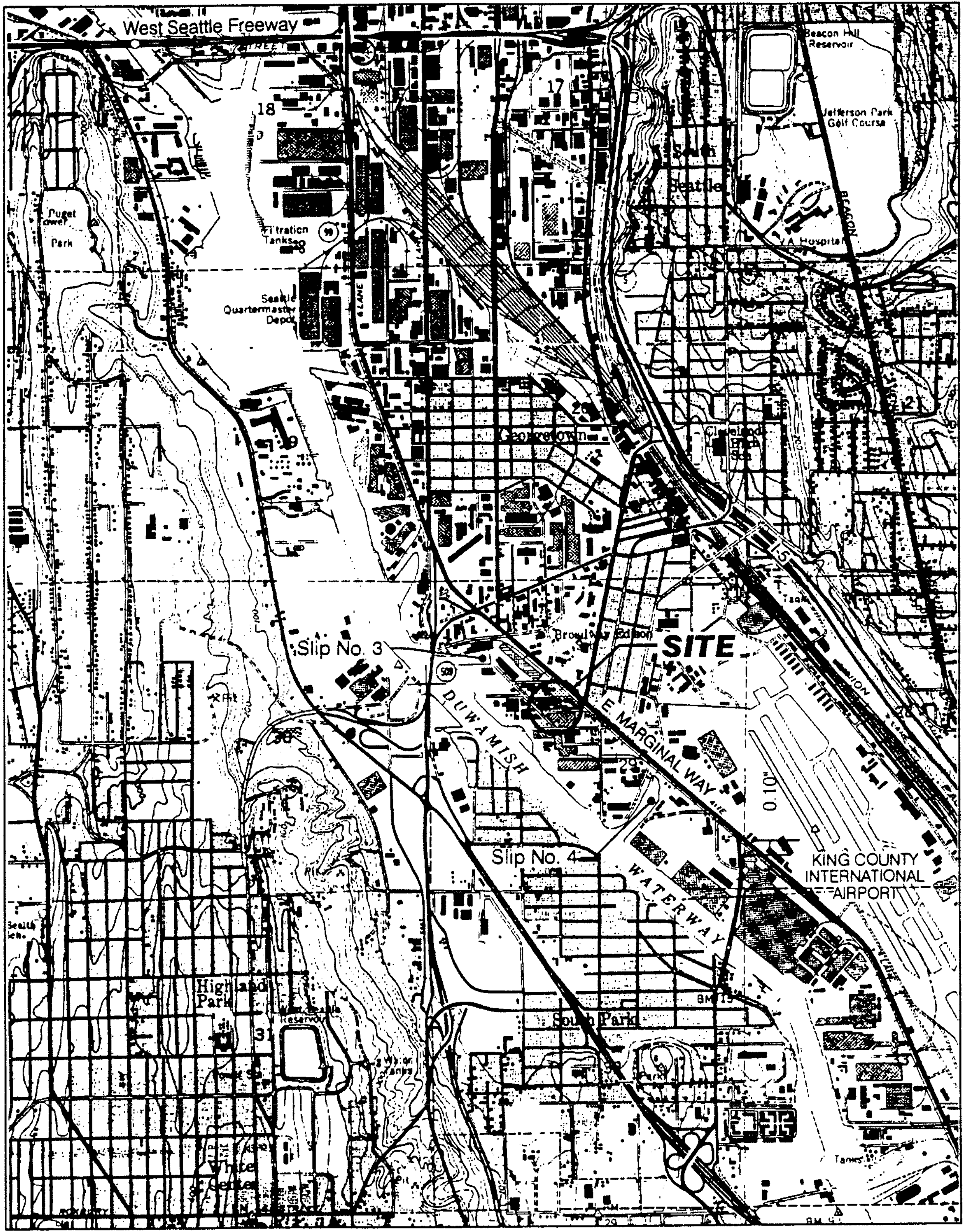
Julie K W Wukelic

JULIE K.W. WUKELIC
Division Manager
Property Assessment/Regulatory Division

HSS/JKWW:sde
MAPLELF.fr

324-9530

Vicinity Map



Note: Base map prepared from USGS 7.5 minute quadrangle map of Seattle South, Washington, dated 1973.

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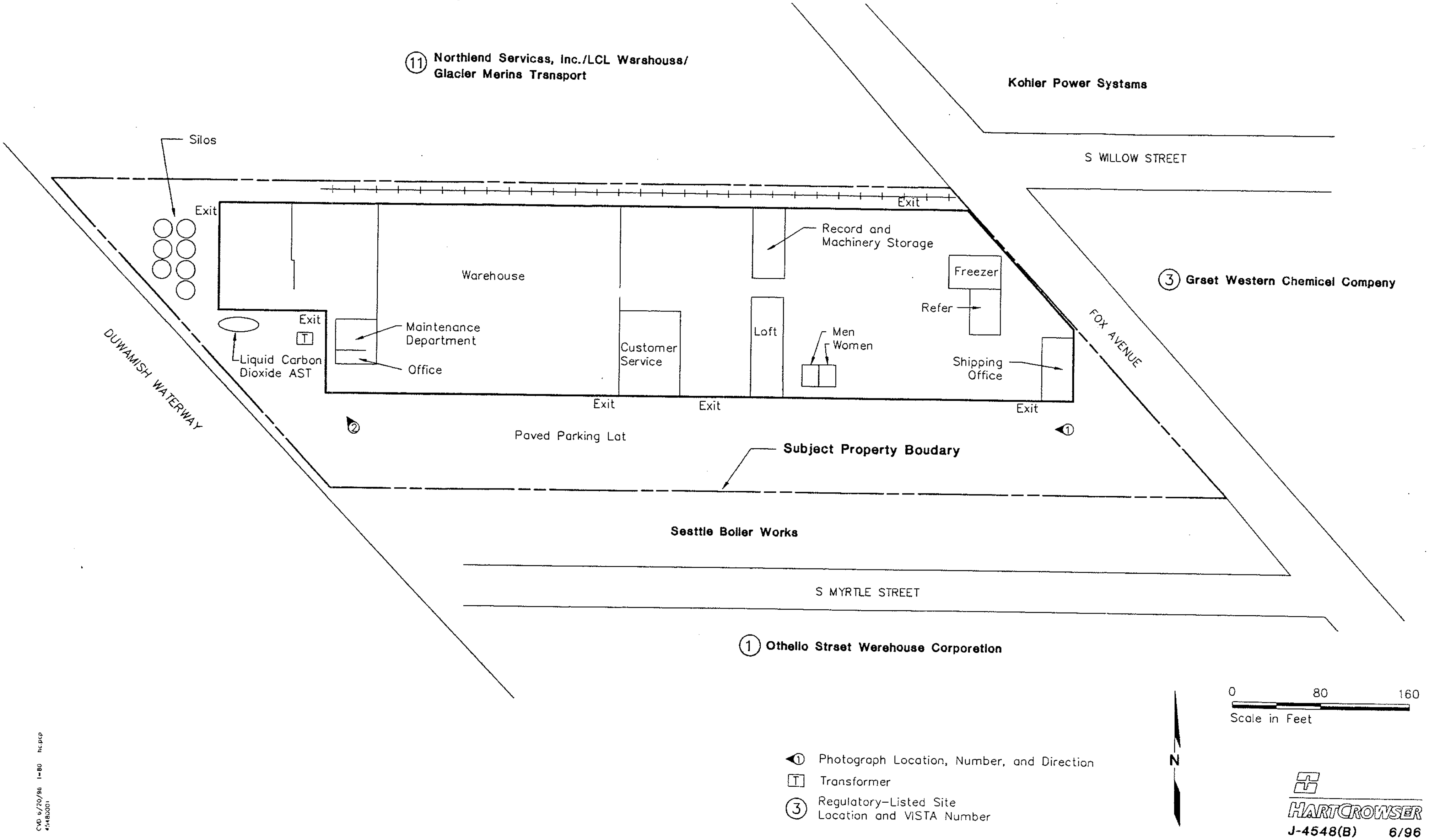
Figure 1

Site Plan Showing Adjacent Properties



◀① Photograph Location, Number, and Direction
T Transformer
③ Regulatory-Listed Site Location and VISTA Number

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Figure 2

CVD 6/20/96 1=80 hc:pcp
45480001

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Earth and Environmental Technologies

Limited Subsurface Investigation
Fox Avenue Property
6901 Fox Avenue
Seattle, Washington

Prepared for
Guimont Trust

November 12, 1996
J-4643

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LABORATORY ANALYTICAL RESULTS
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PROJECT SUMMARY

This summary presents an overview of project findings from our limited subsurface investigation at the Fox Avenue property in Seattle, Washington (Figure 1). The Fox Avenue property includes an approximately 123,000-square-foot concrete tilt-up warehouse covering over 50 percent of the property and asphalt covering the rest of the property (Figure 2).

Subsequent sections of this report should be consulted for expanded discussion and detail, including Table 1 at the end of the report text which summarizes the soil chemical analysis results.

In general, results of the limited subsurface investigation indicate the following:

- There does not appear to be a widespread of soil contamination issue in the areas sampled and analyzed at the subject property, primarily between the 7.5- to 14.0-foot zone. Only two samples were chemically analyzed in the upper 2.5- to 4.0-foot range. The rationale to concentrate on the 7.5- to 14.0-foot zone was because this is the likely area where groundwater fluctuates and where indications of significant impacts to groundwater from on-site sources would be detected.

- The field observations or screening results at the sample locations did not indicate obvious contamination, with the exception of HC-4. HC-4 appeared to contain a mysterious whitish material, metal debris, and petroleum-like odor at depth.

- The metal concentrations primarily were within background levels and TPH was only detected in the soil samples from HC-4 and HC-5.

- Volatile organic compounds were detected in several of the soil samples; however, not at significantly high concentrations. The sample results were not definitive in identifying whether these detectable concentrations were coming from an on-site or off-site source through vapors from the groundwater or in the soil itself from releases. However, based on our screening results and the knowledge from public records that the Great Western Chemical Company is actively working with Washington State Department of Ecology (Ecology) to cleanup up a chlorinated solvent contaminated groundwater plume that has been identified as crossing over the southeast edge of the subject property, the volatiles detected in the soil samples at HC-1 are likely from vapors from this groundwater plume.

RECOMMENDATIONS

The soils in the vicinity of HC-4 and HC-5 could be further assessed to determine the extent of the affected-material discovered in this area.

Additional soil sampling and analysis could be conducted in the upper soils above the water table to further assess the potential for on-site sources of contamination and impacts to groundwater.

If further assessment of on-site groundwater quality is desired, permanent groundwater monitoring wells could be installed and sampled to determine the potential impacts from on-site or off-site sources.

LIMITED SUBSURFACE INVESTIGATION
FOX AVENUE PROPERTY
6901 FOX AVENUE SOUTH
SEATTLE, WASHINGTON

INTRODUCTION

This report presents the results of our limited subsurface investigation for the Fox Avenue property located in Seattle, Washington (Figure 1). The work was completed in accordance with the work scope, as described in our contract (97-11-1003), dated August 29, 1996.

The purpose of the scope of work was to collect subsurface soil information to assist your assessment of the environmental status of the subject property. As discussed in our report, there is one current structure on the subject property. However, prior to the construction of the current structure, several historical structures occupied the subject property that conducted activities such as ship repair, metal fabrication, and electric thermostat manufacturing. In addition, surrounding properties include current and historical industrial businesses such as chemical manufacturing, boiler manufacturing, and transportation companies. These types of industrial uses may represent potential sources such as lead-based and copper-based paint, mercury, solvents, greases, and oils, which if released, could result in potential adverse environmental impacts to site soils ad groundwater.

Our limited subsurface investigation focused on accessible areas (outside the current structure) that represented potential environmental concerns. The rationale for the location of each boring is as follows:

- **HC-1.** Closest to Fox Avenue South and the Great Western Chemical Company (Figure 2). No known on-site historical or current activities were identified in this area that had a high potential for adversely impacting the subsurface conditions.

- **HC-2.** Located in a position near a historical area of the subject property that may have been the sheet metal and assembling area and near a historical area of the adjacent property where a tar kettle building and boiler reaming area were located. There was also a suspect historical aluminum dipping area to the north of this sample location.

- **HC-3.** Located in a position downgradient from HC-2 and near a historical area of the subject property that may have had a paint spray booth.

- **HC-4 and HC-5.** These boring locations were selected because historical uses in this vicinity is believed to have been ship painting and repair. Based on historical maps and aerial photographs, the area of boring location HC-4 and HC-5, is where ships were likely brought up on the shore and painted and maintained. A 1949 Sanborn Fire Insurance map depicts a planed wharf on wood piling in the west end of the property (near HC-4 and HC-5). Ship building was known to occur in this area from 1917 to 1950. The current configuration of the property and location of buildings indicate that this area of historical ship repair and painting

Our work for the current project was completed to assess the chemical quality of subsurface soils near these sources of concern at the subject property.

Scope of Work

The limited Phase II soils assessment scope of work consisted of the following activities:

- Advancing five hollow-stem auger soil borings to an approximate depth of 14 feet;

- Collecting soil samples at 2½-foot-depth intervals in each of the hollow-stem auger borings. The soil samples were screened in the field for indications of chemicals of potential concern;

- Submitting two soil samples from each boring for chemical analysis;

- Evaluating and/or validating field and laboratory analytical data;

- Discussing soil results with Guimont Trust representatives, and preparing this report.

The remainder of this report is divided into five sections:

- **SITE DESCRIPTION** provides a summary overview of the physical setting and adjacent land use of the subject property;

- **PREVIOUS ENVIRONMENTAL REPORT** provides a summary discussion of a previous Phase I Environmental Site Assessment prepared by Hart Crowser in June 1995;

- **SITE GEOLOGY AND HYDROGEOLOGY** summarizes soil stratigraphy and possible groundwater conditions (groundwater flow direction) observed in soil boring explorations installed during the limited subsurface investigation; and

- **RESULTS AND CONCLUSIONS** describes our sampling and analysis rationale; the chemical analyses results for the selected soil samples; provides a general comparison of chemical concentrations to applicable regulatory cleanup levels; and presents our data interpretation and conclusions.

Table 1 summarizes our analytical methods and analytical results. A Vicinity Map is presented on Figure 1. Figure 2 presents a Site and Exploration Plan showing prominent site features and exploration locations. Figures are located after the tables at the end of the text.

Two appendices are also included at the end of this report. Field exploration and sampling methods are provided in Appendix A. Boring log for five borings are presented on Figures A-2 through A-6. A key to the soil boring logs is provided on Figure A-1. A data validation summary and laboratory analytical certificates from Analytical Resources Incorporated (ARI) and the Hart Crowser Chemistry Laboratory are provided in Appendix B.

SITE DESCRIPTION

The Fox Avenue property is located at 6901 Fox Avenue South in the Georgetown area of Seattle, Washington. The size of the property is approximately 5 acres with a majority of that area covered be a 123,500-square-foot concrete tilt-up warehouse (Figure 2).

The Bunge Corporation currently occupies the warehouse. They produce over 200 dry products such as cake and pancake mixes at the subject property. Bulk oils, such as canola oil, are received by rail, and dry bulk items, such as flour and sugar, are received by truck.

Seven silos are also located near the western end of the subject property and contain bulk ingredients used in their production of food products. A shipping office and freezer/refrigerator are located in the eastern portion of the building.

A large asphalt paved parking lot is located to the south of the warehouse. Numerous trucks move in and out of this area during the day and dock up against the south side of the warehouse. A rail spur is located along the north side of the warehouse and the northern property line. Raw materials are brought in that are used in producing various food products.

The subject property is bounded to the north by Northland Services, Inc./ Glacier Marine Transport, to the east by Great Western Chemical Company, to the south by the Seattle Boiler Works, and to the west by the Duwamish Waterway.

PREVIOUS ENVIRONMENTAL REPORT

A preliminary environmental assessment was prepared on the subject property in June 1996. The purpose of the assessment was to determine the likelihood of adverse environmental impacts to the subject property by potential on-site and off-sites sources.

The preliminary environmental assessment report indicated that there was a potential for on-site environmental concerns because of past historical industrial operations on the property and specifically near the southwest side of the property.

These concerns were associated with the possible releases of chemicals associated with ship repair, sheet metal fabrication, and electric thermostat manufacturing.

The other main potential for on-site contamination is from the off-site source of the Great Western Chemical Company, located directly east of the subject property and on the east side of Fox Avenue South. The Great Western Chemical Company is actively working with Ecology and is cleaning up the identified groundwater plume. The groundwater plume of chlorinated solvents originating from GWCC, crosses the southeast corner of the subject property onto the Seattle Boiler Works located directly south of the subject property.

In addition, there were 20 sites identified within 5/8-mile radius of the subject property that are on Ecology's Register and Toxic Sites and thirty-five sites within the same radius with confirmed releases from USTs.

Historical uses surrounding the subject property have also been generally industrial.

The preliminary environmental assessment recommends conducting a limited subsurface investigation in the southwestern area of the property.

GEOLOGY AND HYDROGEOLOGY

Regional Geology and Hydrogeology

Soils in the area are primarily alluvial sands and silts with discontinuous areas of recent fill. The fill soils generally appear to be of local origin, including some debris and dredge spoils from river channel improvements, but mainly local soils disturbed by construction.

Below the fill are alluvial soils comprised of sand and silty sand with occasional silt interbeds. Reports by others indicate that alluvial deposits extend to greater that 60 feet. Hart Crowser explorations in the vicinity of the subject property encountered considerable variation in apparent density or consistency of these soils.

Groundwater is typically encountered below about 10 feet below the surface. Regional groundwater flow direction generally appears to be in a southwestern direction and reflects the Duwamish Waterway drainage pattern. Tidal fluctuations appear to affect groundwater in the vicinity of the subject property. Fill in old meander channels also may affect the local groundwater flow patterns in this area.

RESULTS AND CONCLUSIONS

This section of the report presents our investigation rationale, results of our work, and our conclusions based on these results.

Investigation Rationale

Seven general areas were identified as potential areas of concern based on our existing knowledge of the site and the previous preliminary environmental assessment. These seven areas include:

- The former ship repair area;
- The former potential paint spraying area;
- The former potential sheet metal and manufacturing area;
- The former electric thermostat manufacturing area;

- The former off-site tar kettle area on the Seattle Boiler Works property;

- The former off-site boiler reaming area on the Seattle Boiler Works property; and

- The southeast corner of the subject property near the Great Western Chemical Company.

Our scope of work for a limited subsurface investigation was designed to obtain information on the subsurface conditions near or downgradient of these areas. These areas were identified from reviewing historical Sanborn Fire Insurance Maps and aerial photographs. Their exact locations or previous existences are not confirmed; however, the general areas have been identified as potential concerns.

Most of the subject property is currently occupied by a large concrete tilt-up warehouse which covers some of these identified potential historical areas of concern. Therefore, our boring locations were limited to the undeveloped asphalt-paved areas and locations based on proximity, general representation of an area, or presumably downgradient locations. The objective was to screen these potential areas as possible and to assess major widespread contamination issues.

Soil Sampling and Analysis Results

Five soil borings were advanced by McDonald Drilling Inc. using a hollow-stem auger drill rig. The locations of the soil borings are presented on Figure 2. The depth of the soil borings range from 9.0 feet (HC-5) to 14.0 feet (HC-1 through HC-4) below ground surface. Soil samples were collected by Hart Crowser personnel at 2½-foot-depth intervals.

Field screening using visual observations and a photoionization detector (PID) did not indicate the presence of volatile organic compounds in hollow-stem soil samples except those collected from HC-1 and HC-4. Thus, we collected soil samples around the apparent groundwater interface zone from each of the hollow-stem auger borings and submitted them to the laboratory for chemical analysis.

Chemical analysis of soil samples included:

- Total Metals (EPA Method 7000 Series);
- Polychlorinatedbiphenols (PCBs) (EPA Method 8081);
- Total petroleum hydrocarbons (State Method WTPH-HCID); and
- Volatile Organic Compounds (VOCs - EPA Method 8260).

Table 1 presents a summary of detected analytes in soil. Appendix B presents the Hart Crowser and ARI laboratory certificates for the soil samples analyzed.

Boring HC-1. Low concentrations of chlorinated solvents, and metals, were detected in the soil samples collected at 12.5 to 14.0 feet (S-3) in HC-1 (Figure 2). Volatile organic compounds or metals were not analyzed at the 7.5- to 9.0- or 2.5- to 4.0-foot-depth intervals. At 7.5 to 9.0 feet (S-2), and 12.5 to 14.0 (S-3), the test results indicated non-detectable concentrations of TPH. TPH was not analyzed at the 2.5- to 4.0-foot-depth interval.

Groundwater likely fluctuates 1 to 2 feet at the depth of the detectable concentrations (9.0 to 13.0 feet is possible) based on the sites location relative to the Duwamish River and seasonal influence. At the time of drilling, groundwater was noted at an approximate depth of 11.0 feet.

Based on the depth of groundwater, the known source of chlorinated solvents in the groundwater from the Great Western Chemical Company, the location of HC-1 near the identified contaminated groundwater plume in the southeast corner of the subject property, the Photoionization Detector (PID) readings for volatile organics in the upper fill material being low or zero, and that no known on-site potential historical sources were identified near HC-1 for the detected concentrations of chemicals, the detectable concentrations of VOCs and metals in the soil are likely from an off-site source being transported through the groundwater.

The Great Western Chemical Company is actively working with Ecology to cleanup the identified contaminated groundwater plume.

The PID readings of 1 and 5 detected in samples S-2 and S-3 respectively, although not very high, indicate volatile organic vapors in the soil, likely from the groundwater.

Concentrations of volatile organics in soil do not exceed conservative cleanup levels specified in the State Model Toxics Control Act (MTCA).

Boring HC-2. There were slight detections of chlorinated solvents and metals in the soil sample collected at 7.5 to 9.0 feet (S-2) in HC-2, which is downgradient from HC-1 and the known contaminated groundwater plume. Again, this depth likely represents the water table zone (groundwater was also noted at 11.0 feet during drilling).

Therefore, these low detectable concentrations of VOCs and metals in the soil are likely from an off-site source.

VOCs or metals were not analyzed for the upper soil sample (S-1), so we cannot rule out the possibility of these detectable concentrations of chemical constituents in the soils analyzed in HC-2 were from an on-site source. However, the PID readings for all of the soils sampled at this location were less than 1, indicating no or low concentrations of volatile organic compounds.

Boring HC-3. Very low level VOCs were detected in the soil sample analyzed (S-2 at 7.5 to 9.0 feet), no VOCs were indicated in the other soil samples screened with the PID (S-1 and S-3) from HC-3. Groundwater was noted at a depth of 10.5 feet at the time of drilling for HC-3. Metals were also analyzed for S-2 and only low concentrations near or below background levels were detected.

No concentrations of TPH were detected in S-1 or S-2 from HC-3.

Boring HC-4. Low concentrations of VOCs were detected in soil samples collected at 7.5 to 9.0 feet (S-3) and 12.5 to 14.0 feet (S-4) in HC-4. Total metals and TPH were also detected in the two samples analyzed. The soil samples collected in HC-4 had the higher PID readings indicating volatile organics. The highest PID reading was in the sample at 4.0 to 7.5 feet. However, the material was comprised of gravel/wood and occasional metal debris and soil recovery was poor; therefore, there was not enough sample recovered for chemical analysis. Groundwater was noted at a depth of approximately 10.5 feet at the time of drilling.

The soil sampled in HC-4 from 2.5 to 9.0 feet was noted to contain a variety of fill material such as concrete, metal, wood debris, and an unknown whitish color material. Also, a very loose, wet, dark gray, silty, and fine sand with a petroleum-like odor was noted on the soil sample collected at 12.5 to 14.0 feet (S-4).

Sample S-4 detected the highest concentration of TPH (800 mg/kg), above the conservative 200 mg/kg MTCA Method A cleanup level for TPH. A concentration of 170 mg/kg was detected in soil sample S-3.

Sample S-4 was analyzed for PCB content. No PCBs were detected in this sample.

The detectable concentrations of VOCs and metals were slightly higher in Sample S-4 than in Sample S-3 from HC-4.

Based on these sample locations and results, there appears to be an on-site source for the TPH at a minimum and a pocket of affected material at depth. Since the detectable concentrations of VOCs in S-3 and S-4 are at a depth in or near the water table, it is not clear whether these concentrations are a result of an on-site or off-site source.

The area around HC-4 is where historically ship painting and stripping likely occurred. It is believed that this area is where ships were brought up on the shore and painted and maintained. A 1949 Sanborn Fire Insurance map depicts a planed wharf on wood piling in the west end of the property (near HC-4 and HC-5). Ship building was known to occur in this area from 1917 to 1950. Based on the current configuration of the property and location of buildings, it appears that this area of historical ship repair and painting has been filled in. Therefore, this variety of fill material and affected material may be related to the past practices that occurred in this area prior to filling.

Boring HC-5. The material encountered in HC-5 was extremely gravelly and full of debris. Sample recovery was very difficult. No PID readings were detected on two samples collected at depths of 2.5 to 4.0 feet (S-1) and 7.5 to 9.0 feet (S-2). Groundwater was noted at a depth of approximately 7.5 feet during drilling.

TPH analysis was conducted on Sample S-1, and a total metal analysis was conducted on Sample S-2. Low concentrations of TPH were detected in S-1 (110 ppm) and low concentrations of total metals were detected in S-2.

Assuming HC-5 is downgradient of HC-4, this reinforces the assumption that the previously identified material in HC-4 is likely localized around HC-4.

LIMITATIONS

Work for this project was performed, and this report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of Guimont Trust for specific application to the referenced property. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

The MTCA cleanup levels are included in this report are used for screening and comparison purposes only and are based on our understanding of cleanup levels required by Ecology for similar projects. This comparison does not represent an interpretation of final MTCA cleanup standards for the site, since such standards are established by Ecology through a negotiation and public approval process. It should be understood that the MTCA Method B screening numbers were calculated using, to the best of our knowledge, the most current toxicity criteria available from EPA and Ecology. These criteria are continually being updated by EPA; and, as a result, the MTCA Method B levels used for screening purposes in this report may not be applicable for future use.

It should be noted that Hart Crowser relied on information provided by the reference sources indicated in the report text. Hart Crowser can only relay this information and cannot be responsible for its accuracy nor completeness.

Any questions regarding our work and this report, the presentation of the information, and the interpretation of the data are welcome and should be referred to Julie Wukelic.

We trust that this report meets your needs.

Sincerely,

HART CROWSER, INC.

JULIE K. W. WUKELIC, Division Manager
Property Redevelopment Engineering

jkww:bjg
foxph3.fr

Table 1 - Chemical Results for Subsurface Soil Samples

Sample ID:	HC-1, S-2	HC-1, S-3	HC-2, S-1	HC-2, S-2	HC-3, S-1	HC-3, S-2	Method Detection Limit	MTCA Method A Soil Cleanup Level
Depth Interval in Feet	7.5 to 9.0	12.5 to 14.0	2.5 to 4.0	7.5 to 9.0	2.5 to 4.0	7.5 to 9.0		
PID-Reading	1	5	0	0	0	0		
TPH-HCID in mg/kg (ppm)								
Gasoline	nd	nd	nd	nd	nd	nd	10	100
Stoddard Solvent	nd	nd	nd	nd	nd	nd	10	100
Diesel	nd	nd	nd	nd	nd	nd	20	200
Oil	nd	nd	nd	nd	nd	nd	50	200
Volatiles in µg/kg (ppb)								
Acetone	na	13	na	nd	na	49	1.9	
Methylene Chloride	na	3.2 B	na	3.0 B	na	3.0 B	2.8	500
cis-1,2-Dichloroethene	na	3.7	na	nd	na	nd	1.4	
Trichloroethene	na	14	na	nd	na	nd	1.4	500
Tetrachloroethene	na	120	na	9.1	na	nd	1.4	500
Carbon Disulfide	na	nd	na	nd	na	nd	1.4	
trans-1,2-Dichloroethene	na	nd	na	nd	na	nd	1.4	
Isoproplybenzene	na	nd	na	nd	na	nd	1.4	
1,3,5-Trimethylbenzene	na	nd	na	nd	na	nd	1.4	
1,2,4-Trimethylbenzene	na	nd	na	nd	na	nd	1.4	20000
sec-Butylbenzene	na	nd	na	nd	na	nd	1.4	
4-Isoproplyltoluene	na	nd	na	nd	na	nd	1.4	
n-Butylbenzene	na	nd	na	nd	na	nd	1.4	
Naphthalene	na	nd	na	nd	na	nd	6.9	
Metals in mg/kg (ppm)								
Aluminum	na	8180	na	12400	na	12000	3	
Arsenic	na	nd	na	nd	na	nd	7	20
Iron	na	3100	na	4400	na	4000	2.5	-
Cadmium	na	nd	na	nd	na	nd	0.5	2
Chromium	na	3.2	na	5.9	na	4.4	1.5	100
Lead	na	nd	na	nd	na	nd	5	250
Mercury	na	nd	na	nd	na	nd	0.05	1.0
Copper	na	7.1	na	8.5	na	8.8	1	-
Nickel	na	1.6 J	na	4.9	na	4.5	2	-
Zinc	na	9.4	na	9.6	na	11	0.25	-

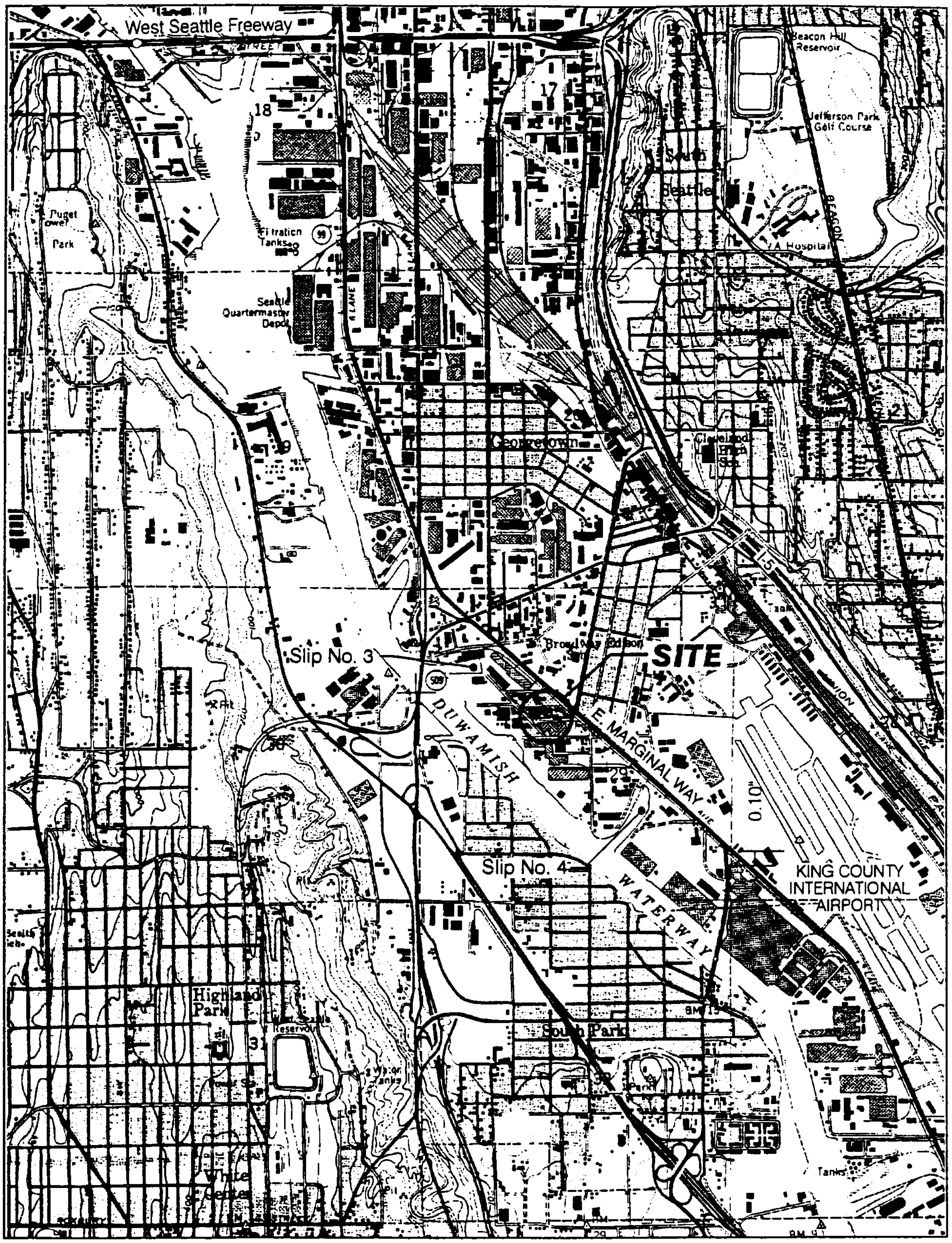
nd	Not detected
na	Not analyzed
-	No established MTCA limit
B	Analyte detected in method blank
J	Estimated value (concentration below detection limit)

Table 1 - Chemical Results for Subsurface Soil Samples (continued)

Sample ID: Depth Interval in Feet	HC-4, S-3 7.5 to 9.0	HC-4, S-4 12.5 to 14.0	HC-5, S-1 2.5 to 4.0	HC-5, S-2 7.5 to 9.0	Method Detection Limit	MTCA Method A Soil Cleanup Level
PID Reading	na	1.5	0	0		
TPH-HCID in mg/kg (ppm)						
Gasoline	nd	nd	nd	na	10	100
Stoddard Solvent	20	nd	nd	na	10	100
Diesel	nd	85	nd	na	20	200
Oil	170	800	110	na	50	200
Total PCBs in mg/kg (ppm)	na	nd	na	na	0.2	1.0
Volatiles in µg/kg (ppb)						
Acetone	38	46 B	na	na	1.9	
Methylene Chloride	3.8	3.1 B	na	na	2.8	500
cis-1,2-Dichloroethene	80	nd	na	na	1.4	
Trichloroethene	68	nd	na	na	1.4	500
Tetrachloroethene	330	nd	na	na	1.4	500
Carbon Disulfide	2.9	1.9	na	na	1.4	
trans-1,2-Dichloroethene	3.4	nd	na	na	1.4	
Isoproplybenzene	1.4	nd	na	na	1.4	
1,3,5-Trimethylbenzene	16	nd	na	na	1.4	
1,2,4-Trimethylbenzene	35	nd	na	na	1.4	
sec-Butylbenzene	5	nd	na	na	1.4	
4-Isoproplyltoluene	6.2	nd	na	na	1.4	
n-Butylbenzene	2.8	nd	na	na	1.4	
Naphthalene	8.9	nd	na	na	6.9	
Metals in mg/kg (ppm)						
Aluminum	12300	9620	na	16000	3	
Arsenic	26	nd	na	nd	7	20
Iron	28000	8200	na	8200	2.5	-
Cadmium	1.8	nd	na	nd	0.5	2
Chromium	44	4.5	na	8.5	1.5	100
Lead	580	36	na	nd	5	250
Mercury	0.41	0.29	na	nd	0.05	1.0
Copper	360	47	na	24	1	-
Nickel	76	9.7	na	11	2	-
Zinc	6400	55	na	32	0.25	-

nd	Not detected
na	Not analyzed
-	No established MTCA limit
B	Analyte detected in method blank
J	Estimated value (concentration below detection limit)

Vicinity Map



Note: Base map prepared from USGS 7.5 minute quadrangle map of Seattle South, Washington, dated 1973.

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Figure 1

Site and Exploration Plan

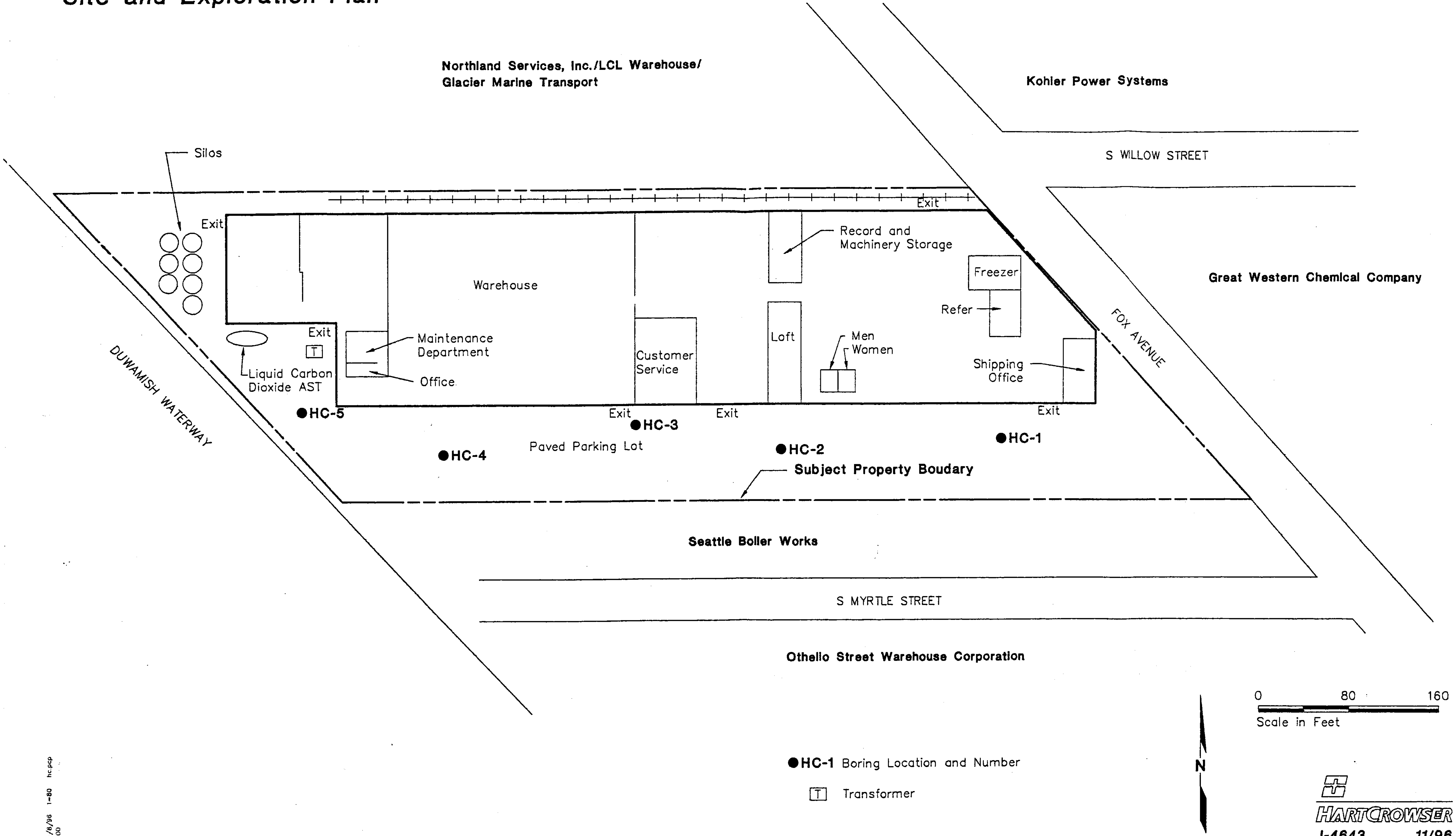

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Figure 2

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Appendix A

APPENDIX A
FIELD EXPLORATIONS AND SAMPLING METHODS

APPENDIX A
FIELD EXPLORATIONS AND SAMPLING METHODS

Subsurface Explorations

Subsurface explorations for this project included advancing five hollow-stem auger soil borings on September 6, 1996 at the Fox Avenue property. Hollow-stem auger borings were completed using a hollow-stem auger advanced with a portable, wheel-mounted drill rig subcontracted by Hart Crowser.

Figure 2, Site and Exploration Plan, shows the locations of the borings. Exploration logs for the site explorations are presented on Figures A-2 through A-6 at the end of this appendix. The exploration logs show our interpretation of the drilling sampling data. They indicate the depth where the soils change. Note that the change may be gradual. In the field, we classified the samples taken from the explorations according to the methods presented on Figure A-1, Key to Exploration Logs. Figure A-1 also provides a legend explaining the symbols and abbreviations used on the logs.

Soil Sample Collection

Soil samples from the site explorations were obtained at 2½-foot-depth intervals using a modified version of the Standard Penetration Test (SPT). Samples were collected by manually driving a 3-inch inside diameter split-spoon sampler with 140-pound hammer. The modified SPTs are an approximate measure of soil density and consistency. To be useful, the results must be used with engineering judgment in conjunction with other tests.

Organic Vapor Detection

Organic vapors were measured in soil sample jar headspaces during the field investigation using an HNU portable photoionization detector (PID). PID measurements were made by piercing the foil-covered headspace jar with the PID probe. These sample jar organic vapor readings are presented on the exploration logs on Figures A-2 through A-6.

The PID has sealed ultraviolet light sources which emit photons which ionize trace organics but does not ionize the major components of air. Which organic vapors are detected depends on the photoionization potential of the particular compounds, and the calibration and lamp voltage of the instrument. For instance, some organic vapors, such as methane, cannot be detected by the PID.

For the field observation, the PID was equipped with a 10.2 eV lamp. The instrument was calibrated to a benzene equivalent which has a relatively low human exposure threshold in air. The organic vapor concentrations measured by the PID can be correlated to the total volatile compounds in a given sample and are, therefore, a useful screening test. The PID values are also used for environmental monitoring as a health and safety measure.

Key to Exploration Logs

Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance.
Soil density/consistency in test pits is estimated based on visual observation and is presented parenthetically on the test pit logs.

SAND or GRAVEL Density	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance (N) in Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 – 4	Very soft	0 – 2	<0.125
Loose	4 – 10	Soft	2 – 4	0.125 – 0.25
Medium dense	10 – 30	Medium stiff	4 – 8	0.25 – 0.5
Dense	30 – 50	Stiff	8 – 15	0.5 – 1.0
Very dense	>50	Very stiff	15 – 30	1.0 – 2.0
		Hard	>30	>2.0

Moisture

Dry	Little perceptible moisture
Damp	Some perceptible moisture, probably below optimum
Moist	Probably near optimum moisture content
Wet	Much perceptible moisture, probably above optimum

Minor Constituents

	Estimated Percentage
Not identified in description	0 – 5
Slightly (clayey, silty, etc.)	5 – 12
Clayey, silty, sandy, gravelly	12 – 30
Very (clayey, silty, etc.)	30 – 50

Legends

Sampling Test Symbols

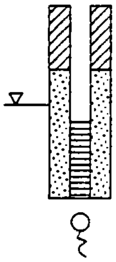
BORING SAMPLES

☒	Split Spoon
⧅	Shelby Tube
▥	Cuttings
◫	Core Run
*	No Sample Recovery
P	Tube Pushed, Not Driven

TEST PIT SAMPLES

☒	Grab (Jar)
⧄	Bag
⧅	Shelby Tube

Groundwater Observations



Surface Seal

Groundwater Level on Date (ATD) At Time of Drilling

Observation Well Tip or Slotted Section

Groundwater Seepage (Test Pits)

Test Symbols

GS	Grain Size Classification
CN	Consolidation
TUU	Triaxial Unconsolidated Undrained
TCU	Triaxial Consolidated Undrained
TCD	Triaxial Consolidated Drained
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer Approximate Compressive Strength in TSF
TV	Torvane Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits
PID	Photoionization Reading
CA	Chemical Analysis

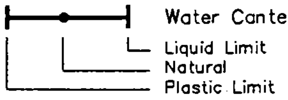


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Figure A-1

Boring Log HC-1

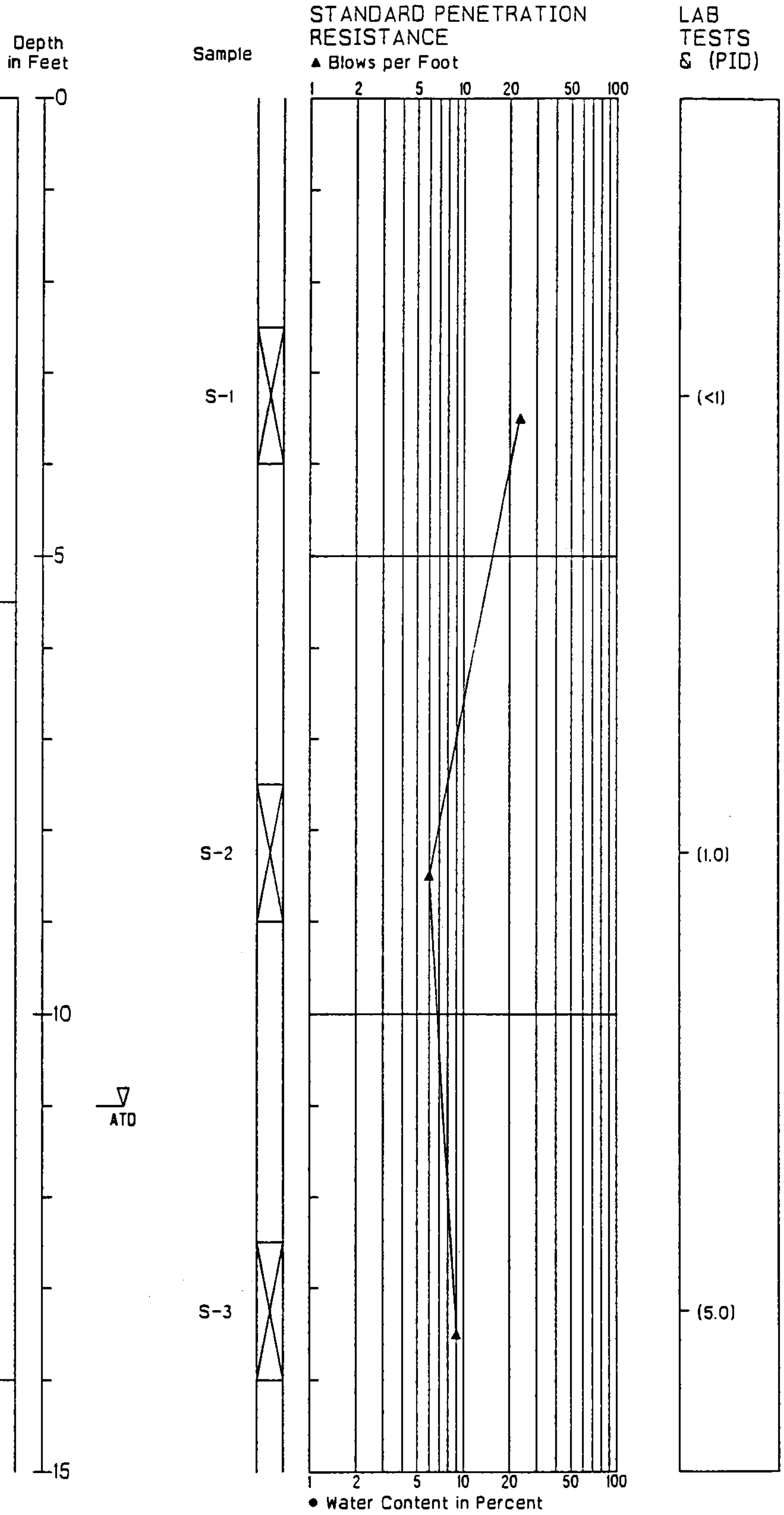
Soil Descriptions

Ground Surface Elevation in ????

6 inches of ASPHALT over medium dense, moist, brown, fine SAND with occasional silty zones.

Loose to medium dense, dark gray, fine SAND and slightly silty, fine SAND.

Bottom of Boring at 14.0 Feet.
Completed 9/6/96.



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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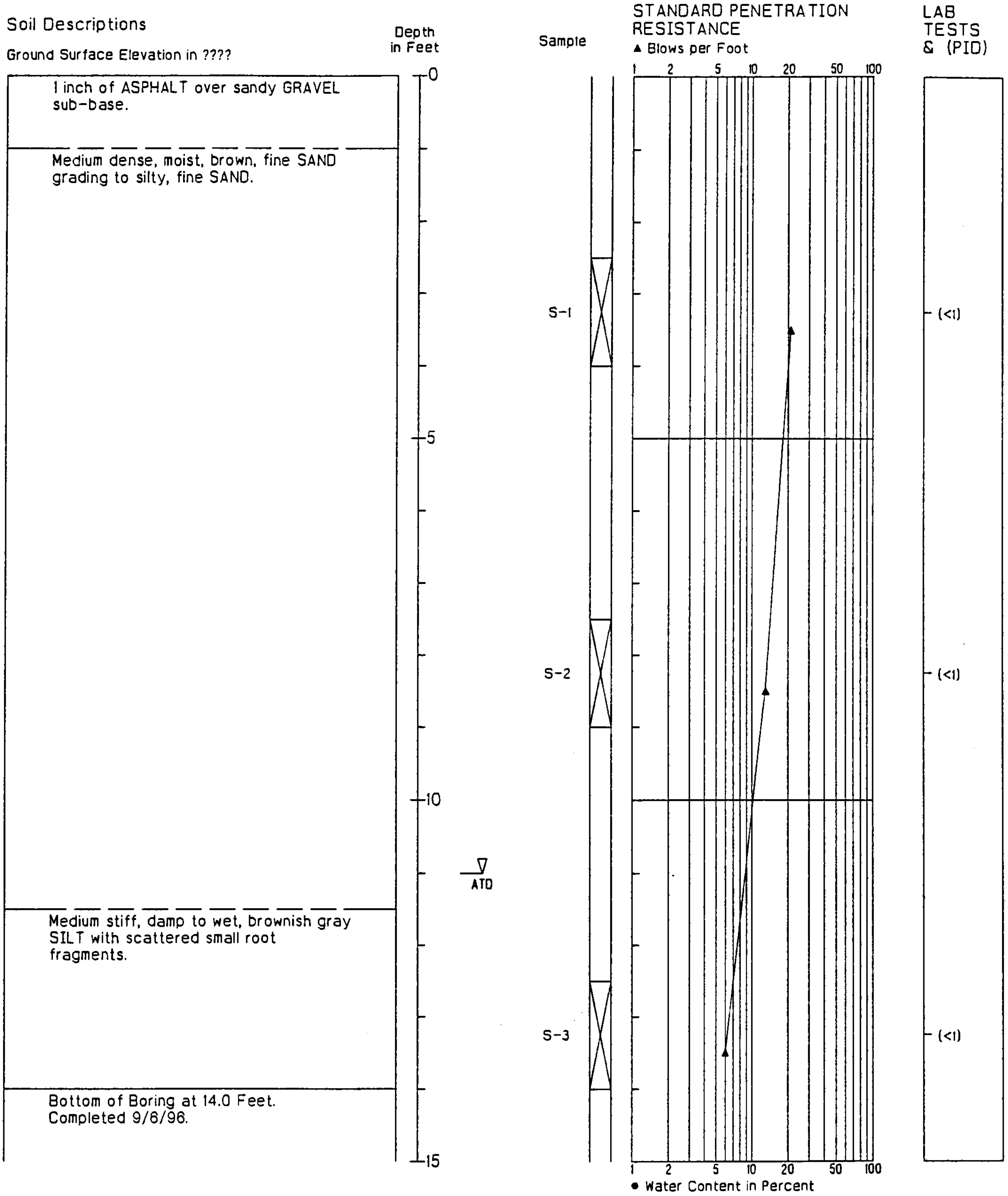
Figure A-2

Boring Log HC-2



Soil Descriptions

Ground Surface Elevation in ????

1 inch of ASPHALT over sandy GRAVEL sub-base.

Medium dense, moist, brown, fine SAND grading to silty, fine SAND.

Medium stiff, damp to wet, brownish gray SILT with scattered small root fragments.

Bottom of Boring at 14.0 Feet.
Completed 9/6/96.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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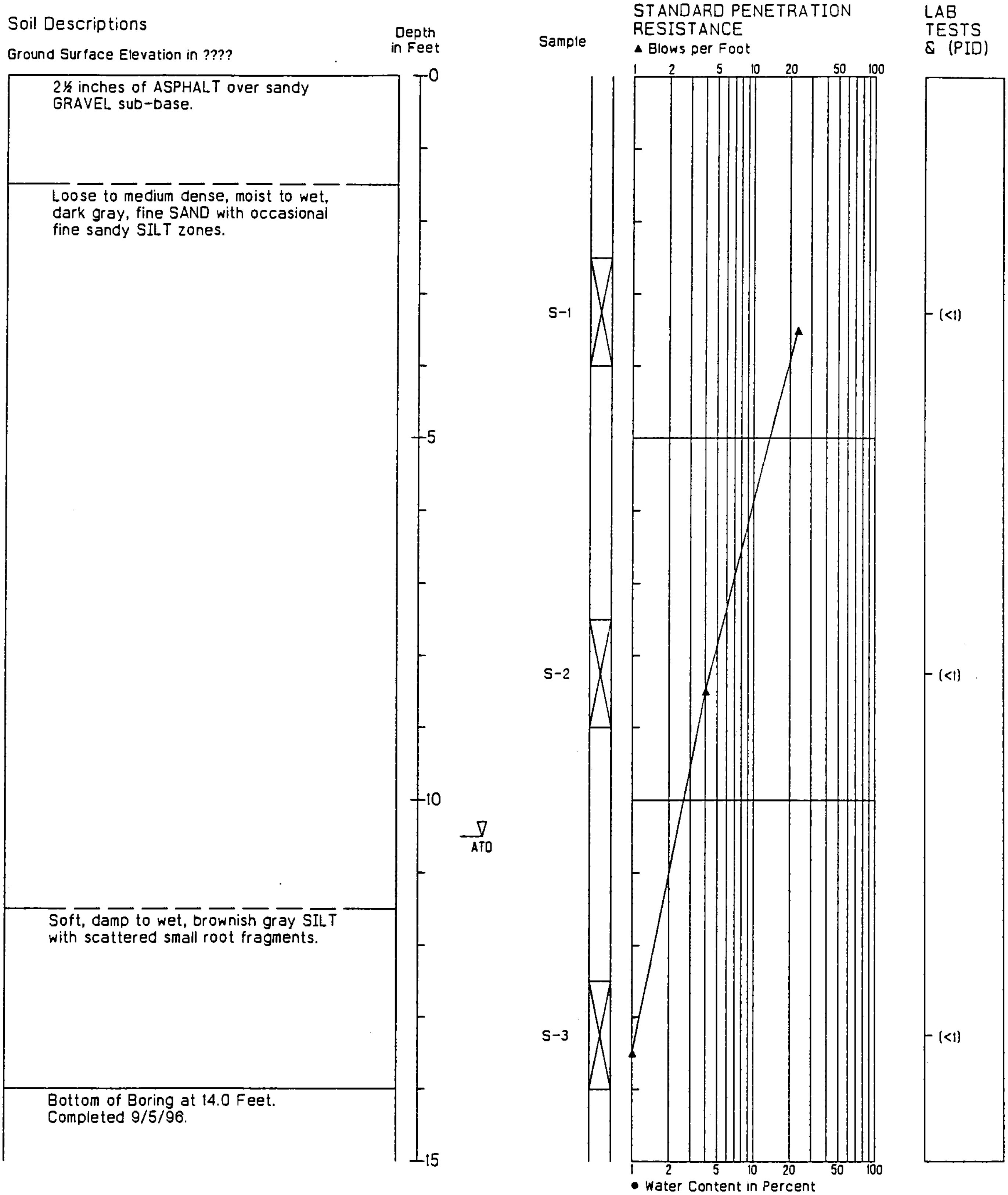
Figure A-3

Boring Log HC-3



Soil Descriptions

Ground Surface Elevation in ????

2½ inches of ASPHALT over sandy GRAVEL sub-base.

Loose to medium dense, moist to wet, dark gray, fine SAND with occasional fine sandy SILT zones.

Soft, damp to wet, brownish gray SILT with scattered small root fragments.

Bottom of Boring at 14.0 Feet. Completed 9/5/96.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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Figure A-4

Boring Log HC-4

Soil Descriptions

Ground Surface Elevation in ????

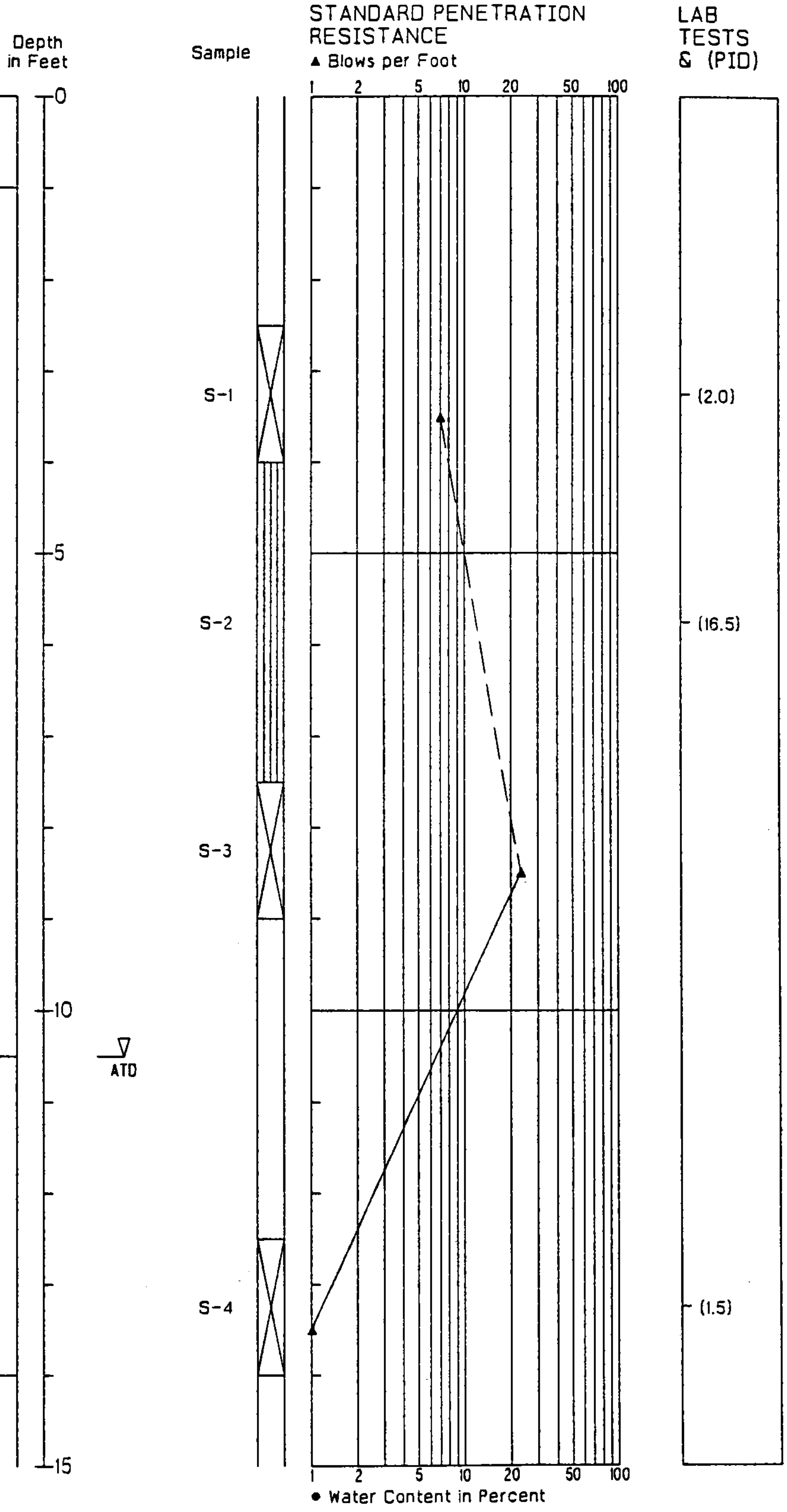
1¼ inches of ASPHALT over sandy GRAVEL sub-base

Loose, moist, brown to gray-brown, silty, gravelly SAND with zones of assorted debris including wood, metal, and concrete.

Unidentified whitish material.

Very loose, wet, dark gray, silty, fine SAND wtih strong petroleum-like odor.

Bottom of Boring at 14.0 Feet.
Completed 9/5/96.



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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Figure A-5

Boring Log HC-5

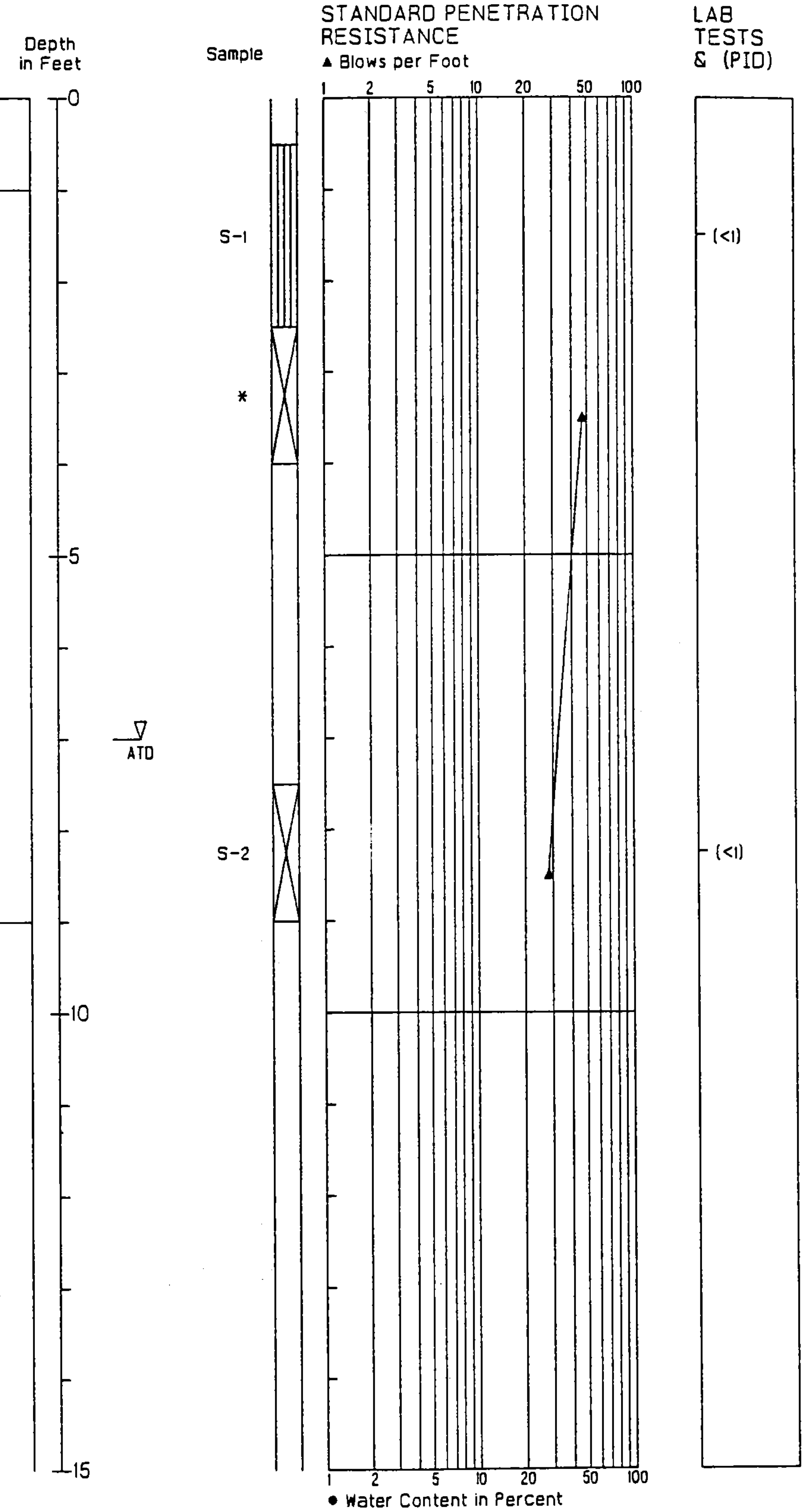
Soil Descriptions

Ground Surface Elevation in ????

2 inches of ASPHALT over sandy GRAVEL sub-base.

Medium dense, moist to wet, brown, fine sandy GRAVEL with scattered concrete debris.

Bottom of Boring at 9.0 Feet.
Completed 9/5/96.



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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Figure A-6

APPENDIX B
LABORATORY ANALYTICAL DATA QUALITY REVIEW AND CHEMICAL LABORATORY REPORTS

APPENDIX B
LABORATORY ANALYTICAL DATA QUALITY REVIEW AND CHEMICAL LABORATORY REPORTS

Data Validation

Eight soil samples were selected from the samples collected at the Fox Avenue property. The samples were submitted to the Hart Crowser Chemistry Laboratory and Analytical Resources, Inc. (ARI) of Seattle, Washington, on the day following collection and were analyzed for the following for various samples.

- Volatiles (EPA SW-846 Method 8260) by ARI;
- Total Metals (Cu, Pb, Cd, Ni, Zn, Fe, and Cr by Hart Crowser and Hg, Al, and As by ARI) (EPA 7000 Series);
- Total Petroleum Hydrocarbons (WTPH-HCID) by Hart Crowser and
- PCBs (EPA Method 8081) by Hart Crowser.

A standard data validation was performed on the original laboratory submitted certificates for all analyses by Hart Crowser, Inc. of Seattle Washington. This included a review of the:

- Holding times;
- Method Blanks;
- Surrogate percent recoveries;
- Matrix spike (MS or S) percent recoveries;
- Laboratory Control Samples (Blank spike) percent recoveries;
- Matrix spike duplicate (MSD) or duplicate (D) precision; and
- Quantitation limits or detection limits.

Methylene chloride was detected in the method blank. Concentrations reported for the project samples are qualified "B". No other data qualifiers were required for any of the other analyses based on our review of the laboratory data.

Hart Crowser
J-4643

CHEMISTRY LABORATORY ANALYTICAL REPORT
HART CROWSER CHEMISTRY LABORATORY

HARTCROWSER

Earth and Environmental Technologies

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Seattle, Washington 98102-3699
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CHEMISTRY LABORATORY ANALYTICAL REPORT

September 30, 1996

Julie Wukelic, Senior Associate, Hart Crowser

RE: Fox Avenue Property, J-4618

Attached are the compiled results from analyses conducted on samples collected on September 6, 1996, and received on September 6, 1996. We performed extraction and analysis as indicated:

	Matrix	Quantity	Date Extracted	Date Analyzed
• TPH-HCID	Soil	9	9/9/96	9/9/96
• Cadmium (7130)	Soil	6	9/6/96	9/7/96
• Chromium (7190)	Soil	6	9/6/96	9/8/96
• Copper (7210)	Soil	6	9/6/96	9/7/96 and 9/27/96
• Iron (7380)	Soil	6	9/6/96	9/8/96
• Lead (7420)	Soil	6	9/6/96	9/7/96
• Nickel (7520)	Soil	6	9/6/96	9/8/96
• Zinc (7950)	Soil	6	9/6/96	9/7/96
• PCB (8081)	Soil	1	9/11/96	9/11/96

This report contains the following:

- Analytical results for soil samples presented on a dry weight basis.
- Data qualifiers.
- Results for method blank.
- Recoveries for laboratory control sample.
- Recoveries for matrix spiked samples.
- Differences for matrix spike duplicate analyses.
- Differences for analytical duplicate analyses.
- Recoveries for proficiency sample.
- Analytical reporting limits.
- QA/QC Control limits.
- Copies of Chain of Custody forms.

Analytical Comment

The copper Matrix Spike (MS) and Matrix Spike Duplicate (MSD) recoveries for the initial analysis of sample HC4-S4 are outside of control limits. The samples were re-homogenized, re-extracted, and re-analyzed. Re-analysis recoveries of MS and MSD are also outside of control limits. The sample matrix has variation in copper contamination.

The TPH HCID concentration in samples HC1-S3 and HC3-S1, and the PCB 8081 concentrations in sample HC4-S4 are less than five times the reporting limit. Relative percent differences are not calculated for these samples.

The method blank for zinc contains contamination above the reporting limit. However, the concentrations of zinc in the samples are greater than ten times the concentration in the method blank, thus requiring no qualification.

The iron and zinc concentrations in sample HC4-S4 are greater than five times the spike concentration. Recoveries are not calculated for the Matrix Spike (MS) and Matrix Spike Duplicate (MSD). Concentrations from the spiked samples are used to calculate Relative Percent Difference (RPD).

The following samples were analyzed, and results are presented in this report:

HC1 S2
HC1 S3
HC2 S1
HC2 S2
HC3 S1
HC3 S2
HC4 S3
HC4 S4
HC5 S1
HC5 S2

HART CROWSER, INC.

James Herndon

JAMES HERNDON
Laboratory Manager
Washington State Department of Ecology
Laboratory Accreditation Number C134
Corps of Engineers Validation 5/13/96

Analytical Results

Compound	HC1 S2	HC1 S3	Duplicate HC1 S3	HC2 S1
Matrix	Soil	Soil	Soil	Soil
% Moisture	16%	21%	21%	6%

Results in mg/kg (ppm)

TPH-HCID				
Gasoline	10 U	10 U	n/t	10 U
Stoddard Solvent	10 U	10 U	n/t	10 U
Kensol	10 U	10 U	n/t	10 U
Kerosene/Jet A	10 U	10 U	n/t	10 U
Diesel/Fuel Oil #2	20 U	20 U	n/t	20 U
Bunker C	50 U	50 U	n/t	50 U
Oil	50 U	50 U	n/t	50 U
Unknown	10 U	10 U	n/t	10 U
Total TPH Concentration	-	-		-
2-Fluorobiphenyl (surr #1)	98%	97%		98%
o-Terphenyl (surr #2)	98%	97%		97%
Hexacosane - nC26 (surr #3)	96%	93%		94%

Results in mg/kg (ppm)

Flame AA				
Cadmium	n/t	0.50 U	0.50 U	n/t
Chromium	n/t	**3.2**	**3.2**	n/t
Copper	n/t	**7.1**	**6.3**	n/t
Iron	n/t	**3,100**	**3,300**	n/t
Lead	n/t	5.0 U	5.0 U	n/t
Nickel	n/t	**1.6 J**	**7.0**	n/t
Zinc	n/t	**9.4**	**9.2**	n/t

Analytical Results, continued

Compound	HC2 S2	HC3 S1	Duplicate HC3 S1	HC3 S2
Matrix	Soil	Soil	Soil	Soil
% Moisture	26%	5%	5%	21%

Results in mg/kg (ppm)

TPH-HCID				
Gasoline	10 U	10 U	10 U	10 U
Stoddard Solvent	10 U	10 U	10 U	10 U
Kensol	10 U	10 U	10 U	10 U
Kerosene/Jet A	10 U	10 U	10 U	10 U
Diesel/Fuel Oil #2	20 U	20 U	20 U	20 U
Bunker C	50 U	50 U	50 U	50 U
Oil	50 U	50 U	50 U	50 U
Unknown	10 U	10 U	10 U	10 U
Total TPH Concentration	-	-	-	-
2-Fluorobiphenyl (surr #1)	98%	99%	98%	99%
o-Terphenyl (surr #2)	98%	99%	97%	98%
Hexacosane - nC26 (surr #3)	93%	93%	91%	91%

Results in mg/kg (ppm)

Flame AA				
Cadmium	0.50 U	n/t	n/t	0.50 U
Chromium	**5.9**	n/t	n/t	**4.4**
Copper	**8.5**	n/t	n/t	**8.8**
Iron	**4,400**	n/t	n/t	**4,000**
Lead	5.0 U	n/t	n/t	5.0 U
Nickel	**4.9**	n/t	n/t	**4.5**
Zinc	**9.6**	n/t	n/t	**11**

Analytical Results, continued

Compound	HC4 S3	HC4 S4	Duplicate HC4 S4	HC5 S1
Matrix	Soil	Soil	Soil	Soil
% Moisture	19%	23%	23%	7%
Results in mg/kg (ppm)				
TPH-HCID				
Gasoline	10 U	10 U	n/t	10 U
Stoddard Solvent	**20**	10 U	n/t	10 U
Kensol	10 U	10 U	n/t	10 U
Kerosene/Jet A	10 U	10 U	n/t	10 U
Diesel/Fuel Oil #2	20 U	**85**	n/t	20 U
Bunker C	50 U	50 U	n/t	50 U
Oil	**170**	**800**	n/t	**110**
Unknown	10 U	10 U	n/t	10 U
Total TPH Concentration	**190**	**885**		**110**
2-Fluorobiphenyl (surr #1)	101%	101%		101%
o-Terphenyl (surr #2)	101%	101%		101%
Hexacosane - nC26 (surr #3)	96%	104%		102%
Results in mg/kg (ppm)				
Flame AA				
Cadmium	**1.8**	0.50 U	n/t	n/t
Chromium	**44**	**4.5**	n/t	n/t
Copper	**360**	**47**	n/t	n/t
Iron	**28,000**	**8,200**	n/t	n/t
Lead	**580**	**36**	n/t	n/t
Nickel	**76**	**9.7**	n/t	n/t
Zinc	**6,400**	**55**	n/t	n/t

Analytical Results, continued

Compound	HC5 S2
Matrix	Soil
% Moisture	17%

Results in mg/kg (ppm)

Flame AA	
Cadmium	0.50 U
Chromium	**8.5**
Copper	**24**
Iron	**8,200**
Lead	5.0 U
Nickel	**11**
Zinc	**32**

Analytical Results, continued

Compound	HC4 S4	Duplicate HC4 S4
Matrix	Soil	Soil
% Moisture	23%	23%
Results in µg/kg (ppm)		
PCB (8081)		
A1016	200 U	200 U
A1221	500 U	500 U
A1232	500 U	500 U
A1242	200 U	200 U
A1248	200 U	200 U
A1254	200 U	200 U
A1260	200 U	200 U
Tetrachloro-m-xylene (surr)	81%	78%
Decachlorobiphenyl (surr)	90%	87%

Data Qualifiers

U	Not detected at the indicated reporting limit.
-	Below reporting limit.
J	Estimated value.
B	Also detected in associated method blank.
C	Co-elution interference.
M	Unable to report due to matrix interference.
n/t	Test not performed.
n/a	Not applicable.
Surr	Surrogate compound.
Dupl	Laboratory analytical duplicate.

Method Blank

Compound	
Matrix	Soil

Results in mg/kg (ppm)

TPH-HCID	09/09/96
Gasoline	10 U
Stoddard Solvent	10 U
Kensol	10 U
Kerosene/Jet A	10 U
Diesel/Fuel Oil #2	20 U
Bunker C	50 U
Oil	50 U
Unknown	10 U
Total TPH Concentration	-
2-Fluorobiphenyl (surr #1)	98%
o-Terphenyl (surr #2)	98%
Hexacosane - nC26 (surr #3)	97%

Results in mg/kg (ppm)

Flame AA	09/06/96
Cadmium	0.50 U
Chromium	1.5 U
Copper	1.0 U
Iron	2.5 U
Lead	5.0 U
Nickel	2.0 U
Zinc	**0.30**

Method Blank, cont.

Results in µg/kg (ppb)

PCB (8081)	09/11/96
A1016	200 U
A1221	500 U
A1232	500 U
A1242	200 U
A1248	200 U
A1254	200 U
A1260	200 U
Tetrachloro-m-xylene (surr)	96%
Decachlorobiphenyl (surr)	99%

Laboratory Control Sample

Compound	
Matrix	Soil

	% Recovery
TPH-HCID	09/09/96
Kerosene/Jet A	92%
2-Fluorobiphenyl (surr #1)	90%
o-Terphenyl (surr #2)	99%
Hexacosane - nC26 (surr #3)	97%

	% Recovery
Flame AA	09/06/96
Cadmium	97%
Chromium	88%
Copper	95%
Iron	97%
Lead	97%
Nickel	97%
Zinc	95%

	% Recovery
PCB (8081)	09/11/96
A1242	91%
Tetrachloro-m-xylene (surr)	94%
Decachlorobiphenyl (surr)	104%

Matrix Spikes

Compound	MS HC2 S1	MSD HC2 S1	MS HC4 S4	MSD HC4 S4
Matrix	Soil	Soil	Soil	Soil
% Moisture	6%	6%	23%	23%
	% Recovery			
TPH-HCID				
Kerosene/Jet A	98%	103%		
2-Fluorobiphenyl (surr #1)	101%	100%		
o-Terphenyl (surr #2)	97%	97%		
Hexacosane - nC26 (surr #3)	94%	93%		
	% Recovery and concentration in mg/kg (ppm)			
Flame AA				
Cadmium			104%	99%
Chromium			74%	74%
Copper			68%	42%
Iron			**11,000**	**12,000**
Lead			112%	120%
Nickel			94%	94%
Zinc			**67**	**72**

Relative Percent Difference for Duplicates

Compound	HC1 S3	HC2 S1	HC4 S4
Matrix	Soil	Soil	Soil
TPH-HCID			
Kerosene/Jet A		5%	
Flame AA			
Cadmium			5%
Chromium			0%
Copper	12%		47%
Iron	6%		9%
Lead			7%
Nickel			0%
Zinc	2%		7%

Proficiency Sample Results

	% Recovery	
Compound	Buffalo River	#9502 ERA
Matrix	Soil	Soil
Flame AA		
Cadmium	98%	
Copper	87%	
Lead	92%	
Nickel	68%	
Zinc	87%	
PCB (8081)		
A1254		69%
Tetrachloro-m-xylene (surr)		100%
Decachlorobiphenyl (surr)		102%

Analytical Reporting Limits

Limits in mg/kg (ppm)

TPH-HCID	Soil
Gasoline	10
Kensol	10
Kerosene/Jet A	10
Stoddard Solvent	10
Diesel/Fuel Oil #2	20
Bunker C	50
Oil	50
Unknown	10

Limits in mg/kg (ppm)

Metals by Flame AA	Soil
Cadmium	0.5
Chromium	1.5
Copper	1.0
Iron	2.5
Lead	5.0
Nickel	2.0
Silver	1.25
Zinc	0.25

Limits in µg/kg (ppb)

PCBs 8081/608	Soil
A1016	200
A1221	500
A1232	500
A1242	200
A1248	200
A1254	200
A1260	200

QA/QC Control Limits

Method: TPH-HCID
Evaluation: 8/96

Parameter Matrix	LCL Soil	UCL Soil
LCS	83%	110%
MS/MSD	45%	144%
MS/MSD (RPD)	0%	35%
Duplicate (RPD)	0%	38%

Surrogates

2-Fluorobiphenyl	88%	117%
o-Terphenyl	89%	118%
Hexacosane	89%	122%

LCL - lower control limit (mean minus 3s)
UCL - upper control limit (mean plus 3s)
s - standard deviation

QA/QC Control Limits, continued

Method: Metals by Flame AA
Evaluation: 8/96

Parameter Matrix	LCL Soil	UCL Soil
LCS		
Cadmium (Cd)	78%	109%
Lead (Pb)	84%	101%
MS/MSD		
Cadmium (Cd)	N/A	N/A
Lead (Pb)	72%	109%
MS/MSD (RPD)		
Cadmium (Cd)	0%	N/A
Lead (Pb)	0%	36%
Buffalo River Sediment		
Cadmium (Cd)	N/A	N/A
Lead (Pb)	75%	105%

N/A - not available due to insufficient database.
LCL - lower control limit (mean minus 3s)
UCL - upper control limit (mean plus 3s)
s - standard deviation

QA/QC Control Limits, continued

Method: PCBs (8081/608)
Evaluation: 8/96

Parameter Matrix	LCL Soil	UCL Soil
LCS	56%	142%
MS/MSD	69%	160%
MS/MSD (RPD)	0%	N/A
Duplicate (RPD)	0%	N/A

Surrogates

Tetrachloro-m-xylene	46%	133%
Decachlorobiphenyl	53%	134%

N/A - not available due to insufficient database.
LCL - lower control limit (mean minus 3s)
UCL - upper control limit (mean plus 3s)
s - standard deviation

E

Sample Custody Record

DATE 9-5-96 PAGE 1 OF 2

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699

JOB NUMBER J-4618 LAB NUMBER

PROJECT MANAGER WLK

PROJECT NAME FOX AVE. PROPERTY

SAMPLED BY: BRUCE D. McDONALD

LAB NO.	SAMPLE	TIME	STATION	MATRIX	WTPH-HCID (HC)	METALS (Cd, Cu, Cr, Pb, Ni, Zn, Fe), HC	PCBs (HC)		Hg & Al, As (ARE)	8260 ✓ (ARE)		MOISTURE (HC)			NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	S-1	2047	HC-4	SOIL											2	
	~~S-2~~	~~2052~~	~~HC-4~~	~~"~~	~~X~~					~~X~~		~~X~~	delete JEH		1	GRAB SAMPLE, FOR VISUAL
	S-3	2057	HC-4	"	X	X			X	X					2	
	S-4	2110	HC-4	"	X	X	X		X	X	— added JEH				2	
	S-1	2213	HC-5	"	X							X			2	
	S-2	2222	HC-5	"		X			X			X			2	
	S-1	2256	HC-3	"	X							X			2	
	S-2	2300	HC-3	"	X	X			X	X					2	
	S-3	2305	HC-3	"											2	
	S-1	2355	HC-2	"	X							X			2	
	S-2	2400	HC-2	"	X	X			X	X					2	
	S-3	2407	HC-2	"											2	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE Bruce D. McDonald	9/6/96	SIGNATURE James Herndon	9/6/96
PRINTED NAME BRUCE D. McDOWALD	TIME 1215	PRINTED NAME JAMES HERNDON	TIME 14:20
COMPANY HART CROWSER		COMPANY H/C	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE		SIGNATURE	
PRINTED NAME	TIME	PRINTED NAME	TIME
COMPANY		COMPANY	

TOTAL NUMBER OF CONTAINERS 29

METHOD OF SHIPMENT HAND DELIVERED

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS Jar for HC4-S2 plastic - not proper type for analysis. Change made as per conversation with WLK 9/6/96 14:15 JEH

DISTRIBUTION:

1. PROVIDE WHITE AND YELLOW COPIES TO LABORATORY
2. RETURN PINK COPY TO PROJECT MANAGER
3. LABORATORY TO FILL IN SAMPLE NUMBER AND SIGN FOR RECEIPT
4. LABORATORY TO RETURN WHITE COPY TO HART CROWSER

Printed On Recycled Paper

1

Sample Custody Record

DATE 9-6-96 PAGE 2 OF 2

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699

JOB NUMBER J-4618 LAB NUMBER

PROJECT MANAGER WUK

PROJECT NAME FOX AVE PROPERTY

SAMPLED BY: BRUCE D. McDONALD

LAB NO.	SAMPLE	TIME	STATION	MATRIX	WTPH-HCID (HC)	Total Metals (Cd, Cu, Cr, Pb, Ni, Zn, Hg) (HC)	PCBs (HC)	Hg, Al, As (ARI)	9260 (ARI)		MOISTURE (HC)				NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	S-1	2442	HC-1	SOIL											2	
	S-2	2447	HC-1	"	☒						☒				2	
	S-3	2455	HC-1	"	☒	☒		☒	☒						2	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
Bruce D McDonald SIGNATURE	9/6/96	James Herndon SIGNATURE	9/6/96
BRUCE D. McDONALD PRINTED NAME	TIME	JAMES HERNDON PRINTED NAME	TIME
HART CROWSER COMPANY	1215	H/C COMPANY	14:00

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE		SIGNATURE	
PRINTED NAME	TIME	PRINTED NAME	TIME
COMPANY		COMPANY	

TOTAL NUMBER OF CONTAINERS 29

METHOD OF SHIPMENT

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS

DISTRIBUTION:

1. PROVIDE WHITE AND YELLOW COPIES TO LABORATORY
2. RETURN PINK COPY TO PROJECT MANAGER
3. LABORATORY TO FILL IN SAMPLE NUMBER AND SIGN FOR RECEIPT
4. LABORATORY TO RETURN WHITE COPY TO HART CROWSER

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LABORATORY ANALYTICAL RESULTS
ANALYTICAL RESOURCES, INC.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

16 September 1996

Jack Herndon
Hart Crowser, Inc.
1910 Fairview Ave. East
Seattle, WA 98102

RE: Client Project: J4618, "Fox Ave. Property";
ARI Job #Q046

Dear Mr. Herndon,

Please find enclosed the original chain-of-custody (COC) record and results for samples from the above-referenced project. Six soil samples were received in good condition on 9/6/96. There were no discrepancies between the COC and sample container labels, and they were logged into the laboratory without incident of note.

The metals and volatile organics analyses were routine, and preliminary results were faxed to you as soon as they became available. Sample **HC4-S3** for volatiles required reanalysis using a smaller sample amount because the concentration of tetrachloroethene was above the linear range of instrument calibration; both sets of results are reported.

Sample **HC4-S3** was used as a QC sample for volatiles; a matrix spike/matrix spike duplicate report is included as documentation. Laboratory Control Samples were prepped and analyzed for both parameters, and recovery results are reported, following the associated method blank results, as additional QC for the project.

A copy of this package will be kept on file by ARI should you required further information or copies of any documentation. Also, if you have questions please feel free to call any time.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kate Stegemoeller
Project Manager
206-340-2866, ext. 117

Enclosures
cc: file #Q046

333 Ninth Avenue North • Seattle WA 98109-5187 • **206-621-6490** • **206-621-7523** fax

Q-72
96-14766 -14771

Sample Custody Record

Samples Shipped to: ARI

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-342-9530 FAX: 206-328-5581

JOB NUMBER J-4618 LAB NUMBER
PROJECT NAME Fox Ave. Property
HART CROWSER CONTACT Bobby Johnson/JACK HERNDON
SAMPLED BY:

REQUESTED ANALYSES

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	Hg/Al/As	8260	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	~~HC4-S2~~				~~Soil~~		~~X~~	~~1~~	
	HC4-S3				Soil	X	X	2	72hr TAT
	HC4-S4				Soil	X	X	2	
	HC5-S2				Soil	X		1	
	HC3-S2				Soil	X	X	2	
	HC2-S2				Soil	X	X	2	
	HC1-S3				Soil	X	X	2	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE James Herndon	9/6/96	SIGNATURE Jan Felkins	9/6/96
PRINT NAME JAMES HERNDON	TIME 15:20	PRINT NAME JAN FELKINS	TIME 15:20
COMPANY H/C		COMPANY ARI	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	TIME	SIGNATURE	TIME
PRINT NAME		PRINT NAME	
COMPANY		COMPANY	

SPECIAL SHIPMENT/HANDILING OR STORAGE REQUIREMENTS:
limited sample volume, Make sure test are run before 70M analysis. Report on as received basis if necessary

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No.
for Other Contract Requirements

TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐ YES ☐ NO ☐ N/A
GOOD CONDITION ☐ YES ☐ NO
TEMPERATURE:
SHIPMENT METHOD: ☐ HAND ☐ COURIER ☐ OVERNIGHT

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☐ STANDARD
☐ 72 HOURS OTHER

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser

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INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample No: HC1-S3

Lab Sample ID: Q046F
LIMS ID: 96-14771
Matrix: Soil

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Data Release Authorized:
Reported: 09/13/96

Percent Total Solids: 77.9%

Prep Meth	**Prep Date**	**Analysis Method**	**Analysis Date**	**CAS Number**	**Analyte**	**RL**	**mg/kg-dry**
3050	09/09/96	6010	09/10/96	**7429-90-5**	**Aluminum**	3	**8,180**
3050	09/09/96	6010	09/10/96	7440-38-2	Arsenic	6	6 U
CLP	09/09/96	7471	09/11/96	7439-97-6	Mercury	0.06	0.06 U

U Analyte undetected at given RL

RL Reporting Limit

**ANALYTICAL
RESOURCES
INCORPORATED**

**INORGANICS ANALYSIS DATA SHEET
TOTAL METALS**

Sample No: HC2-S2

Lab Sample ID: Q046E
LIMS ID: 96-14770
Matrix: Soil

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Data Release Authorized:
Reported: 09/13/96

Percent Total Solids: 75.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry
3050	09/09/96	6010	09/10/96	**7429-90-5**	**Aluminum**	3	**12,400**
3050	09/09/96	6010	09/10/96	7440-38-2	Arsenic	6	6 U
CLP	09/09/96	7471	09/11/96	7439-97-6	Mercury	0.05	0.05 U

U Analyte undetected at given RL

RL Reporting Limit

FORM-I

ANALYTICAL
RESOURCES
INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample No: HC3-S2

Lab Sample ID: Q046D
LIMS ID: 96-14769
Matrix: Soil

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Data Release Authorized:
Reported: 09/13/96

Percent Total Solids: 78.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry
3050	09/09/96	6010	09/10/96	**7429-90-5**	**Aluminum**	2	**12,000**
3050	09/09/96	6010	09/10/96	7440-38-2	Arsenic	6	6 U
CLP	09/09/96	7471	09/11/96	7439-97-6	Mercury	0.06	0.06 U

U Analyte undetected at given RL

RL Reporting Limit

FORM-I

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample No: HC4-S3

Lab Sample ID: Q046A
LIMS ID: 96-14766
Matrix: Soil

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Data Release Authorized: CTG
Reported: 09/13/96

Percent Total Solids: 73.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry
3050	09/09/96	6010	09/10/96	7429-90-5	Aluminum	3	12,300
3050	09/09/96	6010	09/10/96	7440-38-2	Arsenic	7	26
CLP	09/09/96	7471	09/11/96	7439-97-6	Mercury	0.07	0.41

U Analyte undetected at given RL

RL Reporting Limit

ANALYTICAL
RESOURCES
INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample No: HC4-S4

Lab Sample ID: Q046B
LIMS ID: 96-14767
Matrix: Soil

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Data Release Authorized: LTG
Reported: 09/13/96

Percent Total Solids: 75.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry
3050	09/09/96	6010	09/10/96	**7429-90-5**	**Aluminum**	3	**9,620**
3050	09/09/96	6010	09/10/96	7440-38-2	Arsenic	6	6 U
CLP	09/09/96	7471	09/11/96	**7439-97-6**	**Mercury**	0.06	**0.29**

U Analyte undetected at given RL

RL Reporting Limit

FORM-I

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample No: **HC5-S2**

Lab Sample ID: Q046C
LIMS ID: 96-14768
Matrix: Soil

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Data Release Authorized:
Reported: 09/13/96

Percent Total Solids: 80.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry
3050	09/09/96	6010	09/10/96	**7429-90-5**	**Aluminum**	2	**16,500**
3050	09/09/96	6010	09/10/96	7440-38-2	Arsenic	6	6 U
CLP	09/09/96	7471	09/11/96	7439-97-6	Mercury	0.06	0.06 U

U Analyte undetected at given RL

RL Reporting Limit

FORM-I

**INORGANICS ANALYSIS DATA SHEET
TOTAL METALS**

Sample No: Method Blank

Lab Sample ID: Q046MB
LIMS ID: 96-14766
Matrix: Soil

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled: NA
Date Received: NA

Data Release Authorized:
Reported: 09/13/96

Percent Total Solids: NA

Prep Meth	**Prep Date**	**Analysis Method**	**Analysis Date**	**CAS Number**	**Analyte**	**RL**	**mg/kg-dry**
3050	09/09/96	6010	09/10/96	**7429-90-5**	**Aluminum**	2	3
3050	09/09/96	6010	09/10/96	7440-38-2	Arsenic	5	5 U
CLP	09/09/96	7470	09/11/96	7439-97-6	Mercury	0.05	0.05 U

U Analyte undetected at given RL

RL Reporting Limit

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Lab Sample ID: Q046LCS
LIMS ID: 96-14766
Matrix: Soil

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618

Data Release Authorized:
Reported: 09/13/96

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike mg/kg-dry	Spike Added	% Recovery	Q
Aluminum	6010	259	250	103.6%	
Arsenic	6010	253	250	101.2%	
Mercury	7471	0.40	0.50	80.0%	

'Q' codes: N = control limit not met

Control Limits: 75-125%

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS
Page 1 of 2

ANALYTICAL
RESOURCES
INCORPORATED

Sample No: HC1-S3

Lab Sample ID: Q046F
LIMS ID: 96-14771
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/09/96

Sample Amount: 3.90 g dry Wt
Percent Moisture: 23.6%

CAS Number	Analyte	ug/kg
74-87-3	Chloromethane	2.6 U
74-83-9	Bromomethane	2.6 U
75-01-4	Vinyl Chloride	2.6 U
75-00-3	Chloroethane	2.6 U
75-09-2	**Methylene Chloride**	**3.2 B**
67-64-1	**Acetone**	**13**
75-15-0	Carbon Disulfide	1.3 U
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.3 U
156-60-5	trans-1,2-Dichloroethene	1.3 U
156-59-2	**cis-1,2-Dichloroethene**	**3.7**
67-66-3	Chloroform	1.3 U
107-06-2	1,2-Dichloroethane	1.3 U
78-93-3	2-Butanone	6.4 U
71-55-6	1,1,1-Trichloroethane	1.3 U
56-23-5	Carbon Tetrachloride	1.3 U
108-05-4	Vinyl Acetate	6.4 U
75-27-4	Bromodichloromethane	1.3 U
78-87-5	1,2-Dichloropropane	1.3 U
10061-01-5	cis-1,3-Dichloropropene	1.3 U
79-01-6	**Trichloroethene**	**14**
124-48-1	Dibromochloromethane	1.3 U
79-00-5	1,1,2-Trichloroethane	1.3 U
71-43-2	Benzene	1.3 U
10061-02-6	trans-1,3-Dichloropropene	1.3 U
110-75-8	2-Chloroethylvinylether	6.4 U
75-25-2	Bromoform	1.3 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	6.4 U
591-78-6	2-Hexanone	6.4 U
127-18-4	**Tetrachloroethene**	**120**
79-34-5	1,1,2,2-Tetrachloroethane	1.3 U
108-88-3	Toluene	1.3 U
108-90-7	Chlorobenzene	1.3 U
100-41-4	Ethylbenzene	1.3 U
100-42-5	Styrene	1.3 U
75-69-4	Trichlorofluoromethane	2.6 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.6 U
	m,p-Xylene	1.3 U

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS
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ANALYTICAL RESOURCES INCORPORATED

Sample No: HC1-S3

Lab Sample ID: Q046F
LIMS ID: 96-14771
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/09/96

Sample Amount: 3.90 g dry Wt
Percent Moisture: 23.6%

CAS Number	Analyte	ug/kg
95-47-6	O-Xylene	1.3 U
95-50-1	1,2-Dichlorobenzene	1.3 U
541-73-1	1,3-Dichlorobenzene	1.3 U
106-46-7	1,4-Dichlorobenzene	1.3 U
107-02-8	Acrolein	64 U
74-88-4	Methyl Iodide	1.3 U
74-96-4	Bromoethane	2.6 U
107-13-1	Acrylonitrile	6.4 U
563-58-6	1,1-Dichloropropene	1.3 U
74-95-3	Dibromomethane	1.3 U
630-20-6	1,1,1,2-Tetrachloroethane	1.3 U
96-12-8	1,2-Dibromo-3-chloropropane	6.4 U
96-18-4	1,2,3-Trichloropropane	1.3 U
110-57-6	trans-1,4-Dichloro-2-butene	13 Y
108-67-8	1,3,5-Trimethylbenzene	1.3 U
95-63-6	1,2,4-Trimethylbenzene	1.3 U
87-68-3	Hexachlorobutadiene	6.4 U
106-93-4	Ethylene Dibromide	1.3 U
74-97-5	Bromochloromethane	1.3 U
590-20-7	2,2-Dichloropropane	1.3 U
142-28-9	1,3-Dichloropropane	1.3 U
98-82-8	Isopropylbenzene	1.3 U
103-65-1	n-Propylbenzene	1.3 U
108-86-1	Bromobenzene	1.3 U
95-49-8	2-Chlorotoluene	1.3 U
106-43-4	4-Chlorotoluene	1.3 U
98-06-6	tert-Butylbenzene	1.3 U
135-98-8	sec-Butylbenzene	1.3 U
99-87-6	4-Isopropyltoluene	1.3 U
104-51-8	n-Butylbenzene	1.3 U
120-82-1	1,2,4-Trichlorobenzene	6.4 U
91-20-3	Naphthalene	6.4 U
87-61-6	1,2,3-Trichlorobenzene	6.4 U

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	103%
d8-Toluene	97.0%
Bromofluorobenzene	100%
d4-1,2-Dichlorobenzene	99.3%

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS
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ANALYTICAL RESOURCES INCORPORATED

Sample No: HC2-S2

Lab Sample ID: Q046E
LIMS ID: 96-14770
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/09/96

Sample Amount: 3.73 g dry Wt
Percent Moisture: 26.1%

CAS Number	Analyte	ug/kg
74-87-3	Chloromethane	2.7 U
74-83-9	Bromomethane	2.7 U
75-01-4	Vinyl Chloride	2.7 U
75-00-3	Chloroethane	2.7 U
75-09-2	**Methylene Chloride**	**3.0 B**
67-64-1	Acetone	6.7 U
75-15-0	Carbon Disulfide	1.3 U
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.3 U
156-60-5	trans-1,2-Dichloroethene	1.3 U
156-59-2	cis-1,2-Dichloroethene	1.3 U
67-66-3	Chloroform	1.3 U
107-06-2	1,2-Dichloroethane	1.3 U
78-93-3	2-Butanone	6.7 U
71-55-6	1,1,1-Trichloroethane	1.3 U
56-23-5	Carbon Tetrachloride	1.3 U
108-05-4	Vinyl Acetate	6.7 U
75-27-4	Bromodichloromethane	1.3 U
78-87-5	1,2-Dichloropropane	1.3 U
10061-01-5	cis-1,3-Dichloropropene	1.3 U
79-01-6	Trichloroethene	1.3 U
124-48-1	Dibromochloromethane	1.3 U
79-00-5	1,1,2-Trichloroethane	1.3 U
71-43-2	Benzene	1.3 U
10061-02-6	trans-1,3-Dichloropropene	1.3 U
110-75-8	2-Chloroethylvinylether	6.7 U
75-25-2	Bromoform	1.3 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	6.7 U
591-78-6	2-Hexanone	6.7 U
127-18-4	**Tetrachloroethene**	**9.1**
79-34-5	1,1,2,2-Tetrachloroethane	1.3 U
108-88-3	Toluene	1.3 U
108-90-7	Chlorobenzene	1.3 U
100-41-4	Ethylbenzene	1.3 U
100-42-5	Styrene	1.3 U
75-69-4	Trichlorofluoromethane	2.7 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.7 U
	m,p-Xylene	1.3 U

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Volatiles by Purge & Trap GC/MS
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ANALYTICAL RESOURCES INCORPORATED

Sample No: HC2-S2

Lab Sample ID: Q046E
LIMS ID: 96-14770
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/09/96

Sample Amount: 3.73 g dry Wt
Percent Moisture: 26.1%

CAS Number	Analyte	ug/kg
95-47-6	O-Xylene	1.3 U
95-50-1	1,2-Dichlorobenzene	1.3 U
541-73-1	1,3-Dichlorobenzene	1.3 U
106-46-7	1,4-Dichlorobenzene	1.3 U
107-02-8	Acrolein	67 U
74-88-4	Methyl Iodide	1.3 U
74-96-4	Bromoethane	2.7 U
107-13-1	Acrylonitrile	6.7 U
563-58-6	1,1-Dichloropropene	1.3 U
74-95-3	Dibromomethane	1.3 U
630-20-6	1,1,1,2-Tetrachloroethane	1.3 U
96-12-8	1,2-Dibromo-3-chloropropane	6.7 U
96-18-4	1,2,3-Trichloropropane	1.3 U
110-57-6	trans-1,4-Dichloro-2-butene	13 Y
108-67-8	1,3,5-Trimethylbenzene	1.3 U
95-63-6	1,2,4-Trimethylbenzene	1.3 U
87-68-3	Hexachlorobutadiene	6.7 U
106-93-4	Ethylene Dibromide	1.3 U
74-97-5	Bromochloromethane	1.3 U
590-20-7	2,2-Dichloropropane	1.3 U
142-28-9	1,3-Dichloropropane	1.3 U
98-82-8	Isopropylbenzene	1.3 U
103-65-1	n-Propylbenzene	1.3 U
108-86-1	Bromobenzene	1.3 U
95-49-8	2-Chlorotoluene	1.3 U
106-43-4	4-Chlorotoluene	1.3 U
98-06-6	tert-Butylbenzene	1.3 U
135-98-8	sec-Butylbenzene	1.3 U
99-87-6	4-Isopropyltoluene	1.3 U
104-51-8	n-Butylbenzene	1.3 U
120-82-1	1,2,4-Trichlorobenzene	6.7 U
91-20-3	Naphthalene	6.7 U
87-61-6	1,2,3-Trichlorobenzene	6.7 U

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	101%
d8-Toluene	97.6%
Bromofluorobenzene	98.7%
d4-1,2-Dichlorobenzene	97.8%

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Volatiles by Purge & Trap GC/MS
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**ANALYTICAL
RESOURCES
INCORPORATED**

Sample No: HC3-S2

Lab Sample ID: Q046D
LIMS ID: 96-14769
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/09/96

Sample Amount: 4.03 g dry Wt
Percent Moisture: 19.5%

CAS Number	Analyte	ug/kg
74-87-3	Chloromethane	2.5 U
74-83-9	Bromomethane	2.5 U
75-01-4	Vinyl Chloride	2.5 U
75-00-3	Chloroethane	2.5 U
75-09-2	**Methylene Chloride**	**3.0 B**
67-64-1	**Acetone**	**49**
75-15-0	Carbon Disulfide	1.2 U
75-35-4	1,1-Dichloroethene	1.2 U
75-34-3	1,1-Dichloroethane	1.2 U
156-60-5	trans-1,2-Dichloroethene	1.2 U
156-59-2	cis-1,2-Dichloroethene	1.2 U
67-66-3	Chloroform	1.2 U
107-06-2	1,2-Dichloroethane	1.2 U
78-93-3	2-Butanone	6.2 U
71-55-6	1,1,1-Trichloroethane	1.2 U
56-23-5	Carbon Tetrachloride	1.2 U
108-05-4	Vinyl Acetate	6.2 U
75-27-4	Bromodichloromethane	1.2 U
78-87-5	1,2-Dichloropropane	1.2 U
10061-01-5	cis-1,3-Dichloropropene	1.2 U
79-01-6	Trichloroethene	1.2 U
124-48-1	Dibromochloromethane	1.2 U
79-00-5	1,1,2-Trichloroethane	1.2 U
71-43-2	Benzene	1.2 U
10061-02-6	trans-1,3-Dichloropropene	1.2 U
110-75-8	2-Chloroethylvinylether	6.2 U
75-25-2	Bromoform	1.2 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	6.2 U
591-78-6	2-Hexanone	6.2 U
127-18-4	Tetrachloroethene	1.2 U
79-34-5	1,1,2,2-Tetrachloroethane	1.2 U
108-88-3	Toluene	1.2 U
108-90-7	Chlorobenzene	1.2 U
100-41-4	Ethylbenzene	1.2 U
100-42-5	Styrene	1.2 U
75-69-4	Trichlorofluoromethane	2.5 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.5 U
	m,p-Xylene	1.2 U

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Volatiles by Purge & Trap GC/MS
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ANALYTICAL RESOURCES INCORPORATED

Sample No: HC3-S2

Lab Sample ID: Q046D
LIMS ID: 96-14769
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/09/96

Sample Amount: 4.03 g dry Wt
Percent Moisture: 19.5%

CAS Number	Analyte	ug/kg
95-47-6	O-Xylene	1.2 U
95-50-1	1,2-Dichlorobenzene	1.2 U
541-73-1	1,3-Dichlorobenzene	1.2 U
106-46-7	1,4-Dichlorobenzene	1.2 U
107-02-8	Acrolein	62 U
74-88-4	Methyl Iodide	1.2 U
74-96-4	Bromoethane	2.5 U
107-13-1	Acrylonitrile	6.2 U
563-58-6	1,1-Dichloropropene	1.2 U
74-95-3	Dibromomethane	1.2 U
630-20-6	1,1,1,2-Tetrachloroethane	1.2 U
96-12-8	1,2-Dibromo-3-chloropropane	6.2 U
96-18-4	1,2,3-Trichloropropane	1.2 U
110-57-6	trans-1,4-Dichloro-2-butene	12 Y
108-67-8	1,3,5-Trimethylbenzene	1.2 U
95-63-6	1,2,4-Trimethylbenzene	1.2 U
87-68-3	Hexachlorobutadiene	6.2 U
106-93-4	Ethylene Dibromide	1.2 U
74-97-5	Bromochloromethane	1.2 U
590-20-7	2,2-Dichloropropane	1.2 U
142-28-9	1,3-Dichloropropane	1.2 U
98-82-8	Isopropylbenzene	1.2 U
103-65-1	n-Propylbenzene	1.2 U
108-86-1	Bromobenzene	1.2 U
95-49-8	2-Chlorotoluene	1.2 U
106-43-4	4-Chlorotoluene	1.2 U
98-06-6	tert-Butylbenzene	1.2 U
135-98-8	sec-Butylbenzene	1.2 U
99-87-6	4-Isopropyltoluene	1.2 U
104-51-8	n-Butylbenzene	1.2 U
120-82-1	1,2,4-Trichlorobenzene	6.2 U
91-20-3	Naphthalene	6.2 U
87-61-6	1,2,3-Trichlorobenzene	6.2 U

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	100%
d8-Toluene	97.5%
Bromofluorobenzene	98.4%
d4-1,2-Dichlorobenzene	97.6%

ANALYTICAL RESOURCES INCORPORATED

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Volatiles by Purge & Trap GC/MS
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Sample No: HC4-S3

Lab Sample ID: Q046A
LIMS ID: 96-14766
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/09/96

Sample Amount: 3.62 g dry Wt
Percent Moisture: 27.5%

CAS Number	Analyte	ug/kg
74-87-3	Chloromethane	2.8 U
74-83-9	Bromomethane	2.8 U
75-01-4	Vinyl Chloride	2.8 U
75-00-3	Chloroethane	2.8 U
75-09-2	**Methylene Chloride**	**3.8 B**
67-64-1	**Acetone**	**38**
75-15-0	**Carbon Disulfide**	**2.9**
75-35-4	1,1-Dichloroethene	1.4 U
75-34-3	1,1-Dichloroethane	1.4 U
156-60-5	**trans-1,2-Dichloroethene**	**3.4**
156-59-2	**cis-1,2-Dichloroethene**	**80**
67-66-3	Chloroform	1.4 U
107-06-2	1,2-Dichloroethane	1.4 U
78-93-3	2-Butanone	6.9 U
71-55-6	1,1,1-Trichloroethane	1.4 U
56-23-5	Carbon Tetrachloride	1.4 U
108-05-4	Vinyl Acetate	6.9 U
75-27-4	Bromodichloromethane	1.4 U
78-87-5	1,2-Dichloropropane	1.4 U
10061-01-5	cis-1,3-Dichloropropene	1.4 U
79-01-6	**Trichloroethene**	**68**
124-48-1	Dibromochloromethane	1.4 U
79-00-5	1,1,2-Trichloroethane	1.4 U
71-43-2	Benzene	1.4 U
10061-02-6	trans-1,3-Dichloropropene	1.4 U
110-75-8	2-Chloroethylvinylether	6.9 U
75-25-2	Bromoform	1.4 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	6.9 U
591-78-6	2-Hexanone	6.9 U
127-18-4	**Tetrachloroethene**	**360 E**
79-34-5	1,1,2,2-Tetrachloroethane	1.4 U
108-88-3	Toluene	1.4 U
108-90-7	Chlorobenzene	1.4 U
100-41-4	Ethylbenzene	1.4 U
100-42-5	Styrene	1.4 U
75-69-4	Trichlorofluoromethane	2.8 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.8 U
	m,p-Xylene	1.4 U

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ANALYTICAL RESOURCES INCORPORATED

Sample No: HC4-S3

Lab Sample ID: Q046A
LIMS ID: 96-14766
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/09/96

Sample Amount: 3.62 g dry Wt
Percent Moisture: 27.5%

CAS Number	Analyte	ug/kg
95-47-6	**O-Xylene**	**1.6 M**
95-50-1	1,2-Dichlorobenzene	1.4 U
541-73-1	1,3-Dichlorobenzene	1.4 U
106-46-7	1,4-Dichlorobenzene	1.4 U
107-02-8	Acrolein	69 U
74-88-4	Methyl Iodide	1.4 U
74-96-4	Bromoethane	2.8 U
107-13-1	Acrylonitrile	6.9 U
563-58-6	1,1-Dichloropropene	1.4 U
74-95-3	Dibromomethane	1.4 U
630-20-6	1,1,1,2-Tetrachloroethane	1.4 U
96-12-8	1,2-Dibromo-3-chloropropane	6.9 U
96-18-4	1,2,3-Trichloropropane	1.4 U
110-57-6	trans-1,4-Dichloro-2-butene	14 Y
108-67-8	**1,3,5-Trimethylbenzene**	**16**
95-63-6	**1,2,4-Trimethylbenzene**	**35**
87-68-3	Hexachlorobutadiene	6.9 U
106-93-4	Ethylene Dibromide	1.4 U
74-97-5	Bromochloromethane	1.4 U
590-20-7	2,2-Dichloropropane	1.4 U
142-28-9	1,3-Dichloropropane	1.4 U
98-82-8	**Isopropylbenzene**	**1.4**
103-65-1	n-Propylbenzene	1.4 U
108-86-1	Bromobenzene	1.4 U
95-49-8	2-Chlorotoluene	1.4 U
106-43-4	4-Chlorotoluene	1.4 U
98-06-6	tert-Butylbenzene	1.4 U
135-98-8	**sec-Butylbenzene**	**5.0**
99-87-6	**4-Isopropyltoluene**	**6.2**
104-51-8	**n-Butylbenzene**	**2.8**
120-82-1	1,2,4-Trichlorobenzene	6.9 U
91-20-3	**Naphthalene**	**8.9**
87-61-6	1,2,3-Trichlorobenzene	6.9 U

Volatile Surrogate Recovery	
d4-1,2-Dichloroethane	103%
d8-Toluene	94.6%
Bromofluorobenzene	88.6%
d4-1,2-Dichlorobenzene	96.8%

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Volatiles by Purge & Trap GC/MS
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ANALYTICAL
RESOURCES
INCORPORATED

Sample No: HC4-S3
REANALYSIS

Lab Sample ID: Q046A-RE
LIMS ID: 96-14766
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/10/96

Sample Amount: 0.55 g dry Wt
Percent Moisture: 27.5%

CAS Number	Analyte	ug/kg
74-87-3	Chloromethane	18 U
74-83-9	Bromomethane	18 U
75-01-4	Vinyl Chloride	18 U
75-00-3	Chloroethane	18 U
75-09-2	**Methylene Chloride**	**22 B**
67-64-1	**Acetone**	**82 B**
75-15-0	Carbon Disulfide	9.1 U
75-35-4	1,1-Dichloroethene	9.1 U
75-34-3	1,1-Dichloroethane	9.1 U
156-60-5	trans-1,2-Dichloroethene	9.1 U
156-59-2	**cis-1,2-Dichloroethene**	**59**
67-66-3	Chloroform	9.1 U
107-06-2	1,2-Dichloroethane	9.1 U
78-93-3	2-Butanone	45 U
71-55-6	1,1,1-Trichloroethane	9.1 U
56-23-5	Carbon Tetrachloride	9.1 U
108-05-4	Vinyl Acetate	45 U
75-27-4	Bromodichloromethane	9.1 U
78-87-5	1,2-Dichloropropane	9.1 U
10061-01-5	cis-1,3-Dichloropropene	9.1 U
79-01-6	**Trichloroethene**	**56**
124-48-1	Dibromochloromethane	9.1 U
79-00-5	1,1,2-Trichloroethane	9.1 U
71-43-2	Benzene	9.1 U
10061-02-6	trans-1,3-Dichloropropene	9.1 U
110-75-8	2-Chloroethylvinylether	45 U
75-25-2	Bromoform	9.1 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	45 U
591-78-6	2-Hexanone	45 U
127-18-4	**Tetrachloroethene**	**330**
79-34-5	1,1,2,2-Tetrachloroethane	9.1 U
108-88-3	Toluene	9.1 U
108-90-7	Chlorobenzene	9.1 U
100-41-4	Ethylbenzene	9.1 U
100-42-5	Styrene	9.1 U
75-69-4	Trichlorofluoromethane	18 U
76-13-1	1,1,2-Trichlorotrifluoroethane	18 U
	m,p-Xylene	9.1 U

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS
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ANALYTICAL
RESOURCES
INCORPORATED

Sample No: HC4-S3
REANALYSIS

Lab Sample ID: Q046A-RE
LIMS ID: 96-14766
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/10/96

Sample Amount: 0.55 g dry Wt
Percent Moisture: 27.5%

CAS Number	Analyte	ug/kg
95-47-6	O-Xylene	9.1 U
95-50-1	1,2-Dichlorobenzene	9.1 U
541-73-1	1,3-Dichlorobenzene	9.1 U
106-46-7	1,4-Dichlorobenzene	9.1 U
107-02-8	Acrolein	450 U
74-88-4	Methyl Iodide	9.1 U
74-96-4	Bromoethane	18 U
107-13-1	Acrylonitrile	45 U
563-58-6	1,1-Dichloropropene	9.1 U
74-95-3	Dibromomethane	9.1 U
630-20-6	1,1,1,2-Tetrachloroethane	9.1 U
96-12-8	1,2-Dibromo-3-chloropropane	45 U
96-18-4	1,2,3-Trichloropropane	9.1 U
110-57-6	trans-1,4-Dichloro-2-butene	91 Y
108-67-8	**1,3,5-Trimethylbenzene**	**21**
95-63-6	**1,2,4-Trimethylbenzene**	**41**
87-68-3	Hexachlorobutadiene	45 U
106-93-4	Ethylene Dibromide	9.1 U
74-97-5	Bromochloromethane	9.1 U
590-20-7	2,2-Dichloropropane	9.1 U
142-28-9	1,3-Dichloropropane	9.1 U
98-82-8	Isopropylbenzene	9.1 U
103-65-1	n-Propylbenzene	9.1 U
108-86-1	Bromobenzene	9.1 U
95-49-8	2-Chlorotoluene	9.1 U
106-43-4	4-Chlorotoluene	9.1 U
98-06-6	tert-Butylbenzene	9.1 U
135-98-8	sec-Butylbenzene	9.1 U
99-87-6	4-Isopropyltoluene	9.1 U
104-51-8	n-Butylbenzene	10 Y
120-82-1	1,2,4-Trichlorobenzene	45 U
91-20-3	Naphthalene	45 U
87-61-6	1,2,3-Trichlorobenzene	45 U

Volatile Surrogate Recovery	
d4-1,2-Dichloroethane	99.8%
d8-Toluene	97.9%
Bromofluorobenzene	96.9%
d4-1,2-Dichlorobenzene	97.7%

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS
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ANALYTICAL
RESOURCES
INCORPORATED

Sample No: HC4-S4

Lab Sample ID: Q046B
LIMS ID: 96-14767
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/10/96

Sample Amount: 3.97 g dry Wt
Percent Moisture: 21.5%

CAS Number	Analyte	ug/kg
74-87-3	Chloromethane	2.5 U
74-83-9	Bromomethane	2.5 U
75-01-4	Vinyl Chloride	2.5 U
75-00-3	Chloroethane	2.5 U
75-09-2	**Methylene Chloride**	**3.1 B**
67-64-1	**Acetone**	**46 B**
75-15-0	**Carbon Disulfide**	**1.9**
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.3 U
156-60-5	trans-1,2-Dichloroethene	1.3 U
156-59-2	cis-1,2-Dichloroethene	1.3 U
67-66-3	Chloroform	1.3 U
107-06-2	1,2-Dichloroethane	1.3 U
78-93-3	2-Butanone	6.3 U
71-55-6	1,1,1-Trichloroethane	1.3 U
56-23-5	Carbon Tetrachloride	1.3 U
108-05-4	Vinyl Acetate	6.3 U
75-27-4	Bromodichloromethane	1.3 U
78-87-5	1,2-Dichloropropane	1.3 U
10061-01-5	cis-1,3-Dichloropropene	1.3 U
79-01-6	Trichloroethene	1.3 U
124-48-1	Dibromochloromethane	1.3 U
79-00-5	1,1,2-Trichloroethane	1.3 U
71-43-2	Benzene	1.3 U
10061-02-6	trans-1,3-Dichloropropene	1.3 U
110-75-8	2-Chloroethylvinylether	6.3 U
75-25-2	Bromoform	1.3 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	6.3 U
591-78-6	2-Hexanone	6.3 U
127-18-4	Tetrachloroethene	1.3 U
79-34-5	1,1,2,2-Tetrachloroethane	1.6 Y
108-88-3	Toluene	1.3 U
108-90-7	Chlorobenzene	1.3 U
100-41-4	Ethylbenzene	1.3 U
100-42-5	Styrene	1.3 U
75-69-4	Trichlorofluoromethane	2.5 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.5 U
	m,p-Xylene	1.3 U

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS
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ANALYTICAL RESOURCES INCORPORATED

Sample No: HC4-S4

Lab Sample ID: Q046B
LIMS ID: 96-14767
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/10/96

Sample Amount: 3.97 g dry Wt
Percent Moisture: 21.5%

CAS Number	Analyte	ug/kg
95-47-6	O-Xylene	1.3 U
95-50-1	1,2-Dichlorobenzene	1.3 U
541-73-1	1,3-Dichlorobenzene	1.3 U
106-46-7	1,4-Dichlorobenzene	1.3 U
107-02-8	Acrolein	63 U
74-88-4	Methyl Iodide	1.3 U
74-96-4	Bromoethane	2.5 U
107-13-1	Acrylonitrile	6.3 U
563-58-6	1,1-Dichloropropene	1.3 U
74-95-3	Dibromomethane	1.3 U
630-20-6	1,1,1,2-Tetrachloroethane	1.3 U
96-12-8	1,2-Dibromo-3-chloropropane	6.3 U
96-18-4	1,2,3-Trichloropropane	1.3 U
110-57-6	trans-1,4-Dichloro-2-butene	13 Y
108-67-8	1,3,5-Trimethylbenzene	1.3 U
95-63-6	1,2,4-Trimethylbenzene	1.3 U
87-68-3	Hexachlorobutadiene	6.3 U
106-93-4	Ethylene Dibromide	1.3 U
74-97-5	Bromochloromethane	1.3 U
590-20-7	2,2-Dichloropropane	1.3 U
142-28-9	1,3-Dichloropropane	1.3 U
98-82-8	Isopropylbenzene	1.3 U
103-65-1	n-Propylbenzene	1.3 U
108-86-1	Bromobenzene	1.3 U
95-49-8	2-Chlorotoluene	1.3 U
106-43-4	4-Chlorotoluene	1.3 U
98-06-6	tert-Butylbenzene	1.3 U
135-98-8	sec-Butylbenzene	1.3 U
99-87-6	4-Isopropyltoluene	1.3 U
104-51-8	n-Butylbenzene	1.3 U
120-82-1	1,2,4-Trichlorobenzene	6.3 U
91-20-3	Naphthalene	6.3 U
87-61-6	1,2,3-Trichlorobenzene	6.3 U

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	98.4%
d8-Toluene	94.7%
Bromofluorobenzene	90.1%
d4-1,2-Dichlorobenzene	96.8%

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS
Page 1 of 2

ANALYTICAL RESOURCES INCORPORATED

Sample No: Method Blank

Lab Sample ID: 090996MB
LIMS ID: 96-14766
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled: NA
Date Received: NA

Instrument: FINN1
Date Analyzed: 09/09/96

Sample Amount: 5.00 g dry Wt Equiv
Percent Moisture: NA

CAS Number	Analyte	ug/kg
74-87-3	Chloromethane	2.0 U
74-83-9	Bromomethane	2.0 U
75-01-4	Vinyl Chloride	2.0 U
75-00-3	Chloroethane	2.0 U
75-09-2	**Methylene Chloride**	**2.5**
67-64-1	Acetone	5.0 U
75-15-0	Carbon Disulfide	1.0 U
75-35-4	1,1-Dichloroethene	1.0 U
75-34-3	1,1-Dichloroethane	1.0 U
156-60-5	trans-1,2-Dichloroethene	1.0 U
156-59-2	cis-1,2-Dichloroethene	1.0 U
67-66-3	Chloroform	1.0 U
107-06-2	1,2-Dichloroethane	1.0 U
78-93-3	2-Butanone	5.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	1.0 U
108-05-4	Vinyl Acetate	5.0 U
75-27-4	Bromodichloromethane	1.0 U
78-87-5	1,2-Dichloropropane	1.0 U
10061-01-5	cis-1,3-Dichloropropene	1.0 U
79-01-6	Trichloroethene	1.0 U
124-48-1	Dibromochloromethane	1.0 U
79-00-5	1,1,2-Trichloroethane	1.0 U
71-43-2	Benzene	1.0 U
10061-02-6	trans-1,3-Dichloropropene	1.0 U
110-75-8	2-Chloroethylvinylether	5.0 U
75-25-2	Bromoform	1.0 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	5.0 U
591-78-6	2-Hexanone	5.0 U
127-18-4	Tetrachloroethene	1.0 U
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U
108-88-3	Toluene	1.0 U
108-90-7	Chlorobenzene	1.0 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	1.0 U
75-69-4	Trichlorofluoromethane	2.0 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.0 U
	m,p-Xylene	1.0 U

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS
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ANALYTICAL RESOURCES INCORPORATED

Sample No: Method Blank

Lab Sample ID: 090996MB
LIMS ID: 96-14766
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled: NA
Date Received: NA

Instrument: FINN1
Date Analyzed: 09/09/96

Sample Amount: 5.00 g dry Wt Equiv
Percent Moisture: NA

CAS Number	Analyte	ug/kg
95-47-6	O-Xylene	1.0 U
95-50-1	1,2-Dichlorobenzene	1.0 U
541-73-1	1,3-Dichlorobenzene	1.0 U
106-46-7	1,4-Dichlorobenzene	1.0 U
107-02-8	Acrolein	50 U
74-88-4	Methyl Iodide	1.0 U
74-83-9	Bromoethane	2.0 U
107-13-1	Acrylonitrile	5.0 U
563-58-6	1,1-Dichloropropene	1.0 U
74-95-3	Dibromomethane	1.0 U
630-20-6	1,1,1,2-Tetrachloroethane	1.0 U
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U
96-18-4	1,2,3-Trichloropropane	1.0 U
110-57-6	trans-1,4-Dichloro-2-butene	10 Y
108-67-8	1,3,5-Trimethylbenzene	1.0 U
95-63-6	1,2,4-Trimethylbenzene	1.0 U
87-68-3	Hexachlorobutadiene	5.0 U
106-93-4	Ethylene Dibromide	1.0 U
74-97-5	Bromochloromethane	1.0 U
590-20-7	2,2-Dichloropropane	1.0 U
142-28-9	1,3-Dichloropropane	1.0 U
98-82-8	Isopropylbenzene	1.0 U
103-65-1	n-Propylbenzene	1.0 U
108-86-1	Bromobenzene	1.0 U
95-49-8	2-Chlorotoluene	1.0 U
106-43-4	4-Chlorotoluene	1.0 U
98-06-6	tert-Butylbenzene	1.0 U
135-98-8	sec-Butylbenzene	1.0 U
99-87-6	4-Isopropyltoluene	1.0 U
104-51-8	n-Butylbenzene	1.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0 U
91-20-3	Naphthalene	5.0 U
87-61-6	1,2,3-Trichlorobenzene	5.0 U

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	100%
d8-Toluene	96.1%
Bromofluorobenzene	100%
d4-1,2-Dichlorobenzene	98.0%

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS
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ANALYTICAL
RESOURCES
INCORPORATED

Sample No: Method Blank

Lab Sample ID: 091096MB
LIMS ID: 96-14767
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled: NA
Date Received: NA

Instrument: FINN1
Date Analyzed: 09/10/96

Sample Amount: 5.00 g dry Wt Equiv
Percent Moisture: NA

CAS Number	Analyte	ug/kg
74-87-3	Chloromethane	2.0 U
74-83-9	Bromomethane	2.0 U
75-01-4	Vinyl Chloride	2.0 U
75-00-3	Chloroethane	2.0 U
75-09-2	**Methylene Chloride**	**2.2**
67-64-1	**Acetone**	**5.6**
75-15-0	Carbon Disulfide	1.0 U
75-35-4	1,1-Dichloroethene	1.0 U
75-34-3	1,1-Dichloroethane	1.0 U
156-60-5	trans-1,2-Dichloroethene	1.0 U
156-59-2	cis-1,2-Dichloroethene	1.0 U
67-66-3	Chloroform	1.0 U
107-06-2	1,2-Dichloroethane	1.0 U
78-93-3	2-Butanone	5.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	1.0 U
108-05-4	Vinyl Acetate	5.0 U
75-27-4	Bromodichloromethane	1.0 U
78-87-5	1,2-Dichloropropane	1.0 U
10061-01-5	cis-1,3-Dichloropropene	1.0 U
79-01-6	Trichloroethene	1.0 U
124-48-1	Dibromochloromethane	1.0 U
79-00-5	1,1,2-Trichloroethane	1.0 U
71-43-2	Benzene	1.0 U
10061-02-6	trans-1,3-Dichloropropene	1.0 U
110-75-8	2-Chloroethylvinylether	5.0 U
75-25-2	Bromoform	1.0 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	5.0 U
591-78-6	2-Hexanone	5.0 U
127-18-4	Tetrachloroethene	1.0 U
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U
108-88-3	Toluene	1.0 U
108-90-7	Chlorobenzene	1.0 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	1.0 U
75-69-4	Trichlorofluoromethane	2.0 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.0 U
	m,p-Xylene	1.0 U

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS
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ANALYTICAL RESOURCES INCORPORATED

Sample No: Method Blank

Lab Sample ID: 091096MB
LIMS ID: 96-14767
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled: NA
Date Received: NA

Instrument: FINN1
Date Analyzed: 09/10/96

Sample Amount: 5.00 g dry Wt Equiv
Percent Moisture: NA

CAS Number	Analyte	ug/kg
95-47-6	O-Xylene	1.0 U
95-50-1	1,2-Dichlorobenzene	1.0 U
541-73-1	1,3-Dichlorobenzene	1.0 U
106-46-7	1,4-Dichlorobenzene	1.0 U
107-02-8	Acrolein	50 U
74-88-4	Methyl Iodide	1.0 U
74-83-9	Bromoethane	2.0 U
107-13-1	Acrylonitrile	5.0 U
563-58-6	1,1-Dichloropropene	1.0 U
74-95-3	Dibromomethane	1.0 U
630-20-6	1,1,1,2-Tetrachloroethane	1.0 U
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U
96-18-4	1,2,3-Trichloropropane	1.0 U
110-57-6	trans-1,4-Dichloro-2-butene	10 Y
108-67-8	1,3,5-Trimethylbenzene	1.0 U
95-63-6	1,2,4-Trimethylbenzene	1.0 U
87-68-3	Hexachlorobutadiene	5.0 U
106-93-4	Ethylene Dibromide	1.0 U
74-97-5	Bromochloromethane	1.0 U
590-20-7	2,2-Dichloropropane	1.0 U
142-28-9	1,3-Dichloropropane	1.0 U
98-82-8	Isopropylbenzene	1.0 U
103-65-1	n-Propylbenzene	1.0 U
108-86-1	Bromobenzene	1.0 U
95-49-8	2-Chlorotoluene	1.0 U
106-43-4	4-Chlorotoluene	1.0 U
98-06-6	tert-Butylbenzene	1.0 U
135-98-8	sec-Butylbenzene	1.0 U
99-87-6	4-Isopropyltoluene	1.0 U
104-51-8	n-Butylbenzene	1.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0 U
91-20-3	Naphthalene	5.0 U
87-61-6	1,2,3-Trichlorobenzene	5.0 U

Volatile Surrogate Recovery	
d4-1,2-Dichloroethane	98.3%
d8-Toluene	97.9%
Bromofluorobenzene	98.9%
d4-1,2-Dichlorobenzene	98.2%

ORGANICS ANALYSIS DATA SHEET
Volatiles by GC/MS
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ANALYTICAL RESOURCES INCORPORATED

Lab Sample ID: Q046SB
LIMS ID: 96-14766
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96
Date Analyzed: 09/09/96
Instrument: FINN1

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Received: NA

LABORATORY CONTROL SAMPLE CONSTITUENT	SPIKE VALUE	SPIKE AMT	% RECOVERY
Chloromethane	60.3	50.0	121%
Bromomethane	53.3	50.0	107%
Vinyl Chloride	62.5	50.0	125%
Chloroethane	56.5	50.0	113%
Methylene Chloride	50.4	50.0	101%
Acetone	261.	250	104%
Carbon Disulfide	72.6	50.0	145%
1,1-Dichloroethene	49.5	50.0	99.0%
1,1-Dichloroethane	50.4	50.0	101%
trans-1,2-Dichloroethene	49.4	50.0	98.8%
cis-1,2-Dichloroethene	49.6	50.0	99.2%
Chloroform	50.8	50.0	102%
1,2-Dichloroethane	50.0	50.0	100%
2-Butanone	259.	250	104%
1,1,1-Trichloroethane	51.3	50.0	103%
Carbon Tetrachloride	51.4	50.0	103%
Vinyl Acetate	26.0	50.0	52.0%
Bromodichloromethane	50.8	50.0	102%
1,2-Dichloropropane	50.4	50.0	101%
cis-1,3-Dichloropropene	50.4	50.0	101%
Trichloroethene	49.4	50.0	98.8%
Dibromochloromethane	50.6	50.0	101%
1,1,2-Trichloroethane	50.3	50.0	101%
Benzene	49.4	50.0	98.8%
trans-1,3-Dichloropropene	49.8	50.0	99.6%
2-Chloroethylvinylether	19.0	50.0	38.0%
Bromoform	51.6	50.0	103%
4-Methyl-2-Pentanone (MIBK)	257.	250	103%
2-Hexanone	262.	250	105%
Tetrachloroethene	49.8	50.0	99.6%
1,1,2,2-Tetrachloroethane	49.3	50.0	98.6%
Toluene	50.5	50.0	101%
Chlorobenzene	49.0	50.0	98.0%
Ethylbenzene	50.2	50.0	100%
Styrene	51.0	50.0	102%
Trichlorofluoromethane	50.6	50.0	101%
1,1,2-Trichlorotrifluoroethane	68.0	50.0	136%
m,p-Xylene	99.9	100	99.9%
O-Xylene	50.0	50.0	100%

Reported in ug/kg-dry-Wt

ORGANICS ANALYSIS DATA SHEET
Volatiles by GC/MS
Page 2 of 2

ANALYTICAL
RESOURCES
INCORPORATED

Lab Sample ID: Q046SB
LIMS ID: 96-14766
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96
Date Analyzed: 09/09/96
Instrument: FINN1

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Received: NA

LABORATORY CONTROL SAMPLE CONSTITUENT	**SPIKE VALUE**	**SPIKE AMT**	**% RECOVERY**
1,2-Dichlorobenzene	49.1	50.0	98.2%
1,3-Dichlorobenzene	49.3	50.0	98.6%
1,4-Dichlorobenzene	49.4	50.0	98.8%
Acrolein	535.	250	214%
Methyl Iodide	66.9	50.0	134%
Bromoethane	63.5	50.0	127%
Acrylonitrile	56.5	50.0	113%
1,1-Dichloropropene	52.4	50.0	105%
Dibromomethane	51.7	50.0	103%
1,1,1,2-Tetrachloroethane	49.6	50.0	99.2%
1,2-Dibromo-3-chloropropane	48.8	50.0	97.6%
1,2,3-Trichloropropane	49.6	50.0	99.2%
trans-1,4-Dichloro-2-butene	53.8	50.0	108%
1,3,5-Trimethylbenzene	49.6	50.0	99.2%
1,2,4-Trimethylbenzene	49.9	50.0	99.8%
Hexachlorobutadiene	45.5	50.0	91.0%
Ethylene Dibromide	48.7	50.0	97.4%
Bromochloromethane	50.8	50.0	102%
2,2-Dichloropropane	51.8	50.0	104%
1,3-Dichloropropane	49.2	50.0	98.4%
Isopropylbenzene	55.4	50.0	111%
n-Propylbenzene	49.0	50.0	98.0%
Bromobenzene	50.8	50.0	102%
2-Chlorotoluene	50.2	50.0	100%
4-Chlorotoluene	48.2	50.0	96.4%
tert-Butylbenzene	48.0	50.0	96.0%
sec-Butylbenzene	48.8	50.0	97.6%
4-Isopropyltoluene	51.0	50.0	102%
n-Butylbenzene	48.9	50.0	97.8%
1,2,4-Trichlorobenzene	47.9	50.0	95.8%
Naphthalene	49.2	50.0	98.4%
1,2,3-Trichlorobenzene	47.1	50.0	94.2%

Spike Blank Surrogate Recovery	
d4-1,2-Dichloroethane	105%
d8-Toluene	99.7%
Bromofluorobenzene	103%
d4-1,2-Dichlorobenzene	102%

Reported in ug/kg-dry-Wt

ORGANICS ANALYSIS DATA SHEET
Volatiles by GC/MS
Page 1 of 2

**ANALYTICAL
RESOURCES
INCORPORATED**

Lab Sample ID: Q046SB
LIMS ID: 96-14767
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96
Date Analyzed: 09/10/96
Instrument: FINN1

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Received: NA

LABORATORY CONTROL SAMPLE CONSTITUENT	**SPIKE VALUE**	**SPIKE AMT**	**% RECOVERY**
Chloromethane	75.6	50.0	151%
Bromomethane	57.3	50.0	115%
Vinyl Chloride	62.0	50.0	124%
Chloroethane	54.9	50.0	110%
Methylene Chloride	49.4	50.0	98.8%
Acetone	266.	250	106%
Carbon Disulfide	48.3	50.0	96.6%
1,1-Dichloroethene	49.0	50.0	98.0%
1,1-Dichloroethane	50.0	50.0	100%
trans-1,2-Dichloroethene	49.0	50.0	98.0%
cis-1,2-Dichloroethene	49.8	50.0	99.6%
Chloroform	49.3	50.0	98.6%
1,2-Dichloroethane	47.8	50.0	95.6%
2-Butanone	246.	250	98.4%
1,1,1-Trichloroethane	50.2	50.0	100%
Carbon Tetrachloride	49.0	50.0	98.0%
Vinyl Acetate	26.1	50.0	52.2%
Bromodichloromethane	49.1	50.0	98.2%
1,2-Dichloropropane	50.3	50.0	101%
cis-1,3-Dichloropropene	48.5	50.0	97.0%
Trichloroethene	47.9	50.0	95.8%
Dibromochloromethane	49.3	50.0	98.6%
1,1,2-Trichloroethane	48.1	50.0	96.2%
Benzene	49.4	50.0	98.8%
trans-1,3-Dichloropropene	47.4	50.0	94.8%
2-Chloroethylvinylether	14.3	50.0	28.6%
Bromoform	48.9	50.0	97.8%
4-Methyl-2-Pentanone (MIBK)	243.	250	97.2%
2-Hexanone	248.	250	99.2%
Tetrachloroethene	48.0	50.0	96.0%
1,1,2,2-Tetrachloroethane	47.2	50.0	94.4%
Toluene	49.1	50.0	98.2%
Chlorobenzene	48.3	50.0	96.6%
Ethylbenzene	49.2	50.0	98.4%
Styrene	48.9	50.0	97.8%
Trichlorofluoromethane	48.3	50.0	96.6%
1,1,2-Trichlorotrifluoroethane	51.2	50.0	102%
m,p-Xylene	96.7	100	96.7%
O-Xylene	48.4	50.0	96.8%

Reported in ug/kg-dry-Wt

FORM-III

ORGANICS ANALYSIS DATA SHEET
Volatiles by GC/MS
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ANALYTICAL
RESOURCES
INCORPORATED

Lab Sample ID: Q046SB
LIMS ID: 96-14767
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96
Date Analyzed: 09/10/96
Instrument: FINN1

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Received: NA

LABORATORY CONTROL SAMPLE CONSTITUENT	**SPIKE VALUE**	**SPIKE AMT**	**% RECOVERY**
1,2-Dichlorobenzene	47.8	50.0	95.6%
1,3-Dichlorobenzene	47.6	50.0	95.2%
1,4-Dichlorobenzene	48.8	50.0	97.6%
Acrolein	506.	250	202%
Methyl Iodide	48.6	50.0	97.2%
Bromoethane	49.7	50.0	99.4%
Acrylonitrile	50.9	50.0	102%
1,1-Dichloropropene	50.4	50.0	101%
Dibromomethane	49.5	50.0	99.0%
1,1,1,2-Tetrachloroethane	47.8	50.0	95.6%
1,2-Dibromo-3-chloropropane	46.8	50.0	93.6%
1,2,3-Trichloropropane	46.1	50.0	92.2%
trans-1,4-Dichloro-2-butene	48.8	50.0	97.6%
1,3,5-Trimethylbenzene	48.0	50.0	96.0%
1,2,4-Trimethylbenzene	48.2	50.0	96.4%
Hexachlorobutadiene	44.5	50.0	89.0%
Ethylene Dibromide	46.8	50.0	93.6%
Bromochloromethane	49.5	50.0	99.0%
2,2-Dichloropropane	49.9	50.0	99.8%
1,3-Dichloropropane	48.0	50.0	96.0%
Isopropylbenzene	53.6	50.0	107%
n-Propylbenzene	47.7	50.0	95.4%
Bromobenzene	49.2	50.0	98.4%
2-Chlorotoluene	45.3	50.0	90.6%
4-Chlorotoluene	51.9	50.0	104%
tert-Butylbenzene	43.5	50.0	87.0%
sec-Butylbenzene	47.0	50.0	94.0%
4-Isopropyltoluene	49.0	50.0	98.0%
n-Butylbenzene	47.3	50.0	94.6%
1,2,4-Trichlorobenzene	47.3	50.0	94.6%
Naphthalene	47.9	50.0	95.8%
1,2,3-Trichlorobenzene	47.0	50.0	94.0%

Spike Blank Surrogate Recovery	
d4-1,2-Dichloroethane	102%
d8-Toluene	99.1%
Bromofluorobenzene	99.6%
d4-1,2-Dichlorobenzene	99.5%

Reported in ug/kg-dry-Wt

FORM-III

ANALYTICAL
RESOURCES
INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by GC/MS
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Sample No: HC4-S3
Lab Sample ID: Q046A
QC Report No: Q046-Hart Crowser
LIMS ID: 96-14766
Project: Fox Ave Property
Matrix: Soil
J-4618
Date Received: 09/06/96
Data Release Authorized:
Reported: 09/12/96

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
Date Analyzed: 09/09/96

CONSTITUENT	**SAMPLE VALUE**	**SPIKE VALUE**	**SPIKE AMT**	**% RECOVERY**	**RPD**
MATRIX SPIKE					
Chloromethane	< 2.8	96.8	68.3	142%	
Bromomethane	< 2.8	58.6	68.3	85.8%	
Vinyl Chloride	< 2.8	75.6	68.3	111%	
Chloroethane	< 2.8	66.7	68.3	97.6%	
Methylene Chloride	3.8	57.1	68.3	78.0%	
Acetone	37.5	342	342	89.2%	
Carbon Disulfide	2.9	73.8	68.3	104%	
1,1-Dichloroethene	< 1.4	53.4	68.3	78.2%	
1,1-Dichloroethane	< 1.4	57.6	68.3	84.3%	
trans-1,2-Dichloroethene	3.4	52.5	68.3	71.8%	
cis-1,2-Dichloroethene	80.4	191	68.3	162%	
Chloroform	< 1.4	51.8	68.3	75.8%	
1,2-Dichloroethane	< 1.4	48.6	68.3	71.2%	
2-Butanone	< 6.9	303	342	88.7%	
1,1,1-Trichloroethane	< 1.4	54.6	68.3	79.9%	
Carbon Tetrachloride	< 1.4	50.9	68.3	74.5%	
Vinyl Acetate	< 6.9	0.00	68.3	0.0%	
Bromodichloromethane	< 1.4	44.6	68.3	65.3%	
1,2-Dichloropropane	< 1.4	49.9	68.3	73.1%	
cis-1,3-Dichloropropene	< 1.4	38.4	68.3	56.2%	
Trichloroethene	68.0	149	68.3	119%	
Dibromochloromethane	< 1.4	38.9	68.3	56.9%	
1,1,2-Trichloroethane	< 1.4	40.6	68.3	59.4%	
Benzene	< 1.4	50.4	68.3	73.8%	
trans-1,3-Dichloropropene	< 1.4	31.2	68.3	45.7%	
2-Chloroethylvinylether	< 6.9	12.5	68.3	18.3%	
Bromoform	< 1.4	32.9	68.3	48.2%	
4-Methyl-2-Pentanone (MIBK)	< 6.9	291	342	85.2%	
2-Hexanone	< 6.9	308	342	90.2%	
Tetrachloroethene	357.	434	68.3	113%	
1,1,2,2-Tetrachloroethane	< 1.4	52.6	68.3	77.0%	
Toluene	< 1.4	44.1	68.3	64.6%	
Chlorobenzene	< 1.4	37.9	68.3	55.5%	
Ethylbenzene	< 1.4	44.8	68.3	65.6%	
Styrene	< 1.4	33.6	68.3	49.2%	
Trichlorofluoromethane	< 2.8	56.2	68.3	82.3%	

Reported in ug/kg-dry-Wt

ORGANICS ANALYSIS DATA SHEET
Volatiles by GC/MS
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ANALYTICAL
RESOURCES
INCORPORATED

Lab Sample ID: Q046A
LIMS ID: 96-14766
Matrix: Soil

Sample No: HC4-S3
QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Received: 09/06/96

Data Release Authorized:
Reported: 09/12/96

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Date Analyzed: 09/09/96

CONSTITUENT	**SAMPLE VALUE**	**SPIKE VALUE**	**SPIKE AMT**	**% RECOVERY**	**RPD**
MATRIX SPIKE					
1,1,2-Trichlorotrifluoroethane	< 2.8	64.2	68.3	94.0%	
m,p-Xylene	< 1.4	87.7	137	64.2%	
O-Xylene	1.6	41.1	68.3	57.8%	
1,2-Dichlorobenzene	< 1.4	30.4	68.3	44.5%	
1,3-Dichlorobenzene	< 1.4	31.5	68.3	46.1%	
1,4-Dichlorobenzene	< 1.4	30.5	68.3	44.7%	
Acrolein	< 69.1	358	342	105%	
Methyl Iodide	< 1.4	57.3	68.3	83.9%	
Bromoethane	< 2.8	70.6	68.3	103%	
Acrylonitrile	< 6.9	58.0	68.3	84.9%	
1,1-Dichloropropene	< 1.4	49.0	68.3	71.7%	
Dibromomethane	< 1.4	42.9	68.3	62.8%	
1,1,1,2-Tetrachloroethane	< 1.4	42.5	68.3	62.2%	
1,2-Dibromo-3-chloropropane	< 6.9	29.8	68.3	43.6%	
1,2,3-Trichloropropane	< 1.4	46.4	68.3	67.9%	
trans-1,4-Dichloro-2-butene	< 13.8	13.7	68.3	20.1%	
1,3,5-Trimethylbenzene	16.5	65.3	68.3	71.4%	
1,2,4-Trimethylbenzene	34.7	88.6	68.3	78.9%	
Hexachlorobutadiene	< 6.9	21.6	68.3	31.6%	
Ethylene Dibromide	< 1.4	33.3	68.3	48.8%	
Bromochloromethane	< 1.4	50.9	68.3	74.5%	
2,2-Dichloropropane	< 1.4	54.3	68.3	79.5%	
1,3-Dichloropropane	< 1.4	44.4	68.3	65.0%	
Isopropylbenzene	1.4	56.9	68.3	81.2%	
n-Propylbenzene	< 1.4	46.2	68.3	67.6%	
Bromobenzene	< 1.4	60.3	68.3	88.3%	
2-Chlorotoluene	< 1.4	46.3	68.3	67.8%	
4-Chlorotoluene	< 1.4	33.5	68.3	49.0%	
tert-Butylbenzene	< 1.4	44.2	68.3	64.7%	
sec-Butylbenzene	5.0	48.2	68.3	63.2%	
4-Isopropyltoluene	6.2	46.6	68.3	59.2%	
n-Butylbenzene	2.8	45.1	68.3	62.0%	
1,2,4-Trichlorobenzene	< 6.9	18.8	68.3	27.5%	
Naphthalene	8.9	38.3	68.3	43.0%	
1,2,3-Trichlorobenzene	< 6.9	16.4	68.3	24.0%	

Reported in ug/kg-dry-Wt

FORM-III

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by GC/MS
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Lab Sample ID: Q046A
LIMS ID: 96-14766
Matrix: Soil

Data Release Authorized:
Reported: 09/12/96

Sample No: HC4-S3
QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Received: 09/06/96

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
Date Analyzed: 09/09/96

CONSTITUENT	**SAMPLE VALUE**	**SPIKE VALUE**	**SPIKE AMT**	**% RECOVERY**	**RPD**
MATRIX SPIKE DUPLICATE					
Chloromethane	< 2.8	99.5	67.2	148%	4.3%
Bromomethane	< 2.8	66.3	67.2	98.7%	14%
Vinyl Chloride	< 2.8	74.4	67.2	111%	0.3%
Chloroethane	< 2.8	68.7	67.2	102%	4.4%
Methylene Chloride	3.8	61.5	67.2	85.8%	9.6%
Acetone	37.5	355	336	94.5%	5.8%
Carbon Disulfide	2.9	59.9	67.2	84.8%	20%
1,1-Dichloroethene	< 1.4	54.2	67.2	80.6%	3.1%
1,1-Dichloroethane	< 1.4	60.0	67.2	89.3%	5.7%
trans-1,2-Dichloroethene	3.4	52.7	67.2	73.3%	2.0%
cis-1,2-Dichloroethene	80.4	139	67.2	87.2%	60%
Chloroform	< 1.4	55.4	67.2	82.4%	8.3%
1,2-Dichloroethane	< 1.4	55.6	67.2	82.7%	15%
2-Butanone	< 6.9	333	336	99.1%	11%
1,1,1-Trichloroethane	< 1.4	52.7	67.2	78.4%	1.9%
Carbon Tetrachloride	< 1.4	49.0	67.2	72.9%	2.2%
Vinyl Acetate	< 6.9	0.00	67.2	0.0%	NA
Bromodichloromethane	< 1.4	49.8	67.2	74.1%	13%
1,2-Dichloropropane	< 1.4	53.5	67.2	79.6%	8.6%
cis-1,3-Dichloropropene	< 1.4	44.4	67.2	66.1%	16%
Trichloroethene	68.0	108	67.2	59.5%	66%
Dibromochloromethane	< 1.4	44.2	67.2	65.8%	14%
1,1,2-Trichloroethane	< 1.4	47.9	67.2	71.3%	18%
Benzene	< 1.4	52.2	67.2	77.7%	5.2%
trans-1,3-Dichloropropene	< 1.4	37.5	67.2	55.8%	20%
2-Chloroethylvinylether	< 6.9	14.4	67.2	21.4%	16%
Bromoform	< 1.4	41.1	67.2	61.2%	24%
4-Methyl-2-Pentanone (MIBK)	< 6.9	320	336	95.2%	11%
2-Hexanone	< 6.9	301	336	89.6%	0.6%
Tetrachloroethene	357.	301	67.2	NR	NA
1,1,2,2-Tetrachloroethane	< 1.4	49.6	67.2	73.8%	4.3%
Toluene	< 1.4	44.8	67.2	66.7%	3.3%
Chlorobenzene	< 1.4	37.3	67.2	55.5%	0.0%
Ethylbenzene	< 1.4	41.5	67.2	61.8%	5.9%
Styrene	< 1.4	33.6	67.2	50.0%	1.6%
Trichlorofluoromethane	< 2.8	52.6	67.2	78.3%	5.0%

Reported in ug/kg-dry-Wt

ORGANICS ANALYSIS DATA SHEET
Volatiles by GC/MS
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ANALYTICAL
RESOURCES
INCORPORATED

Lab Sample ID: Q046A
LIMS ID: 96-14766
Matrix: Soil

Data Release Authorized:
Reported: 09/12/96

Sample No: HC4-S3
QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Received: 09/06/96

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
Date Analyzed: 09/09/96

CONSTITUENT	**SAMPLE VALUE**	**SPIKE VALUE**	**SPIKE AMT**	**% RECOVERY**	**RPD**
MATRIX SPIKE DUPLICATE					
1,1,2-Trichlorotrifluoroethane	< 2.8	55.0	67.2	81.8%	14%
m,p-Xylene	< 1.4	79.7	134	59.3%	7.9%
O-Xylene	1.6	39.2	67.2	56.0%	3.2%
1,2-Dichlorobenzene	< 1.4	29.1	67.2	43.3%	2.7%
1,3-Dichlorobenzene	< 1.4	28.8	67.2	42.9%	7.2%
1,4-Dichlorobenzene	< 1.4	28.5	67.2	42.4%	5.2%
Acrolein	< 69.1	406	336	121%	14%
Methyl Iodide	< 1.4	63.3	67.2	94.2%	12%
Bromoethane	< 2.8	73.9	67.2	110%	6.2%
Acrylonitrile	< 6.9	69.4	67.2	103%	19%
1,1-Dichloropropene	< 1.4	47.7	67.2	71.0%	1.0%
Dibromomethane	< 1.4	52.5	67.2	78.1%	22%
1,1,1,2-Tetrachloroethane	< 1.4	44.3	67.2	65.9%	5.7%
1,2-Dibromo-3-chloropropane	< 6.9	35.4	67.2	52.7%	19%
1,2,3-Trichloropropane	< 1.4	52.2	67.2	77.7%	13%
trans-1,4-Dichloro-2-butene	< 13.8	41.5	67.2	61.8%	100%
1,3,5-Trimethylbenzene	16.5	48.5	67.2	47.6%	40%
1,2,4-Trimethylbenzene	34.7	59.3	67.2	36.6%	73%
Hexachlorobutadiene	< 6.9	19.5	67.2	29.0%	8.7%
Ethylene Dibromide	< 1.4	42.7	67.2	63.5%	26%
Bromochloromethane	< 1.4	58.2	67.2	86.6%	15%
2,2-Dichloropropane	< 1.4	54.5	67.2	81.1%	2.0%
1,3-Dichloropropane	< 1.4	50.0	67.2	74.4%	13%
Isopropylbenzene	1.4	48.1	67.2	69.5%	16%
n-Propylbenzene	< 1.4	39.3	67.2	58.5%	14%
Bromobenzene	< 1.4	41.1	67.2	61.2%	36%
2-Chlorotoluene	< 1.4	36.6	67.2	54.5%	22%
4-Chlorotoluene	< 1.4	34.4	67.2	51.2%	4.3%
tert-Butylbenzene	< 1.4	37.4	67.2	55.7%	15%
sec-Butylbenzene	5.0	38.0	67.2	49.1%	25%
4-Isopropyltoluene	6.2	37.9	67.2	47.2%	22%
n-Butylbenzene	2.8	34.5	67.2	47.2%	27%
1,2,4-Trichlorobenzene	< 6.9	18.2	67.2	27.1%	1.5%
Naphthalene	8.9	31.3	67.2	33.3%	25%
1,2,3-Trichlorobenzene	< 6.9	18.0	67.2	26.8%	11%

Reported in ug/kg-dry-Wt

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS
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ANALYTICAL RESOURCES INCORPORATED

Sample No: HC4-S3
MATRIX SPIKE

Lab Sample ID: Q046A-MS
LIMS ID: 96-14766
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/09/96

Sample Amount: 3.66 g dry Wt
Percent Moisture: 27.5%

CAS Number	Analyte	ug/kg
74-87-3	Chloromethane	---
74-83-9	Bromomethane	---
75-01-4	Vinyl Chloride	---
75-00-3	Chloroethane	---
75-09-2	Methylene Chloride	---
67-64-1	Acetone	---
75-15-0	Carbon Disulfide	---
75-35-4	1,1-Dichloroethene	---
75-34-3	1,1-Dichloroethane	---
156-60-5	trans-1,2-Dichloroethene	---
156-59-2	cis-1,2-Dichloroethene	---
67-66-3	Chloroform	---
107-06-2	1,2-Dichloroethane	---
78-93-3	2-Butanone	---
71-55-6	1,1,1-Trichloroethane	---
56-23-5	Carbon Tetrachloride	---
108-05-4	Vinyl Acetate	---
75-27-4	Bromodichloromethane	---
78-87-5	1,2-Dichloropropane	---
10061-01-5	cis-1,3-Dichloropropene	---
79-01-6	Trichloroethene	---
124-48-1	Dibromochloromethane	---
79-00-5	1,1,2-Trichloroethane	---
71-43-2	Benzene	---
10061-02-6	trans-1,3-Dichloropropene	---
110-75-8	2-Chloroethylvinylether	---
75-25-2	Bromoform	---
108-10-1	4-Methyl-2-Pentanone (MIBK)	---
591-78-6	2-Hexanone	---
127-18-4	Tetrachloroethene	---
79-34-5	1,1,2,2-Tetrachloroethane	---
108-88-3	Toluene	---
108-90-7	Chlorobenzene	---
100-41-4	Ethylbenzene	---
100-42-5	Styrene	---
75-69-4	Trichlorofluoromethane	---
76-13-1	1,1,2-Trichlorotrifluoroethane	---
	m,p-Xylene	---

**ANALYTICAL
RESOURCES
INCORPORATED**

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS
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Sample No: HC4-S3
MATRIX SPIKE

Lab Sample ID: Q046A-MS
LIMS ID: 96-14766
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/09/96

Sample Amount: 3.66 g dry Wt
Percent Moisture: 27.5%

CAS Number	Analyte	ug/kg
95-47-6	O-Xylene	---
95-50-1	1,2-Dichlorobenzene	---
541-73-1	1,3-Dichlorobenzene	---
106-46-7	1,4-Dichlorobenzene	---
107-02-8	Acrolein	---
74-88-4	Methyl Iodide	---
74-96-4	Bromoethane	---
107-13-1	Acrylonitrile	---
563-58-6	1,1-Dichloropropene	---
74-95-3	Dibromomethane	---
630-20-6	1,1,1,2-Tetrachloroethane	---
96-12-8	1,2-Dibromo-3-chloropropane	---
96-18-4	1,2,3-Trichloropropane	---
110-57-6	trans-1,4-Dichloro-2-butene	---
108-67-8	1,3,5-Trimethylbenzene	---
95-63-6	1,2,4-Trimethylbenzene	---
87-68-3	Hexachlorobutadiene	---
106-93-4	Ethylene Dibromide	---
74-97-5	Bromochloromethane	---
590-20-7	2,2-Dichloropropane	---
142-28-9	1,3-Dichloropropane	---
98-82-8	Isopropylbenzene	---
103-65-1	n-Propylbenzene	---
108-86-1	Bromobenzene	---
95-49-8	2-Chlorotoluene	---
106-43-4	4-Chlorotoluene	---
98-06-6	tert-Butylbenzene	---
135-98-8	sec-Butylbenzene	---
99-87-6	4-Isopropyltoluene	---
104-51-8	n-Butylbenzene	---
120-82-1	1,2,4-Trichlorobenzene	---
91-20-3	Naphthalene	---
87-61-6	1,2,3-Trichlorobenzene	---

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	104%
d8-Toluene	96.3%
Bromofluorobenzene	92.6%
d4-1,2-Dichlorobenzene	95.6%

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS
Page 1 of 2

ANALYTICAL
RESOURCES
INCORPORATED

Sample No: HC4-S3
SPIKE DUPLICATE

Lab Sample ID: Q046A-MSD
LIMS ID: 96-14766
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/10/96

Sample Amount: 3.72 g dry Wt
Percent Moisture: 27.5%

CAS Number	Analyte	ug/kg
74-87-3	Chloromethane	---
74-83-9	Bromomethane	---
75-01-4	Vinyl Chloride	---
75-00-3	Chloroethane	---
75-09-2	Methylene Chloride	---
67-64-1	Acetone	---
75-15-0	Carbon Disulfide	---
75-35-4	1,1-Dichloroethene	---
75-34-3	1,1-Dichloroethane	---
156-60-5	trans-1,2-Dichloroethene	---
156-59-2	cis-1,2-Dichloroethene	---
67-66-3	Chloroform	---
107-06-2	1,2-Dichloroethane	---
78-93-3	2-Butanone	---
71-55-6	1,1,1-Trichloroethane	---
56-23-5	Carbon Tetrachloride	---
108-05-4	Vinyl Acetate	---
75-27-4	Bromodichloromethane	---
78-87-5	1,2-Dichloropropane	---
10061-01-5	cis-1,3-Dichloropropene	---
79-01-6	Trichloroethene	---
124-48-1	Dibromochloromethane	---
79-00-5	1,1,2-Trichloroethane	---
71-43-2	Benzene	---
10061-02-6	trans-1,3-Dichloropropene	---
110-75-8	2-Chloroethylvinylether	---
75-25-2	Bromoform	---
108-10-1	4-Methyl-2-Pentanone (MIBK)	---
591-78-6	2-Hexanone	---
127-18-4	Tetrachloroethene	---
79-34-5	1,1,2,2-Tetrachloroethane	---
108-88-3	Toluene	---
108-90-7	Chlorobenzene	---
100-41-4	Ethylbenzene	---
100-42-5	Styrene	---
75-69-4	Trichlorofluoromethane	---
76-13-1	1,1,2-Trichlorotrifluoroethane	---
	m,p-Xylene	---

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS
Page 2 of 2

ANALYTICAL
RESOURCES
INCORPORATED

Sample No: HC4-S3
SPIKE DUPLICATE

Lab Sample ID: Q046A-MSD
LIMS ID: 96-14766
Matrix: Soil
Data Release Authorized:
Reported: 09/12/96

QC Report No: Q046-Hart Crowser
Project: Fox Ave Property
J-4618
Date Sampled:
Date Received: 09/06/96

Instrument: FINN1
Date Analyzed: 09/10/96

Sample Amount: 3.72 g dry Wt
Percent Moisture: 27.5%

CAS Number	Analyte	ug/kg
95-47-6	O-Xylene	---
95-50-1	1,2-Dichlorobenzene	---
541-73-1	1,3-Dichlorobenzene	---
106-46-7	1,4-Dichlorobenzene	---
107-02-8	Acrolein	---
74-88-4	Methyl Iodide	---
74-96-4	Bromoethane	---
107-13-1	Acrylonitrile	---
563-58-6	1,1-Dichloropropene	---
74-95-3	Dibromomethane	---
630-20-6	1,1,1,2-Tetrachloroethane	---
96-12-8	1,2-Dibromo-3-chloropropane	---
96-18-4	1,2,3-Trichloropropane	---
110-57-6	trans-1,4-Dichloro-2-butene	---
108-67-8	1,3,5-Trimethylbenzene	---
95-63-6	1,2,4-Trimethylbenzene	---
87-68-3	Hexachlorobutadiene	---
106-93-4	Ethylene Dibromide	---
74-97-5	Bromochloromethane	---
590-20-7	2,2-Dichloropropane	---
142-28-9	1,3-Dichloropropane	---
98-82-8	Isopropylbenzene	---
103-65-1	n-Propylbenzene	---
108-86-1	Bromobenzene	---
95-49-8	2-Chlorotoluene	---
106-43-4	4-Chlorotoluene	---
98-06-6	tert-Butylbenzene	---
135-98-8	sec-Butylbenzene	---
99-87-6	4-Isopropyltoluene	---
104-51-8	n-Butylbenzene	---
120-82-1	1,2,4-Trichlorobenzene	---
91-20-3	Naphthalene	---
87-61-6	1,2,3-Trichlorobenzene	---

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	109%
d8-Toluene	98.3%
Bromofluorobenzene	97.6%
d4-1,2-Dichlorobenzene	98.0%

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TECHNICAL MEMORANDUM

DATE:	October 6, 2020
TO:	Ms. Jessica Burgess Bridge Development Partners, LLC
CC:	Ken Lederman Foster Garvey PC
FROM:	Thomas C. Morin, L.G. Principal Geologist
RE:	Third-Party Peer Review 6901 Fox Avenue South Seattle, Washington

TRC Project Number: 413460.0000

TRC Engineering Corp (TRC) has prepared this technical memorandum at the request of Bridge Development Partners LLC (Bridge). TRC understands that its Third-Party Peer Review has been requested by Bridge in support of its potential purchase of 6901 Fox Avenue South in Seattle, Washington (Property). The Property is currently used as a dry foods mixing, handling and distribution facility. TRC further understands that Bridge does not have immediate plans to redevelop the Property.

This technical memorandum provides a brief overview of the history and current level of environmental assessment of the Property and immediate vicinity. This technical memorandum also presents TRC's opinions regarding the current data gaps in the environmental assessment of the Property and the basis for those opinions. Lastly, this technical memorandum provides an evaluation of the potential remedial action costs provided by others.

In preparing this technical memorandum, TRC has reviewed the following:[1]

- Phase I Environmental Site Assessment (ESA) dated January 21, 2020 by Crete Consulting, Inc. (Crete).
- Phase II ESA dated March 6, 2020 by Crete.

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[1] This technical memorandum is not intended to be an exhaustive summary of all past assessment in the area of the Property. For additional detail the reviewer is directed to the source documents.

- Summary tables and graphics for supplemental Phase II ESA sampling dated June 22, 2020 by Crete.

- Summary table of indoor air sampling results dated June 27, 2020 by Crete

- Estimate of Environmental Cleanup Liabilities dated July 22, 2020 by Crete.

- Various attachments and historical documents provided by Bridge in support of this review and prepared by various entities.

Historical Considerations

The Property has a long and varied history of industrial and commercial use in a highly industrialized portion of Seattle, Washington. The Property appears to have been developed prior to 1917 and was used for shipbuilding along the newly channelized Lower Duwamish Waterway, formerly the Duwamish River. In addition to shipbuilding, the Property was used for metal construction/fabrication (National Steel Construction Co) and most recently for dry food stuff mixing, packaging and distribution. For some period of time (i.e., pre-1949 to post-1966), National Steel Construction appears to have operated on both the Property and on the south adjacent property currently operated by Seattle Boiler Works (SBW Property).

Shipbuilding activities likely included vessel renovation and salvage and likely included both wooden and metal ships. The Property contained at least two marine railways and one inclined vessel launch. Shipbuilding and fabrication have historically involved numerous hazardous materials including metals, metals coatings and polychlorinated biphenyls (PCBs) associated with electrical systems and sealants. The metal construction/fabrication activities appear to have included thermostat manufacturing, galvanizing, “aluminum dipping”, painting and related industrial and manufacturing activities. These activities would have included metals including mercury and solvents, acids, and bases to prepare metals for coating.

The current warehouse structure appears to have been constructed in about 1977 and appears to have served as a dry goods mixing, packaging and distribution facility from that time through the current use.

The western shoreline of the Property was filled at some time in the past to its current configuration. The source of that fill may have been sediment dredge spoils from periodic maintenance of the Duwamish Waterway. It is not known to what extent the Property may have received other fill materials to bring it to its current grade or what may have been the source of any such fill.

These historical activities at the Property have the potential to have released a variety of contaminants into the environment. Those contaminants include petroleum compounds, metals, volatile organic compounds and PCBs.

The Property reportedly has several stormwater catch basins and a single stormwater outfall directly to the LDW. This configuration is common for older properties on the LDW. Stormwater outfalls can be considered as a “point source” discharge to surface water and are typically required to comply with applicable regulations. Based on the available data it does not appear that the Property has a current National Pollution Discharge Elimination System (NPDES) permit.

Adjacent Properties

In addition to the historical on-property activities, adjacent properties also have the potential to have impacted the Property.

The east adjacent property across Fox Avenue is a known contaminated site called the Fox Avenue Building Site but is also known as the Great Western Chemical Company (GWCC) Site. The GWCC Site is known to have extensive groundwater impacts from volatile organic compounds, including chlorinated solvents such as trichloroethene and it related degradation compounds. Those impacts are known to extend to the west beneath Fox Avenue and farther west toward the Duwamish Waterway. Data from the consultant for GWCC indicates that some portion of those impacts have migrated beneath a portion of the Property and the SBW Property through passive migration. The GWCC Site has been under investigation since at least 1990 and is currently being remediated under an Agreed Order (AO) with the Washington State Department of Ecology (Ecology).

The SBW Property is not currently under an AO with Ecology but has likely been the subject of prior environmental assessment and investigation. It appears that Seattle Boiler Works is a continuation of the boiler manufacturing activities of National Steel Construction, which appears to have had boiler fabrication activities on this south adjacent property from at least 1949 through 1966. Those activities included “enameling”, ”galvanizing”, “aluminum dipping” and “boiler reaming” and likely included the use of various chemical and solvents to prepare metals for coating and painting.

Regulatory Considerations

The Property is located on the Lower Duwamish Waterway which is a designated Federal Superfund Site (LDW). The LDW has been under investigation by the U.S. Environmental Protection Agency (EPA) for more than two decades. As of now, the Property has not been identified as a source of contamination to the LDW, and the owners (current and former) of the Property have not been identified as potentially responsible parties (PRPs). The owners of the GWCC Site and the SBW Property have been identified as PRPs for the LDW, and are currently participating in an active allocation process regarding response and cleanup costs.

The LDW is known to have impacts to sediments and surface water from various metals, volatile organic compounds, semi-volatile organic compounds, petroleum compounds, and PCBs. If these compounds are identified on the Property under conditions that could lead to discharges to the Duwamish Waterway, then there is a potential that the prior or current owners of the Property could be identified as PRPs for the LDW.

The GWCC Site is known to have contaminated soil and groundwater with a variety of chemicals and some of those impacts are thought to extend beneath the Property. The presence of volatile organic compounds consistent with the GWCC Site have been confirmed beneath the Property. There is no indication that activities or operations on the Property have contributed to or exacerbated the contamination released from the GWCC Site. Currently, there does not a appear to be a direct exposure pathway for occupants of the Property to contact or be impacted by the contamination originating from the GWCC Site. Additional interpretation of potential vapor intrusion (VI) risks are presented below.

A contained area of gasoline-based petroleum contamination (i.e., gasoline-range organics or GRO) has been detected on the eastern portion of the Property, in a location where it is commingled with the volatile organic compound contamination originating from the GWCC Site. Currently, there does not appear to be direct exposure pathway for occupants of the Property to contact or be impacted by this gasoline contamination. Any efforts (if necessary or required) to remediate the gasoline contamination would need to be performed in a manner that avoids any impact to or exacerbation of the contamination from the GWCC Site.

Data Gaps

Bridge has requested that TRC review the available data and information in the context of the current regulatory setting and evaluate potential data gaps in the current assessment of the Property, as well as potential regulatory options for the Property.

Our evaluation has identified the following data gaps. Our analysis also provides a general scope of assessment to address those data gaps.

Data Gap 1 – Mercury in soil in the eastern portion of the Property. A large portion of the eastern section of the Property was noted to historically contain electric thermostat manufacturing. Mechanical thermostats can contain varying amounts of elemental mercury within a small glass vial with electrical connections on each end. Manufacturing this type of thermostat would have required an on-site source of elemental mercury and extensive handling. The long history of this activity on the Property indicates suggests a relatively high probability for releases of elemental mercury to soil.

TRC recommends the sampling and analysis of soil in the eastern portion of the Property in at least four locations down to the water table. We recommend collection of at least three soil samples and one reconnaissance groundwater sample from each location for analysis of mercury. As recommended below, samples from these locations for other compounds will also address other data gaps.

Data Gap 2 – PCBs in soil. The Property uses include ship building and potentially renovation and salvage. Those activities were both before and after World War II, when PCBs were in wide usage and were commonly associated with the electrical systems of ships and some types of sealants and caulks. These activities suggest at least the possibility of PCB use or release on the Property.

TRC recommends sampling and analysis of soil for PCBs in at least six locations on the Property, including at least four locations beneath the current warehouse, with a focus on the western portion of the Property. TRC recommends collection of at least two soil samples from each boring.

Data Gap 3 – Vapor Intrusion in the eastern portion of the Property. Current data indicate that several compounds are present in indoor air at a concentration greater than the MTCA Method B indoor air cleanup level. That value is based on a residential use scenario. However, no compounds are present at a concentration exceeding the MTCA Method C Industrial air cleanup levelwhich is based on an industrial use scenario for adults.

While the Property is zoned as industrial (IG1), it is not certain that an industrial exposure scenario would be applied to food workers or that the use for food stuff handling is compatible with that exposure. It may be appropriate to apply a commercial worker reasonable maximum exposure (RME) to the MTCA Method B value, which is between the Method A and Method C values. It is important to note that of the observed indoor air concentrations only of the values for naphthalene would exceed the RME for a commercial worker.

The compounds detected in indoor air include 1,2-dichlorethane, benzene, naphthalene, tetrachloroethene (PCE) and trichloroethene (TCE). Of those compounds, only PCE and TCE (contaminants associated with the GWCC Site) were detected in the soil gas beneath the floor slab. However, the method detection limits (MDL) for each of these compounds in the sub-slab samples either significantly exceed the soil gas screening levels or the indoor air cleanup level in three of four samples. As a result, there is some uncertainty regarding which compounds are actually present within the building as a result of vapor intrusion and which are present as a result of general poor urban air quality.[2]

TRC recommends collection of additional sub-slab vapor samples and indoor air samples throughout the portion of the building that may be impacted by VOCs from the GWCC Site. Current documentation does not conclusively indicate that all compounds present indoor air are the result of VI. It is also not known whether indoor air quality in the warehouse or processing areas of the building may be affected by VI.

Data Gap 4 – Petroleum in soil and groundwater. Current data indicate the presence or gasoline range petroleum hydrocarbon (i.e., Gasoline-range organics or GRO) are present in groundwater beneath the eastern portion of the Property. This area of impacts appears to be commingled with VOCs in groundwater that originate from the GWCC Site.

The source, ultimate magnitude of impacts, and lateral extent of those impacts is not currently known. The data suggest that the historical source of impacts was at some undetermined location beneath the eastern portion of the warehouse, potential in the area of the office.

TRC recommends advancing and addition four to six borings in the currently interpreted area of the apparent GRO release. That investigation would include two soil samples and a reconnaissance groundwater sample at each location, with the objective of iteratively assessing the magnitude and scale of impacts. Depending on the results of that sampling, additional assessment may be required.

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[2] For example, the MDL for naphthalene for sub-slab samples was 10 or 11 micrograms/cubic meter (ug/M3) while the sub-slab vapor screening level is 2.5 ug/M3 and the indoor air concentrations are between 0.35 and 0.46 ug/M3. It is therefore not possible to reasonably evaluate to what degree naphthalene is present due to vapor intrusion. A similar condition exists for 1,2-DCA and benzene.

Data Gap 5 – Metals in soil and groundwater. Prior assessment has indicted the presence of metals in soil and groundwater in the western portion of the Property. The primary metals of concern appear to be nickel and zinc, which are present in soil and groundwater at concentrations that exceed levels that are protective of surface water. Because groundwater in this are discharges directly to the Duwamish Waterway, compliance with surface water cleanup levels will be the regulatory driver.

The current data suggest that the observed impacts are present only in the southwestern corner of the property. However, the source of those impacts is unclear and the data are not conclusive that this is the only area of impacts. For example, the western portion of the Property appears to have historically received extensive fill to bring it to its current extent and the source of that fill is unknown. This raises the possibility that the metals are entrained within the historical fill material. In order to evaluate this possibility, the areas of filling north of the currently known impacted area would also require assessment.

Additionally, there were activities on the south adjacent SBW Property (i.e., galvanizing and “aluminum dipping”) that could have included the use of both nickel and zinc. It is possible the metal impacts in groundwater on the Property are linked to the historical activities adjacent to the Property.

TRC recommends advancing and sampling three additional borings in the northwestern portion of the Property. These borings would include the collection of additional soil and groundwater samples with analysis of metals consistent with prior results. If possible, the borings would be completed as monitoring wells, properly developed, and then sampled using Ecology recognized methods. Groundwater samples would be submitted for analysis of both total and dissolved metals, with dissolved metals samples field filtered to at least 0.45 microns. TRC also recommends resampling in areas on the southwestern and southern property boundary, using the methods described above, with the objective of confirming prior results and further assessing the extent to which impacts may be migrating to or from the SBW Property. The wells should remain in place long enough to allow groundwater levels to equilibrate and for water levels to be measured and a local hydraulic gradient to be established.

Addressing these data gaps may not fully complete the Remedial Investigation of the Property. During participation in any regulatory program, either voluntary or formal, it is likely that Ecology will request additional sampling and analysis. However, addressing the data gaps above to a reasonable level of certainty will help Bridge to further assess the major issues at the Property. Without addressing the data gaps above, it will be challenging to develop a comprehensive regulatory or remedial approach and associated costs for the Property.

Data Gap No. 6 – Stormwater Outfall and Permitting. As noted above the Property reportedly has at least one stormwater outfall that discharges to the LDW. The Property reportedly had a valid NPDES in the past, but Crete has indicated that they were not able to identify a current valid permit. NPDES permits can be challenging to acquire and often contain significant monitoring and reporting requirements. If the NPDES permit has lapsed it may be necessary to acquire a new permit under current regulations rather than being “grandfathered” under older forms of the regulation. Evaluating the potential stormwater permitting requirements for the Property was beyond the scope of this technical memorandum.

TRC recommends requesting clarification and disclosure from the current owner or operator (whomever has current responsibility for meeting permitting requirements) regarding the current NPDES permitting status, plans to update the permit and a copy of the prior full permit with monitoring and reporting requirements.

Evaluate of Estimated Remedial Costs

Bridge has asked that TRC provide thoughts and opinion regarding estimated future costs provide by Crete. Crete's estimate was provided in the following categories, followed by TRC's additional thoughts.

<u>Regulatory Process - $150,000</u>

This estimate appears to include enrollment in the Ecology Voluntary Cleanup Program (VCP) and development of an RI, Feasibility Study, Cleanup Action Plan, and soliciting Ecology opinions. Given TRC's current understanding of the Level of assessment and the likelihood that any remediation of the Property would be conducted under an Agreed Order, this estimated amount is low. Without filling the data gaps above, TRC would estimate the total costs of the regulatory process would be in the range of $200,000 to $250,000. Bridge would need to add to this estimate the potential legal fees associated with the negotiation and management of an Agreed Order.

<u>Vapor Intrusion Mitigation - $440,000 initial with $40,000 annual costs.</u>

As noted above, the VI data for the Property do not currently exceed allowable concentrations for an Industrial Use scenario. Additionally, the GWCC Site, which is subject to an Agreed Order, apparently does not include VI mitigation as a regulatory requirement. Since the GWCC Site is the source property and is expected to have higher concentrations, it is unlikely that the Property would have VI at concentrations above applicable cleanup levels. Under that set of assumptions, it is unlikely that VI mitigation would be required at the Property.

However, the current assumptions may need to be modified based on additional data gathered in response to the data gaps. An owner of the Property may decide to implement VI mitigation as an added level of protection to address the concerns of the current or future tenants. If that approach is taken, then the estimate above is within the plausible range of costs.

<u>Shipyard Metals in Groundwater</u>

Crete has provided two options for this item.

- Permeable Reactive Barrier - $317,000 capital and $40,000 annually
- Excavation $2,827,000 capital and $30,000 annually

Implementation of any remedial action would be based on the final RI and FS. The FS would include a disproportionate cost analysis (DCA) to evaluate the environmental benefit of any action relative to its cost. It is highly unlikely that an FS/DCA would result in the selection of excavation of impacted soil as a method to protect surface water. As a result, it is TRC's opinion that the $2.8MM value is neither realistic nor practicable. Additionally, the practicality and implementability of deep excavation in this location is highly unlikely. Lastly, if not all impacts can be excavated with some impacts remaining beneath the building or adjacent property, this approach would also likely not be effective.

As a technology, the use of a permeable reactive barrier (PRB) or similar technology, would be more effective, practicable and implementable]. The cost of such a barrier would depend on its lateral extent and may need to include the entire western waterfront of the Property.

It is also TRC's opinion that the estimated cost provided by Crete is low given the logistical requirements for installation of a barrier in this location. Additionally, the extent of such a PRB cannot be known without filling Data Gap No. 5. For purposes of reserve setting TRC would estimate the cost of installing a barrier at the Property at between $800,000 and $1.2MM.

<u>Groundwater Treatment – Solvent/Gasoline - $372,000 capital, $30,000 annually</u>

This estimate includes active treatment using in situ chemical methods. The source of solvents is from off-property at the GWCC Site, while the source of GRO is likely a historical release on the Property beneath the building. It does not appear that the GRO impacts extend off of the Property, but this finding would be confirmed during investigation to fill Data Gap No. 4.

An owner of the Property would not want to undertake actions that could adversely affect the remediation of the GWCC Site groundwater plume. Beneath the Property, treatment of the solvent plume is likely being facilitated through natural reductive dechlorination, which occurs under anaerobic conditions through the biological pathway. The use of in situ chemical oxidation would hinder this process beneath the Property and could have a detrimental effect on the downgradient portions of the GWCC Site solvent plume.

Given current conditions and knowledge of the Site, TRC would not recommend treatment of the GRO impacts on the property. Those impacts do not appear to present a threat of VI and do not appear to be affecting the downgradient SBW property. Therefore, it is likely that any FS and DCA would select capping, long-term monitoring and the use of an environmental covenant to address the GRO impacts. Those impacts, as characterized by addressing Data Gap No. 4, would be addressed during a future redevelopment of the Property.

TRC recommends establishing a reserve for those impacts of about $150,000 for future excavation and treatment during redevelopment. That reserve amount can be better quantified after filling Data Gap No. 4.

The table below provides a summary of the previously estimated cost provided by Crete and TRC's general estimates provided above. The prior estimate summed only the capital costs and did not include estimates for long-term monitoring or operation which should also be taken into account when considering potential life-cycle costs. Footnotes discuss the estimated bases for necessary monitoring, which are likely to vary.

Task	Crete		TRC	
	Low	**High**	**Low**	**High**
Regulatory	$150,000	$150,000	$200,000	$250,000
VI Mitigation	$370,000[a]	$840,000[b]	$0	$370,000[e]
Metals in Groundwater	$672,000[c]	2,977,000[d]	$800,000[f]	$1,200,000[g]
GRO in Groundwater	$522,000	$522,000	$100,000[h]	$250,000[i]
Total	**$1,714,000**	**$4,489,000**	**$1,100,000**	**$2,070,000**

a – Reasonable cost plus 5 years of annual costs
b – High cost plus 10 years of annual costs
c – Permeable Reactive Barrier with 10 years of monitoring
d – Excavation with 5 years of monitoring
e – Same assumptions as Crete assuming VI mitigation is required
f – Installation of PRB, low estimate
g – Installation of PRB assuming longer wall to north and higher installation costs
h – No treatment with 5 years of monitoring at $20,000/year
I – Excavation cost during redevelopment and 5 years of monitoring at $20,000/year

The estimated costs presented above are not a bid or proposal to perform these services and should be considered only for reserve setting purposes. Actual costs will vary and will depend on the outcome of additional assessment and upon regulatory requirements and directives. TRC can provide more detailed estimates, but any such estimates are still subject to revision based on multiple factors, including, but not limited to, the outcome of any additional data gaps assessments.

Appendix B

Boring Logs

CRETE Consulting, Inc.
16300 Christensen Road, Suite 214
Seattle, WA 98188

WELL LOG

BORING/WELL ID: **MW-1**
INSTALLED DEPTH: **20-ft bgs**

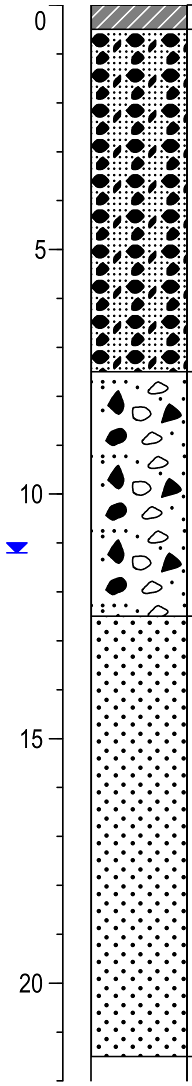
PROJECT INFORMATION

PROJECT:	**Former Bunge Foods R.I.**
SITE LOCATION:	**6901 Fox Ave S** **Seattle, WA**
LOGGED BY:	**Rusty Jones**
PROJECT MANAGER:	**G. Hainsworth**
DATES DRILLED/INSTALLED:	**12/16/2021**
LATITUDE:	**47.5400941° N**
LONGITUDE:	**-122.3300039° W**

DRILLING INFORMATION

DRILLING CO.:	**Holt/John Bennett**
DRILLING METHOD:	**Hollow Stem Auger**
EQUIPMENT TYPE:	**CME 85**
SAMPLING METHOD:	**4.25" ID Hollow Stem Auger** **With 1.5-ft Split-Spoons**
DRILLED DEPTH:	**20-ft bgs, Cored to 21.5-ft bgs**
INITIAL WATER DEPTH:	**11.5-ft bgs**
SCREENED INTERVAL:	**5 to 20-ft bgs**

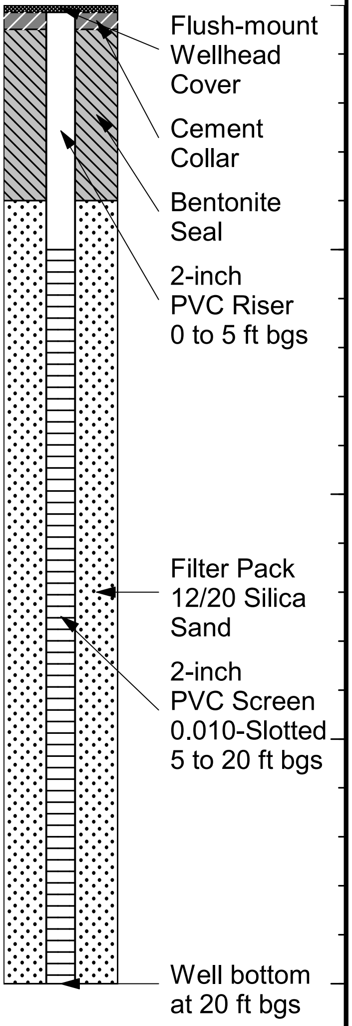
DEPTH / SOIL LOG



USCS	DESCRIPTION
	ASPHALT at surface.
SW	SAND with GRAVEL, medium to coarse-grained, medium brown, slightly moist At 5 ft bgs: CONCRETE RUBBLE, brown to black sand.
SW	POOR RECOVERY CONCRETE RUBBLE SAND, medium to coarse-grained with concrete aggregate, slightly moist to moist. At 10 ft bgs: VERY POOR RECOVERY, medium to dark brown, wet to saturated. At 12.5 ft bgs: Saturated
SP	SAND, fine to medium-grained, minor silty pockets, no gravel, medium to dark brown, wet. At 15 ft bgs: medium to coarse-grained, subround, dark brown to variable grain colors, saturated. At 17.5 ft bgs: No appreciable odors. At 20 ft bgs: Uniform medium-grained, medium to dark brown.

SAMPLE ID	SAMPLE DEPTH (ft bgs)	PID (ppm) SPT
	2.5 - 4 ft	0.8 8-12-13
	5 - 6.5 ft	1.5 9-8-8
	7.5 - 9 ft	2.3 6-10-6
	10 - 11.5 ft	2.6 50/5"
MW-1 13-14'	12.5 - 14 ft	2.2 1-3-4
	15 - 16.5 ft	2.1 2-2-2
	17.5 - 19 ft	2.2 1-6-5
	20 - 21.5 ft	2.6 3-4-9

WELL CONSTRUCT. / WELL DESC.



NOTES: Southwest corner of parcel, adjacent to waterway.
Lithology logged from split spoon core samples. Ecology tag # BNL-604

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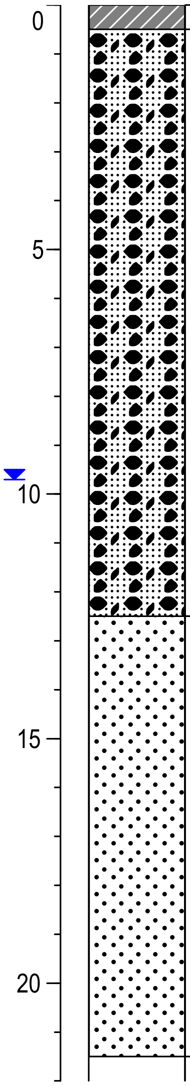
Seattle, WA 98188

WELL LOG

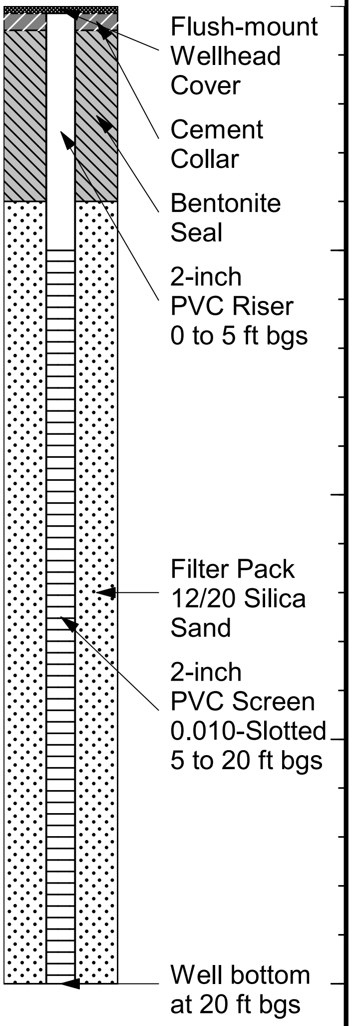
BORING/WELL ID: **MW-2**
INSTALLED DEPTH: **20-ft bgs**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Former Bunge Foods R.I.**	DRILLING CO.:	**Holt/John Bennett**
SITE LOCATION:	**6901 Fox Ave S** **Seattle, WA**	DRILLING METHOD:	**Hollow Stem Auger**
		EQUIPMENT TYPE:	**CME 85**
LOGGED BY:	**Rusty Jones**	SAMPLING METHOD:	**4.25" ID Hollow Stem Auger** **With 1.5-ft Split-Spoons**
PROJECT MANAGER:	**G. Hainsworth**		
DATES DRILLED/INSTALLED:	**12/15/2021**	DRILLED DEPTH:	**20-ft bgs, Cored to 21.5-ft bgs**
LATITUDE:	**47.5404001° N**	INITIAL WATER DEPTH:	**10-ft bgs**
LONGITUDE:	**-122.3304795° W**	SCREENED INTERVAL:	**5 to 20-ft bgs**



USCS	DESCRIPTION
	ASPHALT at surface.
SW	FILL: GRAVELLY SAND, medium to coarse-grained, subround to subangular gravel, tan to brown, dry. At 3 ft bgs: COBBLES, debris. At 5 ft bgs: Fine to medium-grained, angular to subround, some CONCRETE RUBBLE, slightly moist. At 7.5' ft bgs: Mostly coarse-grained, large subround gravel, dark brown, moist. At 10 ft bgs: POOR RECOVERY, tan to medium brown, wet.
SP	SAND, medium to coarse-grained, subangular to subround, with occasional cobble, gray to black grains, wet to saturated. At 15 ft bgs: Medium to coarse-grained, saturated. At 16-16.5 ft bgs: Very gravelly, saturated. At 17.5 ft bgs: fine-grained to coarse-grained, large WOOD pieces, dark brown to black, saturated, reducing odors. At 20 ft bgs: Fine to medium-grained, soft to loose, minor organic fines, dark brown to gray, saturated, reducing odors.

SAMPLE ID	SAMPLE DEPTH (ft bgs)	PID (ppm)	SPT
	2.5 - 4 ft	2.2	7-10-16
	5 - 6.5 ft	2.4	8-6-6
MW-2 7.5-9'	7.5 - 9 ft	2.9	4-42-18
	10 - 11.5 ft	2.3	9-6-3
MW-2 12.5-14'	12.5 - 14 ft	2.1	4-4-28
	15 - 16.5 ft	2.4	10-6-50
	17.5 - 19 ft	2.8	10-14-11
	20 - 21.5 ft	6.9	0-0-0



NOTES: Western perimeter of parcel, adjacent to waterway.
Lithology logged from split spoon core samples. Ecology tag # BNL-602

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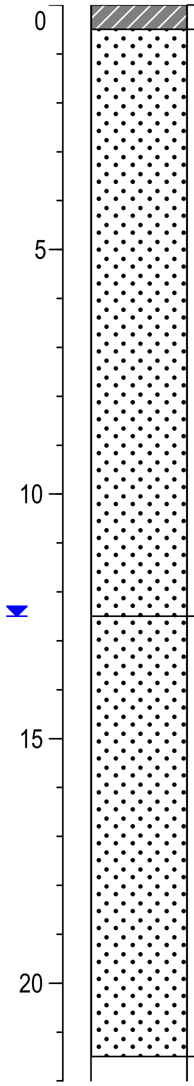
WELL LOG

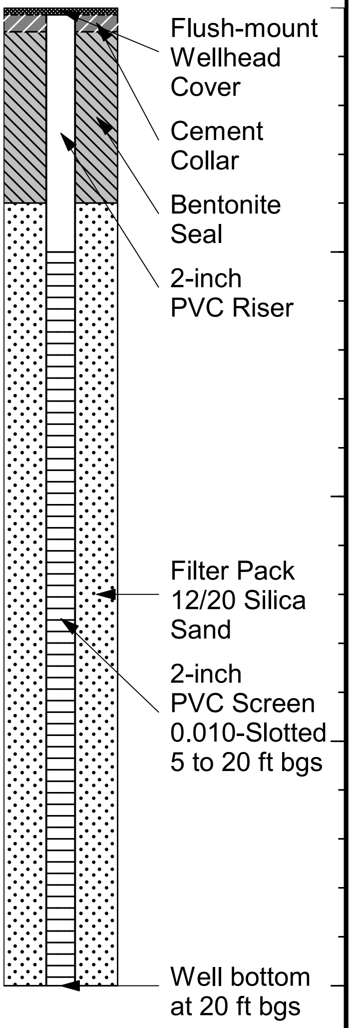
BORING/WELL ID: **MW-3**
INSTALLED DEPTH: **20-ft bgs**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Former Bunge Foods R.I.**	DRILLING CO.:	**Holt/John Bennett**
SITE LOCATION:	**6901 Fox Ave S** **Seattle, WA**	DRILLING METHOD:	**Hollow Stem Auger**
		EQUIPMENT TYPE:	**CME 85**
LOGGED BY:	**Rusty Jones**	SAMPLING METHOD:	**4.25" ID Hollow Stem Auger** **With 1.5-ft Split-Spoons**
PROJECT MANAGER:	**G. Hainsworth**		
DATES DRILLED/INSTALLED:	**12/16/2021**	DRILLED DEPTH:	**20-ft bgs, Cored to 21.5-ft bgs**
LATITUDE:	**47.5407806° N**	INITIAL WATER DEPTH:	**12.5-ft bgs**
LONGITUDE:	**-122.3309709° W**	SCREENED INTERVAL:	**5 to 20-ft bgs**



DEPTH	USCS	DESCRIPTION	SAMPLE ID	SAMPLE DEPTH (ft bgs)	PID (ppm) SPT
0		ASPHALT at surface.			
	SW	SAND, fine to medium-grained, minor coarse-grained, dark brown, slightly moist.			
				2.5 - 4 ft	2.6 3-4-6
5		At 5 ft bgs: CONCRETE fragments and subround to round gravel aggregate, darkbrown, slightly moist.		5 - 6.5 ft	2.3 6-5-5
		7.9 ft bgs: ASPHALT, black, sandy weathered asphalt, red aggregate	MW-3 7.5-9'	7.5 - 9 ft	6.1 28-43-15
10		10-11.5 ft bgs: NO RECOVERY, soft drilling.		10 - 11.5 ft	N/A 2-3-5
	SW	GRAVELLY SAND, medium to coarse-grained, angular gravel, psosible brick fragments, saturated, dark brown.	MW-3 12.5-14'	12.5 - 14 ft	2.1 4-1-1
15				15 - 16.5 ft	2.0 2-2-2
		At 17.5 ft bgs: Subround to subangular sand, coarse-grained, round to subround gravel (<1-inch), saturated.		17.5 - 19 ft	2.7 3-6-12
20		At 20 ft bgs: Coarse-grained, WOOD in sampler tip, saturated.		20 - 21.5 ft	2.6 5-3-5

WELL CONSTRUCT. / WELL DESC.



NOTES: Northwestern perimeter of parcel, adjacent to waterway.
Lithology logged from split spoon core samples. Ecology tag # BNL-605

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WELL LOG

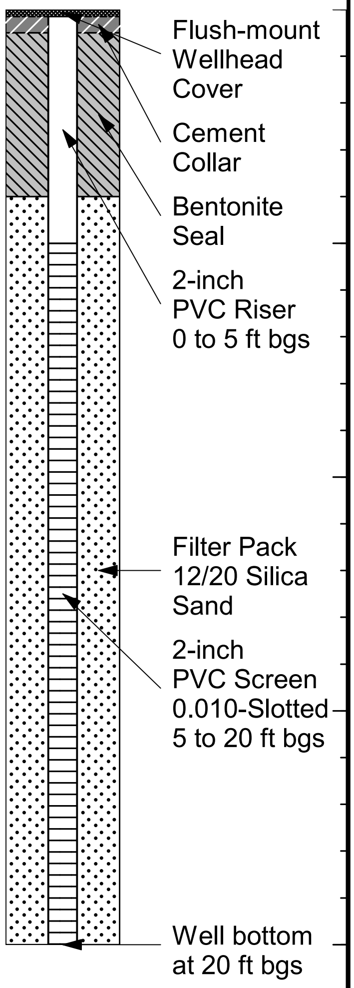
BORING/WELL ID: **MW-4**

INSTALLED DEPTH: **20-ft bgs**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Former Bunge Foods R.I.**	DRILLING CO.:	**Holt/John Bennett**
SITE LOCATION:	**6901 Fox Ave S** **Seattle, WA**	DRILLING METHOD:	**Hollow Stem Auger**
		EQUIPMENT TYPE:	**CME 85**
LOGGED BY:	**Rusty Jones**	SAMPLING METHOD:	**4.25" ID Hollow Stem Auger** **With 1.5-ft Split-Spoons**
PROJECT MANAGER:	**G. Hainsworth**		
DATES DRILLED/INSTALLED:	**12/16/2021**	DRILLED DEPTH:	**20-ft bgs, Cored to 21.5-ft bgs**
LATITUDE:	**47.5401098° N**	INITIAL WATER DEPTH:	**10-ft bgs**
LONGITUDE:	**-122.3295975° W**	SCREENED INTERVAL:	**5 to 20-ft bgs**

DEPTH	SOIL LOG	USCS	DESCRIPTION	SAMPLE ID	SAMPLE DEPTH (ft bgs)	PID (ppm) SPT
0			ASPHALT at surface.			
5		SW	GRAVELLY SAND, fine to coarse grained, well-graded, subround to round, slightly moist, medium to dark brown. At 5 ft bgs: Minor GRAVEL.		2.5 - 4 ft 5 - 6.5 ft	2.2 9-16-12 2.4 4-4-4
▼10		SP	SAND, medium-grained, subround to round, most to wet, dark brown. At 10 ft bgs: Wet to saturated.	MW-4 7.5-9' MW-4 11-11.5'	7.5 - 9 ft 10 - 11.5 ft	3.5 1-1-0 2.2 1-0-1
15		ML	SILT, with some very fine to fine-grained SAND, minor small ROOTS/WOOD, wet, tan. at 13.2 ft bgs: increasing SAND, very fine to fine-grained, saturated, tan to medium brown. At 15 ft bgs: SANDY SILT, very fine to fine-grained, trace ROOTS, soft/loose, saturated, tan.		12.5 - 14 ft 15 - 16.5 ft	1.9 1-2-2 1.4 1-3-3
20		SP-ML	SAND, very fine to medium-grained, with PEAT/WOOD seams, saturated, dark brown. At 17.5-18.1 ft bgs: SANDY SILT layer, very soft, saturated, tan. At 18.1 ft bgs: SAND, mostly medium-grained, some WOOD, saturated, dark brown. At 20 ft bgs: Minor WOOD native debris.		17.5 - 19 ft 20 - 21.5 ft	1.2 1-3-4 1.2 5-4-4

WELL CONSTRUCT. WELL DESC.



NOTES: Southern perimeter of parcel, adjacent to waterway.
Lithology logged from split spoon core samples. Ecology tag # BNL-606

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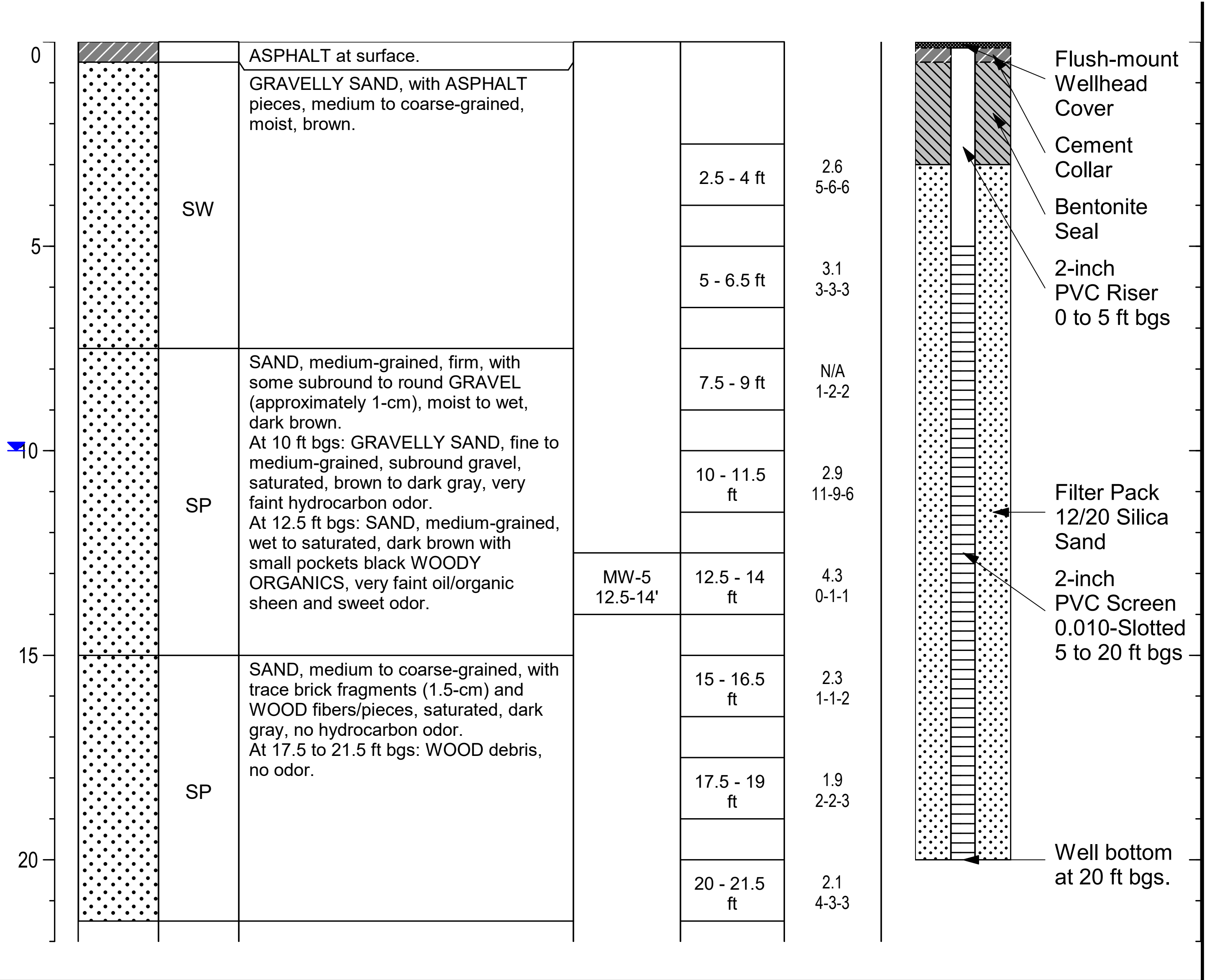
WELL LOG

BORING/WELL ID:	**MW-5**
INSTALLED DEPTH:	**20-ft bgs**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Former Bunge Foods R.I.**	DRILLING CO.:	**Holt/John Bennett**
SITE LOCATION:	**6901 Fox Ave S** **Seattle, WA**	DRILLING METHOD:	**Hollow Stem Auger**
		EQUIPMENT TYPE:	**CME 85**
LOGGED BY:	**Rusty Jones**	SAMPLING METHOD:	**4.25" ID Hollow Stem Auger** **With 1.5-ft Split-Spoons**
PROJECT MANAGER:	**G. Hainsworth**		
DATES DRILLED/INSTALLED:	**12/15/2021**	DRILLED DEPTH:	**20-ft bgs, Cored to 21.5-ft bgs**
LATITUDE:	**47.5402510° N**	INITIAL WATER DEPTH:	**10-ft bgs**
LONGITUDE:	**-122.3298528° W**	SCREENED INTERVAL:	**5 to 20-ft bgs**



DEPTH	SOIL LOG	USCS	DESCRIPTION
0			ASPHALT at surface.
		SW	GRAVELLY SAND, with ASPHALT pieces, medium to coarse-grained, moist, brown.
5			
		SP	SAND, medium-grained, firm, with some subround to round GRAVEL (approximately 1-cm), moist to wet, dark brown. At 10 ft bgs: GRAVELLY SAND, fine to medium-grained, subround gravel, saturated, brown to dark gray, very faint hydrocarbon odor. At 12.5 ft bgs: SAND, medium-grained, wet to saturated, dark brown with small pockets black WOODY ORGANICS, very faint oil/organic sheen and sweet odor.
10			
15		SP	SAND, medium to coarse-grained, with trace brick fragments (1.5-cm) and WOOD fibers/pieces, saturated, dark gray, no hydrocarbon odor. At 17.5 to 21.5 ft bgs: WOOD debris, no odor.
20			

SAMPLE ID	SAMPLE DEPTH (ft bgs)	PID (ppm) SPT
	2.5 - 4 ft	2.6 5-6-6
	5 - 6.5 ft	3.1 3-3-3
	7.5 - 9 ft	N/A 1-2-2
	10 - 11.5 ft	2.9 11-9-6
MW-5 12.5-14'	12.5 - 14 ft	4.3 0-1-1
	15 - 16.5 ft	2.3 1-1-2
	17.5 - 19 ft	1.9 2-2-3
	20 - 21.5 ft	2.1 4-3-3

NOTES: South side of building near loading docks.
Lithology logged from split spoon core samples. Ecology tag # BNL-601

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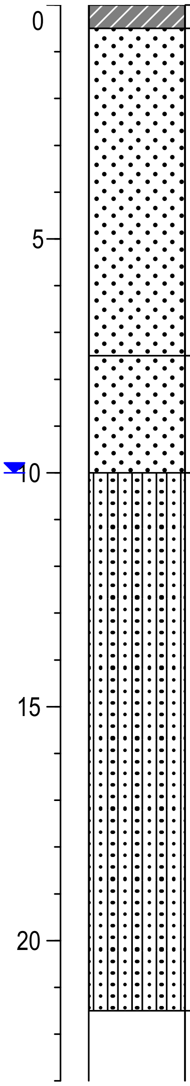
WELL LOG

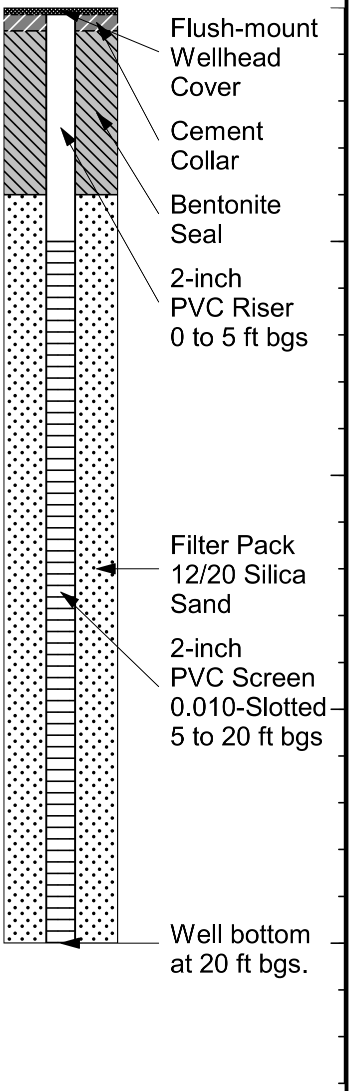
BORING/WELL ID:	**MW-6**
INSTALLED DEPTH:	**20-ft bgs**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Former Bunge Foods R.I.**	DRILLING CO.:	**Holt/John Bennett**
SITE LOCATION:	**6901 Fox Ave S** **Seattle, WA**	DRILLING METHOD:	**Hollow Stem Auger**
		EQUIPMENT TYPE:	**CME 85**
LOGGED BY:	**Rusty Jones**	SAMPLING METHOD:	**4.25" ID Hollow Stem Auger** **With 1.5-ft Split-Spoons**
PROJECT MANAGER:	**G. Hainsworth**		
DATES DRILLED/INSTALLED:	**12/15/2021**	DRILLED DEPTH:	**20-ft bgs, Cored to 21.5-ft bgs**
LATITUDE:	**47.5405094° N**	INITIAL WATER DEPTH:	**10-ft bgs**
LONGITUDE:	**-122.3302284° W**	SCREENED INTERVAL:	**5 to 20-ft bgs**



USCS	DESCRIPTION
	ASPHALT at surface.
SP	SAND, medium to coarse-grained, slightly moist. With ASPHALT pieces. At 5 ft bgs: POOR RECOVERY, moist.
SP	SAND, coarse to very coarse-grained, wet. At 8 to 8.5 ft bgs: SANDY CLAY, non-plastic, soft, wet, tan. At 8.5 to 9 ft bgs: SAND, medium-grained, uniform, oxidized appearance, wet, rusty red.
SM	SILTY SAND, fine to medium-grained, with soft SILT pocket, wet to saturated, tan to brown, strong reducing odors. At 12.5 ft bgs: Variable SILT and SAND, fine-grained, generally soft, trace very small ROOTS, saturated, tan to gray. At 16 ft bgs: SAND, fine-grained, brown, strong reducing odors. At 17.5 ft bgs: SAND, medium-grained, subround, saturated, dark brown, reducing odors. At 20 to 20.3 ft bgs: CLAYEY SILT, soft, saturated, tan to light gray. At 20.3 ft bgs: SAND, medium to coarse-grained, trace ROOTS/WOOD, saturated, black, mild reducing odors.

SAMPLE ID	SAMPLE DEPTH (ft bgs)	PID (ppm) SPT
	2.5 - 4 ft	0.9 2-2-2
	5 - 6.5 ft	N/A 2-1-2
MW-6 7.5-9'	7.5 - 9 ft	2.0 1-1-1
	10 - 11.5 ft	2.0 0-0-0
	12.5 - 14 ft	2.1 1-1-1
	15 - 16.5 ft	2.1 5-5-5
	17.5 - 19 ft	2.2 3-4-5
	20 - 21.5 ft	1.3 3-6-6



NOTES: Southwest of building near walk-through entrance.
Lithology logged from split spoon core samples. Ecology tag # BNL-603

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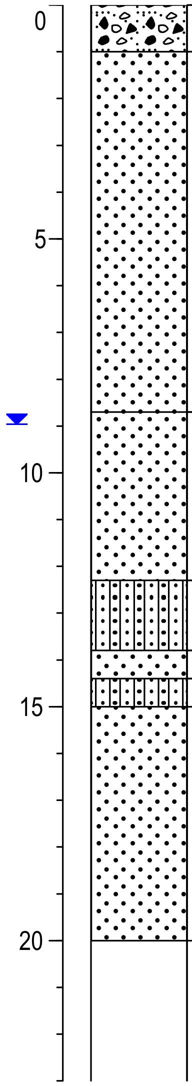
WELL LOG

BORING/WELL ID: **MW-7**
INSTALLED DEPTH: **19.5-ft bgs**

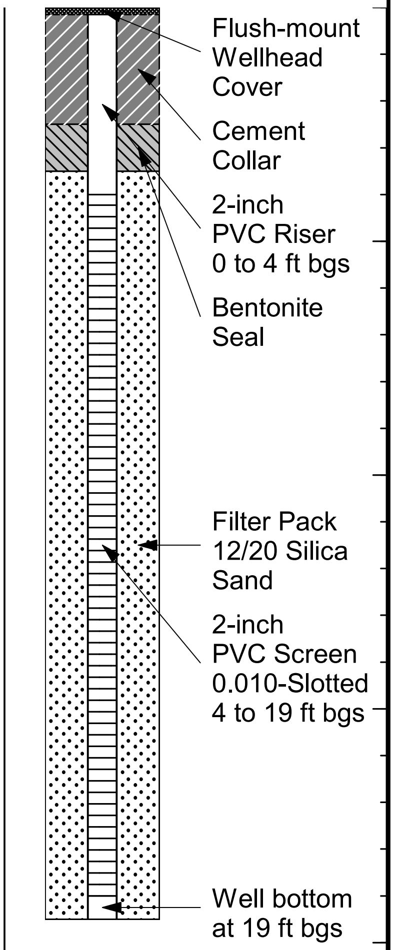
PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Former Bunge Foods R.I.**	DRILLING CO.:	**Holt/Abraham Causland**
SITE LOCATION:	**6901 Fox Ave S** **Seattle, WA**	DRILLING METHOD:	**Hollow Stem Auger**
		EQUIPMENT TYPE:	**Mobile Drill B-57**
LOGGED BY:	**Rusty Jones**	SAMPLING METHOD:	**4.25" ID Hollow Stem Auger** **Pre-cored with DPT probe.**
PROJECT MANAGER:	**G. Hainsworth**		
DATES DRILLED/INSTALLED:	**3/9/2023**	DRILLED DEPTH:	**19.5-ft bgs**
LATITUDE:	**47.5408164° N**	INITIAL WATER DEPTH:	**8.96-ft bgs**
LONGITUDE:	**-122.3286454° W**	SCREENED INTERVAL:	**0 to 19-ft bgs**

DEPTH / SOIL LOG



USCS	DESCRIPTION	SAMPLE ID	SAMPLE DEPTH (ft bgs)	PID (ppm) DPT
GW	SANDY GRAVEL, angular gravel, moist.			
SP	SAND, medium to coarse-grained, subangular to subround, moist, dark brown.		1 - 3 ft 3 - 5 ft 6 - 8 ft	0.0 0.0 0.0
SP	SILTY SAND, very fine to fine-grained, some CLAY content, non-plastic, moist to wet, dark brown. At 10 ft bgs: Fine to medium-grained, saturated, dark brown to dark gray.	MW-7 8-10'	8 - 10 ft 11.5-12.5 ft	0.2 0.0
SM	SANDY SILT, very fine to fine-grained, soft, non-plastic, abundant WOODY ORGANICS, wet, tan.			
SP	SAND, medium-grained, saturated, dark brown.		13.8-15 ft	0.0
SM	SANDY SILT, soft, layering, some very small organics, wet, tan.			
SP	SAND, very fine to medium-grained, some SILT, loose, saturated, dark gray.	MW-7 16-18'	16 - 18 ft	0.1

WELL CONSTRUCT. / WELL DESC.



NOTES: Along railroad spur north of warehouse building between RR timbers.
Lithology logged from Macrocore samplers. Ecology tag # BPW-457

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WELL LOG

BORING/WELL ID: **MW-8**

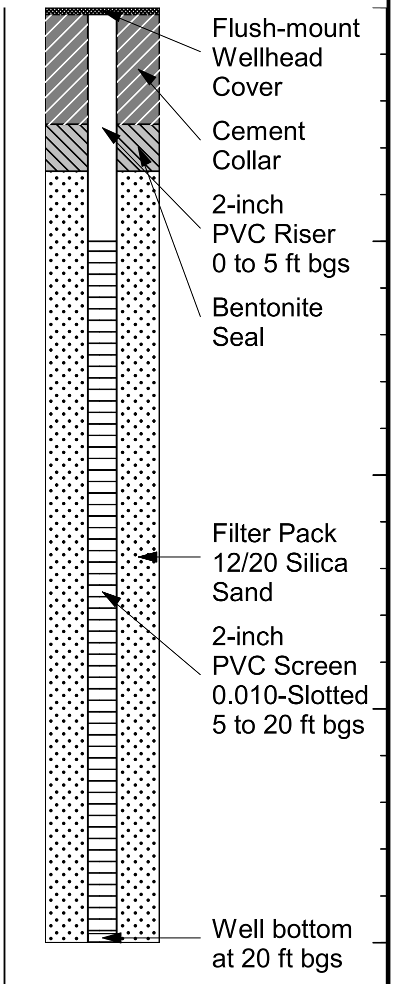
INSTALLED DEPTH: **20-ft bgs**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Former Bunge Foods R.I.**	DRILLING CO.:	**Holt/Abraham Causland**
SITE LOCATION:	**6901 Fox Ave S** **Seattle, WA**	DRILLING METHOD:	**Hollow Stem Auger**
		EQUIPMENT TYPE:	**Mobile Drill B-57**
LOGGED BY:	**Rusty Jones**	SAMPLING METHOD:	**4.25" ID Hollow Stem Auger** **Pre-cored with DPT probe.**
PROJECT MANAGER:	**G. Hainsworth**		
DATES DRILLED/INSTALLED:	**3/9/2023**	DRILLED DEPTH:	**20-ft bgs**
LATITUDE:	**47.5402825° N**	INITIAL WATER DEPTH:	**8.18-ft bgs**
LONGITUDE:	**-122.3274993° W**	SCREENED INTERVAL:	**0 to 20-ft bgs**

DEPTH	SOIL LOG	USCS	DESCRIPTION
0			ASPHALT
		GW	GRAVEL, subround, dry.
		SP	SAND, fine to medium-grained, red-brown.
		SM	SILTY SAND, very fine to fine-grained, trace CLAY, gray, slightly moist to moist. At 1.6 ft bgs: Minor GRAVEL, red-brown SAND.
5		SP	SAND, fine to medium-grained, subround, tan to dark brown with trace rusty-orange mottling, moist. Slightly coarsening downward sequence. At 10 ft bgs: Medium to coase-grained, dark brown with mixed grain colors, wet to saturated. At 11.3 ft bgs: Medium to very coarse-grained, poorly-sorted.
10			
15		SP	SAND, medium-coarse-grained, layering well-sorted, saturated, dark tan with rusty brown staining. At 13.7 ft bgs: Subangular to subround, wet but well-drained, dark brown. At 15 ft bgs: Fine to coarse-grained, mostly medium-grained, wet, well-drained, dark brown.
20			

SAMPLE ID	SAMPLE DEPTH (ft bgs)	PID (ppm) DPT
	1 - 3 ft	0.1
	3 - 5 ft	0.1
	6 - 8 ft	0.1
MW-8 8-10'	8 - 10 ft	0.3
MW-8 11-13'	11 - 13 ft	17.3
MW-8 13-14.5'	13-14.5 ft	4.6
	15 - 17 ft	1.6
	18 - 20 ft	0.3

WELL CONSTRUCT. / WELL DESC.



NOTES: In parking lot near main front office door and stairs.
Lithology logged from Macrocore samplers. Ecology tag # BPW-455

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Tukwila, WA 98188

WELL LOG

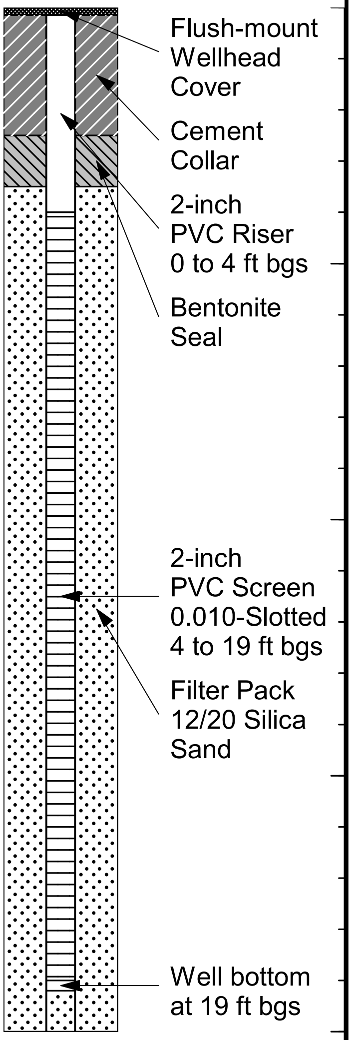
BORING/WELL ID: **MW-9**

INSTALLED DEPTH: **20-ft bgs**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Former Bunge Foods R.I.**	DRILLING CO.:	**Holt/Abraham Causland**
SITE LOCATION:	**6901 Fox Ave S** **Seattle, WA**	DRILLING METHOD:	**Hollow Stem Auger**
		EQUIPMENT TYPE:	**Mobile Drill B-57**
LOGGED BY:	**Rusty Jones**	SAMPLING METHOD:	**4.25" ID Hollow Stem Auger** **Pre-cored with DPT probe.**
PROJECT MANAGER:	**G. Hainsworth**		
DATES DRILLED/INSTALLED:	**3/9/2023**	DRILLED DEPTH:	**20-ft bgs**
LATITUDE:	**47.5405462° N**	INITIAL WATER DEPTH:	**8.85-ft bgs**
LONGITUDE:	**-122.3273549° W**	SCREENED INTERVAL:	**0 to 19-ft bgs**

DEPTH	SOIL LOG	USCS	DESCRIPTION	SAMPLE ID	SAMPLE DEPTH (ft bgs)	PID (ppm) DPT
0			ASPHALT			
		SP	SAND, very fine to medium-grained, slightly moist to moist, reddish tan with rusty orange mottling.		1.5-3 ft	0.0
					3.5-5 ft	0.0
5		SP	POOR RECOVERY SAND, medium to coarse-grained, subangular to subround, moist, brown, black, and white grains.		5.5-7 ft	0.0
▼			At 9 ft bgs: Rusty brown seam, moist to wet below.	MW-9 8.5-10'	8.5-10 ft	0.3
10		SP	SAND, medium to coarse-grained, abundant coarse-grain, wet and well-drained, dark brown to black.		11 - 13 ft	0.2
			At 13.8 to 15 ft bgs: Abundant SILTY SAND, very fine to fine-grained, non-plastic, dark gray.	MW-9 14-15'	14 - 15 ft	0.0
15						
20						

WELL CONSTRUCT. WELL DESC.



NOTES: Along eastern property line with Fox Ave S, just east of warehouse building.
Lithology logged from Macrocore samplers. Ecology tag # BPW-456

DEPARTMENT OF
ECOLOGY
State of Washington

Resource Protection Well Report

Submit one well report per well installed. See page two for instructions.

Type of Work:

☒ Construction
☐ Decommission ⟹ Original NOI No. ______

Ecology Well ID Tag No. BNL 601

Site Well Name Bunge Foods

Consulting Firm Crete Consulting

Was a variance approved for this well/boring? ☐ Yes ☒ No

If yes, what was the variance for? ______

Notice of Intent No. RE 22156

Type of Well:

☒ Resource Protection Well ☐ Injection Point
☐ Remediation Well ☐ Grounding Well
☐ Geotechnical Soil Boring ☐ Ground Source Heat Pump
☐ Environmental Boring ☐ Other ______
↳ ☐ Soil- ☐ Vapor- ☒ Water-sampling

Property Owner Bridge Point Seattle

Well Street Address 6901 Fox Ave S

City Seattle County King

Tax Parcel No. ______

Location (see instructions): WWM ☐ or EWM ☒

SW ¼-¼ NW ¼, Section 29 Town 24N Range 4

Latitude (Example: 47.12345) 47.5409208

Longitude (Example: -120.12345) 122.3311974

(WGS 84 Coordinate System)

Borehole diameter 8"al inches Casing diameter 2 inches

Static water level ______ ft below top of casing Date ______

☐ Above-ground completion with bollards ☒ Flush monument

↳ Stick-up of top of well casing ______ ft above ground surface

Start Date 12-15-21 Completed Date 12-16-21

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported are true to my best knowledge and belief.

☒ Driller ☐ Trainee ☐ Engineer

Name (Print Last, First Name) Bennett, John

Driller/Engineer/Trainee Signature John Bennett

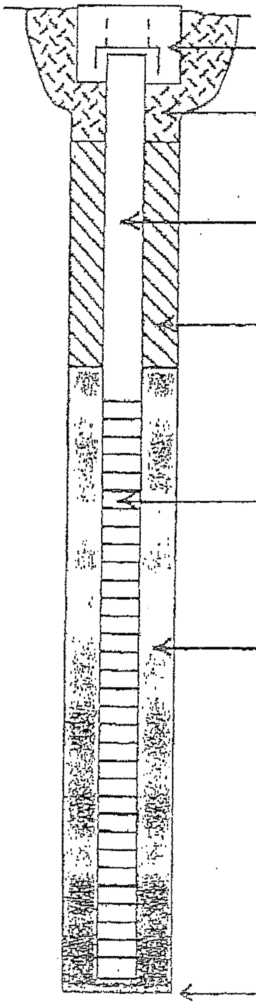
License No. 2933

Company Name Holt Services Inc.

If trainee box is checked, sponsor's license number: ______

Sponsor's signature ______

Construction/Design



Well Data

MONUMENT TYPE: 8" Flush

CONCRETE SURFACE SEAL 2 ft.

PVC BLANK 2"x 5'

BACKFILL 3 ft.

TYPE: Bentonite Chips

PVC SCREEN 2"x 15'

SLOT SIZE: .10

TYPE: Schedule 40 PVC

GRAVEL PACK 17 ft.

MATERIAL: 12-20 Silica Sand

WELL DEPTH ______

Formation Description

0 - 7' ft. brown med Sand

7' - 20' ft. blue gray fine to med Sand H2O bearing

- ft.

- ft.

- ft.

REMARKS ______

DEPARTMENT OF ECOLOGY
State of Washington

Resource Protection Well Report

Submit one well report per well installed. See page two for instructions.

Type of Work:

☒ Construction
☐ Decommission ⟹ Original NOI No. ______

Ecology Well ID Tag No. BNL 602

Site Well Name Bunge Foods

Consulting Firm Crete Consulting

Was a variance approved for this well/boring? ☐ Yes ☒ No

If yes, what was the variance for? ______

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported are true to my best knowledge and belief.

☒ Driller ☐ Trainee ☐ Engineer

Name (Print Last, First Name) Bennett, John

Driller/Engineer/Trainee Signature John Bennett

License No. 2933

Company Name Holt Services Inc.

If trainee box is checked, sponsor's license number: ______

Sponsor's signature ______

Notice of Intent No. RE 22156

Type of Well:

☑ Resource Protection Well ☐ Injection Point
☐ Remediation Well ☐ Grounding Well
☐ Geotechnical Soil Boring ☐ Ground Source Heat Pump
☐ Environmental Boring ☐ Other ______
↳ ☐ Soil- ☐ Vapor- ☒ Water-sampling

Property Owner Bridge Point Seattle

Well Street Address 6901 Fox Ave S

City Seattle County King

Tax Parcel No. ______

Location (see instructions): WWM ☐ or EWM ☒

SW ¼-¼ NW ¼, Section 29 Town 24N Range 4

Latitude (Example: 47.12345) 47.5409208

Longitude (Example: -120.12345) 122.3311974

(WGS 84 Coordinate System)

Borehole diameter 8" inches Casing diameter 2 inches

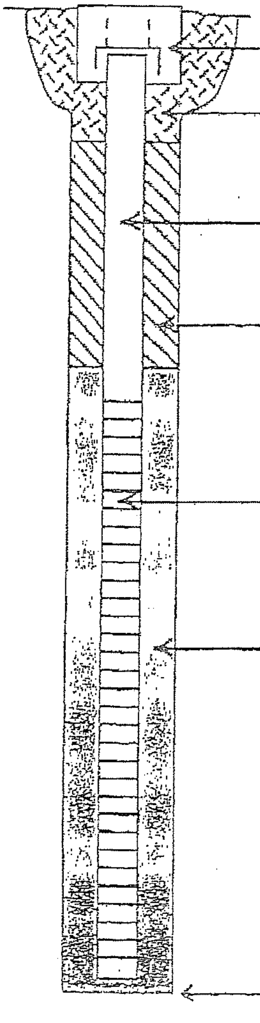
Static water level ______ ft below top of casing Date ______

☐ Above-ground completion with bollards ☒ Flush monument

↳ Stick-up of top of well casing ______ ft above ground surface

Start Date 12-15-21 Completed Date 12-16-21

Construction/Design



Well Data

MONUMENT TYPE: 8" Flush

CONCRETE SURFACE SEAL 2 ft.

PVC BLANK 2"x 5'

BACKFILL 7 ft.

TYPE: Bentonite Chips

PVC SCREEN 2"x 15'

SLOT SIZE: .10

TYPE: Schedule 40 PVC

GRAVEL PACK 17 ft.

MATERIAL: 12-20 Silica Sand

WELL DEPTH ______

Formation Description

0 - 7' ft.	brown and Sand
7' - 20' ft.	blue gray fine to med sand H20 bearing
- ft.	
- ft.	
- ft.	

REMARKS ______

DEPARTMENT OF
ECOLOGY
State of Washington

Resource Protection Well Report

Submit one well report per well installed. See page two for instructions.

Type of Work:

☒ Construction
☐ Decommission ⇨ Original NOI No. ______

Ecology Well ID Tag No. BNL 603
Site Well Name Bunge Foods
Consulting Firm Crete Consulters
Was a variance approved for this well/boring? ☐ Yes ☒ No
If yes, what was the variance for? ______

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported are true to my best knowledge and belief.

☒ Driller ☐ Trainee ☐ Engineer
Name (Print Last, First Name) Bennett, John
Driller/Engineer/Trainee Signature John Bennett
License No. 2933
Company Name Holt Services Inc.

If trainee box is checked, sponsor's license number: ______
Sponsor's signature ______

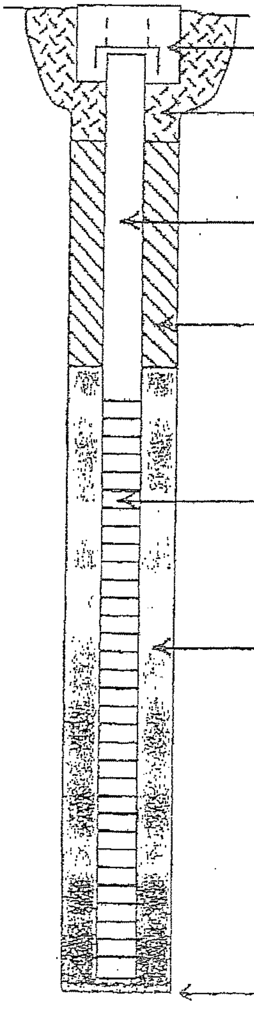
Notice of Intent No. RE 22156

Type of Well:

☒ Resource Protection Well ☐ Injection Point
☐ Remediation Well ☐ Grounding Well
☐ Geotechnical Soil Boring ☐ Ground Source Heat Pump
☐ Environmental Boring ☐ Other ______
↳ ☐ Soil- ☐ Vapor- ☒ Water-sampling

Property Owner Bridge Point Seattle
Well Street Address 6901 Fox Ave S
City Seattle County King
Tax Parcel No. ______
Location (see instructions): WWM ☐ or EWM ☒
SW ¼-¼ NW ¼, Section 29 Town 24N Range 4
Latitude (Example: 47.12345) 47.5409208
Longitude (Example: -120.12345) 122.3311974
(WGS 84 Coordinate System)
Borehole diameter 8"x1 inches Casing diameter 2 inches
Static water level ______ ft below top of casing Date ______
☐ Above-ground completion with bollards ☒ Flush monument
↳ Stick-up of top of well casing ______ ft above ground surface
Start Date 12-15-21 Completed Date 12-16-21

Construction/Design



Well Data

MONUMENT TYPE: 8" Flush
CONCRETE SURFACE SEAL 2 ft.
PVC BLANK 2"x 5'
BACKFILL 7 ft.
TYPE: Bentonite Chips
PVC SCREEN 2"x 15'
SLOT SIZE: .10
TYPE: Schedule 40 PVC
GRAVEL PACK 17 ft.
MATERIAL: 12-20 Silica Sand
WELL DEPTH ______

Formation Description

0 - 7' ft.	brown med Sand
7' - 20' ft.	blue gray fine to med sand H2O bearing
- ft.	
- ft.	
- ft.	

REMARKS

DEPARTMENT OF
ECOLOGY
State of Washington

Resource Protection Well Report

Submit one well report per well installed. See page two for instructions.

Type of Work:

☒ Construction

☐ Decommission ⇨ Original NOI No. ______

Ecology Well ID Tag No. BNL 604

Site Well Name Bunge Foods

Consulting Firm Crete Consulting

Was a variance approved for this well/boring? ☐ Yes ☒ No

If yes, what was the variance for? ______

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported are true to my best knowledge and belief.

☒ Driller ☐ Trainee ☐ Engineer

Name (Print Last, First Name) Bennett, John

Driller/Engineer/Trainee Signature John Bennett

License No. 2933

Company Name Holt Services Inc.

If trainee box is checked, sponsor's license number: ______

Sponsor's signature ______

Notice of Intent No. RE 22156

Type of Well:

☑ Resource Protection Well ☐ Injection Point
☐ Remediation Well ☐ Grounding Well
☐ Geotechnical Soil Boring ☐ Ground Source Heat Pump
☐ Environmental Boring ☐ Other ______
↳ ☐ Soil- ☐ Vapor- ☒ Water-sampling

Property Owner Bridge Point Seattle

Well Street Address 6901 Fox Ave S

City Seattle County King

Tax Parcel No. ______

Location (see instructions): WWM ☐ or EWM ☒

SW ¼-¼ NW ¼, Section 29 Town 24N Range 4

Latitude (Example: 47.12345) 47.5409208

Longitude (Example: -120.12345) 122.3311974

(WGS 84 Coordinate System)

Borehole diameter 8"al inches Casing diameter 2 inches

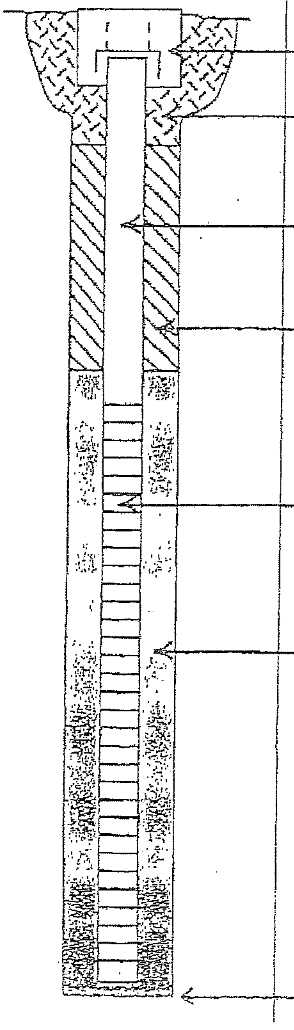
Static water level ______ ft below top of casing Date ______

☐ Above-ground completion with bollards ☒ Flush monument

↳ Stick-up of top of well casing ______ ft above ground surface

Start Date 12-15-21 Completed Date 12-16-21

Construction/Design



Well Data

MONUMENT TYPE: 8" Flush

CONCRETE SURFACE SEAL 2 ft.

PVC BLANK 2"x 5'

BACKFILL 3 ft.

TYPE: Bentonite Chips

PVC SCREEN 2"x 15'

SLOT SIZE: .10

TYPE: Schedule 40 PVC

GRAVEL PACK 17 ft.

MATERIAL: 12-20 Silica Sand

WELL DEPTH ______

Formation Description

0 - 7' ft. brown med Sand

7' - 20' ft. blue gray fine to med sand +/20 boring

- ft.

- ft.

- ft.

REMARKS

DEPARTMENT OF ECOLOGY
State of Washington

Resource Protection Well Report

Submit one well report per well installed. See page two for instructions.

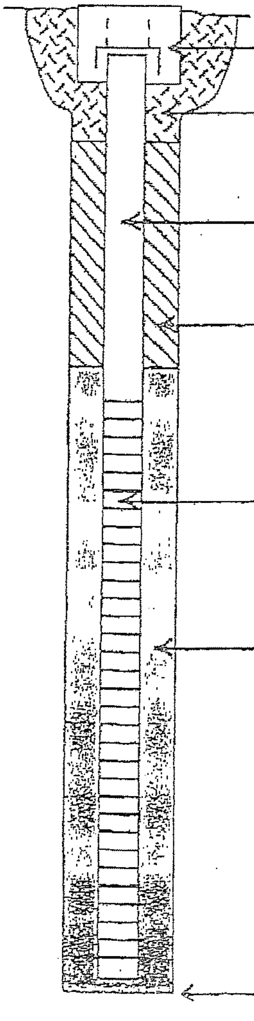
Type of Work:
☒ Construction
☐ Decommission ⇨ Original NOI No. ______
Ecology Well ID Tag No. BNL 605
Site Well Name Bunge Foods
Consulting Firm Crete Consulting
Was a variance approved for this well/boring? ☐ Yes ☒ No
If yes, what was the variance for? ______

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported are true to my best knowledge and belief.

☒ Driller ☐ Trainee ☐ Engineer
Name (Print Last, First Name) Bennett, John
Driller/Engineer/Trainee Signature John Bennett
License No. 2933
Company Name Holt Services Inc.
If trainee box is checked, sponsor's license number: ______
Sponsor's signature ______

Notice of Intent No. RE22156
Type of Well:
☑ Resource Protection Well ☐ Injection Point
☐ Remediation Well ☐ Grounding Well
☐ Geotechnical Soil Boring ☐ Ground Source Heat Pump
☐ Environmental Boring ☐ Other ______
☐ Soil- ☐ Vapor- ☒ Water-sampling
Property Owner Bridge Point Seattle
Well Street Address 6901 Fox Ave S
City Seattle County King
Tax Parcel No. ______
Location (see instructions): WWM ☐ or EWM ☒
SW ¼-¼ NW ¼, Section 29 Town 24N Range 4
Latitude (Example: 47.12345) 47.5409208
Longitude (Example: -120.12345) 122.3311974
(WGS 84 Coordinate System)
Borehole diameter 8"al inches Casing diameter 2 inches
Static water level ______ ft below top of casing Date ______
☐ Above-ground completion with bollards ☒ Flush monument
Stick-up of top of well casing ______ ft above ground surface
Start Date 12-15-21 Completed Date 12-16-21

Construction/Design



Well Data

MONUMENT TYPE: 8" Flush
CONCRETE SURFACE SEAL 2 ft.
PVC BLANK 2"x 5'
BACKFILL 7 ft.
TYPE: Bentonite Chips
PVC SCREEN 2"x 15'
SLOT SIZE: .10
TYPE: Schedule 40 PVC
GRAVEL PACK 17 ft.
MATERIAL: 12-20 Silica Sand
WELL DEPTH ______

Formation Description

0 - 7' ft. brown med Sand
7' - 20' ft. blue gray fine to med Sand +/20 boring
- ft.
- ft.
- ft.

REMARKS

DEPARTMENT OF
ECOLOGY
State of Washington

Resource Protection Well Report

Submit one well report per well installed. See page two for instructions.

Type of Work:
☒ Construction
☐ Decommission ⇨ Original NOI No. ________
Ecology Well ID Tag No. BNL 606
Site Well Name Bunge Foods
Consulting Firm Crete Consulting
Was a variance approved for this well/boring? ☐ Yes ☒ No
If yes, what was the variance for? ________

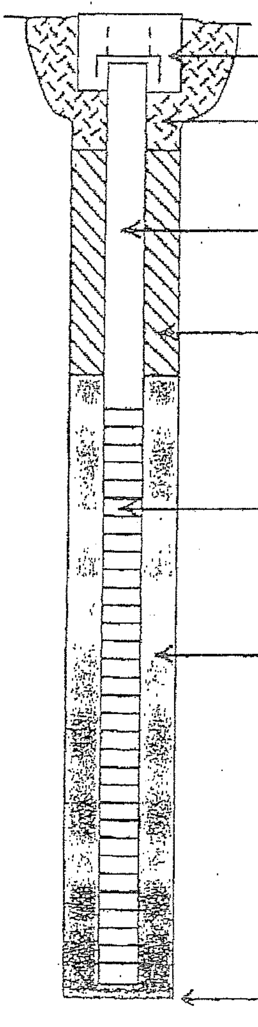
WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported are true to my best knowledge and belief.

☒ Driller ☐ Trainee ☐ Engineer
Name (Print Last, First Name) Bennett, John
Driller/Engineer/Trainee Signature John Bennett
License No. 2933
Company Name Holt Services Inc.

If trainee box is checked, sponsor's license number: ________
Sponsor's signature ________

Notice of Intent No. RE 22156
Type of Well:
☒ Resource Protection Well ☐ Injection Point
☐ Remediation Well ☐ Grounding Well
☐ Geotechnical Soil Boring ☐ Ground Source Heat Pump
☐ Environmental Boring ☐ Other ________
↳ ☐ Soil- ☐ Vapor- ☒ Water-sampling
Property Owner Bridge Point Seattle
Well Street Address 6901 Fox Ave S
City Seattle County King
Tax Parcel No. ________
Location (see instructions): WWM ☐ or EWM ☒
SW ¼-¼ NW ¼, Section 29 Town 24N Range 4
Latitude (Example: 47.12345) 47.5409208
Longitude (Example: -120.12345) 122.3311974
(WGS 84 Coordinate System)
Borehole diameter 8" al inches Casing diameter 2 inches
Static water level ______ ft below top of casing Date ______
☐ Above-ground completion with bollards ☒ Flush monument
↳ Stick-up of top of well casing ______ ft above ground surface
Start Date 12-15-21 Completed Date 12-16-21

Construction/Design



Well Data

MONUMENT TYPE: 8" Flush
CONCRETE SURFACE SEAL 2 ft.
PVC BLANK 2"x 5'
BACKFILL 3 ft.
TYPE: Bentonite Chips
PVC SCREEN 2"x 15'
SLOT SIZE: .10
TYPE: Schedule 40 PVC
GRAVEL PACK 17 ft.
MATERIAL: 12-20 Silica sand
WELL DEPTH ' "

Formation Description

0 - 7' ft. brown med sand
7' - 20' ft. blue gray fine to med sand H20 bearing
- ft.
- ft.
- ft.

REMARKS

Please print, sign and return by mail to Department of Ecology

RESOURCE PROTECTION WELL REPORT

CURRENT Notice of Intent No. RE24194

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

Construction/Decommission *(select one)*
☒ Construction
☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* ______

Type of Well *(select one)*
☒ Resource Protection
☐ Geotech Soil Boring

Consulting Firm CRETE

Unique Ecology Well ID Tag No. BPW-455

Property Owner BRIDGE INDUSTRIAL

Site Address 6901 FOX AVE. S.

City SEATTLE County KING

Location NW 1/4-1/4 NW 1/4 Sec 29 Twn 24N R 4E Select One ☐ EWM ☐ WWM

Lat/Long (s, t, r still REQUIRED) 47.5403017, -122.3275200 Lat Deg ______ Lat Min/Sec ______ Long Deg ______ Long Min/Sec ______

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Name (Print) CARLAND, ABE

Driller/Engineer/Trainee Signature

Driller or Trainee License No. 2861

If trainee, licensed driller's Signature and License No. ______

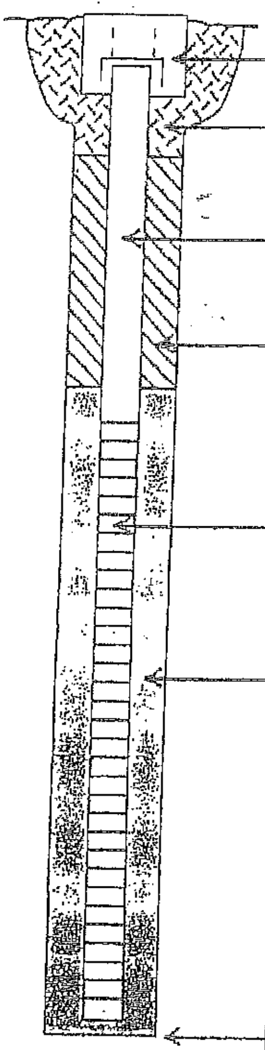
Tax Parcel No. 0001800113

Cased or Uncased Diameter 2" Static Level 10'

Work/Decommission Start Date 03-09-23

Work/Decommission Completed Date 03-09-23

Construction/Design | Well Data | Formation Description



MONUMENT TYPE: 8" FLUSH

CONCRETE SURFACE SEAL 3 ft.

PVC BLANK 2"x 5'

BACKFILL 1 ft.

TYPE: BENT CHIPS

PVC SCREEN 2"x 15'

SLOT SIZE: .010

TYPE: PVC

GRAVEL PACK 16 ft.

MATERIAL: 12/20 SAND

WELL DEPTH 20. ft.

0 - 5 ft.
SANDY GRAVEL

5 - 10 ft.
silty SAND

10 - 20 ft.
Clean medium SAND

- ft.

- ft.

REMARKS Drill to DEPTH install 2" PVC well @ 20'

Please print, sign and return by mail to Department of Ecology

RESOURCE PROTECTION WELL REPORT

CURRENT Notice of Intent No. RE24194

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

Construction/Decommission *(select one)*
☒ Construction
☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* ______

Type of Well *(select one)*
☒ Resource Protection
☐ Geotech Soil Boring

Consulting Firm CRETE

Unique Ecology Well ID Tag No. BPW-456

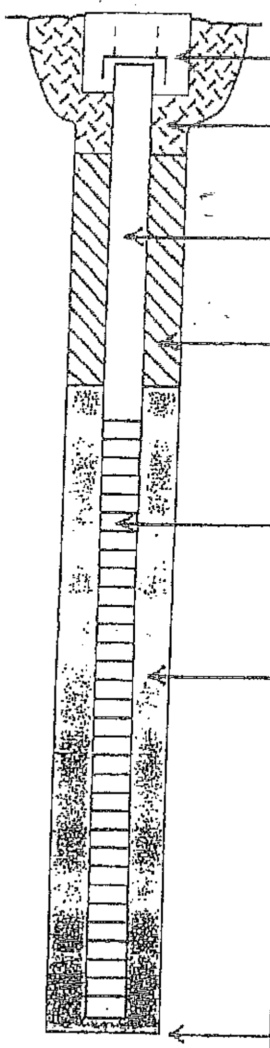
Property Owner BRIDGE INDUSTRIAL
Site Address 6901 FOX AVE. S.
City SEATTLE County KING
Location NW 1/4-1/4 NW 1/4 Sec 29 Twp 24N R 4E Select One ☐ BWM ☐ WWM
47.5405491, -122.3273483
Lat/Long (s, t, r still REQUIRED) Lat Deg ______ Lat Min/Sec ______
Long Deg ______ Long Min/Sec ______
Tax Parcel No. 0001800113
Cased or Uncased Diameter 2" Static Level 10'
Work/Decommission Start Date 03-09-23
Work/Decommission Completed Date 03-09-23

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Name (Print) CARLSLAND, ABE
Driller/Engineer/Trainee Signature
Driller or Trainee License No. 2861

If trainee, licensed driller's Signature and License No. ______

Construction/Design | Well Data | Formation Description



MONUMENT TYPE: 8" FLUSH
CONCRETE SURFACE SEAL 3 ft.
PVC BLANK 2"x 5'
BACKFILL 1 ft.
TYPE: BENT CHIPS
PVC SCREEN 2"x 15'
SLOT SIZE: .010
TYPE: PVC
GRAVEL PACK 16 ft.
MATERIAL: 12/20 SAND
WELL DEPTH 20.

0 - 5 ft.
SANDY GRAVEL

5 - 10 ft.
silty SAND

10 - 20 ft.
Clean medium SAND

- ft.

- ft.

REMARKS Drill TO DEPTH
install 2" PVC well
@ 20'

Please print, sign and return by mail to Department of Ecology

RESOURCE PROTECTION WELL REPORT

CURRENT Notice of Intent No. RE24194

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

Construction/Decommission *(select one)*
☒ Construction
☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* ______

Type of Well *(select one)*
☒ Resource Protection
☐ Geotech Soil Boring

Consulting Firm CRETE

Unique Ecology Well ID Tag No. BPW-457

Property Owner BRIDGE INDUSTRIAL

Site Address 6901 FOX AVE. S.

City SEATTLE County KING

Location NW 1/4-1/4 NW 1/4 Sec 29 Twn 24N R 4E Select One ☐ EWM ☐ WWM

Lat/Long (s, t, r still REQUIRED) 47.5408239, -122.3286488
Lat Deg ____ Lat Min/Sec ____
Long Deg ____ Long Min/Sec ____

Tax Parcel No. 0001800113

Cased or Uncased Diameter 2" Static Level 10'

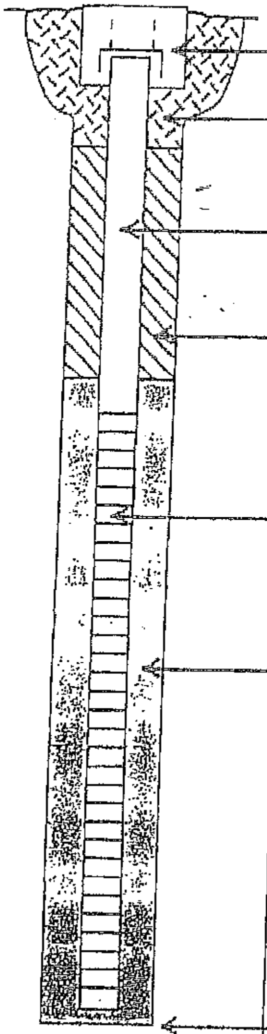
Work/Decommission Start Date 03-09-23

Work/Decommission Completed Date 03-09-23

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Name (Print) CAUSLAND, ABE
Driller/Engineer /Trainee Signature
Driller or Trainee License No. 2861

If trainee, licensed driller's Signature and License No. ______

Construction/Design	Well Data	Formation Description
	MONUMENT TYPE: 8" FLUSH CONCRETE SURFACE SEAL 3 ft. PVC BLANK 2 "x 5 ' BACKFILL 1 ft. TYPE: BENT CHIPS PVC SCREEN 2 "x 15 ' SLOT SIZE: .010 TYPE: PVC GRAVEL PACK 16 ft. MATERIAL: 12/20 SAND WELL DEPTH 20. "	0 - 5 ft. SANDY GRAVEl 5 - 10 ft. silty sand 10 - 20 ft. Clean medium sand - ft. - ft. REMARKS Drill to Depth install 2" PVC well @ 20'

Project: Down Foods	Project Number:	Boring No. GP-SB-1	CRETE CONSULTING, INC.
Address, City, State		Client:	Sheet 1 of 1
Logged By: PB	Date Started: 8:30	Bit Type:	Drilling Contractor: ESN
Drill Crew: ESN	Date Completed: 9:10	Hammer Type:	Diameter:
USA Ticket Number:	Date Backfilled: Bent.	Hammer Weight:	Drill Rig Type: GP
	Groundwater Depth:	Elevation:	Total Depth of Boring: 15'

Depth (feet)	Sample Type	Sample Number	Blow Counts (blows/foot)	Graphic Log	Lithology **Soil Group Name:** modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifierm color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.	Dry Density (pcf)	PID (ppm)	Additional Test
					6" Asphalt + gravel, trace sand.			
					5' Brown FINE sand, dry 0 PPM GP-SB-1-4' 1.2020, 8:44			
					10' SAND Light Brown, dry No odor			
5					WATER @ 9.35' Bgs GP-SB-1 1.2.20 8:55			
					15' DARK BROWN SAND DRY			
					wet @ 14' BGS			
10					SAMPLE @ GP-SB-1-9 1.2.20 8:57			
15								

Project: DAWN FOODS	Project Number:	Boring No. GP-SB-2	CRETE CONSULTING, INC.
Address, City, State		Client:	Sheet 1 of 1
Logged By: PB	Date Started: 9:23	Bit Type:	Drilling Contractor: ESN
Drill Crew:	Date Completed: 9:50	Hammer Type:	Diameter:
USA Ticket Number:	Date Backfilled: Bent.	Hammer Weight:	Drill Rig Type: GP
	Groundwater Depth:	Elevation:	Total Depth of Boring: 15'

Depth (feet)	Sample Type	Sample Number	Blow Counts (blows/foot)	Graphic Log	Lithology **Soil Group Name:** modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifierm color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.	Dry Density (pcf)	PID (ppm)	Additional Test
					0~6" Asphalt + Gravel			
					6"~5' FINE SAND, TAN			
					DRY, NO ODOR			
					0.1 PPM			
					SN: GP-SB-2-4 @ 9:25			
5					5'~10' SAND, DARK BROWN			
					MOIST, NO ODOR			
					GW @ 9.09' BGS SHEEN ON WATER			
					GW SAMPLE GP-SB-2 @ 9:45			
					~~SAND~~ 10-13' SAND, ODOR, 1007 ppm			
					DARK BROWN/BLACK, FUEL ODOR			
					~~TE~~ 13'~14. CLAY/FINE SAND MOIST			
10					14'~15' SAND DARK BROWN			
					MOIST			
					SAMPLE AT 12' BGS			
					GP-SB-2-12 @ 9:40			
15								

Project: DAWN FOODS	Project Number:	Boring No. GP-SB-3	CRETE CONSULTING, INC. Sheet 1 of 1
Address, City, State		Client:	
Logged By: PB	Date Started: 10:10	Bit Type:	Drilling Contractor: ESN
Drill Crew:	Date Completed: 10:40	Hammer Type:	Diameter:
USA Ticket Number:	Date Backfilled: Bent.	Hammer Weight:	Drill Rig Type: GP
	Groundwater Depth:	Elevation:	Total Depth of Boring: 15'

Depth (feet)	Sample Type	Sample Number	Blow Counts (blows/foot)	Graphic Log	Lithology **Soil Group Name:** modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifierm color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.	Dry Density (pcf)	PID (ppm)	Additional Test
					0~12' Asphalt + Gravel Black + grey			
					1'~3' FINE SAND, TAN			
					3'~5' SAND, BLACK + TAN NO ODOR. DRY, 0.6 PPM, SAMPLE @ 4'			
5					5'~8' SAME @ 10:20			
					8'~9' FINE SAND, BROWN/TAN, MOIST NO ODOR 0 PPM			
					9'~10' CLAYEY			
					10'~12' CAND WITH GRAVEL TAN, NO ODOR			
10					GW = 12.04' BGS, Ran dry. GW SAMPLE GP-SB'-3 @ 10:25			
					12'~15' CLAY/FINE SAND 0.1 PPM BROWN			
					SOIL SAMPLE FROM 11~12' BGS			
15								

Project: Dawn Foods	Project Number:	Boring No. GP-SB-4	CRETE CONSULTING, INC.
Address, City, State		Client:	Sheet 1 of 1
Logged By: PB	Date Started: 11:00	Bit Type:	Drilling Contractor: ESN
Drill Crew:	Date Completed: 11:40	Hammer Type:	Diameter:
USA Ticket Number:	Backfilled: Bent.	Hammer Weight:	Drill Rig Type: GP
	Groundwater Depth:	Elevation:	Total Depth of Boring: 15'

Depth (feet)	Sample Type	Sample Number	Blow Counts (blows/foot)	Graphic Log	**Lithology** **Soil Group Name:** modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifierm color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.	Dry Density (pcf)	PID (ppm)	Additional Test
					MOVED 1' FURTHER FROM BLDG. Due to refusal @ 18".			
					0~6" Gravel asphalt SOIL SAMPLE AT 4' BGS @ 11:20			
					6"~5' sand, brown + Tan Dry, No odor P.D = 0			
5					5~6' SAND with trace gravel NO ODOR P.D = 0			
					6'~8' SAND BROWN & TAN DRY, NO ODOR			
					[illegible] 8'~9.5' FINE SAND P.D = 0			
					9.5'~10' CLAYEY SAND, SILT.			
10					10'~12' SAND, FINE SAND BROWN			
					12'~14' SILT, BROWN MOIST			
					GW @ 8.22' BGS			
					SOIL SAMPLE @ 8'~8.5' bgS			
					GW sample @ 11:35			
15								

Project: DAWN FOODS	Project Number:	Boring No. GP-SB-5	CRETE CONSULTING, INC.
Address, City, State		Client:	Sheet 1 of 1
Logged By: PB	Date — Started: 11:55	Bit Type:	Drilling Contractor: ESN
Drill Crew:	Date — Completed: 12:30	Hammer Type:	Diameter:
USA Ticket Number:	Date — Backfilled: Bent.	Hammer Weight:	Drill Rig Type: GP
	Groundwater Depth:	Elevation:	Total Depth of Boring: 15'

Depth (feet)	Sample Type	Sample Number	Blow Counts (blows/foot)	Graphic Log	Lithology **Soil Group Name:** modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifierm color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.	Dry Density (pcf)	PID (ppm)	Additional Test
					0~6" Asphalt			
					6"~4' SAND + GRAVEL			
					4'~5' concrete PID = 0			
					5'~6' SAND			
5					6~6.5' WOOD WASTE			
					6.5~8' SAND, ODOR (Petroleum?) ↳ collect sample PID = 0.1 ppm GP-SB-5-7 @ 12:~~45~~15			
					GW @ 7.81' Bgs COLLECT 8~10 NO recovery GW @ 12:20			
10					10~11 GRAVEL/WASTE			
					11~13 SILT/CLAYEY TAN/BROWN			
					13~15' SAND BROWN NO ODOR 0 ppm			
					SOIL: GP-SB-5-12 @ 12:20			
15								

Project: Dawn Foods	Project Number:	Boring No. GP-SB-6	CRETE CONSULTING, INC.
Address, City, State		Client:	Sheet 1 of 1
Logged By: PB	Date Started: 12:45	Bit Type:	Drilling Contractor: ESN
Drill Crew:	Date Completed: 13:45	Hammer Type:	Diameter:
USA Ticket Number:	Date Backfilled: Bent.	Hammer Weight:	Drill Rig Type: GP
	Groundwater Depth:	Elevation:	Total Depth of Boring: 15'

Depth (feet)	Sample Type	Sample Number	Blow Counts (blows/foot)	Graphic Log	Lithology **Soil Group Name:** modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifierm color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.	Dry Density (pcf)	PID (ppm)	Additional Test
					0~6" Asphalt			
					6"~5' SAND + Gravel, Dry			
					Brown, Trace waste (Brick)			
					PID = 0 ppm			
					5'~10' BROWN SAND WITH			
					GRAVEL DRY, No odor			
5								
					PID = 0 ppm			
					collect soil sample			
					@ 4' (GP-SB-6-4) @ 12:56			
					10~11' Brown sand with gravel No odor			
					11'~14' Brown silt No odor PID = 0.0			
10								
					14'~15' SAND Brown No odor PID = 0.0			
					GW @ 8.73' BGS.			
					Collect soil sample @ 10'			
					(GP-SB-6-10) @ 13:15			
15								

Project: DAWN FOODS	Project Number:	Boring No. GP-SB-7	CRETE CONSULTING, INC.
Address, City, State		Client:	Sheet 1 of 1
Logged By: PB	Date — Started: 14:00	Bit Type:	Drilling Contractor: ESN
Drill Crew:	Date — Completed: 15:00	Hammer Type:	Diameter:
USA Ticket Number:	Date — Backfilled: Bent.	Hammer Weight:	Drill Rig Type: GP
	Groundwater Depth:	Elevation:	Total Depth of Boring: 15'

Depth (feet)	Sample Type	Sample Number	Blow Counts (blows/foot)	Graphic Log	Lithology **Soil Group Name:** modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifierm color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.	Dry Density (pcf)	PID (ppm)	Additional Test
					SOIL SAMPLE @ 4' @ 14:10			
					0~6" ASPHALT			
					6"~5' SAND, TAN, DRY, N, odor P.D = 0.0		0	
					5'~9.5' SAND TAN DRY, No odor PID = 0.0			
5					9.5'~10' SILT, MOIST BROWN 1" Rust above silt			
					10'~13' SAND with some silt. DARK Brown, moist No odor PID = 0.0			
					13~15' SILTY, CLAYEY BROWN, NO odor PID=0.0			
10					GW @ 8.63' bgs			
					SOIL SAMPLE @ 8' bgs @ 14:20 PID = 0.0			
					GW sample GP-SB-7 @ 14:25			
					DUPLICATE = GP-SB-99			
15					@ 14:45			

LOCATION OF BORING

JOB NO		CLIENT		LOCATION	DAWN FOODS
DRILLING METHOD	DPT (7800)			BORING NO	GP-SB-08
SAMPLING METHOD	DPT, MacroCore 2.25" samplers w/ plastic liners			SHEET	1 OF 1

ft BGS					DRILLING START	DRILLING FINISH
WATER LEVEL	9.5	9.9			TIME 1000	TIME 1100
TIME	1022	1104				
DATE	6-9-20	6-9-20			DATE 6-9-20	DATE 6-9-20
CASING DEPTH	BOREHOLE	PVC				

DATUM

ELEVATION

SURFACE CONDITIONS

SAMPLER TYPE	INS DRIVEN / RECOVERED	SAMPLE NO / DEPTH /PID (ppm)	BLOWS PER 6-INCHES	NO OF RINGS	Sample Condition	Drilling Action	DEPTH IN FEET	USCS	
							0		ASPHALT black FILL: SANDY GRAVEL, poorly-sorted, fg to c.g. SAND
		0.5-1' 0.9 ppm					1		dk brown, dry-sl. moist gravel up to 1.5"
							2		
		2-3' 1.6 ppm					3		@ 3-4' SILTY SAND w/ GRAVEL, sl. moist, dk brown fg-med., med-stiff
							4		4-5' SAA (SANDY GRAVEL)
		4-5' 1.4 ppm					5		5-8' SAA, GRAVELLY SAND w/ inc SILT, brown-dk brown, sl. moist, vfg-med SAND, dec. gravel
							6		
		6-7' 1.7 ppm			GP-SB-08-09 @ 1055 (9-10' BGS)		7		
							8		@ ~8' pocket of oxidized gravel
							9		9-10' SAND, minor silt, moist, dk brown-black fg-cg- (mostly med), sub-ang-sub-round.
		9-10' 1.6 ppm					10		Minor SLOUGH @ 10' @10-10.5 wet to saturated
		10-11' 1.6 ppm					11		10-13.5' SAA (med. SAND), dk brown-black, saturated ~~TILL~~ RJ
							12		
		12-13' 1.9 ppm					13		13.5-15' inc. SILT, but SAA, SANDY SILT, soft brown-dk brown, wet-saturated ~~TILL~~ RJ
		~~1.8~~ 14-15' → 1.8 ppm					14		
		15-16' 2.0 ppm					15		15-20' SAND fg-cg, predominantly med., saturated, dk brown-black, ~~TILL~~ RJ
							16		"Duwamish Sand"?
		17-18' 1.9 ppm					17		
							18		
		19-20' 1.8 ppm					19		
							20		Ceased coring @ 20' bgs

LOCATION OF BORING

CRETE CONSULTING, INC.

DATUM

ELEVATION

JOB NO

CLIENT

LOCATION DAWN FOODS

DRILLING METHOD DPT (7800)

BORING NO GP-SB-09

SHEET 1 OF 1

SAMPLING METHOD DPT MacroCore Samplers (2.25") Cores in plastic lines

ft BGS					
WATER LEVEL	10.5				
TIME	~1515				
DATE	6.9.20				
CASING DEPTH	PVC screen				

DRILLING

START	FINISH
TIME 1105	TIME 1200
DATE 6-9-20	DATE 6-9-20

SURFACE CONDITIONS

SAMPLER TYPE	INS DRIVEN / RECOVERED	SAMPLE NO / DEPTH PID (ppm)	BLOWS PER 6-INCHES	NO OF RINGS	Sample Condition	Drilling Action	DEPTH IN FEET	USCS	
							0		ASPHALT, black, at surface (≤0.5' thick) w/ aggregate
		1-2' / 2.2 ppm					1		0.5-4' GRAVELLY SAND, fg-cg, poorly-sorted dry-sl. moist, med. brown, FILL
							2		
							3		@ 3-4' increased SILT (SILTY SAND), sl. moist, med. brown some subround gravel (<1")
		4-5' / 2.2 ppm					4		4-5' GRAVEL, some, med-c.g. sand, dry, FILL coarse, hard
							5		5-5.5' SAA
		6-7' / 1.5 ppm					6		5.5-9.5 GRAVELLY SAND, poorly-sorted, 10% c.g. gravel, subang. up to 1.5" dia,
							7		very dk-grayish brown, fg-cg SAND, mostly med. sl. moist
							8		
		9-10' >1.5 ppm			GP-SB-09 (@1205 (9-10' BGS)		9		@ 9.5' bgs gravel layer subround-round coarse
		10-11' >1.9 ppm					10		10-12' SAND, med-grained, very dk grayish brown wet, 10-25% SILT content, fg-cg (occassional cg)
							11		~~Native TILL~~ RS
		12.5-13.5' / 1.9 ppm					12		12-14.5' SILT, minor to some vfg sand trace wood/cellulose/roots, wet, reducing odors
							13		soft, minor clay fines (trace plasticity), ~~native TILL~~ RS
		14.5-15' / 2.0 ppm					14		14.5-20' SAND, med-c.g. saturated ~~dry~~, dk brown
							15		to v. dk grayish brown, ~~loose~~ RS med. const. ~~NATIVE TILL~~ RS
		16-17' / 1.1 ppm					16		
							17		
							18		Set 1" 10-Slot PVC screen @ ~~19-2~~ RS 9-19' BGS
		19-20' / 1.6 ppm					19		
							20		

Ceased coring @ 20' bgs

LOCATION OF BORING

CRETE
CONSULTING INC

JOB NO	CLIENT	LOCATION DAWN FOODS	
DRILLING METHOD DPT 7800 Truck-Mount Geoprobe			BORING NO GP-SB-10
SAMPLING METHOD DPT MacroCore 2.25" core w/ sleeve			SHEET 1 OF 1

ft BGS

					DRILLING	
					START	FINISH
WATER LEVEL	11.1				TIME 1215	TIME 1255
TIME	~1550					
DATE	6.9.20				DATE 6.9.20	DATE 6.9.20
CASING DEPTH	PVC screen					

DATUM

ELEVATION

SURFACE CONDITIONS

SAMPLER TYPE	INS DRIVEN / RECOVERED	SAMPLE NO / DEPTH / PID (ppm)	BLOWS PER 6-INCHES	NO OF RINGS	Sample Condition	Drilling Action	DEPTH IN FEET	USCS	
							0		ASPHALT @ Surface, black, w/ aggregate 0.5-5' POOR RECOVERY (50%)
		1-2' 1.8 ppm					1		SAND w/ GRAVEL, poorly-sorted, vfg-cg, mostly fg-med, sl. moist, brown-med brown
							2		
							3		
		4-5' 2.3					4		
		5-7.5 2.8 ppm			GP-SB-10-08 @ 1300 (8-10' BGS)		5		5-10' POOR RECOVERY (30-40%) SAA, SAND w/ GRAVEL, mostly fg-med sl. moist, ~~dk brown~~ RS med-dk brown
							6		
		7.5-10' 2.7 ppm					7		
							8		
							9		
		10-12' 2.4 ppm					10		10-15' POOR RECOVERY (~45%) ~1' ft of SLOUGH
							11		10-15' ~~WET/SA~~ RS SAND, saturated, trace gravel, fg-cg, mostly fg-med, V. dk-grayish brown ~~NATIVE TILL~~ RS
							12		
		13-15' 2.5					13		
							14		
							15		15-20' GOOD RECOVERY SAA, saturated, v. dk grayish brown to gray/black, mostly med-cg Sand (sl. coarsening downward sequence) ~~NATIVE TILL~~ RS
		16-17' 2.6 ppm					16		
							17		
							18		Set 1-inch 10-Slot PVC @ 9-19 ft BGS
		19-20 2.1 ppm					19		
							20		Ceased coring @ 20' BGS

LOCATION OF BORING

CRETE CONSULTING INC

DATUM

ELEVATION

JOB NO

CLIENT

LOCATION DAWN FOODS

BORING NO GP-SB-11

SHEET 1 OF 1

DRILLING METHOD DPT (7800 Geoprobe)

SAMPLING METHOD MacroCore Tooling w/ Plastic Liners (5') 2.25" dia.

ft BGS

WATER LEVEL	8.9			
TIME	1435			
DATE	6.9.20			
CASING DEPTH	BOREHOLE			

DRILLING	
START	FINISH
TIME 1305	TIME 1415
DATE 6.9.20	DATE 6.9.20

SURFACE CONDITIONS

SAMPLER TYPE	DRIVEN / RECOVERED	SAMPLE NO / DEPTH / PID (ppm)	BLOWS PER 6-INCHES	NO OF RINGS	Sample Condition	Drilling Action	DEPTH IN FEET	USCS	
		0.5-1.5'					0		ASPHALT @ surface, black, w/ aggregate 0.5-5' FILL: Mixed SAND (fg-c.g.), subround
		5.9 ppm					1		GRAVEL, plastic, nails, sl. moist brown to black
		2-3' (plastic)					2		
		9.7 ppm					3		@ ~3-4' black plastic/polymer/synthetic debris sl. odor, melted/deformed by DPT tooling
		4-5'					4		
		9.4 ppm			GP-SB-11-04 (4-5' BGS) @1345		5		5-10' POOR RECOVERY (30-35%) Fill/disturbed SAND & GRAVEL (subround), mostly med-c.g. reddish brown to dk brown, sl. moist-moist
		5-7.5'					6		
		7.8 ppm					7		
		8.0' 7.5-10'					8		
		2.9 ppm					9		dk brown-dk gray-black
		10-12'					10		10-11 SAA, but saturated, subround GRAVEL up to 1.5" dia, minor brick fragments
		2.8 ppm					11		11-15' Likely NATIVE ~~FILL~~ RS SILTY SAND, fg-med, occ. SILTY CLAY pockets, saturated, dk gray to black
							12		trace v. small roots
		14-15'					13		10-15 ~60% recovery
		3.0 ppm					14		14-15' Inc. ROOT, CLAY, & SILT CONTENT tan to dk brown, wet ~~NATIVE FILL~~ RS
							15		
							16		Ceased coring at 15-ft BGS
							17		
							18		
							19		
							20		

LOCATION OF BORING

CRETE

JOB NO		CLIENT		LOCATION DAWN FOODS	
DRILLING METHOD DPT (7800 Series Geoprobe)				BORING NO GP-SB-12	
SAMPLING METHOD: 2.25" dia MacroCore Tooling using plastic liners				SHEET 1 OF 1	
ft BGS				DRILLING	
				START	FINISH
WATER LEVEL	9.2			TIME 1420	TIME 1520
TIME	~1445				
DATE	6.9.20			DATE 6.9.20	DATE 6.9.20
CASING DEPTH	BOREHOLE				

DATUM

ELEVATION

SAMPLER TYPE	INS DRIVEN / RECOVERED	SAMPLE NO / DEPTH PID	BLOWS PER 6-INCHES	NO OF RINGS	Sample Condition	Drilling Action	DEPTH IN FEET	USCS	SURFACE CONDITIONS
							0		ASPHALT @ surface, black 0.5-2.5 FILL/DISTURBED SOILS
		2-3' 1.6 ppm					1		SAND and GRAVEL, fq-cq, poorly-sorted sl. moist, reddish tan to dk brown
							2		subround gravel up to 1.0" dia 2.5-5 SILTY SAND, fq-med, sl. moist
							3		V.dk grayish brown
		4-5' 3.2 ppm			GP-SB-12-08.5 @ ~~1450~~ 1450 (8.5-9.5' BGS)		4		RT
							5		~~5-10'~~ SAA, minor gravel, fq-cq. sand, 5-9.5' mostly med, sl. moist, same colors
		6-7' 2.3 ppm					6		
							7		
		8.5-9.5' 2.2 ppm					8		
							9		@ 9.5' SILTY SAND inc SILT fines, vfq to med. wet, likely NATIVE
		10.5-12' 2.6 ppm					10		SLOUGH 10-15' SAA, mostly med. SAND, variable
							11		SILT & vfq content w/depth, saturated dark gray to black
							12		NO ROOTS OR GRAVEL, NO ODORS ~~NATIVE TILL~~ RT
							13		
		14-15' 2.2 ppm					14		
							15		
							16		Ceased coring @ 15 ft bgs
							17		
							18		
							19		
							20		

LOCATION OF BORING

CRETE CONSULTING INC

DATUM

ELEVATION

JOB NO

CLIENT

LOCATION DAWN FOODS

BORING NO GP-SB-13

SHEET 1 OF 1

DRILLING METHOD DPT
7800 Series Geoprobe

SAMPLING METHOD 2.25" dia plastic sleeves
inside MacroCore Tooling

ft BGS				
WATER LEVEL	9.2			
TIME	1655			
DATE	6.9.20			
CASING DEPTH	BOREHOLE			

DRILLING	
START	FINISH
TIME 1645	TIME 1735
DATE 6.9.20	DATE 6.9.20

SURFACE CONDITIONS

SAMPLER TYPE	INS DRIVEN / RECOVERED	SAMPLE NO / DEPTH	BLOWS PER 6-INCHES	NO OF RINGS	Sample Condition	Drilling Action	DEPTH IN FEET	USCS
		0.5-1.5 / 1.6ppm					0	
							1	
							2	
		3-4' / 1.7ppm					3	
		4.5-5' / 1.7 ppm					4	
							5	
		5.5-6.5 / 1.6 ppm			GP-SB-13-~~10~~ (10-11' BGS) @1715		6	
							7	
							8	
		9-10' / 1.8 ppm					9	
							10	
		10-11' / 7.1 ppm					11	
							12	
		12-13' / 2.3ppm					13	
							14	
		14-15' / 2.2 ppm					15	
							16	
							17	
							18	
							19	
							20	

ASPHALT @ surface, black, with aggregate

0.5-1.5 SAND and GRAVEL FILL, mixed, poorly sorted
med-c.g.

1.5-2.8 SAND, fg-med, sl. moist, reddish tan

2.8-3.2 SHELL FRAGMENTS, similar to eggshell
(CLAM?), misc. organic debris, sl. moist, tan

3.2-5 SANDY SILT, vfg-fg, variable consistency
(layering), sl. moist to moist, tan to gray
@ ~4' 2" moist to wet zone

5-5.8 SAA

5.8-10 SAND, med, some fg, trace subround c.g.
brown to black grains, moist
~~NATIVE TILL~~ RJ

@ ~8.5' bgs 3-4" SILT layer, gray

10-15' SAA, wet to saturated
~~NATIVE TILL~~ RJ

13-14.5' SILTY SEQENCE (SANDY SILT), gray,
wet

Ceased coring at 15-ft BGS

LOCATION OF BORING

CRETE

JOB NO

CLIENT

LOCATION DAWN FOODS

DRILLING METHOD DPT
7800 Series Geoprobe

BORING NO GP-SB-14

SHEET 1 OF 1

SAMPLING METHOD 2.25" dia sleeves (plastic) inside MacroCore Tubing

ft BGS

					DRILLING	
					START	FINISH
WATER LEVEL	8.8				TIME 1738	TIME 1818
TIME	1749					
DATE	6.9.20				DATE 6.9.20	DATE 6.9.20
CASING DEPTH	BOREHOLE					

DATUM

ELEVATION

SURFACE CONDITIONS

SAMPLER TYPE	INS DRIVEN / RECOVERED	SAMPLE NO / DEPTH / PID	BLOWS PER 6-INCHES	NO OF RINGS	Sample Condition	Drilling Action	DEPTH IN FEET	USCS	
							0		ASPHALT @ surface, black, w/ aggregate 0.5-1.5 Mixed SANDS and GRAVELS,
		1-2' 1.8 ppm					1		dry-sl. moist 1.5-3.5 SANDY SILT, tan/reddish brown,
		2.5-3.5' 1.7 ppm					2		vfg-fg SAND, sl. moist, @3.5' red oxidized seam of vfg-fg Sand
							3		3.5-5' SAND, fg-med, minor-some SILT,
		4-5' 1.5 ppm					4		brown to black, subround, trace c.g. sl. moist, beginning of undisturbed
		5-6' 1.0 ppm					5		5-10' SAA, moist rust red to dark brown to v.dk grayish bown
					GP-SB-14-11 @1800 (11-12' BGS)		6		~~NATIVE TILL~~ RT
		7.5-8.5' 0.8 ppm					7		@7.5-8.5' SILTY LAYER (SILT > SAND), tan, moist
							8		
		9-10' 3.6 ppm					9		
		11-12' 12.4 ppm					10		10-15' SAA, ~~vf~~ RT fg-c.g. (inc. subround c.g.) moist to wet
							11		~~NATIVE TILL~~ RT
		14-15' 4.5 ppm					12		13-14.5' SILTY SAND, wet (layer)
							13		14.5-15' black SAND, SAA
							14		
							15		Ceased coring at 15-ft BGS
							16		
							17		
							18		
							19		
							20		

LOCATION OF BORING

CRETE

JOB NO

CLIENT

LOCATION DAWN FOODS

BORING NO GP-SB-15

SHEET 1 OF 1

DRILLING METHOD DPT
7800 Series Geoprobe

SAMPLING METHOD 2.25" plastic sleeves
inside MacroCore Tooling

ft BGS					DRILLING	
					START	FINISH
WATER LEVEL	8.9				TIME 1819	TIME 1855
TIME	~1840					
DATE	6.9.20				DATE 6.9.20	DATE 6.9.20
CASING DEPTH	BOREHOLE					

DATUM

ELEVATION

SURFACE CONDITIONS

SAMPLER TYPE	INS DRIVEN / RECOVERED	SAMPLE NO / DEPTH PID	BLOWS PER 6-INCHES	NO OF RINGS	Sample Condition	Drilling Action	DEPTH IN FEET	USCS	
		1-2' 1.5 ppm					0		ASPHALT @ surface, black, w/ aggregate 0.5-1 SAND & GRAVEL FILL, dry
							1		1-2 SANDY SILT, tan, sl. moist, vfg SAND
		4-5' 1.5ppm					2		Z-5 SANDY SILT, vfg-fg sand, tan to gray-brown, sl. moist
							3		3.5-5 abundant SILT
							4		
						DUPLICATE	5		5-10' SILTY SAND, fg-med, trace-minor SILT, dk brown to dk gray, sl. moist to moist, subround
		6-7' 1.4ppm					6		~~NATIVE FILL~~ RJ
							7		
							8		
		9-10' 1.4' ppm					9		@ 9.8' 1" GRAVEL
		10-11' 14.9 ppm			GP-SB-15-10 @1845 (10-11' BGS)	GP-SB-1510-1D @1200 (10-11' BGS	10		10-15' SAd, mostly SAND, moist to wet, dk grey-black 10-13'-fg-cg. SAND, moist to wet, ~~NATIVE FILL~~ RJ
							11		13-14' inc. SILT, wet
		12.5-13.5' 3.7 ppm					12		
							13		
		14-15' 6.7 ppm					14		
							15		Ceased coring @ 15' BGS
							16		
							17		
							18		
							19		
							20		

Project: Dawn Food Products	Project Number: BRIDGE	Boring No. GP-SB-16	CRETE CONSULTING, INC.
Location: 6901 Fox Ave. S., Seattle WA		Client: BRIDGE	Sheet 1 of 1
Logged By: R. Jones	Date Started: 12/1/20 0750	Tooling: HydroScreen	Drilling Contractor: ESN Northwest
Drill Crew: Don Harnden	Date Completed: 12/1/20 0845	MacroCore MC5	Borehole Diameter:
USA Ticket Number:	Date Backfilled: Bentonite Chips		Drill Rig Type: Geoprobe 7800 (truck-mounted)
	Groundwater Depth (ft bgs): 9.5		Total Depth of Boring (ft bgs): 15

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time	Lithology/Notes
		6-7' ~~GP-SB-16-6-7~~ RJ 10-11'	— No PID MEASUREMENTS —	GP-SB-16-6-7 @ 0820 GP-SB-16-#11 @ 0815 GP-SB-16-1220 @ 0842	0-0.5' ASPHALT 0.5-3.8' SANDY SILT, vfg, moist, brown 3.8-10' SAND, vfg-med, moist, brown-black, black & brown grains, subround-round 10-15' SAA, wet, loose 10-11' tan-brown 11-15' black-brown *No unusual or appreciable odors*

Project: Dawn Food Products	Project Number:	Boring No. GP-SB-17	CRETE CONSULTING, INC.
Location: 6901 Fox Ave. S., Seattle, WA		Client: BRIDGE	Sheet 1 of 1
Logged By: R. Torres	Date — Started: 12.1.20 0850	Tooling: HydroScreen Tool	Drilling Contractor: ESN Northwest
Drill Crew: Don Harnden	Date — Completed: 12.1.20 0925	MacroCore MC5	Borehole Diameter:
USA Ticket Number:	Date — Backfilled: Bentonite Chips		Drill Rig Type: Truck-mounted Geoprobe 7800
	Groundwater Depth (ft bgs): 8.9		Total Depth of Boring (ft bgs): 15

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time	Lithology/Notes
			NO PID MEASUREMENTS		0-0.5 ASPHALT
		4-5'		GPSB-17-05 @ 0910	0.5-3.8' SANDY SILT, vfg, sl. moist to moist, brown
					3.8-10' SAND vfg-med, black & brown grains, moist, rounded @ ~9-9.5' Rust-red seam of med. SAND,
					10-15' SAND, fg-med, brown-black, wet/saturated, SAA, rounded
		9-10'		GPSB-17-10 @ 0915	
					No unusual or appreciable odors
				GPSB 17-1220 @ 0925	

Project: Dawn Food Products	Project Number:	Boring No. GP-SB-18	CRETE CONSULTING, INC.
Location: 6901 Fox Ave. S., Seattle, WA		Client: BRIDGE	Sheet 1 of 1
Logged By: R. Jones	Date Started: 12.1.20 0933	Tooling: HydroScreen Tool	Drilling Contractor: ESN Northwest
Drill Crew: Don Harnden	Date Completed: 12.1.20 1000	MacroCore MC5	Borehole Diameter:
USA Ticket Number:	Backfilled: Bentonite Chips		Drill Rig Type: Geoprobe 7800 Truck-Mount
	Groundwater Depth (ft bgs): 10.1		Total Depth of Boring (ft bgs): 15

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time	Lithology/Notes
			— No PID MEASUREMENTS —		0-0.5' ASPHALT
					0.5-2' FILL mixed soils, SILT, GRAVEL SEAM @ 1.2-1.5' bgs, black SILT SAND 1.5-2' bgs, dry-sl. moist
		2-3'		GP-SB18-03 @ 0950	2-4.8' SANDY SILT, vfg, dry-sl. moist 2-2.8 Rust orange color 2.8-4.8' Tan-brown, trace shells
					4.8-7' SILTY SAND, vfg-fg, moist, rounded
		~~8.5-9.5~~ 9-9.5'		GP-SB-18-09.5 @ 0955	7-10' SAND, vfg-med, moist, rounded, rust orange banding throughout
					10-15' SAND, fg-cg, wet, rounded, some rust orange discoloration @ 11' thin c.g. seam
					No unusual or appreciable odors.
				GP-SB18-1220 @ 1000	

Project: Dawn Food Products	Project Number:	Boring No. GP-SB19	**CRETE** CONSULTING, INC.
Location: 6901 Fox Ave. S., Seattle WA		Client: BRIDGE	Sheet 1 of 1
Logged By: R. Jones	Date — Started: 12-1-20 1008	Tooling: MacroCore MC5	Drilling Contractor: ESN Northwest
Drill Crew: Don Harnden	Date — Completed: 12-1-20 1045	HydroScreen Tool	Borehole Diameter:
USA Ticket Number:	Date — Backfilled: Bentonite Chips		Drill Rig Type: Geoprobe 7800 Truck Mount
	Groundwater Depth (ft bgs): 9.25		Total Depth of Boring (ft bgs): 15

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time	Lithology/Notes
					0-0.5' ASPHALT
					0.5-1' SAND and GRAVEL baserock, sl. moist
		3-3.5	No PID MEASUREMENTS	GP-SB-19-03.5 @ 1020	1-5' SAND, fg-med, trace c.g., round-subround, brown & black grains, sl. moist to moist
		8-8.5'		GP-SB-19-08.5 @ 1025	5-10' SAA, minor SILT, vfg-med, moist @ ~8.5' WET
					10-13.3' SAND, fg-med, saturated, dk brown, rounded, no c.g. trace reducing/decomp. odors
					13.3-15' SANDY SILT, med. firm, ~~mst~~ RJ wet, brown, trace black streaks (org.)
					No unusual or appreciable odors.
				GP-SB-19-1220 @ 1030	

Project: Dawn Food Products	Project Number: BRIDGE	Boring No. GP-SB-20	CRETE CONSULTING, INC
Location: 6901 Fox Ave. S., Seattle WA		Client: BRIDGE	Sheet 1 of 1
Logged By: R. Jones	Date — Started: 12.1.2020 1050	Tooling: MacroCore MC5	Drilling Contractor: ESN Northwest
Drill Crew: Don Harnden	Date — Completed: 12.1.2020 1159	HydroScreen Tool	Borehole Diameter:
USA Ticket Number:	Date — Backfilled: Bentonite Chips		Drill Rig Type: Truck Mounted GeoProbe 7800
	Groundwater Depth (ft bgs): Per Rod ~10' bgs 9.3' w/ WL		Total Depth of Boring (ft bgs): ~15

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time	Lithology/Notes
					Installed a temporary well at location with 3/4" PVC, 5-ft pre-pack filter pack (7-12' bgs). Hole backfilled/collapsed readily.
					0-0.5' ASPHALT
		3.5-4.5	No PID Measurements	GP-SB-20-04.5 @ 1105	0.5-5' Mixed FILL, SILTY SAND and GRAVEL, fg-cg., gravel up to 1.25" subround to round, Sl. moist, browns (Gravel & Sand)
		~~8-9~~	7-9' (poor recovery)	GP-SB-20-09 @ 1110	5-10' SAA, moist by 8', trace roots/wood @ 9' bgs Limited Recovery <50%
					10-15' <40% Recovery (WOOD in DPT shoe) SAA, GRAVELLY SAND, Round gravel but fractures w/ DPT hammer to angular, black fg basaltic gravel moist to wet
					No unusual odors or appreciable identifiable odors.
				GP-SB-20-1220 @ 1150	

Project: Dawn Food Products	Project Number:	Boring No. GP-SB-21	CRETE CONSULTING, INC
Location: 6901 Fox Ave S., Seattle, WA		Client: BRIDGE	Sheet 1 of 1
Logged By: K. Jones	Date — Started: 12.1.20 1205	Tooling: HydroScreen Tool	Drilling Contractor: ESN Northwest
Drill Crew: Don Harnden	Date — Completed: 12.1.20 ~1245/50	MacroCore MC5	Borehole Diameter:
USA Ticket Number:	Backfilled: Bentonite Chips		Drill Rig Type: Truck Mounted GeoProbe 7800
	Groundwater Depth (ft bgs): 7.9		Total Depth of Boring (ft bgs): 15

Depth (feet)		Sample Depth	PID (ppm) MiniRAE 3000	Sample ID, Depth, Time	Lithology/Notes
		3-5'	1.4	GP-SB-21-05 @1230 (3-5')	0-0.5' ASPHALT 0-5' CORE —> ~40% RECOVERY 0.5-5' Mixed FILL, GRAVELLY SAND, fg-c.g., brown-black, moist fractured rocks/gravel from DPT, otherwise round-subround
		5-7.5'	1.6		5-10' Mostly SAND, Fill (trace brick fragment), some gravel, moist fg-c.g., moist to wet, brown to reddish brown
		7.5-10'	1.2	GPSB-21-10 @1235 (7.5-10')	10-12' ~~SAA~~ RJ SAA, ~~wet~~ RJ trace wood chips, WET/SATURATED
		10-12'	1.4		12-15' SANDY SILT, wet, fg-med, brown, trace WOOD fibers @ 14-15 MORE SAND than SILT, dk gray
		12-13'	1.7		*No distinct odor, no appreciable odors indicating contamination.*
				GP-SB-21-1220 @1240	

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Project: Dawn Food Products
Project Number:
Boring No. GP-SB-22
Location: 6901 Fox Ave. S., Seattle, WA
Client: BRIDGE
Sheet 1 of 1
Logged By: R. Jones
Date
Started: 12.1.20 ~1250
Tooling: HydroScreen Tool
Drilling Contractor: ESN Northwest
Drill Crew: Don Harnden
Completed: 12.1.20 1301
MacroCore MC5
Borehole Diameter:
USA Ticket Number:
Backfilled: Bentonite Chips
Drill Rig Type: Truck-Mounted GeoProbe 7800
Groundwater Depth (ft bgs): 9
Total Depth of Boring (ft bgs): 13'

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time
		5-7'	1.7	GP-SB-22-07 @ 1315
		7-9'	2.0	GP-SB-22-09 @1320
		9-10'	0.9	
		10-12'	0.9	
		12-13'	0.8	
				GP-SB-22-1220 @1339

Lithology/Notes

0-0.5' ASPHALT
0-5' CORE -> ~25% RECOVERY
0.5-5' GRAVELLY SAND, FILL, med-c.g. ~~dry~~ RJ sl. moist, brown to black grains

5-10' <50% RECOVERY
GRAVELLY SAND, moist, FILL, mixed soils/origins, pocket of black-stained sand @ 7-9' Range
@ 9' WET, brown

10-10.2 SLOUGH RJ
~~10.2-RJ~~
10-12' SOUPY, LOOSE SAND, SATURATED, med-g., dk brown
12-13' GRAVELLY SAND, saturated, dk brown, gravel ang./fragmented by DPT

Refusal @ 13' bgs

Project: Dawn Food Products	Project Number:	Boring No. GP-SB-23-	CRETE CONSULTING, INC Sheet 1 of 1
Location: 6901 Fox Ave S., Seattle, WA		Client: BRIDGE	
Logged By: R. Jones	Date Started: 12.1.20 ~1408	Tooling: 3/4" PVC tem well	Drilling Contractor: ESN Northwest
Drill Crew: Don Harnden	Date Completed: 12.1.20 1558	Pre-Pack Screen / Filter	Borehole Diameter:
USA Ticket Number:	Date Backfilled: Bentonite Chips	MacroCore MCS	Drill Rig Type: Truck-Mounted GeoProbe 7800
	Groundwater Depth (ft bgs): 8.5		Total Depth of Boring (ft bgs): 13.5

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time
		0.5-3'	0.5	
		3-5'	1.1	GP-SB-23-05 @1430
		5-8'	0.8	
		8-10'	0.4	
		10-11'	1.4	GP-SB-23-11 @ 1435
				GP-SB-23-1220 @ 1534

Lithology/Notes

0-0.5' ASPHALT

0-5' CORE ~50% Recovery

0.5-5' FILL, mixed GRAVELLY SAND, dry-sl. moist, med-c.g. mostly

5-10' CORE ≤50% Rec.

5-10' SAA, moist, browns to black

@ ~8-9' wet, brown

10-13.5' GRAVELLY SAND, med-c.g., wet, mixed soils
trace brick fragment, mostly Rd gravel

Refusal @ 13.5' bgs

No unusual odors or distinct, appreciable odors.

Project: Dawn Food Products	Project Number:	Boring No. GP-SB-24	CRETE CONSULTING, INC
Location: 6901 Fox Ave S., Seattle, WA		Client: BRIDGE	Sheet 1 of 1
Logged By: R. Jones	Date — Started: 12.1.20 1640	Tooling: MacroCore MC5	Drilling Contractor: ESN Northwest
Drill Crew: Don Harnden	Date — Completed: 12.1.20 1735	HydroScreen Tool	Borehole Diameter:
USA Ticket Number:	Date — Backfilled: Bentonite Chips		Drill Rig Type: Truck-Mounted GeoProbe 7800
	Groundwater Depth (ft bgs): ~9		Total Depth of Boring (ft bgs): 15'

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time
		3-4'	1.6	
		4-5'	1.9	
		5-7.5'	1.4	
		7.5-10'	2.6	GP-SB-24-10 @1650
		10-12'	3.4	GP-SB-24- @1655
		13-15'	3.1	GP-SB-24-1220 @1718

Lithology/Notes

0-0.5' ASPHALT

0.5-5' FILL, GRAVELLY SAND fg-cg, poorly-sorted, dry, trace brick fragments, browns

5-10' Poor Recovery 40-50%
5-10' SAA, dry-sl. moist, no brick, GRAVELLY SAND, mostly fg-med

10-15' SAA, but w/ pockets of weathered ASPHALT, maybe trace COAL, "dense" per DPT driller, wet

*Ceased coring @ 15' bgs

Project: Dawn Food Products	Project Number:	Boring No. GP-SB-25	CRETE CONSULTING, INC.
Location: 6901 Fox Ave S. Seattle, WA		Client: BRIDGE	Sheet 1 of 1
Logged By: R. Jones	Date — Started: 12/5/20 0745	Tooling: 4-ft core barrel	Drilling Contractor: ESN Northwest
Drill Crew: Casey Newman	Date — Completed: 12/5/20 ~0930	PVC temp. well (3/4" PVC)	Borehole Diameter:
USA Ticket Number:	Date — Backfilled: Bentonite Chips	no filter pack	Drill Rig Type: AMS Power Probe 9100
MiniRAE 3000+	Groundwater Depth (ft bgs): below concrete floor 12.22, 12.25 @ GWS		Total Depth of Boring (ft bgs): ~~20~~ RJ 20.05 in PVC

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time
		0-4'	0.7	
		6-8'	7.4	GP-SB-25-08 @ 0915
		12-13.5'	2.3	GP-SB-25-13.5 @ 0920
		14-16'	1.2	
		16-20'	1.7	GP-SB-25-12.22 @ 0935

Lithology/Notes

Location inside building through foundation and FILL below building
4-ft pushes (cores)

0-0.5' CONCRETE, ~4-5" thick, no rebar
0.5-4' GRAVELY SAND FILL, well-graded, sl. moist, vfg-cg, minor silts
~55% Recovery

4-8' ~50% Recovery
4-6' SAA, dry
6-8' Mostly SAND, fg-med, dry, some GRAVEL, brown, FILL, well-sorted, variable GRAVELs (mixed origins, incl. conglomerates)
@ 7.5-8' Dark brown to black SAND, TILL FILL

8-12' No Recovery

12-16' ~75% Recovery, used Catcher on sampler
12-12.5' SAA or SLOUGH
12.5-16' SILTY SAND, no gravel, moist, inc. SILT w/ depth, native
vfg-med, mostly fg, minor to some WOOD FIBERS, round grains

16-20' Little Recovery ~≤5-10%

16-20' SLOUGH (dry GRAVELLY SAND) and SAA little, moist to wet,
abundant wood fibers in SILTY SAND

Boring cave-in/slough @ ~7/8'. Drillers re-push location w/
expendable point to set temp PVC for water sampling

Cease DPT @ 20' BGS

Project: Dawn Food Products	Project Number:	Boring No. GP-SB-26	**CRETE** CONSULTING, INC. Sheet 1 of 1
Location: 6901 Fox Ave. S., Seattle, WA		Client: BRIDGE	
Logged By: R. Jones	Date — Started: 12.5.20 ~0930	Tooling: 4-ft Core Barrel	Drilling Contractor: ESN Northwest
Drill Crew: Casey Newman	Date — Completed: 12.5.20 1030	No temp well	Borehole Diameter:
USA Ticket Number:	Date — Backfilled: Bentonite Chips		Drill Rig Type: AMS Power Probe 9100
MiniRAE 3000+	Groundwater Depth (ft bgs): Below concrete floor ~13.43		Total Depth of Boring (ft bgs): ~16

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time
		2-4'	1.8	GP-SB-26-06 @ 1010
		4-6'	2.2	
		6-8'	1.3	
		10-12'	3.0	GP-SB26-12 @ 1015
		~14-16'	2.5	No water sample

Lithology/Notes

4-ft CORES

0-0.5' CONCRETE
0.5-4' FILL, SAND
0.5-1.5' brown, sl. moist, ~~med~~ RJ fg-med trace GRAVEL
1.5-2.5' Tan-Green, SAA, minor GRAVEL, Rd sand and GRAVEL
2.5-4' GRAVELLY SAND, tan-brown, sl. moist, fg-c.g., sl. cohesive

4-6.3' SAA, fg-med, sl. moist, subround - Rd sand & Gravel
6.3-6.5' SILT seam, firm, sl. moist - moist, brown w/ rust-orange mottling
6.5-8' SAND, ~~[illegible]~~ RJ some GRAVEL, both subrd - Rd, sl. moist
@ 7' ~~weathered ASPHALT seam or~~ RJ black SAND seam, med., sl. moist

8-12' 60% Recovery
~8-10' SILTY SAND, fg-med, brown, subRd, sl. moist
~@ 9.5-10.5' GRAVELLY
10.5-12' SAND, minor GRAVEL, both subrd - rd, sl. moist - moist, med

12-16' <50% Rec.
~12-14' SAA or SLOUGH
~14-16' SAND fg - med, some c.g., wet, dk brown, subrd - rd
trace subrd black GRAVEL

Ceased DPT @ 16' BGS

Project: Dawn Food Products	Project Number:	Boring No. GP-SB-27	CRETE CONSULTING, INC.
Location: 6901 Fox Ave S., Seattle, WA		Client: BRIDGE	Sheet 1 of 1
Logged By: R. Jones	Date — Started: 12.5.20 1110	Tooling: 4-ft Core Barrels	Drilling Contractor: ESN Northwest
Drill Crew: Casey Newman	Date — Completed: 12.5.20 1235	3/4" PVC temp well	Borehole Diameter:
USA Ticket Number:	Date — Backfilled: Bentonite Chips	screened ~14-19' BGS	Drill Rig Type: AMS Power Prober 9100
MiniRAE 3000+	Groundwater Depth (ft bgs): 12.63 in well	WELL TD@ ~19.3' BGS	Total Depth of Boring (ft bgs):

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time
		0-4'	Mixed FILL 1.3	
		6-8'	1.8	GP-SB-27-08 @ ~~1230~~ 1220
		11-12'	1.8	GP-SB-27-12 @ 1225
		12-14.5'	2.0	
		GP-SB-27-14.5 @ 1230		GP-SB-27-1220 @ 1235 MOSTLY CLEAR

Lithology/Notes

*BGS is concrete floor surface
Barometric P 30.10" Hg
4-ft Core Barrels

0-0.5 Concrete
0.5-4' SILTY, GRAVELLY SAND, vfg-med
0.5-3' Tan-gray, sl. moist, ~~well~~ RT well-graded, subrd-rd
~3-4', dk brown, little to no silt, fg-cg., trace glass

4-8' ~70% Rec.
4-5' SAA, dec. GRAVEL
5-8' No appreciable GRAVEL, SAND, Rd-subrd, dry, med-c.g., trace vfg, dk brown-black, mixed grain colors
@ ~5.8' rust red seam, some cementation, ~1-2 cm thick

8-12' 90-95% Rec.
8-11.1' SAND, SAA, med-c.g., sl. moist, dk brown, mixed grains, no cohesion/cementation
11.1-12' SILTY SAND, fg-med., fining down, sl. moist-moist, dk brown

12-16' ~90% Rec., some SLOUGH (dry SAND)
12 to ~14.5' SAA, moist
@ ~14/14.5' moist to wet
14.5-16' minor SILT, wet SAND, med-cg, some vcg, subrd cg

Ceased coring @ 16' BGS (core sleeves), but DPT to 20' BGS.

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Project: Dawn Food Products	Project Number:	Boring No. GP-SB-28	Sheet 1 of 1
Location: 6901 Fox Ave. S., Seattle, WA		Client: BRIDGE	
Logged By: R. Jones	Date — Started: 12.5.20 1230	Tooling: 4-ft core barrels	Drilling Contractor: ESN Northwest
Drill Crew: ~~Don H~~ RJ Casey Newman	Date — Completed: 12.5.20 1315	3/4" PVC temp well	Borehole Diameter:
USA Ticket Number:	Date — Backfilled: Bentonite Chips	w/ no filter pack	Drill Rig Type: AMS Power Probe 9100
MiniRAE 3000	Groundwater Depth (ft bgs): BELOW CONCRETE FLOOR 12.78', 12.75' post-sample		Total Depth of Boring (ft bgs): Temp well TD @ 20.01' CONCRETE

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time	Lithology/Notes
					4-ft CORES
		2-4'	1.7	GP-SB-28-04 @ 1300	0-0.5 CONCRETE 0.5-4 50-60% Rec. SILTY SAND w/ GRAVEL, sl. moist-moist, fg-med, tan-brown, Gravel up to 1.5" (Rd-subround), trace brick fragment/chip
		6-8'	1.9	GP-SB-28-08 @ 1305	4-8 70-80% Rec 4-4.8' SAA 4.8-8' SAND, med-cg, sl. moist, loose, mixed grains (colors, origins), dk browns
		11.2-12'	2.9	GP-SB-28-12 @ 1310	8-12' 90-95% Rec, 8-11.2' SAA @ 11.2' Rusty orange seam, mineralization, trace cementation, moist 11.2-12' SILT, moist, dk brown, some vfg-fg SAND, soft-med. const.
		12-13	NM	GP SB-28-13 @ 1315	12-16' ~1-ft SLOUGH (dry SAND) 12-14.7' SAA sl. inc. SAND content WET 14.7-16' SILTY SAND to SAND, med-c.g., WET, dk brown-black @ 15.9-16' Rusty RED-ORANGE discoloration
				GP-SB-28-1220 @ 1330 CLOUDY	16-20' NOT CORED
					DPT to 20' BGS, cored to 16' BGS

Project: Dawn Food Products	Project Number:	Boring No. GP-SB-29	CRETE CONSULTING, INC.
Location: 6901 Fox Ave. S., Seattle, WA		Client: BRIDGE	Sheet 1 of 1
Logged By: K. Jones	Date — Started: 12.5.20 1320	Tooling: 4-ft Core Barrels	Drilling Contractor: ESN Northwest
Drill Crew: Casey Newman	Date — Completed: 12.5.20 ~1445	3/4" PVC temp well	Borehole Diameter:
USA Ticket Number:	Date — Backfilled: Bentonite Chips	no filter pack	Drill Rig Type: Free-Standing AMS PowerProbe 9100
MiniRAE 3000+	Groundwater Depth (ft bgs): BELOW CONCRETE FLOOR 12.81' Before GWS ~12.80' After GWS		Total Depth of Boring (ft bgs): CONCRETE PVC (well) TD @15.65

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time
		5.2-6.5'	0.8	GP-SB-29-6.5 @1405
		9.5-10.5'	1.7	GP-SB-29-10.5 @1410
		11-12'	2.5	GP-SB-29-12 @1415
				GP-SB-29-122C @1440 CLEAR

Lithology/Notes

Purge 1426-1436 (for 10-min). Clear @ sampletime.
Tubing intake @ ~13.5' BGS

4-ft Core Barrels

0-0.5 CONCRETE

0.5-4' ~80% Rec.
Well-graded FILL, GRAVELLY SAND, ~~ft~~ fg med-c.g. sl. moist
tan to browns, mostly subrd - rd (gravel & sand), trace brick fragments
4-4.6 SAA or SLOUGH
4.6-5.2 SAND, fg-med, dk brown - black, dry - sl. moist

5.2-8' SAND vfg-fg, dry - sl moist, tan - light brown,
well-sorted

8-11' SAA sl. moist to wet, Minor rust-orange mottling
@ 10.8' WET
@ 11' Inc. grain size med c.g
@ 11.7 med-c.g. SAND, dk brown - black (mixed grains) moist, wet (well-drained)
WETEST Interval @ 10.8-11.7'

12-16' 80% Rec.
12-16 SAND, med-c.g, dk brown - black, wet, subrd - rd
mixed grain colors/origins, coarsening downward
@ ~13' GRAVELLY SEAM (~3" thick)
@ 14.6' trace subrd-Rd GRAVEL (≤1.5 cm), c.g. - v.c.g.

Ceased DPT & coring at 16' BGS.

Project: Dawn Food Products	Project Number:	Boring No. GP-SB-30	**CRETE** CONSULTING, INC.
Location: 6901 Fox Ave. S., Seattle, WA		Client: BRIDGE	Sheet 1 of 1
Logged By: R. Jones (Crete)	Date — Started: 12.12.2020 0830	Tooling: 4-ft core barrels	Drilling Contractor: ESN Northwest
Drill Crew: Casey Newman, Don Harden	Date — Completed: 12.12.2020 1040	Screened ~11.5-15.5'	Borehole Diameter:
USA Ticket Number:	Date — Backfilled: Bentonite Chips	re-usable 4' metal screen	Drill Rig Type: AMS Power Probe 9100 P
MiniRAE 3000+	Groundwater Depth (ft bgs): 13.1, 11.8' BGS post-GWS	BELOW CONCRETE	Total Depth of Boring (ft bgs): ~16

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time
		~~0-4~~ ft	0.5-4' 5.2	GP-SB30-05.5 (1) ~~@10~~ @1005
		4-5.5'	6.8	
		7-8'	5.0	GP-SB-30-08 (1) @1010
		9-10'	3.9	
		~~11.6~~-12'	6.2	
		12.5-13.3	8.2	GP-SB-30-13.3 (1) @1015
		15-16'	4.7	
				GP-SB-30-1220 ~~@1330~~ @1030 (3)

Lithology/Notes

0-0.5' CONCRETE, concrete slab here is typically 5-7" thick
0.5-4' ~25% Recovery (POOR)
GRAVELLY SAND, vfg-med, sl. moist, and GRAVELLY SILT, browns-black

4-5.5' SANDY SILT, dry-sl. moist, dk. Brown-black, vfg-fg SAND, generally non-cohesive

5.5-8' SAND, vfg-fg, dry-sl. moist, subround-round, medium brown, mostly loose

8-12' ~75-80% Rec.
8-11.6' SAA, fg, loose to med. firm consistency, sl. moist-moist
11.6-12' SAND, med., trace c.g., moist, dk brown-black, subrd-Rd.

12-16' ~85-90% Rec.
12-16' SAA, coarsening downward sequence
12-12.5' SAA, med-c.g., moist
12.5-13.3' c.g., trace vcg., moist to wet, well-drained, subrd-rd
13.3-16' cg-v.cg., subrd-rd, wet/drained

Project: Dawn Food Products	Project Number:	Boring No. GP-SB-31	CRETE CONSULTING, INC. Sheet 1 of 1
Location: 6901 Fox Ave S. Seattle, WA		Client: BRIDGE	
Logged By: R. Jones	Date — Started: 12.12.20 1030	Tooling: 4-ft core barrel	Drilling Contractor: ESN Northwest
Drill Crew: Casey Newman, D. Harnden	Completed: 12.12.20 1140	temp screen ("HydroTool")	Borehole Diameter:
USA Ticket Number:	Backfilled: Bentonite Chips	(→ ~12-16' BGS (slab)	Drill Rig Type: AMS Power Probe 9100-P
MiniRAE 3000+	Groundwater Depth (ft bgs): BELOW SLAB 12.96' BGS (initial) 11.97' BGS after GWS		Total Depth of Boring (ft bgs): ~16

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time
		2-3.5'	10.8	GP-SB-31-06 @1115 (6)
		4.5-6'	11.1	
		7-8'	9.6	GP-SB-31-08 @1120 (1)
		9-10.7'	7.2	
		10.7-12'	7.7	GP-SB-31-14 @1125 (5)
		12.5-14'	9.0	
		15-16'	6.8	
				GP-SB-31-1220 @~~12-R~~ (6) @1135

Lithology/Notes

0-0.5' CONCRETE slab

0.5-4' FILL, mixed SANDY SILT, vfg-fg, trace med., dry, sl. cohesive pockets of GRAVEL (@ 3.5-3.8' BGS), dk brown-browns

4-4.5' SAA or SLOUGH
4.5-7' SILT/SAND ~50/50, dry, vfg SAND, some fg, sl. cohesive, browns
~7-8' More SAND, vfg-fg, some med., abundant ~~SILT~~ fines, dry-sl. moist

8-12' 90-95% Rec.
8-10.7' SAA fg SAND, trace-minor med., firm consistency, sl. moist, tan-med. brown
10.7-12' SAND, med, subrd-rd, black & brown grains, sl. moist to moist

12-16' ~85-95% Rec.
12-12.5' SAA, moist
12.5-16' Coarsening downward sequence, SAND, med-cg, ~~trace~~ minor vfg, subrd-rd, moist-wet, dk brown-black

Project: Dawn Food Products	Project Number:	Boring No. GP-SB-32	CRETE CONSULTING, INC.
Location: 6901 Fox Ave S, Seattle, WA		Client: BRIDGE	Sheet 1 of 1
Logged By: R. Jones	Date Started: 12.12.20 1125	Tooling: 4-ft core barrels	Drilling Contractor: ESN Northwest
Drill Crew: Casey Newman, Don Harnden	Date Completed: 12.12.20 ~1230	Screen (HydroTool)@~11.60-15.60	Borehole Diameter:
USA Ticket Number:	Backfilled: Bentonite Chips		Drill Rig Type: AMS PowerProbe 9100-P
MiniRAE 3000+	Groundwater Depth (ft bgs): BELOW SLAB 11.83' 12.90' BGS (slab) after GWS		Total Depth of Boring (ft bgs): ~16

Depth (feet)		Sample Depth	PID (ppm)	Sample ID, Depth, Time
		2-4'	12.7	GP-SB-32-04 @ 1200 (5)
		5-6'	8.5	
		7-8'	7.4	
		8.5-10.3'	7.8	GPSB-32-06 @ 1205 (1)
		10.3-12'	5.9	GPSB-32-12 @1210 (5)
		12.5-14	5.1	
		14-16	5.0	GP-SB-32-1220 @ 1215 (6)

Lithology/Notes

0-0.5 CONCRETE slab
0-4 100% Rec.
0-4' SANDY SILT, vfg-med, minor-some GRAVEL pockets, sl. moist, brown-dk brown

4-8' 90% Rec.
Similiar As Above
4-8' SANDY SILT becoming SILTY SAND by ~5' vfg-fg, sl. moist, dk brown-brown, trace to no GRAVEL,
5-8' SANDY mostly, vfg, minor some SILT, SAA

8-12' 70-75% Rec.
8-10.3' SAA, coarsening downward sequence, sl. moist to moist
@~10.3' SAND, no SILT, med-c.g., trace vfg, dk brown-black, subrd-rd, moist, well drained

12-16' ~70% Rec.
Coarsening downward sequence
12-16' SAND, moist to wet, drained, subrd-rd, dk brown-black, med-c.g., some vfg
~14' c.g-vfg

Project: Dawn R.I.	Project Number:	Boring No. RI-SB-01	**CRETE** CONSULTING, INC.
cation: 6901 Fox Avenue S, Seattle		Client: BRIDGE	Sheet 1 of 1
Logged By: R. Jones	Date Started: 12.18.2021 0850	Tooling: AMS Power Probe 9100-P	Drilling Contractor: ESN Northwest
Drill Crew: Don Hardin	Date Completed: 12.18.2021 1045	4' Core Barrels	Borehole Diameter: ~3-inch
USA Ticket Number:	Backfilled: Bentonite Chips		Drill Rig Type: Kubota/AMS Power Probe
	Groundwater Depth (ft bgs): 11.37' Initial FLOOR 11.48' AFTER		Total Depth of Boring (ft bgs): 20 ft below FLOOR

Depth (feet)	Recovery (~%)	Sample Depth	PID (ppm)	Sample ID, Depth, Time	Lithology/Notes
					Inside warehouse, perpendicular to Dock #13, 14' straight from door
	70%	0.5-4'	0.5-2' 2.5 2-4' 2.5		5" CONCRETE SLAB (inside warehouse) ~~0-4'~~ 0.5-4' GRAVELLY SAND, fq-vcq, tan-med. brown, sl. moist, subrd gravel + sand, mostly med-q.
	60%	4-8'	4-6' 2.8 6-8' 2.4		4-4.8' SAA 4.8-8 SAND, med-q., dk brown-black grains, mostly dry, loose trace c.q.
	60%	8-12'	~8-10 3.1 ~10-12' 2.2	RI-SB-01-10 8-10' @1010	8-12' SAA, dry-sl. moist, moist @ ~11-11.5', loose-med.
	100%	12-16'	12.5-14' 2.5 14-16' 1.5	RI-SB-01-14 12.5-14' @ 1015	12-12.5' SLOUGH 12.5-13.6' SAA, moist-wet, medium-firm, vfq-med., no cq, dk brown 13.6-16' SILTY SAND - vfq-med abundant vfq-fq, w/ minor WOOD, ROOTS, wet, firm, dk tan to brown
	100%	16-20'	16-18' 2.7 18-20' 2.2	RI-SB-01 (grab GW) @ 1030	16-18.7' SAND, fq-med, saturated, dk-brown-black, uniform, subrd, firm 18.7-20' SILTY SAND, vfq, some small roots and wood debris, native, moist-wet, dk tan, stiff, some cohesiveness. Temporary Well: 10' Screen, 10-Slot, screened ~~~9-10~~ RJ ~9-19' bgs FLOOR 3/4" PVC Grab GW sample → purged for ~10-15' minutes prior to sampling

Project: Dawn R.I.	Project Number:	Boring No. RI-SB-02	**CRETE** CONSULTING, INC.
cation: 6901 Fox Ave. S, Seattle, WA		Client: BRIDGE	Sheet 1 of 1
Logged By: R. Jones	Date Started: 12.18.2021 1035	Tooling: 4' Core barrels	Drilling Contractor: ESN Northwest
Drill Crew: Don Hardin	Date Completed: 12.18.2021 1155		Borehole Diameter: ~3"
USA Ticket Number:	Date Backfilled: Bentonite Chips		Drill Rig Type: AMS Power Probe 9100-P
	Groundwater Depth (ft bgs): INITIAL 11.4 FINAL ~11.65'		Total Depth of Boring (ft bgs): 20 ft below FLOOR

Lithology/Notes

Pendicular to loading dock #D7, 41-48' from draw door and 10.5' from pedestrian door by stairs.
Near wooden stairs

Depth (feet)	Recovery (%)	Sample Depth	PID (ppm)	Sample ID, Depth, Time	Lithology/Notes
					~.5' CONCRETE (Building slab)
	75%	0-4'	0.5-2' 2.4 2-4' 1.5		0.5-4' GRAVELLY SAND, fg-vcg, (med-cg), dry - sl. moist, ~~tan-gray~~ light brown, small - med gravel, subrd, FILL
	60-65	4-8'	4-6' 1.9 6-8' 2.9	RI-SB-02-08 @1145 (6-8')	4-8' SAND, med-vcg, subrd, trace-minor small subrd gravel, dry - sl. moist, dk brown + black mixed grains
	75	8-12'	8-10' 2.9 10-12' 3.7	RI-SB-02-12 @1155	8-12' SAA, loose, sl. moist, trace subrd cherty gravel moist @ ~11.5' BGS
	65-70	12-16'	12-16' 3.4	DUP-121821S @0825 ⟶	12-16' Most of core was SLOUGH - dry loose SAND as above lower ~1.5' core ⟶ SAND, wet, med-cg, dk brown-black, firm
	85	16-20'	16-18.5' 2.4 18.5-20' 3.0	RI-SB-02 @1215	~~16 ft~~ RT 16-16.4' SLOUGH 16.4-18.5' SAND, SAA, wet, med-cg, dk brown-black, ~~firm~~ RT 18.5-20' SILTY SAND, wet vfg-fg, trace roots/wood, firm, tan - med. brown
				DUP-121821W @0830	Temporary Well 3/4-inch PVC, no filter pack 10-slot screen (10-ft), Screened ~9-19' BGS FLOOR Grab GW sample

Project: Dawn R.T.	Project Number:	Boring No. R1-SB03	**CRETE** CONSULTING, INC.
cation: 6901 Fox Ave S., Seattle WA		Client: BRIDGE	Sheet 1 of 1
Logged By: R. Jones	Date Started: 12.18.2021 1200	Tooling: 4' core barrel	Drilling Contractor: ESN Northwest
Drill Crew: Don Harnden	Date Completed: 12.18.2021 1315		Borehole Diameter: ~3"
USA Ticket Number:	Date Backfilled: Bentonite Chips		Drill Rig Type: AMS Power Probe 9100-P
	Groundwater Depth (ft bgs): N/A		Total Depth of Boring (ft bgs): 20 ft below FLOOR

Depth (feet)	Recovery (~%)	Sample Depth	PID (ppm)	Sample ID, Depth, Time	Lithology/Notes
					~5" CONCRETE
	75%	0-4	0.5-2 2.5		0-4' GRAVELLY SAND, fg-vcg (mostly med-cg), dry, tan-light brown, subrd
	< 5%	4-4'	2-4' 3.0	R1-SB03-4 @ 1315	@ ~4' Refusal per Driller 4+ core had SAA sand (slough), and trace brick & mortar residuals in the core barrel tip *No backup location cored in building slab.*

Project: Bridge Point Seattle 130	Project Desc. Remedial Investigation	Boring ID RI-SB-04	**CRETE** CONSULTING, INC Sheet 1 of 1
Location: 6901 Fox Ave S, Seattle WA		Client: Bridge Industrial	
Logged By: Rusty Jones (CRETE)	Date — Started: 2/28/23 0755	Tooling: MacroCore MC5	Drilling Contractor: Holt Services / Cody Henderson
Drill Crew: Cody Henderson	Date — Completed: 2/28/23 0918		Borehole Diameter: 2-3"
Blake Oliver	Date — Backfilled: Bentonite Chips		Drill Rig Type: Geoprobe 7800
	Groundwater Depth (ft bgs): 8.62' BGS @ 0911 (after GWS)		Total Depth of Boring (ft bgs): 20

Depth (feet)	Sample Depth	PID (ppm)	Recovery (%)	Sample ID, Depth, Time	Lithology/Notes
					DUP-022823 @ 0700 1 FBI
0-5	2-4' 4-5'	264.3 2.2	75%	RI-SB-04 2-4' @ 0850	ASPHALT ~6" (5) 1 FBI (HOLD) 0.5-5' SAND, fg-med, minor SILT, minor GRAVEL, ~~st.~~ moist, dk tan-brown, pockets brick fragments, gray clay @ 1.9', 4.7', WOOD, lower (4.7') piece well-decomposed, mild "sweet" indistinct smell
5-10'	6-7' 9-10'	1.0 0.0	90%	RI-SB-04 6-7' @ 0855	1 FBI 5-10' SAND, fg-med, consistent litho, moist, well-drained, dk brown and black grains, rd-well rd @ 9.5-10' some SILT, moist-wet
10-15'	11-12' 13-14.5'	0.0 0.3	90%	RI-SB-04 11-12' @ 0900	1 FBI 10-11' SAA, saturated, dk tan - browns 11-11.5' SILTY SAND, layering... light gray and light tan, NATIVE, saturated, pockets gray fg SAND, no odors 11.5'-14.6' SILTY CLAY w/ small pockets (minor) fg gray SAND, wet, some ROOTS and small decomposed WOODY DEBRIS, no to low plasticity 14.6-15' SAND, med-g, med. gray, wet
15-20	14.5-15.5	0.1	95%		15-20' SAA, medium-dk gray, subang-sbrd, no appreciable organics
				RI-SB-04 @ 0910	2 @ BAL 3 @ FAB F/U Grab GW ~~tracRS~~ sample from temp well, screened 10-20' bgs, tubing @ 19-20' BGS, 3/4" PVC, Pre-purged 6 liters pH 6.41 SpC 2.13 mS/cm temp 50.6 °F turb. 40.7 NTU

CRETE CONSULTING, INC.

Project: Bridge Point Seattle 130	Project Desc. Remedial Investigation	Boring ID RI-SB-05	Sheet 1 of 1
Location: 6901 Fox Ave S, Seattle WA		Client: Bridge Industrial	
Logged By: Rusty Jones (CRETE)	Date – Started: 2.28.23 0925	Tooling: MacroCore MC5	Drilling Contractor: Holt Services
Drill Crew: Cody Henderson	Date – Completed: 2.28.23 1035		Borehole Diameter: 2-3"
	Date – Backfilled: Bentonite Chips		Drill Rig Type: Truck-mount Geoprobe 7800
	Groundwater Depth (ft bgs): 8.85 (pre-purge)		Total Depth of Boring (ft bgs): 20

Depth (feet)	Sample Depth	PID (ppm)	Recovery (%)	Sample ID, Depth, Time
0-5'	1-3'	0.0	70-75	
	3-5'	0.0		
5-10	6-8'	0.0	80-85	
	9-10'	0.0		RI-SB05 9-10' @1005 1 FBI
10-15	10-12'	0.0	90-95	
	12.5-14	0.0		RI-SB-05 12.5-14' @1010 1 FBI
15-20'	15-16.5'	0.0	90	
	19-20'	0.0		
				RI-SB-05 @1020 #2 BAL(U/F) 3 FBI

Lithology/Notes

ASPHALT ≤ 6"

0.5-1.3' Mixed GRAVELLY SAND, some CLAY clumps (FILL)
sl. moist, dk brown, med-cg

1.3-5' SAND, med-cg, dk brown, moist, subang-subrd

5-7.5' SAA

7.5-10' SAND mostly med, pockets of dense fg SAND w/ some SILT, dk brown, moist
pocket vfg gray SAND @ 9.9', moist to wet

10-12.5' SAND fg-med, dk gray, wet, loose-med.
@12' Indication of disturbed interface (mixed litho clump from 12' & 13' bgs)

12.5-15' SILT & SAND (fg) layering, dk tan-brown, wet, packets of dec. WOODY DEBRIS

15-20' slough @ top
15-17' SAA no wood
17-20' SAA but mostly SAND, fg, layers, dk gray wet
SILT dk gray too
@ 19.3' trace WOODY DEBRIS
@ 19.3-20' SAND, fg-med, wet, dk gray

Grab GW sample 3/4" PVC
Screen interval 5-20' bgs
pH 6.85
SpC 1.15 mS/cm
temp 48.6 °F
turb. 83.9 NTU (pre) 35.0 NTU (post-sampling)

Project: Bridge Point Seattle 130	Project Desc. Remedial Investigation	Boring ID RI-SB-06	CRETE CONSULTING, INC. Sheet 1 of 1
Location: 6901 Fox Ave S, Seattle WA		Client: Bridge Industrial	
Logged By: Rusty Jones (CRETE)	Date – Started: 2/28/2023 1245	Tooling: Macrocore MCS	Drilling Contractor: Holt Services
Drill Crew: Cody Henderson	Date – Completed: 2/28/2023 1349		Borehole Diameter: 2-3"
	Date – Backfilled: Bentonite Chip		Drill Rig Type: GeoProbe 7800 (truck-mounted)
	Groundwater Depth (ft bgs): 9.09 (pre-purge)		Total Depth of Boring (ft bgs): 20

Depth (feet)	Sample Depth	PID (ppm)	Recovery (%)	Sample ID, Depth, Time
0-5	1-3' 3-5'	0.0 0.0	65%	
5-10'	6-8 9-10'	0.0 0.1	80%	RI-SB-06 6-8' @1320 1 FBI
10-15'	10.5-12' 12.5-13.5	0.1 0.1	90-95%	RI-SB-06 12.5-13.5' @ 1325 1 FBI
15-20'	15-17'	0.0	95-100%	
				RI-SB-06 @ 1330 2 BAL W/A 3 FBI

Lithology/Notes

CONCRETE

0.5-1 Sandy GRAVEL, ang-subang

1-5' SAND, med-cg, dk brown-black, subang-subrd, moist

5-9.6' SAA, moist
9.6-9.8' SAND med-cg, black, moist
9.8-10' SILT, w/ vfg SAND (abundant), moist, dk tan/med-brown

10-10.5' Slough; SAA w/ minor subrd gravel

10.5-13.2' CLAYEY SILT non-plastic, moist-wet, small organic pockets (≤0.5cm)
minor SAND layering (vfg-fg)

13.2-~~15'~~ 14.5' SAND, med, dk brown, wet-saturated

14.5-15' SILTY SAND vfg, dk tan/med brown, wet
(yellowish algal or slime seam inbetween)

15-20' SAND, med-cg, dk brown w/ black grains, saturated
subang-subrd

Grab GW sample from temp well 3/4" PVC
Screened 5-20' bgs
pH 6.90
SpC 0.72 mS/cm
temp 49.3 °F
turb pre-sample 69.3 NTU post-sample 57.7 NTU

Appendix C

Recent Analytical Data Reports

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

March 9, 2022

Crete Consulting
ATTN: Rusty Jones
16300 Christensen Road, Suite 214
Tukwila, WA 98188

832-330-1359
rusty.jones@creteconsulting.com

RE: Project CRC-SE2101 Client Project: Dawn/Bunge Foods RI

Revision 1:

Following the submission of the original report on February 28, 2022, an error was identified in the narrative of the report. The original report indicated that capsule filters were provided by BAL for field sampling. The capsule filters were provided by the client instead. In this revised report, capsule filters statement is removed from the report narrative. No other changes have been made, with respect to the original report issued on February 28, 2022.

Rusty Jones,

On February 2, 2022, Brooks Applied Labs (BAL) received eight (8) aqueous samples in a sealed cooler at a temperature of 2.5°C. The samples were logged-in for total recoverable and dissolved (*arsenic [As], cadmium [Cd], chromium [Cr], copper [Cu], lead [Pb], and zinc [Zn]*) analyses, according to the issued quotation. Samples for dissolved analyses were 0.45µm filtered prior to receipt and all sample fractions were preserved to a pH <2 upon receipt at BAL.

A filter blank was submitted (laboratory ID 2202028-05) and analyzed for dissolved (As, Cd, Cr, Cu, Pb, and Zn). (As, Cd, Cr, Cu, Pb, and Zn) results for 2202028-05 were less than the MDL (*not detected*).

Total Recoverable and Dissolved (As, Cd, Cr, Cu, Pb, and Zn) Quantitation by ICP-QQQ-MS

Each aqueous sample fraction for total recoverable or dissolved Se was digested in a closed vessel (bomb) with nitric and hydrochloric acids. The resulting digests were analyzed for (*As, Cd, Cr, Cu, Pb, and Zn*) content via inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS instrumentation uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the Interference Reduction Technology section on our website, brooksapplied.com.

Batch B220262

Sample results were *not* method blank corrected, as described in the calculations section of the relevant BAL SOPs. All results were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the analyte concentration of a standard reference material (SRM) is not certified but instead has been listed only as an informational value by the certifying agency, the recovery limits have been set as not applicable (N/A). In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL, the relative percent difference (RPD) was not calculated (**N/C**).

The copper result for the first method blank, identified as B220262-BLK1, is greater than the MRL and is a statistical outlier according to the Grubbs test. All samples are evaluated against the Grubbs outlier. Client samples with copper results than ten times the level of the Grubbs outlier were re-digested and analyzed in a separate sequence. The remaining samples reported from B220262 yielded results less than the MRL for copper or results were greater than ten times the method blank hit in B220262-BLK1. The impact of the copper method blank outlier is negligible. No data were qualified, and no corrective actions were necessary.

Zinc results for 2202028-08 and 2202028-09 were greater than the value of the associated high calibration standard in sequence S220176. A high calibration verification (S220176-HCV1) standard was analyzed at 200.0 µg/L and the zinc recovery was acceptable at 106%, demonstrating that the linear range of the analytical platform extended to 200.0 µg/L for zinc. All reported zinc results were less than 200.0 µg/L at the instrument and thus within the linear range demonstrated by the HCV. No corrective actions were deemed necessary, and no data were qualified.

Batch B220339
Sample results were *not* method blank corrected, as described in the calculations section of the relevant BAL SOPs. All results were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the analyte concentration of a standard reference material (SRM) is not certified but instead has been listed only as an informational value by the certifying agency, the recovery limits have been set as not applicable (N/A). In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL, the relative percent difference (RPD) was not calculated (**N/C**).

All data was reported without qualification, aside from concentration qualifiers. All associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information, please see the *Report Information* page in your report. Please feel free to contact us if you have any questions regarding this report.

Sincerely,

Jeremy Maute
Senior Project Manager
Brooks Applied Labs
Jeremy@brooksapplied.com

Report Information

Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/> or review Tables 1 and 2 in our Accreditation Information. Results reported relate only to the samples listed in the report.

Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

Common Abbreviations

AR	as received	**MS**	matrix spike
BAL	Brooks Applied Labs	**MSD**	matrix spike duplicate
BLK	method blank	**ND**	non-detect
BS	blank spike	**NR**	non-reportable
CAL	calibration standard	**N/C**	not calculated
CCB	continuing calibration blank	**PS**	post preparation spike
CCV	continuing calibration verification	**REC**	percent recovery
COC	chain of custody record	**RPD**	relative percent difference
D	dissolved fraction	**SCV**	secondary calibration verification
DUP	duplicate	**SOP**	standard operating procedure
IBL	instrument blank	**SRM**	reference material
ICV	initial calibration verification	**T**	total fraction
MDL	method detection limit	**TR**	total recoverable fraction
MRL	method reporting limit		

Definition of Data Qualifiers

(Effective 3/23/2020)

E	An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
H	Holding time and/or preservation requirements not met. Please see narrative for explanation.
J	Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
J-1	Estimated value. A full explanation is presented in the narrative.
M	Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N	Spike recovery was not within acceptance criteria. Please see narrative for explanation.
R	Rejected, unusable value. A full explanation is presented in the narrative.
U	Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
X	Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.
Z	Holding time and/or preservation requirements not established for this method; however, BAL recommendations for holding time were not followed. Please see narrative for explanation.

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.

Accreditation Information

Table 1. Accredited method/matrix/analytes for TNI

Issued by: State of Florida Dept. of Health (The NELAC Institute 2016 Standard)

Issued on: July 1, 2021; Valid to: June 30, 2022

Certificate Number: E87982-37

Method	Matrix	TNI Accredited Analyte(s)
EPA 1638	Non-Potable Waters	Ag, Cd, Cu, Ni, Pb, Sb, Se, Tl, Zn
EPA 200.8	Non-Potable Waters	Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
EPA 6020	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
	Solids/Chemicals & Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn
BAL-5000	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn, Hardness
	Solids/Chemicals	Ag, As, B, Be, Cd, Co, Cr, Cu, Pb, Mo, Ni, Sb, Se, Sn, Sr, Tl, V, Zn
	Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Tl, V, Zn
EPA 1640	Non-Potable Waters	Cd, Cu, Pb, Ni, Zn
EPA 1631E	Non-Potable Waters, Solids/Chemicals & Biological	Total Mercury
EPA 1630	Non-Potable Waters	Methyl Mercury
BAL-3200	Solids/Chemicals & Biological	Methyl Mercury
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs
BAL-4201	Non-Potable Waters	Se(IV), Se(VI)
BAL-4300	Non-Potable Waters Solid/Chemicals	Cr(VI)
SM2340B	Non-Potable Waters	Hardness

Accreditation Information

Table 2. Accredited method/matrix/analytes for ISO (1), Non-Governmental TNI (2)

Issued by: ANAB

Issued on: September 21, 2021; Valid to: March 30, 2024

Method	**Matrix**	**ISO and Non-Gov. TNI Accredited Analyte(s)**
EPA 1638 Mod EPA 200.8 Mod EPA 6020 Mod BAL-5000	Non-Potable Waters	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn
	Solids/Chemicals & Biological	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, V, Zn Hg (Biological Only)
EPA 1640 Mod	Non-Potable Waters	Cd, Cu, Pb, Ni, Zn Ag, As, Cr, Co, Se, Tl, V (ISO Only)
EPA 1631E Mod BAL-3100	Non-Potable Waters, Solids/Chemicals & Biological/Food	Total Mercury
EPA 1630 Mod BAL-3200	Non-Potable Waters, Solids/Chemicals Biological	Methyl Mercury
EPA 1632A Mod BAL-3300	Non-Potable Waters	Inorganic Arsenic (ISO Only)
	Biological/Food Solids/Chemicals	Inorganic Arsenic (ISO Only)
AOAC 2015.01 Mod BAL-5000	Food	As, Cd, Hg, Pb
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs
	Biological by BAL-4117	Inorganic Arsenic, DMAs, MMAs (ISO Only)
BAL-4101	Food by BAL-4117	Inorganic Arsenic, DMAs, MMAs (ISO Only)
BAL-4201	Non-Potable Waters	Se(IV), Se(VI), SeCN, SeMet
BAL-4300	Non-Potable Waters, Solid/Chemicals	Cr(VI)
SM 3500-Fe BAL-4500	Non-Potable Waters	Fe, Fe(II) (ISO Only)
SM2340B	Non-Potable Waters	Hardness
SM 2540G BAL-0501	Solids/Chemicals & Biological	% Dry Weight

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
MW-3-0122	2202028-01	Water	Sample	01/30/2022	02/02/2022
MW-3-0122	2202028-02	Water	Sample	01/30/2022	02/02/2022
MW-6-0122	2202028-03	Water	Sample	01/30/2022	02/02/2022
MW-6-0122	2202028-04	Water	Sample	01/30/2022	02/02/2022
FILTER BLANK	2202028-05	Water	Filter Blank	01/31/2022	02/02/2022
MW-2-0122	2202028-06	Water	Sample	01/31/2022	02/02/2022
MW-2-0122	2202028-07	Water	Sample	01/31/2022	02/02/2022
MW-5-0122	2202028-08	Water	Sample	01/31/2022	02/02/2022
MW-5-0122	2202028-09	Water	Sample	01/31/2022	02/02/2022
DUP-0222	2202028-10	Water	Sample	02/01/2022	02/02/2022
MW-1-0222	2202028-11	Water	Sample	02/01/2022	02/02/2022
DUP-0222	2202028-12	Water	Sample	02/01/2022	02/02/2022
MW-1-0222	2202028-13	Water	Sample	02/01/2022	02/02/2022
MW-4-0222	2202028-14	Water	Sample	02/02/2022	02/02/2022
MW-4-0222	2202028-15	Water	Sample	02/02/2022	02/02/2022

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
As	Water	EPA 1638 Mod	02/10/2022	02/10/2022	B220262	S220176
Cd	Water	EPA 1638 Mod	02/10/2022	02/10/2022	B220262	S220176
Cr	Water	EPA 1638 Mod	02/10/2022	02/10/2022	B220262	S220176
Cu	Water	EPA 1638 Mod	02/10/2022	02/10/2022	B220262	S220176
Cu	Water	EPA 1638 Mod	02/17/2022	02/18/2022	B220339	S220209
Pb	Water	EPA 1638 Mod	02/10/2022	02/10/2022	B220262	S220176
Zn	Water	EPA 1638 Mod	02/10/2022	02/10/2022	B220262	S220176

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW-3-0122										
2202028-01	As	Water	D	3.06		0.227	1.82	µg/L	B220262	S220176
2202028-01	Cd	Water	D	0.168	J	0.152	0.455	µg/L	B220262	S220176
2202028-01	Cr	Water	D	≤ 4.29	U	4.29	15.2	µg/L	B220262	S220176
2202028-01	Cu	Water	D	1.09	J	1.01	2.53	µg/L	B220262	S220176
2202028-01	Pb	Water	D	≤ 0.101	U	0.101	0.303	µg/L	B220262	S220176
2202028-01	Zn	Water	D	≤ 17.7	U	17.7	55.6	µg/L	B220262	S220176
MW-3-0122										
2202028-02	As	Water	TR	4.10		0.227	1.82	µg/L	B220262	S220176
2202028-02	Cd	Water	TR	0.221	J	0.152	0.455	µg/L	B220262	S220176
2202028-02	Cr	Water	TR	≤ 4.29	U	4.29	15.2	µg/L	B220262	S220176
2202028-02	Cu	Water	TR	6.18		1.01	2.53	µg/L	B220339	S220209
2202028-02	Pb	Water	TR	1.49		0.101	0.303	µg/L	B220262	S220176
2202028-02	Zn	Water	TR	≤ 17.7	U	17.7	55.6	µg/L	B220262	S220176
MW-6-0122										
2202028-03	As	Water	D	0.286	J	0.227	1.82	µg/L	B220262	S220176
2202028-03	Cd	Water	D	≤ 0.152	U	0.152	0.455	µg/L	B220262	S220176
2202028-03	Cr	Water	D	≤ 4.29	U	4.29	15.2	µg/L	B220262	S220176
2202028-03	Cu	Water	D	≤ 1.01	U	1.01	2.53	µg/L	B220262	S220176
2202028-03	Pb	Water	D	≤ 0.101	U	0.101	0.303	µg/L	B220262	S220176
2202028-03	Zn	Water	D	≤ 17.7	U	17.7	55.6	µg/L	B220262	S220176
MW-6-0122										
2202028-04	As	Water	TR	0.504	J	0.227	1.82	µg/L	B220262	S220176
2202028-04	Cd	Water	TR	≤ 0.152	U	0.152	0.455	µg/L	B220262	S220176
2202028-04	Cr	Water	TR	≤ 4.29	U	4.29	15.2	µg/L	B220262	S220176
2202028-04	Cu	Water	TR	≤ 1.01	U	1.01	2.53	µg/L	B220262	S220176
2202028-04	Pb	Water	TR	≤ 0.101	U	0.101	0.303	µg/L	B220262	S220176
2202028-04	Zn	Water	TR	≤ 17.7	U	17.7	55.6	µg/L	B220262	S220176
FILTER BLANK										
2202028-05	As	Water	D	≤ 0.091	U	0.091	0.727	µg/L	B220262	S220176
2202028-05	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B220262	S220176
2202028-05	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B220262	S220176
2202028-05	Cu	Water	D	≤ 0.404	U	0.404	1.01	µg/L	B220262	S220176
2202028-05	Pb	Water	D	≤ 0.040	U	0.040	0.121	µg/L	B220262	S220176
2202028-05	Zn	Water	D	≤ 7.07	U	7.07	22.2	µg/L	B220262	S220176

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW-2-0122										
2202028-06	As	Water	TR	3.14		0.091	0.727	µg/L	B220262	S220176
2202028-06	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B220262	S220176
2202028-06	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B220262	S220176
2202028-06	Cu	Water	TR	1.10		0.404	1.01	µg/L	B220339	S220209
2202028-06	Pb	Water	TR	0.081	J	0.040	0.121	µg/L	B220262	S220176
2202028-06	Zn	Water	TR	≤ 7.07	U	7.07	22.2	µg/L	B220262	S220176
MW-2-0122										
2202028-07	As	Water	D	3.37		0.091	0.727	µg/L	B220262	S220176
2202028-07	Cd	Water	D	0.071	J	0.061	0.182	µg/L	B220262	S220176
2202028-07	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B220262	S220176
2202028-07	Cu	Water	D	1.13		0.404	1.01	µg/L	B220339	S220209
2202028-07	Pb	Water	D	≤ 0.040	U	0.040	0.121	µg/L	B220262	S220176
2202028-07	Zn	Water	D	≤ 7.07	U	7.07	22.2	µg/L	B220262	S220176
MW-5-0122										
2202028-08	As	Water	TR	2.08		0.091	0.727	µg/L	B220262	S220176
2202028-08	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B220262	S220176
2202028-08	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B220262	S220176
2202028-08	Cu	Water	TR	1.30		0.404	1.01	µg/L	B220339	S220209
2202028-08	Pb	Water	TR	2.09		0.040	0.121	µg/L	B220262	S220176
2202028-08	Zn	Water	TR	1930		7.07	22.2	µg/L	B220262	S220176
MW-5-0122										
2202028-09	As	Water	D	1.98		0.091	0.727	µg/L	B220262	S220176
2202028-09	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B220262	S220176
2202028-09	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B220262	S220176
2202028-09	Cu	Water	D	≤ 0.404	U	0.404	1.01	µg/L	B220262	S220176
2202028-09	Pb	Water	D	0.147		0.040	0.121	µg/L	B220262	S220176
2202028-09	Zn	Water	D	1880		7.07	22.2	µg/L	B220262	S220176
DUP-0222										
2202028-10	As	Water	TR	0.590	J	0.091	0.727	µg/L	B220262	S220176
2202028-10	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B220262	S220176
2202028-10	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B220262	S220176
2202028-10	Cu	Water	TR	≤ 0.404	U	0.404	1.01	µg/L	B220262	S220176
2202028-10	Pb	Water	TR	≤ 0.040	U	0.040	0.121	µg/L	B220262	S220176
2202028-10	Zn	Water	TR	531		7.07	22.2	µg/L	B220262	S220176

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW-1-0222										
2202028-11	As	Water	TR	1.70		0.091	0.727	µg/L	B220262	S220176
2202028-11	Cd	Water	TR	0.179	J	0.061	0.182	µg/L	B220262	S220176
2202028-11	Cr	Water	TR	2.27	J	1.72	6.06	µg/L	B220262	S220176
2202028-11	Cu	Water	TR	4.12		0.404	1.01	µg/L	B220339	S220209
2202028-11	Pb	Water	TR	0.332		0.040	0.121	µg/L	B220262	S220176
2202028-11	Zn	Water	TR	278		7.07	22.2	µg/L	B220262	S220176
DUP-0222										
2202028-12	As	Water	D	0.564	J	0.091	0.727	µg/L	B220262	S220176
2202028-12	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B220262	S220176
2202028-12	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B220262	S220176
2202028-12	Cu	Water	D	0.635	J	0.404	1.01	µg/L	B220262	S220176
2202028-12	Pb	Water	D	≤ 0.040	U	0.040	0.121	µg/L	B220262	S220176
2202028-12	Zn	Water	D	516		7.07	22.2	µg/L	B220262	S220176
MW-1-0222										
2202028-13	As	Water	D	1.23		0.091	0.727	µg/L	B220262	S220176
2202028-13	Cd	Water	D	0.175	J	0.061	0.182	µg/L	B220262	S220176
2202028-13	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B220262	S220176
2202028-13	Cu	Water	D	2.30		0.404	1.01	µg/L	B220339	S220209
2202028-13	Pb	Water	D	≤ 0.040	U	0.040	0.121	µg/L	B220262	S220176
2202028-13	Zn	Water	D	260		7.07	22.2	µg/L	B220262	S220176
MW-4-0222										
2202028-14	As	Water	TR	0.586	J	0.091	0.727	µg/L	B220262	S220176
2202028-14	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B220262	S220176
2202028-14	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B220262	S220176
2202028-14	Cu	Water	TR	≤ 0.404	U	0.404	1.01	µg/L	B220262	S220176
2202028-14	Pb	Water	TR	≤ 0.040	U	0.040	0.121	µg/L	B220262	S220176
2202028-14	Zn	Water	TR	535		7.07	22.2	µg/L	B220262	S220176
MW-4-0222										
2202028-15	As	Water	D	0.645	J	0.091	0.727	µg/L	B220262	S220176
2202028-15	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B220262	S220176
2202028-15	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B220262	S220176
2202028-15	Cu	Water	D	0.626	J	0.404	1.01	µg/L	B220262	S220176
2202028-15	Pb	Water	D	≤ 0.040	U	0.040	0.121	µg/L	B220262	S220176
2202028-15	Zn	Water	D	515		7.07	22.2	µg/L	B220262	S220176

Accuracy & Precision Summary

Batch: B220262
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits	
B220262-BS1	**Blank Spike, (2116054)**								
	As		277.8	208.7	µg/L	75%	75-125		
	Cd		27.78	24.38	µg/L	88%	75-125		
	Cr		277.8	226.2	µg/L	81%	75-125		
	Cu		277.8	246.7	µg/L	89%	75-125		
	Pb		27.78	24.46	µg/L	88%	75-125		
	Zn		277.8	208.4	µg/L	75%	75-125		
B220262-SRM1	**Reference Material (2145005, TMDA 51.5 Reference Standard - Bottle 4 - SRM)**								
	As		16.70	14.94	µg/L	89%	75-125		
	Cd		25.70	27.04	µg/L	105%	75-125		
	Pb		63.70	69.67	µg/L	109%	75-125		
B220262-SRM2	**Reference Material (2145005, TMDA 51.5 Reference Standard - Bottle 4 - SRM)**								
	Cr		65.10	65.52	µg/L	101%	75-125		
	Cu		77.40	81.92	µg/L	106%	75-125		
B220262-DUP1	**Duplicate, (2202028-06)**								
	As	3.144		3.144	µg/L			0.005%	20
	Cd	ND		ND	µg/L			N/C	20
	Cr	ND		ND	µg/L			N/C	20
	Pb	0.081		0.074	µg/L			10%	20
	Zn	ND		ND	µg/L			N/C	20
B220262-MS1	**Matrix Spike, (2202028-06)**								
	As	3.144	280.6	279.7	µg/L	99%	75-125		
	Cd	ND	28.06	29.52	µg/L	105%	75-125		
	Cr	ND	280.6	291.7	µg/L	104%	75-125		
	Pb	0.081	28.06	28.15	µg/L	100%	75-125		
	Zn	ND	280.6	260.1	µg/L	93%	75-125		
B220262-MSD1	**Matrix Spike Duplicate, (2202028-06)**								
	As	3.144	280.6	272.8	µg/L	96%	75-125	3%	20
	Cd	ND	28.06	28.76	µg/L	102%	75-125	3%	20
	Cr	ND	280.6	293.3	µg/L	105%	75-125	0.5%	20
	Pb	0.081	28.06	27.71	µg/L	98%	75-125	2%	20
	Zn	ND	280.6	258.9	µg/L	92%	75-125	0.5%	20

Accuracy & Precision Summary

Batch: B220262
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B220262-DUP2	**Duplicate, (2202028-14)**						
	As	0.586		0.602	µg/L		3% 20
	Cd	ND		ND	µg/L		N/C 20
	Cr	ND		ND	µg/L		N/C 20
	Cu	ND		ND	µg/L		N/C 20
	Pb	ND		ND	µg/L		N/C 20
	Zn	534.9		529.1	µg/L		1% 20
B220262-MS2	**Matrix Spike, (2202028-14)**						
	As	0.586	280.6	258.9	µg/L	92% 75-125	
	Cd	ND	28.06	29.44	µg/L	105% 75-125	
	Cr	ND	280.6	272.5	µg/L	97% 75-125	
	Cu	ND	280.6	288.8	µg/L	103% 75-125	
	Pb	ND	28.06	28.85	µg/L	103% 75-125	
	Zn	534.9	280.6	775.4	µg/L	86% 75-125	
B220262-MSD2	**Matrix Spike Duplicate, (2202028-14)**						
	As	0.586	280.6	255.0	µg/L	91% 75-125	2% 20
	Cd	ND	28.06	29.31	µg/L	104% 75-125	0.4% 20
	Cr	ND	280.6	268.2	µg/L	96% 75-125	2% 20
	Cu	ND	280.6	282.0	µg/L	101% 75-125	2% 20
	Pb	ND	28.06	28.30	µg/L	101% 75-125	2% 20
	Zn	534.9	280.6	767.4	µg/L	83% 75-125	1% 20

Accuracy & Precision Summary

Batch: B220339
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B220339-BS1	**Blank Spike, (2116054)**						
	Cu		277.8	278.6	µg/L	100% 75-125	
B220339-SRM1	**Reference Material (2145007, TMDA 51.5 Reference Standard - Bottle 6 - SRM)**						
	Cu		77.40	85.40	µg/L	110% 75-125	
B220339-DUP1	**Duplicate, (2202028-02)**						
	Cu	6.178		5.746	µg/L		7% 20
B220339-MS1	**Matrix Spike, (2202028-02)**						
	Cu	6.178	280.6	291.2	µg/L	102% 75-125	
B220339-MSD1	**Matrix Spike Duplicate, (2202028-02)**						
	Cu	6.178	280.6	318.7	µg/L	111% 75-125	9% 20

Method Blanks & Reporting Limits

Batch: B220262
Matrix: Water
Method: EPA 1638 Mod
Analyte: As

Sample	Result	Units
B220262-BLK1	0.001	µg/L
B220262-BLK2	0.001	µg/L
B220262-BLK3	0.001	µg/L
B220262-BLK4	0.003	µg/L

Average: 0.002 **MDL:** 0.009
Limit: 0.072 **MRL:** 0.072

Analyte: Cd

Sample	Result	Units
B220262-BLK1	-0.0003	µg/L
B220262-BLK2	0.0004	µg/L
B220262-BLK3	-0.0002	µg/L
B220262-BLK4	-0.0003	µg/L

Average: 0.000 **MDL:** 0.006
Limit: 0.018 **MRL:** 0.018

Analyte: Cr

Sample	Result	Units
B220262-BLK1	0.004	µg/L
B220262-BLK2	0.004	µg/L
B220262-BLK3	0.00005	µg/L
B220262-BLK4	0.012	µg/L

Average: 0.005 **MDL:** 0.170
Limit: 0.600 **MRL:** 0.600

Method Blanks & Reporting Limits

Analyte: Cu

Sample	Result	Units
B220262-BLK1	*0.607*	µg/L
B220262-BLK2	-0.004	µg/L
B220262-BLK3	-0.004	µg/L
B220262-BLK4	-0.003	µg/L

Average: *0.149*
Limit: 0.100

MDL: 0.040
MRL: 0.100

Analyte: Pb

Sample	Result	Units
B220262-BLK1	0.001	µg/L
B220262-BLK2	0.0005	µg/L
B220262-BLK3	-0.00003	µg/L
B220262-BLK4	0.0002	µg/L

Average: 0.000
Limit: 0.012

MDL: 0.004
MRL: 0.012

Analyte: Zn

Sample	Result	Units
B220262-BLK1	0.306	µg/L
B220262-BLK2	0.103	µg/L
B220262-BLK3	0.025	µg/L
B220262-BLK4	-0.011	µg/L

Average: 0.106
Limit: 2.200

MDL: 0.700
MRL: 2.20

Method Blanks & Reporting Limits

Batch: B220339
Matrix: Water
Method: EPA 1638 Mod
Analyte: Cu

Sample	Result	Units
B220339-BLK1	-0.004	µg/L
B220339-BLK2	-0.002	µg/L
B220339-BLK3	0.003	µg/L
B220339-BLK4	0.0001	µg/L

Average: -0.001
Limit: 0.100

MDL: 0.040
MRL: 0.100

Sample Containers

Lab ID: 2202028-01
Sample: MW-3-0122
Report Matrix: Water
Sample Type: Sample
Collected: 01/30/2022
Received: 02/02/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028
B	XTRA_VOL	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028

Lab ID: 2202028-02
Sample: MW-3-0122
Report Matrix: Water
Sample Type: Sample
Collected: 01/30/2022
Received: 02/02/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028
B	XTRA_VOL	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028

Lab ID: 2202028-03
Sample: MW-6-0122
Report Matrix: Water
Sample Type: Sample
Collected: 01/30/2022
Received: 02/02/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028
B	XTRA_VOL	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028

Lab ID: 2202028-04
Sample: MW-6-0122
Report Matrix: Water
Sample Type: Sample
Collected: 01/30/2022
Received: 02/02/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028
B	XTRA_VOL	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028

Lab ID: 2202028-05
Sample: FILTER BLANK
Report Matrix: Water
Sample Type: Filter Blank
Collected: 01/31/2022
Received: 02/02/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028

Sample Containers

Lab ID: 2202028-06
Sample: MW-2-0122
Report Matrix: Water
Sample Type: Sample
Collected: 01/31/2022
Received: 02/02/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028

Lab ID: 2202028-07
Sample: MW-2-0122
Report Matrix: Water
Sample Type: Sample
Collected: 01/31/2022
Received: 02/02/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028

Lab ID: 2202028-08
Sample: MW-5-0122
Report Matrix: Water
Sample Type: Sample
Collected: 01/31/2022
Received: 02/02/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028

Lab ID: 2202028-09
Sample: MW-5-0122
Report Matrix: Water
Sample Type: Sample
Collected: 01/31/2022
Received: 02/02/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028

Lab ID: 2202028-10
Sample: DUP-0222
Report Matrix: Water
Sample Type: Sample
Collected: 02/01/2022
Received: 02/02/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028

Lab ID: 2202028-11
Sample: MW-1-0222
Report Matrix: Water
Sample Type: Sample
Collected: 02/01/2022
Received: 02/02/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028

Sample Containers

Lab ID: 2202028-12
Sample: DUP-0222
Report Matrix: Water
Sample Type: Sample
Collected: 02/01/2022
Received: 02/02/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028

Lab ID: 2202028-13
Sample: MW-1-0222
Report Matrix: Water
Sample Type: Sample
Collected: 02/01/2022
Received: 02/02/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028

Lab ID: 2202028-14
Sample: MW-4-0222
Report Matrix: Water
Sample Type: Sample
Collected: 02/02/2022
Received: 02/02/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028

Lab ID: 2202028-15
Sample: MW-4-0222
Report Matrix: Water
Sample Type: Sample
Collected: 02/02/2022
Received: 02/02/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2127026	1	Cooler - 2202028

Shipping Containers

Cooler - 2202028

Received: February 2, 2022 12:28
Tracking No: NA via Courier
Coolant Type: Ice
Temperature: 2.5 °C

Description: Cooler
Damaged in transit? No
Returned to client? No
Comments: IR-30

Custody seals present? No
Custody seals intact? No
COC present? Yes

BROOKS APPLIED LABS

Chain-of-Custody Form

Ship samples to:
18804 North Creek Parkway, Suite 100
Bothell, WA 98011

For BAL use only
Received by: HM *Date:* 2/2/22
Work Order ID: *Time:* 12:28
Project ID:

Client: CRETE CONSULTING
Contact: Rusty Jones
Client Project ID: Dawn/Bunge Foods RT
Samples Collected By: Rusty Jones R. Jones
PO Number: BUNGE R.I.
Phone: 832.330.1359
Email: rusty.jones@creteconsulting.com
Mailing Address: 16300 Christensen Rd, Ste 214
Tukwila, WA 98188
Email Receipt Confirmation? ([✓ Yes]/No)
BAL PM: Jeremy Maute

Requested TAT (business days)
☒ 20 (standard)
☐ 15*
☐ 10*
☐ 5*
☐ Other ____

*Surcharges may apply to expedited TATs

Comments: *All dissolved containers field filtered.* *See metals list As, Cd, Cr, Cu, Pb, Zn.*

	Sample ID	Collection Date	Collection Time	Matrix Type	Number of Containers	Field Filtered? (Yes/No)	Preservation Type HCl/HNO$_3$/Other	Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals ~~DISSOLVED~~ (specify) EPA 1638 Mod.	As Species (specify) InOrg, III, V, MMA, DMA	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify) Total Metals 1638 Mod.	Other (specify) Dissolved Metals 1638 Mod.	Comments Specify Here
1	MW-3-0122	1.30.22	2210	WATER	④ BRS	Y	NONE							X	X	Cond.= 22.9 mS/cm
2	MW-6-0122	↓	2305	↓	4	Y	↓							X	X	Cond.= 19.6 mS/cm
3	FILTER BLANK	1.31.22	2129		1	Y									X	
4	MW-2-0122	↓	2225		2	Y								X	X	Cond.= 12.3 mS/cm
5	MW-5-0122	↓	2315		2	Y								X	X	Cond.= 3.30 mS/cm
6	DUP-0222	2.1.22	2230		2	Y								X	X	
7	MW-1-0222	↓	2315		2	Y								X	X	Cond.= 8.16 mS/cm
8	MW-4-0222	2.2.22	0012	↓	2	Y	↓							X	X	Cond.=1.67 mS/cm
9																
10																
Trip Blank																

Relinquished By: R. Jones	Date: 2.2.22	Time: 1227	Relinquished By:	Date:	Time:
Received By:	Date: 2/2/22	Time: 12:28	Total Number of Packages:		

Page 1 of 1

List Hazardous Contaminants:

samples@brooksapplied.com | brooksapplied.com

Sample Receipt Checklist:

Courier

12:28

Container Type:

- ☒ Cooler
- ☐ Cardboard box
- ☐ Styrofoam cooler
- ☐ Other (Specify):

☐ Custody Seal Present?

Custody Seal Intact? Y / N

☒ Chain of Custody Present?

Coolant and Temperature

Coolant Type **IR#:** 30

- ☐ None
- ☐ Blue Ice: °C
- ☒ Ice: 2.5 °C
- ☐ Dry Ice: °C
- ☐ Temp Blank: °C

Corrected Temp: °C

Coolant Note:

Bottle Type:

☐ Client Provided

☒ Class : Trace Metals
Size / Type: 125 mL HDPE
Lot: 21-0064
Preservation: NONE
Preservative Lot: NA

☐ Class :
Size / Type:
Lot:
Preservation:
Preservative Lot:

☐ Class :
Size / Type:
Lot:
Preservation:
Preservative Lot:

All information accurate
Initial/date: HM 2/2/22

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

May 6, 2022

Crete Consulting
ATTN: Rusty Jones
16300 Christensen Road, Suite 214
Tukwila, WA 98188

832-330-1359
rusty.jones@creteconsulting.com

RE: Project CRC-SE2101 Client Project: Dawn/Bunge Foods R.I.

Rusty Jones,

On April 22, 2022, Brooks Applied Labs (BAL) received eight (8) aqueous samples in a sealed cooler at a temperature of 1.4°C. The samples were logged-in for total recoverable and dissolved (*arsenic [As], cadmium [Cd], chromium [Cr], copper [Cu], lead [Pb], and zinc [Zn]*) analyses, according to the issued quotation. Per client request, *nickel [Ni]* was added as a target analyte. Samples for dissolved analyses were 0.45µm filtered prior to receipt and all sample fractions were preserved to a pH <2 upon receipt at BAL.

A filter blank was submitted (laboratory ID 2204267-13) and analyzed for dissolved (As, Cd, Cr, Cu, Ni, Pb, and Zn). (As, Cd, Cr, Cu, and Zn) results for 2204267-13 were less than the MDL (*not detected*). The lead result for 2204267-13 was less the method reporting limit (MRL).

The *FILTER BLANK* (2204267-13) sample yielded a copper result greater than the MRL. The copper result in 2204267-13 should be considered when evaluation client sample results.

Total Recoverable and Dissolved (As, Cd, Cr, Cu, Ni, Pb, and Zn) Quantitation by ICP-QQQ-MS

Each aqueous sample fraction for total recoverable or dissolved Se was digested in a closed vessel (bomb) with nitric and hydrochloric acids. The resulting digests were analyzed for (*As, Cd, Cr, Cu, Pb, and Zn*) content via inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS instrumentation uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the Interference Reduction Technology section on our website, brooksapplied.com.

Batch B220967

Sample results were *not* method blank corrected, as described in the calculations section of the relevant BAL SOPs. All results were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the analyte concentration of a standard reference material (SRM) is not certified but instead has been listed only as an informational value by the certifying agency, the recovery limits have been set as not applicable (N/A). In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL, the relative percent difference (RPD) was not calculated (**N/C**).

The *FILTER BLANK* (2204267-13) sample yielded a copper result greater than the MRL. The copper result in 2204267-13 was confirmed with additional analyses.

All data was reported without qualification, aside from concentration qualifiers. All associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information, please see the *Report Information* page in your report. Please feel free to contact us if you have any questions regarding this report.

Sincerely,

Jeremy Maute
Senior Project Manager
Brooks Applied Labs
Jeremy@brooksapplied.com

Report Information

Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/> or review Tables 1 and 2 in our Accreditation Information. Results reported relate only to the samples listed in the report.

Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

Common Abbreviations

AR	as received	**MS**	matrix spike
BAL	Brooks Applied Labs	**MSD**	matrix spike duplicate
BLK	method blank	**ND**	non-detect
BS	blank spike	**NR**	non-reportable
CAL	calibration standard	**N/C**	not calculated
CCB	continuing calibration blank	**PS**	post preparation spike
CCV	continuing calibration verification	**REC**	percent recovery
COC	chain of custody record	**RPD**	relative percent difference
D	dissolved fraction	**SCV**	secondary calibration verification
DUP	duplicate	**SOP**	standard operating procedure
IBL	instrument blank	**SRM**	reference material
ICV	initial calibration verification	**T**	total fraction
MDL	method detection limit	**TR**	total recoverable fraction
MRL	method reporting limit		

Definition of Data Qualifiers

(Effective 3/23/2020)

E	An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
H	Holding time and/or preservation requirements not met. Please see narrative for explanation.
J	Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
J-1	Estimated value. A full explanation is presented in the narrative.
M	Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N	Spike recovery was not within acceptance criteria. Please see narrative for explanation.
R	Rejected, unusable value. A full explanation is presented in the narrative.
U	Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
X	Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.
Z	Holding time and/or preservation requirements not established for this method; however, BAL recommendations for holding time were not followed. Please see narrative for explanation.

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.

Accreditation Information

Table 1. Accredited method/matrix/analytes for TNI

Issued by: State of Florida Dept. of Health (The NELAC Institute 2016 Standard)
Issued on: July 1, 2021; Valid to: June 30, 2022
Certificate Number: E87982-37

Method	Matrix	TNI Accredited Analyte(s)
EPA 1638	Non-Potable Waters	Ag, Cd, Cu, Ni, Pb, Sb, Se, Tl, Zn
EPA 200.8	Non-Potable Waters	Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
EPA 6020	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
	Solids/Chemicals & Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn
BAL-5000	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn, Hardness
	Solids/Chemicals	Ag, As, B, Be, Cd, Co, Cr, Cu, Pb, Mo, Ni, Sb, Se, Sn, Sr, Tl, V, Zn
	Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Tl, V, Zn
EPA 1640	Non-Potable Waters	Cd, Cu, Pb, Ni, Zn
EPA 1631E	Non-Potable Waters, Solids/Chemicals & Biological	Total Mercury
EPA 1630	Non-Potable Waters	Methyl Mercury
BAL-3200	Solids/Chemicals & Biological	Methyl Mercury
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs
BAL-4201	Non-Potable Waters	Se(IV), Se(VI)
BAL-4300	Non-Potable Waters Solid/Chemicals	Cr(VI)
SM2340B	Non-Potable Waters	Hardness

Accreditation Information

Table 2. Accredited method/matrix/analytes for ISO (1), Non-Governmental TNI (2)

Issued by: ANAB

Issued on: September 21, 2021; Valid to: March 30, 2024

Method	Matrix	ISO and Non-Gov. TNI Accredited Analyte(s)
EPA 1638 Mod EPA 200.8 Mod EPA 6020 Mod BAL-5000	Non-Potable Waters	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn
	Solids/Chemicals & Biological	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, V, Zn Hg (Biological Only)
EPA 1640 Mod	Non-Potable Waters	Cd, Cu, Pb, Ni, Zn Ag, As, Cr, Co, Se, Tl, V (ISO Only)
EPA 1631E Mod BAL-3100	Non-Potable Waters, Solids/Chemicals & Biological/Food	Total Mercury
EPA 1630 Mod BAL-3200	Non-Potable Waters, Solids/Chemicals Biological	Methyl Mercury
EPA 1632A Mod BAL-3300	Non-Potable Waters	Inorganic Arsenic (ISO Only)
	Biological/Food Solids/Chemicals	Inorganic Arsenic (ISO Only)
AOAC 2015.01 Mod BAL-5000	Food	As, Cd, Hg, Pb
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs
	Biological by BAL-4117	Inorganic Arsenic, DMAs, MMAs (ISO Only)
BAL-4101	Food by BAL-4117	Inorganic Arsenic, DMAs, MMAs (ISO Only)
BAL-4201	Non-Potable Waters	Se(IV), Se(VI), SeCN, SeMet
BAL-4300	Non-Potable Waters, Solid/Chemicals	Cr(VI)
SM 3500-Fe BAL-4500	Non-Potable Waters	Fe, Fe(II) (ISO Only)
SM2340B	Non-Potable Waters	Hardness
SM 2540G BAL-0501	Solids/Chemicals & Biological	% Dry Weight

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
MW1-0422	2204267-01	WATER	Sample	04/19/2022	04/22/2022
MW1-0422	2204267-02	WATER	Sample	04/19/2022	04/22/2022
MW2-0422	2204267-03	WATER	Sample	04/19/2022	04/22/2022
MW2-0422	2204267-04	WATER	Sample	04/19/2022	04/22/2022
MW4-0422	2204267-05	WATER	Sample	04/20/2022	04/22/2022
MW4-0422	2204267-06	WATER	Sample	04/20/2022	04/22/2022
MW3-0422	2204267-07	WATER	Sample	04/20/2022	04/22/2022
MW3-0422	2204267-08	WATER	Sample	04/20/2022	04/22/2022
DUP-0422	2204267-09	WATER	Sample	04/21/2022	04/22/2022
DUP-0422	2204267-10	WATER	Sample	04/21/2022	04/22/2022
MW5-0422	2204267-11	WATER	Sample	04/21/2022	04/22/2022
MW5-0422	2204267-12	WATER	Sample	04/21/2022	04/22/2022
FILTER BLANK	2204267-13	WATER	Filter Blank	04/21/2022	04/22/2022
MW6-0422	2204267-14	WATER	Sample	04/21/2022	04/22/2022
MW6-0422	2204267-15	WATER	Sample	04/21/2022	04/22/2022

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
As	Water	EPA 1638 Mod	05/02/2022	05/03/2022	B220967	S220499
Cd	Water	EPA 1638 Mod	05/02/2022	05/03/2022	B220967	S220499
Cr	Water	EPA 1638 Mod	05/02/2022	05/03/2022	B220967	S220499
Cu	Water	EPA 1638 Mod	05/02/2022	05/03/2022	B220967	S220499
Ni	Water	EPA 1638 Mod	05/02/2022	05/03/2022	B220967	S220499
Pb	Water	EPA 1638 Mod	05/02/2022	05/03/2022	B220967	S220499
Zn	Water	EPA 1638 Mod	05/02/2022	05/03/2022	B220967	S220499

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW1-0422										
2204267-01	As	WATER	TR	1.62		0.091	0.727	µg/L	B220967	S220499
2204267-01	Cd	WATER	TR	0.154	J	0.061	0.182	µg/L	B220967	S220499
2204267-01	Cr	WATER	TR	≤ 1.72	U	1.72	6.06	µg/L	B220967	S220499
2204267-01	Cu	WATER	TR	2.16		0.404	1.01	µg/L	B220967	S220499
2204267-01	Ni	WATER	TR	≤ 1.21	U	1.21	3.64	µg/L	B220967	S220499
2204267-01	Pb	WATER	TR	0.053	J	0.040	0.121	µg/L	B220967	S220499
2204267-01	Zn	WATER	TR	292		7.07	22.2	µg/L	B220967	S220499
MW1-0422										
2204267-02	As	WATER	D	1.58		0.091	0.727	µg/L	B220967	S220499
2204267-02	Cd	WATER	D	0.159	J	0.061	0.182	µg/L	B220967	S220499
2204267-02	Cr	WATER	D	≤ 1.72	U	1.72	6.06	µg/L	B220967	S220499
2204267-02	Cu	WATER	D	2.07		0.404	1.01	µg/L	B220967	S220499
2204267-02	Ni	WATER	D	≤ 1.21	U	1.21	3.64	µg/L	B220967	S220499
2204267-02	Pb	WATER	D	≤ 0.040	U	0.040	0.121	µg/L	B220967	S220499
2204267-02	Zn	WATER	D	282		7.07	22.2	µg/L	B220967	S220499
MW2-0422										
2204267-03	As	WATER	TR	3.97		0.091	0.727	µg/L	B220967	S220499
2204267-03	Cd	WATER	TR	≤ 0.061	U	0.061	0.182	µg/L	B220967	S220499
2204267-03	Cr	WATER	TR	≤ 1.72	U	1.72	6.06	µg/L	B220967	S220499
2204267-03	Cu	WATER	TR	3.10		0.404	1.01	µg/L	B220967	S220499
2204267-03	Ni	WATER	TR	1.31	J	1.21	3.64	µg/L	B220967	S220499
2204267-03	Pb	WATER	TR	0.725		0.040	0.121	µg/L	B220967	S220499
2204267-03	Zn	WATER	TR	≤ 7.07	U	7.07	22.2	µg/L	B220967	S220499
MW2-0422										
2204267-04	As	WATER	D	3.48		0.091	0.727	µg/L	B220967	S220499
2204267-04	Cd	WATER	D	≤ 0.061	U	0.061	0.182	µg/L	B220967	S220499
2204267-04	Cr	WATER	D	≤ 1.72	U	1.72	6.06	µg/L	B220967	S220499
2204267-04	Cu	WATER	D	1.02		0.404	1.01	µg/L	B220967	S220499
2204267-04	Ni	WATER	D	≤ 1.21	U	1.21	3.64	µg/L	B220967	S220499
2204267-04	Pb	WATER	D	≤ 0.040	U	0.040	0.121	µg/L	B220967	S220499
2204267-04	Zn	WATER	D	≤ 7.07	U	7.07	22.2	µg/L	B220967	S220499

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW4-0422										
2204267-05	As	WATER	TR	0.410	J	0.091	0.727	µg/L	B220967	S220499
2204267-05	Cd	WATER	TR	≤ 0.061	U	0.061	0.182	µg/L	B220967	S220499
2204267-05	Cr	WATER	TR	≤ 1.72	U	1.72	6.06	µg/L	B220967	S220499
2204267-05	Cu	WATER	TR	0.449	J	0.404	1.01	µg/L	B220967	S220499
2204267-05	Ni	WATER	TR	2.11	J	1.21	3.64	µg/L	B220967	S220499
2204267-05	Pb	WATER	TR	≤ 0.040	U	0.040	0.121	µg/L	B220967	S220499
2204267-05	Zn	WATER	TR	446		7.07	22.2	µg/L	B220967	S220499
MW4-0422										
2204267-06	As	WATER	D	0.323	J	0.091	0.727	µg/L	B220967	S220499
2204267-06	Cd	WATER	D	≤ 0.061	U	0.061	0.182	µg/L	B220967	S220499
2204267-06	Cr	WATER	D	≤ 1.72	U	1.72	6.06	µg/L	B220967	S220499
2204267-06	Cu	WATER	D	0.514	J	0.404	1.01	µg/L	B220967	S220499
2204267-06	Ni	WATER	D	2.02	J	1.21	3.64	µg/L	B220967	S220499
2204267-06	Pb	WATER	D	≤ 0.040	U	0.040	0.121	µg/L	B220967	S220499
2204267-06	Zn	WATER	D	399		7.07	22.2	µg/L	B220967	S220499
MW3-0422										
2204267-07	As	WATER	TR	3.66		0.227	1.82	µg/L	B220967	S220499
2204267-07	Cd	WATER	TR	0.293	J	0.152	0.455	µg/L	B220967	S220499
2204267-07	Cr	WATER	TR	≤ 4.29	U	4.29	15.2	µg/L	B220967	S220499
2204267-07	Cu	WATER	TR	3.30		1.01	2.53	µg/L	B220967	S220499
2204267-07	Ni	WATER	TR	≤ 3.03	U	3.03	9.09	µg/L	B220967	S220499
2204267-07	Pb	WATER	TR	0.595		0.101	0.303	µg/L	B220967	S220499
2204267-07	Zn	WATER	TR	≤ 17.7	U	17.7	55.6	µg/L	B220967	S220499
MW3-0422										
2204267-08	As	WATER	D	3.07		0.227	1.82	µg/L	B220967	S220499
2204267-08	Cd	WATER	D	0.247	J	0.152	0.455	µg/L	B220967	S220499
2204267-08	Cr	WATER	D	≤ 4.29	U	4.29	15.2	µg/L	B220967	S220499
2204267-08	Cu	WATER	D	1.59	J	1.01	2.53	µg/L	B220967	S220499
2204267-08	Ni	WATER	D	≤ 3.03	U	3.03	9.09	µg/L	B220967	S220499
2204267-08	Pb	WATER	D	≤ 0.101	U	0.101	0.303	µg/L	B220967	S220499
2204267-08	Zn	WATER	D	≤ 17.7	U	17.7	55.6	µg/L	B220967	S220499

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
DUP-0422										
2204267-09	As	WATER	TR	0.513	J	0.091	0.727	µg/L	B220967	S220499
2204267-09	Cd	WATER	TR	≤ 0.061	U	0.061	0.182	µg/L	B220967	S220499
2204267-09	Cr	WATER	TR	≤ 1.72	U	1.72	6.06	µg/L	B220967	S220499
2204267-09	Cu	WATER	TR	≤ 0.404	U	0.404	1.01	µg/L	B220967	S220499
2204267-09	Ni	WATER	TR	≤ 1.21	U	1.21	3.64	µg/L	B220967	S220499
2204267-09	Pb	WATER	TR	≤ 0.040	U	0.040	0.121	µg/L	B220967	S220499
2204267-09	Zn	WATER	TR	195		7.07	22.2	µg/L	B220967	S220499
DUP-0422										
2204267-10	As	WATER	D	0.473	J	0.091	0.727	µg/L	B220967	S220499
2204267-10	Cd	WATER	D	≤ 0.061	U	0.061	0.182	µg/L	B220967	S220499
2204267-10	Cr	WATER	D	≤ 1.72	U	1.72	6.06	µg/L	B220967	S220499
2204267-10	Cu	WATER	D	0.983	J	0.404	1.01	µg/L	B220967	S220499
2204267-10	Ni	WATER	D	≤ 1.21	U	1.21	3.64	µg/L	B220967	S220499
2204267-10	Pb	WATER	D	0.093	J	0.040	0.121	µg/L	B220967	S220499
2204267-10	Zn	WATER	D	103		7.07	22.2	µg/L	B220967	S220499
MW5-0422										
2204267-11	As	WATER	TR	0.681	J	0.091	0.727	µg/L	B220967	S220499
2204267-11	Cd	WATER	TR	≤ 0.061	U	0.061	0.182	µg/L	B220967	S220499
2204267-11	Cr	WATER	TR	≤ 1.72	U	1.72	6.06	µg/L	B220967	S220499
2204267-11	Cu	WATER	TR	≤ 0.404	U	0.404	1.01	µg/L	B220967	S220499
2204267-11	Ni	WATER	TR	≤ 1.21	U	1.21	3.64	µg/L	B220967	S220499
2204267-11	Pb	WATER	TR	0.142		0.040	0.121	µg/L	B220967	S220499
2204267-11	Zn	WATER	TR	268		7.07	22.2	µg/L	B220967	S220499
MW5-0422										
2204267-12	As	WATER	D	0.568	J	0.091	0.727	µg/L	B220967	S220499
2204267-12	Cd	WATER	D	≤ 0.061	U	0.061	0.182	µg/L	B220967	S220499
2204267-12	Cr	WATER	D	≤ 1.72	U	1.72	6.06	µg/L	B220967	S220499
2204267-12	Cu	WATER	D	≤ 0.404	U	0.404	1.01	µg/L	B220967	S220499
2204267-12	Ni	WATER	D	≤ 1.21	U	1.21	3.64	µg/L	B220967	S220499
2204267-12	Pb	WATER	D	0.078	J	0.040	0.121	µg/L	B220967	S220499
2204267-12	Zn	WATER	D	122		7.07	22.2	µg/L	B220967	S220499

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
FILTER BLANK										
2204267-13	As	WATER	D	≤ 0.091	U	0.091	0.727	µg/L	B220967	S220499
2204267-13	Cd	WATER	D	≤ 0.061	U	0.061	0.182	µg/L	B220967	S220499
2204267-13	Cr	WATER	D	≤ 1.72	U	1.72	6.06	µg/L	B220967	S220499
2204267-13	Cu	WATER	D	1.84		0.404	1.01	µg/L	B220967	S220499
2204267-13	Ni	WATER	D	≤ 1.21	U	1.21	3.64	µg/L	B220967	S220499
2204267-13	Pb	WATER	D	0.103	J	0.040	0.121	µg/L	B220967	S220499
2204267-13	Zn	WATER	D	≤ 7.07	U	7.07	22.2	µg/L	B220967	S220499
MW6-0422										
2204267-14	As	WATER	TR	1.04	J	0.227	1.82	µg/L	B220967	S220499
2204267-14	Cd	WATER	TR	≤ 0.152	U	0.152	0.455	µg/L	B220967	S220499
2204267-14	Cr	WATER	TR	≤ 4.29	U	4.29	15.2	µg/L	B220967	S220499
2204267-14	Cu	WATER	TR	1.30	J	1.01	2.53	µg/L	B220967	S220499
2204267-14	Ni	WATER	TR	≤ 3.03	U	3.03	9.09	µg/L	B220967	S220499
2204267-14	Pb	WATER	TR	0.414		0.101	0.303	µg/L	B220967	S220499
2204267-14	Zn	WATER	TR	≤ 17.7	U	17.7	55.6	µg/L	B220967	S220499
MW6-0422										
2204267-15	As	WATER	D	0.241	J	0.227	1.82	µg/L	B220967	S220499
2204267-15	Cd	WATER	D	≤ 0.152	U	0.152	0.455	µg/L	B220967	S220499
2204267-15	Cr	WATER	D	≤ 4.29	U	4.29	15.2	µg/L	B220967	S220499
2204267-15	Cu	WATER	D	≤ 1.01	U	1.01	2.53	µg/L	B220967	S220499
2204267-15	Ni	WATER	D	≤ 3.03	U	3.03	9.09	µg/L	B220967	S220499
2204267-15	Pb	WATER	D	≤ 0.101	U	0.101	0.303	µg/L	B220967	S220499
2204267-15	Zn	WATER	D	≤ 17.7	U	17.7	55.6	µg/L	B220967	S220499

Accuracy & Precision Summary

Batch: B220967
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B220967-BS1	**Blank Spike, (2137005)**						
	As		55.56	54.52	µg/L	98% 75-125	
	Cd		5.556	5.852	µg/L	105% 75-125	
	Cr		55.56	56.49	µg/L	102% 75-125	
	Cu		55.56	56.32	µg/L	101% 75-125	
	Ni		55.56	57.25	µg/L	103% 75-125	
	Pb		5.556	5.994	µg/L	108% 75-125	
	Zn		55.56	54.76	µg/L	99% 75-125	
B220967-SRM1	**Reference Material (2145008, TMDA 51.5 Reference Standard - Bottle 7 - SRM)**						
	Cd		25.70	28.26	µg/L	110% 75-125	
	Pb		63.70	70.01	µg/L	110% 75-125	
B220967-SRM2	**Reference Material (2145008, TMDA 51.5 Reference Standard - Bottle 7 - SRM)**						
	As		16.70	17.00	µg/L	102% 75-125	
	Cr		65.10	67.74	µg/L	104% 75-125	
	Cu		77.40	77.46	µg/L	100% 75-125	
	Ni		65.30	67.94	µg/L	104% 75-125	
B220967-DUP1	**Duplicate, (2204267-07)**						
	As	3.656		3.760	µg/L		3% 20
	Cd	0.293		0.245	µg/L		18% 20
	Cr	ND		ND	µg/L		N/C 20
	Cu	3.304		3.257	µg/L		1% 20
	Ni	ND		ND	µg/L		N/C 20
	Pb	0.595		0.548	µg/L		8% 20
	Zn	ND		ND	µg/L		N/C 20
B220967-MS1	**Matrix Spike, (2204267-07)**						
	As	3.656	56.12	64.42	µg/L	108% 75-125	
	Cd	0.293	5.612	5.988	µg/L	101% 75-125	
	Cr	ND	56.12	64.71	µg/L	115% 75-125	
	Cu	3.304	56.12	62.93	µg/L	106% 75-125	
	Ni	ND	56.12	64.42	µg/L	115% 75-125	
	Pb	0.595	5.612	6.062	µg/L	97% 75-125	
	Zn	ND	56.12	65.18	µg/L	116% 75-125	

Accuracy & Precision Summary

Batch: B220967
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B220967-MSD1	**Matrix Spike Duplicate, (2204267-07)**						
	As	3.656	56.12	62.44	µg/L	105% 75-125	3% 20
	Cd	0.293	5.612	6.244	µg/L	106% 75-125	4% 20
	Cr	ND	56.12	58.20	µg/L	104% 75-125	11% 20
	Cu	3.304	56.12	58.06	µg/L	98% 75-125	8% 20
	Ni	ND	56.12	60.86	µg/L	108% 75-125	6% 20
	Pb	0.595	5.612	6.206	µg/L	100% 75-125	2% 20
	Zn	ND	56.12	61.12	µg/L	109% 75-125	6% 20
B220967-DUP2	**Duplicate, (2204267-14)**						
	As	1.039		0.984	µg/L		5% 20
	Cd	ND		ND	µg/L		N/C 20
	Cr	ND		ND	µg/L		N/C 20
	Cu	1.296		1.207	µg/L		7% 20
	Ni	ND		ND	µg/L		N/C 20
	Pb	0.414		0.381	µg/L		8% 20
	Zn	ND		ND	µg/L		N/C 20
B220967-MS2	**Matrix Spike, (2204267-14)**						
	As	1.039	56.12	57.47	µg/L	101% 75-125	
	Cd	ND	5.612	5.925	µg/L	106% 75-125	
	Cr	ND	56.12	58.12	µg/L	104% 75-125	
	Cu	1.296	56.12	57.32	µg/L	100% 75-125	
	Ni	ND	56.12	55.51	µg/L	99% 75-125	
	Pb	0.414	5.612	5.950	µg/L	99% 75-125	
	Zn	ND	56.12	59.96	µg/L	107% 75-125	
B220967-MSD2	**Matrix Spike Duplicate, (2204267-14)**						
	As	1.039	56.12	53.16	µg/L	93% 75-125	8% 20
	Cd	ND	5.612	5.375	µg/L	96% 75-125	10% 20
	Cr	ND	56.12	55.38	µg/L	99% 75-125	5% 20
	Cu	1.296	56.12	54.31	µg/L	94% 75-125	5% 20
	Ni	ND	56.12	54.68	µg/L	97% 75-125	2% 20
	Pb	0.414	5.612	5.709	µg/L	94% 75-125	4% 20
	Zn	ND	56.12	54.18	µg/L	97% 75-125	10% 20

Method Blanks & Reporting Limits

Batch: B220967
Matrix: Water
Method: EPA 1638 Mod
Analyte: As

Sample	Result	Units
B220967-BLK1	0.005	µg/L
B220967-BLK2	0.0002	µg/L
B220967-BLK3	-0.00007	µg/L
B220967-BLK4	-0.0001	µg/L

Average: 0.001
Limit: 0.072

MDL: 0.009
MRL: 0.072

Analyte: Cd

Sample	Result	Units
B220967-BLK1	0.0002	µg/L
B220967-BLK2	0.0002	µg/L
B220967-BLK3	-0.00007	µg/L
B220967-BLK4	0.0002	µg/L

Average: 0.000
Limit: 0.018

MDL: 0.006
MRL: 0.018

Analyte: Cr

Sample	Result	Units
B220967-BLK1	-0.016	µg/L
B220967-BLK2	-0.020	µg/L
B220967-BLK3	-0.021	µg/L
B220967-BLK4	-0.019	µg/L

Average: -0.019
Limit: 0.600

MDL: 0.170
MRL: 0.600

Method Blanks & Reporting Limits

Analyte: Cu

Sample	Result	Units
B220967-BLK1	0.011	µg/L
B220967-BLK2	0.006	µg/L
B220967-BLK3	0.017	µg/L
B220967-BLK4	-0.0006	µg/L

Average: 0.008
Limit: 0.100

MDL: 0.040
MRL: 0.100

Analyte: Ni

Sample	Result	Units
B220967-BLK1	0.020	µg/L
B220967-BLK2	0.016	µg/L
B220967-BLK3	0.006	µg/L
B220967-BLK4	0.006	µg/L

Average: 0.012
Limit: 0.360

MDL: 0.120
MRL: 0.360

Analyte: Pb

Sample	Result	Units
B220967-BLK1	0.004	µg/L
B220967-BLK2	0.003	µg/L
B220967-BLK3	0.003	µg/L
B220967-BLK4	0.003	µg/L

Average: 0.003
Limit: 0.012

MDL: 0.004
MRL: 0.012

Analyte: Zn

Sample	Result	Units
B220967-BLK1	0.121	µg/L
B220967-BLK2	-0.007	µg/L
B220967-BLK3	0.047	µg/L
B220967-BLK4	-0.005	µg/L

Average: 0.039
Limit: 2.200

MDL: 0.700
MRL: 2.20

Sample Containers

Lab ID: 2204267-01
Sample: MW1-0422
Report Matrix: WATER
Sample Type: Sample
Collected: 04/19/2022
Received: 04/22/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2142029	1	Cooler - 2204267

Lab ID: 2204267-02
Sample: MW1-0422
Report Matrix: WATER
Sample Type: Sample
Collected: 04/19/2022
Received: 04/22/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2142029	1	Cooler - 2204267

Lab ID: 2204267-03
Sample: MW2-0422
Report Matrix: WATER
Sample Type: Sample
Collected: 04/19/2022
Received: 04/22/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2142029	1	Cooler - 2204267

Lab ID: 2204267-04
Sample: MW2-0422
Report Matrix: WATER
Sample Type: Sample
Collected: 04/19/2022
Received: 04/22/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2142029	1	Cooler - 2204267

Lab ID: 2204267-05
Sample: MW4-0422
Report Matrix: WATER
Sample Type: Sample
Collected: 04/20/2022
Received: 04/22/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2142029	1	Cooler - 2204267

Lab ID: 2204267-06
Sample: MW4-0422
Report Matrix: WATER
Sample Type: Sample
Collected: 04/20/2022
Received: 04/22/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2142029	1	Cooler - 2204267

Sample Containers

Lab ID: 2204267-07 **Report Matrix:** WATER **Collected:** 04/20/2022
Sample: MW3-0422 **Sample Type:** Sample **Received:** 04/22/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2142029	1	Cooler - 2204267

Lab ID: 2204267-08 **Report Matrix:** WATER **Collected:** 04/20/2022
Sample: MW3-0422 **Sample Type:** Sample **Received:** 04/22/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2142029	1	Cooler - 2204267

Lab ID: 2204267-09 **Report Matrix:** WATER **Collected:** 04/21/2022
Sample: DUP-0422 **Sample Type:** Sample **Received:** 04/22/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2142029	1	Cooler - 2204267

Lab ID: 2204267-10 **Report Matrix:** WATER **Collected:** 04/21/2022
Sample: DUP-0422 **Sample Type:** Sample **Received:** 04/22/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2142029	1	Cooler - 2204267

Lab ID: 2204267-11 **Report Matrix:** WATER **Collected:** 04/21/2022
Sample: MW5-0422 **Sample Type:** Sample **Received:** 04/22/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2142029	1	Cooler - 2204267

Lab ID: 2204267-12 **Report Matrix:** WATER **Collected:** 04/21/2022
Sample: MW5-0422 **Sample Type:** Sample **Received:** 04/22/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2142029	1	Cooler - 2204267

Sample Containers

Lab ID: 2204267-13
Sample: FILTER BLANK
Report Matrix: WATER
Sample Type: Filter Blank
Collected: 04/21/2022
Received: 04/22/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2142029	1	Cooler - 2204267

Lab ID: 2204267-14
Sample: MW6-0422
Report Matrix: WATER
Sample Type: Sample
Collected: 04/21/2022
Received: 04/22/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2142029	1	Cooler - 2204267

Lab ID: 2204267-15
Sample: MW6-0422
Report Matrix: WATER
Sample Type: Sample
Collected: 04/21/2022
Received: 04/22/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0064	1% HNO3 (BAL)	2142029	1	Cooler - 2204267

Shipping Containers

Cooler - 2204267

Received: April 22, 2022 10:47
Tracking No: n/a via Courier
Coolant Type: Ice
Temperature: 1.4 °C

Description: Cooler
Damaged in transit? No
Returned to client? No
Comments: IR#: 33

Custody seals present? No
Custody seals intact? No
COC present? Yes

BAL Report 2204267

BROOKS APPLIED LABS

Chain -of-Custody Form

Ship samples to:
18804 North Creek Parkway, Suite 100
Bothell, WA 98011

For BAL use only
Received by: HM *Date:* 4/22/22
Work Order ID: *Time:* 10:47
Project ID:

Client: CRETE CONSULTING
Contact: Rusty Jones
Client Project ID: Dawn / Bunge Foods R.I.
Samples Collected By: Rusty Jones R. Jones
PO Number: BUNGE R.I.
Phone: 832.330.1359
Email: rusty.jones@creteconsulting.com
Mailing Address: 16300 Christensen Rd, Ste 214
Tukwila, WA 98188
Email Receipt Confirmation? ([✓ Yes]/No)
BAL PM: Jeremy Maute

Requested TAT
(business days)

☒ 20 (standard)
☐ 15*
☐ 10*
☐ 5*
☐ Other ____

*Surcharges may apply to expedited TATs

		Collection		Client Sample Info				BAL Analyses Required								Comments
	Sample ID	Date	Time	Matrix Type	Number of Containers	Field Filtered? (Yes/No)	Preservation Type HCl /HNO$_3$/Other	Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals (specify)	As Species (specify) InOrg, III, V, MMA, DMA	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify) TOTAL METALS 1638 Mod	Other (specify) DISSOLVED METALS 1638 Mod	Metals List: As, Cd, Cr, Cu, Pb, Zn Conductivity Below Specify Here
1	MW1-0422	4.19.2022	1400	WATER	2	Y&N	NONE							X	X	6529 uS/cm
2	MW2-0422	↓	1458	↓	2	Y&N	↓							X	X	14051 uS/cm
3	MW4-0422	4.20.2022	1451	↓	2	↓	↓							X	X	1662 uS/cm
4	MW3-0422	↓	1536	↓	2	↓	↓							X	X	26495 uS/cm
5	DUP-0422	4.21.2022	1445	↓	2	↓	↓							X	X	
6	MW5-0422	↓	1545	↓	2	↓	↓							X	X	2068 uS/cm
7	FILTER BLANK	↓	1600	↓	1	↓	↓								X	N/A
8	MW6-0422	↓	1631	↓	2	Y&N	↓							X	X	8023 uS/cm
9																
10																
	Trip Blank															

Relinquished By: R. Jones	Date: 4.22.22	Time: 1047	Relinquished By:	Date: 4.22.22	Time: 1047
Received By:	Date: 4/22/22	Time: 10:47	Total Number of Packages:		

Page 1 of 1

List Hazardous Contaminants:

samples@brooksapplied.com | brooksapplied.com

Sample Receipt Checklist:

Container Type:

☒ Cooler
☐ Cardboard box
☐ Styrofoam cooler
☐ Other (Specify):

☐ Custody Seal Present?
Custody Seal Intact? Y / N
☒ Chain of Custody Present?

Coolant and Temperature

Coolant Type IR#: 33

☐ None
☐ Blue Ice: °C
☒ Ice: 0.4 °C
☐ Dry Ice: °C
Corrected Temp: 1.4 °C
☐ Temp Blank: °C

Record temp blank as a corrected temp

Coolant Note:

Bottle Type:

☐ Client Provided
☒ Class : Trace Metals
Size / Type: 125 mL HDPE
Lot: 21-0064
Preservation: NONE
Preservative Lot: NA

☐ Class :
Size / Type:
Lot:
Preservation:
Preservative Lot:

☐ Class :
Size / Type:
Lot:
Preservation:
Preservative Lot:

All information accurate
Initial/date: HM 4/22/22

SHIP DAT
ACTWGT
CAD: 11
DIMS: B
BOL SE
RKWA

Courier 10.47

BROOKS APPLIED LABS
13751 Lake City Way NE, Ste 108, Seattle, WA 98125 • USA • T:206-632-6206 • info@brooksapplied.com

September 13, 2022

Crete Consulting
ATTN: Rusty Jones
108 S. Washington Street, Suite 300
Seattle, WA 98104
832-330-1359
rusty.jones@creteconsulting.com

RE: Project CRC-SE2101 Client Project: Dawn Food Products

Rusty Jones,

On August 9, 2022, Brooks Applied Labs (BAL) received eight (8) aqueous samples in a sealed cooler at an acceptable temperature of 2.8°C. The samples were logged-in for total recoverable and dissolved (*arsenic [As], cadmium [Cd], chromium [Cr], copper [Cu], lead [Pb], nickel [Ni], and zinc [Zn]*) analyses, according to the issued quotation. Samples for dissolved analyses were 0.45µm filtered prior to receipt. All sample fractions for (*As, Cd, Cr, Cu, Pb, Ni, and Zn*) were preserved to a pH <2 upon receipt at BAL.

Total Recoverable and Dissolved (As, Cd, Cr, Cu, Pb, Ni, and Zn) Quantitation by ICP-QQQ-MS
Each aqueous sample fraction for total recoverable or dissolved Se was digested in a closed vessel (bomb) with nitric and hydrochloric acids. The resulting digests were analyzed for (*As, Cd, Cr, Cu, Pb, Ni, and Zn*) content via inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS instrumentation uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the Interference Reduction Technology section on our website, brooksapplied.com.

The dissolved copper result for *MW4-0822* (2208131-10) is greater than the corresponding total recoverable copper result (2208131-09). Container labels were checked and there was no indication of samples mis-labeled. Re-analyses confirmed the results for 2208131-09 and 2208131-10, suggesting sampling heterogeneity or potential copper spot contamination in 2208131-10. No additional corrective actions are necessary. The reported results are deemed representative of the submitted containers.

In instances where the analyte concentration of a standard reference material (SRM) is not certified but instead has been listed only as an informational value by the certifying agency, the recovery limits have been set as not applicable (N/A). In such cases the measured concentrations have been provided for informational purposes, but the laboratory fortified blank and/or matrix spike recoveries may be more reflective of the performance of the applied methods.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL, the relative percent difference (RPD) was not calculated (**N/C**).

All data was reported without qualification, aside from concentration qualifiers. All associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information, please see the *Report Information* page in your report. Please feel free to contact us if you have any questions regarding this report.

Sincerely,

Jeremy Maute
Senior Project Manager
Brooks Applied Labs
Jeremy@brooksapplied.com

Report Information

Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/> or review Tables 1 and 2 in our Accreditation Information. Results reported relate only to the samples listed in the report.

Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

Common Abbreviations

AR	as received	**MS**	matrix spike
BAL	Brooks Applied Labs	**MSD**	matrix spike duplicate
BLK	method blank	**ND**	non-detect
BS	blank spike	**NR**	non-reportable
CAL	calibration standard	**N/C**	not calculated
CCB	continuing calibration blank	**PS**	post preparation spike
CCV	continuing calibration verification	**REC**	percent recovery
COC	chain of custody record	**RPD**	relative percent difference
D	dissolved fraction	**SCV**	secondary calibration verification
DUP	duplicate	**SOP**	standard operating procedure
IBL	instrument blank	**SRM**	reference material
ICV	initial calibration verification	**T**	total fraction
MDL	method detection limit	**TR**	total recoverable fraction
MRL	method reporting limit		

Definition of Data Qualifiers

(Effective 3/23/2020)

E	An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
H	Holding time and/or preservation requirements not met. Please see narrative for explanation.
J	Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
J-1	Estimated value. A full explanation is presented in the narrative.
M	Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N	Spike recovery was not within acceptance criteria. Please see narrative for explanation.
R	Rejected, unusable value. A full explanation is presented in the narrative.
U	Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
X	Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.
Z	Holding time and/or preservation requirements not established for this method; however, BAL recommendations for holding time were not followed. Please see narrative for explanation.

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.

Accreditation Information

Table 1. Accredited method/matrix/analytes for TNI

Issued by: State of Florida Dept. of Health (The NELAC Institute 2016 Standard)
Issued on: July 1, 2021; Valid to: June 30, 2022
Certificate Number: E87982-37

Method	Matrix	TNI Accredited Analyte(s)
EPA 1638	Non-Potable Waters	Ag, Cd, Cu, Ni, Pb, Sb, Se, Tl, Zn
EPA 200.8	Non-Potable Waters	Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
EPA 6020	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
	Solids/Chemicals & Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn
BAL-5000	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn, Hardness
	Solids/Chemicals	Ag, As, B, Be, Cd, Co, Cr, Cu, Pb, Mo, Ni, Sb, Se, Sn, Sr, Tl, V, Zn
	Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Tl, V, Zn
EPA 1640	Non-Potable Waters	Cd, Cu, Pb, Ni, Zn
EPA 1631E	Non-Potable Waters, Solids/Chemicals & Biological	Total Mercury
EPA 1630	Non-Potable Waters	Methyl Mercury
BAL-3200	Solids/Chemicals & Biological	Methyl Mercury
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs
BAL-4201	Non-Potable Waters	Se(IV), Se(VI)
BAL-4300	Non-Potable Waters Solid/Chemicals	Cr(VI)
SM2340B	Non-Potable Waters	Hardness

Accreditation Information

Table 2. Accredited method/matrix/analytes for ISO (1), Non-Governmental TNI (2)

Issued by: ANAB

Issued on: September 21, 2021; Valid to: March 30, 2024

Method	Matrix	ISO and Non-Gov. TNI Accredited Analyte(s)
EPA 1638 Mod EPA 200.8 Mod EPA 6020 Mod BAL-5000	Non-Potable Waters	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn
	Solids/Chemicals & Biological	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, V, Zn Hg (Biological Only)
EPA 1640 Mod	Non-Potable Waters	Cd, Cu, Pb, Ni, Zn Ag, As, Cr, Co, Se, Tl, V (ISO Only)
EPA 1631E Mod BAL-3100	Non-Potable Waters, Solids/Chemicals & Biological/Food	Total Mercury
EPA 1630 Mod BAL-3200	Non-Potable Waters, Solids/Chemicals Biological	Methyl Mercury
EPA 1632A Mod BAL-3300	Non-Potable Waters	Inorganic Arsenic (ISO Only)
	Biological/Food Solids/Chemicals	Inorganic Arsenic (ISO Only)
AOAC 2015.01 Mod BAL-5000	Food	As, Cd, Hg, Pb
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs
	Biological by BAL-4117	Inorganic Arsenic, DMAs, MMAs (ISO Only)
BAL-4101	Food by BAL-4117	Inorganic Arsenic, DMAs, MMAs (ISO Only)
BAL-4201	Non-Potable Waters	Se(IV), Se(VI), SeCN, SeMet
BAL-4300	Non-Potable Waters, Solid/Chemicals	Cr(VI)
SM 3500-Fe BAL-4500	Non-Potable Waters	Fe, Fe(II) (ISO Only)
SM2340B	Non-Potable Waters	Hardness
SM 2540G BAL-0501	Solids/Chemicals & Biological	% Dry Weight

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
MW1-0822	2208131-01	Water	Sample	08/08/2022	08/09/2022
MW1-0822	2208131-02	Water	Sample	08/08/2022	08/09/2022
MW3-0822	2208131-03	Water	Sample	08/08/2022	08/09/2022
MW3-0822	2208131-04	Water	Sample	08/08/2022	08/09/2022
MW6-0822	2208131-05	Water	Sample	08/08/2022	08/09/2022
MW6-0822	2208131-06	Water	Sample	08/08/2022	08/09/2022
DUP-0822	2208131-07	Water	Field Duplicate	08/09/2022	08/09/2022
DUP-0822	2208131-08	Water	Field Duplicate	08/09/2022	08/09/2022
MW4-0822	2208131-09	Water	Sample	08/09/2022	08/09/2022
MW4-0822	2208131-10	Water	Sample	08/09/2022	08/09/2022
MW5-0822	2208131-11	Water	Sample	08/09/2022	08/09/2022
MW5-0822	2208131-12	Water	Sample	08/09/2022	08/09/2022
MW2-0822	2208131-13	Water	Sample	08/09/2022	08/09/2022
MW2-0822	2208131-14	Water	Sample	08/09/2022	08/09/2022
FILTER BLANK	2208131-15	DIW	Filter Blank	08/08/2022	08/09/2022

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
As	Water	EPA 1638 Mod	08/26/2022	08/27/2022	B221949	S220904
Cd	Water	EPA 1638 Mod	08/26/2022	08/27/2022	B221949	S220904
Cr	Water	EPA 1638 Mod	08/26/2022	08/27/2022	B221949	S220904
Cu	Water	EPA 1638 Mod	08/26/2022	08/27/2022	B221949	S220904
Cu	Water	EPA 1638 Mod	08/26/2022	08/29/2022	B221949	S220905
Ni	Water	EPA 1638 Mod	08/26/2022	08/27/2022	B221949	S220904
Pb	Water	EPA 1638 Mod	08/26/2022	08/27/2022	B221949	S220904
Zn	Water	EPA 1638 Mod	08/26/2022	08/27/2022	B221949	S220904

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW1-0822										
2208131-01	As	Water	TR	1.38		0.162	0.727	µg/L	B221949	S220904
2208131-01	Cd	Water	TR	0.289		0.061	0.182	µg/L	B221949	S220904
2208131-01	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B221949	S220904
2208131-01	Cu	Water	TR	1.46		0.505	1.01	µg/L	B221949	S220904
2208131-01	Ni	Water	TR	≤ 1.21	U	1.21	3.64	µg/L	B221949	S220904
2208131-01	Pb	Water	TR	≤ 0.061	U	0.061	0.121	µg/L	B221949	S220904
2208131-01	Zn	Water	TR	225		7.07	22.2	µg/L	B221949	S220904
MW1-0822										
2208131-02	As	Water	D	1.37		0.162	0.727	µg/L	B221949	S220904
2208131-02	Cd	Water	D	0.235		0.061	0.182	µg/L	B221949	S220904
2208131-02	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B221949	S220904
2208131-02	Cu	Water	D	1.56		0.505	1.01	µg/L	B221949	S220905
2208131-02	Ni	Water	D	1.37	J	1.21	3.64	µg/L	B221949	S220904
2208131-02	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B221949	S220904
2208131-02	Zn	Water	D	209		7.07	22.2	µg/L	B221949	S220904
MW3-0822										
2208131-03	As	Water	TR	3.08		0.404	1.82	µg/L	B221949	S220904
2208131-03	Cd	Water	TR	0.254	J	0.152	0.455	µg/L	B221949	S220904
2208131-03	Cr	Water	TR	≤ 4.29	U	4.29	15.2	µg/L	B221949	S220904
2208131-03	Cu	Water	TR	2.20	J	1.26	2.53	µg/L	B221949	S220904
2208131-03	Ni	Water	TR	3.35	J	3.03	9.09	µg/L	B221949	S220904
2208131-03	Pb	Water	TR	0.292	J	0.152	0.303	µg/L	B221949	S220904
2208131-03	Zn	Water	TR	≤ 17.7	U	17.7	55.6	µg/L	B221949	S220904
MW3-0822										
2208131-04	As	Water	D	3.10		0.404	1.82	µg/L	B221949	S220904
2208131-04	Cd	Water	D	0.296	J	0.152	0.455	µg/L	B221949	S220904
2208131-04	Cr	Water	D	≤ 4.29	U	4.29	15.2	µg/L	B221949	S220904
2208131-04	Cu	Water	D	1.43	J	1.26	2.53	µg/L	B221949	S220904
2208131-04	Ni	Water	D	4.70	J	3.03	9.09	µg/L	B221949	S220904
2208131-04	Pb	Water	D	≤ 0.152	U	0.152	0.303	µg/L	B221949	S220904
2208131-04	Zn	Water	D	≤ 17.7	U	17.7	55.6	µg/L	B221949	S220904

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW6-0822										
2208131-05	As	Water	TR	0.416	J	0.162	0.727	µg/L	B221949	S220904
2208131-05	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B221949	S220904
2208131-05	Cr	Water	TR	2.29	J	1.72	6.06	µg/L	B221949	S220904
2208131-05	Cu	Water	TR	≤ 0.505	U	0.505	1.01	µg/L	B221949	S220904
2208131-05	Ni	Water	TR	≤ 1.21	U	1.21	3.64	µg/L	B221949	S220904
2208131-05	Pb	Water	TR	0.062	J	0.061	0.121	µg/L	B221949	S220904
2208131-05	Zn	Water	TR	≤ 7.07	U	7.07	22.2	µg/L	B221949	S220904
MW6-0822										
2208131-06	As	Water	D	0.367	J	0.162	0.727	µg/L	B221949	S220904
2208131-06	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B221949	S220904
2208131-06	Cr	Water	D	1.90	J	1.72	6.06	µg/L	B221949	S220904
2208131-06	Cu	Water	D	≤ 0.505	U	0.505	1.01	µg/L	B221949	S220904
2208131-06	Ni	Water	D	≤ 1.21	U	1.21	3.64	µg/L	B221949	S220904
2208131-06	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B221949	S220904
2208131-06	Zn	Water	D	≤ 7.07	U	7.07	22.2	µg/L	B221949	S220904
DUP-0822										
2208131-07	As	Water	TR	0.182	J	0.162	0.727	µg/L	B221949	S220904
2208131-07	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B221949	S220904
2208131-07	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B221949	S220904
2208131-07	Cu	Water	TR	≤ 0.505	U	0.505	1.01	µg/L	B221949	S220904
2208131-07	Ni	Water	TR	≤ 1.21	U	1.21	3.64	µg/L	B221949	S220904
2208131-07	Pb	Water	TR	≤ 0.061	U	0.061	0.121	µg/L	B221949	S220904
2208131-07	Zn	Water	TR	36.9		7.07	22.2	µg/L	B221949	S220904
DUP-0822										
2208131-08	As	Water	D	0.182	J	0.162	0.727	µg/L	B221949	S220904
2208131-08	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B221949	S220904
2208131-08	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B221949	S220904
2208131-08	Cu	Water	D	0.866	J	0.505	1.01	µg/L	B221949	S220904
2208131-08	Ni	Water	D	≤ 1.21	U	1.21	3.64	µg/L	B221949	S220904
2208131-08	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B221949	S220904
2208131-08	Zn	Water	D	33.6		7.07	22.2	µg/L	B221949	S220904

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW4-0822										
2208131-09	As	Water	TR	0.204	J	0.162	0.727	µg/L	B221949	S220904
2208131-09	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B221949	S220904
2208131-09	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B221949	S220904
2208131-09	Cu	Water	TR	≤ 0.505	U	0.505	1.01	µg/L	B221949	S220904
2208131-09	Ni	Water	TR	≤ 1.21	U	1.21	3.64	µg/L	B221949	S220904
2208131-09	Pb	Water	TR	≤ 0.061	U	0.061	0.121	µg/L	B221949	S220904
2208131-09	Zn	Water	TR	106		7.07	22.2	µg/L	B221949	S220904
MW4-0822										
2208131-10	As	Water	D	0.165	J	0.162	0.727	µg/L	B221949	S220904
2208131-10	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B221949	S220904
2208131-10	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B221949	S220904
2208131-10	Cu	Water	D	1.66		0.505	1.01	µg/L	B221949	S220904
2208131-10	Ni	Water	D	1.76	J	1.21	3.64	µg/L	B221949	S220904
2208131-10	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B221949	S220904
2208131-10	Zn	Water	D	99.4		7.07	22.2	µg/L	B221949	S220904
MW5-0822										
2208131-11	As	Water	TR	≤ 0.404	U	0.404	1.82	µg/L	B221949	S220904
2208131-11	Cd	Water	TR	≤ 0.152	U	0.152	0.455	µg/L	B221949	S220904
2208131-11	Cr	Water	TR	≤ 4.29	U	4.29	15.2	µg/L	B221949	S220904
2208131-11	Cu	Water	TR	≤ 1.26	U	1.26	2.53	µg/L	B221949	S220904
2208131-11	Ni	Water	TR	≤ 3.03	U	3.03	9.09	µg/L	B221949	S220904
2208131-11	Pb	Water	TR	≤ 0.152	U	0.152	0.303	µg/L	B221949	S220904
2208131-11	Zn	Water	TR	32.8	J	17.7	55.6	µg/L	B221949	S220904
MW5-0822										
2208131-12	As	Water	D	≤ 0.404	U	0.404	1.82	µg/L	B221949	S220904
2208131-12	Cd	Water	D	≤ 0.152	U	0.152	0.455	µg/L	B221949	S220904
2208131-12	Cr	Water	D	≤ 4.29	U	4.29	15.2	µg/L	B221949	S220904
2208131-12	Cu	Water	D	≤ 1.26	U	1.26	2.53	µg/L	B221949	S220904
2208131-12	Ni	Water	D	≤ 3.03	U	3.03	9.09	µg/L	B221949	S220904
2208131-12	Pb	Water	D	≤ 0.152	U	0.152	0.303	µg/L	B221949	S220904
2208131-12	Zn	Water	D	34.9	J	17.7	55.6	µg/L	B221949	S220904

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW2-0822										
2208131-13	As	Water	TR	3.32		0.162	0.727	µg/L	B221949	S220904
2208131-13	Cd	Water	TR	0.225		0.061	0.182	µg/L	B221949	S220904
2208131-13	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B221949	S220904
2208131-13	Cu	Water	TR	1.51		0.505	1.01	µg/L	B221949	S220904
2208131-13	Ni	Water	TR	1.64	J	1.21	3.64	µg/L	B221949	S220904
2208131-13	Pb	Water	TR	0.194		0.061	0.121	µg/L	B221949	S220904
2208131-13	Zn	Water	TR	≤ 7.07	U	7.07	22.2	µg/L	B221949	S220904
MW2-0822										
2208131-14	As	Water	D	3.29		0.162	0.727	µg/L	B221949	S220904
2208131-14	Cd	Water	D	0.214		0.061	0.182	µg/L	B221949	S220904
2208131-14	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B221949	S220904
2208131-14	Cu	Water	D	1.13		0.505	1.01	µg/L	B221949	S220904
2208131-14	Ni	Water	D	≤ 1.21	U	1.21	3.64	µg/L	B221949	S220904
2208131-14	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B221949	S220904
2208131-14	Zn	Water	D	≤ 7.07	U	7.07	22.2	µg/L	B221949	S220904
FILTER BLANK										
2208131-15	As	DIW	D	≤ 0.162	U	0.162	0.727	µg/L	B221949	S220904
2208131-15	Cd	DIW	D	≤ 0.061	U	0.061	0.182	µg/L	B221949	S220904
2208131-15	Cr	DIW	D	≤ 1.72	U	1.72	6.06	µg/L	B221949	S220904
2208131-15	Cu	DIW	D	≤ 0.505	U	0.505	1.01	µg/L	B221949	S220904
2208131-15	Ni	DIW	D	≤ 1.21	U	1.21	3.64	µg/L	B221949	S220904
2208131-15	Pb	DIW	D	≤ 0.061	U	0.061	0.121	µg/L	B221949	S220904
2208131-15	Zn	DIW	D	≤ 7.07	U	7.07	22.2	µg/L	B221949	S220904

Accuracy & Precision Summary

Batch: B221949
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B221949-BS1	**Blank Spike, (2128023)**						
	As		55.56	52.25	µg/L	94% 75-125	
	Cd		5.556	5.300	µg/L	95% 75-125	
	Cr		55.56	58.03	µg/L	104% 75-125	
	Cu		55.56	51.51	µg/L	93% 75-125	
	Ni		55.56	60.50	µg/L	109% 75-125	
	Pb		5.556	5.092	µg/L	92% 75-125	
	Zn		55.56	46.37	µg/L	83% 75-125	
B221949-BS2	**Blank Spike, (2152010)**						
	As		277.8	272.5	µg/L	98% 75-125	
	Cd		27.78	26.18	µg/L	94% 75-125	
	Cr		277.8	283.6	µg/L	102% 75-125	
	Cu		277.8	251.3	µg/L	90% 75-125	
	Ni		277.8	290.9	µg/L	105% 75-125	
	Pb		27.78	25.29	µg/L	91% 75-125	
	Zn		277.8	223.6	µg/L	80% 75-125	
B221949-SRM1	**Reference Material (2214015, TMDA 51.5 Reference Standard - Bottle 7 - SRM)**						
	Cd		25.70	23.18	µg/L	90% 75-125	
	Pb		63.70	58.14	µg/L	91% 75-125	
B221949-SRM2	**Reference Material (2214015, TMDA 51.5 Reference Standard - Bottle 7 - SRM)**						
	Cd		25.70	23.60	µg/L	92% 75-125	
	Pb		63.70	57.30	µg/L	90% 75-125	
B221949-SRM3	**Reference Material (2214015, TMDA 51.5 Reference Standard - Bottle 7 - SRM)**						
	As		16.70	16.59	µg/L	99% 75-125	
	Cr		65.10	71.06	µg/L	109% 75-125	
	Cu		77.40	72.49	µg/L	94% 75-125	
	Ni		65.30	71.51	µg/L	110% 75-125	
B221949-SRM4	**Reference Material (2214015, TMDA 51.5 Reference Standard - Bottle 7 - SRM)**						
	As		16.70	16.72	µg/L	100% 75-125	
	Cr		65.10	69.43	µg/L	107% 75-125	
	Cu		77.40	71.40	µg/L	92% 75-125	
	Ni		65.30	70.24	µg/L	108% 75-125	

Accuracy & Precision Summary

Batch: B221949
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits	
B221949-DUP1	**Duplicate, (2208131-01)**								
	As	1.383		1.346	µg/L			3%	20
	Cd	0.289		0.210	µg/L			*32%*	20
	Cr	ND		ND	µg/L			N/C	20
	Cu	1.458		1.290	µg/L			12%	20
	Ni	ND		1.420	µg/L			N/C	20
	Pb	ND		ND	µg/L			N/C	20
	Zn	225.0		223.5	µg/L			0.7%	20
B221949-MS1	**Matrix Spike, (2208131-01)**								
	As	1.383	280.6	290.3	µg/L	103%	75-125		
	Cd	0.289	28.06	26.01	µg/L	92%	75-125		
	Cr	ND	280.6	295.3	µg/L	105%	75-125		
	Cu	1.458	280.6	254.0	µg/L	90%	75-125		
	Ni	ND	280.6	294.1	µg/L	105%	75-125		
	Pb	ND	28.06	24.27	µg/L	87%	75-125		
	Zn	225.0	280.6	439.3	µg/L	76%	75-125		
B221949-MSD1	**Matrix Spike Duplicate, (2208131-01)**								
	As	1.383	280.6	297.0	µg/L	105%	75-125	2%	20
	Cd	0.289	28.06	26.47	µg/L	93%	75-125	2%	20
	Cr	ND	280.6	297.1	µg/L	106%	75-125	0.6%	20
	Cu	1.458	280.6	253.5	µg/L	90%	75-125	0.2%	20
	Ni	ND	280.6	295.4	µg/L	105%	75-125	0.5%	20
	Pb	ND	28.06	24.98	µg/L	89%	75-125	3%	20
	Zn	225.0	280.6	437.2	µg/L	76%	75-125	0.5%	20
B221949-DUP2	**Duplicate, (2208206-01)**								
	As	23.38		23.85	µg/L			2%	20
	Cd	ND		ND	µg/L			N/C	20
	Cr	ND		ND	µg/L			N/C	20
	Cu	0.069		0.065	µg/L			7%	20
	Ni	2.136		2.146	µg/L			0.4%	20
	Pb	ND		ND	µg/L			N/C	20
	Zn	ND		0.742	µg/L			N/C	20

Accuracy & Precision Summary

Batch: B221949
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits	
B221949-MS2	**Matrix Spike, (2208206-01)**								
	As	23.38	22.45	47.64	µg/L	108%	75-125		
	Cd	ND	2.245	2.178	µg/L	97%	75-125		
	Cr	ND	22.45	26.10	µg/L	116%	75-125		
	Cu	0.069	22.45	21.49	µg/L	95%	75-125		
	Ni	2.136	22.45	27.06	µg/L	111%	75-125		
	Pb	ND	2.245	1.975	µg/L	88%	75-125		
	Zn	ND	22.45	25.64	µg/L	114%	75-125		
B221949-MSD2	**Matrix Spike Duplicate, (2208206-01)**								
	As	23.38	22.45	48.08	µg/L	110%	75-125	0.9%	20
	Cd	ND	2.245	2.284	µg/L	102%	75-125	5%	20
	Cr	ND	22.45	26.62	µg/L	119%	75-125	2%	20
	Cu	0.069	22.45	22.08	µg/L	98%	75-125	3%	20
	Ni	2.136	22.45	28.25	µg/L	116%	75-125	4%	20
	Pb	ND	2.245	2.014	µg/L	90%	75-125	2%	20
	Zn	ND	22.45	26.43	µg/L	118%	75-125	3%	20

Method Blanks & Reporting Limits

Batch: B221949
Matrix: Water
Method: EPA 1638 Mod
Analyte: As

Sample	Result	Units
B221949-BLK1	-0.0003	µg/L
B221949-BLK2	-0.0007	µg/L
B221949-BLK3	0.001	µg/L
B221949-BLK4	0.0007	µg/L

Average: 0.000
Limit: 0.072

MDL: 0.016
MRL: 0.072

Analyte: Cd

Sample	Result	Units
B221949-BLK1	0.0002	µg/L
B221949-BLK2	0.0002	µg/L
B221949-BLK3	0.0005	µg/L
B221949-BLK4	0.0007	µg/L

Average: 0.000
Limit: 0.018

MDL: 0.006
MRL: 0.018

Analyte: Cr

Sample	Result	Units
B221949-BLK1	-0.015	µg/L
B221949-BLK2	-0.025	µg/L
B221949-BLK3	0.003	µg/L
B221949-BLK4	-0.017	µg/L

Average: -0.014
Limit: 0.600

MDL: 0.170
MRL: 0.600

Method Blanks & Reporting Limits

Analyte: Cu

Sample	Result	Units
B221949-BLK1	-0.010	µg/L
B221949-BLK2	-0.022	µg/L
B221949-BLK3	0.011	µg/L
B221949-BLK4	-0.008	µg/L

Average: -0.007
Limit: 0.100

MDL: 0.050
MRL: 0.100

Analyte: Ni

Sample	Result	Units
B221949-BLK1	0.013	µg/L
B221949-BLK2	-0.007	µg/L
B221949-BLK3	0.011	µg/L
B221949-BLK4	0.045	µg/L

Average: 0.016
Limit: 0.360

MDL: 0.120
MRL: 0.360

Analyte: Pb

Sample	Result	Units
B221949-BLK1	0.001	µg/L
B221949-BLK2	-0.001	µg/L
B221949-BLK3	0.004	µg/L
B221949-BLK4	0.001	µg/L

Average: 0.001
Limit: 0.012

MDL: 0.006
MRL: 0.012

Analyte: Zn

Sample	Result	Units
B221949-BLK1	0.323	µg/L
B221949-BLK2	-0.038	µg/L
B221949-BLK3	2.19	µg/L
B221949-BLK4	1.08	µg/L

Average: 0.889
Limit: 2.200

MDL: 0.700
MRL: 2.20

Sample Containers

Lab ID: 2208131-01 **Report Matrix:** Water **Collected:** 08/08/2022
Sample: MW1-0822 **Sample Type:** Sample **Received:** 08/09/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0031	1% HNO3 (BAL)	2218038	<2	Cooler - 2208131

Lab ID: 2208131-02 **Report Matrix:** Water **Collected:** 08/08/2022
Sample: MW1-0822 **Sample Type:** Sample **Received:** 08/09/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0031	1% HNO3 (BAL)	2218038	<2	Cooler - 2208131

Lab ID: 2208131-03 **Report Matrix:** Water **Collected:** 08/08/2022
Sample: MW3-0822 **Sample Type:** Sample **Received:** 08/09/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0031	1% HNO3 (BAL)	2218038	<2	Cooler - 2208131

Lab ID: 2208131-04 **Report Matrix:** Water **Collected:** 08/08/2022
Sample: MW3-0822 **Sample Type:** Sample **Received:** 08/09/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0031	1% HNO3 (BAL)	2218038	<2	Cooler - 2208131

Lab ID: 2208131-05 **Report Matrix:** Water **Collected:** 08/08/2022
Sample: MW6-0822 **Sample Type:** Sample **Received:** 08/09/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0031	1% HNO3 (BAL)	2218038	<2	Cooler - 2208131

Lab ID: 2208131-06 **Report Matrix:** Water **Collected:** 08/08/2022
Sample: MW6-0822 **Sample Type:** Sample **Received:** 08/09/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0031	1% HNO3 (BAL)	2218038	<2	Cooler - 2208131

Sample Containers

Lab ID: 2208131-07
Sample: DUP-0822
Report Matrix: Water
Sample Type: Field Duplicate
Collected: 08/09/2022
Received: 08/09/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0031	1% HNO3 (BAL)	2218038	<2	Cooler - 2208131

Lab ID: 2208131-08
Sample: DUP-0822
Report Matrix: Water
Sample Type: Field Duplicate
Collected: 08/09/2022
Received: 08/09/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0031	1% HNO3 (BAL)	2218038	<2	Cooler - 2208131

Lab ID: 2208131-09
Sample: MW4-0822
Report Matrix: Water
Sample Type: Sample
Collected: 08/09/2022
Received: 08/09/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0031	1% HNO3 (BAL)	2218038	<2	Cooler - 2208131

Lab ID: 2208131-10
Sample: MW4-0822
Report Matrix: Water
Sample Type: Sample
Collected: 08/09/2022
Received: 08/09/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0031	1% HNO3 (BAL)	2218038	<2	Cooler - 2208131

Lab ID: 2208131-11
Sample: MW5-0822
Report Matrix: Water
Sample Type: Sample
Collected: 08/09/2022
Received: 08/09/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0031	1% HNO3 (BAL)	2218038	<2	Cooler - 2208131

Lab ID: 2208131-12
Sample: MW5-0822
Report Matrix: Water
Sample Type: Sample
Collected: 08/09/2022
Received: 08/09/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0031	1% HNO3 (BAL)	2218038	<2	Cooler - 2208131

Sample Containers

Lab ID: 2208131-13
Sample: MW2-0822
Report Matrix: Water
Sample Type: Sample
Collected: 08/09/2022
Received: 08/09/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0031	1% HNO3 (BAL)	2218038	<2	Cooler - 2208131

Lab ID: 2208131-14
Sample: MW2-0822
Report Matrix: Water
Sample Type: Sample
Collected: 08/09/2022
Received: 08/09/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0031	1% HNO3 (BAL)	2218038	<2	Cooler - 2208131

Lab ID: 2208131-15
Sample: FILTER BLANK
Report Matrix: DIW
Sample Type: Filter Blank
Collected: 08/08/2022
Received: 08/09/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	21-0031	1% HNO3 (BAL)	2218038	<2	Cooler - 2208131

Shipping Containers

Cooler - 2208131

Received: August 9, 2022 12:25
Tracking No: n/a via Courier
Coolant Type: Ice
Temperature: 2.8 °C

Description: Cooler
Damaged in transit? No
Returned to client? No
Comments: IR#:1

Custody seals present? No
Custody seals intact? No
COC present? Yes

BROOKS APPLIED LABS

Chain-of-Custody Form

Ship samples to:
13751 Lake City Way NE, Suite 108
Seattle, WA 98125

For BAL use only
BAL Report 2208131
Received by: WW *Date:* 8/9/22
Work Order ID: *Time:* 12:25
Project ID:

Client: Crete Consulting, Inc.
Contact: R. Jones
Client Project ID: Dawn Food Products
Samples Collected By: Rusty Jones
PO Number:
Phone: 832.330.1359
Email: rusty.jones@creteconsulting.com
Mailing Address: 16300 Christensen Rd., Ste. 214
Tukwila, WA 98188
Email Receipt Confirmation? ([✓ Yes]/No)
BAL PM: Jeremy Maute

Requested TAT (business days)
☒ 20 (standard)
☐ 15*
☐ 10*
☐ 5*
☐ Other ____

*Surcharges may apply to expedited TATs

		Collection		Client Sample Info				BAL Analyses Required								Comments
	Sample ID	Date	Time	Matrix Type	Number of Containers	Field Filtered? (Yes/No)	Preservation Type HCl /HNO3/Other	Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals (specify)	As Species (specify) InOrg, III, V, MMA, DMA	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify) Total Metals 1638 Mod.	Other (specify) Dissolved Metals 1638 Mod.	Metals List: As, Cd, Cr, Cu, Pb, Ni, Zn Specify Here
1	MW1-0822	8.8.2022	0832	WATER	2	Y&N	NONE							X	X	Cond. 9777 uS/cm
2	MW3-0822	↓	0914	↓	2	↓	↓							X	X	Cond. 31660 ↓
3	MW6-0822		0954		2									X	X	Cond. 5091
4	DUP-0822	8.9.2022	0830		2									X	X	
5	MW4-0822	↓	0920		2									X	X	Cond. 460.9 uS/cm
6	MW5-0822		1004		2									X	X	Cond. 2474 ↓
7	MW2-0822		1049		2									X	X	Cond. 26995
8	FILTER BLANK	8.8.2022	0745	WATER	1	Y									X	DI Water
9																
10																
	Trip Blank															

Relinquished By: R Jones	Date: 8/9/2022	Time: 1225	Relinquished By:	Date:	Time:
Received By: Lindy [illegible]	Date: 8/9/22	Time: 12:25	Total Number of Packages:		

Page 1 of 1

List Hazardous Contaminants:

samples@brooksapplied.com | brooksapplied.com

Sample Receipt Checklist:

Container Type:

☒ Cooler
☐ Cardboard box
☐ Styrofoam cooler
☐ Other (Specify):

☐ Custody Seal Present?
Custody Seal Intact? Y / N
☒ Chain of Custody Present?

Coolant and Temperature

Coolant Type IR#:

☐ None
☐ Blue Ice: °C
☒ Ice: 2.8 °C
☐ Dry Ice: °C
Corrected Temp: 2.8 °C
☐ Temp Blank: °C

Record temp blank as a corrected temp

Coolant Note:

Bottle Type:

☐ Client Provided
☒ Class : Trace metals
Size / Type: 125mL HDPE
Lot: 21-0031
Preservation: none
Preservative Lot: n/a
☐ Class :
Size / Type:
Lot:
Preservation:
Preservative Lot:
☐ Class :
Size / Type:
Lot:
Preservation:
Preservative Lot:

All information accurate

Initial/date: LKW 8/9/22

Courier 12:25

RT 565
FZ B09

BROOKS APPLIED LABS
13751 Lake City Way NE, Ste 108, Seattle, WA 98125 • USA • T:206-632-6206 • info@brooksapplied.com

February 1, 2023

Crete Consulting
ATTN: Rusty Jones
108 S. Washington Street, Suite 300
Seattle, WA 98104
832-330-1359
rusty.jones@creteconsulting.com

RE: Project CRC-SE2101 Client Project: Former Bunge Foods

Rusty Jones,

On December 27, 2022, Brooks Applied Labs (BAL) received seven (7) aqueous samples in a sealed cooler at an acceptable temperature of 4.3°C. The samples were logged-in for total recoverable and dissolved (*arsenic [As], cadmium [Cd], chromium [Cr], copper [Cu], lead [Pb], nickel [Ni], and zinc [Zn]*) analyses, according to the issued quotation. Samples for dissolved analyses were 0.45µm filtered prior to receipt. All sample fractions for (*As, Cd, Cr, Cu, Pb, Ni, and Zn*) were preserved to a pH <2 upon receipt at BAL.

Total Recoverable and Dissolved (As, Cd, Cr, Cu, Pb, Ni, and Zn) Quantitation by ICP-QQQ-MS
Each aqueous sample fraction for total recoverable or dissolved Se was digested on a hotblock apparatus with nitric and hydrochloric acids. The resulting digests were analyzed for (*As, Cd, Cr, Cu, Pb, Ni, and Zn*) content via inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS instrumentation uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the Interference Reduction Technology section on our website, brooksapplied.com.

Batch B223195
Sample results were *not* method blank corrected, as described in the calculations section of the relevant BAL SOPs. All results were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

Batch B230001
Sample results were *not* method blank corrected, as described in the calculations section of the relevant BAL SOPs. All results were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

The dissolved copper result (2212445-06) was greater than the corresponding total recoverable copper result (2212445-05) for the *MW5-1222* sample. Secondary criteria were met *(i.e., avg result ≤ 5x the MRL and results within one MRL value*). No qualification of data was necessary.

In instances where the analyte concentration of a standard reference material (SRM) is not certified but instead has been listed only as an informational value by the certifying agency, the recovery limits have been set as not applicable (N/A). In such cases the measured concentrations have been provided for informational purposes, but the laboratory fortified blank and/or matrix spike recoveries may be more reflective of the performance of the applied methods.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL, the relative percent difference (RPD) was not calculated (N/C).

Except for concentration qualifiers, all data were reported without qualification. All associated quality control sample results met the acceptance criteria.

BAL verifies that the reported results of all analyses for which the laboratory is accredited meet the requirements of the accrediting body, unless otherwise noted in the report narrative. For more information regarding accreditations please see the *Report Information* and *Batch Summary* pages. This report must be used in its entirety for interpretation of results.

Please feel free to contact us if you have any questions regarding this report.

Sincerely,

Jeremy Maute
Senior Project Manager
Brooks Applied Labs
Jeremy@brooksapplied.com

Report Information

General Disclaimers

Test results are based solely upon the sample submitted to Brooks Applied Labs in the condition it was received . This report shall not be reproduced or copied, except in full, without written approval of the laboratory. Brooks Applied Labs is not responsible for the consequences arising from the use of a partial report.

Laboratory Accreditation

BAL maintains accreditation with various state and national agencies for select test methods. For a current list of BAL accreditations, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. The reported analyte/matrix/method combination shall be considered outside BAL's scopes of accreditation unless otherwise identified as ISO, TNI, or ISO,TNI in the tables. It is the responsibility of the client to verify whether a specific accreditation is required for the intended data use.

ISO: ISO/IEC 17025:2017 accredited test method. Issued by ANSI National Accreditation Board (ANAB), #ADE-1447.02

TNI: NELAP accredited test method. Issued by the State of Florida Department of Health, #E87982.

ISO,TNI: Test method is accredited under both the ISO/IEC 17025:2017 and NELAP accreditations referenced above.

Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

Common Abbreviations

AR	as received	**MS**	matrix spike
BAL	Brooks Applied Labs	**MSD**	matrix spike duplicate
BLK	method blank	**ND**	non-detect
BS	blank spike	**NR**	non-reportable
CAL	calibration standard	**N/C**	not calculated
CCB	continuing calibration blank	**PS**	post preparation spike
CCV	continuing calibration verification	**REC**	percent recovery
COC	chain of custody record	**RPD**	relative percent difference
D	dissolved fraction	**SCV**	secondary calibration verification
DUP	duplicate	**SOP**	standard operating procedure
IBL	instrument blank	**SRM**	reference material
ICV	initial calibration verification	**T**	total fraction
MDL	method detection limit	**TR**	total recoverable fraction
MRL	method reporting limit		

Definition of Data Qualifiers

E	An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
H	Holding time and/or preservation requirements not met. Please see narrative for explanation.
J	Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
J-1	Estimated value. A full explanation is presented in the narrative.
M	Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N	Spike recovery was not within acceptance criteria. Please see narrative for explanation.
R	Rejected, unusable value. A full explanation is presented in the narrative.
U	Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
X	Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.
Z	Holding time and/or preservation requirements not established for this method; however, BAL recommendations for holding time were not followed. Please see narrative for explanation.

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
DUP02-1222	2212445-01	Water	Sample	12/21/2022	12/27/2022
DUP02-1222	2212445-02	Water	Sample	12/21/2022	12/27/2022
MW1-1222	2212445-03	Water	Sample	12/21/2022	12/27/2022
MW1-1222	2212445-04	Water	Sample	12/21/2022	12/27/2022
MW5-1222	2212445-05	Water	Sample	12/21/2022	12/27/2022
MW5-1222	2212445-06	Water	Sample	12/21/2022	12/27/2022
MW6-1222	2212445-07	Water	Sample	12/21/2022	12/27/2022
MW6-1222	2212445-08	Water	Sample	12/21/2022	12/27/2022
MW4-1222	2212445-09	Water	Sample	12/22/2022	12/27/2022
MW4-1222	2212445-10	Water	Sample	12/22/2022	12/27/2022
MW3-1222	2212445-11	Water	Sample	12/22/2022	12/27/2022
MW3-1222	2212445-12	Water	Sample	12/22/2022	12/27/2022
MW2-1222	2212445-13	Water	Sample	12/22/2022	12/27/2022
MW2-1222	2212445-14	Water	Sample	12/22/2022	12/27/2022

Batch Summary

Analyte	Lab Matrix	Method	Accred.	Prepared	Analyzed	Batch	Sequence
As	Water	EPA 1638 Mod	ISO,TNI	12/29/22	12/30/22	B223195	S221355
Cd	Water	EPA 1638 Mod	ISO,TNI	12/29/22	12/30/22	B223195	S221355
Cr	Water	EPA 1638 Mod	ISO,TNI	12/29/22	12/30/22	B223195	S221355
Cu	Water	EPA 1638 Mod	ISO,TNI	12/29/22	12/30/22	B223195	S221355
Cu	Water	EPA 1638 Mod	ISO,TNI	01/03/23	01/03/23	B230001	S230001
Ni	Water	EPA 1638 Mod	ISO,TNI	12/29/22	12/30/22	B223195	S221355
Pb	Water	EPA 1638 Mod	ISO,TNI	12/29/22	12/30/22	B223195	S221355
Pb	Water	EPA 1638 Mod	ISO,TNI	01/03/23	01/03/23	B230001	S230001
Zn	Water	EPA 1638 Mod	ISO,TNI	12/29/22	12/30/22	B223195	S221355

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
DUP02-1222										
2212445-01	As	Water	TR	0.336	J	0.162	0.727	µg/L	B223195	S221355
2212445-01	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B223195	S221355
2212445-01	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B223195	S221355
2212445-01	Cu	Water	TR	0.945	J	0.505	1.01	µg/L	B223195	S221355
2212445-01	Ni	Water	TR	≤ 1.21	U	1.21	3.64	µg/L	B223195	S221355
2212445-01	Pb	Water	TR	≤ 0.061	U	0.061	0.121	µg/L	B223195	S221355
2212445-01	Zn	Water	TR	≤ 7.07	U	7.07	22.2	µg/L	B223195	S221355
DUP02-1222										
2212445-02	As	Water	D	0.216	J	0.162	0.727	µg/L	B223195	S221355
2212445-02	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B223195	S221355
2212445-02	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B223195	S221355
2212445-02	Cu	Water	D	0.707	J	0.505	1.01	µg/L	B223195	S221355
2212445-02	Ni	Water	D	≤ 1.21	U	1.21	3.64	µg/L	B223195	S221355
2212445-02	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B223195	S221355
2212445-02	Zn	Water	D	≤ 7.07	U	7.07	22.2	µg/L	B223195	S221355
MW1-1222										
2212445-03	As	Water	TR	1.19		0.162	0.727	µg/L	B223195	S221355
2212445-03	Cd	Water	TR	0.550		0.061	0.182	µg/L	B223195	S221355
2212445-03	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B223195	S221355
2212445-03	Cu	Water	TR	2.25		0.505	1.01	µg/L	B223195	S221355
2212445-03	Ni	Water	TR	2.05	J	1.21	3.64	µg/L	B223195	S221355
2212445-03	Pb	Water	TR	≤ 0.061	U	0.061	0.121	µg/L	B223195	S221355
2212445-03	Zn	Water	TR	652		7.07	22.2	µg/L	B223195	S221355
MW1-1222										
2212445-04	As	Water	D	1.14		0.162	0.727	µg/L	B223195	S221355
2212445-04	Cd	Water	D	0.532		0.061	0.182	µg/L	B223195	S221355
2212445-04	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B223195	S221355
2212445-04	Cu	Water	D	2.14		0.505	1.01	µg/L	B223195	S221355
2212445-04	Ni	Water	D	1.85	J	1.21	3.64	µg/L	B223195	S221355
2212445-04	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B223195	S221355
2212445-04	Zn	Water	D	637		7.07	22.2	µg/L	B223195	S221355

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW5-1222										
2212445-05	As	Water	TR	0.297	J	0.162	0.727	µg/L	B223195	S221355
2212445-05	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B223195	S221355
2212445-05	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B223195	S221355
2212445-05	Cu	Water	TR	≤ 0.505	U	0.505	1.01	µg/L	B230001	S230001
2212445-05	Ni	Water	TR	≤ 1.21	U	1.21	3.64	µg/L	B223195	S221355
2212445-05	Pb	Water	TR	0.063	J	0.061	0.121	µg/L	B230001	S230001
2212445-05	Zn	Water	TR	240		7.07	22.2	µg/L	B223195	S221355
MW5-1222										
2212445-06	As	Water	D	0.309	J	0.162	0.727	µg/L	B223195	S221355
2212445-06	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B223195	S221355
2212445-06	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B223195	S221355
2212445-06	Cu	Water	D	1.46		0.505	1.01	µg/L	B230001	S230001
2212445-06	Ni	Water	D	1.52	J	1.21	3.64	µg/L	B223195	S221355
2212445-06	Pb	Water	D	0.116	J	0.061	0.121	µg/L	B230001	S230001
2212445-06	Zn	Water	D	241		7.07	22.2	µg/L	B223195	S221355
MW6-1222										
2212445-07	As	Water	TR	0.294	J	0.162	0.727	µg/L	B223195	S221355
2212445-07	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B223195	S221355
2212445-07	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B223195	S221355
2212445-07	Cu	Water	TR	0.990	J	0.505	1.01	µg/L	B223195	S221355
2212445-07	Ni	Water	TR	≤ 1.21	U	1.21	3.64	µg/L	B223195	S221355
2212445-07	Pb	Water	TR	≤ 0.061	U	0.061	0.121	µg/L	B223195	S221355
2212445-07	Zn	Water	TR	≤ 7.07	U	7.07	22.2	µg/L	B223195	S221355
MW6-1222										
2212445-08	As	Water	D	0.189	J	0.162	0.727	µg/L	B223195	S221355
2212445-08	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B223195	S221355
2212445-08	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B223195	S221355
2212445-08	Cu	Water	D	0.653	J	0.505	1.01	µg/L	B223195	S221355
2212445-08	Ni	Water	D	≤ 1.21	U	1.21	3.64	µg/L	B223195	S221355
2212445-08	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B223195	S221355
2212445-08	Zn	Water	D	≤ 7.07	U	7.07	22.2	µg/L	B223195	S221355

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW4-1222										
2212445-09	As	Water	TR	≤ 0.162	U	0.162	0.727	µg/L	B223195	S221355
2212445-09	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B223195	S221355
2212445-09	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B223195	S221355
2212445-09	Cu	Water	TR	0.582	J	0.505	1.01	µg/L	B223195	S221355
2212445-09	Ni	Water	TR	1.23	J	1.21	3.64	µg/L	B223195	S221355
2212445-09	Pb	Water	TR	≤ 0.061	U	0.061	0.121	µg/L	B223195	S221355
2212445-09	Zn	Water	TR	534		7.07	22.2	µg/L	B223195	S221355
MW4-1222										
2212445-10	As	Water	D	≤ 0.162	U	0.162	0.727	µg/L	B223195	S221355
2212445-10	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B223195	S221355
2212445-10	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B223195	S221355
2212445-10	Cu	Water	D	0.553	J	0.505	1.01	µg/L	B223195	S221355
2212445-10	Ni	Water	D	1.45	J	1.21	3.64	µg/L	B223195	S221355
2212445-10	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B223195	S221355
2212445-10	Zn	Water	D	533		7.07	22.2	µg/L	B223195	S221355
MW3-1222										
2212445-11	As	Water	TR	2.74		0.162	0.727	µg/L	B223195	S221355
2212445-11	Cd	Water	TR	0.148	J	0.061	0.182	µg/L	B223195	S221355
2212445-11	Cr	Water	TR	16.4		1.72	6.06	µg/L	B223195	S221355
2212445-11	Cu	Water	TR	2.60		0.505	1.01	µg/L	B223195	S221355
2212445-11	Ni	Water	TR	8.88		1.21	3.64	µg/L	B223195	S221355
2212445-11	Pb	Water	TR	0.351		0.061	0.121	µg/L	B223195	S221355
2212445-11	Zn	Water	TR	≤ 7.07	U	7.07	22.2	µg/L	B223195	S221355
MW3-1222										
2212445-12	As	Water	D	2.54		0.162	0.727	µg/L	B223195	S221355
2212445-12	Cd	Water	D	0.175	J	0.061	0.182	µg/L	B223195	S221355
2212445-12	Cr	Water	D	2.49	J	1.72	6.06	µg/L	B223195	S221355
2212445-12	Cu	Water	D	1.70		0.505	1.01	µg/L	B223195	S221355
2212445-12	Ni	Water	D	4.36		1.21	3.64	µg/L	B223195	S221355
2212445-12	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B223195	S221355
2212445-12	Zn	Water	D	≤ 7.07	U	7.07	22.2	µg/L	B223195	S221355

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW2-1222										
2212445-13	As	Water	TR	4.46		0.162	0.727	µg/L	B223195	S221355
2212445-13	Cd	Water	TR	0.178	J	0.061	0.182	µg/L	B223195	S221355
2212445-13	Cr	Water	TR	5.02	J	1.72	6.06	µg/L	B223195	S221355
2212445-13	Cu	Water	TR	9.56		0.505	1.01	µg/L	B223195	S221355
2212445-13	Ni	Water	TR	4.35		1.21	3.64	µg/L	B223195	S221355
2212445-13	Pb	Water	TR	2.55		0.061	0.121	µg/L	B223195	S221355
2212445-13	Zn	Water	TR	11.0	J	7.07	22.2	µg/L	B223195	S221355
MW2-1222										
2212445-14	As	Water	D	2.94		0.162	0.727	µg/L	B223195	S221355
2212445-14	Cd	Water	D	0.131	J	0.061	0.182	µg/L	B223195	S221355
2212445-14	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B223195	S221355
2212445-14	Cu	Water	D	1.30		0.505	1.01	µg/L	B223195	S221355
2212445-14	Ni	Water	D	≤ 1.21	U	1.21	3.64	µg/L	B223195	S221355
2212445-14	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B223195	S221355
2212445-14	Zn	Water	D	≤ 7.07	U	7.07	22.2	µg/L	B223195	S221355

Project ID: CRC-SE2101
PM: Jeremy Maute

Client PM: Rusty Jones
Client Project: Former Bunge Foods

Accuracy & Precision Summary

Batch: B223195
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits	
B223195-BS1	**Blank Spike, (2240063)**								
	As		277.8	232.3	µg/L	84%	75-125		
	Cd		27.78	25.07	µg/L	90%	75-125		
	Cr		277.8	262.3	µg/L	94%	75-125		
	Cu		277.8	261.4	µg/L	94%	75-125		
	Ni		277.8	255.3	µg/L	92%	75-125		
	Pb		27.78	24.85	µg/L	89%	75-125		
	Zn		277.8	233.1	µg/L	84%	75-125		
B223195-SRM1	**Reference Material (2128019, T221)**								
	As		17.70	15.23	µg/L	86%	75-125		
	Cd		0.03800	0.033	µg/L	86%	75-125		
	Cr		1.710	1.675	µg/L	98%	75-125		
	Cu		3.780	3.609	µg/L	95%	75-125		
	Ni		0.6000	0.472	µg/L	79%	75-125		
	Pb		0.4900	0.445	µg/L	91%	75-125		
	Zn		25.20	22.01	µg/L	87%	75-125		
B223195-DUP1	**Duplicate, (2212445-05)**								
	As	0.297		0.288	µg/L			3%	20
	Cd	ND		ND	µg/L			N/C	20
	Cr	ND		ND	µg/L			N/C	20
	Ni	ND		ND	µg/L			N/C	20
	Zn	240.1		235.4	µg/L			2%	20
B223195-MS1	**Matrix Spike, (2212445-05)**								
	As	0.297	280.6	236.7	µg/L	84%	75-125		
	Cd	ND	28.06	25.04	µg/L	89%	75-125		
	Cr	ND	280.6	263.7	µg/L	94%	75-125		
	Ni	ND	280.6	256.6	µg/L	91%	75-125		
	Zn	240.1	280.6	472.2	µg/L	83%	75-125		

Accuracy & Precision Summary

Batch: B223195
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits	
B223195-MSD1	**Matrix Spike Duplicate, (2212445-05)**								
	As	0.297	280.6	232.4	µg/L	83%	75-125	2%	20
	Cd	ND	28.06	23.92	µg/L	85%	75-125	5%	20
	Cr	ND	280.6	266.5	µg/L	95%	75-125	1%	20
	Ni	ND	280.6	258.3	µg/L	92%	75-125	0.6%	20
	Zn	240.1	280.6	492.2	µg/L	90%	75-125	4%	20
B223195-DUP2	**Duplicate, (2212445-13)**								
	As	4.463		4.717	µg/L			6%	20
	Cd	0.178		0.184	µg/L			3%	20
	Cr	5.025		5.419	µg/L			8%	20
	Cu	9.563		9.953	µg/L			4%	20
	Ni	4.354		4.686	µg/L			7%	20
	Pb	2.553		2.765	µg/L			8%	20
	Zn	11.02		11.13	µg/L			1%	20
B223195-MS2	**Matrix Spike, (2212445-13)**								
	As	4.463	280.6	264.2	µg/L	93%	75-125		
	Cd	0.178	28.06	24.86	µg/L	88%	75-125		
	Cr	5.025	280.6	291.0	µg/L	102%	75-125		
	Cu	9.563	280.6	279.3	µg/L	96%	75-125		
	Ni	4.354	280.6	273.2	µg/L	96%	75-125		
	Pb	2.553	28.06	26.96	µg/L	87%	75-125		
	Zn	11.02	280.6	266.0	µg/L	91%	75-125		
B223195-MSD2	**Matrix Spike Duplicate, (2212445-13)**								
	As	4.463	280.6	270.0	µg/L	95%	75-125	2%	20
	Cd	0.178	28.06	24.39	µg/L	86%	75-125	2%	20
	Cr	5.025	280.6	297.2	µg/L	104%	75-125	2%	20
	Cu	9.563	280.6	282.5	µg/L	97%	75-125	1%	20
	Ni	4.354	280.6	278.8	µg/L	98%	75-125	2%	20
	Pb	2.553	28.06	27.06	µg/L	87%	75-125	0.4%	20
	Zn	11.02	280.6	266.5	µg/L	91%	75-125	0.2%	20

Accuracy & Precision Summary

Batch: B230001
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B230001-BS1	**Blank Spike, (2240063)**						
	Cu		277.8	288.8	µg/L	104% 75-125	
	Pb		27.78	25.30	µg/L	91% 75-125	
B230001-SRM1	**Reference Material (2128019, T221)**						
	Cu		3.780	3.855	µg/L	102% 75-125	
	Pb		0.4900	0.464	µg/L	95% 75-125	
B230001-DUP1	**Duplicate, (2212445-05)**						
	Cu	ND		ND	µg/L		N/C 20
	Pb	0.063		ND	µg/L		N/C 20
B230001-MS1	**Matrix Spike, (2212445-05)**						
	Cu	ND	280.6	287.1	µg/L	102% 75-125	
	Pb	0.063	28.06	25.62	µg/L	91% 75-125	
B230001-MSD1	**Matrix Spike Duplicate, (2212445-05)**						
	Cu	ND	280.6	274.9	µg/L	98% 75-125	4% 20
	Pb	0.063	28.06	25.31	µg/L	90% 75-125	1% 20

Method Blanks & Reporting Limits

Batch: B223195
Matrix: Water
Method: EPA 1638 Mod
Analyte: As

Sample	Result	Units
B223195-BLK1	0.002	µg/L
B223195-BLK2	0.001	µg/L
B223195-BLK3	0.002	µg/L
B223195-BLK4	0.001	µg/L

Average: 0.002
Limit: 0.072

MDL: 0.016
MRL: 0.072

Analyte: Cd

Sample	Result	Units
B223195-BLK1	0.00002	µg/L
B223195-BLK2	0.0002	µg/L
B223195-BLK3	0.00002	µg/L
B223195-BLK4	0.0003	µg/L

Average: 0.000
Limit: 0.018

MDL: 0.006
MRL: 0.018

Analyte: Cr

Sample	Result	Units
B223195-BLK1	-0.017	µg/L
B223195-BLK2	0.005	µg/L
B223195-BLK3	0.020	µg/L
B223195-BLK4	0.003	µg/L

Average: 0.003
Limit: 0.600

MDL: 0.170
MRL: 0.600

Method Blanks & Reporting Limits

Analyte: Cu

Sample	Result	Units
B223195-BLK1	0.008	µg/L
B223195-BLK2	0.006	µg/L
B223195-BLK3	0.007	µg/L
B223195-BLK4	0.007	µg/L

Average: 0.007
Limit: 0.100

MDL: 0.050
MRL: 0.100

Analyte: Ni

Sample	Result	Units
B223195-BLK1	0.020	µg/L
B223195-BLK2	0.021	µg/L
B223195-BLK3	0.029	µg/L
B223195-BLK4	0.014	µg/L

Average: 0.021
Limit: 0.360

MDL: 0.120
MRL: 0.360

Analyte: Pb

Sample	Result	Units
B223195-BLK1	0.0003	µg/L
B223195-BLK2	0.0001	µg/L
B223195-BLK3	0.0002	µg/L
B223195-BLK4	-0.0001	µg/L

Average: 0.000
Limit: 0.012

MDL: 0.006
MRL: 0.012

Analyte: Zn

Sample	Result	Units
B223195-BLK1	-0.012	µg/L
B223195-BLK2	-0.016	µg/L
B223195-BLK3	0.005	µg/L
B223195-BLK4	-0.029	µg/L

Average: -0.013
Limit: 2.200

MDL: 0.700
MRL: 2.20

Method Blanks & Reporting Limits

Batch: B230001
Matrix: Water
Method: EPA 1638 Mod
Analyte: Cu

Sample	Result	Units
B230001-BLK1	0.018	µg/L
B230001-BLK2	0.003	µg/L
B230001-BLK3	0.011	µg/L
B230001-BLK4	0.008	µg/L

Average: 0.010 **MDL:** 0.050
Limit: 0.100 **MRL:** 0.100

Analyte: Pb

Sample	Result	Units
B230001-BLK1	-0.0004	µg/L
B230001-BLK2	-0.0001	µg/L
B230001-BLK3	-0.0002	µg/L
B230001-BLK4	0.0001	µg/L

Average: 0.000 **MDL:** 0.006
Limit: 0.012 **MRL:** 0.012

Sample Containers

Lab ID: 2212445-01 **Report Matrix:** Water **Collected:** 12/21/2022
Sample: DUP02-1222 **Sample Type:** Sample **Received:** 12/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0031	1% HNO3 (BAL)	2238023	1	Cooler - 2212445

Lab ID: 2212445-02 **Report Matrix:** Water **Collected:** 12/21/2022
Sample: DUP02-1222 **Sample Type:** Sample **Received:** 12/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0031	1% HNO3 (BAL)	2238023	1	Cooler - 2212445

Lab ID: 2212445-03 **Report Matrix:** Water **Collected:** 12/21/2022
Sample: MW1-1222 **Sample Type:** Sample **Received:** 12/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0031	1% HNO3 (BAL)	2238023	1	Cooler - 2212445

Lab ID: 2212445-04 **Report Matrix:** Water **Collected:** 12/21/2022
Sample: MW1-1222 **Sample Type:** Sample **Received:** 12/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0031	1% HNO3 (BAL)	2238023	1	Cooler - 2212445

Lab ID: 2212445-05 **Report Matrix:** Water **Collected:** 12/21/2022
Sample: MW5-1222 **Sample Type:** Sample **Received:** 12/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0031	1% HNO3 (BAL)	2238023	1	Cooler - 2212445

Lab ID: 2212445-06 **Report Matrix:** Water **Collected:** 12/21/2022
Sample: MW5-1222 **Sample Type:** Sample **Received:** 12/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0031	1% HNO3 (BAL)	2238023	1	Cooler - 2212445

Sample Containers

Lab ID: 2212445-07
Sample: MW6-1222
Report Matrix: Water
Sample Type: Sample
Collected: 12/21/2022
Received: 12/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0031	1% HNO3 (BAL)	2238023	1	Cooler - 2212445

Lab ID: 2212445-08
Sample: MW6-1222
Report Matrix: Water
Sample Type: Sample
Collected: 12/21/2022
Received: 12/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0031	1% HNO3 (BAL)	2238023	1	Cooler - 2212445

Lab ID: 2212445-09
Sample: MW4-1222
Report Matrix: Water
Sample Type: Sample
Collected: 12/22/2022
Received: 12/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0031	1% HNO3 (BAL)	2238023	1	Cooler - 2212445

Lab ID: 2212445-10
Sample: MW4-1222
Report Matrix: Water
Sample Type: Sample
Collected: 12/22/2022
Received: 12/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0031	1% HNO3 (BAL)	2238023	1	Cooler - 2212445

Lab ID: 2212445-11
Sample: MW3-1222
Report Matrix: Water
Sample Type: Sample
Collected: 12/22/2022
Received: 12/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0031	1% HNO3 (BAL)	2238023	1	Cooler - 2212445

Lab ID: 2212445-12
Sample: MW3-1222
Report Matrix: Water
Sample Type: Sample
Collected: 12/22/2022
Received: 12/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0031	1% HNO3 (BAL)	2238023	1	Cooler - 2212445

Sample Containers

Lab ID: 2212445-13
Sample: MW2-1222
Report Matrix: Water
Sample Type: Sample
Collected: 12/22/2022
Received: 12/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0031	1% HNO3 (BAL)	2238023	1	Cooler - 2212445

Lab ID: 2212445-14
Sample: MW2-1222
Report Matrix: Water
Sample Type: Sample
Collected: 12/22/2022
Received: 12/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0031	1% HNO3 (BAL)	2238023	1	Cooler - 2212445

Shipping Containers

Cooler - 2212445

Received: December 27, 2022 11:41
Tracking No: N/A via Courier
Coolant Type: Ice
Temperature: 4.3 °C

Description: Cooler
Damaged in transit? No
Returned to client? No
Comments: R-IR-2

Custody seals present? No
Custody seals intact? No
COC present? Yes

BROOKS APPLIED LABS

Chain-of-Custody Form

Ship samples to:
13751 Lake City Way NE, Suite 108
Seattle, WA 98125

For BAL use only
Received by: VF *Date:* 12/27/22
Work Order ID: *Time:* 11:41
Project ID:

Client: R. Jones / G. Hainsworth
Contact: R. Jones / CRETE Consulting
Client Project ID: Former Bunge Foods
Samples Collected By: Rusty Jones R. Jones
PO Number: CRETE
Phone: 832.330.1359
Email:
Mailing Address:
Email Receipt Confirmation? ([✓ Yes]/No)
BAL PM: Jeremy Maute

Requested TAT (business days)
☒ 20 (standard)
☐ 15*
☐ 10*
☐ 5*
☐ Other ____
*Surcharges may apply to expedited TATs

	Sample ID	Collection: Date	Collection: Time	Client Sample Info: Matrix Type	Number of Containers	Field Filtered? (Yes/No)	Preservation Type HCl/HNO$_3$/Other	BAL Analyses Required: Total Hg, EPA 1631	Methyl Hg, EPA 1630	TOTAL ICP-MS Metals 1638 (specify) *See List*	As Species (specify) InOrg, III, V, MMA, DMA	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify) 1638 Dissolved Metals *see List	Other (specify)	Comments: Total & Dissolved Metals List: Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Zinc Specify Here
1	DUP02-1222	12/21/2022	0002	WATER	2	Y&N	NONE			X				X		>10 mS/cm
2	MW1-1222		2139		2					X				X		14.8 mS/cm
3	MW5-1222		2226		2					X				X		3.70 mS/cm
4	MW6-1222		2315		2					X				X		13.8 mS/cm
5	MW4-1222	12/22/2022	2223		2					X				X		1.33 mS/cm
6	MW3-1222		2258		2					X				X		33.9 mS/cm
7	MW2-1222		2331		2					X				X		29.0 mS/cm
8	~~MW1-1222~~ RS															RS
9																
10																
	Trip Blank															

Relinquished By: R. Jones	Date: 12/21/22	Time: 1141	Relinquished By:
Received By:	Date: 12/27/22	Time: 11:41	Total Number of Packages:

Date: Time:

Page 1 of 1

List Hazardous Contaminants:

samples@brooksapplied.com | brooksapplied.com

Courier

11.4

Attach Waybill Here

C
S

Sample Receipt Checklist:

Container Type: Container 1 of 1

☒ Cooler
☐ Cardboard box
☐ Styrofoam cooler
☐ Other (Specify):

☐ Custody Seal Present?
Custody Seal Intact? Y / N
☑ Chain of Custody Present?

Coolant and Temperature

Coolant Type:

☐ None ☐ Blue Ice
☒ Ice: ☐ Dry Ice

IR# R-IR-2
Measured Temp[1]: 4.3 °C
Corrected Temp: 4.3 °C
☐ Temp Blank[2]: °C

1) n of samples >3, observe three measurements, record average
2) Record temp blank as a corrected temp

Coolant Note:

Bottle Type:

☐ Client Provided
☒ Class : Trace Metals
Size / Type: 125mL HDPE
Lot: 21-0031
Preservation: None
Preservative Lot: NA

☐ Class :
Size / Type:
Lot:
Preservation:
Preservative Lot:

☐ Class :
Size / Type:
Lot:
Preservation:
Preservative Lot:

All information accurate
Initial/date:
VF 12/27/22

BROOKS APPLIED LABS
13751 Lake City Way NE, Ste 108, Seattle, WA 98125 • USA • T:206-632-6206 • info@brooksapplied.com

May 3, 2023

Crete Consulting
ATTN: Rusty Jones
108 S. Washington Street, Suite 300
Seattle, WA 98104
832-330-1359
rusty.jones@creteconsulting.com

RE: Project CRC-SE2101 Client Project: Bridge Point Seattle 130

Rusty Jones,

On March 6, 2023, Brooks Applied Labs (BAL) received three (3) aqueous samples in a sealed cooler at an acceptable temperature of 1.6°C. The samples were logged-in for total recoverable and dissolved (*arsenic [As], cadmium [Cd], chromium [Cr], copper [Cu], lead [Pb], nickel [Ni], and zinc [Zn]*) analyses, according to the issued quotation. Samples for dissolved analyses were 0.45μm filtered prior to receipt. All sample fractions for (*As, Cd, Cr, Cu, Pb, Ni, and Zn*) were preserved to a pH <2 upon receipt at BAL.

Total Recoverable and Dissolved (As, Cd, Cr, Cu, Pb, Ni, and Zn) Quantitation by ICP-QQQ-MS
Each aqueous sample fraction for total recoverable or dissolved Se was digested on a hotblock apparatus with nitric and hydrochloric acids. The resulting digests were analyzed for (*As, Cd, Cr, Cu, Pb, Ni, and Zn*) content via inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS instrumentation uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the Interference Reduction Technology section on our website, brooksapplied.com.

Batch B230566
Sample results were *not* method blank corrected, as described in the calculations section of the relevant BAL SOPs. All results were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

The certified concentration for nickel in the reference material sample (B230566-SRM1) was less than five times the reporting limit. Consequently, the nickel recovery is not reported for B230566-SRM1. In this case, the blank spike sample (B230566-BS1) recovery is used as a demonstration of acceptable precision.

All samples in batch B230566 were bracketed by a continuous calibration blank (S230242-CCBD) with a zinc value (4.21 μg/L) greater than the associated reporting limit (*zinc MRL = 2.20 μg/L*). Zinc values for client samples (2303063-02, 2303063-05, and 2303063-06) were less than the MRL. The potential impact of the zinc hit in S230242-CCBD is negligible for (2303063-02, 2303063-05, and 2303063-06). No corrective actions were required due to the CCB outlier for these samples. Samples (2303063-01, 2303063-03, and 2303063-04) were re-analyzed in a separate sequence and zinc is reported from the subsequent injections with clean bracketing CCBs.

In instances where the analyte concentration of a standard reference material (SRM) is not certified but instead has been listed only as an informational value by the certifying agency, the recovery limits have been set as not applicable (N/A). In such cases the measured concentrations have been provided for informational purposes, but the laboratory fortified blank and/or matrix spike recoveries may be more reflective of the performance of the applied methods.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL, the relative percent difference (RPD) was not calculated (N/C).

Except for concentration qualifiers, all data were reported without qualification. All associated quality control sample results met the acceptance criteria.

BAL verifies that the reported results of all analyses for which the laboratory is accredited meet the requirements of the accrediting body, unless otherwise noted in the report narrative. For more information regarding accreditations please see the *Report Information* and *Batch Summary* pages. This report must be used in its entirety for interpretation of results.

Please feel free to contact us if you have any questions regarding this report.

Sincerely,

Jeremy Maute
Senior Project Manager
Brooks Applied Labs
Jeremy@brooksapplied.com

Report Information

General Disclaimers

Test results are based solely upon the sample submitted to Brooks Applied Labs in the condition it was received . This report shall not be reproduced or copied, except in full, without written approval of the laboratory. Brooks Applied Labs is not responsible for the consequences arising from the use of a partial report.

Laboratory Accreditation

BAL maintains accreditation with various state and national agencies for select test methods. For a current list of BAL accreditations, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. The reported analyte/matrix/method combination shall be considered outside BAL's scopes of accreditation unless otherwise identified as ISO, TNI, or ISO,TNI in the tables. It is the responsibility of the client to verify whether a specific accreditation is required for the intended data use.

ISO: ISO/IEC 17025:2017 accredited test method. Issued by ANSI National Accreditation Board (ANAB), #ADE-1447.02

TNI: NELAP accredited test method. Issued by the State of Florida Department of Health, #E87982.

ISO,TNI: Test method is accredited under both the ISO/IEC 17025:2017 and NELAP accreditations referenced above.

Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

Common Abbreviations

AR	as received	**MS**	matrix spike
BAL	Brooks Applied Labs	**MSD**	matrix spike duplicate
BLK	method blank	**ND**	non-detect
BS	blank spike	**NR**	non-reportable
CAL	calibration standard	**N/C**	not calculated
CCB	continuing calibration blank	**PS**	post preparation spike
CCV	continuing calibration verification	**REC**	percent recovery
COC	chain of custody record	**RPD**	relative percent difference
D	dissolved fraction	**SCV**	secondary calibration verification
DUP	duplicate	**SOP**	standard operating procedure
IBL	instrument blank	**SRM**	reference material
ICV	initial calibration verification	**T**	total fraction
MDL	method detection limit	**TR**	total recoverable fraction
MRL	method reporting limit		

Definition of Data Qualifiers

E	An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
H	Holding time and/or preservation requirements not met. Please see narrative for explanation.
J	Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
J-1	Estimated value. A full explanation is presented in the narrative.
M	Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N	Spike recovery was not within acceptance criteria. Please see narrative for explanation.
R	Rejected, unusable value. A full explanation is presented in the narrative.
U	Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
X	Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.
Z	Holding time and/or preservation requirements not established for this method; however, BAL recommendations for holding time were not followed. Please see narrative for explanation.

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
RI-SB-04	2303063-01	Water	Sample	02/28/2023	03/06/2023
RI-SB-04	2303063-02	Water	Sample	02/28/2023	03/06/2023
RI-SB-05	2303063-03	Water	Sample	02/28/2023	03/06/2023
RI-SB-05	2303063-04	Water	Sample	02/28/2023	03/06/2023
RI-SB-06	2303063-05	Water	Sample	02/28/2023	03/06/2023
RI-SB-06	2303063-06	Water	Sample	02/28/2023	03/06/2023

Batch Summary

Analyte	Lab Matrix	Method	Accred.	Prepared	Analyzed	Batch	Sequence
As	Water	EPA 1638 Mod	ISO,TNI	03/09/23	03/09/23	B230566	S230242
Cd	Water	EPA 1638 Mod	ISO,TNI	03/09/23	03/09/23	B230566	S230242
Cr	Water	EPA 1638 Mod	ISO,TNI	03/09/23	03/09/23	B230566	S230242
Cu	Water	EPA 1638 Mod	ISO,TNI	03/09/23	03/09/23	B230566	S230242
Ni	Water	EPA 1638 Mod	ISO,TNI	03/09/23	03/09/23	B230566	S230242
Pb	Water	EPA 1638 Mod	ISO,TNI	03/09/23	03/09/23	B230566	S230242
Zn	Water	EPA 1638 Mod	ISO,TNI	03/09/23	03/09/23	B230566	S230242
Zn	Water	EPA 1638 Mod	ISO,TNI	03/09/23	03/10/23	B230566	S230246

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
RI-SB-04										
2303063-01	As	Water	TR	0.944		0.162	0.727	µg/L	B230566	S230242
2303063-01	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B230566	S230242
2303063-01	Cr	Water	TR	7.21		1.72	6.06	µg/L	B230566	S230242
2303063-01	Cu	Water	TR	5.66		0.505	1.01	µg/L	B230566	S230242
2303063-01	Ni	Water	TR	3.58	J	1.21	3.64	µg/L	B230566	S230242
2303063-01	Pb	Water	TR	1.35		0.061	0.121	µg/L	B230566	S230242
2303063-01	Zn	Water	TR	65.7		7.07	22.2	µg/L	B230566	S230246
RI-SB-04										
2303063-02	As	Water	D	≤ 0.162	U	0.162	0.727	µg/L	B230566	S230242
2303063-02	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B230566	S230242
2303063-02	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B230566	S230242
2303063-02	Cu	Water	D	≤ 0.505	U	0.505	1.01	µg/L	B230566	S230242
2303063-02	Ni	Water	D	≤ 1.21	U	1.21	3.64	µg/L	B230566	S230242
2303063-02	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B230566	S230242
2303063-02	Zn	Water	D	≤ 7.07	U	7.07	22.2	µg/L	B230566	S230242
RI-SB-05										
2303063-03	As	Water	TR	1.68		0.162	0.727	µg/L	B230566	S230242
2303063-03	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B230566	S230242
2303063-03	Cr	Water	TR	3.19	J	1.72	6.06	µg/L	B230566	S230242
2303063-03	Cu	Water	TR	7.00		0.505	1.01	µg/L	B230566	S230242
2303063-03	Ni	Water	TR	2.67	J	1.21	3.64	µg/L	B230566	S230242
2303063-03	Pb	Water	TR	1.82		0.061	0.121	µg/L	B230566	S230242
2303063-03	Zn	Water	TR	138		7.07	22.2	µg/L	B230566	S230246
RI-SB-05										
2303063-04	As	Water	D	0.766		0.162	0.727	µg/L	B230566	S230242
2303063-04	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B230566	S230242
2303063-04	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B230566	S230242
2303063-04	Cu	Water	D	≤ 0.505	U	0.505	1.01	µg/L	B230566	S230242
2303063-04	Ni	Water	D	1.41	J	1.21	3.64	µg/L	B230566	S230242
2303063-04	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B230566	S230242
2303063-04	Zn	Water	D	123		7.07	22.2	µg/L	B230566	S230246

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
RI-SB-06										
2303063-05	As	Water	TR	11.5		0.162	0.727	µg/L	B230566	S230242
2303063-05	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B230566	S230242
2303063-05	Cr	Water	TR	7.02		1.72	6.06	µg/L	B230566	S230242
2303063-05	Cu	Water	TR	9.38		0.505	1.01	µg/L	B230566	S230242
2303063-05	Ni	Water	TR	4.13		1.21	3.64	µg/L	B230566	S230242
2303063-05	Pb	Water	TR	2.22		0.061	0.121	µg/L	B230566	S230242
2303063-05	Zn	Water	TR	19.0	J	7.07	22.2	µg/L	B230566	S230242
RI-SB-06										
2303063-06	As	Water	D	11.1		0.162	0.727	µg/L	B230566	S230242
2303063-06	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B230566	S230242
2303063-06	Cr	Water	D	3.48	J	1.72	6.06	µg/L	B230566	S230242
2303063-06	Cu	Water	D	≤ 0.505	U	0.505	1.01	µg/L	B230566	S230242
2303063-06	Ni	Water	D	2.17	J	1.21	3.64	µg/L	B230566	S230242
2303063-06	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B230566	S230242
2303063-06	Zn	Water	D	8.80	J	7.07	22.2	µg/L	B230566	S230242

Accuracy & Precision Summary

Batch: B230566
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B230566-BS1	**Blank Spike, (2310021)**						
	As		27.78	24.76	µg/L	89% 75-125	
	Cd		2.778	2.589	µg/L	93% 75-125	
	Cr		27.78	24.48	µg/L	88% 75-125	
	Cu		27.78	24.09	µg/L	87% 75-125	
	Ni		27.78	28.15	µg/L	101% 75-125	
	Pb		2.778	2.458	µg/L	88% 75-125	
	Zn		27.78	32.17	µg/L	116% 75-125	
B230566-SRM1	**Reference Material (2305016, T221 - bottle 1)**						
	As		17.70	16.87	µg/L	95% 75-125	
	Cd		0.03800	0.031	µg/L	81% 75-125	
	Cr		1.710	1.561	µg/L	91% 75-125	
	Cu		3.780	3.368	µg/L	89% 75-125	
	Pb		0.4900	0.428	µg/L	87% 75-125	
	Zn		25.20	23.15	µg/L	92% 75-125	
B230566-DUP1	**Duplicate, (2303063-05)**						
	As	11.48		10.98	µg/L		4% 20
	Cd	ND		ND	µg/L		N/C 20
	Cr	7.017		6.721	µg/L		4% 20
	Cu	9.385		9.003	µg/L		4% 20
	Ni	4.131		4.090	µg/L		1% 20
	Pb	2.219		2.127	µg/L		4% 20
	Zn	18.98		18.06	µg/L		5% 20
B230566-MS1	**Matrix Spike, (2303063-05)**						
	As	11.48	28.06	36.11	µg/L	88% 75-125	
	Cd	ND	2.806	2.534	µg/L	90% 75-125	
	Cr	7.017	28.06	32.01	µg/L	89% 75-125	
	Cu	9.385	28.06	34.76	µg/L	90% 75-125	
	Ni	4.131	28.06	29.03	µg/L	89% 75-125	
	Pb	2.219	2.806	4.682	µg/L	88% 75-125	
	Zn	18.98	28.06	43.86	µg/L	89% 75-125	

Accuracy & Precision Summary

Batch: B230566
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits	
B230566-MSD1	**Matrix Spike Duplicate, (2303063-05)**								
	As	11.48	28.06	36.32	µg/L	89%	75-125	0.6%	20
	Cd	ND	2.806	2.647	µg/L	94%	75-125	4%	20
	Cr	7.017	28.06	38.25	µg/L	111%	75-125	18%	20
	Cu	9.385	28.06	40.64	µg/L	111%	75-125	16%	20
	Ni	4.131	28.06	29.93	µg/L	92%	75-125	3%	20
	Pb	2.219	2.806	4.812	µg/L	92%	75-125	3%	20
	Zn	18.98	28.06	45.79	µg/L	96%	75-125	4%	20

Method Blanks & Reporting Limits

Batch: B230566
Matrix: Water
Method: EPA 1638 Mod
Analyte: As

Sample	Result	Units
B230566-BLK1	-0.002	µg/L
B230566-BLK2	-0.0004	µg/L
B230566-BLK3	-0.0004	µg/L
B230566-BLK4	0.002	µg/L

Average: 0.000 **MDL:** 0.016
Limit: 0.072 **MRL:** 0.072

Analyte: Cd

Sample	Result	Units
B230566-BLK1	-0.0002	µg/L
B230566-BLK2	-0.0003	µg/L
B230566-BLK3	-0.0006	µg/L
B230566-BLK4	0.0004	µg/L

Average: 0.000 **MDL:** 0.006
Limit: 0.018 **MRL:** 0.018

Analyte: Cr

Sample	Result	Units
B230566-BLK1	-0.0004	µg/L
B230566-BLK2	0.0008	µg/L
B230566-BLK3	-0.0006	µg/L
B230566-BLK4	0.010	µg/L

Average: 0.002 **MDL:** 0.170
Limit: 0.600 **MRL:** 0.600

Method Blanks & Reporting Limits

Analyte: Cu

Sample	Result	Units
B230566-BLK1	-0.010	µg/L
B230566-BLK2	-0.009	µg/L
B230566-BLK3	0.0002	µg/L
B230566-BLK4	0.015	µg/L

Average: -0.001
Limit: 0.100

MDL: 0.050
MRL: 0.100

Analyte: Ni

Sample	Result	Units
B230566-BLK1	-0.005	µg/L
B230566-BLK2	-0.005	µg/L
B230566-BLK3	-0.003	µg/L
B230566-BLK4	0.003	µg/L

Average: -0.003
Limit: 0.360

MDL: 0.120
MRL: 0.360

Analyte: Pb

Sample	Result	Units
B230566-BLK1	-0.0001	µg/L
B230566-BLK2	-0.0002	µg/L
B230566-BLK3	0.0003	µg/L
B230566-BLK4	0.001	µg/L

Average: 0.000
Limit: 0.012

MDL: 0.006
MRL: 0.012

Analyte: Zn

Sample	Result	Units
B230566-BLK1	-0.112	µg/L
B230566-BLK2	-0.103	µg/L
B230566-BLK3	0.275	µg/L
B230566-BLK4	1.47	µg/L

Average: 0.382
Limit: 2.200

MDL: 0.700
MRL: 2.20

Sample Containers

Lab ID: 2303063-01
Sample: RI-SB-04
Report Matrix: Water
Sample Type: Sample
Collected: 02/28/2023
Received: 03/06/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	22T-0033	1% HNO3 (BAL)	2246016	1	Cooler - 2303063

Lab ID: 2303063-02
Sample: RI-SB-04
Report Matrix: Water
Sample Type: Sample
Collected: 02/28/2023
Received: 03/06/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0064	1% HNO3 (BAL)	2246016	1	Cooler - 2303063

Lab ID: 2303063-03
Sample: RI-SB-05
Report Matrix: Water
Sample Type: Sample
Collected: 02/28/2023
Received: 03/06/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Client-Provided	125mL	n/a	1% HNO3 (BAL)	2246016	1	Cooler - 2303063

Lab ID: 2303063-04
Sample: RI-SB-05
Report Matrix: Water
Sample Type: Sample
Collected: 02/28/2023
Received: 03/06/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0031	1% HNO3 (BAL)	2246016	1	Cooler - 2303063

Lab ID: 2303063-05
Sample: RI-SB-06
Report Matrix: Water
Sample Type: Sample
Collected: 02/28/2023
Received: 03/06/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0064	1% HNO3 (BAL)	2246016	1	Cooler - 2303063

Lab ID: 2303063-06
Sample: RI-SB-06
Report Matrix: Water
Sample Type: Sample
Collected: 02/28/2023
Received: 03/06/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125mL	21-0064	1% HNO3 (BAL)	2246016	1	Cooler - 2303063

Shipping Containers

Cooler - 2303063

Received: March 6, 2023 14:07	**Description:** Cooler	**Custody seals present?** Yes
Tracking No: 3952 3107 4472 via FedEx	**Damaged in transit?** No	**Custody seals intact?** Yes
Coolant Type: None	**Returned to client?** No	**COC present?** Yes
Temperature: 1.6 °C	**Comments:** R-IR-4	

BROOKS APPLIED LABS

Chain-of-Custody Form

Ship samples to:
13751 Lake City Way NE, Suite 108
Seattle, WA 98125

For BAL use only
Received by: VF
Date: 3/6/23
Work Order ID:
Time: 1407
Project ID:

Client: Crete Consulting
Contact: Rusty Jones
Client Project ID: Bridge Point Seattle 130
Samples Collected By: Rusty Jones
PO Number:
Phone: 832.330.1359
Email: rusty.jones@creteconsulting.com
Mailing Address:
Email Receipt Confirmation? (Yes/No)
BAL PM: Jeremy Maute

Requested TAT (business days)
☒ 20 (standard)
☐ 15*
☐ 10*
☐ 5*
☐ Other ____

*Surcharges may apply to expedited TATs

	Collection		Client Sample Info				BAL Analyses Required								Comments
Sample ID	Date	Time	Matrix Type	Number of Containers	Field Filtered? (Yes/No)	Preservation Type HCl /HNO₃/Other	Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals (specify)	As Species (specify) InOrg, III, V, MMA, DMA	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify) 1638 Total – As, Cd, Cr, Cu, Pb, Ni,	Other (specify) 1638 Dissolved – As, Cd, Cr, Cu, Pb, Ni, Z	Metals List: As, Cd, Cr, Cu, Pb, Ni, Zn Total & Dissolved Specify Here
1 RI-SB-04	2/28/2023	0910	WATER	2	Y&N	NONE							X	X	~~Metals~~ SpC 2.13 mS/cm
2 RI-SB-05	↓	1020	↓	2	↓	↓							X	X	SpC 1.15 mS/cm
3 RI-SB-06	↓	1330	↓	2	↓	↓							X	X	SpC 0.72 mS/cm
4															
5															
6															
7															
8															
9															
10															
Trip Blank															

Relinquished By: R. Jones	Date: 3/1/2023	Time: 1441	Relinquished By:	Date:	Time:
Received By:	Date: 3/6/23	Time: 1407	Total Number of Packages:		

Page 1 of 1
List Hazardous Contaminants:

samples@brooksapplied.com | brooksapplied.com

FROM: (832) 330-1359
RUSTY L JONES
1800 S JACKSON ST APT 243
Seattle WA 98144
US

SHIP DATE: 01MAR23
ACTWGT: 34.20 LB
CAD: 6994951/SSFE2401
DIMMED: 16 X 15 X 12 IN

RRDB EXP 12/23

TO **SAMPLE RECEIVING**
13751 LAKE CITY WAY NE STE108
Seattle WA 98125 **(US)**
(832) 330-1359 REF:
INV:
PO: DEPT:

FedEx
Ground
G

TRK# **3952 3107 4472**

98125

9622 0019 0 (000 000 0000) 0 00 3952 3107 4472

Sample Receipt Checklist:

Container Type: Container 1 of 1
☒ Cooler
☐ Cardboard box
☐ Styrofoam cooler
☐ Other (Specify):

☒ Custody Seal Present?
Custody Seal Intact? [✓ Y] N
☐ Chain of Custody Present?

Coolant and Temperature

Coolant Type:
☐ None ☐ Blue Ice
☒ Ice: ☐ Dry Ice
IR# IR-4
Measured Temp[1]: 1.6 °C
Corrected Temp: 1.6 °C
☐ Temp Blank[2]: °C

1) n of samples >3, observe three measurements, record average
2) Record temp blank as a corrected temp

Coolant Note:

Bottle Type:
☒ Client Provided
☒ Class: Trace Metals
Size / Type: 125mL HDPE
Lot: 21-0064
Preservation: None
Preservative Lot: NA

☒ Class: Trace Metals
Size / Type: 125mL HDPE
Lot: 22T-0033
Preservation: None
Preservative Lot: NA

☒ Class: Trace Metals
Size / Type: 125mL HDPE
Lot: 21-0031
Preservation: None
Preservative Lot: NA

All information accurate
Initial/date:
VF 3/6/23

Revised: 10/20/2022

Page 1 of 1

BROOKS APPLIED LABS
13751 Lake City Way NE, Ste 108, Seattle, WA 98125 • USA • T:206-632-6206 • info@brooksapplied.com

May 19, 2023

Crete Consulting
ATTN: Rusty Jones
108 S. Washington Street, Suite 300
Seattle, WA 98104
832-330-1359
rusty.jones@creteconsulting.com

RE: Project CRC-SE2101 Client Project: Bridge Point Seattle 130

Rusty Jones,

On March 29, 2023, Brooks Applied Labs (BAL) received eleven (11) aqueous samples in a sealed cooler at an acceptable temperature of 2.4°C. The samples were logged-in for total recoverable and dissolved (*arsenic [As], cadmium [Cd], chromium [Cr], copper [Cu], lead [Pb], nickel [Ni], and zinc [Zn]*) analyses, according to the issued quotation. Samples for dissolved analyses were 0.45µm filtered prior to receipt. All sample fractions for (*As, Cd, Cr, Cu, Pb, Ni, and Zn*) were preserved to a pH <2 upon receipt at BAL.

Total Recoverable and Dissolved (As, Cd, Cr, Cu, Pb, Ni, and Zn) Quantitation by ICP-QQQ-MS
Each aqueous sample fraction for total recoverable or dissolved Se was digested on a hotblock apparatus with nitric and hydrochloric acids. The resulting digests were analyzed for (*As, Cd, Cr, Cu, Pb, Ni, and Zn*) content via inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS instrumentation uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the Interference Reduction Technology section on our website, brooksapplied.com.

Batch B230801
Sample results were *not* method blank corrected, as described in the calculations section of the relevant BAL SOPs. All results were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

Zinc results for 2303503-11, 2303503-12, and batch QC set 3 (B230801-DUP3, B230801-MS3, B230801-MSD3) were greater than the value of the associated high calibration standard in sequence S230392. A high calibration verification (S230340-HCV1) standard was analyzed at 200.0 µg/L and the Zinc recovery was acceptable at 99%, demonstrating that the linear range of the analytical platform extended to 200.0 µg/L for Zinc. All Zinc results were less than 110% of the HCV standard at the instrument and thus within the linear range demonstrated by the HCV. No data were qualified for over calibration results, and no corrective actions were necessary.

The certified concentrations for nickel and cadmium in the reference material samples (B230801-SRM1 and B230801-SRM2) were less than five times the reporting limit. Consequently, nickel and cadmium recoveries were not reported for (B230801-SRM1 and B230801-SRM2). In this case, the blank spike sample (B230801-BS1 and B230801-BS2) recoveries were used as a demonstration of acceptable precision.

The dissolved copper result for *MW1-0323* (2303503-04) was greater than the corresponding total recoverable copper result (2303503-03). The dissolved copper result for *MW4-0323* (2303503-12) was greater than the corresponding total recoverable copper result (2303503-11). In each case, secondary criteria were met (*i.e., results ≤ 5x the MRL and results within one MRL of each other*). No qualification of data was necessary.

Batch B230824

Sample results were *not* method blank corrected, as described in the calculations section of the relevant BAL SOPs. All results were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the analyte concentration of a standard reference material (SRM) is not certified but instead has been listed only as an informational value by the certifying agency, the recovery limits have been set as not applicable (N/A). In such cases the measured concentrations have been provided for informational purposes, but the laboratory fortified blank and/or matrix spike recoveries may be more reflective of the performance of the applied methods.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL, the relative percent difference (RPD) was not calculated (N/C).

Except for concentration qualifiers, all data were reported without qualification. All associated quality control sample results met the acceptance criteria.

BAL verifies that the reported results of all analyses for which the laboratory is accredited meet the requirements of the accrediting body, unless otherwise noted in the report narrative. For more information regarding accreditations please see the *Report Information* and *Batch Summary* pages. This report must be used in its entirety for interpretation of results.

Please feel free to contact us if you have any questions regarding this report.

Sincerely,

Jeremy Maute
Senior Project Manager
Brooks Applied Labs
Jeremy@brooksapplied.com

Report Information

General Disclaimers

Test results are based solely upon the sample submitted to Brooks Applied Labs in the condition it was received . This report shall not be reproduced or copied, except in full, without written approval of the laboratory. Brooks Applied Labs is not responsible for the consequences arising from the use of a partial report.

Laboratory Accreditation

BAL maintains accreditation with various state and national agencies for select test methods. For a current list of BAL accreditations, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. The reported analyte/matrix/method combination shall be considered outside BAL's scopes of accreditation unless otherwise identified as ISO, TNI, or ISO,TNI in the tables. It is the responsibility of the client to verify whether a specific accreditation is required for the intended data use.

ISO: ISO/IEC 17025:2017 accredited test method. Issued by ANSI National Accreditation Board (ANAB), #ADE-1447.02

TNI: NELAP accredited test method. Issued by the State of Florida Department of Health, #E87982.

ISO,TNI: Test method is accredited under both the ISO/IEC 17025:2017 and NELAP accreditations referenced above.

Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

Common Abbreviations

AR	as received	**MS**	matrix spike
BAL	Brooks Applied Labs	**MSD**	matrix spike duplicate
BLK	method blank	**ND**	non-detect
BS	blank spike	**NR**	non-reportable
CAL	calibration standard	**N/C**	not calculated
CCB	continuing calibration blank	**PS**	post preparation spike
CCV	continuing calibration verification	**REC**	percent recovery
COC	chain of custody record	**RPD**	relative percent difference
D	dissolved fraction	**SCV**	secondary calibration verification
DUP	duplicate	**SOP**	standard operating procedure
IBL	instrument blank	**SRM**	reference material
ICV	initial calibration verification	**T**	total fraction
MDL	method detection limit	**TR**	total recoverable fraction
MRL	method reporting limit		

Definition of Data Qualifiers

E	An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
H	Holding time and/or preservation requirements not met. Please see narrative for explanation.
J	Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
J-1	Estimated value. A full explanation is presented in the narrative.
M	Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N	Spike recovery was not within acceptance criteria. Please see narrative for explanation.
R	Rejected, unusable value. A full explanation is presented in the narrative.
U	Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
X	Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.
Z	Holding time and/or preservation requirements not established for this method; however, BAL recommendations for holding time were not followed. Please see narrative for explanation.

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
DUP01-0323	2303503-01	Water	Sample	03/25/2023	03/29/2023
DUP01-0323	2303503-02	Water	Sample	03/25/2023	03/29/2023
MW1-0323	2303503-03	Water	Sample	03/25/2023	03/29/2023
MW1-0323	2303503-04	Water	Sample	03/25/2023	03/29/2023
MW5-0323	2303503-05	Water	Sample	03/25/2023	03/29/2023
MW5-0323	2303503-06	Water	Sample	03/25/2023	03/29/2023
MW6-0323	2303503-07	Water	Sample	03/25/2023	03/29/2023
MW6-0323	2303503-08	Water	Sample	03/25/2023	03/29/2023
MW8-0323	2303503-09	Water	Sample	03/25/2023	03/29/2023
MW8-0323	2303503-10	Water	Sample	03/25/2023	03/29/2023
MW4-0323	2303503-11	Water	Sample	03/26/2023	03/29/2023
MW4-0323	2303503-12	Water	Sample	03/26/2023	03/29/2023
MW3-0323	2303503-13	Water	Sample	03/26/2023	03/29/2023
MW3-0323	2303503-14	Water	Sample	03/26/2023	03/29/2023
MW2-0323	2303503-15	Water	Sample	03/26/2023	03/29/2023
MW2-0323	2303503-16	Water	Sample	03/26/2023	03/29/2023
MW9-0323	2303503-17	Water	Sample	03/28/2023	03/29/2023
MW9-0323	2303503-18	Water	Sample	03/28/2023	03/29/2023
MW7-0323	2303503-19	Water	Sample	03/28/2023	03/29/2023
MW7-0323	2303503-20	Water	Sample	03/28/2023	03/29/2023
FILTER BLANK	2303503-21	Water	Sample	03/28/2023	03/29/2023

Batch Summary

Analyte	Lab Matrix	Method	Accred.	Prepared	Analyzed	Batch	Sequence
As	Water	EPA 1638 Mod	ISO,TNI	04/05/23	04/05/23	B230801	S230340
Cd	Water	EPA 1638 Mod	ISO,TNI	04/05/23	04/05/23	B230801	S230340
Cr	Water	EPA 1638 Mod	ISO,TNI	04/05/23	04/05/23	B230801	S230340
Cu	Water	EPA 1638 Mod	ISO,TNI	04/05/23	04/05/23	B230801	S230340
Cu	Water	EPA 1638 Mod	ISO,TNI	04/06/23	04/06/23	B230824	S230341
Ni	Water	EPA 1638 Mod	ISO,TNI	04/05/23	04/05/23	B230801	S230340
Pb	Water	EPA 1638 Mod	ISO,TNI	04/05/23	04/05/23	B230801	S230340
Zn	Water	EPA 1638 Mod	ISO,TNI	04/05/23	04/05/23	B230801	S230340

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
DUP01-0323										
2303503-01	As	Water	TR	8.55		0.162	0.727	µg/L	B230801	S230340
2303503-01	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B230801	S230340
2303503-01	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B230801	S230340
2303503-01	Cu	Water	TR	1.04		0.505	1.01	µg/L	B230801	S230340
2303503-01	Ni	Water	TR	2.17	J	1.21	3.64	µg/L	B230801	S230340
2303503-01	Pb	Water	TR	≤ 0.061	U	0.061	0.121	µg/L	B230801	S230340
2303503-01	Zn	Water	TR	≤ 7.07	U	7.07	22.2	µg/L	B230801	S230340
DUP01-0323										
2303503-02	As	Water	D	8.40		0.162	0.727	µg/L	B230801	S230340
2303503-02	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B230801	S230340
2303503-02	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B230801	S230340
2303503-02	Cu	Water	D	0.907	J	0.505	1.01	µg/L	B230801	S230340
2303503-02	Ni	Water	D	2.31	J	1.21	3.64	µg/L	B230801	S230340
2303503-02	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B230801	S230340
2303503-02	Zn	Water	D	≤ 7.07	U	7.07	22.2	µg/L	B230801	S230340
MW1-0323										
2303503-03	As	Water	TR	1.35		0.162	0.727	µg/L	B230801	S230340
2303503-03	Cd	Water	TR	0.252		0.061	0.182	µg/L	B230801	S230340
2303503-03	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B230801	S230340
2303503-03	Cu	Water	TR	1.91		0.505	1.01	µg/L	B230801	S230340
2303503-03	Ni	Water	TR	≤ 1.21	U	1.21	3.64	µg/L	B230801	S230340
2303503-03	Pb	Water	TR	≤ 0.061	U	0.061	0.121	µg/L	B230801	S230340
2303503-03	Zn	Water	TR	388		7.07	22.2	µg/L	B230801	S230340
MW1-0323										
2303503-04	As	Water	D	1.41		0.162	0.727	µg/L	B230801	S230340
2303503-04	Cd	Water	D	0.215		0.061	0.182	µg/L	B230801	S230340
2303503-04	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B230801	S230340
2303503-04	Cu	Water	D	2.91		0.505	1.01	µg/L	B230801	S230340
2303503-04	Ni	Water	D	≤ 1.21	U	1.21	3.64	µg/L	B230801	S230340
2303503-04	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B230801	S230340
2303503-04	Zn	Water	D	380		7.07	22.2	µg/L	B230801	S230340

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW5-0323										
2303503-05	As	Water	TR	0.555	J	0.162	0.727	µg/L	B230801	S230340
2303503-05	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B230801	S230340
2303503-05	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B230801	S230340
2303503-05	Cu	Water	TR	0.595	J	0.505	1.01	µg/L	B230801	S230340
2303503-05	Ni	Water	TR	1.86	J	1.21	3.64	µg/L	B230801	S230340
2303503-05	Pb	Water	TR	0.074	J	0.061	0.121	µg/L	B230801	S230340
2303503-05	Zn	Water	TR	684		7.07	22.2	µg/L	B230801	S230340
MW5-0323										
2303503-06	As	Water	D	0.443	J	0.162	0.727	µg/L	B230801	S230340
2303503-06	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B230801	S230340
2303503-06	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B230801	S230340
2303503-06	Cu	Water	D	≤ 0.505	U	0.505	1.01	µg/L	B230801	S230340
2303503-06	Ni	Water	D	≤ 1.21	U	1.21	3.64	µg/L	B230801	S230340
2303503-06	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B230801	S230340
2303503-06	Zn	Water	D	700		7.07	22.2	µg/L	B230801	S230340
MW6-0323										
2303503-07	As	Water	TR	≤ 0.404	U	0.404	1.82	µg/L	B230801	S230340
2303503-07	Cd	Water	TR	≤ 0.152	U	0.152	0.455	µg/L	B230801	S230340
2303503-07	Cr	Water	TR	≤ 4.29	U	4.29	15.2	µg/L	B230801	S230340
2303503-07	Cu	Water	TR	≤ 1.26	U	1.26	2.53	µg/L	B230801	S230340
2303503-07	Ni	Water	TR	≤ 3.03	U	3.03	9.09	µg/L	B230801	S230340
2303503-07	Pb	Water	TR	0.599		0.152	0.303	µg/L	B230801	S230340
2303503-07	Zn	Water	TR	≤ 17.7	U	17.7	55.6	µg/L	B230801	S230340
MW6-0323										
2303503-08	As	Water	D	≤ 0.404	U	0.404	1.82	µg/L	B230801	S230340
2303503-08	Cd	Water	D	≤ 0.152	U	0.152	0.455	µg/L	B230801	S230340
2303503-08	Cr	Water	D	≤ 4.29	U	4.29	15.2	µg/L	B230801	S230340
2303503-08	Cu	Water	D	≤ 1.26	U	1.26	2.53	µg/L	B230801	S230340
2303503-08	Ni	Water	D	≤ 3.03	U	3.03	9.09	µg/L	B230801	S230340
2303503-08	Pb	Water	D	≤ 0.152	U	0.152	0.303	µg/L	B230801	S230340
2303503-08	Zn	Water	D	≤ 17.7	U	17.7	55.6	µg/L	B230801	S230340

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW8-0323										
2303503-09	As	Water	TR	8.12		0.162	0.727	µg/L	B230801	S230340
2303503-09	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B230801	S230340
2303503-09	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B230801	S230340
2303503-09	Cu	Water	TR	0.966	J	0.505	1.01	µg/L	B230801	S230340
2303503-09	Ni	Water	TR	2.08	J	1.21	3.64	µg/L	B230801	S230340
2303503-09	Pb	Water	TR	≤ 0.061	U	0.061	0.121	µg/L	B230801	S230340
2303503-09	Zn	Water	TR	≤ 7.07	U	7.07	22.2	µg/L	B230801	S230340
MW8-0323										
2303503-10	As	Water	D	8.26		0.162	0.727	µg/L	B230801	S230340
2303503-10	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B230801	S230340
2303503-10	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B230801	S230340
2303503-10	Cu	Water	D	0.748	J	0.505	1.01	µg/L	B230801	S230340
2303503-10	Ni	Water	D	2.10	J	1.21	3.64	µg/L	B230801	S230340
2303503-10	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B230801	S230340
2303503-10	Zn	Water	D	≤ 7.07	U	7.07	22.2	µg/L	B230801	S230340
MW4-0323										
2303503-11	As	Water	TR	0.163	J	0.162	0.727	µg/L	B230801	S230340
2303503-11	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B230801	S230340
2303503-11	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B230801	S230340
2303503-11	Cu	Water	TR	0.720	J	0.505	1.01	µg/L	B230801	S230340
2303503-11	Ni	Water	TR	1.94	J	1.21	3.64	µg/L	B230801	S230340
2303503-11	Pb	Water	TR	≤ 0.061	U	0.061	0.121	µg/L	B230801	S230340
2303503-11	Zn	Water	TR	1380		7.07	22.2	µg/L	B230801	S230340
MW4-0323										
2303503-12	As	Water	D	≤ 0.162	U	0.162	0.727	µg/L	B230801	S230340
2303503-12	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B230801	S230340
2303503-12	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B230801	S230340
2303503-12	Cu	Water	D	1.33		0.505	1.01	µg/L	B230801	S230340
2303503-12	Ni	Water	D	2.04	J	1.21	3.64	µg/L	B230801	S230340
2303503-12	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B230801	S230340
2303503-12	Zn	Water	D	1310		7.07	22.2	µg/L	B230801	S230340

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW3-0323										
2303503-13	As	Water	TR	3.37		0.404	1.82	µg/L	B230801	S230340
2303503-13	Cd	Water	TR	≤ 0.152	U	0.152	0.455	µg/L	B230801	S230340
2303503-13	Cr	Water	TR	≤ 4.29	U	4.29	15.2	µg/L	B230801	S230340
2303503-13	Cu	Water	TR	4.64		1.26	2.53	µg/L	B230801	S230340
2303503-13	Ni	Water	TR	≤ 3.03	U	3.03	9.09	µg/L	B230801	S230340
2303503-13	Pb	Water	TR	0.920		0.152	0.303	µg/L	B230801	S230340
2303503-13	Zn	Water	TR	≤ 17.7	U	17.7	55.6	µg/L	B230801	S230340
MW3-0323										
2303503-14	As	Water	D	2.59		0.404	1.82	µg/L	B230801	S230340
2303503-14	Cd	Water	D	≤ 0.152	U	0.152	0.455	µg/L	B230801	S230340
2303503-14	Cr	Water	D	≤ 4.29	U	4.29	15.2	µg/L	B230801	S230340
2303503-14	Cu	Water	D	1.37	J	1.26	2.53	µg/L	B230801	S230340
2303503-14	Ni	Water	D	≤ 3.03	U	3.03	9.09	µg/L	B230801	S230340
2303503-14	Pb	Water	D	≤ 0.152	U	0.152	0.303	µg/L	B230801	S230340
2303503-14	Zn	Water	D	≤ 17.7	U	17.7	55.6	µg/L	B230801	S230340
MW2-0323										
2303503-15	As	Water	TR	2.86		0.404	1.82	µg/L	B230801	S230340
2303503-15	Cd	Water	TR	≤ 0.152	U	0.152	0.455	µg/L	B230801	S230340
2303503-15	Cr	Water	TR	≤ 4.29	U	4.29	15.2	µg/L	B230801	S230340
2303503-15	Cu	Water	TR	≤ 1.26	U	1.26	2.53	µg/L	B230801	S230340
2303503-15	Ni	Water	TR	≤ 3.03	U	3.03	9.09	µg/L	B230801	S230340
2303503-15	Pb	Water	TR	≤ 0.152	U	0.152	0.303	µg/L	B230801	S230340
2303503-15	Zn	Water	TR	≤ 17.7	U	17.7	55.6	µg/L	B230801	S230340
MW2-0323										
2303503-16	As	Water	D	2.82		0.404	1.82	µg/L	B230801	S230340
2303503-16	Cd	Water	D	≤ 0.152	U	0.152	0.455	µg/L	B230801	S230340
2303503-16	Cr	Water	D	≤ 4.29	U	4.29	15.2	µg/L	B230801	S230340
2303503-16	Cu	Water	D	≤ 1.26	U	1.26	2.53	µg/L	B230801	S230340
2303503-16	Ni	Water	D	≤ 3.03	U	3.03	9.09	µg/L	B230801	S230340
2303503-16	Pb	Water	D	≤ 0.152	U	0.152	0.303	µg/L	B230801	S230340
2303503-16	Zn	Water	D	≤ 17.7	U	17.7	55.6	µg/L	B230801	S230340

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MW9-0323										
2303503-17	As	Water	TR	3.59		0.162	0.727	µg/L	B230801	S230340
2303503-17	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B230801	S230340
2303503-17	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B230801	S230340
2303503-17	Cu	Water	TR	0.556	J	0.505	1.01	µg/L	B230824	S230341
2303503-17	Ni	Water	TR	1.23	J	1.21	3.64	µg/L	B230801	S230340
2303503-17	Pb	Water	TR	≤ 0.061	U	0.061	0.121	µg/L	B230801	S230340
2303503-17	Zn	Water	TR	≤ 7.07	U	7.07	22.2	µg/L	B230801	S230340
MW9-0323										
2303503-18	As	Water	D	3.31		0.162	0.727	µg/L	B230801	S230340
2303503-18	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B230801	S230340
2303503-18	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B230801	S230340
2303503-18	Cu	Water	D	≤ 0.505	U	0.505	1.01	µg/L	B230824	S230341
2303503-18	Ni	Water	D	≤ 1.21	U	1.21	3.64	µg/L	B230801	S230340
2303503-18	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B230801	S230340
2303503-18	Zn	Water	D	≤ 7.07	U	7.07	22.2	µg/L	B230801	S230340
MW7-0323										
2303503-19	As	Water	TR	0.448	J	0.162	0.727	µg/L	B230801	S230340
2303503-19	Cd	Water	TR	≤ 0.061	U	0.061	0.182	µg/L	B230801	S230340
2303503-19	Cr	Water	TR	≤ 1.72	U	1.72	6.06	µg/L	B230801	S230340
2303503-19	Cu	Water	TR	0.655	J	0.505	1.01	µg/L	B230801	S230340
2303503-19	Ni	Water	TR	≤ 1.21	U	1.21	3.64	µg/L	B230801	S230340
2303503-19	Pb	Water	TR	≤ 0.061	U	0.061	0.121	µg/L	B230801	S230340
2303503-19	Zn	Water	TR	≤ 7.07	U	7.07	22.2	µg/L	B230801	S230340
MW7-0323										
2303503-20	As	Water	D	0.415	J	0.162	0.727	µg/L	B230801	S230340
2303503-20	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B230801	S230340
2303503-20	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B230801	S230340
2303503-20	Cu	Water	D	0.521	J	0.505	1.01	µg/L	B230801	S230340
2303503-20	Ni	Water	D	1.40	J	1.21	3.64	µg/L	B230801	S230340
2303503-20	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B230801	S230340
2303503-20	Zn	Water	D	≤ 7.07	U	7.07	22.2	µg/L	B230801	S230340

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
FILTER BLANK										
2303503-21	As	Water	D	≤ 0.162	U	0.162	0.727	µg/L	B230801	S230340
2303503-21	Cd	Water	D	≤ 0.061	U	0.061	0.182	µg/L	B230801	S230340
2303503-21	Cr	Water	D	≤ 1.72	U	1.72	6.06	µg/L	B230801	S230340
2303503-21	Cu	Water	D	≤ 0.505	U	0.505	1.01	µg/L	B230801	S230340
2303503-21	Ni	Water	D	≤ 1.21	U	1.21	3.64	µg/L	B230801	S230340
2303503-21	Pb	Water	D	≤ 0.061	U	0.061	0.121	µg/L	B230801	S230340
2303503-21	Zn	Water	D	≤ 7.07	U	7.07	22.2	µg/L	B230801	S230340

Accuracy & Precision Summary

Batch: B230801
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B230801-BS1	**Blank Spike, (2240063)**						
	As		277.8	277.0	µg/L	100% 75-125	
	Cd		27.78	28.23	µg/L	102% 75-125	
	Cr		277.8	283.0	µg/L	102% 75-125	
	Cu		277.8	289.2	µg/L	104% 75-125	
	Ni		277.8	278.5	µg/L	100% 75-125	
	Pb		27.78	27.02	µg/L	97% 75-125	
	Zn		277.8	281.3	µg/L	101% 75-125	
B230801-BS2	**Blank Spike, (2240063)**						
	As		277.8	277.9	µg/L	100% 75-125	
	Cd		27.78	28.16	µg/L	101% 75-125	
	Cr		277.8	280.5	µg/L	101% 75-125	
	Cu		277.8	288.4	µg/L	104% 75-125	
	Ni		277.8	276.8	µg/L	100% 75-125	
	Pb		27.78	27.43	µg/L	99% 75-125	
	Zn		277.8	282.4	µg/L	102% 75-125	
B230801-SRM1	**Reference Material (2305017, T221 - bottle 2)**						
	As		17.88	17.79	µg/L	100% 75-125	
	Cr		1.727	1.679	µg/L	97% 75-125	
	Cu		3.818	3.800	µg/L	100% 75-125	
	Pb		0.4949	0.478	µg/L	97% 75-125	
	Zn		25.45	25.08	µg/L	99% 75-125	
B230801-SRM2	**Reference Material (2305017, T221 - bottle 2)**						
	As		17.88	17.51	µg/L	98% 75-125	
	Cr		1.727	1.665	µg/L	96% 75-125	
	Cu		3.818	3.801	µg/L	100% 75-125	
	Pb		0.4949	0.471	µg/L	95% 75-125	
	Zn		25.45	25.15	µg/L	99% 75-125	

Accuracy & Precision Summary

Batch: B230801
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits	
B230801-DUP2	**Duplicate, (2303503-01)**								
	As	8.553		8.378	µg/L			2%	20
	Cd	ND		ND	µg/L			N/C	20
	Cr	ND		ND	µg/L			N/C	20
	Cu	1.039		1.028	µg/L			1%	20
	Ni	2.167		2.208	µg/L			2%	20
	Pb	ND		ND	µg/L			N/C	20
	Zn	ND		ND	µg/L			N/C	20
B230801-MS2	**Matrix Spike, (2303503-01)**								
	As	8.553	280.6	303.5	µg/L	105%	75-125		
	Cd	ND	28.06	29.21	µg/L	104%	75-125		
	Cr	ND	280.6	297.1	µg/L	106%	75-125		
	Cu	1.039	280.6	295.7	µg/L	105%	75-125		
	Ni	2.167	280.6	293.8	µg/L	104%	75-125		
	Pb	ND	28.06	28.33	µg/L	101%	75-125		
	Zn	ND	280.6	288.8	µg/L	103%	75-125		
B230801-MSD2	**Matrix Spike Duplicate, (2303503-01)**								
	As	8.553	280.6	298.8	µg/L	103%	75-125	2%	20
	Cd	ND	28.06	28.13	µg/L	100%	75-125	4%	20
	Cr	ND	280.6	291.6	µg/L	104%	75-125	2%	20
	Cu	1.039	280.6	293.4	µg/L	104%	75-125	0.8%	20
	Ni	2.167	280.6	287.4	µg/L	102%	75-125	2%	20
	Pb	ND	28.06	27.74	µg/L	99%	75-125	2%	20
	Zn	ND	280.6	287.9	µg/L	103%	75-125	0.3%	20
B230801-DUP3	**Duplicate, (2303503-11)**								
	As	0.163		ND	µg/L			N/C	20
	Cd	ND		ND	µg/L			N/C	20
	Cr	ND		ND	µg/L			N/C	20
	Cu	0.720		0.765	µg/L			6%	20
	Ni	1.940		1.981	µg/L			2%	20
	Pb	ND		ND	µg/L			N/C	20
	Zn	1384		1413	µg/L			2%	20

Accuracy & Precision Summary

Batch: B230801
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits	
B230801-MS3	**Matrix Spike, (2303503-11)**								
	As	0.163	280.6	286.3	µg/L	102%	75-125		
	Cd	ND	28.06	28.11	µg/L	100%	75-125		
	Cr	ND	280.6	315.0	µg/L	112%	75-125		
	Cu	0.720	280.6	311.3	µg/L	111%	75-125		
	Ni	1.940	280.6	304.2	µg/L	108%	75-125		
	Pb	ND	28.06	26.98	µg/L	96%	75-125		
	Zn	1384	280.6	1779	µg/L	NR	75-125		
B230801-MSD3	**Matrix Spike Duplicate, (2303503-11)**								
	As	0.163	280.6	289.4	µg/L	103%	75-125	1%	20
	Cd	ND	28.06	28.17	µg/L	100%	75-125	0.2%	20
	Cr	ND	280.6	292.1	µg/L	104%	75-125	8%	20
	Cu	0.720	280.6	291.3	µg/L	104%	75-125	7%	20
	Ni	1.940	280.6	288.2	µg/L	102%	75-125	5%	20
	Pb	ND	28.06	27.55	µg/L	98%	75-125	2%	20
	Zn	1384	280.6	1669	µg/L	NR	75-125	N/C	20
B230801-DUP4	**Duplicate, (2303503-19)**								
	As	0.448		0.441	µg/L			2%	20
	Cd	ND		ND	µg/L			N/C	20
	Cr	ND		ND	µg/L			N/C	20
	Cu	0.655		ND	µg/L			N/C	20
	Ni	ND		ND	µg/L			N/C	20
	Pb	ND		ND	µg/L			N/C	20
	Zn	ND		ND	µg/L			N/C	20
B230801-MS4	**Matrix Spike, (2303503-19)**								
	As	0.448	280.6	286.1	µg/L	102%	75-125		
	Cd	ND	28.06	28.29	µg/L	101%	75-125		
	Cr	ND	280.6	333.0	µg/L	119%	75-125		
	Cu	0.655	280.6	330.3	µg/L	117%	75-125		
	Ni	ND	280.6	327.0	µg/L	117%	75-125		
	Pb	ND	28.06	27.48	µg/L	98%	75-125		
	Zn	ND	280.6	323.3	µg/L	115%	75-125		

Accuracy & Precision Summary

Batch: B230801
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits	
B230801-MSD4	**Matrix Spike Duplicate, (2303503-19)**								
	As	0.448	280.6	291.5	µg/L	104%	75-125	2%	20
	Cd	ND	28.06	28.37	µg/L	101%	75-125	0.3%	20
	Cr	ND	280.6	296.3	µg/L	106%	75-125	12%	20
	Cu	0.655	280.6	295.3	µg/L	105%	75-125	11%	20
	Ni	ND	280.6	293.5	µg/L	105%	75-125	11%	20
	Pb	ND	28.06	27.74	µg/L	99%	75-125	1%	20
	Zn	ND	280.6	291.3	µg/L	104%	75-125	10%	20

Accuracy & Precision Summary

Batch: B230824
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B230824-BS1	**Blank Spike, (2240063)**						
	Cu		277.8	260.2	µg/L	94% 75-125	
B230824-SRM1	**Reference Material (2305017, T221 - bottle 2)**						
	Cu		3.780	3.630	µg/L	96% 75-125	
B230824-DUP1	**Duplicate, (2303503-17)**						
	Cu	0.556		0.600	µg/L		8% 20
B230824-MS1	**Matrix Spike, (2303503-17)**						
	Cu	0.556	280.6	270.4	µg/L	96% 75-125	
B230824-MSD1	**Matrix Spike Duplicate, (2303503-17)**						
	Cu	0.556	280.6	256.6	µg/L	91% 75-125	5% 20

Method Blanks & Reporting Limits

Batch: B230801
Matrix: Water
Method: EPA 1638 Mod
Analyte: As

Sample	Result	Units
B230801-BLK1	0.005	µg/L
B230801-BLK2	0.006	µg/L
B230801-BLK3	0.005	µg/L
B230801-BLK4	0.005	µg/L

Average: 0.005
Limit: 0.072

MDL: 0.016
MRL: 0.072

Analyte: Cd

Sample	Result	Units
B230801-BLK1	-0.0003	µg/L
B230801-BLK2	-0.0005	µg/L
B230801-BLK3	-0.0005	µg/L
B230801-BLK4	-0.0001	µg/L

Average: 0.000
Limit: 0.018

MDL: 0.006
MRL: 0.018

Analyte: Cr

Sample	Result	Units
B230801-BLK1	0.121	µg/L
B230801-BLK2	-0.006	µg/L
B230801-BLK3	0.041	µg/L
B230801-BLK4	0.108	µg/L

Average: 0.066
Limit: 0.600

MDL: 0.170
MRL: 0.600

Method Blanks & Reporting Limits

Analyte: Cu

Sample	Result	Units
B230801-BLK1	0.033	µg/L
B230801-BLK2	0.015	µg/L
B230801-BLK3	0.018	µg/L
B230801-BLK4	0.050	µg/L

Average: 0.029
Limit: 0.100

MDL: 0.050
MRL: 0.100

Analyte: Ni

Sample	Result	Units
B230801-BLK1	0.013	µg/L
B230801-BLK2	0.007	µg/L
B230801-BLK3	0.044	µg/L
B230801-BLK4	0.012	µg/L

Average: 0.019
Limit: 0.360

MDL: 0.120
MRL: 0.360

Analyte: Pb

Sample	Result	Units
B230801-BLK1	0.002	µg/L
B230801-BLK2	0.002	µg/L
B230801-BLK3	0.002	µg/L
B230801-BLK4	0.002	µg/L

Average: 0.002
Limit: 0.012

MDL: 0.006
MRL: 0.012

Analyte: Zn

Sample	Result	Units
B230801-BLK1	0.536	µg/L
B230801-BLK2	0.603	µg/L
B230801-BLK3	0.687	µg/L
B230801-BLK4	1.70	µg/L

Average: 0.882
Limit: 2.200

MDL: 0.700
MRL: 2.20

Method Blanks & Reporting Limits

Batch: B230824
Matrix: Water
Method: EPA 1638 Mod
Analyte: Cu

Sample	Result	Units
B230824-BLK1	-0.001	µg/L
B230824-BLK2	0.008	µg/L
B230824-BLK3	-0.004	µg/L
B230824-BLK4	0.004	µg/L

Average: 0.002
Limit: 0.100

MDL: 0.050
MRL: 0.100

Sample Containers

Lab ID: 2303503-01 **Report Matrix:** Water **Collected:** 03/25/2023
Sample: DUP01-0323 **Sample Type:** Sample **Received:** 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-02 **Report Matrix:** Water **Collected:** 03/25/2023
Sample: DUP01-0323 **Sample Type:** Sample **Received:** 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-03 **Report Matrix:** Water **Collected:** 03/25/2023
Sample: MW1-0323 **Sample Type:** Sample **Received:** 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-04 **Report Matrix:** Water **Collected:** 03/25/2023
Sample: MW1-0323 **Sample Type:** Sample **Received:** 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-05 **Report Matrix:** Water **Collected:** 03/25/2023
Sample: MW5-0323 **Sample Type:** Sample **Received:** 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-06 **Report Matrix:** Water **Collected:** 03/25/2023
Sample: MW5-0323 **Sample Type:** Sample **Received:** 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Sample Containers

Lab ID: 2303503-07
Sample: MW6-0323
Report Matrix: Water
Sample Type: Sample
Collected: 03/25/2023
Received: 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-08
Sample: MW6-0323
Report Matrix: Water
Sample Type: Sample
Collected: 03/25/2023
Received: 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-09
Sample: MW8-0323
Report Matrix: Water
Sample Type: Sample
Collected: 03/25/2023
Received: 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-10
Sample: MW8-0323
Report Matrix: Water
Sample Type: Sample
Collected: 03/25/2023
Received: 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-11
Sample: MW4-0323
Report Matrix: Water
Sample Type: Sample
Collected: 03/26/2023
Received: 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-12
Sample: MW4-0323
Report Matrix: Water
Sample Type: Sample
Collected: 03/26/2023
Received: 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Sample Containers

Lab ID: 2303503-13
Sample: MW3-0323
Report Matrix: Water
Sample Type: Sample
Collected: 03/26/2023
Received: 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-14
Sample: MW3-0323
Report Matrix: Water
Sample Type: Sample
Collected: 03/26/2023
Received: 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-15
Sample: MW2-0323
Report Matrix: Water
Sample Type: Sample
Collected: 03/26/2023
Received: 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-16
Sample: MW2-0323
Report Matrix: Water
Sample Type: Sample
Collected: 03/26/2023
Received: 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-17
Sample: MW9-0323
Report Matrix: Water
Sample Type: Sample
Collected: 03/28/2023
Received: 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-18
Sample: MW9-0323
Report Matrix: Water
Sample Type: Sample
Collected: 03/28/2023
Received: 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Sample Containers

Lab ID: 2303503-19
Sample: MW7-0323
Report Matrix: Water
Sample Type: Sample
Collected: 03/28/2023
Received: 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-20
Sample: MW7-0323
Report Matrix: Water
Sample Type: Sample
Collected: 03/28/2023
Received: 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Lab ID: 2303503-21
Sample: FILTER BLANK
Report Matrix: Water
Sample Type: Sample
Collected: 03/28/2023
Received: 03/29/2023

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE ICP-W	125 mL	22T-0033	1% HNO3 (BAL)	2246016	<2	Cooler - 2303503

Shipping Containers

Cooler - 2303503

Received: March 29, 2023 11:54
Tracking No: none via Courier
Coolant Type: Ice
Temperature: 2.4 °C

Description: Cooler
Damaged in transit? No
Returned to client? No
Comments: R-IR-3

Custody seals present? No
Custody seals intact? No
COC present? Yes

BROOKS APPLIED LABS

Chain-of-Custody Form

Ship samples to:
13751 Lake City Way NE, Suite 108
Seattle, WA 98125

For BAL use only
BAL Report 2308503
Received by: VF
Date: 3/29/23
Work Order ID:
Time: 1154
Project ID:

Client: Crete Consulting
Contact: Rusty Jones
Client Project ID: Bridge Point Seattle 130
Samples Collected By: Rusty Jones
PO Number: Bridge Point Seattle 130
Phone: 832.330.1359
Email: rusty.jones@creteconsulting.com R. Jones
Mailing Address:
Email Receipt Confirmation? ([✓ Yes]/No)
BAL PM: R. Jones

Requested TAT (business days)
☒ 20 (standard)
☐ 15*
☐ 10*
☐ 5*
☐ Other ____

**Surcharges may apply to expedited TATs*

	Sample ID	Collection Date	Collection Time	Matrix Type	Number of Containers	Field Filtered? (Yes/No)	Preservation Type HCl /HNO$_3$/Other	Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals (specify) TOTAL 1638 Mod As, Co, Cr, Cu, Pb, Ni, Zn	As Species (specify) InOrg, III, V, MMA, DMA	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify) DISSOLVED 1638 Mod; As, Cd, Cr, Cu, Pb, Ni, Zn	Other (specify)	Comments: All conductivities reported in microSiemens/cm; Specify Here
1	DUP01-0323	3.25.2023	1200	WATER	2	Y&N	NONE			X				X		
2	MW1-0323	↓	1458	↓	2	↓	↓			X				X		Cond. 10228 uS/cm
3	MW5-0323	↓	1539	↓	2	↓	↓			X				X		Cond. 2224 uS/cm
4	MW6-0323	↓	1629	↓	2	↓	↓			X				X		Cond. 19736 uS/cm
5	MW8-0323	↓	1720	↓	2	↓	↓			X				X		Cond. 1.008 uS/cm
6	MW4-0323	3.26.2023	1521	WATER	2	↓	NONE			X				X		Cond. 2241 uS/cm
7	MW3-0323	↓	1602	↓	2	↓	↓			X				X		Cond. 30691 uS/cm
8	MW2-0323	↓	1649	↓	2	↓	↓			X				X		Cond. 25225 uS/cm
9	FILTER BLANK	3.28.2023	0905	WATER	1	Y	NONE							X		
10	MW9-0323	↓	0959	↓	2	Y&N	↓			X				X		Cond. 1.080 uS/cm
	Trip Blank															

Relinquished By: R. Jones	Date: ~~3.28.2023~~ 3/29/2023	Time: 1153	Relinquished By:
			Date:
			Time:
Received By:	Date: 3/29/23	Time: 1154	Total Number of Packages:

Page 1 of 2

List Hazardous Contaminants:

samples@brooksapplied.com | brooksapplied.com

BROOKS APPLIED LABS

Chain-of-Custody Form

Ship samples to:
13751 Lake City Way NE, Suite 108
Seattle, WA 98125

BAL Report 2303503
For BAL use only
Received by: VF *Date:* 3/29/23
Work Order ID: *Time:* 1154
Project ID:

Client: Crete Consulting
Contact: Rusty Jones
Client Project ID: Bridge Point Seattle 130
Samples Collected By: Rusty Jones R. Jones

PO Number: Bridge Point Seattle 130
Phone: 832.330.1359
Email: rusty.jones@creteconsulting.com

Mailing Address:
Email Receipt Confirmation? ([✓ Yes]/No)
BAL PM: Rusty Jones

Requested TAT (business days)
☒ 20 (standard)
☐ 15*
☐ 10*
☐ 5*
☐ Other ____

*Surcharges may apply to expedited TATs

	Sample ID	Collection: Date	Collection: Time	Client Sample Info: Matrix Type	Client Sample Info: Number of Containers	Client Sample Info: Field Filtered? (Yes/No)	Client Sample Info: Preservation Type HCl /HNO$_3$/Other	BAL Analyses Required: Total Hg, EPA 1631	BAL Analyses Required: Methyl Hg, EPA 1630	BAL Analyses Required: TOTAL 1638 Mod ICP-MS Metals (specify) As, Cd, Cr, Cu, Pb, Ni, Zn	BAL Analyses Required: As Species (specify) InOrg, III, V, MMA, DMA	BAL Analyses Required: Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	BAL Analyses Required: Filtration	BAL Analyses Required: DISSOLVED 1638 Mod, Other (specify) As, Cd, Cr, Cu, Pb, Ni, Zn	BAL Analyses Required: Other (specify)	Comments: All conductivities reported in microSiemens/cm Specify Here
1	MW7-0323	3.28.2023	1204	WATER	2	Y&N	NONE			X				X		Cond. 195.3 µS/cm
2																
3																
4																
5																
6																
7																
8																
9																
10																
	Trip Blank															

Relinquished By: R. Jones	Date: 3/29/2023	Time: 1153	Relinquished By:	Date:	Time:
Received By:	Date: 3/29/23	Time: 1154	Total Number of Packages:		

Page 2 of 2

List Hazardous Contaminants:

samples@brooksapplied.com | brooksapplied.com

Courier
11:54

Sample Receipt Checklist:

Container Type: Container ___ of ___

☒ Cooler
☐ Cardboard box
☐ Styrofoam cooler
☐ Other (Specify):

☐ Custody Seal Present?
Custody Seal Intact? Y / N
☒ Chain of Custody Present?

Coolant and Temperature

Coolant Type:

☐ None ☐ Blue Ice
☒ Ice: ☐ Dry Ice

IR# R-IR-3
Measured Temp[1]: 2.4 °C
Corrected Temp: 2.4 °C
☐ Temp Blank[2]: °C

1) n of samples >3, observe three measurements, record average
2) Record temp blank as a corrected temp

Coolant Note:

Bottle Type:

☐ Client Provided

☒ Class : Trace Metals
Size / Type: 125ML HDPE
Lot: 22T-0033
Preservation: None
Preservative Lot: NA

☒ Class : Trace Metals
Size / Type: 125ML HDPE
Lot: 21-0064
Preservation: None
Preservative Lot: NA

☐ Class :
Size / Type:
Lot:
Preservation:
Preservative Lot:

All information accurate
Initial/date:

VF 3/29/23

Revised: 10/20/2022

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

5500 4th Avenue South
Seattle, WA 98108
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 4, 2023

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on March 28, 2023 from the Bridge Point Seattle 130, F&BI 303448 project. There are 16 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grant Hainsworth
CTC0404R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on March 28, 2023 by Friedman & Bruya, Inc. from the Crete Consulting Bridge Point Seattle 130, F&BI 303448 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Crete Consulting
303448 -01	MW1-0323
303448 -02	MW5-0323
303448 -03	MW6-0323
303448 -04	MW8-0323
303448 -05	MW4-0323
303448 -06	MW3-0323
303448 -07	MW2-0323
303448 -08	DUP02-0323
303448 -09	DUP03-0323
303448 -10	MW9-0323
303448 -11	MW7-0323

All quality control requirements were acceptable.

Date of Report: 04/04/23
Date Received: 03/28/23
Project: Bridge Point Seattle 130, F&BI 303448
Date Extracted: 03/28/23
Date Analyzed: 03/29/23

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
MW8-0323 303448-04	2,300	122
DUP02-0323 303448-08	<100	107
MW9-0323 303448-10	<100	102
Method Blank 03-659 MB	<100	105

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW1-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-01
Date Analyzed:	03/30/23	Data File:	033009.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	71	132
Toluene-d8	94	68	139
4-Bromofluorobenzene	109	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW5-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-02
Date Analyzed:	03/30/23	Data File:	033010.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	71	132
Toluene-d8	97	68	139
4-Bromofluorobenzene	103	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	5.0
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	6.3
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	0.53
Tetrachloroethene	9.8

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW6-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-03
Date Analyzed:	03/30/23	Data File:	033011.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	71	132
Toluene-d8	101	68	139
4-Bromofluorobenzene	101	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW8-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-04
Date Analyzed:	03/30/23	Data File:	033012.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	71	132
Toluene-d8	111	68	139
4-Bromofluorobenzene	107	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1.5
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	9.0
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	0.98
Tetrachloroethene	2.6

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW4-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-05
Date Analyzed:	03/30/23	Data File:	033013.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	91	71	132
Toluene-d8	93	68	139
4-Bromofluorobenzene	103	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.11
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	1.9

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW3-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-06
Date Analyzed:	03/30/23	Data File:	033014.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	71	132
Toluene-d8	98	68	139
4-Bromofluorobenzene	105	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW2-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-07
Date Analyzed:	03/30/23	Data File:	033015.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	92	71	132
Toluene-d8	91	68	139
4-Bromofluorobenzene	104	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	DUP03-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-09
Date Analyzed:	03/30/23	Data File:	033016.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	71	132
Toluene-d8	103	68	139
4-Bromofluorobenzene	101	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.15
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW9-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-10
Date Analyzed:	03/30/23	Data File:	033017.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	71	132
Toluene-d8	92	68	139
4-Bromofluorobenzene	105	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	12
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	6.1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW7-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-11
Date Analyzed:	03/30/23	Data File:	033018.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	71	132
Toluene-d8	93	68	139
4-Bromofluorobenzene	100	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.14
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	03-0692 mb
Date Analyzed:	03/30/23	Data File:	033007.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	71	132
Toluene-d8	95	68	139
4-Bromofluorobenzene	101	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Date of Report: 04/04/23
Date Received: 03/28/23
Project: Bridge Point Seattle 130, F&BI 303448

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 303419-05 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	97	70-130

Date of Report: 04/04/23
Date Received: 03/28/23
Project: Bridge Point Seattle 130, F&BI 303448

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 303448-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	10	<0.02	95	16-176
Chloroethane	ug/L (ppb)	10	<1	110	50-150
1,1-Dichloroethene	ug/L (ppb)	10	<1	107	50-150
Methylene chloride	ug/L (ppb)	10	<5	95	40-143
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	102	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	105	50-150
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	109	50-150
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<0.2	101	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	105	50-150
Trichloroethene	ug/L (ppb)	10	<0.5	102	43-133
Tetrachloroethene	ug/L (ppb)	10	<1	105	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	10	95	93	70-130	2
Chloroethane	ug/L (ppb)	10	113	112	70-130	1
1,1-Dichloroethene	ug/L (ppb)	10	112	108	70-130	4
Methylene chloride	ug/L (ppb)	10	105	97	29-192	8
trans-1,2-Dichloroethene	ug/L (ppb)	10	106	103	70-130	3
1,1-Dichloroethane	ug/L (ppb)	10	109	107	70-130	2
cis-1,2-Dichloroethene	ug/L (ppb)	10	112	109	70-130	3
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	103	102	70-130	1
1,1,1-Trichloroethane	ug/L (ppb)	10	110	107	70-130	3
Trichloroethene	ug/L (ppb)	10	104	100	70-130	4
Tetrachloroethene	ug/L (ppb)	10	108	104	70-130	4

Data Qualifiers & Definitions

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

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

ca - The calibration results for the analyte were outside of acceptance criteria, biased high; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. The value reported is an estimate.

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

j - The analyte concentration is reported below the standard reporting limit. The value reported is an estimate.

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

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

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

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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

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

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

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

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

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

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

303448 [redacted]

SAMPLE CHAIN OF COUNTY

Report To R. Jones / G. Hainsworth
Company Crete Consulting
Address
City, State, ZIP
Phone Email

SAMPLE CHAIN OF CUSTODY 03/28/23 VWS

SAMPLERS (*signature*) Rusty Jones R. Jones [redacted]

PROJECT NAME	PO #
Bridge Point Seattle 130	
REMARKS Project specific RLs? - Yes / No	INVOICE TO CRETE

Page # 1 of 2

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

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	cVOCs				Notes
MW1-0323	01 A-C	3/25/2023	1458	WATER	3								X				
MW5-0323	02		1539		3								X				
MW6-0323	03		1629		3								X				
MW8-0323	04 A-F		1720		6		X						X				
MW4-0323	05 A-C	3/26/2023	1521		3								X				
MW3-0323	06		1602		3								X				
MW2-0323	07		1649		3								X				
DUP02-0323	08	3/28/2023	0001		3		X										
DUP03-0323	09		0002		3								X				
MW9-0323	10 A-F		0959		6 ~~3~~		X						X				

Samples received at 3 °C

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

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: R. Jones	Rusty Jones	CRETE	3/28/2023	1257
Received by:	Michael Erdahl	FeBm	3/28/23	1257
Relinquished by:				
Received by:				

303448 [redacted]

SAMPLE CHAIN OF CUSTODY 03/28/23 [redacted]

VW5

Report To R. Jones / G. Hallsworth

Company Crete Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*) Rusty Jones R. Jones

PROJECT NAME Bridge Point Seattle 130

PO #

REMARKS

INVOICE TO CRETE

Project specific RLs? - Yes / No

Page # 2 of 2

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

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

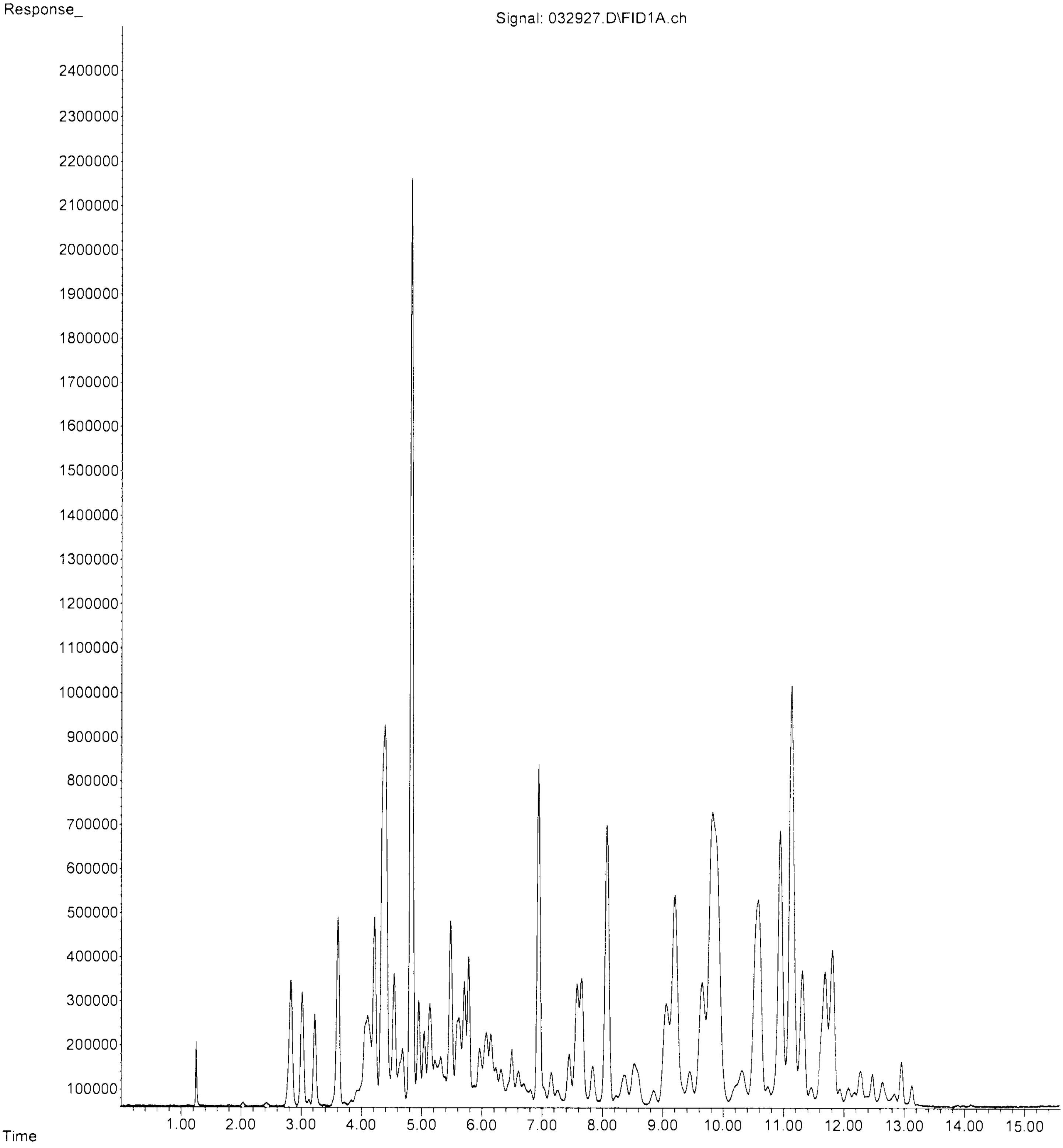
						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	cVOCs				Notes
MW7-0323	11 A-F	3/28/2023	~~0905~~ 1204	WATER	3								X				

Samples received at 3 °C

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

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: R. Jones	Rusty Jones	CRETE	3/28/2023	1257
Received by:	Michael Erdahl	F&Br	3/28/23	1257
Relinquished by:				
Received by:				

```
File       :Z:\Raw Data\GC11\03-29-23\032927.D
Operator   : al
Acquired   : 29 Mar 2023  12:59 pm using AcqMethod Gx.M
Instrument :   gc11
Sample Name: 303448-04
Misc Info  :
Vial Number: 26
```



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File        :Z:\Raw Data\GC11\03-29-23\032928.D
Operator    : al
Acquired    : 29 Mar 2023  01:18 pm using AcqMethod Gx.M
Instrument :   gc11
Sample Name: 303448-08
Misc Info  :
Vial Number: 27
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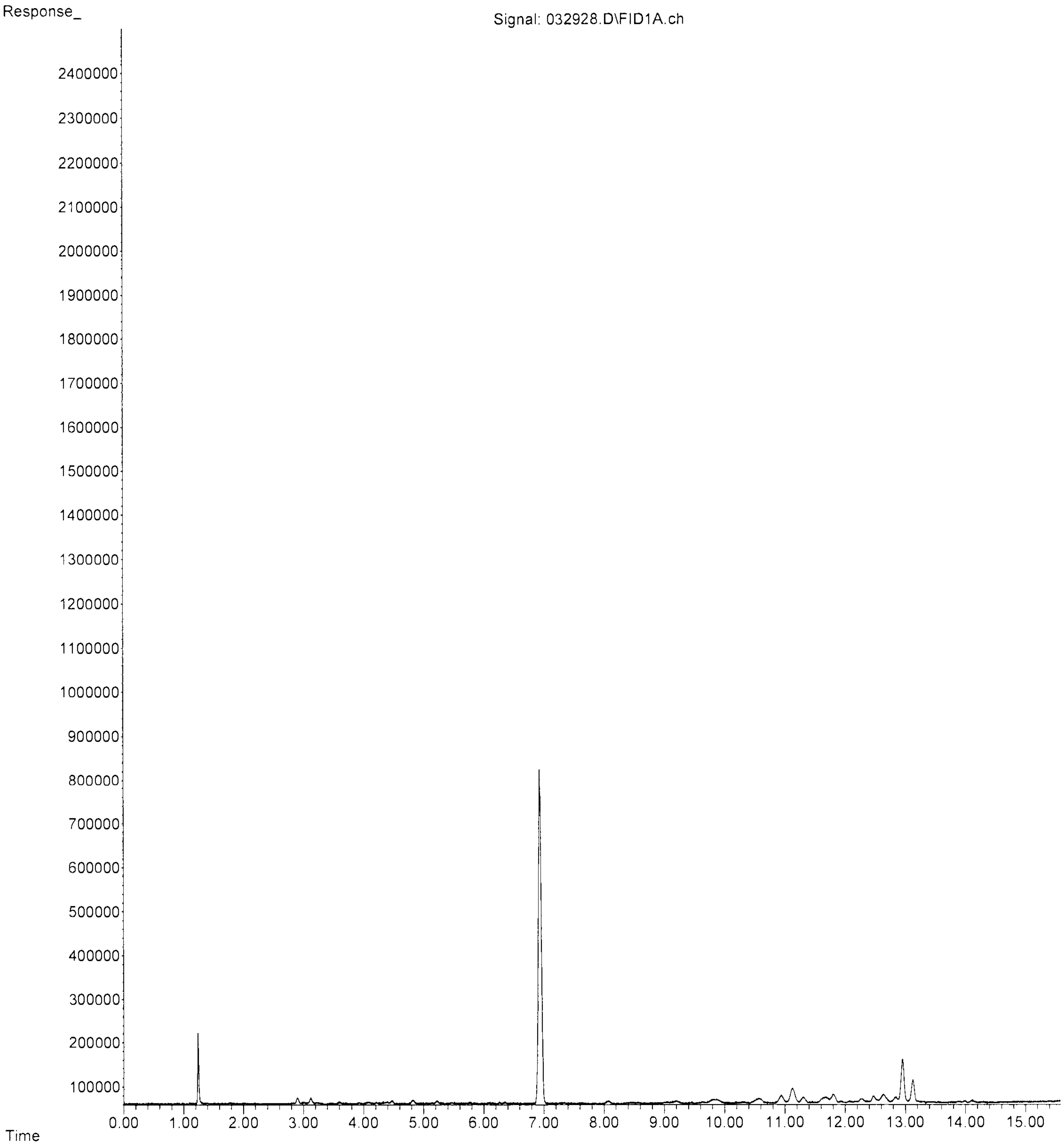
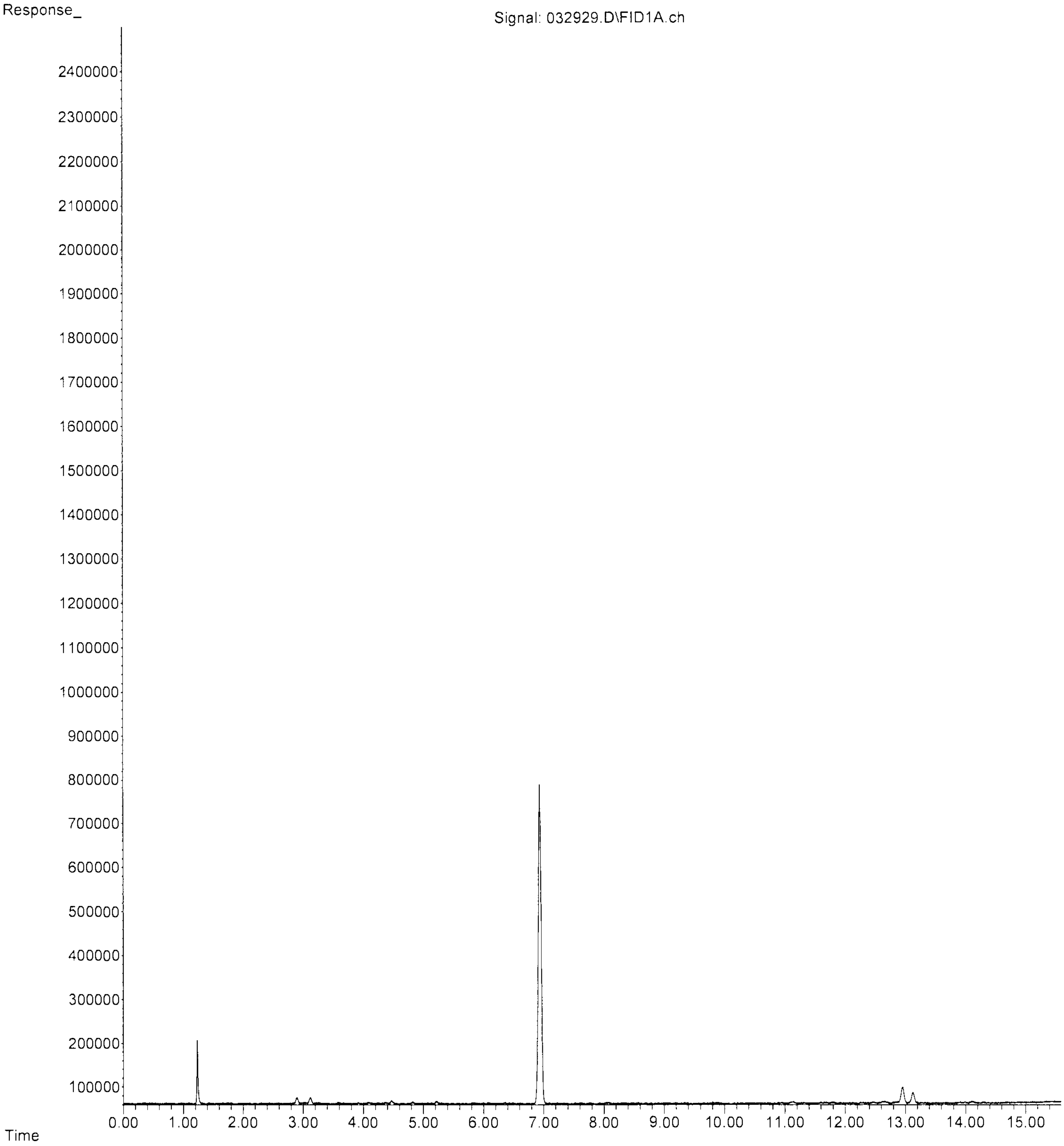


File   :Z:\Raw Data\GC11\03-29-23\032929.D
Operator   : al
Acquired   : 29 Mar 2023 01:38 pm using AcqMethod Gx.M
Instrument :   gc11
Sample Name: 303448-10
Misc Info :
Vial Number: 28



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File       :Z:\Raw Data\GC11\03-28-23\032804.D
Operator   : al
Acquired   : 28 Mar 2023  05:17 am using AcqMethod Gx.M
Instrument :   gc11
Sample Name: 03-659 mb
Misc Info  :
Vial Number: 3
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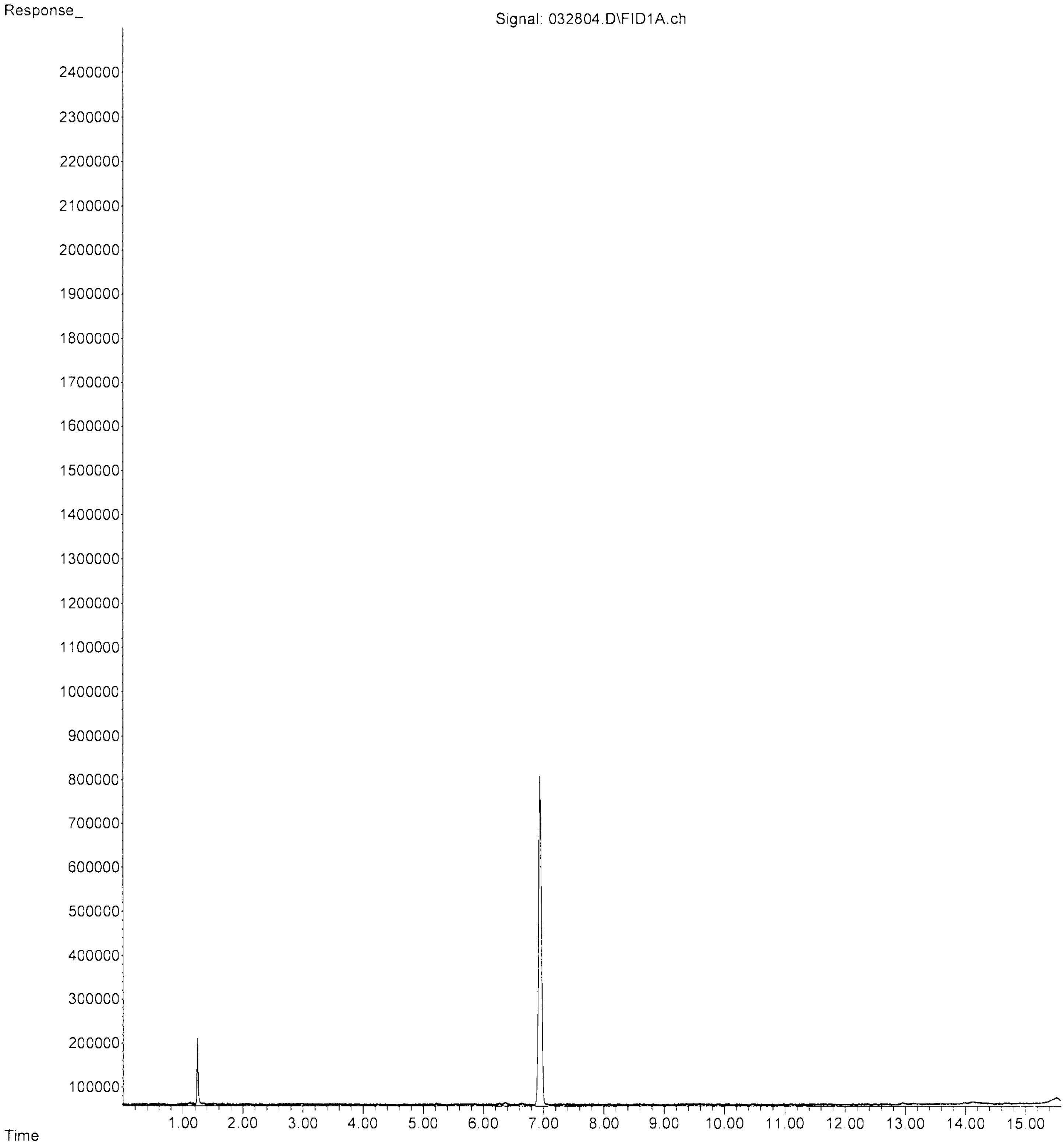

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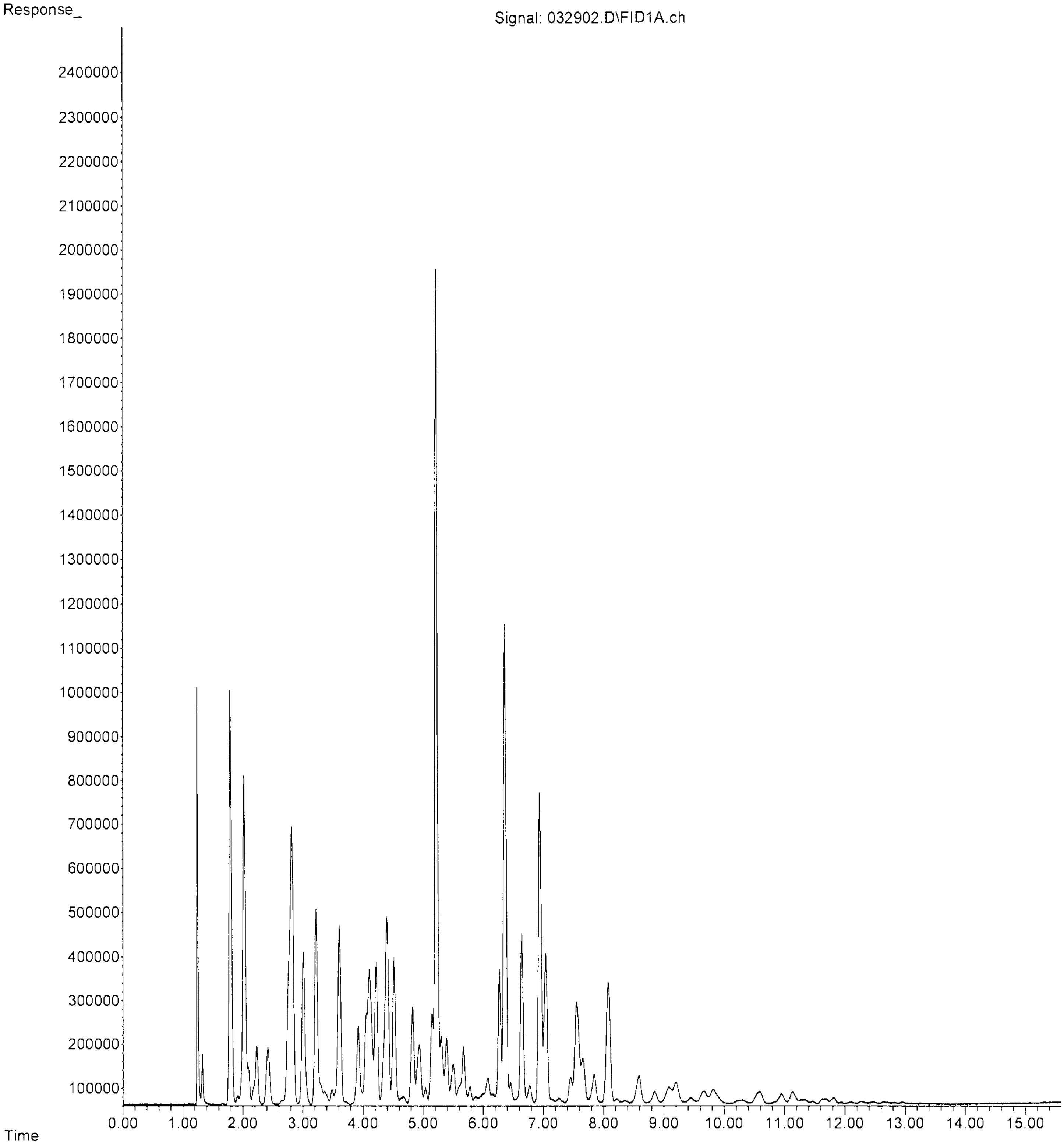
File       :Z:\Raw Data\GC11\03-29-23\032902.D
Operator   : al
Acquired   : 29 Mar 2023  04:43 am using AcqMethod Gx.M
Instrument :   gc11
Sample Name: 03-662 lcsg/ccg 68-106E #1
Misc Info  :
Vial Number: 1
```



FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

5500 4th Avenue South
Seattle, WA 98108
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 8, 2023

Grant Hainsworth, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Hainsworth:

Included are the results from the testing of material submitted on February 28, 2023 from the Bridge Point Seattle 130, F&BI 302388 project. There are 25 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Rusty Jones
CTC0308R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on February 28, 2023 by Friedman & Bruya, Inc. from the Crete Consulting Bridge Point Seattle 130, F&BI 302388 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Crete Consulting
302388 -01	RI-SB-04 2-4'
302388 -02	RI-SB-04 6-7'
302388 -03	RI-SB-04 11-12'
302388 -04	RI-SB-04
302388 -05	RI-SB-05 9-10'
302388 -06	RI-SB-05 12.5-14'
302388 -07	RI-SB-05
302388 -08	MW-9 8.5-10'
302388 -09	MW-9 14-15'
302388 -10	RI-SB-06 6-8'
302388 -11	RI-SB-06 12.5-13.5'
302388 -12	RI-SB-06
302388 -13	MW-7 8-10'
302388 -14	MW-7 16-18'
302388 -15	MW-8 13-14.5'
302388 -16	MW-8 11-13'
302388 -17	MW-8 8-10'
302388 -18	DUP-022823

All quality control requirements were acceptable.

Date of Report: 03/08/23
Date Received: 02/28/23
Project: Bridge Point Seattle 130, F&BI 302388
Date Extracted: 03/02/23
Date Analyzed: 03/02/23

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

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

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 58-139)
RI-SB-04 2-4’ 302388-01	11 x	97
MW-8 11-13’ 302388-16	<5	103
Method Blank 03-472 MB 03-02-23 05:33	<5	102

Date of Report: 03/08/23
Date Received: 02/28/23
Project: Bridge Point Seattle 130, F&BI 302388
Date Extracted: 03/01/23
Date Analyzed: 03/01/23

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

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

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 50-150)
RI-SB-04 2-4’ 302388-01	<50	<250	99
MW-8 11-13’ 302388-16	<50	<250	104
DUP-022823 302388-18	90 x	<250	99
Method Blank 03-500 MB2	<50	<250	104

Analysis For Total Metals By EPA Method 6020B

Client ID:	RI-SB-04 2-4’	Client:	Crete Consulting
Date Received:	02/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/01/23	Lab ID:	302388-01
Date Analyzed:	03/01/23	Data File:	302388-01.145
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Analyte:	Concentration mg/kg (ppm)
Arsenic	13.0
Cadmium	<1
Chromium	43.3
Copper	161
Lead	97.6
Mercury	<1
Nickel	28.8

Analysis For Total Metals By EPA Method 6020B

Client ID:	RI-SB-04 2-4’	Client:	Crete Consulting
Date Received:	02/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/01/23	Lab ID:	302388-01 x10
Date Analyzed:	03/02/23	Data File:	302388-01 x10.091
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Analyte:	Concentration mg/kg (ppm)
Zinc	694

Analysis For Total Metals By EPA Method 6020B

Client ID:	RI-SB-04 11-12'	Client:	Crete Consulting
Date Received:	02/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/01/23	Lab ID:	302388-03
Date Analyzed:	03/01/23	Data File:	302388-03.146
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.73
Cadmium	<1
Chromium	10.7
Copper	20.1
Lead	3.15
Mercury	<1
Nickel	7.98
Zinc	116

Analysis For Total Metals By EPA Method 6020B

Client ID:	RI-SB-05 9-10’	Client:	Crete Consulting
Date Received:	02/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/01/23	Lab ID:	302388-05
Date Analyzed:	03/01/23	Data File:	302388-05.147
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.09
Cadmium	<1
Chromium	7.51
Copper	8.24
Lead	1.35
Mercury	<1
Nickel	5.51
Zinc	58.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	RI-SB-05 12.5-14'	Client:	Crete Consulting
Date Received:	02/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/01/23	Lab ID:	302388-06
Date Analyzed:	03/01/23	Data File:	302388-06.148
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Analyte:	Concentration mg/kg (ppm)
Arsenic	7.30
Cadmium	<1
Chromium	11.2
Copper	16.5
Lead	2.13
Mercury	<1
Nickel	14.2
Zinc	26.0

Analysis For Total Metals By EPA Method 6020B

Client ID:	RI-SB-06 6-8’	Client:	Crete Consulting
Date Received:	02/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/01/23	Lab ID:	302388-10
Date Analyzed:	03/01/23	Data File:	302388-10.149
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Analyte:	Concentration mg/kg (ppm)
Arsenic	1.63
Cadmium	<1
Chromium	8.51
Copper	8.44
Lead	5.51
Mercury	<1
Nickel	5.24
Zinc	24.1

Analysis For Total Metals By EPA Method 6020B

Client ID:	RI-SB-06 12.5-13.5’	Client:	Crete Consulting
Date Received:	02/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/01/23	Lab ID:	302388-11
Date Analyzed:	03/01/23	Data File:	302388-11.150
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.37
Cadmium	<1
Chromium	10.2
Copper	15.1
Lead	1.90
Mercury	<1
Nickel	8.79
Zinc	23.8

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-7 8-10’	Client:	Crete Consulting
Date Received:	02/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/01/23	Lab ID:	302388-13
Date Analyzed:	03/01/23	Data File:	302388-13.151
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Analyte:	Concentration mg/kg (ppm)
Arsenic	5.44
Cadmium	<1
Chromium	11.2
Copper	18.2
Lead	5.70
Mercury	<1
Nickel	8.15
Zinc	21.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-7 16-18’	Client:	Crete Consulting
Date Received:	02/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/01/23	Lab ID:	302388-14
Date Analyzed:	03/01/23	Data File:	302388-14.152
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.89
Cadmium	<1
Chromium	11.1
Copper	18.1
Lead	2.42
Mercury	<1
Nickel	9.74
Zinc	25.9

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-8 11-13’	Client:	Crete Consulting
Date Received:	02/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/01/23	Lab ID:	302388-16
Date Analyzed:	03/01/23	Data File:	302388-16.153
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Cadmium	<1
Chromium	5.23
Copper	7.76
Lead	<1
Mercury	<1
Nickel	4.19
Zinc	15.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	DUP-022823	Client:	Crete Consulting
Date Received:	02/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/01/23	Lab ID:	302388-18
Date Analyzed:	03/01/23	Data File:	302388-18.154
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Analyte:	Concentration mg/kg (ppm)
Arsenic	8.24
Cadmium	<1
Chromium	32.9
Copper	38.8
Lead	76.9
Mercury	<1
Nickel	23.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	DUP-022823	Client:	Crete Consulting
Date Received:	02/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/01/23	Lab ID:	302388-18 x10
Date Analyzed:	03/02/23	Data File:	302388-18 x10.092
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Analyte:	Concentration mg/kg (ppm)
Zinc	627

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Bridge Point Seattle 130
Date Extracted:	03/01/23	Lab ID:	I3-145 mb2
Date Analyzed:	03/01/23	Data File:	I3-145 mb2.109
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Mercury	<1
Nickel	<1
Zinc	<5

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	RI-SB-04	Client:	Crete Consulting
Date Received:	02/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/02/23	Lab ID:	302388-04
Date Analyzed:	03/03/23	Data File:	030321.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	78	126
Toluene-d8	104	84	115
4-Bromofluorobenzene	104	72	130

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.50
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	RI-SB-05	Client:	Crete Consulting
Date Received:	02/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/02/23	Lab ID:	302388-07
Date Analyzed:	03/03/23	Data File:	030322.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	93	78	126
Toluene-d8	99	84	115
4-Bromofluorobenzene	96	72	130

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.55
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	RI-SB-06	Client:	Crete Consulting
Date Received:	02/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/02/23	Lab ID:	302388-12
Date Analyzed:	03/03/23	Data File:	030323.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	108	78	126
Toluene-d8	101	84	115
4-Bromofluorobenzene	97	72	130

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.40
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Bridge Point Seattle 130
Date Extracted:	03/02/23	Lab ID:	03-0364 mb
Date Analyzed:	03/02/23	Data File:	030207.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	78	126
Toluene-d8	103	84	115
4-Bromofluorobenzene	97	72	130

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Date of Report: 03/08/23
Date Received: 02/28/23
Project: Bridge Point Seattle 130, F&BI 302388

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 302388-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	11	49	127 hr

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	100	61-153

Date of Report: 03/08/23
Date Received: 02/28/23
Project: Bridge Point Seattle 130, F&BI 302388

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

Laboratory Code: 302365-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	(Wet wt) Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	108	106	70-130	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	110	70-130

Date of Report: 03/08/23
Date Received: 02/28/23
Project: Bridge Point Seattle 130, F&BI 302388

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

Laboratory Code: 302378-01 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	24.7	68 b	142 b	75-125	70 b
Cadmium	mg/kg (ppm)	10	<5	94	106	75-125	12
Chromium	mg/kg (ppm)	50	11.3	93	108	75-125	15
Copper	mg/kg (ppm)	50	37.4	82	109	75-125	28 b
Lead	mg/kg (ppm)	50	778	0 b	102	75-125	102 b
Mercury	mg/kg (ppm	5	<5	92	96	75-125	4
Nickel	mg/kg (ppm)	25	13.1	94	113	75-125	18
Zinc	mg/kg (ppm)	50	131	73 b	111	75-125	41 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	93	80-120
Cadmium	mg/kg (ppm)	10	102	80-120
Chromium	mg/kg (ppm)	50	113	80-120
Copper	mg/kg (ppm)	50	104	80-120
Lead	mg/kg (ppm)	50	103	80-120
Mercury	mg/kg (ppm)	5	107	80-120
Nickel	mg/kg (ppm)	25	118	80-120
Zinc	mg/kg (ppm)	50	106	80-120

Date of Report: 03/08/23
Date Received: 02/28/23
Project: Bridge Point Seattle 130, F&BI 302388

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 303022-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	10	<0.02	99	50-150
Chloroethane	ug/L (ppb)	10	<1	104	50-150
1,1-Dichloroethene	ug/L (ppb)	10	<1	101	50-150
Methylene chloride	ug/L (ppb)	10	<5	95	50-150
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	101	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	101	50-150
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	98	50-150
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<0.2	101	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	102	50-150
Trichloroethene	ug/L (ppb)	10	<0.5	95	50-150
Tetrachloroethene	ug/L (ppb)	10	<1	99	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	10	95	101	70-130	6
Chloroethane	ug/L (ppb)	10	98	106	70-130	8
1,1-Dichloroethene	ug/L (ppb)	10	99	104	70-130	5
Methylene chloride	ug/L (ppb)	10	94	94	43-134	0
trans-1,2-Dichloroethene	ug/L (ppb)	10	99	104	70-130	5
1,1-Dichloroethane	ug/L (ppb)	10	100	104	70-130	4
cis-1,2-Dichloroethene	ug/L (ppb)	10	98	101	70-130	3
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	105	105	70-130	0
1,1,1-Trichloroethane	ug/L (ppb)	10	104	105	70-130	1
Trichloroethene	ug/L (ppb)	10	99	97	70-130	2
Tetrachloroethene	ug/L (ppb)	10	107	104	70-130	3

Data Qualifiers & Definitions

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

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

ca - The calibration results for the analyte were outside of acceptance criteria, biased high; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. The value reported is an estimate.

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

j - The analyte concentration is reported below the standard reporting limit. The value reported is an estimate.

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

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

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

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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

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

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

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

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

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

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

302388

SAMPLE CHAIN OF CUSTODY

02/28/23 VW2/M2/VS-B

Report To Hainsworth / Jones
Company ~~H&J~~ Crete Consulting
Address 16300 Christense Rd, Ste 214
City, State, ZIP Tukwila, WA 98188
Phone
Email

SAMPLERS (signature) Rusty Jones R-Jones
PROJECT NAME Bridge Point Seattle 130
PO #
REMARKS See email
INVOICE TO CRETE
Project specific RLs? - Yes / [✓ No]

Page # 1 of 2
TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

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

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	cVOCs	Select Metals			Notes: Metals: As, Cd, Cr, Cu, Pb, Hg, N Zn per RJ 3/1/23
RI-SB-04 2-4'	01 A-E	2/28/23	0850	SOIL	~~6~~ 3	X	X							X			
RI-SB-04 6-7'	02		0855	↓	1												HOLD
RI-SB-04 11-12'	03		0900	↓	1									X			
RI-SB-04	04 A-C		0910	WATER	3								X				
RI-SB-05 9-10'	05		1005	SOIL	1									X			
RI-SB-05 12.5-14'	06		1010	↓	1									X			
RI-SB-05	07 A-C		1020	WATER	3								X				
MW-9 8.5-10'	08		1140	SOIL	1												HOLD
MW-9 14-15'	09		1145	↓	1												HOLD
RI-SB-06 6-8'	10	↓	1320	SOIL	1									X			

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

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	R-Jones	Rusty Jones	CRETE	2/28/23	1649
Received by:		VINH	FBI	2-28-23	1644
Relinquished by:					
Received by:			Samples received at 4 °C		

302388 [redacted]

SAMPLE CHAIN OF CUSTODY

02/28/23 [redacted] VW2/M2/VS-B4

Report To Hainsworth / Jones
Company Crete Consulting
Address 16300 Christensen Rd, Ste 214
City, State, ZIP Tukwila, WA 98188
Phone ______ Email ______

SAMPLERS (*signature*) Rusty Jones R. Jones

PROJECT NAME Bridge Point Seattle 130

PO #

REMARKS See email

INVOICE TO CRETE

Project specific RLs? - Yes / No

Page # 2 of 2

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Select Metals	cVOCs			Notes
RI-SB-06 12.5-13.5'	11	2/28/2023	1325	SOIL	1								X				
RI-SB-06	12 A-C	↓	1330	WATER	3									X			
MW-7 8-10'	13		1420	SOIL	1								X				
MW-7 16-18	14		1425	↓	1								X				
MW-8 13-14.5'	15		1545	SOIL	1												HOLD
MW-8 11-13'	16 A-E		1540	↓	5	X	X						X				
MW-8 8-10'	17	↓	1535	↓	1												HOLD
DUP-022823	18	2/28/23	0700	SOIL	1	X	X						X				

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

SIGNATURE		PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	R. Jones	Rusty Jones	CRETE	2/28/23	1649
Received by:		VINH	FBI	2-28-23	1649
Relinquished by:					
Received by:			Samples received at 4 °C		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

5500 4th Avenue South
Seattle, WA 98108
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 4, 2023

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on March 28, 2023 from the Bridge Point Seattle 130, F&BI 303448 project. There are 16 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grant Hainsworth
CTC0404R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 28, 2023 by Friedman & Bruya, Inc. from the Crete Consulting Bridge Point Seattle 130, F&BI 303448 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Crete Consulting
303448 -01	MW1-0323
303448 -02	MW5-0323
303448 -03	MW6-0323
303448 -04	MW8-0323
303448 -05	MW4-0323
303448 -06	MW3-0323
303448 -07	MW2-0323
303448 -08	DUP02-0323
303448 -09	DUP03-0323
303448 -10	MW9-0323
303448 -11	MW7-0323

All quality control requirements were acceptable.

Date of Report: 04/04/23
Date Received: 03/28/23
Project: Bridge Point Seattle 130, F&BI 303448
Date Extracted: 03/28/23
Date Analyzed: 03/29/23

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
MW8-0323 303448-04	2,300	122
DUP02-0323 303448-08	<100	107
MW9-0323 303448-10	<100	102
Method Blank 03-659 MB	<100	105

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW1-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-01
Date Analyzed:	03/30/23	Data File:	033009.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	71	132
Toluene-d8	94	68	139
4-Bromofluorobenzene	109	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW5-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-02
Date Analyzed:	03/30/23	Data File:	033010.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	71	132
Toluene-d8	97	68	139
4-Bromofluorobenzene	103	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	5.0
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	6.3
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	0.53
Tetrachloroethene	9.8

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW6-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-03
Date Analyzed:	03/30/23	Data File:	033011.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	71	132
Toluene-d8	101	68	139
4-Bromofluorobenzene	101	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW8-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-04
Date Analyzed:	03/30/23	Data File:	033012.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	71	132
Toluene-d8	111	68	139
4-Bromofluorobenzene	107	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1.5
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	9.0
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	0.98
Tetrachloroethene	2.6

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW4-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-05
Date Analyzed:	03/30/23	Data File:	033013.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	91	71	132
Toluene-d8	93	68	139
4-Bromofluorobenzene	103	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.11
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	1.9

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW3-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-06
Date Analyzed:	03/30/23	Data File:	033014.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	71	132
Toluene-d8	98	68	139
4-Bromofluorobenzene	105	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW2-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-07
Date Analyzed:	03/30/23	Data File:	033015.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	92	71	132
Toluene-d8	91	68	139
4-Bromofluorobenzene	104	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	DUP03-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-09
Date Analyzed:	03/30/23	Data File:	033016.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	71	132
Toluene-d8	103	68	139
4-Bromofluorobenzene	101	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.15
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW9-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-10
Date Analyzed:	03/30/23	Data File:	033017.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	71	132
Toluene-d8	92	68	139
4-Bromofluorobenzene	105	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	12
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	6.1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW7-0323	Client:	Crete Consulting
Date Received:	03/28/23	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	303448-11
Date Analyzed:	03/30/23	Data File:	033018.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	71	132
Toluene-d8	93	68	139
4-Bromofluorobenzene	100	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.14
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Bridge Point Seattle 130
Date Extracted:	03/30/23	Lab ID:	03-0692 mb
Date Analyzed:	03/30/23	Data File:	033007.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	lm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	71	132
Toluene-d8	95	68	139
4-Bromofluorobenzene	101	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Date of Report: 04/04/23
Date Received: 03/28/23
Project: Bridge Point Seattle 130, F&BI 303448

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 303419-05 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	97	70-130

Date of Report: 04/04/23
Date Received: 03/28/23
Project: Bridge Point Seattle 130, F&BI 303448

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 303448-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	10	<0.02	95	16-176
Chloroethane	ug/L (ppb)	10	<1	110	50-150
1,1-Dichloroethene	ug/L (ppb)	10	<1	107	50-150
Methylene chloride	ug/L (ppb)	10	<5	95	40-143
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	102	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	105	50-150
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	109	50-150
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<0.2	101	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	105	50-150
Trichloroethene	ug/L (ppb)	10	<0.5	102	43-133
Tetrachloroethene	ug/L (ppb)	10	<1	105	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	10	95	93	70-130	2
Chloroethane	ug/L (ppb)	10	113	112	70-130	1
1,1-Dichloroethene	ug/L (ppb)	10	112	108	70-130	4
Methylene chloride	ug/L (ppb)	10	105	97	29-192	8
trans-1,2-Dichloroethene	ug/L (ppb)	10	106	103	70-130	3
1,1-Dichloroethane	ug/L (ppb)	10	109	107	70-130	2
cis-1,2-Dichloroethene	ug/L (ppb)	10	112	109	70-130	3
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	103	102	70-130	1
1,1,1-Trichloroethane	ug/L (ppb)	10	110	107	70-130	3
Trichloroethene	ug/L (ppb)	10	104	100	70-130	4
Tetrachloroethene	ug/L (ppb)	10	108	104	70-130	4

Data Qualifiers & Definitions

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

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

ca - The calibration results for the analyte were outside of acceptance criteria, biased high; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. The value reported is an estimate.

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

j - The analyte concentration is reported below the standard reporting limit. The value reported is an estimate.

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

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

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

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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

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

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

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

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

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

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

303448 [redacted]

SAMPLE CHAIN OF CUSTODY

03/28/23 [redacted] VWS

Page # 1 of 2

Report To ~~R.~~ R. Jones / G. Hainsworth

Company Crete Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*) Rusty Jones R. Jones	
PROJECT NAME Bridge Point Seattle 130	PO #
REMARKS Project specific RLs? - Yes / No	INVOICE TO CRETE

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

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	cVOCs				Notes
MW1-0323	01 A-C	3/25/2023	1458	WATER	3								X				
MW5-0323	02		1539		3								X				
MW6-0323	03		1629		3								X				
MW8-0323	04 A-F		1720		6		X						X				
MW4-0323	05 A-C	3/26/2023	1521		3								X				
MW3-0323	06		1602		3								X				
MW2-0323	07		1649		3								X				
DUP02-0323	08	3/28/2023	0001		3		X										
DUP03-0323	09		0002		3								X				
MW9-0323	10 A-F		0959		~~3~~ 6		X						X				

Samples received at 3 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: R. Jones	Rusty Jones	CRETE	3/28/2023	1257
~~Received by~~	Michael Erdahl	FeBm	3/28/23	1217
Relinquished by:				
Received by:				

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

303448 [redacted]

SAMPLE CHAIN OF CUSTODY 03/28/23 [redacted]

VWS

Page # 2 of 2

Report To R. Jones / G. Hainsworth
Company Crete Consulting
Address
City, State, ZIP
Phone Email

SAMPLERS (*signature*) Rusty Jones R. Jones

PROJECT NAME	PO #
Bridge Point Seattle 130	
REMARKS Project specific RLs? - Yes / No	INVOICE TO CRETE

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	cVOCs				Notes
MW7-0323	11 A-F	3/28/2023	1204 ~~0905~~	WATER	3								X				

Samples received at 3 °C

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

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: R. Jones	Rusty Jones	CRETE	3/28/2023	1257
Received by:	Michael Erdahl	FeBr	3/28/23	1257
Relinquished by:				
Received by:				

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

February 11, 2022

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on February 2, 2022 from the Dawn / Bunge Foods RI, F&BI 202036 project. There are 36 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grant Hainsworth, Jamie Stevens
CTC0211R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on February 2, 2022 by Friedman & Bruya, Inc. from the Crete Consulting Dawn / Bunge Foods RI, F&BI 202036 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Crete Consulting
202036 -01	MW-3-0122
202036 -02	MW-6-0122
202036 -03	FILTER BLANK
202036 -04	MW-2-0122
202036 -05	MW-5-0122
202036 -06	DUP-0222
202036 -07	MW-1-0222
202036 -08	MW-4-0222

All quality control requirements were acceptable.

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-3-0122	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/07/22	Lab ID:	202036-01 x10
Date Analyzed:	02/07/22	Data File:	202036-01 x10.163
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	36.0
Cadmium	<10
Chromium	<10
Copper	<50
Lead	<10
Zinc	<50

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-6-0122	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/07/22	Lab ID:	202036-02 x10
Date Analyzed:	02/07/22	Data File:	202036-02 x10.162
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	28.2
Cadmium	<10
Chromium	<10
Copper	<50
Lead	<10
Zinc	<50

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	FILTER BLANK	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/07/22	Lab ID:	202036-03
Date Analyzed:	02/07/22	Data File:	202036-03.174
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-2-0122	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/07/22	Lab ID:	202036-04 x10
Date Analyzed:	02/07/22	Data File:	202036-04 x10.152
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	19.8
Cadmium	<10
Chromium	<10
Copper	<50
Lead	<10
Zinc	<50

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-5-0122	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/07/22	Lab ID:	202036-05
Date Analyzed:	02/07/22	Data File:	202036-05.176
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	5.25
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-5-0122	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/07/22	Lab ID:	202036-05 x10
Date Analyzed:	02/07/22	Data File:	202036-05 x10.149
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Zinc	1,900

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	DUP-0222	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/07/22	Lab ID:	202036-06
Date Analyzed:	02/07/22	Data File:	202036-06.177
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.22
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Zinc	509

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-1-0222	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/07/22	Lab ID:	202036-07
Date Analyzed:	02/07/22	Data File:	202036-07.182
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<5
Zinc	217

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-1-0222	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/07/22	Lab ID:	202036-07 x10
Date Analyzed:	02/07/22	Data File:	202036-07 x10.151
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	10.4
Cadmium	<10
Chromium	<10
Lead	<10

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-4-0222	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/07/22	Lab ID:	202036-08
Date Analyzed:	02/07/22	Data File:	202036-08.175
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.14
Cadmium	<1
Chromium	1.02
Copper	<5
Lead	<1
Zinc	500

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/07/22	Lab ID:	I2-104 mb
Date Analyzed:	02/09/22	Data File:	I2-104 mb.071
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-3-0122	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-01 x10
Date Analyzed:	02/07/22	Data File:	202036-01 x10.165
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	37.2
Cadmium	<10
Chromium	<10
Copper	<50
Lead	<10
Zinc	<50

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-6-0122	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-02
Date Analyzed:	02/03/22	Data File:	202036-02.141
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	6.48
Zinc	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-6-0122	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-02 x10
Date Analyzed:	02/07/22	Data File:	202036-02 x10.164
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	31.1
Cadmium	<10
Chromium	<10
Lead	<10

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-2-0122	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-04
Date Analyzed:	02/03/22	Data File:	202036-04.142
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	6.88
Zinc	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-2-0122	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-04 x10
Date Analyzed:	02/07/22	Data File:	202036-04 x10.154
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	20.1
Cadmium	<10
Chromium	<10
Lead	<10

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-5-0122	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-05
Date Analyzed:	02/03/22	Data File:	202036-05.143
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	9.51
Cadmium	<1
Copper	<5
Lead	1.72

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-5-0122	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-05 x10
Date Analyzed:	02/07/22	Data File:	202036-05 x10.150
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	<10
Zinc	2,020

Analysis For Total Metals By EPA Method 6020B

Client ID:	DUP-0222	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-06
Date Analyzed:	02/03/22	Data File:	202036-06.144
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	3.18
Cadmium	<1
Copper	<5
Lead	<1
Zinc	537

Analysis For Total Metals By EPA Method 6020B

Client ID:	DUP-0222	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-06 x5
Date Analyzed:	02/07/22	Data File:	202036-06 x5.142
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-1-0222	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-07
Date Analyzed:	02/03/22	Data File:	202036-07.145
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	8.42
Lead	<1
Zinc	234

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-1-0222	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-07 x10
Date Analyzed:	02/07/22	Data File:	202036-07 x10.153
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	12.5
Cadmium	<10
Chromium	<10

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-4-0222	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-08
Date Analyzed:	02/03/22	Data File:	202036-08.146
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	3.38
Cadmium	<1
Copper	<5
Lead	<1
Zinc	522

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-4-0222	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-08 x5
Date Analyzed:	02/07/22	Data File:	202036-08 x5.140
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	I2-99 mb
Date Analyzed:	02/03/22	Data File:	I2-99 mb.094
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW-5-0122	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-05
Date Analyzed:	02/07/22	Data File:	020712.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	78	126
Toluene-d8	97	87	115
4-Bromofluorobenzene	91 vo	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1.4
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	2.5
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	2.1
Tetrachloroethene	3.2

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	DUP-0222	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-06
Date Analyzed:	02/07/22	Data File:	020713.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	110	78	126
Toluene-d8	97	87	115
4-Bromofluorobenzene	100	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.41
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	1.2
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW-1-0222	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-07
Date Analyzed:	02/07/22	Data File:	020717.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	111	78	126
Toluene-d8	96	87	115
4-Bromofluorobenzene	96	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW-4-0222	Client:	Crete Consulting
Date Received:	02/02/22	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	202036-08
Date Analyzed:	02/07/22	Data File:	020718.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	109	78	126
Toluene-d8	99	87	115
4-Bromofluorobenzene	95	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.43
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	1.2
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn Bunge Foods RI, F&BI 202036
Date Extracted:	02/03/22	Lab ID:	02-287 mb
Date Analyzed:	02/03/22	Data File:	020307.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	78	126
Toluene-d8	96	87	115
4-Bromofluorobenzene	99	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Date of Report: 02/11/22
Date Received: 02/02/22
Project: Dawn / Bunge Foods RI, F&BI 202036

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 6020B

Laboratory Code: 202057-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	21.1	92	74 b	75-125	22 b
Cadmium	ug/L (ppb)	5	<1	104	105	75-125	1
Chromium	ug/L (ppb)	20	<1	85	82	75-125	4
Copper	ug/L (ppb)	20	<5	73 vo	73 vo	75-125	0
Lead	ug/L (ppb)	10	<1	83	81	75-125	2
Zinc	ug/L (ppb)	50	<5	77	77	75-125	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	92	80-120
Cadmium	ug/L (ppb)	5	98	80-120
Chromium	ug/L (ppb)	20	96	80-120
Copper	ug/L (ppb)	20	94	80-120
Lead	ug/L (ppb)	10	95	80-120
Zinc	ug/L (ppb)	50	99	80-120

Date of Report: 02/11/22
Date Received: 02/02/22
Project: Dawn / Bunge Foods RI, F&BI 202036

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

Laboratory Code: 202015-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	2.65	105	95	75-125	10
Cadmium	ug/L (ppb)	5	<1	100	94	75-125	6
Chromium	ug/L (ppb)	20	<1	101	93	75-125	8
Copper	ug/L (ppb)	20	<5	95	86	75-125	10
Lead	ug/L (ppb)	10	<1	102	94	75-125	8
Zinc	ug/L (ppb)	50	5.29	98	90	75-125	9

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	98	80-120
Cadmium	ug/L (ppb)	5	100	80-120
Chromium	ug/L (ppb)	20	101	80-120
Copper	ug/L (ppb)	20	98	80-120
Lead	ug/L (ppb)	10	103	80-120
Zinc	ug/L (ppb)	50	101	80-120

Date of Report: 02/11/22
Date Received: 02/02/22
Project: Dawn / Bunge Foods RI, F&BI 202036

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 201382-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	10	<0.02	102	50-150
Chloroethane	ug/L (ppb)	10	<1	109	50-150
1,1-Dichloroethene	ug/L (ppb)	10	<1	98	50-150
Methylene chloride	ug/L (ppb)	10	6.9	104 b	50-150
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	95	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	98	50-150
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	98	50-150
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<0.2	107	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	97	50-150
Trichloroethene	ug/L (ppb)	10	<0.5	105	50-150
Tetrachloroethene	ug/L (ppb)	10	<1	103	50-150

Date of Report: 02/11/22
Date Received: 02/02/22
Project: Dawn / Bunge Foods RI, F&BI 202036

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	10	105	96	70-130	9
Chloroethane	ug/L (ppb)	10	116	107	70-130	8
1,1-Dichloroethene	ug/L (ppb)	10	105	94	70-130	11
Methylene chloride	ug/L (ppb)	10	105	97	43-134	8
trans-1,2-Dichloroethene	ug/L (ppb)	10	98	90	70-130	9
1,1-Dichloroethane	ug/L (ppb)	10	101	93	70-130	8
cis-1,2-Dichloroethene	ug/L (ppb)	10	100	92	70-130	8
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	110	103	70-130	7
1,1,1-Trichloroethane	ug/L (ppb)	10	100	92	70-130	8
Trichloroethene	ug/L (ppb)	10	104	97	70-130	7
Tetrachloroethene	ug/L (ppb)	10	109	101	70-130	8

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

202036 [redacted]

SAMPLE CHAIN OF CUSTODY

02.02.22 [redacted]

AI2/VW6

Page # 1 of 1

Report To R. Jones, G. Hainsworth, J. Stevens

Company Crete Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (signature) Rusty Jones R. Jones

PROJECT NAME Dawn/Bunge Foods RI

PO #

REMARKS Metals List: Cu, Pb, Zn, As, Cd, Cr

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME

☒ Standard turnaround

☐ RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

☐ Archive samples

☐ Other

Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Total Metals	Dissolved Metals	eVOCs		Notes *All dissolved metals are pre-filtered!*
MW-3-0122	01 A-E	1.30.2022	2210	WATER	5								X	X			Cond.=22.9 mS/cm
MW-6-0122	02 ↓	↓	2305		5								X	X			Cond.=19.6 mS/cm
FILTER BLANK	03	1.31.2022	2129		1									X			
MW-2-0122	04 A-E		2225		5								X	X			Cond.= 12.3 mS/cm
MW-5-0122	05 ↓	↓	2315		5								X	X	X		Cond.= 3.30 mS/cm
DUP-0222	06 A-D	2.1.2022	2230		4								X	X	X		
MW-1-0222	07 A-E	2.1.2022	2315		5								X	X	X		Cond.=8.16 mS/cm
MW-4-0222	08 ↓	2.2.2022	0012	↓	5								X	X	X		Cond.=1.67 mS/cm

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

SIGNATURE		PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	R. Jones	Rusty Jones	CRETE	2.2.22	1357
Received by:	Tokala C.	Tokala Christensen	F+B	2.2.22	13:57
Relinquished by:					
Received by:					
				Samples received at	2 °C

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

October 6, 2022

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the amended results from the testing of material submitted on August 9, 2022 from the Dawn Food Products R.I, F&BI 208126 project. The MW2-0822 orginal NWTPH-Gx anlaysis should have been qualified as due to carryover. The sample was reanlzyed outside of the holding time. Both results have been included in the report.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
CTC0817R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
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October 6, 2022

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on August 9, 2022 from the Dawn Food Products R.I, F&BI 208126 project. There are 11 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
CTC0817R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 9, 2022 by Friedman & Bruya, Inc. from the Crete Consulting Dawn Food Products R.I, F&BI 208126 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Crete Consulting
208126 -01	MW1-0822
208126 -02	MW6-0822
208126 -03	MW4-0822
208126 -04	MW5-0822
208126 -05	MW2-0822

Methylene chloride was detected in the 8260D analysis of sample MW6-0822 and the method blank. The data were flagged as due to laboratory contamination.

The 8260D laboratory control sample exceeded the acceptance criteria for chloroethane and methylene chloride. The affected data were flagged accordingly.

All other quality control requirements were acceptable.

Date of Report: 10/06/22
Date Received: 08/09/22
Project: Dawn Food Products R.I, F&BI 208126
Date Extracted: 08/11/22 and 10/04/22
Date Analyzed: 08/11/22, 08/15/22, and 10/04/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
MW1-0822 208126-01	<100	112
MW4-0822 208126-03	<100	105
MW5-0822 208126-04	<100	116
MW2-0822 208126-05	1,000 c	96
MW2-0822 ht 208126-05	<100	91
Method Blank 02-2338 MB	<100	93
Method Blank 02-1728 MB	<100	106

Date of Report: 10/06/22
Date Received: 08/09/22
Project: Dawn Food Products R.I, F&BI 208126
Date Extracted: 08/10/22
Date Analyzed: 08/10/22

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

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW1-0822 208126-01	<50	<250	102
MW4-0822 208126-03	<50	<250	103
MW5-0822 208126-04	330 x	<250	125
MW2-0822 208126-05	<50	<250	110
Method Blank 02-1912 MB	<50	<250	111

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW6-0822	Client:	Crete Consulting
Date Received:	08/09/22	Project:	Dawn Food Products R.I.
Date Extracted:	08/09/22	Lab ID:	208126-02
Date Analyzed:	08/09/22	Data File:	080915.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	71	132
Toluene-d8	98	68	139
4-Bromofluorobenzene	104	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.12
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	7.1 lc jl
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW2-0822	Client:	Crete Consulting
Date Received:	08/09/22	Project:	Dawn Food Products R.I.
Date Extracted:	08/09/22	Lab ID:	208126-05
Date Analyzed:	08/09/22	Data File:	080916.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	71	132
Toluene-d8	97	68	139
4-Bromofluorobenzene	99	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn Food Products R.I.
Date Extracted:	08/09/22	Lab ID:	02-1810 mb
Date Analyzed:	08/09/22	Data File:	080907.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	71	132
Toluene-d8	101	68	139
4-Bromofluorobenzene	97	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	12 lc jl
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Date of Report: 10/06/22
Date Received: 08/09/22
Project: Dawn Food Products R.I, F&BI 208126

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 208106-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	116	69-134

Date of Report: 10/06/22
Date Received: 08/09/22
Project: Dawn Food Products R.I, F&BI 208126

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 209489-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	95	69-134

Date of Report: 10/06/22
Date Received: 08/09/22
Project: Dawn Food Products R.I, F&BI 208126

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

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	116	140	63-142	19

Date of Report: 10/06/22
Date Received: 08/09/22
Project: Dawn Food Products R.I, F&BI 208126

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 208111-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	10	<0.02	106	16-176
Chloroethane	ug/L (ppb)	10	<1	150	50-150
1,1-Dichloroethene	ug/L (ppb)	10	<1	108	50-150
Methylene chloride	ug/L (ppb)	10	<5	112	40-143
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	106	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	106	50-150
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	105	50-150
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<0.2	108	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	107	50-150
Trichloroethene	ug/L (ppb)	10	<0.5	104	43-133
Tetrachloroethene	ug/L (ppb)	10	<1	110	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	10	109	108	70-130	1
Chloroethane	ug/L (ppb)	10	152 vo	150 vo	70-130	1
1,1-Dichloroethene	ug/L (ppb)	10	104	104	70-130	0
Methylene chloride	ug/L (ppb)	10	69	110	29-192	46 vo
trans-1,2-Dichloroethene	ug/L (ppb)	10	100	101	70-130	1
1,1-Dichloroethane	ug/L (ppb)	10	101	102	70-130	1
cis-1,2-Dichloroethene	ug/L (ppb)	10	100	101	70-130	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	104	105	70-130	1
1,1,1-Trichloroethane	ug/L (ppb)	10	104	104	70-130	0
Trichloroethene	ug/L (ppb)	10	100	102	70-130	2
Tetrachloroethene	ug/L (ppb)	10	104	104	70-130	0

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SAMPLE CHAIN OF COUSTODY

8/9/22 VW31E04

Page # 1 of 1

208126 ~~Report To~~ R. Jones / G. Hainsworth

Company Crete Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*) Rusty Jones R. Jones

PROJECT NAME Dawn Food Products R.I.

PO #

REMARKS

INVOICE TO

Project Specific RLs - Yes / No

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

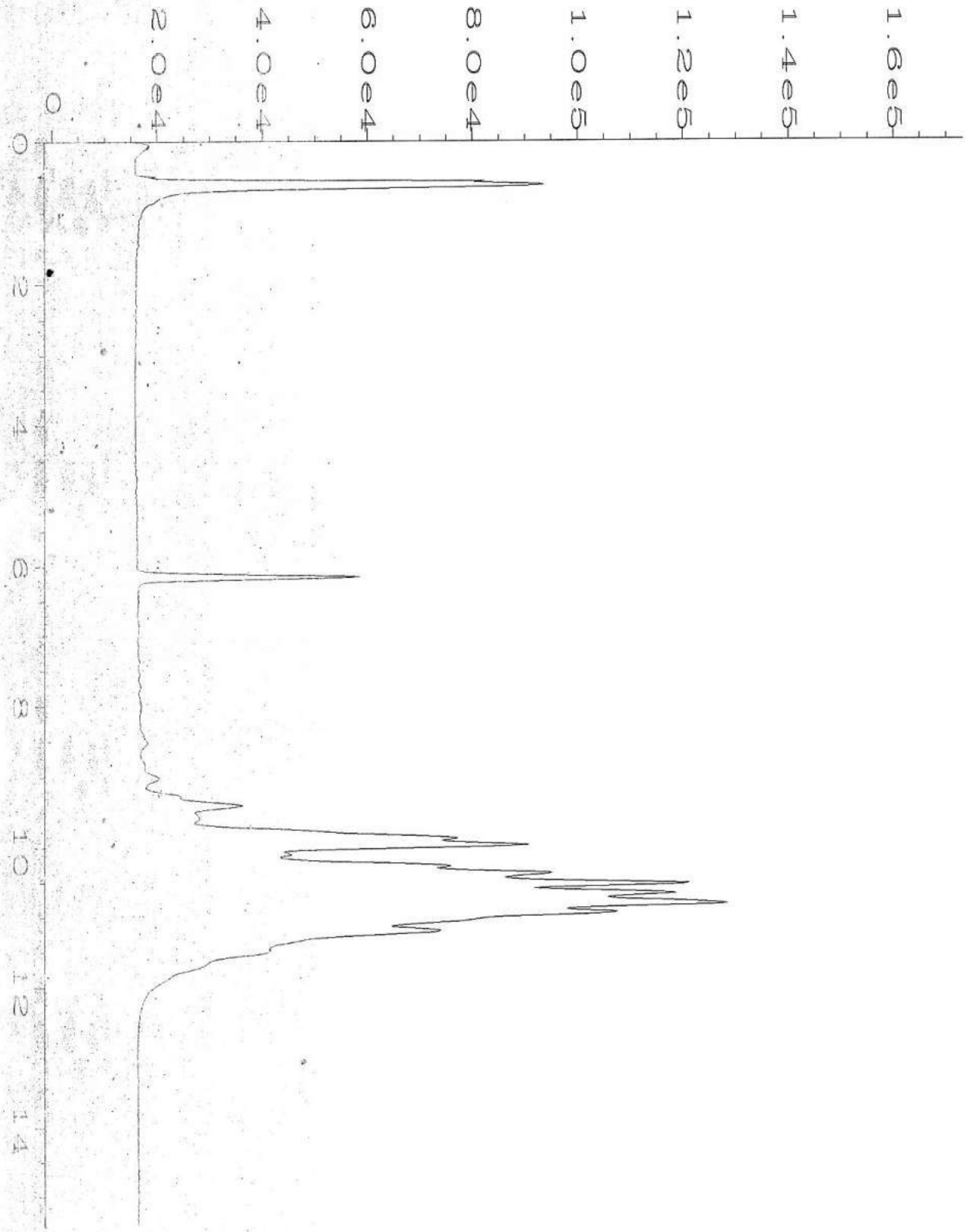
SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Archive Samples
☐ Other

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	cVOCs						Notes
MW1-0822	01 A-G	8/8/2022	0832	WATER	7	X	X											
~~MW3-0822~~			~~0914~~		~~0~~													RJ
MW6-0822	02 A-G	↓	0954		7							X						
MW4-0822	03 A-D	8/9/2022	0920		4	X	X											
MW5-0822	04		1004		4	X	X											
MW2-0822	~~06~~ 05 A-F	↓	1049	↓	~~7~~ 6	X	X					X						
~~DUP-0822~~		~~8/9/2022~~	~~0830~~	~~WATER~~														RJ

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

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: R. Jones	Rusty Jones	Crete Consulting	8/9/2022	1140
Received by: W. Madden	W. Madden	F+BI	8/9/22	1140
Relinquished by:		Samples received at 0 °C		
Received by:				



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Data File Name    : C:\HPCHEM\3\DATA\08-11-22\030F0101.D
Operator          : awb                            Page Number        : 1
Instrument        : ANALYZER3                      Vial Number        : 30
Sample Name       : 208126-05                      Injection Number : 1
Run Time Bar Code:                                 Sequence Line      : 1
Acquired on       : 11 Aug 22   02:54 PM           Instrument Method: GX.MTH
Report Created on: 20 Sep 22   09:24 AM            Analysis Method   : DEFAULT.MTH
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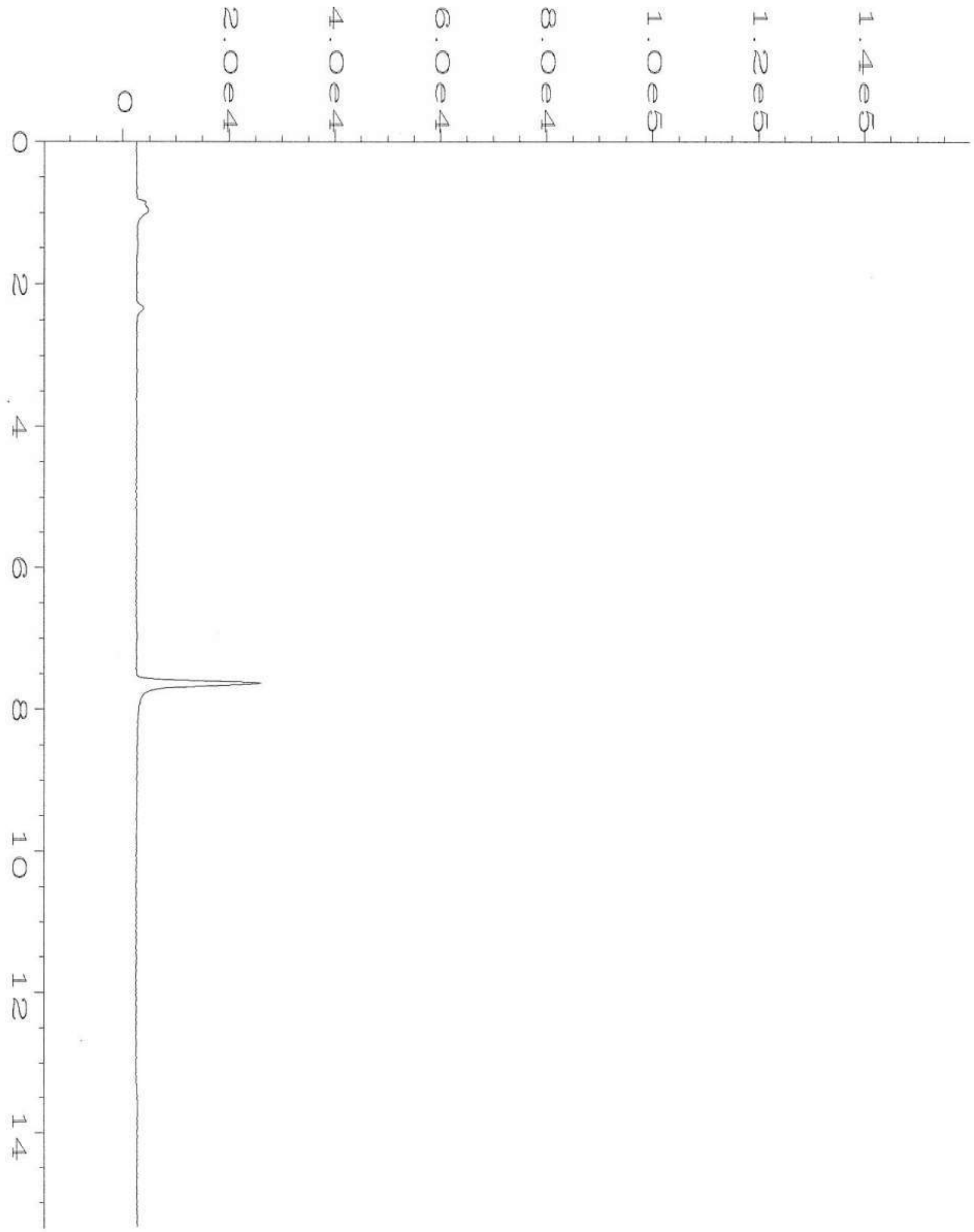
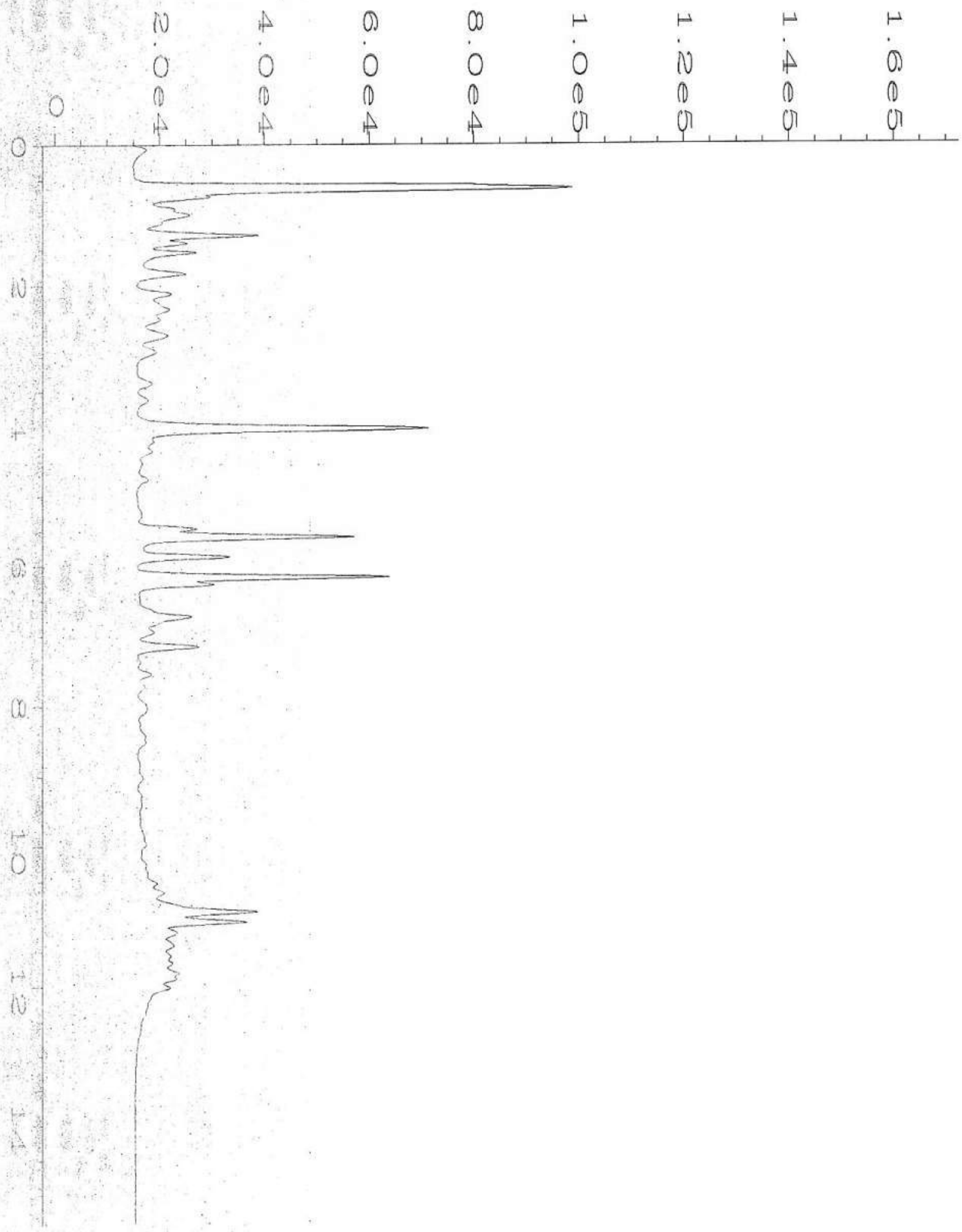


Data File Name : C:\HPCHEM\2\DATA\08-11-22\004F0101.D
Operator : awb
Instrument : GC2
Sample Name : 02-1728 mb
Run Time Bar Code:
Acquired on : 11 Aug 22 06:08 AM
Report Created on: 20 Sep 22 09:08 AM

Page Number : 1
Vial Number : 4
Injection Number : 1
Sequence Line : 1
Instrument Method: GX.MTH
Analysis Method : DEFAULT.MTH



Data File Name : C:\HPCHEM\3\DATA\08-11-22\034F0101.D
Operator : awb
Instrument : ANALYZER3
Sample Name : 1000GX 66-54C#3
Run Time Bar Code:
Acquired on : 11 Aug 22 04:17 PM
Report Created on: 20 Sep 22 09:25 AM

Page Number : 1
Vial Number : 34
Injection Number : 1
Sequence Line : 1
Instrument Method: GX.MTH
Analysis Method : DEFAULT.MTH

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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www.friedmanandbruya.com

February 14, 2022

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the additional results from the testing of material submitted on December 16, 2021 from the Dawn/Bunge Foods R.I., F&BI 112315 project. There are 8 pages included in this report.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grant Hainsworth, Jamie Stevens
CTC0214R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 16, 2021 by Friedman & Bruya, Inc. from the Crete Consulting Dawn/Bunge Foods R.I., F&BI 112315 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Crete Consulting
112315 -01	MW-5 12.5-14'
112315 -02	MW-2 7.5-9'
112315 -03	MW-2 12.5-14'
112315 -04	MW-6-7.5-9.5'
112315 -05	TB-121521

The NWTPH-Gx and NWTPH-Dx analysis of sample MW-5 12.5-14' was requested outside of the holding time. The data were flagged accordingly.

All other quality control requirements were acceptable.

Date of Report: 02/14/22
Date Received: 12/16/21
Project: Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted: 02/08/22
Date Analyzed: 02/09/22

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

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

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
MW-5 12.5-14' ht 112315-01	<5	60
Method Blank 02-313 MB	<5	72

Date of Report: 02/14/22
Date Received: 12/16/21
Project: Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted: 02/08/22
Date Analyzed: 02/10/22

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

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

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 48-168)
MW-5 12.5-14’ ht 112315-01	470 x	1,200	93
Method Blank 02-391 MB	<50	<250	98

Date of Report: 02/14/22
Date Received: 12/16/21
Project: Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted: 02/08/22
Date Analyzed: 02/08/22

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

Sample Extracts Passed Through a Silica Gel Column Prior to Analysis

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

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 53-144)
MW-5 12.5-14' ht 112315-01	730 x	1,300	93
Method Blank 02-391 MB	<50	<250	98

Date of Report: 02/14/22
Date Received: 12/16/21
Project: Dawn/Bunge Foods R.I., F&BI 112315

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 202071-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	100	71-131

Date of Report: 02/14/22
Date Received: 12/16/21
Project: Dawn/Bunge Foods R.I., F&BI 112315

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

Laboratory Code: 202103-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	78	80	73-135	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	80	74-139

Date of Report: 02/14/22
Date Received: 12/16/21
Project: Dawn/Bunge Foods R.I., F&BI 112315

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

Laboratory Code: 202103-01 (Matrix Spike) Silica Gel

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	90	96	64-133	6

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	86	58-147

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

112315 [redacted]

SAMPLE CHAIN OF CUSTODY

12/16/21 [redacted] C01 / US1 / VW1

Page # 1 of 1

Report To R. Jones / G. Halnsworth / J. Stevens
Company CRETE CONSULTING
Address 16300 Christensen Rd, Ste. 214
City, State, ZIP Seattle, WA 98188
Phone ________ Email ________

SAMPLERS (*signature*) Rusty Jones R. Jones

PROJECT NAME Dawn/Bunge Foods R.I.

PO #

REMARKS HOLD ALL. Will assign via email.

INVOICE TO

Project specific RLs? - Yes / No

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	w & w/o Silica Gel NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	MTCA 5, Zn, Ni				Notes ✓-per RJ
MW-5 12.5-14'	01 A-E	12-15-2021	0915	SOIL/GRAB	5	●	●			✓			✓				12/17
MW-2 7.5-9'	02		1200		5								✓				Ef
MW-2 12.5-14'	03		1210		5								✓				STD TAT
MW-6 7.5-9'	04	↓	1500	↓	5					✓			✓				
TB-121521	05 A B	12.15.2021	0800	BLANK	2					✓							● per RJ
																	2/8/22 ME

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

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: R. Jones	Rusty Jones	CRETE Consulting	12/16/2021	0708
Received by:	Nhan Phan	FeBI	12/16/21	0710
Relinquished by:				
Received by:		Samples received at 4 °C		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

January 5, 2022

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included is amended report from the testing of material submitted on December 16, 2021 from the Dawn/Bunge Foods R.I., F&BI 112315 project. Sample ID MW-6-7.5-9.5' has been amended to MW-6 7.5-9' as listed on the chain of custody.

We apologize for the inconvenience and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grant Hainsworth, Jamie Stevens
CTC1228R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
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Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
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fbi@isomedia.com
www.friedmanandbruya.com

December 28, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on December 16, 2021 from the Dawn/Bunge Foods R.I., F&BI 112315 project. There are 18 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grant Hainsworth, Jamie Stevens
CTC1228R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 16, 2020 by Friedman & Bruya, Inc. from the Crete Consulting Dawn/Bunge Foods R.I., F&BI 112315 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Crete Consulting
112315 -01	MW-5 12.5-14'
112315 -02	MW-2 7.5-9'
112315 -03	MW-2 12.5-14'
112315 -04	MW-6 7.5-9’
112315 -05	TB-121521

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-5 12.5-14'	Client:	Crete Consulting
Date Received:	12/16/21	Project:	Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted:	12/20/21	Lab ID:	112315-01
Date Analyzed:	12/20/21	Data File:	112315-01.110
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	5.46
Cadmium	1.08
Chromium	17.1
Lead	93.1
Mercury	<1
Nickel	8.37

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-5 12.5-14’	Client:	Crete Consulting
Date Received:	12/16/21	Project:	Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted:	12/20/21	Lab ID:	112315-01 x5
Date Analyzed:	12/20/21	Data File:	112315-01 x5.135
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Zinc	7,000

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-2 7.5-9’	Client:	Crete Consulting
Date Received:	12/16/21	Project:	Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted:	12/20/21	Lab ID:	112315-02
Date Analyzed:	12/20/21	Data File:	112315-02.170
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.51
Cadmium	<1
Lead	2.73
Mercury	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-2 7.5-9’	Client:	Crete Consulting
Date Received:	12/16/21	Project:	Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted:	12/20/21	Lab ID:	112315-02 x5
Date Analyzed:	12/22/21	Data File:	112315-02 x5.046
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	9.40
Nickel	12.3
Zinc	<25

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-2 12.5-14’	Client:	Crete Consulting
Date Received:	12/16/21	Project:	Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted:	12/20/21	Lab ID:	112315-03
Date Analyzed:	12/20/21	Data File:	112315-03.171
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	8.55
Cadmium	<1
Chromium	12.0
Lead	3.77
Mercury	<1
Nickel	17.1
Zinc	41.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-6 7.5-9’	Client:	Crete Consulting
Date Received:	12/16/21	Project:	Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted:	12/20/21	Lab ID:	112315-04
Date Analyzed:	12/20/21	Data File:	112315-04.172
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.80
Cadmium	<1
Lead	13.9
Mercury	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-6 7.5-9’	Client:	Crete Consulting
Date Received:	12/16/21	Project:	Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted:	12/20/21	Lab ID:	112315-04 x5
Date Analyzed:	12/22/21	Data File:	112315-04 x5.047
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	9.06
Nickel	6.89
Zinc	36.1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted:	12/20/21	Lab ID:	I1-850 mb
Date Analyzed:	12/20/21	Data File:	I1-850 mb.108
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Nickel	<1
Zinc	<5

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW-5 12.5-14'	Client:	Crete Consulting
Date Received:	12/16/21	Project:	Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted:	12/20/21	Lab ID:	112315-01
Date Analyzed:	12/20/21	Data File:	122007.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	90	109
Toluene-d8	99	89	112
4-Bromofluorobenzene	97	84	115

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW-6 7.5-9’	Client:	Crete Consulting
Date Received:	12/16/21	Project:	Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted:	12/20/21	Lab ID:	112315-04
Date Analyzed:	12/20/21	Data File:	122008.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	90	109
Toluene-d8	100	89	112
4-Bromofluorobenzene	97	84	115

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted:	12/20/21	Lab ID:	01-2837 mb
Date Analyzed:	12/20/21	Data File:	122005.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	90	109
Toluene-d8	104	89	112
4-Bromofluorobenzene	96	84	115

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	TB-121521	Client:	Crete Consulting
Date Received:	12/16/21	Project:	Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted:	12/20/21	Lab ID:	112315-05
Date Analyzed:	12/20/21	Data File:	122015.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	85	117
Toluene-d8	95	88	112
4-Bromofluorobenzene	99	90	111

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn/Bunge Foods R.I., F&BI 112315
Date Extracted:	12/20/21	Lab ID:	01-2839 mb
Date Analyzed:	12/20/21	Data File:	122014.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	85	117
Toluene-d8	96	88	112
4-Bromofluorobenzene	100	90	111

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Date of Report: 12/28/21
Date Received: 12/16/21
Project: Dawn/Bunge Foods R.I., F&BI 112315

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

Laboratory Code: 112315-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	3.82	89	93	75-125	4
Cadmium	mg/kg (ppm)	10	<1	90	95	75-125	5
Chromium	mg/kg (ppm)	50	11.9	102	104	75-125	2
Lead	mg/kg (ppm)	50	65.2	117	107	75-125	9
Mercury	mg/kg (ppm	5	<1	66 vo	76	75-125	14
Nickel	mg/kg (ppm)	25	5.86	96	95	75-125	1
Zinc	mg/kg (ppm)	50	4,430	0 b	2240 b	75-125	200 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	90	80-120
Cadmium	mg/kg (ppm)	10	98	80-120
Chromium	mg/kg (ppm)	50	104	80-120
Lead	mg/kg (ppm)	50	99	80-120
Mercury	mg/kg (ppm)	5	91	80-120
Nickel	mg/kg (ppm)	25	101	80-120
Zinc	mg/kg (ppm)	50	97	80-120

Date of Report: 12/28/21
Date Received: 12/16/21
Project: Dawn/Bunge Foods R.I., F&BI 112315

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 112315-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	1	<0.05	28	27	10-138	4
Chloroethane	mg/kg (ppm)	1	<0.5	40	39	10-176	3
1,1-Dichloroethene	mg/kg (ppm)	1	<0.05	41	41	10-160	0
Methylene chloride	mg/kg (ppm)	1	<0.5	85	86	10-156	1
trans-1,2-Dichloroethene	mg/kg (ppm)	1	<0.05	53	53	14-137	0
1,1-Dichloroethane	mg/kg (ppm)	1	<0.05	62	63	19-140	2
cis-1,2-Dichloroethene	mg/kg (ppm)	1	<0.05	66	71	25-135	7
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1	<0.05	67	69	12-160	3
1,1,1-Trichloroethane	mg/kg (ppm)	1	<0.05	58	59	10-156	2
Trichloroethene	mg/kg (ppm)	1	<0.02	57	61	21-139	7
Tetrachloroethene	mg/kg (ppm)	1	<0.025	56	59	20-133	5

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	1	84	22-139
Chloroethane	mg/kg (ppm)	1	87	9-163
1,1-Dichloroethene	mg/kg (ppm)	1	90	47-128
Methylene chloride	mg/kg (ppm)	1	97	10-184
trans-1,2-Dichloroethene	mg/kg (ppm)	1	98	67-129
1,1-Dichloroethane	mg/kg (ppm)	1	101	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	1	100	72-127
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1	94	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	1	101	62-131
Trichloroethene	mg/kg (ppm)	1	97	63-121
Tetrachloroethene	mg/kg (ppm)	1	95	72-114

Date of Report: 12/28/21
Date Received: 12/16/21
Project: Dawn/Bunge Foods R.I., F&BI 112315

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 112280-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	10	<0.2	91	36-166
Chloroethane	ug/L (ppb)	10	<1	96	46-160
1,1-Dichloroethene	ug/L (ppb)	10	<1	95	58-142
Methylene chloride	ug/L (ppb)	10	<5	90	50-145
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	100	61-136
1,1-Dichloroethane	ug/L (ppb)	10	<1	103	63-135
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	101	63-134
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<1	96	48-149
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	97	60-146
Trichloroethene	ug/L (ppb)	10	<1	91	66-135
Tetrachloroethene	ug/L (ppb)	10	<1	91	10-226

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	10	91	91	50-154	0
Chloroethane	ug/L (ppb)	10	96	92	58-146	4
1,1-Dichloroethene	ug/L (ppb)	10	95	95	67-136	0
Methylene chloride	ug/L (ppb)	10	90	95	19-178	5
trans-1,2-Dichloroethene	ug/L (ppb)	10	100	100	68-128	0
1,1-Dichloroethane	ug/L (ppb)	10	103	100	74-135	3
cis-1,2-Dichloroethene	ug/L (ppb)	10	101	100	74-136	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	96	94	66-129	2
1,1,1-Trichloroethane	ug/L (ppb)	10	97	97	74-142	0
Trichloroethene	ug/L (ppb)	10	91	92	67-133	1
Tetrachloroethene	ug/L (ppb)	10	91	92	76-121	1

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

112315
[redacted]

SAMPLE CHAIN OF CUSTODY

12/16/21 [redacted]

C01 / US1 / 1 VW1 Page # 1 of 1

Report To R. Jones / G. Hainsworth / J. Stevens
Company CRETE CONSULTING
Address 16300 Christensen Rd, Ste. 214
City, State, ZIP Seattle, WA 98188
Phone ______ Email ______

SAMPLERS (*signature*) Rusty Jones R. Jones

PROJECT NAME
Dawn/Bunge Foods R.I.

PO #

REMARKS Will assign via email.
HOLD ALL.

Project specific RLs? - Yes / No

INVOICE TO

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	MTCA 5, 7, Ni				Notes
MW-5 12.5-14'	01 A-E	12.15.2021	0915	SOIL/GRAB	5					✓			✓				✓ - per RJ 12/17 ef STD TAT
MW-2 7.5-9'	02		1200		5								✓				
MW-2 12.5-14'	03		1210		5								✓				
MW-6 7.5-9'	04		1500		5					✓			✓				
TB-121521	05 A B	12.15.2021	0800	BLANK	2					✓							

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

SIGNATURE		PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	R. Jones	Rusty Jones	CRETE Consulting	12/16/2021	0708
Received by:		Nhan Phan	FeBI	12/16/21	0710
Relinquished by:					
Received by:			Samples received at 4 °C		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

January 5, 2022

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included is the amended report from the testing of material submitted on December 17, 2021 from the Dawn/Bunge Foods R.I., F&BI 112346 project. The sample IDs have been corrected to reflect the chain of custody.

We apologize for the inconvenience and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grant Hainsworth, Jamie Stevens
CTC1227R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
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Eric Young, B.S.

3012 16th Avenue West
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(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

December 27, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on December 17, 2021 from the Dawn/Bunge Foods R.I., F&BI 112346 project. There are 18 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grant Hainsworth, Jamie Stevens
CTC1227R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 17, 2020 by Friedman & Bruya, Inc. from the Crete Consulting Dawn/Bunge foods R.I., F&BI 112346 project. Samples were logged in under the laboratory ID’s listed below.

Laboratory ID	Crete Consulting
112346 -01	TB-121621
112346 -02	MW-1 13-14'
112346 -03	MW-3 7.5-9’
112346 -04	MW-3 12.5-14’
112346 -05	MW-4 7.5-9’
112346 -06	MW-4 11-11.5’

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-1 13-14’	Client:	Crete Consulting
Date Received:	12/17/21	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	12/20/21	Lab ID:	112346-02
Date Analyzed:	12/20/21	Data File:	112346-02.158
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.86
Cadmium	<1
Chromium	9.48
Lead	1.73
Mercury	<1
Nickel	5.18
Zinc	17.8

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-3 7.5-9'	Client:	Crete Consulting
Date Received:	12/17/21	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	12/20/21	Lab ID:	112346-03
Date Analyzed:	12/20/21	Data File:	112346-03.159
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	1.36
Cadmium	<1
Lead	2.37
Mercury	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-3 7.5-9'	Client:	Crete Consulting
Date Received:	12/17/21	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	12/20/21	Lab ID:	112346-03 x5
Date Analyzed:	12/22/21	Data File:	112346-03 x5.052
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	8.96
Nickel	14.9
Zinc	<25

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-3 12.5-14’	Client:	Crete Consulting
Date Received:	12/17/21	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	12/20/21	Lab ID:	112346-04
Date Analyzed:	12/20/21	Data File:	112346-04.160
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.21
Cadmium	<1
Lead	6.00
Mercury	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-3 12.5-14’	Client:	Crete Consulting
Date Received:	12/17/21	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	12/20/21	Lab ID:	112346-04 x5
Date Analyzed:	12/22/21	Data File:	112346-04 x5.055
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	10.1
Nickel	10.7
Zinc	38.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-4 7.5-9’	Client:	Crete Consulting
Date Received:	12/17/21	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	12/20/21	Lab ID:	112346-05
Date Analyzed:	12/20/21	Data File:	112346-05.161
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	1.86
Cadmium	<1
Lead	1.89
Mercury	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-4 7.5-9’	Client:	Crete Consulting
Date Received:	12/17/21	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	12/20/21	Lab ID:	112346-05 x5
Date Analyzed:	12/22/21	Data File:	112346-05 x5.056
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	8.83
Nickel	6.09
Zinc	138

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-4 11-11.5’	Client:	Crete Consulting
Date Received:	12/17/21	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	12/20/21	Lab ID:	112346-06
Date Analyzed:	12/20/21	Data File:	112346-06.164
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.50
Cadmium	<1
Chromium	11.3
Lead	2.67
Mercury	<1
Nickel	10.7
Zinc	89.2

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	12/20/21	Lab ID:	I1-849 mb
Date Analyzed:	12/20/21	Data File:	I1-849 mb.036
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Nickel	<1
Zinc	<5

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW-4 11-11.5’	Client:	Crete Consulting
Date Received:	12/17/21	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	12/17/21	Lab ID:	112346-06
Date Analyzed:	12/17/21	Data File:	121719.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	90	109
Toluene-d8	99	89	112
4-Bromofluorobenzene	102	84	115

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	12/17/21	Lab ID:	01-2835 mb
Date Analyzed:	12/17/21	Data File:	121705.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	90	109
Toluene-d8	100	89	112
4-Bromofluorobenzene	99	84	115

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	TB-121621	Client:	Crete Consulting
Date Received:	12/17/21	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	12/17/21	Lab ID:	112346-01
Date Analyzed:	12/17/21	Data File:	121735.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	85	117
Toluene-d8	100	88	112
4-Bromofluorobenzene	98	90	111

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	12/17/21	Lab ID:	01-2836 mb
Date Analyzed:	12/17/21	Data File:	121707.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	108	85	117
Toluene-d8	95	88	112
4-Bromofluorobenzene	101	90	111

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Date of Report: 12/27/21
Date Received: 12/17/21
Project: Dawn/Bunge Foods R.I., F&BI 112346

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

Laboratory Code: 112341-01 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	<5	75	72 vo	75-125	4
Cadmium	mg/kg (ppm)	10	<5	90	90	75-125	0
Chromium	mg/kg (ppm)	50	18.7	90	77	75-125	16
Lead	mg/kg (ppm)	50	<5	86	84	75-125	2
Mercury	mg/kg (ppm	5	<5	92	90	75-125	2
Nickel	mg/kg (ppm)	25	14.3	91 b	67 b	75-125	30 b
Zinc	mg/kg (ppm)	50	<25	91	78	75-125	15

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	85	80-120
Cadmium	mg/kg (ppm)	10	94	80-120
Chromium	mg/kg (ppm)	50	97	80-120
Lead	mg/kg (ppm)	50	93	80-120
Mercury	mg/kg (ppm)	5	92	80-120
Nickel	mg/kg (ppm)	25	96	80-120
Zinc	mg/kg (ppm)	50	92	80-120

Date of Report: 12/27/21
Date Received: 12/17/21
Project: Dawn/Bunge Foods R.I., F&BI 112346

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 112320-06 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	1	<0.05	47	48	10-138	2
Chloroethane	mg/kg (ppm)	1	<0.5	56	58	10-176	4
1,1-Dichloroethene	mg/kg (ppm)	1	<0.05	64	62	10-160	3
Methylene chloride	mg/kg (ppm)	1	<0.5	73	77	10-156	5
trans-1,2-Dichloroethene	mg/kg (ppm)	1	<0.05	71	72	14-137	1
1,1-Dichloroethane	mg/kg (ppm)	1	<0.05	77	74	19-140	4
cis-1,2-Dichloroethene	mg/kg (ppm)	1	<0.05	82	80	25-135	2
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1	<0.05	77	78	12-160	1
1,1,1-Trichloroethane	mg/kg (ppm)	1	<0.05	78	78	10-156	0
Trichloroethene	mg/kg (ppm)	1	<0.02	79	75	21-139	5
Tetrachloroethene	mg/kg (ppm)	1	<0.025	79	79	20-133	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	1	73	22-139
Chloroethane	mg/kg (ppm)	1	81	9-163
1,1-Dichloroethene	mg/kg (ppm)	1	89	47-128
Methylene chloride	mg/kg (ppm)	1	101	10-184
trans-1,2-Dichloroethene	mg/kg (ppm)	1	98	67-129
1,1-Dichloroethane	mg/kg (ppm)	1	101	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	1	101	72-127
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1	97	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	1	102	62-131
Trichloroethene	mg/kg (ppm)	1	99	63-121
Tetrachloroethene	mg/kg (ppm)	1	102	72-114

Date of Report: 12/27/21
Date Received: 12/17/21
Project: Dawn/Bunge Foods R.I., F&BI 112346

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 112338-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	10	<0.02	112	16-176
Chloroethane	ug/L (ppb)	10	<1	117	50-150
1,1-Dichloroethene	ug/L (ppb)	10	<1	94	50-150
Methylene chloride	ug/L (ppb)	10	<5	90	40-143
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	96	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	102	50-150
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	101	50-150
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<0.2	117	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	105	50-150
Trichloroethene	ug/L (ppb)	10	<0.5	93	43-133
Tetrachloroethene	ug/L (ppb)	10	<1	94	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	10	110	111	70-130	1
Chloroethane	ug/L (ppb)	10	112	114	70-130	2
1,1-Dichloroethene	ug/L (ppb)	10	93	101	70-130	8
Methylene chloride	ug/L (ppb)	10	94	93	29-192	1
trans-1,2-Dichloroethene	ug/L (ppb)	10	96	97	70-130	1
1,1-Dichloroethane	ug/L (ppb)	10	98	100	70-130	2
cis-1,2-Dichloroethene	ug/L (ppb)	10	96	98	70-130	2
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	111	113	70-130	2
1,1,1-Trichloroethane	ug/L (ppb)	10	100	102	70-130	2
Trichloroethene	ug/L (ppb)	10	89	92	70-130	3
Tetrachloroethene	ug/L (ppb)	10	93	95	70-130	2

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

112346

SAMPLE CHAIN OF CUSTODY

12-17-21

BI3/VS2/VW1

Page # 1 of 1

Report To R. Jones/G. Halwsworth/J. Stevens

Company CRETE Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*) Rusty Jones R. Jones	
PROJECT NAME Dawn/Bunge Foods R.I.	PO #
REMARKS Metals: MTCA 5 + Zn, Ni Project specific RLs? - Yes / No	INVOICE TO

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Select Metals	cVOCs			Notes
TB-121621	01 A-B	12/16/2021	0800	WATER	2									X			
MW-1 13-14'	02 A-E		0920	SOIL	5								X				
MW-3 7.5-9'	03		1145		5								X				
MW-3 12.5-14'	04		1155		5								X				
MW-4 7.5-9'	05		1450		5								X				
MW-4 11-11.5'	06 ↓	↓	1500	↓	5								X	X			

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

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: R. Jones	Rusty Jones	CRETE Consulting	12.17.2021	0706
Received by:	[illegible]	AA F&B	12/17/21	0706
Relinquished by:				
Received by:		Samples received	at 2 °C	

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

3012 16th Avenue West
Seattle, WA 98119-2029
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May 2, 2022

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on April 22, 2022 from the Dawn/Bunge Foods R.I., F&BI 204374 project. There are 18 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grant Hainsworth, Jamie Stevens
CTC0502R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on April 22, 2022 by Friedman & Bruya, Inc. from the Crete Consulting Dawn/Bunge Foods R.I., F&BI 204374 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Crete Consulting
204374 -01	MW1-0422
204374 -02	MW4-0422
204374 -03	DUP-0422
204374 -04	MW5-0422

All quality control requirements were acceptable.

Date of Report: 05/02/22
Date Received: 04/22/22
Project: Dawn/Bunge Foods R.I., F&BI 204374
Date Extracted: 04/26/22
Date Analyzed: 04/29/22

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

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW5-0422 204374-04	<1	<1	<1	<3	<100	79
Method Blank 02-890 MB	<1	<1	<1	<3	<100	81

Date of Report: 05/02/22
Date Received: 04/22/22
Project: Dawn/Bunge Foods R.I., F&BI 204374
Date Extracted: 04/22/22
Date Analyzed: 04/22/22

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

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW5-0422 204374-04	2,100 x	540 x	ip
Method Blank 02-983 MB	<50	<250	131

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW1-0422	Client:	Crete Consulting
Date Received:	04/22/22	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	04/25/22	Lab ID:	204374-01
Date Analyzed:	04/25/22	Data File:	042509.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	78	126
Toluene-d8	97	84	115
4-Bromofluorobenzene	102	72	130

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.021
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW4-0422	Client:	Crete Consulting
Date Received:	04/22/22	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	04/25/22	Lab ID:	204374-02
Date Analyzed:	04/25/22	Data File:	042512.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	109	78	126
Toluene-d8	98	84	115
4-Bromofluorobenzene	99	72	130

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.59
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	2.5
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	DUP-0422	Client:	Crete Consulting
Date Received:	04/22/22	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	04/25/22	Lab ID:	204374-03
Date Analyzed:	04/25/22	Data File:	042520.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	78	126
Toluene-d8	99	84	115
4-Bromofluorobenzene	165 vo	72	130

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1.4
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	1.8
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	4.7
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	1.7
Tetrachloroethene	6.0

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW5-0422	Client:	Crete Consulting
Date Received:	04/22/22	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	04/25/22	Lab ID:	204374-04
Date Analyzed:	04/25/22	Data File:	042514.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	78	126
Toluene-d8	99	84	115
4-Bromofluorobenzene	99	72	130

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	2.1
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	1.9
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	5.0
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	1.7
Tetrachloroethene	6.1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	04/25/22	Lab ID:	02-984 mb
Date Analyzed:	04/25/22	Data File:	042507.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	78	126
Toluene-d8	101	84	115
4-Bromofluorobenzene	101	72	130

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	MW5-0422	Client:	Crete Consulting
Date Received:	04/22/22	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	04/25/22	Lab ID:	204374-04
Date Analyzed:	04/26/22	Data File:	042523.D
Matrix:	Water	Instrument:	GCMS12
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	13	11	65
Phenol-d6	11	11	65
Nitrobenzene-d5	63	50	150
2-Fluorobiphenyl	74	44	108
2,4,6-Tribromophenol	91	10	140
Terphenyl-d14	103	50	150

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
2-Methylnaphthalene	<0.2
1-Methylnaphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	0.034
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.04

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	04/25/22	Lab ID:	02-1025 mb
Date Analyzed:	04/26/22	Data File:	042609.D
Matrix:	Water	Instrument:	GCMS12
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	21	11	65
Phenol-d6	14	11	65
Nitrobenzene-d5	87	50	150
2-Fluorobiphenyl	90	44	108
2,4,6-Tribromophenol	80	10	140
Terphenyl-d14	108	50	150

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
2-Methylnaphthalene	<0.2
1-Methylnaphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	<0.02
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.04

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	MW5-0422	Client:	Crete Consulting
Date Received:	04/22/22	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	04/25/22	Lab ID:	204374-04
Date Analyzed:	04/26/22	Data File:	042607.D
Matrix:	Water	Instrument:	GC7
Units:	ug/L (ppb)	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	41	24	127

Compounds:	Concentration ug/L (ppb)
Aroclor 1221	<0.1
Aroclor 1232	<0.1
Aroclor 1016	<0.1
Aroclor 1242	<0.1
Aroclor 1248	<0.1
Aroclor 1254	<0.1
Aroclor 1260	<0.1
Aroclor 1262	<0.1
Aroclor 1268	<0.1

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Dawn/Bunge Foods R.I.
Date Extracted:	04/26/22	Lab ID:	02-1028 mb
Date Analyzed:	04/27/22	Data File:	042704.D
Matrix:	Water	Instrument:	GC7
Units:	ug/L (ppb)	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	26	24	127

Compounds:	Concentration ug/L (ppb)
Aroclor 1221	<0.1
Aroclor 1232	<0.1
Aroclor 1016	<0.1
Aroclor 1242	<0.1
Aroclor 1248	<0.1
Aroclor 1254	<0.1
Aroclor 1260	<0.1
Aroclor 1262	<0.1
Aroclor 1268	<0.1

Date of Report: 05/02/22
Date Received: 04/22/22
Project: Dawn/Bunge Foods R.I., F&BI 204374

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

Laboratory Code: 204351-01 (Duplicate)

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

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	107	65-118
Toluene	ug/L (ppb)	50	110	72-122
Ethylbenzene	ug/L (ppb)	50	115	73-126
Xylenes	ug/L (ppb)	150	114	74-118
Gasoline	ug/L (ppb)	1,000	81	69-134

Date of Report: 05/02/22
Date Received: 04/22/22
Project: Dawn/Bunge Foods R.I., F&BI 204374

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

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	96	96	63-142	0

Date of Report: 05/02/22
Date Received: 04/22/22
Project: Dawn/Bunge Foods R.I., F&BI 204374

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 204374-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	10	0.021	105	50-150
Chloroethane	ug/L (ppb)	10	<1	95	50-150
1,1-Dichloroethene	ug/L (ppb)	10	<1	112	50-150
Methylene chloride	ug/L (ppb)	10	<5	148	50-150
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	137	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	98	50-150
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	95	50-150
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<0.2	101	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	95	50-150
Trichloroethene	ug/L (ppb)	10	<0.5	100	50-150
Tetrachloroethene	ug/L (ppb)	10	<1	101	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	10	109	107	70-130	2
Chloroethane	ug/L (ppb)	10	89	99	70-130	11
1,1-Dichloroethene	ug/L (ppb)	10	109	108	70-130	1
Methylene chloride	ug/L (ppb)	10	107	105	43-134	2
trans-1,2-Dichloroethene	ug/L (ppb)	10	97	96	70-130	1
1,1-Dichloroethane	ug/L (ppb)	10	98	98	70-130	0
cis-1,2-Dichloroethene	ug/L (ppb)	10	96	95	70-130	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	99	99	70-130	0
1,1,1-Trichloroethane	ug/L (ppb)	10	99	97	70-130	2
Trichloroethene	ug/L (ppb)	10	97	95	70-130	2
Tetrachloroethene	ug/L (ppb)	10	98	97	70-130	1

Date of Report: 05/02/22
Date Received: 04/22/22
Project: Dawn/Bunge Foods R.I., F&BI 204374

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

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	5	81	81	62-90	0
2-Methylnaphthalene	ug/L (ppb)	5	86	90	64-93	5
1-Methylnaphthalene	ug/L (ppb)	5	85	89	64-93	5
Acenaphthylene	ug/L (ppb)	5	92	94	70-130	2
Acenaphthene	ug/L (ppb)	5	90	91	70-130	1
Fluorene	ug/L (ppb)	5	95	97	70-130	2
Phenanthrene	ug/L (ppb)	5	93	94	70-130	1
Anthracene	ug/L (ppb)	5	95	96	70-130	1
Fluoranthene	ug/L (ppb)	5	97	105	70-130	8
Pyrene	ug/L (ppb)	5	97	98	70-130	1
Benz(a)anthracene	ug/L (ppb)	5	97	99	70-130	2
Chrysene	ug/L (ppb)	5	99	99	70-130	0
Benzo(a)pyrene	ug/L (ppb)	5	105	106	70-130	1
Benzo(b)fluoranthene	ug/L (ppb)	5	103	105	70-130	2
Benzo(k)fluoranthene	ug/L (ppb)	5	103	102	70-130	1
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	5	105	108	70-130	3
Dibenz(a,h)anthracene	ug/L (ppb)	5	111	112	70-130	1
Benzo(g,h,i)perylene	ug/L (ppb)	5	105	108	70-130	3

Date of Report: 05/02/22
Date Received: 04/22/22
Project: Dawn/Bunge Foods R.I., F&BI 204374

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Aroclor 1016	ug/L (ppb)	0.25	38	40	25-111	5
Aroclor 1260	ug/L (ppb)	0.25	56	64	23-123	13

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

204374 [redacted]

VW4
1E03

SAMPLE CHAIN OF CUSTODY

04/22/22 [redacted]

Report To R. Jones, G. Hainsworth, J. Stevens
Company CRETE CONSULTING
Address 16300 Christensen Rd Ste 214
City, State, ZIP Tukwila, WA 98188
Phone ______ Email ______

SAMPLERS (*signature*) Rusty Jones R. Jones
PROJECT NAME Dawn/Bunge Foods R.I.
PO #
REMARKS
INVOICE TO
Project specific RLs? - Yes / No

Page # 1 of 1

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	CVOCs				Notes Conductivity
MW1-0422	01 A-C	4.19.22	1400	WATER	3								X				6529 µS/cm
MW4-0422	02	4.20.22	1451		3								X				662 µS/cm
DUP-0422	03	4.21.22	1445		3								X				
MW5-0422	04 A-I	4.21.22	1545	↓	9	X	X	X			X	X	X				2068 µS/cm

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

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	R. Jones	Rusty Jones	CRETE Consult.	4/22/22	0945
Received by:		Dhan Phan	FeBI	4/22/22	0945
Relinquished by:					
Received by:			Samples received at 4 °C		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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fbi@isomedia.com
www.friedmanandbruya.com

December 29, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on December 20, 2021 from the Dawn/Bunge Foods RI, F&BI 112380 project. There are 10 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grant Hainsworth,Jamie Stevens
CTC1229R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 20, 2020 by Friedman & Bruya, Inc. from the Crete Consulting Dawn/Bunge Foods RI project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Crete Consulting
112380 -01	TB-121821
112380 -02	DUP-121821S
112380 -03	DUP-121821W
112380 -04	RI-SB-01-10
112380 -05	RI-SB-01-14
112380 -06	RI-SB-01
112380 -07	RI-SB-02-08
112380 -08	RI-SB-02-12
112380 -09	RI-SB-02
112380 -10	RI-SB-03-4

All quality control requirements were acceptable.

Date of Report: 12/29/21
Date Received: 12/20/21
Project: Dawn/Bunge Foods RI, F&BI 112380
Date Extracted: 12/22/21
Date Analyzed: 12/22/21

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

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

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
DUP-121821S 112380-02	<5	122
RI-SB-01-10 112380-04	<5	117
RI-SB-01-14 112380-05	<5	119
RI-SB-02-08 112380-07	<5	102
RI-SB-02-12 112380-08	<5	117
Method Blank 01-2677 MB	<5	125

Date of Report: 12/29/21
Date Received: 12/20/21
Project: Dawn/Bunge Foods RI, F&BI 112380
Date Extracted: 12/23/21
Date Analyzed: 12/27/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
DUP-121821W 112380-03	<100	88
RI-SB-01 112380-06	<100	86
RI-SB-02 112380-09	<100	88
Method Blank 01-2681 MB	<100	81

Date of Report: 12/29/21
Date Received: 12/20/21
Project: Dawn/Bunge Foods RI, F&BI 112380
Date Extracted: 12/21/21
Date Analyzed: 12/21/21

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

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

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 53-144)
DUP-121821S 112380-02	<50	<250	99
RI-SB-01-10 112380-04	<50	<250	96
RI-SB-01-14 112380-05	<50	<250	112
RI-SB-02-08 112380-07	<50	<250	96
RI-SB-02-12 112380-08	<50	<250	108
Method Blank 01-2909 MB	<50	<250	106

Date of Report: 12/29/21
Date Received: 12/20/21
Project: Dawn/Bunge Foods RI, F&BI 112380
Date Extracted: 12/22/21
Date Analyzed: 12/22/21

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

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
DUP-121821W 112380-03	710 x	290 x	139
RI-SB-01 112380-06	150 x	490 x	133
RI-SB-02 112380-09	65 x	<250	131
Method Blank 01-2912 MB2	<50	<250	108

Date of Report: 12/29/21
Date Received: 12/20/21
Project: Dawn/Bunge Foods RI, F&BI 112380

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 112380-02 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	90	71-131

Date of Report: 12/29/21
Date Received: 12/20/21
Project: Dawn/Bunge Foods RI, F&BI 112380

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 112410-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	86	69-134

Date of Report: 12/29/21
Date Received: 12/20/21
Project: Dawn/Bunge Foods RI, F&BI 112380

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

Laboratory Code: 112392-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	450	76	78	64-133	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	84	58-147

Date of Report: 12/29/21
Date Received: 12/20/21
Project: Dawn/Bunge Foods RI, F&BI 112380

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

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	108	104	63-142	4

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

112380 [redacted]

SAMPLE CHAIN OF CUSTODY

12-20-21 [redacted]

C02/VS2/D03/VW3/AI2

Page # 1 of 1

Report To R. Jones / G. Hainsworth / J. Stevens
Company CRETE CONSULTING
Address 16300 Christensen Rd, Ste. 214
City, State, ZIP Seattle, WA 98188
Phone ______ Email ______

SAMPLERS (*signature*) Rusty Jones R. Jones	
PROJECT NAME DAWN/BUNGE FOODS R.I.	PO #
REMARKS Hold for possible EPH/VPH Project specific RLs? - Yes / No	INVOICE TO

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
TB-121821	01 A-B	12.18.2021	0800	WATER	2												HOLD
DUP-121821S	02 A-E	↓	0825	SOIL	5	X	X										
DUP-121821W	03 A-I		0830	WATER	9	X	X										
RI-SB-01-10	04 A-E		1010	SOIL	5	X	X										
RI-SB-01-14	05		1015	↓	5	X	X										
RI-SB-01	06 A-I		1030	WATER	9	X	X										
RI-SB-02-08	07 A-E		1145	SOIL	5	X	X										
RI-SB-02-12	08		1155	↓	5	X	X										
RI-SB-02	09 A-I		1215	WATER	9	X	X										
RI-SB-03-4	10 A-E		1315	SOIL	5												HOLD

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

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: R. Jones	Rusty Jones	CRETE CONSULTING	12.20.2021	0743
Received by:	Ann W Bruya	F&B	12/20/21	0743
Relinquished by:				
Received by:		Samples received at 1 °C		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

May 4, 2022

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the additional results from the testing of material submitted on April 22, 2022 from the Dawn/Bunge Foods RI, F&BI 204374 project. There are 4 pages included in this report.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grant Hainsworth, Jamie Stevens
CTC0504R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 22, 2022 by Friedman & Bruya, Inc. from the Crete Consulting Dawn/Bunge Foods R.I., F&BI 204374 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Crete Consulting
204374 -01	MW1-0422
204374 -02	MW4-0422
204374 -03	DUP-0422
204374 -04	MW5-0422

All quality control requirements were acceptable.

Date of Report: 05/04/22
Date Received: 04/22/22
Project: Dawn/Bunge Foods R.I., F&BI 204374
Date Extracted: 04/22/22
Date Analyzed: 05/02/22

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

Sample Extracts Passed Through a Silica Gel Column Prior to Analysis

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW5-0422 204374-04	<50	<250	152
Method Blank 02-983 MB	<50	<250	137

Date of Report: 05/04/22
Date Received: 04/22/22
Project: Dawn/Bunge Foods R.I., F&BI 204374

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

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	100	108	63-142	8

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

204374 [redacted]

VW4
IE03

SAMPLE CHAIN OF CUSTODY

04/22/22 [redacted]

Report To R. Jones, G. Hainsworth, J. Stevens
Company CRETE CONSULTING
Address 16300 Christensen Rd Ste 214
City, State, ZIP Tukwila, WA 98188
Phone ______ Email ______

SAMPLERS (*signature*) Rusty Jones R. Jones

PROJECT NAME	PO #
Dawn/Bunge Foods R.I.	
REMARKS	INVOICE TO
Project specific RLs? - Yes / No	

Page # 1 of 1

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

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	CVOCs	Dx w/SG			Notes Conductivity
MW1-0422	01 A-C	4.19.22	1400	WATER	3								X				6529 uS/cm
MW4-0422	02	4.20.22	1451		3								X				662 uS/cm
DUP-0422	03	4.21.22	1445		3								X				
MW5-0422	04 A-I	4.21.22	1545		9	X	X	X			X	X	X	(X)			2068 uS/cm
																	per RS 5/2/22
																	MB

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

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	R. Jones	Rusty Jones	CRETE Consult.	4/22/22	0945
Received by:		Nhan Phan	FeBI	4/22/22	0945
Relinquished by:					
Received by:			Samples received at 4 °C		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

5500 4th Avenue South
Seattle, WA 98108
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

January 3, 2023

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on December 27, 2022 from the Former Bunge Foods, F&BI 212362 project. There are 13 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grant Hainsworth
CTC0103R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 27, 2022 by Friedman & Bruya, Inc. from the Crete Consulting Former Bunge Foods, F&BI 212362 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Crete Consulting
212362 -01	DUP01-1222
212362 -02	DUP02-1222
212362 -03	MW1-1222
212362 -04	MW5-1222
212362 -05	MW6-1222
212362 -06	MW4-1222
212362 -07	MW2-1222

All quality control requirements were acceptable.

Date of Report: 01/03/23
Date Received: 12/27/22
Project: Former Bunge Foods, F&BI 212362
Date Extracted: 12/27/22
Date Analyzed: 12/28/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
MW2-1222 212362-07	<100	114
Method Blank 02-3042 MB	<100	108

Date of Report: 01/03/23
Date Received: 12/27/22
Project: Former Bunge Foods, F&BI 212362
Date Extracted: 12/28/22
Date Analyzed: 12/28/22

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

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 50-150)
DUP01-1222 212362-01 1/0.4	96 x	<250	106
MW5-1222 212362-04 1/0.4	120 x	<250	110
Method Blank 02-3060 MB2	<50	<250	113

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	DUP02-1222	Client:	Crete Consulting
Date Received:	12/27/22	Project:	Former Bunge Foods, F&BI 212362
Date Extracted:	12/28/22	Lab ID:	212362-02
Date Analyzed:	12/28/22	Data File:	122809.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	71	132
Toluene-d8	99	68	139
4-Bromofluorobenzene	103	62	136

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.051
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW1-1222	Client:	Crete Consulting
Date Received:	12/27/22	Project:	Former Bunge Foods, F&BI 212362
Date Extracted:	12/28/22	Lab ID:	212362-03
Date Analyzed:	12/28/22	Data File:	122814.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	78	126
Toluene-d8	97	84	115
4-Bromofluorobenzene	103	72	130

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW5-1222	Client:	Crete Consulting
Date Received:	12/27/22	Project:	Former Bunge Foods, F&BI 212362
Date Extracted:	12/28/22	Lab ID:	212362-04
Date Analyzed:	12/28/22	Data File:	122815.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	78	126
Toluene-d8	95	84	115
4-Bromofluorobenzene	103	72	130

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	6.9
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	10
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	5.9

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW6-1222	Client:	Crete Consulting
Date Received:	12/27/22	Project:	Former Bunge Foods, F&BI 212362
Date Extracted:	12/28/22	Lab ID:	212362-05
Date Analyzed:	12/28/22	Data File:	122816.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	78	126
Toluene-d8	93	84	115
4-Bromofluorobenzene	101	72	130

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.057
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW4-1222	Client:	Crete Consulting
Date Received:	12/27/22	Project:	Former Bunge Foods, F&BI 212362
Date Extracted:	12/28/22	Lab ID:	212362-06
Date Analyzed:	12/28/22	Data File:	122817.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	78	126
Toluene-d8	96	84	115
4-Bromofluorobenzene	95	72	130

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.53
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	1.8
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	1.2

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Former Bunge Foods, F&BI 212362
Date Extracted:	12/28/22	Lab ID:	02-2986 mb2
Date Analyzed:	12/28/22	Data File:	122805.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	78	126
Toluene-d8	96	84	115
4-Bromofluorobenzene	103	72	130

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Date of Report: 01/03/23
Date Received: 12/27/22
Project: Former Bunge Foods, F&BI 212362

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 212347-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	97	70-130

Date of Report: 01/03/23
Date Received: 12/27/22
Project: Former Bunge Foods, F&BI 212362

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

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	99	101	70-130	2

Date of Report: 01/03/23
Date Received: 12/27/22
Project: Former Bunge Foods, F&BI 212362

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 212362-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	10	0.51	115	16-176
Chloroethane	ug/L (ppb)	10	<1	123	50-150
1,1-Dichloroethene	ug/L (ppb)	10	<1	110	50-150
Methylene chloride	ug/L (ppb)	10	<5	102	40-143
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	104	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	106	50-150
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	105	50-150
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<1	117	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	105	50-150
Trichloroethene	ug/L (ppb)	10	<1	101	43-133
Tetrachloroethene	ug/L (ppb)	10	<1	107	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	10	109	103	70-130	6
Chloroethane	ug/L (ppb)	10	116	109	70-130	6
1,1-Dichloroethene	ug/L (ppb)	10	108	100	70-130	8
Methylene chloride	ug/L (ppb)	10	108	100	29-192	8
trans-1,2-Dichloroethene	ug/L (ppb)	10	102	96	70-130	6
1,1-Dichloroethane	ug/L (ppb)	10	107	99	70-130	8
cis-1,2-Dichloroethene	ug/L (ppb)	10	104	97	70-130	7
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	117	109	70-130	7
1,1,1-Trichloroethane	ug/L (ppb)	10	103	96	70-130	7
Trichloroethene	ug/L (ppb)	10	102	95	70-130	7
Tetrachloroethene	ug/L (ppb)	10	106	96	70-130	10

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

212362 [redacted]

SAMPLE CHAIN OF CUSTODY

12/27/22 [redacted] I2/VW3

Page # 1 of 1

Report To R. Jones / G. Hainsworth

Company CRETE Consulting

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*) Rusty Jones R. Jones

PROJECT NAME Former Bunge Foods

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO CRETE

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

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

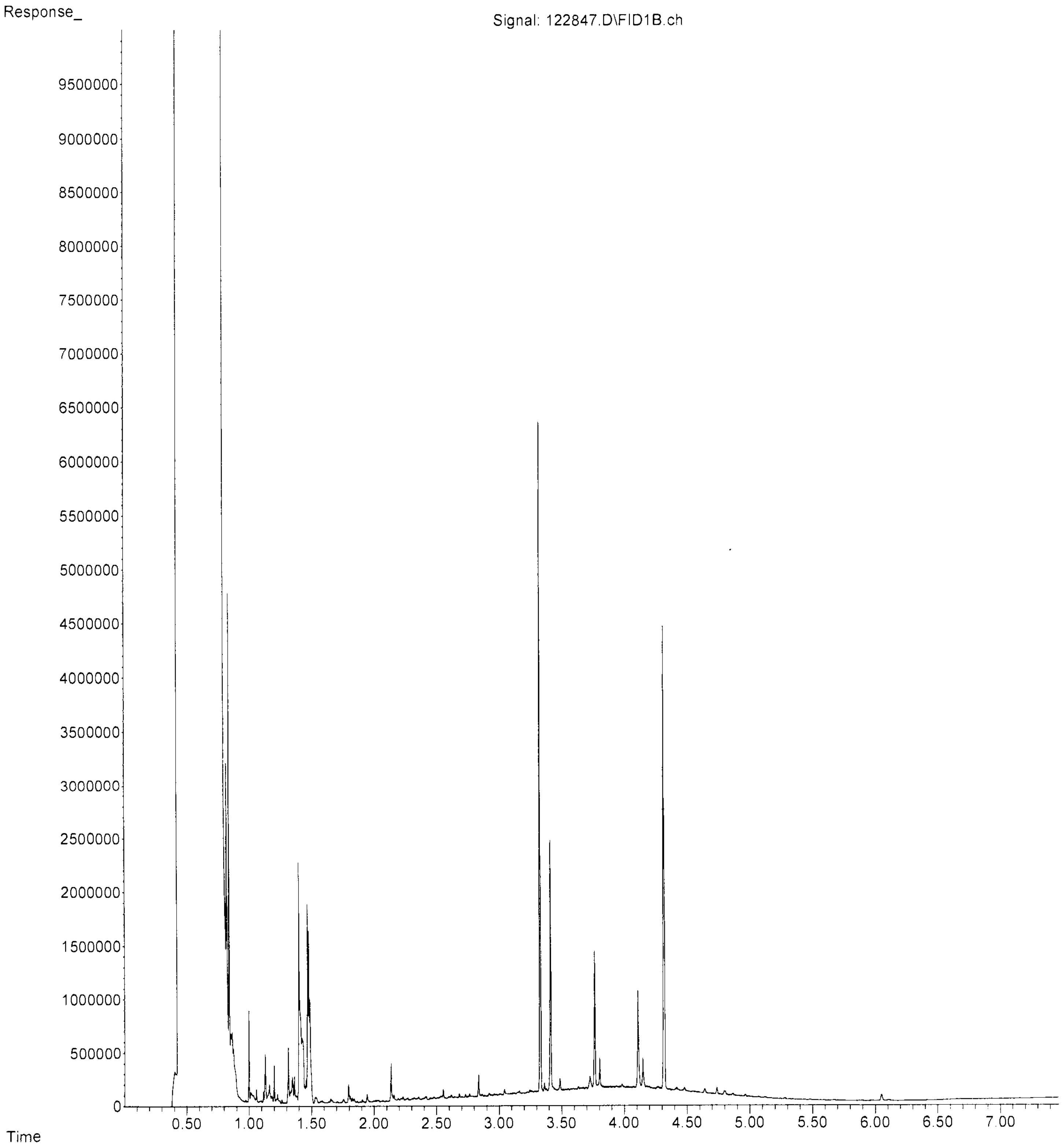
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	cVOCs				Notes
DUP01-1222	01	12/21/2022	0001	WATER	1	X											
DUP02-1222	02 A-C	↓	0002	↓	3								X				
MW1-1222	03 |	↓	2139	↓	3								X				
MW5-1222	04 A-D	↓	2226	↓	4	X							X				
MW6-1222	05 A-C	12/22/2022	2315	↓	3								X				
MW4-1222	06 |	↓	2223	↓	3								X				
MW2-1222	07 |	↓	2331	↓	3		X										

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

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: R. Jones	Rusty Jones	CRETE	12/27/22	1213
Received by:	ANH PHAN	FBB	12/27/22	12:13
Relinquished by:				
Received by:		Samples received at 0 °C		

File   :P:\Proc_GC14\12-28-22\122847.D
Operator   : TL
Acquired   : 28 Dec 2022 06:29 pm using AcqMethod DX.M
Instrument :   GC14
Sample Name: 212362-04
Misc Info :
Vial Number: 20

ERR



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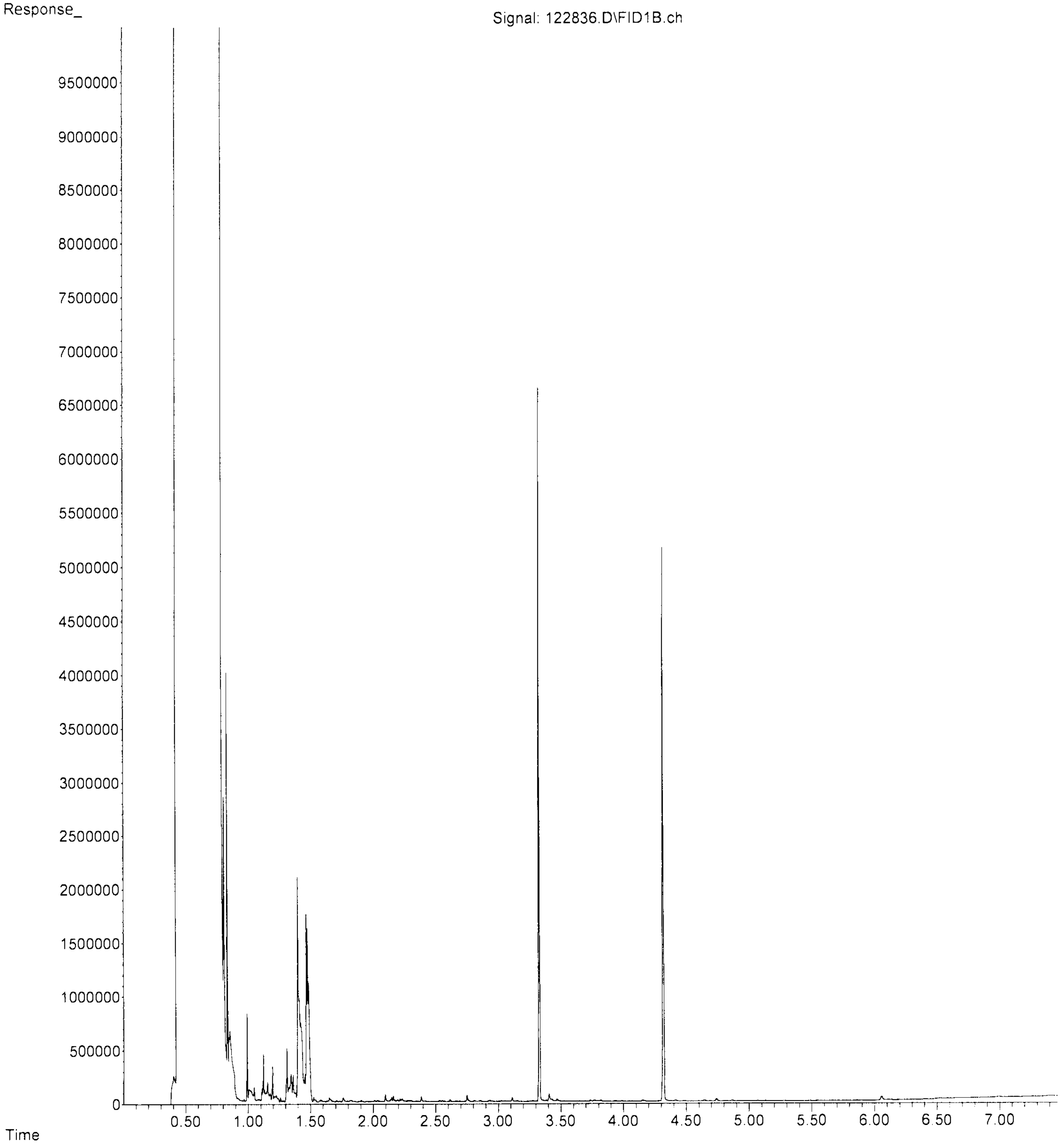
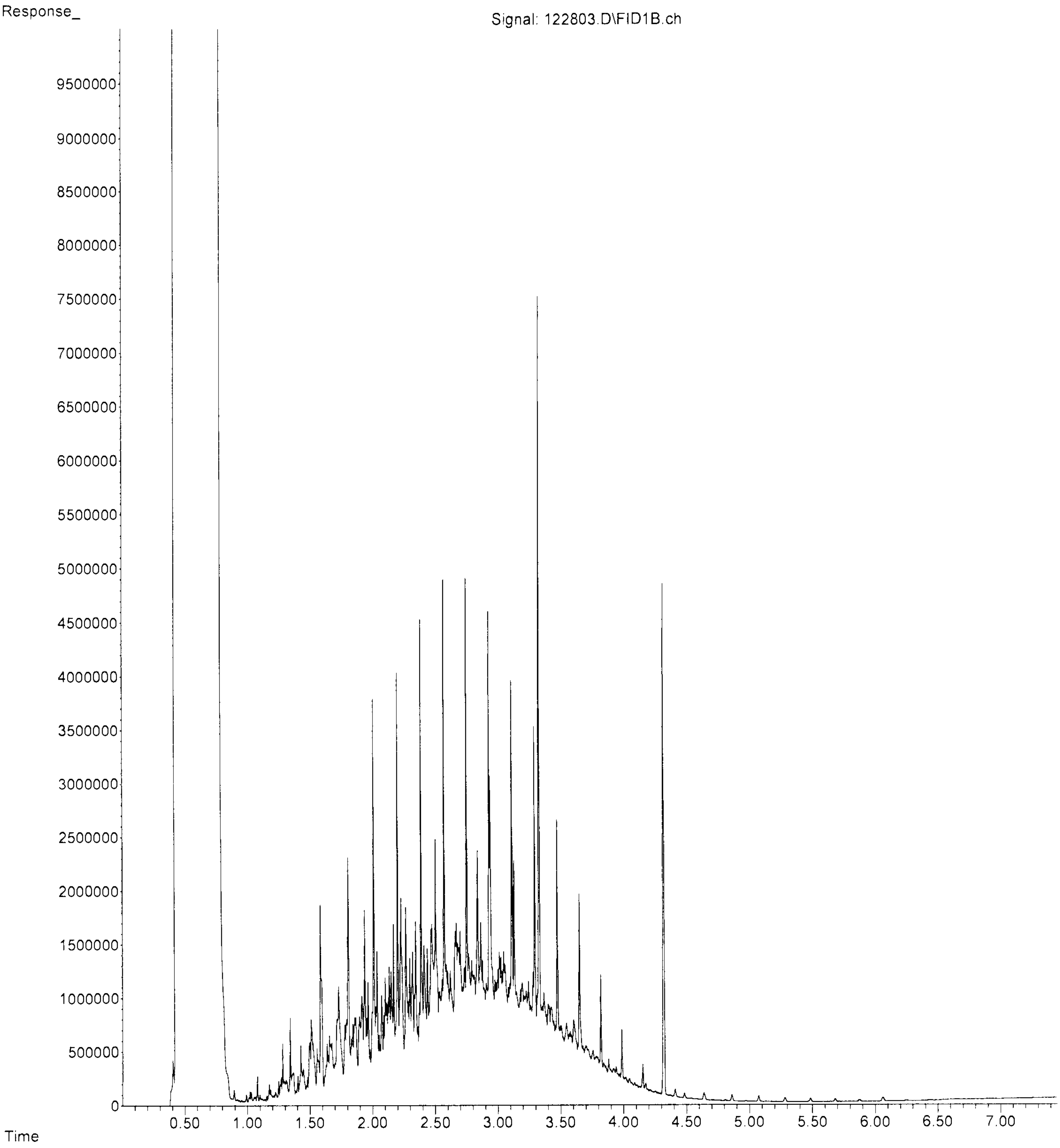
Acquired   : 28 Dec 2022 04:19 pm using AcqMethod DX.M
Instrument :   GC14
Sample Name: 02-3060 mb2
Misc Info :
Vial Number: 117

ERR



File   :P:\Proc_GC14\12-28-22\122803.D
Operator   : TL
Acquired   : 28 Dec 2022 09:31 am using AcqMethod DX.M
Instrument :   GC14
Sample Name: 500 Dx 67-143B
Misc Info :
Vial Number: 3

ERR



PERIODIC VAPOR INTRUSION ASSESSMENT
2023

BRIDGE POINT SEATTLE 130
WAREHOUSE BUILDING
6901 FOX AVENUE SOUTH
SEATTLE, WASHINGTON

September 20, 2023

Prepared for:
CRETE Consulting Inc., PC

Prepared by:
EMB Consulting, LLC

Project Title:

PERIODIC VAPOR INTRUSION ASSESSMENT 2023

BRIDGE POINT SEATTLE 130
WAREHOUSE BUILDING
6901 FOX AVENUE SOUTH
SEATTLE, WASHINGTON

Prepared For:

CRETE Consulting Inc., PC

EMB Consulting Project Number: 1634

September 20, 2023

Elisabeth Black, CIH
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Friedman & Bruya, Inc.
Laboratory Analytical Report
Sample Chromatographs

Attachment B
WeatherUnderground
Weather Data Summary
South Park KWASEATT2547
July 4 to July 5, 2023

ACRONYMS

µg/m^3	micrograms per cubic meter
ACGIH	American Conference of Governmental Industrial Hygienists
APH	Air-Phase Petroleum Hydrocarbons
CLARC	Cleanup Levels and Risk Calculations
COCs	contaminants of concern
CRETE	CRETE Consulting Inc., PC
CUL	Cleanup Level
Cis-1,2-DCE	1,2-Dichloroethene
DOSH	Washington State Division of Occupational Safety and Health
Ecology	Washington State Department of Ecology
EDC	1,2-Dichloroethane
EMB	EMB Consulting, LLC
EPA	Environmental Protection Agency
FBI	Friedman & Bruya, Inc.
GC/MS	Gas Chromatography/Mass Spectrophotometry
GGVs	Group Guidance Values
GWCC	Great Western Chemical Corporation
MTCA	Model Toxics Control Act
OEL	Occupational Exposure Limit
PCE	Perchloroethene (Tetrachloroethene)
PEL	Permissible Exposure Limit
RL	Reporting Limit
TPH	Total Petroleum Hydrocarbons
TCE	Trichloroethene
VC	Vinyl Chloride
VI	Vapor Intrusion
VOCs	Volatile Organic Compounds
Warehouse	6901 Fox Avenue South Warehouse Building

1.0 Introduction

This document presents the results of a periodic vapor intrusion (VI) assessment conducted in July 2023 for the Bridge Point Seattle 130 Warehouse building (Warehouse) at 6901 Fox Avenue South in Seattle, Washington. The assessment was conducted based on environmental data that indicate a plume of chemical contamination in soil and groundwater from the property located across Fox Avenue South to the east (Fox Avenue Building). The assessment consists of indoor and outdoor (ambient) air sampling to determine if vapor contaminants may be migrating into the Warehouse. The results of this assessment are compared in a qualitative manner with the results collected in 2021 (EMB, 2021).

The following sections of this report describe area background, sampling methods, results, and conclusions. Attachments to this report include figures of the Warehouse with 2023 sample locations, tables of air monitoring data, and the laboratory analytical report and sample chromatographs. Ambient weather data for the sample duration are also included.

2.0 Background

Background information for the project was obtained from the CRETE Consulting, Inc. (CRETE) Summary of Soil and Groundwater Conditions letter report dated February 5, 2021 (CRETE, 2021) and from the Washington State Department of Ecology (Ecology) site page for the Fox Avenue Building.

The Warehouse is located in an industrial area of South Seattle on the east bank of the Duwamish Waterway. It is located immediately west and downgradient of the former Great Western Chemical Company (GWCC), now referred to as the Fox Avenue Building. GWCC operated on the site from the 1960s to the 1980s conducting chemical and petroleum repackaging and distribution on the property.

According to the CRETE letter report (2021), groundwater on the Warehouse property is contaminated with the following chlorinated compounds associated with GWCC operations: trichlorethene (TCE), tetrachloroethene (PCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC). Gasoline impacts were also indicated in a limited area on the east side of the Warehouse property.

EMB Consulting, LLC (EMB) conducted an initial VI assessment of the Warehouse in June of 2021, which included six indoor air samples and two ambient air samples to evaluate potential chemical contaminants in ambient air. The 2023 sample locations were selected to be as close as possible to the 2021 sample locations, with two new sample locations added on the west end of the Warehouse.

3.0 Methods

This section provides a summary of the methods employed to perform the VI assessment for the Warehouse in 2023.

3.1 Laboratory Methods

Based on the potential for chlorinated solvent and petroleum hydrocarbon contamination from the adjacent Fox Avenue Building, Air-Phase Petroleum Hydrocarbon (APH) and Environmental Protection Agency (EPA) Method TO-15 were selected as the sampling and analytical methods to evaluate indoor and ambient air. The APH method is applied for evaluation of gasoline and the volatile fraction of diesel fuel oil. The TO-15 method is applied for volatile organic compounds (VOCs), to include chlorinated and non-chlorinated VOCs.

The samples were collected in evacuated canisters prepared by the project laboratory, Friedman & Bruya, Inc. (FBI). FBI performed both analyses using gas chromatography/mass spectrometry (GC/MS).

The APH method provides concentration data in air for the following contaminants of concern (COCs).

- aliphatic petroleum hydrocarbons in the range of C5 through C8 (APH EC5-8 aliphatics);
- aliphatic petroleum hydrocarbons in the range of C9 through C12 (APH EC9-12 aliphatics); and
- aromatic petroleum hydrocarbons in the range of C9 through C10 (APH C9-10 aromatics).

The EPA TO-15 method provides concentration data in air for the following COCs.

- Chlorinated solvents, to include TCE, PCE, cis-1,2-DCE, and VC.
- VOCs associated with petroleum products, to include benzene, toluene, ethylbenzene, xylenes, and naphthalene.

Finally, the APH range values and VOCs associated with petroleum products are summed to provide a Total Petroleum Hydrocarbons (TPH) value in accordance with Ecology guidance (Ecology, 2022).

3.2 Field Methods

The field sampling program was carried out during an approximate 24-hour period over two consecutive days to account for fluctuations in temperature, ambient pressure, surrounding traffic, and personnel movement within the Warehouse. Changes in these conditions can affect the flow of soil vapor to indoor spaces. Weather data for the South Park area for July 4 to July 5, 2023 are provided with this report in Attachment B and summarized in the Results section.

Sampling was conducted from Tuesday to Wednesday morning when the building was at minimal occupancy. Beginning on the morning of July 4, 2023, EMB, accompanied by Rusty Jones of CRETE, placed eight evacuated canisters inside the Warehouse building, with two in the office space on the east end of the building and six spread across the Warehouse space. In addition, two canisters were collected outdoors on the south side of the building in the traffic/loading area (ambient samples). The ambient samples were collected from presumed upwind and downwind locations to provide data on background levels of the COCs in the project area. The canisters were placed on available platforms in the area (stair, desk, box), or on a portable ladder when a platform wasn't available in the location. The attached figures show the locations of the samples.

EMB noted equipment or chemicals nearby each sample that could impact results. The Warehouse was full of Dawn Foods product in flour sacks, including cake, donut, and brownie mixes and tubs of frostings and fillings. Cleaning chemicals are also located in the office and warehouse. Electric forklifts are present in the Warehouse. There may be a small amount of petroleum oil or lubrication product associated with their maintenance.

The samples collected are described below.

- **Sample IA1-070423** is an indoor sample collected in the women's restroom in the office area on the east end of the building. The sampling canister was located on a small table approximately 3 feet above the floor. A can of Glade air freshener was located in the restroom. A review of the safety data sheet for this product revealed limonene and ethanol as the VOCs in the product. No other obvious contributors to indoor VOCs were identified in the office women's restroom.

- **Sample IA2-070423** is an indoor sample collected from a desktop in the open office area in the southeast corner of the office. The sampling equipment was located on the desk approximately 3 feet above the floor. There were no obvious contributors to indoor VOCs in the office at the time of sampling.

- **Sample IA3-070423** is an indoor sample collected from the Warehouse just outside of the office structures on the east and south side of the building.

The sampling equipment was located on a ladder approximately 4 feet above the floor. There were no obvious contributors to indoor VOCs in that area of the Warehouse.

- **Sample IA4-070423** is an indoor sample collected from the center of the Warehouse near the east end, but west of the refrigerator/freezer units. The sampling equipment was located on a ladder approximately 3 feet above the floor. Potential contributors to indoor VOCs in that area of the Warehouse include cooking oils and refrigerants. The COCs for this project are not used as refrigerants.

- **Sample IA5-070423** is an indoor sample collected from the center of the Warehouse on the east side of the stairs to the loft. The sampling equipment was located on a stair tread approximately 2.5 feet above the floor. There were no obvious contributors to indoor VOCs in that area of the Warehouse.

- **Sample IA6-070423** is an indoor sample collected from the south side of the Warehouse near the area marked “customer service” on the figure. The sampling equipment was located on a box approximately 1 foot above the floor. There were no obvious contributors to indoor VOCs in that area of the Warehouse.

- **Sample IA7-070423** is an indoor sample collected from the south side of the Warehouse where sprinkler system risers enter the Warehouse through floor penetrations. The sampling equipment was located on a ladder two feet above the floor. There were no obvious contributors to indoor VOCs in that area of the Warehouse.

- **Sample IA8-070423** is an indoor sample collected from the north side of the Warehouse just outside of the Dawn Foods test kitchen. The sampling equipment was located on a ladder approximately 3.5 feet above the floor. There were no obvious contributors to indoor VOCs in that area of the Warehouse, except for VOCs generated during the baking of Dawn food products in the test kitchen.

- **Sample AE070423** is an ambient air sample on the east side of the Warehouse Building. The sample was placed beneath the furthest east awning on the south side of the Warehouse.

- **Sample AW070423** is an ambient air sample near the west end of the Warehouse Building. The sample was placed beneath an awning (dock 13) on the south side of the Warehouse.

At the completion of sampling on July 5, 2023, the ten samples were retrieved by EMB and CRETE and hand delivered to FBI in Seattle, Washington for analysis.

3.3 Data Assessment

The analytical results for the ten samples are summarized in Table 1 attached to this report. Each of the individual VOCs and hydrocarbon ranges identified by the APH/TO-15 analysis were compared against the following criteria, where available.

- Ecology Model Toxics Control Act (MTCA) Cleanup Levels and Risk Calculations (CLARC) Method B cleanup levels (CULs) for indoor air. The Method B CULs are based on an assumption of 24 hours of continuous exposure, as would be appropriate for a residential scenario.

- In the Guidance for Evaluating Vapor Intrusion in Washington State – Investigation and Remedial Action (Ecology, 2022), Ecology introduced a new screening criteria for indoor air for commercial workers. These screening values are provided in Table 1 and are used to evaluate indoor air for the occupational population. The use of these evaluation criteria replaces the modified Level B values cited in the 2021 report.

  The basis for the new screening level from the Ecology guidance is presented below:

  It may be possible to develop "risk-based indoor air levels" for commercial buildings that do not meet the definition of an industrial property but where only adult workers are present. In this situation, the default exposure assumptions could be adjusted as follows:

  1. *For non-carcinogenic cleanup levels, change the average body weight from 16 kg (representing a child) to 70 kg (representing an adult) and increase the breathing rate from 10 m^3/day to 20 m^3/day.*

  2. *Modify the exposure frequency to better represent the amount of time workers are actually present (e.g. 45 hours/week x 50 weeks/year = 0.26 vs. a default of 1.0). This provision applies to both the cancer and non-cancer pathways.*

  Ecology makes a distinction between a CUL and screening level. These criteria are to be used only for evaluation of potential exposure to the working population, not as target limits for remediation.

  For the purposes of this project, these are the most applicable criteria for current and future tenants of the Warehouse.

- Total TPH CUL was calculated using the method demonstrated in Table 2 attached to this report and specified in WAC 173-340-750, Equation 750-1. Ambient air values are considered background for comparison with indoor air samples. Table 1 includes a column to subtract out potential contributors to indoor air from outdoor air. It should be noted that it is unknown if outdoor sources are the cause of indoor chemical levels.

- The Washington State Division of Occupational Safety and Health (DOSH) Permissible Exposure Limits (PELs) are also listed in Table 1 for comparison with the MTCA Method B VI CULs and the screening criteria for commercial workers. These levels are three to five orders of magnitude higher than the MTCA CULs. The PELs are only applicable to chemical exposures created by the work conducted by site tenant activities or by chemical products stored by the tenant at the site. They are only included with this report for comparison purposes.

- Finally, the American Conference of Governmental Industrial Hygienists (ACGIH) has developed Group Guidance Values (GGVs) for certain refined hydrocarbon solvent mixtures. There are GGVs for specific petroleum compound groups similar to the ranges reported in the APH Method. The ACGIH has developed the GGVs based on similar chemical and toxicological characteristics. GGVs may be used as occupational exposure limits (OELs) when the mixture does not contain a compound for which specific OELs have been established. The ACGIH GGVs for Hydrocarbon Solvent Vapor Mixtures are included in Table 1. The GGVs are only applicable to chemical exposures created by the work conducted by site tenant activities or by chemical products stored by the tenant at the site. They are only included with this report for comparison purposes.

4.0 Results

The results of sampling for indoor air and ambient air at the Bridge Point Seattle 130 Warehouse property on July 4 and July 5, 2023 are described below. Analytical results for indoor air and ambient air are summarized in Table 1 attached to this report. The site-specific TPH CUL derivation is provided in Table 2. The FBI laboratory report and sample chromatographs are provided in Attachment A. Weather data are included in Attachment B.

4.1 Indoor Air and Ambient Air

Following is a summary of results for chlorinated VOCs inside the Warehouse using 2023 data.

- 1,2-dichloroethane (EDC) was detected above the laboratory reporting limit (RL) in all indoor samples, ranging from 0.10 to 0.44 micrograms per cubic meter of air (µg/m^3). EDC was also detected in both ambient air samples at an averaged concentration of 0.058 µg/m^3. If you subtract the ambient concentration of EDC from the indoor air EDC measurements, only the five indoor samples on the east side of the building exceed the

Method B CUL for VI. These samples are IA1-070423, IA2-070423, IA3-070423, IA4-070423, and IA5-070423.

EDC was below the MTCA Screening Level for Commercial Workers in all indoor samples, even without subtracting out the average ambient concentration of EDC.

TCE was detected above the laboratory RL in the seven of the eight indoor samples for the Warehouse, but it was not present in concentration above the Method B CUL level for VI in any of the samples. TCE was not detected in ambient air samples at or above the RL.

Concentrations of TCE detected in indoor samples were below the MTCA Screening Level for Commercial Workers in all samples.

- None of the other chlorinated VOCs were detected in indoor or ambient air at or above the RL for the following compounds: cis-1,2-DCE, PCE, or VC. All RLs are below the MTCA Method B CUL for VI and the MTCA Screening Level for Commercial Workers.

Following is a summary of results for non-chlorinated VOCs associated with petroleum hydrocarbons.

- Benzene was detected above the laboratory RL and above the MTCA Method B VI CUL in all indoor samples. The indoor benzene results ranged from 0.72 to 1.4 µg/m^3. Benzene was also detected in both ambient air samples within the same range (0.73 to 0.83 µg/m^3), with an average ambient level of 0.78 µg/m^3. If you subtract out the potential outdoor contribution to indoor air from benzene all indoor readings are below the Method B CUL or reduced to zero, except for three samples from the central area of the Warehouse.

  All benzene results were below the MTCA Screening Level for Commercial Workers.

- Ethylbenzene and xylenes were detected in all indoor and ambient air samples above laboratory RLs, but below the MTCA Method B CUL for VI and the MTCA Screening Level for Commercial Workers.

- Naphthalene was detected above the laboratory RL in all indoor samples. It was present in concentrations above the Method B CUL level for VI and the MTCA Screening Level for Commercial Workers in all samples. The indoor naphthalene results ranged from 0.45 to 0.75 µg/m^3.

  Naphthalene was also detected in ambient air samples, from 0.36 and 0.73 µg/m^3, with an average of 0.55 µg/m^3. If you subtract out the potential outdoor contribution to indoor air from naphthalene all indoor results are below the MTCA Screening Level for Commercial Workers. Ambient-corrected naphthalene was detected above the MTCA B CUL for four of the eight indoor samples, to include IA3-070423, IA5-070423, IA7-070423, and IA8-070423.

- APH EC5-8 aliphatics were detected in all indoor samples, ranging from 100 to 230 µg/m^3. They were also detected in both ambient samples at an average of 88 µg/m^3.

- APH EC9-12 aliphatics were detected in two of eight indoor samples, ranging from 55 to 68 µg/m^3. Both samples were in the southwest portion of the Warehouse. Aliphatics in this range were not detected at or above the RL for either of the ambient samples.

- APH EC9-10 aromatics were detected in indoor samples above the RL in all Warehouse samples, except for office samples. They were also not detected in ambient air samples. The aromatics were detected ranging from 26 to 61 µg/m^3. The laboratory indicated that the data for these sample chromatographs do not resemble the fuel standard used for quantification by the APH method. The aliphatics detected on the chromatograph likely represent cleaners or food additives present in the Warehouse. These data were not included in the total TPH calculation.

- The project specific derived TPH limits for MTCA Method B VI is 201.23 µg/m^3. See Table 2 for the details and assumptions used in deriving the CUL. The Method B TPH CUL was exceeded for all six of the eight indoor samples, all outside of the office. The average ambient background for TPH is 138 µg/m^3. If you subtract out the background APH ranges where detected, the Method B TPH CUL was exceeded for only one of the indoor samples, IA5-070423.

All COCs detected in indoor and ambient sample results were well below DOSH PELs, where they exist. Likewise, all hydrocarbon ranges detected in indoor and ambient sample results were well below ACGIH GVVs.

4.2 Atmospheric Conditions

The influence of barometric pressure and ambient conditions on the potential release of soil vapor to ambient and indoor air was also evaluated in this assessment. Changes in atmospheric pressure may create a “piston-like” force on soil vapor, possibly causing a cyclic up and down flow of contaminant vapors into and out of the building. Soil vapor compression and expansion in response to barometric pressure fluctuations may alternately enhance or inhibit vapor intrusion. Vapor intrusion into buildings is typically higher during periods of low barometric pressure.

The barometric pressure and precipitation data document high pressure conditions (average 30.00 inches of mercury [in]) with no precipitation across the 24-hour sample period. Temperature fluctuated between 55 and 90 degrees Fahrenheit. Wind was predominantly from the east during sampling. Weather data for the two days on which sampling occurred are included with this report in Attachment B.

5.0 Conclusions

The data developed for this assessment indicate the following conditions for the Warehouse during the 24-hour sampling period. A qualitative assessment of 2023 data relative to 2021 is also provided.

- With the Ecology adoption of the Screening Level for Commercial Workers, all analytes for all indoor samples are below those criteria, with the exception of naphthalene. Again, this is the most appropriate data evaluation criteria because it considers the most likely potentially exposed population for the location. These screening levels had not yet been established by Ecology in 2021.

- The MTCA Method B CUL for EDC, once adjusted for ambient concentrations of the COC, was only exceeded in the five most eastern sample locations. No other chlorinated VOC was detected above the adjusted MTCA B CUL. In 2021, three of the six samples exceeded the adjusted CUL for EDC.

- The MTCA Method B CUL for naphthalene, once adjusted for ambient concentrations of the COC, was exceeded in four Warehouse sample locations in 2023. In 2021, three of the six samples exceeded the adjusted CUL for naphthalene.

- APH EC5-8 aliphatics increased from east to west, but then decreased again in the far west indoor samples. In 2021, the same trend was observed, but the two far west samples were not collected in that year so no comparison can be made for those samples.

- For APH EC9-12 aliphatics, they were not detected at or above the RL in the east six samples but did show up in the two western-most samples. In 2021, they were detected in all samples across the Warehouse and presented the highest concentration for the three petroleum ranges.

- For APH EC9-10 Aromatics, they were not detected at or above the RL in the office samples, but were detected in all Warehouse area samples. FBI indicated that the chromatograph for this range did not resemble the petroleum standard, so it is believed that this shows interference from food or cleaning products in the Warehouse. This aromatic range was not detected in any sample in 2021. The project laboratory provided the sample chromatographs for evidence of the deviation from the petroleum standard. They are included with the lab reports in this document.

- In 2023, only one sample exceeded the project specific MTCA Method B CUL for TPH. In 2021, all indoor samples exceed the project specific MTCA Method B CUL for TPH.

- Average barometric pressure was slightly higher during the sampling event in 2023, with an average of 30.00 in. vs. 29.88 in in 2021.

6.0 References

ACGIH. 2022 Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices - Appendix H.

CRETE Consulting Inc., PC. Memorandum to Bridge Development Partners. Dawn Food Products – Seattle, WA. Summary of Soil and Groundwater Conditions. February 5, 2021.

EMB Consulting, LLC. Vapor Intrusion Assessment. Dawn Foods Warehouse Building, 6901 Fox Avenue South. Seattle, Washington. December 28, 2021.

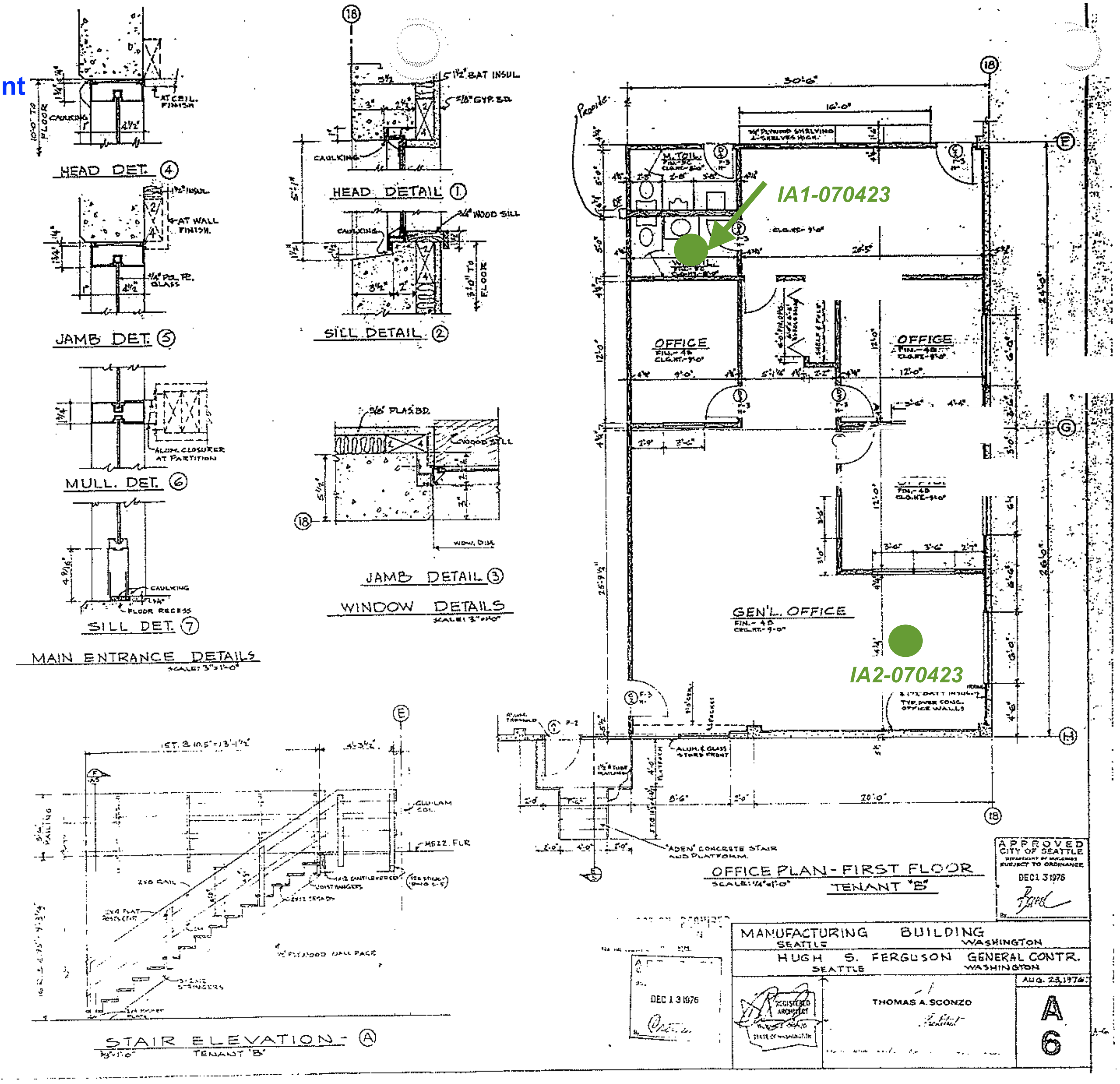
Washington State Department of Ecology. Fox Ave Building. https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=5082

Washington State Department of Ecology. Guidance for Evaluating Vapor Intrusion in Washington State – Investigation and Remedial Action. March 2022. Publication No. 09-09-047.

Washington State Department of Occupational Safety and Health. Permissible Exposure Limits. WAC 296-842-20025.

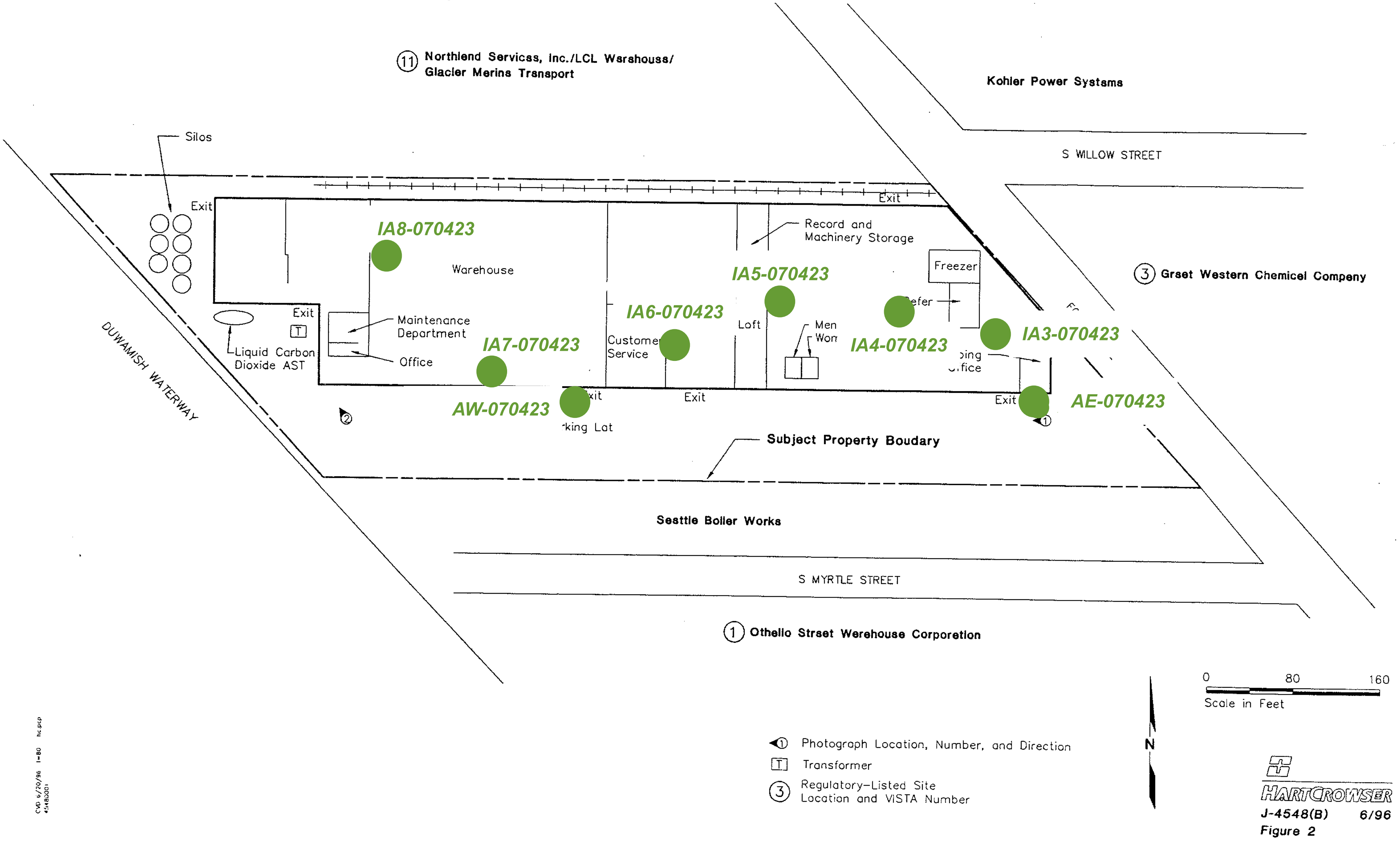
FIGURES

Vapor Intrusion Assessment
Office Sample Locations
6901 Fox Avenue South
Seattle, Washington
July 4 to July 5, 2023



Vapor Intrusion Assessment
Ambient and Warehouse Sample Locations
6901 Fox Avenue South
Seattle, Washington
July 4 to July 5, 2023

Site Plan Showing Adjacent Properties



TABLES

Table 1 - Summary of Indoor and Ambient Air Sample Results
Bridge Point Seattle 130
6901 Fox Avenue South
Seattle, Washington
July 4 to July 5, 2023

					Sample Location Sample ID Sample Duration					
	MTCA Method B CUL VI Indoor Air	**MTCA Screening Level Commercial Worker Scenario Indoor Air**	**DOSH PEL (8hr TWA)[a]**	**ACGIH GGVs for Hydrocarbons[b]**	**Indoor Office - Women's Restroom IA1-070423 5:09 to 5:47**			**Indoor Office IA2-070423 5:11 to 5:46**		
					results as reported	***corrected for ambient***	***APH ranges only***	***results as reported***	***corrected for ambient***	***APH ranges only***
Analytes	*all values in units of µg/m^3*									
Analysis for Volatile Compounds By EPA Method TO-15										
1,1-Dichloroethane	**1.6**	**7.30**	***none***		<0.4			<0.4		
1,1,1-Trichloroethane	**2,300**	**19,500**	**1,900,000.00**		<0.55			<0.55		
1,1,2-Trichloroethane	**0.16**	**0.73**	**54,560.00**		<0.055			<0.055		
1,2-Dichloroethane (EDC)	**0.096**	**0.449**	**4,050.00**		0.18	*0.122*		0.18	*0.122*	
cis-1,2-Dichloroethene	**18.00**	**156**	**793,000.00**		<0.4			<0.4		
Tetrachloroethene	**9.60**	**44.9**	**169,560.00**		<6.8			<6.8		
Trichloroethene	**0.33**	**2.85**	**268,710.00**		0.17			0.19		
Vinyl Chloride	**0.28**	**1.33**	**2,560.00**		<0.13			<0.13		
Benzene	**0.32**	**1.50**	**3,190.00**		0.71	-		0.72	-	
Toluene	**2,300**	**19,500**	**376,810.00**		<7.5	<7.5		<7.5	<7.5	
Ethylbenzene	**460**	**3,890**	**434,190.00**		0.50	-		0.51	-	
m,p-Xylene	**45.7**	**389**	**434,190.00**		1.50	-		1.50	-	
o-Xylene	**45.7**	**389**	**434,190.00**		0.56	-		0.57	-	
Naphthalene	**0.074**	**0.34**	**52,430.00**		0.47	-		0.49	-	
Analysis For Volatile Compounds By Method MA-APH										
APH EC5-8 aliphatics					110	22	22	100	12	12
ACGIH C5-8 aliphatics				**1,500,000.00**						
APH EC9-12 aliphatics					<25	<25	<25	<25	<25	<25
ACGIH C9-15 aliphatics				**1,200,000.00**						
APH EC9-10 aromatics					<25	<25	<25	<25	<25	<25
ACGIH C9-15 aromatics				**1,200,000.00**						
TPH[c]	**201.23**				171.24	79.5	72	161.29	69.5	62

µg/m^3 = micrograms per cubic meter of air

TPH = Total Petroleum Hydrocarbons

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation. Since these compounds are not TPH compounds they have not been included in the TPH sum above the reporting limit. The reporting limit of 25 µg/m^3 has been added instead.

[a] DOSH PELs are cited in units of parts per million in WAC 296-841 for the analytes listed. The PELs have been converted to units of µg/m^3 for the purpose of this report.

[b] The GGVs are reproduced from Column B of the ACGIH Table 1 Group Guidance Values found in Appendix H of the ACGIH publication, 2019 Threshold Limit Values and Biological Exposure Indices.

[c] TPH is based on the Washington State Department of Ecology Guidance for Evaluating Vapor Intrusion in Washington State: Investigation and Remedial Action (March 2022). This TPH limit assumes compounds not detected by laboratory methods are present at the full reporting limit.

Table 1 - Summary of Indoor and Ambient Air Sample Results
Bridge Point Seattle 130
6901 Fox Avenue South
Seattle, Washington
July 4 to July 5, 2023

					Sample Location Sample ID Sample Duration					
	MTCA Method B CUL VI Indoor Air	MTCA Screening Level Commercial Worker Scenario Indoor Air	DOSH PEL (8hr TWA)[a]	ACGIH GGVs for Hydrocarbons[b]	Indoor Warehouse - SE Corner IA3-070423 5:12 to 5:45			Indoor Warehouse - E Center IA4-070423 5:15 to 5:50		
					results as reported	*corrected for ambient*	*APH ranges only*	*results as reported*	*corrected for ambient*	*APH ranges only*
Analytes	*all values in units of $\mu g/m^3$*									
Analysis for Volatile Compounds By EPA Method TO-15										
1,1-Dichloroethane	**1.6**	**7.30**	***none***		<0.4			<0.4		
1,1,1-Trichloroethane	**2,300**	**19,500**	**1,900,000.00**		<0.55			<0.55		
1,1,2-Trichloroethane	**0.16**	**0.73**	**54,560.00**		<0.055			<0.055		
1,2-Dichloroethane (EDC)	**0.096**	**0.449**	**4,050.00**		0.44	*0.382*		0.41	*0.352*	
cis-1,2-Dichloroethene	**18.00**	**156**	**793,000.00**		<0.4			<0.4		
Tetrachloroethene	**9.60**	**44.9**	**169,560.00**		<6.8			<6.8		
Trichloroethene	**0.33**	**2.85**	**268,710.00**		0.14			0.12		
Vinyl Chloride	**0.28**	**1.33**	**2,560.00**		<0.13			<0.13		
Benzene	**0.32**	**1.50**	**3,190.00**		1.40	*0.62*		1.40	*0.62*	
Toluene	**2,300**	**19,500**	**376,810.00**		<7.5	<7.5		<7.5	<7.5	
Ethylbenzene	**460**	**3,890**	**434,190.00**		0.74	0.08		0.74	0.08	
m,p-Xylene	**45.7**	**389**	**434,190.00**		2.60	0.75		2.50	0.65	
o-Xylene	**45.7**	**389**	**434,190.00**		0.88	0.19		0.92	0.23	
Naphthalene	**0.074**	**0.34**	**52,430.00**		0.68	0.13		0.54	-	
Analysis For Volatile Compounds By Method MA-APH										
APH EC5-8 aliphatics					190	102	102	210	122	122
ACGIH C5-8 aliphatics				**1,500,000.00**						
APH EC9-12 aliphatics					<25	<25	<25	<25	<25	<25
ACGIH C9-15 aliphatics				**1,200,000.00**						
APH EC9-10 aromatics					56x (<25 for TPH)	56x (<25 for TPH)	56x (<25 for TPH)	61x (<25 for TPH)	61x (<25 for TPH)	61x (<25 for TPH)
ACGIH C9-15 aromatics				**1,200,000.00**						
TPH[c]	**201.23**				253.8	161.27	152	273.6	181.08	172

$\mu g/m^3$ = micrograms per cubic meter of air

TPH = Total Petroleum Hydrocarbons

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

reporting limit. The reporting limit of 25 $\mu g/m^3$ has been added instead.

[a] DOSH PELs are cited in units of parts per million in WAC 296-841 for the analytes listed. The PELs have b

[b] The GGVs are reproduced from Column B of the ACGIH Table 1 Group Guidance Values found in Appendi

[c] TPH is based on the Washington State Department of Ecology Guidance for Evaluating Vapor Intrusion in W compounds not detected by laboratory methods are present at the full reporting limit.

Table 1 - Summary of Indoor and Ambient Air Sample Results
Bridge Point Seattle 130
6901 Fox Avenue South
Seattle, Washington
July 4 to July 5, 2023

					Sample Location Sample ID Sample Duration					
	MTCA Method B CUL VI Indoor Air	**MTCA Screening Level Commercial Worker Scenario Indoor Air**	**DOSH PEL (8hr TWA)[a]**	**ACGIH GGVs for Hydrocarbons[b]**	**Indoor Warehouse - Stairs to Office IA5-070423 5:06 to 5:53**			**Indoor Warehouse - Center IA6-070423 5:03 to 5:54**		
					results as reported	*corrected for ambient*	*APH ranges only*	*results as reported*	*corrected for ambient*	*APH ranges only*
Analytes	*all values in units of µg/m^3*									
Analysis for Volatile Compounds By EPA Method TO-15										
1,1-Dichloroethane	**1.6**	**7.30**	***none***		<0.4			<0.4		
1,1,1-Trichloroethane	**2,300**	**19,500**	**1,900,000.00**		<0.55			<0.55		
1,1,2-Trichloroethane	**0.16**	**0.73**	**54,560.00**		<0.055			<0.055		
1,2-Dichloroethane (EDC)	**0.096**	**0.449**	**4,050.00**		0.33	*0.272*		0.13	0.072	
cis-1,2-Dichloroethene	**18.00**	**156**	**793,000.00**		<0.4			<0.4		
Tetrachloroethene	**9.60**	**44.9**	**169,560.00**		<6.8			<6.8		
Trichloroethene	**0.33**	**2.85**	**268,710.00**		0.14			<0.11		
Vinyl Chloride	**0.28**	**1.33**	**2,560.00**		<0.13			<0.13		
Benzene	**0.32**	**1.50**	**3,190.00**		1.30	*0.52*		0.79	0.01	
Toluene	**2,300**	**19,500**	**376,810.00**		<7.5	<7.5		<7.5	<7.5	
Ethylbenzene	**460**	**3,890**	**434,190.00**		0.76	0.10		0.75	0.09	
m,p-Xylene	**45.7**	**389**	**434,190.00**		2.60	0.75		2.40	0.55	
o-Xylene	**45.7**	**389**	**434,190.00**		0.97	0.28		0.87	0.18	
Naphthalene	**0.074**	**0.34**	**52,430.00**		0.72	*0.17*		0.45	-	
Analysis For Volatile Compounds By Method MA-APH										
APH EC5-8 aliphatics					230	142	142	170	82	82
ACGIH C5-8 aliphatics				**1,500,000.00**						
APH EC9-12 aliphatics					<25	<25	<25	<25	<25	<25
ACGIH C9-15 aliphatics				**1,200,000.00**						
APH EC9-10 aromatics					50x (<25 for TPH)	50x (<25 for TPH)	50x (<25 for TPH)	27x (<25 for TPH)	27x (<25 for TPH)	27x (<25 for TPH)
ACGIH C9-15 aromatics				**1,200,000.00**						
TPH[c]	**201.23**				293.85	201.32	192	232.76	140.33	132

µg/m^3 = micrograms per cubic meter of air

TPH = Total Petroleum Hydrocarbons

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

reporting limit. The reporting limit of 25 µg/m^3 has been added instead.

[a] DOSH PELs are cited in units of parts per million in WAC 296-841 for the analytes listed. The PELs have b

[b] The GGVs are reproduced from Column B of the ACGIH Table 1 Group Guidance Values found in Appendi

[c] TPH is based on the Washington State Department of Ecology Guidance for Evaluating Vapor Intrusion in W compounds not detected by laboratory methods are present at the full reporting limit.

Table 1 - Summary of Indoor and Ambient Air Sample Results
Bridge Point Seattle 130
6901 Fox Avenue South
Seattle, Washington
July 4 to July 5, 2023

					Sample Location Sample ID Sample Duration					
	MTCA Method B CUL VI Indoor Air	**MTCA Screening Level Commercial Worker Scenario Indoor Air**	**DOSH PEL (8hr TWA)[a]**	**ACGIH GGVs for Hydrocarbons[b]**	**Indoor Warehouse - Fire Sprinkler Risers IA7-070423 5:21 to 5:59**			**Indoor Warehouse - Outside Test Kitchen IA8-070423 4:59 to 5:57**		
					results as reported	*corrected for ambient*	*APH ranges only*	*results as reported*	*corrected for ambient*	*APH ranges only*
Analytes	*all values in units of $\mu g/m^3$*									
Analysis for Volatile Compounds By EPA Method TO-15										
1,1-Dichloroethane	**1.6**	**7.30**	***none***		<0.4			<0.4		
1,1,1-Trichloroethane	**2,300**	**19,500**	**1,900,000.00**		<0.55			<0.55		
1,1,2-Trichloroethane	**0.16**	**0.73**	**54,560.00**		<0.055			<0.055		
1,2-Dichloroethane (EDC)	**0.096**	**0.449**	**4,050.00**		0.10	0.042		0.11	0.052	
cis-1,2-Dichloroethene	**18.00**	**156**	**793,000.00**		<0.4			<0.4		
Tetrachloroethene	**9.60**	**44.9**	**169,560.00**		<6.8			<6.8		
Trichloroethene	**0.33**	**2.85**	**268,710.00**		0.13			0.11		
Vinyl Chloride	**0.28**	**1.33**	**2,560.00**		<0.13			<0.13		
Benzene	**0.32**	**1.50**	**3,190.00**		0.80	0.02		0.79	0.01	
Toluene	**2,300**	**19,500**	**376,810.00**		<7.5	<7.5		<7.5	<7.5	
Ethylbenzene	**460**	**3,890**	**434,190.00**		0.76	0.10		0.76	0.10	
m,p-Xylene	**45.7**	**389**	**434,190.00**		2.50	0.65		2.50	0.65	
o-Xylene	**45.7**	**389**	**434,190.00**		0.91	0.22		0.94	0.25	
Naphthalene	**0.074**	**0.34**	**52,430.00**		0.75	*0.20*		0.72	*0.17*	
Analysis For Volatile Compounds By Method MA-APH										
APH EC5-8 aliphatics					170	82	82	160	72	72
ACGIH C5-8 aliphatics				**1,500,000.00**						
APH EC9-12 aliphatics					68	68	68	55	55	55
ACGIH C9-15 aliphatics				**1,200,000.00**						
APH EC9-10 aromatics					28x	28x	28x	26x	26x	26x
ACGIH C9-15 aromatics				**1,200,000.00**	(<25 for TPH)	(<25 for TPH)	(<25 for TPH)	(<25 for TPH)	(<25 for TPH)	(<25 for TPH)
TPH[c]	**201.23**				285.22	192.7	175	254.21	161.69	152

$\mu g/m^3$ = micrograms per cubic meter of air

TPH = Total Petroleum Hydrocarbons

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

reporting limit. The reporting limit of 25 $\mu g/m^3$ has been added instead.

[a] DOSH PELs are cited in units of parts per million in WAC 296-841 for the analytes listed. The PELs have b

[b] The GGVs are reproduced from Column B of the ACGIH Table 1 Group Guidance Values found in Appendi

[c] TPH is based on the Washington State Department of Ecology Guidance for Evaluating Vapor Intrusion in W
compounds not detected by laboratory methods are present at the full reporting limit.

Table 1 - Summary of Indoor and Ambient Air Sample Results
Bridge Point Seattle 130
6901 Fox Avenue South
Seattle, Washington
July 4 to July 5, 2023

					Sample Location Sample ID Sample Duration				
	MTCA Method B CUL VI Indoor Air	**MTCA Screening Level Commercial Worker Scenario Indoor Air**	**DOSH PEL (8hr TWA)[a]**	**ACGIH GGVs for Hydrocarbons[b]**	**Ambient East AE-070423 4:46 to 5:34**		**Ambient West AW-070423 4:53 to 5:38**		**Average of Detected Ambient Values**
					results as reported	***APH ranges only***	***results as reported***	***APH ranges only***	
Analytes	*all values in units of μg/m^3*								
Analysis for Volatile Compounds By EPA Method TO-15									
1,1-Dichloroethane	**1.6**	**7.30**	***none***		<0.49		<0.4		
1,1,1-Trichloroethane	**2,300**	**19,500**	**1,900,000.00**		<0.65		<0.55		
1,1,2-Trichloroethane	**0.16**	**0.73**	**54,560.00**		<0.065		<0.055		
1,2-Dichloroethane (EDC)	**0.096**	**0.449**	**4,050.00**		0.063		0.053		0.058
cis-1,2-Dichloroethene	**18.00**	**156**	**793,000.00**		<0.48		<0.4		
Tetrachloroethene	**9.60**	**44.9**	**169,560.00**		<8.1		<6.8		
Trichloroethene	**0.33**	**2.85**	**268,710.00**		<0.13		<0.11		
Vinyl Chloride	**0.28**	**1.33**	**2,560.00**		<0.16		<0.13		
Benzene	**0.32**	**1.50**	**3,190.00**		0.83		0.73		0.78
Toluene	**2,300**	**19,500**	**376,810.00**		<9		<7.5		
Ethylbenzene	**460**	**3,890**	**434,190.00**		0.75		0.57		0.66
m,p-Xylene	**45.7**	**389**	**434,190.00**		1.9		1.8		1.85
o-Xylene	**45.7**	**389**	**434,190.00**		0.72		0.66		0.69
Naphthalene	**0.074**	**0.34**	**52,430.00**		0.36		0.73		0.55
Analysis For Volatile Compounds By Method MA-APH									
APH EC5-8 aliphatics					88	88	88	88	88
ACGIH C5-8 aliphatics				**1,500,000.00**					
APH EC9-12 aliphatics					<25	<25	<25	<25	
ACGIH C9-15 aliphatics				**1,200,000.00**					
APH EC9-10 aromatics					<25	<25	<25	<25	
ACGIH C9-15 aromatics				**1,200,000.00**					
TPH[c]	**201.23**				151.56	138	149.99	138	

μg/m^3 = micrograms per cubic meter of air

TPH = Total Petroleum Hydrocarbons

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

reporting limit. The reporting limit of 25 μg/m^3 has been added instead.

[a] DOSH PELs are cited in units of parts per million in WAC 296-841 for the analytes listed. The PELs have b

[b] The GGVs are reproduced from Column B of the ACGIH Table 1 Group Guidance Values found in Appendi

[c] TPH is based on the Washington State Department of Ecology Guidance for Evaluating Vapor Intrusion in W
compounds not detected by laboratory methods are present at the full reporting limit.

Table 2 - Derivation of Total TPH Cleanup Level for Indoor Air
Dawn Foods - Warehouse Building
6901 Fox Avenue South
Seattle, Washington
July 4 to July 5, 2023

The Total TPH Cleanup Level for indoor air for the 6901 Fox Avenue South Property was derived by the following method.

Step 1. Determine which Cleanup method criteria are appropriate for the project. Indoor air cleanup levels were selected for this project - MTCA Method B Cleanup Levels, Vapor Intrusion. In addition, The MTCA Screening Level for Commercial Worker Scenario - Indoor Air was cited.

Step 2. For these data, the Total TPH CUL derivation was conducted for IA5 because it had the highest concentration of aliphatics that resemble petroleum compounds.

Step 3. Use the fractionated results in the equation below to calculate a Method B air CUL.

Step 4. Compare the TPH concentrations in compliance air samples with the Method B air CUL.

Individual petroleum component: $$CUL_i = \frac{RfDi_i \; x \; ABW \; x \; UCF \; x \; HQ \; x \; AT}{BR \; x \; ABS_i \; x \; ED \; x \; EF}$$

(WAC 173-340-750, Equation 750-1)

TPH cleanup level: $$CUL_{TPH} = \frac{1}{\sum_{i=1}^{i=n} \frac{F_i}{CUL_i}}$$

Source: Washington State Department of Ecology. Guidance for Evaluating Vapor Intrusion in Washington State: Investigation and Remedial Action. March 2022.

Table 2 - Derivation of Total TPH Cleanup Level for Indoor Air
Dawn Foods - Warehouse Building
6901 Fox Avenue South
Seattle, Washington
July 4 to July 5, 2023

IA5-070423

Petroleum Fraction or Compound	Measured Concentration Site-Specific Sample (µg/m3)	Fraction of Total Concentration (Fi)	MTCA Method B CUL - Air VI Total TPH Non-carcinogenic CULi (µg/m3)	MTCA Method B CUL - Air VI Fi / CULi
Aliphatics EC>5-8	230	0.783	2.72E+03	2.88E-04
Aliphatics EC>8-12	25	0.085	4.64E+01	1.83E-03
Aromatics EC>9-10	25	0.085	1.82E+02	4.67E-04
Benzene	1.3	0.004	1.37E+01	3.23E-04
Toluene	7.5	0.026	2.24E+03	1.14E-05
Ethylbenzene	0.76	0.003	4.58E+02	5.65E-06
Xylenes	3.57	0.012	4.58E+01	2.65E-04
Naphthalene	0.72	0.002	1.38E+00	1.78E-03
Total TPH	***293.85***	1.000		**201.23**

The Total TPH Non-carcinogenic CUL = 1 / Σ (Fi / CULi)

Total TPH limit assumes compounds not detected are present at the full reporting limit.

ATTACHMENT A
Friedman & Bruya, Inc.
Laboratory Analytical Report

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

5500 4th Avenue South
Seattle, WA 98108
(206) 285-8282
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www.friedmanandbruya.com

July 19, 2023

Elisabeth Black, Project Manager
EMB Consulting, LLC
22725 44th Ave W, Suite 203
Mountlake Terrace, WA 98043

Dear Ms Black:

Included is the amended report from the testing of material submitted on July 5, 2023 from the Bridgepoint, F&BI 307015 project. The data qualifiers and definitions page has been added to the end of the report and the case narrative was updated.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
EMB0713R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
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5500 4th Avenue South
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July 13, 2023

Elisabeth Black, Project Manager
EMB Consulting, LLC
22725 44th Ave W, Suite 203
Mountlake Terrace, WA 98043

Dear Ms Black:

Included are the results from the testing of material submitted on July 5, 2023 from the Bridgepoint, F&BI 307015 project. There are 30 pages included in this report.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
EMB0713R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on July 5, 2023 by Friedman & Bruya, Inc. from the EMB Consulting, LLC Bridgepoint, F&BI 307015 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	EMB Consulting, LLC
307015 -01	AE-070423
307015 -02	AW-070423
307015 -03	IA1-070423
307015 -04	IA2-070423
307015 -05	IA3-070423
307015 -06	IA4-070423
307015 -07	IA5-070423
307015 -08	IA6-070423
307015 -09	IA7-070423
307015 -10	IA8-070423

Non-petroleum compounds identified in the air phase hydrocarbon (APH) ranges were subtracted per the MA-APH method.

The EPH EC9-10 aromatics concentrations in several samples were qualified as not indicative of petroleum. The compounds observed where tentatively identified as d-limonene, terpenes and ethanoate

All quality control requirements were acceptable.

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	AE-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-01
Date Analyzed:	07/05/23	Data File:	070514.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	92	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	88
APH EC9-12 aliphatics	<25
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	AW-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-02
Date Analyzed:	07/05/23	Data File:	070515.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	97	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	88
APH EC9-12 aliphatics	<25
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA1-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-03
Date Analyzed:	07/05/23	Data File:	070516.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	89	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	110
APH EC9-12 aliphatics	<25
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA2-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-04
Date Analyzed:	07/05/23	Data File:	070517.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	89	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	100
APH EC9-12 aliphatics	<25
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA3-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-05
Date Analyzed:	07/05/23	Data File:	070518.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	92	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	190
APH EC9-12 aliphatics	<25
APH EC9-10 aromatics	56 x

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA4-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-06
Date Analyzed:	07/05/23	Data File:	070519.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	94	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	210
APH EC9-12 aliphatics	<25
APH EC9-10 aromatics	61 x

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA5-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-07
Date Analyzed:	07/06/23	Data File:	070520.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	94	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	230
APH EC9-12 aliphatics	<25
APH EC9-10 aromatics	50 x

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA6-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-08
Date Analyzed:	07/06/23	Data File:	070521.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	96	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	170
APH EC9-12 aliphatics	<25
APH EC9-10 aromatics	27 x

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA7-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-09
Date Analyzed:	07/06/23	Data File:	070522.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	94	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	170
APH EC9-12 aliphatics	68
APH EC9-10 aromatics	28 x

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA8-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-10
Date Analyzed:	07/06/23	Data File:	070523.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	97	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	160
APH EC9-12 aliphatics	55
APH EC9-10 aromatics	26 x

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	Method Blank	Client:	EMB Consulting, LLC
Date Received:	Not Applicable	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/05/23	Lab ID:	03-1533 MB
Date Analyzed:	07/05/23	Data File:	070513.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	90	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	<75
APH EC9-12 aliphatics	<25
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	AE-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-01 1/1.2
Date Analyzed:	07/10/23	Data File:	071016.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	97	70	130

	Concentration	
Compounds:	ug/m3	ppbv
Vinyl chloride	<0.16 j	<0.06 j
Chloroethane	<3.2	<1.2
1,1-Dichloroethene	<0.48	<0.12
trans-1,2-Dichloroethene	<0.48	<0.12
1,1-Dichloroethane	<0.49	<0.12
cis-1,2-Dichloroethene	<0.48	<0.12
1,2-Dichloroethane (EDC)	0.063	0.016
1,1,1-Trichloroethane	<0.65	<0.12
Benzene	0.83	0.26
Trichloroethene	<0.13	<0.024
Toluene	<9	<2.4
1,1,2-Trichloroethane	<0.065	<0.012
Tetrachloroethene	<8.1	<1.2
Ethylbenzene	0.75	0.17
m,p-Xylene	1.9	0.45
o-Xylene	0.72	0.17
Naphthalene	0.36	0.070

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	AW-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-02
Date Analyzed:	07/05/23	Data File:	070515.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	98	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.13 j	<0.05 j
Chloroethane	<2.6	<1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
1,2-Dichloroethane (EDC)	0.053	0.013
1,1,1-Trichloroethane	<0.55	<0.1
Benzene	0.73	0.23
Trichloroethene	<0.11	<0.02
Toluene	<7.5	<2
1,1,2-Trichloroethane	<0.055	<0.01
Tetrachloroethene	<6.8	<1
Ethylbenzene	0.57	0.13
m,p-Xylene	1.8	0.41
o-Xylene	0.66	0.15
Naphthalene	0.73	0.14

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA1-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-03
Date Analyzed:	07/05/23	Data File:	070516.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	89	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.13 j	<0.05 j
Chloroethane	<2.6	<1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
1,2-Dichloroethane (EDC)	0.18	0.045
1,1,1-Trichloroethane	<0.55	<0.1
Benzene	0.71	0.22
Trichloroethene	0.17	0.031
Toluene	<7.5	<2
1,1,2-Trichloroethane	<0.055	<0.01
Tetrachloroethene	<6.8	<1
Ethylbenzene	0.50	0.11
m,p-Xylene	1.5	0.35
o-Xylene	0.56	0.13
Naphthalene	0.47	0.090

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA2-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-04
Date Analyzed:	07/05/23	Data File:	070517.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	90	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.13 j	<0.05 j
Chloroethane	<2.6	<1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
1,2-Dichloroethane (EDC)	0.18	0.044
1,1,1-Trichloroethane	<0.55	<0.1
Benzene	0.72	0.22
Trichloroethene	0.19	0.036
Toluene	<7.5	<2
1,1,2-Trichloroethane	<0.055	<0.01
Tetrachloroethene	<6.8	<1
Ethylbenzene	0.51	0.12
m,p-Xylene	1.5	0.35
o-Xylene	0.57	0.13
Naphthalene	0.49	0.093

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA3-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-05
Date Analyzed:	07/05/23	Data File:	070518.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	92	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.13 j	<0.05 j
Chloroethane	<2.6	<1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
1,2-Dichloroethane (EDC)	0.44	0.11
1,1,1-Trichloroethane	<0.55	<0.1
Benzene	1.4	0.44
Trichloroethene	0.14	0.026
Toluene	<7.5	<2
1,1,2-Trichloroethane	<0.055	<0.01
Tetrachloroethene	<6.8	<1
Ethylbenzene	0.74	0.17
m,p-Xylene	2.6	0.60
o-Xylene	0.88	0.20
Naphthalene	0.68	0.13

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA4-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-06
Date Analyzed:	07/05/23	Data File:	070519.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	94	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.13 j	<0.05 j
Chloroethane	<2.6	<1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
1,2-Dichloroethane (EDC)	0.41	0.10
1,1,1-Trichloroethane	<0.55	<0.1
Benzene	1.4	0.43
Trichloroethene	0.12	0.022
Toluene	<7.5	<2
1,1,2-Trichloroethane	<0.055	<0.01
Tetrachloroethene	<6.8	<1
Ethylbenzene	0.74	0.17
m,p-Xylene	2.5	0.57
o-Xylene	0.92	0.21
Naphthalene	0.54	0.10

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA5-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-07
Date Analyzed:	07/06/23	Data File:	070520.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	94	70	130

	Concentration	
Compounds:	ug/m3	ppbv
Vinyl chloride	<0.13 j	<0.05 j
Chloroethane	<2.6	<1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
1,2-Dichloroethane (EDC)	0.33	0.081
1,1,1-Trichloroethane	<0.55	<0.1
Benzene	1.3	0.40
Trichloroethene	0.14	0.026
Toluene	<7.5	<2
1,1,2-Trichloroethane	<0.055	<0.01
Tetrachloroethene	<6.8	<1
Ethylbenzene	0.76	0.18
m,p-Xylene	2.6	0.59
o-Xylene	0.97	0.22
Naphthalene	0.72	0.14

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA6-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-08
Date Analyzed:	07/06/23	Data File:	070521.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	97	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.13 j	<0.05 j
Chloroethane	<2.6	<1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
1,2-Dichloroethane (EDC)	0.13	0.031
1,1,1-Trichloroethane	<0.55	<0.1
Benzene	0.79	0.25
Trichloroethene	<0.11	<0.02
Toluene	<7.5	<2
1,1,2-Trichloroethane	<0.055	<0.01
Tetrachloroethene	<6.8	<1
Ethylbenzene	0.75	0.17
m,p-Xylene	2.4	0.55
o-Xylene	0.87	0.20
Naphthalene	0.45	0.086

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA7-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-09
Date Analyzed:	07/06/23	Data File:	070522.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	95	70	130

	Concentration	
Compounds:	ug/m3	ppbv
Vinyl chloride	<0.13 j	<0.05 j
Chloroethane	<2.6	<1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
1,2-Dichloroethane (EDC)	0.097	0.024
1,1,1-Trichloroethane	<0.55	<0.1
Benzene	0.8	0.25
Trichloroethene	0.13	0.024
Toluene	<7.5	<2
1,1,2-Trichloroethane	<0.055	<0.01
Tetrachloroethene	<6.8	<1
Ethylbenzene	0.76	0.18
m,p-Xylene	2.5	0.58
o-Xylene	0.91	0.21
Naphthalene	0.75	0.14

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA8-070423	Client:	EMB Consulting, LLC
Date Received:	07/05/23	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/04/23	Lab ID:	307015-10
Date Analyzed:	07/06/23	Data File:	070523.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	97	70	130

	Concentration	
Compounds:	ug/m3	ppbv
Vinyl chloride	<0.13 j	<0.05 j
Chloroethane	<2.6	<1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
1,2-Dichloroethane (EDC)	0.11	0.028
1,1,1-Trichloroethane	<0.55	<0.1
Benzene	0.79	0.25
Trichloroethene	0.11	0.021
Toluene	<7.5	<2
1,1,2-Trichloroethane	<0.055	<0.01
Tetrachloroethene	<6.8	<1
Ethylbenzene	0.76	0.17
m,p-Xylene	2.5	0.58
o-Xylene	0.94	0.22
Naphthalene	0.72	0.14

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Method Blank	Client:	EMB Consulting, LLC
Date Received:	Not Applicable	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/05/23	Lab ID:	03-1533 MB
Date Analyzed:	07/05/23	Data File:	070513.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	91	70	130

	Concentration	
Compounds:	ug/m3	ppbv
Vinyl chloride	<0.13 j	<0.05 j
Chloroethane	<2.6	<1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
1,2-Dichloroethane (EDC)	<0.04	<0.01
1,1,1-Trichloroethane	<0.55	<0.1
Benzene	<0.32	<0.1
Trichloroethene	<0.11	<0.02
Toluene	<7.5	<2
1,1,2-Trichloroethane	<0.055	<0.01
Tetrachloroethene	<6.8	<1
Ethylbenzene	<0.43	<0.1
m,p-Xylene	<0.87	<0.2
o-Xylene	<0.43	<0.1
Naphthalene	<0.052 j	<0.01 j

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Method Blank	Client:	EMB Consulting, LLC
Date Received:	Not Applicable	Project:	Bridgepoint, F&BI 307015
Date Collected:	07/10/23	Lab ID:	03-1544 MB
Date Analyzed:	07/10/23	Data File:	071012.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	91	70	130

	Concentration	
Compounds:	ug/m3	ppbv
Vinyl chloride	<0.13 j	<0.05 j
Chloroethane	<2.6	<1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
1,2-Dichloroethane (EDC)	<0.04	<0.01
1,1,1-Trichloroethane	<0.55	<0.1
Benzene	<0.32	<0.1
Trichloroethene	<0.11	<0.02
Toluene	<7.5	<2
1,1,2-Trichloroethane	<0.055	<0.01
Tetrachloroethene	<6.8	<1
Ethylbenzene	<0.43	<0.1
m,p-Xylene	<0.87	<0.2
o-Xylene	<0.43	<0.1
Naphthalene	<0.26	<0.05

Date of Report: 07/13/23
Date Received: 07/05/23
Project: Bridgepoint, F&BI 307015

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD MA-APH

Laboratory Code: 306494-05 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 30)
APH EC5-8 aliphatics	ug/m3	110	140	24
APH EC9-12 aliphatics	ug/m3	740	750	1
APH EC9-10 aromatics	ug/m3	<25	<25	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
APH EC5-8 aliphatics	ug/m3	67	81	70-130
APH EC9-12 aliphatics	ug/m3	67	111	70-130
APH EC9-10 aromatics	ug/m3	67	100	70-130

Date of Report: 07/13/23
Date Received: 07/05/23
Project: Bridgepoint, F&BI 307015

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: 306494-05 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 30)
Vinyl chloride	ug/m3	<0.26	<0.26	nm
Chloroethane	ug/m3	<2.6	<2.6	nm
1,1-Dichloroethene	ug/m3	<0.4	<0.4	nm
trans-1,2-Dichloroethene	ug/m3	<0.4	<0.4	nm
1,1-Dichloroethane	ug/m3	<0.4	<0.4	nm
cis-1,2-Dichloroethene	ug/m3	<0.4	<0.4	nm
1,2-Dichloroethane (EDC)	ug/m3	0.061	0.057	7
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	nm
Benzene	ug/m3	0.48	0.48	0
Trichloroethene	ug/m3	0.13	0.14	7
Toluene	ug/m3	<7.5	<7.5	nm
1,1,2-Trichloroethane	ug/m3	<0.055	<0.055	nm
Tetrachloroethene	ug/m3	<6.8	<6.8	nm
Ethylbenzene	ug/m3	<0.43	<0.43	nm
m,p-Xylene	ug/m3	1.4	1.3	7
o-Xylene	ug/m3	0.47	0.47	0
Naphthalene	ug/m3	0.48	0.53	10

Date of Report: 07/13/23
Date Received: 07/05/23
Project: Bridgepoint, F&BI 307015

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: 307061-01 1/5.0 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 30)
Vinyl chloride	ug/m3	<1.3	<1.3	nm
Chloroethane	ug/m3	<13	<13	nm
1,1-Dichloroethene	ug/m3	<2	<2	nm
trans-1,2-Dichloroethene	ug/m3	<2	<2	nm
1,1-Dichloroethane	ug/m3	<2	<2	nm
cis-1,2-Dichloroethene	ug/m3	<2	<2	nm
1,2-Dichloroethane (EDC)	ug/m3	<0.2	<0.2	nm
1,1,1-Trichloroethane	ug/m3	<2.7	<2.7	nm
Benzene	ug/m3	<1.6	<1.6	nm
Trichloroethene	ug/m3	<0.54	<0.54	nm
Toluene	ug/m3	<38	<38	nm
1,1,2-Trichloroethane	ug/m3	<0.27	<0.27	nm
Tetrachloroethene	ug/m3	<34	<34	nm
Ethylbenzene	ug/m3	<2.2	<2.2	nm
m,p-Xylene	ug/m3	5.4	5.4	0
o-Xylene	ug/m3	2.4	2.3	4
Naphthalene	ug/m3	4.6	4.5	2

Date of Report: 07/13/23
Date Received: 07/05/23
Project: Bridgepoint, F&BI 307015

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	ug/m3	35	116	70-130
Chloroethane	ug/m3	36	115	70-130
1,1-Dichloroethene	ug/m3	54	112	70-130
trans-1,2-Dichloroethene	ug/m3	54	112	70-130
1,1-Dichloroethane	ug/m3	55	117	70-130
cis-1,2-Dichloroethene	ug/m3	54	111	70-130
1,2-Dichloroethane (EDC)	ug/m3	55	113	70-130
1,1,1-Trichloroethane	ug/m3	74	117	70-130
Benzene	ug/m3	43	112	70-130
Trichloroethene	ug/m3	73	114	70-130
Toluene	ug/m3	51	114	70-130
1,1,2-Trichloroethane	ug/m3	74	117	70-130
Tetrachloroethene	ug/m3	92	118	70-130
Ethylbenzene	ug/m3	59	108	70-130
m,p-Xylene	ug/m3	120	102	70-130
o-Xylene	ug/m3	59	114	70-130
Naphthalene	ug/m3	71	104	70-130

Date of Report: 07/13/23
Date Received: 07/05/23
Project: Bridgepoint, F&BI 307015

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	ug/m3	35	101	70-130
Chloroethane	ug/m3	36	101	70-130
1,1-Dichloroethene	ug/m3	54	99	70-130
trans-1,2-Dichloroethene	ug/m3	54	98	70-130
1,1-Dichloroethane	ug/m3	55	102	70-130
cis-1,2-Dichloroethene	ug/m3	54	97	70-130
1,2-Dichloroethane (EDC)	ug/m3	55	105	70-130
1,1,1-Trichloroethane	ug/m3	74	103	70-130
Benzene	ug/m3	43	98	70-130
Trichloroethene	ug/m3	73	103	70-130
Toluene	ug/m3	51	105	70-130
1,1,2-Trichloroethane	ug/m3	74	117	70-130
Tetrachloroethene	ug/m3	92	114	70-130
Ethylbenzene	ug/m3	59	96	70-130
m,p-Xylene	ug/m3	120	91	70-130
o-Xylene	ug/m3	59	103	70-130
Naphthalene	ug/m3	71	90	70-130

Data Qualifiers & Definitions

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

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

ca - The calibration results for the analyte were outside of acceptance criteria, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. The value reported is an estimate.

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

j - The analyte concentration is reported below the standard reporting limit. The value reported is an estimate.

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

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

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

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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

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

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

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

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

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

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

307015

[redacted]

SAMPLE CHAIN OF CUSTODY

07/05/23 [redacted]

Report To EMB Consulting
Company Elisabeth Black
Address 22725 - 44th Ave W, #203
City, State, ZIP Mountlake Terrace, WA
Phone 206 915 2395 Email emblackconsult@gmail.com

SAMPLERS (*signature*) E. Black

PROJECT NAME & ADDRESS Bridgepoint

PO #

NOTES:

INVOICE TO EMB Consulting

Page # 1 of 2

TURNAROUND TIME
[✓ Standard]
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Default:Clean following final report delivery
Hold (Fee may apply):

SAMPLE INFORMATION / ANALYSIS REQUESTED

Sample Name	Lab ID	Canister ID	Flow Cont. ID	Reporting Level: IA=Indoor Air SG=Soil Gas (Circle One)	Date Sampled	Initial Vac. ("Hg)	Field Initial Time	Final Vac. ("Hg)	Field Final Time	TO15 Full Scan	TO15 BTEXN	TO15 cVOCs	APH	Helium		Notes
AE-070423	01	35338	15214	[✓ IA] / SG	070423	30	4:46	7.0	070523 5:34		✓	✓	✓			✓ - per EMB &
AW-070423	02	18563	15208	[✓ IA] / SG	070423	30	4:53	8.0	070523 5:38		↑	↑	↑			~~Sea~~
IA1-070423	03	18580	15210	[✓ IA] / SG	070423	30	5:09	6.5	070523 5:47							~~Eric~~
IA2-070423	04	23231	15219	[✓ IA] / SG	070423	30	5:11	5.5	070523 5:46							
IA3-070423	05	18577	15209	[✓ IA] / SG	070423	20	5:12	0.0	070523 5:45							
IA4-070423	06	18579	15211	[✓ IA] / SG	070423	30	5:15	8.5	070523 5:50							
IA5-070423	07	18569	15216	[✓ IA] / SG	070423	30	5:06	6.5	5:53		↓	↓	↓			
IA6-070423	08	18567	665	[✓ IA] / SG	070423	30	5:03	8.0	070523 5:54		✓	✓	✓			

DW

Friedman & Bruya, Inc.
5500 4th Avenue South
Seattle, WA 98108
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: E. Black	Elisabeth Black	EMB	070523	7:17
Received by:	Nhan Phan	FBI	07/05/23	07:17
Relinquished by:				
Received by:		Samples received at 22 °C		

FORMS\COC\COCTO-15.DOC

307015

SAMPLE CHAIN OF CUSTODY

07/05/23

Page # 2 of 2

Report To EMB Consulting
Company Elisabeth Black
Address 22725 44th Ave W #203
City, State, ZIP Mountlake Terrace
Phone 206 915 2395 Email emblackconsult@gmail.com

SAMPLERS (*signature*) E. Black

PROJECT NAME & ADDRESS

PO #

NOTES:

INVOICE TO

TURNAROUND TIME
[✓ Standard]
~~RUSH~~
Rush charges authorized by:

SAMPLE DISPOSAL
Default:Clean following final report delivery
Hold (Fee may apply):

SAMPLE INFORMATION										ANALYSIS REQUESTED						
Sample Name	Lab ID	Canister ID	Flow Cont. ID	Reporting Level: IA=Indoor Air SG=Soil Gas (Circle One)	Date Sampled	Initial Vac. ("Hg)	Field Initial Time	Final Vac. ("Hg)	Field Final Time	TO15 Full Scan	TO15 BTEXN	TO15 cVOCs	APH	Helium		Notes
IA7-070423	09	20550	15213	[✓ IA] / SG	070423	30	5:21	6.5	5:59		✓	✓	✓			~~See Serv.c~~ per EMP, 7/5
IA8-070423	10	21437	15218	[✓ IA] SG	070423	30	4:59	6.0	5:57		✓	✓	✓			
				IA / SG												
				IA / SG												
				IA / SG												
				IA / SG												
				IA / SG												
				IA / SG												

Friedman & Bruya, Inc.
5500 4th Avenue South
Seattle, WA 98108
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: E. Black	Elisabeth Black	EMB	070523	7:17
Received by:	Nhan Phan	FCBI	7/5/23	07:17
Relinquished by:				
Received by:		Samples received at 22 °C		

FORMS\COC\COCTO-15.DOC

```
File       :D:\Proc_GCMS7\07-05-23\070514.D
Operator   : bat
Acquired   :  5 Jul 2023   7:08 pm using AcqMethod TO15DC.M
Instrument :   GCMS7
Sample Name: 307015-01
Misc Info  : T2
Vial Number: 14
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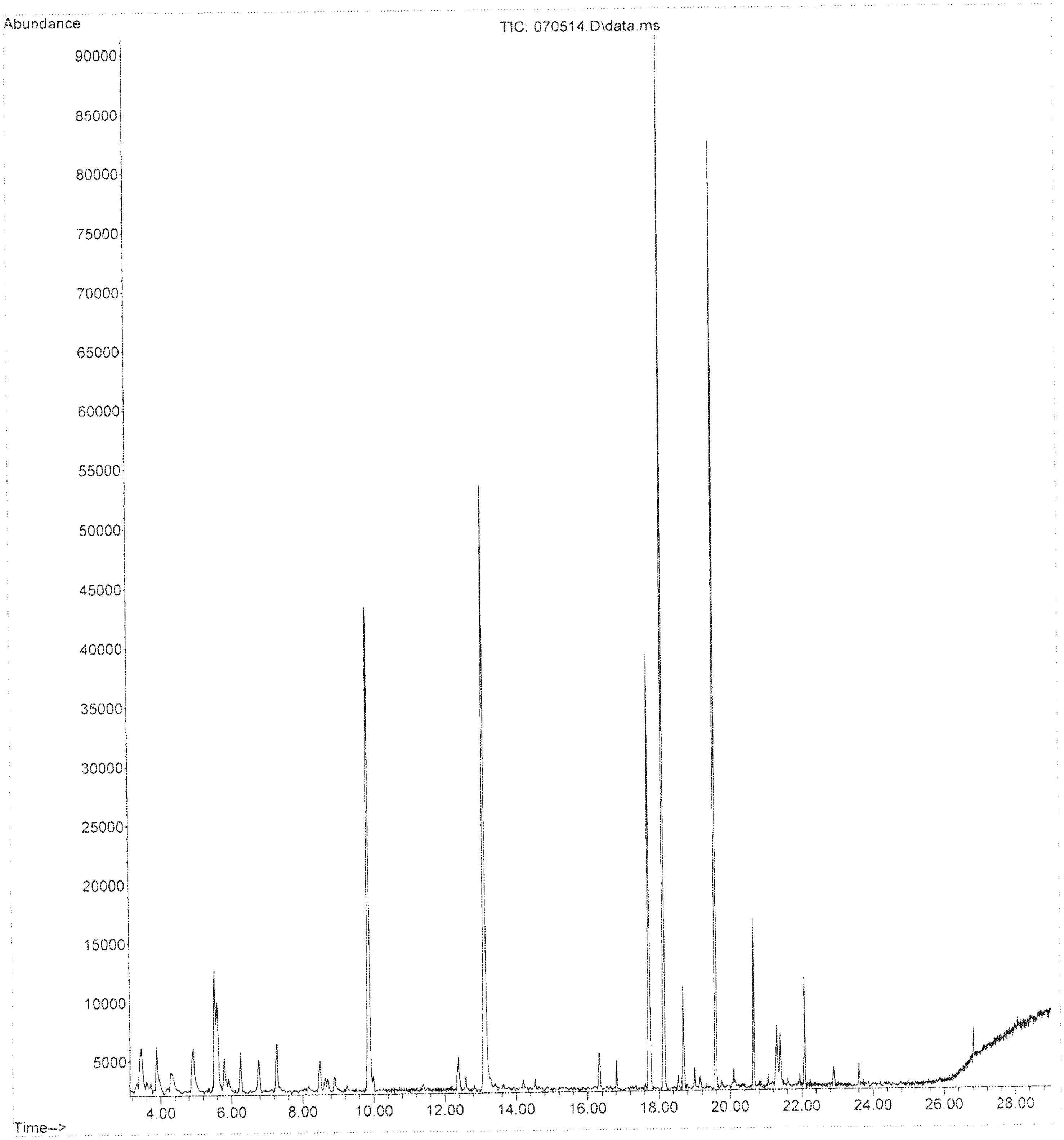

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File       :D:\Proc_GCMS7\07-05-23\070515.D
Operator   : bat
Acquired   :  5 Jul 2023   8:02 pm using AcqMethod TO15DC.M
Instrument :   GCMS7
Sample Name: 307015-02
Misc Info  : T3
Vial Number: 15
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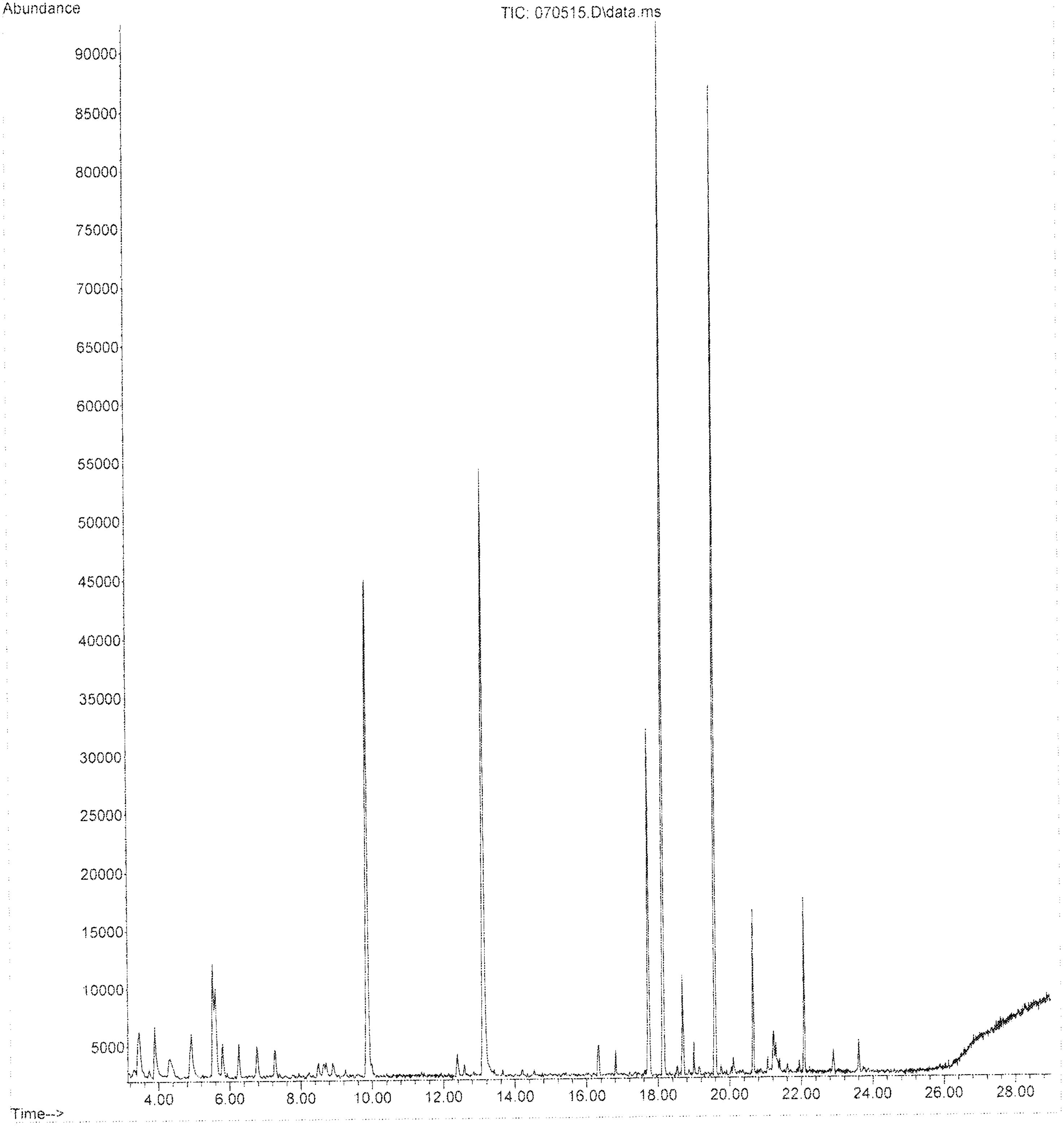

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Operator   : bat
Acquired   :  5 Jul 2023   8:53 pm using AcqMethod TO15DC.M
Instrument :   GCMS7
Sample Name: 307015-03
Misc Info  : T4
Vial Number: 16
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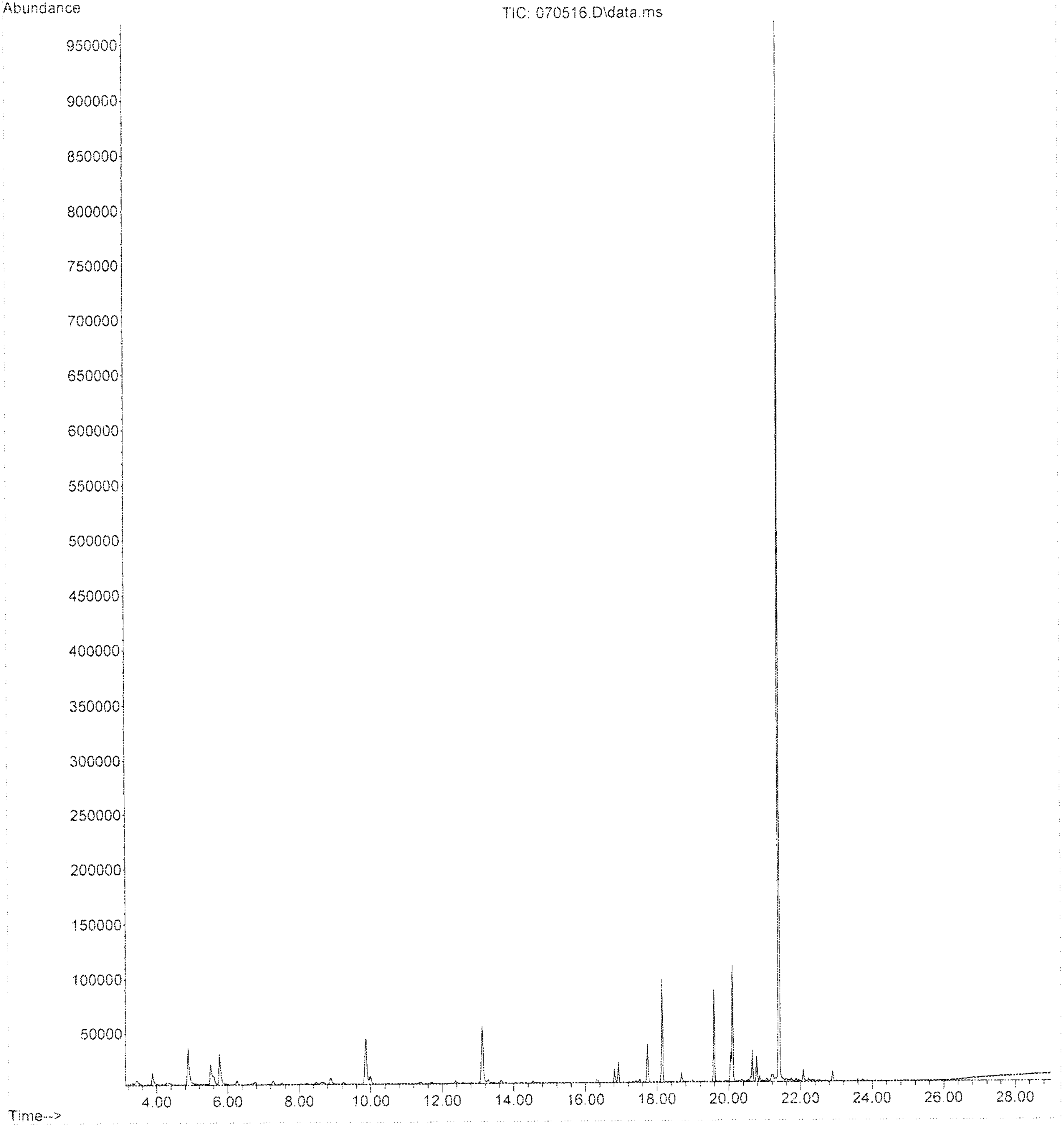

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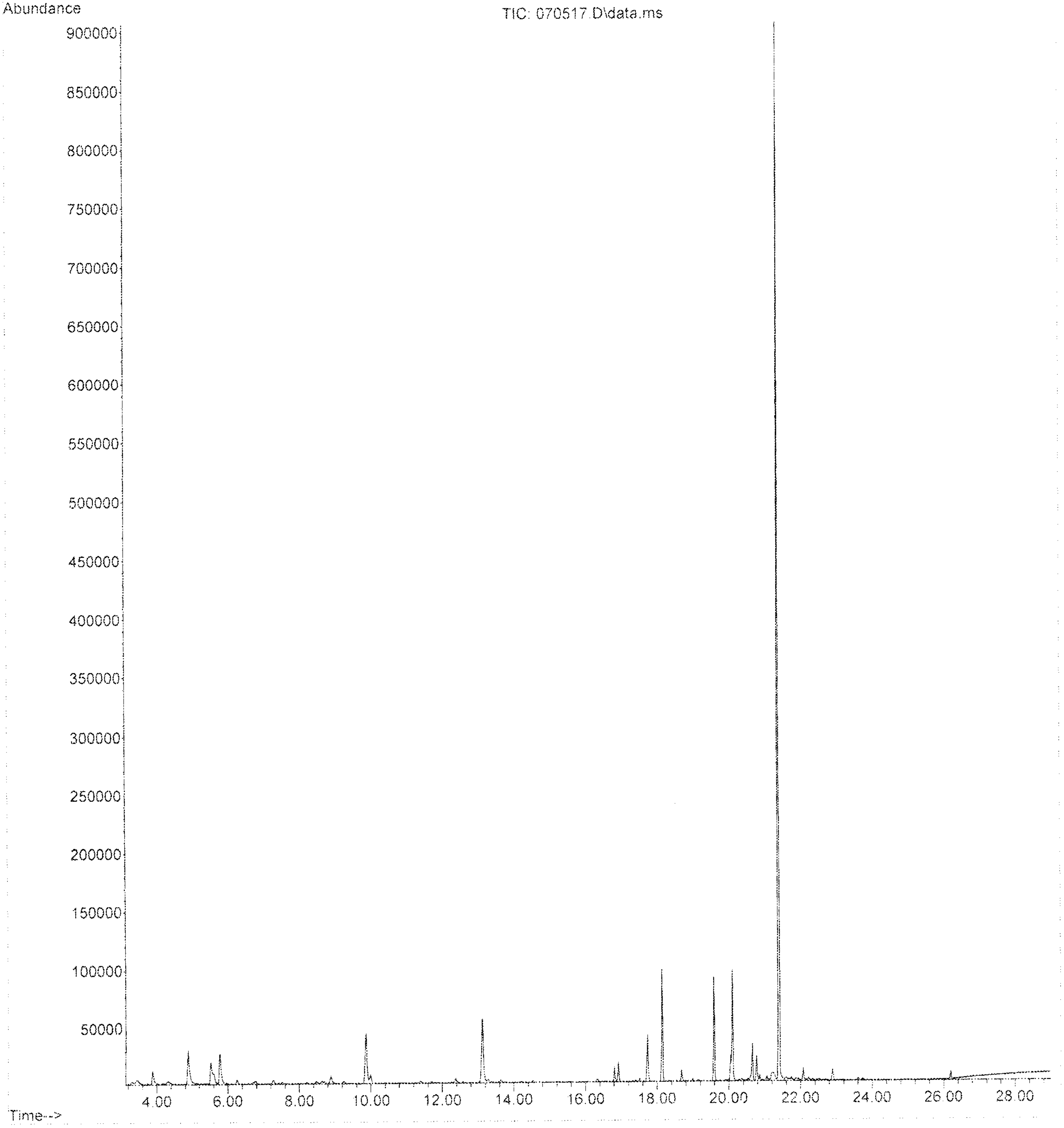
File       :D:\Proc_GCMS7\07-05-23\070517.D
Operator   : bat
Acquired   :  5 Jul 2023   9:43 pm using AcqMethod TO15DC.M
Instrument :   GCMS7
Sample Name: 307015-04
Misc Info  : T5
Vial Number: 17
```



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File       :D:\Proc_GCMS7\07-05-23\070518.D
Operator   : bat
Acquired   :  5 Jul 2023  10:30 pm using AcqMethod TO15DC.M
Instrument :   GCMS7
Sample Name: 307015-05
Misc Info  : T6
Vial Number: 18
```

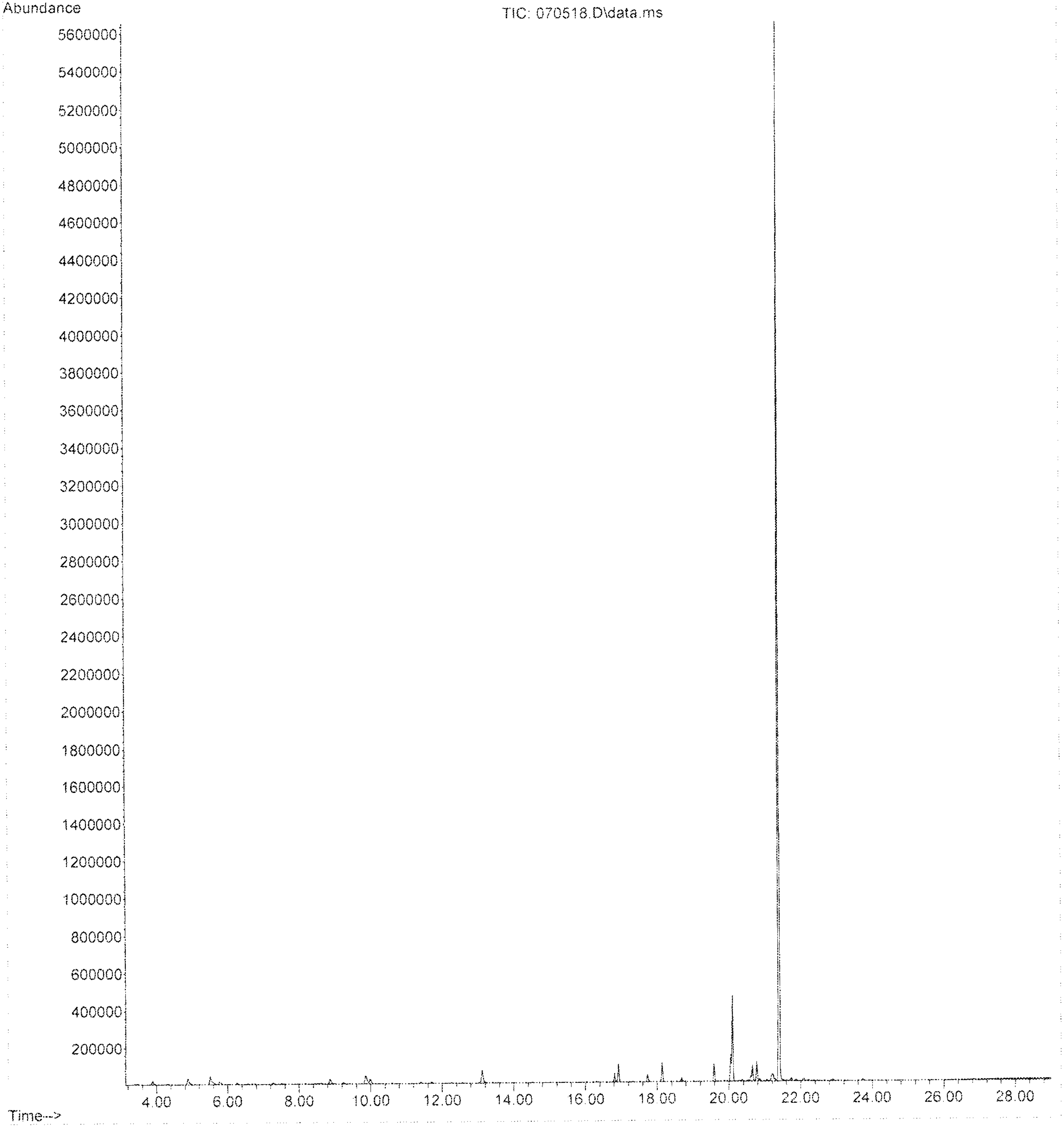

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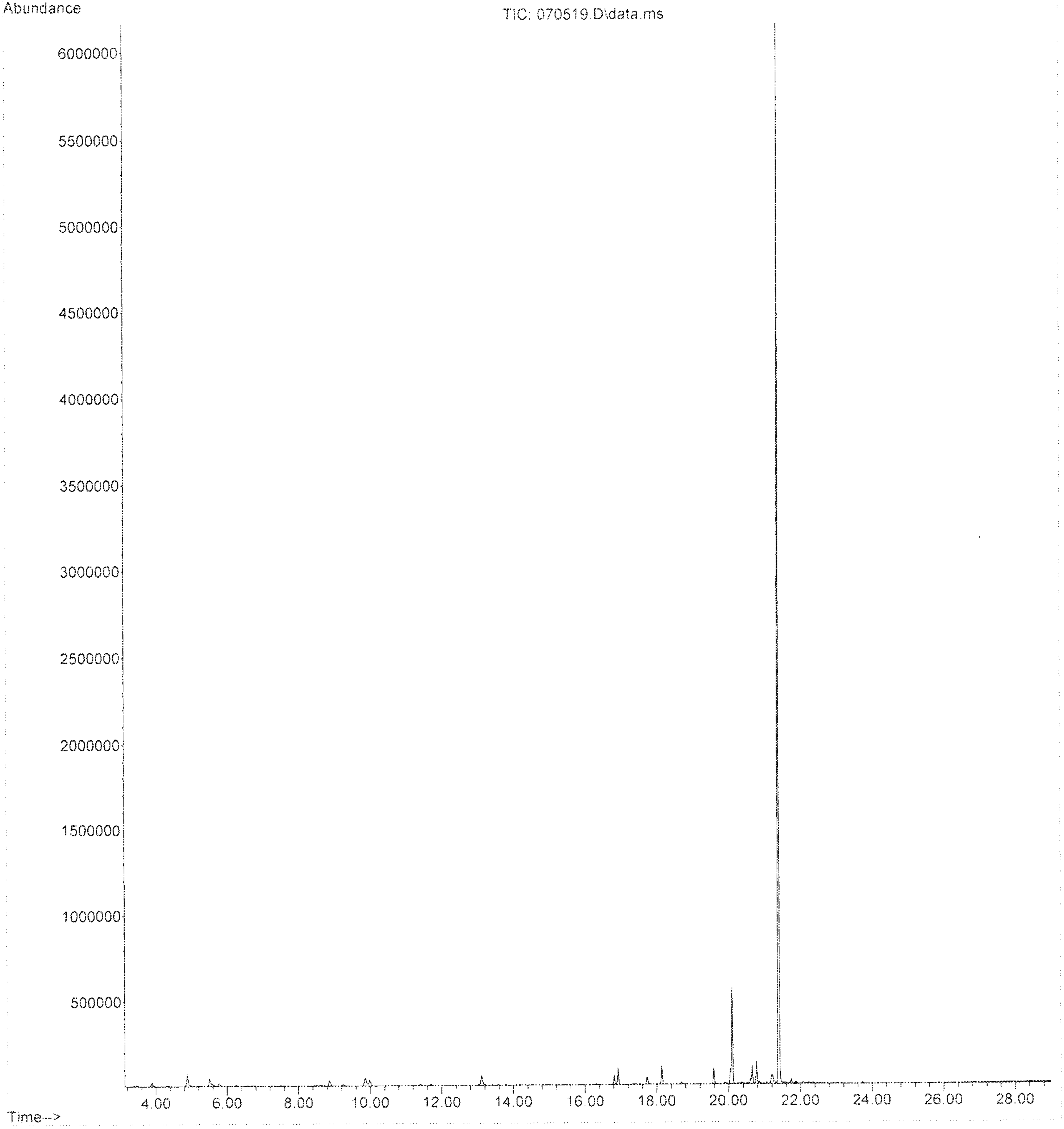
File       :D:\Proc_GCMS7\07-05-23\070519.D
Operator   : bat
Acquired   :  5 Jul 2023  11:26 pm using AcqMethod TO15DC.M
Instrument :   GCMS7
Sample Name: 307015-06
Misc Info  : T7
Vial Number: 19
```



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File        :D:\Proc_GCMS7\07-05-23\070520.D
Operator    : bat
Acquired    :  6 Jul 2023  12:17 am using AcqMethod TO15DC.M
Instrument :   GCMS7
Sample Name: 307015-07
Misc Info  : T8
Vial Number: 20
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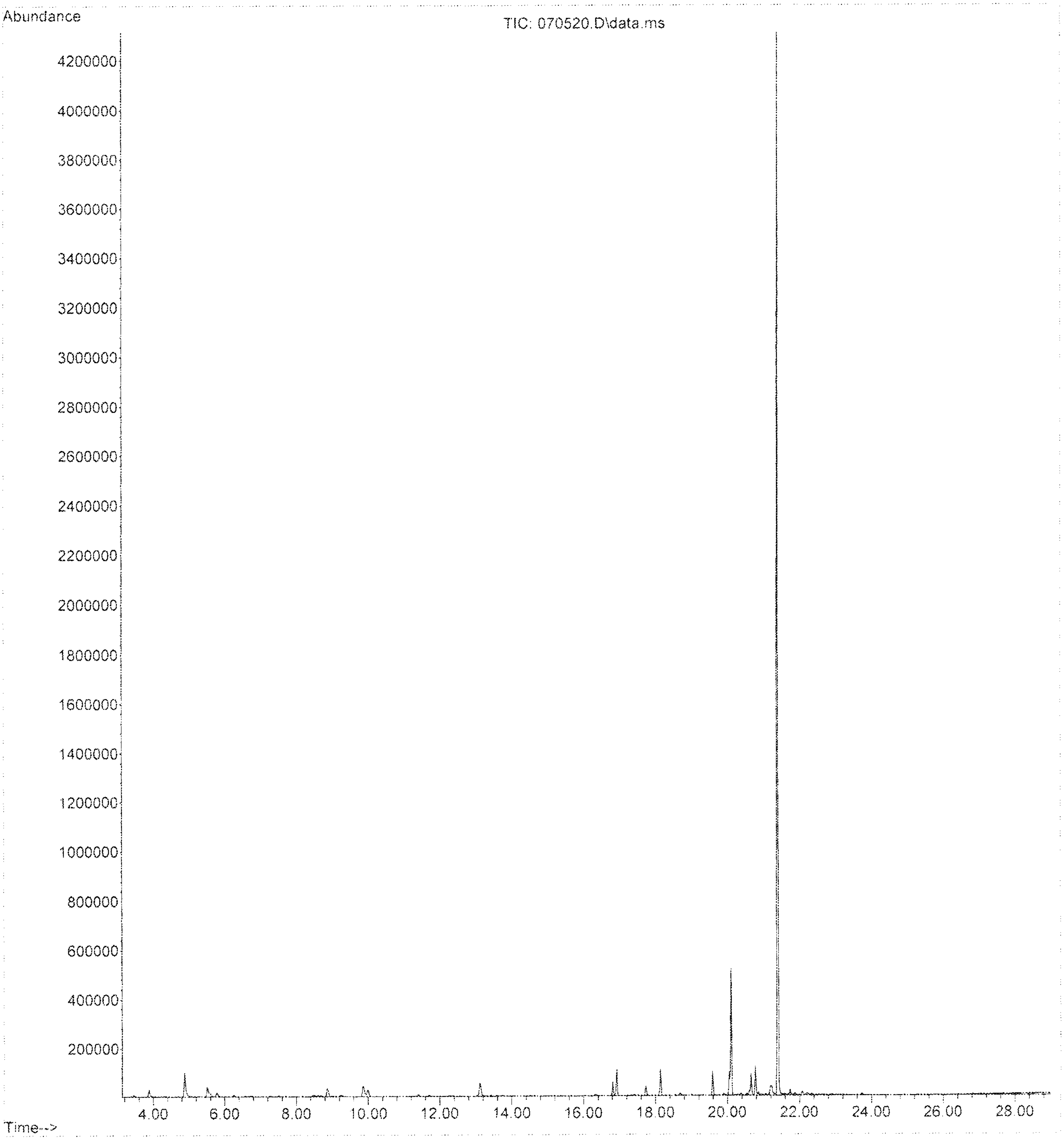

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File        :D:\Proc_GCMS7\07-05-23\070521.D
Operator    : bat
Acquired    :  6 Jul 2023   1:11 am using AcqMethod TO15DC.M
Instrument :   GCMS7
Sample Name: 307015-08
Misc Info   : T9
Vial Number: 21
```

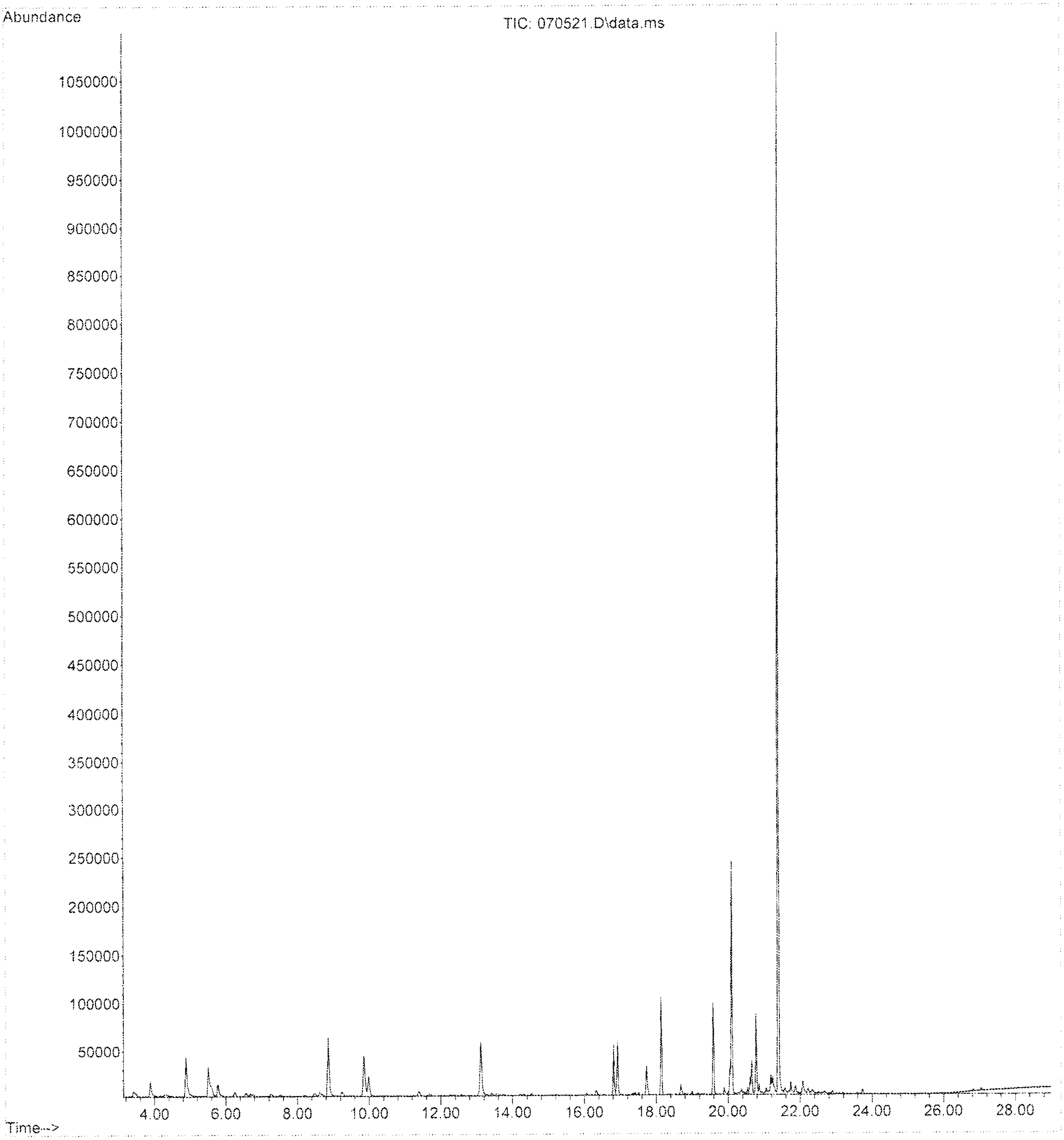

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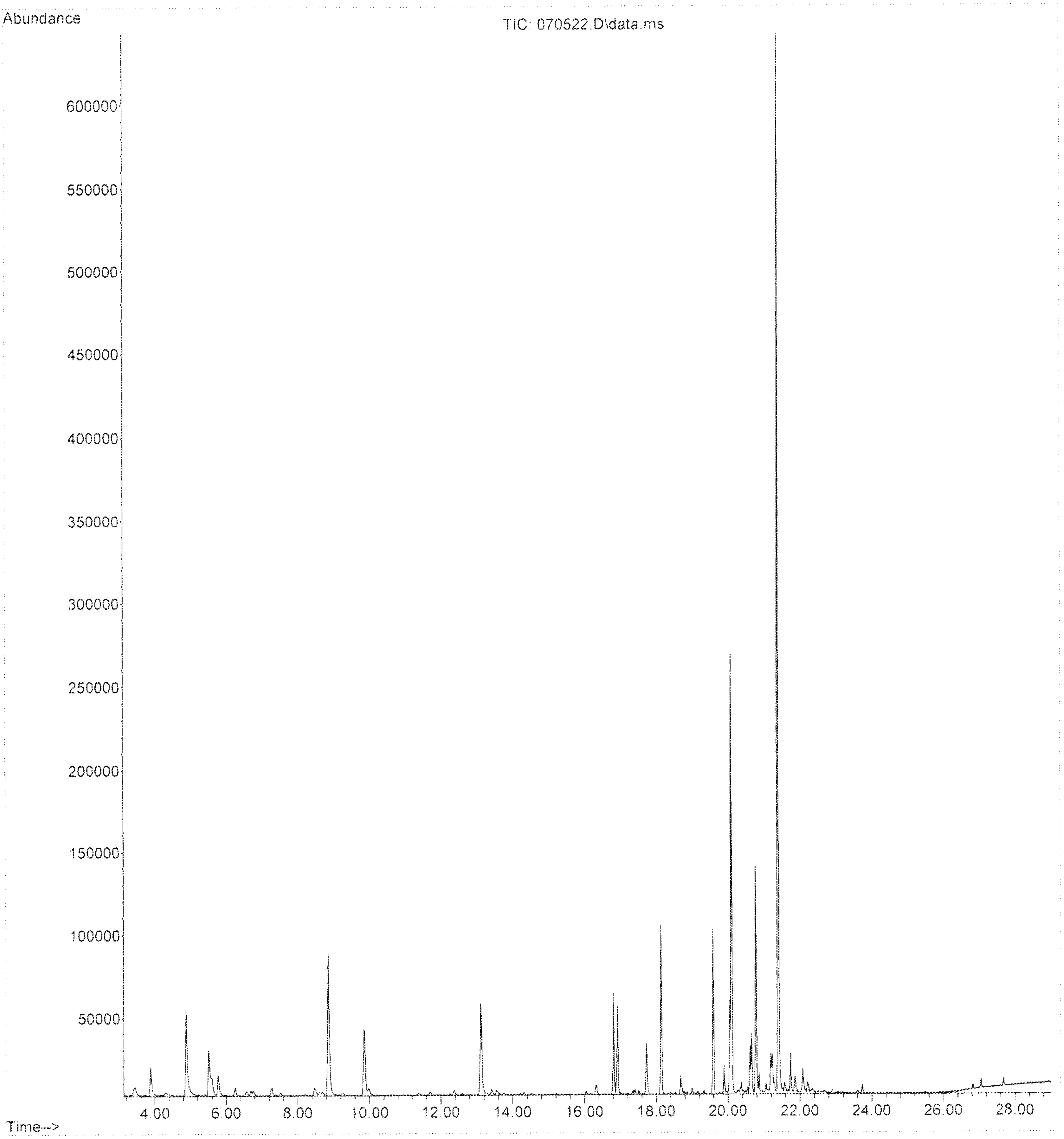
Operator    : bat
Acquired    :  6 Jul 2023   2:03 am using AcqMethod TO15DC.M
Instrument :   GCMS7
Sample Name: 307015-09
Misc Info   : T10
Vial Number: 22
```



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File       :D:\Proc_GCMS7\07-05-23\070523.D
Operator   : bat
Acquired   :  6 Jul 2023   2:54 am using AcqMethod TO15DC.M
Instrument :   GCMS7
Sample Name: 307015-10
Misc Info  : T11
Vial Number: 23
```
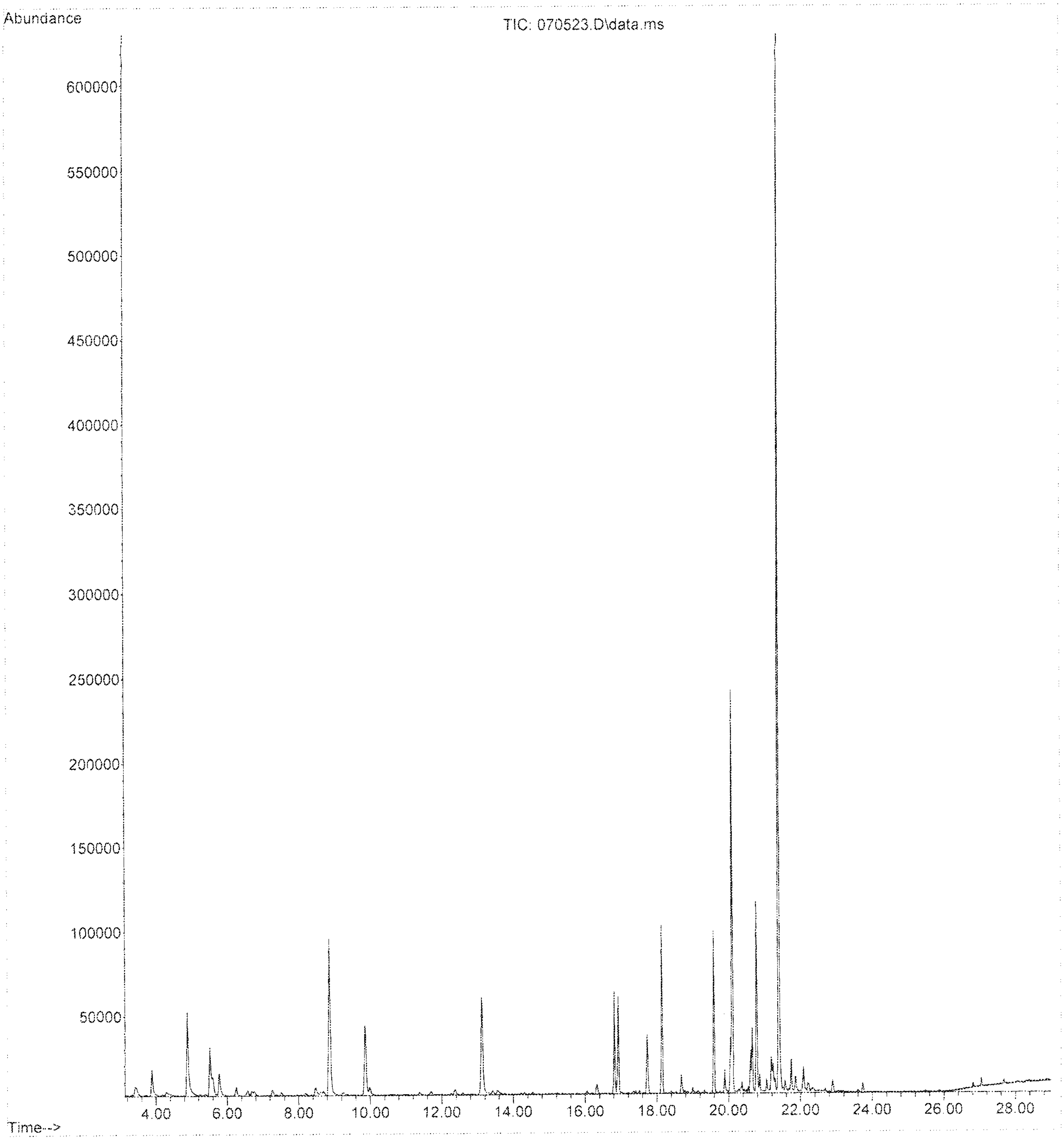
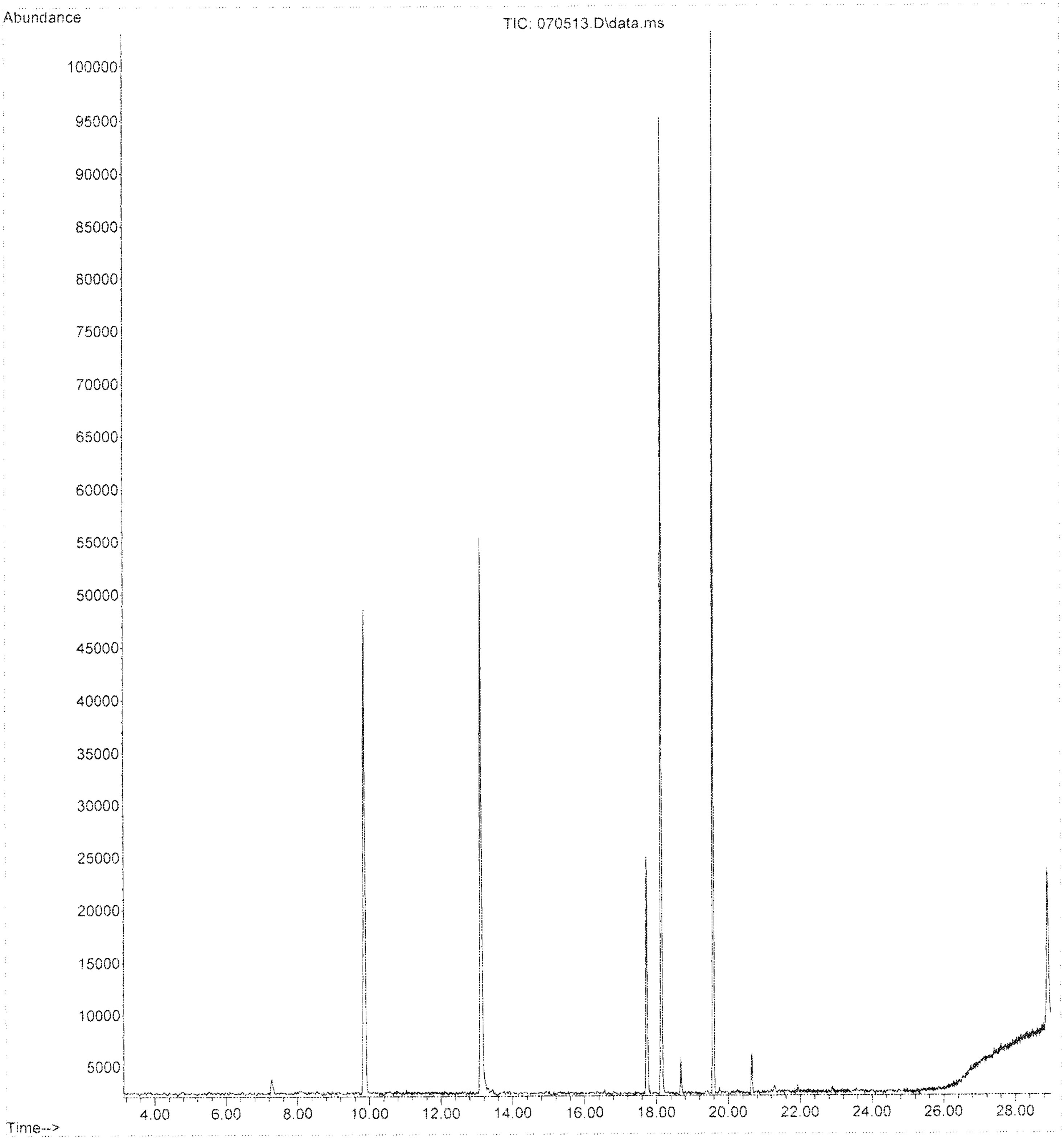



```
File       :D:\Proc_GCMS7\07-05-23\070513.D
Operator   : bat
Acquired   :  5 Jul 2023   6:07 pm using AcqMethod TO15DC.M
Instrument :   GCMS7
Sample Name: 03-1533 MB
Misc Info  : T1
Vial Number: 13
```



307015

SAMPLE CHAIN OF CUSTODY

07/05/23

Report To EMB Consulting
Company Elisabeth Black
Address 22725 · 44th Ave W, #203
City, State, ZIP Mountlake Terrace, WA
Phone 206·915·2395 Email emblackconsult@gmail.com

SAMPLERS (*signature*) E. Black

PROJECT NAME & ADDRESS Bridgepoint	PO #
NOTES:	INVOICE TO EMB Consulting

Page # 1 of 2

TURNAROUND TIME
[✓ Standard]
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Default: Clean following final report delivery
Hold (Fee may apply):

SAMPLE INFORMATION / ANALYSIS REQUESTED

Sample Name	Lab ID	Canister ID	Flow Cont. ID	Reporting Level: IA=Indoor Air SG=Soil Gas (Circle One)	Date Sampled	Initial Vac. ("Hg)	Field Initial Time	Final Vac. ("Hg)	Field Final Time	TO15 Full Scan	TO15 BTEXN	TO15 cVOCs	APH	Helium		Notes
AE-070423	01	35338	15214	[✓ IA] / SG	070423	30	4:46	7.0	070523 5:34		✓	✓	✓			✓- per EMB & ~~Sue~~ Eric
AW-070423	02	18563	15208	[✓ IA] / SG	070423	30	4:53	8.0	070523 5:38		↕	↕	↕			
IA1-070423	03	18580	15210	[✓ IA] / SG	070423	30	5:09	6.5	070523 5:47							
IA2-070423	04	23231	15219	[✓ IA] / SG	070423	30	5:11	5.5	070523 5:46							
IA3-070423	05	18577	15209	[✓ IA] / SG	070423	20	5:12	0.0	070523 5:45							
IA4-070423	06	18579	15211	[✓ IA] / SG	070423	30	5:15	8.5	070523 5:50							
IA5-070423	07	18569	15216	[✓ IA] / SG	070423	30	5:06	6.5	5:53							
IA6-070423	08	18567	665	[✓ IA] / SG	070423	30	5:03	8.0	070523 5:54		✓	✓	✓			

DW

Friedman & Bruya, Inc.
5500 4th Avenue South
Seattle, WA 98108
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: E. Black	Elisabeth Black	EMB	070523	7:17
Received by:	Nhan Phan	FEBI	07/05/23	07:17
Relinquished by:				
Received by:		Samples received at 22 °C		

FORMS\COC\COCTO-15.DOC

307015

SAMPLE CHAIN OF CUSTODY

07/05/23

Page # 2 of 2

Report To EMB Consulting
Company Elisabeth Black
Address 22725 44th Ave W #203
City, State, ZIP Mountlake Terrace
Phone 206 915 2395 Email emblackconsult@gmail.com

SAMPLERS (*signature*)	E. Black
PROJECT NAME & ADDRESS	
PO #	
NOTES:	
INVOICE TO	

TURNAROUND TIME
[✓ Standard]
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Default: Clean following final report delivery
Hold (Fee may apply):

SAMPLE INFORMATION / ANALYSIS REQUESTED

Sample Name	Lab ID	Canister ID	Flow Cont. ID	Reporting Level: IA=Indoor Air SG=Soil Gas (Circle One)	Date Sampled	Initial Vac. ("Hg)	Field Initial Time	Final Vac. ("Hg)	Field Final Time	TO15 Full Scan	TO15 BTEXN	TO15 cVOCs	APH	Helium		Notes
IA7-070423	09	20550	15213	[✓ IA] / SG	070423	30	5:21	~~8~~ 6.5	5:59		✓	✓	✓			~~See Eric~~ per EMP, 7/5
IA8-070423	10	21437	15218	[✓ IA] / SG	070423	30	4:59	6.0	5:57		✓	✓	✓			
				IA / SG												
				IA / SG												
				IA / SG												
				IA / SG												
				IA / SG												
				IA / SG												

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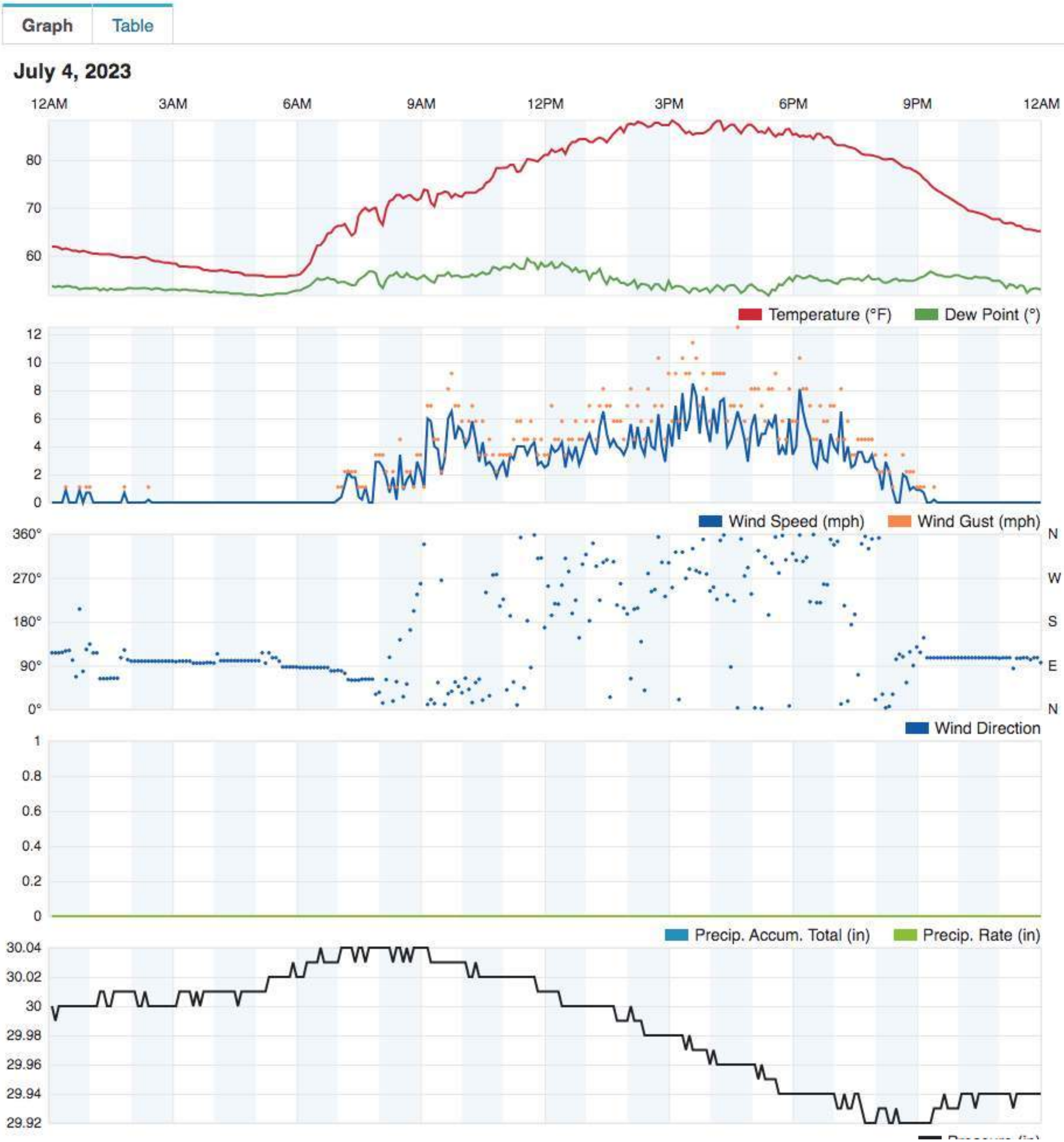
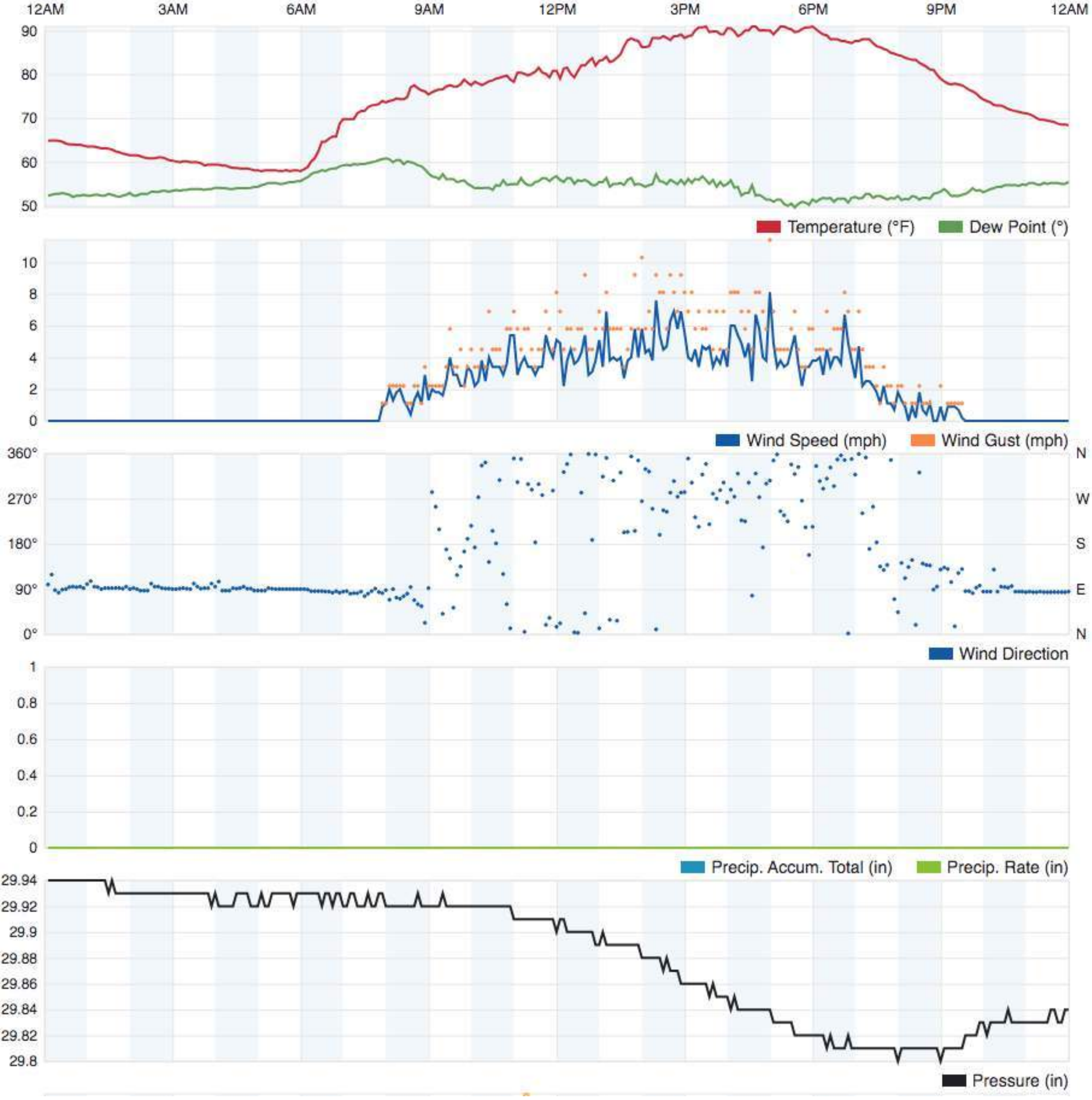
Received by:	Nhan Phan	FCBI	7/5/23	07:17
Relinquished by:				
Received by:		Samples received at 22 °C		

FORMS\COC\COCTO-15.DOC

ATTACHMENT B
Weather Data
South Park KWASEATT2547
July 4 to July 5, 2023


Graph
Table
July 4, 2023
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
80
70
60
Temperature (°F)
Dew Point (°)
12
10
8
6
4
2
0
Wind Speed (mph)
Wind Gust (mph)
360°
270°
180°
90°
0°
N
W
S
E
N
Wind Direction
1
0.8
0.6
0.4
0.2
0
Precip. Accum. Total (in)
Precip. Rate (in)
30.04
30.02
30
29.98
29.96
29.94
29.92

July 5, 2023


12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
90
80
70
60
50
🟥 Temperature (°F)
🟩 Dew Point (°)
10
8
6
4
2
0
🟦 Wind Speed (mph)
🟧 Wind Gust (mph)
360°
270°
180°
90°
0°
N
W
S
E
N
🟦 Wind Direction
1
0.8
0.6
0.4
0.2
0
🟦 Precip. Accum. Total (in)
🟩 Precip. Rate (in)
29.94
29.92
29.9
29.88
29.86
29.84
29.82
29.8
⬛ Pressure (in)

Appendix D

Tidal Study Results

REMEDIAL INVESTIGATION WORK PLAN – TIDAL STUDY

Former Bunge Foods Facility
6901 Fox Ave South

July 11 2023

Prepared for:

Bridge Point Seattle 130, LLC

BRIDGE

Prepared by:

CRETE
CONSULTING, INC.

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Figure B-3 Net Groundwater Flow

1 INTRODUCTION

The 6901 Fox Avenue South site (the site) is located on the east bank of the Lower Duwamish Waterway (LDW), in a tidally influenced area, between River Mile (RM) 2.2 and RM 2.3 as measured from the southern tip of Harbor Island (see Figure B-1). In tidally influenced groundwater monitoring wells, samples are typically collected during a negative low tide. In the LDW, negative low tides occur during two approximately two- to seven-day periods during each month. Groundwater is sampled during the time of low groundwater elevation in each well in order to collect samples that are representative of the aquifer groundwater.

The purpose of the tidal study is to:

1. Estimate tidal lag times for each monitoring well to determine when groundwater sampling should be performed relative to LDW low tide.
2. Define net groundwater flow conditions to support fate and transport analyses and remedial alternative design.

2 DATA COLLECTION AND ANALYSIS

2.1 METHODOLOGY

The study was conducted from January 4 to 10, 2022 during a time period including negative and non-negative low tides, allowing for observation of the tidal response. A subset of this transducer data was used for additional statistical evaluation This subset data range was midnight 6 January through midnight 9 January. The 6 nearshore monitoring wells and the nearest NOAA-monitored tidal station (ID# 9447130 in Seattle, WA) were used to measure tidal variations.

2.2 WATER LEVEL ELEVATION CONVERSIONS

Van Essen pressure transducers, called Micro-Divers, were placed in each monitoring well and left undisturbed for the duration of the study. Transducer details are included on Table B-1. Water level measurements were collected by hand in all onsite wells using a water level meter at the time of transducer installations and removals as spot checks of the transducer water level calculations (see Table B-2). Raw data collected directly from the transducers (water depths as a function of water head pressure) were corrected against barometric pressure recorded concurrently at the site using a Baro-Diver. The barometric pressure corrections were conducted using the Van Essen Diver-Office software. Separately, each well was surveyed by a licensed professional surveyor for top of casing elevation measurements to approximately 0.01 feet in NAVD88 datum to establish a reference point for each monitoring well and corresponding transducer. The reference point for each monitoring well is on the approximate north point of the top of well casing. The barometrically-corrected transducer pressure measurements (water head) were then subtracted from the surveyed well casing depth to calculate water level elevations from the transducer data.

2.3 EXTRAPOLATED DATA FOR MW-3

No wells went dry during the tidal study. The transducer installed in monitoring well MW-3 did experience out-of-water conditions during lower low water (LLW) of the first four tides from January 4th through January 8th. The LLW elevation data for MW-3 is the last known elevation before the water level dropped below the transducer's installed position in the well. The time of the LLW was estimated as the middle of the time period in which the water level was below the transducer depth. The values are sufficient to demonstrate the tidal response at MW-3, which had the largest water level elevation changes and largest calculated tidal efficiency, even with these conservative elevation values.

2.4 LAG TIME

Tidally influenced groundwater follows the tidal fluctuations of the adjacent waterway on a delayed cycle. The length of time it takes for water in a well to respond to the tidal cycle is known as the "tidal time lag" (Fetter 1994). The lag time was used to predict groundwater sample timing based on the low tides predicted for the reference station.

Tidal lag time was calculated by averaging the difference in time between the two higher high tides and two lower low tides in each monitoring well relative to the reference tidal station #9447130. Tidal Station 9447130 is at the Seattle Ferry Terminal near the intersection of Columbia Street and Alaskan Way (Figure B2-1). The gauging station is in Elliot Bay and a straight-line distance of approximately 4.25-miles for the site.

2.5 TIDAL EFFICIENCY

Tidal efficiency is the magnitude of the tidal fluctuation of a groundwater monitoring well, expressed as a percentage of the tidal fluctuation in the adjacent water body. Tidal efficiency is used to understand the hydrologic characteristics of the aquifer. The amplitude of the groundwater fluctuation is generally much less than the tidal range and is usually greatest nearest the shoreline and diminishes further from shoreline, although other factors may affect the groundwater level response observed in wells. The tidal efficiency was calculated by dividing the tidal range for one-quarter of a tidal cycle (first lower low tide to the corresponding next higher high tide) by the same tidal range for the tidal station. Calculated tidal efficiencies for each monitoring well during each recorded LLW to higher high water (HHW) tidal cycles are summarized on Table B-4.

2.6 NET GROUNDWATER FLOW

Net groundwater elevation and flow direction are used to assess contaminant fate and transport at a site. In a tidally influenced area, groundwater elevations and flow directions may vary through the tidal cycle. As the tides rise and fall, they produce pressure waves in the adjacent aquifers and may cause groundwater levels and hydraulic gradients to fluctuate, resulting in a situation where a single synoptic set of groundwater levels may not adequately characterize groundwater. To evaluate net groundwater flow directions, average elevations are typically estimated using the Serfes (1991) method. Data from this tidal study was used to evaluate average elevations using a simple averaging and filtering from the modified method of

Serfes (1991). Serfes developed a method based on the earlier work of Godin (1966) to filter out tidal influences. Serfes method uses hourly water-level readings taken over a three-day period (72 hours). The hourly readings from each well are processed using a moving average technique.

The Serfes method averaged for each well within the tidal study window (1/6/2022 00:00 to 1/8/2022 23:59) are tabulated on Table B-3. The net groundwater flow direction for the site was obtained by interpolating elevation contours from the average, filtered groundwater elevations for each well (Figure B-3).

Additionally, for reference and to verify the appropriateness of the above method, simple arithmetic average elevations for the wells were determined by calculating the arithmetic mean of the elevations during the full tidal cycle from the first LLW to the second LLW level for each well within the assigned study window (Table B-4). The result was that this arithmetic average elevation and the averaged calculated by the Serfes (1991) method were similar (maximum 0.05 feet variance). Data is presented on Table B-4 for side-by-side comparison of the two methods.

3 TIDAL STUDY RESULTS

3.1 LAG TIME RESULTS

The average tidal lag time for wells at the site during the 72-hour tidal window described in Section 2.6 ranged from 30 minutes (MW-1) to 1 hour and 30 minutes (MW-2). Shoreline well MW-1 had the shortest lag time and well MW-2 and MW-6 had the longest lag times. MW-2 and MW-6 are located in close proximity to each other suggesting this area is hydrogeologically unique for the site. See Table B-3 for lag times and tidal efficiency.

An alternate lag time analyses is summarized on Table B-4. This analysis was performed for data across a larger recorded range of transducer results, ranging from January 5 through January 9, increasing the tidal window beyond the Serfes method (1991) 72-hour analysis tidal window. This analysis generally corresponds to the 72-hour window with MW-1 having the shortest average lag time at 29 minutes and MW-2 having the longest lag time at 1 hour and 37 minutes. The inland wells have a similar average lag time ranging from 41-minutes (MW-4) to 1 hour and 13-minutes (MW-6). The average lag time for MW-3 at 57-minutes generally corresponds to the 72-hour tidal window analysis of 51-minutes.

3.2 TIDAL RANGE RESULTS

The tidal range on the LDW during the first quarter cycle of tidal study (first lower low water level to the first higher high water level) was 12.21 feet, ranging in elevation from -1.56 feet mean lower low water (MLLW) to 13.77 feet MLLW. Groundwater levels fluctuated from a maximum 10.87 feet (MW-3) near the bank to a minimum of 0.45 feet (MW-1) during the first two tidal quarter cycles (first two LLW to HHW). There was a significant tidal influence in all wells, with tidal efficiencies ranging from 41% to 72%.

It was expected that tidal influence would be strongest in near-bank wells and diminished further upland, but this was not consistent with tidal study observations. Two near-bank wells, MW-1 and MW-3, had strong tidal influence, but one near bank well, MW-2, had the weakest tidal influence observed during the tidal study. Similarly, upland well MW-4 had strong tidal influence and upland wells MW-5 and MW-6 had lesser tidal influence. This variability may be a function of shoreline changes from 1917 to 1966 and composition and compaction of fill materials used during these shoreline changes. Gaging and potentiometric map data from the adjacent Great Western International Chemical Company (GWCC) site RI/FS (Floyd Snider 2011) suggests that tidal influence may occur to 300 feet inland and others report significant tidal influence within 500 feet of the LDW (Booth and Herman 1998). Table B-4 summarizes this data.

3.3 NET GROUNDWATER FLOW

The net flow direction at the site is generally toward the LDW, which had an average water level elevation of 7.92 feet MLLW at the tidal station (see Figure B-3) during the 72-hour tidal study analyses. Serfes average groundwater elevations during the tidal study period ranged from the on-site wells ranged from 6.18 feet MLLW (MW-1) to 6.67 feet MLLW (MW-2). Groundwater elevation in shoreline well MW-2 was observed to be slightly higher than the upland wells (MW-4, MW-5, MW-6). Hydraulic gradient calculations for the water level elevations among the monitoring wells in this area on the western end of the site range from 0.0021 to 0.0043 ft/ft.

3.4 GROUNDWATER SAMPLE TIMING

Table B-3 provides a summary of groundwater sample timing for each well at the site based on the logic presented in the introduction to this appendix (Section 1). Suggested sample collection times vary from 25-minutes to approximately 87-minutes following the lower low tide of a given tidal diurnal tidal cycle.

REFERENCES

Booth and Herman 1998. Duwamish Industrial Area Hydrogeologic Pathways Project, Duwamish Basin Groundwater Pathways Conceptual model Report. Prepared for City of Seattle Office of Economic Development and King County Office of Budget and Strategic Planning. April 1998.

Floyd Snider 2011. Remedial Investigation Feasibility, Fox Avenue Site, Seattle Washington. Prepared for Fox Avenue Building LLC, 6900 Fox Avenue S, Seattle, Washington, 98108. June 10, 2011

TABLES

Table B-1 6901 Fox Ave S - Van Essen Level Logger Type and Placement

Level Logger ID	Level Logger Serial Number	Level Logger Type	Total Well Depth (ft BTOC)	Depth of Transducer in well (ft BTOC to pressure sensor)	Transducer distance above bottom of well (ft)
MW-1	W6760	Van Essen Micro-Diver	18.90	17.13	1.77
MW-2	Y1746	Van Essen Micro-Diver	19.20	15.36	3.84
MW-3	W6723	Van Essen Micro-Diver	19.43	15.19	4.24
MW-4	W6738	Van Essen Micro-Diver	19.28	14.62	4.66
MW-5	Y1751	Van Essen Micro-Diver	19.40	16.03	3.37
MW-6	Y1387	Van Essen Micro-Diver	19.81	13.75	6.06
Barometer	N2290	Van Essen Baro-Diver	N/A	N/A	N/A

NOTES:
TOC - top of casing
BTOC - below top of casing
ft - feet
N/A - not applicable

Table B-2 6901 Fox Ave S - Monitoring Well Gauging, Select Transducer Readings

Well ID	Date	Time	Elevation Top of PVC Casing (ft)	Gauged DTW (ft BTOC)	Water Level Elevation (ft)	Transducer Level Reading (Head ft)	Difference in Gauged DTW and Transducer Measured Head (ft)
MW-1	1/4/2022	~13:10	15.85	8.95	6.90	NA	
	1/10/2022	11:34	15.85	7.24	8.61	7.90	-0.66000
MW-2	1/4/2022	~13:40	14.36	7.02	7.34	NA	
	1/10/2022	13:14	14.36	6.8	7.56	NA	
MW-3	1/4/2022	~14:00	16.22	9.18	7.04	NA	
	1/10/2022	12:29	16.22	7.62	8.60	NA	
MW-4	1/4/2022	~14:20	15.51	8.12	7.39	NA	
	1/10/2022	11:58	15.51	7.02	8.49	7.25	-0.23000
MW-5	1/4/2022	~13:25	14.27	7.13	7.14	NA	
	1/10/2022	11:47	14.27	6.25	8.02	6.47	-0.22000
MW-6	1/4/2022	~14:30	14.76	7.35	7.41	NA	
	1/10/2022	12:10	14.76	6.68	8.08	7.04	-0.36000

NOTES:

PVC - polyvinyl chloride

ft - feet
DTW - depth to water
BTOC - below top of casing

Table B-3 6901 Fox Ave S - Tidal Lag Time Analysis at Monitoring Wells

Well ID	Elevation		Tidal Range for a Quarter Cycle				Tidal Range for a Quarter Cycle				Lag Time						Sample Collection Time
	Average Elevation (Average from 1st low low to 2nd low low)	Serfes Method Mean Elevation (72-Hour Period)	First Low Low Elevation	First High High Elevation	Tidal Range	Tidal Efficiency (Quarter Cycle)	Second Low Low Elevation	Second High High Elevation	Tidal Range	Tidal Efficiency (Quarter Cycle)	Lag Time (1st Low Low Tides Only)	Lag Time (2nd Low Low Tides Only)	Lag Time (1st High High Tides Only)	Lag Time (2nd High High Tides Only)	Average Lag Time (2 low low tides)	Average Lag Time (2 high high and 2 low low tides)	Suggested Sample Collection Time
	MLLW	MLLW	MLLW	MLLW	ft		MLLW	MLLW	ft		hr:min	hr:min	hr:min	hr:min	hr:min	hr:min	
MW-1	6.20	6.18	0.45	9.23	8.78	57%	1.39	9.89	8.50	61%	0:31	0:22	0:31	0:43	0:26	0:31	30 minutes after low low tide
MW-2	6.73	6.67	2.17	9.39	7.22	47%	2.97	10.40	7.43	54%	1:49	1:25	1:10	1:04	1:37	1:22	90 minutes after low low tide
MW-3 *	6.16	6.14	0.82	9.98	9.16	60%	0.93	10.87	9.94	72%	0:36	1:03	1:09	0:45	0:49	0:53	50 minutes after low low tide
MW-4	6.42	6.40	1.06	9.28	8.22	54%	2.20	9.97	7.77	56%	0:35	0:35	0:50	0:23	0:35	0:35	35 minutes after low low tide
MW-5	6.50	6.47	2.25	8.59	6.34	41%	3.15	9.16	6.01	43%	1:07	0:52	1:10	0:43	0:59	0:58	60 minutes after low low tide
MW-6	6.58	6.58	2.15	8.87	6.72	44%	3.22	9.62	6.40	46%	1:12	0:57	1:51	1:36	1:04	1:24	84 minutes after low low tide
Tidal Station #9447130	7.92	8.04	-1.56	13.77	15.33	NA	0.60	14.47	13.87	NA	NA	NA	NA	NA	NA	NA	ND

The tidal study window for this analysis and these table values is from 1/6/2022 00:00 (AM) to 1/8/2022 23:59 (PM).

* LLW values for MW-3 are approximate due to the well water level falling just below the installed transducer device elevation. LLW elevations are lowest groundwater elevation before groundwater dropped below transducer position in monitoring well and times are middle of time period in which the groundwater level was below the transducer's position.

ft - feet

MLLW - mean lower low water

NA - not applicable

Table B-4 6901 Fox Ave S - Additional Tidal Lag Times at Monitoring Wells

		Tidal LLW		Tidal HHW		Monitor Well Observed LLW		Monitor Well Observed HHW		Calculated LLW Lag	Tidal	
Well	**Date**	**Time**	**Elevation**	**Time**	**Elevation**	**Time**	**Elevation**	**Time**	**Elevation**	**Time (H:MM)**	**Efficiency**	**Comment**
MW-1	1/5/2022	0:06	-2.35	7:30	13.09	0:37	0.33	8:04	8.93	0:31	56%	
MW-2	1/5/2022	0:06	-2.35	7:30	13.09	2:19	2.36	8:58	8.85	2:13	42%	
MW-3	1/5/2022	0:06	-2.35	7:30	13.09	1:14	0.88	8:42	9.46	1:08	56%	Transducer above fallen water level
MW-4	1/5/2022	0:06	-2.35	7:30	13.09	0:47	0.82	8:17	8.83	0:41	52%	
MW-5	1/5/2022	0:06	-2.35	7:30	13.09	1:31	2.2	8:46	8.23	1:25	39%	
MW-6	1/5/2022	0:06	-2.35	7:30	13.09	1:42	2.03	9:30	8.39	1:36	41%	
MW-1	1/6/2022	0:48	-1.56	8:24	13.77	1:19	0.45	8:55	9.23	0:31	57%	
MW-2	1/6/2022	0:48	-1.56	8:24	13.77	2:37	2.17	9:34	9.39	1:49	47%	
MW-3	1/6/2022	0:48	-1.56	8:24	13.77	1:25	0.84	9:33	9.98	0:37	60%	Transducer above fallen water level
MW-4	1/6/2022	0:48	-1.56	8:24	13.77	1:23	1.05	9:17	9.28	0:35	54%	
MW-5	1/6/2022	0:48	-1.56	8:24	13.77	1:55	2.25	9:34	8.59	1:07	41%	
MW-6	1/6/2022	0:48	-1.56	8:24	13.77	2:00	2.15	10:15	8.87	1:12	44%	
MW-1	1/7/2022	1:42	0.59	9:18	14.47	2:04	1.39	10:01	9.89	0:22	61%	
MW-2	1/7/2022	1:42	0.59	9:18	14.47	3:07	2.97	10:22	10.4	1:25	54%	
MW-3	1/7/2022	1:42	0.59	9:18	14.47	2:47	0.95	10:03	10.87	1:05	71%	Transducer above fallen water level
MW-4	1/7/2022	1:42	0.59	9:18	14.47	2:17	2.2	9:41	9.97	0:35	56%	
MW-5	1/7/2022	1:42	0.59	9:18	14.47	2:34	3.15	10:01	9.16	0:52	43%	
MW-6	1/7/2022	1:42	0.59	9:18	14.47	2:39	3.22	10:54	9.62	0:57	46%	
MW-1	1/8/2022	2:24	1.35	9:42	13.07	2:52	1.69	10:10	8.82	0:28	61%	
MW-2	1/8/2022	2:24	1.35	9:42	13.07	3:49	2.96	10:43	8.91	1:25	51%	
MW-3	1/8/2022	2:24	1.35	9:42	13.07	3:42	0.88	10:30	9.55	1:18	74%	Transducer above fallen water level
MW-4	1/8/2022	2:24	1.35	9:42	13.07	3:05	2.47	10:26	8.97	0:41	55%	
MW-5	1/8/2022	2:24	1.35	9:42	13.07	3:19	3.37	10:49	8.37	0:55	43%	
MW-6	1/8/2022	2:24	1.35	9:42	13.07	3:39	3.31	11:09	8.59	1:15	45%	
MW-1	1/9/2022	3:12	3.11	10:12	12.53	3:49	2.46	10:37	8.89	0:37	68%	
MW-2	1/9/2022	3:12	3.11	10:12	12.53	4:28	3.14	11:31	8.41	1:16	56%	
MW-3	1/9/2022	3:12	3.11	10:12	12.53	4:09	1.58	11:12	9.18	0:37	81%	
MW-4	1/9/2022	3:12	3.11	10:12	12.53	4:05	3.19	10:53	8.76	0:53	59%	
MW-5	1/9/2022	3:12	3.11	10:12	12.53	4:04	3.78	11:19	8.17	0:52	47%	
MW-6	1/9/2022	3:12	3.11	10:12	12.53	4:21	3.72	11:33	8.38	1:09	49%	

	Average Lag Time	Date Range Used	LLW Lag Time Range
Well ID	Time (H:MM)		(H:MM)
MW-1	0:29	1/5 - 1/9	0:22 - 0:37
MW-2	1:37	1/5 - 1/9	0:58 - 2:13
MW-3	0:57	1/5 - 1/9	0:37 - 1:18
MW-4	0:41	1/5 - 1/9	0:35 - 0:53
MW-5	1:02	1/5 - 1/9	0:52 - 1:25
MW-6	1:13	1/5 - 1/9	0:57 - 1:36

NOTES:

The tidal efficiency was calculated by taking the ratio of variations in water levels observed in wells relative to measured tidal fluctuation from the tidal station.

This table presents recorded data outside of the 72-hour tidal study period (1/6/2022 00:00 to 1/8/2022 23:59). Additional analyses was not performed on data outside this 72-hour period.

Values are extrapolated from transducer data. Elevation values are last recorded values prior to water levels dropping below transducer installation position.

Values are estimates based on extrapolated data.

HHW - higher high water

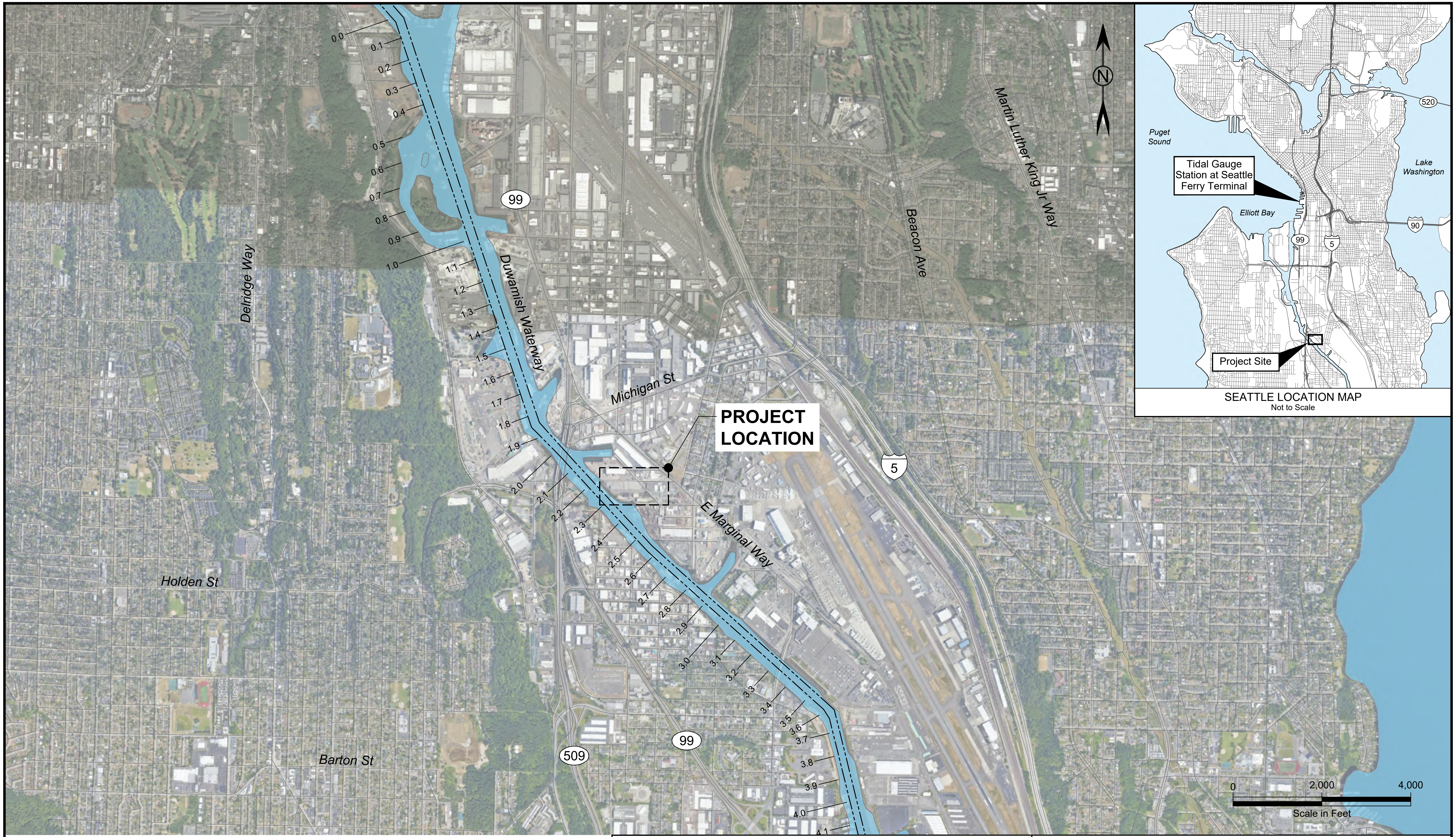
LLW - lower low water

NA - not available

HH:MM - Hour:Minutes

--- no data

FIGURES



LEGEND

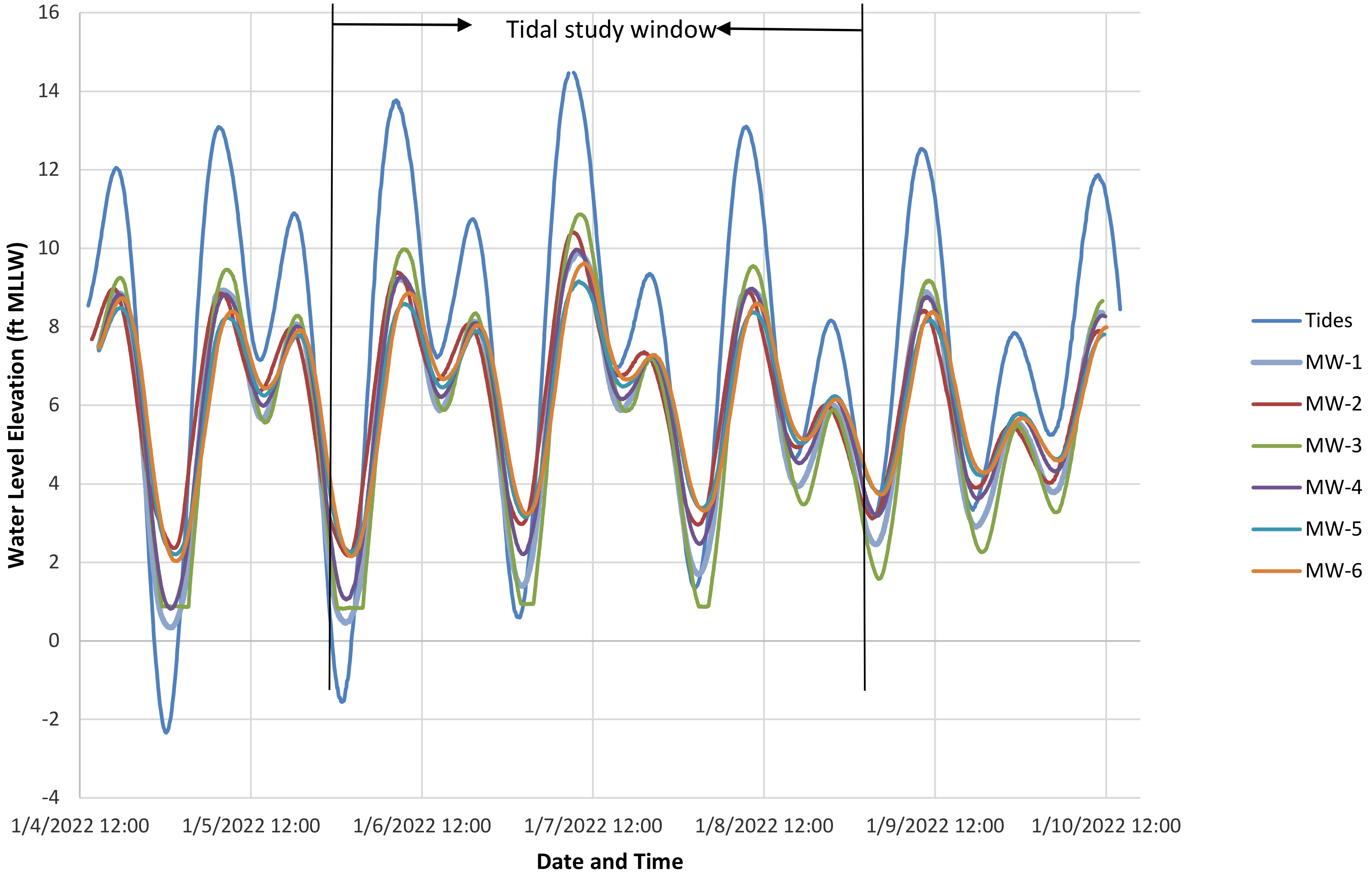
—·—·— Navigation Channel

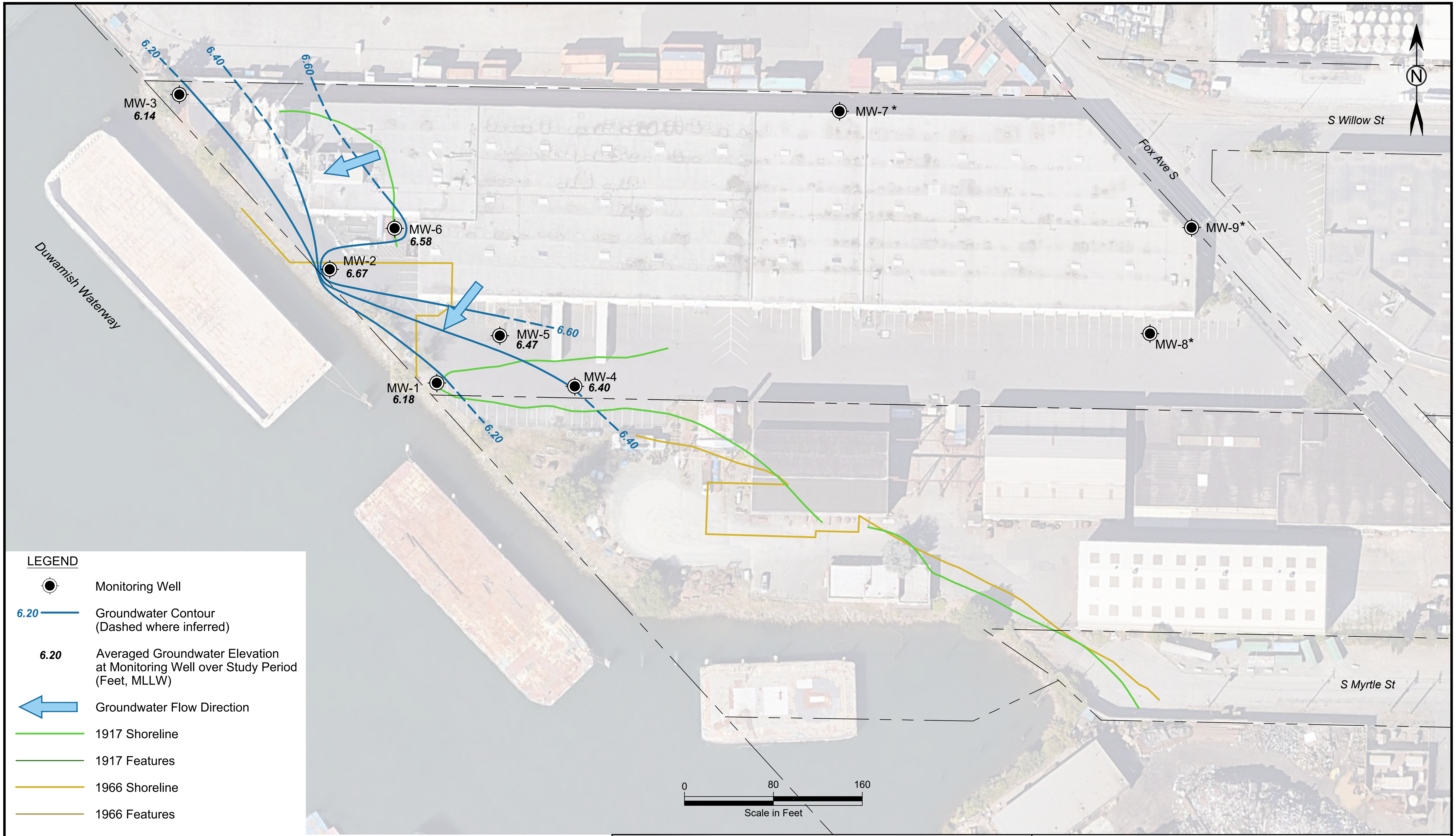
1.0 —— Approximate Mile Marker

Former Bunge Foods Facility
Bridge Industrial
April 2022

Figure 1
Tidal Study
Site Location Map

Figure B-2
Monitoring Well and Tide Water Levels (Unabridged)





CRETE
CONSULTING, INC.

NOTE
Groundwater elevations averaged using Serfes (1991) method from 1/6/2022 00:00 to 1/8/2022 23:50.
* MW not installed at time of the Tidal Study.

Former Dawn Foods Facility
Bridge Point Seattle 130, LLC
July 17, 2023

Figure B-3
Tidal Study
Net Groundwater Flow

Appendix E

Petroleum Air Compliance Spreadsheets

Table E-1
Petroleum Air Compliance Spreadsheets - Summary of Results
July 2023 Vapor Data - Bridge - Former Dawn Foods

Results	Sample ID (2023 Vapor Sampling Event)	IA1-070423 5:03 - 5:57	IA2-070423 5:03 - 5:57	IA3-070423 5:03 - 5:57	IA4-070423 5:03 - 5:57	IA5-070423 5:03 - 5:57	IA6-070423 5:03 - 5:57	IA7-070423 5:21 - 5:59	IA8-070423 4:59 - 5:57
	Location (2023 Vapor Sampling Event)	Indoor Office Women's Bath	Indoor Office	Indoor Warehouse SE Corner	Indoor Warehouse E Center	Indoor Warehouse Stairs to Office	Indoor Warehouse Center	Indoor Warehouse Fire Sprinkler Risers	Indoor Warehouse Outside Test Kitchen
Sample is in compliance if all of the following are true:		**2023 Summary - Method B - values corrected for ambient detections**							
1) Hazard index in purple cell L42 doesn't exceed 1		pass	pass	pass	pass	pass	pass	fail	fail
2) Total cancer risk in purple cell M42 doesn't exceed 1E-05		pass	pass	pass	pass	pass	pass	pass	pass
3) Individual cancer risks in column M don't exceed 1E-06.		fail	fail	fail	fail	fail	pass	fail	fail
Sample is in compliance if all of the following are true:		**2023 Summary - Commercial - values corrected for ambient detections**							
1) Hazard index in purple cell L42 doesn't exceed 1		pass	pass	pass	pass	pass	pass	pass	pass
2) Total cancer risk in purple cell M42 doesn't exceed 1E-05		pass	pass	pass	pass	pass	pass	pass	pass
3) Individual cancer risks in column M don't exceed 1E-06.		pass	pass	pass	pass	pass	pass	pass	pass
Sample is in compliance if all of the following are true:		**2023 Summary - Method C - values corrected for ambient detections**							
1) Hazard index in purple cell L42 doesn't exceed 1		pass	pass	pass	pass	pass	pass	pass	pass
2) Total cancer risk in purple cell M42 doesn't exceed 1E-05		pass	pass	pass	pass	pass	pass	pass	pass
3) Individual cancer risks in column M don't exceed 1E-05.		pass	pass	pass	pass	pass	pass	pass	pass

Evaluating Compliance with Method B Air Cleanup Levels for Petroleum

Equations

1) Noncancer inhalation intake factor: IIF = ABW x UCF x HQ x AT / (BR x ED x EF)
2) Cancer inhalation intake factor: IIF = Risk x ABW x AT x UCF / (BR x ED x EF)
3) Noncancer cleanup level: CUL = IIF x RfDi / ABS
4) TPH CUL = Total Adjusted Concentration (D43) / Total Noncancer Hazard (L43)
5) Cancer cleanup level: CUL = IIF / (CPFi x ABS)
6) Hazard Quotient = Adjusted Concentration / Noncancer CUL
7) Cancer Risk = Adjusted Concentration x 1E-6 / Cancer CUL

Instructions

Input measured concentrations in green cells B28-B41 and C28-C41. If the fraction/component was not detected in the sample but was detected elsewhere on site, enter half the detection limit. If the fraction/component wasn't analyzed or was never detected anywhere on site, enter 0 mg/kg.

Results

Sample is in compliance if all of the following are true:
1) Hazard index in purple cell L42 doesn't exceed 1
2) Total cancer risk in purple cell M42 doesn't exceed 1E-05
3) Individual cancer risks in column M don't exceed 1E-06.

Results from each sample location from the July 2023 sampling event were evaluated, see separate tables below. See Table E-2 for sample results.

Exposure Parameters

Parameter	Abbrev.	Noncancer	Cancer	Units
Average body weight	ABW	16	70	kg
Target risk	Risk	--	1E-06	unitless
Unit conversion factor	UCF	1,000	1,000	ug/mg
Hazard quotient	HQ	1	--	unitless
Averaging time	AT	6	75	yr
Breathing rate	BR	10	20	m3/day
Exposure duration	ED	6	30	yr
Exposure frequency	EF	1	1	unitless
Inhalation intake factor (Equations 1 and 2 above)	IIF	1.60E+03	8.75E-03	kg-ug-day/ mg-m3
Source: MTCA Equations 750-1 and 750-2				

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA1-070423 5:03 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Site Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**110**	88.00	2.20E+01	46.7%	1.71E+00	--	1	2.74E+03	--	2.74E+03	8.04E-03	--
Aliphatics EC>8-12	12.5	0.00	1.25E+01	26.6%	2.86E-02	--	1	4.58E+01	--	4.58E+01	2.73E-01	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	4.58E+01	--	4.58E+01	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	1.82E+02	--	1.82E+02	6.55E-02	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	1.37E+00	--	1.37E+00	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	1.82E-01	--	1.82E-01	--	--
Benzene	***0.71***	0.78	0.00E+00	0.0%	8.57E-03	2.73E-02	1	1.37E+01	3.21E-01	3.21E-01	0.00E+00	0.00E+00
Ethylbenzene	**0.5**	0.00	5.00E-01	1.1%	2.86E-01	--	1	4.58E+02	--	4.58E+02	1.09E-03	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	2.29E+03	--	2.29E+03	--	--
Total xylenes	**2.06**	2.54	0.00E+00	0.0%	2.86E-02	--	1	4.58E+01	--	4.58E+01	0.00E+00	--
Naphthalene (note a)	***0.47***	0.55	0.00E+00	0.0%	8.57E-04	1.19E-01	1	1.37E+00	7.35E-02	7.35E-02	0.00E+00	0.00E+00
1,2-Dichlorethane (EDC)	**0.18**	0.058	1.22E-01	0.3%	2.00E-03	9.10E-02	1	3.20E+00	9.62E-02	9.62E-02	3.81E-02	1.27E-06
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	4.11E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.37E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	1.39E+02	9.19E+01	4.71E+01	100.0%	--	--	Total TPH:	1.22E+02	--	1.22E+02	4E-01	1E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA2-070423 5:03 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Site Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**100**	8.80E+01	1.20E+01	25.5%	1.71E+00	--	1	2.74E+03	--	2.74E+03	4.39E-03	--
Aliphatics EC>8-12	12.5	0.00E+00	1.25E+01	26.6%	2.86E-02	--	1	4.58E+01	--	4.58E+01	2.73E-01	--
Aliphatics EC>12-16	0	0.00E+00	0.00E+00	0.0%	2.86E-02	--	1	4.58E+01	--	4.58E+01	--	--
Aromatics EC>9-10 (note a)	12.5	0.00E+00	1.20E+01	25.4%	1.14E-01	--	1	1.82E+02	--	1.82E+02	6.55E-02	--
Aromatics EC>10-12	0	0.00E+00	0.00E+00	0.0%	8.57E-04	--	1	1.37E+00	--	1.37E+00	--	--
Aromatics EC>12-16	0	0.00E+00	0.00E+00	0.0%	1.14E-04	--	1	1.82E-01	--	1.82E-01	--	--
Benzene	**0.72**	7.80E-01	0.00E+00	0.0%	8.57E-03	2.73E-02	1	1.37E+01	3.21E-01	3.21E-01	0.00E+00	0.00E+00
Ethylbenzene	**0.51**	0.00E+00	5.10E-01	1.1%	2.86E-01	--	1	4.58E+02	--	4.58E+02	1.11E-03	--
Toluene	0	0.00E+00	0.00E+00	0.0%	1.43E+00	--	1	2.29E+03	--	2.29E+03	--	--
Total xylenes	**2.07**	2.54E+00	0.00E+00	0.0%	2.86E-02	--	1	4.58E+01	--	4.58E+01	0.00E+00	--
Naphthalene (note a)	***0.49***	5.50E-01	0.00E+00	0.0%	8.57E-04	1.19E-01	1	1.37E+00	7.35E-02	7.35E-02	0.00E+00	0.000000
1,2-Dichlorethane (EDC)	**0.18**	5.80E-02	1.22E-01	0.3%	2.00E-03	9.10E-02	1	3.20E+00	9.62E-02	9.62E-02	3.81E-02	1.27E-06
Ethylene dibromide (EDB)	0	0.00E+00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	4.11E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00E+00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.37E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	1.29E+02	9.19E+01	3.71E+01	78.8%	--	--	Total TPH:	9.70E+01	--	9.70E+01	4E-01	1E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA3-070423 5:03 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Site Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**190**	8.80E+01	1.02E+02	216.7%	1.71E+00	--	1	2.74E+03	--	2.74E+03	3.73E-02	--
Aliphatics EC>8-12	12.5	0.00E+00	1.25E+01	26.6%	2.86E-02	--	1	4.58E+01	--	4.58E+01	2.73E-01	--
Aliphatics EC>12-16	0	0.00E+00	0.00E+00	0.0%	2.86E-02	--	1	4.58E+01	--	4.58E+01	--	--
Aromatics EC>9-10 (note a)	12.5	0.00E+00	1.20E+01	25.4%	1.14E-01	--	1	1.82E+02	--	1.82E+02	6.55E-02	--
Aromatics EC>10-12	0	0.00E+00	0.00E+00	0.0%	8.57E-04	--	1	1.37E+00	--	1.37E+00	--	--
Aromatics EC>12-16	0	0.00E+00	0.00E+00	0.0%	1.14E-04	--	1	1.82E-01	--	1.82E-01	--	--
Benzene	***1.40***	7.80E-01	6.20E-01	1.3%	8.57E-03	2.73E-02	1	1.37E+01	3.21E-01	3.21E-01	4.52E-02	1.93E-06
Ethylbenzene	**0.74**	0.00E+00	7.40E-01	1.6%	2.86E-01	--	1	4.58E+02	--	4.58E+02	1.62E-03	--
Toluene	0	0.00E+00	0.00E+00	0.0%	1.43E+00	--	1	2.29E+03	--	2.29E+03	--	--
Total xylenes	**3.48**	2.54E+00	9.40E-01	2.0%	2.86E-02	--	1	4.58E+01	--	4.58E+01	2.05E-02	--
Naphthalene (note a)	***0.68***	5.50E-01	1.30E-01	0.3%	8.57E-04	1.19E-01	1	1.37E+00	7.35E-02	7.35E-02	9.48E-02	1.77E-06
1,2-Dichlorethane (EDC)	**0.44**	5.80E-02	3.82E-01	0.8%	2.00E-03	9.10E-02	1	3.20E+00	9.62E-02	9.62E-02	1.19E-01	3.97E-06
Ethylene dibromide (EDB)	0	0.00E+00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	4.11E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00E+00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.37E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	2.22E+02	9.19E+01	1.29E+02	274.6%	--	--	Total TPH:	1.97E+02	--	1.97E+02	7E-01	8E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA4-070423 5:03 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Site Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**210**	8.80E+01	1.22E+02	259.2%	1.71E+00	--	1	2.74E+03	--	2.74E+03	4.46E-02	--
Aliphatics EC>8-12	12.5	0.00E+00	1.25E+01	26.6%	2.86E-02	--	1	4.58E+01	--	4.58E+01	2.73E-01	--
Aliphatics EC>12-16	0	0.00E+00	0.00E+00	0.0%	2.86E-02	--	1	4.58E+01	--	4.58E+01	--	--
Aromatics EC>9-10 (note a)	12.5	0.00E+00	1.20E+01	25.4%	1.14E-01	--	1	1.82E+02	--	1.82E+02	6.55E-02	--
Aromatics EC>10-12	0	0.00E+00	0.00E+00	0.0%	8.57E-04	--	1	1.37E+00	--	1.37E+00	--	--
Aromatics EC>12-16	0	0.00E+00	0.00E+00	0.0%	1.14E-04	--	1	1.82E-01	--	1.82E-01	--	--
Benzene	**1.40**	7.80E-01	6.20E-01	1.3%	8.57E-03	2.73E-02	1	1.37E+01	3.21E-01	3.21E-01	4.52E-02	1.93E-06
Ethylbenzene	**0.74**	0.00E+00	7.40E-01	1.6%	2.86E-01	--	1	4.58E+02	--	4.58E+02	1.62E-03	--
Toluene	0	0.00E+00	0.00E+00	0.0%	1.43E+00	--	1	2.29E+03	--	2.29E+03	--	--
Total xylenes	**3.42**	2.54E+00	8.80E-01	1.9%	2.86E-02	--	1	4.58E+01	--	4.58E+01	1.92E-02	--
Naphthalene (note a)	***0.54***	5.50E-01	0.00E+00	0.0%	8.57E-04	1.19E-01	1	1.37E+00	7.35E-02	7.35E-02	0.00E+00	0.00E+00
1,2-Dichlorethane (EDC)	**0.41**	5.80E-02	3.52E-01	0.7%	2.00E-03	9.10E-02	1	3.20E+00	9.62E-02	9.62E-02	1.10E-01	3.66E-06
Ethylene dibromide (EDB)	0	0.00E+00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	4.11E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00E+00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.37E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	2.42E+02	9.19E+01	1.49E+02	316.6%	--	--	Total TPH:	2.66E+02	--	2.66E+02	6E-01	6E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA5-070423 5:03 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Site Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**230**	8.80E+01	1.42E+02	301.7%	1.71E+00	--	1	2.74E+03	--	2.74E+03	5.19E-02	--
Aliphatics EC>8-12	12.5	0.00E+00	1.25E+01	26.6%	2.86E-02	--	1	4.58E+01	--	4.58E+01	2.73E-01	--
Aliphatics EC>12-16	0	0.00E+00	0.00E+00	0.0%	2.86E-02	--	1	4.58E+01	--	4.58E+01	--	--
Aromatics EC>9-10 (note a)	12.5	0.00E+00	1.20E+01	25.4%	1.14E-01	--	1	1.82E+02	--	1.82E+02	6.55E-02	--
Aromatics EC>10-12	0	0.00E+00	0.00E+00	0.0%	8.57E-04	--	1	1.37E+00	--	1.37E+00	--	--
Aromatics EC>12-16	0	0.00E+00	0.00E+00	0.0%	1.14E-04	--	1	1.82E-01	--	1.82E-01	--	--
Benzene	**1.3**	7.80E-01	5.20E-01	1.1%	8.57E-03	2.73E-02	1	1.37E+01	3.21E-01	3.21E-01	3.79E-02	1.62E-06
Ethylbenzene	**0.76**	0.00E+00	7.60E-01	1.6%	2.86E-01	--	1	4.58E+02	--	4.58E+02	1.66E-03	--
Toluene	0	0.00E+00	0.00E+00	0.0%	1.43E+00	--	1	2.29E+03	--	2.29E+03	--	--
Total xylenes	**3.57**	2.54E+00	1.03E+00	2.2%	2.86E-02	--	1	4.58E+01	--	4.58E+01	2.25E-02	--
Naphthalene (note a)	***0.72***	5.50E-01	1.70E-01	0.4%	8.57E-04	1.19E-01	1	1.37E+00	7.35E-02	7.35E-02	1.24E-01	2.31E-06
1,2-Dichlorethane (EDC)	**0.33**	5.80E-02	2.72E-01	0.6%	2.00E-03	9.10E-02	1	3.20E+00	9.62E-02	9.62E-02	8.50E-02	2.83E-06
Ethylene dibromide (EDB)	0	0.00E+00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	4.11E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00E+00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.37E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	2.62E+02	9.19E+01	1.69E+02	359.5%	--	--	Total TPH:	2.56E+02	--	2.56E+02	7E-01	7E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA6-070423
5:03 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Site Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**170**	8.80E+01	8.20E+01	174.2%	1.71E+00	--	1	2.74E+03	--	2.74E+03	3.00E-02	--
Aliphatics EC>8-12	12.5	0.00E+00	1.25E+01	26.6%	2.86E-02	--	1	4.58E+01	--	4.58E+01	2.73E-01	--
Aliphatics EC>12-16	0	0.00E+00	0.00E+00	0.0%	2.86E-02	--	1	4.58E+01	--	4.58E+01	--	--
Aromatics EC>9-10 (note a)	12.5	0.00E+00	1.20E+01	25.4%	1.14E-01	--	1	1.82E+02	--	1.82E+02	6.55E-02	--
Aromatics EC>10-12	0	0.00E+00	0.00E+00	0.0%	8.57E-04	--	1	1.37E+00	--	1.37E+00	--	--
Aromatics EC>12-16	0	0.00E+00	0.00E+00	0.0%	1.14E-04	--	1	1.82E-01	--	1.82E-01	--	--
Benzene	**0.79**	7.80E-01	1.00E-02	0.0%	8.57E-03	2.73E-02	1	1.37E+01	3.21E-01	3.21E-01	7.29E-04	3.12E-08
Ethylbenzene	**0.75**	0.00E+00	7.50E-01	1.6%	2.86E-01	--	1	4.58E+02	--	4.58E+02	1.64E-03	--
Toluene	0	0.00E+00	0.00E+00	0.0%	1.43E+00	--	1	2.29E+03	--	2.29E+03	--	--
Total xylenes	**3.27**	2.54E+00	7.30E-01	1.6%	2.86E-02	--	1	4.58E+01	--	4.58E+01	1.60E-02	--
Naphthalene (note a)	***0.45***	5.50E-01	0.00E+00	0.0%	8.57E-04	1.19E-01	1	1.37E+00	7.35E-02	7.35E-02	0.00E+00	0.00E+00
1,2-Dichlorethane (EDC)	**0.13**	5.80E-02	7.20E-02	0.2%	2.00E-03	9.10E-02	1	3.20E+00	9.62E-02	9.62E-02	2.25E-02	7.49E-07
Ethylene dibromide (EDB)	0	0.00E+00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	4.11E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00E+00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.37E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	2.00E+02	9.19E+01	1.08E+02	229.5%	--	--	Total TPH:	2.64E+02	--	2.64E+02	4E-01	8E-07
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA7-070423
5:21 - 5:59

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Site Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**170**	8.80E+01	8.20E+01	174.2%	1.71E+00	--	1	2.74E+03	--	2.74E+03	3.00E-02	--
Aliphatics EC>8-12	**68**	0.00E+00	6.80E+01	144.5%	2.86E-02	--	1	4.58E+01	--	4.58E+01	1.49E+00	--
Aliphatics EC>12-16	0	0.00E+00	0.00E+00	0.0%	2.86E-02	--	1	4.58E+01	--	4.58E+01	--	--
Aromatics EC>9-10 (note a)	12.5	0.00E+00	1.20E+01	25.4%	1.14E-01	--	1	1.82E+02	--	1.82E+02	6.55E-02	--
Aromatics EC>10-12	0	0.00E+00	0.00E+00	0.0%	8.57E-04	--	1	1.37E+00	--	1.37E+00	--	--
Aromatics EC>12-16	0	0.00E+00	0.00E+00	0.0%	1.14E-04	--	1	1.82E-01	--	1.82E-01	--	--
Benzene	***0.8***	7.80E-01	2.00E-02	0.0%	8.57E-03	2.73E-02	1	1.37E+01	3.21E-01	3.21E-01	1.46E-03	6.24E-08
Ethylbenzene	**0.76**	0.00E+00	7.60E-01	1.6%	2.86E-01	--	1	4.58E+02	--	4.58E+02	1.66E-03	--
Toluene	0	0.00E+00	0.00E+00	0.0%	1.43E+00	--	1	2.29E+03	--	2.29E+03	--	--
Total xylenes	**3.41**	2.54E+00	8.70E-01	1.8%	2.86E-02	--	1	4.58E+01	--	4.58E+01	1.90E-02	--
Naphthalene (note a)	***0.75***	5.50E-01	2.00E-01	0.4%	8.57E-04	1.19E-01	1	1.37E+00	7.35E-02	7.35E-02	1.46E-01	2.72E-06
1,2-Dichlorethane (EDC)	**0.1**	5.80E-02	4.20E-02	0.1%	2.00E-03	9.10E-02	1	3.20E+00	9.62E-02	9.62E-02	1.31E-02	4.37E-07
Ethylene dibromide (EDB)	0	0.00E+00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	4.11E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00E+00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.37E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	2.56E+02	9.19E+01	1.64E+02	348.1%	--	--	Total TPH:	9.30E+01	--	9.30E+01	2E+00	3E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA8-070423
4:59 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Site Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**160**	8.80E+01	7.20E+01	153.0%	1.71E+00	--	1	2.74E+03	--	2.74E+03	2.63E-02	--
Aliphatics EC>8-12	**55**	0.00E+00	5.50E+01	116.8%	2.86E-02	--	1	4.58E+01	--	4.58E+01	1.20E+00	--
Aliphatics EC>12-16	0	0.00E+00	0.00E+00	0.0%	2.86E-02	--	1	4.58E+01	--	4.58E+01	--	--
Aromatics EC>9-10 (note a)	12.5	0.00E+00	1.20E+01	25.4%	1.14E-01	--	1	1.82E+02	--	1.82E+02	6.55E-02	--
Aromatics EC>10-12	0	0.00E+00	0.00E+00	0.0%	8.57E-04	--	1	1.37E+00	--	1.37E+00	--	--
Aromatics EC>12-16	0	0.00E+00	0.00E+00	0.0%	1.14E-04	--	1	1.82E-01	--	1.82E-01	--	--
Benzene	***0.79***	7.80E-01	1.00E-02	0.0%	8.57E-03	2.73E-02	1	1.37E+01	3.21E-01	3.21E-01	7.29E-04	3.12E-08
Ethylbenzene	**0.76**	0.00E+00	7.60E-01	1.6%	2.86E-01	--	1	4.58E+02	--	4.58E+02	1.66E-03	--
Toluene	0	0.00E+00	0.00E+00	0.0%	1.43E+00	--	1	2.29E+03	--	2.29E+03	--	--
Total xylenes	**3.44**	2.54E+00	9.00E-01	1.9%	2.86E-02	--	1	4.58E+01	--	4.58E+01	1.97E-02	--
Naphthalene (note a)	***0.72***	5.50E-01	1.70E-01	0.4%	8.57E-04	1.19E-01	1	1.37E+00	7.35E-02	7.35E-02	1.24E-01	2.31E-06
1,2-Dichlorethane (EDC)	**0.11**	5.80E-02	5.20E-02	0.1%	2.00E-03	9.10E-02	1	3.20E+00	9.62E-02	9.62E-02	1.63E-02	5.41E-07
Ethylene dibromide (EDB)	0	0.00E+00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	4.11E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00E+00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.37E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	2.33E+02	9.19E+01	1.41E+02	299.2%	--	--	Total TPH:	9.67E+01	--	9.67E+01	1.46	3E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Notes

a) The concentration of each fraction or component under Measured Ambient Conc. (column C) is subtracted from the corresponding concentration under Measured Site Concentration (column B) to correct for ambient background concentrations. In addition, the concentration of naphthalene is subtracted from the concentration of aromatics EC >9-10 to avoid double counting per Section E-6 of Ecology's (2022) vapor intrusion guidance. If the subtraction returns a negative result, it is adjusted up to zero. Ambient air samples must be collected consistent with Section 4.7 of Ecology's (2022) VI guidance and the ambient air adjustment must be approved by the Ecology site manager.

b) Total CUL (cells I42 and K42) is calculated for informational purposes but should not be used to evaluate other air samples because the compositions of other samples could be different. Total hazard index (purple cell K42) includes all fractions and components, assuming all have common target organs per WAC 173-340-750(3)(b)(ii)(C).

c) If the fraction or component was not analyzed or not detected on site, no hazard quotient or cancer risk appears in this column. If the fraction/component was detected on site but the ambient concentration was higher, a value of zero appears in this column.

Reference

Ecology. 2022. Guidance for Evaluating Vapor Intrusion in Washington State. Publ. no. 09-09-047.

Additional Abbreviations

-- - no value because parameter isn't relevant in this case
ABS - inhalation absorption fraction
CLARC - Cleanup Levels and Risk Calculation database
CPFi - inhalation carcinogenic potency factor
CUL - cleanup level
EC - effective carbon chain length
na - not analyzed
RfDi - inhalation reference dose
TPH - total petroleum hydrocarbons

Evaluating Compliance with Commercial Air Remediation Levels for Petroleum

Equations

1) Noncancer inhalation intake factor: IIF = ABW x UCF x HQ x AT / (BR x ED x EF)
2) Cancer inhalation intake factor: IIF = Risk x ABW x AT x UCF / (BR x ED x EF)
3) Noncancer cleanup level: CUL = IIF x RfDi / ABS
4) TPH CUL = Total Adjusted Concentration (D43) / Total Noncancer Hazard (L43)
5) Cancer cleanup level: CUL = IIF / (CPFi x ABS)
6) Hazard Quotient = Adjusted Concentration / Noncancer CUL
7) Cancer Risk = Adjusted Concentration x 1E-6 / Cancer CUL
8) Exposure Frequency = ET x WD / (24 x 365)

Exposure Parameters

Parameter	Abbrev.	Noncancer	Cancer	Units
Average body weight	ABW	70	70	kg
Target risk	Risk	--	1E-06	unitless
Unit conversion factor	UCF	1,000	1,000	ug/mg
Hazard quotient	HQ	1	--	unitless
Averaging time	AT	25	75	yr
Breathing rate	BR	20	20	m3/day
Exposure duration	ED	25	25	yr
Exposure frequency	EF	0.26	0.26	unitless
Inhalation intake factor (Equations 1 and 2 above)	IIF	1.36E+04	4.09E-02	kg-ug-day/ mg-m3
Sources: MTCA Equations 750-1 and 750-2, Ecology's (2022) VI guidance				

Instructions

Input measured concentrations in green cells B28-B41. If the fraction/component was not detected in the sample but was detected elsewhere on site, enter half the detection limit. If the fraction/component wasn't analyzed or was never detected anywhere on site, enter 0 mg/kg.

Results

Sample is in compliance if all of the following are true:
1) Hazard index in purple cell L42 doesn't exceed 1
2) Total cancer risk in purple cell M42 doesn't exceed 1E-05
3) Individual cancer risks in column M don't exceed 1E-06.

Calculating Exposure Frequency

Parameter	Abbrev.	Value	Units
Exposure time	ET	9	hr/day
Work days	WD	250	day/yr
Exposure freq. (Equation 8)	EF	2.57E-01	unitless

Results from each sample location from the July 2023 sampling event were evaluated, see separate tables below. See Table E-2 for sample results.

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA1-070423 5:03 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	Measured Concentration (ug/m3)	Measured Ambient Conc. (ug/m3)	Adjusted Concentration (ug/m3)	Proportion of TPH (percent)	RfDi (mg/kg-day)	CPFi (risk per mg/kg-day)	ABS (unitless)	Noncancer CUL (ug/m3)	Cancer CUL (ug/m3)	Minimum CUL (ug/m3)	Noncancer Hazard (unitless)	Cancer Risk (unitless)
Aliphatics EC>5-8	**110**	88.00	2.20E+01	46.7%	1.71E+00	--	1	2.33E+04	--	2.33E+04	9.44E-04	--
Aliphatics EC>8-12	12.5	0.00	1.25E+01	26.6%	2.86E-02	--	1	3.90E+02	--	3.90E+02	3.21E-02	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	3.90E+02	--	3.90E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	1.55E+03	--	1.55E+03	7.69E-03	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	1.17E+01	--	1.17E+01	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	1.55E+00	--	1.55E+00	--	--
Benzene	***0.71***	0.78	0.00E+00	0.0%	8.57E-03	2.73E-02	1	1.17E+02	1.50E+00	1.50E+00	0.00E+00	0.00E+00
Ethylbenzene	**0.5**	0.00	5.00E-01	1.1%	2.86E-01	--	1	3.90E+03	--	3.90E+03	1.28E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	1.95E+04	--	1.95E+04	--	--
Total xylenes	**2.06**	2.54	0.00E+00	0.0%	2.86E-02	--	1	3.90E+02	--	3.90E+02	0.00E+00	--
Naphthalene (note a)	***0.47***	0.55	0.00E+00	0.0%	8.57E-04	1.19E-01	1	1.17E+01	3.44E-01	3.44E-01	0.00E+00	0.00E+00
1,2-Dichlorethane (EDC)	**0.18**	0.058	1.22E-01	0.3%	2.00E-03	9.10E-02	1	2.73E+01	4.49E-01	4.49E-01	4.48E-03	2.72E-07
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	3.50E+01	1.95E-02	1.95E-02	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.17E+04	4.49E+01	4.49E+01	--	--
Total (sum of rows 28-41) (note b)	1.39E+02	9.19E+01	4.71E+01	100.0%	--	--	Total TPH:	1.04E+03	--	1.04E+03	5E-02	3E-07
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA2-070423 5:03 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**100**	88.00	1.20E+01	25.5%	1.71E+00	--	1	2.33E+04	--	2.33E+04	5.15E-04	--
Aliphatics EC>8-12	12.5	0.00	1.25E+01	26.6%	2.86E-02	--	1	3.90E+02	--	3.90E+02	3.21E-02	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	3.90E+02	--	3.90E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	1.55E+03	--	1.55E+03	7.69E-03	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	1.17E+01	--	1.17E+01	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	1.55E+00	--	1.55E+00	--	--
Benzene	**0.72**	0.78	0.00E+00	0.0%	8.57E-03	2.73E-02	1	1.17E+02	1.50E+00	1.50E+00	0.00E+00	0.00E+00
Ethylbenzene	**0.51**	0.00	5.10E-01	1.1%	2.86E-01	--	1	3.90E+03	--	3.90E+03	1.31E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	1.95E+04	--	1.95E+04	--	--
Total xylenes	**2.07**	2.54	0.00E+00	0.0%	2.86E-02	--	1	3.90E+02	--	3.90E+02	0.00E+00	--
Naphthalene (note a)	***0.49***	0.55	0.00E+00	0.0%	8.57E-04	1.19E-01	1	1.17E+01	3.44E-01	3.44E-01	0.00E+00	0.00E+00
1,2-Dichlorethane (EDC)	**0.18**	0.058	1.22E-01	0.3%	2.00E-03	9.10E-02	1	2.73E+01	4.49E-01	4.49E-01	4.48E-03	2.72E-07
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	3.50E+01	1.95E-02	1.95E-02	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.17E+04	4.49E+01	4.49E+01	--	--
Total (sum of rows 28-41) (note b)	1.29E+02	9.19E+01	3.71E+01	78.8%	--	--	Total TPH:	8.26E+02	--	8.26E+02	4E-02	3E-07
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA3-070423 5:03 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**190**	88.00	1.02E+02	216.7%	1.71E+00	--	1	2.33E+04	--	2.33E+04	4.38E-03	--
Aliphatics EC>8-12	12.5	0.00	1.25E+01	26.6%	2.86E-02	--	1	3.90E+02	--	3.90E+02	3.21E-02	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	3.90E+02	--	3.90E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	1.55E+03	--	1.55E+03	7.69E-03	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	1.17E+01	--	1.17E+01	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	1.55E+00	--	1.55E+00	--	--
Benzene	***1.40***	0.78	6.20E-01	1.3%	8.57E-03	2.73E-02	1	1.17E+02	1.50E+00	1.50E+00	5.31E-03	4.14E-07
Ethylbenzene	**0.74**	0.00	7.40E-01	1.6%	2.86E-01	--	1	3.90E+03	--	3.90E+03	1.90E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	1.95E+04	--	1.95E+04	--	--
Total xylenes	**3.48**	2.54	9.40E-01	2.0%	2.86E-02	--	1	3.90E+02	--	3.90E+02	2.41E-03	--
Naphthalene (note a)	***0.68***	0.55	1.30E-01	0.3%	8.57E-04	1.19E-01	1	1.17E+01	3.44E-01	3.44E-01	1.11E-02	3.78E-07
1,2-Dichlorethane (EDC)	**0.44**	0.058	3.82E-01	0.8%	2.00E-03	9.10E-02	1	2.73E+01	4.49E-01	4.49E-01	1.40E-02	8.50E-07
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	3.50E+01	1.95E-02	1.95E-02	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.17E+04	4.49E+01	4.49E+01	--	--
Total (sum of rows 28-41) (note b)	2.22E+02	9.19E+01	1.29E+02	274.6%	--	--	Total TPH:	1.67E+03	--	1.67E+03	8E-02	2E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA4-070423 5:03 - 5:57

Fraction or Component	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
	Measured Concentration (ug/m3)	Measured Ambient Conc. (ug/m3)	Adjusted Concentration (ug/m3)	Proportion of TPH (percent)	RfDi (mg/kg-day)	CPFi (risk per mg/kg-day)	ABS (unitless)	Noncancer CUL (ug/m3)	Cancer CUL (ug/m3)	Minimum CUL (ug/m3)	Noncancer Hazard (unitless)	Cancer Risk (unitless)
Aliphatics EC>5-8	**210**	88.00	1.22E+02	259.2%	1.71E+00	--	1	2.33E+04	--	2.33E+04	5.24E-03	--
Aliphatics EC>8-12	12.5	0.00	1.25E+01	26.6%	2.86E-02	--	1	3.90E+02	--	3.90E+02	3.21E-02	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	3.90E+02	--	3.90E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	1.55E+03	--	1.55E+03	7.69E-03	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	1.17E+01	--	1.17E+01	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	1.55E+00	--	1.55E+00	--	--
Benzene	**1.40**	0.78	6.20E-01	1.3%	8.57E-03	2.73E-02	1	1.17E+02	1.50E+00	1.50E+00	5.31E-03	4.14E-07
Ethylbenzene	**0.74**	0.00	7.40E-01	1.6%	2.86E-01	--	1	3.90E+03	--	3.90E+03	1.90E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	1.95E+04	--	1.95E+04	--	--
Total xylenes	**3.42**	2.54	8.80E-01	1.9%	2.86E-02	--	1	3.90E+02	--	3.90E+02	2.26E-03	--
Naphthalene (note a)	***0.54***	0.55	0.00E+00	0.0%	8.57E-04	1.19E-01	1	1.17E+01	3.44E-01	3.44E-01	0.00E+00	0.00E+00
1,2-Dichlorethane (EDC)	**0.41**	0.058	3.52E-01	0.7%	2.00E-03	9.10E-02	1	2.73E+01	4.49E-01	4.49E-01	1.29E-02	7.84E-07
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	3.50E+01	1.95E-02	1.95E-02	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.17E+04	4.49E+01	4.49E+01	--	--
Total (sum of rows 28-41) (note b)	2.42E+02	9.19E+01	1.49E+02	316.6%	--	--	Total TPH:	2.27E+03	--	2.27E+03	7E-02	1E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA5-070423 5:03 - 5:57

Fraction or Component	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
	Measured Concentration (ug/m3)	Measured Ambient Conc. (ug/m3)	Adjusted Concentration (ug/m3)	Proportion of TPH (percent)	RfDi (mg/kg-day)	CPFi (risk per mg/kg-day)	ABS (unitless)	Noncancer CUL (ug/m3)	Cancer CUL (ug/m3)	Minimum CUL (ug/m3)	Noncancer Hazard (unitless)	Cancer Risk (unitless)
Aliphatics EC>5-8	**230**	88.00	1.42E+02	301.7%	1.71E+00	--	1	2.33E+04	--	2.33E+04	6.09E-03	--
Aliphatics EC>8-12	12.5	0.00	1.25E+01	26.6%	2.86E-02	--	1	3.90E+02	--	3.90E+02	3.21E-02	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	3.90E+02	--	3.90E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	1.55E+03	--	1.55E+03	7.69E-03	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	1.17E+01	--	1.17E+01	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	1.55E+00	--	1.55E+00	--	--
Benzene	**1.3**	0.78	5.20E-01	1.1%	8.57E-03	2.73E-02	1	1.17E+02	1.50E+00	1.50E+00	4.45E-03	3.47E-07
Ethylbenzene	**0.76**	0.00	7.60E-01	1.6%	2.86E-01	--	1	3.90E+03	--	3.90E+03	1.95E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	1.95E+04	--	1.95E+04	--	--
Total xylenes	**3.57**	2.54	1.03E+00	2.2%	2.86E-02	--	1	3.90E+02	--	3.90E+02	2.64E-03	--
Naphthalene (note a)	***0.72***	0.55	1.70E-01	0.4%	8.57E-04	1.19E-01	1	1.17E+01	3.44E-01	3.44E-01	1.46E-02	4.95E-07
1,2-Dichlorethane (EDC)	**0.33**	0.058	2.72E-01	0.6%	2.00E-03	9.10E-02	1	2.73E+01	4.49E-01	4.49E-01	9.98E-03	6.05E-07
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	3.50E+01	1.95E-02	1.95E-02	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.17E+04	4.49E+01	4.49E+01	--	--
Total (sum of rows 28-41) (note b)	2.62E+02	9.19E+01	1.69E+02	359.5%	--	--	Total TPH:	2.18E+03	--	2.18E+03	8E-02	1E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA6-070423
5:03 - 5:57

Fraction or Component	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
	Measured Concentration (ug/m3)	Measured Ambient Conc. (ug/m3)	Adjusted Concentration (ug/m3)	Proportion of TPH (percent)	RfDi (mg/kg-day)	CPFi (risk per mg/kg-day)	ABS (unitless)	Noncancer CUL (ug/m3)	Cancer CUL (ug/m3)	Minimum CUL (ug/m3)	Noncancer Hazard (unitless)	Cancer Risk (unitless)
Aliphatics EC>5-8	**170**	88.00	8.20E+01	174.2%	1.71E+00	--	1	2.33E+04	--	2.33E+04	3.52E-03	--
Aliphatics EC>8-12	12.5	0.00	1.25E+01	26.6%	2.86E-02	--	1	3.90E+02	--	3.90E+02	3.21E-02	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	3.90E+02	--	3.90E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	1.55E+03	--	1.55E+03	7.69E-03	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	1.17E+01	--	1.17E+01	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	1.55E+00	--	1.55E+00	--	--
Benzene	**0.79**	0.78	1.00E-02	0.0%	8.57E-03	2.73E-02	1	1.17E+02	1.50E+00	1.50E+00	8.56E-05	6.68E-09
Ethylbenzene	**0.75**	0.00	7.50E-01	1.6%	2.86E-01	--	1	3.90E+03	--	3.90E+03	1.92E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	1.95E+04	--	1.95E+04	--	--
Total xylenes	**3.27**	2.54	7.30E-01	1.6%	2.86E-02	--	1	3.90E+02	--	3.90E+02	1.87E-03	--
Naphthalene (note a)	***0.45***	0.55	0.00E+00	0.0%	8.57E-04	1.19E-01	1	1.17E+01	3.44E-01	3.44E-01	0.00E+00	0.00E+00
1,2-Dichlorethane (EDC)	**0.13**	0.058	7.20E-02	0.2%	2.00E-03	9.10E-02	1	2.73E+01	4.49E-01	4.49E-01	2.64E-03	1.60E-07
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	3.50E+01	1.95E-02	1.95E-02	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.17E+04	4.49E+01	4.49E+01	--	--
Total (sum of rows 28-41) (note b)	2.00E+02	9.19E+01	1.08E+02	229.5%	--	--	Total TPH:	2.25E+03	--	2.25E+03	5E-02	2E-07
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA7-070423
5:21 - 5:59

Fraction or Component	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
	Measured Concentration (ug/m3)	Measured Ambient Conc. (ug/m3)	Adjusted Concentration (ug/m3)	Proportion of TPH (percent)	RfDi (mg/kg-day)	CPFi (risk per mg/kg-day)	ABS (unitless)	Noncancer CUL (ug/m3)	Cancer CUL (ug/m3)	Minimum CUL (ug/m3)	Noncancer Hazard (unitless)	Cancer Risk (unitless)
Aliphatics EC>5-8	**170**	88.00	8.20E+01	174.2%	1.71E+00	--	1	2.33E+04	--	2.33E+04	3.52E-03	--
Aliphatics EC>8-12	**68**	0.00	6.80E+01	144.5%	2.86E-02	--	1	3.90E+02	--	3.90E+02	1.74E-01	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	3.90E+02	--	3.90E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	1.55E+03	--	1.55E+03	7.69E-03	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	1.17E+01	--	1.17E+01	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	1.55E+00	--	1.55E+00	--	--
Benzene	***0.8***	0.78	2.00E-02	0.0%	8.57E-03	2.73E-02	1	1.17E+02	1.50E+00	1.50E+00	1.71E-04	1.34E-08
Ethylbenzene	**0.76**	0.00	7.60E-01	1.6%	2.86E-01	--	1	3.90E+03	--	3.90E+03	1.95E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	1.95E+04	--	1.95E+04	--	--
Total xylenes	**3.41**	2.54	8.70E-01	1.8%	2.86E-02	--	1	3.90E+02	--	3.90E+02	2.23E-03	--
Naphthalene (note a)	***0.75***	0.55	2.00E-01	0.4%	8.57E-04	1.19E-01	1	1.17E+01	3.44E-01	3.44E-01	1.71E-02	5.82E-07
1,2-Dichlorethane (EDC)	**0.1**	0.058	4.20E-02	0.1%	2.00E-03	9.10E-02	1	2.73E+01	4.49E-01	4.49E-01	1.54E-03	9.35E-08
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	3.50E+01	1.95E-02	1.95E-02	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.17E+04	4.49E+01	4.49E+01	--	--
Total (sum of rows 28-41) (note b)	2.56E+02	9.19E+01	1.64E+02	348.1%	--	--	Total TPH:	7.92E+02	--	7.92E+02	2E-01	7E-07
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA8-070423 4:59 - 5:57

Fraction or Component	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
	Measured Concentration (ug/m3)	Measured Ambient Conc. (ug/m3)	Adjusted Concentration (ug/m3)	Proportion of TPH (percent)	RfDi (mg/kg-day)	CPFi (risk per mg/kg-day)	ABS (unitless)	Noncancer CUL (ug/m3)	Cancer CUL (ug/m3)	Minimum CUL (ug/m3)	Noncancer Hazard (unitless)	Cancer Risk (unitless)
Aliphatics EC>5-8	**160**	88.00	7.20E+01	153.0%	1.71E+00	--	1	2.33E+04	--	2.33E+04	3.09E-03	--
Aliphatics EC>8-12	**55**	0.00	5.50E+01	116.8%	2.86E-02	--	1	3.90E+02	--	3.90E+02	1.41E-01	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	3.90E+02	--	3.90E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	1.55E+03	--	1.55E+03	7.69E-03	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	1.17E+01	--	1.17E+01	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	1.55E+00	--	1.55E+00	--	--
Benzene	***0.79***	0.78	1.00E-02	0.0%	8.57E-03	2.73E-02	1	1.17E+02	1.50E+00	1.50E+00	8.56E-05	6.68E-09
Ethylbenzene	**0.76**	0.00	7.60E-01	1.6%	2.86E-01	--	1	3.90E+03	--	3.90E+03	1.95E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	1.95E+04	--	1.95E+04	--	--
Total xylenes	**3.44**	2.54	9.00E-01	1.9%	2.86E-02	--	1	3.90E+02	--	3.90E+02	2.31E-03	--
Naphthalene (note a)	***0.72***	0.55	1.70E-01	0.4%	8.57E-04	1.19E-01	1	1.17E+01	3.44E-01	3.44E-01	1.46E-02	4.95E-07
1,2-Dichlorethane (EDC)	**0.11**	0.058	5.20E-02	0.1%	2.00E-03	9.10E-02	1	2.73E+01	4.49E-01	4.49E-01	1.91E-03	1.16E-07
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	3.50E+01	1.95E-02	1.95E-02	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	1.17E+04	4.49E+01	4.49E+01	--	--
Total (sum of rows 28-41) (note b)	2.33E+02	9.19E+01	1.41E+02	299.2%	--	--	Total TPH:	8.24E+02	--	8.24E+02	2E-01	6E-07
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Notes

a) The concentration of each fraction or component under Measured Ambient Conc. (column C) is subtracted from the corresponding concentration under Measured Site Concentration (column B) to correct for ambient background concentrations. In addition, the concentration of naphthalene is subtracted from the concentration of aromatics EC >9-10 to avoid double counting per Section E-6 of Ecology's (2022) vapor intrusion guidance. If the subtraction returns a negative result, it is adjusted up to zero. Ambient air samples must be collected consistent with Section 4.7 of Ecology's (2022) VI guidance and the ambient air adjustment must be approved by the Ecology site manager.

b) Total CUL (cells I42 and K42) is calculated for informational purposes but should not be used to evaluate other air samples because the compositions of other samples could be different. Total hazard index (purple cell K42) includes all fractions and components, assuming all have common target organs per WAC 173-340-750(3)(b)(ii)(C).

c) If the fraction or component was not analyzed or not detected on site, no hazard quotient or cancer risk appears in this column. If the fraction/component was detected on site but the ambient concentration was higher, a value of zero appears in this column.

Reference

Ecology. 2022. Guidance for Evaluating Vapor Intrusion in Washington State. Publ. no. 09-09-047.

Additional Abbreviations

--	no value because parameter isn't relevant in this case
ABS	inhalation absorption fraction
CLARC	Cleanup Levels and Risk Calculation database
CPFi	inhalation carcinogenic potency factor
CUL	cleanup level
EC	effective carbon chain length
na	not analyzed
RfDi	inhalation reference dose
TPH	total petroleum hydrocarbons

Evaluating Compliance with Method C Air Cleanup Levels for Petroleum

Equations

1) Noncancer inhalation intake factor: IIF = ABW x UCF x HQ x AT / (BR x ED x EF)
2) Cancer inhalation intake factor: IIF = Risk x ABW x AT x UCF / (BR x ED x EF)
3) Noncancer cleanup level: CUL = IIF x RfDi / ABS
4) TPH CUL = Total Adjusted Concentration (D43) / Total Noncancer Hazard (L43)
5) Cancer cleanup level: CUL = IIF / (CPFi x ABS)
6) Hazard Quotient = Adjusted Concentration / Noncancer CUL
7) Cancer Risk = Adjusted Concentration x 1E-6 / Cancer CUL

Exposure Parameters

Parameter	Abbrev.	Noncancer	Cancer	Units
Average body weight	ABW	70	70	kg
Target risk	Risk	--	1E-06	unitless
Unit conversion factor	UCF	1,000	1,000	ug/mg
Hazard quotient	HQ	1	--	unitless
Averaging time	AT	6	75	yr
Breathing rate	BR	20	20	m3/day
Exposure duration	ED	6	30	yr
Exposure frequency	EF	1	1	unitless
Inhalation intake factor (Equations 1 and 2 above)	IIF	3.50E+03	8.75E-03	kg-ug-day/ mg-m3
Sources: MTCA Equations 750-1 and 750-2, WAC 173-340-750(4)				

Instructions

Input measured concentrations in green cells B28-B41 and C28-C41. If the fraction/component was not detected in the sample but was detected elsewhere on site, enter half the detection limit. If the fraction/component wasn't analyzed or was never detected anywhere on site, enter 0 mg/kg.

Results

Sample is in compliance if all of the following are true:

1) Hazard index in purple cell L42 doesn't exceed 1
2) Total cancer risk in purple cell M42 doesn't exceed 1E-05
3) Individual cancer risks in column M don't exceed 1E-05.

Results from each sample location from the July 2023 sampling event were evaluated, see separate tables below. See Table E-2 for sample results.

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA1-0704235:03 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**110**	88.00	2.20E+01	46.7%	1.71E+00	--	1	5.99E+03	--	5.99E+03	3.68E-03	--
Aliphatics EC>8-12	12.5	0.00	1.25E+01	26.6%	2.86E-02	--	1	1.00E+02	--	1.00E+02	1.25E-01	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	1.00E+02	--	1.00E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	3.99E+02	--	3.99E+02	2.99E-02	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	3.00E+00	--	3.00E+00	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	3.99E-01	--	3.99E-01	--	--
Benzene	***0.71***	0.78	0.00E+00	0.0%	8.57E-03	2.73E-02	1	3.00E+01	3.21E-01	3.21E-01	0.00E+00	0.00E+00
Ethylbenzene	**0.5**	0.00	5.00E-01	1.1%	2.86E-01	--	1	1.00E+03	--	1.00E+03	5.00E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	5.01E+03	--	5.01E+03	--	--
Total xylenes	**2.06**	2.54	0.00E+00	0.0%	2.86E-02	--	1	1.00E+02	--	1.00E+02	0.00E+00	--
Naphthalene (note a)	***0.47***	0.55	0.00E+00	0.0%	8.57E-04	1.19E-01	1	3.00E+00	7.35E-02	7.35E-02	0.00E+00	0.00E+00
1,2-Dichlorethane (EDC)	**0.18**	0.058	1.22E-01	0.3%	2.00E-03	9.10E-02	1	7.00E+00	9.62E-02	9.62E-02	1.74E-02	1.27E-06
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	9.00E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	3.00E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	1.39E+02	9.19E+01	4.71E+01	100.0%	--	--	Total TPH:	2.67E+02	--	2.67E+02	2E-01	1E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA2-0704235:03 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**100**	88.00	1.20E+01	25.5%	1.71E+00	--	1	5.99E+03	--	5.99E+03	2.01E-03	--
Aliphatics EC>8-12	12.5	0.00	1.25E+01	26.6%	2.86E-02	--	1	1.00E+02	--	1.00E+02	1.25E-01	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	1.00E+02	--	1.00E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	3.99E+02	--	3.99E+02	2.99E-02	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	3.00E+00	--	3.00E+00	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	3.99E-01	--	3.99E-01	--	--
Benzene	**0.72**	0.78	0.00E+00	0.0%	8.57E-03	2.73E-02	1	3.00E+01	3.21E-01	3.21E-01	0.00E+00	0.00E+00
Ethylbenzene	**0.51**	0.00	5.10E-01	1.1%	2.86E-01	--	1	1.00E+03	--	1.00E+03	5.09E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	5.01E+03	--	5.01E+03	--	--
Total xylenes	**2.07**	2.54	0.00E+00	0.0%	2.86E-02	--	1	1.00E+02	--	1.00E+02	0.00E+00	--
Naphthalene (note a)	***0.49***	0.55	0.00E+00	0.0%	8.57E-04	1.19E-01	1	3.00E+00	7.35E-02	7.35E-02	0.00E+00	0.00E+00
1,2-Dichlorethane (EDC)	**0.18**	0.058	1.22E-01	0.3%	2.00E-03	9.10E-02	1	7.00E+00	9.62E-02	9.62E-02	1.74E-02	1.27E-06
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	9.00E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	3.00E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	1.29E+02	9.19E+01	3.71E+01	78.8%	--	--	Total TPH:	2.12E+02	--	2.12E+02	2E-01	1E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA3-0704235:03 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**190**	88.00	1.02E+02	216.7%	1.71E+00	--	1	5.99E+03	--	5.99E+03	1.70E-02	--
Aliphatics EC>8-12	12.5	0.00	1.25E+01	26.6%	2.86E-02	--	1	1.00E+02	--	1.00E+02	1.25E-01	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	1.00E+02	--	1.00E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	3.99E+02	--	3.99E+02	2.99E-02	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	3.00E+00	--	3.00E+00	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	3.99E-01	--	3.99E-01	--	--
Benzene	***1.40***	0.78	6.20E-01	1.3%	8.57E-03	2.73E-02	1	3.00E+01	3.21E-01	3.21E-01	2.07E-02	1.93E-06
Ethylbenzene	**0.74**	0.00	7.40E-01	1.6%	2.86E-01	--	1	1.00E+03	--	1.00E+03	7.39E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	5.01E+03	--	5.01E+03	--	--
Total xylenes	**3.48**	2.54	9.40E-01	2.0%	2.86E-02	--	1	1.00E+02	--	1.00E+02	9.39E-03	--
Naphthalene (note a)	***0.68***	0.55	1.30E-01	0.3%	8.57E-04	1.19E-01	1	3.00E+00	7.35E-02	7.35E-02	4.33E-02	1.77E-06
1,2-Dichlorethane (EDC)	**0.44**	0.058	3.82E-01	0.8%	2.00E-03	9.10E-02	1	7.00E+00	9.62E-02	9.62E-02	5.46E-02	3.97E-06
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	9.00E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	3.00E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	2.22E+02	9.19E+01	1.29E+02	274.6%	--	--	Total TPH:	4.30E+02	--	4.30E+02	3E-01	8E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA4-0704235:03 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**210**	88.00	1.22E+02	259.2%	1.71E+00	--	1	5.99E+03	--	5.99E+03	2.04E-02	--
Aliphatics EC>8-12	12.5	0.00	1.25E+01	26.6%	2.86E-02	--	1	1.00E+02	--	1.00E+02	1.25E-01	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	1.00E+02	--	1.00E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	3.99E+02	--	3.99E+02	2.99E-02	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	3.00E+00	--	3.00E+00	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	3.99E-01	--	3.99E-01	--	--
Benzene	**1.40**	0.78	6.20E-01	1.3%	8.57E-03	2.73E-02	1	3.00E+01	3.21E-01	3.21E-01	2.07E-02	1.93E-06
Ethylbenzene	**0.74**	0.00	7.40E-01	1.6%	2.86E-01	--	1	1.00E+03	--	1.00E+03	7.39E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	5.01E+03	--	5.01E+03	--	--
Total xylenes	**3.42**	2.54	8.80E-01	1.9%	2.86E-02	--	1	1.00E+02	--	1.00E+02	8.79E-03	--
Naphthalene (note a)	***0.54***	0.55	0.00E+00	0.0%	8.57E-04	1.19E-01	1	3.00E+00	7.35E-02	7.35E-02	0.00E+00	0.00E+00
1,2-Dichlorethane (EDC)	**0.41**	0.058	3.52E-01	0.7%	2.00E-03	9.10E-02	1	7.00E+00	9.62E-02	9.62E-02	5.03E-02	3.66E-06
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	9.00E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	3.00E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	2.42E+02	9.19E+01	1.49E+02	316.6%	--	--	Total TPH:	5.83E+02	--	5.83E+02	3E-01	6E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA5-0704235:03 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**230**	88.00	1.42E+02	301.7%	1.71E+00	--	1	5.99E+03	--	5.99E+03	2.37E-02	--
Aliphatics EC>8-12	12.5	0.00	1.25E+01	26.6%	2.86E-02	--	1	1.00E+02	--	1.00E+02	1.25E-01	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	1.00E+02	--	1.00E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	3.99E+02	--	3.99E+02	2.99E-02	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	3.00E+00	--	3.00E+00	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	3.99E-01	--	3.99E-01	--	--
Benzene	**1.3**	0.78	5.20E-01	1.1%	8.57E-03	2.73E-02	1	3.00E+01	3.21E-01	3.21E-01	1.73E-02	1.62E-06
Ethylbenzene	**0.76**	0.00	7.60E-01	1.6%	2.86E-01	--	1	1.00E+03	--	1.00E+03	7.59E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	5.01E+03	--	5.01E+03	--	--
Total xylenes	**3.57**	2.54	1.03E+00	2.2%	2.86E-02	--	1	1.00E+02	--	1.00E+02	1.03E-02	--
Naphthalene (note a)	***0.72***	0.55	1.70E-01	0.4%	8.57E-04	1.19E-01	1	3.00E+00	7.35E-02	7.35E-02	5.67E-02	2.31E-06
1,2-Dichlorethane (EDC)	**0.33**	0.058	2.72E-01	0.6%	2.00E-03	9.10E-02	1	7.00E+00	9.62E-02	9.62E-02	3.89E-02	2.83E-06
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	9.00E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	3.00E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	2.62E+02	9.19E+01	1.69E+02	359.5%	--	--	Total TPH:	5.59E+02	--	5.59E+02	3E-01	7E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA6-0704235:03 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**170**	88.00	8.20E+01	174.2%	1.71E+00	--	1	5.99E+03	--	5.99E+03	1.37E-02	--
Aliphatics EC>8-12	12.5	0.00	1.25E+01	26.6%	2.86E-02	--	1	1.00E+02	--	1.00E+02	1.25E-01	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	1.00E+02	--	1.00E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	3.99E+02	--	3.99E+02	2.99E-02	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	3.00E+00	--	3.00E+00	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	3.99E-01	--	3.99E-01	--	--
Benzene	**0.79**	0.78	1.00E-02	0.0%	8.57E-03	2.73E-02	1	3.00E+01	3.21E-01	3.21E-01	3.33E-04	3.12E-08
Ethylbenzene	**0.75**	0.00	7.50E-01	1.6%	2.86E-01	--	1	1.00E+03	--	1.00E+03	7.49E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	5.01E+03	--	5.01E+03	--	--
Total xylenes	**3.27**	2.54	7.30E-01	1.6%	2.86E-02	--	1	1.00E+02	--	1.00E+02	7.29E-03	--
Naphthalene (note a)	***0.45***	0.55	0.00E+00	0.0%	8.57E-04	1.19E-01	1	3.00E+00	7.35E-02	7.35E-02	0.00E+00	0.00E+00
1,2-Dichlorethane (EDC)	**0.13**	0.058	7.20E-02	0.2%	2.00E-03	9.10E-02	1	7.00E+00	9.62E-02	9.62E-02	1.03E-02	7.49E-07
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	9.00E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	3.00E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	2.00E+02	9.19E+01	1.08E+02	229.5%	--	--	Total TPH:	5.77E+02	--	5.77E+02	2E-01	8E-07
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA7-0704235:21 - 5:59

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**170**	88.00	8.20E+01	174.2%	1.71E+00	--	1	5.99E+03	--	5.99E+03	1.37E-02	--
Aliphatics EC>8-12	**68**	0.00	6.80E+01	144.5%	2.86E-02	--	1	1.00E+02	--	1.00E+02	6.79E-01	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	1.00E+02	--	1.00E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	3.99E+02	--	3.99E+02	2.99E-02	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	3.00E+00	--	3.00E+00	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	3.99E-01	--	3.99E-01	--	--
Benzene	***0.8***	0.78	2.00E-02	0.0%	8.57E-03	2.73E-02	1	3.00E+01	3.21E-01	3.21E-01	6.67E-04	6.24E-08
Ethylbenzene	**0.76**	0.00	7.60E-01	1.6%	2.86E-01	--	1	1.00E+03	--	1.00E+03	7.59E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	5.01E+03	--	5.01E+03	--	--
Total xylenes	**3.41**	2.54	8.70E-01	1.8%	2.86E-02	--	1	1.00E+02	--	1.00E+02	8.69E-03	--
Naphthalene (note a)	***0.75***	0.55	2.00E-01	0.4%	8.57E-04	1.19E-01	1	3.00E+00	7.35E-02	7.35E-02	6.67E-02	2.72E-06
1,2-Dichlorethane (EDC)	**0.1**	0.058	4.20E-02	0.1%	2.00E-03	9.10E-02	1	7.00E+00	9.62E-02	9.62E-02	6.00E-03	4.37E-07
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	9.00E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	3.00E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	2.56E+02	9.19E+01	1.64E+02	348.1%	--	--	Total TPH:	2.03E+02	--	2.03E+02	8E-01	3E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Noncancer Hazards and Cancer Risks for Air Sample

Sample ID: IA8-0704234:59 - 5:57

	Concentration Data				Toxicity Data			Cleanup Levels			Evaluating Compliance	
Fraction or Component	**Measured Concentration (ug/m3)**	**Measured Ambient Conc. (ug/m3)**	**Adjusted Concentration (ug/m3)**	**Proportion of TPH (percent)**	**RfDi (mg/kg-day)**	**CPFi (risk per mg/kg-day)**	**ABS (unitless)**	**Noncancer CUL (ug/m3)**	**Cancer CUL (ug/m3)**	**Minimum CUL (ug/m3)**	**Noncancer Hazard (unitless)**	**Cancer Risk (unitless)**
Aliphatics EC>5-8	**160**	88.00	7.20E+01	153.0%	1.71E+00	--	1	5.99E+03	--	5.99E+03	1.20E-02	--
Aliphatics EC>8-12	**55**	0.00	5.50E+01	116.8%	2.86E-02	--	1	1.00E+02	--	1.00E+02	5.49E-01	--
Aliphatics EC>12-16	0	0.00	0.00E+00	0.0%	2.86E-02	--	1	1.00E+02	--	1.00E+02	--	--
Aromatics EC>9-10 (note a)	12.5	0.00	1.20E+01	25.4%	1.14E-01	--	1	3.99E+02	--	3.99E+02	2.99E-02	--
Aromatics EC>10-12	0	0.00	0.00E+00	0.0%	8.57E-04	--	1	3.00E+00	--	3.00E+00	--	--
Aromatics EC>12-16	0	0.00	0.00E+00	0.0%	1.14E-04	--	1	3.99E-01	--	3.99E-01	--	--
Benzene	***0.79***	0.78	1.00E-02	0.0%	8.57E-03	2.73E-02	1	3.00E+01	3.21E-01	3.21E-01	3.33E-04	3.12E-08
Ethylbenzene	**0.76**	0.00	7.60E-01	1.6%	2.86E-01	--	1	1.00E+03	--	1.00E+03	7.59E-04	--
Toluene	0	0.00	0.00E+00	0.0%	1.43E+00	--	1	5.01E+03	--	5.01E+03	--	--
Total xylenes	**3.44**	2.54	9.00E-01	1.9%	2.86E-02	--	1	1.00E+02	--	1.00E+02	8.99E-03	--
Naphthalene (note a)	***0.72***	0.55	1.70E-01	0.4%	8.57E-04	1.19E-01	1	3.00E+00	7.35E-02	7.35E-02	5.67E-02	2.31E-06
1,2-Dichlorethane (EDC)	**0.11**	0.058	5.20E-02	0.1%	2.00E-03	9.10E-02	1	7.00E+00	9.62E-02	9.62E-02	7.43E-03	5.41E-07
Ethylene dibromide (EDB)	0	0.00	0.00E+00	0.0%	2.57E-03	2.10E+00	1	9.00E+00	4.17E-03	4.17E-03	--	--
Methyl tert-butyl ether (MTBE)	0	0.00	0.00E+00	0.0%	8.57E-01	9.10E-04	1	3.00E+03	9.62E+00	9.62E+00	--	--
Total (sum of rows 28-41) (note b)	2.33E+02	9.19E+01	1.41E+02	299.2%	--	--	Total TPH:	2.12E+02	--	2.12E+02	7E-01	3E-06
Source	Site-specific	Site-specific	Note a	--	Ecology (2022) App. E, CLARC	CLARC	Default	Equation 3 TPH: Equation 4	Equation 5	--	Equation 6 Note c	Equation 7 Note c

Notes

a) The concentration of each fraction or component under Measured Ambient Conc. (column C) is subtracted from the corresponding concentration under Measured Site Concentration (column B) to correct for ambient background concentrations. In addition, the concentration of naphthalene is subtracted from the concentration of aromatics EC >9-10 to avoid double counting per Section E-6 of Ecology's (2022) vapor intrusion guidance. If the subtraction returns a negative result, it is adjusted up to zero. Ambient air samples must be collected consistent with Section 4.7 of Ecology's (2022) VI guidance and the ambient air adjustment must be approved by the Ecology site manager.

b) Total CUL (cells I42 and K42) is calculated for informational purposes but should not be used to evaluate other air samples because the compositions of other samples could be different. Total hazard index (purple cell K42) includes all fractions and components, assuming all have common target organs per WAC 173-340-750(3)(b)(ii)(C).

c) If the fraction or component was not analyzed or not detected on site, no hazard quotient or cancer risk appears in this column. If the fraction/component was detected on site but the ambient concentration was higher, a value of zero appears in this column.

Reference

Ecology. 2022. Guidance for Evaluating Vapor Intrusion in Washington State. Publ. no. 09-09-047.

Additional Abbreviations

-- - no value because parameter isn't relevant in this case
ABS - inhalation absorption fraction
CLARC - Cleanup Levels and Risk Calculation database
CPFi - inhalation carcinogenic potency factor
CUL - cleanup level
EC - effective carbon chain length
na - not analyzed
RfDi - inhalation reference dose
TPH - total petroleum hydrocarbons

Table E-2

Petroleum Air Compliance Spreadsheets - July 2023 Vapor Intrusion Assessment Results

Bridge - Former Dawn Foods

	Indoor Air Samples								Ambient		
	IA1-070423 5:03 - 5:57	IA2-070423 5:03 - 5:57	IA3-070423 5:03 - 5:57	IA4-070423 5:03 - 5:57	IA5-070423 5:03 - 5:57	IA6-070423 5:03 - 5:57	IA7-070423 5:21 - 5:59	IA8-070423 4:59 - 5:57	AE-070423 4:46 - 5:34	AW-070423 4:46 - 5:34	Average of Detected Ambient Values
	Indoor Office Women's Bath	Indoor Office	Indoor Warehouse SE Corner	Indoor Warehouse E Center	Indoor Warehouse Stairs to Office	Indoor Warehouse Center	Indoor Warehouse Fire Sprinkler Risers	Indoor Warehouse Outside Test Kitchen	Ambient East	Ambient West	
	7/4/2023	7/4/2023	7/4/2023	7/4/2023	7/4/2023	7/4/2023	7/4/2023	7/4/2023	7/4/2023	7/4/2023	
Compounds	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3
1,1-Dichloroethane	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.49	<0.4	---
1,1,1-Trichloroethane	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.65	<0.55	---
1,1,2-Trichloroethane	<0.055	<0.055	<0.055	<0.055	<0.055	<0.055	<0.055	<0.055	<0.065	<0.055	---
1,2-Dichloroethane (EDC)	**0.18**	**0.18**	**0.44**	**0.41**	**0.33**	**0.13**	**0.1**	**0.11**	**0.063**	**0.053**	**0.058**
cis-1,2-Dichloroethene	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	---
Tetrachloroethene	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<8.1	<6.8	---
Trichloroethene	**0.17**	**0.19**	**0.14**	**0.12**	**0.14**	<0.11	**0.13**	**0.11**	<0.13	<0.11	---
Vinyl chloride	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.16	<0.13	---
Benzene	***0.71***	**0.72**	***1.40***	**1.40**	**1.3**	**0.79**	***0.8***	***0.79***	***0.83***	***0.73***	**0.78**
Toluene	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5	<9	<7.5	---
Ethylbenzene	**0.5**	**0.51**	**0.74**	**0.74**	**0.76**	**0.75**	**0.76**	**0.76**	**0.75**	**0.57**	**0.66**
m,p-Xylene	**1.5**	**1.5**	**2.6**	**2.5**	**2.6**	**2.4**	**2.5**	**2.5**	**1.9**	**1.8**	**1.85**
o-Xylene	**0.56**	**0.57**	**0.88**	**0.92**	**0.97**	**0.87**	**0.91**	**0.94**	**0.72**	**0.66**	**0.69**
total xylenes	**2.06**	**2.07**	**3.48**	**3.42**	**3.57**	**3.27**	**3.41**	**3.44**	**2.62**	**2.46**	**2.54**
Naphthalene	***0.47***	***0.49***	***0.68***	***0.54***	***0.72***	***0.45***	***0.75***	***0.72***	***0.36***	***0.73***	**0.55**
Analysis For Volatile Compounds By Method MA-APH											
APH EC5-8 aliphatics/ACGIH C5-8 aliphatics	**110**	**100**	**190**	**210**	**230**	**170**	**170**	**160**	**88**	**88**	**88**
APH EC9-12 aliphatics/ACGIH C9-15 aliphatics	<25	<25	<25	<25	<25	<25	**68**	**55**	<25	<25	---
APH EC9-10 aromatics/ACGIH C9-15 aromatics	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	---
Data used for spreadsheets											
	IA1-070423 5:03 - 5:57	IA2-070423 5:03 - 5:57	IA3-070423 5:03 - 5:57	IA4-070423 5:03 - 5:57	IA5-070423 5:03 - 5:57	IA6-070423 5:03 - 5:57	IA7-070423 5:21 - 5:59	IA8-070423 4:59 - 5:57			Average of Detected Ambient Values
APH EC5-8 aliphatics/ACGIH C5-8 aliphatics	**110**	**100**	**190**	**210**	**230**	**170**	**170**	**160**			**88**
APH EC9-12 aliphatics/ACGIH C9-15 aliphatics	12.5	12.5	12.5	12.5	12.5	12.5	**68**	**55**			12.5
Aliphatics EC>12-16	0	0	0	0	0	0	0	0			0
APH EC9-10 aromatics/ACGIH C9-15 aromatics	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5			12.5
Aromatics EC>10-12	0	0	0	0	0	0	0	0			0
Aromatics EC>12-16	0	0	0	0	0	0	0	0			0
Benzene	***0.71***	**0.72**	***1.40***	**1.40**	**1.3**	**0.79**	***0.8***	***0.79***			**0.78**
Ethylbenzene	**0.5**	**0.51**	**0.74**	**0.74**	**0.76**	**0.75**	**0.76**	**0.76**			**0.66**
Toluene	0	0	0	0	0	0	0	0			0
total xylenes	**2.06**	**2.07**	**3.48**	**3.42**	**3.57**	**3.27**	**3.41**	**3.44**			**2.54**
Naphthalene	***0.47***	***0.49***	***0.68***	***0.54***	***0.72***	***0.45***	***0.75***	***0.72***			**0.55**
1,2-Dichloroethane (EDC)	**0.18**	**0.18**	**0.44**	**0.41**	**0.33**	**0.13**	**0.1**	**0.11**			**0.058**
Ethylene dibromide (EDB)	0	0	0	0	0	0	0	0			0
Methyl tert-butyl ether (MTBE)	0	0	0	0	0	0	0	0			0

Notes:
ug/m3 = micrograms per cubic meter
Bold = detected compound
TPH = Total Petroleum Hydrocarbons

Appendix F

COI Backup

Table F-1 Summary 2000-2023 Soil Data - Metals
Bridge - Former Dawn Foods

Sample ID	Date Sampled	Sample Depth (feet bgs)	Vadose or Saturated	Units	Aluminum	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
GP-SB-5-7	1/2/2020	7	Saturated	mg/kg	NA	**5.09**	1 U	NA	**213**	**222**	**2**	**6.84**	**180**
GP-SB-5-12	1/2/2020	12	Saturated	mg/kg	NA	**2.48**	1 U	NA	**19.1**	**3.09**	1 U	**9.08**	**24.9**
GP-SB-6-4	1/2/2020	4	Vadose	mg/kg	NA	**4.98**	1 U	NA	**26.9**	**25**	1 U	**10.6**	**78.7**
GP-SB-6-10	1/2/2020	10	Saturated	mg/kg	NA	**2.37**	1 U	NA	**12.7**	**2.17**	1 U	**5.32**	**26.7**
GP-SB-08	6/9/2020	9 to 10	Saturated	mg/kg	NA	**11.6**	**2.76**	NA	**78**	**227**	1 U	**62.1**	**7110**
GP-SB-09	6/9/2020	9 to 10	Saturated	mg/kg	NA	**5.32**	1 U	NA	25 U	**4.23**	1 U	**11.8**	**71.9**
GP-SB-10	6/9/2020	8 to 10	Saturated	mg/kg	NA	5 U	1 U	NA	**35**	**18.6**	1 U	**14.2**	**57.6**
GP-SB-11	6/9/2020	4 to 5	Vadose	mg/kg	NA	5 U	1 U	NA	**83.1**	**48.2**	1 U	**174**	**459**
GP-SB-12	6/9/2020	8.5 to 9.5	Saturated	mg/kg	NA	5 U	1 U	NA	25 U	**1.04**	1 U	**5.40**	**34.5**
GP-SB-18-03	12/1/2020	2 to 3	Vadose	mg/kg	NA	**4.81**	1 U	**15.9**	NA	**13.5**	1 U	**5.05**	**55.3**
GP-SB-18-09.5	12/1/2020	9 to 9.5	Saturated	mg/kg	NA	1 U	1 U	**7.66**	NA	**1 U**	1 U	**3.00**	**24.2**
GP-SB-19-03.5	12/1/2020	3 to 3.5	Vadose	mg/kg	**6790**	**3.56**	1 U	**9.41**	NA	**49.1**	1 U	**5.04**	**40.1**
GP-SB-19-08.5	12/1/2020	8 to 8.5	Saturated	mg/kg	**14500**	**3.48**	1 U	**9.91**	NA	**2.27**	1 U	**9.19**	**57.1**
GP-SB-20-04.5	12/1/2020	3.5 to 4.5	Vadose	mg/kg	NA	**3.41**	1 U	**8.53**	NA	**6.36**	1 U	**8.16**	**29.7**
GP-SB-20-09	12/1/2020	7 to 9	Saturated	mg/kg	NA	**2.49**	1 U	**8.34**	NA	**2.96**	1 U	**6.79**	**26.8**
GP-SB-21-05	12/1/2020	3 to 5	Vadose	mg/kg	NA	**1.75**	1 U	**9.89**	NA	**2.04**	1 U	**11.5**	**19.3**
GP-SB-21-10	12/1/2020	7.5 to 10	Saturated	mg/kg	NA	**6.11**	1 U	**7.63**	NA	**5.41**	1 U	**5.18**	**27.7**
GP-SB-22-07	12/1/2020	5 to 7	Saturated	mg/kg	NA	**4.87**	1 U	**98.4**	NA	**3.41**	1 U	**17.4**	**30.2**
GP-SB-22-09	12/1/2020	9 to 10	Saturated	mg/kg	NA	**2.09**	1 U	**9.35**	NA	**2.42**	1 U	**12.4**	**19.4**
GP-SB-23-05	12/1/2020	3 to 5	Saturated	mg/kg	NA	**13.6**	1 U	**12.8**	NA	**7.66**	1 U	**17.1**	**77.5**
GP-SB-23-11	12/1/2020	10 to 11	Saturated	mg/kg	NA	**8.31**	1 U	**12.2**	NA	**7.16**	1 U	**14.2**	**55.4**
GP-SB-24-10	12/1/2020	7.5 to 10	Saturated	mg/kg	NA	**10.4**	1 U	**11.2**	NA	**6.27**	1 U	**15.0**	**51.7**
GP-SB-24-12	12/1/2020	10 to 12	Saturated	mg/kg	NA	**8.53**	1 U	**11.7**	NA	**4.35**	1 U	**12.4**	**43.3**
GP-SB-25-08	12/5/2020	6 to 8	Vadose	mg/kg	NA	**5.44**	1 U	**9.67**	NA	**48.3**	1 U	**6.49**	**140**
GP-SB-25-13.5	12/5/2020	12 to 13.5	Saturated	mg/kg	NA	**5.07**	1 U	**9.10**	NA	**3.37**	1 U	**11.4**	**29.2**
GP-SB-26-06	12/5/2020	4 to 6	Vadose	mg/kg	NA	**4.13**	1 U	**20.3**	NA	**20.0**	1 U	**14.7**	**39.8**
GP-SB-26-12	12/5/2020	10 to 12	Saturated	mg/kg	NA	**2.48**	1 U	**8.91**	NA	**3.01**	1 U	**9.48**	**22.8**
GP-SB-27-08	12/5/2020	6 to 8	Vadose	mg/kg	NA	**2.03**	1 U	**6.61**	NA	**1.08**	1 U	**5.45**	**18.5**
GP-SB-27-12	12/5/2020	11 to 12	Saturated	mg/kg	NA	**3.05**	1 U	**9.13**	NA	**6.60**	1 U	**7.43**	**32.3**
GP-SB-27-14.5	12/5/2020	12 to 14.5	Saturated	mg/kg	NA	**4.79**	1 U	**11.3**	NA	**3.83**	1 U	**7.00**	**20.7**
GP-SB-28-04	12/5/2020	2 to 4	Vadose	mg/kg	NA	**2.31**	1 U	**18.4**	NA	**34.0**	1 U	**22.9**	**36.9**
GP-SB-28-08	12/5/2020	6 to 8	Vadose	mg/kg	NA	**1.81**	1 U	**6.53**	NA	**1.04**	1 U	**5.68**	**17.5**
GP-SB-28-12	12/5/2020	11.2 to 12	Saturated	mg/kg	NA	**6.91**	1 U	**11.6**	NA	**5.49**	1 U	**12.8**	**39.5**
GP-SB-28-13	12/5/2020	12 to 13	Saturated	mg/kg	NA	**3.26**	1 U	**11.3**	NA	**2.81**	1 U	**7.09**	**16.5**
GP-SB-29-06.5	12/5/2020	5.2 to 6.5	Vadose	mg/kg	NA	**3.87**	1 U	**9.71**	NA	**3.31**	1 U	**6.13**	**19.9**
GP-SB-29-10.5	12/5/2020	9.5 to 10.5	Saturated	mg/kg	NA	**1.85**	1 U	**10.6**	NA	**1.83**	1 U	**3.88**	**28.1**
GP-SB-29-12	12/5/2020	11 to 12	Saturated	mg/kg	NA	**1.33**	1 U	**8.60**	NA	**1.42**	1 U	**3.93**	**18.4**
GP-SB-30-05.5	12/12/2020	4 to 5.5	Vadose	mg/kg	NA	**6.06**	1 U	**9.67**	NA	**24.8**	1 U	**7.62**	**58.6**
GP-SB-30-08	12/12/2020	7 to 8	Vadose	mg/kg	NA	**1.40**	1 U	**5.74**	NA	1 U	1 U	**4.2**	**12.1**
GP-SB-30-13.3	12/12/2020	12.5 to 13.3	Saturated	mg/kg	NA	**3.56**	1 U	**17.5**	NA	**5.90**	1 U	**12.4**	**54.6**
GP-SB-31-06	12/12/2020	4.5 to 6	Vadose	mg/kg	NA	**4.50**	1 U	**9.68**	NA	**16.5**	1 U	**6.97**	**99.8**
GP-SB-31-08	12/12/2020	7 to 8	Vadose	mg/kg	NA	**3.85**	1 U	**12.9**	NA	**2.50**	1 U	**6.59**	**22.8**
GP-SB-31-14	12/12/2020	12.5 to 14	Saturated	mg/kg	NA	**1.08**	1 U	**9.36**	NA	**1.79**	1 U	**4.82**	**23.2**
MW-1 13-14'	12/16/2021	13 to 14	Saturated	mg/kg	NA	**3.86**	1 U	**9.48**	NA	**1.73**	1 U	**5.18**	**17.8**
MW-2 7.5-9'	12/15/2021	7.5 to 9	Saturated	mg/kg	NA	**2.51**	1 U	**9.4**	NA	**2.73**	1 U	**12.3**	25 U
MW-2 12.5-14'	12/15/2021	12.5 to 14	Saturated	mg/kg	NA	**8.55**	1 U	**12.0**	NA	**3.77**	1 U	**17.1**	41.7
MW-3 7.5-9'	12/16/2021	7.5 to 9	Saturated	mg/kg	NA	**1.36**	1 U	**8.96**	NA	**2.37**	1 U	**14.9**	25 U
MW-3 12.5-14'	12/16/2021	12.5 to 14	Saturated	mg/kg	NA	**4.21**	1 U	**10.1**	NA	**6.00**	1 U	**10.7**	**38.3**
MW-4 7.5-9'	12/16/2021	7.5 to 9	Saturated	mg/kg	NA	**1.86**	1 U	**8.83**	NA	**1.89**	1 U	**6.09**	**138**
MW-4 11-11.5'	12/16/2021	11 to 11.5	Saturated	mg/kg	NA	**2.50**	1 U	**11.3**	NA	**2.67**	1 U	**10.7**	**89.2**
MW-5 12.5-14'	12/15/2021	12.5 to 14	Saturated	mg/kg	NA	**5.46**	**1.08**	**17.1**	NA	**93.1**	1 U	**8.37**	**7,000**
MW-6 7.5-9'	12/15/2021	7.5 to 9	Saturated	mg/kg	NA	**3.80**	1 U	**9.06**	NA	**13.9**	1 U	**6.89**	**36.1**
RI-SB-01-10	12/18/2021	8 to 10	Saturated	mg/kg	NA	**2.20**	1 U	**14.9**	NA	**7.51**	1 U	**8.21**	**49.2**
RI-SB-01-14	12/18/2021	12.5 to 14	Saturated	mg/kg	NA	**3.31**	1 U	**13.0**	NA	**2.60**	1 U	**7.39**	**16.9**
RI-SB-02-08	12/18/2021	6 to 8	Vadose	mg/kg	NA	**3.17**	1 U	**9.21**	NA	**2.14**	1 U	**5.74**	**64.9**
RI-SB-02-12	12/18/2021	10 to 12	Saturated	mg/kg	NA	**1.59**	1 U	**10.2**	NA	**1.49**	1 U	**4.96**	**25.1**
-SB-04 2-4' / DUP-0228	2/28/2023	2 to 4	Vadose	mg/kg	NA	**13.0**	1 U	**43.3**	**161**	**97.6**	1 U	**28.8**	**694**
RI-SB-04 11-12'	2/28/2023	11 to 12	Saturated	mg/kg	NA	**2.73**	1 U	**10.7**	**20.1**	**3.15**	1 U	**7.98**	**116**
RI-SB-05 9-10'	2/28/2023	9 to 10	Saturated	mg/kg	NA	**2.09**	1 U	**7.51**	**8.24**	**1.35**	1 U	**5.51**	**58.3**
RI-SB-05 12.5-14'	2/28/2023	12.5 to 14	Saturated	mg/kg	NA	**7.30**	1 U	**11.2**	**16.5**	**2.13**	1 U	**14.2**	**26.0**
RI-SB-06 6-8'	2/28/2023	6 to 8	Saturated	mg/kg	NA	**1.63**	1 U	**8.51**	**8.44**	**5.51**	1 U	**5.24**	**24.1**
RI-SB-06 12.5-13.5'	2/28/2023	12.5 to 13.5	Saturated	mg/kg	NA	**3.37**	1 U	**10.2**	**15.1**	**1.90**	2 U	**8.79**	**23.8**
MW-7 8-10'	2/28/2023	8 to 10	Saturated	mg/kg	NA	**5.44**	1 U	**11.2**	**18.2**	**5.70**	1 U	**8.15**	**21.3**
MW-7 16-18'	2/28/2023	16 to 18	Saturated	mg/kg	NA	**2.89**	1 U	**11.1**	**18.1**	**2.42**	1 U	**9.74**	**25.9**
MW-8 11-13'	2/28/2023	11 to 13	Saturated	mg/kg	NA	1 U	1 U	**5.23**	**7.76**	1 U	1 U	**4.19**	**15.3**
Screening Level MTCA Soil Method A/B					80000	20	2		3,200	250	2	1600	24,000
Screening Level MTCA Soil Protective of Groundwater Vadose (based on					80000	7.3	0.77	0.14	36.4	250	0.07	48	100
Screening Level MTCA Soil Protective of Groundwater Saturated (based on protection of surface water)					80000	7.3	0.770	0.007	36.4	56	0.07	48	85
Number of samples					**2**	**65**	**65**	**65**	**65**	**65**	**65**	**65**	**65**
Number of detections					**2**	**60**	**2**	**56**	**16**	**62**	**1**	**65**	**63**
% detections					**100%**	**92%**	**3%**	**86%**	**25%**	**95%**	**2%**	**100%**	**97%**
Number of Detections above MTCA Method A/B SL?					**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
umber of Detections above MTCA Method B Protection of SW SL - lowest value?					**0**	**7**	**2**	**56**	**4**	**4**	**1**	**2**	**13**
Soil - Initial COI?					**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

Notes:

Bold = detection

Shading indicates an exceedance of a screening level

MTCA screening levels are from Preliminary Cleanup Levels (pCUL) for Lower Duwamish Waterway workbook, these have been developed by Ecology specifically for the LDW. Source: https://apps.ecology.wa.gov/cleanupsearch/site/1643#site-documents.

feet bgs = feet below ground surface	NA = Not analyzed
mg/kg = milligrams per kilograms	ND = Not detected
U = laboratory detection limit	MTCA - Model Toxics Control Act

For duplicates, the highest result between the duplicate and parent sample are shown on this COI screening table.

J qualifers have been removed on this COI screening table.

Table F-2 Summary of 2000-2023 Soil Data - Non Metal Compounds
Bridge - Former Dawn Foods

Sample ID	Screening Level (mg/kg)	Number of samples	Number of detections	% detections	Number of Detections above SL?	Max Detection Value	Soil - Initial COI?	GP-SB-15	GP-SB-1510 (Duplicate)	GP-SB-16-07	GP-SB-16-11	GP-SB-17-05	GP-SB-17-10	GP-SB-21-05	GP-SB-21-10	GP-SB-22-07	GP-SB-22-09	GP-SB-23-05	GP-SB-23-11	GP-SB-24-10	GP-SB-24-12	GP-SB-25-08	GP-SB-25-13.5	GP-SB-26-06	GP-SB-26-12	GP-SB-27-08	GP-SB-27-12
Date Sample								6/9/2020	6/9/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/5/2020	12/5/2020	12/5/2020	12/5/2020	12/5/2020	12/5/2020
Depth ft. bgs								10 to 11	10 to 11	6 to 7	10 to 11	4 to 5	9 to 10	3 to 5	7.5 to 10	5 to 7	9 to 10	3 to 5	10 to 11	7.5 to 10	10 to 12	6 to 8	12 to 13.5	4 to 6	10 to 12	6 to 8	11 to 12
Zone								Saturated	Saturated	Saturated	Saturated	Vadose	Saturated	Vadose	Saturated	Saturated	Saturated	Vadose	Saturated	Saturated	Saturated	Vadose	Saturated	Vadose	Saturated	Vadose	Saturated
Units								mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BTEX/GRO/DRO															BTEX/GRO/DRO											BTEX/GRO/DRO	
Benzene	5.60E-04	10	0	0%	0	no detection	No	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	4.40E-02	10	0	0%	0	no detection	No	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	1.00E-02	10	0	0%	0	no detection	No	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	5.50E-02	10	0	0%	0	no detection	No	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range	100	17	2	12%	0	11	No	5 U	6 U	5 U	5 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diesel Range Organics (DRO)	2000	7	2	29%	0	470	No	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diesel Range Organics (DRO) - SGC	2,000	1	1	100%	0	730	No	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lube Range Oil (ORO)	2000	7	1	14%	0	1200	No	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lube Range Oil (ORO) - SGC	2,000	1	1	100%	0	1300	No	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DRO/ORO (Diesel + Lube Oil)	2,000	7	2	29%	0	1200	No	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DRO/ORO (Diesel + Lube Oil) - SGC	2,000	1	1	100%	0	1300	No	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CVOCs															CVOCs											CVOCs	
Vinyl chloride	0.000056	5	0	0%	0	no detection	No	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	No Criteria	5	0	0%	0	no detection	No	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	1.4	5	0	0%	0	no detection	No	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	0.03	5	0	0%	0	no detection	No	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	0.32	5	0	0%	0	no detection	No	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	110	5	0	0%	0	no detection	No	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	120	5	0	0%	0	no detection	No	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane (EDC)	0.024	5	0	0%	0	no detection	No	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	210	5	0	0%	0	no detection	No	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	0.0027	5	0	0%	0	no detection	No	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	0.0016	5	0	0%	0	no detection	No	0.025 U	0.025 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs															SVOCs											SVOCs	
Naphthalene	0.0021	12	0	0%	0	no detection	No	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.05	NA	NA
2-Methylnaphthalene	0.039	12	1	8%	1	0.28	no - see note 1	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.28**	<0.01	<0.01	<0.05	NA	NA
1-Methylnaphthalene	2.1	12	1	8%	0	no detection	No	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**1.8**	<0.01	<0.01	<0.05	NA	NA
Acenaphthylene	1.3	12	0	0%	0	no detection	No	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.05	NA	NA
Acenaphthene	1.3	12	1	8%	0	no detection	No	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.43**	<0.01	<0.01	<0.05	NA	NA
Fluorene	0.029	12	1	8%	1	0.67	no - see note 1	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.67**	<0.01	<0.01	<0.05	NA	NA
Phenanthrene	1.5	12	1	8%	0	no detection	No	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**1.0**	<0.01	<0.01	<0.05	NA	NA
Anthracene	0.051	12	0	0%	0	no detection	No	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.05	NA	NA
Fluoranthene	0.09	12	2	17%	1	0.21	no - see note 1	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.21**	<0.01	**0.016**	<0.05	NA	NA
Pyrene	0.14	12	3	25%	1	0.24	no - see note 1	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	**0.062**	<0.05	<0.05	<0.05	<0.05	**0.24**	<0.01	**0.017**	<0.05	NA	NA
Benzo(g,h,i)perylene	0.67	12	5	42%	0	no detection	No	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.05	**0.01**	<0.05	<0.05	**0.064**	**0.051**	**0.10**	<0.01	**0.010**	<0.05	NA	NA
Total cPAHs TEQ	0.007	12	6	50%	3	0.763	yes	NA	NA	NA	NA	NA	NA	<0.05	<0.01	**0.006**	**0.012**	<0.05	<0.05	**0.0064**	**0.006**	**0.763**	<0.01	**0.018**	<0.05	NA	NA
PCBs															PCBs											**PCBs**	
Total Aroclors	0.03	21	1	5%	1	0.057	yes	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

Table F-2 Summary of 2000-2023 Soil Data - Non Metal Compounds
Bridge - Former Dawn Foods

Sample ID	Screening Level (mg/kg)	GP-SB-28-08	GP-SB-28-13	GP-SB-29-10.5	GP-SB-30-05.5	GP-SB-30-13.3	GP-SB-31-06	GP-SB-31-14	GP-SB-32-04	GP-SB-32-12	MW-1	MW-2	MW-2	MW-3	MW-3	MW-4 11-11.5'	MW-5 12.5-14'	MW-6 7.5-9'	RI-SB-01-10	RI-SB-01-14	RI-SB-02-08	RI-SB-02-12 / Duplicate	RI-SB-04 2-4' / DUP-022823	MW-8 11-13'
Date Sample		12/5/2020	12/5/2020	12/5/2020	12/12/2020	12/12/2020	12/12/2020	12/12/2020	12/12/2020	12/12/2020	12/16/2021	12/15/2021	12/15/2021	12/16/2021	12/16/2021	12/16/2021	12/15/2021	12/15/2021	12/18/2021	12/18/2021	12/18/2021	12/18/2021	2/28/2023	2/28/2023
Depth ft. bgs		6 to 8	12 to 13	9.5 to 10.5	4 to 5.5	12.5 to 13.3	4.5 to 6	12.5 to 14	2 to 4	10.3 to 12	13 to 14	7.5 to 9	12.5 to 14	7.5 to 9	12.5 to 14	11 to 11.5	12.5 to 14	7.5 to 9	8 to 10	12.5 to 14	6 to 8	10 to 12	2 to 4	11 to 13
Zone		Vadose	Saturated	Saturated	Vadose	Saturated	Vadose	Saturated	Vadose	Saturated	Saturated	Saturated	Saturated	Saturated	Saturated	Saturated	Saturated	Saturated	Saturated	Saturated	Vadose	Saturated	Vadose	Saturated
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BTEX/GRO/DRO							BTEX/GRO/DRO										BTEX/GRO/DRO							
Benzene	5.60E-04	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	4.40E-02	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	1.00E-02	NA	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	5.50E-02	NA	NA	NA	NA	NA	0.06 U	0.06 U	0.06 U	0.06 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range	100	NA	NA	NA	NA	NA	5 U	5 U	**5.6**	5 U	NA	NA	NA	NA	NA	NA	5 U	NA	5 U	5 U	5 U	5 U	**11**	5 U
Diesel Range Organics (DRO)	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**470**	NA	50 U	50 U	50 U	50 U	90	50 U
Diesel Range Organics (DRO) - SGC	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**730**	NA	NA	NA	NA	NA	NA	NA
Lube Range Oil (ORO)	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1,200**	NA	250 U	250 U	250 U	250 U	250 U	250 U
Lube Range Oil (ORO) - SGC	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1,300**	NA	NA	NA	NA	NA	NA	NA
DRO/ORO (Diesel + Lube Oil)	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1,200**	NA	250 U	250 U	250 U	250 U	90	250 U
DRO/ORO (Diesel + Lube Oil) - SGC	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1,300**	NA	NA	NA	NA	NA	NA	NA
CVOCs							CVOCs										CVOCs							
Vinyl chloride	0.000056	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
Chloroethane	No Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
Methylene chloride	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	0.32	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane (EDC)	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	210	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
Trichloroethene	0.0027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA
Tetrachloroethene	0.0016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.025 U	0.025 U	0.025 U	NA	NA	NA	NA	NA	NA
SVOCs							SVOCs										SVOCs							
Naphthalene	0.0021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	0.051	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	0.09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	0.67	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total cPAHs TEQ	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs							PCBs										PCBs							
Total Aroclors	0.03	0.02 U	0.02 U	0.02 U	0.02 U	**0.057**	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table F-2 Summary of 2000-2023 Soil Data - Non Metal Compounds
Bridge - Former Dawn Foods

Notes:

Bold = detection

Shading denotes an exceedance of a screening level

MTCA screening levels are from Preliminary Cleanup Levels (pCUL) for Lower Duwamish Waterway workbook, these have been developed by Ecology specifically for the LDW. Source: https://apps.ecology.wa.gov/cleanupsearch/site/1643#site-documents.

feet bgs = feet below ground surface
mg/kg = milligrams per kilograms
U = laboratory detection limit
NA = Not analyzed
ND = Not detected
MTCA - Model Toxics Control Act

TPH GRO - Total Petroleum Hydrocarbons Gasoline Range Organics
TPH DRO - Total Petroleum Hydrocarbons Diesel Range Organics
BTEX - Benzene, toluene, ethylbenzene, xylenes
CVOCs - Chlorinated Volatile Organic Compounds
SVOCs - Semi Volatile Organic Compounds
PCBs - Polychlorinated biphenyls
cPAHs - carcinogenic polycyclic aromatic hydrocarbons

COI notes:

1. For saturated and vadose screning levels, the lowest was used in this intial screeing. For SVOC compounds noted (2-Methylnaphthalene, Fluorene, Fluoranthene, and Pyrene) the one detection above SL is from a vadose sample (GP-SB-25-08). The saturerated sample from the same location has no detections above the labortory reporting limits. Because the detections are from the vadose

If 2 screening levels are listed, the lowest was used for the COI analysis.

For duplicates, the highest result between the duplicate and parent sample are shown on this COI screening table.

J qualifiers have been removed on this COI screening table.

Chromium SL based on Chromium VI

Table F-3 Summary of 2000-2023 Direct Push Borehole Groundwater Samples - Detected Compounds Only
Bridge - Former Dawn Foods

Sample ID	Screening Level (ug/L)	Number of samples	Number of detections	% detections	Number of Detections above SL?	Max Detection Value	Water - Initial COI?	GP-SB-1	GP-SB-2	GP-SB-3	GP-SB-5	GP-SB-6	GP-SB-7	GP-SB-08	GP-SB-09	Dup (GP-SB-09)	GP-SB-10	GP-SB-11	GP-SB-12	GP-SB-13	GP-SB-14	GP-SB-15	GP-SB-16	GP-SB-17
Date Sampled								1/2/2020	1/2/2020	1/2/2020	1/2/2020	1/2/2020	1/2/2020	6/9/2020	6/9/2020	6/9/2020	6/9/2020	6/9/2020	6/9/2020	6/9/2020	6/9/2020	6/9/2020	12/1/2020	12/1/2020
																					Sample results are in ug/L			
Metals Total/Dissolved																								
Arsenic - dissolved	8.00	28	21	75%	15	29.7	yes	NA	NA	**6.92**	1 U	**10.6**	**29.7**	**13.1**	**10.2**	**10.7**	**25.2**	**4.61**	1 Uca	NA	NA	NA	NA	NA
Cadmium - dissolved	1.20	28	0	0%	0	no detection	no	NA	NA	1 U	1 U	5 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA
Chromium - dissolved	0.36	18	7	39%	7	4.1	yes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper - dissolved	3.10	13	5	38%	3	7.0	yes	NA	NA	25 U	25 U	5 U	5 U	**7.00**	**5.58**	**2.97**	**5.29**	**2.73**	2.4 UJ	NA	NA	NA	NA	NA
Lead - dissolved	5.60	28	0	0%	0	no detection	no	NA	NA	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA
Mercury - dissolved	0.03	25	0	0%	0	no detection	no	NA	NA	1 U	1 U	5 U	1 U	0.2 U	0.2 U	**2 J**	0.2 UJ	0.2 U	0.2 U	NA	NA	NA	NA	NA
Nickel - dissolved	8.20	28	22	79%	5	22.7	yes	NA	NA	5 U	5 U	**8.71**	**22.7**	**6.35**	**4.88**	**4.14**	**5.74**	**10.9**	**2.37**	NA	NA	NA	NA	NA
Zinc - dissolved	81	28	17	61%	7	22300.0	yes	NA	NA	25 U	25 U	**3,110**	**22,300**	**574**	**378**	**317**	5 U	**18.8**	**16.5**	NA	NA	NA	NA	NA
TPH GRO/DRO																								
Gasoline Range Organics	1000	11	2	18%	1	3300.0	yes	100 U	**800**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**100**	**380**	**3,300**	100 U	100 U
Total Dx (DRO + ORO)	500	2	2	100%	2	1000.0	yes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOCs																								
Benzene	1.6	14	0	0%	0	no detection	no	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	NA	NA	0.35 U	0.35 U	NA	NA	NA	1 U	1 U	1U	1 U	1 U
Chloroethane	15000	15	0	0%	0	no detection	no	1U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	1 U	NA	NA
cis-1,2-Dichloroethene	180	15	2	13%	1	400.0	yes	**16**	**400**	1 U	1 U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	**11**	NA	NA
1,2-Dichloroethane (EDC)	3.5	15	0	0%	0	no detection	no	1U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	1 U	NA	NA
1,1-Dichloroethane	11	15	0	0%	0	no detection	no	1U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	1 U	NA	NA
1,1-Dichloroethene	130	15	0	0%	0	no detection	no	1U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	1 U	NA	NA
trans-1,2-Dichloroethene	77	15	0	0%	0	no detection	no	1U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	1 U	NA	NA
Ethylbenzene	21	15	2	13%	0	5.1	no	1 U	1 U	1 U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	NA	1 U	**3.1**	**5.1**	1 U	1 U
Phenanthrene	No Criteria	3	1	33%	0	0.0	no	NA	NA	NA	NA	0.04 U	NA	NA	0.02 U	**0.039**	NA	NA	NA	NA	NA	NA	NA	NA
Methyl t-butyl ether	800	9	1	11%	0	1.1	no	**1.1**	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	NA	NA	NA
Methylene chloride	100	15	2	13%	0	11.0	no	5U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	5U	NA	NA	1 U	NA	NA
Tetrachloroethene	2.9	15	1	7%	0	1.6	no	1 U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	**2.5**	NA	NA
1,1,1-Trichloroethane	5400	15	0	0%	0	no detection	no	1U	10 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	NA	1 U	NA	NA
Trichloroethene	0.7	17	0	0%	0	no detection	no	1 U	1 U	1U	1U	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	1U	1U	1 U	NA	NA
Toluene	100	13	1	8%	0	8.1	no	1 U	1 U	1U	1 U	1 U	NA	1 U	1 U	1 U	NA	NA	NA	NA	NA	**8.1**	1 U	1 U
Vinyl chloride	0.18	15	9	60%	9	72.0	yes	**44**	**72**	**0.31**	0.2 U	0.2 U	NA	0.1 U	1 U	1 U	NA	NA	0.21	NA	NA	**1.8**	NA	NA
Xylenes, Total	110	15	2	13%	0	8.3	no	2 U	2 U	2 U	2 U	2 U	NA	2 U	2 U	2 U	NA	NA	NA	1 U	**5.6**	**8.3**	3 U	3 U
Tributyltin	0.19	2	0	0%	0	0.0	no	NA	NA	NA	NA	NA	NA	NA	0.31U	0.36U	NA	NA	NA	NA	NA	NA	NA	NA

Table F-3 Summary of 2000-2023 Direct Push Borehole Groundwater Samples - Detected Compounds Only
Bridge - Former Dawn Foods

Sample ID	Screening Level (ug/L)	GP-SB-18	GP-SB-19	GP-SB-20	GP-SB-21	GP-SB-22	GP-SB-23	GP-SB-24	GP-SB-25	GP-SB-27	GP-SB-28	GP-SB-29	GP-SB-30	GP-SB-31	GP-SB-32	RI-SB-01	RI-SB-02 / Duplicate	RI-SB-04	RI-SB-05	RI-SB-06
Date Sampled		12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/1/2020	12/5/2020	12/5/2020	12/5/2020	12/5/2020	12/12/2020	12/12/2020	12/12/2020	12/18/2021	12/18/2021	2/28/2023	2/28/2023	2/28/2023
Metals Total/Dissolved																				
Arsenic - dissolved	8.00	**14.8**	**1.85**	**11.9**	**20**	**18.4**	**27.2**	**27.1**	**5.05**	1 U	1 U	1 U	**11.3**	**16.4**	NA	1 U	**1.29**	0.162 U	**0.766**	**11.1**
Cadmium - dissolved	1.20	1 U	1 U	1 U	1 UJ	1 U	1 UJ	1 UJ	1U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	0.061 U	0.061 U	0.061 U
Chromium - dissolved	0.36	**1.72**	10 U	**4.06**	10 U	**2.14**	10 U	10 U	1 U	1 U	1 U	1 U	1 U	**1.19**	NA	**1.39**	**2.12**	1.72 U	1.72 U	**3.48**
Copper - dissolved	3.10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.505 U	0.505 U	0.505 U
Lead - dissolved	5.60	1 U	1 U	1 U	1 UJ	1 U	1 UJ	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	0.061 U	0.061 U	0.061 U
Mercury - dissolved	0.03	1 U	1 U	1 U	1 UJ	1 U	1 UJ	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	NA	NA	NA
Nickel - dissolved	8.20	**5.30**	10 U	**4.26**	**14.8**	10U	10 U	**11.3**	**1.62**	**2.33**	**3.28**	**3.41**	**2.96**	**4.49**	NA	**1.95**	**1.66**	1.21 U	**1.41**	**2.17**
Zinc - dissolved	81	**7.01**	50U	5 U	50U	5 U	50U	50U	**14.6**	5 U	**6.36**	**209**	**33.0**	**12.3**	NA	**5.49**	**10.7**	7.07 U	**123**	**8.8**
TPH GRO/DRO																				
Gasoline Range Organics	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	100 U	100 U	100 U	100 U	NA	NA	NA
Total Dx (DRO + ORO)	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**640**	**1,000**	NA	NA	NA
VOCs																				
Benzene	1.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	NA	NA	NA	NA	NA
Chloroethane	15000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U / 1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	180	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U / 1 U	1 U	1 U	1 U
1,2-Dichloroethane (EDC)	3.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.2 U / 0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethane	11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U / 1 U	1 U	1 U	1 U
1,1-Dichloroethene	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U / 1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U / 1 U	1 U	1 U	1 U
Ethylbenzene	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	NA	NA	NA	NA	NA
Phenanthrene	No Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl t-butyl ether	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5.2**	**11**	5 U	5 U	5 U
Tetrachloroethene	2.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.6**	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	5400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	1 U	1 U	1 U
Trichloroethene	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	NA	NA	NA	NA	NA
Vinyl chloride	0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.21**	**0.3**	**0.50**	**0.55**	**0.40**
Xylenes, Total	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3 U	3 U	NA	NA	NA	NA	NA
Tributyltin	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table F-3 Summary of 2000-2023 Direct Push Borehole Groundwater Samples - Detected Compounds Only
Bridge - Former Dawn Foods

Notes:

Bold = detection

Shading denotes an exceedance of a screening level

MTCA screening levels are from Preliminary Cleanup Levels (pCUL) for Lower Duwamish Waterway workbook, these have been developed by Ecology specifically for the LDW. Source: https://apps.ecology.wa.gov/cleanupsearch/site/1643#site-documents.

TEq - Toxicity Equivalency to cPAHs, calculated by multiplying result by appropriate TEF.

ug/L = micrograms per liters
U = laboratory detection limit
NC - No Criterion
NA = Not analyzed

TPH GRO - Total Petroleum Hydrocarbons Gasoline Range Organics
TPH DRO - Total Petroleum Hydrocarbons Diesel Range Organics
VOCs -Volatile Organic Compounds
ND = Not detected

COI notes:

If 2 screening levels are listed, the lowest was used for the COI analysis.

For duplicates, the highest result between the duplicate and parent sample are shown on this COI screening table.

J qualifiers have been removed on this COI screening table.

Monitoring well samples were analyzed using inductively coupled plasma mass spectrometry methods because of the high conductivity observed at the site. Groundwater grab samples collected prior to 2023 were not analyzed using these methods and resultsshown may include interferences resulting from high conductivity in the sample matrix.

Table F-3 Summary of 2000-2023 Direct Push Borehole Groundwater Samples - Detected Compounds Only
Bridge - Former Dawn Foods

Notes:

Bold = detection

Shading denotes an exceedance of a screening level

MTCA screening levels are from Preliminary Cleanup Levels (pCUL) for L

https://apps.ecology.wa.gov/cleanupsearch/site/1643#site-documents

TEq - Toxicity Equivalency to cPAHs, calculated by multiplying result by

ug/L = micrograms per liters

U = laboratory detection limit

NC - No Criterion

NA = Not analyzed

COI notes:

If 2 screening levels are listed, the lowest was used for the COI analysis.

For duplicates, the highest result between the duplicate and parent san

J qualifiers have been removed on this COI screening table.

Monitoring well samples were analyzed using inductively coupled plasm

prior to 2023 were not analyzed using these methods and resultsshown

Table F-4 Summary of Monitoring Well Groundwater Samples
Bridge - Former Dawn Foods

Sample ID	Screening Level (ug/L)	Number of samples	Number of detections	% detections	Number of Detections above SL?	Max Detection	Water - Initial COI?	MW-1						MW-2						MW-3						MW-4		
Date Sampled								2/1/2022	2/1/2022	4/19/2022	8/8/2022	12/21/2022	3/25/2023	1/31/2022	1/31/2022	4/19/2022	8/9/2022	12/22/2022	3/26/2023	1/30/2022	1/30/2022	4/20/2022	8/8/2022	12/22/2022	3/26/2023	2/2/2022	2/2/2022	4/20/2022
Sample results are in ug/L																												
Metals Total/Dissolved																												
Laboratory - Analytical Method for Metals Only								F&B - 6020B	BAL-1638 Mod					F&B - 6020B	BAL - 1638 Mod.					F&B - 6020B	BAL - 1638 Mod.					F&B - 6020B	BAL - 1638 Mod.	
Arsenic - dissolved	8.00	33	29	88%	1	8.4	yes	NA	**1.23**	**1.58**	**1.37**	**1.14**	**1.41**	NA	**3.37**	**3.48**	**3.29**	**2.94**	**2.82**	NA	**4.10**	**3.07**	**3.10**	**2.54**	**2.59**	NA	**0.645**	**0.323**
Cadmium - dissolved	1.20	33	12	36%	0	0.5	no	NA	**0.175**	**0.159**	**0.235**	**0.532**	**0.215**	NA	**0.071**	0.061 U	**0.214**	**0.131**	0.152 U	NA	**0.221**	**0.247**	**0.296**	**0.175**	0.152 U	NA	0.061 U	0.061 U
Chromium - dissolved	0.36	33	2	6%	2	2.5	yes	NA	1.72 U	1.72 U	1.72 U	1.72 U	1.72 U	NA	1.72 U	1.72 U	1.72 U	1.72 U	4.29 U	NA	4.29 U	4.29 U	4.29 U	**2.49**	4.29 U	NA	1.72 U	1.72 U
Copper - dissolved [b]	3.10	33	24	73%	1	6.2	yes	NA	**2.30**	**2.07**	**1.56**	**2.14**	**2.91**	NA	**1.13**	**1.02**	**1.13**	**1.30**	1.26 U	NA	**6.18**	**1.59**	**1.43**	**1.70**	**1.37**	NA	**0.635**	**0.514**
Lead - dissolved	5.60	33	4	12%	0	1.5	no	NA	0.040 U	0.040 U	0.061 U	0.061 U	0.061 U	NA	0.040 U	0.040 U	0.061 U	0.061 U	0.152 U	NA	**1.49**	0.101 U	0.152 U	0.061 U	0.152 U	NA	0.040 U	0.040 U
Nickel - dissolved	8.20	27	11	41%	0	4.7	no	NA	NA	1.21 U	**1.37**	**1.85**	1.21 U	NA	NA	1.21 U	1.21 U	1.21 U	3.03 U	NA	NA	3.03 U	**4.7**	**4.36**	3.03 U	NA	NA	**2.02**
Zinc - dissolved	81	33	15	45%	14	1880	yes	NA	**260**	**282**	**209**	**637**	**380**	NA	7.07 U	7.07 U	7.07 U	7.07 U	17.7 U	NA	17.7 U	17.7 U	17.7 U	7.07 U	17.7 U	NA	**516**	**399**
GRO/DRO - NWTPH-Dx/-Gx																												
Gasoline Range Organics	1000	8	2	25%	1	2300	yes	NA	NA	NA	100 U	NA	NA	NA	NA	NA	**1,000**	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Dx (DRO + ORO)	500	6	3	50%	1	2640	yes	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOCs																												
Benzene	1.60	1	0	0%	0	no detections	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	15000.00	21	0	0%	0	no detections	no	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	NA	1 U
cis-1,2-Dichloroethene	180.00	21	9	43%	0	10	no	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	**1.2**	NA	**2.5**
1,2-Dichloroethane (EDC)	3.5	21	0	0%	0	no detections	no	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	NA	NA	NA	0.2 U	NA	0.2 U	NA	NA	NA	NA	NA	0.2 U	0.2 U	NA	0.2 U
1,1-Dichloroethane	11	21	0	0%	0	no detections	no	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	NA	1 U
1,1-Dichloroethene	130	21	0	0%	0	no detections	no	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	NA	1 U
trans-1,2-Dichloroethene	77	21	1	5%	0	1.9000	no	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	NA	1 U
Ethylbenzene	21	1	0	0%	0	no detections	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	100.00	21	1	5%	0	no detections	no	5 U	NA	5 U	NA	5 U	5 U	NA	NA	NA	5 U	NA	5 U	NA	NA	NA	NA	NA	5 U	5 U	NA	5 U
Tetrachloroethene	2.90	21	7	33%	4	9.8000	yes	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	NA	1 U
Trichloroethane	No critiera	21	0	0%	0	no detections	no	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	NA	0.5 U
1,1,1-Trichloroethane	5400.00	21	0	0%	0	no detections	no	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	NA	1 U
Trichloroethene	0.70	21	4	19%	3	2.1000	yes	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	NA	NA	NA	0.5 U	NA	0.5 U	NA	NA	NA	NA	NA	0.5 U	0.5 U	NA	0.5 U
Toluene	100.00	1	0	0%	0	no detections	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	0.18	21	14	67%	9	12.0000	yes	0.02 U	NA	**0.021**	NA	0.02 U	0.02 U	NA	NA	NA	0.02 U	NA	0.02 U	NA	NA	NA	NA	NA	0.02 U	**0.43**	NA	**0.59**
Xylenes, Total	110.00	1	0	0%	0	no detections	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																												
Naphthalene [a]	1.4	1	0	0%	0	no detections	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	0.14	1	0	0%	0	no detections	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	7500	1	0	0%	0	no detections	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	5.3	1	0	0%	0	no detections	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	3.7	1	0	0%	0	no detections	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	2.1	1	0	0%	0	no detections	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	1.8	1	0	0%	0	no detections	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	2	1	0	0%	0	no detections	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total cPAH TEQ	0.000016	1	0	0%	0	no detections	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs																												
Total PCBs	0.03	1	0	0%	0	no detections	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table F-4 Summary of Monitoring Well Groundwater Samples
Bridge - Former Dawn Foods

Sample ID	**Screening Level (ug/L)**				**MW-5**						**MW-6**						**MW-7**	**MW-8**	**MW-9**
							MW-5 / DUP-0422 (duplicate)	MW-5 / DUP-0822 (duplicate)							DUP02-1222 (duplicate)		DUP03-0323 (duplicate)	DUP01-0323 (duplicate)	DUP02-0323 (duplicate)
Date Sampled		8/9/2022	12/22/2022	3/26/2023	1/31/2022	1/31/2022	4/21/2022	8/9/2022	12/21/2022	3/25/2023	1/30/2022	1/30/2022	4/21/2022	8/8/2022	12/21/2022	3/25/2023	3/28/2023	3/25/2023	3/28/2023
Sample results are in ug/L																			
Metals Total/Dissolved																			
Laboratory - Analytical Method for Metals Only					F&B - 6020B	BAL - 1638 Mod.					F&B - 6020B	BAL - 1638 Mod.					BAL - 1638 Mod.	BAL-1638 Mod	BAL-1638 Mod
Arsenic - dissolved	8.00	**0.165**	0.162 U	0.162 U	NA	**1.98**	**0.568**	0.404 U	**0.309**	**0.443**	NA	**0.286**	**0.241**	**0.367**	**0.216**	0.404 U	**0.415**	**8.4**	**3.31**
Cadmium - dissolved	1.20	0.061 U	0.061 U	0.061 U	NA	0.061 U	0.061 U	0.152 U	0.061 U	0.061 U	NA	0.152 U	0.152 U	0.061 U	0.061 U	0.152 U	0.061 U	0.061 U	0.061 U
Chromium - dissolved	0.36	1.72 U	1.72 U	1.72 U	NA	1.72 U	1.72 U	4.29 U	1.72 U	1.72 U	NA	4.29 U	4.29 U	**1.9**	1.72 U	4.29 U	1.72 U	1.72 U	1.72 U
Copper - dissolved [b]	3.10	**1.66**	**0.553**	**1.33**	NA	0.404 U	0.983	1.26 U	**1.46**	0.505 U	NA	1.01 U	1.01 U	0.505 U	**0.707**	1.26 U	**0.521**	**0.907**	0.505 U
Lead - dissolved	5.60	0.061 U	0.061 U	0.061 U	NA	**0.147**	**0.093**	0.061 U	**0.116**	0.061 U	NA	0.101 U	0.101 U	0.061 U	0.061 U	0.152 U	0.061 U	0.061 U	0.061 U
Nickel - dissolved	8.20	**1.76**	**1.45**	**2.04**	NA	NA	1.21 U	3.03 U	**1.52**	1.21 U	NA	NA	3.03 U	1.21 U	1.21 U	3.03 U	**1.4**	**2.31**	1.21 U
Zinc - dissolved	81	**99.4**	**533**	**1310**	NA	**1,880**	**122**	**34.9**	**241**	**700**	NA	17.7 U	17.7 U	7.07 U	7.07 U	17.7 U	7.07 U	7.07 U	7.07 U
GRO/DRO - NWTPH-Dx/-Gx																			
Gasoline Range Organics	1000	100 U	NA	NA	NA	NA	100 U	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2,300**	100 U
Total Dx (DRO + ORO)	500	ND	NA	NA	NA	NA	**2,640**	**330**	**120**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOCs																			
Benzene	1.60	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	15000.00	NA	1 U	1 U	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	180.00	NA	**1.8**	1 U	**2.5**	NA	**5**	NA	**10**	**6.3**	NA	NA	NA	1 U	1 U	1 U	1 U	**9.0**	**6.1**
1,2-Dichloroethane (EDC)	3.5	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	NA	NA	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethane	11	NA	1 U	1 U	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	130	NA	1 U	1 U	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	77	NA	1 U	1 U	1 U	NA	**1.9**	NA	1 U	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	21	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	100.00	NA	5 U	5 U	5 U	NA	5 U	NA	5 U	5 U	NA	NA	NA	**7.1**	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	2.90	NA	**1.2**	**1.9**	**3.2**	NA	**6.1**	NA	**5.9**	**9.8**	NA	NA	NA	1 U	1 U	1 U	1 U	**2.6**	1 U
Trichloroethane	No critiera	NA	1 U	1 U	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	5400.00	NA	1 U	1 U	1 U	NA	1 U	NA	1 U	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	0.70	NA	0.5 U	0.5 U	**2.1**	NA	**1.7**	NA	0.5 U	**0.53**	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	**0.98**	0.5 U
Toluene	100.00	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	0.18	NA	**0.53**	**0.11**	**1.4**	NA	**2.1**	NA	**6.9**	**5.0**	NA	NA	NA	**0.12**	**0.057**	0.02 U	**0.15**	**1.5**	**12**
Xylenes, Total	110.00	NA	NA	NA	NA	NA	3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																			
Naphthalene [a]	1.4	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	0.14	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	7500	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	5.3	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	3.7	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	2.1	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	1.8	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	2	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total cPAH TEQ	0.000016	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs																			
Total PCBs	0.03	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table F-4 Summary of Monitoring Well Groundwater Samples
Bridge - Former Dawn Foods

Notes:
All results in ug/L.
Bold = detection
Shading denotes an exceedance of a screening level
MTCA screening levels are from Preliminary Cleanup Levels (pCUL) for Lower Duwamish Waterway workbook, these have been developed by Ecology specifically for the LDW. Source: https://apps.ecology.wa.gov/cleanupsearch/site/1643#site-documents.
MTCA - Model Toxics Control Act
ug/L = micrograms per liters
U = laboratory detection limit
NC - No Criterion
NA = Not analyzed
ND = Not detected

TPH GRO - Total Petroleum Hydrocarbons Gasoline Range Organics
TPH DRO - Total Petroleum Hydrocarbons Diesel Range Organics
BTEX - Benzene, toluene, ethylbenzene, xylenes
VOCs -Volatile Organic Compounds
cPAHs - carcinogenic polycyclic aromatic hydrocarbons, TEQ - toxicity Equivalency to cPAHs, calculated by multiplying result by appropriate TEF.
TEQ - toxicity Equivalency to cPAHs, calculated by multiplying result by appropriate toxic equivalency factors.

COI notes:
If 2 screening levels are listed, the lowest was used for the COI analysis.
For duplicates, the highest result between the duplicate and parent sample are shown on this COI screening table.
J qualifiers have been removed on this COI screening table.

Table F-5 Summary of 1996 Hart Crowser Soil Data
Bridge - Former Dawn Foods

Sample ID	Screening Level (mg/kg)	Number of samples	Number of detections	% detections	Number of Detections above SL?	Max Detection	Soil - Initial COI?	HC-1, S-2	HC-1, S-3	HC-2, S-1	HC-2, S-2	HC-3, S-1	HC-3, S-2	HC-4, S-3	HC-4, S-4	HC-5, S-1	HC-5, S-2	
Date Sample								9/6/1996	9/6/1996	9/6/1996	9/6/1996	9/6/1996	9/6/1996	9/6/1996	9/6/1996	9/6/1996	9/6/1996	
Depth ft. bgs								7.5-9.0	12.5-14.0	2.5-4.0	7.5-9	2.5-4.0	7.5-9.0	7.5-9.0	12.5-14.0	2.5-4.0	7.5-9	
PID Reading								1	5	0	0	0	0	NA	1.5	0	0	MDL
Units								mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TPH																		
Gasoline Range	100	9	1	11%	0	10.0	no	ND	ND	ND	NA	ND	ND	ND	ND	ND	NA	10
Stoddard Solvent	1000	10	2	20%	0	20.0	no	ND	ND	ND	ND	ND	ND	20	ND	ND	NA	10
Diesel	2000	10	2	20%	0	85.0	no	ND	ND	ND	ND	ND	ND	ND	85	ND	NA	20
Oil	2000	10	4	40%	0	800.0	no	ND	ND	ND	ND	ND	ND	170	800	110	NA	50
PCBs																		
Total Aroclors	0.03	2	1	50%	1	0.5	yes	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	0.5
VOCs																		
Acetone	72000	6	5	83%	0	0.049	no	NA	0.013	NA	ND	NA	0.049	0.038	0.046	NA	NA	0.0019
Methylene Chloride	3.20E-02	6	6	100%	0	0.004	no	NA	0.0032	NA	0.003	NA	0.003	0.0038	0.0031	NA	NA	0.0028
cis-1,2-Dichloroethene	120	6	3	50%	0	0.1	no	NA	0.0037	NA	ND	NA	ND	0.08	ND	NA	NA	0.0014
Trichloroethene	2.70E-04	6	3	50%	3	0.1	yes	NA	0.014	NA	ND	NA	ND	0.068	ND	NA	NA	0.0014
Tetrachloroethene	1.60E-03	6	4	67%	3	0.3	yes	NA	0.12	NA	0.0091	NA	ND	0.33	ND	NA	NA	0.0014
Carbon Disulfide	7,400	6	3	50%	0	0.003	no	NA	ND	NA	ND	NA	ND	0.0029	0.0019	NA	NA	0.0014
trans-1,2-Dichloroethene	0.32	6	2	33%	0	0.003	no	NA	ND	NA	ND	NA	ND	0.0034	ND	NA	NA	0.0014
Isoproplybenzene	1600	6	2	33%	0	0.001	no	NA	ND	NA	ND	NA	ND	0.0014	ND	NA	NA	0.0014
1,3,5-Trimethylbenzene	170	6	2	33%	0	0.016	no	NA	ND	NA	ND	NA	ND	0.016	ND	NA	NA	0.0014
1,2,4-Trimethylbenzene	170	6	2	33%	0	0.035	no	NA	ND	NA	ND	NA	ND	0.035	ND	NA	NA	0.0014
sec-Butylbenzene	1400	6	2	33%	0	0.005	no	NA	ND	NA	ND	NA	ND	0.005	ND	NA	NA	0.0014
4-Isoproplyltoluene	na	6	2	33%	4	0.006	yes	NA	ND	NA	ND	NA	ND	0.0062	ND	NA	NA	0.0014
n-Butylbenzene	690	6	2	33%	0	0.003	no	NA	ND	NA	ND	NA	ND	0.0028	ND	NA	NA	0.0014
Naphthalene	0.0021	6	2	33%	2	0.009	no	NA	ND	NA	ND	NA	ND	0.0089	ND	NA	NA	0.0069
Metals																		
Aluminum	80000	7	7	100%	0	16000.0	no	NA	8180	NA	12400	NA	12000	12300	9620	NA	16000	3
Arsenic	7.3	7	2	29%	1	26.0	yes	NA	ND	NA	ND	NA	ND	26	ND	NA	ND	7
Iron	56000	7	7	100%	0	28000.0	no	NA	3100	NA	4400	NA	4000	28000	8200	NA	8200	2.5
Cadmium	0.77	7	2	29%	1	1.8	yes	NA	ND	NA	ND	NA	ND	1.8	ND	NA	ND	0.5
Chromium	0.0069	7	7	100%	7	44.0	yes	NA	3.2	NA	5.9	NA	4.4	44	4.5	NA	8.5	1.5
Lead	56	7	3	43%	1	580.0	yes	NA	ND	NA	ND	NA	ND	580	36	NA	ND	5
Mercury	0.07	7	3	43%	2	0.4	yes	NA	ND	NA	ND	NA	ND	0.41	0.29	NA	ND	0.05
Copper	36	7	7	100%	2	360.0	yes	NA	7.1	NA	8.5	NA	8.8	360	47	NA	24	1
Nickel	48	7	7	100%	1	76.0	yes	NA	1.6	NA	4.9	NA	4.5	76	9.7	NA	11	5
Zinc	85	7	7	100%	1	6400.0	yes	NA	9.4	NA	9.6	NA	11	6400	55	NA	32	0.25

Notes:

Bold = detection

Shading denotes an exceedance of a screening level

feet bgs = feet below ground surface

mg/kg = milligrams per kilograms

U = laboratory detection limit

NA = Not analyzed

ND = Not detected

MTCA - Model Toxics Control Act

COI notes:

If 2 screening levels are listed, the lowest was used for the COI analysis.

For duplicates, the highest result between the duplicate and parent sample are shown on this COI screening table.

J qualifiers have been removed on this COI screening table.

Chromium SL based on Chromium VI

Appendix F - ProUCL output Date Ran: 10/24/2023

UCL Statistics for Uncensored Full Data Sets

```
User Selected Options
Date/Time of Computation         ProUCL 5.2 10/24/2023 1:52:23 PM
From File                        WorkSheet.xls
Full Precision                   OFF
Confidence Coefficient             90%
Number of Bootstrap Operations    2000

General Statistics
Total Number of Observations                 65            Number of Distinct Observations        58
                                                           Number of Missing Observations          0
Minimum                                       1                                      Mean      4.176
Maximum                                    13.6                                    Median       3.56
SD                                        2.661                         Std. Error of Mean      0.33
Coefficient of Variation                  0.637                                  Skewness      1.486

Normal GOF Test
Shapiro Wilk Test Statistic               0.866                      Shapiro Wilk GOF Test
1% Shapiro Wilk P Value                1.02E-07    Data Not Normal at 1% Significance Level
Lilliefors Test Statistic                 0.146                         Lilliefors GOF Test
1% Lilliefors Critical Value              0.127    Data Not Normal at 1% Significance Level
Data Not Normal at 1% Significance Level

Assuming Normal Distribution
  90% Normal UCL                                            90% UCLs (Adjusted for Skewness)
  90% Student's-t UCL                     4.604          90% Adjusted-CLT UCL (Chen-1995)      4.643
                                                          90% Modified-t UCL (Johnson-1978)     4.614

Gamma GOF Test
A-D Test Statistic                        0.422             Anderson-Darling Gamma GOF Test
5% A-D Critical Value                     0.758    Gamma Distributed at 5% Significance Level
K-S Test Statistic                       0.0818         Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value                     0.111    Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics
k hat (MLE)                               2.916                 k star (bias corrected MLE)    2.791
Theta hat (MLE)                           1.432             Theta star (bias corrected MLE)    1.496
nu hat (MLE)                                379                     nu star (bias corrected)    362.9
MLE Mean (bias corrected)                 4.176                     MLE Sd (bias corrected)      2.5
                                                          Approximate Chi Square Value (0.1)    328.8
Adjusted Level of Significance           0.0959                    Adjusted Chi Square Value    328.2

Assuming Gamma Distribution
  90% Approximate Gamma UCL               4.609                      90% Adjusted Gamma UCL    4.617

Lognormal GOF Test
Shapiro Wilk Test Statistic               0.977               Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk P Value                  0.516     appear Lognormal at 10% Significance Level
Lilliefors Test Statistic                0.0681                 Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value               0.1     appear Lognormal at 10% Significance Level
Data appear Lognormal at 10% Significance Level
```

```
Lognormal Statistics
Minimum of Logged Data                         0                      Mean of logged Data      1.248
Maximum of Logged Data                      2.61                        SD of logged Data      0.611

Assuming Lognormal Distribution
   90% H-UCL                               4.702             90% Chebyshev (MVUE) UCL      5.208
   95% Chebyshev (MVUE) UCL                5.671           97.5% Chebyshev (MVUE) UCL      6.315
   99% Chebyshev (MVUE) UCL                7.579

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs
   90% CLT UCL                             4.599                  90% BCA Bootstrap UCL    4.674
   90% Standard Bootstrap UCL              4.601                  90% Bootstrap-t UCL      4.656
   90% Hall's Bootstrap UCL                4.651           90% Percentile Bootstrap UCL    4.604
   90% Chebyshev(Mean, Sd) UCL             5.166          95% Chebyshev(Mean, Sd) UCL      5.615
 97.5% Chebyshev(Mean, Sd) UCL             6.237          99% Chebyshev(Mean, Sd) UCL      7.46
```

Data Set Used:

Appendix D - ProUCL output

Arsenic	
5.09	
2.48	
4.98	
2.37	
11.6	
5.32	
5	full reporting limit
5	full reporting limit
5	full reporting limit
4.81	
1	full reporting limit
3.56	
3.48	
3.41	
2.49	
1.75	
6.11	
4.87	
2.09	
13.6	
8.31	
10.4	
8.53	
5.44	
5.07	
4.13	
2.48	
2.03	
3.05	
4.79	
2.31	
1.81	
6.91	
3.26	

3.87	
1.85	
1.33	
6.06	
1.40	
3.56	
4.50	
3.85	
1.08	
3.86	
2.51	
8.55	
1.36	
4.21	
1.86	
2.50	
5.46	
3.80	
2.20	
3.31	
3.17	
1.59	
10.6	
2.73	
2.09	
7.30	
1.63	
3.37	
5.44	
2.89	
1	full reporting limit

Appendix G

Quality Assurance Project Plan

REMEDIAL INVESTIGATION WORK PLAN APPENDIX G: QUALITY ASSURANCE PROJECT PLAN

Former Dawn Foods Site
6901 Fox Ave South

January 17, 2024

Prepared for:

BRIDGE

REMEDIAL INVESTIGATION WORK PLAN APPENDIX G: QUALITY ASSURANCE PROJECT PLAN

Former Dawn Foods Site
6901 Fox Ave South

January 17, 2024

Prepared by:

CRETE
CONSULTING, INC.

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Acronyms and Abbreviations

COI	contaminant of interest
COC	contaminant of concern
CLP	Contract Laboratory Program
cPAH	carcinogenic polyaromatic hydrocarbon
CTD	conductivity, temperature, and depth
DQO	data quality objective
EDD	electronic data deliverable
EPA	United States Environmental Protection Agency
HCID	hydrocarbon identification
LCS/LCSD	laboratory control sample/laboratory control sample duplicate
MDL	method detection limit
MLLW	mean lower low water
MRL	method reporting limit
MS/MSD	matrix spike/matrix spike duplicate
PARCC	precision, accuracy, representativeness, comparability, and completeness
Property	Former Dawn Foods Site

PDF	portable document format
PQL	practical quantitation limit
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
RIWP	Remedial Investigation Work Plan
RPD	relative percent difference
SL	screening level
SOP	standard operating procedure
SVOC	semi-volatile organic compound
TPH	total petroleum hydrocarbons
VOC	volatile organic compound
WAC	Washington Administrative Code

1 Introduction

1.1 Background

This Quality Assurance Project Plan accompanies the Remedial Investigation Work Plan for the former Dawn Foods site (Property), located at 6901 Fox Ave South in Seattle, Washington (King County Parcel Number 000180-0113).

This QAPP describes quality assurance/quality control (QA/QC) procedures associated with collecting, analyzing, validating, and using groundwater and vapor data to fill data gaps identified in the Remedial Investigation Work Plan (RIWP). This QAPP uses Ecology's Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies. July 2004. Publication No. 04-03-030 (Ecology 2004).

The history, contaminants of interest (COIs), screening levels (SLs), and other background information for the site are described in the RIWP.

1.2 Project Description

This QAPP pertains to the following tasks that are part of the larger RI to be conducted, as described in the RIWP (where the goals and objectives of this work are defined):

- Fieldwork
- Laboratory analyses
- Data validation and management
- Data analysis and report preparation.

Fieldwork

Groundwater sampling and testing will include collection of groundwater samples for analysis of COIs. Groundwater field measurements will be taken for pH, specific conductance, temperature, oxidation-reduction potential, and dissolved oxygen during well purging and as an indicator that samples are collected under stable conditions. Groundwater samples will be analyzed for the analytes in Table 2. This table also includes reporting limits and analysis methods.

Laboratory Analyses

Analyses will be completed using EPA methods (EPA 1638, 2001, 2006) listed in Table 2. Unique analytical procedures are described in Section 5.

Level 2B laboratory data reports will be provided in portable document format (PDF), and electronic data deliverables (EDDs) will be provided in a text or Excel file format.

Data Validation and Management
Data verification will be completed by the Quality Assurance Officer. The accuracy and completeness of the data will be verified by the Quality Assurance Officer. Following verification, data collected during the RI will be uploaded to Ecology's EIM system.

Data Analysis and Report Preparation
The data collected under the RIWP will provide the information needed to complete the RI/FS. The results of those efforts will be documented in the RI/FS Report.

1.3 Organization and Schedule

1.3.1 Roles and Responsibilities

Roles and responsibilities are defined in Table 1.

Friedman & Bruya and Brooks Applied Labs (BAL) will perform the majority of chemical analyses of the groundwater samples collected by CRETE Consulting, Inc. Other laboratories may be added should specialized testing be required.

1.3.2 Schedule

Field work will follow the schedule in the RIWP.

Samples will be delivered to the laboratory within applicable holding times and within 24 hours of collection time, when possible, with schedule constraints. Samples will be delivered to the laboratory by field personnel or arranged for pickup by laboratory couriers. Chain-of-custody procedures will be maintained during transit to the laboratory.

Data will be uploaded to the Ecology Environmental Information Management (EIM) System at the conclusion of the RI/FS.

2 Quality Objectives

The overall data quality objective for this project is the collection of representative data of known and acceptable quality. The QA procedures and measurements that will be used for this project are based on EPA guidance (EPA 2001, 2002, 2006). Parameters related to precision, accuracy or bias, representativeness, completeness, and comparability (PARCC) will be used to assess the quality of RI data (Table 3).

2.1 Precision

Precision is a measure of how closely one result matches another result expected to have the same value. Field precision will be assessed by collecting one duplicate sample for every ten field samples of each media. Field precision is determined by the relative percent difference (RPD) between a sample and its duplicate. However, results from the analysis of a duplicate sample also test laboratory precision. Therefore, the RPD between the sample and the field replicate provides an indication of both the field and laboratory precision. The tolerance limit for percent differences between field duplicates will be ± 35 percent for groundwater. If the RPDs exceed these limits, a replicate sample may be run to verify laboratory precision. If any RPD exceedance is linked to field sampling, the Field Manager will recheck field sampling procedures and identify the problem. Resampling and analysis may be required.

Laboratory precision can be measured through the evaluation of laboratory control samples/duplicates (LCS/ LCSD). The laboratory will perform the analysis of one set of LCS/LCSD samples for every 20 samples. Laboratory precision will be evaluated by the RPD for each analyte between LCS/LCSD samples.

$$\mathrm{RPD} = \frac{\mathrm{ABS}(R1-R2)}{(R1+R2)/2} \times 100$$

Where:
ABS = absolute value
R1 = Sample result
R2 = Duplicate sample result.

The tolerance limit for percent differences between laboratory duplicates will be ± 20 percent for groundwater samples. If the precision values are outside this limit, the laboratory will recheck the calculations and/or identify the problem. Reanalysis may be required.

2.2 Accuracy

Accuracy is an expression of the degree to which a measured or computed value represents the true value. Accuracy may be expressed as a percentage of the true or reference value for reference material or as spike recovery from matrix spike/matrix spike duplicate (MS/MSD) samples. The RPD between the MS and MSD is used to evaluate laboratory precision. The following equations are used to express accuracy:

- For reference materials:
  - Percent of true value = (measured value/true value) x 100
- For spiked samples:
  - Percent recovery = ([SQ – NQ]/S) x 100

SQ = quantity of spike or surrogate found in sample
NQ = quantity found in native (unspiked) sample
S = quantity of spike or surrogate added to native sample

The performance of the method will be monitored using surrogate compounds or elements. Surrogate standards are added to all samples, method blanks, matrix spikes, and calibration standards.

Laboratory method reporting limits (MRL) are listed in Table 2. All RLs are below SLs; otherwise, SLs derived in the RIWP were set to the practical quantitation limit, which is identical to the MRL for this project.

3 Sampling Process Design

The adequacy of the sampling design is evaluated by representativeness, comparability, and completeness of the data produced. The data must also be adequate to characterize nature and extent of contamination and to evaluate the completeness of pathways.

3.1 Representativeness

Representativeness is the degree to which data from the project accurately represent a particular characteristic of the environmental matrix which is being tested. Representativeness of samples is achieved by adherence to standard field sampling protocols and standard laboratory protocols. Representativeness is achieved through following of the sampling plan design, sampling techniques, and sample handling protocols.

3.2 Comparability

Comparability is the qualitative similarity of one dataset to another (i.e., the extent to which different datasets can be combined for use). Comparability will be addressed through the use of field and laboratory methods that are consistent with methods and procedures recommended by Ecology and that are commonly used for groundwater studies.

3.3 Completeness

Completeness is a measure of the amount of data that is determined to be valid in proportion to the amount of data collected. Completeness will be calculated as follows:

Completeness =
(number of valid measurements/ total number of data points planned) x 100

The data quality objective (DQO) for completeness for all analytes is 95%. Data that have been qualified as estimated (J qualified) will be considered valid for the purpose of assessing completeness. Data that have been qualified as rejected will not be considered valid for the purpose of assessing completeness. Results will be considered valid if all the precision and accuracy targets are met. Resampling or re-analysis of remaining sample aliquots may be required if the completeness DQO is not met.

4 Sampling Procedures

The sampling program addressed in this QAPP is to:

- Collect water samples from permanent monitoring wells and well points (4.1)
- Collect soil samples from Geoprobe soil borings (4.2)
- Collect water samples from temporary well points (4.3)
- Collect indoor air and ambient air vapor samples (4.4)

Standard Operating Procedures and Field forms are included in Attachment A.

4.1 Sampling from Monitoring Wells and Well Points

Groundwater sampling will include measurement of field parameters to evaluate stability of groundwater collected from wells and in support of fate and transport analyses. Field water quality instruments will be calibrated at the beginning (prior to sampling) and middle of each day. Calibration data will be recorded on a field form or log book.

New, disposable, polyethylene tubing will be used to draw water from each monitoring well. The following tasks will be performed at each well:

- Measure and record static water level (distance from top of casing) to the nearest 0.01 foot using an electric well sounder and measuring tape.
- Use the EPA Low-Flow Groundwater Sampling Procedure (EPA, 2010b). This procedure includes several steps and can be summarized as follows. First, purge groundwater at a low rate (~100-200 mL/min). Second, monitor the discharge water for temperature, pH, and specific conductance at least three times during the purging period. Third, measure the purge volume using a calibrated bucket. Fourth, record purge water volume, time, and field parameter values in the field notes.
- Sampling may begin after three consecutive field parameter measurements (temperature, specific conductance, and pH) are stable. Continue purging water until three consecutive stable measurements are recorded. Sampling may be conducted without stabilization if the parameter trends are reasonably attributed to in-aquifer variability such as tidal flux.
- Collect samples of water for laboratory analysis in a manner that minimizes volatilization of constituents. Hands and clothing will be clean when handling sampling equipment and during sampling. Clean, disposable, latex gloves will be worn when filling bottles for analyses. Gloves will be changed when dirty and between samples. All water samples will be collected from the pump discharge lines directly into the appropriate sample containers. Samples submitted for dissolved metals analyses only will be filtered in the field prior to filling the sample container.

Collect samples in the following manner:

- VOCs and TPH-gasoline: For each sample, fill three 40-ml vials preserved with hydrochloric acid. Slowly fill each vial until all air is removed and sample water bulges slightly over the top of the vial. Wet cap with sample water and screw onto top of vial. Invert vial and tap with finger. The properly filled vial has NO visible air bubbles.

- Metals: Samples will be collected directly into lab-supplied bottles with acid preservative. For dissolved samples, water will be collected directly into lab-supplied bottles with acid preservative after passing through an in-line, disposable, 0.45-micron filter such as the Sample Filter Plus or equivalent installed in the discharge line of the pump. A new filter will be used for each sample. Sample bottles will be filled almost to the top but not overfilled.
- Other Parameters: There are no headspace or filtering concerns related to the other water quality parameters. Fill the laboratory prepared sample bottles almost to the top, taking care not to overfill.
- Record sample identification data on each sample container, in the field notes, and on the chain-of-custody. Sample identification will be the same as the well name/number and the sample collection date.

Stable is defined as:

- Specific conductance and temperature that do not indicate a trend (continuously increase or decrease between readings) and do not vary by more than 10 percent between readings.
- pH measurements that do not vary by more than 0.1 pH units between readings.

The container and preservative requirements are listed in Table 2.

4.2 Soil Sample Collection

For subsurface soil sample collection, a Washington-licensed driller will complete geoprobe borings using a push probe to advance a 2-inch diameter sampler. Water and soil samples will be collected at the intervals prescribed in the RIWP. The probe will be decontaminated before each use. Drill cuttings and decontamination water will be drummed for appropriate disposal.

Soil will be removed from the subsurface in 4-ft or 5-ft sleeves. Each sleeve will be cut open on a table and positioned with the upper end at the same side of the table each time. A photograph of the open sleeve placed next to a tape measure will be taken of each 4-ft or 5-foot sleeve. Percent recovery for the sleeve as a whole, and for any specific portions of the sleeve that differ from the general recovery will be recorded on a field form/boring log (Attachment A). As soon as feasible after the core sleeve is opened, the photo-ionization detector will be scanned over the soil for a qualitative indication of soil quality. Any areas with measurement spikes will be evaluated more closely.

The soil will be visually classified, and the following information will be recorded:

- Depth of visual observations and sample collection, with sample ID
- Physical soil description (soil type and color, stratification per ASTM 2488)

- Other distinguishing characteristics or features, such as debris or concrete
- If odors are noted, a photo-ionization detector reading will be recorded by placing soil in a plastic bag, shaking it, and inserting the probe into the bag; indigo-blue dye test kits may also be used for soils exhibiting gasoline- or diesel-like odors.
- Qualitative moisture content (dry, damp, moist, wet, saturated).

Sample containers for all analyses except VOCs, metals, and TPH-gasoline will be filled directly from the Geoprobe sleeve using a gloved hand and clean stainless steel spoon, if appropriate. Disposable soil sampler will be used to obtain soil for VOCs, metals, and TPH-gasoline analyses. Gloves will be changed between samples. Stainless steel spoons will be decontaminated prior to each use (and between samples). Sample containers will be clearly labeled with sample ID, collection date and time, and project name, and then placed in an iced cooler for delivery to the laboratory within 24 hours of sample collection. Chain of custody will be maintained. The sample ID is the boring and the depth below ground surface. The container and preservative requirements are listed in Table 2.

4.3 Groundwater Sampling from Geoprobe Locations

Groundwater samples collected from geoprobe borings will be collected with a temporary screen, placed to intercept the water table, and peristaltic pump as follows:

- Lower the new, clean polyethylene tubing into the well until the tubing intake is in the middle of the screened interval, or slightly above the middle of the screened interval. Secure the tubing to the top of the well and leave approximately 5 feet of tubing outside the well. Attach a 1-foot length of silicon tubing that is appropriate for a peristaltic pump to the polyethylene tubing.
- Attach the silicon tubing to the peristaltic pump. Purge (remove with pump) water from the well into a calibrated 5-gallon pail or similar and monitor flow rate.
- Purge at approximately 100-300 milliliters (0.03-0.09 gallons) per minute until turbidity has decreased. The goal is to create minimal screen velocities during purging such that fines, which may bias sampling results, are not captured. This goal may be difficult to achieve under some circumstances and may require adjustment based on site-specific conditions and professional judgment.
- Sampling may begin when turbidity has stabilized. Other field parameters at the time of sampling will be recorded. Field instruments are to be calibrated prior to use, according to the manufacturer’s instructions.
- Collect samples of water for laboratory analysis in a manner that minimizes volatilization of potential contaminants from the water into the air. Hands and clothing will be clean when handling sampling equipment and during sampling.
- Clean, disposable, latex, nitrile, or equivalent–material gloves will be worn when filling bottles for analyses. Gloves will be changed when dirty and between samples.

- All water samples will be collected from the pump discharge lines directly into the appropriate sample containers following the procedures described for filling sampling containers from monitoring wells.

The container and preservative requirements are listed in Table 2.

4.4 Vapor Samples

Vapor samples will include indoor air and ambient samples. All vapor samples will be submitted for analysis described in Table 2.

Indoor and ambient air samples will be collected over 24 hours so that a time weighted average sample could be collected. Samples will be collected using an integrated passive air sampler consisting of a 6-L laboratory-certified evacuated Summa canister. Each Summa canister will be equipped with a pressure gauge and a calibrated critical orifice air flow controller, all supplied by the laboratory.

Canister inlet valve heights for indoor air samples will be set to be approximately at the breathing zone of an office worker. Ambient samples will be set at the two main entrances to the building, locations will be determined based on wind data for the day of sampling.

Time-weighted average indoor air and ambient air samples will be collected with 6-L Summa canisters fitted with 24-hour flow controllers. The samples will be submitted to Friedman and Bruya analytical laboratory (Seattle, WA) to measure the concentrations of chlorinated VOCs and benzene using EPA Method TO-15 low-level (indoor air and ambient air samples).

4.5 Sampling Equipment

Field equipment and supplies include sampling equipment (e.g., bowls, tape measures), utensils (e.g., spoons), decontamination supplies, sample containers, coolers, log books and forms, personal protection equipment, and personal gear. Protective wear (e.g., hard hats, gloves) are described in the Health and Safety Plan. Sample containers, coolers, and packaging material will be supplied by the analytical laboratory.

4.6 Decontamination

If used, stainless-steel sampling equipment will be washed with Liquinox™ detergent and rinsed with distilled water prior to use and between sampling stations. The following decontamination steps will be performed on stainless-steel bowls and spoons using for compositing prior to use at each station:

- Wash with Liqui-nox™
- Double rinse with distilled/deionized water
- Final rinse with distilled/deionized water.

If a residual petroleum sheen remains on the sampling equipment or is difficult to remove using the standard decontaminations procedures above, a hexane rinse may be added, followed by a final rinse with distilled/deionized water. Sample equipment will be kept wrapped in aluminum foil until time for use. To minimize sample cross-contamination, disposable gloves will be replaced between samples. If any equipment decontamination occurs, an equipment blank will be collected by pouring distilled water over the equipment and collecting in a set of the same sample containers as those used for the environmental samples the equipment is used to collect.

Gloves will be changed between each sample. Tubing used to collect groundwater samples is also disposable. Water level and field parameter meters will require decontamination between sample collection locations.

4.7 Sample Nomenclature

The sample nomenclature is identified in the RIWP.

4.8 Sampling Containers

Requirements for sample containers and storage conditions are provided in Tables 2 and 3. Samples analyzed for TPH-diesel, VOCs, and dissolved metals (groundwater only) will require chemical preservation, which will be present in the laboratory-supplied containers. All sample containers will have screw-type lids so that they are adequately sealed. Lids of the glass containers will have Teflon^{TM} inserts to prevent sample reaction with the plastic lid and to improve the quality of the seal. Commercially available, pre-cleaned jars will be used, and the laboratory will maintain a record of certification from the suppliers. The container shipment documentation will record batch numbers for the bottles. With this documentation, containers can be traced to the supplier, and bottle rinse blank results can be reviewed.

Sampling containers will be filled to minimize head space, and will be appropriately labeled and stored prior to shipment or delivery to the laboratory. Samples must be packed to prevent damage to the sample containers and labeled to allow sample identification. All samples must be packaged so that they do not leak, break, vaporize or cause cross-contamination of other samples. Each individual sample must be properly labeled and identified. When refrigeration is required for sample preservation, samples must be kept cool, by means of ice packs or double-bagged ice in coolers, during the time between collection and final packaging.

4.9 Field Logs

All field activities and observations will be noted on weatherproof paper at the time they occur. The field logs will be compiled in a binder in the chronological order they were completed. Information will include personnel, date, time, station designation, sampler, types and number of samples collected, photographs taken, weather conditions, health and safety meetings conducted (tailgate meeting), and general observations. Any changes that occur at the site (e.g., personnel, responsibilities, deviations from the RIWP) and the reasons for these changes will be documented in the field log. It will also identify onsite visitors observing the sampling. The Site is an actively used property, therefore only those specifically visiting/observing sampling activities will be documented. The Field Manager is responsible for ensuring that the field logs are correct.

All field activities and observations will be noted during fieldwork. The descriptions will be clearly written with enough detail so that participants can reconstruct events later, if necessary. Requirements for entries include:

- Field logs will be compiled in chronological order in a 3-ring binder, with the date and observer clearly marked on all field forms and note sheets.
- Entries will be made legibly with black (or dark) waterproof ink or pencil.
- Unbiased, accurate language will be used.
- Entries will be made while activities are in progress or as soon afterward as possible (the date and time that the notation is made should be noted, as well as the time of the observation itself).
- Each consecutive day's first entry will be made on a new, blank page.
- The date and time, based on a 24-hour (military) clock (e.g., 0900 for 9 a.m. and 2100 for 9 p.m.), will appear on each page.
- When the field activity is complete, the field binder will be physically entered into the project file and the pages will be scanned to a PDF file and saved in the electronic project library. Scanning of sheets may also occur after each day’s field activities.
- The person recording the information must initial and date each sheet. If more than one individual makes entries on the same sheet, each recorder must initial and date each entry. The bottom of the page must be signed and dated by the individual who makes the last entry.
- The Field Manager, after reading the day’s entries, also must sign and date the last page of each daily entry.
- Corrections will be made by drawing a single line through the original entry allowing the original entry to be read. The corrected entry will be written alongside the original. Corrections will be initialed, dated, and explained.

4.10 Chain-of-Custody Procedures

All samples must be clearly identified immediately upon collection. Each sample container label will list:

- Client and project name
- A unique sample description/sample ID
- Sample collection date and time.

Additionally, the container’s label may include:

- Sampler's name or initials
- Preservative, if applicable

- Analyses to be performed.

Chain-of-custody procedures will be used to document sample possession from the time of collection, through analysis, to disposal. Chain-of-custody forms will document transfers of sample custody. A sample is considered to be under custody if it is in one's possession, view, or in a designated secure area. One set of chain-of-custody forms will be used per laboratory shipment. The chain-of-custody record will include, at a minimum, the following information:

- Client and project name
- Sample collector's name
- Sampler’s company mailing address and telephone number
- Designated recipient of data (name, email, and telephone number)
- Analytical laboratory's name and city
- Description of each sample (i.e., unique identifier and matrix)
- Date and time of collection
- Quantity of each sample or number of containers
- Type of analysis required
- Any unique features of analysis, such as lower reporting limits
- Any requests to hold/archive samples
- Addition of preservative, if applicable
- Requested turn-around times
- Date and method of shipment.

When transferring custody, both the staff relinquishing custody of samples and the staff receiving custody of samples will sign, date, and note the time on the form. Samples to be analyzed by Friedman & Bruya Laboratory will not be shipped, but will be delivered by project personnel to the laboratory at the end of each sampling day. If samples are to be analyzed by other laboratories, they will either be delivered or shipped, depending on the location. All samples will be stored appropriately by the laboratory.

5 Measurement Procedures

Groundwater and vapor samples will be analyzed by the methods and to the reporting limits identified in Tables 2 and 3. The number of samples and the sample nomenclature are described in the RIWP.

The standard SVOC analytical method (8270D – selective ion monitoring [SIM]) for aqueous samples has a polycyclic aromatic hydrocarbon (PAH) reporting limit of 0.1 µg/L, 10-fold higher than the benzo(a)pyrene (or carcinogenic PAH [cPAH] toxicity equivalent [TEQ]) SL. Therefore, a trace-level modification of 8270D – SIM will be used to achieve 0.01 µg/L MRLs for the cPAHs. This modification requires collection of 2-liter sample, as opposed to 500 mL needed to achieve the 0.1 µg/L MRL.

6 Quality Control

6.1 Laboratory Quality Control

Only laboratories accredited in accordance with WAC 173-50, Accreditation of Environmental Laboratories will be used for this project. EPA Contract Laboratory Program (CLP) QA/QC procedures or similar efforts will be used for the analyses. Internal quality control procedures are used to produce consistently high-quality data. A routine QC protocol is an essential part of the analytical process. The minimum requirements for each analytical run are described here. Additional description of laboratory QA/QC procedures can be found in the laboratory's QA manual. A project narrative detailing analytical results must accompany all data packages submitted by the laboratory.

Preparation batches have a maximum of 20 field samples of the same matrix. QA/QC samples processed with each batch are:

- **One method blank**. The method blank is used to assess the preparation batch for possible contamination during the preparation and processing steps. It is processed along with and under the same conditions as the environmental samples. Concentrations of compounds detected in the blank will be compared to the samples. Any concentration of common laboratory contaminants (i.e., phthalates, acetone, methylene chloride, or 2-butanone) in a sample lower than 10 times that found in the blank will be considered a laboratory contaminant and will be so qualified. For other contaminants, any compounds detected at concentrations lower than five times that found in the blank will be considered laboratory contamination (EPA 2008). Values reported for the method blanks are expected to be below the MDLs for all analytes, except the common laboratory contaminants. Deviations from this must be explained in the laboratory project narrative(s).
- **One LCS**. The LCS is used to evaluate the performance of the total analytical system, including all preparation and analysis steps.
- **One MS**. Matrix specific QA/QC samples indicate the effect of the sample matrix on the precision and accuracy of the results generated using the selected method. The information from these controls is sample/matrix specific and is not normally used to determine the validity of the entire batch.
- **At least one duplicate**. Duplicates are replicate aliquots of the same sample taken through the entire analytical procedure. The results from this analysis indicate the precision of the results for the specific sample using the selected method. One duplicate sample is analyzed with each preparation batch. If sufficient sample is provided, this will be either an MSD. If not, an LCSD will be analyzed.
- **Initial and continuing calibration:** A calibration standard will be analyzed each time an instrument is calibrated. The instruments used to perform the analyses will be calibrated, and the calibrations will be verified as required by EPA methodologies. For example, a standard five-point initial calibration will be utilized to determine the linearity of response with the gas chromatograph/electron capture detection. Once calibrated, the system must be

verified every 12 hours. All relative response factors, as specified by the analytical method, must be greater than or equal to 0.05. All relative standard deviations, as specified by the analytical method, must be less than or equal to 30 percent for the initial calibration and less than or equal to 25 percent for the continuing calibration.

- **Surrogate evaluations:** Surrogate recovery is a QC measure used in organics analyses. Surrogates are compounds added to every sample at the initiation of preparation to monitor the success of the sample preparation on an individual sample basis (accuracy). Although some methods have established surrogate recovery acceptance criteria that are part of the method or contract compliance, for the most part, acceptable surrogate recoveries need to be determined by the laboratory. Recoveries of surrogates will be calculated for all samples, blanks, and QC samples. Acceptance limits will be listed for each surrogate and sample type and will be compared against the actual result by the data validator.
- **Laboratory management review:** The Laboratory Project Manager will review all analytical results prior to final external distribution (preliminary results will be reported before this review). If the QA Officer finds that the data meet project quality requirements, the data will be released as “final” information. Data which are not acceptable will be held until the problems are resolved, or the data will be flagged appropriately.

6.2 Field Quality Control

QA/QC samples will be collected during all sampling activities. Trip blank, field duplicate, and matrix spike/matrix spike duplicate samples will be collected as follows:

One water trip blank per sampling day will be prepared by the laboratory and will travel with the sample containers from and to the lab for analysis. This sample will be handled in the same manner as the groundwater samples. The blank will be submitted to the lab and will be analyzed for the EPA Method 8260 VOCs.

Field duplicate samples will use the same naming system as the environmental samples do that they are submitted “blind” to the laboratory. Field duplicates are useful in identifying problems with sample collection or sample processing. One duplicate sample will be collected for every 10 field samples of the same matrix. Each field duplicate will be analyzed for the same parameters as the samples to evaluate heterogeneity attributable to sample handling.

One matrix spike/matrix spike duplicate sample (MS/MSD) will be collected for every 20 field samples. Extra sample containers (the same as those for the environmental sample) collected for MS/MSD analyses will be noted in field notes and on chain-of-custody forms submitted to the analytical laboratory. Extra sample bottles for MS/MSD will be labeled with a “-MS/MSD” suffix for clarity in sample processing.

Rinsate and equipment blanks will not be collected for groundwater samples because samples will be collected using either disposable or dedicated sample tubing, which prevents cross-contamination.

6.3 Instrument and Equipment Testing, Inspection, and Maintenance

The primary objective of an instrument/equipment testing, inspection, and maintenance program is to aid in the timely and effective completion of a measurement effort by minimizing the downtime due to component failure.

Testing, inspection, and maintenance will be carried out on all field and laboratory equipment in accordance with manufacturer's recommendations and professional judgment. Hand-held field monitors will be used to monitor groundwater for field parameters. They will be calibrated and maintained according to the manufacturer's recommendations.

Analytical laboratory equipment preventative testing, inspection, and maintenance will be addressed in the laboratory QA manual, which will be kept on file at the contracted laboratory.

As appropriate, schedules and records of calibration and maintenance of field equipment will be maintained in the field notebook. Equipment that is out of calibration or is malfunctioning will be removed from operation until it is recalibrated or repaired.

6.4 Instrument and Equipment Calibration and Frequency

Field equipment and laboratory instrumentation used for monitoring and sample analysis will be subject to the following calibration requirements:

- **Identification**. Either the manufacturer's serial number or the calibration system identification number will be used to uniquely identify equipment. This identification, along with a label indicating when the next calibration is due, will be attached to the equipment. If this is not possible, records traceable to the equipment will be readily available for reference.
- **Standards**. Equipment will be calibrated, whenever possible, against reference standards having known valid relationships to nationally recognized standards (e.g., National Institute of Standards and Technology) or accepted values of natural physical constraints. If national standards do not exist, the basis for calibration will be described and documented.
- **Frequency.** Equipment will be calibrated at prescribed intervals and/or prior to use. Frequency will be based on the type of equipment, inherent stability, manufacturers' recommendations, intended use, and observation of equipment

readings over the course of the field work. All sensitive equipment to be used in the field or laboratory will be calibrated or checked prior to use.

- **Records**. Calibration records (certifications, logs, etc.) will be maintained for all measuring and test equipment used.

If field or laboratory equipment is found to be out of calibration, the validity of previous measurements will be investigated, and/or corrective action will be implemented. The Field QA Manager or the Laboratory QA Manager, respectively, will lead the evaluation process, which will be document in the field forms or laboratory log book, respectively.

All laboratory calibration requirements must be met before sample analysis may begin. The laboratory will follow the calibration procedures dictated by the analytical methods to be performed. If calibration non-conformances are noted, samples will be reanalyzed under compliant calibration conditions within method-specified hold times.

6.5 Inspection and Acceptance of Supplies and Consumables

The Field Manager will be responsible for material procurement and control. The Field Manager will verify upon receipt that materials meet the required specifications and that, as applicable, material or standard certification documents are provided, maintained, and properly stored with the project files. The Field Manager will also verify that material storage is properly maintained and that contamination of materials is not allowed.

The laboratory must document and follow procedures related to:

- Checking purity standards, reagent grade water, and other chemicals relative to intended use
- Preparing and storing chemicals
- Handling disposable glassware (including appropriate grade).

The Field Manager will be responsible for procuring and transporting the appropriate sample containers, equipment, and consumables (e.g., soap) to the Site. The containers will be pre-cleaned and certified by lot. If needed, reagents provided will be of the appropriate grade for the analysis. Records of these certifications and grades of material will be maintained on file at the laboratory.

7 Corrective Actions

Upon receipt of data, the QA Officer will evaluate field and laboratory precision by the RPDs between the field duplicate and sample data (using calculated totals for total PCBs, and cPAH TEQ and using other individual constituents). Non-conforming items and activities are those which do not meet the project requirements or approved work procedures. Non-conformance may be identified by any of the following groups:

- **Field staff/Manager**: during the performance of field activities, supervision of subcontractors, performance of audits
- **Laboratory staff**: during the preparation for and performance of laboratory testing, calibration of equipment, and QC activities
- **QA Staff**: during the performance of audits and during data validation, through the use of data to make decisions (i.e., do the data make sense?).

If possible, the Field Manager will identify any action that can be taken in the field to correct any non-conformance observed during field activities. If necessary and appropriate, corrective action may consist of a modification of methods or a re-collection of samples. If implementation of corrective action in the field is not possible, the non-conformance and its potential impact on data quality will be discussed in the data quality section of the RI/FS Report.

Corrective action to be taken as a result of non-conformance during field activities will be situation-dependent. The laboratory will be contacted regarding any deviations from the QAPP, will be asked to provide written justification for such deviations, and in some instances, will be asked to reanalyze the sample(s) in question. All corrective actions must be documented. The person identifying the nonconformance will be responsible for its documentation.

Documentation will include the following information:

- Name(s) of the individual(s) identifying or originating the nonconformance
- Description of the nonconformance
- Any required approval signatures
- Method(s) for correcting the nonconformance or description of the variance granted.

Documentation will be made available to project, laboratory, and/or QA management. Appropriate personnel will be notified by the management of any significant nonconformance detected by the project, laboratory, or QA staff. Implementation of corrective actions will be the responsibility of the Field Manager or the QA Officer. Any significant recurring nonconformance will be evaluated by project or laboratory personnel to determine its cause. Appropriate changes will then be instituted in project requirements and procedures to prevent future recurrence. When such an evaluation is performed, the results will be documented. If there are unavoidable deviations from this QAPP, the Project Manager will document the alteration and track the change in the subsequent deliverables.

8 Data Management Procedures

The project database will only have one result per constituent in a given sample. Where duplicate analyses of the same constituent are present in the data for the same sample due to reanalysis or inclusion in multiple analytical methods, only one value will be preserved in the primary database tables; this does not apply to duplicate samples which are maintained as separate samples in the database. The preserved value will be selected as follows: for non-detects, the result with the lower reporting limit; values without QA flags are preserved over flagged values; detections are selected over non-detects; where all other conditions are equal, the result with the higher concentration is preserved in the database.

For accepted data, concentrations will be averaged between the parent and field duplicate, using one-half the reporting limit if any values are undetected. The database will store both the parent and field duplicate data.

All hard copies of field forms or log book pages will be filed in the project library as scanned PDFs. Well installation logs and boring logs will be transcribed from hand-written field notes into formal electronic logs using LogPlot or a similar software program. Field forms, field-prepared boring logs, and LogPlot-style logs will be included in the RI/FS report appendices.

9 Audits and Reports

Field investigators will maintain field notes in a bound notebook or on field forms, and all documents, records, and data collected will be kept in a case file in a secure records filing area. All laboratory deliverables with verifiable supporting documentation shall be submitted by the laboratory to the QA Officer. The following documents will be archived at the laboratory: 1) signed hard copies of sampling and chain-of-custody records; and 2) electronic files of analytical data including extraction and sample preparation bench sheets, raw data, and reduced analytical data. The laboratory will store all laboratory documentation of sample receipt and login; sample extraction, cleanup, and analysis; and instrument output in accordance with the laboratory Standard Operating Procedure (SOP) or QA manual.

PDFs of all analytical reports will be retained in the laboratory files, and at the discretion of laboratory management, the data will be stored electronically for a minimum of 1 year. After 1 year, or whenever the data become inactive, the files will be transferred to archives in accordance with standard laboratory procedure. Data may be retrieved from archives upon request.

No audits, other than the identified data verification and validation will be conducted.

10 Data Verification and Validation

Analytes detected at concentrations between the MRL and the method detection limit (MDL) will be reported with a J qualifier to indicate that the value is an estimate (i.e., the analyte concentration is below the calibration range). J-qualified data are considered valid when completeness is calculated. Undetected data will be reported at the MRL. The MRL will be adjusted by the laboratory as necessary to reflect sample dilution or matrix interference.

No guidelines are available for validation of data for TOC. These data will be validated using procedures described in the functional guidelines for inorganic data review (EPA 2010), as applicable.

Verification of completeness and method compliance, as well as raw data entry and calculations by analysts will be reviewed by the Laboratory Project Manager. The Laboratory Project Manager will be responsible for checking each group or test data package for precision, accuracy, method compliance, compliance to special client requirements, and completeness. The Laboratory Project Manager will also be responsible certifying that data in PDFs and EDDs are identical prior to release from the laboratory.

Data validation will be completed by a third-party data validator. Data validation will be completed within two weeks after receipt of the complete laboratory data package.

The laboratory will generate Level 2B data package for all analytes. Validation of the analytical data will comply with criteria set forth in the CLP National Functional Guidelines for Superfund Organic Methods Data Review (EPA 2008).

11 Data Quality (Usability) Assessment

The QA Officer will review the field notebooks, laboratory reports, and the data validation report to determine if the data quality objectives have been met. Instances where the data quality objectives were not met will be documented. The usability of the data will depend on the magnitude of the data quality objective exceedance. Data that has been rejected will be flagged as “R” and will not be included in the database. The QA Officer will determine if rejected data trigger additional sample collection.

The achieved MRLs will be compared to the SL in order to determine if the produced laboratory data can answer the study questions. In some cases, the SL was set to the practical quantitation limit (PQL, also the MRL), and therefore those MRLs need to be achieved in order for the data to be usable.

12 References

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EPA 2006. SW-846 on-line, test methods for evaluating solid waste— physical/chemical methods. http://www.epa.gov/epaoswer/hazwaste/test/main.htm.

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EPA 2010b. Low Stress Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells. Revision 3, January 19, 2010. EQASOP-GW-001

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Tables

Table 1 Project Roles and Responsibilities

Role	Person	Responsibilities
Ecology Project Manager	David Butler (206-518-3513)	• Direct other Ecology staff and their consultants to review and comment on materials • Grant final approval on this QAPP, on data use, and on further data collection.
Consultant Team Project Manager	Grant Hainsworth (253-797-6323)	• Primary point of contact • Review all technical documents associated with the project for technical accuracy and feasibility, as well as adherence to budget and schedule.
Quality Assurance Officer	Jamie Stevens (206-799-2744)	• Monitor all aspects of the project to verify that work follows project plans • Review laboratory analytical data • Serve as liaison between the laboratory and Field Manager • Maintain a complete set of laboratory data • Evaluate conformance of the analyses with the specifications of this QAPP • Verify the reported results with the raw data • Check that EDDs match the analytical reports • Review compliance with field methods and procedures.
Field Manager	Rusty Jones (832-330-1359)	• Collect or direct collection of groundwater and vapor samples • Maintain a log (field log book) for all sampling-related activities • Coordinate the sampling operations to verify that the this QAPP is followed • Identify any deviations from this QAPP • Prepare the field data and information for RI/FS • Maintain the integrity of samples throughout sample collection and transport to the laboratory.
Laboratory Project Manager	Eric Young – Friedman and Bruya Lab (206-285-8282) Amy Goodall – Brooks Applied Lab (206-632-6206)	• Conduct analysis of water, soil and vapor samples • Practice quality assurance methods per internal laboratory SOPs and this QAPP, and document such practices • Verify quality of samples (e.g., cooler temperature) as they're received at the laboratory • Verify accuracy and completeness of laboratory reports and EDDs.

Table 2 Sample Analytes

Analyte	Preparation Method	Analytical Method	Method Reporting Limit	Lowest Initial Screening Level	Holding Time	Sample Container
Groundwater Samples						
Dissolved/Total Metals other than Mercury (µg/L)	200.8/ EPA Method 1638 ICP-DRC-MS *	200.8 with reductive precipitation/ Method 1638	0.0068 – 0.18 (CAS-calculated MDLs)	Copper = 2.4	6 months	Field filter into 500-mL plastic bottle with HNO_3 preservative to pH <2
Mercury (µg/L)	200.8 (same extract as other metals)	1631	0.2	0.2 (PQL)	28 days	Same as other metals
SVOCs (µg/L)	3510 with 2 extractions	High-volume EPA 8270D-SIM; possible silica gel cleanup for wood waste interferences	0.01	cPAH TEQ = 0.018	7 days to extract; 40 days to analysis	Two 1-L amber glass
VOCs (µg/L)	5030	EPA 8260C; potentially with SIM for groundwater	0.2 – 2	Vinyl chloride = 2.4	14 days (if preserved)	Three 40-ml vials preserved with hydrochloric acid
Diesel Range Organics (mg/L)	3510	NWTPH-Dx with silica gel cleanup	0.1	0.5	14 days to extract; 40 days to analysis	500-ml amber glass
Gasoline Range Organics (mg/L)	5030	NWTPH-G with silica gel cleanup	0.2	0.8	14 days (if preserved)	Three 40-ml vials preserved with hydrochloric acid
PCB Aroclors (mg/L);	Centrifuge by EPA SW-846; 3510	EPA 8082	5	5 (total PCB set to PQL)	1 year	1-L amber glass
Soil Samples						
Metals other than Mercury (mg/kg)	3050	EPA 6010	0.3 to 5	Selenium = 0.38	1 year	4-ounce glass
Mercury (mg/kg)	3050	CVAA	0.025	0.07	28 days	4-ounce glass
PCB Aroclors (µg/kg)	3550	EPA 8082	4	4 (total PCB ISL set to PQL)	1 year	4-ounce glass
SVOCs (µg/kg)	3550	EPA 8270D-SIM	5	N-Nitrosodiphenylamine = 24.9	14 days to extract; 40 days to analysis	4-ounce glass

Analyte	Preparation Method	Analytical Method	Method Reporting Limit	Lowest Initial Screening Level	Holding Time	Sample Container
VOCs (µg/kg)	5035	8260C	0.5 - 1	Trichloroethene = 2.4	48 hours to freeze; 14 days to analysis	Three methanol-preserved 40-ml VOA vials
Diesel Range Organics (mg/kg)	3550	NWTPH-Dx with silica gel cleanup	5	2,000	14 days to extract; 40 days to analysis	4-ounce glass
Gasoline Range Organics (mg/kg)	5035	NWTPH-G with silica gel cleanup	5	TPH-G with benzene = 30	14 days (if preserved)	Three methanol-preserved 40-ml VOA vials
Vapor Samples						
VOC/APH (Sim) Indoor air and Ambient air (ppbv)	TO-15 SIM/ EPA Method TO-15	TO-15 SIM/ EPA Method TO-15	0.2 ppbv	Benzene = 0.32	28 days	SUMMA Canister

Notes:

PCBs - polychlorinated biphenyl	APH- Air-Phase Petroleum Hydrocarbon
SVOCs - semivolatile organic compound	VOCs - volatile organic compound
mg/L- milligram per liter	µg/L - micrograms per liter
µg/kg - micrograms per cubic	mg/kg - milligram per kilogram
ppbv – parts per billion	SIM – Selective Ion Mode
ml– milliliters	PQL – practical Quantified limit
VOA – volatile organic analysis	EPA – Environmental Protection Agency

NWTPH – Dx – Northwest Total Petroleum Hydrocarbons – Diesel Range Organics

NWTPH – G – Northwest Total Petroleum Hydrocarbons - Gasoline Range Organics

*Chromium (III) and Chromium (VI) Speciation in Water by IC-ICP-MS (Ion Chromatography. Groundwater samples analyzed for metals will be analyzed using EPA Method 1638. EPA Method 1638 uses inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS), which allows for method detection limits below 1 µg/L even with saline interferences, and is modified with Closed-Vessel Hotblock Digestion.

Table 3 Measurement Quality Objectives

Parameter	Precision (RPD; lab/field)	Accuracy	Completeness	Preservation/ Storage
Metals	Soil: 20%/50% Water: 20%/35% Vapor: 20%/50%	70-130%	100%	Dark, 4^{o}C; freeze VOCs with 48 hours if not analyzed.
PCBs				
APH (vapor only)				
Dioxin and Furans (water only)				
Petroleum Hydrocarbons				
SVOCs				
VOCs				

Notes:

PCBs - polychlorinated biphenyl

APH- Air-Phase Petroleum Hydrocarbon

SVOCs - semivolatile organic compound

VOCs - volatile organic compound

Attachment A

Standard Operating Procedures and Field Forms

1 INTRODUCTION

1.1 Purpose and Applicability

This Standard Operating Procedure (SOP) describes the methods available for collecting subsurface soil samples using commercially available Geoprobe™ Systems or split spoon sampling methods or similar soil sampling equipment. Sub surface soil samples may be obtained using this system for purposes of determining subsurface soil conditions and for obtaining soil samples for physical and/or chemical evaluation.

This SOP covers subsurface soil sampling using Geoprobe™ Systems equipment; specifically, the Macro-Core Soil Sampler, and the Large Bore Sampler. Use of this sampling equipment requires use of the Geoprobe™ hydraulically-powered percussion/probing machine. The Geoprobe™ sampling methods are applicable to unconsolidated soil/fill materials and to a maximum depth of approximately 15-30 feet. The maximum depth is dependent on the site specific soil density because the sampling equipment is hydraulically-powered. Sample recovery is also dependent on grain size as very coarse gravel, cobbles, and boulders will occasionally cause premature refusal of the sampler.

This SOP also covers subsurface soil sampling by split spoon, which is a common method for obtaining samples at deeper depths (greater than 20 feet) but can also be used to collect shallower samples. Other types of samplers such as thin-wall tube samples (e.g. Shelby tubes), piston samplers and continuous core barrel samplers but are not discussed in this SOP, details of sampling related to these types of samplers can be found in the American Society of Testing and Materials standards.

1.2 General Principles

1.2.1 Geoprobe Sampling

The percussion/probing machine is typically mounted onto the bed of a truck or ATV-mounted so that a stable working platform is established. The percussion/probing machine pushes and hammers the soil sampling equipment vertically into the ground within the targeted sampling interval. The soil sampler is then extracted from the ground to recover the sample.

The Macro-Core Sampler consists of a 45-inch long by 1.5-inch diameter open-ended steel sampling tool with liners made of clear plastic (cellulose acetate butyrate), stainless steel, or Teflon®. The tool is designed for use in a continuous sampling capacity in an open borehole up to depths of approximately 30-50 feet. The borehole walls are required to stay open in order to collect a sample from the next depth interval. Once the sampling tool is removed from the ground, the inserted liner containing the soil

1 INTRODUCTION

1.1 Purpose and Applicability

This standard operating procedure (SOP) is concerned with the collection of valid and representative samples of groundwater from monitoring wells. The scope of this document is limited to field operations and protocols applicable during groundwater sample collection.

This SOP is written in a broad-based manner and considers the application of a variety of sampling equipment in the collection of representative groundwater samples. Respective state and/or federal agency regulations may require specific types of equipment to be used when applying this SOP to a particular project. The project manager should review the applicable regulatory requirements, if any, prior to the start of the field sampling program. Deviations from this SOP to accommodate regulatory requirements should be reviewed in advance of the field program and documented in the project work plan.

This SOP has been developed based on the Washington State Department of Ecology (Ecology) Standard Operating Procedure for Purging and Sampling Monitoring Wells plus Guidance on Collecting Samples for Volatiles and other Organic Compounds (Ecology 2014) and the Environmental Protection Agency Low Stress Purging and Sampling Procedures for Collection of Groundwater Samples from Monitoring Wells (EPA 2017).

1.2 Quality Assurance Planning

Sampling personnel should follow specific quality assurance guidelines as outlined in the site-specific QAPP. Proper quality assurance requirements should be provided which will allow for collection of representative samples from representative sampling points. Quality assurance requirements typically suggest the collection of a sufficient quantity of quality control (QC) samples such as field duplicate, equipment and/or field blanks and matrix spike/matrix spike duplicate (MS/MSD) samples. These requirements should be outlined in the QAPP. Additional information regarding quality assurance sample collection relevant to groundwater sampling is contained in Section 5.0 of this SOP.

1.3 Health and Safety Considerations

Groundwater sampling may involve chemical hazards associated with the materials being sampled. Adequate health and safety measures must be taken to protect project sampling personnel from potential chemical exposures or other hazards.

These measures must be addressed in the project Health and Safety Plan (HASP). This plan must be approved by the project Health and Safety Officer before work commences, must be distributed to all personnel performing sampling, and must be adhered to as field activities are performed.

2 RESPONSIBILITIES

2.1 Project Manager

The project manager is responsible for ensuring that project-specific requirements are communicated to the project team and for providing the materials, resources, and guidance necessary to perform the measurements in accordance with this SOP and the project-specific work plan.

2.2 Sampling Technician

It is the responsibility of the sampling technician to be familiar with the sampling procedures outlined within this SOP and with specific sampling, quality assurance, and health and safety requirements outlined within project-specific work plans (Sampling Plan, HASP, and QAPP). The sampling technician is responsible for collection of groundwater samples and for proper documentation of sampling activities as samples are being collected.

3 REQUIRED MATERIALS

Groundwater sampling objectives may vary significantly between projects. Project objectives should be defined within the project-specific work plans. The list of required materials below identifies the types of equipment which may be used for a range of groundwater sampling applications. From this list, a project-specific equipment list should be selected based upon project objectives and other factors such as the depth to groundwater, well construction, required purge volumes, and analytical parameters, among others. The various types of sampling equipment which may be used include:

Well Purging Equipment

- Bailers
- Bladder pumps
- Submersible pumps
- Peristaltic pumps
- Centrifugal Pumps
- WaterraTM pumps

Field Instruments

- Individual or multi-parameter meter(s) to measure temperature, pH, specific conductance, dissolved oxygen (DO) oxidation reduction potential (ORP), and/or turbidity

- Water level measuring device

- Interface probe or product detection paste

Sampling Equipment

- Reusable or disposable bailers

- Peristaltic pump

- Bladder pump

Sample Preparation Equipment

- Filtration equipment

- Intermediate containers

- Sample kit (i.e., bottles, labels, preservatives, custody records, cooler)

General Equipment

- Project-specific sampling plans (SAP, QAPP, HASP)

- Sample collection records

- Field notebook/pen

- Waterproof marker pens

- Deionized water dispenser bottler

- Sample cup

- Buckets

- Coolers, or sample shuttles

- Instrument calibration solutions
- Power source (generator of 12V marine battery)
- Equipment decontamination supplies
- Health and safety supplies
- First-Aid kit
- Tool box

Expendable Materials

- Deionized water supply
- Disposable bailer string (nylon or polypropylene)
- 0.45 micron filters
- Paper towels
- Plastic sheeting
- Ice/blue ice for sample preservation
- Disposable latex powder-free glove liners
- Disposable nitrile gloves
- Plastic trash bags
- Ziplock® bags

This equipment list was developed to aid in field organization and should be used in preparation for each sampling event. Depending on the site-specific sampling plan, additional material and equipment may be necessary and should be determined before the scheduled sampling event. Similarly, not all of the items shown in this list may be necessary for any one sampling event.

4 Method

4.1 Free Product Determination

Wells that may potentially contain free product should be assessed for product with an interface probe or product detection paste. Interface probes generally operate on the same principle as a water level tape although they are designed to register water and product levels usually with different audible tones. Product paste generally is used in combination with some type of measuring tape which is lowered into the well with a coating of paste applied to it. Wells containing free product are generally not used for groundwater sampling, since the concentration of contaminants present in the free product can adversely affect the quality of the water sample, lending to a non-representative water sample.

4.2 Water Level Measurement

To obtain a water level measurement, lower the probe of a water level measuring device into the well until the audible sound of the unit is detected or the light on an electronic sounder illuminates. At this time the precise measurement should be determined (to nearest 0.01 feet) by repeatedly raising and lowering the tape to converge on the exact measurement. Obtain the reading of the TOC measuring point. The water level measurement should be entered on the Groundwater Sample Collection Record or in the field records.

The measurement device shall be decontaminated immediately after use with a non-phosphatic detergent and rinsed with distilled water. Generally, only that portion of the tape which enters the water table should be cleaned. It is important that the measuring tape is never placed directly on the ground surface or allowed to become kinked. Measuring devices, including interface probes, which come into contact with free product will likely require more thorough decontamination.

4.3 Purge Volume Calculation

Wells designated for sampling require purging to remove stagnant water in the well. A single casing volume of groundwater will be calculated after measuring the length of the water column and checking the well casing diameter.

The amount of standing water can be calculated using a variety of methods. One equation is:

Well volume: V = 0.041 x HD2 = ____ gallons, where

- V is volume of water in the well, in gallons,
- H is height of water column in well (i.e. total well depth – measured depth to water), in feet, and
- D is the inside diameter of the well casing, in inches

4.4 Well Purging Methods and Procedures

4.4.1 Objectives

Prior to sample collection, purging must be performed for all groundwater monitoring wells to remove stagnant water from within the casing and gravel pack and to ensure that a representative groundwater sample is obtained.

There are three general types of non-dedicated equipment used for well purging and include: bailers, surface pumps and down-well pumps. The purge method and equipment selected should be specified in the project-specific work plans.

NOTE: This SOP only describes the most common equipment and methods used for purging. Other purging equipment, as well as dedicated equipment, can be used provided that the method employed does not have an adverse effect on the overall quality of the groundwater.

Regardless of the purge method, purge water temperature, pH, and specific conductance will be monitored at predetermined purge volumes and recorded on the Groundwater Sample Collection Record. Additional water quality parameters may be required by the project-specific sampling plan. In general, purging will be considered complete following the withdrawal of at least 3 to 5 well volumes of groundwater and when all field parameters have stabilized.

Purging a well to dryness may occur under some low-yield conditions or tidal conditions. When the well recovers, a cascading effect may occur within the screened zone which can volatilize some organic compounds. This may be considered inappropriate by regulatory agencies when volatile organic compounds (VOC) are the target analyte of interest. Purging a well to dryness, then sampling after it has recovered may be acceptable for other target analytes, however. Under low yield conditions, low-flow sampling pumps such as bladder pumps may be required for VOC sample collection.

4.4.2 Bailing

General

Bailing is often the most convenient method for well purging especially if only a small volume of purge water is required during the purge routine. Bailers are constructed using a variety of materials including PVC, polyethylene, stainless steel, and Teflon®. Teflon® bailers are generally most "inert" and are available in reusable and disposable form. Disposable polyethylene bailers are relatively inert and inexpensive. Reusable stainless steel and PVC bailers must be decontaminated between uses. Most commercially available bailers are constructed to fit into a 2-inch diameter well, although other bailer diameters are available.

Waterra™ foot valves are essentially bailer check valves which manually thread onto the bottom of standard pump tubing (polyethylene, teflon). The foot valves are commercially available in a variety of diameters in stainless steel, Teflon®, and high-density plastic (Delrin). The foot valves operate by manually or mechanically raising and lowering the valve assembly within the water column which raises the water level within the discharge tube. Flow rates usually in the vicinity of 1 gallon per minute can be achieved with these devices.

Measurements of the pumping rate, temperature, pH, and specific conductance (and/or other parameters as required) should be made after each purge volume is removed and documented on the Groundwater Sample Collection Record or in the field logbook. Samples may be collected after the required purge volume has been withdrawn and the field parameters have stabilized to within 10% of their preceding measurement. Project-specific sampling objectives may require that the sample be collected with a bailer.

Bailing presents two potential problems with well purging. First, increased suspended solids may be present in samples as a result of the turbulence caused by raising and lowering the bailer through the water column. High solids concentrations may affect sample representativeness. Second, bailing may be less feasible for deep wells or wells which require a large volume of water to be removed during purging because of the time involved with continuous insertion and removal/emptying of the bailer.

Bailing Procedure

Obtain a clean bailer and a spool of clean polypropylene or nylon bailer cord. Uncover the top end of the bailer and tie a bowline knot, or equivalent, through the bailer loop. Test the knot and the bailer itself to ensure that all knots and parts are secure prior to inserting the bailer into the well.

Remove the protective wrapping from the bailer, and lower the bailer to the bottom of the monitoring well and cut the cord at a proper length. Bailer rope should never touch the ground surface at any time during the purge routine. Tie a hand loop at the end of the bailer cord.

Raise the bailer by grasping a section of cord using each hand alternatively in a "rocking" action. This method requires that the sampler's hands be kept approximately 2-3 feet apart and that the bailer rope is alternately looped onto or off each hand as the bailer is raised and lowered.

Grab the bailer with one hand as it emerges from the well. Pour the bailed groundwater from the bailer into a graduated bucket to measure the purged water volume. Repeat this procedure until one complete purge volume of water is removed from the well.

At the end of one complete well purge volume, place a small of purged water into a sample cup. Measure temperature, pH and specific conductance (and for other assigned parameters) and record the results on the Groundwater Sample Collection Record or in the field logbook. Samples may be collected after the required purge volume has been withdrawn and the specific field parameters have stabilized to within 10% of their preceding measurement.

4.4.3 Surface Pumps

General

Well purging using pumps located at the ground surface can be performed with peristaltic or centrifugal pumps if the water level in the well is within approximately 20 feet of the top of the well.

Peristaltic pumps provide a low rate of flow typically in the range of 0.02-0.2 gallons/minute (75-750 ml/min). For this reason, peristaltic pumps are not particularly effective for well purging. Peristaltic pumps are suitable for purging situations where disturbance of the water column must be kept minimal for particularly sensitive analyses.

Centrifugal pumps are designed to provide a high rate of pumping, in the range of 5 to 40 gallons/minute (gpm), depending on pump capacity. Discharge rates can also be regulated somewhat, provided the pump has an adjustable throttle. These pumps also require polyethylene or teflon-lined polyethylene tubing as suction line. The pump may also require priming to initiate flow.

Peristaltic Pump Procedure

Attach a new suction and discharge line to the peristaltic pump. Silicon tubing must be used through the pump head and must meet the pump head specifications. A second type of tubing may be attached to the silicon tubing for use as the suction and discharge continuous discharge. If drawdown causes the discharge to stop, the suction line will be lowered very slowly further down into the well until pumping restarts.

Measurements of temperature, pH and specific conductance (and/or other assigned parameters) should be made after each well purge volume and documented on the Groundwater Sample Collection Record or in the field logbook. Samples may be collected after the required purge volume has been removed and the specific field parameters have stabilized to within 10% of their preceding measurement. Project-specific sampling objectives may require that the sample be collected with a bailer.

Measure the length of the suction line and lower it down the monitoring well until the end is in the upper foot or more of the water column. Start the pump and direct the discharge into a graduated bucket. Adjust the pumping rate with the speed control knob so that a smooth flowing discharge is attained.

Centrifugal Pump Procedure

Attach a new suction and discharge line to the centrifugal pump. Start the pump and record the stabilized rate of discharge. As with other well purging systems, measurement of temperature, pH, and specific conductance (or other parameters as required) will be made after each well purge volume has been removed. These measurements shall be recorded on the Groundwater Sample Collection Record or in the field logbook. Samples may be collected after the required purge volume has been removed and the field parameters have stabilized to within 10% of their preceding measurement. Project-specific sampling objectives may require that the sample be collected with a bailer.

4.4.4 Down-Well Pumps

Groundwater withdrawal using non-dedicated down-well pumps may be performed with a submersible pump or a bladder pump.

Electric submersible pumps provide an effective means for well purging and in some cases sample collection. Submersible pumps are particularly useful for situations where the depth to water table is greater than 20 feet and where the depth or diameter of the well requires that a large purge volume be removed before sample collection.

Commonly available submersible pumps include the Johnson-Keck pump model SP-82, the Grunfos Ready-Flow 2 pump, and disposable marine galley pumps, all of which are suited for operation in 2-inch or larger internal diameter wells.

Recently, the use of bladder pumps (positive gas-displacement pumps) has been promoted by the EPA for use in well purging and sampling primarily because the pumps can be operated at low flow rates (less than 1 liter per minute). Bladder pumps generally reduce the potential turbidity of the sample and theoretically reduce the potential for loss of VOC constituents, ultimately providing a more representative groundwater sample. Use of bladder pumps may require additional time for purging and sampling because of the low flow rate. Please note, however, that when using bladder pumps, it may not be necessary to purge an entire well volume of water prior to each check of the water quality parameters. Well purging is accomplished at such a low rate that, theoretically, the influent flow into the pump represents groundwater flow through the well screen, thereby eliminating the requirement for purging several entire well volumes of water before sample collection.

Bladder pumps usually consist of a stainless steel pump housing with an internal teflon or polyethylene bladder. Discharge tubing is generally made from teflon, polyethylene, or teflon-lined polyethylene. The pump is operated by lowering it into the water column within the well screen, then pulsing air into the bladder with an air compressor and pump controller unit. Pumps and controllers are often not interchangeable between manufacturers; therefore, it is usually necessary to have both items provided by the same manufacturer. Pump bladders are generally field-serviceable and replaceable.

A check of well condition may be required prior to inserting any down-well pump if the well has not been sampled for some time or if groundwater quality conditions are not known. The well condition check should include a check of casing plumbness as a bent well casing could cause a pump to get stuck. Casing plumbness can be checked by lowering a clean cylindrical tube with the approximate pump dimensions into the well. If the well casing is not plumb then an alternative purging method should be used.

The well inspection should also include a check of air quality or headspace conditions within the well for potentially explosive gasses and a check for free product which could foul the pump. Well casing headspace conditions can be monitored with a photoionization detector (PID) and/or an explosimeter for the presence of potentially explosive gasses. If potentially hazardous conditions exist, then an alternative purging method should be used. In general, it is rare for explosive conditions to be present.

The presence of free product should be determined before inserting the submersible pump into the well because free product may contaminate the pump's internal mechanisms making it extremely difficult to decontaminate. An interface probe should be used to check for free product.

Electric Submersible Pump Procedure

Once the above well conditions have been assessed, and assuming it’s safe to precede, slowly lower the submersible pump with attached discharge line into the monitoring well taking notice of any roughness or restriction within the well riser pipe. The pump should be placed in the uppermost section of the static water column of the monitoring well. The power cord should be attached to the discharge line with an inert material (i.e., zip-ties) to prevent the power cord from getting stuck between the pump, discharge line, and the well casing. Secure the discharge line and power cord to the well casing, using tape or a clamp, taking care not to crimp or cut either the discharge line or power cord.

Connect the power cord to the power source (i.e., rechargeable battery pack, auto battery, or generator) and turn the pump on. Voltage and amperage meter readings on the pump controller (if provided) should be monitored closely during purging. The operations manual for the specific pump used should be reviewed regarding changes in voltage/amperage and the potential impacts on pump integrity. Pumping should be discontinued if warning conditions occur and/or if the well is pumped to where drawdown falls below the pump's intake level.

If drawdown continues to the extent that the well is pumped dry, the pump should be shut off and the well allowed to recharge. This on/off cycle may be necessary in order to purge the well properly.

Measurements of the pumping rate, temperature, pH, and specific conductance (and/or other required parameters) should be made after each purge volume is removed and documented on the Groundwater Sample Collection Record or in the field logbook. Samples may be collected after the required purge volume has been withdrawn and the field parameters have stabilized to within 10% of their preceding measurement. Project-specific sampling objectives may require that the sample be collected with a bailer.

Bladder Pump Procedure

To operate the bladder pump system, the pump and discharge line should be lowered into the well close to the bottom of the well screen, and then secured to the well casing with a clamp. The air compressor should then be turned on to activate pumping. The pump controller is used to vary the discharge rate to the required flow.

Measurements of the pumping rate, temperature, pH, and specific conductance (and/or other required parameters) should be made at periodic intervals while water is removed and documented on the Groundwater Sample Collection Record or in the field logbook. Samples may be collected after the required field parameters have stabilized to within 10% of their preceding measurement. Generally, because of the low flow rate, samples are usually obtained from the bladder pump discharge line.

4.5 Sample Collection Methods and Procedures

4.5.1 Objectives

Groundwater samples can be collected using similar methods employed for purging, provided these methods do not adversely affect the quality of the groundwater. These methods include bailing, surface pumping and down-well pumping.

In most cases during sampling, groundwater will be transferred to the appropriate containers directly for the discharge source. During transfer, discharge tubing and other equipment shall not contact the inside of the sample containers. In addition, a clean pair of nitrile or latex gloves will be worn during sample collection and handling.

As a general rule of thumb, samples should be collected in order of decreasing volatilization of the target parameters. The preferred order of sample collection is as follows: volatile organic compounds, extractable organic compounds (e.g., semivolatile organic compounds, PCBs, pesticides), metals, and general water chemistry (ions and turbidity).

4.5.2 Bailers

The methods and procedures described in this section also apply to collecting groundwater samples with a bailer. If a bailer was used to purge the well, the same bailer may be used for sampling. If other well purging equipment was used, a decontaminated or new disposable bailer should be used for sampling.

When volatile organic compounds are the target sampling parameter, a bottom discharge tip should be used during sample transfer. A discharge tip restricts the outflow of the sample from the bailer and diminishes the potential for volatilization. Reusable bailers may require a special screw-on tip fitted with a bottom discharge top. Disposable bottom discharge tips are usually supplied with disposable bailers.

Bailer cord shall be discarded after sampling is completed. Disposable bailers should only be used in one well. Reusable bailers should be appropriately decontaminated between uses.

4.5.3 Surface Pumps

The methods and procedures described in this section for peristaltic and centrifugal pumps also apply to groundwater sample collection.

Peristaltic Pumps

Peristaltic pumps equipped with the appropriate type tubing will be used to collect groundwater from wells in which the water resides at a depth less than 20 feet. Sample bottles shall be filled directly from the pump's discharge line and care shall be taken to keep the discharge tube from contacting the sample container.

Groundwater samples requiring filtration prior to placement in sample containers can be placed in intermediate containers for subsequent filtration, or may be filtered directly with in-line disposable 0.45-micron filters.

After sampling is complete, all used tubing and filters shall be disposed of appropriately.

Centrifugal Pumps

Centrifugal pumps are generally not recommended for use in sample collection, especially when volatile organic compounds are the target analyte of interest. Samples for other analytes, however, may be obtained with use of an in-line sample trap. It is suggested that if samples cannot be obtained before going through the pump, that samples be obtained by using a bailer once purging is complete and pumping has ceased. Collecting samples from the pump discharge is not recommended.

After sampling is complete, all suction line tubing should be disposed of properly.

4.5.4 Down-Well Pumps

Electric Submersible Pump

Using the pump methods described in Section 4.9.4, groundwater samples can be collected directly from the pump discharge line, provided the discharge line is composed of inert material. Sample bottles will be filled directly from the discharge line of the pump. This method is generally not recommended for collection of volatile organic samples.

Bladder Pumps

Groundwater samples, including those collected for VOC analysis may be collected directly from the pump discharge tubing under active pumping conditions. Sample bottles will be filled directly from the discharge line of the pump.

After sampling is complete, the pump, discharge line and power cord shall be decontaminated and/or disposed of as required by the project-specific work plan.

Low Volume and Poor Recovery Wells - Purging and Sampling Procedures

Even with a low pumping rate, some wells experience significant drawdown or in extreme cases may even purge dry. Slow recovering wells or wells that purge dry require extra care in order to be purged and sampled with minimal disturbance to the water column and fine materials in and around the well screen.

For low volume and poor recovery wells, review past field data sheets if available for previous purge rates, amounts of drawdown, and purge volume prior to sample collection. Measure the well's water level. If you suspect the well may be low yielding, calculate the amount of standing water in one well volume as described in step 4.3.

If the well is not equipped with a dedicated sampling system, install a decontaminated pump or pump tubing. Slowly lower the equipment through the water column to avoid stirring up particulates. The final pump intake depth should be near the bottom of the screened interval. To prevent stirring up particulates it is important not to touch the well bottom. Record the intake depth on the field data sheet.

Once the pump or pump tubing is in place, slowly lower the water level probe back into the well. It is important to frequently measure the water level throughout purging in low volume or poor recovery wells to enable the pump rate to be adjusted downward if necessary.

Start purging at a rate less than 0.5 liter per minute if the pump capacity allows. Record the pump rate on the field data sheet. At regular intervals record field parameter values, water level, time of measurement, and amount of purge water discharged. Allow at least one complete exchange of water in the flow cell between measurements. Note and provide qualifying remarks if parameter readings are anomalous, the water level is dropping or if at some point the water level stabilizes. Record observations on the pumped waters appearance (e.g. clarity, odor, etc.) during purging and sampling. Continue purging until field parameters stabilize.

Attempts should be made to avoid purging low yielding wells dry. However, if this is not possible shut the pump off and allow the well to recover at least once before collecting samples. This generally constitutes an adequate purge, and the well can be sampled as soon as it has recovered sufficiently to produce an adequate volume of water to fill the sample containers. If time permits, purge the well a second time and allow it to recover before sampling. Samples should be collected within 24 hours of the final purge/recovery cycle.

It should be noted that there can be significant alterations in groundwater chemistry when a well is purged dry and allowed to recover before sampling. Groundwater chemistry can change as formation water surrounding or entering the screened interval of the well is exposed to air which can affect volatile organics and redox sensitive analytes. Increased turbidity can also be an issue when sampling metals and some general chemistry parameters (Ecology 2014). Collect samples once field parameters stabilize and any end of purge analysis has been conducted.

If the well has been purged dry and allowed to recover, field parameters should be measured after sample collection if there is an adequate volume of water. Sample containers should be filled in the order specified in the project QAPP. However, when sampling low-yielding wells which may not have a sufficient volume of water to fill all the sample containers, the relative importance of each analyte should be evaluated. Samples for analytes of most interest should be collected first.

4.6 Sample Filtration

Groundwater samples collected for total dissolved metals analyses will be filtered prior to being placed in sample containers and properly preserved. Groundwater filtration will be performed using a peristaltic pump and a 0.45-micron in-line water filter. Disposable filters are commonly available in 0.45-micron size. Low-capacity or high-capacity cartridges are available and may be selectively used based on sample turbidity.

The filtration of groundwater samples shall be performed either directly from the pump discharge line or from laboratory-supplied intermediate containers. In either case, well purging shall be performed first. Fresh groundwater shall then be filtered directly into sample containers.

4.7 Sample Handling

All samples collected should be packaged and handled according to ensure no breakage during shipping. Preservatives should be used where analytical methods require preservation. The QAPP will indicate the type of sample preservation necessary.

5 QUALITY CONTROL

5.1 Field Blank/Equipment Blank Sample Collection

Field blank samples serve as a quality assurance check of equipment and field conditions at the time of sampling. Field blank samples are usually prepared by transferring analyte-free water into a clean set of sample containers, then analyzing it as a sample. Sometimes, the analyte-free water is transferred over or through the sampling device before it is placed into the sample containers. This type of field blank sample is known as an equipment blank. The QAPP contains specific information regarding the type and number of field blanks or equipment blanks required for collection.

5.2 Field Duplicate Sample Collection

Field duplicate samples are collected for the purpose of providing two sets of results for comparison. These samples are used to assess precision. Duplicate samples are usually prepared by splitting the sample into two sets of sample containers, then analyzing each set as a separate sample. The QAPP contains specific information regarding the type and number of duplicate samples for collection.

5.3 MS/MSD Sample Collection

MS/MSDs provide information about the effect of the sample matrix on digestion and measurement methodology. For samples submitted for MS/MSD analysis, triple sample volume is generally required (contact the analytical laboratory for information specific to the project analytical parameters). The QAPP contains specific information regarding the frequency of MS/MSD samples.

6 DOCUMENTATION

Specific information regarding sample collection should be documented in several areas: the sample chain-of-custody record, sample collection record, field notebook, and sample labels, tags. Additional information regarding each form of documentation is presented in the following paragraphs:

6.1 Sample Chain-of-Custody Record

This ENSR standard form requires input of specific information regarding each collected sample for laboratory analytical purposes. The information requested includes site name and location, project number, field notebook reference, collection date and type of analysis requested. Each sample submitted for analysis is also listed individually using its field identification number, number and type of container, and requested analyses.

6.2 Groundwater Sample Collection Record

This form (Attachment 1 or 2) requires input of specific information regarding the collection of each individual sample including sample identification, water quality parameters, collection method, and containers/preservation requirements.

6.3 Field Logbook

This logbook should be dedicated to the project and should be used by field personnel to maintain a general log of activities throughout the sampling program. This logbook should be used in support of, and in combination with, the sample collection record. Documentation within the logbook should be thorough and sufficiently detailed to present a concise, descriptive history of the sample collection process.

6.4 Sample Labels/Tags

Sample labels shall be completed at the time each sample is collected and attached to each sample container. Labels will include the information listed below.

- Client or project name/project number
- Sample number
- Sample designation
- Analysis type
- Preservative
- Sample collection date
- Sample collection time
- Sampler's name

7 TRAINING/QUALIFICATIONS

Groundwater sample collection is a relatively involved procedure requiring formal training and a variety of equipment. It is recommended that initial sampling attempts be supervised by more experienced personnel. Sampling technicians should be health and safety certified as specified by OSHA (29 CFR 1910.120(e)(3)(i)) to work on sites where hazardous waste materials are considered to be present.

8 REFERENCES

Washington State Department of Ecology (Ecology) Standard Operating Procedure for Purging and Sampling Monitoring Wells plus Guidance on Collecting Samples for Volatiles and other Organic Compounds. Version 2.0. January 27, 2014.

EPA, Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, EQASOP-GW4. Revised September 19, 2017.

EPA, Handbook for Sampling and Sample Preservation of Water and Wastewater, EPA-600/4-82-029, September 1982.

EPA, RCRA Groundwater Monitoring Technical Enforcement Guidance, November 1992.

Geotrans, Inc., RCRA Permit Writer's Manual, Groundwater Protection, prepared for the U.S. EPA, Contract No. 68-01-6464, October 1983.

Code of Federal Regulations, Chapter 40 (Section 261.4(d)).

Low Flow Groundwater Sample Collection Record

Date:	**Well ID:**
Project Name:	**Location:**
Project Number:	**Collector(s):**
Start Time:	**End Time:**

Water Level Data

Total Well Depth:		Water Table Depth:	
Screen Interval:		Tubing Placement Depth:	
Well Volume		**Well Volume = 3.14*(R^2*H*(CF)** R= Radius (feet), 2 inch = 0.17 feet H = Height of the water column CF = conversion factor = 7.48 gal/ft3	
Purge Method:		Purge Rate:	

Water Quality Parameters

Time (24 hr)	Vol. Purged (L)	Temp (C)	pH	Spec. Cond (uS/cm)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Flow Rate (ml/min)	DTW	Color/ Odor

Acceptance Criteria defined:									
Temp	3%	pH	+/- 1.0 unit	Spec. Cond	3%	DO	10%		
Turbidity	<5 NTU*	ORP	+/- 10 MV	Drawdown	<0.3'*				
Sample Collection:						Duplicate Details:			

*Achievement of turbidity levels of less than 5 NTU, and stable drawdowns of less than 0.3 feet, while desirable, are not mandatory. If after 2 hours of purging indicator field parameters have not stabilized, discontinue purging, collect samples and provide full explanation of attempts to achieve stabilization.

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Low Flow Groundwater Sample Collection Record

Date:	**Well ID:**
Project Name:	**Location:**
Project Number:	**Collector(s):**
Start Time:	**End Time:**

Water Level Data

Total Well Depth (ft BTOC):		Initial Water Level (ft BTOC): Product Level (if applicable):	
Screen Interval:		Tubing/Pump Intake Depth:	
Well Volume:		Equipment and Additional Details:	
Purge Method:			

Water Quality Parameters

Time (24 hr)	Vol. Purged (L)	Temp (C)	pH	Spec. Cond	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (mL/min)	DTW (ft BTOC)	Color/ Odor

Stabilization guidelines:

Temp	3%	pH	+/- 1.0 unit	Spec. Cond	3%	DO	10%
Turbidity	<10 NTU*	ORP	+/- 10 MV	Drawdown	<0.3’*		

*Achievement of turbidity levels of less than 10 NTU, and stable drawdowns of less than 0.3 feet, while desirable, are not mandatory. If after 1 hour of purging indicator field parameters have not stabilized, discontinue purging, collect samples and provide full explanation of attempts to achieve stabilization.

Sub-slab Soil Gas Sampling Methods	June 30, 2020	**CRETE SOP No. 1014**
	Rev. # 1	
	Jamie Stevens	

1 INTRODUCTION

The purpose of this SOP is to provide field personnel with an outline of the specific information needed to collect and document representative subsurface soil vapor samples. The recommended soil vapor sampling technique, as presented in this SOP, is based on the assumption that soil vapor samples should be representative of chemicals that may volatilize from the uppermost aquifer into the vadose zone or from soil contamination within the vadose zone.

This SOP includes Sub Slab Soil Vapor and soil vapor from established monitoring points. A typical sampling set up is shown on Figure 1.

2 Sampling Equipment and Materials

The following equipment and materials are necessary to properly soil vapor sampling from an established sampling point:

- Sample port connector and tamper resistant lid screwdriver (if a tamper resistant lid is on the soil gas sample port)
- Summa canister sample manifold kit provided by laboratory
- Air pump and appropriate connection tubing, tee fittings, valves, and flow metering device for purging and sampling vapor ports.
- 1-liter Tedlar® bags to collect purged vapors if venting is not used.
- Sufficient number of Summa canisters and appropriate flow controllers to collect samples per the sampling and analysis plan.
- Equipment required for collection of samples using Summa canisters, including appropriate wrenches and pressure gauges.
- An accurate and reliable watch that has been properly set.
- A calculator.
- Field notebook, applicable sampling analysis plan, and Chain of Custody.
- Health-and-safety equipment and supplies (e.g., personal protective equipment [PPE]) as described in the relevant site health-and-safety plan (HSP).
- Shipping package for the Summa canisters.
- Meters to measure for oxygen, carbon dioxide and methane (typically a landfill gas meter) and a PID meter (for volatile organic compounds).

When leak testing is required, additional equipment and materials include:

- Leak test shroud of sufficient size to cover soil gas vapor probe and sampling train (including Summa canister).
- A soft gasket to seal the leak test shroud to the floor.

- Tracer gas (helium), supplied in a 20 cubic foot gas cylinder with flow regulator (note, helium used for inflating balloons 'balloon grade' is not acceptable for leak testing as it may have inpurtities which can contaminate the soil gas sample).
- Flow regulator with 1/8-inch barbed outlet and tubing to connect the helium gas cylinder to the shroud.
- MGD-2002 helium meter or equivalent.

If the sample probe is not established you will all need the following equipment:

The following equipment and materials are necessary to conduct sub-slab soil vapor sampling:

- Rotary hammer drill with a 1-inch and a 1/2-inch carbide tipped bit.
- Extension cord and/or generator (if no power outlets are available).
- For the sample probe – Stainless Steel 3" (length) implant, Rubber Shaft Plug, Connectors, Top Plug, Hose B, Stainless Steel Tube 1/4" x 12" x 0.35" (the sample tube may need to be cut to length to fit the slab thickness)
- sealant, or suitable substitute, to seal vapor port borehole annulus.
- Concrete hole patch, to seal vapor port borehole annulus.

Cox-Colvin Vapor Pin Methods

Sub-slab soil gas samples using cox-colvin vapor pin can be collected from just beneath or within a slab from a 5/8-inch or 1-inch diameter hole. The hole is drilled with a handheld rotary hammer style drill. Immediately following coring, a photoionization detector (PID) is inserted into the drilled hole to quickly check for VOCs, and will proceed with installing the sample point to minimize the introduction of soil gas into indoor air as described below:

> **Cox-Colvin Vapor Pin** - Vapor Pins are comprised of a barbed, stainless-steel sample point fitted with an inert, compressible, silicon sleeve. Each Vapor Pin is installed using a hammer and specialized installation tool to drive the Vapor Pin into a ⅝-inch-diameter vertical hole within the slab. Driving the Vapor Pin into the hole compresses the sleeve, creating a seal between the sample point and slab surface. Typically, slabs are thicker than 3 inches, so the bottom of the Vapor Pin will rest within the slab, above underlying soil. After the Vapor Pin is installed, the end with a hose barb is exposed at the ground surface. A fitted cap will be attached to the barb to allow the sub-slab soil gas to equilibrate without exposure to ambient air. A flushmounted installation will be used for locations where multiple sampling events are anticipated.

3 Sampling Procedure

3.1 Preparation

- Prior to beginning, clear sampling locations for utilities, verify access agreements are in place, and obtain required permits, as appropriate.
- Install sub-slab soil vapor sampling ports at locations described in the sampling and analysis plan as follows:

  - Drill a 1/2-inch borehole through the concrete floor of the building foundation to a depth of approximately 12-inches below the surface.
  - Over-drill a 1-inch borehole centered over the top of the 1/2-inch hole to a depth of approximately 3-inches. Construct the vapor point using the brass fittings and tubing described and insert in borehole. The vapor point should fit snug in the 1/2-inch borehole.
  - Seal the vapor port by installing approximately 1-inch of sealant above the vapor point and 2-inches of concrete patch flush to the floor surface to minimize short-circuiting.
  - Concrete should fully cure based on manufactures recommendations. Sufficient time should be allowed for soil gas to equilibrate.
- Assemble sampling train. The sampling train will be set up so that the Summa canister is in-line between the vapor port and the air pump, with a valve between the canister and the pump (see Figure 1 and Figure 2). Below are detailed manifold instructions specific to sample train manifolds provided by Friedman and Bruya laboratory in Seattle Washington. These general procedures would apply to most sample train configurations.

  1. Attach a section of FEP tubing to the sample point
  2. Attach the other end of the sample point tubing to a ¼ turn ball valve
  3. Connect the FEP tubing to the vinyl tee using a 1”-2” piece of silicon tubing on each end of the tee. The FEP tubing should be pushed up against the sample tee.
  4. Attach a piece of FEP tubing to the sample point ¼ turn valve, a second piece as the sample line and a third piece as the purge line
  5. Attach a ¼ turn ball valve to the purge line
  6. Make sure the cap is on the sample canister flow controller and quickly open and close the sample canister to measure the initial vacuum. The initial vacuum should read 30” of Hg. If the vacuum is below 25” of Hg, do not use – contact the laboratory (206)285-8282
  7. Ensure the sample canister valve is closed and remove the flow controller end cap
  8. Attach the sample line tubing to the flow controller on the canister using a ¼” nut and a PTFE ferrule. Do not open the sample canister.
  9. Attach a pump or purge canister to the purge line ¼ turn valve using a short piece of FEP or other tubing
  10. If using a purge can, attach with a ¼” nut and a PTFE ferrule

- Verify the Summa canister number engraved on the canister matches the number listed on the certified clean tag to insure proper decontamination of the canister was completed. Fill out the sample tag.
- Verify the canister valve is closed tightly and remove the threaded cap at the inlet of the canister.
- Attach the flow controller to the inlet of the canister, the flow controller will have a built in pressure gauge.
- Connect the Summa canister/flow controller to one outlet of the tee fitting.
- Connect air pump to the other outlet of the tee fitting, insert a 1/4-inch shutoff valve between the tee fitting and the air pump.

Leak Testing

Where leak testing is required, a shroud will be placed over the vapor port and the Summa canister to keep tracer gas in contact with the vapor port and fittings.

The shroud consists of a plastic bin of a known volume. Two holes will be drilled near the top of the shroud, one for connection of the helium gas cylinder and one for connection of the air pump located outside the shroud. A third hole will be drilled near the base of the shroud to monitor the helium concentration inside during sampling.

A water dam can also be used for leak testing. A water dam can be used with a vapor pin water dam, or a similar piece of PVC pipe. Use play-doh or VOC free modeling clay to create a seal between the dam and the floor.

Once the sample port is installed and the area free of dust, complete the following steps:

1. Roll a 1-inch diameter ball of Play-Doh or modeling clay between your palms to form a “snake” approximately 7 inches long and press it against the end of the pipe couple. Push the couple against the slab to form a seal between the pipe and the concrete.
2. Attach the sample tubing to the top of the sample port/vapor pin and pour enough distilled water into the pipe couple to immerse base of the sample port/vapor pin, and if desired, the tubing connection at the top of the sample port/vapor pin.
3. Purge the sample point as required by the data quality objectives. Concrete will absorb some of the water, which is normal; however, if water is lost to the sub-slab, stop, remove the water from the couple, and reposition the sample port/vapor pin to stop the leakage. Reseat the leak test equipment, if needed.
4. If the sample port/vapor pin is installed in the flush-mount configuration, the larger hole can be filled with water in place of the plastic pipe fitting and Play-Doh or modeling clay.

3.2 Sampling Methodology Sample Collection

- Purge the vapor port and sampling train at approximately 100 ml/min using the air pump to ensure the sample is representative of subsurface conditions. Capture purged vapor in 1-liter Tedlar® bags at the outlet of the air pump and release the vapor outdoors or purge directly to a well vented location.

Volume of Tubing

Three-five tubing volumes should be removed. Use the following equation to calculate volume to be purged:

$V = \pi \times r^2 \times l$

Where:
V = Volume of tubing
r = the inner radius of the tubing being used [inches]
l = the length of the tubing being used [inches]
π = 3.14
(Convert to ml using 1-inch^3 = 16.387 ml to determine how long to purge port)

Volume and Purge Time for One Probe Volume

Three probe volumes should be removed Use the following equation to calculate the time required to purge one probe volume:

$$\frac{D^2 \times P_d \times 9.24}{P_r} = P_t$$

Where:
D = Diameter of probe, inches
P_d = Probe depth, feet
P_r = Pump rate, liters per minute
P_t = Purge time for one probe volume, seconds

- **Shut-In Test Procedure -** Shut-In Test procedures should be performed to ensure that there is no loss in the sample train. Below are detailed shut-in test procedures specific to sample train manifolds provided by Friedman and Bruya laboratory in Seattle Washington. These general procedures would apply to most sample train configurations.

  1. Close the sample point ¼ turn valve
  2. Open the purge line ¼ turn valve
  3. Open the purge canister or turn on purge line pump until the vacuum gauge on the sample canister reads 10” of Hg or greater.
  4. Close the purge line ¼ turn valve
  5. Let the system sit at >10” of Hg vacuum for a minimum of 5 minutes.
  6. The manifold is not leaking if the reading on the vacuum gauge is unchanged after a minimum of 5 minutes.

Sample Collection

- Begin sample collection by closing the 1/4-inch shutoff valve between the Summa canister and the air pump and opening the valve on the Summa canister. Immediately record the pressure on the gauge as the “initial pressure” on the tag attached to the canister. Document the time and initial vacuum on the COC
- After sampling begins and the apparatus is verified to be operating correctly, leave the canister to fill.
- Record all sample information in the field book and/or applicable field forms including the following:
- Canister number and sample identification, Sample start date and times, Location of sample (distance from walls shown on building floor plan), Initial and final pressure of canister, Notes regarding leak test, if applicable.
- Return to check canisters periodically (depending on length of sample period), to ensure proper operation. It is necessary to check the canister prior to completion because the accuracy of the flow regulators can vary, causing the canisters to fill faster than expected.
- The final pressure at the end of sampling should be approximately -5 to -6 inches mercury (Hg). If the canister has already reached this point, sampling is complete, the canister valve should be closed, and the pressure recorded as the "final pressure" on the sample tag, the field book, and applicable field forms. Sample collection will be considered complete, regardless of final pressure, after the stated sample period has elapsed. Sample until the vacuum gauge reads 5” of Hg

    - 1L samples will take ~5 minutes; 6L samples will take ~30 minutes
- Record the exact pressure of the canister and time at the end of sampling on the sample tag for that canister, in the field book and on the applicable field forms.
- Verify that the canister valve is closed tightly, remove the flow controller, and replace the threaded cap at the top of the canister. Discard all sample tubing.
- Abandon vapor port by removing vapor screen and tubing, backfilling with glass bead, and patching with concrete.

Leak Testing

Before purging or sampling begins, place the leak test shroud over the vapor port/Summa canister sampling apparatus. The tubing from the tee connection above the canister will pass through the wall of the shroud to connect with the air pump outside.

Connect the helium cylinder to the leak test shroud using tubing from the flow regulator on the cylinder, through a hole in the wall of the shroud. Be sure to keep the cylinder in an upright position at all times.

Connect the helium meter to the leak test shroud using the hole near the base.

Use the flow regulator to slowly release helium into the leak test shroud until a predetermined concentration of helium is contained within the enclosed area. The helium concentration will be measured using the helium meter. Maintain helium concentrations throughout the sampling period by continuously bleeding cylinder gas into the shroud as needed.

Prior to collecting the canister sample, the vapor port will be purged as described in the previous section. Purged vapor contained in the Tedlar® bags will be field screened using the helium meter to ensure that the concentration of helium inside the bags is less than 5-percent of the shroud concentration. If leakage is detected, the vapor port seal will be enhanced and connections will be inspected and tightened. This process will be repeated until no significant leakage has been demonstrated.

After confirming no significant leakage, the 1/4-inch shutoff valve between the Summa canister and the air pump will be closed and the canister valve will be opened to begin collecting the sample.

3.3 Post-Sample Collection Procedures

Label all sample containers with the following information: sample identification, date and time sample was collected, the starting and ending canister pressure, the site name, and the company name. Include all this information in the field book plus the ending time of sample collection, and transfer pertinent information to the chain-of-custody record. Pack all Summa canisters in the original shipping containers, sealed with a custody seal, and send to the lab for analysis. The official holding time for this analysis is 30 days. However, attempt to get samples to the lab as soon as possible to allow lab time to conduct re-runs, dilutions, and low-level analyses, as necessary prior to sample expiration.

4 Analysis

The soil gas samples should be analyzed using EPA Methods TO-14 or TO-15, and when necessary/possible, low-level analysis or Selective Ion Mode (SIM) analysis to obtain the lowest achievable detection and reporting limits. Note the desired analytical methods on the Chain of Custody form, and be sure analysis for helium is specified for leak-tested samples. Additional analysis may be required based on the sampling program.

5 Decontamination

The equipment used for soil gas sampling does not require decontamination in the field. The Summa canisters will be individually cleaned and certified to 0.02 ppbv THC for the project-specific analyte list by the contract laboratory prior to shipment, or batch cleaned and certified. Sample manifold kits provided from the laboratory are decontaminated and purged for off-gassing. Insure that documentation of this certification is included on a tag attached to the canister and in the paperwork that accompanies the canister shipment from the lab.

6 Documentation

Record all field activities, environmental and building conditions, and sample documentation on the appropriate field forms and field notebook.

7 References

EPRI, Reference Handbook for Site Specific Assessment of Sub-Surface Vapor Intrusion to Indoor Air, March 2005.

Department of Environmental Protection, Commonwealth of Massachusetts, Indoor Air Sampling and Evaluation Guide, WSC Policy #02-430, Boston, Massachusetts, April 2002.

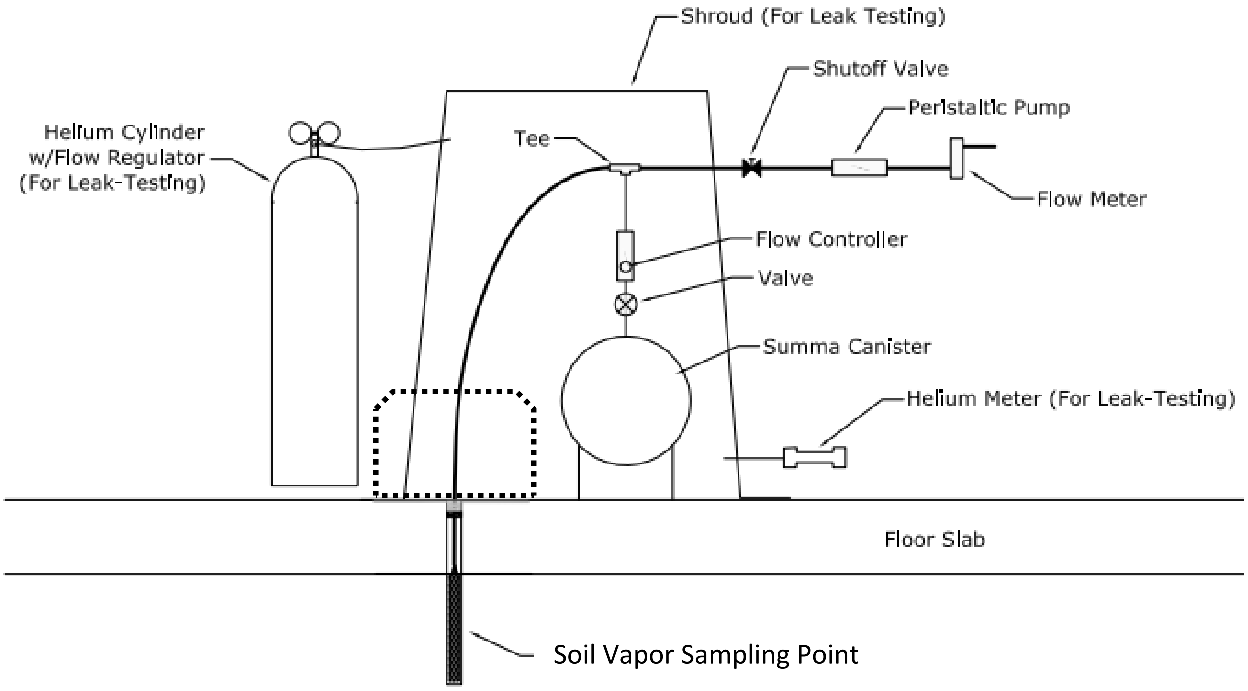
New Jersey Department of Environmental Protection, Vapor Intrusion Guidance, October 2005.

New York State Department of Health, Guidance for Evaluation Soil Vapor Intrusion in the State of New York, October 2006.

USEPA, Center for Environmental Research Information, Office of Research and Development, Compendium of Methods for Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Compendium Method To-14A, Determination of Volatile Organic Compounds (VOCs) in Ambient Air Using Specially Prepared Canisters with Subsequent Analysis by Gas Chromatography, January 1999.

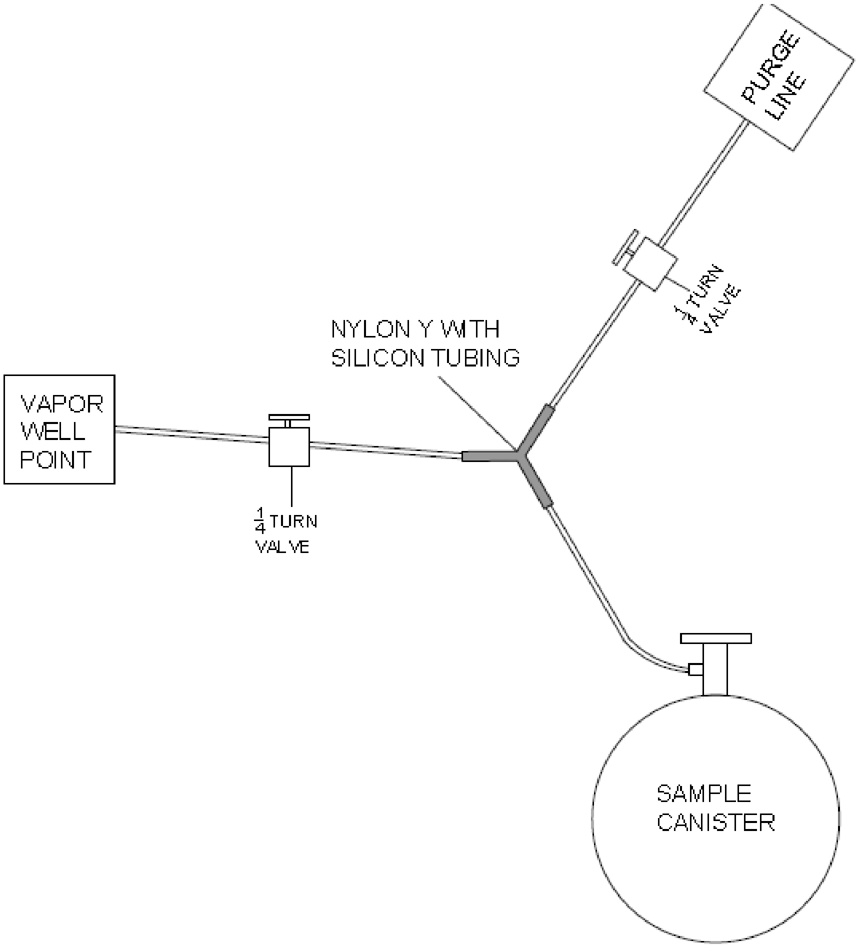
USEPA, Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway Form Groundwater and Soils, EPA530-F-02-052, November 2002.

Figure 1 – Typical Soil Vapor Sampling Train



Notes: Alternative shroud is shown as a dash line. A smaller shroud can be used around the surface of the sampling port.

Figure 2 – Typical Soil Vapor Sampling Train Layout



CRETE
CONSULTING, INC.

Soil Vapor Sampling - Field Form

Project	
Sampler	
Date and Start Time	
Date and End Time	
Weather Barometric Pressure (in Hg) (attach copies of detailed weather reports)	
Sample Port Type	
Leak Detection Method	

Location ID							
Surface Conditions							
Sample Canister LAB ID			Flow Controller LAB ID			Sample Canister Size	
Start Sample Time		Start Pressure (“ Hg)		End Sample Time		End Pressure (“ Hg)	
Analysis							

Purging Volumes and Purge Time

Purge Vol (ml)		Purge Rate (ml/min)		Time Required	

Leak Testing

Observation of Leak (bubbles) after 5 mins [if Yes, reinstall sample Vapor Pin and re-do leak testing]	

Sample Collection Notes/General Observations

PID (PPM)									

Shut-In Testing (minimum duration 5 minutes, system should maintain >10” of vacuum)

Start Time		End Time	
Start Pressure (“ Hg)		End Pressure (“ Hg)	

Decontamination of Field Equipment	May 2020	**CRETE SOP No. 1014**
	Rev. # 2	
	Jamie Stevens	

1 INTRODUCTION

1.1 Purpose and Applicability

This Standard Operating Procedure (SOP) describes the methods used for decontamination of field equipment used in the collection of environmental samples which may have contacted investigated media (including soil, groundwater, surface water, sediment, and other media). It is important to follow these procedures from a quality control (QC) perspective to ensure that environmental data generated in the field are of the highest quality and are not misrepresented or misinterpreted due to cross-contamination. Also, improperly decontaminated sampling equipment can lead to cross contamination and could expose field personnel to hazardous materials.

This SOP discusses the decontamination procedures to be used with reusable field equipment. Respective state or federal agency regulations may require specific types of equipment or procedures used in the decontamination of field equipment. The Project Manager should review applicable state/federal regulations (if any) prior to the start of field work and update this SOP per those regulations.

1.2 General Principles

Potential hazards associated with the planned tasks should be thoroughly evaluated prior to conducting field activities. The site-specific Health and Safety Plan (HASP) provides a description of potential hazards and associated safety and control measures.

Decontamination is accomplished by manually scrubbing, washing, or spraying equipment with detergent solutions, tap water, distilled/deionized water, steam and/or high pressure water or solvents. Generally this is conducted between each sampling site or collection points, unless sufficient sampling collecting tools are available. Waste decontamination materials, such as spent liquids and solids, are collected and managed as investigation-derived waste for later disposal.

Sampling personnel must wear powder-free nitrile gloves while performing the procedures described in this SOP. Specifically, nitrile gloves must be worn while preparing sample bottleware, preparing and decontaminating sampling equipment, collecting and processing samples, and packing samples. At a minimum, nitrile gloves must be changed prior to the collection of each sample or as necessary to prevent the possibility of cross-contamination with the sample, the sample bottleware, or the sampling equipment.

Consideration should be given to the order in which the samples are collected. In general, samples should be collected from areas suspected to be least impacted by contamination followed by areas suspected to be most impacted by contamination, thereby minimizing the potential for cross-contamination Prior to field activities, the field team should consider how investigation-derived waste (such as decontamination fluids) is to be handled.

1.3 Quality Assurance Planning Considerations

Sampling personnel should follow specific quality assurance guidelines as outlined in the site-specific Quality Assurance Project Plan (QAPP). Proper quality assurance requirements should be provided which will allow for collection of equipment blank samples in order to determine the effectiveness of the decontamination procedures.

Solvent selection is an important consideration and should be evaluated for each scope of work, at each site. There are several factors which shall be considered. The solvent should not be an analyte of interest, the sampling equipment should be resistant to the solvent, and the solvent must evaporate or be water soluble or preferably both.

Pesticide-grade methanol is the solvent of choice for general organic analysis. Hexane, acetone, and isopropanol are also good choices for organic analysis. A 10% nitric acid in deionized water solution is the solvent of choice for general metals analysis. Nitric acid can be used on Teflon, plastics and glass. If used on metal equipment, the nitric acid will eventually corrode the metal and could introduce metals from the sampling equipment into the environmental samples. Dilute hydrochloric acid can also be used for metal analysis.

All Decontamination should be performed a safe distance away from the sampling area as to not interfere with sampling activities.

1.4 Health and Safety Considerations

The health and safety considerations for the site, including both potential physical and chemical hazards, will be addressed in the site-specific Health and Safety Plan (HASP). All field activities will be conducted in conformance to this HASP.

At a minimum, the following precautions should be taken in the field during these cleaning operations:

- When conducting field cleaning or decontamination using laboratory detergent, safety glasses with splash shields or goggles, and latex gloves will be worn.

• No eating, smoking, drinking, chewing, or any hand to mouth contact should be permitted during cleaning operations

2 RESPONSIBILITIES

2.1 Sampling Technician

It will be the responsibility of the sampling technician to be familiar with the decontamination procedures outlined within this SOP, the HASP, the QAPP, and the Sampling Plan. The sampling technician is responsible for the proper decontamination of all field equipment and proper documentation. The sampling technician is also responsible for ensuring that all decontamination producers are following by all subcontractors. Decontamination may be required on heavy equipment; it is the responsible of the sampling technician to ensure all equipment has been properly decontaminated.

2.2 Field Project Manager

It will be the responsibility of the field project manager to ensure that the sampling technician understands the decontamination producers and has access to all materials required for decontamination. The field project manager is also responsible for all waste generated during decontamination producers.

3 REQUIRED MATERIALS

In addition to those materials provided by the subcontractor, the project geologist/sampling engineer may require:

- Decontamination agents
- Chemical free paper towels
- Waste storage containers
- Cleaning storage containers
- Cleaning brushes
- Pressure sprayers (if required)
- Squeeze bottles
- Plastic sheeting
- Aluminum foil
- Health and safety equipment (as required by HASP)
- Project notebook/field sheets/pen

Sampling equipment which comes in direct contact with environmental samples during the sample collection process should be constructed of stainless steel, teflon, or glass, unless specified otherwise in the Project Sampling Plan or QAPP.

4 METHOD

4.1 General Method Description

It should be assumed that all sampling equipment, even new items, are contaminated until the proper decontamination procedures have been performed, unless, certificate of analysis is available and demonstrates the items are clean.

It is important to set up a decontamination cleaning station. This will vary depending on site acitivites and site access. Generally speaking, an decontamination area for small/hand held equipment cleaning should include a barrier (e.g. plastic sheeting) to work on, should decontamination tubs and/or buckets and rinse bottles in order of use on top of the barrier. Decontamination solution containing solutions and water should be gathered and put into accessible containers within easy reach of the decontamination tubs). Record the source of the water in the field logbook.

For decontamination of drilling rigs or backhoes/excavators, establish an area for decontamination that will meet the program and site-specific requirements for collection of decontamination fluids. If necessary, set up a decontamination pad. If containerization of decontamination fluids associated with decontaminating large equipment (such as drilling rigs and backhoes/excavators) is required, it is imperative to ensure that the subcontractor will have appropriate equipment onsite. This equipment may include a portable electric generator and a high-pressure steam-cleaner or steam-jenny. In addition, a decontamination pad or portable containment system should be used to collect fluids. The contractor shall conduct gross decontamination (such as removing general mud from large equipment) prior to arriving at site.

All equipment used for sampling, testing, or measuring, including excavating and drilling equipment, that comes in contact with potentially sampled media will be decontaminated prior to use unless the equipment is prepackaged and sealed by a manufacturer of environmental sampling equipment. Reusable sampling equipment will also be decontaminated between sampling locations. If disposable sampling equipment (clean prepackaged materials) is used, this equipment will not be decontaminated before use and will be disposed of properly after one use. Disposable equipment will not be used at more than one sampling location.

The following presents decontamination procedures for manual sampling equipment and heavy equipment.

4.2 Equipment Decontamination – Small Hand Held Equipment

The following general decontamination steps should be applied to all equipment prior to initial use (unless using clean prepackaged environmental sampling equipment) or that have been utilized to collect sample media for analytical purposes. Site-specific project control documents may specify modifications to these procedures and should be followed when applicable. It is important to note that no acids or solvents will be used to decontaminate any electrical or electronic instrumentation unless specified by the manufacturer.

a. Physically remove visible material from the sampling equipment to the extent practical before decontaminating the equipment with decontamination fluids. If this material appears to be impacted based on visual observation, instrument readings, or other credible indication, collect and manage this material in accordance proper procedures.
b. Immerse (to the extent practicable) the equipment in the cleaning solution and scrub the equipment thoroughly with a stiff brush until visible residual material is removed and the equipment is visibly clean. Circulate detergent solution through equipment that cannot be disassembled such as submersible pumps (ASTM, 1990).
c. Rinse the equipment thoroughly with potable water.
d. Rinse the equipment with organic desorbing agent (e.g., isopropyl alcohol). If samples are not being collected for analysis of organic compounds, omit this step (ASTM, 1990).
e. Rinse the equipment thoroughly with potable or DI water.
f. To the extent practicable, allow the equipment to air dry in a clean area (equipment does not need to be completely dry before reuse; under certain weather conditions, complete air drying is not possible).
g. Change the initial decontamination solution daily and/or between sites at a minimum and more frequently as needed. Collect decontamination solvents in a separate container from water/detergent solutions and properly containerize, store, and dispose of decontamination solutions.

If decontaminated equipment will not be used immediately, the equipment may be wrapped in aluminum foil (if used for organics only) or sealed in a plastic bag for storage. Decontamination activities, including date, time, and reagents used, should be documented in the field logbook and decontaminated sampling equipment should be labeled with this information as appropriate.

4.3 Equipment Decontamination – Decontamination of Heavy Equipment

The following steps for decontamination can be applied to heavy equipment.

a. Physically remove as much of the visible material as possible from the heavy equipment after use and prior to steam cleaning. If contaminated material is suspected as determined by visual observations, instrument readings, or other means, collect material in an appropriate container. Otherwise, return the material to the area where it originated.
b. Place the heavy equipment on the decontamination pad in the decontamination area. If wash water is to be collected, ensure that the collection mechanism functions properly and that the decontamination pad has no leaks.
c. Steam clean parts of the heavy machinery that come into contact with visible material (such as tires, bulldozer bucket, augers, and back of drill rig).
d. For any portion of the heavy equipment that comes into contact with the sampling media, decontaminate by following listed in Section 4.2.
e. Containerize fluids, if appropriate. Place solids in a drum or other appropriate container.

5 QUALITY CONTROL

Quality control requirements are dependent on project-specific sampling objectives. The QAPP will provide requirements for equipment decontamination (frequency and materials), sample preservation and holding times, sample container types, sample packaging and shipment, as well as requirements for the collection of various quality assurance samples such as trip blanks, field blanks, equipment blanks, and field duplicate samples.

Equipment blanks and Field blanks are generally made by pouring laboratory-supplied deionized water into, over, or through the freshly decontaminated sampling equipment. Blanks should be labeled as a sample and submitted to the laboratory to be analyzed for the same parameters as the associated sample.

6 DOCUMENTATION

Various forms are required to ensure that adequate documentation is made of sample collection activities. These forms include:

- Boring logs
- Field log books
- Sample collection records
- Chain-of-custody records
- Shipping labels

The field team should document and log all field sampling decontamination methods. Repetitive decontamination of small items of equipment does not need to be logged each time the item is cleaned.

7 REFERENCES

ASTM. Standard Practice for Decontamination of Field Equipment Used at Nonradioactive Waste Sites: D 5088-90, 1990.

sample is removed from the tool. The soil sample is then cut from or extracted from the liner. This sampling tool is most often used for soil profiling and collection of larger volume soil samples (1,300 ml).

The Large Bore Sampler consists of a 22-inch long by a slightly over 1-inch diameter steel sampling tool and may be used for sampling to depths of approximately 30-50 feet. Various liner types are available for use with this sampler, and include: plastic, brass, stainless steel, and Teflon®. The metal liners are available in segmented 6-inch lengths. The sampler is designed for discrete interval sampling and is not affected significantly by borehole wall collapse. This sampler is similar to a piston sampler where a retractable drive (piston) point is withdrawn when the targeted sampling interval is achieved and the soil sample enters the sampler. Once the sampler is removed from the ground, the inserted liner containing the soil sample is extracted from the sampler and the soil sample is then cut from or extracted from the liner. The segmented liner materials and discrete interval sampling capability gives this device greater suitability for collection of smaller volume soil samples (320 ml).

1.2.2 Split Spoon Sampling

Split-spoon subsurface sampling methods require the use of a drilling rig (e.g. hollow-stem auger) to drill a borehole in which a split spoon sampling device is inserted and then driven to collect soil at the desired depth. The sampling device is driven using a weighted hammer and retrieved and opened to remove the recovered soil sample. Soil samples can be collected at continuous intervals or at pre-selected intervals. Typical split spoon samplers are used on a 2 inch diameter auger, though sampling devices come in a variety of sizes to fit difference auger diameters.

1.3 Quality Assurance Planning Considerations

Sampling personnel should follow specific quality assurance guidelines as outlined in the site-specific Quality Assurance Project Plan (QAPP). Proper quality assurance requirements should be provided which will allow for collection of representative samples from representative sampling points. Quality assurance requirements outlined in the QAPP typically suggest the collection of a sufficient quantity of field duplicate, field blank, and other samples.

1.4 Health and Safety Considerations

All utilities (electric, water, sewer, etc.) or property owners who may have equipment or transmission lines buried in the vicinity of proposed investigation area should be notified. Sufficient time should be allowed after notification (typically 3 working days) for the utilities to respond and mark locations of any equipment that may be buried on site. The estimated location of utility installations, such as sewer, telephone, electric, water lines and other underground installations that may reasonably be expected to be encountered during excavation work, shall be verified by the site owner prior to opening an excavation and may require a private utility locate to verify location and or material present.

The health and safety considerations for the site, including both potential physical and chemical hazards, will be addressed in the site-specific Health and Safety Plan (HASP). All field activities will be conducted in conformance to this HASP.

2 RESPONSIBILITIES

2.1 Project Geologist/Engineer

It will be the responsibility of the project geologist/sampling engineer to conduct subsurface soil sampling in a manner which is consistent with this SOP. The project geologist/sampling engineer will observe all activities pertaining to subsurface soil sampling to ensure that the SOP is followed, and to record all pertinent data onto a boring log. It is also the project geologist/sampling engineer's responsibility to indicate the specific targeted sampling depth or sampling interval to the drilling subcontractor. The project geologist/sampling engineer is also responsible for the collection of representative environmental or stratigraphic characterization samples once the sampling device has been retrieved and opened. Additional sample collection responsibilities include labeling, handling, and storage of samples until further chain-of-custody procedures are implemented.

2.2 Drilling Subcontractor

It will be the responsibility of the drilling subcontractor to provide the necessary Geoprobe™ or auger drilling equipment for obtaining subsurface soil samples. For Geoprobe™ equipment this generally includes the truck or ATV-mounted percussion/probing machine and one or more Macro-Core and Large Bore samplers in good operating condition, appropriate liners, and other necessary equipment for borehole preparation and sampling. For split spoon sampling a drill rig – such as a hollow-stem auger drill rig – and one or more split spoon sampling devices which fit with the drill rig augers, all of which should be in good operating condition.

It is the drilling subcontractor's responsibility to provide and maintain their own boring logs if desired. Equipment decontamination materials should also be provided by the subcontractor and should meet project specifications.

3 REQUIRED MATERIALS

In addition to those materials provided by the subcontractor, the project geologist/sampling engineer will require:

- Project Sampling Plan, QAPP, and HASP

- Field records/logbook (boring logs)
- Sampling spoons and sample collection bowl
- Stakes and/or fluorescent flagging for marking locations
- Sample kit (bottles, labels, custody records and tape, cooler)
- Folding rule or tape measure
- Equipment decontamination materials (as required by QAPP)
- Health and safety equipment (as required by HASP)
- Sheet plastic
- Decontamination materials and solutions

Sampling equipment which comes in direct contact with environmental samples during the sample collection process should be constructed of stainless steel, Teflon®, or glass, unless specified otherwise in the Project Sampling Plan or QAPP.

4 METHOD

4.1 General Method Description – Geoprobe

Geoprobe™ soil sampling methods generally involve collection of soil samples by driving the sampling tool directly into the ground using the percussion/probing machine and without the aid of hollow-stem augers or other casing-installed drilling methods. Both the Macro-Core and Large Bore soil samplers consist of metal tubes of seamless construction which cannot be split apart like split-spoons. Liner/sleeve inserts are required in order to extract an intact soil core/sample from the sampling device.

Both sampling devices operate by being directly pushed/hammered into the ground by the percussion/probing machine. The borehole is created as the sampling device is advanced downward. The Macro-Core Sampler collects samples continuously and requires that an open borehole be maintained for efficient sample recovery. The Large Bore Sampler contains a piston tip/drive point which allows for advancing the sampler to a designated depth for discrete interval sampling. The piston tip is retracted when the desired sampling interval is reached. When the soil sampling device is retrieved from the borehole, the drive head, cutting shoe and/or piston assembly is removed, and the liner insert with sample is removed from the sampling device. The project geologist/sampling engineer is then given access to the sample for whatever purpose is required.

4.2 General Method Description – Split Spoon Sampling

Split spoon sampling devices are typical construction of steel and most commonly available in lengths of 18 and 24 inches. Sampling device diameters are typical 1.5 to 3 inches. The sampling device includes a long tubular column with two halves that split apart lengthwise, a drive head is located on the upper end with a ball-check valve for venting and a hardened steel cutting shoe is located at the bottom. Soil enters the sampling device through the hardened steel cutting shoe as the sampler is driven into the ground to the required depth. Inside the cutting shoe is often a plastic or metal basket that prevents the soil sample from falling out of the shoe as the sample is retrieved.

Soil borings completed with a hollow-stem auger (typical for completing soil borings for the collection of soil samples) must have casing/augers of sufficient diameter to allow for the collection of the minimum soil sample volume required in the Sampling Plan. The casing/augers are advanced to the required sampling depth per the Sampling Plan. If hollow-stem augers are used, a temporary plug shall be used in the lead auger to prevent the auger from becoming filled with drill cuttings while drilling is in progress.

Use of added or recirculated water during drilling is permitted when necessary but should be minimized to avoid any possible impacts to the sample quality. Water usage shall be documented in the field notebook and should follow the QAPP or Sampling Plan.

4.3 Equipment Decontamination

Each sampling device must be decontaminated prior to its initial use and following collection of each soil sample. If sampling for soil logging only is conducted, thorough sampler decontamination between samples may not be necessary although sufficient cleansing is necessary for the sampler to operate properly. Site-specific requirements for equipment decontamination should be outlined in the Project Sampling Plan.

4.4 Sampling Procedures - Macro-Core Sampler

These procedures are excerpted from Geoprobe™ Systems literature. This SOP assumes that the subcontractor will perform sampling; therefore, detailed procedures regarding sample acquisition are not provided.

4.4.1 Sampler Preparation

- Decontaminate the sampler parts (cutting shoe, sample tube, liners) before assembly.
- Assemble the sampler by first placing the liner over the inside end of the cutting shoe, then inserting the liner/shoe assembly into the sample tube, and then finally threading the cutting shoe into the sample tube. Tighten the cutting shoe with the shoe wrench.
- Thread the sampler onto the drive head.

4.4.2 Sampling

- Using the percussion/probing machine, drive the sampler into the ground until the drive head reaches the ground surface.
- For deeper samples, the borehole walls must remain stable. The cutting shoe is designed with a tapered surface to limit sidewall scraping. Add additional probe rods until the sampler reaches the targeted sample interval, then drive the sampler through the desired sample interval.
- Use the machine hydraulics to pull the sampler from the borehole.

4.4.3 Sample Recovery

- Once the sampler has been removed from the borehole, the sampler must be unthreaded from the drive head, the cutting shoe unthreaded from the sampler, and the liner/shoe assembly removed from the sample tube.
- Disconnect the cutting shoe from the liner which contains the soil sample. The recovered soil sample may now be viewed, logged, and extracted from the liner for analysis (refer to Section 4.5 for sample containment procedures).

4.5 Sampling Procedures - Large Bore Sampler

These procedures are excerpted from Geoprobe™ Systems literature. This SOP assumes that the subcontractor will perform sampling; therefore, detailed procedures regarding sample acquisition are not provided. Additional detailed sampling procedures for this specific item of equipment is presented in Geoprobe™ Technical Bulletin No.93-660, appended to this SOP.

4.5.1 Sampler Preparation

- Decontaminate the sampler parts (cutting shoe, piston rod/tip, sample tube, liners) before assembly.
- Assemble the sampler by first placing the liner on the cutting shoe, then threading the liner/shoe assembly into the sample tube, then connecting the piston tip to the piston rod, and then finally inserting the piston tip/rod assembly into the sample tube. Tighten the cutting shoe with the shoe wrench.
- Thread the sampler onto the drive head. Thread the stop-pin onto the drive head (stop-pin holds the piston tip/rod in place while driving the sampler to the desired sample interval).

4.5.2 Sampling

- Using the percussion/probing machine, drive the sampler into the ground until the upper portion of the targeted sampling interval is achieved.

- Unthread and remove the stop-pin from the drive head using extension rods. This will activate the piston tip/rod.
- Drive the sampler through the targeted sampling interval to collect the sample. The piston tip/rod will retract as the sample enters the sample tube.
- Use the machine hydraulics to pull the sampler from the ground.

4.5.3 Sample Recovery

- Once the sampler has been removed from the ground, the sampler must be unthreaded from the drive head, then the cutting shoe unthreaded from the sample tube, and the liner/shoe assembly removed from the sample tube.
- Disconnect the cutting shoe from the liner which contains the soil sample. The recovered soil sample may now be viewed, logged, and extracted from the liner for analysis (below).

4.6 Sampling Procedures – Split Spoon Sampler

- Decontaminate the sampler parts (cutting shoe, piston rod/tip, sample tube, baskets) before assembly.
- Assemble the sampler by placing the 2 split halves together, thread the cutting shoe (with the basket inserted, if used) and then place the top ball check valve. Tighten the cutting shoe with the shoe wrench.
- Thread the sampling device to the drilling auger.

4.6.1 Sampling

- The driller will lower the split spoon into the borehole. The sampler will be driven, using Standard Penetration Test in ASTM Standards (ASTM D 1586-84) with a 140-pound hammer with a vertical free drop of 30 inches using two turns of rope on the cathead. The number of hammer blows required for every 6 inches of penetration will be recorded on the boring log.
- Once the split spoon is driven to depth, or to refusal, it will be removed, buy the driller, from the borehole.

4.6.2 Sample Recovery

- Once the sampler has been removed from the ground, the sampler must be unthreaded from the drive head, then the cutting shoe unthreaded from the sample tube, and the liner/shoe assembly removed from the sample tube.
- Disconnect the cutting shoe from the liner which contains the soil sample. The recovered soil sample may now be viewed, logged, and extracted for analysis (below).

4.7 Sample Containment

4.7.1 General

- The soil sample can be removed from the liner/split spoon device following viewing and/or logging. Non-segmented plastic or Teflon® liners should be cut with a utility knife into approximate 6-inch lengths to facilitate sample extraction or to isolate specific sample zones targeted for analysis. Segmented metal liners can be manually separated.
- Once the liner has been separated, the soil sample may be extracted from the individual liner segments with a spoon or spatula. Except for volatile organic samples (see below), the soil sample should be placed into a sample collection pan and homogenized. Place the sample directly into the required sample container.
- Once filled, the sample container should be properly capped, cleaned and labeled. Sample chain-of-custody and preservation procedures should then be initiated.
- Perform equipment decontamination following containment of the sample.

4.7.2 Volatile Organic Samples

- Using Geoprobe methods, the use of Teflon® liners is preferred when sampling for analysis of volatile organic compounds (VOC) because these liners are more inert. In order to limit the potential for loss of volatiles, the soil sample should be removed from the liner as soon as possible after sample recovery. VOC soil samples should be selected from a central point within the liner unless another specific sample zone has been targeted. The liner should be cut with a knife and the sample immediately extracted and containerized. Clean and label the container and place it into a cooler immediately. Residual sample may then be used to fill other sample or logging requirements.
- Using a split spoon sampling methods, to limit the potential loss of volatiles during sample collection, the soil sample needs to be obtained as quickly and as directly (from the sampler) as possible. This generally means the VOC sample is collected and placed in the sample container as soon as the split spoon is opened, prior to inspection of the soil or the collection of other samples. The VOC sample should be collected from a discrete portion of the entire sample interval and not composited or homogenized in the field, as this can cause VOC to volatize with the air.

5 QUALITY CONTROL

Quality control requirements are dependent on project-specific sampling objectives. The QAPP will provide requirements for equipment decontamination (frequency and materials), sample preservation and holding times, sample container types, sample packaging and shipment, as well as requirements for the collection of various quality assurance samples such as trip blanks, field blanks, equipment blanks, and field duplicate samples.

6 DOCUMENTATION

Various forms are required to ensure that adequate documentation is made of sample collection activities. These forms include:

- Boring logs
- Field log books
- Sample collection records
- Chain-of-custody records
- Shipping labels

Boring logs will provide visual and descriptive information for each sample collected and are often the most critical form of documentation generated during a soil sampling program. The field log book is kept as a general log of activities and should not be used in place of the boring log. Occasionally, sample collection records are used to supplement boring logs, especially for environmental samples which have been collected for laboratory analysis. Chain-of-custody forms are transmitted with the samples to the laboratory for sample tracking purposes. Shipping labels are required if sample coolers are to be transported to the laboratory by a third party (courier service). Original copies of these records should be maintained in the appropriate project files.

7 REFERENCES

ASTM D1586 / D1586M-18, Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils, ASTM International, West Conshohocken, PA, 2018, www.astm.org

ASTM D6282 / D6282M-14, Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations, ASTM International, West Conshohocken, PA, 2014, www.astm.org

Geoprobe™ Systems, August 1993, "1993-94 Equipment and Tools Catalog".

CRETE
CONSULTING, INC.

FIELD ACTIVITY LOG

PROJECT____________________

JOB NO.________________________________

DAY & DATE____________________________

COMPLETED BY________________________

APPROVED BY__________________________

SHEET OF

FIELD ACTIVITY SUBJECT:
DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

TIME	

VISITORS ON SITE:

CHANGES FROM PLANS OR IMPORTANT DECISIONS

WEATHER CONDITIONS:

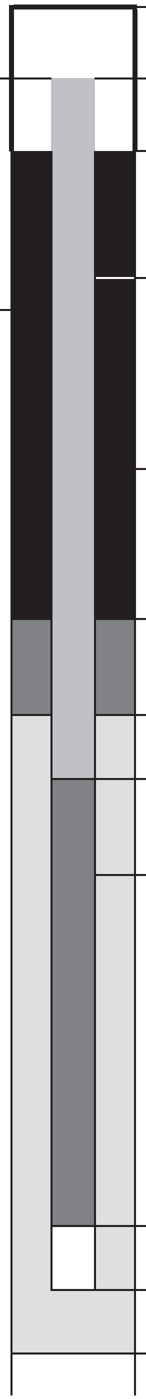
IMPORTANT TELEPHONE CALLS:

PERSONNEL ON SITE:

Monitoring Well Construction Detail

CRETE CONSULTING, INC.	*Client:*	WELL ID:
	Project Number:	
	Site Location:	*Date installed:*
	Well Location:	*Inspector:*
	Method:	*Contractor:*

MONITORING WELL CONSTRUCTION DETAIL



Measuring Point for Surveying & Water Levels

Cement, Bentonite, Bentonite Slurry Grout, or Native Materials

_____ % Cement

_____ % Bentonite

_____ % Native Materials

		Depth from G.S. (feet)	Elevation(feet) Datum ______
Top of Steel Guard Pipe			
Top of Riser Pipe			
Ground Surface (G.S.)			
Riser Pipe:			
Length			
Inside Diameter (ID)			
Type of Material			
Bottom of Steel Guard Pipe			
Top of Bentonite			
Bentonite Seal Thickness			
Top of Sand			
Top of Screen			
▼ Stabilized Water Level			
Screen:			
Length			
Inside Diameter (ID)			
Slot Size			
Type of Material			
Type/Size of sand			
Sand Pack Thickness			
Bottom of Screen			
Bottom of Tail Pipe:			
Length			
Bottom of Borehole			

Borehole Diameter ______

Describe Measuring Point:

____

Signature ______________________ Date ______________

CRETE CONSULTING, INC.

Low Flow Groundwater Sample Collection Record

Date:	**Well ID:**
Project Name:	**Location:**
Project Number:	**Collector(s):**
Start Time:	**End Time:**

Water Level Data

Total Well Depth:		Water Table Depth:	
Screen Interval:		Tubing Placement Depth:	
Well Volume		**Well Volume (gallons) = 0.041xH(D^2)** D= is in the inside diameter of the well casing, in inches H = Height of the water column (in feet)	
Purge Method:		Purge Rate:	

Water Quality Parameters

Time (24 hr)	Vol. Purged (L)	Temp (C)	pH	Spec. Cond (uS/cm)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Flow Rate (ml/min)	DTW	Color/ Odor

Acceptance Criteria defined:

Temp	3%	pH	+/- 1.0 unit	Spec. Cond	3%	DO	10%		
Turbidity	<5 NTU*	ORP	+/- 10 MV	Drawdown	<0.3'*				

Sample Collection:		Duplicate Details:	

*Achievement of turbidity levels of less than 5 NTU, and stable drawdowns of less than 0.3 feet, while desirable, are not mandatory. If after 2 hours of purging indicator field parameters have not stabilized, discontinue purging, collect samples and provide full explanation of attempts to achieve stabilization.

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Indoor Air/Ambient Air Sampling - Field Form

Project	
Sampler	
Date and Start Time	
Date and End Time	
Weather (attach copies of detailed weather reports)	
Sample Port Type	
Indoor or Ambient Location	

Location ID	
Location Details	

Sample Canister LAB ID			Flow Controller LAB ID			Sample Canister Size	
Start Sample Time		Start Pressure (“ Hg)		End Sample Time		End Pressure (“ Hg)	
Analysis							

Sample Collection Notes/General Observations

Date	Time	Canister Vacuum (in Hg)	Weather Conditions/Barometric Pressure (in Hg)

Observations/VOC product inventory around sample location

List any potential VOC containing products observed around sample location:	

Was HVAC Fan On?	
Was Heat on?	

Appendix H

Health and Safety Plan

HEALTH AND SAFETY PLAN
6901 Fox Avenue South, Seattle WA
Former Dawn Foods

Updated July 17, 2023

Prepared for:

Bridge Point Seattle 130, LLC

Prepared by:

CRETE
CONSULTING, INC.

HEALTH AND SAFETY PLAN
6901 Fox Avenue South, Seattle WA
Former Dawn Foods

July 17, 2023

Prepared by:

Rusty Jones

Rusty Jones, Project Geologist

Reviewed by:

Jamie C. Stevens

Jamie Stevens, P.E.

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Acronyms and Abbreviations

ACM	asbestos-containing material
APR	air purifying respirator
CDC	The Centers for Disease Control and Prevention
CIH	Certified Industrial Hygienist
CO_2	carbon dioxide
COC	chemicals of concern
COVID-19	coronavirus disease 2019
CRETE	CRETE Consulting, Inc.
dB	decibels
DOSH	Washington State Division of Occupational Safety and Health
DOT	United States Department of Transportation
EPA	United States Environmental Protection Agency
HASP	Health and Safety Plan
IDLH	Immediately Dangerous to Life and Health
IDW	investigation-derived waste
JHA	job hazard analysis
MSDS	material safety data sheet
NIOSH	National Institute for Occupational Safety and Health
PEL	permissible exposure limit
PPE	personal protective equipment
SDS	safety data sheet
Site	6901 Fox Ave South, Washington
STEL	short-term exposure limit
TWA	time weighted average
WAC	Washington Administrative Code
WHO	World Health Organization

1 Introduction

This Health and Safety Plan (HASP) describes the health and safety protocols to be used during the 6901 Fox Ave South, Seattle Washington WA (Site) Environmental Site Assessment. The field investigation will include the following site activities:

- Grab groundwater samples from existing monitoring well and well point locations.
- Indoor air and ambient air and vapor sampling

CRETE Consulting, Inc. (CRETE) will oversee all field work and collect all soil and groundwater samples from the Site. This plan was written by CRETE. All subcontractors will be contracted through CRETE and be supervised by a CRETE employee. Any further mention of CRETE in this HASP refers to field work performed by CRETE. Subcontractors involved in this work will follow the requirements of this HASP in addition to following their own HASPs. This HASP will address potential chemical hazards and general site safety, but will not address subcontractor-specific hazards related to their equipment or work practices.

General site information is summarized in Table 1-1. Background information pertaining to site history and general hazards is listed in Table 1-2.

In addition to the requirements set forth in this HASP, CRETE personnel shall comply with the HASPs and related protocols of all onsite Contractors and any health and safety protocols required by the Access Agreement.

1.1 COVID-19 Infection Control Procedures

Crete has established infection control procedures (Procedures) to address the coronavirus disease 2019 (COVID-19) pandemic impacting the Puget Sound region. The intent of these Procedures is to protect all employees, subcontractors, and visitors from infection by COVID-19 at sites where Crete is actively working. A detail of all Procedures in included in Appendix A.

These Procedures are based on what is currently known about COVID-19. The Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) are continually updating recommended protections as needed and as additional information becomes available. These Procedures will be updated as this information evolves.

Coronaviruses are a large family of viruses that are common in humans and many different species of animals, including cattle, cats, and bats. Rarely, animal coronaviruses can infect people and then spread between people, such as with MERS-CoV and SARS-CoV. The virus that causes COVID-19 is spreading from person-to-person across the United States and much of the world. It should be noted, however, that respiratory illnesses like seasonal influenza, are also currently widespread in many communities.

Reported COVID-19 cases have ranged from mild symptoms to severe illness and death. The following symptoms are most commonly reported. Symptoms may appear **2-14 days after exposure.**

- Loss of sense of smell
- Sore throat
- Fever
- Dry cough

If you develop **emergency warning signs** for COVID-19 get **medical attention immediately**. Emergency warning signs include:

- Difficulty breathing or shortness of breath
- Persistent pain or pressure in the chest
- New confusion or inability to arouse
- Bluish lips or face

SOCIAL DISTANCING

Based on the knowledge that COVID-19 can be spread through droplet transmission, the CDC has established a safe distance parameter of six feet between people. The following procedures are designed to provide guidance for spatial distancing on the jobsite.

- Workers, if working in a team, will take separate vehicles to the job site.
- A minimum distance of six feet should be maintained from other individuals on the worksite.
- Workers will not congregate in groups of more than four other individuals.
- Workers will not be permitted to come to work if they feel sick or exhibit any symptoms common to cold, flu or COVID-19. These symptoms include a fever, sore throat, or dry cough.
- No person will eat, drink, chew gum or tobacco in potentially contaminated areas or around other people. Drinking replacement fluids for heat stress control will be permitted only in areas that are free from contamination, except in emergency situations.

- Food should be consumed in a car or away from other individuals.
- All personnel leaving potentially contaminated areas will wash their hands and face prior to entering any new area. If that is not possible, hands should be sanitized with hand-sanitizer. Hands and face should be washed with soap and water as soon as it is feasible after leaving a job site.

1.2 Site Safety Plan Acknowledgment and Acceptance

The Field Manager (the CRETE staff onsite leading field activities) shall be responsible for informing all individuals assigned to work on the site of the contents of this HASP and for ensuring that each person signs the Site Safety Plan Acknowledgment Form (Appendix B). By signing the Site Safety Plan Acknowledgment Form, individuals recognize the site health and safety hazards, known or suspected, and will adhere to the protocols required to minimize exposure to such hazards. Subcontractors will also adhere to their own HASPs related to the work they are performing.

Visitors to the site who will not conduct work or enter active work areas will be required to sign the Visitor Sign-In Log in Appendix C.

1.3 Site Health and Safety Meetings

A pre-work meeting addressing site-specific health and safety issues shall be held on the first day of mobilization to the site and prior to the commencement of any work activities. Mandatory attendance is required for all personnel assigned to the particular tasks for which the equipment and crew was mobilized. The intent of these meetings is to discuss the site-specific health and safety issues (such as known or suspected contaminants), not to discuss activity-specific (such as sand blasting) health and safety issues.

At the conclusion of the meeting, personnel are to sign the Site Safety Plan Acknowledgment Form in Appendix B, indicating their attendance and understanding of the health and safety protocols. As additional personnel are assigned to the site, it is the responsibility of the Field Manager to ensure that new personnel are briefed on site-specific health and safety information and that they also have signed the Site Safety Plan Acknowledgment Form (Appendix B).

Daily tailgate meetings will be held by the Field Manager or field staff in charge of the day’s activities, and attendance will be documented in the tailgate meeting form in Appendix D.

1.4 Training Requirements

All personnel assigned to work on this site must have successfully completed 40 hours of Training for Hazardous Waste Site Work in accordance with the Washington State Division of Occupational Safety and Health (DOSH) WAC 296-843 or PCB awareness training.

1.5 Medical Monitoring Requirements

All personnel, including subcontractors, assigned to work on this site must be enrolled in a medical surveillance program meeting the requirements of WAC 296-841. Personnel must have successfully passed an occupational physical within the past 12 months and be medically cleared to wear appropriate personal protective equipment (PPE), including the respiratory protection prescribed in this Plan.

1.6 Fit Testing Requirements

All CRETE personnel and subcontractors assigned to work on this site must be familiar with the requirements of the DOSH respiratory standard (WAC 296-841). All personnel who are required to wear respiratory protection must have successfully passed a respirator fit test within the past 12 months. Personnel who do not have a current fit test are prohibited from working in areas where any potential exists for exceeding DOSH Permissible Exposure Limits (PELs). Documentation of a successful respirator fit test for the appropriate type of respirator needed for this work must be maintained by each contractor performing onsite work.

1.7 Project Staff Responsibilities

The Field Manager is responsible for overall project administration and for coordinating health and safety protocols and procedures for all onsite CRETE personnel at all times. All applicable United States Environmental Protection Agency (EPA), DOSH, state, and local health and safety requirements shall be followed throughout the course of the project. Any person who observes health and safety problems or infractions should immediately report the problem or infraction to appropriate personnel.

1.8 Hazard Communication

The Field Manager will advise all CRETE personnel assigned to this site of the hazards associated with working onsite and of the methods to mitigate those hazards and prevent exposures. This information will be presented to personnel prior to initiation of any field activities. The following information regarding site contaminants or any chemicals brought to the site to conduct the work will be presented to site personnel prior to conducting any field work:

- Material Safety Data Sheets or Safety Data Sheets (MSDS/SDS; Appendix E)
- Chemical/physical hazards
- Appropriate PPE for protection from exposure
- Labeling.

Table 1-1 General Information

Client: Bridge	
Site Name: 6901 Fox Ave South- Former Bunge Foods	
Site Location: 6901 Fox Ave South, Seattle WA	
Description of Field Activities: Site groundwater, soil sampling, drilling, and sub slab vapor and indoor air sampling	
Dates of Field Activities: Q1-Q4 2020	
Project Manager: Grant Hainsworth, CRETE	**Project Manager Telephone Number:** 253-797-6323
QA Officer: Jamie Stevens, CRETE	**Office:** Seattle
Field Manager: Jamie Stevens, CRETE	
The following requirements have been fulfilled for each employee to work onsite: ☒**Completed OSHA 40-Hour HAZWOPER Training or PCB Awareness Training** ☒**Current Medical Surveillance Examination (within last 12 months)** ☒**Current Respirator Fit Test (within last 12 months)** **Note:** CRETE employees and subcontractors may not enter a site unless the training/qualifications listed above are current.	

Table 1-2 Site Background

Overall Hazard Is:			
High: ☐	**Low:** ☐	**Moderate:** ☒	**Unknown:** ☐
Facility Description: The Property is currently used to store and manufacture dry bulk baking products. Part of the facility is a 'food grade' production area which requires additional health and safety measures – work is not expected to be conducted within those areas of the building. Past investigations at the site have indicated the soil and groundwater may be contaminated with petroleum products, chlorinated solvents, metals and products associated with historical boat building operations. The source of contamination is from leaks or spills over the operational history of the property.			
Status: This is an active commercial whole sale production facility. Considerable truck traffic is possible. Currently deliveries are not made via rail, but existing lines are in close proximity to the site.			
Unusual Features (containers, dikes, buildings, power lines, terrain, etc.): None			
Site History (worker injury, complaints, regulatory agency action): None within the last 10 years.			
Potential Waste Types: The site has known contamination in the soil and groundwater. Building materials likely contain contamination.			
Liquid: ☒	**Solid:** ☒	**Sludge:** ☐	**Debris:** ☒
Characteristics:			
Corrosive: ☒	**Ignitable:** ☐	**Volatile:** ☒	**Toxic:** ☒
Reactive: ☐	**Unknown:** ☒	**Radioactive:** ☐	**Other (name):** ☐
Hazards posed by site activities (Job Hazard Analysis in Appendix G): Potential injury during sample collection and possible exposure to contaminated materials.			
Unusual Hazards: None			

2 Health & Safety Risk Analysis

This section identifies the specific hazards associated with the building material field investigation work and presents an analysis of documented or potential chemical hazards at the site. Every effort must be made to reduce or eliminate exposure to these hazards. Hazards that cannot be eliminated must be abated by use of engineering controls and/or PPE.

2.1 Hazard Analysis Requirements

2.1.1 Job Hazard Analysis

A Job Hazard Analysis (JHA) Form (Appendix G) is a basic tool that allows personnel to think through the steps involved in each job and discuss how to complete the job safely prior to mobilizing to the field. Each JHA accomplishes the following:

- Breaks a job down into individual steps
- Lists the safety hazards in each step
- Lists appropriate precautions to be followed for each hazard and safety resources (engineering controls, PPE, equipment, permits, etc.) to be obtained and coordinated.

Completion of a JHA requires thoroughness and attention to detail, as well as input of all those who participate in the job. As part of this HASP and prior to commencement of work, initial JHA forms (Appendix E) for sample collection and the PCB paint removal pilot study have been completed and reviewed by the project Certified Industrial Hygienist (CIH). Each JHA will be modified if job scope or conditions change. If additional tasks are added to the scope of work in the field, a new JHA will be completed and approved by the CIH prior to the commencement of those additional tasks.

A JHA for the COVID-19 procedures is included in Appendix A and copied below for easy reference.

Work Activity	Primary Potential Hazards	Control Measures
All	Exposure to/spreading of COVID-19	Drive individually to the job site, lab, or to obtain equipment Do not engage in group work, if possible, if required, limit groups to no more than 4 people Direct workers to stay home if they are sick Wear gloves, and change as needed Maintain a six-foot distance from other individuals or don a mask if distancing is unavoidable Disinfect frequently touched objects Wash hands after using the restroom, lunch breaks and after co-handling objects Eat lunch in the car or away from others

2.2 General Site Hazards

2.2.1 Lighting

Work areas must have adequate lighting for employees to see to work and identify hazards. The building has no electricity and many of the windows have been covered. The interior is dimly lit and all personnel should have flashlights available and auxiliary portable lighting for all indoor activities, or if working outdoors after daylight hours.

2.2.2 Fall Protection

Work site slip, trip, and fall accidents can result in serious injuries or fatalities. Procedures to help prevent these types of incidents will be implemented. Elevated work (above 4 feet) where a fall potential exists will be performed using appropriate ladders and/or fall protection. Applicable DOSH standards for fall protection shall apply (WAC 296-155-246).

2.2.3 Temperature Extremes

The site is in Tacoma, Washington and extreme cold or heat events are unlikely. However, cold or heat stress can occur over prolonged exposures and can be intensified by PPE.

Cold Stress

Site personnel will be instructed on the signs, symptoms, and the prevention of cold-related disorders prior to performing specific work tasks. The two major effects of cold stress are frostbite and hypothermia.

- Frostbite: Sudden blanching of the skin progressing to skin with a waxy or white appearance, which is firm to the touch, but the tissue beneath the skin is resilient to the touch.
- Hypothermia: The symptoms of systematic hypothermia are exhibited as follows: (1) shivering, (2) apathy, listlessness, and (sometimes) rapid cooling of the body to less than 90F, (3) unconsciousness, glassy stare, slow pulse, and slow respiratory rate, (4) freezing of the extremities, and (5) death.

Personnel will monitor themselves and other team members for signs of frostbite and hypothermia. If temperatures fall below 20°F, thermal clothing may be required. Field activities will be curtailed if equivalent wind chill temperatures are less than 0°F, unless operations are of an emergency nature or are conducted indoors.

Heat-Related Illness

Work will be performed in accordance with WAC 296-62-095 with regard to heat-related illness. Site personnel may be required to perform their work tasks in ambient temperatures of 70°F or above or while wearing impervious clothing. All personnel must be instructed on the symptoms of the primary heat-related disorders and how to minimize their chances of becoming affected by them. These disorders, their symptoms, and first-aid measures are outlined below:

- Heat Rash: Decreased ability to tolerate heat, raised red vesicle on affected areas, and clothes that chafe. Maintain good personnel hygiene and use drying powders or lotions.
- Heat Cramps: Muscle spasms and pain in the extremities and abdomen. Rest in cool area and drink plenty of fluids. If pain persists, seek medical attention.
- Heat Exhaustion: Shallow breathing; pale, cool, moist, clammy skin, profuse sweating, dizziness, lassitude, and fainting. Rest in a cool area and drink plenty of fluids. Get medical attention prior to returning to work.
- Heat Stroke: Red, hot, dry skin, no perspiration, nausea, dizziness, confusion, strong rapid pulse, coma. Cool victim immediately with cool or cold water. Seek immediate medical attention.

At a minimum, personnel wearing non-breathable clothing at temperatures greater than 70°F should take a break every one to two hours and drink plenty of fluids. The intake of an average of one quart of fluids per hour is recommended. CRETE is required to provide enough water on site for each employee to drink one quart per hour on site. A cool or shaded rest area should be used.

2.2.4 Eye Wash

All operations involving the potential for eye injury, splash, etc., must have approved eye wash units locally available WAC 296-800-15030.

2.2.5 Hearing Protection

When the noise level of any operation exceeds the 8-hour Time Weighted Average (TWA) of 85 decibels (dB), a hearing protection program meeting the requirements of WAC 296-155-145 will be implemented. Noise monitoring will not be conducted during this project. If it you must raise your voice to be heard when talking to someone three feet away, that noise level is typically around 85 dB.

2.2.6 Fire Prevention

Operations involving the potential for fire hazards shall be conducted in a manner that minimizes the risk. Fire extinguishers shall be used or available as required. Sources of ignition shall be removed.

2.2.7 Confined Space Entry

If any operation is conducted in an area classified as a permit-required confined space by DOSH, a “Confined Space Entry Permit” will be completed and all applicable procedures meeting the requirements of WAC 296-155-203 will be implemented. No confined spacy entry is expected under this scope of work.

2.2.8 Severe Weather and Lightning

The Field Manager will monitor local media resources to identify possible severe weather situations at the project site. Site work may be delayed, postponed, or cancelled due to severe weather based on the Field Manager's discretion. In the event of a weather emergency, the site will be evacuated in accordance with Section 6 of this document.

Lightning can strike up to a distance of 10 miles, but thunder can only be heard at a distance of 8 miles. Therefore, if site personnel working outdoors hear thunder and/or see lightning, work will be stopped and personnel will move to an indoor location. If indoor facilities are not available, personnel will move inside of passenger vehicles such as cars and pickups. During a thunderstorm with thunder/lightning, avoid trees/poles, standing water, high areas, and metal structures (fences, scaffolding, etc.). Work will resume 30 minutes following the final observance of thunder and/or lightning.

2.2.9 Drum Handling

Accidents may occur during handling of drums and other IDW containers. Hazards include vapor generation and/or physical injury resulting from moving heavy containers by hand and working around drums and heavy equipment. DOSH regulations (WAC 296-155) include general requirements and standards for storing, containing, and handling chemicals and containers, and for maintaining equipment used for handling materials. EPA regulation 40 CFR Part 265 stipulate requirements for types of containers, maintenance of containers and containment structures, and design and maintenance of storage areas. Department of Transportation (DOT) regulations (49 CFR Parts 171 through 178) also stipulate requirements for containers and procedures for shipment of hazardous waste.

- Have a dry chemical fire extinguisher on hand to control small fires.
- Check for labels, markings, etc., and note conditions of containers.
- Before moving any drum or container, determine the most appropriate sequence in which the various containers should be moved.
- Exercise extreme caution in handling drums that are not intact or tightly sealed.
- Use the following types of equipment to move drums and/or containers: 1) drum grappler attached to a hydraulic excavator, 2) small front-end loader with a bucket sling, 3) rough terrain fork lift, or 4) drum cart.
- Train personnel in proper lifting and moving techniques to prevent back injuries.
- Have over packs ready before any attempt is made to move drums.
- Pressurized drums are extremely hazardous. If possible, do not move drums that may be under internal pressure as evidenced by bulging or swelling. This is not expected because the only drums to be handled during the Field Investigation are those storing IDW (PPE, blasting media, decontamination fluid).

- If a drum containing liquid cannot be moved without rupture, immediately transfer its contents to a sound drum using a pump designed for transferring the liquid.
- DO NOT use picks, chisels, or firearms to open drums.
- If pressure must be released manually, place a barrier such as explosion-resistant plastic sheeting between the worker and bung to deflect any gas, liquid, or solid that may be expelled as the bung is loosened.
- Reseal open bungs and drill holes with new bungs or plugs to avoid explosions and/or vapor generation. If an open drum cannot be resealed, place the drum into an over pack. Plug any opening in pressurizing drums with pressure venting caps set for 5 psi.
- Cover drum tops with plastic sheeting or other suitable non-chlorinated material to avoid excessive contact with drum tops.
- Never stand on drum tops.

2.2.10 Ladder Safety

Site activities that include ladder will follow these steps:

- Read and follow all labels/markings on the ladder.
- Avoid electrical hazards– Look for overhead power lines before handling a ladder. Avoid using a metal ladder near power lines or exposed energized electrical equipment.
- Always inspect the ladder prior to using it. If the ladder is damaged, it must be removed from service and tagged until repaired or discarded.
- Always maintain a 3-point (two hands and a foot, or two feet and a hand) contact on the ladder when climbing. Keep your body near the middle of the step and always face the ladder while climbing.
- Only use ladders and appropriate accessories (ladder levelers, jacks or hooks) for their designed purposes.
- Ladders must be free of any slippery material on the rungs, steps or feet.
- Do not use a self-supporting ladder (e.g., step ladder) as a single ladder or in a partially closed position.
- Do not use the top step/rung of a ladder as a step/rung unless it was designed for that purpose.
- Use a ladder only on a stable and level surface, unless it has been secured (top or bottom) to prevent displacement.
- Do not place a ladder on boxes, barrels or other unstable bases to obtain additional height.
- Do not move or shift a ladder while a person or equipment is on the ladder.
- An extension or straight ladder used to access an elevated surface must extend at least 3 feet above the point of support. Do not stand on the three top rungs of a straight, single or extension ladder.
- The proper angle for setting up a ladder is to place its base a quarter of the working length of the ladder from the wall or other vertical surface.

- A ladder placed in any location where it can be displaced by other work activities must be secured to prevent displacement or a barricade must be erected to keep traffic away from the ladder.
- Be sure that all locks on an extension ladder are properly engaged.
- Do not exceed the maximum load rating of a ladder. Be aware of the ladder's load rating and of the weight it is supporting, including the weight of any tools or equipment.

2.3 Chemical Hazards

Available historical environmental reports for the site indicate that there are no known chemicals of concern (COCs) for this scope of work. Asbestos and lead may be present in building materials. Because the unknown nature of the soil and groundwater COCs, workers should assume that soil and groundwater may have chemicals.

The COCs and applicable occupational exposure limits are listed in Table 2-1. Mold is also present in the building due to deteriorated building condition and water intrusion. There are currently no occupational exposure limits for mold. Workers will use appropriate PPE if exposure to a known or suspected contaminated medium is likely.

The primary routes of exposure for all chemicals on site are the inhalation of building debris particulate, inhalation of fibers, direct skin contact with contaminated media, or the accidental ingestion of contaminated building debris. The hazards are minimized by limiting dust generating activities, the use of vacuums and dust control systems during paint removal, segregating work areas from other non-work areas, the use of wet methods, and PPE.

The hazards discussed in this section represent those known to exist on site. Given the nature of the work on this project, it is of course possible to encounter hazardous materials that had not been previously identified, particularly during sampling activities. It is difficult to predict where unknown contaminants might be present; therefore workers involved in sampling activities must be alert to potentially contaminated media. Sensory cues such as discoloration or unusual odor provide some indication of the presence of contamination. If unanticipated contamination is encountered, all work in the area must cease immediately. If contamination is confirmed, the CIH will be notified and this plan will be amended accordingly.

All work with chemicals and contaminated media, whether previously identified or discovered during the course of work on the site, will be performed in accordance with the requirements of this Health and Safety Plan.

2.4 Potential Exposure Routes

2.4.1 Inhalation

It is assumed that some of the compounds identified in the site assessment will be released during site work in the form of dust. The use of mechanized dust collection systems and segregation of work areas will minimize worker exposure. Other workers in the vicinity of the site work should stage themselves at a safe distance upwind during paint removal or sampling activities, if possible.

Air monitoring will be conducted to ensure workers' airborne exposures are less than the Permissible Exposure Limits (PELs) and project action limits.

2.4.2 Skin and Eye Contact

Skin and eye contact with contaminated media presents a potential for worker exposure. For this reason, sturdy construction clothing, boots, and safety glasses shall be worn at all times by workers on-site to prevent potential exposure. Workers conducting PCB paint removal will be required to use chemical-resistant clothing, goggles, gloves, respirators, and follow decontamination procedures to further minimize the potential for skin contact with contaminated materials.

2.4.3 Ingestion

The inadvertent transfer of site contaminants from hands or other objects to the mouth could occur if site workers engage in eating, drinking, smoking, chewing gum or tobacco, or applying cosmetics in contaminated areas. This could result in accidental ingestion of site contaminants, potentially leading to illness. For this reason, eating, drinking, smoking, chewing gum or tobacco, applying cosmetics or similar activities are not allowed in the work area.

2.5 Chemical Hazard Information and Assessment

Table 2-1 lists the COCs known to be present in building materials on site and DOSH PELs and project action limits for site contaminants in air. The primary contaminants identified on the site are PCBs, lead, and asbestos.

This section discusses the hazards associated with the contaminants remaining on site. Employees may inhale contaminated dusts or come into direct contact with contaminated media while performing building material field investigations or otherwise handling the building materials.

Table 2-1 Chemical Hazards

Contaminant	Unit	PEL[a]	TLV[b]	REL[c]	STEL[d]	IDLH[e]	Odor Threshold	IP[f] (in eV)
Benzene	ppm	1	0.1	0.1	1	500	34-119	9.24
Toluene	ppm	200	50	100	150	500	0.16-37	8.82
Ethylbenzene	ppm	100	100	100	125	800	0.092-0.06	8.76
Xylene	ppm	100	100	100	150	900	20	8.44 - 8.56
Benzo(a)pyrene	mg/m^3	0.2 (soluble aerosol, as coal tar pitches		0.1	10 (mineral mist)	Ca	None Reported	NA
Diesel (as mist)	mg/m^3	5	5	5	10	Ca	None Reported	NA
Gasoline	ppm	None	300	LOQ 15	C, 500	Ca	None Reported	9.24
Phenol	mg/m^3	19	19	19	NA	962.5	0.04	NA
Naphthalene	ppm	10	10	10	15	250	0.084	8.12
Trichloroethylene (TCE)	ppm	100	50	25	NA	1000	1.36	9.45
Tetrachloroethylene (perc; PCE)	ppm	100	100	Ca	100	150 Ca	1	9.32
Dichloroethane	ppm	50	10	1	2	50	11.2	11.05
Dichlorobenzene	ppm	75	25	75	NA	150	0.72	8.98
Vinyl Chloride	ppm	1	1	1	5	NA	0.253	9.80

Note:

[a] OSHA Permissible Exposure Limit (PEL) (8-hour time weighted average [TWA])

[b] American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) (8-hour TWA)

[c] National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limit (REL) (8-hour TWA)

[d] Short-Term Exposure Limit (15-minute TWA that should not be exceeded at any time during the work day)

[e] Immediately Dangerous to Life & Health

[f] Ionization Potential

C = Ceiling Limit (Concentration that should not be exceeded during any part of the working exposure)

CA = Carcinogenic

mg/m^3: milligrams per cubic meter

2.5.1 Other Chemical Hazards

Other hazards may be posed by chemicals brought on site by CRETE or their subcontractors. In accordance with DOSH requirements for hazard communication, MSDS/SDSs are available for all products brought on site. In order to facilitate the accessibility by site workers, all MSDS/SDSs will be maintained in a separate binder and kept on site.

- CRETE employees and subcontractors will bring on site only those materials required to perform work on site. The following procedures will be followed to optimize use of the MSDS/SDSs.
- All CRETE employees will be briefed on material safety procedures, use of MSDS/SDSs for employee health information, and use of MSDS/SDSs for mishap response during safety meetings.
- In the event of a spill or other emergency event involving a material brought on site by CRETE employees, the MSDS binder will be brought to the mishap location for use by the Field Manager.

3 Personal Protective Equipment

PPE is required for all field work. The level of PPE required varies by the type and duration of potential exposures. The EPA terminology for protective equipment (Levels A, B, C, and D) provides guidance on typical work levels and required PPE. Requirements for Level C or Level D PPE are described below. Level A and B PPE are not anticipated for this project and are not described here.

Table 3-1 PPE for Project Activities

Activity	Level of PPE	Special Requirements
Groundwater, Soil, Vapor Sampling	Level D	None

3.1 Level D

Level D protection will be used when:

- The atmosphere contains no known hazard.
- Work functions preclude splashes, immersions, or the potential for unexpected inhalation of, or contact with, hazardous concentrations of chemicals.
- Atmospheric concentrations of contaminants are less than one half of the PEL.

Table 3-2 Level D PPE

☒	Standard construction clothing
☒	Work boots with safety toe
☒	Work gloves
☐	Safety goggles
☒	Safety glasses
☒	Hearing protectors (**REQUIRED** if site noise levels are greater than 85 dB based on an 8-hour TWA)
☒	Hard hat (**REQUIRED** if overhead or bump hazards exist)
☐	Hard hat with face shield
☐	**Modifications:**

4 Air Monitoring and Action Levels

According to WAC 296-841, air monitoring shall be used to identify and quantify airborne levels of hazardous substances and health hazards in order to determine the appropriate level of employee protection required for personnel working on site.

5 Decontamination

In general, everything that enters the PCB paint removal pilot test area must either be decontaminated or properly discarded upon exit from the containment. Material that is generated by decontamination procedures will be drummed and properly disposed of.

5.1 Personnel Decontamination

Personnel may become contaminated in a number of ways including, not limited to:

- Contacting particulates in the air
- Being splashed by materials during sampling or paint removal tests
- Walking through puddles or on contaminated soil
- Using contaminated instruments or equipment.

Even with safeguards, personnel contamination may occur. Harmful materials can be transferred into the clean area, exposing unprotected personnel. In removing contaminated clothing, personnel may contact contaminants on clothing or inhale them. To prevent such occurrences, decontamination procedures must be developed and established before anyone enters the site and must continue throughout site operations.

Personnel decontamination procedures will be based on the contaminants of concern and the level of protection being worn by site personnel.

5.2 Equipment Decontamination

All equipment will be decontaminated by the operator/subcontractor.

5.3 Disposal of Contaminated Materials

All materials and equipment used for decontamination must be disposed of properly (Table 6-1).

5.4 Emergency Decontamination

Personnel with medical problems or injuries may also require decontamination. There is the possibility that the decontamination may aggravate or cause more serious health effects. If prompt lifesaving, first aid, and medical treatment are required, decontamination procedures will be omitted. In either case, a member of the site management team will accompany contaminated personnel to the medical facility to advise on matters involving decontamination.

5.5 Sanitizing of Personal Protective Equipment

Respirators, reusable protective clothing, and other personal articles not only must be decontaminated before being reused, but also sanitized. The insides of masks and clothing become soiled due to exhalation, body oils, and perspiration. Manufacturer's instructions should be used to sanitize the respirator masks.

Table 5-1 Decontamination Procedures

☒	**Level D:** Wash hands before eating, drinking, smoking, or applying cosmetics. **Modifications:**

6 Emergency Response/Contingency Plan

It is essential that site personnel be prepared in the event of an emergency. Emergencies can take many forms: illnesses, injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, earthquake, tsunami, or sudden changes in weather. Table 6-1 outlines the contact information for emergencies. The first two numbers should be called in the order listed for all emergencies requiring immediate assistance. The other numbers are specific to emergency type (e.g., spill, poisoning). The Project Manager and the client contact are to be notified of the incident after the emergency situation is addressed.

Table 6-1 Emergency Contacts/Telephone Numbers

1. Fire, Police, Ambulance	911 or
Capable of Transporting Contaminated Personnel?	**Yes:** ☒ **No:** ☐
Hospital:	**Virginia Mason Hospital and Seattle Medical Center** **1100 9th Ave, Seattle, WA 98101** **(206) 223-6600**
Note: See map for route to hospital at the end of this section. ***The route to the hospital was verified by:*** Jamie Stevens. Distance from the Site to the hospital is: 5.7 miles. The approximate driving time is: 11 minutes.	
National Response Center (for spill reporting)	(800) 424-8802
Washington Emergency Management Division (for spill reporting)	(800) 258-5990 or (800) OILS-911
CRETE Consulting Office and Project Manager	Grant Hainsworth (253) 797 -6323 – cell/office
CRETE Consulting Personnel Medical Consultant	Valley Medical Center Occupation Health and Safety
CRETE QA Officer	Jamie Stevens (206) 799-2744 – cell/office
CRETE Field Manager	Jamie Stevens (206) 799-2744 – cell/office
Client Contact	Matt Gladney 425.749.4324

6.1 Incident Reporting and Management

In the event of any type of health or safety incident, including but not limited to, near misses, injury/illness, environmental release or impact, property damage, or a potential exposure the onsite Field Manager is responsible for providing a verbal notification to Port of Tacoma security as well as to Mike Byers, the Crete Project Manager, as soon as possible following the incident. Written follow-up and an evaluation of procedures leading up to the incident may be conducted depending on the severity of the incident.

The following steps should be followed if an injury or illness case occurs:

1) Check the scene of the injury or illness and; either provide first aid, if trained and the conditions are safe to do so, or call 911 to obtain emergency care for the victim.

2) Ensure that appropriate decontamination treatment for exposed or injured personnel is obtained.

3) Once the victim is stabilized, place the following calls in the following order :

Grant Hainsworth (Crete) (253) 797-6323 (cell)

4) Mike Byers will then call the following individuals:

Matt Gladney (Bridge) (425) 749-4324 (cell)

5) If the incident results in one or more fatalities or hospitalization of one or more personnel, notify the Washington State Department of Labor and Industries within 8 hours.

6) The Project Manager or his designee will follow up with the victim after receiving medical attention to find out about the nature of the injury or illness, medical care given, and whether there are any work restrictions or modifications.

Any person transporting an injured/exposed person to a hospital for treatment should take directions to the hospital (Figure 7-1) and information on the chemicals involved with him. Any vehicle used to transport contaminated personnel will be cleaned or decontaminated as necessary.

In order to be prepared for an emergency, field staff should add key phone numbers to their cell phone contact lists, such as Port Security. If using a smart phone onsite, staff should also save hospital directions into the Google Maps or similar application.

6.2 Environmental or Property Damage Incident Response

The Field Manager or designee has primary responsibility for responding to environmental and property damage incidents. The Field Manager will:

1) Take appropriate measures to protect the public and the environment including isolating and securing the site, preventing run-off to surface waters, and ending and/or controlling the emergency to the extent possible.

2) Ensure that the appropriate federal, state, and local agencies are informed and emergency response plans are coordinated. In the event of an air release of toxic materials, 911 and Port Security should be informed in order to assess the need for evacuation.

3) Notify the Project Manager.

6.3 Fire or Explosion

Although unlikely for the anticipated scope of work, in the event of a fire or explosion, the local fire department must be summoned immediately. Upon their arrival, the Field Manager and any additional personnel with firsthand knowledge of the nature of the fire will advise the fire commander of the location and nature of the fire and identification of all hazardous materials on site.

If it is safe to do so and personnel have been properly trained, site personnel may use fire-fighting equipment available on site, or remove or isolate flammable or other hazardous materials, which may contribute to the fire (i.e., incipient stage fire-fighting only).

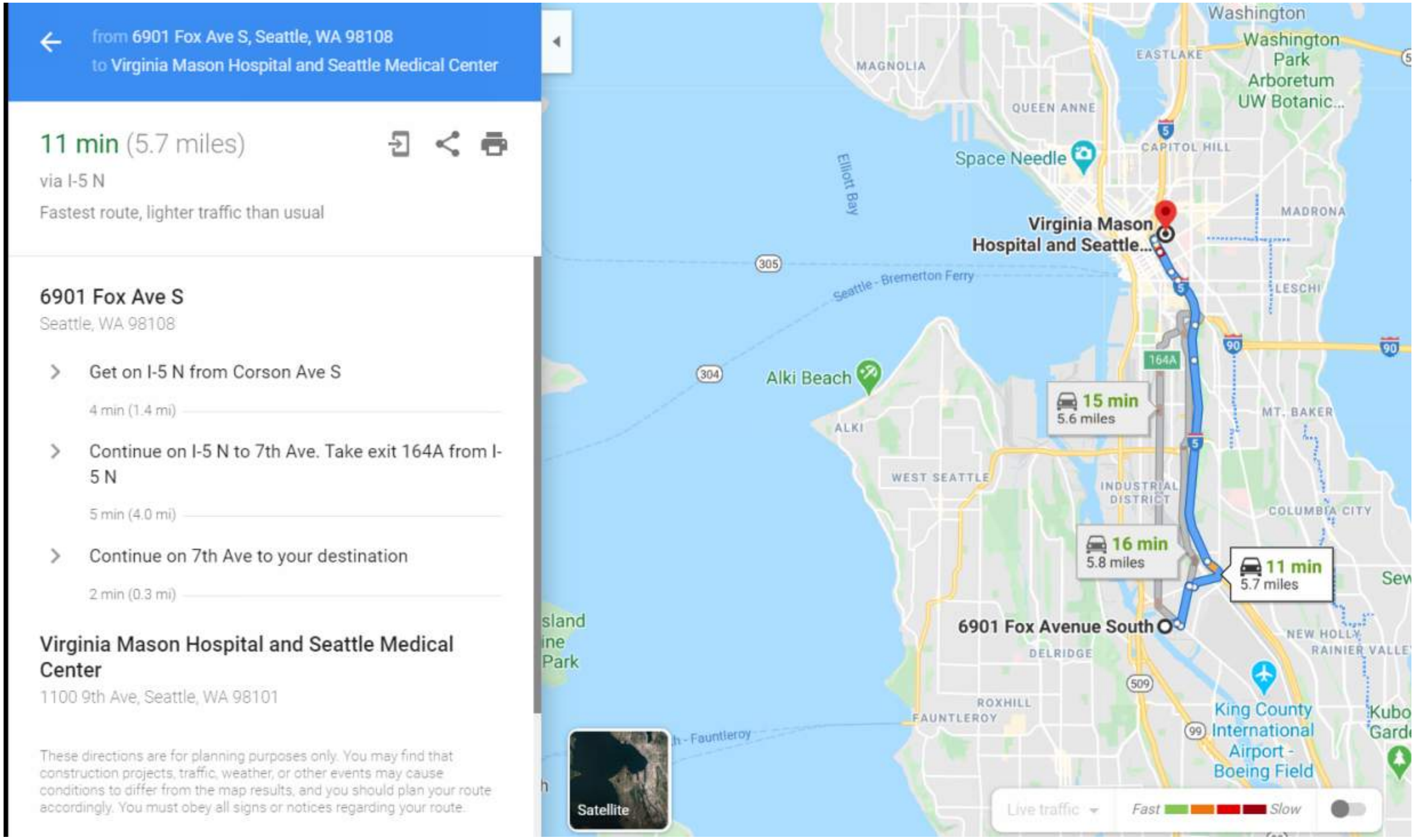
6.4 Evacuation Routes and Resources

The site is at the head of the Sitcum Waterway. The evacuation route is to the northwest or northeast, toward 11th Avenue. In extreme emergencies, evacuation should be conducted immediately, without regard for equipment or property.

In the event a site evacuation is necessary, all personnel are to:

- Escape the emergency situation
- Decontaminate to the maximum extent practical
- Meet at Port of Tacoma office or some other pre-arranged location
- Notification may be verbal or by a continuous blast on an air horn or vehicle horn.
- Keep upwind of smoke, vapors, or spill location.

Figure 6-1 Route to Hospital
Virginia Mason Hospital and Seattle Medical Center - 1100 9th Ave, Seattle, WA 98101
911 Emergency - (206) 223-6600 Non-Emergency



from 6901 Fox Ave S, Seattle, WA 98108
to Virginia Mason Hospital and Seattle Medical Center

11 min (5.7 miles)
via I-5 N
Fastest route, lighter traffic than usual

6901 Fox Ave S
Seattle, WA 98108

- Get on I-5 N from Corson Ave S
  4 min (1.4 mi)
- Continue on I-5 N to 7th Ave. Take exit 164A from I-5 N
  5 min (4.0 mi)
- Continue on 7th Ave to your destination
  2 min (0.3 mi)

Virginia Mason Hospital and Seattle Medical Center
1100 9th Ave, Seattle, WA 98101

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Appendix A

COVID-19 Infection Control Procedures

HEALTH AND SAFETY PLAN ADDENDUM
COVID-19 INFECTION CONTROL PROCEDURES

1.0 INTRODUCTION

Crete Consulting (Crete) established these infection control procedures (Procedures) to address the coronavirus disease 2019 (COVID-19) pandemic impacting the Puget Sound region. The intent of these Procedures is to protect all employees, subcontractors, and visitors from infection by COVID-19 at sites where Crete is actively working.

These Procedures are based on what is currently known about COVID-19. The Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) are continually updating recommended protections as needed and as additional information becomes available. These Procedures will be updated as this information evolves.

2.0 SCOPE AND PURPOSE

Crete has been identified as providing an essential service, so is able to perform field work during the COVID-19 pandemic. The Procedures specified here are expected to be protective of site personnel during all field work activities. The following specific activities were considered in preparation of these procedures.

- Site inspections (Phase I);
- Site explorations (Phase II), which may include test pits, direct push drilling, auger and rotary boreholes, wells, hand and excavator bucket soil sampling for confirmation samples, groundwater sampling, indoor air and sub-slab vapor sampling, and slab coring;
- Remediation system operation, monitoring, and maintenance; and
- Construction monitoring.

3.0 COVID-19 PREVALENCE

Coronaviruses are a large family of viruses that are common in humans and many different species of animals, including cattle, cats, and bats. Rarely, animal coronaviruses can infect people and then spread between people, such as with MERS-CoV and SARS-CoV. The virus that causes COVID-19 is spreading from person-to-person across the United States and much of the world. It should be noted, however, that respiratory illnesses like seasonal influenza, are also currently widespread in many communities.

Reported COVID-19 cases have ranged from mild symptoms to severe illness and death. The following symptoms are most commonly reported. Symptoms may appear 2-14 days after exposure.

- Loss of sense of smell
- Sore throat

- Fever
- Dry cough

If you develop **emergency warning signs** for COVID-19 get **medical attention immediately**. Emergency warning signs include:

- Difficulty breathing or shortness of breath
- Persistent pain or pressure in the chest
- New confusion or inability to arouse
- Bluish lips or face

Older adults and people who have severe underlying chronic medical conditions like heart or lung disease or diabetes seem to be at higher risk for developing more serious complications from COVID-19 illness.

COVID-19 can be transmitted from an infected person to the surroundings or another person via the following identified pathways.

- The primary mode of transmission is believed to be through droplet transmission. This may occur when a person is in in close contact (within three feet) with someone who has respiratory symptoms (e.g., coughing or sneezing).
- There is some evidence that droplet transmission may also occur during normal breathing and speaking.
- The virus-laden droplets may also be deposited on surfaces and remain viable from hours to up to three days, depending upon the type of surface. The surface viral contamination can then be picked up by a person who comes into direct contact with that surface.

There are many other infectious agents that can impact your workplace, including common cold viruses, influenza, and Methicillin-resistant Staphylococcus aureus (MRSA). This Plan was developed primarily to address the emerging COVID-19 pandemic, but the protocols provided in this Plan will also offer protection against these other, more common, infections.

4.0 INFECTION CONTROL PROCEDURES

This section presents the currently recommended infection control procedures to limit the potential for the spread of COVID-19 in the workplace and in the general public.

4.1 SPATIAL DISTANCING

Based on the knowledge that COVID-19 can be spread through droplet transmission, the CDC has established a safe distance parameter of six feet between people. The following procedures are designed to provide guidance for spatial distancing on the jobsite.

- Workers, if working in a team, will take separate vehicles to the job site.
- A minimum distance of six feet should be maintained from other individuals on the worksite.

- Workers will not congregate in groups of more than four other individuals.

- Workers will not be permitted to come to work if they feel sick or exhibit any symptoms common to cold, flu or COVID-19. These symptoms include a fever, sore throat, or dry cough.

- No person will eat, drink, chew gum or tobacco in potentially contaminated areas or around other people. Drinking replacement fluids for heat stress control will be permitted only in areas that are free from contamination, except in emergency situations.

- Food should be consumed in a car or away from other individuals.

- All personnel leaving potentially contaminated areas will wash their hands and face prior to entering any new area. If that is not possible, hands should be sanitized with hand-sanitizer. Hands and face should be washed with soap and water as soon as it is feasible after leaving a job site.

4.2 PERSONAL PROTECTIVE EQUIPMENT

The following PPE is required on each job site:

- Disposable nitrile gloves should be worn at all times while on site. Gloves should be disposed each time the worker leaves the job site

- If work must be conducted in groups or a six-foot distancing is not possible, a filtering facepiece respirator is recommended. It is recognized that any device used to cover the nose and mouth may reduce exposure to virus particles. Respirators or face coverings have an added benefit in that they reduce face touching. There is currently a shortage of filtering facepiece respirators for non-medical personnel. If a commercial N-95 or other filtering facepiece respirator is not available, a cloth mask or other face cover may be used.

4.3 DISINFECTION

Cleaning for infection control is a two-step process. Surfaces must first be cleaned, then disinfected. Cleaning will remove soil and organic matter that would otherwise reduce the effectiveness of the disinfection step that follows. Water can be cold or warm, or as recommended on the label of the cleaning product used. Disinfectant cleaning will be conducted following general cleaning.

Disinfectants registered by the Environmental Protection Agency are recommended whenever they are available. Lists of all registered disinfectants can be found at EPA-Registered Disinfectants and COVID-19 disinfectants can be found at EPA-Registered Disinfectants for COVID-19.

Cleaning and disinfection Procedures are as follows:

- Routinely clean all frequently touched surfaces in the workplace, such as tools, equipment, and handles.

- Provide disposable wipes so that commonly used surfaces can be wiped down by employees before each use.

- Workers will avoid sharing unsanitized equipment, including phones, tools, and equipment.

- Hands should be washed with soap and water after using the restroom, before and after lunch breaks and after co-handling objects. If that is not possible, hands should be sanitized with hand-sanitizer. Hands and face should be washed with soap and water as soon as it is feasible after leaving a job site.

5.0 COVID-19 JOB HAZARD ASSESSMENT

COVID-19 hazards and corresponding control measures for planned site work activities are summarized as follows:

Work Activity	Primary Potential Hazards	Control Measures
All	• Exposure to/spreading of COVID-19	• Drive individually to the job site, lab, or to obtain equipment • Do not engage in group work, if possible, if required, limit groups to no more than 4 people • Direct workers to stay home if they are sick • Wear gloves, and change as needed • Maintain a six-foot distance from other individuals or don a mask if distancing is unavoidable • Disinfect frequently touched objects • Wash hands after using the restroom, lunch breaks and after co-handling objects • Eat lunch in the car or away from others

6.0 REFERENCES

- Occupational Safety and Health Administration (OSHA) https://www.osha.gov/Publications/OSHA3990.pdf

- Centers for Disease Control (CDC) https://www.cdc.gov/coronavirus/2019-ncov/downloads/community-mitigation-strategy.pdf
- Washington State Department of Health. Washington State Department of Health COVID-19
- World Health Organization (WHO) https://www.who.int/emergencies/diseases/novel-coronavirus-2019

Appendix B

Site Safety Plan Acknowledgment Form

Site Safety Plan
Acknowledgment Form

I have been informed, understand, and will abide by all the procedures and protocols set forth in this Site Health and Safety Plan for the Property - 6901 Fox Avenue S.

Name (Print)	Signature	Affiliation	Date

Appendix C

Visitor Sign-In Log

Visitor Sign-In Log

Client:______________________________

Project Name:______________________________

Location:______________________________

Field Activity:______________________________

Project Mgr.:______________________________

Field Manager:______________________________

Date	Name	Affiliation	Purpose of Visit	Site EHS Training		Do you have Level D PPE?		Time In	Time Out
				Yes	No	Yes	No		

Appendix D

Site Safety/Tailgate Meeting Form

Site Safety/Tailgate Meeting Form

Project Name:______________________________
Date:______________________________
Project Number:______________________________

Location:______________________________
Time:______________________________
Instructor:______________________________

Safety Topics Presented

JHA:______________________________

Lessons Learned:______________________________

General Safety Topics:______________________________

Name	Attendee's Signature

Appendix E

Material Safety Data Sheets/

Safety Data Sheets

Appendix F

Job Hazard Analysis Forms

Job Hazard Analysis

6901 Fox Avenue S, Seattle

JHA Type: ☒ Investigation ☐ O&M ☐ Office ☐ Construction	☒ New ☐ Revised	Date: 5/15/17

Office: Seattle Client: Port of Tacoma Location: 1940 E 11th Street, Tacoma WA

Work Type: Investigation	Detailed Work Activity: Collection of solids samples from a catch basin or manhole. Though significant contamination is not expected, samples may have environmental contamination including carcinogenic contamination (including metals, Polycyclic Aromatic Hydrocarbons, and polychlorinated biphenyl). Direct skin contact, ingestion, and inhalation with solids should be avoided. PPE stated below is required. All CRETE employees shall be 40 hour OSHA HAWOPER trained and have current refresher training. The field manager shall also have 8 hour supervisor OSHA HAWOPER training. All subcontractors shall comply with training and instruction from the Field Manager and found in this JHA.

<u>Personal Protective Equipment (PPE):</u> Minimum PPE is Level D including: Hard hat, safety glasses or goggles, steel-toed boots, personal floatation device, and gloves as needed. Wet weather PPE may be required.

Additional PPE may be required in the Health & Safety Plan (HASP). Also refer to the HASP for emergency procedures.

Development Team	Position/Title	Reviewed By	Position/Title	Date
Geoff Saunders	Field Manager	Jamie Stevens	QAQC Manager	5/15/17

❶ Job Steps	❷ Potential Hazard	❸ Critical Actions
1. Mobilization/Demobilization	Slips/Trips/Falls, Heat/Cold Stress	• Care should be taken during loading and unloaded equipment and samples to/from the work area. • If available, use dollies or wagons to move samples and equipment

CRETE CONSULTING, INC.

Job Hazard Analysis

6901 Fox Avenue S, Seattle

JHA Type: ☒ Investigation ☐ O&M ☐Office ☐ Construction | ☒ New ☐ Revised | Date: 3/11/11

Office: Seattle Client: Sound Refining Location: 4110 11th Street E. Tacoma, WA

Work Type: Direct Push Drilling (Geoprobe) | Work Activity: Boring and Monitoring Well Installation

Personal Protective Equipment (PPE): Minimum PPE is Level D including: Hard hat, safety glasses or goggles, steel-toed boots, high visibility safety vest, hearing protection as needed, and gloves as needed (type dependent on job-specific requirements).

Additional PPE may be required in the Health & Safety Plan (HASP). Also refer to the HASP for air monitoring and emergency procedures.

Development Team	**Position/Title**	**Reviewed By**	**Position/Title**	**Date**
Geoff Saunders	Project Engineer	Jamie Stevens	Project Manager	3/14/11

❶ Job Steps	**❷ Potential Hazard**	**❸ Critical Actions**
1. All Onsite Activities	Slips/Trips/Falls Heat/Cold Stress Biological Hazards	• Keep all areas free of excess materials and debris and clear all walking paths. • Monitor onsite workers for signs of heat/cold stress and ensure that necessary breaks are taken. • Use insect repellant and check areas for signs of snakes, spiders, poisonous plants, ticks and mosquitoes • Maintain a clear line of sight.
2. Utility Locate	Explosion, electrocution, injury, death or property damage	• Contact public utility locate and have utilities marked out around the site. • Oversee a private onsite utility locate. • Review locations against construction drawings and known utilities • If necessary, clear upper eight feet of intended drilling location with an air/knife/vacuum truck
3. Equipment Inspections	Leaks, defective or damaged parts, slip/trip/fall hazards, fuel/oil spills, fire hazards, pinch points	• Conduct thorough inspections of all equipment at the beginning of each day and throughout the day, as appropriate. • Check for leaking hoses or fittings, loose connections, functional controls, functional emergency shutoff and damaged equipment • Identify pinch points • Check that a spill kit is available for use on site in the event of a spill or that secondary containment is provided. • Clear working areas of all unnecessary equipment.

4. Equipment Set Up	Flying debris, pinch points	• Identify pinch points • Use a spotter to locate drill rig • Delineate work area with delineators or equivalent • Establish a support zone and set up sampling equipment outside of drill rig work zone • Use designated hand signals to approach drill crew • Engage outriggers • Lower drill rig derrick prior to moving the rig
5.Drilling Operation	Flying debris, pinch points, back strain, cross-contamination, struck by drill rig derrick, chemical exposure, clothing caught in rotating equipment, hearing loss	• Keep hands and feet away from the drill stem while in motion • Wear all appropriate PPE (incl. hearing protection) • Decontaminate all equipment prior to use. • Avoid lifting heavy equipment and use the buddy system for heavy objects • Assure that the drill rig derrick is secured • Make sure all guards are in place while drilling operations are underway. • Do not wear loose fitting clothes or jewelry
6. Collecting soil samples	Pinch points, back strain, knee strain, chemical exposure	• Identify pinch points • Wear all appropriate PPE • Place soil core samples on an elevated surface (portable table) to avoid bending. • Keep hands clear while core samples are removed from the drill stem
7. Monitoring well construction	Back strain, pinch points, chemical exposure, hearing loss	• Identify pinch points • Wear all appropriate PPE • Use proper lifting technique and avoid lifting more than one bag of sand or bentonite at a time • Avoid bending while pouring sand pack or bentonite seal • Keep hands and feet clear as drill stem is raised out of the borehole
8. Well Box Construction	Back strain, knee strain, vehicle hazards	• Delineate work area with delineators or equivalent so you can be seen when vehicles or equipment are being moved. • Avoid lifting heavy objects without assistance • Avoid bending while laying the concrete • Wear knee pads when kneeling.
9. Backfilling soil borings	Back strain	• When soil borings are not completed as monitoring wells, borings must be backfilled with bentonite. • Avoid lifting more than one bag of bentonite at a time • Take breaks as necessary.
10. Equipment Decontamination	Cross-contamination, chemical exposure, back strain	• Use Alconox or liquid-nox to decontaminate all equipment with potential to contact soil or groundwater • Ask for help when moving heavy or awkward equipment. • Wear all appropriate PPE

11. Debris and Waste Mgmt.	Spills, chemical exposure, regulatory infractions, back strain, pinch points	• Ensure that all soil cuttings, decon water and purge water are properly contained and labeled • Use a drum dolly or lift to move any drums onsite. • Clear a path before moving drums • Prepare a bill of lading for all waste to be moved from site.
12. Demobilization	Chemical exposure, back strain, pinch points	• Avoid lifting heavy or awkward objects without help. • Wear all appropriate PPE • Ensure that all equipment has been decontaminated prior to repacking. • Ensure that all equipment is securely put away and tied down.

Appendix I

Inadvertent Discovery Protocol

Cultural Resource Consultants

Inadvertent Discovery Protocol for 6901 Fox Ave S, Seattle, King County, Washington

Prepared by
Margaret Berger,
Principal Investigator

October 24, 2023

Inadvertent Discovery Protocol 2307K-1

Submitted to
Jamie Stevens
Crete Consulting Inc.

Cultural Resource Consultants, LLC
P.O. Box 4159
Seattle, Washington 98194

Inadvertent Discovery Protocol for 6901 Fox Ave S, Seattle, King County, Washington

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1. Project Description

Crete Consulting Inc. requested that Cultural Resource Consultants, LLC (CRC) develop an Inadvertent Discovery Protocol (IDP) for 6901 Fox Ave S, Seattle, King County, Washington. The project encompasses King County tax parcel number 0001800113, with an area of approximately 5.42 acres, in Section 29 of Township 24 North, Range 04 East, Willamette Meridian (Figures 1 – 2). The project seeks to conduct environmental testing on the subject property for a remedial investigation under the Model Toxics Control Act. Proposed ground disturbance consists of soil sampling. Soil samples will be collected using a geo probe (<1.5-inch diameter) drilling rig to depths up to about 20 feet below ground surface. Sub slab (i.e., the crawl space/slab beneath the buildings), indoor, and ambient air samples will also be collected. Monitoring wells were previously installed on the property (Figure 3).

As part of this IDP, CRC conducted a review of previous cultural resource assessments, archaeological sites, historic built environment properties, Traditional Cultural Places (TCPs), and other cultural resources recorded in close proximity to the project location on the Washington Information System for Architectural and Archaeological Records Data (WISAARD) database. Examination of WISAARD records indicate that no archaeological sites or historic register properties are recorded at the project location, but a historic-era cemetery is mapped as overlapping the southeastern part of the project. The IDP for this project is provided following the WISAARD review.

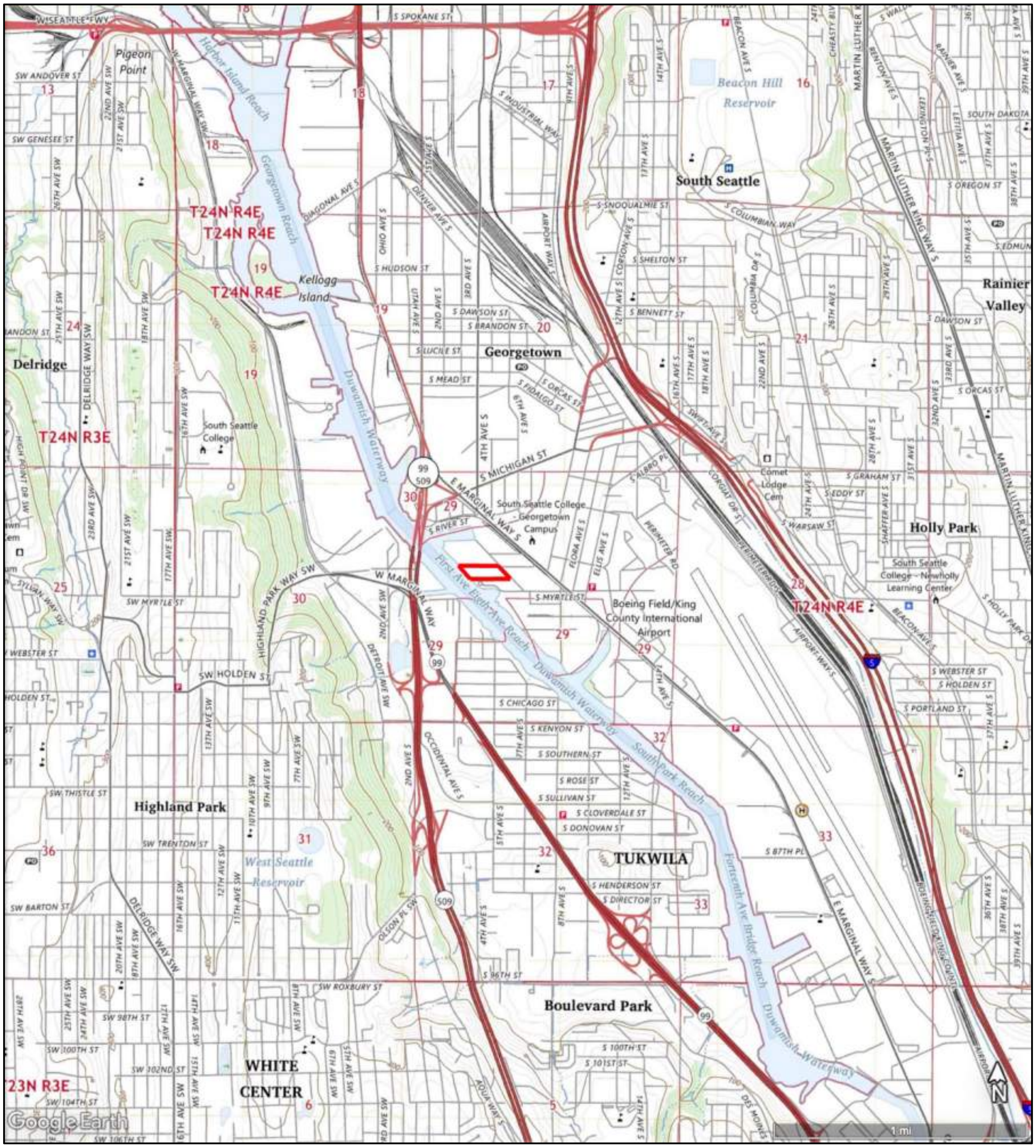


Figure 1. Seattle South, Washington, topographic quadrangle, annotated with the project location in red (United States Geological Survey [USGS] 2023).

Date: 7/14/2023 Notes:

N

King County

Figure 2. King County parcel map, annotated with the project location in red.

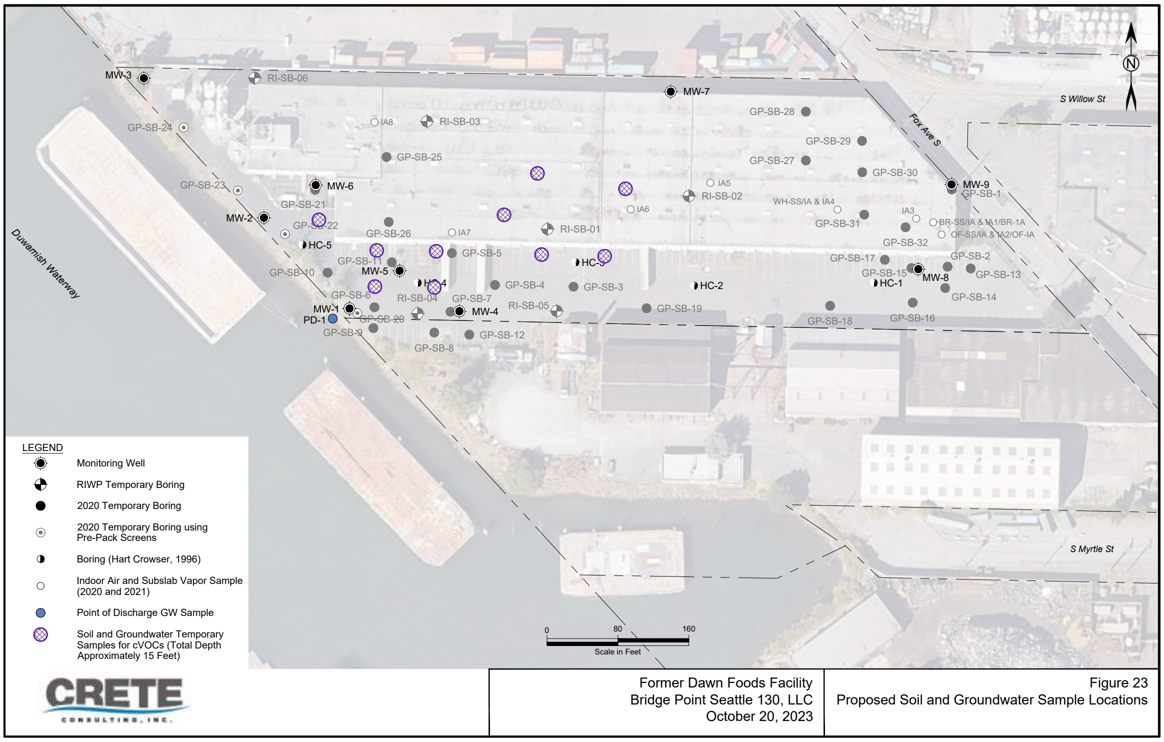


Figure 3. Figure showing proposed boring locations along with prior investigations on the property, courtesy of Crete Consulting, Inc.

1.1 Regulatory Context

This inadvertent discovery protocol was developed as a component of preconstruction environmental review for 6901 Fox Avenue South. It sought to prevent adverse impacts to cultural resources during ground disturbing activities by evaluating whether archaeological sites, historic built environment resources (i.e., buildings or structures at least 50 years old), or other cultural resources exist within the boundaries of the project. CRC's work was intended, in part, to assist in addressing state regulations pertaining to the identification and protection of cultural resources. The Archaeological Sites and Resources Act (RCW 27.53) prohibits knowingly disturbing archaeological sites without a permit from the Washington State Department of Archaeology and Historic Preservation (DAHP); the Indian Graves and Records Act (RCW 27.44) prohibits knowingly disturbing Native American or historic graves; and the Abandoned and Historic Cemeteries and Historic Graves Act (RCW 68.60) calls for the protection and preservation of historic era cemeteries and graves.

The proposed environmental sampling also has oversight from Washington State Department of Ecology (Ecology), who requested that this IDP be prepared to support compliance with Washington Governor's Executive Order (EO) 21-02. Under EO 21-02, projects using state capital funds not otherwise subject to review under Section 106 of the National Historic Preservation Act (NHPA) are required to undergo cultural resources review. Cultural resources as specified by EO 21-02 include, but are not limited to, archaeological and historic archaeological sites, historic buildings and structures, traditional cultural places, and sacred sites. Furthermore, state agencies are required to take "all reasonable action to avoid, minimize, or mitigate adverse effects" to cultural resources.

1.2 WISAARD Review

A review of the Washington Information System for Architectural and Archaeological Records Data (WISAARD) database in September 2023 identified previous cultural resource studies, recorded precontact and historic sites, and recorded built environment, which helps gauge the potential and likely nature of cultural resources present within the project vicinity (DAHP 2023a). The DAHP statewide predictive ranks the project location as "very high risk" for encountering previously unrecorded archaeological sites, based on environmental criteria such as proximity to aquatic resources and accessible topography (Kauhi and Markert 2009). An archaeological sensitivity model developed for King County maps the project location as high sensitivity for sites overall, with potential archaeological sites most likely dating to 2500 to 500 cal BP (Kopperl et al. 2016:173-208).

Twenty-six cultural resources surveys have been conducted within one mile of the project location. Kelly (2012) completed the nearest prior cultural resource survey, located approximately 675 feet southeast of the project. The survey was conducted prior to the proposed replacement of a wharf on the Duwamish Waterway. Fieldwork consisted of pedestrian survey. No archaeological or historic resources were identified during the survey, and no further cultural resources investigation was recommended.

The closest cultural resource survey with subsurface investigation was completed by Ostrander et al. (2016) approximately 0.25 mile north of the project. The survey was conducted prior to the proposed construction of a wet weather treatment station, conveyance system, and outfall structure. Subsurface investigations included archaeological monitoring of direct push geoprobes, mud rotary borings, and test pits excavated during geotechnical explorations. While no archaeological sites were found by the investigation, an archaeological monitoring plan was developed for use during project ground disturbance.

No traditional cultural properties (TCPs) listed on WISAARD are located within one mile of the project location. TCPs documented in ethnographic literature are present over 2.5 miles to the south-southeast. TCPs outside the project location will not be adversely affected by the proposed project activities.

Eleven archaeological sites have been recorded within one mile of the project. The archaeological site recorded nearest to the project is 45KI1385, located approximately 550 feet to the west-southwest, on the left (western) bank of the Duwamish Waterway. This site consists of various pilings associated with an historic platform and dock, historic house foundations, and a historic-era debris scatter attributed to domestic and maritime industrial activities in the early to mid-twentieth century (Anderson 2018). Previously recorded archaeological sites will not be affected by the proposed project activities.

Three properties listed on the NRHP and/or the Washington Heritage Register (WHR) are located within 1 mile of the project. The register-listed historic property nearest to the project is the Seattle Electric Company Georgetown Steam Plant, located approximately 0.36 mile to the east. Register-listed historic properties will not be adversely affected by the proposed project activities.

Four historic built environment resources are recorded on parcels adjacent to the project, but none are located within the subject property. These consist of industrial buildings dating from 1916 to 1959. Historic structures outside of the project location will not be adversely affected by the proposed project activities.

Three cemeteries are recorded in close proximity to the project, one of which is mapped as overlapping the southeastern part of the project. The area mapped on WISAARD for the Potters Field/Duwamish Cemetery/King County Poor Farm Cemetery (45KI1158) is partially within the southeastern portion of the project (DAHP 2023b) (Figure 4). This is the suspected location of the cemetery, but it has not been field-verified. In the early twentieth century, hundreds of individuals were removed from the cemetery and cremated at the King

County Crematorium and Columbarium (45KI1159), which was located approximately 1,000 feet east-northeast of the project (DAHP 2023c). However, it is not known if all individuals were removed. Approximately 900 feet northwest of the project, a partial cranium was found on the right (eastern) bank shoreline of the Duwamish Waterway in the 1950s (45KI1004) (DAHP 2023d). It is suspected to be related to the Potters Field/Duwamish Cemetery/King County Poor Farm Cemetery. The file on this location notes the possibility that some graves were bulldozed and not properly removed.

Figure 4. WISAARD map showing mapped location of the Potters Field/Duwamish Cemetery/King County Poor Farm Cemetery, annotated with the project location in red.

Based upon these records, there is a possibility for historic-era human remains to be present in the southeastern portion of the project. It is also possible that evidence of the historical cemetery such as bone or coffin fragments could be encountered elsewhere on the property, however this is not very likely due to the narrow (<1.5-inch) diameter of the proposed geo probes. It is CRC's understanding that no ground disturbance is proposed within the mapped cemetery location. In the event of any future ground disturbance that exposes subsurface sediments in the historic cemetery location, archaeological monitoring is recommended.

2. References

Anderson, Erik

2018 State of Washington Archaeological Site Inventory Form, 45KI1385. On file at DAHP, Olympia.

Crete Consulting Inc.
2021 *Remedial Investigation Work Plan, Former Bunge Foods Facility, 6901 Fox Avenue South.* Crete Consulting Inc. Prepared for Bridge.

Kauhi, T. C., and J. Markert
2009 *Washington Statewide Archaeology Predictive Model*. GeoEngineers. Report submitted to the Washington State Department of Archaeology & Historic Preservation.

Kelly, Katherine M.
2012 *Cultural Resources Assessment for the Seattle Iron & Metals Wharf Replacement Project, Seattle, WA*. Cultural Resource Consultants. Prepared for Harbor Consulting Engineers.

Kopperl, Robert, Charles Hodges, Christian Miss, Johonna Shea, and Alecia Spooner
2016 *Archaeology of King County, Washington: A Context Statement for Native American Archaeological Resources*. SWCA Environmental Consultants. Report submitted to the King County Historic Preservation Program.

Ostrander, Thomas, Katherine Wilson, Chris Lockwood, Chanda Schneider, and Paula Johnson
2016 *Georgetown Wet Weather Treatment Station Cultural Resources Assessment*. Environmental Science Associates. Prepared for King County Wastewater Treatment Division.

United States Geological Survey (USGS)
2023 *Seattle South, Washington, Quadrangle*. 1:24,000 scale. United States Geological Survey, Washington D.C.

Washington State Department of Archaeology and Historic Preservation (DAHP)
2023a Washington Information System for Architectural and Archaeological Records Data (WISAARD) database. Electronic document, https://secureaccess.wa.gov/dahp/wisaard/, accessed September 15, 2023.
2023b Cemetery Report, Potters Field (45KI1058). On file at DAHP, Olympia.
2023c Cemetery Report, King County Crematorium and Columbarium (45KI1059). On file at DAHP, Olympia.
2023d Cemetery Report, Human Skeletal Remains (HR10-00011) (45KI1004). On file at DAHP, Olympia.

Attachment A. Inadvertent Discovery Plan

INADVERTENT DISCOVERY PLAN

PLAN AND PROCEDURES FOR THE DISCOVERY OF CULTURAL RESOURCES AND HUMAN SKELETAL REMAINS

To request ADA accommodation, including materials in a format for the visually impaired, call Ecology at 360-407-6000 or visit https://ecology.wa.gov/accessibility. People with impaired hearing may call Washington Relay Service at 711. People with a speech disability may call TTY at 877-833-6341.

Site Name(s): Dawn Food Products Cleanup Site Location: 6901 Fox Ave S, Seattle, WA 98108

Project Lead/Organization: Bridge Point Seattle 130 LLC County: King

If this Inadvertent Discovery Plan (IDP) is for multiple (batched) projects, ensure the location information covers all project areas.

1. INTRODUCTION

The IDP outlines procedures to perform in the event of a discovery of archaeological materials or human remains, in accordance with applicable state and federal laws. An IDP is required, as part of Agency Terms and Conditions for all grants and loans, for any project that creates disturbance above or below the ground. An IDP is not a substitute for a formal cultural resource review (Executive 21-02 or Section 106).

Once completed, **the IDP should always be kept at the project site** during all project activities. All staff, contractors, and volunteers should be familiar with its contents and know where to find it.

2. CULTURAL RESOURCE DISCOVERIES

A cultural resource discovery could be prehistoric or historic. Examples include (see images for further examples):

- An accumulation of shell, burned rocks, or other food related materials.
- Bones, intact or in small pieces.
- An area of charcoal or very dark stained soil with artifacts.
- Stone tools or waste flakes (for example, an arrowhead or stone chips).
- Modified or stripped trees, often cedar or aspen, or other modified natural features, such as rock drawings.
- Agricultural or logging materials that appear older than 50 years. These could include equipment, fencing, canals, spillways, chutes, derelict sawmills, tools, and many other items.
- Clusters of tin cans or bottles, or other debris that appear older than 50 years.
- Old munitions casings. ***Always assume these are live and never touch or move***.
- Buried railroad tracks, decking, foundations, or other industrial materials.
- Remnants of homesteading. These could include bricks, nails, household items, toys, food containers, and other items associated with homes or farming sites.

The above list does not cover every possible cultural resource. When in doubt, assume the material is a cultural resource.

3. ON-SITE RESPONSIBILITIES

If any employee, contractor, or subcontractor believes that they have uncovered cultural resources or human remains at any point in the project, take the following steps to ***Stop-Protect-Notify***. **If you suspect that the discovery includes human remains, also follow Sections 5 and 6.**

STEP A: Stop Work.

All work must stop immediately in the vicinity of the discovery.

STEP B: Protect the Discovery.

Leave the discovery and the surrounding area untouched and create a clear, identifiable, and wide boundary (30 feet or larger) with temporary fencing, flagging, stakes, or other clear markings. Provide protection and ensure integrity of the discovery until cleared by the Department of Archaeological and Historical Preservation (DAHP) or a licensed, professional archaeologist.

Do not permit vehicles, equipment, or unauthorized personnel to traverse the discovery site. Do not allow work to resume within the boundary until the requirements of this IDP are met.

STEP C: Notify Project Archaeologist (if applicable).

If the project has an archaeologist, notify that person. If there is a monitoring plan in place, the archaeologist will follow the outlined procedure.

STEP D: Notify Project and Washington Department of Ecology (Ecology) contacts.

Project Lead Contacts

Primary Contact		Alternate Contact	
Name:	Matt Gladney	Name:	
Organization:	Bridge Point	Organization:	
Phone:	425-749-4324	Phone:	
Email:	mgladney@bridgedev.com	Email:	

Ecology Contacts (completed by Ecology Project Manager)

Ecology Project Manager		Alternate or Cultural Resource Contact	
Name:	David Butler	Name:	Jon Klem
Program:	Toxics Cleanup Program	Program:	TCP
Phone:	206-518-3513	Phone:	206-556-5584
Email:	david.butler@ecy.wa.gov	Email:	jon.klem@ecy.wa.gov

STEP E: Ecology will notify DAHP.

Once notified, the Ecology Cultural Resource Contact or the Ecology Project Manager will contact DAHP to report and confirm the discovery. To avoid delay, the Project Lead/Organization will contact DAHP if they are not able to reach Ecology.

DAHP will provide the steps to assist with identification. DAHP, Ecology, and Tribal representatives may coordinate a site visit following any necessary safety protocols. DAHP may also inform the Project Lead/Organization and Ecology of additional steps to further protect the site.

Do not continue work until DAHP has issued an approval for work to proceed in the area of, or near, the discovery.

DAHP Contacts:

Name: Rob Whitlam, PhD
Title: State Archaeologist
Cell: 360-890-2615
Email: Rob.Whitlam@dahp.wa.gov
Main Office: 360-586-3065

Human Remains/Bones:

Name: Guy Tasa, PhD
Title: State Anthropologist
Cell: 360-790-1633 (24/7)
Email: Guy.Tasa@dahp.wa.gov

4. TRIBAL CONTACTS

In the event cultural resources are discovered, the following tribes will be contacted. See Section 10 for Additional Resources.

Tribe: Muckleshoot Indian Tribe
Name: Laura Murphy
Title: Archaeologist
Phone: 253-876-3272
Email: laura.murphy@muckleshoot.nsn.us

Tribe: Duwamish Tribe
Name: Cecile Hansen
Title: Chair
Phone: 206-421-1582
Email: cecile@duwamishtribe.org

Tribe: Suquamish Tribe
Name: Stephanie Trudel
Title: THPO
Phone: 360-394-8533
Email: strudel@suquamish.nsn.us

Tribe: Snoqualmie Indian Tribe
Name: Steve Moses
Title: Director, Archaeology & Historic Preservation
Phone: 425.495.6097
Email: steve@snoqualmietribe.us

Please provide contact information for additional tribes within your project area, if needed, in Section 11.

5. FURTHER CONTACTS (if applicable)

If the discovery is confirmed by DAHP as a cultural or archaeological resource, or as human remains, and there is a partnering federal or state agency, Ecology or the Project Lead/Organization will ensure the partnering agency is immediately notified.

Federal Agency:

Agency:
Name:
Title:
Phone:
Email:

State Agency:

Agency:
Name:
Title:
Phone:
Email:

6. 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. Follow the steps under ***Stop-Protect-Notify.*** For specific instructions on how to handle a human remains discovery, see: *RCW 68.50.645: Skeletal human remains—Duty to notify—Ground disturbing activities—Coroner determination—Definitions*.

Suggestion: If you are unsure whether the discovery is human bone or not, contact Guy Tasa with DAHP, for identification and next steps. Do not pick up the discovery.

Guy Tasa, PhD State Physical Anthropologist
Guy.Tasa@dahp.wa.gov

(360) 790-1633 (Cell/Office)

For discoveries that are confirmed or suspected human remains, follow these steps:

1. Notify law enforcement and the Medical Examiner/Coroner using the contacts below. **Do not call 911** unless it is the only number available to you.

   Enter contact information below (required):
   - Local Medical Examiner or Coroner name and phone: King County Medical Examiner, 206-731-3232 ext. 4
   - Local Law Enforcement main name and phone: King County Sheriff's Office, 206-296-4155
   - Local Non-Emergency phone number (911 if without a non-emergency number): 206-296-3311
2. The Medical Examiner/Coroner (with assistance of law enforcement personnel) will determine if the remains are human or if the discovery site constitutes a crime scene and will notify DAHP.
3. **DO NOT speak with the media, allow photography or disturbance of the remains, or release any information about the discovery on social media.**
4. If the remains are determined to be non-forensic, Cover the remains with a tarp or other materials (not soil or rocks) for temporary protection and to shield them from being photographed by others or disturbed.

Further activities:

- 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. Organizations may also participate in consultation.
- 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, work in the discovery area may resume as described in Section 8.

If the project occurs on federal lands (such as a national forest or park or a military reservation) the provisions of the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) 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 Lead/Organization will comply with applicable state and federal laws, and the above protocol.

7. DOCUMENTATION OF ARCHAEOLOGICAL MATERIALS

Archaeological resources discovered during construction are protected by state law RCW 27.53 and assumed eligible for inclusion in the National Register of Historic Places under Criterion D until a formal Determination of Eligibility is made.

The Project Lead/Organization must ensure that proper documentation and field assessment are made of all discovered cultural resources in cooperation with all parties: the federal agencies (if any), DAHP, Ecology, affected tribes, and the archaeologist.

The archaeologist will record all prehistoric and historic cultural material discovered during project construction on a standard DAHP archaeological site or isolate inventory form. They will photograph site overviews, features, and artifacts and prepare stratigraphic profiles and soil/sediment descriptions for minimal subsurface exposures. They will document discovery locations on scaled site plans and site location maps.

Cultural features, horizons, and artifacts detected in buried sediments may require the archaeologist to conduct further evaluation using hand-dug test units. They will excavate units in a controlled fashion to expose features, collect samples from undisturbed contexts, or to interpret complex stratigraphy. They may also use a test unit or trench excavation to determine if an intact occupation surface is present. They will only use test units when necessary to gather information on the nature, extent, and integrity of subsurface cultural deposits to evaluate the site's significance. They will conduct excavations using standard archaeological techniques to precisely document the location of cultural deposits, artifacts, and features.

The archaeologist will record spatial information, depth of excavation levels, natural and cultural stratigraphy, presence or absence of cultural material, and depth to sterile soil, regolith, or bedrock for each unit on a standard form. They will complete test excavation unit level forms, which will include plan maps for each excavation level and artifact counts and material types, number, and vertical provenience (depth below surface and stratum association where applicable) for all recovered artifacts. They will draw a stratigraphic profile for at least one wall of each test excavation unit.

The archaeologist will screen sediments excavated for purposes of cultural resources investigation through 1/8-inch mesh, unless soil conditions warrant 1/4-inch mesh.

The archaeologist will analyze, catalogue, and temporarily curate all prehistoric and historic artifacts collected from the surface and from probes and excavation units. The ultimate disposition of cultural materials will be determined in consultation with the federal agencies (if any), DAHP, Ecology, and the affected tribe(s).

Within 90 days of concluding fieldwork, the archaeologist will provide a technical report describing any and all monitoring and resultant archaeological excavations to the Project Lead/Organization, who will forward the report to Ecology, the federal agencies (if any), DAHP, and the affected tribe(s) for review and comment.

If assessment activities expose human remains (burials, isolated teeth, or bones), the archaeologist and Project Lead/Organization will follow the process described in **Section 6**.

8. PROCEEDING WITH WORK

The Project Lead/Organization shall work with the archaeologist, DAHP, and affected tribe(s) to determine the appropriate discovery boundary and where work can continue.

Work may continue at the discovery location only after the process outlined in this plan is followed and the Project Lead/Organization, DAHP, any affected tribe(s), Ecology, and the federal agencies (if any) determine that compliance with state and federal laws is complete.

9. ORGANIZATION RESPONSIBILITY

The Project Lead/Organization is responsible for ensuring:

- This IDP has complete and accurate information.
- This IDP is immediately available to all field staff at the sites and available by request to any party.
- This IDP is implemented to address any discovery at the site.
- That all field staff, contractors, and volunteers are instructed on how to implement this IDP.

10. ADDITIONAL RESOURCES

Informative Video

Ecology recommends that all project staff, contractors, and volunteers view this informative video explaining the value of IDP protocol and what to do in the event of a discovery. The target audience is anyone working on the project who could unexpectedly find cultural resources or human remains while excavating or digging. The video is also posted on DAHP’s inadvertent discovery language website.

Ecology's IDP Video (https://www.youtube.com/watch?v=ioX-4cXfbDY)

Informational Resources

DAHP (https://dahp.wa.gov)

Washington State Archeology (DAHP 2003)
(https://dahp.wa.gov/sites/default/files/Field%20Guide%20to%20WA%20Arch_0.pdf)

Association of Washington Archaeologists (https://www.archaeologyinwashington.com)

Potentially Interested Tribes

Interactive Map of Tribes by Area
(https://dahp.wa.gov/archaeology/tribal-consultation-information)

WSDOT Tribal Contact Website
(https://wsdot.wa.gov/tribal/TribalContacts.htm)

11. ADDITIONAL INFORMATION

Please add any additional contact information or other information needed within this IDP.

Tulalip Tribes
Richard Young
Cultural Resources Specialist
425.239.0182
ryoung@tulaliptribes-nsn.gov

Implement the IDP if you see…

Chipped stone artifacts.

Examples are:

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

Stone artifacts from Oregon.

Stone artifacts from Washington.

Biface-knife, scraper, or pre-form found in NE Washington. Thought to be a well knapped object of great antiquity. Courtesy of Methow Salmon Rec. Foundation.

Implement the IDP if you see…

Ground stone artifacts.

Examples are:

- Unusual or unnatural shapes or unusual stone.
- Striations or scratching.
- Etching, perforations, or pecking.
- Regularity in modifications.
- Variability of size, function, or complexity.

Above: Fishing Weight - credit CRITFC Treaty Fishing Rights website.

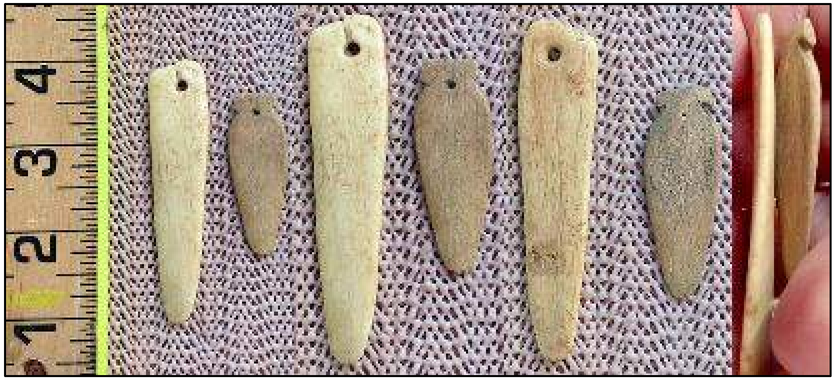
Artifacts from unknown locations (left and right images).

Implement the IDP if you see…

Bone or shell artifacts, tools, or beads.

Examples are:

- Smooth or carved materials.
- Unusual shape.
- Pointed as if used as a tool.
- Wedge shaped like a “shoehorn”.
- Variability of size.
- Beads from shell (dentalium) or tusk.



Upper Left:*Bone Awls from Oregon.*

Upper Center: *Bone Wedge from California.*

Upper Right: *Plateau dentalium choker and bracelet, from Nez Perce National Historical Park, 19th century, made using Antalis pretiosa shells Credit: Nez Perce - Nez Perce National Historical Park, NEPE 8762, Public Domain.*

Above: *Tooth Pendants. Right: Bone Pendants. Both from Oregon and Washington.*

Implement the IDP if you see…

Culturally modified trees, fiber, or wood artifacts.

Examples are:

- Trees with bark stripped or peeled, carvings, axe cuts, de-limbing, wood removal, and other human modifications.
- Fiber or wood artifacts in a wet environment.
- Variability of size, function, and complexity.

Left and Below: *Culturally modified tree and an old carving on an aspen (Courtesy of DAHP).*

Right, Top to Bottom: *Artifacts from Mud Bay, Olympia: Toy war club, two strand cedar rope, wet basketry*.

Implement the IDP if you see…

Strange, different, or interesting looking dirt, rocks, or shells.

Human activities leave traces in the ground that may or may not have artifacts associated with them. Examples are:

- "Unusual" accumulations of rock (especially fire-cracked rock).
- "Unusual" shaped accumulations of rock (such as a shape similar to a fire ring).
- Charcoal or charcoal-stained soils, burnt-looking soils, or soil that has a "layer cake" appearance.
- Accumulations of shell, bones, or artifacts. Shells may be crushed.
- Look for the "unusual" or out of place (for example, rock piles in areas with otherwise few rocks).

Shell Midden pocket in modern fill discovered in sewer trench.

Underground oven. Courtesy of DAHP.

Shell midden with fire cracked rock.

Hearth excavated near Hamilton, WA.

Implement the IDP if you see…

Historic period artifacts (historic archaeology considered older than 50 years).

Examples are:

- Agricultural or logging equipment. May include equipment, fencing, canals, spillways, chutes, derelict sawmills, tools, etc.
- Domestic items including square or wire nails, amethyst colored glass, or painted stoneware.

Left: Top to Bottom: *Willow pattern serving bowl and slip joint pocket knife discovered during Seattle Smith Cove shantytown (45-KI-1200) excavation.*

Right: *Collections of historic artifacts discovered during excavations in eastern Washington cities.*

Implement the IDP if you see…

Historic period artifacts (historic archaeology considered older than 50 years).

Examples are:

- Railway tokens, coins, and buttons.
- Spectacles, toys, clothing, and personal items.
- Items helping to understand a culture or identity.
- Food containers and dishware.

Main Image: *Dishes, bottles, workboot found at the North Shore Japanese bath house (ofuro) site, Courtesy Bob Muckle, Archaeologist, Capilano University, B.C. This is an example of an above ground resource.*

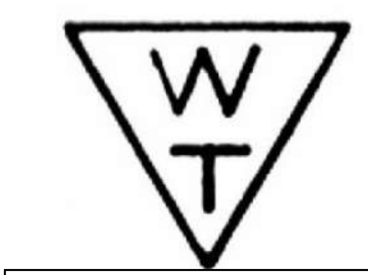
Right, from Top to Bottom: *Coins, token, spectacles and Montgomery Ward pitchfork toy discovered during Seattle Smith Cove shantytown (45-KI-1200) excavation.*

Implement the IDP if you see…

- Old munition casings – if you see ammunition of any type – ***always assume they are live and never touch or move!***
- Tin cans or glass bottles with an older manufacturer's technique – maker's mark, distinct colors such as turquoise, or an older method of opening the container.

Far Left: .303 British cartridge found by a WCC planting crew on Skagit River. Don't ever touch something like this!
Left: Maker's mark on bottom of old bottle.

Right: *Old beer can found in Oregon. ACME was owned by Olympia Brewery. Courtesy of Heather Simmons.*



Logo employed by Whithall Tatum & Co. between 1924 to 1938 (Lockhart et al. 2016).

Can opening dates, courtesy of W.M. Schroeder.

Implement the IDP if you see…

You see historic foundations or buried structures.

Examples are:

- Foundations.
- Railroad and trolley tracks.
- Remnants of structures.

Counter Clockwise, Left to Right: *Historic structure 45KI924, in WSDOT right of way for SR99 tunnel. Remnants of Smith Cove shantytown (45-KI-1200) discovered during Ecology CSO excavation, City of Spokane historic trolley tracks uncovered during stormwater project, intact foundation of historic home that survived the Great Ellensburg Fire of July 4, 1889, uncovered beneath parking lot in Ellensburg.*

Implement the IDP if you see...

Potential human remains.

Examples are:

- Grave headstones that appear to be older than 50 years.
- Bones or bone tools--intact or in small pieces. It can be difficult to differentiate animal from human so they must be identified by an expert.
- These are all examples of animal bones and are not human.

Center: *Bone wedge tool, courtesy of Smith Cove Shantytown excavation (45KI1200).*

Other images (Top Right, Bottom Left, and Bottom) Center: Courtesy of DAHP.

Directly Above: This is a real discovery at an Ecology sewer project site.

What would you do if you found these items at a site? Who would be the first person you would call?

Hint: *Read the plan!*