Georgetown Flume Off-Leash Area and Trail

Interim Action Work Plan

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CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

AOC	area of concern
ARAR	applicable or relevant and appropriate requirements
bgs	below ground surface
BMP	best management practice
Boeing	The Boeing Company
City	City of Seattle
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CUL	cleanup level
cy	cubic yard
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
GTSP	Georgetown Steam Plant
IASL	interim action screening level
IAWP	Interim Action Work Plan
LDW	Lower Duwamish Waterway
MTCA	Model Toxics Control Act
NBF/GTSP	North Boeing Field/Georgetown Steam Plant
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
Proposed Park Site	Georgetown Steam Plant Former Flume Property (partial), east of 1001 South Myrtle Street, Seattle, WA 98108
QA/QC	quality assurance and quality control
RI/FS	remedial investigation and feasibility study
SAP	sampling and analysis plan
SCL	Seattle City Light
SDOT	Seattle Department of Transportation
SEPA	State Environmental Policy Act
TCE	trichloroethene

TEE	terrestrial ecological evaluation
TEQ	toxicity equivalence
TESC	temporary erosion and sediment control
TPH	total petroleum hydrocarbons

1 INTRODUCTION

This report presents the Interim Action Work Plan (IAWP) for the Georgetown Steam Plant (GTSP) flume off-leash area and trail property (Proposed Park Site) located east of 1001 South Myrtle Street, Seattle, WA 98108 (Figure 1-1). The Proposed Park Site is located in Seattle's Georgetown community, which is a traditionally underserved/environmental justice community. Seattle City Light (SCL), Seattle Department of Transportation (SDOT), and Seattle Parks and Recreation (all departments of the City of Seattle [City]), plan to develop the Proposed Park Site into a community amenity featuring an off-leash pet area and bicycle/pedestrian path, long requested by the community.

The Proposed Park Site is part of the North Boeing Field/Georgetown Steam Plant (NBF/GTSP) site that is part of an ongoing remedial investigation and feasibility study (RI/FS) under Agreed Order No. DE 5685 (Ecology 2008) between the Washington State Department of Ecology (Ecology), The Boeing Company (Boeing), the City, and King County. The Proposed Park Site is at the margin of the NBF/GTSP site and historically had limited industrial activity (i.e., the former flume and a former electrical substation [Ellis substation]). Soil remediation for the former flume and the retired Ellis substation was completed in 2009. The Proposed Park Site development constitutes an interim action while the NBF/GTSP RI/FS process proceeds. The Proposed Park Site will be subject to the final NBF/GTSP cleanup action plan. This IAWP fulfills the requirements of a Model Toxics Control Act (MTCA) interim action submittal as specified in WAC 173-340-430.

2 BACKGROUND

The Proposed Park Site extends between South Myrtle Street and East Marginal Way S, an area of approximately 1.1 acres (Figure 1-1). North Boeing Field is located to the east. A multi-tenant, multi-use warehouse and motel are located to the west. Public rights-of-way bound the Proposed Park Site on the north (South Myrtle Street) and south (East Marginal Way S).

The Proposed Park Site is at the southern end of the former flume that connected the GTSP to the Lower Duwamish Waterway (LDW) at Slip 4 (Figure 2-1) (Herrera 2010). The flume was a 2,450-ft-long system of wood-fortified and concrete-lined open ditches and buried piped segments constructed in the early 1900s to discharge cooling water from the steam plant to the river. Cooling water discharge stopped when the plant ceased operation in the 1960s.[1] Thereafter, the former flume served as a conveyance for stormwater and surface water runoff draining approximately 6 acres, including the steam plant roof, adjacent City rights-of-way, parts of North Boeing Field, and adjacent private properties.

Currently, the Proposed Park Site is an undeveloped parcel covered in places with vegetation, bare dirt, or gravel (Figure 1-1). Future use is envisioned as an off-leash pet area, bicycle/pedestrian path, and bioswale as further detailed in this IAWP.

2.1 NEIGHBORING UPLAND PROPERTIES

The Proposed Park Site is located in a commercial/industrial area. Its immediate neighbors are North Boeing Field to the east and a multi-tenant, multi-use warehouse and motel to the west (Figure 1-1).

The Proposed Park Site, part of the NBF/GTSP MTCA site, is also within 1,000 ft of six other upland cleanup sites that are currently listed on the MTCA Confirmed and Suspected Contaminated Sites List (Table 2-1, Figure 2-2) (Ecology 2022a). None of these other upland cleanup sites are immediately adjacent to the Proposed Park Site (Figure 2-2), nor are any of these sites upgradient in terms of groundwater (Appendix A), so none are expected to have impacted the Proposed Park Site. It also appears that the Proposed Park Site has not impacted any of the neighboring upland sites. The only upland sites with contaminants overlapping Proposed Park Site chemicals of concern (i.e., polychlorinated biphenyls [PCBs] and polycyclic aromatic hydrocarbons [PAHs]) are the Sternoff Metals Seattle and Crowley Marine Services sites, which, based on available information, are not hydraulically linked to the Proposed Park Site (Appendix A).

[1] The plant was maintained on "cold standby" as part of a regional reserve for emergencies, but was formally retired in 1977 (SAIC 2009).

The former flume previously provided a hydraulic connection between the Proposed Park Site and the Duwamish Slip 4 site and Lower Duwamish Waterway. The City completed a non-time-critical removal action in Slip 4 to address sediment contamination in 2012 (Integral 2012). Prior to the construction activities, both the City and Boeing implemented stormwater mitigation measures to reduce the potential for Slip 4 recontamination by stormwater discharge. This included replacement of the former GTSP flume (see Section 2.2.1.2), an interim action at both the GTSP and NBF to excavate contaminated soil (see Section 2.2.2), and installation of a long-term stormwater treatment system by Boeing (Windward 2019). Slip 4 has a 490-acre drainage basin and receives input from three public outfalls and several private storm drains on adjacent properties (Windward 2019). The 1.1-acre Proposed Park Site is unlikely to have a substantive impact on Slip 4 and, by extension, the Lower Duwamish Waterway.

2.2 PREVIOUS SITE INVESTIGATIONS AND REMEDIATION

Multiple investigations and remedial actions have been conducted at the GTSP or former flume (Figure 1-1) starting as early as 1983. Some of these actions were conducted in conjunction with Boeing as part of the NBF/GTSP Remedial Investigation, while others were completed in coordination with early actions for the Lower Duwamish Superfund site. A summary of investigations that were completed at the GTSP or former flume, or as part of the ongoing NBF/GTSP Remedial Investigation, and how they relate to the Proposed Park Site, is included below.

2.2.1 1983–2009

PCBs were found in LDW Slip 4 sediments in the early 1980s, triggering efforts to determine the source(s) (SAIC 2009). SCL initiated sampling programs in 1983 to evaluate the presence and distribution of PCBs at the GTSP. Between 1983 and 2009, SCL investigated soil, groundwater, tank sludge, Power House equipment, and flume sediment.

2.2.1.1 GTSP

Investigations at the GTSP found low levels of PCBs, PAHs, and metals (SAIC 2009). Metals were detected in wipe and ash samples from the GTSP Power House and in soil samples collected near the Power House, fuel storage areas, and boiler blowdown ditch. PCBs were detected in sediments in the GTSP discharge tunnel. Elevated concentrations of PCBs and PAHs were detected in soils of the low-lying area and fenceline area (property boundary) between GTSP and North Boeing Field. Total petroleum hydrocarbons (TPH) were found in soils adjacent to the underground storage tanks (SAIC 2009).

Based on findings, SCL implemented a series of remedial actions (SAIC 2009), including:

- Blocking the GTSP discharge tunnel and removing contaminated sediments from the tunnel floor (1985)
- Excavating contaminated soil from the low-lying area (1985)
- Removing the fuel storage tanks (1989)
- Removing contaminated soil along the GTSP property boundary with North Boeing Field, lining the trench with geotextile fabric and backfilling with clean material, and sealing the concrete retaining wall located along the fenceline (2006).

2.2.1.2 Flume

SCL conducted site characterization work along the flume in 2006 (Appendix B Data Sets B-1 and B-2; Herrera 2007, 2010), including the southern extent that comprises the Proposed Park Site. Soil samples were collected beneath or adjacent to the flume and analyzed for PCBs, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), metals, and diesel-range petroleum hydrocarbons depending on location (Figure 2-3; Appendix B Data Sets B-1 and B-2; Herrera 2007). In the Proposed Park Site, there were occasional PCB and cPAH MTCA Method B CUL exceedances, as well as a few arsenic natural background (7.3 mg/kg) exceedances, but most samples had concentrations below MTCA Method B or natural background screening levels, as applicable (Figure 2-3; Appendix B Data Sets B-1 and B-2). Soil samples were also collected around the former Ellis electrical substation (Figures 2-3 and 2-4) and analyzed for PCBs and petroleum hydrocarbons (Figure 2-4; Appendix B Data Sets B-1 and B-2). PCB concentrations in soil along the west side of the north equipment pad of the former Ellis electrical substation exceeded the MTCA Method B CUL (Figure 2-4); all other PCB concentrations were below the MTCA Method B CUL (Appendix B Data Set B-1; Herrera 2007). Petroleum hydrocarbon concentrations were all below MTCA Method A CULs.[2] PCBs were not detected in two concrete samples collected from the former Ellis substation prior to demolition (Appendix B Data Sets B-1 and B-2; Herrera 2010). No TPH, volatile organic compounds, semivolatile organic compounds, PCBs, or metals, except for copper, were detected in groundwater collected from a piezometer (MW-B4) installed near South Myrtle Street along the flume channel (Appendix B Data Set B-8; Goldberg 2007, pers. comm.; Herrera 2010).

Two investigations were conducted in 2008 to assess the potential for PCBs in various media to impact Slip 4 (SAIC 2009, Leidos 2013). One investigation focused on the former Ellis substation, with several soil samples collected from within the Proposed Park Site (Figure 2-3). Depending on location, samples were collected from 0.5 ft bgs to up to 5 ft bgs. The maximum detected concentration (0.31 mg/kg in the 0–0.5 ft bgs sample at ESS08-04; Appendix B Data Set B-2) was below the MTCA Method B CUL (0.5 mg/kg). The second investigation involved the collection of soil samples along a new storm drain line installed perpendicular to the western side of NBF Building 3-380 that bends north, running approximately parallel to the former

[2] There are no MTCA Method B CULs for petroleum hydrocarbons.

flume. Two of those samples (SD08-08 and SD08-09) fall within the Proposed Park Site footprint (Figure 2-3). Samples were analyzed for PCBs, which were not detected in any samples (Appendix B Data Set B-3; SAIC 2009).

In 2009, the area containing the former flume underwent a demolition, removal, and drainage project to remove contaminated sediment from within the flume and prevent the flume from being a potential conveyance for contamination to reach Slip 4 (Herrera 2010).[3] This project involved the removal of all unauthorized drains into the flume, all sediment within the flume, contaminated soil immediately adjacent to and below the flume, and remaining remnants of the decommissioned Ellis substation. The former flume was replaced by a fully enclosed storm drain to provide stormwater conveyance from the steam plant and other adjacent properties to Slip 4 (Figure 2-5, Appendix C).

Work completed within the Proposed Park Site as part of the 2009 removal action included (Herrera 2010):

- Removal of the wood-lined flume and sediment within the flume.
- Removal of the remaining remnants of the retired Ellis substation, located adjacent to the flume, including removal of contaminated soil from the west side of the north equipment pad (Figure 2-4).[4]
- Removal of approximately 6 in. of soil from beneath the flume, along the entire flume alignment.[5] Additional soil was excavated at new manhole locations in order to meet grade requirements.
- Installation of a new 24-in. polyvinyl chloride stormwater pipe at the bottom of the flume excavation, which was then backfilled.
- A parking lot drain pipe formerly connected to the flume was connected to the new stormwater pipe. A bioswale was installed adjacent to South Myrtle Street to filter parking lot and street run-off (Figure 2-5).

Confirmation soil samples were collected following the 2009 flume removal action (Figure 2-3; Appendix B Data Set B-4; Herrera 2010). Based on past results and knowledge of past site use,

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[3] Given the complex regulatory framework surrounding the cleanup of the LDW, the flume removal project was performed under both federal Superfund and state hazardous waste cleanup regulations. Regulatory oversight was provided primarily by the U.S. Environmental Protection Agency (EPA), because most of the work was covered under the Slip 4 Administrative Settlement Agreement and Order on Consent (CERCLA Docket No. 10-2006-0364). MTCA-regulated portions of the work were performed as an independent cleanup and, as such, required minimal oversight. However, Ecology was kept informed of project progress and significant changes via monthly reports (Herrera 2010).

[4] Ellis substation remnants included 12 concrete equipment pads and chain link fencing.

[5] Soil samples collected up to 6 in. below the bottom of the flume met MTCA Method A (unrestricted land use) and Method B CULs for PCBs and cPAHs.

chemicals of concern in the Proposed Park Site area were PCBs and cPAHs. PCB and cPAH concentrations in composite soil samples collected from 6 in. below the bottom of the flume were less than the MTCA Method B CULs. In the current Proposed Park Site specifically, PCBs and cPAHs were non-detect.

Some uncertainty remains regarding the removal status of subsurface soil at four historical locations that during the 2006 and 2008 investigations had occasional cPAH or PCB MTCA Method B or arsenic natural background exceedances.[6] The NBF/GTSP RI Work Plan (Leidos 2013) indicates that soil at these locations was removed during the 2009 interim action to remove the flume and associated contaminated media. However, in February 2022, Leidos re-evaluated the data and concluded that subsurface soils at these four locations were not removed (Dube 2022, pers. comm.). Given the lack of clarity in the source documents (Herrera 2007, 2010), the City will proceed under the assumption that these subsurface soils remain onsite. Three of these sample locations had subsurface soil arsenic concentrations above background (Figure 2-3).[7] Arsenic is not linked to past uses of the Proposed Park Site. Further, soils with arsenic natural background exceedances occurred in just 8 percent[8] of samples collected as part of the NBF/GTSP RI (LAI 2021), and those exceedances are not related to particular areas of the NBF/GTSP site (LAI 2016). Because of the uncertainty regarding whether these soils remain, and due to the fact that arsenic has been identified as a chemical of concern for Area of Concern (AOC) 10 of the NBF/GTSP Site (see Section 2.2.3), Ecology has requested that the City collect additional samples within the Proposed Park Site for arsenic analysis and evaluation. The City will provide details regarding this additional sampling in a separate memorandum to Ecology.[9]

2.2.1.3 Other

Monitoring well NGW253 was installed in 1991 as part of a North Boeing Field investigation (SAIC 2009). This well is located in the southeastern part of the Proposed Park Site (Figure 2-6). The well was sampled in 1991, 1993, and 2002 and analyzed for PCBs (1991 only), TPH, and volatile organic compounds (Appendix B, Data Sets B-5, B-6, and B-7). PCBs were not detected in the 1991 sample. TPH concentrations exceeded the current MTCA Method A CUL[10] in 1991, but TPH was non-detect in 1993 and 2002 (SEACOR 1992, 1993; SAIC 2009). Vinyl chloride was detected above the current MTCA Method B CUL in 1993, but was non-detect in 1991 and 2002 (SEACOR 1992, 1993; SAIC 2009). Trichloroethene (TCE) concentrations exceeded the current MTCA Method B CUL in all three sampling events.

[6] Locations MS02SS, W2T18, W2, and W1. Subsurface soil exceedances are shown in Figure 2-3.
[7] Locations W2T18, W2, and W1.
[8] Nine samples of 110 analyzed had natural background arsenic exceedances.
[9] The memorandum is expected to be submitted to Ecology in Fourth Quarter 2022. It is anticipated that the associated sampling will occur no later than First Quarter 2023.
[10] There are no MTCA Method B TPH CULs for groundwater.

2.2.2 2010–2012

In 2010, Ecology requested an interim action at GTSP to minimize the potential for recontamination of Slip 4 sediments via PCBs in stormwater following remediation of the slip (Ecology 2010). SCL received Ecology's approval to also remediate for other chemicals simultaneously with the cleanup of PCBs to minimize the need for future additional remediation. Consequently, the GTSP site characterization and cleanup project also addressed metals, TPH, pesticides, semivolatile organic compounds, and volatile organic compounds (Integral 2012).

To support the interim action, SCL conducted additional GTSP-wide soil investigation and groundwater monitoring. This investigation characterized the nature and extent of chemicals detected in GTSP groundwater and soil, including petroleum-impacted soil in a former fuel tank area at the southwest corner of the GTSP building. The results were used to identify chemicals of concern, derive preliminary interim action levels, and develop an Interim Action Work Plan (Integral 2011a–c). The interim action chemicals of concern and associated interim action levels are provided in Appendix D.

The Ecology-approved interim action (Ecology 2011) was successfully implemented between July and December 2011, as detailed in the Interim Action Completion Report (Integral 2012). In areas where complete removal of soil with constituents exceeding preliminary interim action cleanup levels was impractical, a minimum 18-in. cover of clean soil was placed to limit potential direct contact exposure pathways. Because Boeing had been similarly instructed to conduct an interim action to remove PCBs from an area of North Boeing Field immediately adjacent to GTSP, SCL and Boeing worked closely together to conduct simultaneous interim actions at GTSP and the North Boeing Field Fenceline Area using one shared prime contractor (Integral 2012). Boeing's completion report was submitted under a separate cover (LAI 2012).

This interim action was confined to the GTSP property and did not extend to the former flume.

2.2.3 NBF/GTSP Remediation Investigation

In 2013, Ecology and its consultant developed the NBF/GTSP Site RI/FS Work Plan (Leidos 2013). The remedial investigation is intended to characterize the nature and extent of contamination in soil, groundwater, and exterior building materials at the NBF/GTSP site, as well as identify sources of contaminants to stormwater, in such a way as to adequately address data gaps identified in the RI/FS Work Plan. Upon completion of the remedial investigation, the feasibility study will develop and evaluate cleanup action alternatives. In 2015, an amendment to the Agreed Order reassigned responsibility for conducting the RI/FS from Ecology to the potentially liable parties (i.e., the City, Boeing, and King County), with Ecology providing oversight (Ecology 2015). The Proposed Park Site comprises 1.1 acres on the margin of the larger 115.6-acre NBF/GTSP site.

The remedial investigation was implemented in two phases between 2013 and 2015, in accordance with the RI/FS Work Plan (Leidos 2013) and subsequent addenda (LAI 2015a–e). A preliminary draft remedial investigation report presenting findings and recommended areas for consideration in the feasibility study was submitted to Ecology in 2016 (LAI 2016). This investigation included additional groundwater sampling of Proposed Park Site well NGW253 for PCBs (2013 only), petroleum hydrocarbons (2013 only), and volatile organic compounds (Figure 2-6; Appendix B Data Set B-9). PCBs were not detected in groundwater, at a reporting limit of 0.01 µg/L, which is below the MTCA Method B CUL (0.044 µg/L). Petroleum hydrocarbons were not detected in groundwater with reporting limits below MTCA Method A CULs (Appendix B Data Set B-9).[11] Periodic remedial investigation screening level exceedances[12] of vinyl chloride and TCE were recorded during quarterly monitoring at NGW253 (LAI 2016). Slight TCE exceedances of MTCA Method B CULs were also recorded in NGW253 groundwater samples collected in 2016 and 2018 (Gaona 2022, pers. comm.).

Following review of the preliminary draft remedial investigation report, Ecology requested substantive revisions to the NBF/GTSP site AOCs and required additional Phase 3 soil and groundwater investigations, including offsite sample locations. The Proposed Park Site is part of AOC 6, which is focused on chlorinated volatile organic compounds in groundwater associated with sources located north of the Proposed Park Site on Boeing property, and AOC 10, which encompasses site-wide NBF/GTSP chemicals of concern in soil and groundwater other than chlorinated volatile organic compounds. Phase 3 was implemented between 2017 and 2018 in accordance with Sampling and Analysis Plan/Quality Assurance Project Plan, Addendum 6 (LAI 2017). Phase 3 further characterized the downgradient extent of groundwater contaminants within select AOC designated by Ecology, with additional soil samples collected in the vadose zone if field observations indicated soil contamination was present. Phase 3 sampling included four temporary wells installed at the south end of the Proposed Park Site (Figure 2-6). Wells AOC06-GW01, -GW02, -GW03, and -GW04 were analyzed solely for select volatile organic compounds (Appendix B Data Set B-9). Most compounds were non-detect; detected results were at or close to reporting limits (LAI 2018a).

Upon review of the initial Phase 3 results, Ecology determined that with the new data, there was "sufficient information to allow selection of a cleanup alternative in the Feasibility Study;" in particular, the Markov area (immediately to the east of the Proposed Park Site; Figure 2-2), needed "no further investigation or remedial action" (Adams 2018, pers. comm.; Appendix E). Ecology did require an offsite vapor intrusion study to confirm local residents and commercial property staff were not at risk from vapor intrusion (Adams 2018, pers. comm.). The offsite soil vapor and groundwater investigation was conducted in accordance with an Ecology-approved work plan (LAI 2018b,c). Sampling occurred in April and May 2018. This investigation included the installation and sampling of two soil vapor wells on the Proposed Park Site

[11] There are no MTCA Method B TPH CULs for groundwater.
[12] The Draft RI screening levels are provided in Appendix B (Data Set B-10).

(Figure 2-6). Wells OSI-VP26 and -VP27 were analyzed for TCE and vinyl chloride in soil gas; all results were non-detect (LAI 2018a,d). Soil vapor wells were not analyzed for PCBs or PAHs.

Another well, MW-B4, is also located on the Proposed Park Site (Figure 2-6). The provenance of this well is not clearly understood, but it was sampled in 2018 for select volatile organic compounds, including TCE and vinyl chloride. All were non-detect (Appendix B Data Set B-9; Gaona 2022, pers. comm.).

2.2.4 2021–2022

SCL collected additional soil and groundwater samples in 2021 and 2022 to more completely characterize the Proposed Park Site for the Proposed Park Site chemicals of concern (PCBs and cPAHs) (Figure 2-7; Appendices F and G). As detailed in the Sampling and Analysis Plan (SAP) and SAP Addendum (Appendix F), soil samples were collected with a direct push drill rig. Four composite soil samples were collected from the top foot of soil in four designated subareas[13] to characterize the soil for eventual disposal. Forty additional discrete soil samples were collected from 1 to 2.5 ft bgs to characterize the remaining soil and assess the potential for residual risk or impediment to unrestricted site use. Soil samples were collected sufficiently deep to establish that the residual "new surface" soil (which following excavation will then be covered with clean materials to design grade, as discussed later in this IAWP) is below the interim action screening levels (IASLs), which are further discussed in Section 3.[14]

As detailed in the SAP Addendum (Appendix F), groundwater samples were collected from a temporary well casing installed in a direct push borehole. Three groundwater samples were collected: upgradient of, at, and downgradient of the soil sample location with the deepest subsurface soil concentrations above IASLs (GTF_S6). The groundwater samples were collected to assess whether any leaching from soil to groundwater is occurring. Soil and groundwater results are provided in Tables 2-2 and 2-3, respectively. Proposed Park Site chemicals of concern (PCBs and cPAHs) were not detected in groundwater samples, indicating there is no evidence of leaching to groundwater from the vicinity soils.

2.3 GEOLOGY AND HYDROGEOLOGY

The Proposed Park Site is situated in the Duwamish Valley. Historical mudflows from Mount Rainier, river sedimentation, and mudflow erosion have created the current floodplain of silt,

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[13] Trail and right-of-way, off-leash area, former Ellis substation, and stormwater facility.

[14] Data were originally compared to MTCA Method A CULs (Appendix G), which are higher than the MTCA Method B CULs for PCBs. Additional sampling is planned to confirm the "new surface" PCB concentration at or near GTF_S2, as well as provide arsenic soil data. Details of the sampling plan are being established and will be finalized with Ecology input and approval.

sand, and gravel (Fabritz et al. 1998). Bedrock, glacial deposits, marine deposits, and river/floodplain deposits constitute the geologic units underlying the Duwamish Valley. The bedrock beneath the Proposed Park Site is likely a few hundred feet deep (Fabritz et al. 1998; Booth and Herman 1998). The bedrock is overlain by Vashon glacial deposits. Former marine embayment sediment overlies the glacial deposits in the valley; the former marine embayment sediment is overlain by the river/floodplain deposits. The upper 3 to 20 ft below ground surface (bgs) is primarily fill material consisting of sand, silt, and gravel (LAI 1990; Hart Crowser 1991; GeoMapNW 2009).

The Proposed Park Site is located in the central Puget Sound Lowland, situated within the north–south trending Duwamish Valley on the Duwamish floodplain. The Duwamish River originates approximately 5 miles south of the Proposed Park Site where the Green River formerly merged with the Black River; for the last 5 miles, the river is the LDW. The LDW flows northward and drains into Elliott Bay on Puget Sound. Surface water in the Proposed Park Site vicinity drains primarily to the LDW, just beyond East Marginal Way S (at the Proposed Park Site's southern boundary). The original tide flats and floodplain of the valley were filled during the late 1800s and early 1900s, and the meandering Duwamish River straightened between 1913 and 1917. Over time, old channel and lowland areas were raised above sea level using fill material (Fabritz et al. 1998; Windward 2010). Groundwater flow in the Proposed Park Site vicinity is anticipated to be generally toward the LDW and Slip 4 (Appendix A). Depth to groundwater during a March 2022 sampling event (described in Section 2.2.4) ranged from 8.8 to 10.6 ft.

The City conducted an infiltration feasibility study of the Proposed Park Site, considering existing hydrogeological conditions and anticipated post-redevelopment conditions (Appendix H). The study was conducted to satisfy the City of Seattle Stormwater Manual, which requires that projects must include onsite stormwater management if feasible.

2.4 CONCEPTUAL SITE MODEL

The Proposed Park Site is an undeveloped, 1.1-acre (approximate) parcel at the southwestern margin, and outside the fenceline, of the NBF/GTSP site. The Proposed Park Site has historically not had developed buildings or other commercial/industrial facilities located on the property, with the exception of the former GTSP flume, which traversed the property and was subsequently removed and remediated, and the former Ellis electrical substation, the remains of which were removed and remediated in 2009. The site is currently unpaved, with ground surface covering ranging from vegetation to bare dirt and gravel. Two City streets bound the site to the north and south (South Myrtle Street and East Marginal Way S, respectively). North Boeing Field bounds the Proposed Park Site to the east. A multi-tenant, multi-use warehouse and motel bound the Proposed Park Site to the west. The Proposed Park Site is a vacant, urban parcel in a commercial/industrial area and site access is unrestricted.

Proposed Park Site chemicals of concern, PAHs and PCBs, were identified based on historical site facilities (the flume and Ellis substation). Soil concentrations indicate that these chemicals are elevated above MTCA unrestricted land use levels in shallow soil; however, the generally low-level and dispersed nature of the chemical detections in shallow soil do not indicate that the former site uses are the source of contamination. The dispersed, shallow soil contamination is consistent with unspecified urban sources of these chemicals, which would be expected for a parcel that has been in a similar status for decades.

PAHs are chemical components of common commercial and industrial products, including petroleum hydrocarbon fuels, coal tar, roofing tar, and creosote. PAHs are common in an urban environment. Carcinogenic PAHs are persistent in the environment because they have a low aqueous solubility, are organophilic, and thermally stable.

PCBs were historically manufactured in the United States for industrial use until 1979, and until that time, were commonly used in electrical transformers and capacitors. PCBs have also been found in such products as used motor oils, paints, and caulking, to name a few. PCBs are inadvertent by-products of some currently manufactured products. Like PAHs, PCBs are extremely stable in the environment. They are hydrophobic, organophilic, and thermally stable. Low levels of PCBs are common in urban environments.

The most likely pathway for exposure to the Proposed Park Site chemicals is through human use of the Proposed Park Site property. The property is subject to a transient population, and the Proposed Park Site chemicals are found in the shallowest soil horizons (to depths of about 2 ft bgs). As discussed in Section 2.2.4, no Proposed Park Site chemicals of concern were detected in groundwater collected adjacent to and downgradient of the soil with the highest concentrations, demonstrating that no chemical leaching of Proposed Park Site chemicals of concern to groundwater is occurring. Site-specific groundwater sampling did not detect total PCBs or cPAHs in groundwater above MTCA Method B CULs or practical quantitation limits. If chemical migration had occurred from Proposed Park Site soil to groundwater, PCBs and cPAHs would be expected in Proposed Park Site groundwater because the site is situated in an area with generally permeable sandy soil, shallow groundwater (~8–15 ft depth bgs), and many years for potential aqueous transport. There is no evidence that the groundwater leaching process has occurred or caused exceedances of these chemicals above MTCA Method B CULs (which are protective of the highest beneficial water use).

Based on past site use, arsenic, and metals generally, have not been chemicals of concern at the Proposed Park Site, which consequently has had limited soil sampling for metals and no groundwater sampling for metals. Arsenic, a naturally-occurring element in site soil, has been screened as a chemical of concern in AOC 10 because of infrequent, scattered soil concentrations on the NBF/GTSP site that are slightly above background (LAI 2021). There has been no demonstrated link to locations with arsenic soil concentrations above background and past or current industrial activities at the NBF/GTSP site (LAI 2016). AOC 10 encompasses much of the broader NBF/GTSP site (areas and analytes not encompassed by other AOCs), including the Proposed Park Site. Because of this, as well as the nine 2006 soil samples from the Proposed Park Site that were analyzed for arsenic, four of which had arsenic concentrations slightly above natural background (Figure 2-3; Appendix B Data Sets B-1 and B-2), Ecology has requested arsenic be considered as part of the interim action. The City is presently working with Ecology to develop a plan for additional soil sampling and arsenic analysis to confirm (or adjust as necessary) the proposed interim action detailed in Sections 3.5 and 3.6.

3 INTERIM ACTION OVERVIEW

This section of the report provides a summary of the objectives of this interim action, a discussion of IASLs, points of compliance, terrestrial ecological evaluation (TEE), applicable or relevant and appropriate requirements (ARARs), and a discussion of the development and general description of the interim action.

3.1 OBJECTIVE

The objective of this interim action is to remove soil that contains chemicals of concern at concentrations that are marginally above MTCA Method B unrestricted site use CULs and then redevelop the Proposed Park Site into a community amenity featuring an off-leash pet area, bicycle/pedestrian path, and bioswale. The Proposed Park Site is vacant, and was never part of the active NBF/GTSP facility, with the exception of housing the southern extent of the former flume, which was remediated in 2009 (Herrera 2010). The interim action will allow expedited improvement of the Proposed Park Site for a beneficial public use.

This work is designated as an interim action under WAC 173-340-430. This interim action will meet MTCA Method B CULs for unrestricted use for Proposed Park Site chemicals of concern at the Proposed Park Site, which is a small portion of the larger NBF/GTSP site. CULs for the larger NBF/GTSP site have not been defined at this time as the RI/FS for the NBF/GTSP site is ongoing, and the final cleanup will likely not be known for many years. Proposed IASLs and points of compliance for this interim action are discussed below. Following the final RI/FS and during development of the Cleanup Action Plan for the larger NBF/GTSP site, this area and the IASLs will be reviewed to determine compliance with the final cleanup.

3.2 INTERIM ACTION SCREENING LEVELS AND POINTS OF COMPLIANCE

Numeric CULs are developed using the methodology outlined in MTCA (WAC 173-340-700 to 173-340-760). CULs under MTCA are defined as the concentrations of hazardous substances that are protective of human health and the environment under specified exposure conditions. There are three methods for development of CULs under MTCA. Risk-based CULs can be developed under MTCA Method B for residential exposure scenarios, and under MTCA Method C for industrial exposure scenarios. The third method, Method A, consists of tabulated values, and is appropriate for routine cleanup actions or for sites with only a few hazardous substances (WAC 173-340-700(5)(a)). Method A CULs are at least as stringent as concentrations specified in applicable state and federal laws (ARARs) and WAC 173-340-700 Tables 720-1, 740-1, and 745-1.

The Method B and Method C approaches to developing CULs are similar, but they use different "acceptable" risk levels and slightly different exposure assumptions for residential versus industrial exposures, respectively. Because of the more protective assumptions used for residential exposure scenarios, MTCA Method B is applicable to all sites.

3.2.1 Soil

Both MTCA Method A and Method B values were considered protective of soil based on the proposed site use and likely exposure scenarios. Upon further discussion with Ecology, MTCA Method B was selected as the basis for soil IASLs for PCBs and cPAHs at the Proposed Park Site. The remaining NBF/GTSP site is being screened against a broader set of Lower Duwamish preliminary cleanup levels (PCULs), many of which are not applicable to the Proposed Park Site. As discussed in Sections 2.2.4 and 2.4, recent groundwater data indicate that soil leaching is not occurring; hence, PCULs SL-2, -3, and -4 do not apply. The planned park design will include paved, gravel, and vegetated areas, and will capture and treat any stormwater that occurs on site, so PCUL SL-8 for soil erosion does not and will not apply.

As discussed in Section 2.2.3, arsenic is also a chemical of concern in the NBF/GTSP AOC 10, of which the Proposed Park Site is a part. Arsenic is a naturally-occurring chemical in soil and there are no documented historical uses of arsenic on the Proposed Park Site. With Ecology's concurrence, the soil IASL for arsenic is equal to natural background (7.3 mg/kg) (Schwarz 2022, pers. comm.)

Selected IASLs for soil are shown in Table 3-1.

The standard point of compliance for human exposure via direct contact with soil is throughout the site from ground surface to 15 feet bgs. Soil IASLs will be met at the standard point of compliance across the entire flume property by removing the surface soil that exceeds IASLs for the Proposed Park Site. Site soil contamination is from unidentified urban background sources, is shallow, and decreases with depth to less than the IASLs within 2.5 ft of the ground surface for PCBs and cPAHs. Historical arsenic data indicated two potential IASL exceedances deeper than 2.5 ft bgs in places (Figure 2-3), but it is unclear whether this soil remains in place. The City is presently working with Ecology to develop a plan for additional soil sampling and arsenic analysis to confirm (or adjust as necessary) the proposed interim action detailed in Sections 3.5 and 3.6.

3.2.2 Groundwater

Groundwater at the site is not designated for drinking water. In addition, shallow site groundwater is assumed to discharge to the LDW, which is designated as a non-drinking water source per WAC 173-201A, Table 602. Despite these factors, MTCA Method B values, which are based on a drinking water source and therefore more protective than required, were designated as IASLs to evaluate groundwater at the Proposed Park Site for PCBs and cPAHs (Table 3-1). For arsenic, Ecology (2022b) has derived a natural background groundwater concentration for the Puget Sound Basin (8.0 μg/L). As with soil, the arsenic groundwater IASL is equal to natural background (Table 3-1). Existing Proposed Park Site groundwater results are included in Appendix B (Data Sets B-5 through B-9).

The standard point of compliance for protection of groundwater is all groundwater beneath the site. Site monitoring demonstrates that groundwater IASLs are currently being met, even with the current volume of surface soil that exceeds IASLs. The removal of soil exceeding IASLs will be further protective of groundwater.

3.2.3 Additive Risk Evaluation

Cancer risks and noncancer hazards were calculated for the Proposed Park Site IASLs to evaluate whether they needed to be adjusted based on the MTCA requirements for additive hazard and risk. The total cancer risk across all carcinogens must not exceed 1×10^{-5} (WAC 173-340-708(5)(a)). The total noncancer hazard across all chemicals affecting the same target organ must not exceed 1 (WAC 173-340-708(5)(b)).

The cancer risk for arsenic and PCBs was calculated by inserting the proposed IASL into MTCA Equation 740-2 and solving for Risk (Worksheet 1). The cancer risk for the carcinogenic PAHs was calculated consistent with Ecology's (2021) CLARC supporting materials to account for additional risk to children when exposed to chemicals that cause cancer through a mutagenic mode of action (Worksheet 2). The noncancer hazard for all three chemicals was calculated by inserting the proposed IASL into MTCA Equation 740-1 and solving for hazard quotient (Worksheet 1). Reference doses and carcinogenic potency factors were obtained from the Cleanup Levels and Risk Calculation database in July 2022. Noncancer hazard was not calculated for PCBs because there is no reference dose.

The total noncancer hazard across arsenic and cPAH TEQ is 0.3. Because the hazard is less than 1, it is not necessary to evaluate target organs.

The cancer risk across all three chemicals is 1×10^{-5}, which does not exceed the cancer risk threshold.

The IASLs do not need to be adjusted on the basis of additive hazard or risk.

3.3 TERRESTRIAL ECOLOGICAL EVALUATION

WAC 173-340-7490 to 7494 specifies the requirements and procedures for a TEE under MTCA. The goal of a TEE is to prevent terrestrial ecological receptors from being exposed to contaminated soil that could potentially cause significant adverse effects, which for nonendangered species, are effects that impair reproduction, growth, or survival. A cleanup action for terrestrial ecological protection separate from a human health-based cleanup action is not necessarily required; however, where appropriate, a TEE may be conducted so as to avoid duplicative studies of soil contamination that will be remediated to address other concerns (WAC 173-340-7490 (1)(b)). WAC 173-340-740 requirements define criteria for different levels of a TEE including 1) a TEE exclusion (WAC 173-340-7491), 2) a simplified TEE (WAC 173-340-7492), or 3) a site-specific TEE (WAC 173-340-7493).

The Proposed Park Site does not qualify for a TEE exclusion because of the site characteristics. However, an option under the simplified TEE is to use the chemical concentration numbers listed in Table 749-2 as CULs (WAC 173-340-7492(d)). The Table 749-2 TEE CUL for total PCB mixtures is 2 mg/kg for unrestricted land use. There is no Table 749-2 value for cPAHs; however, the TEE CUL for the individual PAH benzo[*a*]pyrene is 30 mg/kg for unrestricted land use. The maximum concentration of total PCB mixtures and benzo[*a*]pyrene in Proposed Park Site soil is 1 and 3.8 mg/kg, respectively. Proposed Park Site soil already meets these TEE CULs; therefore, no further ecological evaluation is required. Also, the interim action soil excavations being conducted to achieve human health-based CULs will serve to further reduce PCB and PAH concentrations on the Proposed Park Site.

3.4 ARARS

Under WAC 173-340-710, cleanup actions conducted under MTCA must comply with applicable local, state, and federal laws. Applicable local, state, and federal laws are defined in WAC 173-340-710(1) as those requirements that are legally applicable and considered relevant and appropriate. Legally applicable requirements include regulatory cleanup standards, standards of control, and other environmental requirements, criteria, or limitations established under state or federal law that specifically address a contaminant, remedial action, location, or other circumstances at the site (WAC 173-340-710(3)). Relevant and appropriate standards include those cleanup standards, standards of control, and other environmental requirements, criteria, or limitations established under state or federal law that, while not legally applicable to the hazardous substance, cleanup action, location, or other circumstance at a site, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site (WAC 173-340-710(3)).

Remedial actions conducted under MTCA must comply with the substantive requirements of the ARARs but are exempt from their procedural requirements (WAC 173-340-710[9]). Specifically, this exemption applies to state and local permitting requirements under the Washington State Water Pollution Control Act, Solid Waste Management Act, Hazardous Waste Management Act, Clean Air Act, State Fisheries Code, and Shoreline Management Act.

Table 3-2 provides a summary of the identified ARARs for the Proposed Park Site.

The City submitted a State Environmental Policy Act (SEPA) checklist for the Proposed Park Site redevelopment in December 2021. SEPA is intended to ensure that state and local government officials consider environmental values in their decision-making process. The SEPA checklist received a Determination of Non-Significance (Appendix I).

3.5 INTERIM CLEANUP ACTION DEVELOPMENT AND DESCRIPTION

To evaluate areas for soil removal, soil analytical results were originally compared to MTCA Method A (Unrestricted Land Use) criteria consistent with prior site investigations (Appendix G), then also to MTCA Method B CULs as requested by Ecology during a February 15, 2022, meeting with the City. Groundwater results were similarly compared to MTCA Method A and B criteria. Findings of those comparisons are summarized below.

3.5.1 Soil

For PCBs, none of the 23 soil samples collected in 2021 to characterize current site conditions had PCB concentrations exceeding MTCA Method A value (1 mg/kg).[15] One of the 23 soil samples exceeded the MTCA Method B value of 0.5 mg/kg. The latter sample was from a depth of 1 to 1.5 ft bgs at core location GTF_S2 and had a total PCB concentration of 1.0 mg/kg. The median detected value of PCBs at the site was 0.051 mg/kg. PCBs were not detected in 11 of the 23 soil samples (48 percent).

For cPAHs, seven of the 40 soil samples collected in 2021 and 2022 to characterize current site conditions had concentrations exceeding MTCA Method A value (0.1 mg/kg). Six of the 40 soil samples exceeded the MTCA Method B value of 0.19 mg/kg. The maximum detected concentration of cPAHs is 4.8 mg/kg at GTF_S21 at a depth of 1–1.5 ft bgs. The median detected value of cPAHs at the site was 0.0078 mg/kg. cPAHs were undetected in 4 of the 40 soil samples (10 percent).

These soil data demonstrate that seven Proposed Park Site locations exceeded the cPAH IASL, primarily on the western margin of the site (Figure 3-1). The one PCB IASL exceedance was collocated with the cPAH exceedance at GTF_S2. Where detected, concentrations of cPAHs and PCBs rapidly attenuated with depth in the upper 2 ft of Proposed Park Site soil.

Historical site data also suggest subsurface impacts for PCBs, cPAHs, and/or arsenic in the northernmost portion of the Proposed Park Site, as well as at select locations near the former flume (Figure 2-3). However, it is unclear whether this soil remains in place.

[15] The City originally selected MTCA Method A (unrestricted land use) as the screening criterion (Appendices F and G). Because no 2021 soil samples had PCBs exceeding MTCA Method A, no further PCB analysis was conducted for the later March 2022 soil samples. That event focused on refining the cPAH nature and extent.

Per Ecology request, the City will collect additional samples for arsenic analysis and evaluation. Samples will also be collected in three locations and analyzed for PCBs and cPAHs, as applicable,[16] to clarify the required depth of excavation (see Section 3.5.3). Details regarding this additional sampling will be provided in a separate memorandum to Ecology.

3.5.2 Groundwater

Groundwater samples collected upgradient of, at, and downgradient of GTF_S6 did not have detections of PCBs (Figure 2-6). GTF_S6 had the highest soil concentrations above IASLs to at least 2 ft bgs (Appendix G). The laboratory analytical methodology was able to achieve a detection limit of 0.044 μg/L for PCBs, which meets the IASL.

The Proposed Park Site groundwater samples also did not have detected concentrations of cPAHs. The laboratory analytical methodology was able to achieve a detection limit of 0.06 μg/L for cPAHs, which is slightly above the IASL (0.023 μg/L).

Groundwater data collected from the Proposed Park Site demonstrate that the low levels of PCBs and cPAHs in site soil are not impacting groundwater above IASLs for PCBs and to the limits of analytical detection for cPAHs, which is within less than a factor of 3 from the cPAH IASL. Also, because the site is situated on permeable soils and has a shallow groundwater surface (i.e., ~8–15 ft bgs), and has been in its present unpaved state for many decades, any anticipated impact from Proposed Park Site chemicals to groundwater would have been expected to have occurred and be measurable by now. Keeping in mind that the proposed interim action will be removing the highest concentrations of cPAHs that remain in Proposed Park Site soil, the potential for further impact to groundwater will be reduced even further.

3.5.3 Remedy Development

To develop the interim action footprint for the soil remedy, the site soil sample data were subdivided into areas using the Thiessen polygon method as shown on Figure 3-1. Most of the Proposed Park Site is already achieving IASLs at a depth of 1 ft bgs, as shown in gray shading, with a few locations exceeding the cPAHs IASL (or in one case, cPAH and PCB IASLs) to depths of 1.5 or 2 ft bgs. All of the IASL exceedance areas are on the western and southern margins of the site and west of the former flume remediation area.

Excavation areas were further developed and refined by combining areas of similar depth into a single excavation depth requirement. This results in three separate excavation areas with excavation depths of 1, 1.5, and 2 ft bgs (Figure 3-2). In a few cases, this results in select areas that will be excavated deeper than necessary to achieve IASLs (e.g., GTF_S1, S3, and S5). The

[16] Two additional samples collected in the northernmost portion of the Proposed Park Site will be analyzed for both PCBs and cPAHs given historical results. Location GTF_S2 will undergo additional PCB analysis due to the use of MTCA Method B as the PCB IASL.

boundary for the eastern edge of deeper soil removal (i.e., to depths greater than 1 ft bgs) is the former flume remediation boundary, where previous remediation was already completed (Figure 3-2).

Historical site data also suggest subsurface impacts for PCBs, cPAHs, and/or arsenic in the northernmost portion of the Proposed Park Site, as well as at select locations near the former flume (Figure 2-3). However, it is unclear whether this soil remains in place. The expected excavation areas, which include the northernmost portion of the Proposed Park Site, are shown on Figure 3-2. These excavation areas represent the minimum excavation limits; the additional soil sampling described in Section 3.5.1 will be used to evaluate whether the proposed excavation areas require modification with respect to excavation depth.

3.6 INTERIM ACTION SUMMARY

Soil samples collected from the Proposed Park Site have low concentrations of the two chemicals of concern (cPAHs and PCBs). Concentrations were detected in shallow soil (i.e., 2.5 ft bgs or less) and decreased with depth to concentrations below IASLs by 2.5 ft bgs. These soil data are indicative of an unpaved urban property adjacent to commercial/industrial properties, but are not indicative of any known site source of PAHs or PCBs.

The final excavation depth will be determined following additional sampling requested by Ecology. As discussed in Section 2.2.1.2, Ecology has requested that the City collect additional samples within the Proposed Park Site for arsenic analysis and evaluation. In addition, extension of the northern boundary of the Proposed Park Site to encompass soil with historical IASL exceedances that may still be in place necessitates the need for additional cPAH and PCB analysis in this area. The adoption of MTCA Method B as the PCB IASL (rather than MTCA Method A) also necessitates additional PCB analysis at location GTF_S2. The City will provide details regarding this additional sampling in a separate memorandum to Ecology, and final results will be used to refine the excavation depth as needed.

Shallow soil exceeding IASLs will be removed and disposed offsite as part of this interim action, prior to redevelopment of the site as a community amenity. Data from recently collected groundwater samples demonstrate that contaminants are not leaching from soil to groundwater above site IASLs. Long-term groundwater monitoring at the nearby NBF/GTSP site also demonstrates that these chemicals are not detected in groundwater in the Proposed Park Site area.

The interim action will be completed in accordance with the Interim Action Scope of Work and the contractor’s work plan, as described in Section 4.

4 INTERIM ACTION SCOPE OF WORK

The interim action will remove and dispose of approximately 2,200 cubic yards (cy) of low-level contaminated soil within the Proposed Park Site. The work shall be completed in accordance with this work plan, the Georgetown Flume Off-Leash Area Plan Set (Appendix J), and other documents referenced within this section. The interim action work includes the following activities:

- Site preparation
- Surveying to confirm excavation limits
- Procedures for inadvertent discovery of cultural resources
- Utility management
- Excavation
- Stockpile management
- Transport and disposal of excavated soils
- Backfill and compaction
- Site restoration.

The following sections provide additional information on how these components will be implemented to complete the interim action. The City will hire a contractor to conduct the work. The contractor shall prepare a work plan that details the means and methods for executing the work described below. The City intends to apply for and receive applicable permits, as referenced in this section (i.e., the City does not plan to utilize the MTCA permit exemption to meet substantive permit requirements but waive the permits).

4.1 SITE PREPARATION

Proposed Park Site preparation consists of the following subtasks: utility notification, contractor staging areas, clearing and demolition, site security and traffic control, temporary erosion and sediment controls, and dust and noise control. Each of these is generally described in the following sections.

4.1.1 Utility Notification

The Washington State Utilities Underground Location Center at 811 (or 1-800-424-5555) as well as private utility locating services shall be contacted in order to locate utilities on and near the Proposed Park Site. A pre-construction survey completed by PACE on behalf of SDOT identified existing utilities at or near the Proposed Park Site as shown on Sheets 2 and 3 of 30 of the Plan Set (Appendix J). Known utilities in the vicinity of the Proposed Park Site include overhead power and telephone and underground stormwater and sewer. The exact location or depth of the underground utilities is not known and shall be verified in the field by the contractor. There are two existing monitoring wells (MW-B4 and NGW253) located within the excavation areas that shall be protected (Figure 3-2 and Sheet 19 of 30 of the Plan Set in Appendix J). Assumptions for managing utilities during remedial activities are presented in Section 4.4.

4.1.2 Contractor Staging Areas

The entire Proposed Park Site requires excavation, so staging areas shall be managed to accommodate the work. The contractor shall provide a staging plan as part of its work plan for review and approval by the City.

4.1.3 Clearing and Demolition

The majority of the Proposed Park Site is covered in grass/gravel with a small area of asphalt in the southeast corner adjacent to East Marginal Way S. This asphalt and any aboveground vegetation that exists within the removal area (e.g., trees) shall be removed prior to soil excavation. These features are shown on the topographic survey provided in Sheets 2 and 3 of 30 of the Plan Set (Appendix J). Clearing and demolition debris shall be disposed of by the contractor at an Ecology-permitted disposal facility in coordination with the City.

4.1.4 Site Security and Traffic Control

The contractor shall prepare a temporary site security and traffic control plan as part of the contractor's work plan. The site security plan shall include providing and installing temporary site security measures including fencing, barricades, etc., as necessary for cordoning off the construction work and contractor staging areas from the public during active work and non-work hours. Appropriate gate(s) shall be provided along the temporary fence to provide access to construction personnel, vehicles, and other construction equipment.

The contractor shall implement traffic control in accordance with the approved traffic control plan, pedestrian mobility plan, and any required City permits. In general, traffic controls shall include providing necessary signs (e.g., sidewalk closure, rerouting signs), barricades, and flaggers (if necessary) to maintain safe movement of pedestrian, bike, and vehicular traffic. The traffic control plan shall also identify the truck haul route within the City limits that the contractor proposes to use for transport of contaminated material.

The Proposed Park Site is adjacent to East Marginal Way, a City arterial, and South Myrtle Street. Given the proximity of a City arterial, construction access and materials hauling can be accommodated consistent with City requirements and minimize impacts to the adjacent residential neighborhood.

4.1.5 Temporary Erosion and Sediment Controls

Best management practices (BMPs) consistent with the 2021 City of Seattle Stormwater Manual and the project permit requirements will be used for erosion and sediment control during construction. The January 2022 stormwater technical memorandum documents the requirements of the 2021 City of Seattle Stormwater Code as it applies to the proposed improvements and describes the project treatment measures (Appendix K). The City will also obtain an Ecology stormwater construction permit. The contractor shall prepare a temporary erosion and sediment control (TESC) plan and include it in the contractor's work plan. SDOT will provide a TESC plan template for use. The contractor shall be required to update the TESC plan as necessary to identify TESC BMPs that will be implemented during construction. A standard TESC plan is provided in Sheet 12 of 30 of the Plan Set (Appendix J).

The proposed temporary erosion and sediment control elements must, at a minimum, include the following:

- Prevention of sediment, debris, and sediment-laden water from leaving the work area and entering adjacent surface streets and storm drains using stabilized construction access, filter fences, compost socks, catch basin inlet protection, and/or similar BMPs
- BMPs to divert stormwater such that stormwater from offsite does not enter the excavation area
- BMPs at the construction access and internal haul routes to minimize the tracking of soil onto the adjacent surface streets (described below)
- Street sweeping and/or street cleaning, as necessary, to remove soil tracked onto the adjacent surface streets
- Stockpile BMPs (described below)
- Management of stormwater runoff from contaminated soil (contact stormwater).

Stabilized construction access shall be installed at all entry/exit points to the site. The construction access shall be stabilized with geotextile fabric and quarry spalls as shown in Sheet 12 of 30 of the Plan Set (Appendix J). Wheel wash or tire baths may be required if other BMPs installed for construction entrance/exit and internal haul routes are not effective in preventing tracking soil onto roads.

The contractor may elect to directly load contaminated material to haul trucks or to temporarily stockpile contaminated material outside the limits of excavation area prior to loading. Temporary stockpiling of excavated contaminated material must be placed on impermeable plastic sheeting (minimum 6-mil thick) with a berm along the perimeter of the stockpile and a plastic sheeting cover. The berm may be constructed with straw wattles or other equivalent methods approved by the City. The plastic sheeting and berm prevent the runoff of stockpiled soil contaminants to surrounding areas. The bottom plastic sheeting should be lapped over the berm materials, and the soil stockpile within the berm shall be covered with plastic sheeting to prevent erosion or leaching of contaminants from the soil stockpile. The plastic sheeting covering the soil stockpile should be secured using sand bags or equivalent. The plastic sheeting cover prevents the stockpiled soil from being exposed to precipitation and wind. All water accumulated within the temporary stockpile area shall be managed as described below.

The contractor shall prepare a water management plan as part of the contractor's work plan. All water encountered during or generated from construction activities shall be managed under this plan. This includes stormwater and runoff from areas where contaminated soil removal is being performed; stormwater and runoff from areas where contaminated soil removal is complete; water that is generated during decontamination activities; and any other water that is generated during construction activities.

Depending on the pollutants and associated concentrations, the water may be able to be discharged to the sanitary sewer system, subject to approval by the City and King County and the requirements of a discharge permit obtained from King County.

4.1.6 Dust and Noise Control

Excavation, backfill, and site grading work has the potential to generate airborne dust. Engineering controls shall be used during construction (e.g., wetting or covering exposed soil), as necessary, to meet Puget Sound Clean Air Agency substantive restrictions on the offsite transport of airborne particulates. If wetting is employed, care shall be taken to apply the appropriate amount of water to prevent dust only. Visual monitoring shall take place and water application shall cease if over-saturation is noted (i.e., puddling, surface runoff). In addition, street sweeping shall be performed, as necessary to comply with City street use permit requirements.

Construction noise will be generated by a variety of construction equipment, including truck engines, backup alarms, generators, other small engines, and earthmoving equipment. Work associated with the interim action shall be performed during hours allowed by the City municipal code. If required, a variance on the allowable work hours shall be coordinated with the City.

4.2 SURVEYING

The contractor shall retain an independent surveyor to lay out, control, and document the interim action work. The surveyor will be a licensed professional land surveyor registered with the State of Washington. Surveying requirements include, but are not limited to, the following:

- Excavation and backfill layout
- Documentation of the horizontal and vertical extent of all completed excavations
- Preparation of as-built record survey drawings.

Prior to mobilization of equipment, the surveyor shall stake the actual property lines and mark the removal boundaries based on Sheet 19 of 30 of the Plan Set (Appendix J). The boundaries shall be field-verified by the contractor and the City. Surveys shall be completed and submitted to the City prior to and at the completion of excavation activities to document the Interim Action removal work and any deviations from this work plan or the Plan Set.

4.3 UTILITY MANAGEMENT PLAN

The contractor shall manage utilities according to the 100% design set. Utilities shall be managed in one of three ways: (1) demolish and remove, (2) temporarily reroute if necessary and restore, or (3) protect in-place to facilitate remedial excavation activities. The contractor shall be responsible for coordinating and notifying respective utility providers in advance of demolition and remedial excavation. In addition, the contractor shall be responsible for obtaining necessary inspections for the restored utilities. The approximate locations of the utilities are shown on Sheets 4 and 5 of 30 of the Plan Set (Appendix J). SCL power poles will be preserved in place and excavation will be offset 3 ft from the edge of each pole. Hand tools shall be used to remove the soil within 3 ft of the poles.

The locations of the monitoring wells and soil vapor wells are shown on Figure 2-6. Monitoring wells MW-B4 and NGW-253 shall be clearly identified and protected from construction activities. The elevation of these wells shall be adjusted if necessitated by grade changes.[17] To prevent damage to the wells, the excavation shall be offset 3 ft from the edge of the flush-mount monument. Hand tools shall be used to remove the soil within 3 ft of the monitoring wells. Soil vapor wells OSI-VP26 and OSI-VP27 (Figure 2-4b) shall be decommissioned by a driller licensed in the State of Washington.

If a utility not identified in the pre-construction survey or contractor's utility locate is uncovered during excavation, the contractor shall notify the City immediately. Appropriate notifications

[17] If the monitoring well elevations are adjusted, the wells will be resurveyed to obtain current elevations.

shall be made to the utility owner, if necessary, and the utility shall be managed in coordination with the utility owner. Any accidental damage to such utilities shall be repaired.

4.4 EXCAVATION

Excavation limits (vertical and horizontal) to remove contaminated soils are shown on Sheet 19 of 30 of the Plan Set (Appendix J).[18] A total of approximately 2,200 cy of contaminated material is estimated to be removed from the excavation based on the limits. Additional excavation beyond the vertical limits described above will be required to accommodate the installation of new utility trenches as shown on Sheet 25 of 30 of the Plan Set. Due to the shallow excavation depths, groundwater management is not anticipated to be required. Excavations adjacent to buildings or utilities shall be offset to prevent damage to the structure(s).

4.5 STOCKPILE MANAGEMENT

All excavated soil will be treated as contaminated and disposed of at a landfill. Soil profiles will be based on the 2021/2022 soil results (Appendix G). The contractor may elect to either directly load contaminated material to haul trucks or temporarily stockpile contaminated material outside the limits of excavation area prior to loading. Contaminated material shall be managed in a lined, bermed area with appropriate cover and water management in place. Stockpile BMPs are discussed Section 4.1.5.

The contractor may propose to stockpile import backfill material in non-contaminated areas on the Proposed Park Site (areas that have been excavated and backfilled). Stockpiles shall be managed in accordance with the TESC section (Section 4.1.5) of this document.

4.6 TRANSPORT AND DISPOSAL OF EXCAVATED SOILS

All excavated soil will be treated as contaminated and disposed of at a landfill. Soil profiles will be based on the 2021/2022 soil results (Appendix G). Excavated contaminated soil and additional soil excavated to accommodate utility installation will be transported offsite and disposed of at an Ecology-permitted disposal facility. The contractor shall ensure that material loaded for offsite disposal meets paint filter criteria in accordance with all applicable transportation laws and regulations and the requirements of the receiving disposal facility. Material with free liquid will not be allowed for offsite transportation. The contractor shall set up a designated area(s) for loading excavated or stockpiled material onto trucks/containers used for transporting material offsite to contain accidental spills and prevent cross-contamination.

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[18] The plan set will be adjusted as needed following completion of the planned additional sampling to determine the final excavation depths across the Proposed Park Site. Details regarding this additional sampling will be provided in a separate memorandum to Ecology.

Trucks/containers used for transporting excavated material will be covered with tarp and equipped with seals and doors to prevent spillage of material during transportation in accordance with applicable regulatory requirements.

Transportation of excavated material shall be completed in accordance with applicable state and federal solid waste handling and transportation regulations. Transportation contractor(s) shall be capable of providing documentation that demonstrates that they are properly licensed and are in compliance with applicable U.S. Department of Transportation regulations. Transportation contractors shall also provide a copy of their contingency and spill control plans describing the measures to be implemented in the event of spills or discharges during material handling and transporting. The contractor shall provide records of disposal (weight tickets, certificate of disposal) from the disposal facility to confirm the weight of the excavated material.

Disposal characterization for contaminated material was completed using existing chemical analytical data (Appendix G). The existing chemical analytical data along with the completed disposal-facility waste profile forms will be submitted to permitted solid waste disposal landfills to obtain preliminary authorizations. Based on existing data, it is assumed that the contaminated material will be characterized as non-hazardous/non-dangerous waste and require disposal at solid waste landfills that are permitted to accept MTCA Method A/Method B level waste (RCRA Subtitle D landfill). Preliminary disposal authorizations will be made available to the contractor to obtain final authorizations. Alternatively, the contractor may propose to use landfills of their choice that are Ecology-approved and permitted to accept contaminated waste generated from the Proposed Park Site. The City's representative will coordinate with contractor-proposed landfills and/or Ecology's Hazardous Waste and Toxics Reduction Program, as necessary, to assist in obtaining disposal authorization. Because waste profiles for contaminated material will be developed prior to construction, stockpiling of contaminated material is not expected to be necessary for disposal characterization purposes.

4.7 BACKFILL AND COMPACTION

The excavation shall be backfilled with clean import backfill material that has been approved for use by the City. The contractor shall provide the City with verification that imported backfill materials have been tested and certified to be free of contaminants and meet the criteria listed below:

- Imported backfill shall meet the standards of Division 2 of the City of Seattle Standard Specifications.
- Engineering aggregates shall be sourced from licensed, permitted commercial sand and gravel pits or quarries.

The backfill of material shall be in accordance with City of Seattle Standard Specification 2-10 (Backfilling). The compaction of material shall be in accordance with City of Seattle Standard Specification 2-11 Compaction. Field density testing shall be conducted to confirm adequate compaction is achieved.

4.8 SITE RESTORATION

After removal of contaminated soil and general backfill, the City will create an off-leash area for dogs, a multiuse trail, two large bioretention cells, and a planted buffer and plant approximately 80 new trees (see Plan Set in Appendix J).

5 COMPLIANCE MONITORING

Three types of compliance monitoring requirements are described in WAC 173-340-410—protection monitoring, performance monitoring, and confirmational monitoring.

5.1 PROTECTION MONITORING

Protection monitoring is conducted during the interim action to confirm that human health and the environment are adequately protected during construction. Protection monitoring will be addressed in a health and safety plan prepared by the contractor prior to construction. The plan will detail the approved methods and procedures to ensure adequate protection is maintained during the interim action construction phase.

5.2 PERFORMANCE MONITORING

Performance monitoring is the monitoring conducted to demonstrate that the interim action has attained the IASL requirements per this IAWP. For this interim action, the performance standards consist of two elements: 1) soil sampling and analysis to demonstrate that the implementation of the interim action soil excavation work has achieved the IASLs, and 2) verification that the remedial excavations have extended to the proper depth to remove all soil that exceeds the IASLs.

Performance monitoring soil sampling is commonly conducted after excavation; however, for this project, a robust and extensive pre-excavation soil sampling and analysis program has confirmed the areas and volumes of soil that contains Proposed Park Site chemicals of concern exceeding IASLs (Appendices E and F). Thus, the interim action excavation has been designed to remove all of the site soil that exceeds these IASLs. Figure 5-1 provides the performance verification soil sample results for cPAHs in the soil horizon remaining after excavation.[19]

Verification that the soil exceeding IASLs has been removed is an important element of performance monitoring. Table 5-1 presents the current ground surface elevation and target post-excavation ground surface elevation based on the planned excavation areas for this interim action. As previously discussed in Section 3.5.3, planned excavation at a few locations is deeper

[19] MTCA Method A was originally anticipated to be the basis for the IASLs; PCB concentrations met MTCA Method A criteria at 1 ft bgs, so cPAHs are the primary contaminant determining excavation depth. With the final selection of MTCA Method B as the basis for the IASLs, additional confirmation for PCBs will be needed at location STF_S2 at the interval below the proposed excavation depth. In addition, potential remnants of historical subsurface impacted soil and the inclusion of arsenic will require some additional confirmation sampling (for arsenic across the Proposed Park Site, and also for PCBs and cPAHs in the northern area of the Proposed Park Site). Details regarding this additional sampling will be provided in a separate memorandum to Ecology.

than required for the park design based on the performance monitoring soil sample data. A post-construction survey will be conducted to confirm that the planned soil removal ground surface elevation is achieved at all of the performance monitoring soil locations (Table 5-1). The survey will be conducted by a licensed Washington surveyor and will be conducted to an accuracy of 0.1 ft elevation.

5.3 CONFIRMATIONAL MONITORING

Confirmational monitoring is typically conducted to confirm the long-term effectiveness of the interim action; however, because soil IASLs will be attained at the standard point of compliance upon completion of the interim action, and will be verified through the performance monitoring, no confirmational sampling will be necessary. In addition, because pre-remediation groundwater samples demonstrated that the Proposed Park Site chemicals of concern are not detected in site groundwater at the IASL or practical quantitation limit, soil leaching to groundwater is not a concern for the Proposed Park Site. Furthermore, any soil exceeding IASLs will be removed from the site; consequently, any potential future impacts to groundwater from chemicals of concern in Proposed Park Site soil will be further reduced. For the broader NBF/GTSP, site-wide groundwater monitoring is ongoing under Ecology oversight.

6 QUALITY ASSURANCE/QUALITY CONTROL

This section describes the general quality assurance and quality control (QA/QC) procedures to be implemented during the interim action, including contractor quality control, construction monitoring and field documentation, and analytical QA/QC.

6.1 CONTRACTOR QUALITY CONTROL

The contractor shall include a description of the primary elements of work, quality control procedures that will be utilized, and project management structure in the construction work plan. The contractor's quality control procedures will be subject to review and approval by the City to ensure that the construction is completed in accordance with the IAWP and contract requirements (to be developed).

The contractor shall maintain quality control records for the duration of the construction. These records shall include evidence that the required inspections or tests have been performed, including the type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, and causes for rejection; proposed corrective action; and corrective actions taken. Records shall be sufficient to demonstrate that target elevations/excavation depth(s) were achieved.

In addition to the contractor's quality control activities, the City and/or City representatives will perform independent oversight of the contractor's activities.

6.2 CONSTRUCTION MONITORING AND FIELD DOCUMENTATION

Construction monitoring and oversight will be performed by the City and its representatives. A comprehensive record of field activities will be maintained. The field documentation will record construction activities, as well as decisions, corrective actions, and/or modifications to the project plans and procedures discussed in this report.

6.3 HEALTH AND SAFETY

Cleanup-related construction activities shall be performed in accordance with the requirements of the Washington Industrial Safety and Health Act (RCW 49.17) and the federal Occupational Safety and Health Act (29 CFR 1910, 1926). These regulations include requirements that workers are to be protected from exposure to contaminants.

The contractor shall prepare and submit a separate health and safety plan for use by contractor personnel. Personnel engaged in work that involves hazardous material excavation and handling will comply with MTCA safety and health provisions in WAC 173-340-810 and shall be Hazardous Waste Operations and Emergency Response-, Occupational Safety and Health Act -, and Washington Industrial Safety and Health Act-certified as required.

7 SCHEDULE AND REPORTING

The anticipated schedule and reporting requirements are described below.

7.1 SCHEDULE

Pending public review of this IAWP and Ecology approvals, interim action-related construction work is scheduled to begin in third quarter 2023. The construction duration is estimated to occur over a period of 10 months. A detailed project schedule will be established at the time of contractor selection.

7.2 REPORTING

Upon completion of interim action construction work, an Interim Action Completion Report describing the construction activities will be prepared and submitted to Ecology for review and approval. In addition, the results of the interim action, as described in the final Interim Action Completion Report, will be incorporated into the RI/FS Report for the NBF/GTSP site.

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Figures

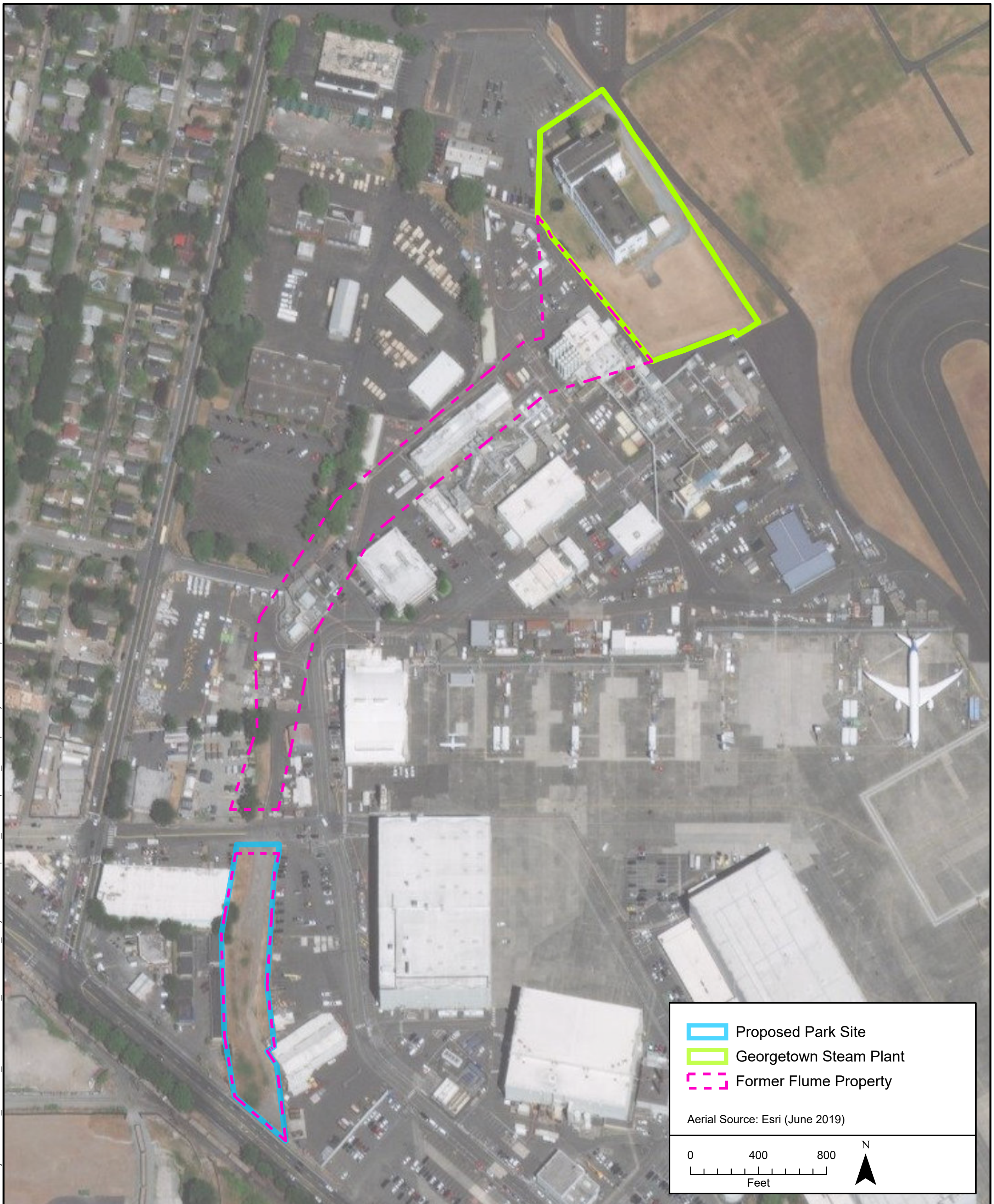

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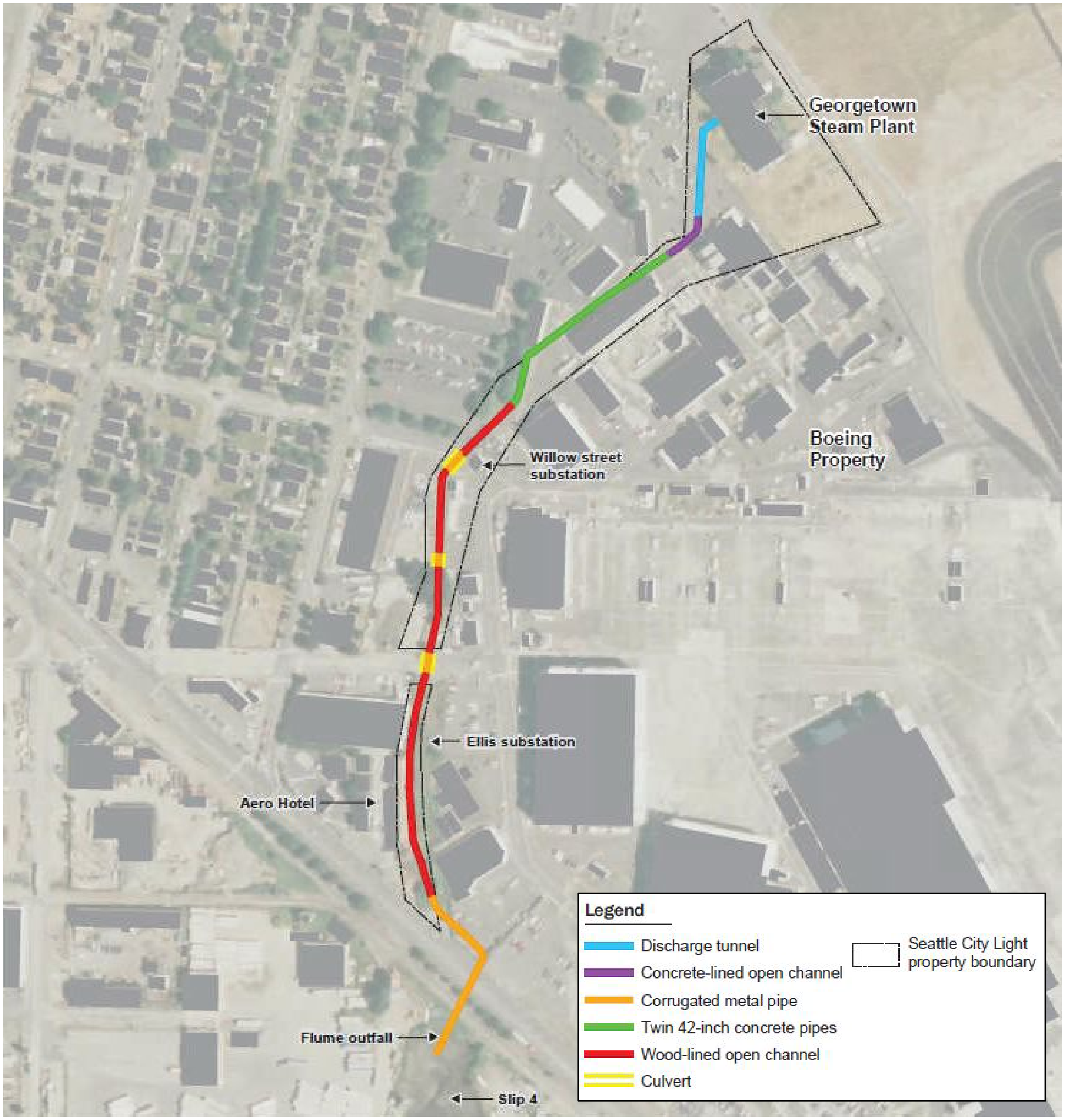
Figure 1-1.
Proposed Park Site Vicinity Map



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Source:
Herrera 2010, Figure 2

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Figure 2-1.
Former Georgetown Flume

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Note:
1) The Proposed Park Site is part of the North Boeing Field/Georgetown Steam Plant MTCA site, which itself is not shown here.
2) The Markov site boundary is approximate, based on Leidos (2013).

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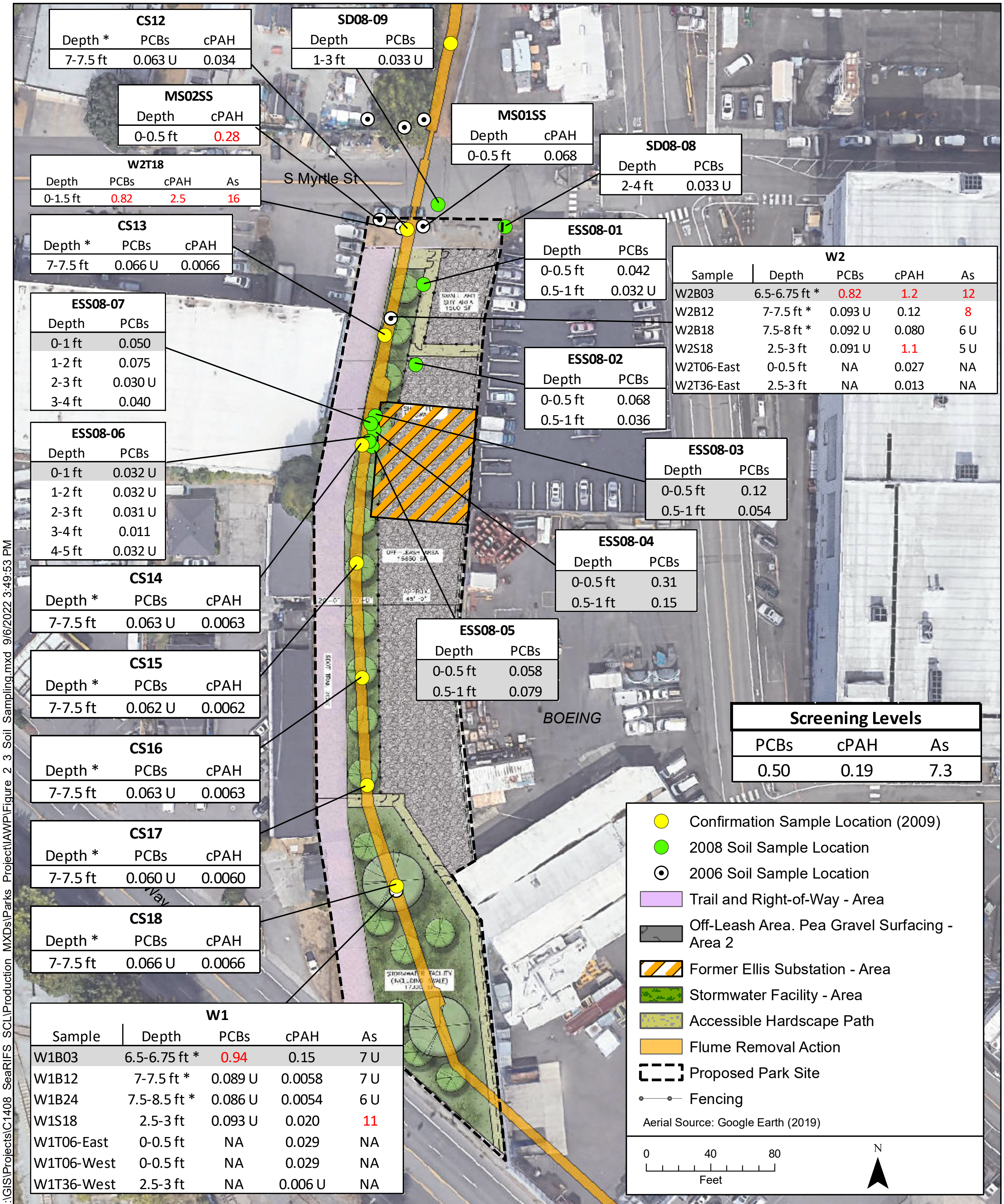
Figure 2-2.
Neighboring Upland Sites on the MTCA Confirmed and Suspected Contaminated Sites List



CS12

Depth *	PCBs	cPAH
7-7.5 ft	0.063 U	0.034

SD08-09

Depth	PCBs
1-3 ft	0.033 U

MS02SS

Depth	cPAH
0-0.5 ft	0.28

MS01SS

Depth	cPAH
0-0.5 ft	0.068

SD08-08

Depth	PCBs
2-4 ft	0.033 U

W2T18

Depth	PCBs	cPAH	As
0-1.5 ft	0.82	2.5	16

CS13

Depth *	PCBs	cPAH
7-7.5 ft	0.066 U	0.0066

ESS08-01

Depth	PCBs
0-0.5 ft	0.042
0.5-1 ft	0.032 U

W2

Sample	Depth	PCBs	cPAH	As
W2B03	6.5-6.75 ft *	0.82	1.2	12
W2B12	7-7.5 ft *	0.093 U	0.12	8
W2B18	7.5-8 ft *	0.092 U	0.080	6 U
W2S18	2.5-3 ft	0.091 U	1.1	5 U
W2T06-East	0-0.5 ft	NA	0.027	NA
W2T36-East	2.5-3 ft	NA	0.013	NA

ESS08-07

Depth	PCBs
0-1 ft	0.050
1-2 ft	0.075
2-3 ft	0.030 U
3-4 ft	0.040

ESS08-02

Depth	PCBs
0-0.5 ft	0.068
0.5-1 ft	0.036

ESS08-06

Depth	PCBs
0-1 ft	0.032 U
1-2 ft	0.032 U
2-3 ft	0.031 U
3-4 ft	0.011
4-5 ft	0.032 U

ESS08-03

Depth	PCBs
0-0.5 ft	0.12
0.5-1 ft	0.054

ESS08-04

Depth	PCBs
0-0.5 ft	0.31
0.5-1 ft	0.15

CS14

Depth *	PCBs	cPAH
7-7.5 ft	0.063 U	0.0063

ESS08-05

Depth	PCBs
0-0.5 ft	0.058
0.5-1 ft	0.079

CS15

Depth *	PCBs	cPAH
7-7.5 ft	0.062 U	0.0062

Screening Levels

PCBs	cPAH	As
0.50	0.19	7.3

CS16

Depth *	PCBs	cPAH
7-7.5 ft	0.063 U	0.0063

CS17

Depth *	PCBs	cPAH
7-7.5 ft	0.060 U	0.0060

CS18

Depth *	PCBs	cPAH
7-7.5 ft	0.066 U	0.0066

W1

Sample	Depth	PCBs	cPAH	As
W1B03	6.5-6.75 ft *	0.94	0.15	7 U
W1B12	7-7.5 ft *	0.089 U	0.0058	7 U
W1B24	7.5-8.5 ft *	0.086 U	0.0054	6 U
W1S18	2.5-3 ft	0.093 U	0.020	11
W1T06-East	0-0.5 ft	NA	0.029	NA
W1T06-West	0-0.5 ft	NA	0.029	NA
W1T36-West	2.5-3 ft	NA	0.006 U	NA

N:\GIS\Projects\C1408 SeaRIFS SCL\Production MXDs\Parks Project\AWP\Figure 2 3 Soil Sampling.mxd 9/6/2022 3:49:53 PM

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Notes:
1. cPAH presented as toxic equivalents (TEQ)
2. 2006 locations are approximate
3. units = mg/kg
4. U = non-detect
5. Screening Levels: PCBs, cPAH = MTCA Method B Direct Contact; As = natural background
6. red = screening level exceedance
7. gray highlight = soil removed
8. NA = not analyzed
9. * approx. depth; sample collected below flume bottom (approx. 6.5 ft below ground surface)

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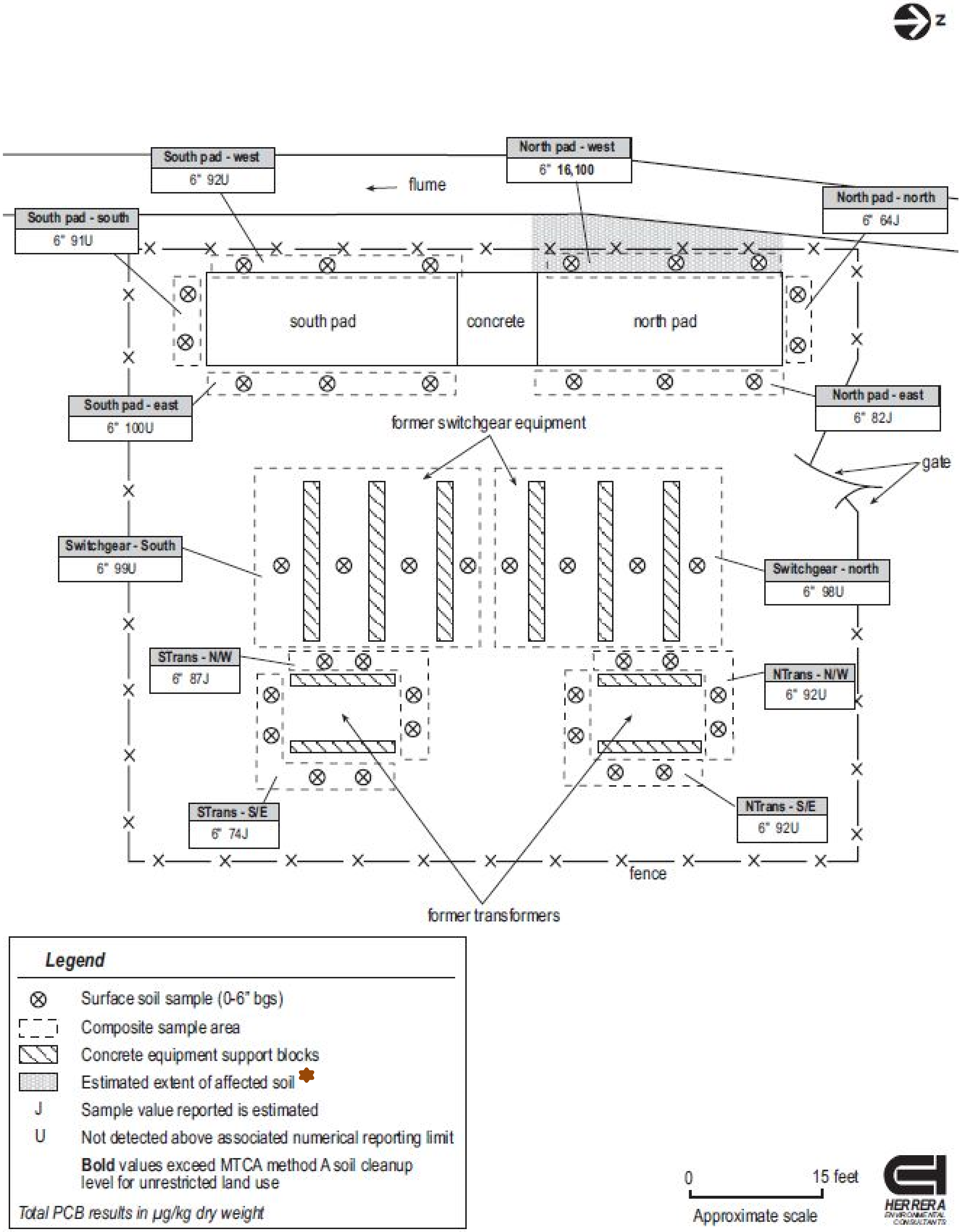
Figure 2-3.
Flume Removal Action Area - Historical and Confirmation Soil Sample Results



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Source:
Herrera 2007, Figure 3-8

The gray area (estimated affected soil extent) was removed in 2009 (Herrera 2010).

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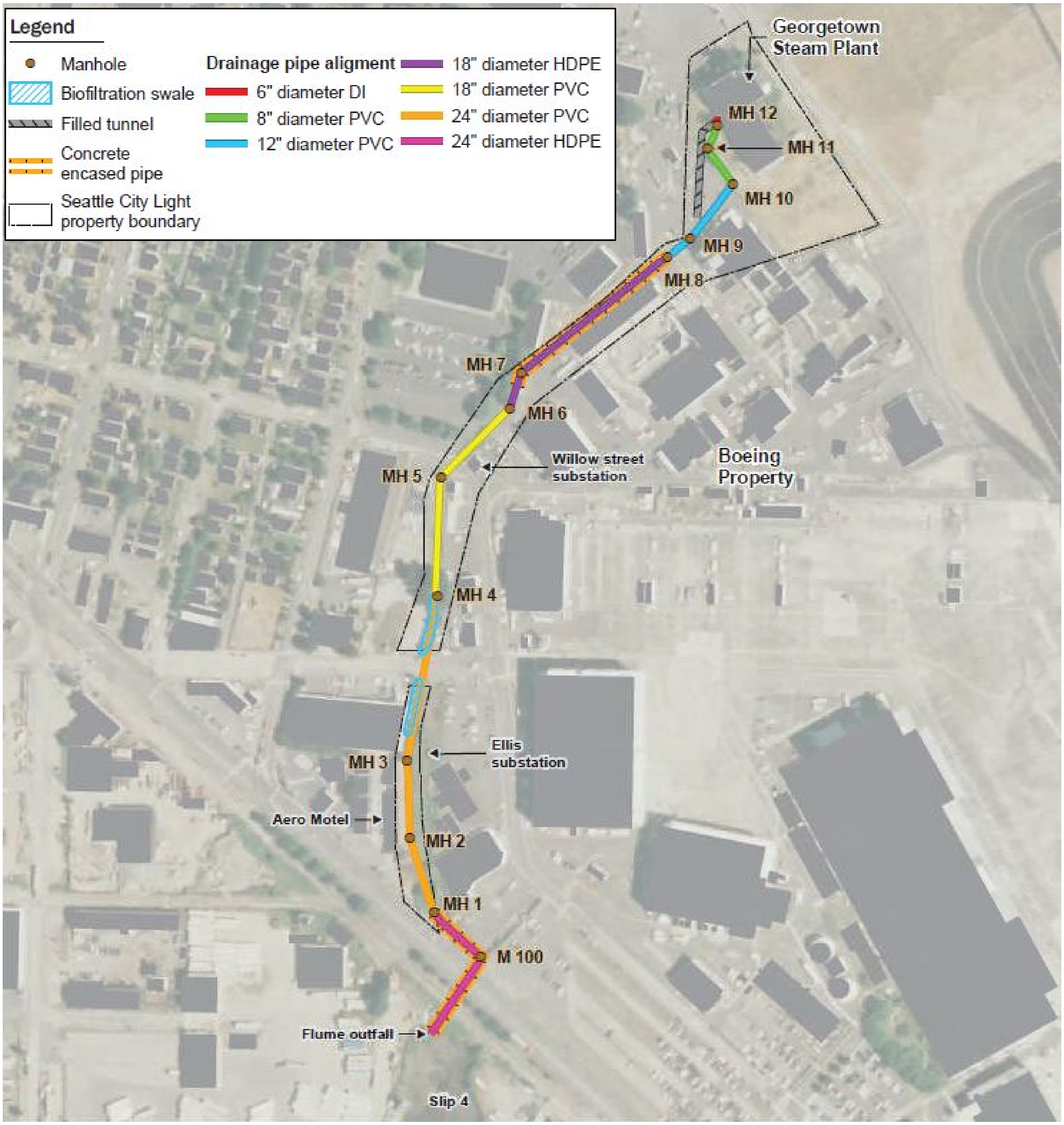
Figure 2-4.
Former Ellis Substation Composite Soil Total PCB Sample Results, 2006



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Source:
Herrera 2010, Figure 3

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Figure 2-5.
Existing Georgetown Storm Drain

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Figure 2-6.
Proposed Park Site Historical Groundwater and Soil Vapor Sample Locations

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Figure 2-7.
2021 and 2022 Soil and Groundwater Sample Locations

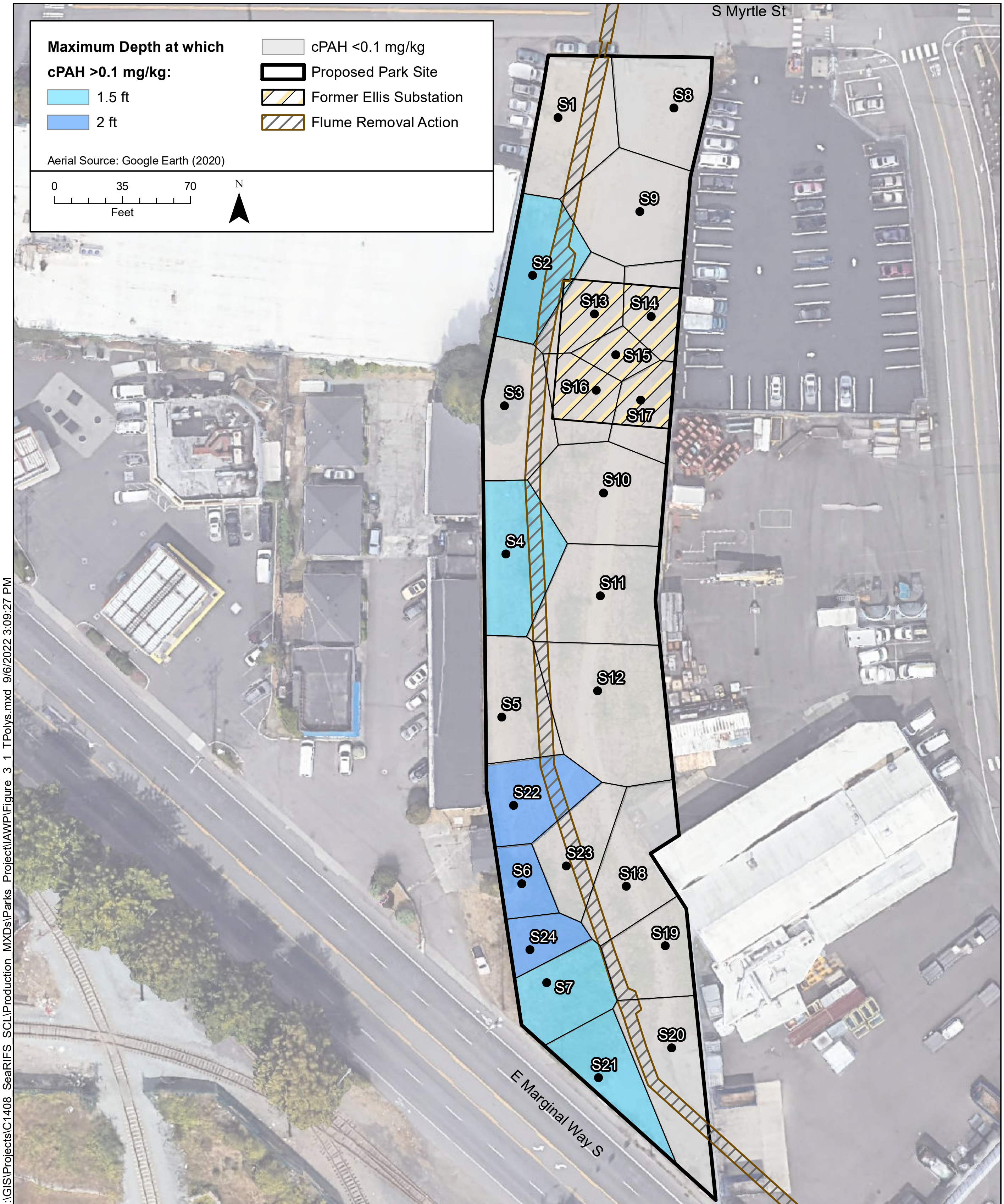

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Figure 3-1.
cPAH Concentrations in Soil
Thiessen Polygons

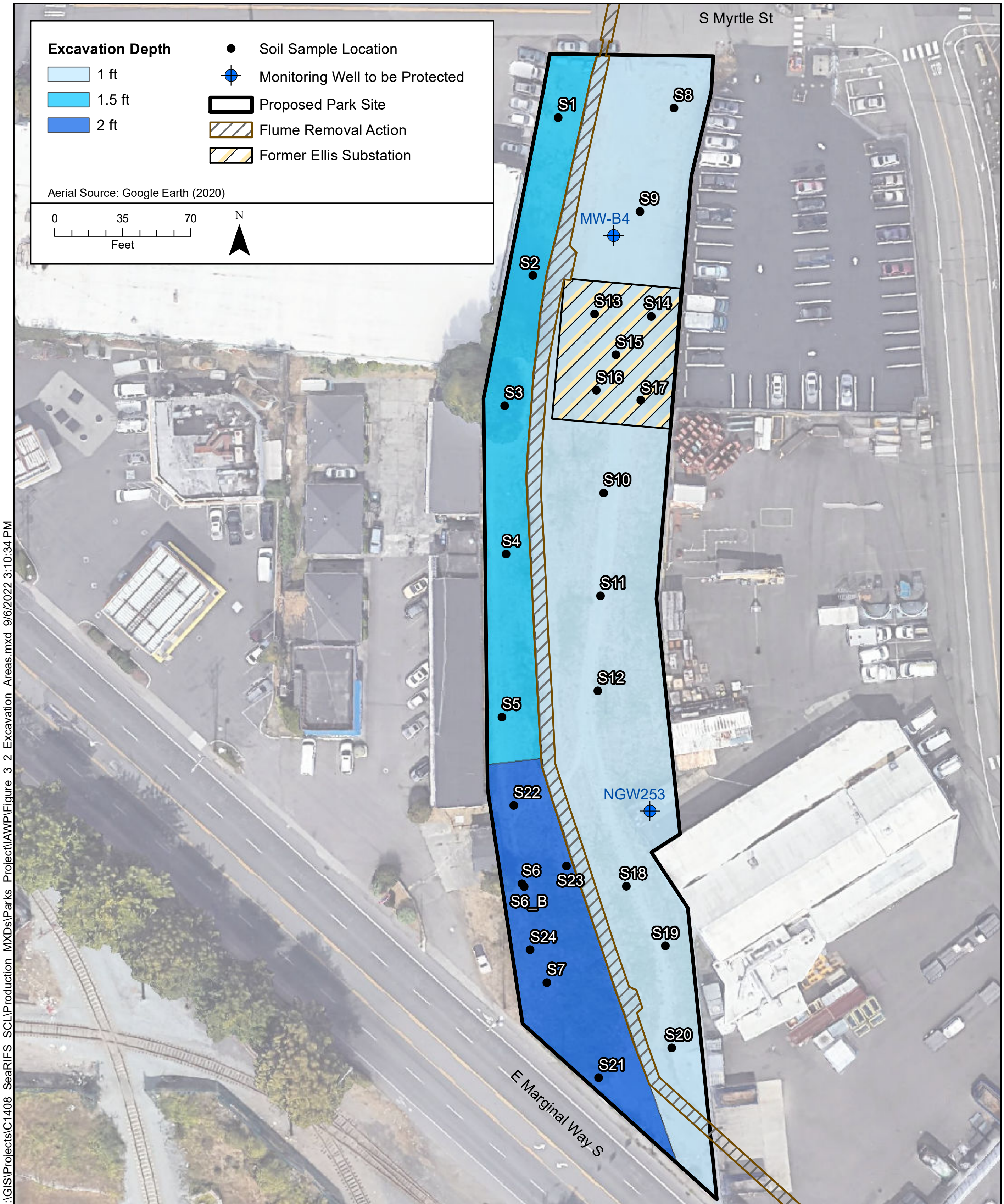

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Figure 3-2.
Excavation Areas

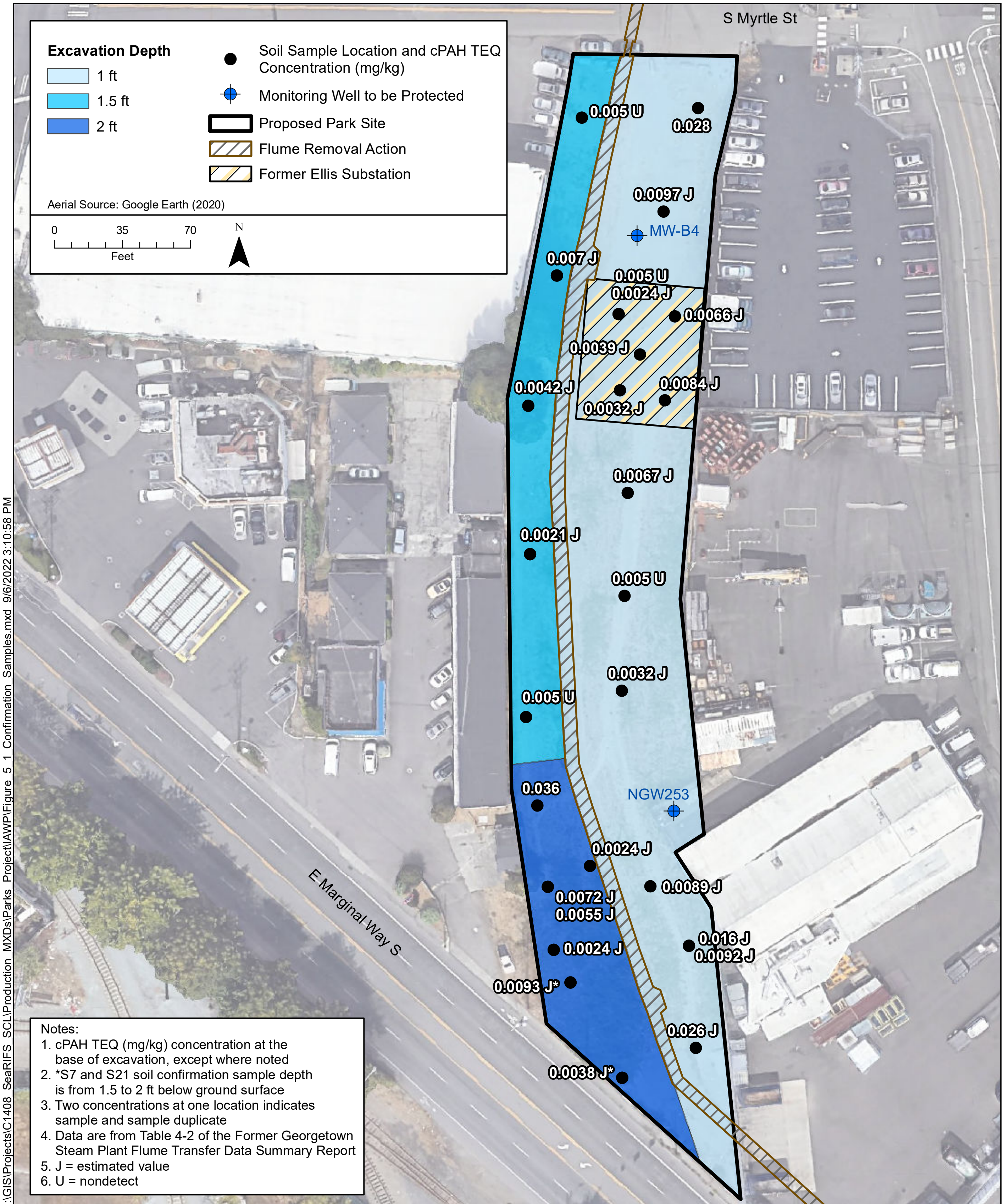

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Figure 5-1.
Soil Confirmation Sample Results - cPAH

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Tables

Table 2-1. Neighboring Upland Sites on the MTCA Confirmed and Suspected Contaminated Sites List

Cleanup Site Name	Cleanup Site ID	Address	Contaminant	Media: Soil	Media: Groundwater	Media: Surface Water
Vic Markov Tire Co	3987	7300 E MARGINAL WAY S	Petroleum Products-Unspecified	S	C	
			Petroleum-Gasoline	S	C	
ARCO 5218	9979	7200 E MARGINAL WAY S	Benzene	C	C	
			Non-Halogenated Solvents	C	C	
			Petroleum-Gasoline	C	C	
Sternoff Metals Seattle	4466	7201 E MARGINAL WAY S	Metals Priority Pollutants	C	C	S
			Petroleum Products-Unspecified		C	
			PCBs	C	C	S
Markey Machinery 8th Avenue	14476	7266 8TH AVE S	Petroleum-Diesel	C	C	
			Petroleum-Other	C	C	
Crowley Marine Services 8th Ave S	2520	7400 8TH AVE S	Arsenic	C	C	
			Metals Priority Pollutants	C	C	
			Base/Neutral/Acid Organics	C	C	
			Petroleum Products-Unspecified	C	S	
			Phenolic Compounds	S	S	
			PCBs	C	S	
			PAHs	C	C	
Duwamish River Slip 4	2732	SLIP 4 DUWAMISH RIVER	Arsenic	C	S	
			Petroleum-Other	C	C	
			PCBs	C		
			PAHs	C	S	

Notes:
Listed are upland sites within 1000 ft of the Project Site (which is part of the North Boeing Field/Georgetown Steam Plant MTCA site) that are currently listed on the MTCA Confirmed and Suspected Contaminated Sites List (Ecology 2022).

C = Confirmed Above Cleanup Level
MTCA = Model Toxics Control Act
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
S = Suspected

Table 2-2. Proposed Park Site: Analytical Results for Discrete Soil Samples (2021-2022)

			Area	1: Trail and Right-of-Way									
			Location ID	GTF_S1		GTF_S2		GTF_S3		GTF_S4		GTF_S5	
			Sample ID	GTF_S1_1-1.5ft	GTF_S1_1.5-2ft	GTF_S2_1-1.5ft	GTF_S2_1.5-2ft	GTF_S3_1-1.5ft	GTF_S3_1.5-2ft	GTF_S4_1-1.5ft	GTF_S4_1.5-2ft	GTF_S5_1-1.5ft	GTF_S5_1.5-2ft
			Sample Number	GTF-SL005	GTF-SL006	GTF-SL007	GTF-SL008	GTF-SL009	GTF-SL010	GTF-SL011	GTF-SL012	GTF-SL013	GTF-SL014
			Sample Date	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21
		MTCA Method B	Sample Type	N	N	N	N	N	N	N	N	N	N
Analyte	Units	Noncancer (Eq. 740-1)	Cancer (Eq. 740-2)	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Polychlorinated Biphenyls													
Aroclor 1016	mg/kg	5.6	14	0.020 *U*	NA	0.10 *U*	NA	0.020 *U*	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1221	mg/kg			0.020 *U*	NA	0.10 *U*	NA	0.020 *U*	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1232	mg/kg			0.020 *U*	NA	0.10 *U*	NA	0.020 *U*	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1242	mg/kg			0.020 *U*	NA	0.10 *U*	NA	0.020 *U*	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1248	mg/kg			0.020 *U*	NA	0.10 *U*	NA	0.020 *U*	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1254	mg/kg	1.6	0.5	0.020 *U*	NA	0.14 *J*	NA	0.041	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1260	mg/kg		0.5	0.020 *U*	NA	0.89	NA	0.093	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1262	mg/kg			0.020 *U*	NA	0.10 *U*	NA	0.020 *U*	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1268	mg/kg			0.020 *U*	NA	0.10 *U*	NA	0.020 *U*	NA	0.020 *U*	NA	0.020 *U*	NA
Total PCB Aroclors	mg/kg		0.5	0.020 *U*	NA	**1.0 *J***	NA *	0.13	NA	0.020 *U*	NA	0.020 *U*	NA
Polycyclic Aromatic Hydrocarbons													
1-Methylnaphthalene	mg/kg	5600	34	0.0016 *UJ*	0.0018 *UJ*	0.0048 *UJ*	0.0020 *UJ*	0.0015 *UJ*	0.00044 *UJ*	0.0045 *UJ*	0.0037 *UJ*	0.0050 *U*	0.0050 *U*
2-Methylnaphthalene	mg/kg	320		0.0019 *UJ*	0.0019 *J*	0.0064	0.0020 *J*	0.0027 *UJ*	0.0050 *U*	0.0055	0.0042 *J*	0.0050 *U*	0.0050 *U*
Acenaphthene	mg/kg	4800		0.0011 *UJ*	0.0013 *UJ*	0.012	0.0050 *U*	0.0011 *UJ*	0.0050 *U*	0.0012 *UJ*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Acenaphthylene	mg/kg			0.0050 *U*	0.0012 *J*	0.014	0.0050 *U*	0.0023 *J*	0.0050 *U*	0.0022 *J*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Anthracene	mg/kg	24000		0.0050 *U*	0.0050 *U*	0.044	0.0014 *J*	0.0041 *J*	0.0050 *U*	0.0051	0.0050 *U*	0.0050 *U*	0.0050 *U*
Benzo(a)anthracene	mg/kg			0.0050 *U*	0.0050 *U*	0.38	0.0044 *J*	0.036	0.0020 *J*	0.19	0.0050 *U*	0.0050 *U*	0.0050 *U*
Benzo(a)pyrene	mg/kg			0.00071 *J*	0.0050 *U*	0.39	0.0052	0.056	0.0030 *J*	0.39	0.00081 *J*	0.0014 *J*	0.0050 *U*
Benzo(b)fluoranthene	mg/kg			0.0014 *J*	0.0050 *U*	0.44	0.0052	0.091	0.0036 *J*	0.40	0.0050 *U*	0.0021 *J*	0.0050 *U*
Benzo(g,h,i)perylene	mg/kg			0.0012 *J*	0.0050 *U*	0.31	0.0044 *J*	0.080	0.0049 *J*	0.33	0.0050 *U*	0.0022 *J*	0.0050 *U*
Benzo(j)fluoranthene	mg/kg			0.0050 *U*	0.0050 *U*	0.17	0.0024 *J*	0.032	0.0014 *J*	0.14	0.0050 *U*	0.00081 *J*	0.0050 *U*
Benzo(k)fluoranthene	mg/kg			0.0050 *U*	0.0050 *U*	0.21	0.0030 *J*	0.039	0.0022 *J*	0.19	0.0050 *U*	0.00084 *J*	0.0050 *U*
Benzofluoranthenes	mg/kg			0.0100 *U*	0.010 *U*	0.73	0.011	0.15	0.0070 *J*	0.65	0.0100 *U*	0.0033 *J*	0.010 *U*
Chrysene	mg/kg			0.0011 *J*	0.0050 *U*	0.44	0.0054	0.074	0.0028 *J*	0.16	0.0050 *U*	0.0011 *J*	0.0050 *U*
Dibenzo(a,h)anthracene	mg/kg			0.0050 *U*	0.0050 *U*	0.086	0.0010 *J*	0.017	0.00099 *J*	0.067	0.0050 *U*	0.0050 *U*	0.0050 *U*
Dibenzofuran	mg/kg	80		0.0050 *U*	0.0050 *U*	0.0061	0.0050 *U*	0.0018 *J*	0.0050 *U*	0.0016 *J*	0.0016 *J*	0.0050 *U*	0.0050 *U*
Fluoranthene	mg/kg	3200		0.0013 *J*	0.00088 *J*	0.60	0.0080	0.050	0.0030 *J*	0.034	0.00085 *UJ*	0.0013 *J*	0.0050 *U*
Fluorene	mg/kg	3200		0.00090 *UJ*	0.0011 *UJ*	0.011	0.0050 *U*	0.00069 *UJ*	0.00099 *UJ*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Indeno(1,2,3-cd)pyrene	mg/kg			0.0012 *J*	0.0050 *U*	0.26	0.0035 *J*	0.055	0.0028 *J*	0.24	0.0050 *U*	0.0019 *J*	0.0050 *U*
Naphthalene	mg/kg	1600		0.0019 *UJ*	0.0017 *J*	0.010	0.0016 *UJ*	0.0039 *UJ*	0.0050 *U*	0.0047 *UJ*	0.0029 *UJ*	0.0050 *U*	0.0050 *U*
Phenanthrene	mg/kg			0.0018 *UJ*	0.0018 *J*	0.22	0.0063	0.020	0.0020 *J*	0.0077	0.0026 *J*	0.0019 *UJ*	0.0012 *J*
Pyrene	mg/kg	2400		0.0013 *J*	0.00092 *J*	0.59	0.0085	0.068	0.0031 *J*	0.081	0.0010 *J*	0.0011 *J*	0.0050 *U*
cPAH TEQ	mg/kg	24	0.19	0.0017 *J*	0.0050 *U*	**0.53**	0.0070 *J*	0.081	0.0042 *J*	**0.50**	0.0021 *J*	0.0024 *J*	0.0050 *U*

Table 2-2. Proposed Park Site: Analytical Results for Discrete Soil Samples (2021-2022)

			Area	1: Trail and Right-of-Way									
			Location ID	GTF_S22		GTF_S6				GTF_S24		GTF_S7	
			Sample ID	GTF_S22_1.5-2ft	GTF_S22_2-2.5ft	GTF_S6_1-1.5ft	GTF_S6_1.5-2ft	GTF_S6_B_2-2.5ft	GTF_S6_B_2-2.5ft_DUP	GTF_S24_1.5-2ft	GTF_S24_2-2.5ft	GTF_S7_1-1.5ft	GTF_S7_1.5-2ft
			Sample Number	GTF-SL061	GTF-SL062	GTF-SL015	GTF-SL016	GTF-SL056	GTF-SL084	GTF-SL073	GTF-SL074	GTF-SL017	GTF-SL018
			Sample Date	03/09/22	03/09/22	09/29/21	09/29/21	03/09/22	03/09/22	03/09/22	03/09/22	09/29/21	09/29/21
		MTCA Method B	Sample Type	N	N	N	N	N	FD	N	N	N	N
Analyte	Units	Noncancer (Eq. 740-1)	Cancer (Eq. 740-2)	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Polychlorinated Biphenyls													
Aroclor 1016	mg/kg	5.6	14	NA	NA	0.020 *U*	NA	NA	NA	NA	NA	0.020 *U*	NA
Aroclor 1221	mg/kg			NA	NA	0.020 *U*	NA	NA	NA	NA	NA	0.020 *U*	NA
Aroclor 1232	mg/kg			NA	NA	0.020 *U*	NA	NA	NA	NA	NA	0.020 *U*	NA
Aroclor 1242	mg/kg			NA	NA	0.020 *U*	NA	NA	NA	NA	NA	0.020 *U*	NA
Aroclor 1248	mg/kg			NA	NA	0.020 *U*	NA	NA	NA	NA	NA	0.020 *U*	NA
Aroclor 1254	mg/kg	1.6	0.5	NA	NA	0.048	NA	NA	NA	NA	NA	0.020 *U*	NA
Aroclor 1260	mg/kg		0.5	NA	NA	0.082	NA	NA	NA	NA	NA	0.018 *J*	NA
Aroclor 1262	mg/kg			NA	NA	0.020 *U*	NA	NA	NA	NA	NA	0.020 *U*	NA
Aroclor 1268	mg/kg			NA	NA	0.020 *U*	NA	NA	NA	NA	NA	0.020 *U*	NA
Total PCB Aroclors	mg/kg		0.5	NA	NA	0.13	NA	NA	NA	NA	NA	0.018 *J*	NA
Polycyclic Aromatic Hydrocarbons													
1-Methylnaphthalene	mg/kg	5600	34	0.0019 *UJ*	0.0015 *UJ*	0.0099	0.0035 *UJ*	0.00095 *UJ*	0.0010 *UJ*	0.012	0.0050 *U*	0.028	0.0031 *UJ*
2-Methylnaphthalene	mg/kg	320		0.0025 *J*	0.0015 *J*	0.011	0.0055	0.0050 *U*	0.0050 *U*	0.0096	0.0050 *U*	0.029	0.0033 *J*
Acenaphthene	mg/kg	4800		0.0047 *UJ*	0.0012 *UJ*	0.048	0.0068	0.00059 *UJ*	0.0050 *U*	0.032	0.0050 *U*	0.16	0.0021 *UJ*
Acenaphthylene	mg/kg			0.0021 *J*	0.0013 *J*	0.0061	0.0036 *J*	0.0050 *U*	0.0050 *U*	0.0042 *J*	0.0050 *U*	0.0032 *J*	0.0015 *J*
Anthracene	mg/kg	24000		0.012	0.0015 *J*	0.080	0.021	0.0050 *U*	0.0050 *U*	0.055	0.0050 *U*	0.29	0.0021 *J*
Benzo(a)anthracene	mg/kg			0.066	0.0065	0.44	0.13	0.0022 *J*	0.0026 *J*	0.11	0.0012 *J*	0.75	0.0057
Benzo(a)pyrene	mg/kg			0.077	0.029	0.44	0.17	0.0043 *J*	0.0056	0.097	0.0016 *J*	0.63	0.0069
Benzo(b)fluoranthene	mg/kg			0.069	0.026	0.41	0.15	0.0045 *J*	0.0051	0.069	0.0015 *J*	0.67	0.0075
Benzo(g,h,i)perylene	mg/kg			0.070	0.029	0.43	0.16	0.0048 *J*	0.0063	0.062	0.0022 *J*	0.45	0.0078
Benzo(j)fluoranthene	mg/kg			0.029	0.0087	0.23	0.072	0.0017 *J*	0.0023 *J*	0.035	0.00076 *J*	0.35	0.0029 *J*
Benzo(k)fluoranthene	mg/kg			0.035	0.011	0.30	0.092	0.0017 *J*	0.0028 *J*	0.040	0.00087 *J*	0.47	0.0035 *J*
Benzofluoranthenes	mg/kg			0.13	0.044	0.95	0.31	0.0083 *J*	0.0099 *J*	0.14	0.0031 *J*	1.1	0.014
Chrysene	mg/kg			0.076	0.0091	0.50	0.16	0.0033 *J*	0.0036 *J*	0.11	0.0015 *J*	0.85	0.0081
Dibenzo(a,h)anthracene	mg/kg			0.014	0.0053	0.13	0.036	0.0011 *J*	0.0012 *J*	0.020	0.0050 *U*	0.20	0.0014 *J*
Dibenzofuran	mg/kg	80		0.0026 *J*	0.0050 *U*	0.021	0.0050	0.0050 *U*	0.0050 *U*	0.012	0.0050 *U*	0.11	0.0022 *J*
Fluoranthene	mg/kg	3200		0.12	0.0047 *J*	0.87	0.21	0.0022 *J*	0.0023 *J*	0.17	0.0020 *J*	2.0	0.013
Fluorene	mg/kg	3200		0.0040 *J*	0.00079 *J*	0.039	0.0062	0.0050 *U*	0.0050 *U*	0.023	0.0050 *U*	0.19	0.0013 *J*
Indeno(1,2,3-cd)pyrene	mg/kg			0.052	0.020	0.39	0.14	0.0027 *J*	0.0040 *J*	0.053	0.0015 *J*	0.45	0.0054
Naphthalene	mg/kg	1600		0.0039 *J*	0.0017 *J*	0.013	0.0087	0.0050 *U*	0.0013 *J*	0.011	0.0050 *U*	0.042	0.0032 *UJ*
Phenanthrene	mg/kg			0.071	0.0029 *J*	0.58	0.11	0.0024 *J*	0.0028 *J*	0.18	0.0012 *J*	1.9	0.014
Pyrene	mg/kg	2400		0.13	0.0059	0.90	0.27	0.0024 *J*	0.0027 *J*	0.20	0.0024 *J*	1.5	0.011
cPAH TEQ	mg/kg	24	0.19	0.10	0.036	**0.61**	**0.23**	0.0055 *J*	0.0072 *J*	0.13	0.0024 *J*	**0.89**	0.0093 *J*

Table 2-2. Proposed Park Site: Analytical Results for Discrete Soil Samples (2021-2022)

			Area	2: Off-Leash Area					3: Former Ellis Substation					
			Location ID	GTF_S8	GTF_S9	GTF_S10	GTF_S11	GTF_S12	GTF_S13		GTF_S14	GTF_S15	GTF_S16	GTF_S17
			Sample ID	GTF_S8_1-1.5ft	GTF_S9_1-1.5ft	GTF_S10_1-1.5ft	GTF_S11_1-1.5ft	GTF_S12_1-1.5ft	GTF_S13_1-1.5ft	GTF_S13_1-1.5ft_DUP	GTF_S14_1-1.5ft	GTF_S15_1-1.5ft	GTF_S16_1-1.5ft	GTF_S17_1-1.5ft
			Sample Number	GTF-SL019	GTF-SL021	GTF-SL023	GTF-SL025	GTF-SL027	GTF-SL029	GTF-SL047	GTF-SL031	GTF-SL033	GTF-SL035	GTF-SL037
			Sample Date	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21
		MTCA Method B	Sample Type	N	N	N	N	N	N	FD	N	N	N	N
Analyte	Units	Noncancer (Eq. 740-1)	Cancer (Eq. 740-2)	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Polychlorinated Biphenyls														
Aroclor 1016	mg/kg	5.6	14	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Aroclor 1221	mg/kg			0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Aroclor 1232	mg/kg			0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Aroclor 1242	mg/kg			0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Aroclor 1248	mg/kg			0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Aroclor 1254	mg/kg	1.6	0.5	0.020 *U*	0.012 *J*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Aroclor 1260	mg/kg		0.5	0.083	0.026	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.036	0.012 *J*	0.020 *U*	0.034
Aroclor 1262	mg/kg			0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Aroclor 1268	mg/kg			0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Total PCB Aroclors	mg/kg		0.5	0.083	0.038 *J*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.036	0.012 *J*	0.020 *U*	0.034
Polycyclic Aromatic Hydrocarbons														
1-Methylnaphthalene	mg/kg	5600	34	0.0018 *UJ*	0.0050 *U*	0.00098 *UJ*	0.0050 *U*	0.0050 *U*	0.00076 *UJ*	0.0050 *U*	0.00082 *UJ*	0.00056 *UJ*	0.00084 *UJ*	0.0011 *UJ*
2-Methylnaphthalene	mg/kg	320		0.0031 *UJ*	0.0050 *U*	0.0011 *UJ*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0012 *UJ*	0.0015 *UJ*
Acenaphthene	mg/kg	4800		0.0019 *UJ*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.00074 *UJ*	0.0050 *U*	0.00072 *UJ*	0.0050 *U*	0.0050 *U*	0.00098 *UJ*
Acenaphthylene	mg/kg			0.0043 *J*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Anthracene	mg/kg	24000		0.0028 *J*	0.0050 *U*	0.0050 *U*	0.0025 *J*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0011 *J*
Benzo(a)anthracene	mg/kg			0.012	0.0045 *J*	0.0029 *J*	0.0050 *U*	0.0012 *J*	0.0050 *U*	0.0015 *J*	0.0030 *J*	0.0019 *J*	0.0012 *J*	0.0049 *J*
Benzo(a)pyrene	mg/kg			0.021	0.0069	0.0048 *J*	0.0050 *U*	0.0021 *J*	0.0050 *U*	0.0014 *J*	0.0047 *J*	0.0028 *J*	0.0022 *J*	0.0059
Benzo(b)fluoranthene	mg/kg			0.027	0.0098	0.0056	0.0050 *U*	0.0024 *J*	0.0050 *U*	0.0050 *U*	0.0063	0.0022 *J*	0.0024 *J*	0.0078
Benzo(g,h,i)perylene	mg/kg			0.024	0.0092	0.012	0.0050 *U*	0.0046 *J*	0.0050 *U*	0.0017 *J*	0.0071 *J*	0.0027 *J*	0.0030 *J*	0.0080 *J*
Benzo(j)fluoranthene	mg/kg			0.0084	0.0033 *J*	0.0021 *J*	0.0050 *U*	0.00096 *J*	0.0050 *U*	0.0050 *U*	0.0024 *J*	0.00087 *J*	0.00098 *J*	0.0027 *J*
Benzo(k)fluoranthene	mg/kg			0.0097	0.0047 *J*	0.0026 *J*	0.0050 *U*	0.0014 *J*	0.0050 *U*	0.0050 *U*	0.0032 *J*	0.0011 *J*	0.0016 *J*	0.0039 *J*
Benzofluoranthenes	mg/kg			0.041	0.016	0.0092 *J*	0.010 *U*	0.0044 *J*	0.0100 *U*	0.0100 *U*	0.011	0.0046 *J*	0.0048 *J*	0.014
Chrysene	mg/kg			0.025	0.0080	0.0052	0.0050 *U*	0.0026 *J*	0.0050 *U*	0.0016 *J*	0.0037 *J*	0.0028 *J*	0.0020 *J*	0.0071
Dibenzo(a,h)anthracene	mg/kg			0.0053	0.0024 *J*	0.0012 *J*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0018 *J*	0.0050 *U*	0.0050 *U*	0.0018 *J*
Dibenzofuran	mg/kg	80		0.0015 *J*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Fluoranthene	mg/kg	3200		0.020	0.0072	0.0048 *J*	0.00063 *J*	0.0021 *J*	0.00062 *UJ*	0.0026 *J*	0.0050	0.0027 *UJ*	0.0023 *UJ*	0.0088
Fluorene	mg/kg	3200		0.00092 *UJ*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Indeno(1,2,3-cd)pyrene	mg/kg			0.018	0.0065	0.0065	0.0050 *U*	0.0027 *J*	0.0050 *U*	0.0011 *J*	0.0048 *J*	0.0023 *J*	0.0021 *J*	0.0059
Naphthalene	mg/kg	1600		0.0039 *UJ*	0.0050 *U*	0.0015 *UJ*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0014 *UJ*
Phenanthrene	mg/kg			0.013	0.0032 *UJ*	0.0039 *UJ*	0.0025 *UJ*	0.0019 *UJ*	0.00097 *J*	0.0025 *J*	0.0026 *J*	0.0023 *J*	0.0016 *J*	0.0046 *J*
Pyrene	mg/kg	2400		0.027	0.0087	0.0069	0.00075 *J*	0.0028 *J*	0.00067 *J*	0.0025 *J*	0.0051 *J*	0.0032 *J*	0.0024 *J*	0.0082 *J*
cPAH TEQ	mg/kg	24	0.19	0.028	0.0097 *J*	0.0067 *J*	0.0050 *U*	0.0032 *J*	0.0050 *U*	0.0024 *J*	0.0066 *J*	0.0039 *J*	0.0032 *J*	0.0084 *J*

Table 2-2. Proposed Park Site: Analytical Results for Discrete Soil Samples (2021-2022)

			Area	4: Stormwater Facility								
			Location ID	GTF_S23			GTF_S18	GTF_S19		GTF_S20	GTF_S21	
			Sample ID	GTF_S23_1.5-2ft	GTF_S23_1.5-2ft_DUP	GTF_S23_2-2.5ft	GTF_S18_1-1.5ft	GTF_S19_1-1.5ft	GTF_S19_1-1.5ft_DUP	GTF_S20_1-1.5ft	GTF_S21_1-1.5ft	GTF_S21_1.5-2ft
			Sample Number	GTF-SL067	GTF-SL083	GTF-SL068	GTF-SL039	GTF-SL041	GTF-SL049	GTF-SL043	GTF-SL045	GTF-SL046
			Sample Date	03/09/22	03/09/22	03/09/22	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21
		MTCA Method B	Sample Type	N	FD	N	N	N	FD	N	N	N
Analyte	Units	Noncancer (Eq. 740-1)	Cancer (Eq. 740-2)	Result	Result	Result	Result	Result	Result	Result	Result	Result
Polychlorinated Biphenyls												
Aroclor 1016	mg/kg	5.6	14	NA	NA	NA	0.020 *U*	0.020 *U*	0.020 *U*	0.099 *U*	0.10 *U*	NA
Aroclor 1221	mg/kg			NA	NA	NA	0.020 *U*	0.020 *U*	0.020 *U*	0.099 *U*	0.10 *U*	NA
Aroclor 1232	mg/kg			NA	NA	NA	0.020 *U*	0.020 *U*	0.020 *U*	0.099 *U*	0.10 *U*	NA
Aroclor 1242	mg/kg			NA	NA	NA	0.020 *U*	0.020 *U*	0.020 *U*	0.099 *U*	0.10 *U*	NA
Aroclor 1248	mg/kg			NA	NA	NA	0.020 *U*	0.020 *U*	0.020 *U*	0.099 *U*	0.10 *U*	NA
Aroclor 1254	mg/kg	1.6	0.5	NA	NA	NA	0.020 *U*	0.021	0.020 *U*	0.099 *U*	0.10 *U*	NA
Aroclor 1260	mg/kg		0.5	NA	NA	NA	0.018 *J*	0.044	0.020 *U*	0.11	0.10 *U*	NA
Aroclor 1262	mg/kg			NA	NA	NA	0.020 *U*	0.020 *U*	0.020 *U*	0.099 *U*	0.10 *U*	NA
Aroclor 1268	mg/kg			NA	NA	NA	0.020 *U*	0.020 *U*	0.020 *U*	0.099 *U*	0.10 *U*	NA
Total PCB Aroclors	mg/kg		0.5	NA	NA	NA	0.018 *J*	0.064	0.020 *U*	0.11	0.10 *U*	NA
Polycyclic Aromatic Hydrocarbons												
1-Methylnaphthalene	mg/kg	5600	34	0.0050 *U*	0.0050 *U*	0.00046 *UJ*	0.00081 *UJ*	0.0013 *UJ*	0.0012 *UJ*	0.0015 *UJ*	0.13	0.0027 *UJ*
2-Methylnaphthalene	mg/kg	320		0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0024 *UJ*	0.0018 *UJ*	0.0029 *UJ*	0.092	0.0035 *J*
Acenaphthene	mg/kg	4800		0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.00086 *UJ*	0.00096 *UJ*	0.59	0.0016 *UJ*
Acenaphthylene	mg/kg			0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.040	0.0050 *U*
Anthracene	mg/kg	24000		0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0014 *J*	0.00088 *J*	0.0016 *J*	0.99	0.0010 *J*
Benzo(a)anthracene	mg/kg			0.0050 *U*	0.0050 *U*	0.0015 *J*	0.0041 *J*	0.0082	0.0051	0.015	3.9	0.0026 *J*
Benzo(a)pyrene	mg/kg			0.00072 *J*	0.0008 *J*	0.0015 *J*	0.0064	0.011 *J*	0.0066 *J*	0.019	3.7	0.0027 *J*
Benzo(b)fluoranthene	mg/kg			0.0050 *U*	0.0050 *U*	0.0020 *J*	0.0078	0.017 *J*	0.0075 *J*	0.028	2.8	0.0028 *J*
Benzo(g,h,i)perylene	mg/kg			0.0050 *U*	0.0012 *J*	0.0024 *J*	0.0099 *J*	0.021 *J*	0.013 *J*	0.026 *J*	2.1 *J*	0.0028 *J*
Benzo(j)fluoranthene	mg/kg			0.0050 *U*	0.0050 *U*	0.00079 *J*	0.0034 *J*	0.0059	0.0026 *J*	0.0068	1.1	0.0014 *J*
Benzo(k)fluoranthene	mg/kg			0.0050 *U*	0.0050 *U*	0.00084 *J*	0.0045 *J*	0.0073	0.0035 *J*	0.0080	1.4	0.0016 *J*
Benzofluoranthenes	mg/kg			0.010 *U*	0.0100 *U*	0.0036 *J*	0.016	0.030 *J*	0.013 *J*	0.050	5.6	0.0059 *J*
Chrysene	mg/kg			0.0014 *J*	0.0015 *J*	0.0026 *J*	0.0063	0.015 *J*	0.0073 *J*	0.057	3.7	0.0033 *J*
Dibenzo(a,h)anthracene	mg/kg			0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0019 *J*	0.0031 *J*	0.0016 *J*	0.0041 *J*	0.66	0.0012 *J*
Dibenzofuran	mg/kg	80		0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0015 *J*	0.18	0.0016 *J*
Fluoranthene	mg/kg	3200		0.00099 *J*	0.0011 *J*	0.0035 *J*	0.0074	0.017	0.010	0.021	6.5	0.0043 *UJ*
Fluorene	mg/kg	3200		0.0050 *U*	0.0007 *J*	0.0050 *U*	0.0050 *U*	0.00073 *J*	0.0050 *U*	0.00080 *J*	0.46	0.00087 *J*
Indeno(1,2,3-cd)pyrene	mg/kg			0.0050 *U*	0.0050 *U*	0.0015 *J*	0.0061	0.013 *J*	0.0076 *J*	0.0093	2.0	0.0024 *J*
Naphthalene	mg/kg	1600		0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0021 *UJ*	0.0050 *U*	0.0023 *UJ*	0.11	0.0032 *UJ*
Phenanthrene	mg/kg			0.00087 *J*	0.0013 *J*	0.0027 *J*	0.0036 *J*	0.0087	0.0066	0.011	5.3	0.0047 *J*
Pyrene	mg/kg	2400		0.00099 *J*	0.0012 *J*	0.0033 *J*	0.0073 *J*	0.016 *J*	0.0098 *J*	0.019 *J*	6.1 *J*	0.0042 *J*
cPAH TEQ	mg/kg	24	0.19	0.0020 *J*	0.0021 *J*	0.0024 *J*	0.0089 *J*	0.016 *J*	0.0092 *J*	0.026 *J*	**4.8**	0.0038 *J*

Notes
MTCA soil values as provided in the Washington Department of Ecology Cleanup Levels and Risk Calculation (CLARC) tables: https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Contamination-clean-up-tools/CLARC/Data-tables

cPAH TEQs were calculated in accordance with Washington Department of Ecology Implementation Memorandum #10 (April 20, 2015).
= detected exceedance of MTCA Method B value
bold = exceedance of the lowest MTCA Method B value
* Original comparison made to MTCA Method A. Additional soil sampling will be undertaken to address data gaps.

cPAH = carcinogenic PAH
FD = field duplicate
MTCA = Model Toxics Control Act
N = normal sample
NA = not analyzed / not applicable
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TEQ = toxicity equivalence

Qualifiers:
J = The reported value was an estimate.
U = The analyte was not detected. The associated numerical value is the reporting limit.

Table 2-3. Proposed Park Site: Analytical Results for Groundwater Samples (2022)

			Location ID	GTF_GW1	GTF_GW2	GTF_GW3	
			Sample ID	GTF_GW1_1	GTF_GW2_1	GTF_GW3_1	GTF_GW3_1_DUP
			Sample Number	GTF-SL079	GTF-SL080	GTF-SL081	GTF-SL082
			Sample Date	03/09/22	03/09/22	03/09/22	03/09/22
			Sample Type	N	N	N	FD
		MTCA Method B					
Analyte	Units	Noncancer (Eq. 720-1)	Cancer (Eq. 720-2)	Result	Result	Result	Result
Polychlorinated Biphenyls							
Aroclor 1016	µg/L	1.1	1.3	0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1221	µg/L			0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1232	µg/L			0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1242	µg/L			0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1248	µg/L			0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1254	µg/L	0.32	0.044	0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1260	µg/L		0.044	0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1262	µg/L			0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1268	µg/L			0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Total PCB Aroclors	µg/L		0.044	0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Polycyclic Aromatic Hydrocarbons							
1-Methylnaphthalene	µg/L	560	1.5	0.020 *UJ*	0.030 *UJ*	0.020 *UJ*	0.020 *UJ*
2-Methylnaphthalene	µg/L	32		0.030 *UJ*	0.030 *J*	0.030 *UJ*	0.030 *UJ*
Acenaphthene	µg/L	960		0.020 *UJ*	0.020 *UJ*	0.020 *UJ*	0.020 *UJ*
Acenaphthylene	µg/L			0.020 *UJ*	0.020 *UJ*	0.020 *UJ*	0.020 *UJ*
Anthracene	µg/L	4800		0.020 *UJ*	0.040 *J*	0.050 *J*	0.050 *J*
Benzo(a)anthracene	µg/L			0.050 *UJ*	0.050 *UJ*	0.050 *UJ*	0.050 *UJ*
Benzo(a)pyrene	µg/L			0.060 *UJ*	0.060 *UJ*	0.060 *UJ*	0.060 *UJ*
Benzo(b)fluoranthene	µg/L			0.090 *UJ*	0.090 *UJ*	0.090 *UJ*	0.090 *UJ*
Benzo(g,h,i)perylene	µg/L			0.070 *UJ*	0.070 *UJ*	0.070 *UJ*	0.070 *UJ*
Benzo(j)fluoranthene	µg/L			0.030 *UJ*	0.030 *UJ*	0.030 *UJ*	0.030 *UJ*
Benzo(k)fluoranthene	µg/L			0.090 *UJ*	0.090 *UJ*	0.090 *UJ*	0.090 *UJ*
Benzofluoranthenes	µg/L			0.19 *UJ*	0.19 *UJ*	0.19 *UJ*	0.19 *UJ*
Chrysene	µg/L			0.060 *UJ*	0.060 *UJ*	0.060 *UJ*	0.060 *UJ*
Dibenzo(a,h)anthracene	µg/L			0.090 *UJ*	0.090 *UJ*	0.090 *UJ*	0.090 *UJ*
Dibenzofuran	µg/L	16		0.020 *UJ*	0.020 *UJ*	0.020 *UJ*	0.020 *UJ*
Fluoranthene	µg/L	640		0.020 *UJ*	0.020 *J*	0.070 *J*	0.070 *J*
Fluorene	µg/L	640		0.020 *UJ*	0.12 *J*	0.040 *UJ*	0.030 *UJ*
Indeno(1,2,3-cd)pyrene	µg/L			0.080 *UJ*	0.080 *UJ*	0.080 *UJ*	0.080 *UJ*

Table 2-3. Proposed Park Site: Analytical Results for Groundwater Samples (2022)

			Location ID	GTF_GW1	GTF_GW2	GTF_GW3	
			Sample ID	GTF_GW1_1	GTF_GW2_1	GTF_GW3_1	GTF_GW3_1_DUP
			Sample Number	GTF-SL079	GTF-SL080	GTF-SL081	GTF-SL082
			Sample Date	03/09/22	03/09/22	03/09/22	03/09/22
			Sample Type	N	N	N	FD
		MTCA Method B					
		Noncancer	Cancer				
Analyte	Units	(Eq. 720-1)	(Eq. 720-2)	Result	Result	Result	Result
Naphthalene	µg/L	160		0.020 *UJ*	0.40 *J*	0.020 *UJ*	0.020 *UJ*
Phenanthrene	µg/L			0.020 *UJ*	0.050 *J*	0.16 *J*	0.15 *J*
Pyrene	µg/L	480		0.030 *UJ*	0.050 *J*	0.090 *J*	0.090 *J*
cPAH TEQ	µg/L	4.8	0.023	0.060 *UJ*	0.060 *UJ*	0.060 *UJ*	0.060 *UJ*

Notes:

MTCA soil values as provided in the Washington Department of Ecology Cleanup Levels and Risk Calculation (CLARC) tables:
https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Contamination-clean-up-tools/CLARC/Data-tables
cPAH TEQs were calculated in accordance with Washington Department of Ecology Implementation Memorandum #10 (April 20, 2015).
Non-detects are reported to the method detection limit.

cPAH = carcinogenic PAH
FD = field duplicate
MTCA = Model Toxics Control Act
N = normal sample
NA = not analyzed / not applicable
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TEQ = toxicity equivalence

Qualifiers:

J = The reported value was an estimate.
U = The analyte was not detected. The associated numerical value is the reporting limit.

Table 3-1. Interim Action Screening Levels for Proposed Park Site Soil and Groundwater

Analyte	Units	MTCA Method B Noncancer (Eq. 720-1)	MTCA Method B Cancer (Eq. 720-2)	Natural Background
Soil				
Total PCBs	mg/kg	—	**0.5**	NA
cPAH TEQ	mg/kg	24	**0.19**	NA
Arsenic	mg/kg	NA	NA	**7.3**
Groundwater				
Total PCBs	µg/L	—	**0.044**	NA
cPAH TEQ	µg/L	4.8	**0.023**	NA
Arsenic	µg/L	4.8	0.058	**8.0**

Notes
MTCA soil values as provided in the Washington Department of Ecology Cleanup Levels and Risk Calculation (CLARC) tables: https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Contamination-clean-up-tools/CLARC/Data-tables

Arsenic soil interim action screening level is set equal to natural background (Schwarz 2022, pers. comm.).

Arsenic groundwater interim action screening level is set equal to natural background (Ecology 2022b).

Proposed interim action screening levels are shown in **Bold**.

— = no value
cPAH = carcinogenic PAH
MTCA = Model Toxics Control Act
NA = not applicable
PCB = polychlorinated biphenyl
TEQ = toxicity equivalence

Table 3-2. Preliminary Applicable or Relevant and Appropriate Requirements

Preliminary ARAR	Citation or Source
Model Toxics Control Act (MTCA)	Chater 70.105 of the Revised Code of Washington (RCW)
MTCA cleanup regulations	Chater 173-340 Washington Administrative Code (WAC)
State Environmental Policy Act	RCW 43.21C
Clean Water Act	33 United States Code (USC) 1251 et seq.
Comprehensive Environmental Response, Compensation, and Liability Act of 1980	42 USC 9601 et seq. and Part 300 of Title 40 of the Code of Federal Regulation (40 CFR 300)
Toxic Substances Control Act of 1976	15 USC. §2601 et seq. (1976)
Fish and Wildlife Coordination Act	16 USC 661-667e, the Act of March 10, 1934; CH. 55; 48 Stat. 401
Endangered Species Act	16 USC 1531 et seq.; 50 CFR 17, 225, and 402
Native American Graves Protection and Repatriation Act	25 USC 3001 through 3013; 43 CFR 10 and Washington's Indian Graves and Records Law (RCW 27.44)
Archeological Resources Protection Act	16 USC 470aa et seq.; 43 CFR 7
Washington Dangerous Waste Regulations	WAC 173-303
Solid Waste Management Act	RCW 70.95; WAC 173-304 and 173-351
Occupational Safety and Health Adminstration Regulations	29 CFR 1910; 1926
Washington Department of Labor and Industries Regulations	WAC 296
Water Quality Standards for Surface Waters of the State of Washington	RCW 90.48 and 90.54; WAC 173-201A
Water Quality Standards for Ground Water	WAC 173-200
Department of Transportation Hazardous Materials Regulations	40 CFR Parts 100 through 185
Washington State Water Well Construction Act	RCW 18.104; WAC 173-160
City of Seattle regulations, codes and standards (To Be Considered)	All applicable or relevant and appropriate regulations, codes, and standards
King County regulations, codes, and standards	All applicable or relevant and appropriate regulations, codes, and standards

Table 5-1. Target Ground Surface Elevations for Compliance Monitoring

Sample Location	Current Ground Surface Elevation SDOT_EG_Elev_ft	Target Compliance Elevation (ft)	Adjusted Compliance Elevation (ft)	Overexcavation (ft)
GTF_S1	13.29	12.29	11.79	0.5
GTF_S2	12.68	11.18	11.18	0
GTF_S3	13.39	12.39	11.89	0.5
GTF_S4	13.14	11.64	11.64	0
GTF_S5	13.21	12.21	11.71	0.5
GTF_S6	15.04	13.04	13.04	0
GTF_S7	16.25	14.75	14.25	0.5
GTF_S8	13.83	12.83	12.83	0
GTF_S9	13.71	12.71	12.71	0
GTF_S10	13.35	12.35	12.35	0
GTF_S11	13.50	12.50	12.50	0
GTF_S12	14.05	13.05	13.05	0
GTF_S13	13.03	12.03	12.03	0
GTF_S14	13.66	12.66	12.66	0
GTF_S15	13.37	12.37	12.37	0
GTF_S16	13.11	12.11	12.11	0
GTF_S17	13.70	12.70	12.70	0
GTF_S18	15.63	14.63	14.63	0
GTF_S19	16.08	15.08	15.08	0
GTF_S20	16.47	15.47	15.47	0
GTF_S21	17.08	15.58	15.08	0.5
GTF_S22	13.47	11.47	11.47	0
GTF_S23	12.34	11.34	10.34	1
GTF_S24	16.37	14.37	14.37	0

Notes:

SDOT_EG_Elev_ft	Elevation of ground surface at borehole location based on SDOT surface topographic elevation map. Datum: NAVD88 and NAD83 (2011) 2010.00 EPOCH.
Target Compliance Elevation	Target elevation required at each core location to achieve MTCA cleanup target values.
Adjusted Compliance Elevation	Target elevation based on City's adjusted excavation areas to simplify excavations for soil excavation contractors.
Overexcavation	Additional soil removed but not required to achieve interim action screening levels (Table 3-1).

City = City of Seattle
MTCA = Model Toxics Control Act
SDOT = Seattle Department of Transportation

Appendix A

Groundwater Flow and Depth at NBF/GTSP Site

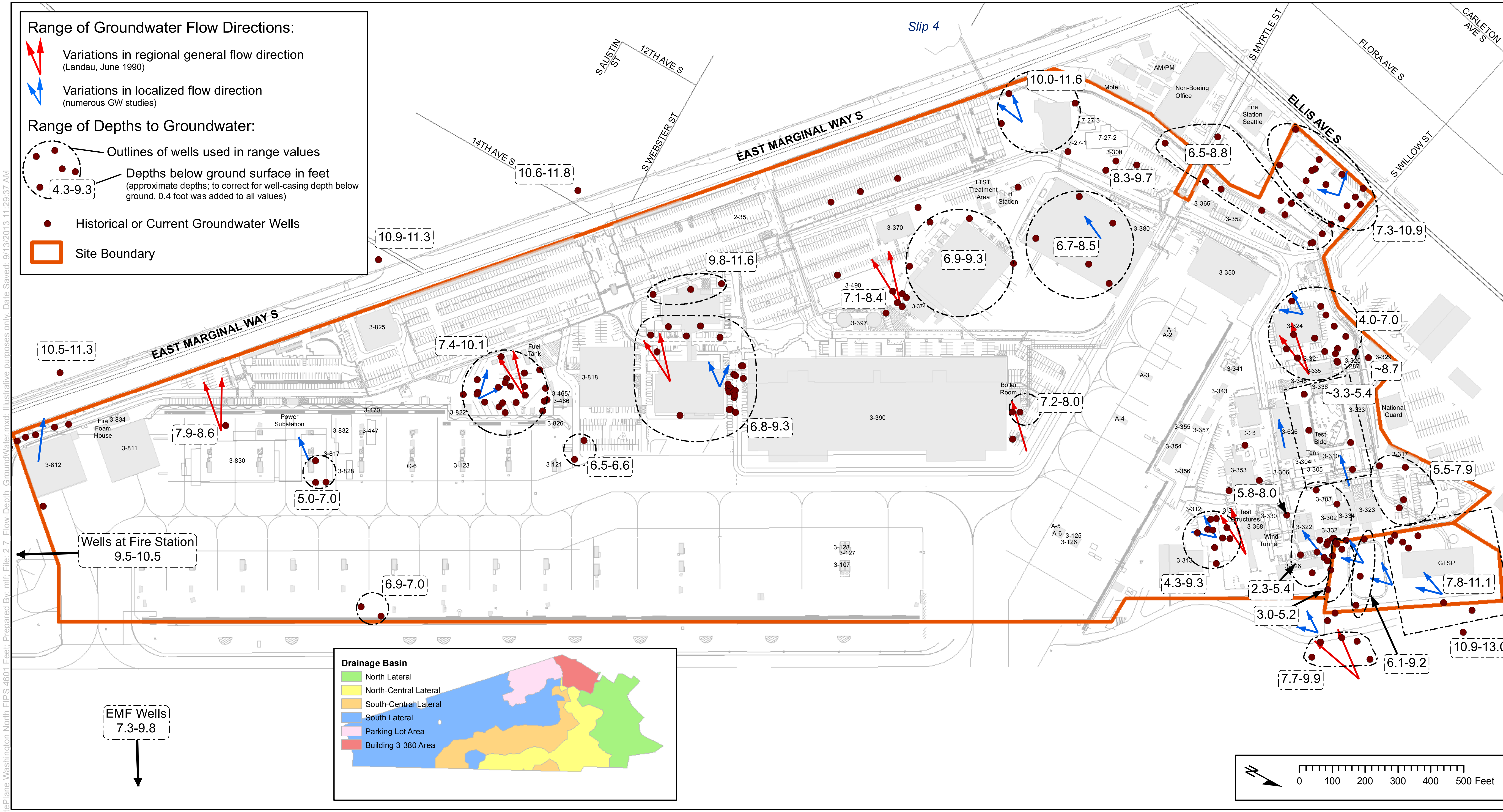
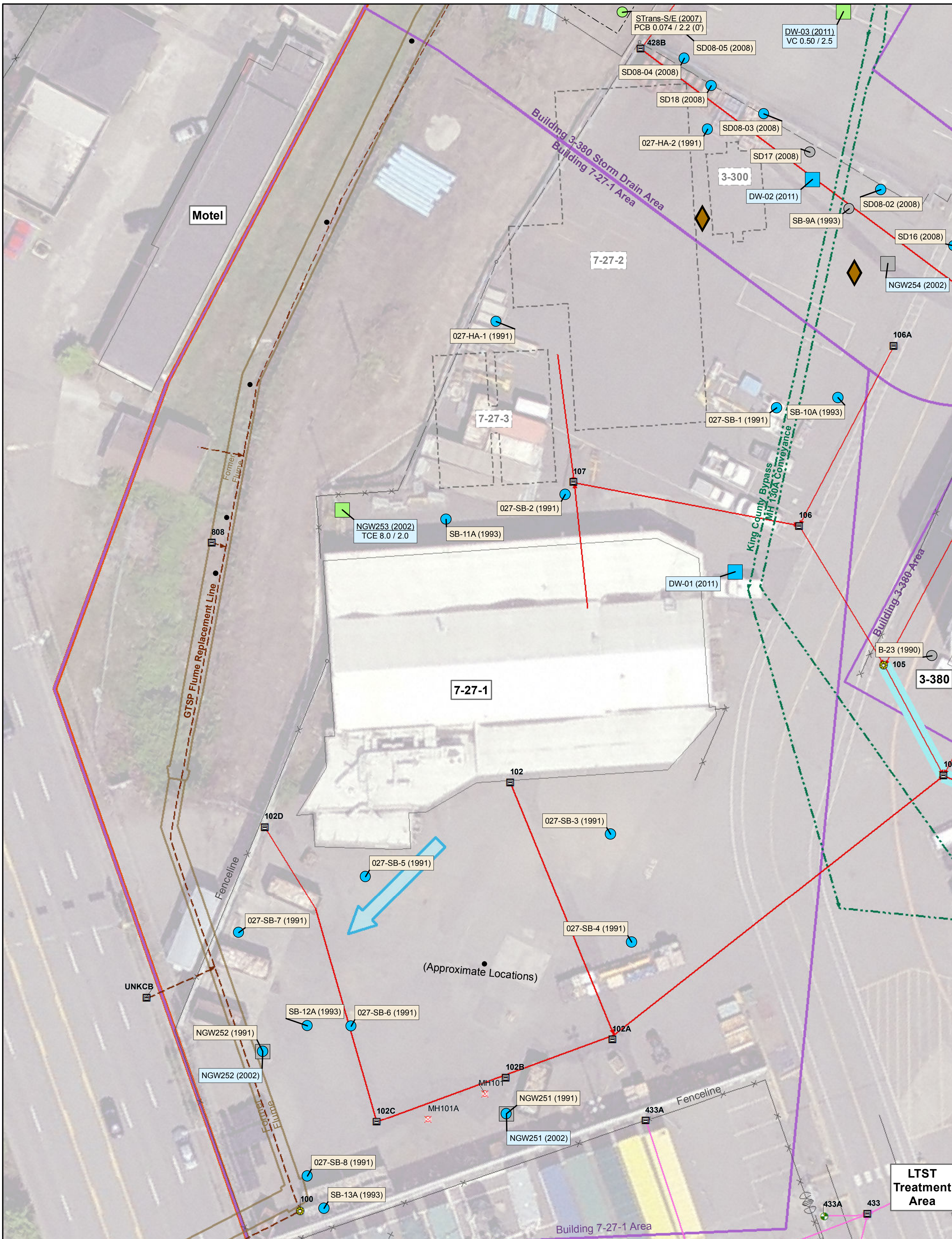
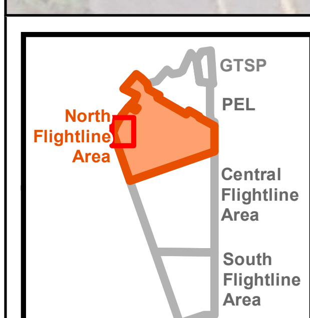


Figure 2-7. Groundwater Flow and Depth at NBF-GTSP Site

Source: Leidos (2013)





Labels:

Groundwater: Sample ID (Date) / Concentration / EF

Soil: Sample ID (Date) / Concentration / EF (Depth)

Bold Black: Max EF > 5 (for TPH only)
Orange: Max EF > 25 (all COPCs)
Red: Max EF > 125 (all COPCs)

Concentrations in mg/kg for soil.
Concentrations in ug/L for groundwater.

Soil and Groundwater Exceedances

EF Range
(only detected results unless stated):

- ND > 1 (all results ND)
- ≤ 1 (ND or detect)
- > 1 - 5
- > 5 - 25
- > 25 - 125
- > 125
- All sampled soil excavated at location

Storm Drain Lines

- North Lateral
- North-Central Lateral
- South-Central Lateral
- South Lateral
- Building 3-380 Area
- Parking Lot Area
- Other
- Area where SD Line lies below the water table at high water levels

Approximate Groundwater Flow Direction

Approximate Outline of Excavation

Proposed Sample Locations

Monitoring Well   Soil Boring

0 10 20 30
Feet

N

DEPARTMENT OF ECOLOGY
State of Washington

Figure 7.1-54. Soil and Groundwater Sample Locations at Building 7-27-1 Area

Source: Leidos (2013)

SAIC
From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-54_Bldg7-27-1.mxd
Illustrative purposes only.

Date Saved: 8/5/2013 3:53:13 PM

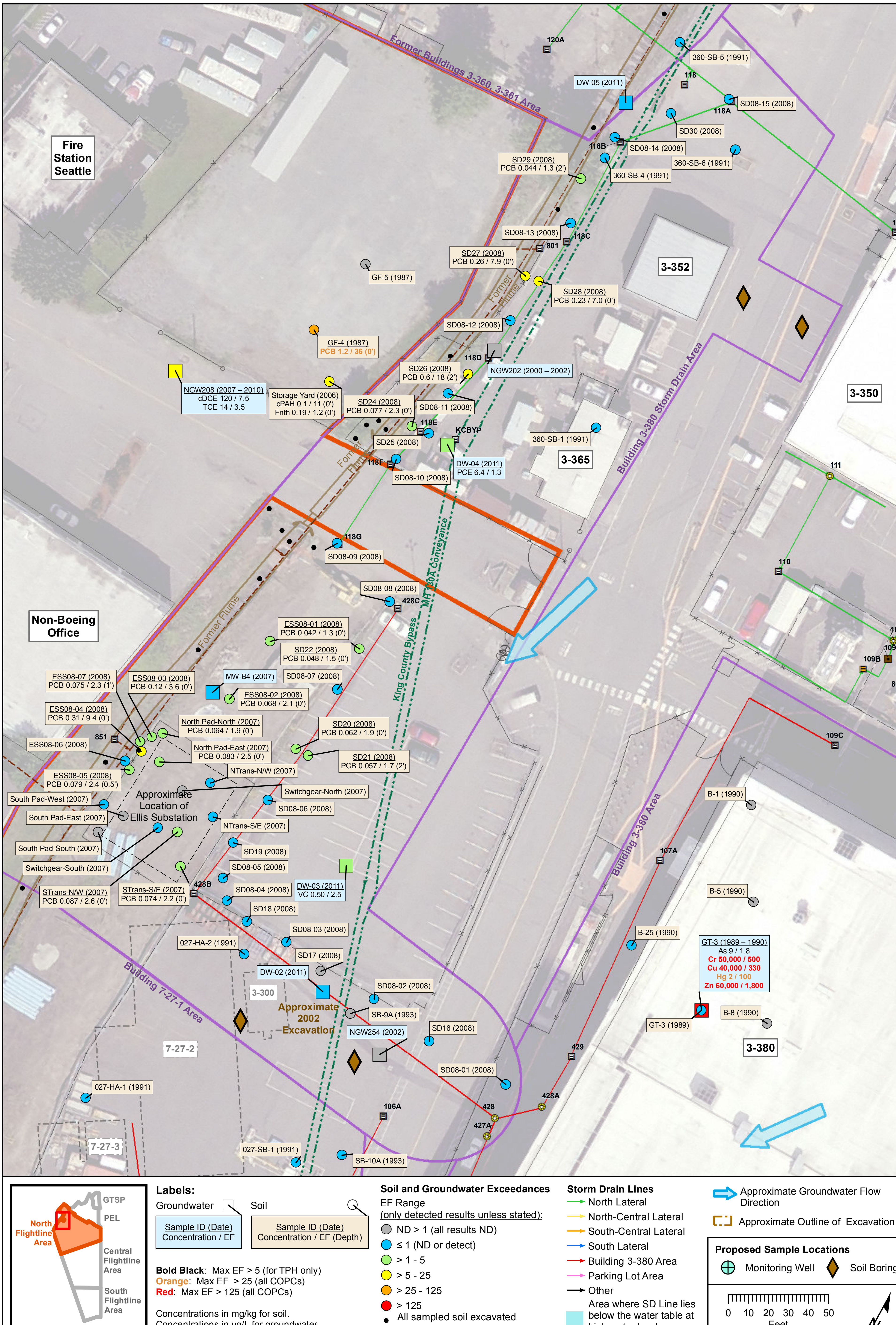


Figure 7.1-52. Soil and Groundwater Sample Locations at Building 3-380 Storm Drain Area

Source: Leidos (2013)

DEPARTMENT OF ECOLOGY State of Washington

SAIC
From Science to Solutions

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: mlf
File: Figure_7_1-52_Bldg3-380Area.mxd
Illustrative purposes only.
Date Saved: 10/8/2013 11:24:57 AM

Appendix B

Proposed Park Site Historical Data

Data Set B-1 Soil Data (Herrera 2007 Excerpt)

Data Set B-2 Soil Data (Leidos 2013 Excerpt)

Data Set B-3 Soil Data (NBF/GTSP RI Database Excerpt)

Data Set B-4 Concrete and Soil Data (Herrera 2010 Excerpt)

Data Set B-5 Groundwater Data (SEACOR 1992 Excerpt)

Data Set B-6 Groundwater Data (SEACOR 1993 Excerpt)

Data Set B-7 Groundwater Data (SAIC 2009 Excerpt)

Data Set B-8 Groundwater Data (Goldberg 2007 Excerpt)

Data Set B-9 Groundwater Data (NBF/GTSP RI Database Excerpt)

Data Set B-10 Draft NBF/GTSP Remedial Investigation Screening Levels (LAI 2016)

Data Set B-1. Soil Data (Herrera 2007 Excerpt)

Table 3-4. Soil sample analysis results (2006), Georgetown flume.

Parameter	MTCA Method A Soil Cleanup Level[a] for Unrestricted Land Use	MTCA Method A Soil Cleanup Level[a] for Industrial Properties	MTCA Method C Cleanup Level[a] for Protection of Ground Water	Soil Sampling Location in the Georgetown Flume (Locations Arranged from Downstream to Upstream)																
				W1B03 (0-3 inches)	W1B12 (6-12 inches)	W1B24 (12-24 inches)	W1S18 (30-36 inches)	W1T06-East (0-6 inches)	W1T06-West (0-6 inches)	W1T36-West (30-36 inches)	W2B03 (0-3 inches)	W2B12 (6-12 inches)	W2B18 (12-18 inches)	W2S18 (30-36 inches)	W2T06 (0-6 inches)	W2T06-East (0-6 inches)	W2T36-East (30-36 inches)	W3B03 (0-3 inches)	W3B12 (6-12 inches)	W3B24 (12-24 inches)
Metals (mg/kg)																				
Arsenic	20	20	--	7 U	7 U	6 U	11	NA	NA	NA	12	8	6 U	5 U	NA	NA	NA	6 U	6 U	6 U
Cadmium	2	2	--	1.8	0.3 U	0.2 U	0.2 U	NA	NA	NA	0.3 U	0.2 U	0.2 U	0.2 U	NA	NA	NA	0.2 U	0.2 U	0.2 U
Chromium	2,000	2,000	--	36.8	12.4	12.3	19.0	NA	NA	NA	25.0	9.3	7.8	12.9	NA	NA	NA	12.5	10.9	12.5
Hexavalent chromium	19	19	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	--	--	263	61.1	12.6	12.8	13.8	NA	NA	NA	35.2	9.1	7.2	18.9	NA	NA	NA	9.2	10.0	8.2
Lead	250	1,000	--	93	3 U	2 U	9	NA	NA	NA	77	6	2	24	NA	NA	NA	5	2 U	2
Mercury	2	2	--	0.43	0.05 U	0.04 U	0.05 U	NA	NA	NA	0.16	0.05 U	0.05 U	0.04 U	NA	NA	NA	0.06 U	0.05 U	0.05 U
Petroleum Hydrocarbons (mg/kg)																				
Diesel-range	2,000	2,000	--	180	6.2 U	7.0	57	NA	NA	NA	46	6.5 U	6.4 U	8.0	NA	NA	NA	7.6	6.4 U	6.2 U
Transformer oil	4,000	4,000	--	270	6.2 U	9.2	79	NA	NA	NA	78	6.5 U	6.4 U	17	NA	NA	NA	12	6.4 U	6.2 U
Polychlorinated Biphenyls (ug/kg)																				
Aroclor 1016	--	--	--	97 U	89 U	86 U	93 U	NA	NA	NA	90 U	93 U	92 U	91 U	NA	NA	NA	90 U	92 U	89 U
Aroclor 1242	--	--	--	97 U	89 U	86 U	93 U	NA	NA	NA	90 U	93 U	92 U	91 U	NA	NA	NA	90 U	92 U	89 U
Aroclor 1248	--	--	--	410 U	89 U	86 U	93 U	NA	NA	NA	390 U	93 U	92 U	91 U	NA	NA	NA	90 U	92 U	89 U
Aroclor 1254	--	--	--	720	89 U	86 U	93 U	NA	NA	NA	660	93 U	92 U	91 U	NA	NA	NA	110	92 U	89 U
Aroclor 1260	--	--	--	220	89 U	86 U	93 U	NA	NA	NA	160	93 U	92 U	91 U	NA	NA	NA	90 U	92 U	89 U
Aroclor 1221	--	--	--	97 U	89 U	86 U	93 U	NA	NA	NA	90 U	93 U	92 U	91 U	NA	NA	NA	90 U	92 U	89 U
Aroclor 1232	--	--	--	97 U	89 U	86 U	93 U	NA	NA	NA	90 U	93 U	92 U	91 U	NA	NA	NA	90 U	92 U	89 U
Total PCBs	1,000	10,000	--	940	89 U	86 U	93 U	NA	NA	NA	820	93 U	92 U	91 U	NA	NA	NA	110	92 U	89 U
Polycyclic Aromatic Hydrocarbons (ug/kg)																				
Naphthalene	5,000	--	--	26 U	6.2 U	6 U	6.2 U	5.7 U	6.5 U	6.6 U	7	4.6 J	6.4 U	4.9 J	26	6.5 U	6.4 U	6.3 U	5.2 J	6.2 U
Acenaphthylene	--	--	--	26 U	6.2 U	6 U	6.2 U	5.7 U	6.5 U	6.6 U	9.8	6.5 U	6.4 U	11	18 J	6.5 U	6.4 U	6.3 U	6.5 U	6.2 U
Acenaphthene	--	--	98,000	26 U	6.2 U	6 U	6.2 U	5.7 U	6.5 U	6.6 U	3.9 J	3.3 J	6.4 U	6.1 U	20	6.5 U	6.4 U	6.3 U	6.5 U	6.2 U
Fluorene	--	--	101,000	26 U	6.2 U	6 U	6.2 U	5.7 U	6.5 U	6.6 U	4.6 J	3.9 J	6.4 U	6.1 U	16 J	6.5 U	6.4 U	6.3 U	6.5 U	6.2 U
Phenanthrene	--	--	--	59	41	6 U	32	14	18	6.6 U	39	80	3.8 J	36	350	16	6.4 U	4.4 J	6.5 U	6.2 U
Anthracene	--	--	1,114,000	26	6.2 U	6 U	7.5	5.7 U	6.5 U	6.6 U	33	12	3.8 J	35	83	6.5 U	6.4 U	6.3 U	6.5 U	6.2 U
2-Methylnaphthalene	--	--	--	26 U	3.7 J	6 U	6.2 U	5.7 U	6.5 U	6.6 U	5.2 J	3.9 J	6.4 U	4.3 J	18 J	6.5 U	6.4 U	6.3 U	6.5 U	6.2 U
Fluoranthene	--	--	630,000	180	6.2 U	6 U	110	44	44	6.6 U	230	88	12	140	1,300	43	14	9.5	6.5 U	6.2 U
Pyrene	--	--	650,000	150	6.8	6 U	57	35	32	6.6 U	170	76	13	160	1,200	34	10	12	6.5 U	3.7 J
Benzo(a)anthracene	--	--	720	61	4 J	6 U	11	18	12	6.6 U	180	38	14	150	660	16	7.7	4.4 J	6.5 U	6.2 U
Chrysene	--	--	800	120	6 J	6 U	43	36	36	6.6 U	420	55	27	290	920	25	10	6.3	6.5 U	6.2 U
Benzo(b)fluoranthene	--	--	2,400	100	6.2 U	6 U	24	31	42	6.6 U	1,100	83	55	820	780	28	9.6	7.6	6.5 U	6.2 U
Benzo(k)fluoranthene	--	--	2,400	120	6.2 U	6 U	26	23	33	6.6 U	390	60	28	590	840	22	9.6	6.3	6.5 U	6.2 U
Benzo(a)pyrene	100	2,000	--	100	6.2 U	6 U	11	19	18	6.6 U	**960**	94	62	**870**	**800**	18	9.0	4.4 J	6.5 U	6.2 U
Indeno(1,2,3-c,d)pyrene	--	--	7,000	89	6.2 U	6 U	8	12	11	6.6 U	400	61	37	440	510	7.2	6.4 U	6.3 U	6.5 U	6.2 U
Dibenz(a,h)anthracene	--	--	3,600	31	6.2 U	6 U	6 U	5.7 U	6.5 U	6.6 U	160	20	12	180	170	6.5 U	6.4 U	6.3 U	6.5 U	6.2 U
Total cPAH (TEF)	100[b]	2,000[b]	--	**150**	5.8	5.4	20	29	29	6.0 U	**1,200**	**120**	80	**1,100**	**1,200**	27	13	7.9	5.9	5.6
Benzo(g,h,i)perylene	--	--	--	110	6.2 U	6 U	9.3	15	14	6.6 U	520	89	53	520	750	6.5 U	6.4 U	6.3 U	6.5 U	6.2 U
Dibenzofuran	--	--	--	26 U	8.1	6 U	6 U	5.7 U	6.5 U	6.6 U	5 J	3.9 J	6 U	6.1 U	20 U	6.5 U	6.4 U	6.3 U	6.5 U	6.2 U

[a] Washington State Model Toxics Control Act (MTCA).
[b] Cleanup level based on Toxicity Equivalency Factor (WAC 173-340-708(8).
µg/kg micrograms per kilogram.
mg/kg milligrams per kilogram.

Bold values exceed MTCA cleanup levels for unrestricted land use.
U The material was analyzed for, but was not detected; the associated numerical value is the reporting limit.
J The associated numerical value is considered an estimated concentration.
NA Not analyzed.
-- Regulatory standard not available.

Table 3-4 (continued). Soil sample analysis results (2006), Georgetown flume.

Parameter	MTCA Method A Soil Cleanup Level[a] for Unrestricted Land Use	MTCA Method A Soil Cleanup Level[a] for Industrial Properties	MTCA Method C Cleanup Level[a] for Protection of Ground Water	Soil Sampling Location (Locations Arranged from Downstream to Upstream)																
				W3S18 (30-36 inches)	W3T06-West (0-6 inches)	W3T06-East (0-6 inches)	W3T36-East (30-36 inches)	W4B03 (0-3 inches)	W4S18 (30-36 inches)	W4T06-West (0-6 inches)	W4T06-East (0-6 inches)	W4T36-East (30-36 inches)	C1B03 (0-3 inches)	C1B12 (6-12 inches)	C1B24 (12-24 inches)	C2B03 (0-3 inches)	C2B12 (6-12 inches)	C2B24 (12-24 inches)	C3GP115 (15 feet)	C3GP215 (15 feet)
Metals (mg/kg)																				
Arsenic	20	20	--	6	NA	NA	NA	13	5 U	NA	NA	NA	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
Cadmium	2	2	--	0.2 U	NA	NA	NA	0.3 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	0.2 U	0.2 U
Chromium	2,000	2,000	--	17.7	NA	NA	NA	22.7	12.0	NA	NA	NA	12.9	10.4	10.4	11.9	11.4	11.6	12.4	10.2
Hexavalent chromium	19	19	--	NA	NA	NA	NA	0.160 UJ	0.114 UJ	NA	NA	NA	NA	NA	NA	0.134 UJ	0.139 UJ	0.136 UJ	NA	NA
Copper	--	--	263	16.4	NA	NA	NA	26.2	13.1	NA	NA	NA	16.9	11.4	10.7	12.4	12.4	10.2	10.1	9.6
Lead	250	1,000	--	11	NA	NA	NA	65	7	NA	NA	NA	5	3	3	8	7	2 U	2 U	4 U
Mercury	2	2	--	0.05 U	NA	NA	NA	0.21	0.05 U	NA	NA	NA	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Petroleum Hydrocarbons (mg/kg)																				
Diesel-range	2,000	2,000	--	7.4	NA	NA	NA	40	6.9	NA	NA	NA	6.8 U	8.6	6.4 U	6.4 U	6.2 U	6.2 U	6.2 U	6.0 U
Transformer oil	4,000	4,000	--	14	NA	NA	NA	68	12	NA	NA	NA	8.0	11	6.4 U	8.1	6.6	6.2 U	6.2 U	6.0 U
Polychlorinated Biphenyls (ug/kg)																				
Aroclor 1016	--	--	--	92 U	NA	NA	NA	130 U	89 U	NA	NA	NA	98 U	89 U	91 U	92 U	88 U	89 U	95 U	92 U
Aroclor 1242	--	--	--	92 U	NA	NA	NA	130 U	89 U	NA	NA	NA	98 U	89 U	91 U	92 U	88 U	89 U	95 U	92 U
Aroclor 1248	--	--	--	92 U	NA	NA	NA	660 U	89 U	NA	NA	NA	98 U	89 U	91 U	92 U	88 U	89 U	95 U	92 U
Aroclor 1254	--	--	--	180	NA	NA	NA	1,100	100	NA	NA	NA	98 U	89 U	91 U	92 U	88 U	89 U	95 U	92 U
Aroclor 1260	--	--	--	92 U	NA	NA	NA	340	89 U	NA	NA	NA	98 U	89 U	91 U	92 U	88 U	89 U	95 U	92 U
Aroclor 1221	--	--	--	92 U	NA	NA	NA	130 U	89 U	NA	NA	NA	98 U	89 U	91 U	92 U	88 U	89 U	95 U	92 U
Aroclor 1232	--	--	--	92 U	NA	NA	NA	130 U	89 U	NA	NA	NA	98 U	89 U	91 U	92 U	88 U	89 U	95 U	92 U
Total PCBs	1,000	10,000	--	180	NA	NA	NA	**1,440**	100	NA	NA	NA	98 U	89 U	91 U	92 U	88 U	89 U	95 U	92 U
Polycyclic Aromatic Hydrocarbons (ug/kg)																				
Naphthalene	5,000	--	--	6.5 U	6.7 U	18	6.5 U	4.3 J	6.0 U	6.5 U	6.4 U	30	6.5 U	31	7.0	7.1	7.2	6.5 U	6.5 U	6.4 U
Acenaphthylene	--	--	--	7.2	6.7 U	12	6.5 U	6.7	13	10	20	26	9.7	16	6.4 U	6.5	5.2 J	6.5 U	6.5 U	6.4 U
Acenaphthene	--	--	98,000	6.5 U	6.7 U	6.4 U	6.5 U	4.9 J	6.0 U	6.5 U	16	65	6.5 U	28	5.8 J	9.7	5.9 J	10	6.5 U	6.4 U
Fluorene	--	--	101,000	6.5 U	6.7 U	6.4 U	6.5 U	4.9 J	3.6 J	6.5 U	12	54	6.5 U	16	4.5 J	10	8.5	6.5 U	6.5 U	6.4 U
Phenanthrene	--	--	--	10	15	98	6.5 U	46	41	39	200	130	22	35	6.4	35	74	6.5 U	6.5 U	6.4 U
Anthracene	--	--	1,114,000	20	6.7	34	6.5 U	21	26	15	65	1,200	21	32	6.4 U	26	37	6.5 U	6.5 U	6.4 U
2-Methylnaphthalene	--	--	--	6.5 U	6.7 U	9.0	6.5 U	6.1 U	6.0 U	6.5 U	6.4 U	26	6.5 U	4.6 J	4.5 J	6.5 U	6.6 U	6.5 U	6.5 U	6.4 U
Fluoranthene	--	--	630,000	36	41	320	19	180	280	250	490	250	150	210	17	110	200	6.5 U	6.5 U	6.4 U
Pyrene	--	--	650,000	77	46	360	36	140	260	230	380	1,400	200	300	16	210	320	4.6 J	6.5 U	6.4 U
Benzo(a)anthracene	--	--	720	110	36	460	68	66	160	160	180	1,200	100	140	3.2 J	77	120	6.5 U	6.5 U	6.4 U
Chrysene	--	--	800	190	83	590	100	110	210	170	280	490	130	200	7.7	110	170	6.5 U	6.5 U	6.4 U
Benzo(b)fluoranthene	--	--	2,400	620	220	1,500	360	95	210	160	300	540	160	240	3.8 J	130	160	6.5 U	6.5 U	6.4 U
Benzo(k)fluoranthene	--	--	2,400	440	220	910	210	120	210	130	350	420	140	240	5.1 J	120	140	6.5 U	6.5 U	6.4 U
Benzo(a)pyrene	100	2,000	--	**620**	**220**	**1,100**	**320**	80	**200**	**120**	**240**	**460**	**130**	**220**	3.8 J	**110**	**140**	6.5 U	6.5 U	6.4 U
Indeno(1,2,3-c,d)pyrene	--	--	7,000	180	86	280	120	30	52	34	100	480	28	50	6.4 U	22	32	6.5 U	6.5 U	6.4 U
Dibenz(a,h)anthracene	--	--	3,600	71	34	96	30	9	13	9.7	38.0	110	8	11	6.4 U	8	11	6.5 U	6.5 U	6.4 U
Total cPAH (TEF)	100[b]	2,000[b]	--	**790**	**290**	**1,500**	**410**	**120**	**270**	**170**	**350**	**650**	**180**	**290**	6.7	**150**	**190**	5.9 U	5.9	5.8
Benzo(g,h,i)perylene	--	--	--	220	110	300	150	30	53	29	94	41	23	45	6.4 U	21	31	6.5 U	6.5 U	6.4 U
Dibenzofuran	--	--	--	6.5 U	6.5 U	9.0	6.5 U	4.9 J	6.0 U	6.5 U	6.5 U	44	6.5 U	50	5.1 J	5.8 J	5.9 J	6.5 U	6.5 U	6.4 U

[a] Washington State Model Toxics Control Act (MTCA).
[b] Cleanup level based on Toxicity Equivalency Factor (WAC 173-340-708(8).
µg/kg micrograms per kilogram.
mg/kg milligrams per kilogram.
Bold values exceed MTCA cleanup levels for unrestricted land use.
U The material was analyzed for, but was not detected; the associated numerical value is the reporting limit.
J The associated numerical value is considered an estimated concentration.
NA Not analyzed.
-- Regulatory standard not available.

Table 3-6. Surface soil composite sample analytical results, Ellis substation, Georgetown flume.

Parameter	MTCA Method A Soil Cleanup Level[a] for unrestricted land use	Surface Soil Sampling Location											
		Northpad-East (0-6 inches)	Northpad-North (0-6 inches)	Northpad-West (0-6 inches)	Southpad-East (0-6 inches)	Southpad-South (0-6 inches)	Southpad-West (0-6 inches)	Switchgear-North (0-6 inches)	Switchgear-South (0-6 inches)	NTrans-N/W (0-6 inches)	NTrans-S/E (0-6 inches)	STrans-N/W (0-6 inches)	STrans-S/E (0-6 inches)
Petroleum Hydrocarbons (mg/kg)													
Diesel-range	2,000	5.4 U	5.4 U	33	5.5 U	5.5 U	5.5 U	5.4 U	7.1	8.4	6.7	5.5 U	7.6
Transformer oil	4,000	5.4 U	5.4 U	53	5.5 U	5.5 U	6.6	5.4 U	9.2	12	11	5.5 U	11
Polychlorinated Biphenyls (ug/kg)													
Aroclor 1016	--	99 U	98 U	3000 U	100 U	91 U	92 U	98 U	99 U	92 U	92 U	92 U	91 U
Aroclor 1242	--	99 U	98 U	3000 U	100 U	91 U	92 U	98 U	99 U	92 U	92 U	92 U	91 U
Aroclor 1248	--	99 U	98 U	3000 U	100 U	91 U	92 U	98 U	99 U	92 U	92 U	92 U	91 U
Aroclor 1254	--	99 U	98 U	12,000	100 U	91 U	92 U	98 U	99 U	92 U	92 U	92 U	91 U
Aroclor 1260	--	83 J	64 J	4,100	100 U	91 U	92 U	98 U	99 U	92 U	92 U	87 J	74 J
Aroclor 1221	--	99 U	98 U	3000 U	100 U	91 U	92 U	98 U	99 U	92 U	92 U	92 U	91 U
Aroclor 1232	--	99 U	98 U	3000 U	100 U	91 U	92 U	98 U	99 U	92 U	92 U	92 U	91 U
Total PCBs	1,000	83 J	64 J	**16,000**	100 U	91 U	92 U	98 U	99 U	92 U	92 U	92 U	74 J

[a] Washington State Model Toxics Control Act (MTCA).
bgs below ground surface.
µg/kg micrograms per kilogram dry weight.
mg/kg milligrams per kilogram dry weight.
Bold values exceed MTCA method A cleanup levels for unrestricted land use.
U The material was analyzed for, but was not detected; the associated numerical value is the reporting limit.
J The associated numerical value is considered an estimated concentration.
-- Regulatory standard not available.

Table 3-7. Soil sample analysis results (2006), South Myrtle Street.

Parameter	MTCA Method A Soil Cleanup Level[a] for Unrestricted Land Use	MTCA Method A Soil Cleanup Level[a] for Industrial Properties	MTCA Method C Cleanup Level[a] for Protection of Ground Water	Soil Sample Locations					
				W2T18	MS01SS	MS02SS	MS03SS	MS04SS	Storage Yard
				(0-18 inches)	(0-6 inches)	(0-6 inches)	(0-6 inches)	(0-6 inches)	(0-6 inches)
Metals (mg/kg)									
Arsenic	20	20	--	16	NA	NA	NA	NA	NA
Cadmium	2	2	--	1.6	NA	NA	NA	NA	NA
Chromium	2,000	2,000	--	32.9	NA	NA	NA	NA	NA
Copper	--	--	263	90.4	NA	NA	NA	NA	NA
Lead	250	1,000	--	**317**	NA	NA	NA	NA	NA
Mercury	2	2	--	0.19	NA	NA	NA	NA	NA
Petroleum Hydrocarbons (mg/kg)									
Diesel-range	2,000	2,000	--	310	NA	NA	NA	NA	NA
Transformer oil	4,000	4,000	--	510	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (ug/kg)									
Aroclor 1016	--	--	--	95 U	NA	NA	98 U	98 U	95 U
Aroclor 1242	--	--	--	95 U	NA	NA	98 U	98 U	95 U
Aroclor 1248	--	--	--	95 U	NA	NA	98 U	98 U	95 U
Aroclor 1254	--	--	--	140 U	NA	NA	100 J	98 U	95 U
Aroclor 1260	--	--	--	820	NA	NA	260	180	95 U
Aroclor 1221	--	--	--	95 U	NA	NA	98 U	98 U	95 U
Aroclor 1232	--	--	--	95 U	NA	NA	98 U	98 U	95 U
Total PCBs	1,000	10,000	--	820	NA	NA	360	180	95 U
Polycyclic Aromatic Hydrocarbons (ug/kg)									
Naphthalene	5,000	--	--	33	6.5 U	20 U	33	19 U	19 U
Acenaphthylene	--	--	--	110	6.5 U	20 U	25	19	19 U
Acenaphthene	--	--	98,000	11 J	6.5 U	20 U	39	19 U	19 U
Fluorene	--	--	101,000	31	6.5 U	20 U	25	19 U	19 U
Phenanthrene	--	--	--	1,000	22	78	430	110	140
Anthracene	--	--	1,114,000	1,500	12	24	62	36	25
2-Methylnaphthalene	--	--	--	33	6.5 U	20 U	25	19 U	19 U
Fluoranthene	--	--	630,000	7,500	99	240	610	360	190
Pyrene	--	--	650,000	4,500	110	240	610	340	180
Benzo(a)anthracene	--	--	720	3,400	34	100	220	150	78
Chrysene	--	--	800	5,400	95	240	350	310	100
Benzo(b)fluoranthene	--	--	2,400	2,500	58	270	380	540	71
Benzo(k)fluoranthene	--	--	2,400	2,100	90	240	320	390	71
Benzo(a)pyrene	100	2,000	--	**1,500**	43	**200**	**310**	**410**	82
Indeno(1,2,3-c,d)pyrene	--	--	7,000	420	33	90	120	150	19 U
Dibenz(a,h)anthracene	--	--	3,600	170	7.2	26	31	44	19 U
Total cPAH (TEF)	100[b]	2000[b]	--	<u>**2,500**</u>	68	**280**	**430**	**550**	**110**
Benzo(g,h,i)perylene	--	--	--	400	41	110	130	190	27
Dibenzofuran	--	--	--	15 J	6.5 U	20 U	21	19 U	19 U

[a] Washington State Model Toxics Control Act (MTCA).
[b] Cleanup level based on Toxicity Equivalency Factor (WAC 173-340-708(8).
bgs below ground surface
µg/kg micrograms per kilogram.
mg/kg milligrams per kilogram.

Bold values exceed MTCA cleanup levels for unrestricted land use.
<u>Underlined</u> values exceed MTCA cleanup levels for industrial properties.
U The material was analyzed for, but was not detected; the associated numerical value is the reporting limit.
J The associated numerical value is considered an estimated concentration.
NA Not analyzed.
-- Regulatory standard not available

04-24-07/rtb/HEC-R/06-03385-000-003-001/Characterization Rpt

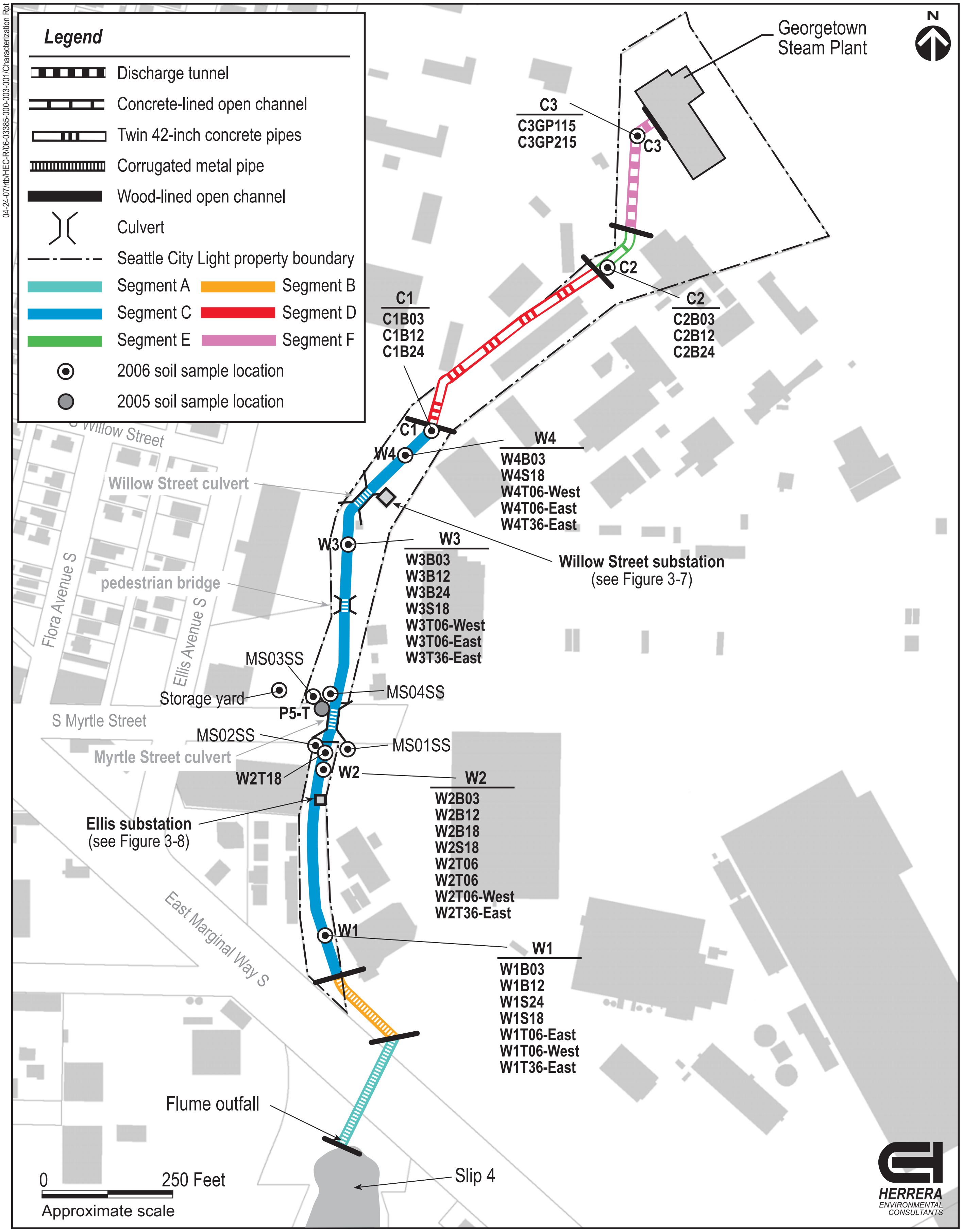
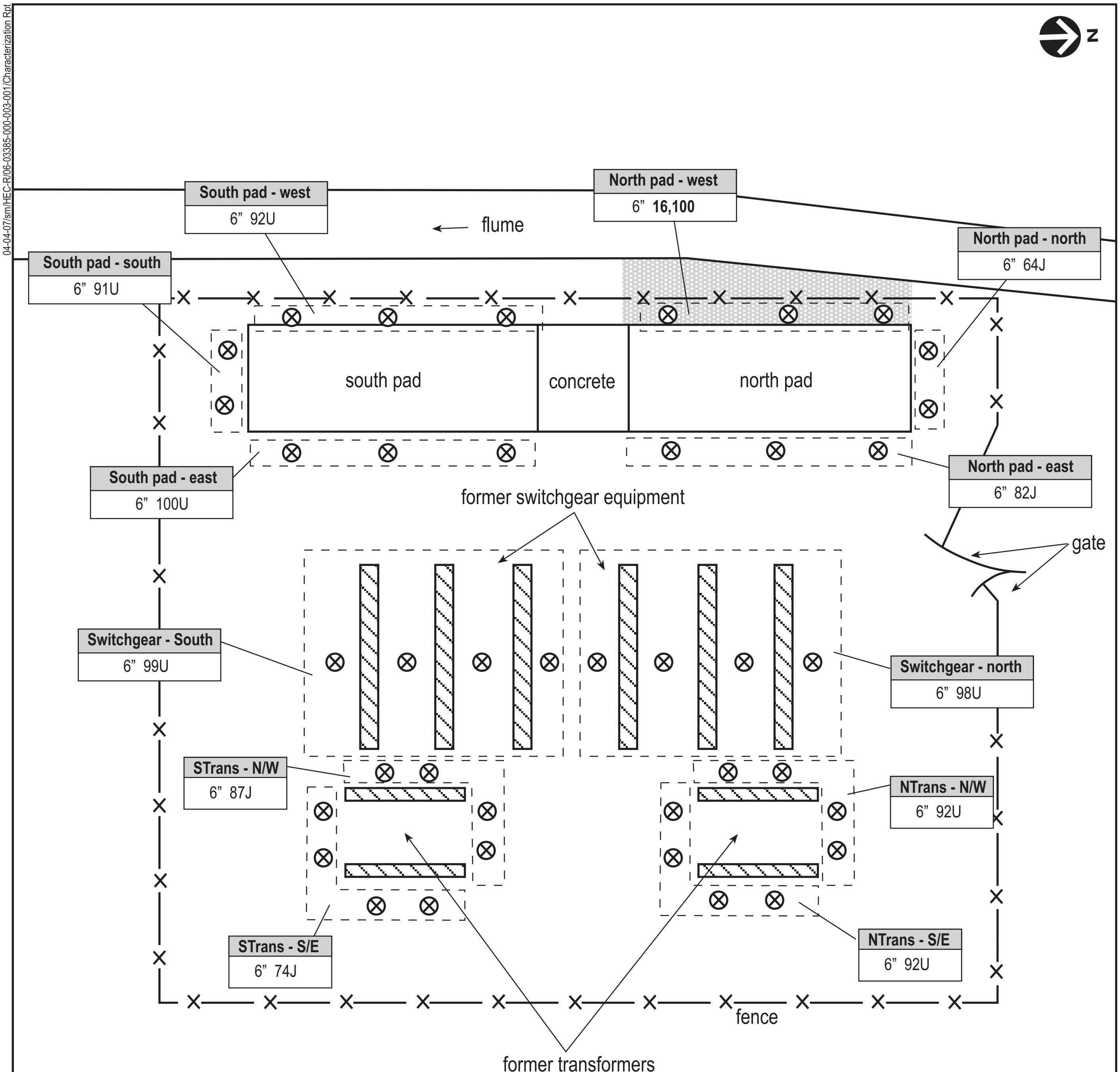


Figure 3-2. Soil sample locations (2005 and 2006), Georgetown flume.



Legend

- Surface soil sample (0-6” bgs)
- Composite sample area
- Concrete equipment support blocks
- Estimated extent of affected soil
- J Sample value reported is estimated
- U Not detected above associated numerical reporting limit
- **Bold** values exceed MTCA method A soil cleanup level for unrestricted land use

Total PCB results in µg/kg dry weight

Figure 3-8. Surface soil total PCB results, Ellis substation.

Data Set B-2. Soil Data (Leidos 2013 Excerpt)

Table 7.1-7
RI Selected Screening Level Exceedances for Detected COPCs in Soil at North Flightline Area

User Location ID	Location Name	Location Type	Sample ID	Sample Date	Depth (ft bgs)	Chemical Class	Chemical	Concentration (mg/kg)	RISL (mg/kg)	RISL Exceedance Factor	Excavation Status
Former Buildings 3-360, 3-361 Area											
2103	360-SB-2	SB	360/1/5-SB-2-4.5	11/13/1991	4.5 - 5	MET	Beryllium	0.21	--	--	
2103	360-SB-2	SB	360/1/5-SB-2-4.5	11/13/1991	4.5 - 5	MET	Mercury	0.35	0.070	5.0	
637	DP1	TW	DP1-8-10	05/23/2002	8 - 10	VOC	cis-1,2-Dichloroethene	0.034	0.0052	6.5	
637	DP1	TW	DP1-8-10	05/23/2002	8 - 10	VOC	Trichloroethene (TCE)	0.2	0.0015	130	
4163	SS-1-360	EX	SS1-9-9.5	03/25/2002	9 - 9.5	VOC	cis-1,2-Dichloroethene	0.7	0.0052	130	Removed
4163	SS-1-360	EX	SS1-9-9.5	03/25/2002	9 - 9.5	VOC	Trichloroethene (TCE)	3.7	0.0015	2,500	Removed
4164	SS-2-360	EX	SS2-7-7.5	03/25/2002	7 - 7.5	VOC	Trichloroethene (TCE)	0.017	0.0015	11	Removed
4165	SS-3-360	EX	SS3-7-7.5	03/25/2002	7 - 7.5	VOC	cis-1,2-Dichloroethene	0.013	0.0052	2.5	Removed
4165	SS-3-360	EX	SS3-7-7.5	03/25/2002	7 - 7.5	VOC	Trichloroethene (TCE)	0.15	0.0015	100	Removed
4166	SS-4-360	EX	SS4-7-7.5	03/26/2002	7 - 7.5	VOC	Trichloroethene (TCE)	0.24	0.0015	160	Removed
4167	SS-5-360	EX	SS5-7-7.5	03/26/2002	7 - 7.5	VOC	cis-1,2-Dichloroethene	0.07	0.0052	13	Removed
4167	SS-5-360	EX	SS5-7-7.5	03/26/2002	7 - 7.5	VOC	Trichloroethene (TCE)	0.34	0.0015	230	Removed
4168	SS-6-360	EX	SS6-9-9.5	03/26/2002	9 - 9.5	VOC	cis-1,2-Dichloroethene	0.5	0.0052	96	
4168	SS-6-360	EX	SS6-9-9.5	03/26/2002	9 - 9.5	VOC	Trichloroethene (TCE)	5.4	0.0015	3,600	
4146	W3	SB	W3B03	09/21/2006	0 - 0.25	PCB	Total PCBs	0.11	0.033	3.3	Removed
4146	W3	SB	W3B03	09/21/2006	0 - 0.25	PAH	Benzo(a)anthracene	0.0044 J	--	--	Removed
4146	W3	SB	W3B03	09/21/2006	0 - 0.25	PAH	Benzo(b)fluoranthene	0.0076	--	--	Removed
4146	W3	SB	W3B03	09/21/2006	0 - 0.25	PAH	Benzo(k)fluoranthene	0.0063	--	--	Removed
4146	W3	SB	W3B03	09/21/2006	0 - 0.25	PAH	Total Benzofluoranthenes	0.0139	--	--	Removed
4146	W3	SB	W3B03	09/21/2006	0 - 0.25	PAH	Chrysene	0.0063	--	--	Removed
4146	W3	SB	W3T06-East	12/13/2006	0 - 0.5	PAH	Benzo(a)anthracene	0.46	--	--	Removed
4146	W3	SB	W3T06-East	12/13/2006	0 - 0.5	PAH	Benzo(b)fluoranthene	1.5	--	--	Removed
4146	W3	SB	W3T06-East	12/13/2006	0 - 0.5	PAH	Benzo(k)fluoranthene	0.91	--	--	Removed
4146	W3	SB	W3T06-East	12/13/2006	0 - 0.5	PAH	Total Benzofluoranthenes	2.41	--	--	Removed
4146	W3	SB	W3T06-East	12/13/2006	0 - 0.5	PAH	Benzo(g,h,i)perylene	0.3	0.031	9.7	Removed
4146	W3	SB	W3T06-East	12/13/2006	0 - 0.5	PAH	Benzo(a)pyrene	1.1	0.0094	120	Removed
4146	W3	SB	W3T06-East	12/13/2006	0 - 0.5	PAH	Chrysene	0.59	--	--	Removed
4146	W3	SB	W3T06-East	12/13/2006	0 - 0.5	PAH	Dibenz(a,h)anthracene	0.096	--	--	Removed
4146	W3	SB	W3T06-East	12/13/2006	0 - 0.5	PAH	Fluoranthene	0.32	0.16	2.0	Removed
4146	W3	SB	W3T06-East	12/13/2006	0 - 0.5	PAH	Indeno(1,2,3-cd)pyrene	0.28	--	--	Removed
4146	W3	SB	W3T06-East	12/13/2006	0 - 0.5	PAH	Total cPAHs (TEQ, NDx0.5)	1.4	0.0094	150	Removed
4146	W3	SB	W3S18	09/21/2006	2.5 - 3	PCB	Total PCBs	0.18	0.033	5.5	Removed
4146	W3	SB	W3S18	09/21/2006	2.5 - 3	PAH	Benzo(a)anthracene	0.11	--	--	Removed
4146	W3	SB	W3T36-East	12/13/2006	2.5 - 3	PAH	Benzo(a)anthracene	0.068	--	--	Removed
4146	W3	SB	W3S18	09/21/2006	2.5 - 3	PAH	Benzo(b)fluoranthene	0.62	--	--	Removed
4146	W3	SB	W3T36-East	12/13/2006	2.5 - 3	PAH	Benzo(b)fluoranthene	0.36	--	--	Removed
4146	W3	SB	W3S18	09/21/2006	2.5 - 3	PAH	Benzo(k)fluoranthene	0.44	--	--	Removed
4146	W3	SB	W3T36-East	12/13/2006	2.5 - 3	PAH	Benzo(k)fluoranthene	0.21	--	--	Removed
4146	W3	SB	W3S18	09/21/2006	2.5 - 3	PAH	Total Benzofluoranthenes	1.06	--	--	Removed
4146	W3	SB	W3T36-East	12/13/2006	2.5 - 3	PAH	Total Benzofluoranthenes	0.57	--	--	Removed
4146	W3	SB	W3S18	09/21/2006	2.5 - 3	PAH	Benzo(g,h,i)perylene	0.22	0.031	7.1	Removed
4146	W3	SB	W3T36-East	12/13/2006	2.5 - 3	PAH	Benzo(g,h,i)perylene	0.15	0.031	4.8	Removed

Table 7.1-7
RI Selected Screening Level Exceedances for Detected COPCs in Soil at North Flightline Area

User Location ID	Location Name	Location Type	Sample ID	Sample Date	Depth (ft bgs)	Chemical Class	Chemical	Concentration (mg/kg)	RISL (mg/kg)	RISL Exceedance Factor	Excavation Status
4146	W3	SB	W3S18	09/21/2006	2.5 - 3	PAH	Benzo(a)pyrene	0.62	0.0094	66	Removed
4146	W3	SB	W3T36-East	12/13/2006	2.5 - 3	PAH	Benzo(a)pyrene	0.32	0.0094	34	Removed
4146	W3	SB	W3S18	09/21/2006	2.5 - 3	PAH	Chrysene	0.19	--	--	Removed
4146	W3	SB	W3T36-East	12/13/2006	2.5 - 3	PAH	Chrysene	0.1	--	--	Removed
4146	W3	SB	W3S18	09/21/2006	2.5 - 3	PAH	Dibenz(a,h)anthracene	0.071	--	--	Removed
4146	W3	SB	W3T36-East	12/13/2006	2.5 - 3	PAH	Dibenz(a,h)anthracene	0.03	--	--	Removed
4146	W3	SB	W3S18	09/21/2006	2.5 - 3	PAH	Indeno(1,2,3-cd)pyrene	0.18	--	--	Removed
4146	W3	SB	W3T36-East	12/13/2006	2.5 - 3	PAH	Indeno(1,2,3-cd)pyrene	0.12	--	--	Removed
4146	W3	SB	W3S18	09/21/2006	2.5 - 3	PAH	Total cPAHs (TEQ, NDx0.5)	0.76	0.0094	81	Removed
4146	W3	SB	W3T36-East	12/13/2006	2.5 - 3	PAH	Total cPAHs (TEQ, NDx0.5)	0.40	0.0094	43	Removed
Building 3-380 Storm Drain Area											
4088	CS10	EX	CS10A	07/15/2009	--	PAH	Benzo(a)anthracene	0.014	--	--	Removed
4088	CS10	EX	CS10A	07/15/2009	--	PAH	Benzo(b)fluoranthene	0.029	--	--	Removed
4088	CS10	EX	CS10A	07/15/2009	--	PAH	Benzo(k)fluoranthene	0.0095	--	--	Removed
4088	CS10	EX	CS10A	07/15/2009	--	PAH	Total Benzofluoranthenes	0.0385	--	--	Removed
4088	CS10	EX	CS10A	07/15/2009	--	PAH	Benzo(g,h,i)perylene	0.034	0.031	1.1	Removed
4088	CS10	EX	CS10A	07/15/2009	--	PAH	Benzo(a)pyrene	0.031	0.0094	3.3	Removed
4088	CS10	EX	CS10A	07/15/2009	--	PAH	Chrysene	0.018	--	--	Removed
4088	CS10	EX	CS10A	07/15/2009	--	PAH	Indeno(1,2,3-cd)pyrene	0.023	--	--	Removed
4088	CS10	EX	CS10A	07/15/2009	--	PAH	Total cPAHs (TEQ, NDx0.5)	0.039	0.0094	4.2	Removed
4090	CS12	EX	CS12A	07/15/2009	--	PAH	Benzo(a)anthracene	0.017	--	--	Removed
4090	CS12	EX	CS12A	07/15/2009	--	PAH	Benzo(b)fluoranthene	0.046	--	--	Removed
4090	CS12	EX	CS12A	07/15/2009	--	PAH	Benzo(k)fluoranthene	0.013	--	--	Removed
4090	CS12	EX	CS12A	07/15/2009	--	PAH	Total Benzofluoranthenes	0.059	--	--	Removed
4090	CS12	EX	CS12A	07/15/2009	--	PAH	Benzo(a)pyrene	0.023	0.0094	2.4	Removed
4090	CS12	EX	CS12A	07/15/2009	--	PAH	Chrysene	0.037	--	--	Removed
4090	CS12	EX	CS12A	07/15/2009	--	PAH	Indeno(1,2,3-cd)pyrene	0.021	--	--	Removed
4090	CS12	EX	CS12A	07/15/2009	--	PAH	Total cPAHs (TEQ, NDx0.5)	0.033	0.0094	3.6	Removed
4104	CS9	EX	CS9A	07/15/2009	--	PCB	Total PCBs	0.13	0.033	3.9	Removed
4104	CS9	EX	CS9A	07/15/2009	--	PAH	Benzo(a)anthracene	0.074	--	--	Removed
4104	CS9	EX	CS9A	07/15/2009	--	PAH	Benzo(b)fluoranthene	0.12	--	--	Removed
4104	CS9	EX	CS9A	07/15/2009	--	PAH	Benzo(k)fluoranthene	0.027	--	--	Removed
4104	CS9	EX	CS9A	07/15/2009	--	PAH	Total Benzofluoranthenes	0.147	--	--	Removed
4104	CS9	EX	CS9A	07/15/2009	--	PAH	Benzo(g,h,i)perylene	0.048	0.031	1.5	Removed
4104	CS9	EX	CS9A	07/15/2009	--	PAH	Benzo(a)pyrene	0.069	0.0094	7.3	Removed
4104	CS9	EX	CS9A	07/15/2009	--	PAH	Chrysene	0.088	--	--	Removed
4104	CS9	EX	CS9A	07/15/2009	--	PAH	Dibenz(a,h)anthracene	0.016	--	--	Removed
4104	CS9	EX	CS9A	07/15/2009	--	PAH	Indeno(1,2,3-cd)pyrene	0.039	--	--	Removed
4104	CS9	EX	CS9A	07/15/2009	--	PAH	Total cPAHs (TEQ, NDx0.5)	0.097	0.0094	10	Removed
2080	ESS08-01	SB	ESS08-01-0-0.5	09/18/2008	0 - 0.5	PCB	Total PCBs	0.042	0.033	1.3	
2081	ESS08-02	SB	ESS08-02-0-0.5	09/18/2008	0 - 0.5	PCB	Total PCBs	0.068	0.033	2.1	
2081	ESS08-02	SB	ESS08-02-0.5-1	09/18/2008	0.5 - 1	PCB	Total PCBs	0.036	0.033	1.1	

Table 7.1-7
RI Selected Screening Level Exceedances for Detected COPCs in Soil at North Flightline Area

User Location ID	Location Name	Location Type	Sample ID	Sample Date	Depth (ft bgs)	Chemical Class	Chemical	Concentration (mg/kg)	RISL (mg/kg)	RISL Exceedance Factor	Excavation Status
2082	ESS08-03	SB	ESS08-03-0-0.5	09/18/2008	0 - 0.5	PCB	Total PCBs	0.12	0.033	3.6	
2082	ESS08-03	SB	ESS08-03-0.5-1	09/18/2008	0.5 - 1	PCB	Total PCBs	0.054	0.033	1.6	
2083	ESS08-04	SB	ESS08-04-0-0.5	09/18/2008	0 - 0.5	PCB	Total PCBs	0.31	0.033	9.4	
2083	ESS08-04	SB	ESS08-04-0.5-1	09/18/2008	0.5 - 1	PCB	Total PCBs	0.15	0.033	4.5	
2084	ESS08-05	SB	ESS08-05-0-0.5	09/18/2008	0 - 0.5	PCB	Total PCBs	0.058	0.033	1.8	
2084	ESS08-05	SB	ESS08-05-0.5-1	09/18/2008	0.5 - 1	PCB	Total PCBs	0.079	0.033	2.4	
2086	ESS08-07	SB	ESS08-07-0-1	09/23/2008	0 - 1	PCB	Total PCBs	0.05	0.033	1.5	
2086	ESS08-07	SB	ESS08-07-1-2	09/23/2008	1 - 2	PCB	Total PCBs	0.075	0.033	2.3	
2086	ESS08-07	SB	ESS08-07-3-4	09/23/2008	3 - 4	PCB	Total PCBs	0.04	0.033	1.2	
4115	MS01SS	SS	MS01SS	11/21/2006	0 - 0.5	PAH	Benzo(a)anthracene	0.034	--	--	Removed
4115	MS01SS	SS	MS01SS	11/21/2006	0 - 0.5	PAH	Benzo(b)fluoranthene	0.058	--	--	Removed
4115	MS01SS	SS	MS01SS	11/21/2006	0 - 0.5	PAH	Benzo(k)fluoranthene	0.09	--	--	Removed
4115	MS01SS	SS	MS01SS	11/21/2006	0 - 0.5	PAH	Total Benzofluoranthenes	0.148	--	--	Removed
4115	MS01SS	SS	MS01SS	11/21/2006	0 - 0.5	PAH	Benzo(g,h,i)perylene	0.041	0.031	1.3	Removed
4115	MS01SS	SS	MS01SS	11/21/2006	0 - 0.5	PAH	Benzo(a)pyrene	0.043	0.0094	4.6	Removed
4115	MS01SS	SS	MS01SS	11/21/2006	0 - 0.5	PAH	Chrysene	0.095	--	--	Removed
4115	MS01SS	SS	MS01SS	11/21/2006	0 - 0.5	PAH	Dibenz(a,h)anthracene	0.0072	--	--	Removed
4115	MS01SS	SS	MS01SS	11/21/2006	0 - 0.5	PAH	Indeno(1,2,3-cd)pyrene	0.033	--	--	Removed
4115	MS01SS	SS	MS01SS	11/21/2006	0 - 0.5	PAH	Total cPAHs (TEQ, NDx0.5)	0.066	0.0094	7.0	Removed
4116	MS02SS	SS	MS02SS	11/22/2006	0 - 0.5	PAH	Benzo(a)anthracene	0.1	--	--	Removed
4116	MS02SS	SS	MS02SS	11/22/2006	0 - 0.5	PAH	Benzo(b)fluoranthene	0.27	--	--	Removed
4116	MS02SS	SS	MS02SS	11/22/2006	0 - 0.5	PAH	Benzo(k)fluoranthene	0.24	--	--	Removed
4116	MS02SS	SS	MS02SS	11/22/2006	0 - 0.5	PAH	Total Benzofluoranthenes	0.51	--	--	Removed
4116	MS02SS	SS	MS02SS	11/22/2006	0 - 0.5	PAH	Benzo(g,h,i)perylene	0.11	0.031	3.5	Removed
4116	MS02SS	SS	MS02SS	11/22/2006	0 - 0.5	PAH	Benzo(a)pyrene	0.2	0.0094	21	Removed
4116	MS02SS	SS	MS02SS	11/22/2006	0 - 0.5	PAH	Chrysene	0.24	--	--	Removed
4116	MS02SS	SS	MS02SS	11/22/2006	0 - 0.5	PAH	Dibenz(a,h)anthracene	0.026	--	--	Removed
4116	MS02SS	SS	MS02SS	11/22/2006	0 - 0.5	PAH	Fluoranthene	0.24	0.16	1.5	Removed
4116	MS02SS	SS	MS02SS	11/22/2006	0 - 0.5	PAH	Indeno(1,2,3-cd)pyrene	0.09	--	--	Removed
4116	MS02SS	SS	MS02SS	11/22/2006	0 - 0.5	PAH	Total cPAHs (TEQ, NDx0.5)	0.28	0.0094	29	Removed
4117	MS03SS	SS	MS03SS	11/22/2006	0 - 0.5	PCB	Total PCBs	0.36	0.033	11	Removed
4117	MS03SS	SS	MS03SS	11/22/2006	0 - 0.5	PAH	Benzo(a)anthracene	0.22	--	--	Removed
4117	MS03SS	SS	MS03SS	11/22/2006	0 - 0.5	PAH	Benzo(b)fluoranthene	0.38	--	--	Removed
4117	MS03SS	SS	MS03SS	11/22/2006	0 - 0.5	PAH	Benzo(k)fluoranthene	0.32	--	--	Removed
4117	MS03SS	SS	MS03SS	11/22/2006	0 - 0.5	PAH	Total Benzofluoranthenes	0.7	--	--	Removed
4117	MS03SS	SS	MS03SS	11/22/2006	0 - 0.5	PAH	Benzo(g,h,i)perylene	0.13	0.031	4.2	Removed
4117	MS03SS	SS	MS03SS	11/22/2006	0 - 0.5	PAH	Benzo(a)pyrene	0.31	0.0094	33	Removed
4117	MS03SS	SS	MS03SS	11/22/2006	0 - 0.5	PAH	Chrysene	0.35	--	--	Removed
4117	MS03SS	SS	MS03SS	11/22/2006	0 - 0.5	PAH	Dibenz(a,h)anthracene	0.031	--	--	Removed
4117	MS03SS	SS	MS03SS	11/22/2006	0 - 0.5	PAH	Fluoranthene	0.61	0.16	3.8	Removed
4117	MS03SS	SS	MS03SS	11/22/2006	0 - 0.5	PAH	Indeno(1,2,3-cd)pyrene	0.12	--	--	Removed
4117	MS03SS	SS	MS03SS	11/22/2006	0 - 0.5	PAH	Total cPAHs (TEQ, NDx0.5)	0.42	0.0094	45	Removed
4118	MS04SS	SS	MS04SS	11/22/2006	0 - 0.5	PCB	Total PCBs	0.18	0.033	5.5	Removed

Table 7.1-7
RI Selected Screening Level Exceedances for Detected COPCs in Soil at North Flightline Area

User Location ID	Location Name	Location Type	Sample ID	Sample Date	Depth (ft bgs)	Chemical Class	Chemical	Concentration (mg/kg)	RISL (mg/kg)	RISL Exceedance Factor	Excavation Status
4118	MS04SS	SS	MS04SS	11/22/2006	0 - 0.5	PAH	Benzo(a)anthracene	0.15	--	--	Removed
4118	MS04SS	SS	MS04SS	11/22/2006	0 - 0.5	PAH	Benzo(b)fluoranthene	0.54	--	--	Removed
4118	MS04SS	SS	MS04SS	11/22/2006	0 - 0.5	PAH	Benzo(k)fluoranthene	0.39	--	--	Removed
4118	MS04SS	SS	MS04SS	11/22/2006	0 - 0.5	PAH	Total Benzofluoranthenes	0.93	--	--	Removed
4118	MS04SS	SS	MS04SS	11/22/2006	0 - 0.5	PAH	Benzo(g,h,i)perylene	0.19	0.031	6.1	Removed
4118	MS04SS	SS	MS04SS	11/22/2006	0 - 0.5	PAH	Benzo(a)pyrene	0.41	0.0094	44	Removed
4118	MS04SS	SS	MS04SS	11/22/2006	0 - 0.5	PAH	Chrysene	0.31	--	--	Removed
4118	MS04SS	SS	MS04SS	11/22/2006	0 - 0.5	PAH	Dibenz(a,h)anthracene	0.044	--	--	Removed
4118	MS04SS	SS	MS04SS	11/22/2006	0 - 0.5	PAH	Fluoranthene	0.36	0.16	2.3	Removed
4118	MS04SS	SS	MS04SS	11/22/2006	0 - 0.5	PAH	Indeno(1,2,3-cd)pyrene	0.15	--	--	Removed
4118	MS04SS	SS	MS04SS	11/22/2006	0 - 0.5	PAH	Total cPAHs (TEQ, NDx0.5)	0.54	0.0094	58	Removed
4119	North Pad-East	SS	North Pad-East	02/23/2007	0 - 0.5	PCB	Total PCBs	0.083	0.033	2.5	
4120	North Pad-North	SS	North Pad-North	02/23/2007	0 - 0.5	PCB	Total PCBs	0.064	0.033	1.9	
4121	North Pad-West	SS	North Pad-West	02/23/2007	0 - 0.5	PCB	Total PCBs	16.1	0.033	490	Removed
4177	P5-T	SS	P5-T	04/01/2005	0 - 0.1	PCB	Total PCBs	1.5	0.033	45	Removed
4177	P5-T	SS	P5-T	04/01/2005	0 - 0.1	MET	Antimony	0.4	--	--	Removed
4177	P5-T	SS	P5-T	04/01/2005	0 - 0.1	MET	Barium	116	83	1.4	Removed
4177	P5-T	SS	P5-T	04/01/2005	0 - 0.1	MET	Copper	95.1	36	2.6	Removed
4177	P5-T	SS	P5-T	04/01/2005	0 - 0.1	MET	Lead	73	57	1.3	Removed
4177	P5-T	SS	P5-T	04/01/2005	0 - 0.1	MET	Manganese	569	--	--	Removed
4177	P5-T	SS	P5-T	04/01/2005	0 - 0.1	MET	Mercury	0.08	0.070	1.1	Removed
4177	P5-T	SS	P5-T	04/01/2005	0 - 0.1	MET	Nickel	43	38	1.1	Removed
4177	P5-T	SS	P5-T	04/01/2005	0 - 0.1	MET	Zinc	195	86	2.3	Removed
4177	P5-T	SS	P5-T	04/01/2005	0 - 0.1	TPH	Oil Range Hydrocarbons	3,000	2,000	1.5	Removed
4177	P5-T	SS	P5-T	04/01/2005	0 - 0.1	PHT	Bis(2-ethylhexyl) phthalate	3.8	0.067	57	Removed
4177	P5-T	SS	P5-T	04/01/2005	0 - 0.1	PAH	Chrysene	0.81 J	--	--	Removed
4177	P5-T	SS	P5-T	04/01/2005	0 - 0.1	PAH	Fluoranthene	1	0.16	6.3	Removed
4177	P5-T	SS	P5-T	04/01/2005	0 - 0.1	PAH	Total cPAHs (TEQ, NDx0.5)	1.2	0.0094	130	Removed
1651	SD20	SB	NBF-SD20-0-2	11/17/2008	0 - 2	PCB	Total PCBs	0.062	0.033	1.9	
1652	SD21	SB	NBF-SD21-0-2	11/17/2008	0 - 2	PCB	Total PCBs	0.037	0.033	1.1	
1652	SD21	SB	NBF-SD21-2-4	11/17/2008	2 - 4	PCB	Total PCBs	0.057	0.033	1.7	
1653	SD22	SB	NBF-SD22-0-2	11/17/2008	0 - 2	PCB	Total PCBs	0.048	0.033	1.5	
1654	SD24	SB	NBF-SD24-0-2	11/17/2008	0 - 2	PCB	Total PCBs	0.077	0.033	2.3	
1656	SD26	SB	NBF-SD26-2-4	11/17/2008	2 - 4	PCB	Total PCBs	0.6	0.033	18	
1657	SD27	SB	NBF-SD27-0-2	11/18/2008	0 - 2	PCB	Total PCBs	0.26	0.033	7.9	
1658	SD28	SB	NBF-SD28-0-2	11/18/2008	0 - 2	PCB	Total PCBs	0.23	0.033	7.0	
1659	SD29	SB	NBF-SD29-0-2-Dup	11/18/2008	0 - 2	PCB	Total PCBs	0.042	0.033	1.3	
1659	SD29	SB	NBF-SD29-2-4	11/18/2008	2 - 4	PCB	Total PCBs	0.044	0.033	1.3	
4139	STrans-N/W	SS	STrans-N/W	02/23/2007	0 - 0.5	PCB	Total PCBs	0.087	0.033	2.6	
4140	STrans-S/E	SS	STrans-S/E	02/23/2007	0 - 0.5	PCB	Total PCBs	0.074	0.033	2.2	
4144	W2	SB	W2B03	09/22/2006	0 - 0.25	PCB	Total PCBs	0.82	0.033	25	Removed
4144	W2	SB	W2B03	09/22/2006	0 - 0.25	MET	Arsenic	12	7.0	1.7	Removed
4144	W2	SB	W2B03	09/22/2006	0 - 0.25	MET	Lead	77	57	1.4	Removed

Table 7.1-7
RI Selected Screening Level Exceedances for Detected COPCs in Soil at North Flightline Area

User Location ID	Location Name	Location Type	Sample ID	Sample Date	Depth (ft bgs)	Chemical Class	Chemical	Concentration (mg/kg)	RISL (mg/kg)	RISL Exceedance Factor	Excavation Status
4144	W2	SB	W2B03	09/22/2006	0 - 0.25	MET	Mercury	0.16	0.070	2.3	Removed
4144	W2	SB	W2B03	09/22/2006	0 - 0.25	PAH	Benzo(a)anthracene	0.18	--	--	Removed
4144	W2	SB	W2B03	09/22/2006	0 - 0.25	PAH	Benzo(b)fluoranthene	1.1	--	--	Removed
4144	W2	SB	W2B03	09/22/2006	0 - 0.25	PAH	Benzo(k)fluoranthene	0.39	--	--	Removed
4144	W2	SB	W2B03	09/22/2006	0 - 0.25	PAH	Total Benzofluoranthenes	1.49	--	--	Removed
4144	W2	SB	W2B03	09/22/2006	0 - 0.25	PAH	Benzo(g,h,i)perylene	0.52	0.031	17	Removed
4144	W2	SB	W2B03	09/22/2006	0 - 0.25	PAH	Benzo(a)pyrene	0.96	0.0094	100	Removed
4144	W2	SB	W2B03	09/22/2006	0 - 0.25	PAH	Chrysene	0.42	--	--	Removed
4144	W2	SB	W2B03	09/22/2006	0 - 0.25	PAH	Dibenz(a,h)anthracene	0.16	--	--	Removed
4144	W2	SB	W2B03	09/22/2006	0 - 0.25	PAH	Fluoranthene	0.23	0.16	1.4	Removed
4144	W2	SB	W2B03	09/22/2006	0 - 0.25	PAH	Indeno(1,2,3-cd)pyrene	0.4	--	--	Removed
4144	W2	SB	W2B03	09/22/2006	0 - 0.25	PAH	Total cPAHs (TEQ, NDx0.5)	1.2	0.0094	130	Removed
4144	W2	SB	W2T06	11/21/2006	0 - 0.5	PAH	Benzo(a)anthracene	0.66	--	--	Removed
4144	W2	SB	W2T06-East	12/13/2006	0 - 0.5	PAH	Benzo(a)anthracene	0.016	--	--	Removed
4144	W2	SB	W2T06	11/21/2006	0 - 0.5	PAH	Benzo(b)fluoranthene	0.78	--	--	Removed
4144	W2	SB	W2T06-East	12/13/2006	0 - 0.5	PAH	Benzo(b)fluoranthene	0.028	--	--	Removed
4144	W2	SB	W2T06	11/21/2006	0 - 0.5	PAH	Benzo(k)fluoranthene	0.84	--	--	Removed
4144	W2	SB	W2T06-East	12/13/2006	0 - 0.5	PAH	Benzo(k)fluoranthene	0.022	--	--	Removed
4144	W2	SB	W2T06	11/21/2006	0 - 0.5	PAH	Total Benzofluoranthenes	1.62	--	--	Removed
4144	W2	SB	W2T06-East	12/13/2006	0 - 0.5	PAH	Total Benzofluoranthenes	0.05	--	--	Removed
4144	W2	SB	W2T06	11/21/2006	0 - 0.5	PAH	Benzo(g,h,i)perylene	0.75	0.031	24	Removed
4144	W2	SB	W2T06	11/21/2006	0 - 0.5	PAH	Benzo(a)pyrene	0.8	0.0094	85	Removed
4144	W2	SB	W2T06-East	12/13/2006	0 - 0.5	PAH	Benzo(a)pyrene	0.018	0.0094	1.9	Removed
4144	W2	SB	W2T06	11/21/2006	0 - 0.5	PAH	Chrysene	0.92	--	--	Removed
4144	W2	SB	W2T06-East	12/13/2006	0 - 0.5	PAH	Chrysene	0.025	--	--	Removed
4144	W2	SB	W2T06	11/21/2006	0 - 0.5	PAH	Dibenz(a,h)anthracene	0.17	--	--	Removed
4144	W2	SB	W2T06	11/21/2006	0 - 0.5	PAH	Fluoranthene	1.3	0.16	8.1	Removed
4144	W2	SB	W2T06	11/21/2006	0 - 0.5	PAH	Indeno(1,2,3-cd)pyrene	0.51	--	--	Removed
4144	W2	SB	W2T06-East	12/13/2006	0 - 0.5	PAH	Indeno(1,2,3-cd)pyrene	0.0072	--	--	Removed
4144	W2	SB	W2T06	11/21/2006	0 - 0.5	PAH	Total cPAHs (TEQ, NDx0.5)	1.1	0.0094	120	Removed
4144	W2	SB	W2T06-East	12/13/2006	0 - 0.5	PAH	Total cPAHs (TEQ, NDx0.5)	0.026	0.0094	2.8	Removed
4144	W2	SB	W2B12	09/22/2006	0.5 - 1	MET	Arsenic	8	7.0	1.1	Removed
4144	W2	SB	W2B12	09/22/2006	0.5 - 1	PAH	Benzo(a)anthracene	0.038	--	--	Removed
4144	W2	SB	W2B12	09/22/2006	0.5 - 1	PAH	Benzo(b)fluoranthene	0.083	--	--	Removed
4144	W2	SB	W2B12	09/22/2006	0.5 - 1	PAH	Benzo(k)fluoranthene	0.06	--	--	Removed
4144	W2	SB	W2B12	09/22/2006	0.5 - 1	PAH	Total Benzofluoranthenes	0.143	--	--	Removed
4144	W2	SB	W2B12	09/22/2006	0.5 - 1	PAH	Benzo(g,h,i)perylene	0.089	0.031	2.9	Removed
4144	W2	SB	W2B12	09/22/2006	0.5 - 1	PAH	Benzo(a)pyrene	0.094	0.0094	10	Removed
4144	W2	SB	W2B12	09/22/2006	0.5 - 1	PAH	Chrysene	0.055	--	--	Removed
4144	W2	SB	W2B12	09/22/2006	0.5 - 1	PAH	Dibenz(a,h)anthracene	0.02	--	--	Removed
4144	W2	SB	W2B12	09/22/2006	0.5 - 1	PAH	Indeno(1,2,3-cd)pyrene	0.061	--	--	Removed
4144	W2	SB	W2B12	09/22/2006	0.5 - 1	PAH	Total cPAHs (TEQ, NDx0.5)	0.12	0.0094	13	Removed
4144	W2	SB	W2B18	09/22/2006	1 - 1.5	PAH	Benzo(a)anthracene	0.014	--	--	Removed

Table 7.1-7
RI Selected Screening Level Exceedances for Detected COPCs in Soil at North Flightline Area

User Location ID	Location Name	Location Type	Sample ID	Sample Date	Depth (ft bgs)	Chemical Class	Chemical	Concentration (mg/kg)	RISL (mg/kg)	RISL Exceedance Factor	Excavation Status
4144	W2	SB	W2B18	09/22/2006	1 - 1.5	PAH	Benzo(b)fluoranthene	0.055	--	--	Removed
4144	W2	SB	W2B18	09/22/2006	1 - 1.5	PAH	Benzo(k)fluoranthene	0.028	--	--	Removed
4144	W2	SB	W2B18	09/22/2006	1 - 1.5	PAH	Total Benzofluoranthenes	0.083	--	--	Removed
4144	W2	SB	W2B18	09/22/2006	1 - 1.5	PAH	Benzo(g,h,i)perylene	0.053	0.031	1.7	Removed
4144	W2	SB	W2B18	09/22/2006	1 - 1.5	PAH	Benzo(a)pyrene	0.062	0.0094	6.6	Removed
4144	W2	SB	W2B18	09/22/2006	1 - 1.5	PAH	Chrysene	0.027	--	--	Removed
4144	W2	SB	W2B18	09/22/2006	1 - 1.5	PAH	Dibenz(a,h)anthracene	0.012	--	--	Removed
4144	W2	SB	W2B18	09/22/2006	1 - 1.5	PAH	Indeno(1,2,3-cd)pyrene	0.037	--	--	Removed
4144	W2	SB	W2B18	09/22/2006	1 - 1.5	PAH	Total cPAHs (TEQ, NDx0.5)	0.077	0.0094	8.2	Removed
4144	W2	SB	W2S18	09/20/2006	2.5 - 3	PAH	Benzo(a)anthracene	0.15	--	--	Removed
4144	W2	SB	W2T36-East	12/13/2006	2.5 - 3	PAH	Benzo(a)anthracene	0.0077	--	--	Removed
4144	W2	SB	W2S18	09/20/2006	2.5 - 3	PAH	Benzo(b)fluoranthene	0.82	--	--	Removed
4144	W2	SB	W2T36-East	12/13/2006	2.5 - 3	PAH	Benzo(b)fluoranthene	0.0096	--	--	Removed
4144	W2	SB	W2S18	09/20/2006	2.5 - 3	PAH	Benzo(k)fluoranthene	0.59	--	--	Removed
4144	W2	SB	W2T36-East	12/13/2006	2.5 - 3	PAH	Benzo(k)fluoranthene	0.0096	--	--	Removed
4144	W2	SB	W2S18	09/20/2006	2.5 - 3	PAH	Total Benzofluoranthenes	1.41	--	--	Removed
4144	W2	SB	W2T36-East	12/13/2006	2.5 - 3	PAH	Total Benzofluoranthenes	0.0192	--	--	Removed
4144	W2	SB	W2S18	09/20/2006	2.5 - 3	PAH	Benzo(g,h,i)perylene	0.52	0.031	17	Removed
4144	W2	SB	W2S18	09/20/2006	2.5 - 3	PAH	Benzo(a)pyrene	0.87	0.0094	93	Removed
4144	W2	SB	W2S18	09/20/2006	2.5 - 3	PAH	Chrysene	0.29	--	--	Removed
4144	W2	SB	W2T36-East	12/13/2006	2.5 - 3	PAH	Chrysene	0.01	--	--	Removed
4144	W2	SB	W2S18	09/20/2006	2.5 - 3	PAH	Dibenz(a,h)anthracene	0.18	--	--	Removed
4144	W2	SB	W2S18	09/20/2006	2.5 - 3	PAH	Indeno(1,2,3-cd)pyrene	0.44	--	--	Removed
4144	W2	SB	W2S18	09/20/2006	2.5 - 3	PAH	Total cPAHs (TEQ, NDx0.5)	1.1	0.0094	120	Removed
4144	W2	SB	W2T36-East	12/13/2006	2.5 - 3	PAH	Total cPAHs (TEQ, NDx0.5)	0.012	0.0094	1.3	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	PCB	Total PCBs	0.82	0.033	25	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	MET	Arsenic	16	7.0	2.3	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	MET	Cadmium	1.6	1.0	1.6	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	MET	Copper	90.4	36	2.5	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	MET	Lead	317	57	5.6	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	MET	Mercury	0.19	0.070	2.7	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	PAH	Benzo(a)anthracene	3.4	--	--	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	PAH	Benzo(b)fluoranthene	2.5	--	--	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	PAH	Benzo(k)fluoranthene	2.1	--	--	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	PAH	Total Benzofluoranthenes	4.6	--	--	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	PAH	Benzo(g,h,i)perylene	0.4	0.031	13	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	PAH	Benzo(a)pyrene	1.5	0.0094	160	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	PAH	Chrysene	5.4	--	--	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	PAH	Dibenz(a,h)anthracene	0.17	--	--	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	PAH	Fluoranthene	7.5	0.16	47	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	PAH	Indeno(1,2,3-cd)pyrene	0.42	--	--	Removed
4145	W2T18	SS	W2T18	09/20/2006	0 - 1.5	PAH	Total cPAHs (TEQ, NDx0.5)	2.4	0.0094	260	Removed

Table 7.1-7
RI Selected Screening Level Exceedances for Detected COPCs in Soil at North Flightline Area

User Location ID	Location Name	Location Type	Sample ID	Sample Date	Depth (ft bgs)	Chemical Class	Chemical	Concentration (mg/kg)	RISL (mg/kg)	RISL Exceedance Factor	Excavation Status
Building 7-27-1 Area											
3366	3-350-S1	SR	3-350-S1-091208	12/08/2009	0.2 - 1	TPH	Oil Range Hydrocarbons-HCID	5,700	2,000	2.9	Removed
3367	3-350-S2	SR	3-350-S2-091208	12/08/2009	0.2 - 1	PCB	Total PCBs	0.51	0.5	1.0	Removed
4143	W1	SB	W1B03	09/21/2006	0 - 0.25	PCB	Total PCBs	0.94	0.50	1.9	Removed
4143	W1	SB	W1B03	09/21/2006	0 - 0.25	PAH	Benzo(a)anthracene	0.061	--	--	Removed
4143	W1	SB	W1B03	09/21/2006	0 - 0.25	PAH	Benzo(b)fluoranthene	0.1	--	--	Removed
4143	W1	SB	W1B03	09/21/2006	0 - 0.25	PAH	Benzo(k)fluoranthene	0.12	--	--	Removed
4143	W1	SB	W1B03	09/21/2006	0 - 0.25	PAH	Total Benzofluoranthenes	0.22	--	--	Removed
4143	W1	SB	W1B03	09/21/2006	0 - 0.25	PAH	Benzo(g,h,i)perylene	0.11	--	--	Removed
4143	W1	SB	W1B03	09/21/2006	0 - 0.25	PAH	Chrysene	0.12	--	--	Removed
4143	W1	SB	W1B03	09/21/2006	0 - 0.25	PAH	Dibenz(a,h)anthracene	0.031	--	--	Removed
4143	W1	SB	W1B03	09/21/2006	0 - 0.25	PAH	Indeno(1,2,3-cd)pyrene	0.089	--	--	Removed
4143	W1	SB	W1B03	09/21/2006	0 - 0.25	PAH	Total cPAHs (TEQ, NDx0.5)	0.14	0.14	1.0	Removed
4143	W1	SB	W1T06-East	12/13/2006	0 - 0.5	PAH	Benzo(a)anthracene	0.018	--	--	Removed
4143	W1	SB	W1T06-West	12/13/2006	0 - 0.5	PAH	Benzo(b)fluoranthene	0.042	--	--	Removed
4143	W1	SB	W1T06-West	12/13/2006	0 - 0.5	PAH	Benzo(k)fluoranthene	0.033	--	--	Removed
4143	W1	SB	W1T06-West	12/13/2006	0 - 0.5	PAH	Total Benzofluoranthenes	0.075	--	--	Removed
4143	W1	SB	W1T06-East	12/13/2006	0 - 0.5	PAH	Benzo(g,h,i)perylene	0.015	--	--	Removed
4143	W1	SB	W1T06-West	12/13/2006	0 - 0.5	PAH	Chrysene	0.036	--	--	Removed
4143	W1	SB	W1T06-East	12/13/2006	0 - 0.5	PAH	Indeno(1,2,3-cd)pyrene	0.012	--	--	Removed
4143	W1	SB	W1B12	09/21/2006	0.5 - 1	PAH	Benzo(a)anthracene	0.004 J	--	--	Removed
4143	W1	SB	W1B12	09/21/2006	0.5 - 1	PAH	Chrysene	0.006 J	--	--	Removed
4143	W1	SB	W1S18	09/21/2006	2.5 - 3	MET	Arsenic	11	7.0	1.6	Removed
4143	W1	SB	W1S18	09/21/2006	2.5 - 3	PAH	Benzo(a)anthracene	0.011	--	--	Removed
4143	W1	SB	W1S18	09/21/2006	2.5 - 3	PAH	Benzo(b)fluoranthene	0.024	--	--	Removed
4143	W1	SB	W1S18	09/21/2006	2.5 - 3	PAH	Benzo(k)fluoranthene	0.026	--	--	Removed
4143	W1	SB	W1S18	09/21/2006	2.5 - 3	PAH	Total Benzofluoranthenes	0.05	--	--	Removed
4143	W1	SB	W1S18	09/21/2006	2.5 - 3	PAH	Benzo(g,h,i)perylene	0.0093	--	--	Removed
4143	W1	SB	W1S18	09/21/2006	2.5 - 3	PAH	Chrysene	0.043	--	--	Removed
4143	W1	SB	W1S18	09/21/2006	2.5 - 3	PAH	Indeno(1,2,3-cd)pyrene	0.008	--	--	Removed
Building 3-380 Area											
517	B-3	SB	B-3	03/13/1990	2 - 6	PAH	Benzo(a)pyrene	0.77	0.0094	82	
517	B-3	SB	B-3	03/13/1990	2 - 6	PAH	Total cPAHs (TEQ, NDx0.5)	0.85	0.0094	91	
493	GT-2	MW	GT-2	03/16/1989	7.5	MET	Beryllium	1.3	--	--	
495	GT-4	MW	GT-4	03/17/1989	7.5	MET	Beryllium	1.4	--	--	
Building 3-374 Area											
No detected exceedances											
Building 3-390 Area											
No detected exceedances											
Concourse A Area											
1980	A5	TW	A5 @ 6.0	07/25/1996	6 - 7	TPH	Gasoline Range Hydrocarbons-HCID	8,500	30	280	
1980	A5	TW	A5 @ 6.0	07/25/1996	6 - 7	TPH	Diesel Range Hydrocarbons-HCID	3,900	2,000	2.0	

Table 7.1-7
RI Selected Screening Level Exceedances for Detected COPCs in Soil at North Flightline Area

User Location ID	Location Name	Location Type	Sample ID	Sample Date	Depth (ft bgs)	Chemical Class	Chemical	Concentration (mg/kg)	RISL (mg/kg)	RISL Exceedance Factor	Excavation Status
1980	A5	TW	A5 @ 6.0	07/25/1996	6 - 7	PHT	Bis(2-ethylhexyl) phthalate	0.89	0.067	13	
1980	A5	TW	A5 @ 6.0	07/25/1996	6 - 7	PAH	2-Methylnaphthalene	8.9	0.043	210	
1980	A5	TW	A5 @ 6.0	07/25/1996	6 - 7	VAH	Benzene	0.11574	0.0010	120	
1981	A6	TW	A6 @ 6.0	07/25/1996	6 - 7.5	PHT	Bis(2-ethylhexyl) phthalate	0.1	0.067	1.5	

EX = Excavation
J = Estimated value
MET = Metals
MW = Monitoring well
PAH = Polycyclic aromatic hydrocarbons
PCB = Polychlorinated biphenyls
PHT = Phthalates
SB = Soil boring
SR = Soil regrading
SS = Surface soil
TPH = Petroleum Hydrocarbons
TW = Temporary well
VAH = Volatile aromatic hydrocarbons
VOC = Volatile organic compounds
-- = Not applicable

Data Set B-3. Soil Data (NBF/GTSP RI Database Excerpt)

Proposed Park Site NBF/GTSP Remedial Investigation Database Excerpt: Select 2008 Soil Data

Location ID	Sample ID	Date	Depth (ft)	Analyte	Result	Unit	Qualifier
SD08-08	SD08-08-2-4	09/17/08	2-4	Total PCBs	0.033	mg/kg	U
SD08-09	SD08-09-1-3	09/18/08	1-3	Total PCBs	0.033	mg/kg	U

Notes
NBF/GTSP = North Boeing Field / Georgetown Steam Plant
U = non-detected result; value is set to the reporting limit

Data Set B-4. Concrete and Soil Data (Herrera 2010 Excerpt)

Table 4. Concrete analytical results, Georgetown Flume removal.

Location	Total PCBs
MTCA Method A Soil Cleanup Level [(a)]	*1.0*
A/BC1	0.096
A/BC2	0.050 U
LC-1	0.050 U
LC-2	0.050 U
CC1	0.050 U
DC1	0.10 U
DC2	0.27
DC3	0.18
DC4	0.26
FC1	0.10 U
FC2	0.10 U
FC3	0.10 U
FC4	0.10 U
FC5	0.10 U
EC1	0.15
EC2	0.51
EC3	0.20
EC4	0.10 U
EC5	0.10 U

Notes: Values reported in milligrams per kilogram (mg/kg).
PCBs – Polychlorinated biphenyls
[a] Method A soil cleanup level for unrestricted land use (Ecology 2007).

Table 5. Soil analytical results, Georgetown Flume removal.

Sample Location	Petroleum Hydrocarbons: Diesel		Petroleum Hydrocarbons: Lube Oil		Total Carcinogenic Polycyclic Aromatic Hydrocarbons (TEQ) [a]	Total Polychlorinated Biphenyls[b]	
MTCA Method A Soil Cleanup Level	*2,000*		*2,000*		*2.0*	*1.0*	
CS1	NA		NA		**0.0075**	0.067	U
CS2A	NA		NA		0.0064	0.064	U
CS3A	NA		NA		0.0064	0.064	U
CS4A	NA		NA		0.0066	0.066	U
CS5A	NA		NA		0.0066	0.065	U
CS6A	NA		NA		0.0067	0.067	U
CS7A	NA		NA		**0.13**	0.066	U
CS8A	NA		NA		0.0066	0.066	U
CS9A	NA		NA		**0.097**	**0.13**	
CS10A	NA		NA		**0.039**	0.050	U
CS11A	NA		NA		0.0064	0.064	U
CS12A	NA		NA		**0.034**	0.063	U
CS13A	NA		NA		0.0066	0.066	U
CS14A	NA		NA		0.0063	0.063	U
CS15A	NA		NA		0.0062	0.062	U
CS16A	NA		NA		0.0063	0.063	U
CS17A	NA		NA		0.0060	0.060	U
CS18A	NA		NA		0.0066	0.066	U
DS1	NA		NA		0.0062	0.061	U
ES1	NA		NA		**0.073**	0.063	U
FS1	27	U	54	U	0.0054	0.050	U
FS2	**8,000**		**14,000**		**0.39**	**0.10**	
FS3	33	U	66	U	0.0066	0.066	U
FS4	58	U	**650**		**0.16**	0.058	U
FS5	28	U	56	U	0.0056	0.056	U

Values reported in milligrams per kilogram (mg/kg).

Bold values indicate concentrations detected above the reporting limit.

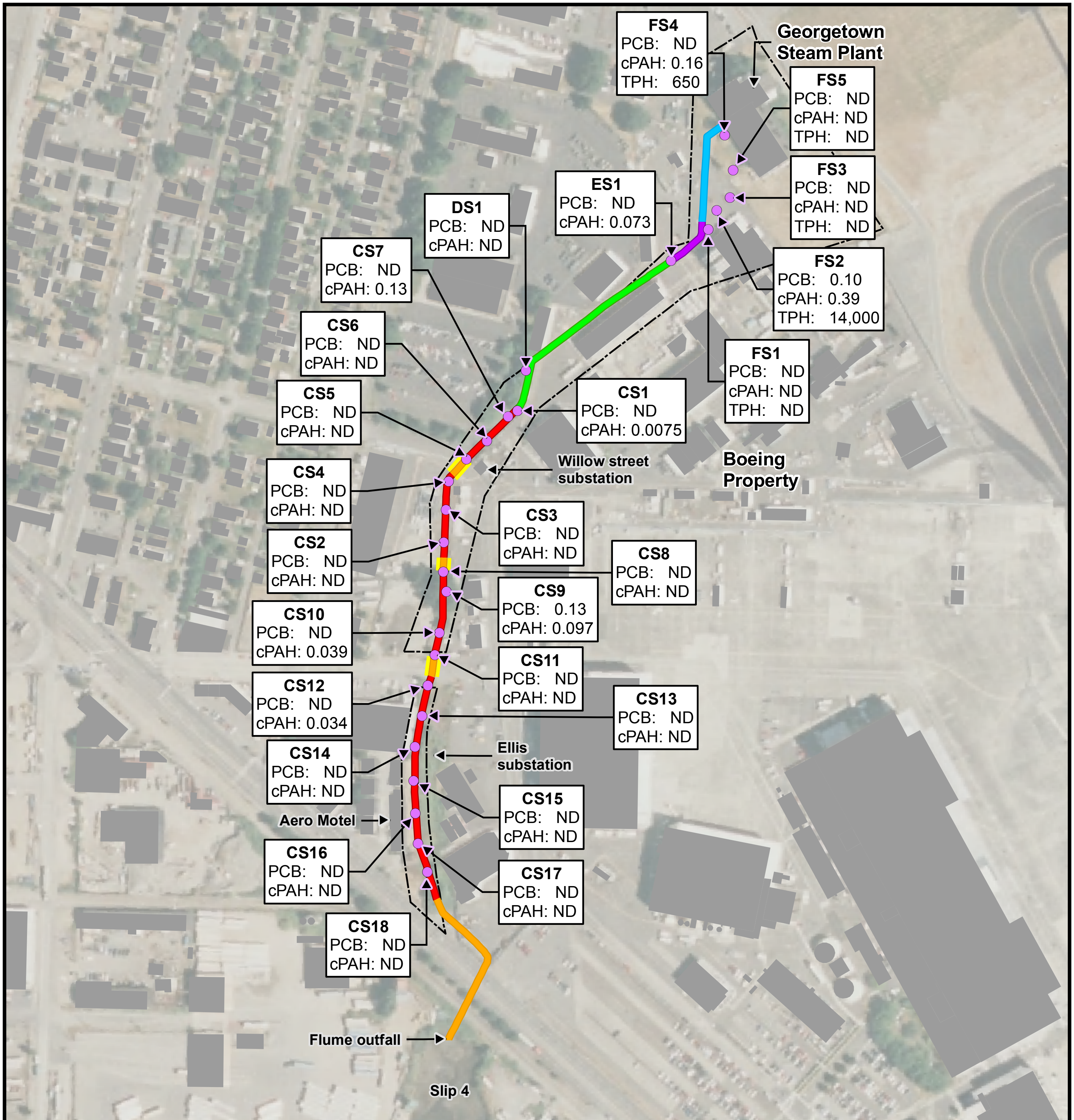
Shaded values indicate concentrations that exceed the established cleanup levels.

[a] Washington State Model Toxics Control Act (MTCA) method A industrial land use.

[b] Washington State Model Toxics Control Act (MTCA) method A unrestricted land use.

NA Not analyzed.

TEQ Toxic equivalents for all carcinogenic polycyclic aromatic hydrocarbons (see WAC 173-340-708(8)).



Legend

- Discharge tunnel
- Concrete-lined open channel
- Corrugated metal pipe
- Twin 42-inch concrete pipes
- Wood-lined open channel
- Culvert
- Seattle City Light property boundary

- Sample location
- PCB Polychlorinated biphenyls
- cPAH Carcinogenic polycyclic aromatic hydrocarbons as toxic equivalence (TEQ)
- TPH Total petroleum hydrocarbons (lube oil)

Note: Sample concentrations in milligrams per kilograms (mg/kg) dry weight.

Figure 4. Confirmation sample location map, Georgetown flume, Seattle, Washington.

N

0 150 300 600 Feet

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Data Set B-5. Groundwater Data (SEACOR 1992 Excerpt)

Samples collected November 20, 1991. MW-3 is now known as NGW253. Table 3 is attached (next page).

TABLE 8
GROUNDWATER SAMPLING ANALYTICAL RESULTS
SITE 1
BUILDINGS 7-027-1/2/3

	Sample Identification					MTCA Method A
Compound[1]	027-MW-1	027-MW-2	027-MW-3	027-MW-4	Trip Blank	Groundwater Cleanup Level[2]
TPH (mg/L)[3]	(1)[4]	**1.7**[5]	**2.0**	**1.7**	NA[6]	1.0
PCBs (μg/L)[3]	NA	NA	(1.0)	NA	NA	0.1
VOCs (μg/L)						
Benzene	NA	4	(1)	NA	(1)	5.0
Ethyl Benzene	NA	**100**	(1)	NA	(1)	30.0
Methylene Chloride	NA	3 J,B[7]	(5)	NA	11 B	5.0
Toluene	NA	2	(1)	NA	(1)	40.0
Trichloroethane	NA	(1)	**24**	NA	(1)	5.0
Total Xylenes	NA	**380**	(1)	NA	(1)	20
Metals (mg/L)						
Copper	NA	0.0098	NA	0.0094	NA	---[8]
Lead	NA	0.046	NA	(0.0030)	NA	0.005
Zinc	NA	0.016	NA	(0.010)	NA	---

NOTES:

1 Only those VOCs and metals detected are listed. For a complete list of analyzed compounds see Table 3. TPH = total petroleum hydrocarbons; PCBs = polychlorinated biphenyls; VOCs = volatile organic compounds; metals = priority pollutant metals.
2 MTCA Method A Groundwater Cleanup Level from the Model Toxics Control Act Cleanup Regulation [WAC 173-340-720(2)(a)(i)].
3 mg/L = milligrams per liter; μg/L = micrograms per liter.
4 ( ) indicates constituent not detected above the enclosed method detection level.
5 Results shown in bold exceed MTCA Cleanup Level.
6 NA = not analyzed.
7 J indicates laboratory estimated value. B indicates analyte was detected in the associated blank as well as the sample.
8 --- indicates no MTCA Method A Cleanup Level published.

TABLE 3
ANALYTICAL METHODS AND COMPOUNDS

TOTAL PETROLEUM HYDROCARBONS, EPA 418.1

VOLATILE ORGANIC COMPOUNDS, EPA 8240 (GS/MS)

Acetone	1,2-Dichloropropane
Benzene	Cis-1,3-Dichloropropene
Bromodichloromethane	Trans-1,3-Dichloropropene
Bromoform	Ethyl Benzene
Bromomethane	2-Hexanone (MBK)
2-Butanone (MEK)	4-Methyl-2-Pentanone (MIBK)
Carbon Disulfide	Methylene Chloride
Carbon Tetrachloride	Styrene
Chlorobenzene	1,1,2,2-Tetrachloroethane
Chloroethane	Tetrachloroethene
Chloroform	Toluene
Chloromethane	1,1,1-Trichloroethane
Dibromochloromethane	1,1,2-Trichloroethane
1,1-Dichloroethane	Trichloroethane
1,2-Dichloroethane	Vinyl Acetate
1,1-Dichloroethene	Vinyl Chloride
1,2-Dichloroethene (Total)	Xylenes (Total)

POLYCHLORINATED BIPHENYLS, EPA 8080

PCB 1016	PCB 1248
PCB 1221	PCB 1254
PCB 1232	PCB 1260
PCB 1242	

PRIORITY POLLUTANT METALS

Antimony	(EPA 6010)	Lead	(EPA 7421)
Arsenic	(EPA 7060)	Mercury	(EPA 7471)
Beryllium	(EPA 6010)	Nickel	(EPA 6010)
Cadmium	(EPA 6010)	Selenium	(EPA 7740)
Chromium	(EPA 6010)	Silver	(EPA 6010)
Copper	(EPA 6010)	Thallium	(EPA 7841)
		Zinc	(EPA 6010)

TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) METALS, EPA 6010

Arsenic	Lead
Barium	Mercury
Cadmium	Selenium
Chromium	Silver

Data Set B-6. Groundwater Data (SEACOR 1993 Excerpt)

Samples collected February 3, 1993. MW-3 is now known as NGW253.

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TABLE 2
GROUNDWATER SAMPLE ANALYTICAL RESULTS
SUPPLEMENTAL SITE INVESTIGATION
BUILDING GROUP 7-027-1/2/3
NORTH BOEING FIELD
SEATTLE, WASHINGTON

Compound[1]	MW-1	MW-2	MW-2D (Duplicate of MW-2)	MW-3	MW-4	MTCA Cleanup Level[2]
	Sample Designation					
TPH (mg/l)[3]						
As gasoline	ND <0.25[4]	**1.5**[5]	**1.6**	ND <0.25	ND <0.25	1.0
As diesel	ND <0.25	ND <0.25	ND <0.25	ND <0.25	ND <0.25	1.0
BTEX (µg/l)[3]						
Benzene	ND <1.0	1.4	1.5	NA[6]	NA	5.0
Toluene	ND <1.0	ND <1.0	ND <1.0	NA	NA	40.0
Ethyl Benzene	ND <1.0	**34**	**38**	NA	NA	30.0
Xylenes	ND <2.0	**91**	**96**	NA	NA	20.0
VOCs (µg/l)						
Vinyl Chloride	NA	NA	NA	**1.2**	**0.7**	0.2
Acetone	NA	NA	NA	ND <5.0	5.2 B[7]	800*
Cis-1,2,Dichloroethene	NA	NA	NA	1.8	ND <1.0	80*
Trichloroethene	NA	NA	NA	**22**	ND <1.0	5.0

NOTES:

1 TPH = Total Petroleum Hydrocarbons; as gasoline (hydrocarbon range C_6 to C_{12}) by Washington State Department of Ecology (Ecology) Method WTPH-G; as diesel (hydrocarbon range C_{12} to C_{24}) by Ecology Method WTPH-D. BTEX by EPA Method 8020. VOCs = Volatile Organic Compounds by EPA Method 8240. Only those VOCs detected are shown.
2 MTCA Cleanup Level = Method A groundwater cleanup level from WAC 173-340-720(2)(a)(i), except those marked with * which are Method B cleanup levels from a Department of Ecology memorandum, dated March 23, 1992, entitled "Development of MTCA Cleanup Level."
3 mg/l = milligrams per liter, µg/l = micrograms per liter.
4 ND <0.25 indicates constituent not detected above the method detection level shown.
5 Results shown in **Bold** exceed MTCA cleanup level.
6 NA = Not Analyzed.
7 B = Analyte was detected in the associated blank as well as the sample indicating possible/probable laboratory contamination.

BN6005.LTR/6

Data Set B-7. Groundwater Data (SAIC 2009 Excerpt)

Table E-2
North Boeing Field - Central Area
Chemicals Detected in Groundwater Plus Non-Detections Above MTCA Cleanup Levels or Groundwater-to-Sediment Screening Levels

Well Name	Sample Date	Analyte	Conc'n (ug/L)	MTCA Cleanup Level (ug/L)	A, B, C	MTCA Cleanup Level Exceedence	MTCA Cleanup Level Exceedence Factor	GW-to-Sediment Screening Level (ug/L)	GW-to-Sediment Screening Level Exceedence	GW-to-Sediment Screening Level Exceedence Factor	Source
NGW252/MW-2	11/20/1991	Trichloroethene	1 U	0.49	B, Carc	RLE	2.0	NA	NA	NA	SEACOR 2/14/92*
NGW252/MW-2	11/20/1991	Vinyl Chloride	1 U	0.029	B, Carc	RLE	34	NA	NA	NA	SEACOR 2/14/92*
NGW252/MW-2	11/20/1991	Xylenes, total	380	1000	A	No	<1	NA	NA	NA	SEACOR 2/14/92*
NGW252/MW-2	11/20/1991	Zinc	16	4800	B, NC	No	<1	76	No	<1	SEACOR 2/14/92*
NGW252/MW-2	2/3/1993	Benzene	1.4	0.8	B, Carc	Yes	1.8	NA	NA	NA	SECOR 6/15/93*
NGW252/MW-2	2/3/1993	Benzene	1.5	0.8	B, Carc	Yes	1.9	NA	NA	NA	SECOR 6/15/93*
NGW252/MW-2	2/3/1993	Ethylbenzene	34	700	A	No	<1	NA	NA	NA	SECOR 6/15/93*
NGW252/MW-2	2/3/1993	Ethylbenzene	38	700	A	No	<1	NA	NA	NA	SECOR 6/15/93*
NGW252/MW-2	2/3/1993	Gasoline Range Hydrocarbons	1500	800	A	Yes	1.9	NA	NA	NA	SECOR 6/15/93*
NGW252/MW-2	2/3/1993	Gasoline Range Hydrocarbons	1600	800	A	Yes	2.0	NA	NA	NA	SECOR 6/15/93*
NGW252/MW-2	2/3/1993	Xylenes, total	91	1000	A	No	<1	NA	NA	NA	SECOR 6/15/93*
NGW252/MW-2	2/3/1993	Xylenes, total	96	1000	A	No	<1	NA	NA	NA	SECOR 6/15/93*
NGW252/MW-2	1/16/2002	1,1,2,2-Tetrachloroethane	1 U	0.22	B, Carc	RLE	4.5	NA	NA	NA	Not Recorded*
NGW252/MW-2	1/16/2002	1,1,2-Trichloroethane	1 U	0.77	B, Carc	RLE	1.3	NA	NA	NA	Not Recorded*
NGW252/MW-2	1/16/2002	1,2,3-Trichloropropane	3 U	0.0063	B, Carc	RLE	476	NA	NA	NA	Not Recorded*
NGW252/MW-2	1/16/2002	1,2,4-Trichlorobenzene	5 U	80	B, NC	No	<1	2.5	RLE	2.0	Not Recorded*
NGW252/MW-2	1/16/2002	1,2-Dibromo-3-chloropropane	5 U	0.031	B, Carc	RLE	161	NA	NA	NA	Not Recorded*
NGW252/MW-2	1/16/2002	1,2-Dichloroethane	1 U	0.48	B, Carc	RLE	2.1	NA	NA	NA	Not Recorded*
NGW252/MW-2	1/16/2002	1,2-Dichloropropane	1 U	0.64	B, Carc	RLE	1.6	NA	NA	NA	Not Recorded*
NGW252/MW-2	1/16/2002	Acrylonitrile	1 U	0.081	B, Carc	RLE	12	NA	NA	NA	Not Recorded*
NGW252/MW-2	1/16/2002	Benzene	1 U	0.8	B, Carc	RLE	1.3	NA	NA	NA	Not Recorded*
NGW252/MW-2	1/16/2002	Bromodichloromethane	1 U	0.71	B, Carc	RLE	1.4	NA	NA	NA	Not Recorded*
NGW252/MW-2	1/16/2002	Carbon Tetrachloride	1 U	0.34	B, Carc	RLE	2.9	NA	NA	NA	Not Recorded*
NGW252/MW-2	1/16/2002	Dibromochloromethane	1 U	0.52	B, Carc	RLE	1.9	NA	NA	NA	Not Recorded*
NGW252/MW-2	1/16/2002	Ethylene Dibromide	1 U	0.00051	B, Carc	RLE	1961	NA	NA	NA	Not Recorded*
NGW252/MW-2	1/16/2002	Hexachlorobutadiene	5 U	0.56	B, Carc	RLE	8.9	6.2	No	<1	Not Recorded*
NGW252/MW-2	1/16/2002	Tetrachloroethene	1 U	0.081	B, Carc	RLE	12	NA	NA	NA	Not Recorded*
NGW252/MW-2	1/16/2002	Trichloroethene	1 U	0.49	B, Carc	RLE	2.0	NA	NA	NA	Not Recorded*
NGW252/MW-2	1/16/2002	Vinyl Chloride	1 U	0.029	B, Carc	RLE	34	NA	NA	NA	Not Recorded*
NGW253/MW-3	11/20/1991	1,1,2,2-Tetrachloroethane	1 U	0.22	B, Carc	RLE	4.5	NA	NA	NA	SEACOR 2/14/92*
NGW253/MW-3	11/20/1991	1,1,2-Trichloroethane	1 U	0.77	B, Carc	RLE	1.3	NA	NA	NA	SEACOR 2/14/92*
NGW253/MW-3	11/20/1991	1,2-Dichloroethane	1 U	0.48	B, Carc	RLE	2.1	NA	NA	NA	SEACOR 2/14/92*
NGW253/MW-3	11/20/1991	1,2-Dichloropropane	1 U	0.64	B, Carc	RLE	1.6	NA	NA	NA	SEACOR 2/14/92*
NGW253/MW-3	11/20/1991	Aroclor 1254	1 U	0.32	B, NC	RLE	3.1	0.86	RLE	1.2	SEACOR 2/14/92*
NGW253/MW-3	11/20/1991	Aroclor 1260	1 U	NA	NA	NA	NA	0.31	RLE	3.2	SEACOR 2/14/92*
NGW253/MW-3	11/20/1991	Benzene	1 U	0.8	B, Carc	RLE	1.3	NA	NA	NA	SEACOR 2/14/92*
NGW253/MW-3	11/20/1991	Bromodichloromethane	1 U	0.71	B, Carc	RLE	1.4	NA	NA	NA	SEACOR 2/14/92*
NGW253/MW-3	11/20/1991	Carbon Tetrachloride	1 U	0.34	B, Carc	RLE	2.9	NA	NA	NA	SEACOR 2/14/92*
NGW253/MW-3	11/20/1991	Chloromethane	10 U	3.4	B, Carc	RLE	2.9	NA	NA	NA	SEACOR 2/14/92*
NGW253/MW-3	11/20/1991	Dibromochloromethane	1 U	0.52	B, Carc	RLE	1.9	NA	NA	NA	SEACOR 2/14/92*
NGW253/MW-3	11/20/1991	Tetrachloroethene	1 U	0.081	B, Carc	RLE	12	NA	NA	NA	SEACOR 2/14/92*
NGW253/MW-3	11/20/1991	Total Petroleum Hydrocarbons	2000	500	A	Yes	4.0	NA	NA	NA	SEACOR 2/14/92*
NGW253/MW-3	11/20/1991	Trichloroethene	24	0.49	B, Carc	Yes	49	NA	NA	NA	SEACOR 2/14/92*
NGW253/MW-3	11/20/1991	Vinyl Chloride	1 U	0.029	B, Carc	RLE	34	NA	NA	NA	SEACOR 2/14/92*
NGW253/MW-3	2/3/1993	1,1,2,2-Tetrachloroethane	1 U	0.22	B, Carc	RLE	4.5	NA	NA	NA	SECOR 6/15/93*
NGW253/MW-3	2/3/1993	1,1,2-Trichloroethane	1 U	0.77	B, Carc	RLE	1.3	NA	NA	NA	SECOR 6/15/93*
NGW253/MW-3	2/3/1993	1,2-Dichloroethane	1 U	0.48	B, Carc	RLE	2.1	NA	NA	NA	SECOR 6/15/93*

Table E-2
North Boeing Field - Central Area
Chemicals Detected in Groundwater Plus Non-Detections Above MTCA Cleanup Levels or Groundwater-to-Sediment Screening Levels

Well Name	Sample Date	Analyte	Conc'n (ug/L)	MTCA Cleanup Level (ug/L)	A, B, C	MTCA Cleanup Level Exceedence	MTCA Cleanup Level Exceedence Factor	GW-to-Sediment Screening Level (ug/L)	GW-to-Sediment Screening Level Exceedence	GW-to-Sediment Screening Level Exceedence Factor	Source
NGW253/MW-3	2/3/1993	1,2-Dichloropropane	1 U	0.64	B, Carc	RLE	1.6	NA	NA	NA	SECOR 6/15/93*
NGW253/MW-3	2/3/1993	Benzene	1 U	0.8	B, Carc	RLE	1.3	NA	NA	NA	SECOR 6/15/93*
NGW253/MW-3	2/3/1993	Bromodichloromethane	1 U	0.71	B, Carc	RLE	1.4	NA	NA	NA	SECOR 6/15/93*
NGW253/MW-3	2/3/1993	Carbon Tetrachloride	1 U	0.34	B, Carc	RLE	2.9	NA	NA	NA	SECOR 6/15/93*
NGW253/MW-3	2/3/1993	cis-1,2-Dichloroethene	1.8	80	B, NC	No	<1	NA	NA	NA	SECOR 6/15/93*
NGW253/MW-3	2/3/1993	Dibromochloromethane	1 U	0.52	B, Carc	RLE	1.9	NA	NA	NA	SECOR 6/15/93*
NGW253/MW-3	2/3/1993	Tetrachloroethene	1 U	0.081	B, Carc	RLE	12	NA	NA	NA	SECOR 6/15/93*
NGW253/MW-3	2/3/1993	Trichloroethene	22	0.49	B, Carc	Yes	44.9	NA	NA	NA	SECOR 6/15/93*
NGW253/MW-3	2/3/1993	Vinyl Chloride	1.1 M	0.029	B, Carc	Yes	38	NA	NA	NA	SECOR 6/15/93*
NGW253/MW-3	1/16/2002	1,1,2,2-Tetrachloroethane	1 U	0.22	B, Carc	RLE	4.5	NA	NA	NA	Not Recorded*
NGW253/MW-3	1/16/2002	1,1,2-Trichloroethane	1 U	0.77	B, Carc	RLE	1.3	NA	NA	NA	Not Recorded*
NGW253/MW-3	1/16/2002	1,2,3-Trichloropropane	3 U	0.0063	B, Carc	RLE	476	NA	NA	NA	Not Recorded*
NGW253/MW-3	1/16/2002	1,2,4-Trichlorobenzene	5 U	80	B, NC	No	<1	2.5	RLE	2.0	Not Recorded*
NGW253/MW-3	1/16/2002	1,2-Dibromo-3-chloropropane	5 U	0.031	B, Carc	RLE	161	NA	NA	NA	Not Recorded*
NGW253/MW-3	1/16/2002	1,2-Dichloroethane	1 U	0.48	B, Carc	RLE	2.1	NA	NA	NA	Not Recorded*
NGW253/MW-3	1/16/2002	1,2-Dichloropropane	1 U	0.64	B, Carc	RLE	1.6	NA	NA	NA	Not Recorded*
NGW253/MW-3	1/16/2002	Acrylonitrile	1 U	0.081	B, Carc	RLE	12	NA	NA	NA	Not Recorded*
NGW253/MW-3	1/16/2002	Benzene	1 U	0.8	B, Carc	RLE	1.3	NA	NA	NA	Not Recorded*
NGW253/MW-3	1/16/2002	Bromodichloromethane	1 U	0.71	B, Carc	RLE	1.4	NA	NA	NA	Not Recorded*
NGW253/MW-3	1/16/2002	Carbon Tetrachloride	1 U	0.34	B, Carc	RLE	2.9	NA	NA	NA	Not Recorded*
NGW253/MW-3	1/16/2002	Dibromochloromethane	1 U	0.52	B, Carc	RLE	1.9	NA	NA	NA	Not Recorded*
NGW253/MW-3	1/16/2002	Ethylene Dibromide	1 U	0.00051	B, Carc	RLE	1961	NA	NA	NA	Not Recorded*
NGW253/MW-3	1/16/2002	Hexachlorobutadiene	5 U	0.56	B, Carc	RLE	8.9	6.2	No	<1	Not Recorded*
NGW253/MW-3	1/16/2002	Tetrachloroethene	1 U	0.081	B, Carc	RLE	12	NA	NA	NA	Not Recorded*
NGW253/MW-3	1/16/2002	Trichloroethene	8	0.49	B, Carc	Yes	16	NA	NA	NA	Not Recorded*
NGW253/MW-3	1/16/2002	Vinyl Chloride	1 U	0.029	B, Carc	RLE	34	NA	NA	NA	Not Recorded*
NGW254/MW-4	11/20/1991	Antimony	50 U	6.4	B, NC	RLE	7.8	370	No	<1	SEACOR 2/14/92*
NGW254/MW-4	11/20/1991	Arsenic	5 U	0.058	B, Carc	RLE	86	370	No	<1	SEACOR 2/14/92*
NGW254/MW-4	11/20/1991	Copper	9.4	590	B, NC	No	<1	120	No	<1	SEACOR 2/14/92*
NGW254/MW-4	11/20/1991	Mercury	0.4 U	2	A	No	<1	0.0074	RLE	54	SEACOR 2/14/92*
NGW254/MW-4	11/20/1991	Silver	5 U	80	B, NC	No	<1	1.5	RLE	3.3	SEACOR 2/14/92*
NGW254/MW-4	11/20/1991	Total Petroleum Hydrocarbons	1700	500	A	Yes	3.4	NA	NA	NA	SEACOR 2/14/92*
NGW254/MW-4	2/3/1993	1,1,2,2-Tetrachloroethane	1 U	0.22	B, Carc	RLE	4.5	NA	NA	NA	SECOR 6/15/93*
NGW254/MW-4	2/3/1993	1,1,2-Trichloroethane	1 U	0.77	B, Carc	RLE	1.3	NA	NA	NA	SECOR 6/15/93*
NGW254/MW-4	2/3/1993	1,2-Dichloroethane	1 U	0.48	B, Carc	RLE	2.1	NA	NA	NA	SECOR 6/15/93*
NGW254/MW-4	2/3/1993	1,2-Dichloropropane	1 U	0.64	B, Carc	RLE	1.6	NA	NA	NA	SECOR 6/15/93*
NGW254/MW-4	2/3/1993	Acetone	5.2 B	800	B, NC	No	<1	NA	NA	NA	SECOR 6/15/93*
NGW254/MW-4	2/3/1993	Benzene	1 U	0.8	B, Carc	RLE	1.3	NA	NA	NA	SECOR 6/15/93*
NGW254/MW-4	2/3/1993	Bromodichloromethane	1 U	0.71	B, Carc	RLE	1.4	NA	NA	NA	SECOR 6/15/93*
NGW254/MW-4	2/3/1993	Carbon Tetrachloride	1 U	0.34	B, Carc	RLE	2.9	NA	NA	NA	SECOR 6/15/93*
NGW254/MW-4	2/3/1993	Dibromochloromethane	1 U	0.52	B, Carc	RLE	1.9	NA	NA	NA	SECOR 6/15/93*
NGW254/MW-4	2/3/1993	Tetrachloroethene	1 U	0.081	B, Carc	RLE	12	NA	NA	NA	SECOR 6/15/93*
NGW254/MW-4	2/3/1993	Trichloroethene	1 U	0.49	B, Carc	RLE	2.0	NA	NA	NA	SECOR 6/15/93*
NGW254/MW-4	2/3/1993	Vinyl Chloride	2 U	0.029	B, Carc	RLE	69	NA	NA	NA	SECOR 6/15/93*
NGW254/MW-4	1/16/2002	1,1,2,2-Tetrachloroethane	1 U	0.22	B, Carc	RLE	4.5	NA	NA	NA	Not Recorded*
NGW254/MW-4	1/16/2002	1,1,2-Trichloroethane	1 U	0.77	B, Carc	RLE	1.3	NA	NA	NA	Not Recorded*
NGW254/MW-4	1/16/2002	1,2,3-Trichloropropane	3 U	0.0063	B, Carc	RLE	476	NA	NA	NA	Not Recorded*

Data Set B-8. Groundwater Data (Goldberg 2007 Excerpt)

IC#488

Greg Cocks

From: Jennie Goldberg [Jennie.Goldberg@Seattle.Gov]
Sent: Monday, July 16, 2007 4:27 PM
To: Greg Cocks
Cc: Betsy Day
Subject: Fwd: FW: LF26-Georgetown Flume

Attachments: LF26voas.pdf; LF26coc.pdf; LF26metals.pdf; LF26pcbs.pdf; LF26svoas.pdf; LF26hcid.pdf

LF26voas.pdf (481 KB) LF26coc.pdf (86 KB) LF26metals.pdf (186 KB) LF26pcbs.pdf (217 KB) LF26svoas.pdf (606 KB) LF26hcid.pdf (55 KB)

Greg - go ahead and contact Gina at Herrera for the coordinates for the well.

>>> Wanda Schulze 7/11/2007 4:48 PM >>>
FYI - these results are from a groundwater sample collected from the piezometer SPU installed along the flume near Myrtle St. the purpose of this testing was to help us design our construction dewatering system. Feel free to forward to Integral for entry into their mega database. herrera or SPU can probably provide GPS coordinates for the well.

>>> "Gina Catarra" <gcatarra@herrerainc.com> 7/10/2007 1:29 PM >>>
Results for Georgetown Flume ground water monitoring well. No detects above reporting limitswith the exception of copper (0.004 mg/L).

Gina Catarra
Herrera Environmental Consultants
ph. 206.441.9080

-----Original Message-----
From: Mark Harris [mailto:markh@arilabs.com]
Sent: Thursday, July 05, 2007 2:04 PM
To: Gina Catarra
Subject: LF26-Georgetown Flume

Finals for the rush samples submitted 6/28/07.

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: LF26
Turn-around Requested: 1 week
Page: 1 of 1
ARI Client Company: Herrera Env.
Phone: 206 441 9080
Date: 6/28/07
Ice Present? Y
Client Contact: Gina Catarra
No. of Coolers: 1
Cooler Temps: 10.7
Client Project Name: Georgetown Flume
Client Project #: 06-03385-000
Samplers: GC/GI

Sample ID	Date	Time	Matrix	No. Containers	PCBs by 8082 (100 ppb RL)	SVOCs 8270C	VOCs 8260B	NWTPH-HCID	Total metals*				Notes/Comments
MW-B4 062807	6/28/07	1130	W	10	X	X	X	X	X				* As, Cd, Cr, Cu, Pb, Ni, Ag, Zn, Hg* * if enough vol.
MW-B4D 062807	↓	1130	↓	10	X	X	X	X	X				

Comments/Special Instructions:
Bill to:
Wanda Schulze
Seattle City Light

Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
Printed Name: Gina Catarra	Printed Name: Brian Kegel	Printed Name:	Printed Name:
Company: Herrera	Company: ARI	Company:	Company:
Date & Time: 6/28/07 12:40	Date & Time: 6/28/7 1240	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: MW-B4 062807
SAMPLE

Lab Sample ID: LF26A
LIMS ID: 07-13221
Matrix: Water
Data Release Authorized: VTS
Reported: 07/05/07

QC Report No: LF26-Herrera Environmental Consultant
Project: Georgetown Flume
06-03385-000
Date Sampled: 06/28/07
Date Received: 06/28/07

Date Extracted: 06/28/07
Date Analyzed: 07/03/07 15:21
Instrument/Analyst: NT6/LJR

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
111-44-4	Bis-(2-Chloroethyl) Ether	1.0	< 1.0 U
95-57-8	2-Chlorophenol	1.0	< 1.0 U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	5.0	< 5.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1.0	< 1.0 U
106-44-5	4-Methylphenol	1.0	< 1.0 U
621-64-7	N-Nitroso-Di-N-Propylamine	5.0	< 5.0 U
67-72-1	Hexachloroethane	1.0	< 1.0 U
98-95-3	Nitrobenzene	1.0	< 1.0 U
78-59-1	Isophorone	1.0	< 1.0 U
88-75-5	2-Nitrophenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	1.0	< 1.0 U
65-85-0	Benzoic Acid	10	< 10 U
111-91-1	bis(2-Chloroethoxy) Methane	1.0	< 1.0 U
120-83-2	2,4-Dichlorophenol	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
106-47-8	4-Chloroaniline	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	1.0	< 1.0 U
59-50-7	4-Chloro-3-methylphenol	5.0	< 5.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
77-47-4	Hexachlorocyclopentadiene	5.0	< 5.0 U
88-06-2	2,4,6-Trichlorophenol	5.0	< 5.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
91-58-7	2-Chloronaphthalene	1.0	< 1.0 U
88-74-4	2-Nitroaniline	5.0	< 5.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
99-09-2	3-Nitroaniline	5.0	< 5.0 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: MW-B4 062807
SAMPLE

Lab Sample ID: LF26A
LIMS ID: 07-13221
Matrix: Water
Date Analyzed: 07/03/07 15:21

QC Report No: LF26-Herrera Environmental Consultant
Project: Georgetowm Flume
06-03385-000

CAS Number	Analyte	RL	Result
83-32-9	Acenaphthene	1.0	< 1.0 U
51-28-5	2,4-Dinitrophenol	10	< 10 U
100-02-7	4-Nitrophenol	5.0	< 5.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
606-20-2	2,6-Dinitrotoluene	5.0	< 5.0 U
121-14-2	2,4-Dinitrotoluene	5.0	< 5.0 U
84-66-2	Diethylphthalate	1.0	< 1.0 U
7005-72-3	4-Chlorophenyl-phenylether	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
100-01-6	4-Nitroaniline	5.0	< 5.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	10	< 10 U
86-30-6	N-Nitrosodiphenylamine	1.0	< 1.0 U
101-55-3	4-Bromophenyl-phenylether	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	5.0	< 5.0 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
91-94-1	3,3'-Dichlorobenzidine	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
205-99-2	Benzo(b)fluoranthene	1.0	< 1.0 U
207-08-9	Benzo(k)fluoranthene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	73.6%	2-Fluorobiphenyl	70.0%
d14-p-Terphenyl	71.2%	d4-1,2-Dichlorobenzene	58.0%
d5-Phenol	62.9%	2-Fluorophenol	64.0%
2,4,6-Tribromophenol	73.1%	d4-2-Chlorophenol	70.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: MW-B4D 062807
SAMPLE

Lab Sample ID: LF26B
LIMS ID: 07-13222
Matrix: Water
Data Release Authorized: VTS
Reported: 07/05/07

QC Report No: LF26-Herrera Environmental Consultant
Project: Georgetowm Flume
06-03385-000
Date Sampled: 06/28/07
Date Received: 06/28/07

Date Extracted: 06/28/07
Date Analyzed: 07/03/07 16:59
Instrument/Analyst: NT6/LJR

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
111-44-4	Bis-(2-Chloroethyl) Ether	1.0	< 1.0 U
95-57-8	2-Chlorophenol	1.0	< 1.0 U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	5.0	< 5.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1.0	< 1.0 U
106-44-5	4-Methylphenol	1.0	< 1.0 U
621-64-7	N-Nitroso-Di-N-Propylamine	5.0	< 5.0 U
67-72-1	Hexachloroethane	1.0	< 1.0 U
98-95-3	Nitrobenzene	1.0	< 1.0 U
78-59-1	Isophorone	1.0	< 1.0 U
88-75-5	2-Nitrophenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	1.0	< 1.0 U
65-85-0	Benzoic Acid	10	< 10 U
111-91-1	bis(2-Chloroethoxy) Methane	1.0	< 1.0 U
120-83-2	2,4-Dichlorophenol	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
106-47-8	4-Chloroaniline	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	1.0	< 1.0 U
59-50-7	4-Chloro-3-methylphenol	5.0	< 5.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
77-47-4	Hexachlorocyclopentadiene	5.0	< 5.0 U
88-06-2	2,4,6-Trichlorophenol	5.0	< 5.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
91-58-7	2-Chloronaphthalene	1.0	< 1.0 U
88-74-4	2-Nitroaniline	5.0	< 5.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
99-09-2	3-Nitroaniline	5.0	< 5.0 U

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: MW-B4D 062807
SAMPLE

Lab Sample ID: LF26B
LIMS ID: 07-13222
Matrix: Water
Date Analyzed: 07/03/07 16:59

QC Report No: LF26-Herrera Environmental Consultant
Project: Georgetowm Flume
06-03385-000

CAS Number	Analyte	RL	Result
83-32-9	Acenaphthene	1.0	< 1.0 U
51-28-5	2,4-Dinitrophenol	10	< 10 U
100-02-7	4-Nitrophenol	5.0	< 5.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
606-20-2	2,6-Dinitrotoluene	5.0	< 5.0 U
121-14-2	2,4-Dinitrotoluene	5.0	< 5.0 U
84-66-2	Diethylphthalate	1.0	< 1.0 U
7005-72-3	4-Chlorophenyl-phenylether	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
100-01-6	4-Nitroaniline	5.0	< 5.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	10	< 10 U
86-30-6	N-Nitrosodiphenylamine	1.0	< 1.0 U
101-55-3	4-Bromophenyl-phenylether	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	5.0	< 5.0 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
91-94-1	3,3'-Dichlorobenzidine	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
205-99-2	Benzo(b)fluoranthene	1.0	< 1.0 U
207-08-9	Benzo(k)fluoranthene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	77.6%	2-Fluorobiphenyl	73.6%
d14-p-Terphenyl	82.4%	d4-1,2-Dichlorobenzene	63.2%
d5-Phenol	73.6%	2-Fluorophenol	72.3%
2,4,6-Tribromophenol	80.3%	d4-2-Chlorophenol	78.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: MW-B4 062807**

SAMPLE

Lab Sample ID: LF26A
LIMS ID: 07-13221
Matrix: Water
Data Release Authorized:
Reported: 06/29/07

QC Report No: LF26-Herrera Environmental Consultant
Project: Georgetowm Flume
06-03385-000
Date Sampled: 06/28/07
Date Received: 06/28/07

Instrument/Analyst: NT3/AAR
Date Analyzed: 06/28/07 21:16

Sample Amount: 5.00 mL
Purge Volume: 5.0 mL

CAS Number	Analyte	RL	Result	Q
74-87-3	Chloromethane	1.0	< 1.0	U
74-83-9	Bromomethane	1.0	< 1.0	U
75-01-4	Vinyl Chloride	1.0	< 1.0	U
75-00-3	Chloroethane	1.0	< 1.0	U
75-09-2	Methylene Chloride	2.0	< 2.0	U
67-64-1	Acetone	5.0	< 5.0	U
75-15-0	Carbon Disulfide	1.0	< 1.0	U
75-35-4	1,1-Dichloroethene	1.0	< 1.0	U
75-34-3	1,1-Dichloroethane	1.0	< 1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	< 1.0	U
156-59-2	cis-1,2-Dichloroethene	1.0	< 1.0	U
67-66-3	Chloroform	1.0	< 1.0	U
107-06-2	1,2-Dichloroethane	1.0	< 1.0	U
78-93-3	2-Butanone	5.0	< 5.0	U
71-55-6	1,1,1-Trichloroethane	1.0	< 1.0	U
56-23-5	Carbon Tetrachloride	1.0	< 1.0	U
108-05-4	Vinyl Acetate	5.0	< 5.0	U
75-27-4	Bromodichloromethane	1.0	< 1.0	U
78-87-5	1,2-Dichloropropane	1.0	< 1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	< 1.0	U
79-01-6	Trichloroethene	1.0	< 1.0	U
124-48-1	Dibromochloromethane	1.0	< 1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	< 1.0	U
71-43-2	Benzene	1.0	< 1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	< 1.0	U
110-75-8	2-Chloroethylvinylether	5.0	< 5.0	U
75-25-2	Bromoform	1.0	< 1.0	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	5.0	< 5.0	U
591-78-6	2-Hexanone	5.0	< 5.0	U
127-18-4	Tetrachloroethene	1.0	< 1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	< 1.0	U
108-88-3	Toluene	1.0	< 1.0	U
108-90-7	Chlorobenzene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
100-42-5	Styrene	1.0	< 1.0	U
75-69-4	Trichlorofluoromethane	1.0	< 1.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroe	2.0	< 2.0	U
1330-20-7	m,p-Xylene	1.0	< 1.0	U
95-47-6	o-Xylene	1.0	< 1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0	U
107-02-8	Acrolein	50	< 50	U
74-88-4	Methyl Iodide	1.0	< 1.0	U
74-96-4	Bromoethane	2.0	< 2.0	U
107-13-1	Acrylonitrile	5.0	< 5.0	U
563-58-6	1,1-Dichloropropene	1.0	< 1.0	U
74-95-3	Dibromomethane	1.0	< 1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	< 1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	< 5.0	U
96-18-4	1,2,3-Trichloropropane	2.0	< 2.0	U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B

Sample ID: MW-B4 062807
SAMPLE

Lab Sample ID: LF26A
LIMS ID: 07-13221
Matrix: Water
Date Analyzed: 06/28/07 21:16

QC Report No: LF26-Herrera Environmental Consultant
Project: Georgetown Flume
06-03385-000

CAS Number	Analyte	RL	Result	Q
110-57-6	trans-1,4-Dichloro-2-butene	5.0	< 5.0	U
108-67-8	1,3,5-Trimethylbenzene	1.0	< 1.0	U
95-63-6	1,2,4-Trimethylbenzene	1.0	< 1.0	U
87-68-3	Hexachlorobutadiene	5.0	< 5.0	U
106-93-4	Ethylene Dibromide	1.0	< 1.0	U
74-97-5	Bromochloromethane	1.0	< 1.0	U
594-20-7	2,2-Dichloropropane	1.0	< 1.0	U
142-28-9	1,3-Dichloropropane	1.0	< 1.0	U
98-82-8	Isopropylbenzene	1.0	< 1.0	U
103-65-1	n-Propylbenzene	1.0	< 1.0	U
108-86-1	Bromobenzene	1.0	< 1.0	U
95-49-8	2-Chlorotoluene	1.0	< 1.0	U
106-43-4	4-Chlorotoluene	1.0	< 1.0	U
98-06-6	tert-Butylbenzene	1.0	< 1.0	U
135-98-8	sec-Butylbenzene	1.0	< 1.0	U
99-87-6	4-Isopropyltoluene	1.0	< 1.0	U
104-51-8	n-Butylbenzene	1.0	< 1.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0	U
91-20-3	Naphthalene	5.0	< 5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	< 5.0	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	103%
d8-Toluene	104%
Bromofluorobenzene	92.2%
d4-1,2-Dichlorobenzene	108%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B

Sample ID: MW-B4D 062807
SAMPLE

Lab Sample ID: LF26B
LIMS ID: 07-13222
Matrix: Water
Data Release Authorized:
Reported: 06/29/07

QC Report No: LF26-Herrera Environmental Consultant
Project: Georgetown Flume
06-03385-000
Date Sampled: 06/28/07
Date Received: 06/28/07

Instrument/Analyst: NT3/AAR
Date Analyzed: 06/28/07 21:42

Sample Amount: 5.00 mL
Purge Volume: 5.0 mL

CAS Number	Analyte	RL	Result	Q
74-87-3	Chloromethane	1.0	< 1.0	U
74-83-9	Bromomethane	1.0	< 1.0	U
75-01-4	Vinyl Chloride	1.0	< 1.0	U
75-00-3	Chloroethane	1.0	< 1.0	U
75-09-2	Methylene Chloride	2.0	< 2.0	U
67-64-1	Acetone	5.0	< 5.0	U
75-15-0	Carbon Disulfide	1.0	< 1.0	U
75-35-4	1,1-Dichloroethene	1.0	< 1.0	U
75-34-3	1,1-Dichloroethane	1.0	< 1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	< 1.0	U
156-59-2	cis-1,2-Dichloroethene	1.0	< 1.0	U
67-66-3	Chloroform	1.0	< 1.0	U
107-06-2	1,2-Dichloroethane	1.0	< 1.0	U
78-93-3	2-Butanone	5.0	< 5.0	U
71-55-6	1,1,1-Trichloroethane	1.0	< 1.0	U
56-23-5	Carbon Tetrachloride	1.0	< 1.0	U
108-05-4	Vinyl Acetate	5.0	< 5.0	U
75-27-4	Bromodichloromethane	1.0	< 1.0	U
78-87-5	1,2-Dichloropropane	1.0	< 1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	< 1.0	U
79-01-6	Trichloroethene	1.0	< 1.0	U
124-48-1	Dibromochloromethane	1.0	< 1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	< 1.0	U
71-43-2	Benzene	1.0	< 1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	< 1.0	U
110-75-8	2-Chloroethylvinylether	5.0	< 5.0	U
75-25-2	Bromoform	1.0	< 1.0	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	5.0	< 5.0	U
591-78-6	2-Hexanone	5.0	< 5.0	U
127-18-4	Tetrachloroethene	1.0	< 1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	< 1.0	U
108-88-3	Toluene	1.0	< 1.0	U
108-90-7	Chlorobenzene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
100-42-5	Styrene	1.0	< 1.0	U
75-69-4	Trichlorofluoromethane	1.0	< 1.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroe	2.0	< 2.0	U
1330-20-7	m,p-Xylene	1.0	< 1.0	U
95-47-6	o-Xylene	1.0	< 1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0	U
107-02-8	Acrolein	50	< 50	U
74-88-4	Methyl Iodide	1.0	< 1.0	U
74-96-4	Bromoethane	2.0	< 2.0	U
107-13-1	Acrylonitrile	5.0	< 5.0	U
563-58-6	1,1-Dichloropropene	1.0	< 1.0	U
74-95-3	Dibromomethane	1.0	< 1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	< 1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	< 5.0	U
96-18-4	1,2,3-Trichloropropane	2.0	< 2.0	U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B

Sample ID: MW-B4D 062807
SAMPLE

Lab Sample ID: LF26B
LIMS ID: 07-13222
Matrix: Water
Date Analyzed: 06/28/07 21:42

QC Report No: LF26-Herrera Environmental Consultant
Project: Georgetowm Flume
06-03385-000

CAS Number	Analyte	RL	Result	Q
110-57-6	trans-1,4-Dichloro-2-butene	5.0	< 5.0	U
108-67-8	1,3,5-Trimethylbenzene	1.0	< 1.0	U
95-63-6	1,2,4-Trimethylbenzene	1.0	< 1.0	U
87-68-3	Hexachlorobutadiene	5.0	< 5.0	U
106-93-4	Ethylene Dibromide	1.0	< 1.0	U
74-97-5	Bromochloromethane	1.0	< 1.0	U
594-20-7	2,2-Dichloropropane	1.0	< 1.0	U
142-28-9	1,3-Dichloropropane	1.0	< 1.0	U
98-82-8	Isopropylbenzene	1.0	< 1.0	U
103-65-1	n-Propylbenzene	1.0	< 1.0	U
108-86-1	Bromobenzene	1.0	< 1.0	U
95-49-8	2-Chlorotoluene	1.0	< 1.0	U
106-43-4	4-Chlorotoluene	1.0	< 1.0	U
98-06-6	tert-Butylbenzene	1.0	< 1.0	U
135-98-8	sec-Butylbenzene	1.0	< 1.0	U
99-87-6	4-Isopropyltoluene	1.0	< 1.0	U
104-51-8	n-Butylbenzene	1.0	< 1.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0	U
91-20-3	Naphthalene	5.0	< 5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	< 5.0	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	103%
d8-Toluene	98.4%
Bromofluorobenzene	92.5%
d4-1,2-Dichlorobenzene	108%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: MW-B4 062807
SAMPLE

Lab Sample ID: LF26A
LIMS ID: 07-13221
Matrix: Water
Data Release Authorized:
Reported: 06/29/07

QC Report No: LF26-Herrera Environmental Consultant
Project: Georgetowm Flume
06-03385-000
Date Sampled: 06/28/07
Date Received: 06/28/07

Date Extracted: 06/28/07
Date Analyzed: 06/29/07 13:17
Instrument/Analyst: ECD5/PK
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: No

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U
37324-23-5	Aroclor 1262	1.0	< 1.0 U
11100-14-4	Aroclor 1268	1.0	< 1.0 U

Reported in $\mu g/L$ (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	91.8%
Tetrachlorometaxylene	80.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: MW-B4D 062807
SAMPLE

Lab Sample ID: LF26B
LIMS ID: 07-13222
Matrix: Water
Data Release Authorized:
Reported: 06/29/07

QC Report No: LF26-Herrera Environmental Consultant
Project: Georgetown Flume
06-03385-000
Date Sampled: 06/28/07
Date Received: 06/28/07

Date Extracted: 06/28/07
Date Analyzed: 06/29/07 13:35
Instrument/Analyst: ECD5/PK
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: No

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U
37324-23-5	Aroclor 1262	1.0	< 1.0 U
11100-14-4	Aroclor 1268	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	99.8%
Tetrachlorometaxylene	93.0%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: MW-B4 062807
SAMPLE

Lab Sample ID: LF26A
LIMS ID: 07-13221
Matrix: Water
Data Release Authorized:
Reported: 07/03/07

QC Report No: LF26-Herrera Environmental Consultant
Project: Georgetown Flume
06-03385-000
Date Sampled: 06/28/07
Date Received: 06/28/07

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	06/29/07	6010B	07/02/07	7440-38-2	Arsenic	0.05	0.05	U
3010A	06/29/07	6010B	07/02/07	7440-43-9	Cadmium	0.002	0.002	U
3010A	06/29/07	6010B	07/02/07	7440-47-3	Chromium	0.005	0.005	U
3010A	06/29/07	6010B	07/02/07	**7440-50-8**	**Copper**	0.002	**0.004**	
3010A	06/29/07	6010B	07/02/07	7439-92-1	Lead	0.02	0.02	U
7470A	06/29/07	7470A	07/02/07	7439-97-6	Mercury	0.0001	0.0001	U
3010A	06/29/07	6010B	07/02/07	7440-02-0	Nickel	0.01	0.01	U
3010A	06/29/07	6010B	07/02/07	7440-22-4	Silver	0.003	0.003	U
3010A	06/29/07	6010B	07/02/07	7440-66-6	Zinc	0.01	0.01	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: MW-B4 062807
DUPLICATE

Lab Sample ID: LF26A
LIMS ID: 07-13221
Matrix: Water
Data Release Authorized:
Reported: 07/03/07

QC Report No: LF26-Herrera Environmental Consultant
Project: Georgetowm Flume
06-03385-000
Date Sampled: 06/28/07
Date Received: 06/28/07

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	6010B	0.05 U	0.05 U	0.0%	+/- 0.05	L
Cadmium	6010B	0.002 U	0.002 U	0.0%	+/- 0.002	L
Chromium	6010B	0.005 U	0.005 U	0.0%	+/- 0.005	L
Copper	6010B	0.004	0.004	0.0%	+/- 0.002	L
Lead	6010B	0.02 U	0.02 U	0.0%	+/- 0.02	L
Mercury	7470A	0.0001 U	0.0001 U	0.0%	+/- 0.0001	L
Nickel	6010B	0.01 U	0.01 U	0.0%	+/- 0.01	L
Silver	6010B	0.003 U	0.003 U	0.0%	+/- 0.003	L
Zinc	6010B	0.01 U	0.01 U	0.0%	+/- 0.01	L

Reported in mg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: MW-B4D 062807
SAMPLE

Lab Sample ID: LF26B
LIMS ID: 07-13222
Matrix: Water
Data Release Authorized:
Reported: 07/03/07

QC Report No: LF26-Herrera Environmental Consultant
Project: Georgetowm Flume
06-03385-000
Date Sampled: 06/28/07
Date Received: 06/28/07

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	06/29/07	6010B	07/02/07	7440-38-2	Arsenic	0.05	0.05	U
3010A	06/29/07	6010B	07/02/07	7440-43-9	Cadmium	0.002	0.002	U
3010A	06/29/07	6010B	07/02/07	7440-47-3	Chromium	0.005	0.005	U
3010A	06/29/07	6010B	07/02/07	**7440-50-8**	**Copper**	0.002	**0.004**	
3010A	06/29/07	6010B	07/02/07	7439-92-1	Lead	0.02	0.02	U
7470A	06/29/07	7470A	07/02/07	7439-97-6	Mercury	0.0001	0.0001	U
3010A	06/29/07	6010B	07/02/07	7440-02-0	Nickel	0.01	0.01	U
3010A	06/29/07	6010B	07/02/07	7440-22-4	Silver	0.003	0.003	U
3010A	06/29/07	6010B	07/02/07	7440-66-6	Zinc	0.01	0.01	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPH-HCID Method by GC/FID
Page 1 of 1
Matrix: Water

QC Report No: LF26-Herrera Environmental Con
Project: Georgetowm Flume
06-03385-000

Data Release Authorized: VTS
Reported: 07/05/07

ARI ID	Sample ID	Extraction Date	Analysis Date	DL	Range	Result
MB-062807 07-13221	Method Blank	06/28/07	06/29/07	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.63 U < 0.63 U 86.8%
LF26A 07-13221	MW-B4 062807 HC ID: ---	06/28/07	06/29/07	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.63 U < 0.63 U 91.9%
LF26ADP 07-13221 07-13221	MW-B4 062807 HC ID: ---	06/28/07	06/29/07	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.63 U < 0.63 U 89.6%
LF26B 07-13222	MW-B4D 062807 HC ID: ---	06/28/07	06/29/07	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.63 U < 0.63 U 92.2%

Reported in mg/L (ppm)

Gas value based on total peaks in the range from Toluene to C12.
Diesel value based on the total peaks in the range from C12 to C24.
Oil value based on the total peaks in the range from C24 to C38.

Data Set B-9. Groundwater Data (NBF/GTSP RI Database Excerpt)

Proposed Park Site Historical Groundwater Data

	Well ID:	MW-B4	NGW253							AOC06-GW01	AOC06-GW02	AOC06-GW03	AOC06-GW04
	Date:	02/06/18	08/26/13	11/19/13	02/25/14	05/06/14	11/13/15	02/18/16	02/06/18	09/26/17	09/26/17	09/26/17	09/26/17
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Polychlorinated Biphenyls													
Total PCBs	µg/L		0.01 U	0.01 U									
Volatile Organic Compounds													
1,1-Dichloroethane	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
1,1-Dichloroethene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U				0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dibromo-3-chloropropane	µg/L		0.5 U	0.5 U	0.5 U	0.5 U							
1,2-Dichlorobenzene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
1,2-Dichloroethane (EDC)	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
1,2-Dichloroethene	µg/L												
cis-1,2-Dichloroethene	µg/L	0.2 U	1.5	1	0.32	1.2	0.32	0.09 J	0.39	0.18 J	0.1 J	0.15 J	0.39
trans-1,2-Dichloroethene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U		0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloropropane	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
1,3-Dichlorobenzene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
1,3-Dichloropropane	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
cis-1,3-Dichloropropene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
trans-1,3-Dichloropropene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
1,4-Dichlorobenzene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
1,1,1-Trichloroethane	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
1,1,2-Trichloroethane	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
1,2,3-Trichloropropane	µg/L		0.5 U	0.5 U	0.5 U	0.5 U							
1,2,4-Trichlorobenzene	µg/L		0.5 U	0.5 U	0.5 U	0.5 U							
1,2,4-Trimethylbenzene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
1,3,5-Trimethylbenzene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
1,1,1,2-Tetrachloroethane	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
1,1,2,2-Tetrachloroethane	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
2-Chlorotoluene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
2-Hexanone	µg/L		5 U	5 U	5 U	5 U							
Acetone	µg/L		5 U	5 U	5 U	5 U							
Acrolein	µg/L		5 U	5 U	5 U	5 U							
Acrylonitrile	µg/L		1 U	1 U	1 U	1 U							
Benzene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U				0.03 U	0.03 U	0.03 U	0.03 U
Bromobenzene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
Bromoform	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
Bromomethane	µg/L		1 U	1 U	1 U	1 U							
n-Butylbenzene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
sec-Butylbenzene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
tert-Butylbenzene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
Carbon disulfide	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
Carbon tetrachloride	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
CFC-11 (Trichlorofluoromethane)	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
CFC-113 (Trichlorotrifluoroethane)	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
Chlorobenzene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
Chloroethane	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
Chloroform	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
Chloromethane (Methyl chloride)	µg/L		0.5 U	0.5 U	0.5 U	0.5 U							
Cumene (Isopropylbenzene)	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
Dibromomethane	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
Dichlorobromomethane	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							

Proposed Park Site Historical Groundwater Data

	Well ID:	MW-B4	NGW253							AOC06-GW01	AOC06-GW02	AOC06-GW03	AOC06-GW04
	Date:	02/06/18	08/26/13	11/19/13	02/25/14	05/06/14	11/13/15	02/18/16	02/06/18	09/26/17	09/26/17	09/26/17	09/26/17
Analyte	**Units**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Ethylbenzene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U				0.05 J	0.05 J	0.06 J	0.08 J
Ethylene dibromide (EDB)	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
Hexachlorobutadiene	µg/L		0.5 U	0.5 U	0.5 U	0.5 U							
Methyl ethyl ketone (MEK)	µg/L		5 U	5 U	5 U	5 U							
Methyl isobutyl ketone (MIBK)	µg/L		5 U	5 U	5 U	5 U							
Methylene chloride	µg/L		1 U	1 U	1 U	1 U							
Naphthalene	µg/L		0.5 U	0.5 U	0.5 U	0.5 U							
n-Propylbenzene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
Styrene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
Tetrachloroethene (PCE)	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	µg/L		0.2 U	0.2 U	0.2 U	0.2 U				0.27	0.2	0.15 J	0.25
Trichloroethene (TCE)	µg/L	0.2 U	0.2 U	2.5	2.7	5.4	0.08 J	6.2	14.8	0.08 J	0.08 J	0.09 J	0.05 U
Vinyl acetate	µg/L		0.2 U	0.2 U	0.2 U	0.2 U							
Vinyl chloride	µg/L	0.2 U	0.72	0.62	0.2 U	0.23	0.84	0.2 U	0.2 U	0.06 U	0.06 U	0.06 U	0.06 U
Total Xylenes	µg/L		0.4 U	0.4 U	0.4 U	0.4 U				0.27 J	0.3 J	0.23 J	0.42 J
Petroleum Hydrocarbons													
Diesel Range Hydrocarbons	µg/L		100 U	100 U									
Gasoline Range Hydrocarbons	µg/L		100 U	100 U									
Oil Range Hydrocarbons	µg/L		200 U	200 U									

Notes
U = non-detected result; value is set to the reporting limit

Data Set B-10. Draft NBF/GTSP Remedial Investigation Screening Levels (LAI 2016)

Table 5-1
Remedial Investigation Screening Levels for Detected Analytes
North Boeing Field/Georgetown Steam Plan RI

Soil

Analyte	RISL
Metals (mg/kg)	
Aluminum	80,000
Antimony	32
Arsenic	7.0
Barium	16,000
Beryllium	160
Cadmium	70
Chromium	120,000
Cobalt	23
Copper	3,200
Iron	43,000
Lead	400
Manganese	11,000
Mercury	10
Molybdenum	400
Nickel	1,600
Selenium	400
Thallium	5.0
Tin	48,000
Vanadium	---
Zinc	24,000
SVOCs (µg/kg)	
1,2,4-Trichlorobenzene	35,000
1,4-Dichlorobenzene	2,400
1-Methylnaphthalene	35,000
2,4-Dimethylphenol	1,600,000
2-Chloronaphthalene	---
2-Methylnaphthalene	320,000
2-Methylphenol	4,000,000
4-Chlorophenyl-phenylether	---
4-Methylphenol	400,000
Acenaphthene	4,800,000
Acenaphthylene	---
Anthracene	24,000,000
Benzo(a)anthracene	1,400
Benzo(a)pyrene	140
Benzo(g,h,i)perylene	---
Benzoic Acid	320,000,000
Benzyl Alcohol	8,000,000
bis(2-Ethylhexyl)phthalate	71,000
Butylbenzylphthalate	530,000
Carbazole	---
Chrysene	140,000
Dibenz(a,h)anthracene	140
Dibenzofuran	80,000
Diethylphthalate	64,000,000
Dimethylphthalate	---
Di-n-Butylphthalate	8,000,000
Di-n-Octyl phthalate	730,000
Fluoranthene	3,200,000
Fluorene	3,200,000
Hexachlorobutadiene	13,000
Indeno(1,2,3-cd)pyrene	1,400
Isophorone	1,100,000
Naphthalene	1,600,000
N-Nitrosodiphenylamine	200,000
Pentachlorophenol	2,500
Phenanthrene	---
Phenol	24,000,000
Pyrene	2,400,000
Total Benzofluoranthenes	---
cPAH TEQ	140
Total Petroleum Hydrocarbons (mg/kg)	
Diesel-Range Organics	2,000

Groundwater

Analyte	RISL
Metals (µg/L)	
Aluminum	16,000
Antimony	6.0
Arsenic	5.0
Barium	2,000
Beryllium	4.0
Cadmium	2.6
Chromium	100
Cobalt	---
Copper	120
Iron	11,000
Lead	11
Manganese	2,200
Mercury	0.02
Molybdenum	---
Nickel	100
Selenium	50
Silver	1.5
Thallium	0.50
Tin	9,600
Vanadium	80
Zinc	33
SVOCs (µg/L)	
1-Methylnaphthalene	---
2-Methylnaphthalene	18
2-Methylnaphthalene	18
4-Methylphenol	40
Acenaphthene	2.6
Acenaphthylene	11
Anthracene	11
Benzo(a)anthracene	0.12
Benzo(a)pyrene	0.012
Benzo(g,h,i)perylene	0.012
bis(2-Ethylhexyl)phthalate	3.0
Chrysene	0.47
Dibenzofuran	1.3
Fluoranthene	2.3
Fluorene	2.0
Naphthalene	54
Phenanthrene	4.8
Pyrene	14
Total Benzofluoranthenes	0.12
cPAH TEQ	0.01
Total Petroleum Hydrocarbons (mg/L)	
Diesel-Range Organics	0.5
Oil-range organics	0.5
Jet Fuel	0.5
Gasoline-Range Organics	0.8/1.0 [b]
PCBs (µg/L)	
Aroclor 1242	---
Aroclor 1254	0.044
Total PCBs	0.044
VOCs (µg/L)	
1,1,1-Trichloroethane	200
1,1-Dichloroethane	1,600
1,1-Dichloroethene	7.0
Acetone	7,200
Benzene	0.80
Carbon Disulfide	800
Chloroethane	---
Chloroform	80
Chloromethane	---

Soil Gas and Indoor Air

Analyte	Shallow Soil Gas Screening Level AF = 0.03	MTCA Method B Indoor Air Cleanup Level
VOCs (µg/m^3)		
1,1,1-Trichloroethane	76,200	2290
1,1,2,2-Tetrachloroethane	1.44	0.0431
1,1,2-Trichloroethane	3.05	0.156
1,1-Dichloroethane	52.1	1.56
1,1-Dichloroethene	3050	91.4
1,2,4-Trichlorobenzene	30.5	0.914
1,2,4-Trimethylbenzene	107	3.20
1,2-Dibromoethane (EDB)	0.139	0.00417
1,2-Dichlorobenzene	3050	91.4
1,2-Dichloroethane	3.21	0.0962
1,2-Dichloropropane	8.33	0.250
1,3,5-Trimethylbenzene	---	---
1,3-Dichlorobenzene	---	---
1,4-Dichlorobenzene	7.58	0.227
2-Butanone (Methyl Ethyl Ketone)	76,200	2290
2-Hexanone	---	---
4-Methyl-2-pentanone	45,700	1370
Acetone	---	---
Benzene	10.7	0.321
Bromodichloromethane	2.25	0.0676
Bromoform	75.8	2.27
Bromomethane	76.2	2.29
Carbon Disulfide	10,700	320
Carbon Tetrachloride	13.9	0.417
Chlorobenzene	762	22.9
Chloroethane	152,000	4570
Chloroform	3.62	0.109
Chloromethane	1370	41.1
cis-1,2-Dichloroethene	---	---
cis-1,3-Dichloropropene	---	---
Cumene	6100	183
Dibromochloromethane	3.09	0.0926
Ethyl Benzene	15,200	457
Freon 11	10,700	320
Freon 113	457,000	13,700
Freon 12	1520	45.7
Hexachlorobutadiene	3.79	0.114
m,p-Xylene	1520	45.7
Methyl tert-butyl ether	321	9.62
Methylene Chloride	8330	250
Naphthalene	2.45	0.0735
o-Xylene	1520	45.7
Propylbenzene	---	---
Styrene	15,200	457
Tetrachloroethene	321	9.62
Toluene	76,200	2290
trans-1,2-Dichloroethene	---	---
trans-1,3-Dichloropropene	---	---
Trichloroethene	12.3	0.370
Vinyl Chloride	9.33	0.280

Storm Drain Solids and Surface Debris

Analyte	RISL
Metals (mg/kg-dry wt)	
Aluminum	---
Antimony	---
Arsenic	7.3
Barium	---
Beryllium	---
Cadmium	5.1
Chromium	260
Cobalt	---
Copper	390
Iron	---
Lead	450
Manganese	---
Mercury	0.41
Molybdenum	---
Nickel	370
Selenium	---
Silver	6.1
Thallium	---
Tin	---
Vanadium	---
Zinc	410
SVOCs (µg/kg-dry wt)	
1-Methylnaphthalene	---
2,4-Dimethylphenol	67
2,4-Dinitrophenol	---
2,4-Dinitrotoluene	---
2,6-Dinitrotoluene	---
2-Methylnaphthalene	670
2-Methylphenol	67
4-Methylphenol	670
4-Nitrophenol	---
Acenaphthene	500
Acenaphthylene	1300
Anthracene	960
Benzo(a)anthracene	1300
Benzo(a)pyrene	150
Benzo(g,h,i)perylene	670
Benzoic Acid	---
bis(2-Ethylhexyl)phthalate	1300
Butylbenzylphthalate	67
Carbazole	---
Chrysene	1400
Dibenz(a,h)anthracene	230
Dibenzofuran	540
Diethylphthalate	71
Dimethylphthalate	71
Di-n-Butylphthalate	1400
Di-n-Octyl phthalate	6200
Fluoranthene	1700
Fluorene	---
Indeno(1,2,3-cd)pyrene	600
Isophorone	---
Naphthalene	2100
Phenanthrene	1500
Phenol	420
Pyrene	2600
Total Benzofluoranthenes	3200
cPAH TEQ	150
PCBs (µg/kg-dry wt)	
Aroclor 1016	---
Aroclor 1248	---
Aroclor 1254	---
Aroclor 1260	---

Anthropogenic Media

Analyte	RISL
Metals (mg/kg-dry wt)	
Mercury	4.1
SVOCs (µg/kg-dry wt)	
Butylbenzylphthalate	---
bis(2-Ethylhexyl)phthalate	---
Di-n-Butylphthalate	---
Di-n-Octyl phthalate	---
Benzo(a)anthracene	13,000
Chrysene	14,000
Benzo(a)pyrene	1,500
Indeno(1,2,3-cd)pyrene	6,000
Dibenz(a,h)anthracene	2,300
Total Benzofluoranthenes	32,000
cPAH TEQ	1,500
PCBs (µg/kg-dry wt)	
Aroclor 1016	---
Aroclor 1242	---
Aroclor 1248	---
Aroclor 1254	---
Aroclor 1260	---
Total PCBs	1,300

Stormwater

Analyte	RISL
Metals (mg/L)	
Arsenic	0.87
Cadmium	0.43
Chromium	310
Copper	2.4
Iron	---
Lead	8.1
Manganese	---
Nickel	8.2
Zinc	33
SVOCs (µg/L)	
Phenol	78
Naphthalene	54
2-Methylnaphthalene	18
Acenaphthylene	11
Acenaphthene	2.6
Dibenzofuran	1.3
Diethylphthalate	480
Fluorene	2
Phenanthrene	4.8
Anthracene	11
Fluoranthene	2.3
Pyrene	9.8
Butylbenzylphthalate	1
Benzo(a)anthracene	0.01
bis(2-Ethylhexyl)phthalate	1.4
Chrysene	0.01
Di-n-Octyl phthalate	1
Benzo(a)pyrene	0.01
Indeno(1,2,3-cd)pyrene	0.01
Dibenz(a,h)anthracene	0.01
Benzo(g,h,i)perylene	0.012
1-Methylnaphthalene	---
Total Benzofluoranthenes	---
CPAH TEQ	0.010
PCBs (µg/L)	
Aroclor 1242	---
Aroclor 1248	---
Aroclor 1254	---
Aroclor 1260	---
Total PCBs	0.030

Table 5-1
Remedial Investigation Screening Levels for Detected Analytes
North Boeing Field/Georgetown Steam Plan RI

Soil		Groundwater		Soil Gas and Indoor Air			Storm Drain Solids and Surface Debris		Anthropogenic Media		Stormwater	
Analyte	RISL	Analyte	RISL	Analyte	Shallow Soil Gas Screening Level AF = 0.03	MTCA Method B Indoor Air Cleanup Level	Analyte	RISL	Analyte	RISL	Analyte	RISL
Oil-Range Organics	2,000	cis-1,2-Dichloroethene	16				Total PCBs	130				
Gasoline-Range Organics	30/100 [a]	Ethylbenzene	700									
		Isopropylbenzene	800				**Dioxins and Furans (pg/g-dry wt)**					
PCBs (µg/kg)		m, p-Xylene	1,600				2,3,7,8-TCDF	---				
Aroclor 1248	220	Methyl tert-Butyl Ether	---				2,3,7,8-TCDD	13				
Aroclor 1254	500	n-Butylbenzene	---				1,2,3,7,8-PeCDF	---				
Aroclor 1260	500	n-Propylbenzene	800				2,3,4,7,8-PeCDF	---				
Aroclor 1262	---	O-Xylene	1,600				1,2,3,7,8-PeCDD	---				
Total PCBs	500	sec-Butylbenzene	---				1,2,3,4,7,8-HxCDF	---				
		tert-Butylbenzene	---				1,2,3,6,7,8-HxCDF	---				
VOCs (µg/kg)		Tetrachloroethene	5.0				2,3,4,6,7,8-HxCDF	---				
1,1-Dichloroethane	16,000,000	Toluene	640				1,2,3,7,8,9-HxCDF	---				
1,2,4-Trimethylbenzene	---	Toluene	640				1,2,3,4,7,8-HxCDD	---				
1,3,5-Trimethylbenzene	800,000	trans-1,2-Dichloroethene	100				1,2,3,6,7,8-HxCDD	---				
2-Butanone	---	Trichloroethene	4.0				1,2,3,7,8,9-HxCDD	---				
4-Isopropyltoluene	---	Vinyl Chloride	0.20				1,2,3,4,6,7,8-HpCDF	---				
Acetone	72,000,000						1,2,3,4,7,8,9-HpCDF	---				
Benzene	18,000						1,2,3,4,6,7,8-HpCDD	---				
Bromomethane	110,000						OCDF	---				
Carbon Disulfide	8,000,000						OCDD	---				
cis-1,2-Dichloroethene	160,000						Total TCDF	---				
Ethylbenzene	8,000,000						Total TCDD	---				
Iodomethane	---						Total PeCDF	---				
Isopropylbenzene	8,000,000						Total PeCDD	---				
m, p-Xylene	16,000,000						Total HxCDF	---				
Methylene Chloride	130,000						Total HxCDD	---				
Naphthalene	1,600,000						Total HpCDF	---				
n-Butylbenzene	---						Total HpCDD	---				
n-Propylbenzene	---						TEQ	13				
o-Xylene	16,000,000											
sec-Butylbenzene	---											
tert-Butylbenzene	---											
Tetrachloroethene	480,000											
Toluene	6,400,000											
Trichloroethene	11,500											
Trichlorofluoromethane	24,000,000											

AF = attenuation factor
--- = screening level not available

cPAH = carcinogenic polycyclic aromatic hydrocarbons
dry wt = dry weight
µg/m³ = micrograms per cubic meter
µg/kg = micrograms per kilogram
µg/L = micrograms per liter
mg/kg = milligrams per kilogram

mg/L = milligrams per liter
MTCA = Model Toxics Control Act

pg/g = picograms per gram
PCBs = polychlorinated biphenyls
RISL = Remedial Investigation Screening Level
SVOCs = semivolatile organic compounds
TEQ = toxic equivalent concentration
VOCs = volatile organic compounds

[a] The higher value of 100 mg/kg can be used only if no benzene is present and the total of ethylbenzene, toluene, and xylenes is less than 1% of the gasoline mixture.

[b] The higher value of 1.0 mg/L can be used only if no benzene is present in the groundwater sample.

Appendix C

Stormwater Inputs to GTSP Flume Replacement Line

Stormwater Inputs to GTSP Flume Replacement Line

(Listed from Upsteam to Downstream)

Flume Line Station Distance (approx. ft)	SD Structure or SD Line	Description	Stormwater Source Within NBF Lease Area	Stormwater Source Within NBF-GTSP Site Boundary	Shown on NBF-GTSP RI/FS Work Plan Figure*
0+00	GTSP Power House roof drains	GTSP Power House downspouts draining to 6" storm drain line that forms beginning of flume replacement line	No	Yes	Fig 7.1-6
10+04	CB802	Grated catch basin in gravel alley on NBF leased property northwest of Willow St. Substation, may also drain small portion of parking lot at WANG and part of Willow Street; CB drains through 8" SD line and connects to 18" PVC flume replacement line	Yes^	Yes^	Fig 7.1-39
13+40	CB801	Drains from northern bioswale outlet (north downstream end) to CB through 12" line to 18" PVC flume replacement line	No	Yes	Fig 7.1-52
15+46	SD line	8" SD line drains roof of the Jensen Carlyle office/warehouse building ("non-Boeing office") and parking lot on north side of building, connects to 24" PVC flume replacement line	No	No	Fig 7.1-52 (see SPU map)
16+62	CB851	Drains from southern bioswale outlet (south downstream end) to CB through 12" line to 24" PVC flume replacement line	No	Yes	Fig 7.1-52
17+12	SD line	4" SD line from the driveway drains on north side of Aero Motel (next to Jensen Carlyle building), connects to 24" PVC flume replacement line	No	No	Fig 7.1-52, Fig 7.2-14
19+26	SD line	8" SD line from the driveway drains on south side of Aero Motel, connects to 24" PVC flume replacement line	No	No	Fig 7.1-54
19+62	CB808	CB drains low point on western side of flume, southeast of Aero Motel, through 12" line to 24" PVC flume replacement line	No	Yes	Fig 7.1-54
21+19	UNKCB (unnumbered)	Grated catch basin on paved edge of E Marginal Way, outside the fence near the Building 7-27-1 area, drains through 8" SD line to 24" HDPE flume replacement line	No	No	Fig 7.1-54

* All stormwater inputs but UNKCB are also shown on the SPU 2013 map ("Georgetown SD, Map No. 10 - Drainage Basin Boundary")

^ CB802 is on NBF leased property and may also drain areas outside NBF property and the Site, including along Willow Street and in the WANG parking lot

Within the Proposed Park Site

Schmoyer, B. 2017. Personal communication (e-mail to A. Crowley, Seattle City Light, Seattle, WA, dated January 9, 2017). Seattle Public Utilities, Seattle, WA.

Appendix D

GTSP Interim Action Levels for Soil and Groundwater Chemicals of Concern

Table 3-1. Interim Action Levels for Soil and Groundwater Chemicals of Concern

	Soil		Groundwater	
Chemical of Concern	IAL (mg/kg)	Basis	IAL (µg/L)	Basis
TCDD TEQ	TBD[a]	Awaiting results of Ecology urban background study	--	
Arsenic	20	Area-wide background	1.2	Natural background in surface water
Copper	550	Terrestrial ecological evaluation		
Lead	220	Terrestrial ecological evaluation		
Nickel	38	Leaching pathway	8.2	Protection of marine receptors in surface water
Zinc	570	Terrestrial ecological evaluation		
BaP TEQ	3.3	Typical urban concentrations	--	
PCBs	0.5 in groundwater-impacted area	Empirical leaching threshold	0.03	PQL
	1 in remainder of site	Direct contact with soil (TSCA)	--	
TPH	3,000 in fuel tank area	Method B direct contact	--	
	2,000 in remainder of site	Method B direct contact		
	Remove free product	Residual saturation limitation		

Notes:

[a] The IAL for dioxins/furans will be established following completion of an ongoing Washington State Department of Ecology study to measure soil dioxin concentrations in Seattle residential neighborhoods. This study will generate data that can be used to determine area background, which may affect determination of the IAL.

-- = not a chemical of concern for this medium or in this site area
BaP = benzo(a)pyrene
IAL = interim action level
PCB = polychlorinated biphenyl
PQL = practical quantitation limit
TBD = to be determined
TCDD = tetrachlorodibenzo-*p*-dioxin
TEQ = toxicity equivalent
TPH = total petroleum hydrocarbon

Source: Integral 2011c

Appendix E

Ecology Phase 3 Initial Conclusions—NBF/GTSP

Shannon Ashurst

From: Adams, Mark (ECY) <MADA461@ECY.WA.GOV>
Sent: Thursday, January 11, 2018 4:15 PM
To: Crowley, Allison; Linda Baker; Shannon Ashurst; Roy Jensen; Julie Wukelic; Dumaliang, Peter; Flaherty, Joseph L; Bach, Carl M; Gaona, Colette (CGaona@landauinc.com); Kris Hendrickson; Dube, Tom E.
Subject: RE: Phase III Initial Conclusions - NBF/GTSP

Categories: business

Correction – it's Ellis Av S., not Albro

Mark

From: Adams, Mark (ECY)
Sent: Thursday, January 11, 2018 4:03 PM
To: 'Crowley, Allison' <Allison.Crowley@seattle.gov>; Linda Baker <lbaker@integral-corp.com>; 'Shannon Ashurst' <sashurst@integral-corp.com>; Roy Jensen <roy.jensen@hartcrowser.com>; Julie Wukelic <julie.wukelic@hartcrowser.com>; Dumaliang, Peter <Peter.Dumaliang@kingcounty.gov>; Flaherty, Joseph L <Joseph.L.Flaherty@boeing.com>; Bach, Carl M <carl.m.bach@boeing.com>; Gaona, Colette (CGaona@landauinc.com) <CGaona@landauinc.com>; Kris Hendrickson <KHendrickson@landauinc.com>; 'Dube, Tom E.' <THOMAS.E.DUBE@leidos.com>
Subject: Phase III Initial Conclusions - NBF/GTSP

Hi All:

I've looked through the preliminary Phase III results and arrived at the initial conclusion that the new data served its' purpose - there is now sufficient information to allow selection of a cleanup alternative in the FS. Some details are outlined below, and we can discuss them further at our meeting on the 22nd.

Markov

The results look good here, with no need for further investigation or remedial action.

AOC 4 – South PEL

The contaminants in groundwater do not appear to be migrating beyond the AOC boundary.

AOC 6 – Chlorinated Solvent Plume

There is a confirmed VOC plume originating in the WANG/360 area that extends southward to the property boundary along East Marginal Way and beyond (Slip 4). The eastern boundary of this plume appears to be defined, but not the western boundary. However, it likely does not extend beyond Albro St. There also is a separate, less coherent plume in the middle part of the PEL area that appears to be stable and isolated from the bigger WANG/360 plume.

Although not needed for the RI, I believe additional testing needs to be done as soon as possible along the west side of Albro to confirm the residents in this area are not at risk from vapor intrusion.

AOC 7 – 3-800 Building

A narrow vinyl chloride plume is confirmed to be heading due west directly towards Slip 4, located some 1,000+ feet away. Plume concentrations do not appear to have declined within 200 feet of the source area, suggesting the plume could well reach Slip 4 at detectable concentrations.

AOC 9 – Main Fuel Farm

The extent of groundwater contamination is largely corralled and indicates essentially no potential for off-property movement. There is however a significant likelihood that elevated TPH concentrations extend beneath the new delivery building immediately to the north. While this data gap is not significant for the RI, there is a need to evaluate the potential for vapor intrusion in the building. I understand the issue was originally evaluated in 2015, when a soil vapor sample was obtained from a point near the building (VP10). Although the data from this vapor point is relevant, it represents conditions outside the area of maximum contamination.

AOC 10 – Low Density Sampling Area

PCBs will apparently be the only site contaminants known to be migrating off-property in groundwater.

Thanks and see you on the 22nd.
Mark

Mark Adams, LHG
Cleanup Project Manager, Toxics Cleanup Program
Department of Ecology, Northwest Regional Office
3190 160th Ave SE, Bellevue, Washington 98008
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Appendix F

Former Georgetown Steam Plant Flume Property Transfer Sampling and Analysis Plan (SAP) and SAP Addendum

Former Georgetown Steam Plant Flume Property Transfer

Sampling and Analysis Plan

Prepared for
Seattle City Light
P.O. Box 34023
Seattle, WA 98124

Prepared by

integral consulting inc.
719 2nd Avenue
Suite 1450
Seattle, WA 98104

September 23, 2021

CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

ARI	Analytical Resources, Inc.
ASTM	American Society for Testing and Materials
bgs	below ground surface
City	City of Seattle
COC	chain of custody
cPAH	carcinogenic polycyclic aromatic hydrocarbon
DGPS	differential global positioning system
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
flume	Georgetown Steam Plant flume
HASP	health and safety plan
IDW	investigation-derived waste
Integral	Integral Consulting Inc.
LDW	Lower Duwamish Waterway
MDL	method detection limit
MS/MSD	matrix spike/matrix spike duplicate
MTCA	Model Toxics Control Act
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
Project Site	southern portion of the Former Georgetown Flume Property
QA/QC	quality assurance and quality control
SCL	Seattle City Light
SDOT	Seattle Department of Transportation
SOP	standard operating procedure
SPR	Seattle Parks and Recreation
SVOC	semivolatile organic compound
TCLP	toxicity characteristic leaching procedure
VOC	volatile organic compound

1 INTRODUCTION

This sampling and analysis plan was prepared for Seattle City Light (SCL) to conduct soil sampling at the southern portion of the Former Georgetown Flume Property (Project Site) located immediately adjacent (to the east) of 1001 South Myrtle Street, Seattle, WA 98108 (the southernmost segment of Parcel 7006700570) (Figure 1), to support the transfer of a part of the property to Seattle Parks and Recreation (SPR) and Seattle Department of Transportation (SDOT). The purpose of this investigation is to support SCL in characterizing the top 1 ft of soil for eventual disposal and characterizing the remaining new surface soil to assess the potential for residual risk or impediment to unrestricted site use.

As further described in Section 2, the former flume was removed and replaced in 2009 as part of an effort to eliminate the flume as a potential conveyance for contamination from the Former Georgetown Steam Plant to Slip 4 of the Lower Duwamish Waterway (LDW), an Early Action Area in the LDW Superfund site (Herrera 2010). Based on that work, it is expected that the soils at the Project Site will be clean (i.e., below or near Model Toxics Control Act [MTCA] unrestricted land use criteria). The procedures described in this document are in general accordance with MTCA investigation and cleanup requirements.

The following sections present a brief investigation overview and describe soil sampling procedures, investigation-derived waste (IDW) management, laboratory analytical procedures, quality assurance and quality control (QA/QC) procedures, reporting, schedule, and project management. Standard operating procedures (SOPs) and field forms are presented in Appendices A and B, respectively. The site-specific health and safety plan (HASP) is presented in Appendix C, and the sample locations, analytical methods, and detection limits are presented in Tables 1 through 4.

2 BACKGROUND AND INVESTIGATION OVERVIEW

SPR, SDOT, and SCL are teaming to create a Georgetown flume off-leash area and trail on a portion of the former Georgetown Steam Plant flume (flume) footprint (SPR et al. 2020) (Figures 1 and 2). SCL will provide the property. The current plans call for the removal of approximately the top foot of soil from the entire site; that top foot of soil will then be replaced and the area re-graded with clean gravel or soil. SPR will lead the off-leash area development. SDOT will lead the trail development. SPR and SDOT will jointly contribute to the onsite stormwater management/bioswale feature.

The Project Site was part of the former flume removal action completed in 2009 (Herrera 2010). The purpose of the removal action was to remove contamination from within and adjacent to the flume, provide for stormwater conveyance for the Georgetown Steam Plant and the South Myrtle Street right of way, and implement controls so that the flume no longer acted as a potential conveyance for contamination from the Georgetown Steam Plant to reach Slip 4 of the LDW, an Early Action Area in the LDW Superfund site.

A review of the post-removal action data for the Project Site identified data gaps in some areas of the Project Site. SCL is initiating additional site characterization to address these data gaps and facilitate additional soil removal and disposal to support site redevelopment.

2.1 SITE HISTORY

The former flume operated as a 2,450-ft-long system of wood-fortified and concrete-lined open ditches and buried piped segments that connected the Georgetown Steam Plant to the LDW at Slip 4 (Figure 3) (Herrera 2010). The former flume was constructed in the early 1900s to discharge cooling water from the steam plant to the river. Cooling water discharge ceased when the plant ceased operation in the 1960s. Thereafter, the former flume served as a conveyance for stormwater and surface water runoff draining approximately 6 acres, including the steam plant roof, adjacent City of Seattle (City) rights-of-way, parts of North Boeing Field, and adjacent private properties.

The City conducted site characterization work along the flume in 2006 (Herrera 2010). Concentrations of polychlorinated biphenyls (PCBs), carcinogenic polycyclic aromatic hydrocarbons (cPAHs), metals, and diesel-range petroleum hydrocarbons in soil samples collected beneath or adjacent to the flume did not exceed MTCA Method A cleanup levels for industrial properties, although PCB concentrations in soils along the west side of the north equipment pad of the former Ellis electrical substation (Figure 4) did exceed MTCA Method A cleanup levels for unrestricted land use. [1] Two concrete samples collected from the former Ellis substation prior to demolition did not have detected PCBs. No contaminants of concern were detected in groundwater collected from a piezometer installed near South Myrtle Street along the flume channel.

In 2009, the former flume underwent a demolition, removal, and drainage project to remove contaminated sediments from within the flume and prevent the flume from being a potential conveyance for contamination to reach Slip 4 (Herrera 2010). This project involved the removal of all unauthorized drains into the flume, all sediment within the flume, and contaminated soil immediately adjacent to and below the flume. Additionally, the former flume was replaced by a fully enclosed piping system to provide stormwater conveyance from the steam plant and the South Myrtle Street right-of-way (Figure 5).

The Project Site comprises the southern portion of the former flume extending between South Myrtle Street and East Marginal Way, an area of approximately 1.25 acres (Figure 2). North Boeing Field is located to the east. A commercial warehouse and motel are located to the west. Work completed within the Project Site as part of the 2009 removal action included (Herrera 2010):

- Removal of the wood-lined flume and sediment within the flume.
- Removal of the remaining remnants of the retired Ellis substation[2], located adjacent to the flume.
- Installation of a new 24-in. polyvinyl chloride stormwater pipe at the bottom of the flume excavation, which was then backfilled. Sampling of soil beneath the flume did not identify exceedances of cleanup levels for PCBs or cPAHs below the 0.5-ft depth. Thus, excavation beneath the flume was limited to 0.5 ft for flume demolition and pipe laying purposes. A parking lot drainpipe formerly connected to the flume was connected to the new stormwater pipe. A bioswale was installed adjacent to South Myrtle Street to filter parking lot and street run-off (Figure 5).

No PCBs or cPAHs were detected above laboratory detection limits in soil confirmation samples collected in the footprint of the Project Site following completion of the 2009 removal action (Figure 6).

[1] Exceeded the MTCA Method A cleanup level for unrestricted land use. The property qualifies for industrial cleanup levels, but SCL made the decision to use the more stringent standard due to concerns about PCBs in Slip 4.
[2] Ellis substation remnants included 12 concrete equipment pads and chain link fencing (Figure 4).

2.2 SOIL SAMPLING OBJECTIVES

The proposed sample objectives are to:

1. Characterize the 0- to 1-ft below ground surface (bgs) interval through the collection of composite samples for soil disposal characterization. Four composite subareas—Trail and Right-of-Way (Area 1), Off-Leash Area (Area 2), Former Ellis Substation (Area 3), and Stormwater Facility (Area 4)—are defined by the area's past and/or future use and are presented on Figure 7.
2. Characterize the 1- to 1.5-ft bgs interval using a set of discrete samples to determine whether the "remaining" soil surface would pose any residual human health or ecological risk or an impediment to unrestricted site use. Discrete sample locations are presented on Figure 7.
3. Collect the 1.5- to 2-ft bgs interval for the same sample locations as Objective 2 above to archive and potentially analyze depending on the 1- to 1.5-ft interval sample results.

The expected Project Site users are people and their pets accessing the site in a recreational capacity. The expected soil exposure depth for a recreator is no greater than 0.5 ft, based on common convention.

3 SCOPE OF WORK AND FIELD SAMPLING PROCEDURES

This section describes the procedures for soil sampling. Soil will be collected from 21 discrete sample locations and four composite subareas, as shown on Figure 7. The procedures described below are supplemented by more detailed SOPs, which are presented in Appendix A. All work will be conducted in accordance with the site HASP (Appendix C) and will be documented in a field logbook, field log forms, and/or photographs (SOP AP-02). If cultural resources are discovered or suspected, field staff will follow the procedure in SOP AP-07 (Appendix A). Geologic work will be conducted under the responsible charge of a State of Washington licensed geologist.

3.1 BLOCK REMOVAL

Prior to commencing field operations, Integral Consulting Inc. (Integral) will coordinate with SCL to remove the ecology blocks placed across the entrances to the Project Site to allow the field and drilling crews access to the property.

3.2 SUBSURFACE UTILITY CLEARANCE

Prior to commencing drilling operations, all proposed drilling locations will be cleared by local utility representatives (Underground Service Alert of Washington [phone number 811]; must be notified at least 2 business days prior to drilling). A representative from Cascade Drilling will call in the public utility locate request. In addition, all proposed boring locations will be cleared by Applied Professional Services Inc., a private utility locator, on or before the first day of sampling. Integral will be onsite during the private utility locate to ensure that all locations can be safely accessed by the drill rig.

The proposed locations will be shown to the drillers during a site walk prior to beginning the work. Any concerns about underground utilities will be discussed by the drillers and Integral staff. If any overhead lines are nearby and the boring location cannot be moved, the utility company responsible for the lines will be called by Integral staff and requested to shield the lines. Clearance of the boring locations will be documented in the field logbook and in digital photographs.

3.3 EQUIPMENT DECONTAMINATION

All non-disposable soil sampling equipment (e.g., stainless-steel spoons and bowls) will be decontaminated in accordance with SOP SL-01 (Appendix A). The equipment will be washed with a non-surfactant detergent solution (e.g., Alconox® or Liquinox®) followed by a tap water rinse, and finally a distilled water rinse.

All drilling equipment will be decontaminated using a pressure washer prior to the start of work, and any reused pieces of equipment will be cleaned between each boring to minimize the potential for cross-contamination in accordance with SOP SL-01 (Appendix A). The drilling contractor may bring a sufficient number of rods such that each can be used once, without onsite decontamination of reused pieces. The pressure washing will be conducted in a self-contained decontamination trailer (or equivalent area) that will catch all decontamination water.

All decontamination fluids will be managed in accordance with the procedures outlined in Section 4, below.

3.4 SAMPLE LOCATION POSITIONING

Target sample location coordinates are presented in Table 1, and locations are shown in Figure 7. The standard projection system to be used during the field activities is horizontal datum: Washington State Plane North NAD83 U.S. feet (EPSG 2285). A differential global positioning system (DGPS) unit will be used to determine coordinates in the field. Target coordinates will be loaded into the DGPS unit prior to deployment. The positioning objective is to sample each location within 10 ft of the target location coordinates, and to measure and record the final positions of each sampling location to within ±1 meter. More detailed information on the DGPS receivers can be found in SOP AP-06 (Appendix A).

3.5 SAMPLE IDENTIFIERS

The discrete soil samples collected from the Project Site will be labeled using a site identifier prefix (“GTF”), with a boring identifier (e.g., “S3”), followed by the depth from where the sample was collected separated by an underscore. For example, a soil sample collected from 1–1.5 ft bgs at boring GTF_S3 would be labeled “GTF_S3_1-1.5ft.”

The waste characterization composite samples will be labeled using a site identifier prefix (“GTF”), with a composite subarea identifier (e.g., “AREA2”), followed by the depth from where the sample was collected separated by an underscore, followed by the composite sample identifier (e.g., “_comp”). For example, a soil sample collected from 0- to 1-ft bgs interval from the five discrete boring locations within Area 2 would be labeled “GTF_AREA2_0-1ft_comp.”

The sample identifier for the IDW composite sample will be labeled “IDW” followed by the date the sample was collected separated by an underscore. For example, a sample collected on September 29, 2021, would be labeled “IDW_20210929.”

QA/QC samples and their identifiers are further discussed in Section 6.4.

3.6 SOIL SAMPLING PROCEDURES

Each boring will be advanced using a direct push drill rig by a driller licensed in the State of Washington (SOP SL-07, Appendix A). Target boring recovery is 75% (i.e., 1.5 ft of recovery on a 2.0-ft drive). If less than 75% recovery is achieved, field staff and project manager will use best professional judgment to determine if additional borings are necessary. If necessary, additional borings will be advanced a few feet away from first boring. Up to three attempts will be made to achieve a minimum 75% sample recovery. If the 75% recovery is not achieved, the sample core with the greatest recovery will be used for logging and sampling. Soils will be logged by a geologist or engineer using the American Society for Testing and Materials (ASTM) International soil classification system in accordance with SOPs SL-04 and SL-06 (Appendix A). A boring log key is presented in Appendix B. Each soil sampling interval will be photographed with a tape measure for scale and each photograph will show the station location sample identifier written on a white board.

Sample jars will be provided by the laboratory and pre-labeled with the sample number (prefix "GTF_SL" followed by a random 3-digit number, unique to the sample for laboratory communication purposes), site name, date, time, sampler initials, preservatives (if any), and tag number (random 4-digit number that is unique to each individual sample container, in case one soil sample is contained in multiple containers). Jar types and sizes needed for each core and analysis are presented in the sample matrix (Table 2) and laboratory analyses table (Table 3). Details of the sample labeling procedure are presented in SOP AP-04 (Appendix A).

3.6.1 Sampling Interval: 0–1 ft bgs

A total of four composite soil samples (one from each subarea) will be analyzed for the following parameters for waste characterization purposes (Table 2):

- PCBs (Aroclors – U.S. Environmental Protection Agency [EPA] 8082A)
- Polycyclic aromatic hydrocarbons (PAHs) (EPA 8270E SIM)
- pH/corrosivity (SM4500-H+ B)
- Ignitability/flashpoint (ASTM D93)
- Reactive cyanides (SM4500-CN)
- Reactive sulfides (SM4500-S2)
- Toxicity characteristic leaching procedure (TCLP) (semivolatile organic compounds [SVOCs], volatile organic compounds [VOCs], pesticides, herbicides, and 12 metals).

One composite sample will be collected from each of the four subareas. Equal aliquots of soil from 0- to 1-ft bgs from each boring location within the subarea will be collected and placed in a decontaminated stainless-steel bowl. Each subarea has between four and seven discrete boring locations (Table 1). Once all boring locations in the subarea have been sampled, the composite soil sample will be thoroughly mixed until the color and texture are consistent throughout the sample. Rocks and debris greater than 0.5-in. diameter will be removed from the soil prior to placing it in pre-labeled, laboratory-supplied sample containers. Further detail on sample collection is presented in SOP SL-07 (Appendix A).

The soil samples will be placed in a cooler with ice and transported to Analytical Resources, Inc. (ARI) under chain-of-custody (COC) protocols in accordance with SOPs AP-01 and AP-03 (Appendix A).

3.6.2 Sampling Interval: 1–2 ft bgs

A total of 46 soil samples (two from each of 21 boring locations and two from each of two duplicate locations[3]) will be collected. Twenty-three of these samples, collected from 1 to 1.5 ft bgs, will be analyzed for percent solids (SM2540G), PCBs (Aroclors – EPA 8082A), and PAHs (EPA 8270E SIM). The remaining 23 samples, collected from 1.5 to 2 ft bgs, will be archived for potential future analysis (Table 2).

Discrete soil samples will be collected from each boring location as detailed in the soil sample collection and analytical matrix (Table 2). Discrete samples from each sample interval will be collected and placed in a decontaminated stainless-steel bowl. The discrete soil sample will be thoroughly mixed until the color and texture are consistent throughout the sample. Rocks and debris greater than 0.5-in. diameter will be removed from the soil prior to placing it in pre-labeled, laboratory-supplied sample containers. Further detail on sample collection is presented in SOP SL-07 (Appendix A).

The soil samples will be placed in a cooler with ice and transported to ARI under COC protocols in accordance with SOPs AP-01 and AP-03 (Appendix A).

[3] For QA/QC purposes, additional soil volume will be submitted to the laboratory for the matrix spike/matrix spike duplicate, volume permitting.

4 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

Soil cuttings and liquid IDW generated at the Project Site will be transferred into U.S. Department of Transportation–approved 55-gallon drums and temporarily stored onsite pending analytical results. Integral will coordinate with SCL to ensure that the drums are stored in a secure location or, alternatively, at a location acceptable to SCL. IDW drums will be labeled with the material type, boring numbers, and date, and will be given a unique number so that the IDW can be efficiently tracked. Representative soil samples will be collected from the drums and analyzed for PCBs (Aroclors – EPA 8082A), PAHs (EPA 8270E SIM), pH/corrosivity (SM4500-H+ B), ignitability/flashpoint (ASTM D93), reactive cyanides (SM4500-CN), reactive sulfides (SM4500-S2), and TCLP (SVOCs, VOCs, pesticides, herbicides, and 12 metals) (Table 2). Representative liquid samples will be collected from the drums and analyzed for PAHs (EPA8270E SIM), Resource Conservation and Recovery Act Metals (EPA 7470A/6010D), and TCLP VOCs (EPA 8260C) (Table 2). Details of the IDW handling procedure are presented in SOP AP-05 (Appendix A).

Solid wastes generated during the investigation (e.g., paper towels, personal protective equipment, disposable sampling equipment) will be cleansed of any gross soil contamination and will be placed in garbage bags and disposed of in a municipal landfill.

All IDW will be disposed of in accordance with all applicable regulations and guidelines. Integral will arrange for ACTEnviro to dispose of the drums within 30 days following receipt of waste characterization data from ARI.

5 LABORATORY ANALYTICAL PROCEDURES

Analytical methods, sample containers, preservation methods, and holding times are presented in Table 3. Method detection limits and reporting limits are presented in Table 4.

ARI is the laboratory selected to perform the soil chemistry analysis and waste characterization analysis due to its accreditation with the State of Washington, as well as its previous experience with the LDW.

Analytical results for PCBs and PAHs will be reported on a dry-weight basis.

5.1 ARCHIVE SAMPLE PROCEDURE

Archived samples will be stored for 6 months for potential future analysis depending on shallower sample results. Integral, in consultation with SCL, will determine the necessity of analyzing the archived samples, based on the MTCA Method A unrestricted land use screening levels of the 1- to 1.5-ft discrete sample results.

6 QUALITY ASSURANCE AND QUALITY CONTROL PLAN

This section presents the QA/QC procedures that will be implemented to ensure that the investigation data results are defensible and usable for their intended purpose. The purpose is to provide confidence in the project data results through a system of quality control performance checks of field data entry, laboratory analysis, and laboratory data reporting, and appropriate corrective actions to achieve compliance with established performance and data quality criteria.

Quality control requirements will be instituted during field sampling, laboratory analysis, and data management to ensure that the data quality objectives are met. If quality control problems are encountered, they will be brought to the attention of the Integral quality assurance coordinator. Corrective actions, if appropriate, will be implemented to meet the project's objectives.

6.1 FIELD QUALITY CONTROL SAMPLES

Field quality control samples will be collected and used to assess sample variability and evaluate potential sources of sample contamination. Field quality control samples will be collected for soil samples to be analyzed for chemical parameters. The quality control samples will include field duplicate samples and equipment rinsate blanks to be collected in the field and analyzed by the analytical laboratory:

- Field duplicate samples are collocated samples collected identically over a minimum period of time to measure field and laboratory variance, including variance resulting from sample heterogeneity. Field duplicate samples will be prepared by collecting two separate sets of samples from the same station and submitting them for analysis as individual samples. During the study, field duplicate samples will be collected at two of the planned stations (to be selected by the field lead) and each will be collected within 5 ft of the original station's boring location.
- One equipment rinse blank per 20 samples will be collected to help identify possible contamination from the sampling environment or from the non-dedicated sampling equipment. The rinse blank will be obtained by pouring analytical laboratory–supplied distilled water over at least three items of non-dedicated sampling equipment after a decontamination event (between samples). The water will be collected in a laboratory-provided jar and analyzed for PCBs (Aroclors) and PAHs. The equipment rinse blank sample will be clearly noted in the field logbook (e.g., sample identifier, equipment type, date and time of collection, and analysis).

Additional details regarding procedures to follow for collecting field quality control samples are provided in SOP SL-02 (Appendix A).

6.2 ANALYTICAL QUALITY CONTROL SAMPLES

Detailed requirements for laboratory quality control procedures are provided in the analytical method protocols (see methods in Table 3). Every method protocol includes descriptions of quality control procedures, and many incorporate additional quality control requirements by reference to separate quality control chapters in the protocols. Quality control requirements include control limits and requirements for corrective action in many cases. Quality control procedures will be completed by the laboratory, as required in each protocol.

For chemical analyses, the frequency of analysis for laboratory control samples, matrix spike/matrix spike duplicates (MS/MSD[4]) or laboratory duplicates, and method blanks will be 1 for every 20 samples or 1 per extraction batch, whichever is more frequent. Internal standards will be added to every field sample and quality control sample, as required. Calibration procedures will be completed at the frequency specified in each method description. As required for EPA SW-846 methods, performance-based control limits have been established by the laboratory. These and all other control limits specified in the method descriptions will be used by the laboratory to establish the acceptability of the data or the need for reanalysis of the samples.

6.3 DATA VALIDATION

The analytical laboratory begins the data validation process for analytical samples with the review and evaluation of data by the laboratory quality assurance manager. It is the responsibility of the laboratory analyst to confirm that the analytical data are correct and complete, that appropriate procedures have been followed, and that quality control results have been compared with acceptable limits. The Integral laboratory quality assurance coordinator is responsible for confirming that all analyses performed by the analytical laboratories are correct and properly documented.

All laboratory data will be validated by Integral. The data will undergo Stage 2b validation described in EPA's *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (USEPA 2009). If problems or questions are encountered during validation, the laboratory will be contacted for resolution. The data will be validated using procedures described in the following EPA guidance documents for data validation:

- *Guidance on Environmental Data Verification and Data Validation* (USEPA 2002)
- *National Functional Guidelines for Organic Superfund Methods Data Review* (USEPA 2020a)

[4] MS/MSDs are samples prepared from a field sample matrix or clean matrix, respectively, and are spiked with known amounts of analytes. Laboratory control samples will be analyzed for PCBs and PAHs.

- *National Functional Guidelines for Inorganic Superfund Methods Data Review* (USEPA 2020b).

The accuracy and completion of the database will be verified at the laboratory when the electronic data deliverables (EDDs) are prepared and again as part of independent data validation. The data validator will confirm 10% of entries to the database from laboratory EDDs against hard-copy data packages. In addition to verification of field and laboratory data and information, final validation data qualifier entries into the database will be verified. Any discrepancies will be resolved before the final database is released for use.

Reported method detection limits (MDLs) for non-detects will be compared to the MDL goals to evaluate method sensitivity for each sample. A discussion of any exceedance of actual MDLs over the target MDLs will be archived with the data.

6.4 QA/QC SAMPLE IDENTIFIERS

Duplicate sample IDs will be appended with "_dup." For example, a duplicate sample of "GTF_S3_1-1.5ft" would be "GTF_S3_1-1.5ft_dup." Sample numbers (not sample IDs) are included on the COC form submitted to the laboratory; sample numbers will not identify duplicates. Continuing the example, sample numbers for the same samples could be, for example, GTF_SL012 and GTF_SL013. Sample IDs and their associated sample numbers will be documented in the field using the sample matrix (Table 2).

For equipment rinse blanks, sequential numbers starting at 900 will be assigned to each blank instead of station numbers. For example, the first equipment rinse blank for a soil sample collected using a stainless-steel spoon and stainless-steel bowl will be labeled as GTF_SLEB_901S. On the other hand, the second equipment rinse blank for a soil sample collected using a coring device will be labeled as GTF_SLEB_902C (where SL = soil, EB = equipment blank, S = stainless-steel spoon and bowl, and C = core).

7 DATA MANAGEMENT, EVALUATION, AND REPORTING

7.1 DATA MANAGEMENT

Data will be integrated into a project database. The data manager will facilitate data validation, support data evaluation, and generate summary tables for final reporting. Validated data will be compiled and submitted for integration into the Washington State Department of Ecology's Environmental Information Management database.

7.2 DATA EVALUATION AND REPORTING

Analytical results will be compared to MTCA Method A unrestricted land use screening levels. This comparison will provide a conservative assessment of potential exposure (i.e., the property presently qualifies as industrial). Integral will then prepare a letter report to present the results of the investigation, provided in summary text, tables, and figures, along with Integral's conclusions with respect to the Project Site. Laboratory and data validation reports will be included as attachments.

8 SCHEDULE

The private utility locate is scheduled for September 29, 2021. The soil investigation will be conducted on September 29–30, 2021. Sample collection is anticipated to take 2 days. Analytical data are anticipated to be available within 15 business days of submittal to the analytical laboratory. Validation is expected to be complete within 15 business days of receipt of laboratory EDDs and the final report. A draft letter report will be provided for SCL, SPR, and SDOT to review within 4 to 6 weeks after completion of data validation.

9 PROJECT MANAGEMENT

Shannon Ashurst is the project manager for this project. David Livermore is the Principal. All roles and contact information are detailed below.

Role	Name	Organization	Contact Information
Principal	David Livermore, R.G., L.H.G.	Integral Consulting Inc.	(503) 943-3613
Project Manager	Shannon Ashurst	Integral Consulting Inc.	(206) 957-0373
Client Contact	Allison Crowley	Seattle City Light	(206) 684-3167
Field Lead/Site Safety Officer	Mauri Fabio	Integral Consulting Inc.	(503) 780-9502
Field Staff	Kelsey Kirkland	Integral Consulting Inc.	(206) 957-0308
Laboratory Quality Assurance Coordinator	Glenn Esler	Integral Consulting Inc.	(503) 943-3617
Chemistry Laboratory	Sue Dunnihoo	Analytical Resources, Inc.	(206) 695-6207
Drilling Contractor	Kasey Goble	Cascade Environmental	(425) 485-8908 ext. 2126
Private Utility Locator	Lucas Devereau	Applied Professional Services Inc.	(425) 941-6288
Drum Disposal	Kyle Satterthwaite	ACTEnviro	(253) 334-9256

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Figures

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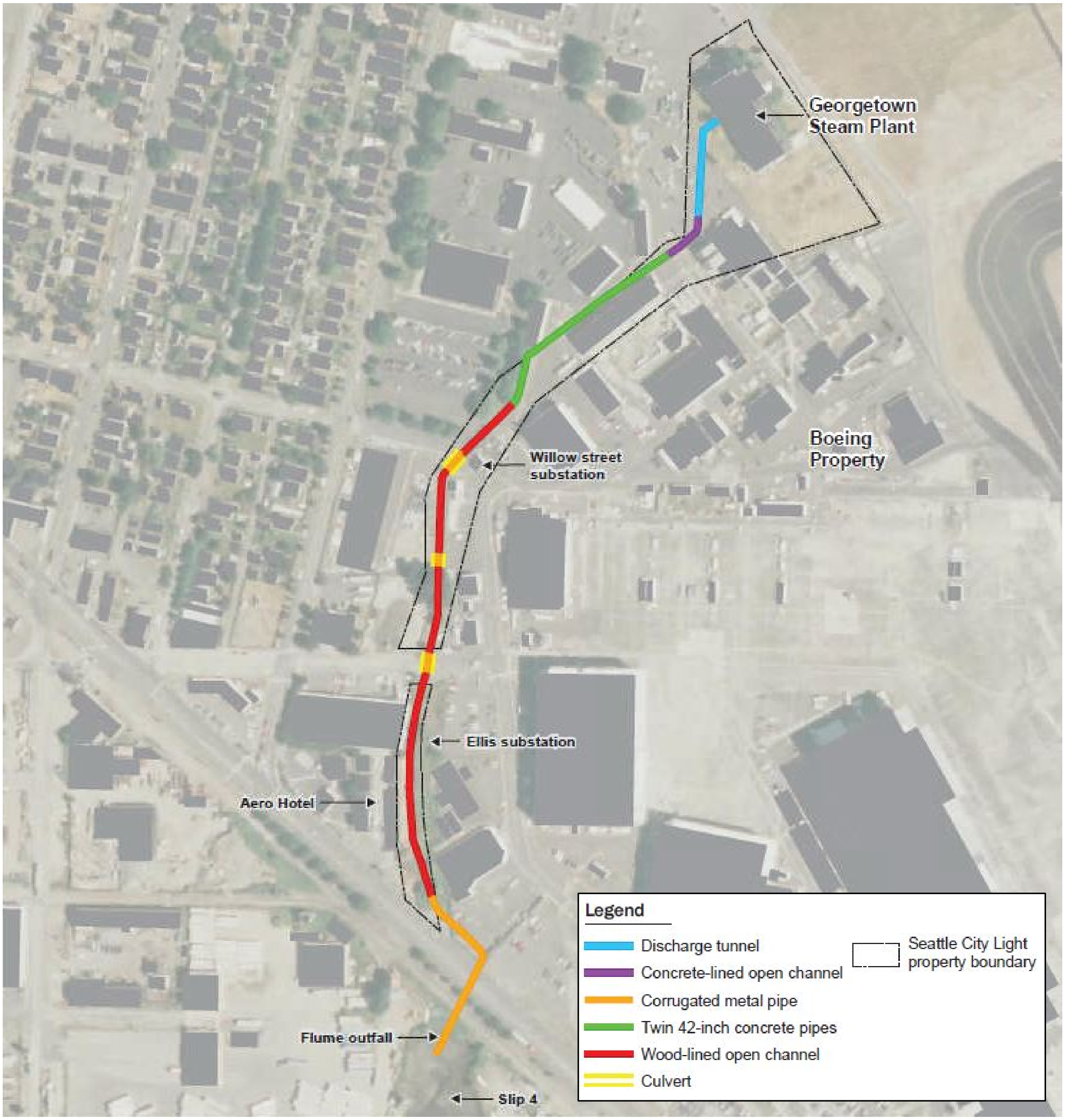
integral consulting inc.

Figure 1.
Project Site Vicinity Map

N:\GIS\Projects\C1408 SeaRIFS SCL\Production MXDs\Parks Project\GTSP Fig Support\Figure 2 Flume vs Project.mxd 8/2/2021 12:10:16 PM

integral consulting inc.

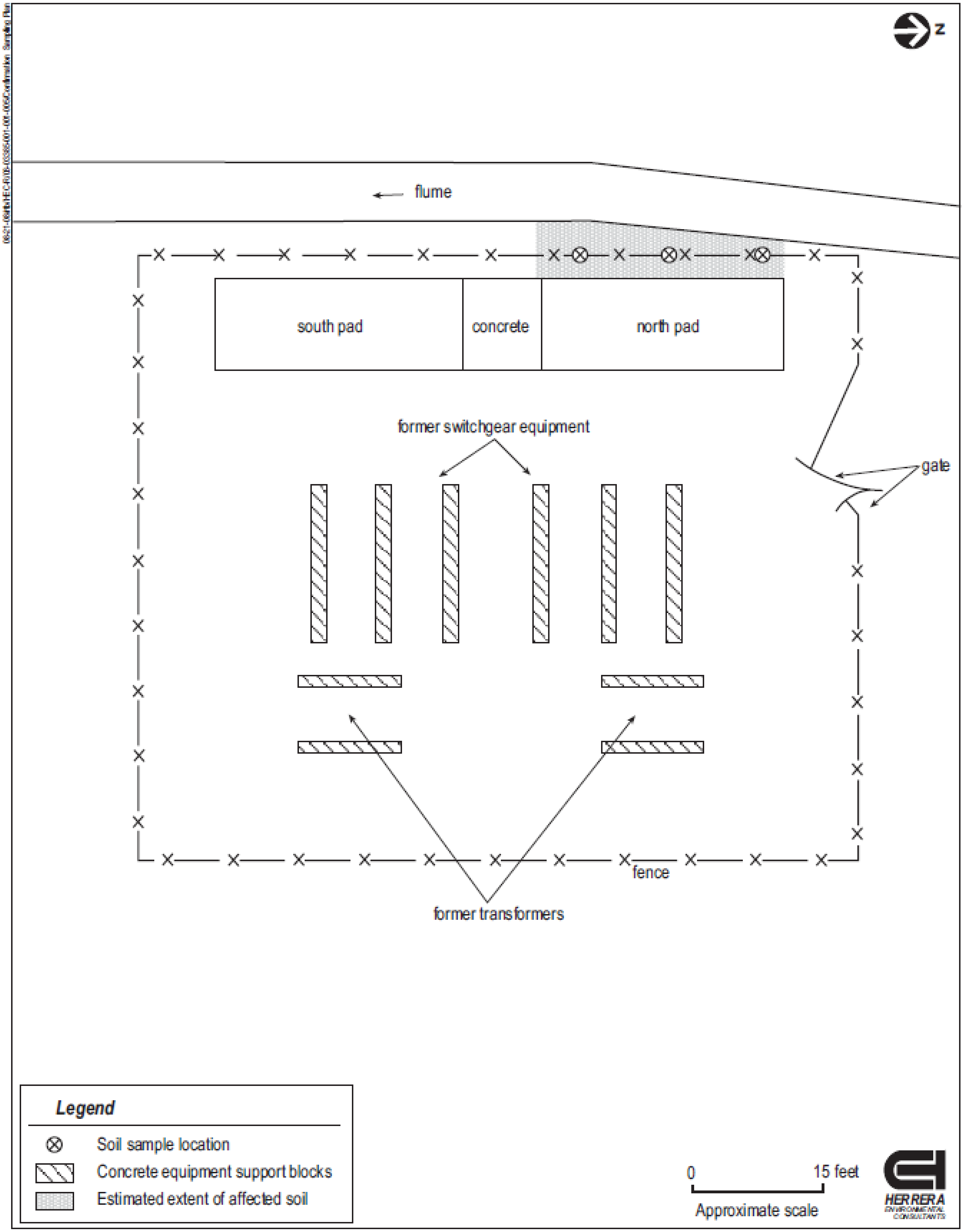
Figure 2.
Flume Removal Action Area Relative to Project Site



integral consulting inc.

Source:
Herrera 2010, Figure 2

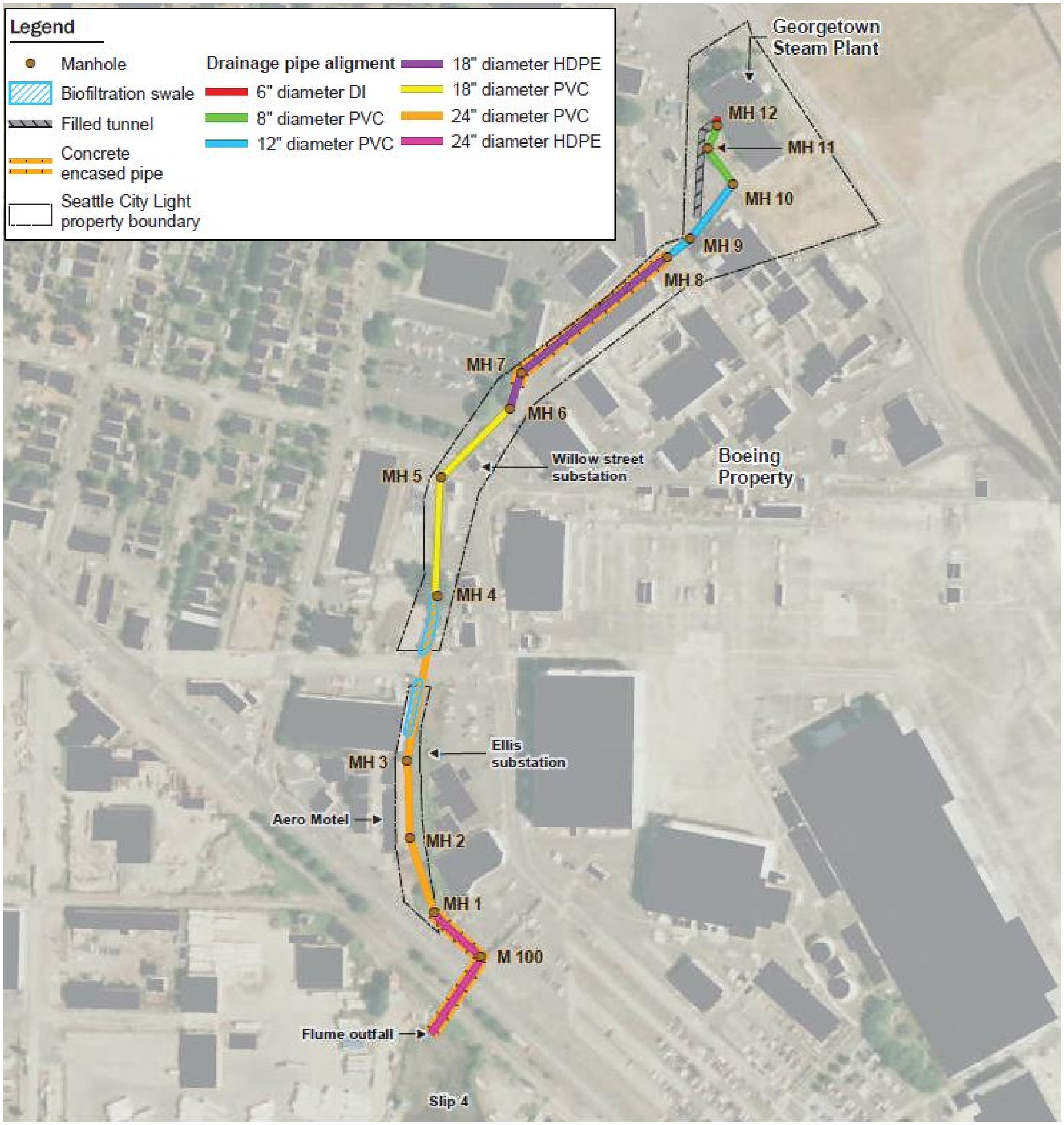
Figure 3.
Former Georgetown Flume



integral consulting inc.

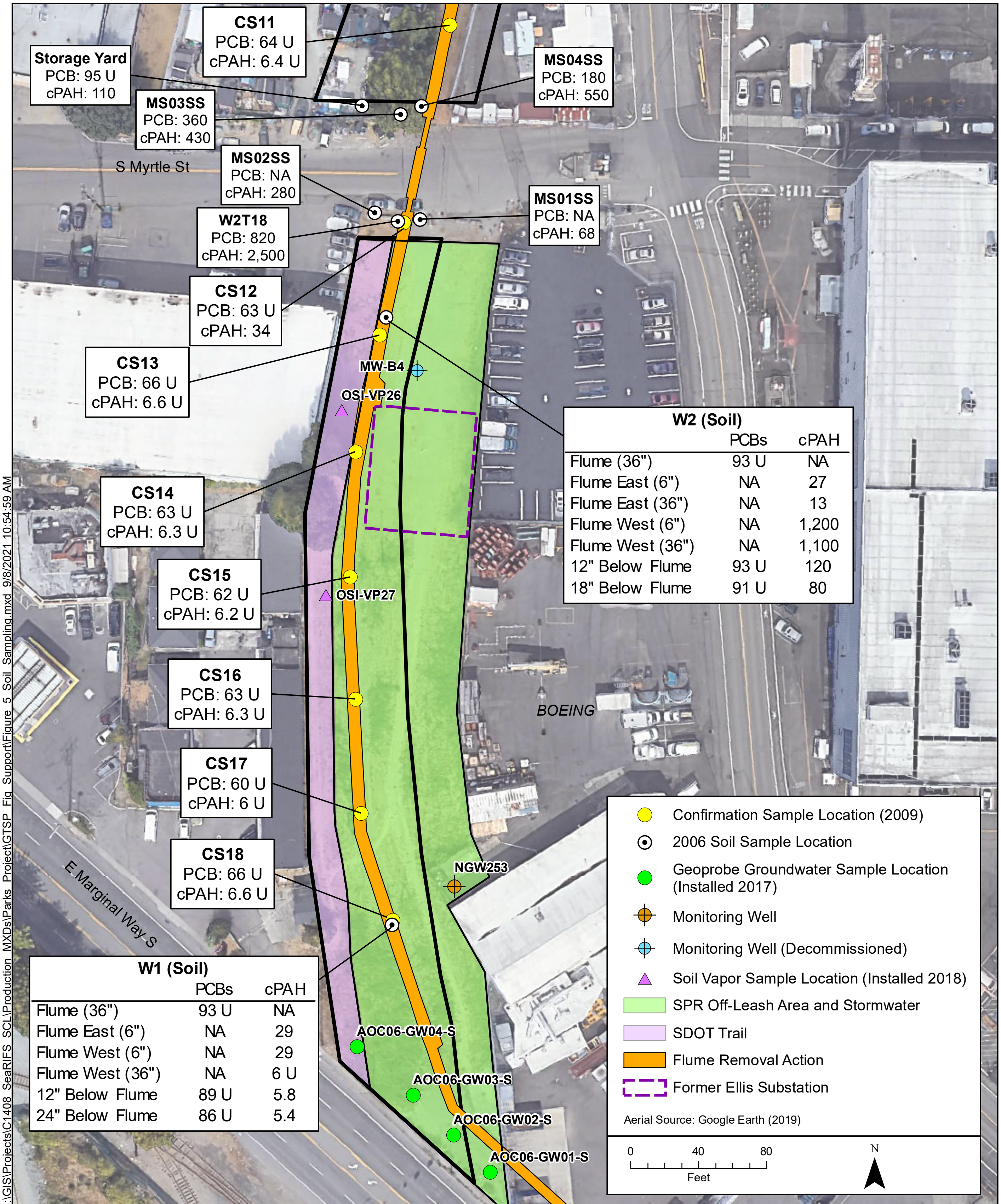
Source:
Herrera 2009, Figure 4-4

Figure 4.
Former Ellis Substation



Source:
Herrera 2010, Figure 3

Figure 5.
Current Georgetown Stormwater Piping System



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Note:
Analytical values reported in micrograms per kilogram (µg/kg). cPAH presented as Toxic equivalents (TEQ). U-flag indicates non-detected result. 1998, 2005, and 2006 locations are approximate.

Figure 6.
Flume Removal Action Area - Historical and Confirmation Soil Sample Results

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Figure 7.
Proposed Soil Sample Locations

Tables

Table 1. Sample Locations, Coordinates, Rationales, and Depth Intervals

Area	Location	X[a]	Y[a]	Chemistry Sampling Rationale	0 to 1 ft Composite	1 to 1.5 ft Discrete	1.5 to 2 ft Discrete Archive
1	GTF_S1	1273430.69482	200261.707605	• Composite and analyze interval from 0 to 1 ft for waste characterization parameters of Area 1. • Analyze discrete 1- to 1.5-ft interval for chemicals of interest (PAHs, PCBs). • Archive discrete 1.5- to 2-ft interval.	X	X	A
	GTF_S2	1273411.32648	200174.878723			X	A
	GTF_S3	1273399.42146	200111.707922			X	A
	GTF_S4	1273400.78078	200028.218561			X	A
	GTF_S5	1273400.49707	199946.938517			X	A
	GTF_S6	1273409.59981	199860.926508			X	A
	GTF_S7	1273422.52975	199811.037133			X	A
2	GTF_S8	1273488.24687	200260.665830	• Composite and analyze interval from 0 to 1 ft for waste characterization parameters of Area 2. • Analyze discrete 1- to 1.5-ft interval for chemicals of interest (PAHs, PCBs). • Archive discrete 1.5- to 2-ft interval.	X	X	A
	GTF_S9	1273472.53087	200211.037336			X	A
	GTF_S10	1273452.30900	200061.186910			X	A
	GTF_S11	1273451.00668	200009.363838			X	A
	GTF_S12	1273451.00653	199960.405589			X	A
3	GTF_S13	1273450.74664	200159.103412	• Composite and analyze interval from 0 to 1 ft for waste characterization parameters of Area 3. • Analyze discrete 1- to 1.5-ft interval for chemicals of interest (PAHs, PCBs). • Archive discrete 1.5- to 2-ft interval.	X	X	A
	GTF_S14	1273478.03364	200154.597461			X	A
	GTF_S15	1273458.68126	200134.226471			X	A
	GTF_S16	1273449.46730	200113.009661			X	A
	GTF_S17	1273471.92230	200109.781277			X	A
4	GTF_S18	1273462.98520	199859.884741	• Composite and analyze interval from 0 to 1 ft for waste characterization parameters of Area 4. • Analyze discrete 1- to 1.5-ft interval for chemicals of interest (PAHs, PCBs). • Archive discrete 1.5- to 2-ft interval.	X	X	A
	GTF_S19	1273484.24295	199830.389672			X	A
	GTF_S20	1273488.28576	199777.223089			X	A
	GTF_S21	1273451.00592	199760.145106			X	A

Notes:

[a] Coordinates are in Washington State Plan North NAD83 feet (EPSG 2285)
A = archive sample collection for pending analysis
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
X = sample collection for planned analysis

Table 2. Sample Matrix

Station	Location Type	Sample ID	Sample Number	Sample Type	Approximate Sample Volume Required	Sample Date	Sample Time	Sample Interval	Chemical Delineation				Waste Characterization/IDW Solids							IDW Liquids			Equipment Blanks	
									Archive Samples	Percent Solids (SM 2540G)	PCBs (Aroclors - EPA 8082A)	PAHs (EPA 8270E SIM)	PCBs (Aroclors - EPA 8082A)	PAHs (EPA 8270E SIM)	pH/Corosivity (SM4500-H+ B) Ignitability/Flashpoint (ASTM D93)	Reactive Cyanides (SM4500-CN)	Reactive Sulfides (SM4500-S2)	TCLP (SVOC/Metals/Pesticides/ Herbicides)	TCLP (VOCs)	PAHs (EPA 8270E SIM)	RCRA (8) Metals	VOCs (TCLP list)	PCBs (Aroclors - EPA 8082A)	PAHs (EPA 8270E SIM)
									8 oz WMG	8 oz WMG			8 oz WMG		32 oz WMG				2 oz WMG	500 mL AG	250 mL HDPE	3x40 mL Vials	500 mL AG	500 mL AG
									≤6° C	≤6° C			≤6° C		≤6° C	≤6° C	≤6° C	≤6° C	≤6° C, with septa	≤6° C	≤6° C, pH < 2 w/HNO3	≤6° C, pH < 2 w/HCl	≤6° C	≤6° C
Area 1 (GTF_S1, GTF_S2, GTF_S3, GTF_S4, GTF_S5, GTF_S6, GTF_S7)	Composite	GTF_AREA1_0-1ft_comp	GTF_SL001	Normal	44 oz / ~0.5 gal								○	○	○	○	○	○	○					
Area 2 (GTF_S8, GTF_S9, GTF_S10, GTF_S11, GTF_S12)	Composite	GTF_AREA2_0-1ft_comp	GTF_SL002	Normal	44 oz / ~0.5 gal								○	○	○	○	○	○	○					
Area 3 (GTF_S13, GTF_S14, GTF_S15, GTF_S16, GTF_S17)	Composite	GTF_AREA3_0-1ft_comp	GTF_SL003	Normal	44 oz / ~0.5 gal								○	○	○	○	○	○	○					
Area 4 (GTF_S18, GTF_S19, GTF_S20, GTF_S21)	Composite	GTF_AREA4_0-1ft_comp	GTF_SL004	Normal	44 oz / ~0.5 gal								○	○	○	○	○	○	○					
GTF_S1	Soil core to 2 ft	GTF_S1_1-1.5ft	GTF_SL005	Normal	8 oz					○	○	○												
		GTF_S1_1.5-2ft	GTF_SL006	Archive	8 oz				○															
GTF_S2	Soil core to 2 ft	GTF_S2_1-1.5ft	GTF_SL007	Normal	8 oz					○	○	○												
		GTF_S2_1.5-2ft	GTF_SL008	Archive	8 oz				○															
GTF_S3	Soil core to 2 ft	GTF_S3_1-1.5ft	GTF_SL009	Normal	8 oz					○	○	○												
		GTF_S3_1.5-2ft	GTF_SL010	Archive	8 oz				○															

Table 2. Sample Matrix

Station	Location Type	Sample ID	Sample Number	Sample Type	Approximate Sample Volume Required	Sample Date	Sample Time	Sample Interval	Chemical Delineation				Waste Characterization/IDW Solids							IDW Liquids			Equipment Blanks	
									Archive Samples	Percent Solids (SM 2540G)	PCBs (Aroclors - EPA 8082A)	PAHs (EPA 8270E SIM)	PCBs (Aroclors - EPA 8082A)	PAHs (EPA 8270E SIM)	pH/Corosivity (SM4500-H+ B) Ignitability/Flashpoint (ASTM D93)	Reactive Cyanides (SM4500-CN)	Reactive Sulfides (SM4500-S2)	TCLP (SVOC/Metals/Pesticides/ Herbicides)	TCLP (VOCs)	PAHs (EPA 8270E SIM)	RCRA (8) Metals	VOCs (TCLP list)	PCBs (Aroclors - EPA 8082A)	PAHs (EPA 8270E SIM)
									8 oz WMG	8 oz WMG			8 oz WMG		32 oz WMG				2 oz WMG	500 mL AG	250 mL HDPE	3x40 mL Vials	500 mL AG	500 mL AG
									≤6° C	≤6° C			≤6° C		≤6° C	≤6° C	≤6° C	≤6° C	≤6° C, with septa	≤6° C	≤6° C, pH < 2 w/HNO3	≤6° C, pH < 2 w/HCl	≤6° C	≤6° C
GTF_S4	Soil core to 2 ft	GTF_S4_1-1.5ft	GTF_SL011	Normal	8 oz					○	○	○												
		GTF_S4_1.5-2ft	GTF_SL012	Archive	8 oz				○															
GTF_S5	Soil core to 2 ft	GTF_S5_1-1.5ft	GTF_SL013	Normal	8 oz					○	○	○												
		GTF_S5_1.5-2ft	GTF_SL014	Archive	8 oz				○															
GTF_S6	Soil core to 2 ft	GTF_S6_1-1.5ft	GTF_SL015	Normal	8 oz					○	○	○												
		GTF_S6_1.5-2ft	GTF_SL016	Archive	8 oz				○															
GTF_S7	Soil core to 2 ft	GTF_S7_1-1.5ft	GTF_SL017	Normal	8 oz					○	○	○												
		GTF_S7_1.5-2ft	GTF_SL018	Archive	8 oz				○															
GTF_S8	Soil core to 2 ft	GTF_S8_1-1.5ft	GTF_SL019	Normal	8 oz					○	○	○												
		GTF_S8_1.5-2ft	GTF_SL020	Archive	8 oz				○															
GTF_S9	Soil core to 2 ft	GTF_S9_1-1.5ft	GTF_SL021	Normal	8 oz					○	○	○												
		GTF_S9_1.5-2ft	GTF_SL022	Archive	8 oz				○															
GTF_S10	Soil core to 2 ft	GTF_S10_1-1.5ft	GTF_SL023	Normal	8 oz					○	○	○												
		GTF_S10_1.5-2ft	GTF_SL024	Archive	8 oz				○															
GTF_S11	Soil core to 2 ft	GTF_S11_1-1.5ft	GTF_SL025	Normal	8 oz					○	○	○												
		GTF_S11_1.5-2ft	GTF_SL026	Archive	8 oz				○															
GTF_S12	Soil core to 2 ft	GTF_S12_1-1.5ft	GTF_SL027	Normal	8 oz					○	○	○												
		GTF_S12_1.5-2ft	GTF_SL028	Archive	8 oz				○															

Table 2. Sample Matrix

Station	Location Type	Sample ID	Sample Number	Sample Type	Approximate Sample Volume Required	Sample Date	Sample Time	Sample Interval	Chemical Delineation				Waste Characterization/IDW Solids							IDW Liquids			Equipment Blanks	
									Archive Samples	Percent Solids (SM 2540G)	PCBs (Aroclors - EPA 8082A)	PAHs (EPA 8270E SIM)	PCBs (Aroclors - EPA 8082A)	PAHs (EPA 8270E SIM)	pH/Corosivity (SM4500-H+ B) Ignitability/Flashpoint (ASTM D93)	Reactive Cyanides (SM4500-CN)	Reactive Sulfides (SM4500-S2)	TCLP (SVOC/Metals/Pesticides/ Herbicides)	TCLP (VOCs)	PAHs (EPA 8270E SIM)	RCRA (8) Metals	VOCs (TCLP list)	PCBs (Aroclors - EPA 8082A)	PAHs (EPA 8270E SIM)
									8 oz WMG	8 oz WMG			8 oz WMG		32 oz WMG				2 oz WMG	500 mL AG	250 mL HDPE	3x40 mL Vials	500 mL AG	500 mL AG
									≤6° C	≤6° C			≤6° C		≤6° C	≤6° C	≤6° C	≤6° C	≤6° C, with septa	≤6° C	≤6° C, pH < 2 w/HNO3	≤6° C, pH < 2 w/HCl	≤6° C	≤6° C
GTF_S13	Soil core to 2 ft	GTF_S13_1-1.5ft	GTF_SL029	Normal	8 oz					○	○	○												
		GTF_S13_1.5-2ft	GTF_SL030	Archive	8 oz				○															
GTF_S14	Soil core to 2 ft	GTF_S14_1-1.5ft	GTF_SL031	Normal	8 oz					○	○	○												
		GTF_S14_1.5-2ft	GTF_SL032	Archive	8 oz				○															
GTF_S15	Soil core to 2 ft	GTF_S15_1-1.5ft	GTF_SL033	Normal	8 oz					○	○	○												
		GTF_S15_1.5-2ft	GTF_SL034	Archive	8 oz				○															
GTF_S16	Soil core to 2 ft	GTF_S16_1-1.5ft	GTF_SL035	Normal	8 oz					○	○	○												
		GTF_S16_1.5-2ft	GTF_SL036	Archive	8 oz				○															
GTF_S17	Soil core to 2 ft	GTF_S17_1-1.5ft	GTF_SL037	Normal	8 oz					○	○	○												
		GTF_S17_1.5-2ft	GTF_SL038	Archive	8 oz				○															
GTF_S18	Soil core to 2 ft	GTF_S18_1-1.5ft	GTF_SL039	Normal	8 oz					○	○	○												
		GTF_S18_1.5-2ft	GTF_SL040	Archive	8 oz				○															
GTF_S19	Soil core to 2 ft	GTF_S19_1-1.5ft	GTF_SL041	Normal	8 oz					○	○	○												
		GTF_S19_1.5-2ft	GTF_SL042	Archive	8 oz				○															
GTF_S20	Soil core to 2 ft	GTF_S20_1-1.5ft	GTF_SL043	Normal	8 oz					○	○	○												
		GTF_S20_1.5-2ft	GTF_SL044	Archive	8 oz				○															
GTF_S21	Soil core to 2 ft	GTF_S21_1-1.5ft	GTF_SL045	Normal	8 oz					○	○	○												
		GTF_S21_1.5-2ft	GTF_SL046	Archive	8 oz				○															

Table 2. Sample Matrix

									Chemical Delineation				Waste Characterization/IDW Solids							IDW Liquids			Equipment Blanks	
									Archive Samples	Percent Solids (SM 2540G)	PCBs (Aroclors - EPA 8082A)	PAHs (EPA 8270E SIM)	PCBs (Aroclors - EPA 8082A)	PAHs (EPA 8270E SIM)	pH/Corosivity (SM4500-H+ B) Ignitability/Flashpoint (ASTM D93)	Reactive Cyanides (SM4500-CN)	Reactive Sulfides (SM4500-S2)	TCLP (SVOC/Metals/Pesticides/ Herbicides)	TCLP (VOCs)	PAHs (EPA 8270E SIM)	RCRA (8) Metals	VOCs (TCLP list)	PCBs (Aroclors - EPA 8082A)	PAHs (EPA 8270E SIM)
									8 oz WMG	8 oz WMG			8 oz WMG		32 oz WMG				2 oz WMG	500 mL AG	250 mL HDPE	3x40 mL Vials	500 mL AG	500 mL AG
Station	Location Type	Sample ID	Sample Number	Sample Type	Approximate Sample Volume Required	Sample Date	Sample Time	Sample Interval	≤6° C	≤6° C			≤6° C		≤6° C	≤6° C	≤6° C	≤6° C	≤6° C, with septa	≤6° C	≤6° C, pH < 2 w/HNO3	≤6° C, pH < 2 w/HCl	≤6° C	≤6° C
	Field duplicate core 1-1.5 ft		GTF_SL047	QC sample	8 oz					○	○	○												
	Field duplicate core 1.5-2 ft		GTF_SL048	QC sample	8 oz				○															
	Field duplicate core 1-1.5 ft		GTF_SL049	QC sample	8 oz					○	○	○												
	Field duplicate core 1.5-2 ft		GTF_SL050	QC sample	8 oz				○															
	Equipment Rinse Blank	GTF_SLEB_9_ _ _	GTF_SL051	QC sample	1 L																		○	○
	Equipment Rinse Blank	GTF_SLEB_9_ _ _	GTF_SL052	QC sample	1 L																		○	○
	Equipment Rinse Blank	GTF_SLEB_9_ _ _	GTF_SL053	QC sample	1 L																		○	○
	IDW grab	GTF_IDW_ _ _ _ _ _ _ _	GTF_SL054	QC sample	44 oz / ~0.5 gal								○	○	○	○	○	○	○					
	IDW grab	GTF_IDW_ _ _ _ _ _ _ _	GTF_SL055	QC sample	44 oz / ~0.5 gal															○	○	○		

Notes:
AG = amber glass
ASTM = ASTM International
EPA = U.S. Environmental Protection Agency
IDW = investigation-derived waste
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
QC = quality control
SIM = selective ion monitoring
SM = Standard Methods for the Examination of Water and Wastewater
SVOC = semivolatile organic compound
TCLP = toxicity characteristic leaching procedure
VOC = volatile organic compound
WMG = wide mouth glass

Table 3. Laboratory Analyses

Analysis	Matrix	Method	Container Type	Preservation	Holding Time
Chemical Delineation					
Percent Solids	Soil	SM2540G	Glass WM, Clear, 8 oz	Cool ≤6˚C	7 days
PCB Aroclors	Soil	EPA 8082A			1 year/40 days[a]
PAHs	Soil	EPA 8270E SIM			14/40 days[b]
Waste Characterization					
PCB Aroclors	Soil	EPA 8082A	Glass WM, Clear, 8 oz	Cool ≤6˚C	1 year/40 days[a]
PAHs	Soil	EPA 8270E SIM			14/40 days[b]
pH/Corrosivity	Soil	SM4500-H+ B	Glass WM, Clear, 32 oz	Cool ≤6˚C	24 hours
Ignitability/Flashpoint	Soil	ASTM D93		Cool ≤6˚C	14 days
Reactive Cyanide	Soil	SM4500-CN		Cool ≤6˚C	14 days
Reactive Sulfide	Soil	SM4500-S2		Cool ≤6˚C	14 days
TCLP SVOCs	Soil	EPA 1311/8270D		Cool ≤6˚C	14/7/40 days[c]
TCLP Pesticides	Soil	EPA 1311/8270D		Cool ≤6˚C	14/7/40 days[c]
TCLP Herbicides	Soil	EPA 1311/8015A		Cool ≤6˚C	14/7/40 days[c]
TCLP Metals	Soil	EPA 1311/7470A/6010D		Cool ≤6˚C	180(28)/180(28) days[d]
TCLP VOCs	Soil	EPA 1311/8260C	Glass WM, Clear, 2 oz with septa	Cool ≤6˚C	14/14 days[e]
Investigation-Derived Waste					
PCB Aroclors	Soil	EPA 8082A	Glass WM, Clear, 8 oz	Cool ≤6˚C	1 year/40 days[a]
PAHs	Soil	EPA 8270E SIM			14/40 days[b]
pH/Corrosivity	Soil	SM4500-H+ B	Glass WM, Clear, 32 oz	Cool ≤6˚C	24 hours
Ignitability/Flashpoint	Soil	ASTM D93		Cool ≤6˚C	14 days
Reactive Cyanide	Soil	SM4500-CN		Cool ≤6˚C	14 days
Reactive Sulfide	Soil	SM4500-S2		Cool ≤6˚C	14 days
TCLP SVOCs	Soil	EPA 1311/8270D		Cool ≤6˚C	14/7/40 days[c]
TCLP Pesticides	Soil	EPA 1311/8270D		Cool ≤6˚C	14/7/40 days[c]
TCLP Herbicides	Soil	EPA 1311/8015A		Cool ≤6˚C	14/7/40 days[c]
TCLP Metals	Soil	EPA 1311/7470A/6010D		Cool ≤6˚C	180(28)/180(28) days[d]
TCLP VOCs	Soil	EPA 1311/8260C	Glass WM, Clear, 4 oz with septa	Cool ≤6˚C	14/14 days[e]
PAHs	Water	EPA 8270E SIM	500 mL AG	Cool ≤6˚C	7/40 days[f]
RCRA Metals	Water	EPA 7470A/6010D	250 ml HDPE	Cool ≤6˚C pH<2 w/HNO3	180 days
VOCs (TCLP list)	Water	EPA 8260C	40 mL Glass Vial with septa	Cool ≤6˚C pH<2 w/HCl	14 days

Table 3. Laboratory Analyses

Analysis	Matrix	Method	Container Type	Preservation	Holding Time
Equipment Blank					
PCB Aroclors	Water	EPA 8082A	500 mL AG	Cool ≤6˚C	7/40 days[f]
PAHs	Water	EPA 8270E SIM	500 mL AG	Cool ≤6˚C	7/40 days[f]

Notes:

AG = amber glass
ASTM = ASTM International
EPA = U.S. Environmental Protection Agency
HCl = hydrochloric acid
HNO3 = nitric acid
HPDE = high density polyethylene
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SIM = selective ion monitoring
SM = Standard Methods for the Examination of Water and Wastewater
SVOC = semivolatile organic compound
TCLP = toxicity characteristic leaching procedure
VOC = volatile organic compound
WM = wide mouth

[a]1 year to extraction, 40 days to analysis
[b]14 days to extraction, 40 days to analysis
[c]14 days to TCLP extraction, 7 days to extraction, 40 days to analysis
[d] 180 days to TCLP extraction, 180 days to analysis (28/28 days for mercury)
[e]14 days to TCLP extraction, 14 days to analysis
[f]7 days to extraction, 40 days to analysis

Table 4. Method Detection Limits and Reporting Limits

Analysis	Units	Method Detection Limits	Reporting Limits
Soils			
PCB Aroclors (EPA 8082A)			
Aroclor 1016	µg/kg	8	20
Aroclor 1221	µg/kg	8	20
Aroclor 1232	µg/kg	8	20
Aroclor 1242	µg/kg	8	20
Aroclor 1248	µg/kg	8	20
Aroclor 1254	µg/kg	8	20
Aroclor 1260	µg/kg	9.3	20
Aroclor 1262	µg/kg	9.3	20
Aroclor 1268	µg/kg	9.3	20
PAHs (EPA 8270E SIM)			
Naphthalene	µg/kg	1.28	5
2-Methylnaphthalene	µg/kg	1.1	5
1-Methylnaphthalene	µg/kg	0.401	5
Acenaphthylene	µg/kg	1.08	5
Acenaphthene	µg/kg	0.571	5
Dibenzofuran	µg/kg	1.38	5
Fluorene	µg/kg	0.631	5
Phenanthrene	µg/kg	0.718	5
Anthracene	µg/kg	0.871	5
Fluoranthene	µg/kg	0.47	5
Pyrene	µg/kg	0.626	5
Benzo(a)anthracene	µg/kg	0.824	5
Chrysene	µg/kg	1.05	5
Benzo(b)fluoranthene	µg/kg	1.37	5
Benzo(k)fluoranthene	µg/kg	0.76	5
Benzo(j)fluoranthene	µg/kg	0.68	5
Benzofluoranthenes, Total	µg/kg	3.01	10
Benzo(a)pyrene	µg/kg	0.614	5
Indeno(1,2,3-cd)pyrene	µg/kg	1.05	5
Dibenzo(a,h)anthracene	µg/kg	0.891	5
Benzo(g,h,i)perylene	µg/kg	1.06	5
General Chemistry			
Reactive Cyanide (SM4500-CN)	mg/kg	0.01	0.01
Reactive Sulfide (SM4500-S2)	mg/kg	0.1	0.1
Percent Solids (SM2540G)	%	0.1	0.1

Table 4. Method Detection Limits and Reporting Limits

Analysis	Units	Method Detection Limits	Reporting Limits
TCLP SVOCs (EPA 1311/8270D)			
o-Cresol	mg/L	0.00037	0.01
m-Cresol	mg/L	0.00037	0.01
p-Cresol	mg/L	0.00037	0.01
1,4-Dichlorobenzene	mg/L	0.01	0.01
2,4-Dinitrotoluene	mg/L	0.00021	0.01
Hexachlorobenzene	mg/L	0.0002	0.01
Hexachlorobutadiene	mg/L	0.00011	0.01
Hexachloroethane	mg/L	0.0001	0.01
Nitrobenzene	mg/L	0.0002	0.005
Pentachlorophenol	mg/L	0.0002	0.01
Pyridine	mg/L	0.01	0.1
2,4,5-Trichlorophenol	mg/L	0.01	0.01
2,4,6-Trichlorophenol	mg/L	0.00016	0.01
TCLP Pesticides (EPA 1311/8270D)			
Chlordane	mg/L	0.01	0.01
Endrin	mg/L	0.01	0.01
Heptachlor	mg/L	0.005	0.01
Heptachlor Epoxide	mg/L	0.005	0.005
Lindane	mg/L	0.0003	0.01
Methoxychlor	mg/L	0.01	0.01
Toxaphene	mg/L	0.5	0.5
TCLP Herbicides (EPA 1311/8015A)			
2,4-D	mg/L	0.0005	0.005
2,4,5-TP (Silvex)	mg/L	0.0005	0.005
TCLP Metals (EPA 1311/7470A/6010D)			
Arsenic	mg/L	0.008	0.025
Barium	mg/L	0.001	0.002
Cadmium	mg/L	0.0006	0.01
Chromium	mg/L	0.001	0.01
Lead	mg/L	0.006	0.01
Mercury	mg/L	0.0005	0.0005
Selenium	mg/L	0.008	0.013
Silver	mg/L	0.001	0.01
Aluminum	mg/L	0.1	0.01
Copper	mg/L	0.01	0.02
Nickel	mg/L	0.001	0.04
Zinc	mg/L	0.001	0.005

Table 4. Method Detection Limits and Reporting Limits

Analysis	Units	Method Detection Limits	Reporting Limits
TCLP VOCs (EPA 1311/8260C)			
Benzene	mg/L	0.0005	0.005
Carbon Tetrachloride	mg/L	0.0005	0.005
Chlorobenzene	mg/L	0.0005	0.005
Chloroform	mg/L	0.0005	0.005
1,2-Dichloroethane	mg/L	0.0005	0.005
1,1-Dichloroethylene	mg/L	0.0005	0.005
Methyl Ethyl Ketone	mg/L	0.0005	0.02
Tetrachloroethylene	mg/L	0.0005	0.005
Trichloroethylene	mg/L	0.0005	0.005
Vinyl Chloride	mg/L	0.0005	0.005
Waters			
PCB Aroclors (EPA 8082A)			
Aroclor 1016	µg/L	0.13	1.0
Aroclor 1221	µg/L	0.147	1.0
Aroclor 1232	µg/L	0.147	1.0
Aroclor 1242	µg/L	0.147	1.0
Aroclor 1248	µg/L	0.13	1.0
Aroclor 1254	µg/L	0.13	1.0
Aroclor 1260	µg/L	0.147	1.0
Aroclor 1262	µg/L	0.147	1.0
Aroclor 1268	µg/L	0.147	1.0
PAHs (EPA 8270E SIM)			
Naphthalene	µg/L	0.0169	0.100
2-Methylnaphthalene	µg/L	0.0259	0.100
1-Methylnaphthalene	µg/L	0.0196	0.100
Acenaphthylene	µg/L	0.0232	0.100
Acenaphthene	µg/L	0.0203	0.100
Dibenzofuran	µg/L	0.0217	0.100
Fluorene	µg/L	0.0161	0.100
Phenanthrene	µg/L	0.0243	0.100
Anthracene	µg/L	0.0228	0.100
Fluoranthene	µg/L	0.0161	0.100
Pyrene	µg/L	0.0254	0.100
Benzo(a)anthracene	µg/L	0.0458	0.100
Chrysene	µg/L	0.0552	0.100
Benzo(b)fluoranthene	µg/L	0.0854	0.100
Benzo(k)fluoranthene	µg/L	0.0864	0.100
Benzo(j)fluoranthene	µg/L	0.0309	0.100
Benzofluoranthenes, Total	µg/L	0.191	0.200
Benzo(a)pyrene	µg/L	0.0559	0.100

Table 4. Method Detection Limits and Reporting Limits

Analysis	Units	Method Detection Limits	Reporting Limits
Indeno(1,2,3-cd)pyrene	µg/L	0.0840	0.100
Dibenzo(a,h)anthracene	µg/L	0.0900	0.100
Benzo(g,h,i)perylene	µg/L	0.0721	0.100

Notes:
EPA = U.S. Environmental Protection Agency
EPA = U.S. Environmental Protection Agency
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SIM = selective ion monitoring
SVOC = semivolatile organic compound
TCLP = toxicity characteristic leaching procedure
VOC = volatile organic compound

Appendix A

Standard Operating Procedures

STANDARD OPERATING PROCEDURE (SOP) AP-01

SAMPLE PACKAGING AND SHIPPING

SCOPE AND APPLICATION

This SOP describes specific requirements for sample packaging and shipping to ensure the proper transfer and documentation of environmental samples collected during field operations. Procedures for the careful and consistent transfer of samples from the field to the laboratory are outlined herein. This SOP also presents the method to be used when packing samples that will either be hand delivered or shipped by commercial carrier to the laboratory.

EQUIPMENT AND SUPPLIES REQUIRED

Make sure that you have the equipment and supplies necessary to properly pack and ship environmental samples, including the following:

- Project-specific sampling and analysis plan (SAP)
- Project-specific field logbook
- Sealable airtight bags in assorted sizes (e.g., Ziploc®)
- Wet ice in doubled, sealed bags; frozen Blue Ice®; or dry ice
- Cooler(s)
- Bubble wrap
- Fiber-reinforced packing tape, clear plastic packing tape, and duct tape
- Scissors or knife
- Chain-of-custody (COC) forms
- COC seals
- Large plastic garbage bags (preferably 3 mil [0.003 in.] thick)
- Paper towels
- “Fragile,” “This End Up,” or “Handle With Care” labels
- Mailing labels
- Air bills for overnight shipment

PROCEDURE

Customize the logistics for sample packaging and shipping to each study. If necessary, transfer samples from the field to a local storage facility where they can be frozen or refrigerated. Depending on the logistics of the operation, field personnel may transport samples to the laboratory or use a commercial courier or shipping service. In the latter case, Integral field personnel must be aware of any potentially limiting factors to timely shipping, such as availability of overnight service and weekend deliveries to specific areas, and shipping regulations regarding "restricted articles" (e.g., dry ice, formalin) prior to shipping the samples.

SAMPLE PREPARATION

Take the following steps to ensure the proper transfer of samples from the field to the laboratories:

At the sample collection site:

1. Document all samples using the proper logbooks or field forms (see SOP AP-02), required sample container identification (i.e., sample labels with tag numbers), and COC form (example provided in SOP AP-03). Fill out the COC form as described in SOP AP-03, and use the sample labeling techniques provided in SOP AP-04.
2. Make all applicable laboratory quality control sample designations on the COC forms. Clearly identify samples that will be archived for future possible analysis. Label these samples as follows: "Do Not Analyze: Hold and archive for possible future analysis." Some laboratories interpret "archive" to mean that they should continue holding the residual sample after analysis.
3. Notify the laboratory contact and the Integral project quality assurance/quality control (QA/QC) coordinator that samples will be shipped and the estimated arrival time. Send copies of all COC forms to Integral's project QA/QC coordinator or project manager, as appropriate.
4. Keep the samples in the possession of the sampling personnel at all times. Lock and secure any temporary onsite sample storage areas to maintain sample integrity and COC requirements.
5. Clean the outside of all dirty sample containers to remove any residual material that may lead to cross-contamination.
6. Complete the COC form as described in SOP AP-03, and retain the back (pink) copy for project records prior to sealing the cooler. Check sample containers against the COC form to ensure all the samples that were collected are in the cooler.

7. Store each sample container in a sealed plastic bag that allows the sample label (example provided in SOP AP-03) to be read. Before sealing the bags, ensure that volatile organic analyte (VOA) vials are encased in a foam sleeve or in bubble wrap.
8. If the samples require storage at a specific temperature, place enough ice in the sample cooler to maintain the temperature (e.g., 4°C) throughout the sampling day.

At the sample processing area (immediately after sample collection) take the following steps:

1. If the samples require a specific storage temperature, then cool the samples and maintain the temperature prior to shipping. For example, place enough ice in each sample cooler to maintain the temperature at 4°C until processing begins at the testing laboratory.
2. Be aware of holding time requirements for project-specific analytes and arrange the sample shipping schedule accordingly.
3. Place samples in secure storage (i.e., locked room or vehicle) or keep them in the possession of Integral sampling personnel before shipment. Lock and secure any sample storage areas to maintain sample integrity and COC requirements.
4. Store samples in the dark (e.g., keep coolers shut).

At the sample processing area (just prior to shipping), do the following:

1. Check sample containers against the COC form to account for all samples intended for shipment.
2. Choose cooler(s) of appropriate size and make sure they are clean of gross contamination inside and out. If the cooler has a drain, close the drain and secure it with duct tape.
3. Line the cooler with bubble wrap and place a large plastic bag (preferably with a thickness of 3 mil), open, inside the cooler.
4. Individually wrap each glass container (which was sealed in a plastic bag at the collection site) in bubble wrap and secure with tape or a rubber band. Place the wrapped samples in the large plastic bag in the cooler, leaving room for ice to keep the samples cold (i.e., 4°C).
5. If temperature blanks have been provided by the testing laboratory, place one temperature blank in each sample cooler.
6. If the samples require a specific storage temperature, add enough wet ice or Blue Ice® to maintain that temperature during overnight shipping (i.e., 4°C). Always overestimate the amount of ice that will be required. Keep ice in a sealed plastic bag, which is placed in a second sealed plastic bag to prevent leakage. Avoid separating the samples from the ice with excess bubble wrap because it may insulate the samples from the ice. After adding all samples and ice to the cooler, use bubble wrap (or other

available clean packing material) to fill any empty space and prevent the samples from shifting during transport.

7. If possible, consolidate all VOA samples in a single cooler and ship them with (a) trip blank(s) if the project-specific QA project plan calls for them.
8. Sign, date, and include any tracking numbers provided by the shipper on the COC form. Remove the back (pink) copy of the original COC form and retain this copy for the project records.
9. Seal the rest of the signed COC form in a bag and tape the bag to the inside of the cooler lid. Each cooler should contain an individual COC form for the samples contained inside it. If time is short and it becomes necessary to combine all the samples onto a single set of COC forms and ship multiple coolers together, then indicate on the outside of the appropriate cooler, "Chain-of-Custody Inside."
10. After the cooler is sufficiently packed to prevent shifting of the containers, close the lid and seal it with fiber-reinforced packing tape. Tape the cooler around the opening, joining the lid to the bottom, and around the circumference of the cooler at both hinges.
11. As security against unauthorized handling of the samples, apply two COC seals across the opening of the cooler lid (provided with example field forms). Place one seal on the front right portion of the cooler and one on the back left. Be sure the seals are properly affixed to the cooler to prevent removal during shipment. Additional tape across the seal may be necessary if the outside of the cooler is wet.

SAMPLE SHIPPING

Hand Delivery to the Testing Laboratory

1. Notify the laboratory contact and the Integral project QA/QC coordinator that samples will be delivered to the laboratory and the estimated arrival time.
2. When hand-delivering environmental samples, make sure the testing laboratory receives them on the same day that they were packed in the coolers.
3. Fax or scan and e-mail copies of all COC forms to the Integral project QA/QC coordinator. Note: It may be necessary to photocopy the COC form on a slightly darker setting so the form is readable after it has been faxed. Never leave the original COC form in the custody of non-Integral staff.

Shipped by Commercial Carrier to the Laboratory

1. Apply a mailing label to the cooler with destination and return addresses, and add other appropriate stickers, such as "This End Up," "Fragile," and "Handle With Care." If the shipment contains multiple coolers, indicate on the mailing label the number of coolers that the testing laboratory should expect to receive (e.g., 1 of 2; 2 of 2). Place clear tape over the mailing label to firmly affix it to the cooler and to protect it from the weather. This is a secondary label in case the air bill is lost during shipment.
2. Fill out the air bill and fasten it to the handle tags provided by the shipper (or the top of the cooler if handle tags are not available).
3. If samples must be frozen (–20°C) during shipping, make sure that dry ice has been placed in the sample cooler. Be aware of any additional shipping, handling, and special labeling requirements that the shipper may require.
4. Make sure that benthic infauna samples have been preserved with formalin in the field prior to shipping. Be aware of any additional shipping, handling, and special labeling requirements that the shipper may require for these samples.
5. Notify the laboratory contact and the Integral project QA/QC coordinator that samples will be shipped and the estimated arrival date and time. If environmental samples must be shipped at 4°C or –20°C, choose overnight shipping for delivery next morning. Fax or scan and e-mail copies of all COC forms to the Integral project QA/QC coordinator. Note: It may be necessary to photocopy the COC form on a slightly darker setting so the form is readable after faxing. Never leave the original COC form in the custody of non-Integral staff.

STANDARD OPERATING PROCEDURE (SOP) AP-02

FIELD DOCUMENTATION

SCOPE AND APPLICATION

This SOP describes the Integral procedure for accurate record-keeping in the field for the purposes of ensuring that samples can be traced from collection to final disposition.

Document all information relevant to field operations properly to ensure that activities are accounted for in written records to the extent that someone not present at the site could reconstruct the activity without relying on the memory of the field crew. Several types of field documents are used for this purpose and should be consistently used by field personnel. Field documentation should include only a factual description of site-related activities and observations. Field personnel should not include superfluous comments or speculation regarding the field activities or observations.

FIELD LOGBOOKS

During field sampling events, field logbooks must be used to record all daily activities. The purpose of the field logbook is to document events and record data measured in the field to the extent that someone not present at the site could reconstruct the activity without relying on the memory of the field crew. The project manager (or designee) should issue a field logbook to the appropriate site personnel for the direction of onsite activities (e.g., reconnaissance survey team leader, sampling team leader). It is this designee's responsibility to maintain the site logbook while it is in his or her possession and return it to the project manager or turn it over to another field team.

Make entries in the field logbook as follows:

1. Document all daily field activities in indelible ink in the logbook and make no erasures. Make corrections with a single line-out deletion, followed by the author's initials and the date. The author must initial and date each page of the field logbook. The author must sign and date the last page at the end of each day, and draw a line through any blank space remaining on the page below the last entry.

2. Write the project name, dates of the field work, site name and location (city and state), and Integral job number on the cover of the field logbook. If more than one logbook is used during a single sampling event, then annotate the upper right-hand corner of the logbook (e.g., Volume 1 of 2, 2 of 2) to indicate the number of logbooks used during the field event. Secure all field logbooks when not in use in the field. The following is a list of the types of information that is appropriate for entry in the field notebook:
   - Project start date and end date
   - Date and time of entry (24-hour clock)
   - Time and duration of daily sampling activities
   - Weather conditions at the beginning of the field work and any changes that occur throughout the day, including the approximate time of the change (e.g., wind speed and direction, rain, thunder, wave action, current, tide, vessel traffic, air and water temperature, thickness of ice if present)
   - Name and affiliation of person making entries and other field personnel and their duties, including what times they are present
   - The location and description of the work area, including sketches, map references, and photograph log, if appropriate
   - Level of personal protection being used
   - Onsite visitors (names and affiliations), if any, including what times they are present
   - The name, agency, and telephone number of any field contacts
   - Notation of the coordinate system used to determine the station location
   - The sample identifier and analysis code for each sample to be submitted for laboratory analysis, if not included on separate field data sheets
   - All field measurements made (or reference to specific field data sheets used for this purpose), including the time of collection and the date of calibration, if appropriate
   - The sampling location name, date, gear, water depth (if applicable), and sampling location coordinates, if not included on separate field data sheets
   - For aquatic sampling, the type of vessel used (e.g., size, power, type of engine)
   - Specific information on each type of sampling activity
   - The sample type (e.g., groundwater, soil, surface sediment), sample number, sample tag number, and any preservatives used, if not included on separate field data sheets
   - Sample storage methods

- Cross-references of numbers for duplicate samples
- A description of the sample (source and appearance, such as soil or sediment type, color, texture, consistency, presence of biota or debris, presence of oily sheen, changes in sample characteristics with depth, presence/location/thickness of the redox potential discontinuity [RPD] layer, and odor) and penetration depth, if not included on separate field data sheets
- Estimate of length and appearance of recovered cores, if not included on separate field data sheets
- Photographs (uniquely identified) taken at the sampling location, if any
- Details of the work performed
- Variations, if any, from the project-specific sampling and analysis plan (SAP) or standard operating protocols and reasons for deviation
- Details pertaining to unusual events that might have occurred during sample collection (e.g., possible sources of sample contamination, equipment failure, unusual appearance of sample integrity, control of vertical descent of the sampling equipment)
- References to other logbooks or field forms used to record information (e.g., field data sheets, health and safety log)
- Any field results not appearing on the field data sheets (if used), including station identification and location, date, and time of measurement
- Sample shipment information (e.g., shipping manifests, chain-of-custody (COC) form numbers, carrier, air bill numbers, time addresses)
- A record of quantity of investigation-derived wastes (if any) and storage and handling procedures.

3. During the field day, as listed above, record in the logbook a summary of all site activities. Provide a date and time for each entry. The information need not duplicate anything recorded in other field logbooks or field forms (e.g., site health and safety officer's logbook, calibration logbook, field data sheets), but should summarize the contents of the other logbooks and refer to the pages in these logbooks for detailed information.

4. If measurements are made at any location, record the measurements and equipment used, or refer to the logbook and page number(s) or field forms on which they are recorded. All maintenance and calibration records for equipment should be traceable through field records to the person using the instrument and to the specific piece of instrumentation itself.

5. Upon completion of the field sampling event, the sampling team leader will be responsible for submitting all field logbooks to be copied. A discussion of copy distribution is provided below.

FIELD DATA FORMS

Occasionally, additional field data forms are generated during a field sampling event (e.g., groundwater monitoring form, sediment core profile form, water quality measurement form) to record the relevant sample information collected. For instructions regarding the proper identification of field data forms, sampling personnel should consult the project-specific SAP.

Upon completion of the field sampling event, the sampling team leader will be responsible for submitting all field data forms to be copied. A discussion of copy distribution is provided below.

PHOTOGRAPHS

In certain cases, photographs (print or digital) of sampling stations may be taken using a camera-lens system with a perspective similar to the naked eye. Ensure that photographs include a measured scale in the image, when practical. If you take photographs of sample characteristics and routine sampling activities, avoid using telephoto or wide-angle shots, because they cannot be used in enforcement proceedings. Record the following items in the field logbook for each photograph taken:

1. The photographer’s name or initials, the date, the time of the photograph, and the general direction faced (orientation)
2. A brief description of the subject and the field work shown in the picture
3. For print photographs, the sequential number of the photograph and the roll number on which it is contained
4. For digital photographs, the sequential number of the photograph, the file name, the file location, and back-up disk number (if applicable).

Upon completion of the field sampling event, the sampling team leader is responsible for submitting all photographic materials to be developed (prints) or copied (disks). Place the prints or disks and associated negatives in the project files (at the Integral project manager’s location). Make photocopies of photo logs and any supporting documentation from the field logbooks, and place them in the project files with the prints or disks.

EQUIPMENT CALIBRATION RECORDS

Record in the field logbook all equipment calibration records, including instrument type and serial number, calibration supplies used, calibration methods and calibration results, date, time, and personnel performing the calibration. Calibrate all equipment used during the investigation daily, at a minimum, in accordance with the manufacturers' recommendations.

DISTRIBUTION OF COPIES

When the field team has returned from the sampling event, the field team leader is responsible for making sure that the field documentation is 1) scanned and placed into the project file on the portal (in a subfolder named Field under Working_Files), and 2) a copy of all field logbooks and additional field data forms is made and placed into the project file. Both the scanned copy and the hard copy will be available for general staff use.

The original field logbooks and forms will be placed in a locked file cabinet for safekeeping. One file cabinet at each Integral office will contain the original field documentation for multiple projects. The original field documentation will be filed at the Integral office where the project manager is located.

SET-UP OF LOCKING FILE CABINET

Place each project in its own file folder in a locking file cabinet. On the folder label, include the project name and contract number. Each project folder will include up to six kinds of files:

- Field logbook(s)
- Additional field data forms
- Photographs
- COC forms
- Acknowledgment of Sample Receipt forms
- Archive Record form (to be completed only if samples are archived at an Integral field storage facility or Integral laboratory).

STANDARD OPERATING PROCEDURE (SOP) AP-03

SAMPLE CUSTODY

SCOPE AND APPLICATION

This SOP describes Integral procedures for custody management of environmental samples.

A stringent, established program of sample chain of custody will be followed during sample storage and shipping activities to account for each sample. The procedure outlined herein will be used with SOP AP-01, which covers sample packaging and shipping; SOP AP-02, which covers the use of field logbooks and other types of field documentation; and SOP AP-04, which covers sample labeling.

SAMPLE CUSTODY

A sample is considered to be in a person's custody if any of the following criteria are met:

1. The sample is in the person's possession
2. The sample is in the person's view after being in his or her possession
3. The sample has been transferred to a designated secure area to prevent tampering after it was in the person's possession.

At no time is it acceptable for samples to be outside of Integral personnel's custody unless the samples have been transferred to a secure area (i.e., locked up). If the samples cannot be placed in a secure area, then an Integral field team member must physically remain with the samples (e.g., at lunch time one team member must remain with the samples).

CHAIN-OF-CUSTODY FORMS

Chain-of-custody (COC) forms ensure that samples are traceable from the time of collection through processing and analysis until final disposition. The COC form is critical because it documents sample possession from the time of collection through final disposition. The form also provides information to the laboratory regarding what analyses are to be performed on the samples that are shipped.

Complete the COC form after each field collection activity and before shipping the samples to the laboratory. Sampling personnel are responsible for the care and custody of the samples until they are shipped. The individuals relinquishing and receiving the samples must sign the COC form(s), indicating the time and date of the transfer, when transferring possession of the samples.

Record on the COC form the project-assigned sample number and the unique tag number at the bottom of each sample label. The COC form also identifies the sample collection date and time, type of sample, project name, and sampling personnel. In addition, the COC form provides information on the preservative or other sample pretreatment applied in the field and the analyses to be conducted by referencing a list of specific analyses or the statement of work for the laboratory. The COC form is sent to the laboratory along with the sample(s).

PROCEDURES

Use the following guidelines to ensure the integrity of the samples:

1. At the end of each sampling day and prior to shipping or storage, enter information for all samples on a COC form. Check the information against the sample container labels and tags and field logbook entries.
2. Do not sign the COC form until the team leader has checked the information for inaccuracies. Make corrections by drawing a single line through any incorrect entry, and then initial and date it.
3. Mark out any blank lines remaining on the COC form, using single lines that are initialed and dated. This procedure will prevent any unauthorized additions.
4. Sign and date each COC form. At the bottom of each COC form is a space for the signatures of the persons relinquishing and receiving the samples and the time and date of the transfer. The time the samples were relinquished should match exactly the time they were received by another party. Under no circumstances should there be any time when custody of the samples is undocumented.
5. If samples are being sent by a commercial carrier not affiliated with the laboratory, such as FedEx or United Parcel Service (UPS), record the name of the carrier on the COC form. Also enter on the COC form any tracking numbers supplied by the carrier. The time of transfer should be as close to the actual drop-off time as possible. After signing the COC forms and retaining a copy (e.g., the pink copy if the COC form is in triplicate, or an electronic or photocopy if not), seal them inside the transfer container.
6. If errors are found after the shipment has left the custody of sampling personnel, make a corrected version of the forms and send it to all relevant parties. Fix minor errors by making the change on a copy of the original with a brief explanation and signature. Errors in the signature block may require a letter of explanation.

Upon completion of the field sampling event, the sampling team leader is responsible for providing copies of all COC forms to the project chemist or laboratory coordinator. A discussion of copy distribution is provided in SOP AP-02.

CUSTODY SEAL

As security against unauthorized handling of the samples during shipping, affix two signed and dated custody seals to each sample cooler. Place the custody seals across the opening of the cooler prior to shipping. Be sure the seals are properly affixed to the cooler so they cannot be removed during shipping. Additional tape across the seal may be prudent.

SHIPPING AIR BILLS

When samples are shipped from the field to the testing laboratory via a commercial carrier (e.g., FedEx, UPS), the shipper provides an air bill or receipt. Upon completion of the field sampling event, the sampling team leader will be responsible for submitting the sender's copy of all shipping air bills to be copied at an Integral office. A discussion of copy distribution is provided in SOP AP-02. Note the air bill number (or tracking number) on the applicable COC forms or, alternatively, note the applicable COC form number on the air bill to enable the tracking of samples if a cooler becomes lost.

ACKNOWLEDGMENT OF SAMPLE RECEIPT FORMS

In most cases, when samples are sent to a testing laboratory, an Acknowledgment of Sample Receipt form is faxed to the project QA/QC coordinator the day the samples are received by the laboratory. The person receiving this form is responsible for reviewing it, making sure that the laboratory has received all the samples that were sent, and verifying that the correct analyses were requested. If an error is found, call the laboratory immediately, and document any decisions made during the telephone conversation, in writing, on the Acknowledgment of Sample Receipt form. In addition, correct the COC form and fax the corrected version to the laboratory.

Submit the Acknowledgment of Sample Receipt form (and any modified COC forms) to be copied. A discussion of copy distribution is provided in SOP AP-02.

ARCHIVE RECORD FORMS

On the rare occasion that samples are archived at an Integral office, it is the responsibility of the project manager to complete an Archive Record form. This form is to be accompanied by a copy of the COC form for the samples, and will be placed in a locked file cabinet. The original COC form remains with the samples in a sealed resealable (e.g., Ziploc®) bag.

STANDARD OPERATING PROCEDURE (SOP) AP-04

SAMPLE LABELING

SCOPE AND APPLICATION

This SOP describes the general Integral procedures for labeling samples, and the three kinds of labels that can be used on a project (i.e., sample labels, sample tags, and internal sample labels). Consult the project-specific sampling and analysis plan (SAP) to determine the exact sample identifiers and sample labels that are required for a given project. If they are not specified in the SAP, then follow the designations below.

SAMPLE IDENTIFIERS

Before field sampling begins, establish sample identifiers to be assigned to each sample as it is collected. Sample identifiers consist of codes designed to fulfill three purposes: 1) to identify related samples (i.e., replicates) to ensure proper data analysis and interpretation, 2) to obscure the relationships between samples so that laboratory analysis will be unbiased by presumptive similarities between samples, and 3) to track individual sample containers to ensure that the laboratory receives all material associated with a single sample. To accomplish these purposes, each container may have three different codes associated with it: the sample identifier, the sample number, and the sample tag number. These codes and their use are described as follows:

- **Sample Identification Code—**The sample identification code (Sample ID) is a unique designation that identifies where and how the sample was collected. The sample identifier is recorded in the field logbook *only* and is not provided on the sample label or chain-of-custody (COC) form. The sample identifier is a multiple-part code. The first component begins with the letter abbreviation; for example, "SWNS" or "SWNB" to designate the surface water sample was collected from the near-surface or near-bottom of the water column. The second part could identify the sampling event; for example, "1" to designate Round 1 sampling. The third part could contain an abbreviation for whether the station is a single point (SP), a transect (TR), a composite (CO), or a vertically integrated station (VI). The station number would be the final component of the sample identifier. Use leading zeros for stations with numbers below 100 for ease of data management and correct data sorting.

  If appropriate, add a supplemental component to the sample identifier to code field duplicate samples and splits. Use a single letter (i.e., a suffix of "A" and "B") to indicate field duplicates or splits in the final component of the sample identifiers. For equipment decontamination blanks, assign sequential numbers starting at 900 instead of station numbers. Use a sample type code that corresponds to the sample type for which the decontamination blank was collected. Additional codes may be adopted, if necessary, to reflect sampling equipment requirements (see project-specific SAP).

Examples of sample IDs are as follows:

- SWNS-1-SP-002: Surface water sample collected from the near-surface at a single point during Round 1 from Station 2.
- SWNB-1-TR-010-A: Duplicate surface water sample from the near-bottom transect during Round 1 from Station 10.

- **Sample Number**—The sample number is an arbitrary number assigned to each distinct sample or split that is shipped to the laboratory for separate analysis. The sample number appears on the sample containers and the COC forms. Each sample will be assigned a unique sample number. All aliquots of a composited field sample will have the same sample number. In cases where samples consist of multiple bottles from the same location, assign each bottle the same sample number and time. However, assign replicates from the same location different sample numbers and times. Sample numbers of related field replicates will not necessarily have any shared content.

  Each field split of a single sample will also have a different sample number and time. The sample number is generally a unique six-digit number that includes a two-digit media code and a four-digit number. The media code may be site-specific, but the Integral default codes are as follows:

  - SS—Surface soil
  - BH—Subsurface soil or rock (typically from borehole)
  - GW—Groundwater
  - SW—Surface water
  - PW—Pore water
  - SD—Sediment
  - BT—Biota or biological tissue

    The exact sample numbering scheme may vary from project to project. Variances in the sample numbering scheme will be described in the project-specific SAP for the field event. Example sample numbers are PW0001, PW0002, PW0003, etc.

- **Tag Number—**Attach a different tag number to each sample container. If the amount of material (i.e., everything associated with a single sample number) is too large for a single container, assign each container the same sample number and a different sample tag. A sample will also be split between containers if a different preservation technique is used for each container (i.e., because different analyses will be conducted).

  The sample tag number is a unique five- or six-digit number assigned to each sample label (or "tag") for multiple bottles per sample. Integral sample labels come with a preprinted sample tag number. The tag number provides a unique tracking number to a specific sample bottle. This allows for greater flexibility in tracking sample bottles and assists in field quality control when filling out documentation and shipping. Sample tags are not used by many other consultants, and there may be resistance from such firms during teaming situations. However, experience has shown that tags can be very valuable, both in the field and while processing data from field efforts.

  Record tag numbers on the COC form. Laboratories use tag numbers only to confirm that they have received all of the containers that were filled and shipped. Data are reported by sample number.

Assign sample numbers sequentially in the field; sample labels are preprinted with sequential tag numbers.

SAMPLE LABELS

Integral sample labels are designed to uniquely identify each individual sample container that is collected during a sampling event. Field sampling teams are provided with preprinted sample labels, which must be affixed to each sample container used. Fill out the labels at the time the samples are collected, documenting the following information:

- Sample number
- Site name or project number
- Date and time sample is collected
- Initials of the samplers
- Preservatives used, if any
- A unique number (commonly referred to as the "Tag Number") that is preprinted on the label consisting of five or six digits; used to identify individual containers.

SAMPLE TAGS

Integral sample tags are designed to be affixed to each container that is used for a sample. Sample tags are required only for environmental samples collected in certain U.S.

Environmental Protection Agency (EPA) regions (e.g., EPA Region 5). Field crews are provided with preprinted sample tags. Attach sample tags to each individual sample container with a rubber band or wire through a reinforced hole in the tag. Mark all sample tag entries with indelible ink. Fill out the tags at the time the samples are collected, documenting the following information:

- Sample number
- Site name or project number
- Date and time sample is collected
- Initials of the samplers
- Preservatives used, if any
- Type of analysis.

A space for the laboratory sample number (provided by the laboratory at log-in) will also be provided on the sample tag.

INTERNAL SAMPLE LABELS

For benthic infaunal samples, wash away the sediment from the sample and collect the remaining benthic infauna into a sample container. Affix sample label (as discussed above) to the outside of the sample container. In addition, place an internal sample label inside the sample container. This internal sample label is made of waterproof paper; be sure to make all internal sample label entries with pencil. Fill out the internal sample labels at the time the samples are collected, documenting the following information:

- Sample number
- Site name or project number
- Date and time sample is collected
- Initials of the samplers
- Preservative used (e.g., formalin).

STANDARD OPERATING PROCEDURE (SOP) AP-05

INVESTIGATION-DERIVED WASTE HANDLING

SCOPE AND APPLICATION

This SOP presents the method to be used for handling wastes generated during field sampling activities that could be hazardous. These wastes are referred to as investigation-derived waste and are subject to specific regulations.

All disposable materials used for sample collection and processing, such as paper towels and gloves, are not considered investigation-derived wastes and will be placed in heavyweight garbage bags or other appropriate containers. Disposable supplies will be removed from the site by sampling personnel and placed in a normal refuse container for disposal at a solid waste landfill.

EQUIPMENT AND REAGENTS REQUIRED

- 55-gallon drums (or appropriately sized waste container)
- Paint markers
- Tools (to open and close drum)
- Ziploc® bags
- Drum labels.

PROCEDURES

1. Place solid wastes that need to be containerized in properly labeled, DOT- approved, 55-gallon drums.
2. Properly close, seal, label, and stage all filled or partially filled drums before demobilization. Properly profile full drums and have them shipped off site to a RCRA Subtitle C facility.

3. Sampling activities generate personal protective equipment and miscellaneous debris that require disposal. Remove gross contamination from these items, and place the items in plastic bags. It is acceptable to store these items in plastic bags as an interim measure. At the end of each day, dispose of the bags at an appropriate solid waste facility dumpster.

STANDARD OPERATING PROCEDURE (SOP) AP-06

NAVIGATION AND STATION POSITIONING

SCOPE AND APPLICATION

This SOP describes procedures for accurate navigation and station positioning required to ensure quality and consistency in collecting samples. Station positioning must be both absolutely accurate, in that it correctly defines a position by latitude and longitude, and relatively accurate, in that the position must be repeatable, allowing field crews to reoccupy a station location in the future (e.g., for long-term monitoring programs).

This SOP is structured as follows:

- Procedures
- Equipment capabilities
- Basic data collection, navigation, and file transfer.

PROCEDURES

A global positioning system (GPS) is used to obtain latitude and longitude coordinates for locations where samples are to be collected and to verify the accuracy of coordinates through use of control points and post-processing differential correction to industry standards.

For most sampling events, the GPS unit is used to direct the sampling team to the proposed sampling location, having loaded target locations onto the device prior to field deployment. For some sampling events, the GPS unit is used to record positions on the fly, in the field.

A typical positioning objective is to accurately determine and record the positions of all sampling locations to within 2 m. Positioning accuracies on the order of 1 to 5 m can be achieved[1] but may be diminished during times when the geometry of the satellites above the GPS antenna does not provide the optimum signal. The time intervals during the day when accuracies are decreased are available on Trimble Navigation Limited's (Trimble's) web site: http://www.trimble.com/gnssplanningonline/#/Settings.

[1] GPS accuracy depends on the unit (Table 1).

Use of Control Points

GPS accuracy should be verified at the beginning and end of each sampling day through use of one (or more) known horizontal control point(s) in the study area. The GPS position reading at any given station can then be compared to the known control point. All GPS signal propagation is controlled by the U.S. government (the U.S. Department of Defense for satellite signals and the U.S. Coast Guard for differential corrections).

Daily GPS Activities

A consistent routine should be established for each day's positioning activities. After successful reception of differential signals is confirmed, the GPS can be powered up and the software booted. As stated above, accuracy of the system should be verified through use of a horizontal control point.

The sampling team will proceed to the vicinity of a target station location selected by the team leader. That station location is then selected from a number of preloaded station locations that have been entered into the integrated navigation system database. Once the station has been selected, the positioning data are displayed on the computer screen or hand-held unit to assist in proceeding to the station and in maintaining the station position during sampling. A confirmed position is recorded electronically each time a sample collection is attempted (i.e., during sediment grab sampling and coring, the locations of both accepted and rejected grab samples or cores are recorded). Upon recovery of the sampling device, the station position latitude and longitude coordinates from the archived GPS file are read and recorded in the field logbook or on log sheets as a backup to the GPS record. The sampling time and water depth are also recorded, if applicable. Ancillary information recorded in the field logbook may include personnel operating the GPS, tidal phase, type of sampling activity, and the time when coordinates were collected.

On-Water Sampling Events

For on-water GPS navigation, an assessment should be made of the type of vessel that will be used to do the work and from what type of structure (e.g., side davit, A-frame, moon pool) the sampling equipment be deployed. A GPS antenna must be installed immediately above the location where the sampling equipment will be deployed.

> **Note:** On-water GPS navigation can be affected by overhead structures. If sampling from a boat is conducted underneath a bridge or adjacent to tall buildings, a laser range finder such as the Trimble TruPulse 200 Rangefinder may be needed. If sampling is performed in deep water from a boat (e.g., collecting sediments with a remotely operated vehicle), it may be necessary to install an ultrashort baseline (USBL) underwater acoustic positioning system on the sampling equipment. The USBL

system is set up differently from a common GPS unit. **This SOP does not address USBL or laser range-finder navigation.**

When a GPS antenna is mounted on a movable A-frame, the antenna should face up when the A-frame is extended out. The antenna may be mounted on an angle when the A-frame is retracted and not in use. This will optimize satellite signal reception during sampling.

If an antenna cannot be mounted exactly above the point of sampling, an offset should be incorporated into the navigation software so that each time a sample is taken, the correct location of its deployment will be accurately recorded/placed on the map (Figure 1).

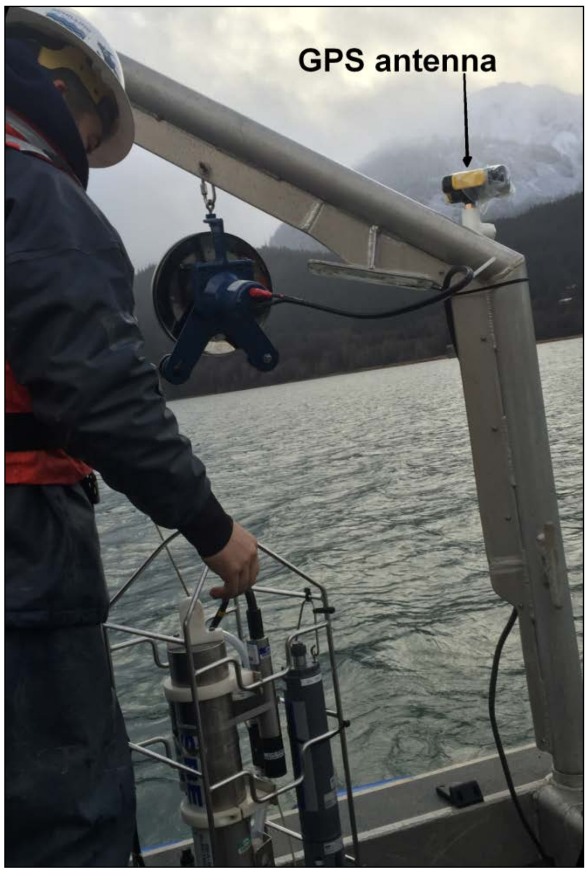


Figure 1. GPS Antenna Mounted with an Offset from the Winch Location

GPS antennae can be connected through a cable or via wireless Bluetooth® connection. Bluetooth® connections are typically limited by distances less than 10 m. If the GPS antenna is to be mounted at distances beyond 10 m, a cable connection may be needed.

The GPS antenna should be mounted vertically, with the dome facing toward the sky, at the time of deployment. The GPS antenna can be mounted on top of a davit or A-frame, or offset over a cabin roof or other boat structure. The GPS antenna may be coupled with a receiver such as the Trimble Pro XH model and connected to a Trimble Yuma tablet or field laptop. The Yuma tablet is waterproof and therefore does not need to be situated inside a cabin (consult user manual for its operation). However, if a standard laptop is used for navigation, there must be enough cable available to connect the laptop to the antenna from inside a cabin or protected area, unless a Bluetooth® connection is available.

1. Mount the GPS antenna for receiving differential corrections on a convenient fixture outside the cabin.
2. Locate the differential corrections receiver and the computer in the cabin. Orient the video screen of the computer to allow the vessel operator to observe on-screen positioning data from the helm. A second monitor may be necessary if the distance between navigator and boat operator makes this setup impractical.
3. Alternatively, manually place a GPS antenna as close as possible to where the sampling will occur (e.g., the moon pool on a barge), and direct the vessel operator to the sampling station location.
4. Once the sampling vessel is anchored or is maintaining its position at the sampling station location, record the horizontal coordinates of the station on the GPS unit and in the field logbook. In some instances, coordinates should be recorded once the sampling device (e.g., core or grab sampler) has contacted the bottom of the water body, or if collecting surface water samples, when the sampling device is in the water at a specific sampling depth.

All target GPS coordinates should be loaded into the GPS unit before field sampling activities begin. The navigator should make sure that the sampling coordinate system is set up according to field sampling plan specifications (e.g., World Geodetic System 1984 [WGS84] or a site-specific state plane, if required). To facilitate navigation, additional background files containing georeferenced aerial photos or polygons of river edges, facility structures, etc. may be preloaded as well.

After sample collection, actual sample location positioning will be checked for precision against the target sampling location to ensure that samples were collected at the target location within the project's navigational error specifications (e.g., within ± 2 to 10 m from the target, depending on project data quality objectives).

EQUIPMENT CAPABILITIES

GPS Units

Integral maintains up-to-date navigation equipment and some units may not be listed in this SOP. However, the basic principles of GPS navigation, field setup, and data collection are, for the most part, similar to the ones described herein. Integral owns several types of Trimble GPS units, such as the GeoXH, Yuma with a ProXH receiver, and Juno 3B.

The GeoXH GeoExplorer 2008 series (Figure 2) runs the Windows Mobile operating system, and the newer Juno 3B (Figure 3) runs Windows Handheld Professional. The Trimble Yuma rugged tablet computer (Figure 4) runs the Windows 7 Professional operating system. All units utilize Trimble TerraSync software for GPS data collection. The GeoXH and Yuma are capable of offering submeter accuracy (the Yuma has an internal GPS antenna capable of 2 to 5 m accuracy, but requires an external ProXH antenna for subfoot accuracy). The Juno is capable of 1 to 3 m post-processed accuracy. Table 1 presents an accuracy comparison between the different units. Integral also owns a Trimble TruPulse 200 laser range finder (described in the "Sources of Error" section, below).

Figure 2. GeoXH GeoExplorer 2008 Series Unit

Figure 3. Trimble Juno

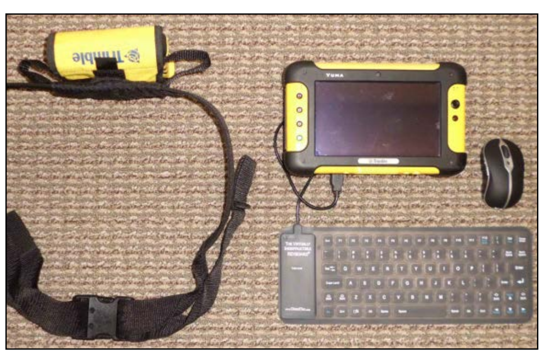


Figure 4. Trimble Yuma Rugged Tablet Computer
with Pro XH Receiver Mounted on a Waist Belt

Table 1. GPS Unit Comparison

GPS Unit	Horizontal Accuracy[a,b]	Vertical Accuracy[a,b]
GeoXH handheld 2008	≥15 cm–1 m	≥ 2x horizontal error
Yuma with ProXH antenna	≥15 cm–1 m	≥ 2x horizontal error
Yuma without ProXH antenna	2–5 m	≥ 2x horizontal error
Juno 3B	2–5 m	≥ 2x horizontal error

Notes:
[a] The stated accuracy assumes post-processing differential correction.
[b] The vertical and horizontal precisions are provided for each GPS point to a specified confidence level.

Sources of Error

GPS error is temporal- and location-specific depending on satellite locations and atmospheric conditions. Obtaining high-accuracy GPS data requires rigorous data collection techniques, and data collection can be compromised by inconsistent antenna height, obstructed view of the sky (e.g., tree canopy, docks, bridges), available satellites in view, station occupation time, atmospheric conditions, and distance from the base station. A laser range finder can be used with the unit if the target location is obstructed by tree canopy or structures. Consistently achieving 15 to 30 cm horizontal accuracy for large field-collection efforts requires preplanning and optimal conditions. Users should confirm GPS accuracy by collocating GPS coordinate collection with a surveyed monument (i.e., base station) prior to high-accuracy fieldwork. Users must set the positional dilution of precision (PDOP) value to 6 as the standard setup for accuracy. However, if field conditions preclude receiving a good satellite signal, the PDOP can be set to "Productivity" in the TerraSync software during fieldwork. This will allow the unit to accept available satellite signals to navigate to a target location; an example of the means for this adjustment is shown in Figure 5 (not applicable for the Juno). Setting the PDOP to Productivity will, however, decrease the level of accuracy in the field.

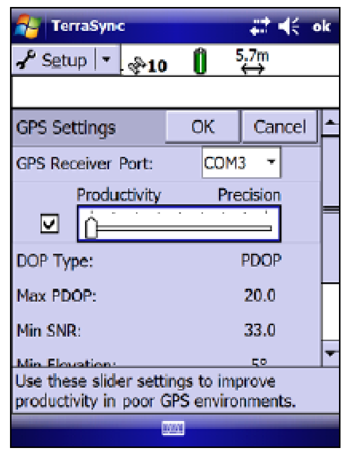


Figure 5. Recommended TerraSync GPS Settings

Differential Correction

```
Estimated accuracies for 18012 corrected positions are as follows:
        Range       Percentage
        ----------  ----------
         0-15cm       27.3%
        15-30cm       43.1%
        30-50cm       15.4%
         0.5-1m       11.1%
           1-2m        2.7%
           2-5m        0.4%
            >5m        0.0%
```

Figure 6. Error Ranges from Differential Correction Report

To achieve optimal accuracy, GPS data must be post-processed using GPS Pathfinder Office. Differential correction reduces errors and provides a report that states the estimated horizontal accuracies in error ranges. With the GeoHX and Yuma (with ProXH antenna), the average horizontal error of most GPS field efforts is typically within 0.5 m, although individual station location errors may range from <15 cm to >1 m (Figure 6). With the Juno, the average horizontal error in the field is typically 2 to 5 m. Vertical error is at a minimum 2 to 3 times that of horizontal error, but vertical error is not estimated with the differential correction report. The corrected GPS data include horizontal and vertical precision calculated to a specified confidence level.

Integral’s geographic information system (GIS) staff can assist with loading station coordinates and base maps onto the GPS units prior to fieldwork mobilization.

Following field collection, Integral GIS staff can assist with transferring, correcting, archiving, and preparing source files for integration into Integral’s data management processes. If a project requires greater accuracy and less uncertainty, a licensed surveyor can provide subcentimeter horizontal and vertical location accuracy using a survey-grade GPS unit or total station instrument.

BASIC DATA COLLECTION, NAVIGATION, AND FILE TRANSFER

This section outlines basic data collection, navigation, and file transfer using Trimble’s TerraSync software. Questions regarding GPS use for fieldwork should be directed to Integral’s GIS team. GPS settings related to data accuracy (PDOP, signal-to-noise ratio [SNR], etc.) should not be changed.

If new to using Trimble software, it is strongly recommended that a mock data collection event be conducted *before* actual data collection begins in the field. Any area outside of an office building, in a nearby parking lot, or anywhere that is relatively free of obstructions such as tall buildings or large trees will suffice.

Basic Data Collection

Create a New File

1. In the upper left corner, select Data from the Section button.
2. Directly below in the Subsection button, select New and then New File.
3. In the New File screen, set File Type to Rover, Location to Default, type in a File Name, and set Dictionary Name to Generic (unless a specific data dictionary has been created).
4. Confirm antenna height dialogue appears. Enter the correct height if collecting vertical. Select OK.

Create (Log) GPS Features

1. Tap Create, and the Collect Features screen appears. If the generic data dictionary is chosen (typical), there are three feature options: Point_generic, Line_generic, and Area_generic.
2. To record a point feature, select Point_generic and tap Create. An attribute entry screen will appear, and the GPS unit will start logging positions. All logging positions will be averaged to compute a final GPS position. The running number of logging positions appears next to the pencil icon at the top of the screen.
3. While the unit is logging positions, remain stationary and fill out the Comment field. The Comment field is a text field that can have any combination of letters, numbers, or symbols (up to 30 characters). Typically, by the time the Comment field is completed, the unit has logged enough positions. Approximately 20 to 30 positions are sufficient; however, a minimum of 40 to 60 logged positions is required for a greater level of positioning accuracy. In theory, a greater number of positions results in a more accurate final position, although additional factors also contribute to accuracy (satellite distribution, canopy cover, etc.); with a very large number of positions, there comes a point of diminishing returns.
4. To stop logging positions and to record the feature, press OK. This returns you to the Collect Features screen.

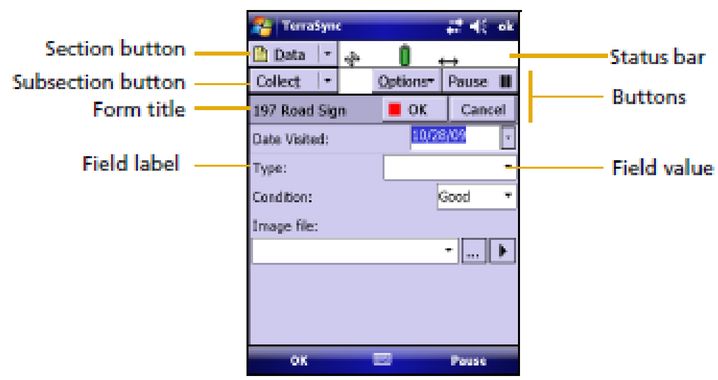
Line and area features are collected in much the same manner, except that the user walks along the alignment or outline of the feature instead of remaining in place. The pace of the walk should be rather slow, to allow the GPS unit to log enough positions along the way. A line feature will simply create a line that follows the walked path. An area feature will always be a closed polygon, so if the end is not at the point of beginning, the GPS will automatically close the loop by connecting the first and last position, regardless of how far apart the two might be. During collection of lines and features, position logging can be paused if there is a need to deviate from the line. Operations are resumed by tapping Resume.

The map can be viewed at any time while features are being collected:

1. Tap the Section button and select Map.
2. To go back to data collection, tap the Section button again, and select Data.
3. To end data collection, tap the Collect button and select Close.

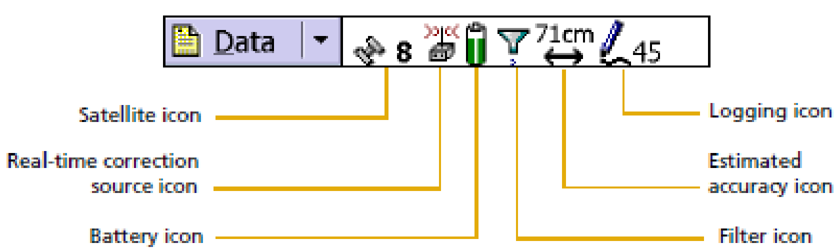
The TerraSync interface and icons are shown below:

The screen below shows elements that are common to all screens in the TerraSync software:



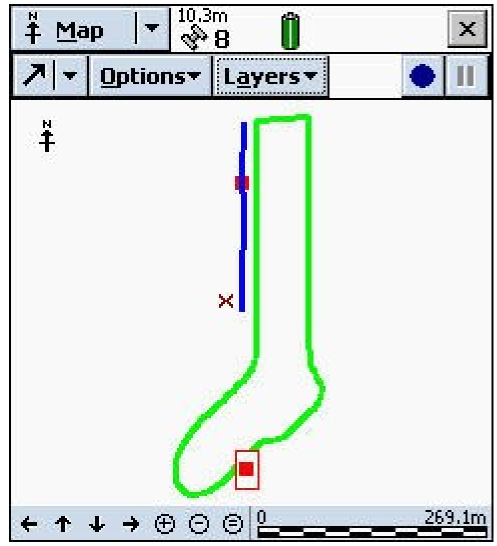
Status bar

The status bar appears at the top of the TerraSync software screen and provides basic status information about the connected GPS receiver. For information about how to connect to a GPS receiver, see Connecting to a GPS receiver, page 48.

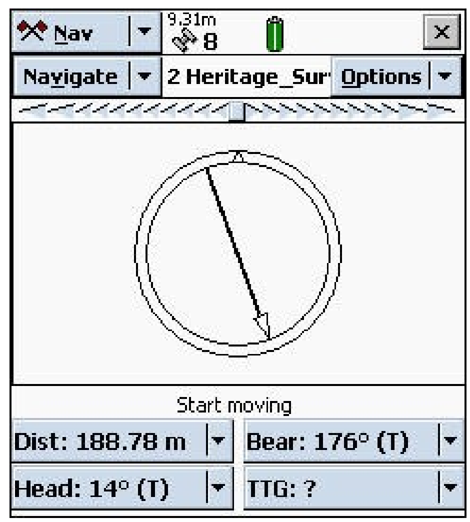


Navigation

The Navigation section of the program permits users to navigate from their current position (small red ×) to a selected target or feature.



1. To open the Navigation section, tap the Section List button and select Navigation.
2. To navigate to a point, select the desired point feature in Map view. The selected feature will be displayed as the boxed point feature symbol (at right).
3. Tap Options—Set Nav Target in Map view. The navigation target will now be displayed as a blue crossed-flags navigation target symbol.
4. Select Navigation from the section list, and note the following items (depicted in the example to the right):
   - Target's identification and type (2 Heritage_Survey_pt)
   - Distance to target (188.78 m)
   - Bearing to target (176°); the arrow pointer indicates the bearing graphically
   - User's current heading (14°); the pointer on top of the dial represents the user's heading.



TerraSync's "compass" depends on a series of GPS positions to detect the direction of travel, so users must keep moving for the compass to stay in an active state. If they stop, the compass will wander and drift.

Users follow the arrow pointer until the target feature is reached. As the target is approached, an alert tone will sound, and the view changes to a zoomed-in representation of the target feature and the current GPS position.

File Transfer

Data files are transferred to and from the GPS unit using the Data Transfer utility. This utility is part of the GPS Pathfinder Office software but can also be used as a stand-alone program (free to download onto any computer).

1. Before using the software, connect the GPS unit to your computer via the universal serial bus (USB) cable. Microsoft Mobile Device Center (Windows 7) should successfully connect to the GPS unit.
2. Once that connection is successful, open GPS Pathfinder Office; select Utilities and then Data Transfer (if you are using the stand-alone version, simply open the program).
3. In the device box, select GIS Datalogger on Windows. It should show the GPS as successfully connected. There are two options—Send and Receive.
4. To download your data, select the Receive tab, and hit Add and then Data File. The files that appear are the files in the GPS unit. Any files that have not been downloaded (or modified since the last download) will be selected in bold.
5. Click Open; the Files to Receive dialog box appears. A list of all files that will be downloaded appears, and you can remove any from the list as needed.
6. Click Transfer All; a message box showing summary information about the transfer appears.

Transferring data on the Yuma tablet is done somewhat differently. With the Yuma, the GPS and the computer are both on the same device. The difference is that the files still need to be transferred to and from the computer portion of the device. The easiest method is to use a thumb drive.

1. To load data onto the unit (Send, in the Data Transfer utility), point the path to the thumb drive containing the files to upload.
2. To download data, follow the instructions above, and take note as to where the files are being transferred in the Yuma computer, in the Destination field.
3. After transferring files, navigate to the files in Windows Explorer and copy them to the thumb drive.

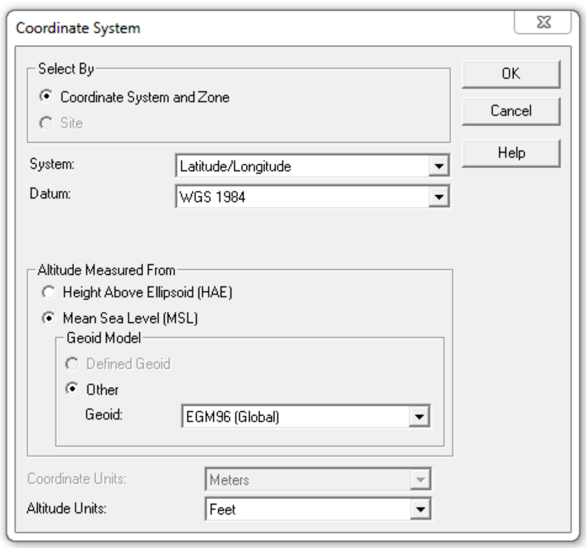
Loading Background Files

File Types

Background layers supported by TerraSync include vector data (.shp) and raster data (.bmp, .jpg, .sid, and .tif). The raster data must be uploaded with a world file (.wld, .jgw, .tfw, .sdw), which tells TerraSync the coordinate system in which the data is projected. All data should be projected into WGS84 before it is uploaded to the GPS unit.

Uploading to the GPS Unit

1. To transfer background data to the GPS unit, open the file in Pathfinder.
2. Set the coordinate system of the Pathfinder Office display to WGS 1984 by going to Options > Coordinate System.
3. To open the background file, go to File > Background and navigate to the file by clicking Add.
4. To check that it is displaying correctly, click on View > Map. Once it is displayed in Pathfinder, it can be transferred to the GPS unit.
5. Connect the GPS unit to the computer and click Utilities > Data Transfer.
6. On the Send tab, click Add > Background and add the file.
7. Click Transfer All for the file to be uploaded to the unit.



Displaying on the GPS Unit

1. Open TerraSync on the GPS unit and click on the drop-down menu next to Setup.
2. Go to Map, click Layers > Background Files, and choose the background file.
3. Click OK and the file will be added to the map.

STANDARD OPERATING PROCEDURE (SOP) AP-07

HANDLING AND REPORTING OF CULTURAL RESOURCES

SCOPE AND APPLICATION

Although federal land management agencies retain the responsibility to comply with federal laws on lands under their stewardship, Integral has the responsibility to comply with federal, state, and tribal laws for its facilities/projects. Sites containing artifacts or human remains are protected by law and public release of information about these sites can lead to damage or vandalism to the sites.

The term "artifacts" means *any* evidence of the activities or presence of past peoples and includes, without limitation, arrowheads, grinding stones, buildings over 50 years old, old bottles, old farm equipment, and teepee rings. Human remains, including marked and unmarked graves of any age, need to be treated in a respectful manner and according to laws, ordinances, and regulations.

HUMAN REMAINS

1. If you encounter what you suspect might be human remains, immediately stop work in the area of the remains:
   - Do not pick them up or excavate them
   - Do not photograph them
   - Mark their location on a map when possible
   - Immediately call the Integral project manager.
2. You may continue working only in areas not within 100 ft of the suspected human remains. The project manger will notify you when you can continue to work in the immediate vicinity of the remains.
3. Other than conversing as needed to promote compliance with this SOP, do not discuss the presence of the human remains with others.
4. If law enforcement officials become involved (e.g., you are asked to call the county coroner), please request that they mark their files as confidential.

ARTIFACTS

Cultural resource locations (sites) are protected by law, and public release of information about sites can lead to their being damaged. If you encounter artifacts (e.g., stone tools, historic materials) while working for Integral on Integral projects/facilities:

- Do not pick them up or excavate them
- Photograph them if you have a camera with you
- Mark their location on a map when possible
- Immediately call the Integral project manager. If continuing your work will disturb the artifact (e.g., you are digging a trench and unearth artifacts), stop work until further notice to proceed is given by Integral.
- If the artifact is not endangered by your work (e.g., you are recording an inventory of plants for a botanical study and see artifacts on the ground), continue working and call the Integral project manager at the end of the workday.

STANDARD OPERATING PROCEDURE (SOP) SL-01

DECONTAMINATION OF SOIL SAMPLING EQUIPMENT

SCOPE AND APPLICATION

This SOP describes procedures for decontaminating sampling and processing equipment contaminated by either organic or inorganic materials. To prevent potential cross contamination of samples, all reusable soil sampling and processing equipment is decontaminated before each use. At the sample collection site, a decontamination area is established in a clean location that is upwind of actual sampling locations, if possible. All soil sampling and processing equipment is cleaned in this location. Decontaminated equipment is stored away from areas that may cause recontamination. When handling decontamination chemicals, field personnel must follow all relevant procedures and wear protective clothing as stipulated in the site-specific health and safety plan (HSP).

Sampling equipment may be used to collect samples that will 1) undergo a full-suite analysis (organics, metals, and conventional parameters) or 2) be analyzed for metals and conventional parameters only. Decontamination of sampling equipment (e.g., hand auger, split-spoon sampler) used for both analyte groups should follow the order of a detergent wash, site water rinse, organic solvent rinses, and final site water rinse. Sample processing equipment (e.g., bowls, spoons) is rinsed with distilled/deionized water instead of with site water.

EQUIPMENT AND REAGENTS REQUIRED

Equipment required for decontamination includes the following:

- Steam cleaner and collection basin (if required)
- 55-gal, Department of Transportation (DOT)-approved drums (if required)
- Polyethylene or polypropylene tub (to collect solvent rinsate)
- Plastic bucket(s) (e.g., 5-gal bucket)
- Tap water or site water (i.e., potable water)
- Carboy, distilled/deionized water (analyte-free; received from testing laboratory or other reliable source)
- Properly labeled squirt bottles

- Funnels
- Alconox®, Liquinox®, or equivalent industrial nonphosphate detergent
- Pesticide-grade ethanol and hexane (consult project-specific field sampling plan [FSP], as the solvents may vary by U.S. Environmental Protection Agency [EPA] region or state)
- 10 percent diluted nitric acid or hydrochloric acid (reagent grade) for inorganic contaminants (if required; see project-specific FSP)
- Baking soda (if required)
- Long handled, hard-bristle brushes
- Plastic sheeting, garbage bags, and aluminum foil
- Personal protective equipment as specified in the HSP.

PROCEDURES

Decontamination Procedures for Full Suite Analysis (Organic, Metal, or Conventional Parameters)

Two organic solvents are used in this procedure. The first is miscible with water (e.g., ethanol) and is intended to scavenge water from the surface of the sampling equipment and allow the equipment to dry quickly. This allows the second solvent to fully contact the surface of the sampler. Make sure that the solvent ordered is anhydrous or has a very low water content (i.e., <1 percent). If ethanol is used, make sure that the denaturing agent in the alcohol is not one of the sample analytes. The second organic solvent is hydrophobic (e.g., hexane) and is intended to dissolve any organic chemicals that are on the surface of the equipment.

The exact solvents used for a given project may vary by EPA region or state (see project-specific FSP). Integral uses ethanol and hexane as preferred solvents for equipment decontamination. If specified in the project-specific FSP, isopropanol or acetone can be substituted for ethanol, and methanol can be substituted for hexane in the decontamination sequence. The choice of solvents is also dependent on the kind of material from which the equipment is made (e.g., acetone cannot be used on polycarbonate), and the ambient temperature (e.g., hexane is too volatile in hot climates). In addition, although methanol is slightly more effective than other solvents, its use is discouraged because of its potential toxicity to sampling personnel. Always follow the procedures listed in the site-specific HSP when decontaminating sampling equipment (e.g., always stand upwind when using volatile solvents, wear appropriate gloves and safety glasses or goggles). Containerize all decontamination fluids for proper disposal, following procedures listed in the FSP.

The specific procedures for decontaminating soil sampling equipment and soil compositing equipment are as follows:

1. Rinse the equipment thoroughly with tap or site water to remove visible soil. This step should be performed onsite for all equipment. After removing visible solids, set aside sampling equipment that does not need to be used again that day and see that it is thoroughly cleaned in the field laboratory at the end of the day.
2. Pour a small amount of concentrated laboratory detergent into a bucket (i.e., about 1 to 2 tablespoons per 5-gal bucket) and fill it halfway with tap or site water. If the detergent is in crystal form, make sure all crystals are completely dissolved prior to use.
3. Scrub the equipment in the detergent solution using a long-handled brush with rigid bristles, using a back-and-forth motion. Be sure to clean the outside of the compositing bowls and other pieces that may be covered with soil.
4. Double rinse the equipment with tap or site water and set upright on a stable surface to drain. The more completely the equipment drains, the less solvent will be needed in the next step. Do not allow any surface that will come in contact with the sample to touch any contaminated surface. If acid and solvent rinses are not required by the FSP, skip to step 8.
5. If an acid rinse is required by the FSP, rinse the equipment using a squirt bottle using a 10 percent acid solution. Double-rinse equipment with tap or site water and set right-side-up on a stable surface to drain. If solvent rinses are not required by the FSP, skip to step 8.
6. Carefully rinse the equipment with ethanol from a squirt bottle, and let the excess solvent drain into a waste container (which may need to be equipped with a funnel). These solvents act primarily as a drying agent by scavenging water from the equipment surface and carrying it away, but they also work as a solvent for some organic contamination. Hand-augers must be held over the waste container and turned slowly so the stream of solvent contacts the entire surface. The sample apparatus may be turned on its side, and if applicable, opened to be washed more effectively. Set the equipment in a clean location and allow it to air dry. Use only enough solvent to scavenge all of the water and flow off the surface of the equipment (i.e., establish sheet flow) into the waste container. Allow equipment to drain as much as possible. Ideally, the equipment will be dry. The more thoroughly it drains, the less solvent will be needed in the next step.
7. Carefully rinse the drained or air-dried equipment with hexane from a squirt bottle, and let the excess solvent drain into the waste container, which may need to be equipped with a funnel. Hexane acts as the primary solvent of organic chemicals. Ethanol is soluble in hexane but water is not. If water beading occurs, it means that the

equipment was not thoroughly rinsed with ethanol or that the ethanol that was purchased was not free of water. When the equipment has been rinsed with hexane, set it in a clean location and allow the hexane to evaporate before using the equipment for sampling. Use only enough solvent to scavenge all of the ethanol and flow off the surface of the equipment (i.e., establish sheet flow) into the waste container.

8. Do a final rinse with site water for the sampling equipment (i.e., hand-auger) and distilled/deionized water for the processing equipment (i.e., stainless-steel bowls and spoons). Equipment does not need to be dried before use.
9. If the decontaminated sampling equipment is not to be used immediately, wrap small stainless-steel items in aluminum foil (dull side facing the cleaned area).

   If the sample collection or processing equipment is precleaned at the field laboratory and transported to the site, then the decontaminated equipment will be wrapped in aluminum foil (dull side facing the cleaned area) and stored and transported in a clean plastic bag (e.g., a trash bag) until ready for use, unless the project-specific FSP lists special handling procedures.
10. After decontaminating all of the sampling equipment, dispose of the disposable gloves and used foil per the procedures listed in the project-specific FSP. When not in use, keep the waste solvent container closed and store in a secure area. The waste should be transferred to empty solvent bottles for disposal at a licensed facility per the procedures listed in the project-specific FSP. When not in use, keep the waste acid container closed and store in a secure area. The acid waste should be neutralized with baking soda or containerized and disposed of per the procedures listed in the project-specific FSP.

Decontamination Procedures for Metals and Conventional Parameters Only

The specific procedures for decontaminating soil sampling equipment and soil processing equipment are as follows:

1. Rinse the equipment thoroughly with tap or site water to remove the visible soil. Perform this step onsite for all equipment. Set aside any pieces that do not need to be used again that day see that they are thoroughly cleaned in the field laboratory at the end of the day.
2. Pour a small amount of concentrated laboratory detergent into a bucket (i.e., about 1 to 2 tablespoons per 5-gal bucket) and fill it halfway with tap or site water. If the detergent is in crystal form, make sure all crystals are completely dissolved prior to use.

3. Scrub the equipment in the detergent solution using a long-handled brush with rigid bristles. Be sure to clean the outside of the compositing bowls and other pieces that may be covered with soil.
4. Double-rinse the equipment with tap or site water (if an acid rinse is required) or with distilled/deionized water (if no acid rinse) and set right-side-up on a stable surface to drain. Do not allow any surface that will come in contact with the sample to touch any contaminated surface.
5. If an acid rinse is required by the FSP, rinse the equipment using a squirt bottle containing a 10 percent acid solution. Double-rinse equipment with distilled/deionized water and set right-side-up on a stable surface to drain.
6. If the decontaminated sampling equipment is not to be used immediately, wrap small stainless-steel items in aluminum foil (dull side facing the cleaned area).

   If the sample collecting or processing equipment is cleaned at the field laboratory and transported to the site, then the decontaminated equipment will be wrapped in aluminum foil (dull side facing the cleaned area) and stored and transported in a clean plastic bag until ready for use, unless the project-specific FSP lists special handling procedures.
7. After decontaminating all of the sampling equipment, place the disposable gloves and used foil in garbage bags for disposal in a solid waste landfill. When not in use, keep the waste acid container closed and store in a secure area. The acid waste should be neutralized with baking soda and disposed of per the procedures listed in the project-specific FSP.

Decontamination Procedures for Drill Rig or Test Pit Sampling Equipment

1. Decontaminate sampling equipment before use, between samples and stations, and upon completion of sampling operations.
2. Equipment used during drilling/test pit operations should be decontaminated in the Exclusion Zone prior to transport to the Support Zone (refer to site-specific HSP).
3. If the steam-cleaning location is in an area outside of the Exclusion Zone, remove loose soil on the drill rig, augers, drill pipe, and rods, and other large equipment at the drill site, then move the equipment directly to the steam-cleaning decontamination area for more thorough cleaning.
4. To decontaminate a drill rig or backhoe, pressure wash with a steam cleaner using potable water rinse upon mobilization, between drilling locations, and upon demobilization. Cleaning water can generally be allowed to drain directly on the ground near the station (refer to the FSP).

5. To decontaminate auger, drill rods, and other down-hole tools, pressure wash with a steam cleaner and potable water rinse upon mobilization, between drilling locations, and upon demobilization. All decontamination fluids are to be containerized for proper disposal.
6. To decontaminate split-spoon and hand-auger samplers, follow the decontamination procedures listed above (the selected decontamination procedures is dependent upon analyte list provided in the project-specific FSP). To the extent possible, allow to air dry prior to sampling. If the split-spoon is not used immediately, wrap it in aluminum foil. All decontamination fluids are to be containerized for proper disposal.

STANDARD OPERATING PROCEDURE (SOP) SL-02

PREPARATION OF FIELD QUALITY CONTROL SAMPLES FOR SOILS

SCOPE AND APPLICATION

This SOP describes the purpose, preparation, and collection frequency of field duplicate samples, field replicate samples, matrix spike/matrix spike duplicates (MS/MSDs), equipment rinsate blanks, bottle blanks, trip blanks, temperature blanks, environmental blanks, and reference materials (i.e., a standard reference material, a certified reference material, or other reference material) for soil samples. Not all of the field quality control samples discussed in this SOP may be required for a given project. The specific field quality control samples will be identified in the project-specific field sampling plan (FSP) and quality assurance project plan (QAPP). For most projects, Integral's recommended field quality control samples include an equipment rinsate blank, a field duplicate, and trip blanks if volatile organic compounds (VOCs) are to be analyzed. Definitions of all potential quality control samples are described below.

As part of the quality assurance and quality control (QA/QC) program, all field quality control samples will be sent to the laboratories blind. To accomplish this, field quality control samples will be prepared and labeled in the same manner as regular samples, with each quality control sample being assigned a unique sample number that is consistent with the numbering for regular samples. All of the containers that are required to complete the field quality control sample for the applicable analyte list must be labeled with the same sample number. The sample ID for field quality control samples should allow data management and data validation staff to identify them as such and should only be recorded in the field logbook or field sampling forms. Under no circumstances should the laboratory be allowed to use reference materials, rinsate blanks, or trip blanks for laboratory quality control analysis (i.e., duplicates, matrix spike, and matrix spike duplicates). To prevent this from happening, select and mark regular samples on the chain-of-custody/sampling analysis request (COC) form or instruct the laboratory to contact the project QA/QC coordinator to select appropriate samples for each sample group.

Prepare field quality control samples at least once per sampling event, and prepare certain types more often at predetermined frequencies. If the number of samples taken does not equal an integer multiple of the intervals specified in this SOP, the number of field quality control samples is specified by the next higher multiple. For example, if a frequency of 1 quality control sample per 20 is indicated and 28 samples are collected, prepare 2 quality control samples. The method of preparation and frequency of field quality control samples required for soil sampling activities are described below. These protocols must be followed, unless different frequency requirements are listed in the FSP and QAPP.

For most projects, Integral's recommended field quality control samples include an equipment rinsate blank, a field duplicate, and trip blanks if VOCs are to be analyzed. The following table lists the possible quality control sample types and suggested frequencies for soil sampling programs (not all types of quality control samples will always be collected; see project-specific FSP and QAPP for actual quality control samples that need to be collected for a particular sampling event). A detailed explanation of each type of quality control sample with the required preparation follows.

Field Quality Control Sample Requirements

Quality Control Sample Name	Abbreviation	Preparation		Frequency[a]
		Location	Method	
Duplicate	DUP	Sampling site	Additional natural sample	One per 20 samples. May not be applicable if REP is being collected.
Replicate	REP	Sampling site	Additional natural sample	One replicate per 20 samples. May not be applicable if DUP is being collected.
Matrix spike/matrix spike duplicate	MS/MSD	Sampling site	Additional sample bottles filled for laboratory quality control requirements	One per 20 samples
Equipment rinsate blank	ER	Sampling site	Deionized water collected after pouring through and over decontaminated equipment	Minimum of one per sampling event per type of sampling equipment used and then 1:20 thereafter
Bottle blank	BB	Field	Unopened bottle	One per sample episode or one per bottle type
Trip blank	TB	Laboratory	Deionized water with preservative	One pair per each VOC sample cooler shipment
Temperature blank	TMB	Laboratory	Deionized water	One per sample cooler
Environmental (transfer) blank	EB	Field	Bottle filled at sample site with deionized water	One per 20 samples
Standard reference material	SRM	Field laboratory or sampling site	SRM ampules or other containers for each analyte group	One set per 50 samples or one per episode

[a] Frequencies provided here are general recommendations; specific frequencies should be provided in the project-specific FSP or QAPP.

FIELD DUPLICATE SAMPLES

Collect field duplicate (or split) samples to assess the homogeneity of the samples collected in the field and the precision of the sampling process. Prepare field duplicates by collecting two aliquots for the sample and submitting them for analysis as separate samples. Collect field duplicates at a minimum frequency of 1 per 20 samples or once per sampling event, whichever is more frequent. The project QA/QC coordinator will determine the actual number of field duplicate samples collected during a sampling event on a case-by-case basis (consult the project-specific FSP and QAPP, as the requirements on frequency of field duplicate collection may vary by EPA region or state).

FIELD REPLICATE SAMPLES

Field replicate samples are co-located samples collected in an identical manner over a minimum period of time to provide a measure of the field and laboratory variance, including variance resulting from sample heterogeneity. Prepare field replicates by collecting two completely separate samples from the same station and submitting them for analysis as separate samples. Collect field replicates at a minimum frequency of 1 per 20 samples or once per sampling event, whichever is more frequent. If field duplicate samples are collected, then it is unlikely that field replicate samples will also be collected during a sampling event. The project QA/QC coordinator will determine the actual number of field replicate samples collected during a sampling event on a case-by-case basis (consult the project-specific FSP and QAPP, as the requirements on frequency of field duplicate collection may vary by EPA region or state).

MATRIX SPIKE/MATRIX SPIKE DUPLICATES

The MS/MSD analyses provide information about the effect of the sample matrix on the design and measurement methodology used by the laboratory. To account for the additional volume that may be needed by the laboratory to perform the analyses, extra sample volumes may be required to be collected from designated soil stations. MS/MSDs may be collected at a minimum frequency of 1 per 20 samples or once per sampling event, whichever is more frequent. The project QA/QC coordinator will determine the actual number of extra bottles collected during a sampling event on a case-by-case basis (consult the project-specific FSP and QAPP, as the requirements may vary by analyte group).

EQUIPMENT RINSATE BLANKS

Use equipment rinsate blanks to help identify possible contamination from the sampling environment and/or from decontaminated sampling equipment. Prepare equipment rinsate blanks by pouring laboratory distilled/deionized water through, over, and into the decontaminated sample collection equipment, then transferring the water to the appropriate sample containers and adding any necessary preservatives. Prepare equipment rinsate blanks for all inorganic, organic, and sometimes conventional analytes at least once per sampling event per the type of sampling equipment used. The project QA/QC coordinator will determine the actual number of equipment rinsate blanks prepared during an event on a case-by-case basis (consult the project-specific FSP and QAPP, as the requirements on frequency of equipment rinsate blank collection may vary by EPA region or state).

BOTTLE BLANKS

The bottle blank is an unopened sample bottle. Submit bottle blanks along with soil samples to ensure that contaminants are not originating from the bottles themselves because of improper preparation, handling, or cleaning techniques. If required, submit one bottle blank per lot of prepared bottles for analysis. If more than one type of bottle will be used in the sampling (e.g., HDPE or glass), then submit a bottle blank for each type of bottle and preservative. The project QA/QC coordinator will determine the actual number of bottle blanks analyzed during a project on a case-by-case basis (consult the project-specific FSP and QAPP, as the requirements on frequency of bottle blank analysis may vary by EPA region or state).

To prepare a bottle blank in the field, set aside one unopened sample bottle from each bottle lot sent from the testing laboratory. Label the bottle as “Bottle Blank” on the sample label (and in the “Remarks” column on the COC form), and send the empty bottle to the laboratory with the field samples.

TRIP BLANKS

Use trip blanks to help identify whether contaminants may have been introduced during shipment of the soil samples from the field to the laboratory for VOC analyses only. Trip blanks are prepared at the testing laboratory by pouring distilled/deionized water into two 40 mL VOC vials and tightly closing the lids. Invert each vial and tap lightly to determine if air bubbles exist. There should be no air bubbles in the VOC trip blank vials. If air bubbles are present, then note this information in the field logbook.

Transport the trip blanks unopened to and from the field in the cooler with the VOC samples. Label the trip blank and place it inside the cooler that contains newly collected VOC samples; it must remain in the cooler at all times. A trip blank must accompany samples at all times in the field. Send one trip blank (consisting of a pair of VOC vials) with each cooler of samples shipped to the testing laboratory for VOC analysis.

TEMPERATURE BLANKS

The laboratory will use temperature blanks to verify the temperature of the samples upon receipt at the testing laboratory. The testing laboratory will prepare temperature blanks by pouring distilled/deionized water into a vial and tightly closing the lid. The blanks will be transported unopened to and from the field in the cooler with the sample containers. A temperature blank must be included with each sample cooler shipped to the testing laboratory.

ENVIRONMENTAL BLANKS

Prepare the environmental (i.e., transfer) blank in the field to evaluate potential background concentrations present in the air and in the distilled/deionized water used for the final decontamination rinse. If you use unpreserved bottles, then you must add the appropriate preservative (e.g., for metals samples, use a 10 percent nitric acid solution to bring sample pH to 2 or less), if required. Collect environmental blanks at a minimum frequency of 1 in 20 samples. The project QA/QC coordinator will determine the actual number of environmental blanks analyzed during a project on a case-by-case basis (consult the project-specific FSP and QAPP, as the requirements on frequency of environmental blank analysis may vary by EPA region or state).

To prepare an environmental blank in the field, open the laboratory-prepared sample bottle while at a sample collection site, fill the sample bottle with distilled/deionized water and then seal. Note the location from which the environmental blank was collected along with atmospheric conditions at the time of its collection in the field logbook. Assign the environmental blank a unique sample number, label the bottle, and then send the bottle to the laboratory with the field samples.

REFERENCE MATERIALS

Reference materials (i.e., a standard reference material, a certified reference material, or other reference material are samples containing known analytes at known concentrations that have been prepared by and obtained from EPA-approved sources. Reference materials have undergone multilaboratory analyses using a standard method which provides certified concentrations. When available for a specific analyte, Reference material samples provide a measure of analytical performance and/or analytical method bias (i.e., accuracy) of the laboratory. Several reference materials may be required to cover all analytical parameters. For all analytes where available, one reference material will be analyzed at a frequency of one per 50 samples. The project QA/QC coordinator will determine the actual number of reference materials analyzed during a project on a case-by-case basis (consult the project-specific FSP and QAPP, as the requirements on frequency of reference material analysis may vary by EPA region or state).

STANDARD OPERATING PROCEDURE (SOP) SL-04

FIELD CLASSIFICATION OF SOIL

SCOPE AND APPLICATION

This SOP establishes the minimum information that must be recorded in the field to adequately document surface soil sampling and soil borehole advancement activities performed during field exploration. The surface soil sampling or borehole log form must be filled out completely for each station.

This SOP presents the field classification of soils to be used by Integral field staff. In general, Integral has adopted the procedures provided in American Society for Testing and Materials (ASTM) Method D-2488-00, Standard Practice for Description and Identification of Soils. ASTM D-2488-00 uses the Unified Soil Classification (USC) system for naming soils. Field personnel are encouraged to study these procedures prior to initiation of fieldwork.

Soil descriptions should be precise and comprehensive without being verbose. The overall impression of the soil should not be distorted by excessive emphasis on minor constituents. In general, the similarities of consecutive soil samples should be emphasized and minor differences de-emphasized. These descriptions will be used to interpret potential contaminant transport properties, rather than interpret the exact mineralogy or tectonic environment. We are primarily interested in engineering and geochemical properties of the soil.

Soil descriptions should be provided on the surface soil field collection form or in the soil description column of the Integral's soil boring log for each sample collected. If there is no difference between consecutive soil samples, subsequent descriptions can be noted as "same as above" or minor changes such as "increasing sand" or "becomes dark brown" can be added.

The format and order of soil descriptions should be as follows:

- Group symbol (in the Unified Symbol column)
- USC name (should be identical to the ASTM D-2488-00 Group Name with the appropriate modifiers)
- Minor components
- Color
- Moisture
- Additional descriptions.

EQUIPMENT AND REAGENTS REQUIRED

- Surface soil field collection form or borehole log form (see SOP SL-06, *Logging of Soil Boreholes*)
- Munsell® soil color chart.

PROCEDURES

The USC is an engineering properties system that uses grain size to classify soils. The first major distinction is between fine-grained soils (more than 50 percent passing the No. 200 sieve [75 µm/0.0029 in.]) and coarse-grained soils (more than 50 percent retained by the No. 200 sieve). Small No. 200 sieves are necessary to classify soils near the cutoff size.

1. Fine-grained soils are classified as either silts or clays. Field determinations of silts and clays are based on observations of dry strength, dilatancy, toughness, and plasticity. Field procedures for these tests are included in ASTM D-2488-00. If these tests are used, include the results in the soil description. If these materials are encountered, perform at least one complete round of field tests for a site, preferably at the beginning of the field investigation. The modifiers "fat" and "lean" are used by ASTM to describe soils of high and low plasticity. The soil group symbols (e.g., CL, MH) already indicate plasticity characteristics, and these modifiers are not necessary in the description. Soils with high plasticity can be emphasized by describing them as "silty CLAY with high plasticity." Plasticity, for example, is an important descriptor because it is often used to interpret whether an ML soil is acting as either a leaky or a competent aquitard. For example, an ML soil can be dilatant/nonplastic and serve as a transport pathway, or it can be highly plastic and very impervious.
2. Coarse-grained soils are classified as either predominantly gravel or sand, with the No. 4 sieve (4.75 mm/0.19 in.) being the division. Use modifiers to describe the relative amounts of fine-grained soil, as noted below:

Description	Percent Fines	Group Symbol
Gravel (sand)	<5 percent	GW, GP (SW, SP)
Gravel (sand) with silt (clay)	5–15 percent	Hyphenated names
Silty (clayey) gravel (sand)	>15 percent	GM, GC (SM, SC)

The gradation of a coarse-grained soil is included in the specific soil name (e.g., fine to medium SAND with silt). Estimating the percent of size ranges following the group name is encouraged for mixtures of silt sand and gravel. Use of the modifiers "poorly graded" or "well graded" is not necessary, as they are indicated by the group symbol.

Show a borderline classification with a slash (e.g., GM/SM). Use this symbol when the soil cannot be distinctly placed in either soil group. Also use a borderline symbol when describing interbedded soils of two or more soil group names when the thickness of the beds are approximately equal, such as "interbedded lenses and layers of fine sand and silt." Do not use a borderline symbol indiscriminately. Make every effort to place the soil into a single group. (One very helpful addition to the soil log form description is the percentage of silt/sand/gravel. Even if the geologist did not have sufficient time to properly define the soil, this percentage breakdown allows classification at a later date).

3. Precede minor components, such as cobbles, roots, and construction debris with the appropriate adjective reflecting relative percentages: trace (0–5 percent), few (5–10 percent), little (15–25 percent), and some (30–45 percent). Use the word "occasional" to describe random particles of a larger size than the general soil matrix (i.e., occasional cobbles, occasional brick fragments). The term "with" indicates definite characteristics regarding the percentage of secondary particle size in the soil name. It is not to be used to describe minor components. If a nonsoil component exceeds 50 percent of an interval, state it in place of the group name.
4. Give the basic color of a soil, such as brown, gray, or red. Modify the color term with adjectives such as light, dark, or mottled, as appropriate. Especially note staining or mottling. This information, for example, may be useful to establish water table fluctuations or contamination in boreholes. The Munsell® soil color chart designation is the Integral color standard. These charts are readily available and offer a high degree of consistency in descriptions between geologists.
5. Define the degree of moisture present in the soil as dry, moist, or wet. Moisture content can be estimated from the criteria listed in Table 3 of ASTM D-2488-00.
6. If observed, note such features as discontinuities, inclusions, joints, fissures, slickensides, bedding, laminations, root holes, and major mineralogical components. Note anything unusual. Additional soil descriptions may be made at the discretion of the project manager or as the field conditions warrant. The surface soil field collection and soil boring log forms list some optional descriptions, as does Table 13 of the ASTM standard. The reader is referred to the ASTM standard for procedures of these descriptions.

The contact between two soil types must be clearly marked on the surface soil field collection or soil boring log forms. If the contact is obvious and sharp, draw it in with a straight line. If it is gradational, use a slanted line over the interval. In the case where it is unclear, use a dashed line over the most likely interval.

For drilling activities, the field geologist, who has the advantage of watching the drilling rate and cuttings removal and can talk with the driller in real time, has a much better chance of interpreting the interval than someone in the office.

REFERENCE

ASTM D2488 – 00: Standard practice for description and identification of soils (visual-manual procedure). ASTM International.

STANDARD OPERATING PROCEDURE (SOP) SL-06

LOGGING OF SOIL BOREHOLES

SCOPE AND APPLICATION

This SOP describes how to complete a Soil Boring Log form, which must be completed for Integral projects where soil boring techniques are performed during field exploration. A correctly completed form contains all of the information that must be recorded in the field to adequately characterize soil boreholes.

These procedures are adapted from ASTM D-2488-00. Field staff are encouraged to examine ASTM D-2488-00 in its entirety. This SOP represents minor modifications to emphasize environmental investigations rather than geotechnical investigations, for which the standards were written. Because each environmental project is unique and because job requirements can vary widely, the minimum standards presented may need to be supplemented with additional technical descriptions or field test results. However, all soil boring field logs, regardless of special project circumstances, must include information addressed in this SOP to achieve the minimum acceptable standards required by Integral.

LOG FORM INFORMATION

Project Number—Use the standard contract number.

Client—Identify the name of the client and the project site location.

Location—If stations, coordinates, mileposts, or similar markers are applicable, use them to identify the location of the project. If this information is not available, identify the facility (e.g., 20 ft NE of Retort #1).

Drilling Method—Identify the bit size and type, drilling fluid (if used), and method of drilling (e.g., rotary, hollow-stem auger, cable tool) and the name of the drill rig (e.g., Mobil B 61, CME 55).

Diameter—Provide the diameter of the borehole. If the borehole has variable diameters, provide the depth interval for each diameter.

Sampling Method—Identify the type of sampler(s) used (e.g., standard split spoon, Dames & Moore sampler, grab).

Drilling Contractor—Provide the name of the drilling contractor.

Integral Staff—Enter the name(s) of Integral staff members performing logging and sampling activities.

Water Level Information—Provide the date, time, depth to static water, and casing depth. Generally, water levels should be taken each day before resuming drilling and at the completion of drilling. If water is not encountered in the boring, this information should be recorded.

Boring Number—Provide the boring number. A numbering system should be developed prior to drilling that does not conflict with other site information, such as previous drilling or other sampling activities.

Sheet—Number the sheets consecutively for each boring and continue the consecutive depth numbering.

Drilling Start and Finish—Provide the drilling start and finish dates and times.

For consecutive sheets, provide (at a minimum) the job number, boring number, and sheet number.

TECHNICAL DATA

Sampler Type—Provide the sampler type (e.g., SS = split spoon, G = grab).

Depth of Casing—Enter the depth of the casing below ground surface immediately prior to sampling.

Driven/Recovery—Provide the length that the sampler was driven and the length of sample recovered in the sampler. This column would not apply to grab samples.

Sample Number/Sample Depth—Provide the sample number. The sample numbering scheme should be established prior to drilling. One method is to use the boring number and consecutive alphabetical letters. For instance, the first sample obtained from boring MW-4 would be identified as 4A, the second would be identified as 4B, and so on. Another method for sample identification is naming the boring number with the depth. For example, the sample from Boring 1 at 10 ft would be labeled B1-10'. The depth of the sample is the depth of the casing plus the length to the middle of the recovered sample to the nearest 0.1 ft. Typically, split spoon samplers are 18 in. long. Samples should be obtained from the middle of the recovered sample. The depth of the sample with the casing at 10 ft would then be 10.7 ft.

Number of Blows—For standard split-spoon samplers, record the number of blows for each 6 in. of sampler penetration. A typical blow count of 6, 12, and 14 is recorded as 6/12/14. Refusal is a penetration of less than 6 in. with a blow count of 50. A partial penetration of 50 blows for 4 in. is recorded as 50/4". Total blows will be recorded for nonstandard split spoons (e.g., 5-ft tube used for continuous sampling).

Blank Columns—Two blank columns are provided. Use these columns for site-specific information, usually related to the chemicals of concern. Examples for a hydrocarbon site would be sheen and photoionization detector readings of the samples.

Depth—Use a depth scale that is appropriate for the complexity of the subsurface conditions. The boxes located to the right of the scale should be used to graphically indicate sample locations as shown in the example.

Surface Conditions—Describe the surface conditions (e.g., paved, 4-in. concrete slab, grass, natural vegetation and surface soil, oil-stained gravel).

Soil Description—Enter the soil classification and definition of soil contacts using the format described in SOP SL-04, *Field Classification of Soil*.

Comments—Include all pertinent observations. Drilling observations might include drilling chatter, rod-bounce (boulder), sudden differences in drilling speed, damaged samplers, and malfunctioning equipment. Information provided by the driller should be attributed to the driller. Information on possible contaminants might include odor, staining, color, and presence or absence of some indicator of contamination. Describe what it is that indicates contamination (e.g., fuel-like odor, oily sheen in drill cuttings, yellow water in drill cuttings).

REFERENCE

ASTM D 2488 – 00: Standard practice for description and identification of soils (visual-manual procedure). ASTM International.

ATTACHMENT 1. SOIL BORING LOG FORM

integral consulting inc.

319 SW Washington St., Suite 1150
Portland, OR 97204
(503) 284-5545

STATION NUMBER ______
PROJECT ______
LOCATION ______
PROJECT NUMBER ______
LOGGED BY ______

SAMPLE INFORMATION							DESCRIPTION
Sample ID	Depth	Time	Tag No.	% Recov.	Depth (Feet)	STRATA	USCS group name, color, grain size range, minor constituents, plasticity, odor, sheen, moisture content, texture, weathering, cementation, geologic interpretation, etc.
					2--		
					4--		
					6--		
					8--		
					10--		
					12--		
					14--		

DRILLING CONTRACTOR ______
DRILLING METHOD ______
SAMPLING EQUIPMENT ______
DRILLING STARTED ______
COORDINATES ______
SURFACE ELEVATION ______
DATUM ______

Location Sketch

ATTACHMENT 2. FIELD CLASSIFICATION OF SOILS, BASED ON UNIFIED SOIL CLASSIFICATION SYSTEM AND ASTM STANDARD D-2488

integral consulting inc

Field Classification of Soils, Based on Unified Soil Classification System and ASTM Standard D-2488

Major Divisions		Symbol and Pattern	General Soil Description
Coarse-Grained Soils (More than 1/2 of soil >No. 200 sieve size)	**Gravels**	GW	Well-graded gravels or gravel-sand mixtures, little to no fines
		GP	Poorly-graded gravels or gravel-sand mixtures, little to no fines
		GM	Silty gravels or gravel-sand-silt mixtures
		GC	Clayey gravels or gravel-sand-clay mixtures
	Sands	SW	Well-graded sands or gravel-sand mixtures, little to no fines
		SP	Poorly-graded sands or gravelly sands, little to no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
Fine-Grained Soils (More than 1/2 of soil <No. 200 sieve size)	**Silts**	ML	Inorganic silts with slight plasticity
		MH	Inorganic elastic silts
		OL	Organic elastic silts
	Clays	CL	Inorganic clays of low to medium plasticity, lean clays
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity
Highly Organic Soils		Pt	Peat, sample composed primarily of vegetable tissue

Soil Classification Notes

Groundwater, First Observed

Groundwater, Static

Sampling Equipment

SS	Split Spoon
ST	Shelby Tube
GS	Geoprobe® Macrocore Sampler

Sheen Types

NS	No Sheen
LS	Light Sheen
MS	Moderate Sheen
HS	Heavy Sheen

Sample Moisture

Dry	No moisture, dry to touch
Moist	Damp, but no free water
Wet	Visible free water

Sample Plasticity (Fine-Grained Soils)

Non-Plastic -	Cannot be rolled at any moisture content.
Low -	Can barely be rolled, lump cannot be formed when drier than plastic limit.
Medium -	Can easily be rolled, lump crumbles when drier than plastic limit.
High -	Can easily be rolled, but takes considerable time to reach the plastic limit. Lump can be formed without crumbling when drier than the plastic limit.

Particle Size Range (Coarse-Grained Soils)

Gravel -	Fine, Coarse
Sand -	Fine, Medium, Coarse

STANDARD OPERATING PROCEDURE (SOP) SL-07

SUBSURFACE SOIL SAMPLING

SCOPE AND APPLICATION

The following procedures are designed to be used to collect subsurface soil samples using a hand auger, direct-push drill rig, and a backhoe. *All underground utilities must be located and cleared prior to drilling or excavating.* Soil samples should be collected from areas having lower levels of constituents of interest first, followed by stations with higher expected levels of constituents of interest.

Based on field and site conditions, the procedures listed below may be modified in the field upon agreement of the field team leader and project management, after appropriate annotations have been made in the project-specific field logbook. If specialized sampling methods (e.g., Encore®) are to be used, refer to the manufacturer's recommended procedures. If methanol preservation is required, refer to Integral SOP SL-08 on methanol preservation of soil samples. Record all pertinent information in the Integral field logbook, subsurface soil field collection form, or boring log (as appropriate).

EQUIPMENT AND SUPPLIES REQUIRED

- Subsurface sampling equipment (e.g., hand auger, direct-push drill rig [e.g., Geoprobe®], backhoe, stainless-steel spade) (consult project-specific field sampling plan [FSP] for kind of equipment to be used for a specific field event)
- Large stainless steel mixing bowl and spoon
- Laboratory-supplied sample containers, insulated coolers, and ice
- Chain-of-custody forms, custody seals, sample labels
- Resealable plastic bags (e.g., Ziploc®)
- Camera
- Tape measure
- Logging table
- 6-mil visqueen and duct tape for covering the logging table
- Aluminum foil

- 55-gallon drums for decontamination waters and excess soil (separate drums for liquid and solid wastes) if required by the project-specific FSP
- Field logbook, subsurface soil field collection form, and/or soil boring form, and pens
- Project-specific FSP and health and safety plan (HSP)
- Personal protective equipment (PPE) (safety glasses, steel-toed boots, nitrile gloves, and any other items required by the project-specific HSP)
- Photoionization detector (PID), if required by the project-specific FSP or HSP
- Global positioning system (GPS), if required by the project-specific FSP
- Decontamination equipment.

HAND AUGER SAMPLER

The following procedures are designed to be used during the general operation of a hand auger sampler. The procedures listed below may be modified in the field upon agreement of the field team leader and drill operators, based on field and site conditions, after appropriate annotations have been made in the field logbook.

1. Locate the sample station as directed in the project-specific FSP. Place sample labels on the sample container prior to filling in accordance with Integral's SOP on sample labeling (SOP AP-04).
2. Place plastic sheeting adjacent to the sampling location.
3. Advance the hand auger into subsurface soil.
4. Empty soil from the first interval (as specified in the project-specific FSP) from the hand auger into a decontaminated stainless steel bowl and cover the bowl with aluminum foil. Continue advancing the hand auger until the next appropriate sample interval has been completed.
5. Screen the soil sample for volatile organic compounds (VOCs) using a PID if required by the project-specific FSP.
6. Photograph each interval with depth and site markers visible in the photograph, if applicable.
7. Log the soils in accordance with SOP SL-04 (*Field Classification of Soils*).
8. If VOC samples are required (see project-specific FSP), collect them prior to homogenizing (i.e., mixing) the sample. Collect the VOC sample (with a minimum of disturbance) by placing the sample into the container with no headspace and sealing it tightly. If an Encore® sampling device is specified in the project-specific FSP, follow the sample collection guidelines provided by the manufacturer.

9. (a) If the soil sample is to be a discrete sample (see project-specific FSP), collect soil from the hand auger using a decontaminated stainless-steel spoon and place the sample into a decontaminated stainless-steel bowl. Homogenize the soil to a consistent color and texture.

   (b) If additional sample volume is required to perform the analyses specified in the project-specific FSP, place multiple soil samples collected from nearby locations (it is important to keep the distance between multiple soil borings as close as possible; the maximum distance will be specified in the project-specific FSP) from the same depth interval into a composite sample in a single decontaminated stainless-steel bowl. When a sufficient volume of soil has been obtained, homogenize all of the soil in the bowl to a consistent color and texture using a decontaminated spoon.

10. Discard rocks found in the homogenized soil that are greater than 0.5 in. in diameter after positively identifying them, determining their percentage contribution to the homogenized soil volume, and noting it in the field notebook.

11. Remove samples of the homogenized soil from the compositing bowl and place in the appropriate size sample container. Fill the sample container with soil to just below the container lip, and seal the container tightly.

12. Decontaminate all sampling equipment in accordance with SOP SL-01 and the project-specific FSP.

13. Repeat the process described above for all subsequent sample intervals.

14. Complete the appropriate field books, field data sheets, and quality assurance and quality control (QA/QC) documentation. Record any deviations from the specified sampling procedures or any obstacles encountered.

15. Backfill the borehole with remaining hand auger soil cuttings or place the cuttings in a properly labeled 55-gallon drum, as specified in the project-specific FSP. If soil cuttings are placed in a 55-gallon drum, backfill the borehole with bentonite hole plug pellets and hydrate the pellets with potable water.

16. Mark the sampling location with a wire flag, wooden stake, metal rebar, or flagging, as appropriate. Collect GPS coordinates of the sample location if specified in the project-specific FSP.

DIRECT-PUSH DRILL RIG

The following procedures are designed to be used during the general operation of direct-push drill rig (e.g., Geoprobe®). The procedures listed below may be modified in the field upon agreement of the field team leader and drill operators, based on field and site conditions, after appropriate annotations have been made in the field logbook. The direct-push drill rig will be operated by a licensed drilling contractor.

The direct-push drilling technique hydraulically pushes tools into the ground to collect soil samples. Direct-push drilling techniques can be used to collect soil samples to depths of 30–100 ft, depending on drilling conditions at the site. In addition to soil sample collection, direct-push techniques can be used to collect soil gas samples, reconnoiter groundwater samples, and install small-diameter monitoring wells.

Soil samples can be collected using two types of Macrocore® samplers, open tip and closed tip. These samplers are typically either 4 ft long by 1.5 in. inside diameter (i.d.) or 5 ft long by 2.5 in. i.d. These samplers have a tubular design and utilize acetate liners to collect the soil samples. The following sections of this SOP describe how to collect soil samples using open-tip and closed-tip Macrocore® samplers.

Open-Tip Sampler

The open-tip sampler is typically used in soils that are cohesive (e.g., stiff silts and clays), where the soil boring is stable and stays open when the sampler and rods are removed from the ground.

1. Ensure all underground utilities are cleared prior to initiating drilling activities.
2. Position the direct-push drill rig over the sample station and remove any surface material that will interfere with sampling. Note in the field logbook any surface material that is removed prior to sampling.
3. Determine the interval to be sampled and install a new clean liner into the open tip Macrocore® sampler.
4. Push the sampler to the bottom of the appropriate sample interval.
5. Retract the rods and Macrocore® sampler.
6. After the Macrocore® sampler has been brought to the surface, remove the liner from the sampler, cap both ends of the liner, and inspect it.
7. After the soil sample is judged to be acceptable, label the sample liner with the station identifier, depth interval, and soil orientation (i.e., arrow pointing toward uppermost soil interval).
8. Place the capped sample liner on a new piece of aluminum foil on the logging table and split the liner open with a hook or utility knife. Process the sample in accordance with the “General Sampling Procedures” listed below.
9. Repeat Steps 2–8 for each subsequent sample interval.

Closed-Tip Sampler

The closed-tip sampler is typically used to collect soil samples that are noncohesive (e.g., sandy materials), where the soil boring is unstable and collapses when the rods and sampler are removed from the ground.

1. Ensure all underground utilities are cleared prior to initiating drilling activities.
2. Position the direct-push drill rig over the sample station and remove any surface material that will interfere with sampling. Note in the field logbook any surface material removed prior to sampling.
3. Determine the interval to be sampled and install a drive point and a new clean liner into the closed-tip Macrocore® sampler.
4. Push the rods and sampler to the top of the appropriate sample interval.
5. Retract the rods to release the drive point.
6. Push the sampler to the bottom of the appropriate sample interval.
7. Retract the rods and Macrocore® sampler.
8. Once the soil sample has been brought to the surface, remove the liner from the sampler, cap both ends of the liner, and inspect it.
9. After the soil sample is judged to be acceptable, label the sample liner with the station identifier, depth interval, and soil orientation (i.e., arrow pointing toward uppermost soil interval).
10. Place the capped sample liner on a new piece of aluminum foil on the logging table and split the liner open with a hook or utility knife. Process the sample in accordance with the "General Sampling Procedures" listed below.
11. Repeat Steps 2–10 for each additional sample interval.

General Sampling Procedures

1. After the liner has been split open, screen the soil sample for VOCs using a PID if required by the project-specific FSP.
2. Log the soils in accordance with SOP SL-04 (*Field Classification of Soils*).
3. Photograph each section of the soil boring with appropriate orientation, depth, and site markers visible in the photograph, if specified in the project-specific FSP.

4. If VOC samples are required (see project-specific FSP), collect them prior to sample removal from the liner. Collect the VOC sample (with a minimum of disturbance) by placing the sample into the container with no headspace and seal it tightly. If an Encore® sampling device is specified in the project-specific FSP, follow the sample collection guidelines provided by the manufacturer.
5. Remove the soil from the liner using a decontaminated stainless-steel spoon and place the soil in a decontaminated compositing bowl and thoroughly mix and homogenize the sample using a decontaminated spoon until the color and texture are consistent throughout.
6. (a) If the soil sample is to be a discrete sample (see project-specific FSP), collect soil from the liner using a decontaminated stainless-steel spoon and place the sample into a decontaminated stainless-steel bowl. Homogenize the soil to a consistent color and texture.

   (b) If additional sample volume is required to perform the analyses specified in the project-specific FSP, place multiple soil samples collected from nearby locations (it is important to keep the distance between multiple soil borings as close as possible; the maximum distance will be specified in the project-specific FSP) from the same depth interval into a composite sample in a single decontaminated stainless-steel bowl. When a sufficient volume of soil has been obtained, homogenize all of the soil in the bowl to a consistent color and texture using a decontaminated spoon.
7. Discard rocks found in the homogenized soil that are greater than 0.5 in. in diameter after positively identifying them, determining their percentage contribution to the homogenized soil volume, and noting it in the field notebook.
8. Remove samples of the homogenized soil from the compositing bowl and place in the appropriate size sample container. Fill the sample container with soil to just below the container lip, and seal the container tightly.
9. Repeat the process described above for subsequent sample intervals.
10. Complete the appropriate field books, field data sheets, and QA/QC documentation. Record any deviations from the specified sampling procedures or any obstacles encountered.
11. Backfill the borehole with remaining direct-push sampler cuttings or place the cuttings in a properly labeled 55-gallon drum, as specified in the project-specific FSP. If soil cuttings are placed in a 55-gallon drum, backfill the borehole with bentonite grout (mixed to the manufacturer's specifications) or bentonite hole plug pellets and hydrate the pellets with potable water.
12. Mark the sampling location with a wire flag, wooden stake, metal rebar, or flagging, as appropriate. Collect GPS coordinates of the sample location if specified in the project-specific FSP.

13. Decontaminate all sampling equipment in accordance with SOP SL-01 and the project-specific FSP.

Test Pit Excavations

The following procedures are to be used during the excavation of pits with construction equipment (i.e., backhoe or track-hoe) prior to soil sampling operations. Adhere to all requirements of the site-specific HSP for this specific activity. The procedures listed below may be modified in the field upon agreement of the field team leader and project management, based on field and site conditions, after appropriate annotations have been made in the field logbook.

1. Locate the sample station as directed in the project-specific FSP. Ensure all underground utilities have been cleared prior to initiating excavation activities. Place sample labels on all sample containers prior to filling in accordance with Integral's SOP for sample labeling (SOP AP-04).
2. Select the appropriate orientation for the excavation, basing it on the judgment of the field team leader, backhoe operator, and onsite conditions. Sampling personnel **MUST** remain in visual contact with the backhoe operator at all times, and out of possible "pinch zones" or areas where heavy equipment may move or swing.
3. Place plastic sheeting from the edge of the proposed excavation leading away for a sufficient distance to the proposed temporary stockpile location so that the excavated soil does not slough back into the pit.
4. Begin pit excavation.
5. Continue excavation of the pit to the required depth. If pit entry is necessary, this depth will not exceed 4 ft from the ground surface. Never enter a trench or pit if conditions are unstable. Excavate the proper pit exit trenches, shoring, and sloping to prevent accidental burial of sampling crew, and to meet or exceed all OSHA Construction Standards (29 CFR § 1926; Attachment 201-2) for entrance by sampling personnel. If pit entry is not necessary for sampling activities, pit depth can exceed 4 ft below ground surface. Instruct the backhoe operator to scrape material evenly along an exposed face to collect (to the extent practicable) a representative sample of the soils across the entire face in the bucket. Collect soil samples from the middle of the backhoe bucket.
6. Screen the soil sample for VOCs using a PID if required by the project-specific FSP.
7. Photograph each interval with depth and site markers visible in the photograph, if applicable.
8. Log the test pit soils in accordance with SOP SL-04 (*Field Classification of Soils*).

9. If VOC samples are required (see project-specific FSP), collect them prior to homogenizing (i.e., mixing) the sample. Collect the VOC sample (with a minimum of disturbance) by placing the sample into the container with no headspace and seal it tightly. If an Encore® sampling device is specified in the project-specific FSP, follow the sample collection guidelines provided by the manufacturer.
10. Collect soil using a decontaminated stainless-steel spoon or disposable sampling tool (depending on project-specific requirements; see FSP), which has been evenly removed from the face of the trench wall or from the bucket, and place the sample into a decontaminated stainless-steel bowl. Homogenize the soil to a consistent color and texture.
11. Discard rocks found in the homogenized soil that are greater than 0.5 in. in diameter after positively identifying them, determining their percentage contribution to the homogenized soil volume, and noting it in the field notebook.
12. Remove samples of the homogenized soil from the compositing bowl and place them in the appropriate size sample container. Fill the sample container with soil to just below the container lip and seal it tightly.
13. Decontaminate all sampling equipment in accordance with SOP SL-01 and the project-specific FSP.
14. Repeat the process described above for all subsequent sample intervals.
15. Complete all pertinent field logbooks, field data sheets, and QA/QC documentation. Record any deviations from the specified sampling procedures or any obstacles encountered.
16. Mark the sampling location with a wire flag, wooden stake, metal rebar, or flagging, as appropriate. Collect GPS coordinates of the sample location if specified in the project-specific FSP. Photograph sample location and document in the logbook.
17. Backfill the test pit with the excavated soils. Depending on historical site data (see project-specific FSP), the plastic sheeting will either be disposed of as garbage or it will be drummed and sent to a hazardous waste landfill.

Appendix B

Field Forms

CHAIN OF CUSTODY FORM

Project: ______________________________

Samplers: ______________________________

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Integral Contact: ______________________________

Phone ______________________________

Ship to: Lab Name ______________________________

Address ______________________________

____

____

Contact ______________________________

Phone ______________________________

Sample No.	Tag #	Date	Time	Matrix	ANALYSES REQUESTED								Extra Container	Archive	Comments

Analysis Turn Time: **Normal** **Rush** **Rush Results Needed By:**

Shipped by: **Shipping Tracking No.**

Condition of Samples Upon Receipt: **Custody Seal Intact?**

Matrix Code: GW - Groundwater
SL - Soil SW - Surface water
SD -Sediment Other:

Relinquished by: ______________________ *(signature)* **Date/Time:** ________ **Received by:** ______________________ *(signature)* **Date/Time:** ________

Relinquished by: ______________________ *(signature)* **Date/Time:** ________ **Received by:** ______________________ *(signature)* **Date/Time:** ________

Special Instructions:

SEDIMENT CORE LOG

PROJECT: ____________________ **Core ID:** __________ pg ___of ____

Collected:		**Processed:**
Date: ______	Drive Length: ______	Date: ______
Time: ______	Tide Level (CRD): ______	Time: ______
Recovery Length: ____	Mudline Depth: ______	Core Length: ______
Recovery Efficiency: ____	Vessel: ______________	Location: ______________
Crew: ______________________________		Crew: ______________

Depth in Core (ft/cm)	Visual Description: (Grainsize, color, density/consistency, odor, organics, debris)	Grain Size (%)			Photo ID	Sample ID / Notes
		G	S	Si/Cl		

Core segment breaks at (ft/cm):

integral consulting inc

Field Classification of Soils, Based on Unified Soil Classification System and ASTM Standard D-2488

Major Divisions		Symbol and Pattern	General Soil Description
Coarse-Grained Soils (More than 1/2 of soil >No. 200 sieve size)	**Gravels**	GW	Well-graded gravels or gravel-sand mixtures, little to no fines
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		GM	Silty gravels or gravel-sand-silt mixtures
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	Sands	SW	Well-graded sands or gravel-sand mixtures, little to no fines
		SP	Poorly-graded sands or gravelly sands, little to no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
Fine-Grained Soils (More than 1/2 of soil <No. 200 sieve size)	**Silts**	ML	Inorganic silts with slight plasticity
		MH	Inorganic elastic silts
		OL	Organic elastic silts
	Clays	CL	Inorganic clays of low to medium plasticity, lean clays
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		OH	Organic clays of medium to high plasticity
Highly Organic Soils		Pt	Peat, sample composed primarily of vegetable tissue

Soil Classification Notes

Groundwater, First Observed

Groundwater, Static

Sampling Equipment

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ST	Shelby Tube
GS	Geoprobe® Macrocore Sampler

Sheen Types

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Low -	Can barely be rolled, lump cannot be formed when drier than plastic limit.
Medium -	Can easily be rolled, lump crumbles when drier than plastic limit.
High -	Can easily be rolled, but takes considerable time to reach the plastic limit. Lump can be formed without crumbling when drier than the plastic limit.

Particle Size Range (Coarse-Grained Soils)

Gravel -	Fine, Coarse
Sand -	Fine, Medium, Coarse

Appendix C

Health and Safety Plan

Appendix C: Former Georgetown Steam Plant Flume Property Transfer

Health and Safety Plan

Prepared for
Seattle City Light
P.O. Box 34023
Seattle, WA 98124

Prepared by
integral consulting inc.
719 2nd Avenue
Suite 1450
Seattle, WA 98104

September 23, 2021

CONTENTS

ATTACHMENTS: HEALTH AND SAFETY FORMS

ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
AWG	American Wire Gauge
CDC	Centers for Disease Control and Prevention
CFR	Code of Federal Regulations
CHSM	Corporate Health and Safety Manager
COPC	chemical of potential concern
CPR	cardiopulmonary resuscitation
CRZ	contamination reduction zone
EPA	U.S. Environmental Protection Agency
HASP	health and safety plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IDLH	immediately dangerous to life and health
Integral	Integral Consulting Inc.
JHA	job hazard analysis
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PEL	permissible exposure limit
PFD	personal flotation device
PPE	personal protective equipment
SAP	sampling and analysis plan
SDS	safety data sheet
SSO	Site Safety Officer
STEL	short-term exposure limit
TLV	threshold limit value
TWA	time-weighted average
WISHA	Washington Industrial Safety and Health Act

CERTIFICATION PAGE

This health and safety plan has been reviewed and approved by Integral Consulting Inc. (Integral) for the 2021 soil study in support of the Former Georgetown Steam Plant property transfer in Washington state.

____ ________________________
Project Manager Date

9/23/2021

____ ________________________
Corporate Health and Safety Manager Date

HEALTH AND SAFETY PLAN ACKNOWLEDGMENT

In the absence of an appropriate subcontractor or consultant health and safety plan (HASP), and with the written approval of Integral Consulting Inc. (Integral) corporate health and safety manager, the subcontractor or consultant may utilize the Integral HASP, provided there is written concurrence from the subcontractor or consultant that they will directly administer the plan for their employees and assume all risks associated with any possible errors or omissions in the plan. This HASP does not cover any construction activities. The Integral HASP is a minimum standard for the site and will be strictly enforced for all Integral personnel, or its subcontractors or consultants where applicable.

I have reviewed the HASP prepared by Integral, dated September 23, 2021, for the Former Georgetown Steam Plant flume property soil sampling fieldwork. I understand the purpose of the plan, and I consent to adhere to its policies, procedures, and guidelines while an employee of Integral, or its subcontractors or consultants. I have had an opportunity to ask questions regarding this plan, which have been answered satisfactorily by Integral.

Employee signature	Company	Date
Employee signature	Company	Date
Employee signature	Company	Date
Employee signature	Company	Date
Employee signature	Company	Date
Employee signature	Company	Date
Employee signature	Company	Date

KEY PROJECT AND SAFETY INFORMATION

Site and Location

Former Georgetown Steam Plant Flume
Approximately 1035 South Myrtle Street
Seattle, WA 98108
(Portion of Parcel 700670-0570 between S Myrtle Street and East Marginal Way S)

Owner Contact Information
Seattle City Light
P.O. Box 34023
Seattle, WA 98124
Phone number: 206-684-3167 (Allison Crowley)

WorkCare Medical Contact Information
Tony Vo
300 S. Harbor Blvd., Suite 600
Anaheim, CA 92805
(657) 549-3265
Tony.Vo@workcare.com

Incident Intervention Hotline
1-888-449-7787

Integral Project Manager

Shannon Ashurst
work: (206) 957-0373
cell: (206) 794-1313

Integral Corporate Health and Safety Manager

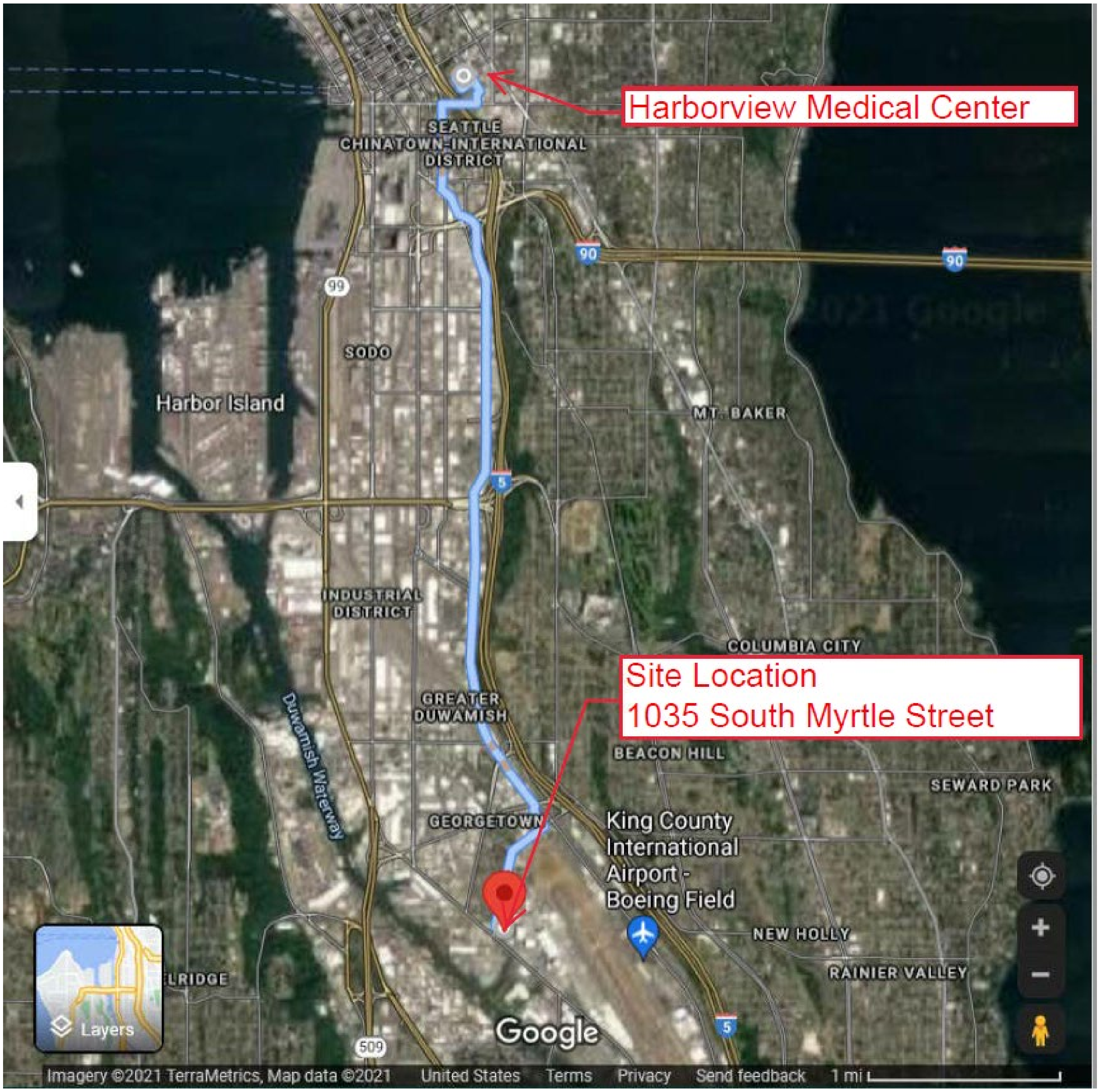
Matthew Behum
work: (667) 225-5412
cell: (443) 454-1615

Nearest Hospital

Harborview Medical Center
325 9th Avenue
Seattle, WA 98104
(206) 731-3000

See next page for hospital map and directions from the project site.

HOSPITAL ROUTE MAP AND DRIVING DIRECTIONS



Directions from the vicinity of the site location to Harborview Medical Center are as follows:

From the Site location (approximately 1035 South Myrtle Street):

- Head west on S Myrtle St toward Ellis Ave S
- Turn right onto Ellis Ave S
- Ellis Ave S turns right and becomes S Albro Pl
- Turn Left onto Stanley Ave S

- Turn right onto 13th Ave S
- Turn left onto Airport Way S
- Slight left to stay on Airport Way S
- Turn Right onto6th Ave S
- Turn Right on to Yesler Way
- Turn left onto 8th Ave
- Turn left onto 9th Ave
- Turn left onto Alder St
- Turn right onto 8th Ave
- Destination will be on the right

1 INTRODUCTION

It is the policy of Integral Consulting Inc. (Integral) to provide a safe and healthful work environment that is compliant with applicable regulations. No aspect of the work is more important than protecting the health and safety of all workers. This site-specific health and safety plan (HASP) provides general health and safety provisions to protect workers from potential hazards during soil sample collection. The sampling area comprises the 1.25-acre project site located approximately at 1035 South Myrtle Street, Seattle, Washington. The sampling and analysis plan (SAP) provides complete details of the sampling program.

This HASP has been prepared in accordance with Washington state regulations and federal Occupational Safety and Health Administration (OSHA) safety regulations (Code of Federal Regulations [CFR] 29 CFR 1910 and 29 CFR 1926). The Washington Industrial Safety and Health Act (WISHA; Chapter 49.17 of the Revised Code of Washington) requires employers to provide safe and healthful workplaces for all employees. All work that Integral conducts in the state of Washington must conform to the WISHA core rules presented in Title 296, Chapter 296-800 of the Washington Administrative Code. The Division of Safety and Health of the Washington State Department of Labor and Industries administers WISHA. WISHA is the state equivalent of the federal government's Occupational Safety and Health Act, which is administered by OSHA. This HASP follows both WISHA and OSHA hazardous waste operations and emergency response (HAZWOPER) and applicable regulations in 29 CFR 1910 and 29 CFR 1926.

This site-specific HASP has been prepared to identify potential site hazards to the extent possible based on information available to Integral. Integral cannot guarantee the health or safety of any person entering this site. Because of the potentially hazardous nature of this site and the activity occurring thereon, it is not possible to discover, evaluate, and provide protection for all possible hazards that may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, but not eliminate, the potential for injury and illness at this site. The health and safety guidelines in this plan were prepared specifically for this site and should not be used on any other site without prior evaluation by trained health and safety personnel.

The provisions of this HASP are mandatory for all Integral and any contractor personnel assigned to the project. Other contractors that will be working at the site are also expected to follow the provisions of this HASP unless they have their own HASP that covers their specific activities related to this study and such HASPs have been approved by Integral. Any other contractor HASPs must include the requirements set forth in this HASP, at a minimum. All visitors to the work site—including U.S. Environmental Protection Agency (EPA) personnel; state and local government personnel; or employees, representatives, or contractors—must also abide by the requirements of this HASP.

A copy of this HASP must be in the custody of the field crew during field activities. All individuals performing fieldwork must read, understand, and comply with these plans before undertaking field activities. Once the information has been read and understood, the individual must sign the Health and Safety Acknowledgment Form provided with this HASP. The signed form will become part of Integral project files.

This HASP may be modified at any time based on the judgment of Integral's Site Safety Officer (SSO) in consultation with Integral's Corporate Health and Safety Manager (CHSM) and Project Manager or designee. Any modification will be presented to the onsite team during a safety briefing and will be recorded in the field notebook.

Attachments to this HASP provide a site-specific map and directions to the hospital from the site (Attachment 1), regulatory notices (Attachment 2), safety data sheets (SDSs; Attachment 3), a near-miss/near-loss incident report form (Attachment 4), a job hazard analysis (JHA) form (Attachment 5), safety guidelines (Attachment 6), a field safety tailgate briefing form (Attachment 7), and Integral's COVID-19 field program management plan (Attachment 8).

2 SCOPE OF WORK

To perform the fieldwork required for the soil study, a field sampling team will be deployed for 2 days in September or October 2021. The following tasks will be performed by the team using this soil sampling HASP:

- Collection of soil borings for chemical analyses
- Collection of soil borings for waste characterization.

Soil borings will be collected from land. The collection method for soil boring is with a direct push technology drill rig using a decontaminated coring device.

Proposed sampling locations are within the 1.25-area project site, which is predominantly a grassy field.

3 AUTHORITY AND RESPONSIBILITY OF KEY PERSONNEL

This section describes the authority and responsibilities of key Integral project personnel.

The Integral team will have an SSO that will have the authority to enforce the rules of the HASP for any individual present at the site, whether that individual is an employee or an outside contractor who is working with their team. The HASP will be enforced consistently to ensure that onsite personnel have a clear understanding of health and safety expectations, lines of authority, and emergency response actions.

The names and contact information for key safety personnel are listed in the "Key Project and Safety Information" section at the beginning of this HASP. Should key site personnel change during the course of the project, a new list will be established and given immediately to the field teams. The emergency phone number for the site is 911, and should be used for all medical, fire, and police emergencies.

The Integral field lead and SSO have oversight responsibility for all health and safety activities and the authority to discontinue or modify site operations when unsafe conditions are detected. The field lead will be in direct contact with the CHSM (Matthew Behum for Integral) and project manager (Shannon Ashurst for Integral).

The project manager will be in regular contact with their field lead/SSO and CHSM to ensure that appropriate health and safety procedures are implemented during the soil study.

All Integral personnel on this site must comply with the requirements of this HASP. The HASP is a minimum standard for the site and will be strictly enforced for all Integral personnel, or subcontractors or consultants, where applicable. The specific responsibilities and authority of management, safety and health, and other personnel on this site are detailed in the following paragraphs.

3.1 SITE SAFETY OFFICER

The SSO has full responsibility and authority to implement this HASP and to verify compliance. The SSO reports to the project manager and is onsite or readily accessible to the site during all work operations. The SSO is responsible for assessing site conditions and directing and controlling emergency response activities. The specific responsibilities of the SSO include the following:

- Managing the safety and health functions on this site
- Serving as the onsite point of contact for safety and health concerns
- Assessing site conditions for unsafe acts and conditions and ensuring corrective action

- Ensuring that all Integral employees and subcontractors understand and follow the HASP
- Ensuring that daily work schedules and tasks are reasonable for the required levels of effort and weather conditions
- Confirming local emergency response phone numbers and locations
- Conducting and documenting the initial and daily or periodic health and safety briefings
- Evaluating and modifying the level of protective apparel and safety equipment, based on site conditions
- Ensuring that the field team observes all necessary decontamination procedures.

If the SSO determines that site conditions are unsafe, the SSO has the authority to suspend field operations until the problem is corrected. The SSO can modify HASP procedures in the field. Any changes must be documented in the field logbook, and field staff must be immediately informed of the change. The project manager and Integral's CHSM must be notified by phone or email within 24 hours of any major changes to the HASP.

3.2 PROJECT MANAGER

The project manager has overall responsibility to ensure that personnel working onsite are safe. The specific responsibilities of the project manager include:

- Ensuring that the HASP is developed prior to the fieldwork or site visit
- Reviewing and approving the HASP prior to the fieldwork or site visit
- Ensuring employee understanding of and compliance with the HASP.

3.3 CORPORATE HEALTH AND SAFETY MANAGER

The CHSM provides guidance to the project manager and SSO on HASP preparation and reviews and approves the HASP. The CHSM also serves as an arbitrator if there is a conflict between the project manager, SSO, and field personnel. In addition, the CHSM[1] conducts periodic unannounced audits of Integral field operations to ensure compliance with the site-specific HASP.

3.4 FIELD PERSONNEL

All Integral personnel and subcontractors, where applicable, on this site are responsible for reading and complying with this HASP, using the proper personal protective equipment (PPE),

[1] The audit task may be delegated to an office health and safety representative by the CHSM.

reporting unsafe acts and conditions, and following the work and safety and health instructions of the project manager and SSO. All Integral personnel, subcontractors, or consultants can and are encouraged to suspend field operations if they feel conditions have become unsafe.

4 JOB HAZARD ANALYSIS

The OSHA standard (29 CFR 1910.120) mandates that site safety and health programs require that task- and operation-specific hazard analyses be conducted at the site. These analyses are intended to ensure a comprehensive and systematic approach to hazard anticipation, recognition, and evaluation at hazardous waste sites.

The kinds of potential hazards associated with soil sampling are summarized in the JHA table provided in Section 4.5 of this HASP for the soil sampling task. The JHA lists a task or operation required during site activity and the location(s) where that task or operation is performed. A single JHA may be used for a task performed in multiple locations if the hazards, potential exposures, and controls are the same in each location. A JHA form can be found in Attachment 5 of this HASP.

The JHA lists the chemical hazards associated with that task and their known or anticipated concentrations during performance of the task. Each JHA also identifies anticipated physical and biological hazards and potential exposure levels or the likelihood of exposure. The final section of each JHA lists the control measures implemented to protect employees from exposure to the identified hazards. The information provided here is designed to satisfy OSHA's HAZWOPER JHA requirements of 1910.120(b)(4)(ii)(A) and the workplace hazard assessment requirements of 1910.132(d).

Health hazard information for all chemicals of potential concern (COPCs) identified in site JHAs appears in the SDSs included in Attachment 3.

The SSO will modify the study-specific JHA when:

- The scope of work is changed by adding, eliminating, or modifying tasks
- New methods of performing study tasks are selected
- Observation of the performance of study tasks results in a revised characterization of the hazards
- New chemical, biological, or physical hazards are identified
- Exposure data indicate changes in the concentration and/or likelihood of exposure
- New/different control measures are selected.

If the JHA is modified, then related provisions in other sections of this soil sampling HASP will also be modified as needed.

The overall hazard level associated with the activities described in Section 2 is low. Hazards encountered during these sampling programs are due to physical safety hazards associated with the field operations, exposure to chemicals used to decontaminate sampling gear and preserve samples, and potential exposure to hazardous materials present within the soil. Potential hazards while working at the site include, but are not limited to, the following:

- Exposure to toxic and/or hazardous chemicals
- Physical hazards from use of sampling equipment
- Physical hazards from working conditions (e.g., hypothermia, slips/trips/falls, or drowning).
- Exposure to the SARS-CoV-2 virus.

As described below, protective equipment and safe working procedures will help prevent accidents caused by these hazards. All workers are required to use the buddy system, and no one will be allowed to work alone.

4.1 DEFINITIONS

Chemical hazards are defined by the following terms:

Time-Weighted Average (TWA): The recommended exposure limits for a hazardous chemical in the workplace, typically during an 8-hour work day over a 40-hour work week. TWAs are recommended by the National Institute for Occupational Safety and Health (NIOSH) under the authority of OSHA.

Permissible Exposure Limit (PEL): The legal maximum air concentration of a hazardous chemical to which workers may be exposed on an 8-hour basis as established by OSHA. The PEL is a time-weighted average value (PEL-TWA), and for all chemicals discussed below, the corresponding PEL-TWA is the same for OSHA.

Threshold Limit Value (TLV): The recommended maximum air concentration of a hazardous chemical to which workers may be exposed on an 8-hour basis. TLVs are TWA values (TLV-TWA) and are recommended by the American Conference of Governmental Industrial Hygienists (ACGIH).

Short-Term Exposure Limit (STEL): A 15-minute TWA exposure that should not be exceeded at any time during a workday.

Ceiling Limit: Employee's exposure, which should not be exceeded during any part of the workday.

Buddy system: "Buddy system" means that an employee is designated to be observed by at least one other employee in the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

4.2 PHYSICAL HAZARDS

Physical hazards of the soil sampling event include motor vehicle operation, physical exposure, and others. The sections below provide safety guidelines for physical hazards. The different physical hazards that may be associated with each of these operations are discussed below.

4.2.1 Motor Vehicle Operation

Motor vehicles will be used to transport field personnel, equipment, and supplies to the project site. Motor vehicles will also be used to transport field personnel, equipment, and supplies to the sample shipping locations. Only sampling team personnel with valid driver's licenses and liability insurance (per local state laws) will operate motor vehicles required for work activities. All field staff will use best professional judgment at all times to ensure safe operation of motor vehicles, including:

- Operators are to practice defensive driving and drive in a courteous manner.
- Operators are to be aware of pedestrians and give them the right-of-way.
- All vehicles are to be operated in a safe manner and in compliance with statutory traffic regulations and ordinances.
- Operators are to verify that safety seat belts are in proper operating order.
- Seat belts are to be worn by the driver and all passengers whenever the vehicle is in motion.
- No persons are allowed to ride in the back of any vehicles, unless equipped with seat belts.
- Vehicles are to be driven in conformance with local speed limits.
- Operators are to avoid excessively long driving periods.
- Personnel who are impaired by fatigue, illness, alcohol, illegal or prescription drugs, or who are otherwise physically unfit, are not allowed to drive.
- Personnel are not to use cellular phones or engage in other distractions while driving.
- Motor vehicle accidents are to be reported to the responsible law enforcement agency, Integral's human resources manager, and Integral's CHSM.

4.2.2 Physical Exposure

Exposure to the elements and fatigue are two major causes of accidents while working outside. The individual task activities may include long work days and unpredictable weather. To prevent fatigue and overexposure in adverse weather conditions, field personnel will take regular work breaks. Extra clothing will be brought to accommodate changes in weather. Cold stress can be manifested as hypothermia. Heat-related illnesses can occur at any time when protective clothing is worn. When air temperatures average 70°F to 75°F or higher, the risk of heat-related illnesses increases. Heat stress can be manifested as both heat stroke and heat exhaustion. In cold conditions, precautions should be taken to reduce the risk of cold stress hypothermia. Field personnel should make every effort to stay warm and dry and should bring changes of clothes to the project area. Personnel should not work in extreme conditions without proper equipment and training. Follow cold stress information in Attachment 6.

Personnel should monitor their own conditions and capabilities and are responsible for taking appropriate measures to relieve fatigue, exposure, or heat stress. Because fatigue and extreme heat/cold stress may impair an individual's judgment, the SSO is also responsible for monitoring workers' apparent condition in relation to physical exposure. The SSO may direct any crew member to cease working if conditions indicate the potential for overexposure.

4.2.3 Other Physical Hazards

Incorporating the following basic safety procedures can prevent many of the most common causes of injury or accident during field sampling:

- Implement good housekeeping practices, including immediate cleanup of spills and safe storage of all materials. All equipment or materials not in current use will be removed from the immediate work area.
- The project site is a grassy field. Walking, carrying equipment, and working in this area could be hazardous. Use caution, wear properly fitting shoes or boots, and keep work areas orderly to avoid tripping on uneven terrain.
- Use proper lifting and moving techniques to prevent back or muscle strain or injury. Any heavy equipment, boxes, coolers, or other items should be tested before lifting. If a piece of equipment is too heavy, the equipment should be broken into smaller components or assistance requested. Lifting should be done with the legs, not the back.
- Stay back from operating equipment; wear safety vests and hard hats; coordinate and maintain eye contact with equipment operator.
- Use extra caution when handling sharp tools or sampling devices and when possible, wear protective gloves.
- Use hearing protection when working with or near heavy equipment and other noise sources.
- Use the following safety procedures when employing extension cords:
  - Always inspect cords before using them. Only use cords in good condition to avoid electrical shocks.
  - Extension cords used in wet and/or outdoor locations have to be protected by ground fault circuit interrupters.

- Extension cords should be a minimum of 16 American Wire Gauge size (AWG) and be rated for the equipment in use. Example: To connect an impact corer to a 2,000-watt power generator, a 12 AWG (25 amps) extension cord is needed to carry the necessary current to startup the unit.
- Avoid running extension cords across walkways. Instead, run them overhead if possible and place flagging tape on the extension cord to warn of possible overhead hazard.
- An extension cord that is hot to the touch is overloaded and should be replaced.

4.3 CHEMICAL HAZARDS

A summary of the COPCs for health and safety and their maximum onsite concentrations are provided in Section 4.5. This list includes chemicals or characteristics of soil that have been identified as the primary COPCs on the upland site, including polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs). During the soil sampling, these COPCs will be bound in a wet or dry solid matrix (i.e., the soil) and pose a low risk for inhalation. Personnel will also be working in an open-air environment. Nonetheless, these compounds are potentially hazardous and exposure by all routes should be minimized. SDSs for these compounds are provided in Attachment 3. Respiratory protection is not expected to be needed, and either Level D (offsite sampling handling) or Modified Level D PPE should be appropriate for the entire investigation. SDSs for these compounds are provided in Attachment 3.

4.4 BIOLOGICAL HAZARDS

Field sampling will be conducted in accordance with SARS-CoV-2 safe practices requirements dictated by the State of Washington Office of the Governor's Phase 1 Construction Restart – Proclamation 20-25, its supporting Phase 1 Construction Restart COVID-19 Job Site Requirements (Inslee 2020a,b), and the General Coronavirus Prevention Under Stay at Home-Stay Healthy guidelines (L&I 2020). COVID-19 safe practice requirements can be found in Attachment 8.

COVID-19 is a contagious respiratory illness caused by the SARS-CoV-2 virus (OSHA 2020). SARS-CoV-2 infection can cause mild to severe illness, and can be fatal in severe cases. Typical symptoms include shortness of breath, coughing, and fever (>100.4°F). Other reported symptoms include chills, shaking with chills, muscle pain, sore throat, headache, and a loss of taste or smell. Some infected persons are asymptomatic. The U.S. Department of Health and Human Services Centers for Disease Control and Prevention (CDC) states that symptoms may appear within 2 to 14 days of exposure (CDC 2020). The virus is typically spread through inhalation and from person-to-person contact; either between people within close distances (less than approximately 6 ft) or through respiratory droplets from an infected person's cough or sneeze. The virus may also be transmitted to a person by the person touching a surface or object that has SARS-CoV-2 on it, and then touching their eyes, nose, or mouth. It is thought that people are most contagious when they are most symptomatic, but transmission is also possible when an infected person is asymptomatic (CDC 2021).

4.4.1 COVID-19 Safety Protocols

To reduce the risks of worker exposure to SARS-CoV-2 during field operations, the following practices will be followed:

- Workers should stay home if they are sick or symptomatic.
- If an employee is showing symptoms they should contact their healthcare provider for medical advice. Testing or examinations may be recommended.
- If an employee shows any symptoms of COVID-19 they will be asked to leave the site and return only after a minimum of 14 days have passed, or if they test negative for COVID-19 and are permitted to return by a healthcare professional.
- If an employee has traveled outside of the United States to an affected country or has been exposed to an infected person, they must self-quarantine for a minimum of 14 days before returning to the project site.
- Field personnel should be limited to the minimum number of persons required to complete the work safely.
- Time spent in close contact with other or in enclosed spaces should be avoided if possible.
- Personnel should travel individually to and from the work site.
- Workers' temperatures should be monitored for signs of fever.
- Personnel should cover coughs and sneezes and follow respiratory etiquette.
- Hands should be washed frequently and thoroughly using soapy water, or an alcohol-based sanitizer (>60% alcohol) when running water is not available.
- Disposable PPE should be used during sampling and disposed of properly as necessary.
- Physical distance should be maximized between employees and others.
- Barriers to COVID-19 exposure (i.e., facemasks, face shields, protective eyewear) should be utilized when social distancing is not feasible.
- When possible, personal items (e.g., a worker's phone, pen, work tools, or equipment) should not be shared between employees.
- Surfaces, equipment, and other elements of the work environment should be routinely cleaned and disinfected.

- If possible, strategies to reduce exposure, such as staggering work shifts and breaks or covering commonly touched surfaces with cleanable/disposable materials, should be employed.
- The same prevention measures should be followed offsite, including while traveling, at home, or at a hotel, and while participating in other activities, to limit exposure outside the workplace.

Subsequent sections of this HASP and Integral's COVID-19 Field Program Management Plan (Attachment 8) contain additional compliance measures adhering to Washington state's COVID-19 safe practices guidelines.

4.4.2 Other Biological Hazards

Additional biological hazards include insect bites and stings.

4.5 ACTIVITY HAZARD ANALYSIS

The following tables summarize the potential hazards associated with this field sampling project:

Job Hazard Analysis for Soil Sampling—Types of Potential Hazards

Operational Phase: SAP **Location: Project Site**

Chemical Hazards

Chemical of Potential Concern	Max Concentration Found Onsite[a]	PEL – TWA[b] mg/m^3	TLV – TWA[c] mg/m^3	STEL mg/m^3	IDLH mg/m^3	Exposure Routes	Symptoms
PCBs	93 µg/kg (nondetected result)	0.5	0.5	1	5	Inh, Ing, Con	Irritation to eyes, nose, throat, skin irritation or burning
cPAHs	6.6 µg TEQ/kg (nondetected result)	0.2	0.2	10		Inh, Ing, Con	Irritation to eyes, nose, throat, skin irritation or burning; headache, loss of appetite, nausea
Tetrasodium Pyrophosphate (Alconox)		5	10	--	--	Inh, Ing, Con	Irritation to eyes, nose, throat, skin irritation or burning; nausea, vomiting, diarrhea if ingested

Physical Hazards

Name of Physical Hazard	Source	Exposure Level/ Potential	Exposure Limit
Pinch and crush zones	Drill rig machinery	Likely	NA
Heat (ambient)	Sun	Likely	NA
Cold weather operations	Work area	Likely	NA
Heavy manual lifting/moving	Soil cores; equipment	Likely	NA
Oxidizers—storage and use	Decontamination solution	Likely	NA
Slips/trips/falls	Work area	Likely	NA
Inclement weather—rain, wind	Work area	Likely	NA
Uneven terrain/tripping	Work area	Likely	NA

Physical Hazards			
Name of Physical Hazard	**Source**	**Exposure Level/ Potential**	**Exposure Limit**
Heavy equipment	Work area	Likely	NA
Noise	Work area	Likely	NA
Sharp objects—broken glass	Work area	Likely	NA
Corrosives—storage and use	Decontamination solution	Likely	NA
Flammable liquids—storage and use	Decontamination solution	Likely	NA
Material handling	Soil	Likely	NA
Vehicular travel	Vehicle	Likely	NA

Biological Hazards			
Name of Biological Hazard	**Source**	**Exposure Level/ Potential**	**Exposure Limit**
COVID-19	Field personnel, surfaces	Likely	NA
Insect bites and stings	Work area	Likely	NA
Thorny plants (e.g., blackberries)	Work area	Likely	NA
Poisonous plants (e.g., poison oak)	Work area	Likely	NA

Control Measures Used

Engineering Controls: see the SAP

In addition:

1. Weights of coolers are such that two persons should lift the units to prevent back injuries.
2. To avoid insect bites, insect repellents may be applied.
3. Field staff must bring allergy medications if allergic to ragweed.

Level of PPE: D Location: Work area	PPE Equipment: Chemical-resistant steel-toed boots, PVC bib-style overalls and jacket with hood, splash-proof safety goggles, nitrile gloves, hardhat, ear protection worn in areas where exposure is over 85 decibels (dB). Additional COVID-19 Practices requirements in Attachment 8.

Biological Hazards	
Work Practices:	Change disposable nitrile gloves frequently. Wash hands and face with soap and water after each sampling event. Take shower at end of workday. Make sure extension cords are intact and connectors are away from wet surfaces. Additional COVID-19 requirements in Attachment 8.

Notes:
[a] Maximum onsite concentration values from Herrera 2010 Removal Action Completion Report (Herrera 2010).
[b] PEL-TWA values from NIOSH Pocket Guide to Chemical Hazards (1997).
[c] TLV-TWA values from American Conference of Governmental Industrial Hygienists (ACGIH 2005).
[d] Zinc acetate potential health reactions based on NJDHSS 2002 Hazardous Substance Fact Sheet. https://nj.gov/health/eoh/rtkweb/documents/fs/2022.pdf.
Ca = carcinogen
Inh = inhalation, Abs = absorption, Con = contact, Ing = ingestion
NA = Not applicable
NE = Not established

The information in the JHA and the SDSs will be made available to all employees who could be affected by it prior to the time they begin their work activities. Modifications to the JHA found in Attachment 5 and the accompanying data sheets will be communicated during routine briefings.

Consistent with paragraph 1910.120 (i) of the HAZWOPER guidelines (OSHA 1994), the SSO will also inform other contractors and subcontractors working on this study about the nature and level of hazardous substances at the site, the likely degree of exposure to workers who participate in site operations, and any modifications to this soil sampling HASP.

Daily safety briefings will take place before work begins. The daily briefing form provided in Attachment 7 will be used to record the daily meetings.

5 SITE CONTROL ZONES

The use of site control zones is designed to reduce the spread of hazardous substances from contaminated areas to clean areas, to identify and isolate contaminated areas of the site, to facilitate emergency evacuation and medical care, to prevent unauthorized entry to the site, and to deter vandalism and theft.

5.1 SOIL SAMPLING ZONE

5.1.1 Exclusion Zone

Exclusion zones will be established wherever exposed soil is handled.

Soil Sampling: When sampling soil, the exclusion zone will be the area within a 6-ft radius around the sampling point. The same area will apply when homogenizing soil onsite. A designated member of the field team will be tasked with preventing unauthorized individuals from entering the exclusion zone.

Field Processing Area: A canopy with plastic walls and ground plastic cover may be used as a field processing area. Each soil processing facility or field processing area under a canopy will be identified by a clearly marked exclusion zone where all soil handing will occur. The exclusion zone boundaries will be marked with caution tape, orange traffic safety cones, or equivalent. A designated member of the field team will be tasked with preventing unauthorized individuals from entering the field processing area.

5.1.2 Contamination Reduction Zone

Contamination reduction zones (CRZs) will be established wherever decontamination of sampling equipment is conducted and personnel are exposed to soil.

Soil Sampling: When sampling soil, field personnel may carry the sampling equipment and sampling bowls containing soil samples back to the field processing area (if one is used). The CRZ zone will be the reserved area outside the exclusion zone of the field processing area where decontamination of both personnel and field equipment will take place and prevent the transfer of COPCs to the support zone.

Field Processing Area: This is a reserved area outside the exclusion zone where decontamination of both personnel and equipment will occur to prevent the transfer of COPCs to the support zone. As appropriate, the boundaries of the field processing area will be marked with caution tape, orange traffic safety cones, or equivalent.

5.2 SUPPORT ZONE

The support zone will be located wherever exposed contaminated soil is not present. In general, the support zone is where sample processing occurs after soil samples haven been sealed in sample jars and inserted into resealable plastic bags. It is also the area where chain-of-custody forms are completed, sample jar labels are prepared, and sample jars are packed for shipping.

Soil Sampling: The support zone will be located adjacent to the field processing area and may consist of a separate room in a field laboratory (if used), the inside space of a cargo van or trailer, or an area under another canopy with clean tables and chairs where soils are not being processed.

Field Processing Area: The support zone will be located adjacent to the field processing area and may consist of a separate room in a field laboratory (if used), the inside space of a cargo van or trailer, or an area under another canopy with clean tables and chairs where soils are not being processed.

6 PERSONAL PROTECTIVE EQUIPMENT AND SAFETY EQUIPMENT

The following sections address PPE and safety equipment required for completing the field activities.

6.1 PERSONAL PROTECTIVE EQUIPMENT

Based on the hazards identified above in Section 4, the following table identifies the PPE required for site activities.

	Level of Protection	
Site Activity	Initial	Contingency[a]
Soil sampling	MD	Leave Project Area
Sample handling	D/MD	C/Leave Project Area
Decontamination	D/MD	C/Leave Project Area

Notes:
[a] Based on unexpected change in project area conditions.

Each level of protection will incorporate the following PPE:

Level D — Long pants and long sleeves, hard hat, latex or nitrile gloves, high-visibility traffic vest with reflective striping, eye protection, and steel-toe and steel-shank boots are required. Hearing protection, work gloves, coveralls are required as needed.

Level MD — Same as Level D with addition of a personal flotation device (PFD). Rain gear will be worn as needed.

6.2 SAFETY EQUIPMENT

In addition to this HASP and PPE, the following safety equipment will be onsite during the proposed field activities.

First Aid Kit: Mandatory, including absorbent compress, adhesive bandages, adhesive tape, antiseptic, burn treatment, medical exam gloves, sterile pad, cardiopulmonary resuscitation (CPR) shield, triangle bandage, scissors—for cutting off the PPE from an injured person (check additional items required for the site).

- [X] Emergency blanket
- [X] Insect repellent
- [X] Sunscreen
- [X] Other: Air horn
  Extra cloth or disposable face masks

Other (check the items required for this project):

X	Eyewash		Fit test supplies
X	Drinking water	X	Fire extinguisher (drill rigs and onboard larger sampling vessels)
	Stopwatch for monitoring heart rate for heat stress monitoring[2]		Windsock
	Thermoscan® thermometer for heat stress monitoring	X	Cellular phone
			Radio sets
	Survival kit[3]	X	Global positioning system
	Personal flotation device		Other: ______________________
	Cool vests		______________________

[2] Heart rate monitoring requires special training.
[3] Consult the CHSM for guidance for site-specific survival kits.

7 MONITORING PROCEDURES FOR SITE ACTIVITIES

A monitoring program will be followed to address potential onsite hazards. Dust monitoring will not be necessary because soil will be wet and will not pose a dust hazard. Some of the equipment may emit high-amplitude (> 85 dBA) sound, so noise monitoring will be required as needed. All workers must monitor themselves and their co-workers during sampling activities. The following signs may indicate illness or mental or physical stress and should be monitored for during all field activities:

- Dizziness
- Headaches
- Nausea or vomiting
- Fever
- Coughing
- Sore throat
- Difficulty breathing or shortness of breath
- Loss of sense of taste or smell
- Heat stress symptoms
- Cold stress symptoms
- Cramps
- Blurred vision
- Eye, skin, or respiratory irritation
- Changes in complexion or skin color
- Changes in apparent motor coordination
- Increased frequency of minor errors
- Changes in papillary response or excessive salivation
- Changes in speech pattern or ability
- Blue lips or fingertips
- Shivering.

If field personnel develop any of these symptoms during sampling, work will be stopped immediately and the affected person(s) will be evaluated. Personnel at the local hospital will be notified if further assistance is needed. An ambulance will be dispatched to the site if the condition is thought to be serious. Procedures for sampling will be modified if the condition is the direct result of sample collection or handling activities.

8 DECONTAMINATION

Decontamination of field supplies and PPE will be performed by field personnel to prevent the migration of contaminants into the surrounding environment and to minimize the risk of potential exposure of personnel to contaminated materials. The following sections discuss equipment and personnel decontamination procedures. The following decontamination supplies will be available to field personnel:

- Rinse buckets
- Wash buckets
- Scrub brushes
- Clean water sprayers
- Paper towels
- Garbage bags (plastic)
- Alconox® or a similar decontamination solution.

8.1 MINIMIZATION OF CONTAMINATION

To prevent contamination, exposure to biological hazards and existing contaminated materials, and the spread of those materials, will be minimized. The SSO will enforce the following contamination minimization procedures during field activities:

- Limit number of field staff to minimum required to safely do the work.
- Frequently and thoroughly wash hands. Use alcohol-based sanitizers (>60% alcohol) when soap and running water are not readily available.
- Follow proper sneezing and coughing etiquette.
- Avoid group gatherings and enclosed spaces.
- Avoid sharing personal items.
- Maintain a minimum social distance of 6 ft, if possible.
- Follow the same guidelines at all times offsite, including when traveling, at a hotel, and while participating in other activities.
- If avoidable, do not walk through areas of known contamination.
- Do not smell, handle, or touch contaminated materials directly.
- Protect and cover skin injuries.
- Check PPE for cuts or tears prior to use.

- Stay upwind of airborne vapors or dust.
- Do not eat, drink, smoke, or chew tobacco in the work zones.

To minimize decontamination, the following procedures will be followed regarding sampling equipment:

- The handling of equipment, tools, and supplies by multiple people will be avoided or minimized.
- Supplies, tools, handheld equipment, and touch surfaces will be cleaned or disinfected frequently.
- Clean equipment will be placed on or covered with clean aluminum foil or plastic sheets to avoid contact with contaminated surfaces.
- Contaminated tools and equipment will be kept away from clean tools and equipment.

8.2 PERSONNEL DECONTAMINATION

The SSO will be in charge of familiarizing all site personnel with personnel decontamination procedures prior to sampling. Decontamination procedures will be performed by personnel before eating lunch, taking a break, and leaving the work station, when appropriate. Personnel will implement to the following personnel decontamination procedures:

- Rinse off heavily soiled suits.
- Remove outer suit.
- Rinse and wash outer gloves and boots with soap.
- Remove outer gloves. Inspect and discard if damaged.
- Remove and discard inner gloves.
- Wash hands with soapy water.

Personnel will put on all necessary PPE before returning to work. All soiled or expendable PPE will be disposed of at the end of the day.

8.3 DECONTAMINATION OF SAMPLING EQUIPMENT

As described in the SAP, sampling equipment will be decontaminated to minimize sample contamination and worker exposure to contaminants from samples or the SARS-CoV-2 virus. No chemical solvents will be required for decontamination of sampling equipment.

All vehicles, vessels, and equipment that have entered potentially contaminated areas will be visually inspected and, if necessary, decontaminated prior to leaving the area by rinsing tires and wheel wells with Alconox® detergent and water. An effort will be made to keep vehicles away from contaminated soil by parking on the service road and carrying field sampling equipment to the site on foot or by using carts or sleds. Large tools will be cleaned in the same manner. Small reusable sampling equipment, including bowls, spoons, and knives, will be rinsed, washed in phosphate-free detergent, and rinsed again. All personnel walking over the work area will have their boots decontaminated as well. Rinsate from all decontamination activities will be collected for proper disposal. Decontamination of equipment and tools will take place within the CRZ.

The following supplies will be available to perform decontamination activities:

- Wash and rinse buckets
- Tap water and phosphate-free detergent (i.e., Alconox® or Liquinox®)
- Scrub brushes
- Distilled/deionized water
- Deck pump with pressurized water hose (aboard the vessel)
- Pressure washer/steam cleaner, if appropriate
- Paper towels and plastic garbage bags
- 50-gallon drums with labels and lids or 5-gallon plastic buckets with labels and lids to segregate rinsed waste water and solid waste derived from soil sampling and processing activities.

Field personnel will adhere to the following practices:

- Shared supplies, equipment, and workspaces will be disinfected frequently or between uses, as appropriate.
- Personal face shields and safety glasses will be supplied and disinfected frequently, including between uses and at the end of the day, and will be stored in a sealed clean bag.
- Any equipment or utensils that come in contact with soil (e.g., coring tubes, grab samplers, shovels, spoons, and bowls) will be cleaned with Alconox® detergent, rinsed with deionized water, and stored in aluminum foil until their next use.
- Sample processing surfaces will be lined with aluminum foil and cleaned frequently to prevent direct contact with samples.
- Ice chests will be cleaned with Alconox® and rinsed with deionized water prior to use during sampling. Handles and lids will also be cleaned frequently throughout each sampling event.

- Any wet ice used for sample storage during field activities will be kept in separate plastic bags. Samples will also be kept in separate resealable, waterproof plastic bags to avoid contamination from melted ice.
- All sampling equipment will be kept free of contamination from fuel, oils, and greases.

9 DISPOSAL OF CONTAMINATED MATERIALS

Contaminated materials, including PPE and excess sample material, may be generated during sampling. Disposable supplies that do not contain site soil will be removed from the site by sampling personnel and placed in a normal refuse container for disposal at a solid waste landfill. Any liquid wastes from decontamination, samples remaining after processing, and dry waste (e.g., contaminated boots, bibs, Tyvek™ suits, contaminated soils) present at the end of the sampling event, will be segregated and containerized (e.g., 50-gallon drums) and disposed of by a subcontractor specialized in hazardous waste removal. The subcontractor will be required to have, at a minimum, a drum management service that provides the following:

- Proper waste identification including full analytical capability
- Pickup and disposal of a broad range of hazardous wastes
- Safe and proper transportation
- Environmentally sound treatment and disposal
- Regularly scheduled service visits with manifest and label preparation.

PPE and all other disposal sampling materials using during field activities (e.g., gloves, paper towels, disposable coveralls, masks) will be placed in heavyweight garbage bags. Once full, garbage bags will be disposed of as solid waste in a normal refuse container.

10 TRAINING REQUIREMENTS

Field personnel must be specially trained to work at locations where potentially hazardous materials and conditions may be present. Encountering hazardous concentrations of chemicals in sampled material is unlikely. Site-specific training instruction for all personnel and oversight of inexperienced personnel will be conducted by an experienced person each day. The following sections describe the training requirements for these field activities.

10.1 PROJECT-SPECIFIC TRAINING

HAZWOPER training will be required for the field lead and all other field personnel. All field personnel and visitors must also read and become familiar with this HASP before beginning work or providing oversight. Personnel must acknowledge reviewing the HASP by signing the HASP review form, which will be reserved in the project files.

Field workers will not be permitted to start work until they have undergone project-specific training, and receive the proper SSO documentation of their completion. The training will cover all health and safety issues and protocols relevant to sampling activity. The training will include, but shall not be restricted to, the following topics:

- Activities with potentially harmful chemical exposure
- Activities that raise bodily hazards, and ways to limit potential hazards
- Understanding the limits and proper utilization of PPE
- Sterilization techniques
- Emergency protocols
- Understanding proper use and hazards of field equipment
- Knowing the location of emergency supplies
- Safety protocols
- Emergency and evacuation protocols.

10.2 DAILY SAFETY BRIEFINGS

The SSO, or designee, will deliver current safety briefings prior to beginning the day's sampling activities. These briefings will summarize the activities anticipated for the day, inform personnel of updated field operations and hazards, authenticate completed medical screenings, clarify safeguards, report on particular work location concerns, and reassess emergency protocols and methods. Social distancing protocols will be in effect during safety briefings, and COVID-19 safety protocols will be clearly displayed at the work station (Inslee 2020b; L&I 2020).

The SSO, or designee, must document daily safety briefings using the daily safety briefing form located in Attachment 7.

10.3 FIRST AID AND CPR

All Integral field personnel are required to have current first aid and cardiopulmonary resuscitation (CPR) certification/training, and each individual's documentation of said training must be kept in the project health and safety files.

11 MEDICAL SURVEILLANCE

OSHA requires medical monitoring for personnel potentially exposed to chemical hazards in concentrations in excess of the PEL for more than 30 days per year and for personnel who must use respiratory protection for more than 30 days per year. Integral requires medical monitoring for all employees potentially exposed to chemical hazards.

Will personnel working at this site be enrolled in a medical monitoring program? Yes __X__ No _____

11.1 COVID-19

All workers will be screened at the beginning of their shifts, which will include having their temperatures taken using a non-contact thermometer and answering questions about whether they are experiencing any of the following symptoms: fever, cough, shortness of breath, fatigue, muscle aches, or recent loss of taste or smell. The SSO (or designee) will monitor the health of workers and enforce wearing of face coverings. Workers are required to inform the SSO if they develop symptoms of COVID-19 or learn that they have been exposed to the virus.

Integral's COVID-19 Field Program Management Plan is included as Attachment 8. This plan provides operational guidance for conducting field programs during the pandemic.

12 REPORTING AND RECORDKEEPING

All field personnel must sign the HASP review form. Accident and incident report forms (Attachment 4) must be completed by the SSO in the event of an accident.

A health and safety logbook must be maintained by the SSO or a designee with daily logs of health- and safety-related project specifics. The logbook will consist of bound and numbered daily safety briefing forms (Attachment 7) filled out in permanent ink. Each daily entry must include, but is not limited to, the following:

- Project name/location
- A manifest of all personnel present
- Weather conditions at the time of sampling
- Fieldwork activities performed.

The SSO or designee in charge of maintaining the logbook must initial and date each completed page. Any blank spaces at the end of each page must be lined out. New entries should begin on the next blank page each sampling day. An additional record of all field personnel and visitors (i.e., email addresses and phone numbers) should be kept on file for a minimum of 4 weeks from the last day each person was onsite for COVID-19 tracking purposes.

13 EMERGENCY RESPONSE PLAN

13.1 EMERGENCY RECOGNITION AND PREVENTION

It is the responsibility of all personnel to monitor work at the site for potential safety hazards. All personnel are required to immediately report any unsafe conditions to the SSO. The SSO is responsible to immediately take steps to remedy any unsafe conditions observed at the work site.

The following are examples of some emergency situations that could occur during the soil sampling activities:

- Slips, trips, and falls (on sloped areas, steel stairs, etc.)
- Lacerations from scrap metal (in soil, waste piles, etc.)
- Entrainment of clothes or objects in moving equipment or parts
- Serious injury or illness (e.g., physical injury, heart attack)
- Severe thunderstorm with lightning.

Immediate actions will be taken by the field team under the leadership of the SSO in response to these emergencies.

13.2 EMERGENCY RESPONSE AND NOTIFICATION

If an emergency at the site warrants it, all personnel must immediately evacuate the affected work area and report to the SSO at the predetermined emergency assembly location: **Seattle Fire Station 27 (Across S Myrtle Street).**

In case of injury, field personnel should take precautions to protect the victim from further harm and notify local or facility emergency services. In remote areas, it will be necessary to have first aid–trained personnel on the field team. The victim may require decontamination prior to treatment if practicable—requirements will vary based on site conditions.

Emergency medical care will be provided by:

X	Local emergency medical provider (i.e., fire department)
	Facility emergency medical provider
	First aid-trained field staff (for remote areas only)

Local Resources	Name	Telephone	Notified Prior to Work (Yes/No)?
Fire	Seattle Fire Dept. 1000 S Myrtle St.	(206) 386-1400	No
Police	Seattle Police Dept. 3001 S Myrtle St.	(206) 386-1850	No
Ambulance	Tri-Med Ambulance 2325 SE Dolphin Ave.	(206) 988-5000	No
Hospital	Harborview Medical Ctr. 325 9th Avenue Seattle, WA 98104	(206) 731-3000	No
Site phone			NA
Directions to the hospital:	Consult attached maps		

The SSO must confirm that the hospital listed is still in operation and that it has an emergency room. **It is required that the SSO drive to the hospital so that the directions are practiced and understood prior to initiating fieldwork.**

Corporate Resource	Name	Work Telephone	Cell Phone
Integral CHSM [a]	Matt Behum	Office: (667) 225-5412	(443) 454-1615
Integral President	William Locke	Office: (720) 465-3315	(303) 548-1111
Integral Human Resources Manager	Joseph Drew	Office: (206) 957-0330	NA
Medical consultant	Tony Vo	Office: (657) 549-3265	NA
Incident Intervention (WorkCare)	-	(888) 449-7787	NA

Notes:
[a] If the CHSM cannot be reached, call Eron Dodak [Office: (503) 943-3614; Cell: (503) 407-2933]. If Eron Dodak cannot be reached, call David Livermore [Office: (503) 943-3613; Cell: (503) 806-4665].

In case of serious injuries, death, or other emergency, the Integral CHSM must be notified <u>immediately</u> at the phone numbers listed above. The Integral CHSM will notify the project manager and Integral's President. The project manager will notify the client.

13.3 EMERGENCY DECONTAMINATION PROCEDURES

No concentrations of chemicals of concern warranting emergency decontamination exist on this site.

14 REFERENCES

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Inslee, J. 2020a. Implementation of Phase 1 construction restart - Proclamation 20-25. Office of the Governor, State of Washington, Olympia, WA.

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L&I. 2020. DOSH Directive. General coronavirus prevention under Stay Home-Stay Healthy order. Washington State Department of Labor and Industries, Olympia, WA.

NIOSH. 1997. National Institute for Occupational Safety and Health (NIOSH) pocket guide to chemical hazards. Keller & Associates, Neenah, WI.

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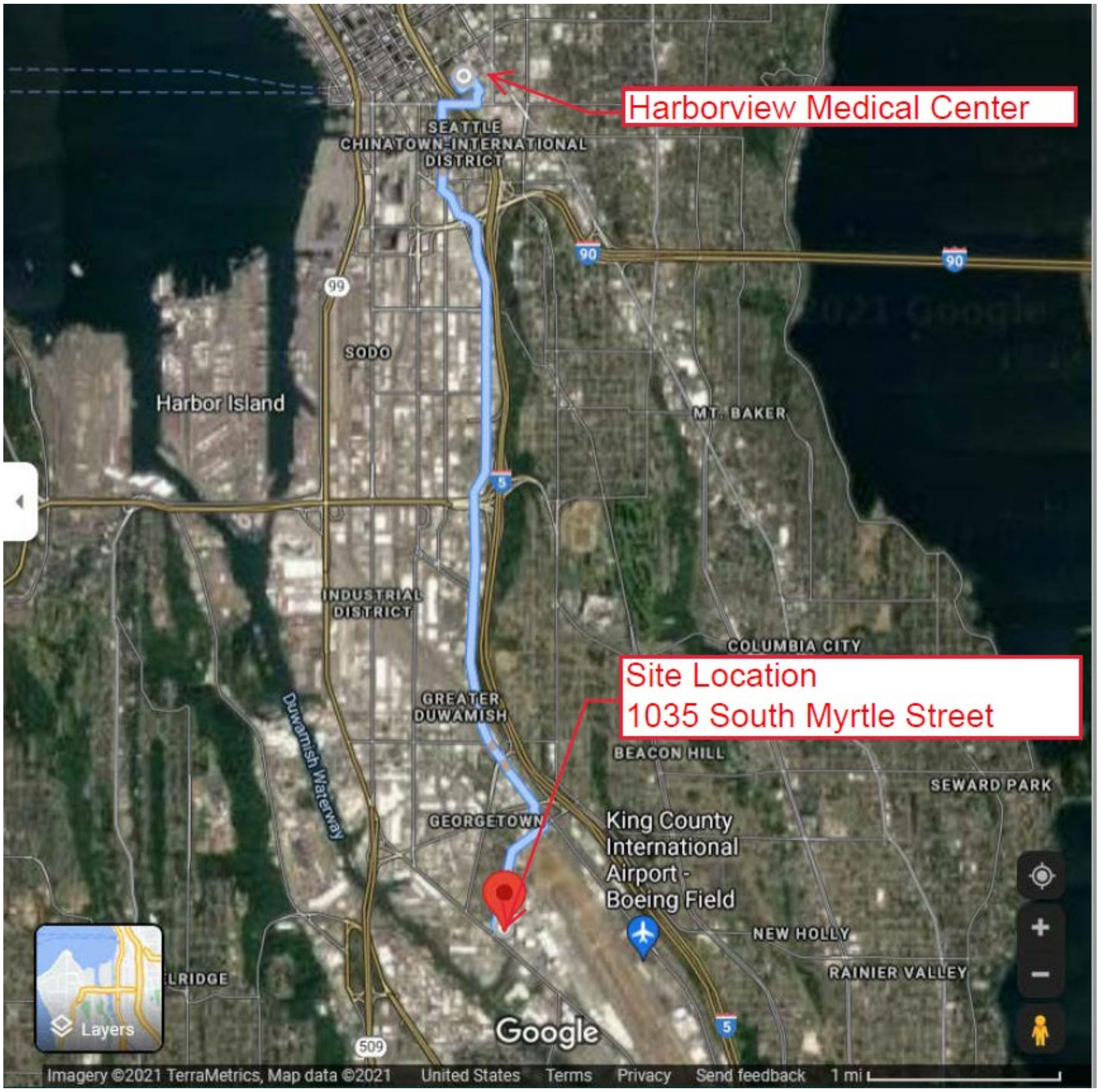
OSHA. 2020. Guidance on preparing workplaces for COVID-19. OSHA 3990-03 2020. U.S. Department of Labor, Occupational Safety and Health Administration, Washington, DC.

Attachment 1

Site Map and
Hospital Route Map

Hospital route map



Directions from the vicinity of the site location to Harborview Medical Center are as follows:

From the Site location (approximately 1035 South Myrtle Street):

- Head west on S Myrtle St toward Ellis Ave S
- Turn right onto Ellis Ave S
- Ellis Ave S turns right and becomes S Albro Pl
- Turn Left onto Stanley Ave S
- Turn right onto 13th Ave S

- Turn left onto Airport Way S
- Slight left to stay on Airport Way S
- Turn Right onto 6th Ave S
- Turn Right onto Yesler Way
- Turn left onto 8th Ave
- Turn left onto 9th Ave
- Turn left onto Alder St
- Turn right onto 8th Ave
- Destination will be on the right.

Attachment 2

Regulatory Notices

You Have a Right to a Safe and Healthful Workplace.

IT'S THE LAW!

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in the inspection.
- You can file a complaint with OSHA within 30 days of discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act.*
- You have a right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violation.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records or records of your exposure to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.

The *Occupational Safety and Health Act of 1970 (OSH Act),* P.L. 91-596, assures safe and healthful working conditions for working men and women throughout the Nation. The Occupational Safety and Health Administration, in the U.S. Department of Labor, has the primary responsibility for administering the *OSH Act*. The rights listed here may vary depending on the particular circumstances. To file a complaint, report an emergency, or seek OSHA advice, assistance, or products, call 1-800-321-OSHA or your nearest OSHA office: • Atlanta (404) 562-2300 • Boston (617) 565-9860 • Chicago (312) 353-2220 • Dallas (214) 767-4731 • Denver (303) 844-1600 • Kansas City (816) 426-5861 • New York (212) 337-2378 • Philadelphia (215) 861-4900 • San Francisco (415) 975-4310 • Seattle (206) 553-5930. Teletypewriter (TTY) number is 1-877-889-5627. To file a complaint online or obtain more information on OSHA federal and state programs, visit OSHA's website at **www.osha.gov**. If your workplace is in a state operating under an OSHA-approved plan, your employer must post the required state equivalent of this poster.

1-800-321-OSHA

www.osha.gov

U.S. Department of Labor • Occupational Safety and Health Administration • OSHA 3165

Your Rights as a Non-agricultural Worker

Minimum wage

The minimum wage in Washington State is recalculated each year as a result of an initiative approved by voters in 1998. **Your employer is required to pay the current minimum wage.** You or your employer can learn the current minimum wage by:

- Visiting the L&I web site at www.LNI.wa.gov
- Calling a local L&I office
- Calling L&I's Employment Standards information line, 360-902-5316

Work week

The employer must establish a fixed 7-day work week. The work week in this establishment is_____________ (day of week) through_____________(day of week).

Overtime

You must be paid one and one-half times your regular rate of pay for hours worked over 40 in a work week regardless of your pay basis (i.e., hourly, salary, piece rate, commission or flat rate). You cannot waive this right, even if you and your employer agree. If you are an executive, administrative or professional employee, or work as an outside salesperson and are paid on a salary basis, you may be exempt from overtime under WAC 296-128 (510-540).

Other exemptions or exceptions may apply based on the nature of your employment. See RCW 49.46.130.

Working conditions

You are entitled to a **meal period** of at least 30 minutes if you work more than five hours in a day. If you are required to remain on duty during your meal period, you must be paid for that time.

If you are age 18 or older, you must have a paid rest break of at least 10 minutes for every four hours you work. The break must be taken by the end of the third hour you work. Intermittent paid breaks totaling at least 10 minutes for every four hours of work may be permitted instead. (Note: If you are under age 18, see "Workers under age 18" in the second column for information about meal and rest breaks.)

If you lift or move more than 20 pounds as a normal part of your duties, you must be taught proper lifting techniques.

Pay periods

You must be paid at least once a month on a regularly scheduled pay day. The regularly scheduled pay date(s) in this establishment is/are_________________.

Each time you are paid, you must receive a statement showing the days or hours you worked, your rate(s) of pay, your gross wages and all deductions taken.

Deductions

Your employer may withhold money from your wages only when required to do so by state or federal law or when you have authorized a deduction in writing in advance for a lawful purpose that benefits you and not the employer.

Employment records and inspections

Your employer must record your name, address, occupation, rate of pay, the amount you receive each pay period and the hours or days you work. **These records must be made available to you upon request at any reasonable time.**

You are entitled to review your personnel file at least once a year.

Under state law, the Department of Labor and Industries (L&I) has the right to investigate the wages, hours and working conditions of all employees covered by the Industrial Welfare and Minimum Wage acts.

Variances

Employers may request variances from employment standards and child labor rules. For information on variances, contact your local L&I office.

Complaints

If you believe your rights listed on this poster have been denied, you may file a Worker Rights Complaint Report and mail it to the L&I office nearest to where you work. You may obtain this form from a local L&I office or on our web site at **www.LNI.wa.gov/WorkplaceRights/**.

Penalties

Employers who violate child labor or family care rules may be fined for each occurrence.

An employer who is convicted of violating provisions of the Minimum Wage Act or of discriminating against an employee for filing a minimum wage complaint will be guilty of a gross misdemeanor.

Appeals

Any person, firm or corporation may appeal an action or decision made by L&I. Contact your local L&I office to learn more about the appeals process.

Workers under age 18

Except under very limited circumstances, the minimum age for employment is 14.

The minimum wage for 16- and 17-year-old workers is the same as for adults. Minors under 16 may be paid 85 percent of the state minimum wage.

Employers who hire workers under age 18 must have a minor work permit endorsement as part of the Master Business License and must renew it each year.

If you are under age 18, your employer needs to give you a Parent/School Authorization form that your parent or legal guardian must sign before you begin work. If you plan to work during the school year, your school must sign this form, too. Your employer needs to renew the Parent/School Authorization each year when it expires in September. Your employer must also have proof of your age and keep it on file for three years.

Fourteen- and 15-year-old workers may not work more than four hours without a uninterrupted 30-minute meal period. In addition, 14- and 15-year-old workers must be provided a paid rest break of at least 10 minutes for every two hours worked.

Sixteen- and 17-year-old workers may not work more than five hours without an uninterrupted 30-minute meal period. In addition, 16- and 17-year-old workers must be provided a paid rest break of at least 10 minutes for every three hours worked.

An adult must supervise minors working after 8 p.m. in service occupations, such as restaurants and retail businesses.

What hours are teens under 18 allowed to work in non-agricultural jobs?

Hours and Schedules Minors are Permitted to Work in Non-agricultural Jobs

	Hours a Day	Hours a Week	Days a Week	Begin	Quit
14- and 15-year-olds					
School weeks	3 hours (8 hours Sat.-Sun.)	16 hours	6 days	7 a.m.	7 p.m.
Non-school weeks	8 hours	40 hours	6 days	7 a.m.	7 p.m. (9 p.m. June 1 to Labor Day)
16- and 17-year-olds					
School weeks	4 hours (8 hours Fri.-Sun.)	20 hours	6 days	7 a.m.	10 p.m. (Midnight Fri.-Sat.)
School weeks with a special variance from school	6 hours (8 hours Fri.-Sun.)	28 hours	6 days	7 a.m.	10 p.m. (Midnight Fri.-Sat.)
Non-school weeks	8 hours	48 hours	6 days	5 a.m.	Midnight

- An adult must supervise minors working after 8 p.m. in service occupations, such as restaurants and retail businesses.
- Overtime rules apply for all hours worked over 40 in one week.
- These rules also apply to home-schooled teens.

Prohibited duties for minor employees: Experience has shown that some job duties are potentially hazardous for young workers. Certain jobs and duties are prohibited for workers under age 18 and additional ones for those under 16. To obtain the list of prohibited duties, visit L&I's teen worker web site at **www.TeenWorkers.LNI.wa.gov**, call your local office or call 360-902-5316.

More information on your rights as a worker

For more information on these laws or for more copies of this poster, contact your local L&I office, call 360-902-5316, or visit the L&I web site: **www.LNI.wa.gov/WorkplaceRights/**.

Family Leave Provisions

Leave for care of a newborn/family member

The federal Family and Medical Leave Act requires covered employers to provide up to 12 weeks of unpaid, job-protected leave to "eligible" employees for certain family and medical reasons. Employees are eligible if they have worked for a covered employer for at least one year, for 1,250 hours over the previous 12 months, and if there are at least 50 employees within 75 miles.

For additional information, contact the nearest office of the U.S. Department of Labor, Wage and Hour Division, listed in your telephone directory. The toll-free number is 1-866-487-9243.

Family care/use of paid leave

Effective January 1, 2003, if you work for an employer who has an established paid leave policy (sick, vacation or other paid time off), your employer must let you use your choice of any paid leave to care for sick family members. Family members include: children under age 18 with health conditions that require supervision or treatment; spouse, parent, parent-in-law or grandparent with a serious or emergency health condition; or an adult son or daughter incapable of self-care due to a disability.

Employers may not discharge, penalize or discriminate against workers who exercise the right to use leave for such purposes or for filing a complaint about an alleged violation of these leave laws.

Pregnancy disability/discrimination

Discrimination because of pregnancy or pregnancy disability is sex discrimination and a violation of state law (RCW 49.60.180). For more information or a copy of the state's maternity regulations (WAC 162-30-020), contact the Washington State Human Rights Commission at 1-800-233-3247.

Department of LABOR AND INDUSTRIES

This document is available in other formats to accommodate persons with disabilities. For assistance, call 800-547-8367. (TDD users, please call 360-902-5797.) Labor and Industries is an Equal Opportunity Employer.

PUBLICATION F700-074-909 [11-2005]

Sus derechos como trabajador no agrícola

Salario mínimo

El salario mínimo en el Estado de Washington se calcula cada año como resultado de una iniciativa aprobada por los votantes en 1998. **A su empleador se le exige que pague el salario mínimo actual.** Usted o su empleador puede verificar cuál es el salario mínimo actual:

- Visitando el sitio de Internet del Depto. de Labor e Industrias (L&I): www.LNI.wa.gov
- Llamando a una oficina local de L&I
- Llamando a la línea de información de normas de empleo de L&I: 360-902-5316

Días de trabajo semanales

El empleador tiene que establecer una semana laboral fija de 7 días. Los días de trabajo semanales en esta empresa son de ____________(día de la semana) a ____________ (día de la semana).

Horas extras

Se le tiene que pagar tiempo y medio de su tarifa regular por las horas que trabaje encima de las 40 horas por semana, sin importar su base de pago (es decir, por hora, sueldo fijo, a destajo/pieza, comisión o tarifa fija). No puede renunciar a este derecho, ni siquiera si se ponen de acuerdo su empleador y usted. Si usted es un empleado ejecutivo, administrativo o profesional o si trabaja como un vendedor y se le paga a base de un sueldo, usted podría estar exento de las horas extras bajo la ley WAC 296-128 (510-540).

Otras exenciones o excepciones pueden aplicar según la naturaleza de su empleo. Vea la ley RCW 49.46.130.

Condiciones de trabajo

Usted tiene derecho a **una pausa para comer** por lo menos de 30 minutos, si trabaja más de cinco horas diarias. Si se requiere que siga trabajando durante su período de comida, se le tiene que pagar este tiempo.

Si tiene 18 años de edad o más, tiene que tener un período de descanso pagado de por lo menos 10 minutos cada cuatro horas de trabajo. El descanso tiene que ser tomado al terminar la tercera hora de trabajo o antes, también se permite tomar periodos de descanso intermitentes pagados que suman a por lo menos 10 minutos por cada cuatro horas de trabajo. (Atención: Si tiene menos de 18 años de edad, lea la sección "Trabajadores menores de 18 años de edad" en la segunda columna para información sobre períodos de descanso y de comida.)

Si levanta o desplaza más de 20 libras como parte normal de su trabajo, se le tienen que enseñar técnicas correctas para levantar cargas.

Períodos de pago

Se le tiene que pagar por lo menos una vez por mes en un día fijo. La(s) fecha(s) de pago programada(s) en esta empresa es/son: ________________________.

Cada vez que se le pague, usted tiene que recibir un comprobante que muestre los días o las horas que trabajó, su(s) tarifa(s) de pago, su salario bruto y todas las deducciones que se le hagan.

Deducciones

Su empleador solo podrá retener dinero de su salario cuando así lo requieran las leyes estatales o federales o cuando usted haya autorizado por escrito una deducción por adelantado para algún pago legal que le beneficie a usted y no al empleador.

Inspecciones y registros de empleo

Su empleador tiene que registrar su nombre, domicilio, ocupación, tarifa de pago, la cantidad que recibe cada período de pago y las horas o los días que trabaja. **Esos registros tienen que estar disponibles a usted cuando los solicite, en un momento razonable.**

Usted tiene derecho a revisar su expediente personal por lo menos una vez al año.

Bajo las leyes estatales, el Departamento de Labor e Industrias tiene derecho a investigar los salarios, horas y condiciones de trabajo de todos los empleados cubiertos por las leyes del bienestar industrial y salario mínimo (Industrial Welfare and Minimum Wage acts).

Modificaciones

Los empleadores pueden solicitar modificaciones de las normas de empleo y las reglas de trabajo de menores de edad. Para obtener información sobre las modificaciones, póngase en contacto con su oficina local de L&I.

Quejas

Si usted cree que le han negado sus derechos como son explicados en este cartel, puede presentar un Informe de Queja Sobre los Derechos Laborales (Worker Rights Complaint Report) y enviarlo a la oficina local de L&I más cercana a su lugar de trabajo. Puede obtener este formulario en una oficina local de L&I o por Internet: **www.LNI.wa.gov/WorkplaceRights/** .

Penalizaciones

Los empleadores que violen las reglas de trabajo de menores de edad o de cuidado familiar podrían recibir multas por cada infracción.

Un empleador convicto por violar disposiciones de la ley del salario mínimo o por discriminar contra un empleado por haber registrado una queja relativa al salario mínimo será culpable de un delito menor.

Apelaciones

Cualquier persona, empresa o sociedad anónima puede apelar cualquier acción o decisión tomada por el Departamento de Labor e Industrias. Póngase en contacto con la oficina local de L&I para más información sobre el proceso de apelaciones.

Trabajadores menores de 18 años de edad

La edad mínima para trabajadores es de 14 años de edad, salvo en circunstancias muy especiales.

El salario mínimo para los empleados de 16 y 17 años de edad es el mismo que para los adultos. A los menores de 16 años se les podrá pagar un 85 por ciento del salario mínimo del estado.

Los empleadores que contratan a trabajadores de menos de 18 años de edad tienen que tener un permiso de trabajo para menores como parte de la Licencia Maestra de Negocios (Master Business License) y tiene que renovarse cada año.

Si tiene menos de 18 años de edad, su empleador necesita proporcionarle un formulario de Autorización de los Padres y la Escuela (Parent/School Autorization form) que sus padres o tutor legal deben firmar antes de que empiece a trabajar. Si piensa trabajar durante el año escolar, su escuela también tiene que firmar el formulario. Su empleador tiene que renovar la autorización de los padres y la escuela cuando caduque cada año en septiembre. Su empleador también tiene que tener una prueba de su edad y guardarla en sus archivos durante tres años.

Los trabajadores de 14 y 15 años de edad no podrán trabajar más de cuatro horas sin un período sin interrupciones de 30 minutos para comida. Además, a los trabajadores de 14 y 15 años de edad se les tendrá que proporcionar por lo menos un período pagado de descanso de 10 minutos cada dos horas de trabajo.

Los trabajadores de 16 y 17 años de edad no podrán trabajar más de cinco horas sin un período sin interrupciones de 30 minutos para comida. Además, a los trabajadores de 16 y 17 años de edad se les tendrá que proporcionar por lo menos un período pagado de descanso de 10 minutos cada tres horas de trabajo.

Un adulto debe supervisar a los menores de edad que trabajen después de las 8 p.m. en las ocupaciones de servicio, como los restaurantes y negocios de venta al por menor.

¿Qué horas se les permite trabajar a los menores de edad en trabajos no agrícolas?

Los menores de edad en empleos no agrícolas pueden trabajar los siguientes días y horas:

	Horas al día	Horas por semana	Días por semana	Empieza	Termina
14 y 15 años de edad					
Durante el año escolar	3 horas (8 horas sábado y domingo)	16 horas	6 días	7 a.m.	7 p.m.
Durante vacaciones	8 horas	40 horas	6 días	7 a.m.	7 p.m. (9 p.m. del 1 de junio hasta el Día del Trabajo) "Labor Day"
16 y 17 años de edad					
Durante el año escolar	4 horas (8 horas de viernes a domingo)	20 horas	6 días	7 a.m.	10 p.m. (medianoche viernes y sábado)
Durante el año escolar con una modificación especial de la escuela	6 horas (8 horas de viernes a domingo)	28 horas	6 días	7 a.m.	10 p.m. (medianoche viernes y sábado)
Durante vacaciones	8 horas	48 horas	6 días	5 a.m.	medianoche

- Un adulto debe supervisar a los menores de edad que trabajen después de las 8 p.m.en las ocupaciones de servicio, como los restaurantes y negocios de venta al por menor.
- Las reglas acerca de horas extras se aplican a todas las horas trabajadas en exceso de 40 en una semana.
- Estas reglas también se aplican a los adolescentes que toman clases en casa (home-school).

Funciones prohibidas para los empleados menores de edad: La experiencia ha demostrado que algunas actividades en el trabajo pueden resultar potencialmente peligrosas para los trabajadores jóvenes. Ciertas actividades y trabajos están prohibidos para trabajadores menores de 18 años de edad. Hay prohibiciones adicionales para los menores de 16 años de edad. Para obtener la lista de funciones de trabajo prohibidas, visite el sitio de Internet de L&I para trabajadores adolescentes: **www.TeenWorkers.LNI.wa.gov** o llame a su oficina local o al 360-902-5316.

Más información sobre sus derechos como trabajador

Para más información sobre estas leyes o para recibir más copias de este cartel, póngase en contacto con la oficina local de L&I (que aparece bajo "Labor and Industries, Department of" en la sección de gobierno en su directorio telefónico), o llame al 360-902-5316. También puede visitar el sitio de Internet de L&I: **www.LNI.wa.gov/WorkplaceRights/**

Disposiciones de permisos familiares

Permiso para cuidar a un recién nacido o un familiar

La ley federal de permisos médicos y familiares (Family and Medical Leave Act) requiere que los empleadores cubiertos bajo la ley proporcionen hasta 12 semanas de permiso sin pago y con empleo protegido a los trabajadores "elegibles" por ciertas razones familiares y médicas. Los trabajadores serán elegibles si han trabajado para un empleador cubierto bajo la ley por lo menos un año, por 1,250 horas durante los 12 meses anteriores y si hay por lo menos 50 trabajadores de la misma empresa dentro de un radio de 75 millas.

Para más información, póngase en contacto con la oficina más cercana del U.S. Department of Labor, Wage and Hour Division, que aparece en su directorio telefónico. El número gratuito es: 1-866-487-9243.

Department of LABOR AND INDUSTRIES

Este documento está disponible en formato alterno para personas con discapacidades. Para asistencia llame al 1-800-547-8367. (Usuarios de TDD "aparato especial para personas con problemas auditivos e impedimento del habla", por favor llamen al 360-902-5797.) El Departamento de Labor e Industrias es un empleador con igualdad de oportunidad.

PUBLICACIÓN F700-074-909 [11-2005]

Atención familiar/uso de ausencia compensada

Efectivo el 1º de enero de 2003, si usted trabaja para un empleador que tiene un plan establecido de ausencia compensada (enfermedades, vacaciones u otra forma de tiempo libre pagado), su empleador tiene que permitirle el uso de cualquier forma de ausencia pagada que haya ganado para cuidar a familiares enfermos. Familiares incluyen: hijos menores de 18 años de edad con condiciones de salud que requieren supervisión o tratamiento; cónyuge, padres, suegros o abuelos con una condición de salud grave o de emergencia; o un hijo adulto que no pueda cuidarse por discapacidad.

Los empleadores no pueden desemplear, castigar o discriminar contra un trabajador que ejerce su derecho de usar su ausencia compensada para este propósito o por haber hecho una denuncia sobre una alegada violación de estas leyes de ausencia.

Discriminación/discapacidad por embarazo

La discriminación por embarazo o discapacidad debido al embarazo constituyen una discriminación por sexo y una violación de las leyes estatales (ley RCW 49.60.180). Si desea más información o una copia de los reglamentos de maternidad del estado (ley WAC 162-30-020), póngase en contacto con la Comisión de Derechos Humanos del Estado de Washington (Washington State Human Rights Commission) al 1-800-233-3247.

NOTICE TO EMPLOYEES

Employer: This is your official industrial insurance poster.
You are required by law to post this notice.

If a job injury occurs...

Your employer is insured through the Department of Labor and Industries' workers' compensation program. If you are injured on the job or develop an occupational disease, you are entitled to workers' compensation benefits.

Benefits include:

Medical care. Medical expenses arising from your workplace injury or disease will be paid by the workers' compensation benefits program.

Disability income. If your injury or occupational disease prevents you from working, you may be eligible for benefits to partially replace your wages.

Vocational assistance. Under certain conditions, you may be eligible for help in returning to work.

Partial disability benefits. You may be eligible for a monetary award to compensate for the loss of body functions.

Pensions. Injuries that permanently keep you from returning to work may qualify you for a disability pension.

Death benefits for survivors. If a worker dies, the surviving spouse and/or dependents may receive a pension.

What you should do...

Report your injury. If you are injured, no matter how minor the injury seems, contact the person listed to the right.

Get medical care. You have the right to go to any doctor qualified to treat your injury. Qualified doctors include: medical, osteopathic, chiropractic, naturopathic and podiatric physicians, dentists, optometrists and opthalmologists. Medical bills that arise from a workplace injury or occupational disease will be paid by the workers' compensation program.

Tell your doctor that your injury or condition is work-related. Your doctor will complete a *Report of Industrial Injury or Occupational Disease* form and send it in. This is the first step in filing your industrial insurance claim.

File your claim within set time frames. For an on-the-job injury, you must file a claim and Labor and Industries must receive it within one year after the date the injury occurred. For an occupational disease, you must file a claim and Labor and Industries must receive it within two years following the date you are advised by a doctor in writing that your condition is work-related.

Report your injury to:

____

(Your employer fills in this space.)

Helpful phone numbers:

____

Ambulance

____

Police

____

Fire

IMPORTANT:

Every worker is entitled to workers' compensation benefits. You cannot be penalized or discriminated against for filing a claim. For more information, call toll-free **800-547-8367**. TDD users, please call 360-902-5797.

Department of LABOR AND INDUSTRIES

THE SEAL OF THE STATE OF WASHINGTON 1889

www.LNI.wa.gov

F242-191-909 [English, 09/2003]

AVISO A LOS EMPLEADOS

Empleador: Este es su aviso oficial de seguro industrial. Se requiere por ley que este aviso esté fijado en un lugar visible.

Si ocurre una lesión en el trabajo...

Su empleador está asegurado a través del seguro industrial del Departamento de Labor e Industrias. Si usted sufre una lesión en el trabajo, o desarrolla una enfermedad ocupacional, tiene derecho a recibir beneficios del programa de compensación para trabajadores.

Los beneficios incluyen:

Atención médica. Los gastos médicos que surjan por la lesión ocurrida en el trabajo serán pagados por el programa de beneficios del programa de compensación para trabajadores.

Ingresos por incapacidad. Si no puede trabajar como resultado de su lesión o enfermedad ocupacional, podría ser elegible para beneficios de reembolso parcial de su salario normal.

Asistencia vocacional. Bajo ciertas condiciones, Ud. podría ser elegible para recibir ayuda para regresar a trabajar.

Beneficios de incapacidad parcial. Usted podría recibir una concesión monetaria como compensación por la pérdida de funciones corporales.

Pensiones. Si la lesión no le permite regresar permanentemente al trabajo, usted podría calificar para una pensión por incapacidad.

Beneficios para los sobrevivientes. Si un trabajador fallece, el cónyuge sobreviviente y/o los dependientes podrían recibir una pensión.

Lo que Ud. debe de hacer...

Reporte su lesión. Si se lesiona, aún cuando la lesión parece ser mínima, póngase en contacto con la persona indicada a la derecha.

Obtenga atención médica. Tiene derecho a consultar con el médico de su elección calificado para atender su lesión. Médicos calificados incluyen: medicinales, osteópatas, quiroprácticos, médicos de naturopatía y podiatría, dentistas, optometristas y oftalmólogos. Las facturas médicas relacionadas con la lesión del trabajo o con la enfermedad ocupacional, serán pagadas por el programa de compensación para trabajadores.

Dígale a su médico que la lesión está relacionada con el trabajo. El médico completará el formulario *Informe de Lesión Industrial o Enfermedad Ocupacional** y él nos lo enviará. Este es el primer paso para registrar su reclamo del seguro industrial.

Registre su reclamo a tiempo. Para lesiones en el trabajo, tiene que registrar su reclamo y el Departamento de Labor e Industrias tiene que recibirlo dentro de *un año* a partir de la fecha que la lesión ocurrió. Para una enfermedad ocupacional, tiene que registrar su reclamo y el Departamento de Labor e Industrias tiene que recibirlo dentro de los *dos años* siguientes a la fecha que su médico le avisó por escrito que su condición está relacionada con su trabajo.

Department of LABOR AND INDUSTRIES

THE SEAL OF THE STATE OF WASHINGTON 1889

www.LNI.wa.gov

Reporte su lesión a:

____
(El empleador llena este espacio)

Números de teléfonos:

____
Ambulancia

____
Policía

____
Bomberos

IMPORTANTE:

Cada trabajador tiene derecho a recibir beneficios del programa de compensación para trabajadores. Ud. no puede ser penalizado ni puede ser discriminado por haber registrado un reclamo.
Para más información, llame a la línea gratuita **800-547-8367**. Las personas con problemas de audición (TDD), pueden llamar al 360-902-5797.

* *Report of Industrial Injury or Occupational Disease*

Job Safety and Health Protection

The Washington Industrial Safety and Health Act (WISHA) — Chapter 49.17 Revised Code of Washington — provides job safety and health protection for Washington employees. The Department of Labor and Industries administers the law and adopts job safety and health regulations. All employers and employees are required to comply with these regulations. Department representatives conduct workplace inspections and investigations to ensure compliance with safety and health regulations.

This poster describes some important parts of the law.

Employers are required to:

Provide job sites that are free from recognized hazards that may cause death or serious harm to employees.

Comply with occupational safety and health regulations administered under WISHA.

Post this and other notices to keep employees informed of their protection and obligations under WISHA.

Notify the Department of Labor and Industries within eight (8) hours of any fatality or probable fatality or catastrophe — an injury or illness that results in two or more workers being hospitalized. The employer must report the following information in person or by telephone to the nearest department office or use the Occupational Safety and Health Administration toll-free central number 1-800-321-6742:

- Name of employer.
- Location and time of the incident.
- Number of fatalities or hospitalized employees.
- Contact person and his/her phone number.
- A brief description of the incident.

Allow an employee representative to attend all meetings between the Department of Labor and Industries and the employer concerning an appeal of a citation by the employer.

Allow an employee representative to accompany the department representative and the employer during an inspection or investigation of the workplace. Employers cannot withhold wages or benefits or discriminate against the employee for time spent participating in the inspection, investigation, or opening and closing conferences.

Provide personal protective equipment when required by a WISHA regulation.

Promptly notify an employee who was or is being exposed to toxic materials or harmful physical agents at levels that exceed those allowed by WISHA regulations.

Employees are required to:

Comply with occupational safety and health regulations that apply to their own actions and conduct on the job.

Inspections and investigations:

Employer and employee representatives may accompany a department inspector to assist with an inspection or investigation. If an employee representative does not participate, the inspector will consult with a number of employees about safety and health conditions in the workplace.

Complaints:

Employees and employee representatives who believe that an unsafe or unhealthy condition exists in their workplace have the right to request an inspection by the Department of Labor and Industries. The names of those filing complaints will be kept confidential upon the request of the employee. Employees also have the right to bring unsafe or unhealthy conditions to the attention of the inspector during an investigation or inspection.

Employees may not be fired or discriminated against for filing safety and health complaints or for exercising any of their rights under WISHA.

Employees who believe they have been discriminated against may file a complaint with the department or with the U.S. Department of Labor, Occupational Safety and Health Administration, within 30 days of the alleged discrimination. Public employees may file discrimination complaints with the Department of Labor and Industries only.

The U.S. Department of Labor monitors the operation of the WISHA program to assure effective administration. Any person may make a written complaint regarding the administration of state regulations directly to the Occupational Safety and Health Administration, Region 10, 1111-3rd Avenue, Suite 715, Seattle, WA 98101-3212.

Citations:

If, upon inspection the department believes a WISHA regulation has been violated, a citation alleging such violation will be issued to the employer. Citations will specify a time period allowed for correcting the violation.

The WISHA citation must be prominently displayed at or near the place of the alleged violation for a minimum of three days. It cannot be taken down until the violation is corrected.

Penalties:

Penalties of up to $70,000 may be assessed for each willful or repeated violation of a WISHA regulation, and a minimum penalty of $5,000 shall be assessed for each willful violation. Employers may be fined up to $7,000 for each serious or non-serious violation. Penalties up to $7,000 will be assessed for failure to post this or any other required notices.

Penalties of up to $7,000 per day may be assessed for failure to correct a violation by the allowed time specified in the citation.

Criminal penalties are also provided for under WISHA. Any person who is convicted of giving advance notice of an inspection without the authority of the department may be fined up to $1,000 and imprisoned for up to six months. A person convicted of knowingly making a false statement or report in regard to WISHA may be fined up to $10,000 and imprisoned for up to six months.

An employer convicted of a willful or repeated violation that results in the death of an employee may be fined up to $10,000 and imprisoned for up to six months. A second conviction doubles these penalties.

Appeals:

Employers may appeal the alleged citation, the proposed penalties or the time allowed to correct a violation to the department and to the Board of Industrial Insurance Appeals.

Employees may appeal the time allowed to correct a violation if they believe that time to be unreasonable.

Consultation services:

The department offers free consultations to help employers comply with safety and health regulations. Specialists can help correct hazardous conditions and develop safety and health programs. These specialists **do not** issue citations or assign penalties. The consultation is confidential unless the employer wishes to make it public.

Department employees are also available to conduct seminars and training on occupational safety and health for both employer and employee groups.

More information:

To request an inspection, consultation or additional information, call the safety and health toll-free information number:

1-800-423-7233 (4BE-SAFE)

or contact:

Department of Labor and Industries
WISHA Services Division
PO Box 44600
Olympia WA 98504-4600

This document is available in other formats to accommodate persons with disabilities. For assistance, call 1-800-547-8367. (TDD users, please call 360-902-5797.) Labor and Industries is an Equal Opportunity Employer.

Department of LABOR AND INDUSTRIES

PUBLICATION F416-081-909 [12/2004]

Seguridad en el Empleo y Protección de la Salud

La ley de salud y seguridad industrial de Washington (Washington Industrial Safety and Health Act -WISHA) Capítulo 49.17, Código revisado de Washington—proporciona seguridad en el empleo y protección de salud para los empleados de Washington. El Departamento de Labor e Industrias administra la ley y adopta los reglamentos de seguridad y salud en el empleo. Se les requiere a todos los empleadores y empleados que cumplan con estos reglamentos. Los representantes del departamento efectuarán inspecciones e investigaciones en el sitio de trabajo para asegurar que se cumplan los reglamentos de seguridad y salud.

Este cartel describe algunas de las secciones importantes de la ley.

Se requiere a los empleadores que:

Proporcionen sitios de trabajo que estén libres de peligros reconocidos que puedan causar la muerte o daños graves a los empleados.

Cumplan con los reglamentos de seguridad y salud ocupacionales administrados por WISHA.

Fijen esta y otras notificaciones para mantener a los empleados informados de su protección y sus obligaciones bajo WISHA.

Notifiquen al Departamento de Labor e Industrias dentro de un plazo de ocho (8) horas de cualquier fatalidad o fatalidad probable o catástrofe - una lesión o enfermedad que resulte con dos o más trabajadores hospitalizados. El empleador tiene que reportar la siguiente información por teléfono o en persona en la oficina más cercana del departamento o utilizar el número central gratuito 1-800-321-6742 de la Administración de Seguridad y Salud Ocupacional:

- Nombre del empleador.
- Lugar y hora del incidente.
- Número de fatalidades o de empleados hospitalizados.
- Persona de contacto y su número telefónico.
- Una breve descripción del incidente.

Permitan asistir a un representante de los empleados a todas las reuniones que existan entre el Departamento de Labor e Industrias y el empleador con referencia a apelaciones por el empleador contra citaciones expedidas.

Permitan que un representante de los empleados acompañe al representante del departamento y al empleador durante una inspección o investigación del sitio de trabajo. Los empleadores no pueden retener salarios, beneficios o discriminar contra el empleado por el tiempo dedicado a la participación de la inspección, la investigación o a las conferencias de la apertura o cierre.

Proporcionen el equipo de protección personal cuando sea requerido por los reglamentos de WISHA.

Notifiquen prontamente a cualquier empleado que haya sido o esté siendo expuesto a materiales tóxicos o a agentes físicos dañinos a niveles que sobrepasen los permitidos por los reglamentos de WISHA.

Se requiere a los empleados que:

Cumplan con los reglamentos de seguridad y salud ocupacionales aplicables a sus propias acciones y conducta en el trabajo.

Inspecciones e investigaciones:

Los representantes del empleador y del empleado pueden acompañar a un inspector del departamento para asistir en una inspección o investigación. Si no participa un representante de los empleados, el inspector consultará con otros empleados sobre las condiciones de seguridad y salud en el sitio de trabajo.

Quejas:

Los empleados y los representantes de los empleados que crean que una condición insegura o insalubre existe en su sitio de trabajo, tienen el derecho de solicitar una inspección por el Departamento de Labor e Industrias. Los nombres de los que registren quejas serán mantenidos confidenciales a solicitud del empleado. Durante una investigación o inspección los empleados también tienen el derecho de informar al inspector de condiciones inseguras o insalubres que existan.

No se podrá despedir ni discriminar en contra de los empleados por registrar quejas de seguridad y salud o por ejercitar cualquiera de sus derechos bajo WISHA.

Los empleados que crean haber sido discriminados pueden registrar una queja con el departamento o con el Departamento de Trabajo de los Estados Unidos, Administración de Seguridad y Salud Ocupacional, dentro de un plazo de treinta (30) días de la supuesta discriminación. Los empleados públicos solo pueden presentar quejas de discriminación con el Departamento de Labor e Industrias.

El Departamento de Trabajo de los Estados Unidos supervisa la operación del programa WISHA para asegurar que su administración sea eficaz. Cualquier persona podrá presentar una queja por escrito con respecto a la administración de los reglamentos del estado directamente a la Administración de Seguridad y Salud Ocupacional (Occupational Safety and Health Administration), Region 10, 1111 - 3rd Avenue, Suite 715, Seattle, WA 98101-3212.

Citaciones:

Si después de efectuar una inspección, el departamento considera que se ha violado alguno de los reglamentos de WISHA, una citación que afirma tal infracción será emitida al empleador. Las citaciones especificarán un período de tiempo permitido para corregir la violación.

La citación de WISHA se deberá fijar en forma muy visible en o cerca del lugar de la presunta infracción durante un período mínimo de tres días. No se podrá quitar hasta que se haya corregido la infracción.

Multas:

Se podrán imponer multas de hasta $70,000 dólares por cada infracción deliberada o repetida de un reglamento de WISHA, y una multa mínima de $5,000 dólares será impuesta por cada infracción deliberada. Los empleadores pueden ser multados hasta $7,000 dólares por cada infracción grave o no grave. Se puede imponer multas de hasta $7,000 dólares por no fijar esta o cualquier otra notificación requerida.

Se pueden imponer multas de hasta $7,000 dólares diarios por el hecho de no corregir una infracción en el período especificado de la citación.

WISHA dispone también de castigos de índole criminal. Cualquier persona declarada culpable por dar aviso anticipado de una inspección sin autorización del departamento, puede ser multada hasta con $1,000 dólares y ser encarcelada por hasta seis meses. Una persona convicta de haber hecho declaraciones falsas sabiendo que estaba presentando un informe falso en relación con WISHA podrá ser multada hasta $10,000 dólares y ser encarcelada por hasta seis meses.

Un empleador declarado culpable por una infracción deliberada o repetida que resulte en la muerte de un empleado podría tener que pagar una multa de hasta $10,000 dólares y ser encarcelado por hasta seis meses. Una segunda condena duplicará estas penas.

Apelaciones:

Los empleadores pueden apelar la presunta citación, las multas propuestas o el tiempo permitido para corregir una infracción con el departamento y el Consejo de Apelaciones del Seguro Industrial (Board of Industrial Insurance Appeals.)

Los empleados podrán apelar contra el tiempo permitido para corregir una violación si consideran que es irrazonable.

Servicios de consulta:

El departamento ofrece consultas gratuitas para ayudar a los empleadores a cumplir con los reglamentos de seguridad y salud. Hay especialistas que pueden ayudar a corregir condiciones peligrosas y desarrollar programas de seguridad y salud. Estos especialistas **no** emiten citaciones ni asignan multas. La consulta es confidencial a menos que el empleador desee hacerla pública.

Los empleados del departamento están también disponibles para realizar seminarios y entrenamiento en seguridad y salud ocupacional para los grupos del empleador y de los empleados.

Información adicional:

Para solicitar una inspección, una consulta o información adicional, llame al número gratuito de información de seguridad y salud:

1-800-423-7233 (4BE-SAFE)

o póngase en contacto con:

Department of Labor and Industries
WISHA Services Division
P.O. Box 44600
Olympia, WA 98504-4600

Este documento está disponible en formato alterno para asistir personas con discapacidades. Para asistencia llame al 1-800-547-8367. (Usuarios de TDD "aparato especial para personas con problemas auditivos e impedimentos del habla" llamen al 360-902-5797.)
El Departamento de Labor e Industrias es un empleador de igualdad de oportunidad.

PUBLICACIÓN F416-081-909 [12/2004]

Department of LABOR AND INDUSTRIES

Attachment 3

Safety Data Sheets

Safety Data Sheet

Effective date: 11 May 2020 **Revision**: 11 May 2020
Trade Name: Alconox®

1 Identification of the substance/mixture and of the supplier

1.1 GHS Product identifier

Trade Name: Alconox®

Product number: 1101, 1103, 1104, 1104-1, 1112, 1112-1, 1125, 1150

1.2 Application of the substance / the mixture: Cleaning material/Detergent

1.2.1 Recommended dilution ratio: 1 – 2% in water

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer:
Alconox Inc.
30 Glenn St
White Plains, NY 10603
(914) 948-4040

Supplier:

Emergency telephone number:
ChemTel Inc
North America: 1-888-255-3924
International: +1 813-248-0573

2 Hazards identification

2.1 Classification of the substance or mixture:

In compliance with EC regulation No. 1272, 29CFR1910/1200 and GHS requirements.

Hazard-determining components of labeling:
Tetrasodium Pyrophosphate
Sodium tripolyphosphate
Sodium Alkylbenzene Sulfonate

2.2 Label elements:

Eye damage, category 1.

Skin irritation, category 2.

Product at recommended dilution:
Eye irritation, category 2B

Hazard pictograms:

Signal word: Danger

Hazard statements:
H315 Causes skin irritation.
H318 Causes serious eye damage.

Precautionary statements:
P264 Wash skin thoroughly after handling.

Effective date: 11 May 2020 **Revision**: 11 May 2020
Trade Name: Alconox®

P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Hazardous Elements at Use Dilution:

Hazard Pictograms:

Signal Word: Warning
Hazard Statements:
H320 Causes eye irritation

Precautionary statements:
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P501 Dispose of contents and container as instructed in Section 13

Additional information: None.

Hazard description
Hazards Not Otherwise Classified (HNOC): May cause surfaces to become slippery if wet. Use caution in areas of foot traffic if on floors.

Information concerning particular hazards for humans and environment:
The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:
The classification is according to EC regulation No. 1272, 29CFR1910/1200 and GHS Requirements, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists and is supplemented by information from technical literature and by information provided by the company.

3 Composition/information on ingredients

3.1 Chemical characterization: Not determined or not available.

3.2 Description: None
3.3 Hazardous components (percentages by weight)

Identification	Chemical Name	Classification	Wt. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Skin Irrit. 2; H315 Eye Irrit. 2; H319	12-28
CAS number: 68081-81-2 or 68411-30-3	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2; H315 Eye Dam. 1; H318	8-22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Skin Irrit. 2; H315 Eye Irrit. 2; H319	2-16

Hazardous components at use dilution (percentages by weight):

Identification	Chemical Name	Classification	Wt. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Eye Irrit. 2; H319	0.12 - 0.28
CAS number: 68081-81-2 or 68411-30-3	Sodium Alkylbenzene Sulfonate	Eye Irrit. 2; H319	0.08 – 0.22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Eye Irrit. 2; H319	0.02 – 0.16

3.4 Additional Information: None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:
Maintain an unobstructed airway.
Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:
Wash affected area with soap and water.
Seek medical attention if symptoms develop or persist.

After eye contact:
Rinse/flush exposed eye(s) gently using water for 15-20 minutes.
Remove contact lens(es) if able to do so during rinsing.
Seek medical attention if irritation persists or if concerned.

After swallowing:
Rinse mouth thoroughly.
Seek medical attention if irritation, discomfort, or vomiting persists.

4.2 Most important symptoms and effects, both acute and delayed

None

4.3 Indication of any immediate medical attention and special treatment needed:

No additional information.

First aid measure at recommended dilution:

General information: None.

After inhalation:
Maintain an unobstructed airway.
Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:
Wash affected area with soap and water.

After eye contact:
Rinse/flush exposed eye(s) gently using water for 15-20 minutes.
Remove contact lens(es) if able to do so during rinsing.

After swallowing:
Rinse mouth thoroughly. Seek medical attention if irritation, discomfort, or vomiting develops.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

For safety reasons unsuitable extinguishing agents: None

5.2 Special hazards arising from the substance or mixture:

Thermal decomposition can lead to release of irritating gases and vapors.

5.3 Advice for firefighters

Protective equipment:

Wear protective eye wear, gloves and clothing.
Refer to Section 8.

5.4 Additional information:

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.
Avoid contact with skin, eyes and clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

Ensure adequate ventilation.
Ensure air handling systems are operational.

6.2 Environmental precautions:

Should not be released into the environment.
Prevent from reaching drains, sewer or waterway.

6.3 Methods and material for containment and cleaning up:

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections: None

7 Handling and storage

7.1 Precautions for safe handling:

No expected hazards under normal use condition.

Avoid breathing mist or vapor if aerosolized.
Do not eat, drink, smoke or use personal products when handling chemical substances.

7.2 Conditions for safe storage, including any incompatibilities:

Store in a cool, well-ventilated area.

7.3 Specific end use(s):

No additional information.

Effective date: 11 May 2020 **Revision**: 11 May 2020

Trade Name: Alconox®

8 Exposure controls/personal protection

8.1 Control parameters:

a) 7722-88-5, Tetrasodium Pyrophosphate, ACGIH TWA 10 mg/m3
b) 7758-29-4, Sodium Tripolyphosphate, ACGIH TWA 10 mg/m3
c) Dusts, non-specific OEL, Irish Code of Practice
   (i) Total inhalable 10 mg/m3 (8hr)
   (ii) Respirable 4 mg/m3 (8hr)
   (iii) Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3, (8hr)

8.2 Exposure controls

Appropriate engineering controls:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Respiratory protection:

Not needed under normal use conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance.

Eye protection:

Safety goggles or glasses, or appropriate eye protection. Recommended to comply with ANSI Z87.1 and/or EN 166.

General hygienic measures:

Wash hands before breaks and at the end of work.
Avoid contact with skin, eyes and clothing.

Exposure Control and Personal Protective Equipment at recommended dilution:

Under normal use and operational conditions, no special personal protective equipment or engineering controls will be necessary. Handle with care.

9 Physical and chemical properties

Appearance (physical state, color):	White and cream colored flakes - powder	**Explosion limit lower**: **Explosion limit upper**:	Not determined or notavailable. Not determined or notavailable.
Odor:	Not determined or not available.	**Vapor pressure at 20°C**:	Not determined or notavailable.
Odor threshold:	Not determined or not available.	**Vapor density**:	Not determined or notavailable.
pH-value:	9.5 (1% aqueous solution)	**Relative density**:	Not determined or notavailable.

Effective date: 11 May 2020 **Revision**: 11 May 2020
Trade Name: Alconox®

Melting/Freezing point:	Not determined or not available.	**Solubilities**:	Not determined or notavailable.
Boiling point/Boiling range:	Not determined or not available.	**Partition coefficient (n-octanol/water)**:	Not determined or notavailable.
Flash point (closed cup):	Not determined or not available.	**Auto/Self-ignition temperature**:	Not determined or notavailable.
Evaporation rate:	Not determined or not available.	**Decomposition temperature**:	Not determined or notavailable.

Flammability (solid, gaseous):	Not determined or not available.	**Viscosity**:	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.
Density at 20°C:	Not determined or not available.		

10 Stability and reactivity

10.1 Reactivity: Not determined or not available.
10.2 Chemical stability: Not determined or not available.
10.3 Possibility hazardous reactions: Not determined or not available.
10.4 Conditions to avoid: Not determined or not available.
10.5 Incompatible materials: Not determined or not available.
10.6 Hazardous decomposition products: Not determined or not available.

11 Toxicological information

11.1 Information on toxicological effects:

Acute Toxicity:

Oral:

: LD50 > 5000 mg/kg oral rat - Product.

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Sodium Alkylbenzene Sulfonate: Causes skin irritation.

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye damage.

Tetrasodium Pyrophosphate: Risk of serious damage to eyes.

Product information at recommended dilution:

Eye irritation may occur upon direct contact with eyes. No specific hazards for skin contact, inhalation, or chronic exposure are expected within normal use parameters.

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

IARC (International Agency for Research on Cancer): None of the ingredients are listed.

NTP (National Toxicology Program): None of the ingredients are listed.

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.
Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.9 mg/l, 48 hours.
Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.
Tetrasodium Pyrophosphate: Fish, LC50 - other fish - 1,380 mg/l - 96 h.
Tetrasodium Pyrophosphate: Aquatic invertebrates, EC50 - Daphnia magna (Water flea) - 391 mg/l - 48 h.

12.2 Persistence and degradability: No additional information.

12.3 Bioaccumulative potential: No additional information.

12.4 Mobility in soil: No additional information.

General notes: No additional information.

12.5 Results of PBT and vPvB assessment:

PBT: No additional information.

vPvB: No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal)

Relevant Information:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

14 Transport information

14.1 UN Number: ADR, ADN, DOT, IMDG, IATA	None
14.2 UN Proper shipping name: ADR, ADN, DOT, IMDG, IATA	None
14.3 Transport hazard classes: ADR, ADN, DOT, IMDG, IATA	**Class:** None **Label:** None **LTD. QTY:** None

US DOT

Limited Quantity Exception: None

Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

Non Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

	Comments: None	**Comments:** None
14.4	**Packing group:** ADR, ADN, DOT, IMDG, IATA	None
14.5	**Environmental hazards**:	None
14.6	**Special precautions for user:** **Danger code (Kemler):** **EMS number:** **Segregation groups:**	None None None None

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

14.8 Transport/Additional information:

Transport category:	None
Tunnel restriction code:	None
UN "Model Regulation":	None

15 Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.

North American

SARA

Section 313 (specific toxic chemical listings): None of the ingredients are listed.
Section 302 (extremely hazardous substances): None of the ingredients are listed.

CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

Inventory: All ingredients are listed as active.
Rules and Orders: Not applicable.

Proposition 65 (California):

Chemicals known to cause cancer: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for females: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.

Chemicals known to cause developmental toxicity: None of the ingredients are listed.

Canadian

Canadian Domestic Substances List (DSL):
All ingredients are listed.

EU

REACH Article 57 (SVHC): None of the ingredients are listed.

Effective date: 11 May 2020 **Revision**: 11 May 2020
Trade Name: Alconox®

Germany MAK: Not classified.
EC 648/2004 – This is an industrial detergent. Contains >30% phosphate, 15-30% anionic surfactant, <5% EDTA salts
EC 551/2009 – This is not a laundry or dishwasher detergent
EC 907/2006 – Contains no enzymes, optical brighteners, perfumes, allergenic fragrances, or preservative agents

Asia Pacific

Australia

Australian Inventory of Chemical Substances (AICS): All ingredients are listed.

China

Inventory of Existing Chemical Substances in China (IECSC): All ingredients are listed.

Japan

Inventory of Existing and New Chemical Substances (ENCS): All ingredients are listed.

Korea

Existing Chemicals List (ECL): All ingredients are listed.

New Zealand

New Zealand Inventory of Chemicals (NZOIC): All ingredients are listed.

Philippines

Philippine Inventory of Chemicals and Chemical Substances (PICCS): All ingredients are listed.

Taiwan

Taiwan Chemical Substance Inventory (TSCI): All ingredients are listed.

16 Other information

Abbreviations and Acronyms: None

Summary of Phrases

Hazard statements:
H315 Causes skin irritation.
H318 Causes serious eye damage.

NFPA: 1-0-0
HMIS: 1-0-0

At recommended dilution:
NFPA: 1-0-0
HMIS: 1-0-0

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Safety Data Sheet

Ethanol 95 IPA

Version 1.00 Revision Date 08.04.2020

SECTION 1. Identification of the substance/mixture and of the company/undertaking

Product identifier

Trade name	Ethanol 95 IPA
Synonyms	Ethanol 95 IPA blend
Product code	E95IPA

Relevant identified uses of the substance or mixture and uses advised against

Use	Raw material for alcohol hand rub production

Manufacturer or supplier's details

Company	Sasol Chemicals, a division of Sasol South Africa Ltd
Address	Sasol Place, 50 Katherine Street Sandton 2090 South Africa
Telephone	+27103445000
E-mail address	sasolchem.info.sa@sasol.com
Emergency telephone number	+27 (0)17 610 4444 (South Africa)

SECTION 2. Hazards identification

Classification of the substance or mixture

REGULATION (EC) No 1272/2008

Classification	Flammable liquids	Category 2

Label elements

REGULATION (EC) No 1272/2008

Hazard pictograms	:	
Signal word	:	Danger
Hazard statements	:	H225 Highly flammable liquid and vapour.

Precautionary statements

Prevention	P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P233 Keep container tightly closed.
Response	P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
Storage	P403 + P235 Store in a well-ventilated place. Keep cool.
Disposal	P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. Composition/information on ingredients

Mixture

Ethanol

Contents: >= 94.00 %VOL/VOL

CAS-No. 64-17-5 **Index-No.** 603-002-00-5 **EC-No.** 200-578-6

Hazard statements *H225*

Propan-2-ol

Contents: <= 6.00 %VOL/VOL

CAS-No. 67-63-0 **Index-No.** 603-117-00-0 **EC-No.** 200-661-7

Hazard statements *H225 H319 H336*

SECTION 4. First aid measures

Description of necessary first-aid measures

Inhalation	Move to fresh air in case of accidental inhalation of vapours. If breathing is irregular or stopped, administer artificial respiration. If symptoms persist, call a physician.
Skin contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Eye contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses. Call a physician immediately.
Ingestion	If swallowed, seek medical advice immediately and show this container or label. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person.

Most important symptoms/effects, acute and delayed

Refer to SECTION 11

Risks	First aider needs to protect himself.

SECTION 5. Firefighting measures

Suitable extinguishing media	Water spray. Dry powder. Foam.
Special hazards arising from the substance or mixture	Do not allow run-off from fire fighting to enter drains or water courses.
Special protective equipment for firefighters	Wear self-contained breathing apparatus and protective suit.

SECTION 6. Accidental release measures

Personal precautions	Ensure adequate ventilation. Keep away from sources of ignition - No smoking.

Environmental precautions	Avoid subsoil penetration. Do not flush into surface water or sanitary sewer system.
Methods for cleaning up	Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). The material taken up must be disposed of in accordance with regulations.
Reference to other sections	Refer to section 8 and 13

SECTION 7. Handling and storage

Safe handling advice	Keep away from sources of ignition - No smoking.
Advice on protection against fire and explosion	When handling this product in plastic drums, take measures to prevent the build up of electrostatic charges.
Requirements for storage areas and containers	Keep containers tightly closed in a cool, well-ventilated place.Handle empty containers with care.
Advice on common storage	Store between 15 and 30 deg C. Avoid freezing and excessive heat exceeding 40 deg C.

SECTION 8. Exposure controls/personal protection

Components with workplace control parameters

NATIONAL OCCUPATIONAL EXPOSURE LIMITS

Components	Type	Control parameters	Update	Basis
ISOPROPYL ALCOHOL	TWA	980 mg/m3	1995	South Africa RELs
PROPAN-2-OL	TWA	400 ppm	1995	South Africa RELs
PROPAN-2-OL	STEL	1,225 mg/m3	1995	South Africa RELs
	STEL	500 ppm	1995	South Africa RELs
ETHYL ALCOHOL	TWA	1,900 mg/m3	1995	South Africa RELs
ETHANOL	TWA	1,000 ppm	1995	South Africa RELs

Exposure controls

Engineering measures

Provide sufficient air exchange and/or exhaust in work rooms.

Personal protective equipment

Respiratory protection	Not required for normal conditions of use
Hand protection	Gloves suitable for permanent contact: Material: butyl-rubber Break through time: 4 h Material thickness: 0.5 mm
Eye protection	Wear safety glasses with side shields or goggles.
Skin and body protection	Full protective suit
Hygiene measures	Wash hands before breaks and at the end of workday.

SECTION 9. Physical and chemical properties

Information on basic physical and chemical properties

Form	Liquid
State of matter	Liquid; at 20 °C; 1,013 hPa
Colour	Clear and bright
Odour	Characteristic
Odour Threshold	No data available
pH	Not applicable
Boiling point/boiling range	78.8 - 79.2 °C; ASTM D1078
Flash point	14 °C; ASTM D 93
Evaporation rate	No data available
Flammability (solid, gas)	No data available
Vapour pressure	10 kPa; 37.7 °C; SASOL 2014
Relative vapour density	No data available
Density	0.789 kg/dm3; 20 °C; ASTM D4052
Viscosity, kinematic	1.10 mm2/s; ASTM D455

SECTION 10. Stability and reactivity

Reactivity	Stable under normal conditions.
Chemical stability	Stable under recommended storage conditions.
Possibility of hazardous reactions	Reactivity hazard in contact with strong oxidizing agents
Conditions to avoid	Heat, flames and sparks.
Materials to avoid	Oxidizing agents. Reducing agents. Acids and bases
Hazardous decomposition products	No decomposition if stored normally.

SECTION 11. Toxicological information

Acute oral toxicity	Propan-2-ol: LD50 Rat: > 2,000 mg/kg; (literature value)
Acute oral toxicity	Ethanol; Ethyl alcohol: LD50 Rat: > 2,000 mg/kg; OECD Test Guideline 401; (literature value)
Acute inhalation toxicity	Ethanol; Ethyl alcohol: LC50 Mouse: 4 h; > 20 mg/l; (literature value)
Acute inhalation toxicity	Propan-2-ol: LC50 Rat: 8 h; vapour; > 20 mg/l; (literature value)
Acute dermal toxicity	Propan-2-ol: LD50 Rabbit: > 2,000 mg/kg; (literature value)
Acute dermal toxicity	Ethanol; Ethyl alcohol: LD50 Dermal Rabbit: > 2,000 mg/kg; OECD Test Guideline 402; (literature value)
Skin irritation	Ethanol; Ethyl alcohol: Rabbit: Not irritating; OECD Test Guideline 404 (literature value)
Skin irritation	Propan-2-ol: Rabbit: Not irritating; (literature value)
Eye irritation	Ethanol; Ethyl alcohol: Rabbit: irritating OECD Test Guideline 405 (literature value)
Eye irritation	Propan-2-ol: Rabbit: irritating (literature value)

Sensitisation	Ethanol; Ethyl alcohol: Maximisation Test; Guinea pig: Not sensitizing; OECD Test Guideline 406; (literature value)
Sensitisation	Propan-2-ol: Buehler Test; Guinea pig: Not sensitizing; (literature value)
Repeated dose toxicity	Ethanol; Ethyl alcohol: Oral Rat; 90-day; NOAEL Early embryonic development 1,730 mg/kg Lowest observed adverse effect level 3,160 mg/kg
Mutagenicity	Ethanol; Ethyl alcohol: Ames test: Salmonella typhimurium; with and without; Not mutagenic; OECD Test Guideline 471; (literature value)

SECTION 12. Ecological information

Toxicity to fish	Ethanol; Ethyl alcohol: static test; Leuciscus idus; 48 h; LC50; > 100 mg/l; OECD Test Guideline 203; (literature value)
Toxicity to fish	Propan-2-ol: static test; Leuciscus idus melanotus; 48 h; LC50; > 100 mg/l; (literature value)
Toxicity to daphnia and other aquatic invertebrates	Ethanol; Ethyl alcohol: static test; Daphnia magna (Water flea); 24 h; EC50; > 100 mg/l(literature value)
Toxicity to daphnia and other aquatic invertebrates	Propan-2-ol: static test; Daphnia magna (Water flea); 48 h; EC50; > 100 mg/l(literature value)
Toxicity to algae	Ethanol; Ethyl alcohol: static test; Chlorella pyrenoidosaEC50; > 100 mg/l; OECD Test Guideline 201; (literature value)
Toxicity to algae	Propan-2-ol: static test; Scenedesmus subspicatus72 h; EC50; > 100 mg/l; (literature value)
Biodegradability	Ethanol; Ethyl alcohol: aerobic; > 70 %; 5 d; Readily biodegradable.; OECD Guideline 301 D; (literature value)

Biodegradability	Propan-2-ol: aerobic; activated sludge; 53 %; 5 d; Readily biodegradable.; (literature value)
Bioaccumulation	Propan-2-ol: No bioaccumulation is to be expected (log Pow <= 4).
Mobility in soil	No data available
Results of PBT and vPvB assessment	This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).
Chemical Oxygen Demand (COD)	Ethanol; Ethyl alcohol: ca.1,700 mg/g; Directive 84/449/EEC, C.9; GLP: no;

SECTION 13. Disposal considerations

Product	In accordance with local and national regulations. " Packaging - Dispose of spent product packaging responsibly and lawfully with due consideration for health, safety and the environment.

SECTION 14. Transport information

ADR

UN number:	1170
Class:	3
Packaging group:	II; F1;
Proper shipping name:	ETHANOL

RID

UN number:	1170
Class:	3
Packaging group:	II; F1
Proper shipping name:	ETHANOL

IMDG

UN number:	1170
Class:	3

EmS:	F-E, S-D
Packaging group:	II
Proper shipping name:	ETHANOL
ICAO/IATA	
UN number :	1170
Class:	3
Packaging group:	II
Proper shipping name:	ETHANOL

SECTION 15. Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

Canada. DSL - Domestic Substances List, part of CEPA	All chemical constituents are listed in: Canada. DSL - Domestic Substances List, part of CEPA (See chapter 3)
Australia. AICS - Australian Inventory of Chemical Substances	All chemical constituents are listed in: Australia. AICS - Australian Inventory of Chemical Substances (See chapter 3)
New Zealand Inventory of Chemical Substances	All chemical constituents are listed in: New Zealand Inventory of Chemical Substances (See chapter 3)
Japan. ENCS - Existing and New Chemical Substances Inventory	All chemical constituents are listed in: Japan. ENCS - Existing and New Chemical Substances Inventory (See chapter 3)
Japan. Industrial Safety and Health Law - Inventory	All chemical constituents are listed in: Japan. Industrial Safety and Health Law - Inventory (See chapter 3)
Korea. KECI - Korean Existing Chemicals Inventory	All chemical constituents are listed in: Korea. KECI - Korean Existing Chemicals Inventory (See chapter 3)
Philippines. PICCS - Philippines Inventory of Chemicals and Chemical Substances	All chemical constituents are listed in: Philippines. PICCS - Philippines Inventory of Chemicals and Chemical Substances (See chapter 3)
China. IECSC - Inventory of Existing Chemical Substances in China	All chemical constituents are listed in: China. IECSC - Inventory of Existing Chemical Substances in China (See chapter 3)
Taiwan. Chemical Substances Inventory	All chemical constituents are listed in: Taiwan. Chemical

(TCSI)	Substances Inventory (TCSI) (See chapter 3)
USA TSCA Inventory	All chemical constituents are listed in: USA TSCA Inventory (See chapter 3)

SECTION 16. Other information

Full text of H-Statements

H225 Highly flammable liquid and vapour.
H319 Causes serious eye irritation.
H336 May cause drowsiness or dizziness.

All reasonable efforts were exercised to compile this SDS in accordance with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). The SDS only provides information regarding the health, safety and environmental hazards at the date of issue, to facilitate the safe receipt, use and handling of this product in the workplace and does not replace any product information or product specifications. Since Sasol and its subsidiaries cannot anticipate or control all conditions under which this product may be handled, used and received in the workplace, it remains the obligation of each user, receiver or handler to, prior to usage, review this SDS in the context within which this product will be received, handled or used in the workplace. The user, handler or receiver must ensure that the necessary mitigating measures are in place with respect to health and safety. This does not substitute the need or requirement for any relevant risk assessments to be conducted. It further remains the responsibility of the receiver, handler or user to communicate such information to all relevant parties that may be involved in the receipt, use or handling of this product.

Although all reasonable efforts were exercised in the compilation of this SDS, Sasol does not expressly warrant the accuracy of, or assume any liability for incomplete information contained herein or any advice given. When this product is sold, risk passes to the purchaser in accordance with the specific terms and conditions of sale.

Attachment 4

Near-Miss/Near-Loss Incident Report

NEAR-MISS/NEAR-LOSS INCIDENT REPORT

This form is to be completed by field staff.

Employee: ______________________________

Office or site location: ______________________________

Near-miss incident (check one or more): Exposure ☐ Physical injury ☐ Property damage ☐

Location (city and state): ________________ Project no.: ________

Date of incident: ________________ Time of incident: ________

Fully describe the incident, including how it happened, persons involved, if chemicals were involved in the incident, etc.:

____

____

____

____

____

____

Was the operation being conducted under an established safety plan? ☐ Yes ☐ No

If yes, attach a copy. If no, explain: ______________________________

____

______________________________ ________________

Employee signature Date

______________________________ ________________

Site safety officer signature (field incidents only) Date

______________________________ ________________

Project manager or office health and safety representative signature Date

CORPORATE HEALTH AND SAFETY MANAGER (CHSM) REVIEW AND COMMENTS

Corrective action/procedure changes carried out on this project or office:

Corrective actions to be taken to prevent similar incidents at other project sites or offices:

CHSM signature

Date

Attachment 5

Job Hazard Analysis Form

Instructions for Using the Job Hazard Analysis Tool

Purpose

A job hazard analysis (JHA) is a valuable tool used to assess risk to personal safety, property, and equipment. It provides a systematic method of evaluating processes or tasks for hazards and ensuring that employees are adequately trained to safely perform job tasks.

When to Perform a JHA?

For purposes of safety, it is Integral's goal to perform a JHA for all field tasks, whether infrequent or routine. If a high-risk procedure is about to be undertaken, a JHA must be performed as part of planning for the job. A JHA may also be needed when new equipment is introduced. In the event of an occupational injury, a JHA should be performed to help prevent future occurrences.

Who Should Be Involved?

If you are not familiar with a particular job or procedure, interview an employee who can "walk-through" the operation with you step-by-step and provide insight on potential hazards.

Using the JHA Assessment Tools

The JHA assessment form can be printed and taken into the field. The "JHA Hazard List" and "JHA Control List" tabs provide lists of several potential hazards/controls; these are pre-populated in drop-down boxes on the assessment form.

Procedures for Completing a JHA Assessment Form

1 Fill in the header cells at the top of the form.

2 Evaluate the process or task by breaking it down into a series of **job steps** or subtasks.
- ♦ List the steps in sequential order (start to finish).
- ♦ Include **photographs** of the steps being performed and reference the photo numbers if available.

3 Identify all **potential hazards** for each individual job step. Hazard = Potential Danger
- ♦ Utilize the JHA potential hazard list for assistance in identifying potential hazards.
- ♦ Click on a **hazard type** cell in the assessment form to choose from the drop-down selections.
- ♦ Use the drop-down selections in the next column of the form to describe the potential hazards (which are dependent on the type of hazard [physical, chemical, environmental, biological]).

4 Identify all **existing controls** for each job step.
- ♦ Utilize the JHA control list for assistance in identifying types of controls.
- ♦ Use the drop-down selections in the assessment form to choose the **control type**(s).
- ♦ Use the drop-down selections (which are dependent on the type of control [engineering, administrative, PPE]) to describe the controls.
- ♦ Rank the severity **(SEV)** and occurrence **(OCC)** likelihood (1 through 5) for each job step/activity. For help with the risk scale, refer to the pop-out comment boxes in the assessment form. For SEV, 5 is the most severe and 1 is the least; for OCC, 5 is the most likely to occur and 1 is the least likely.
- ♦ Assign a control effectiveness **(EFF)** ranking (0.25, 0.5, 0.75, 1) for the job step as a whole. Refer to the pop-out comment box in the assessment form for help in determining the appropriate control ranking. An EFF of 0.25 indicates that the control fully safeguards the hazard (fully effective); a 1 means the control does not effectively influence the hazard.
- ♦ A hazard priority number **(HPN)** for each job step is automatically calculated in the assessment form. Refer to the attached table for a guide to the categories of risk.

5 Identify any additional, **recommended controls** that would help eliminate or mitigate the risk of hazards that could lead to an accident, injury, or occupational illness.
- ♦ Refer to Step 4 for help in identifying and entering the additional recommended controls on the assessment form.
- ♦ Assign new rankings—**SEV, OCC, EFF**—taking into account the presumed effectiveness of the recommended control actions.
- ♦ A new **HPN** will automatically be calculated to determine a risk reduction rate with additional controls.

Formatting Tips

- ♦ **To start a new assessment form electronically,** right-click on the "JHA Assessment Form" tab and select Move or Copy, Create a copy, OK.
- ♦ **Rename each tab** with a brief description of the process: right-click and select Rename.
- ♦ **The potential hazards and existing controls columns** have been formatted with potential selections. Modify the selections by making them as descriptive as possible.
- ♦ **Hide unused rows for each job step** (rows that do not contain potential hazards or existing controls): right-click on the row number(s) to be hidden and select Hide.
- ♦ **To insert a photograph,** select the desired cell, then click Insert (on the upper ribbon) and select Pictures. Find the photograph in the file. Resize the image to fit in the appropriate cell. Note: The picture cells may become smaller after hiding unused rows, so it is recommended that photographs be added after entering all potential hazards and existing controls.
- ♦ **Adjust page breaks** so that a complete job step is printed on each page: click View (on the upper ribbon), select Page Break Preview, and click and drag the blue page borders to the desired row.

Risk Category	Action Planning
Low Risk 0 to 5	Ensure that control measures remain in place. Occasional monitoring to ensure that risks are controlled. No need for "recommended controls."
Moderate Risk 6 to 8	Control measures are satisfactory but require regular monitoring to ensure that risks are controlled. No need for "recommended controls."
High Risk 9 to 14	Reducing the highest-priority job-step risks first, using "recommended controls."
Critical Risk 15 to 25	Urgent and immediate focus. Consider short-term control actions to reduce the immediate risk for all job steps, using "recommended controls."

Job Hazard Analysis (JHA) Assessment Form

JHA Title: Former Georgetown Steam Plant Flume Investigation	**JHA Number:** 5	**Date:** September 8, 2021	
Job Description: Soil collection	**Project Number:** CF1408		
General Personal Protective Equipment (PPE) Required: Nitrile gloves, bibs, steel-toe boots, sunscreen, class 2 safety vest	**JHA Team Names:** Shannon Ashurst, Kelsey Kirkland, Mauri Fabio	**Approved by:**	
Additional PPE Required: Insect repellent, cut resistant gloves, safety glasses			

Job Steps	Photographs	Hazard Type	Potential Hazards	Control Type	Existing Controls	SEV	OCC	EFF	HPN	Control Type	Recommended Controls	SEV	OCC	EFF	HPN
Drill rig positioning		Phys	Heavy equipment / drill rigs	Adm	Crush/pinch/abrasion protection—"Body out of line of fire"	2	3	0.50	3			2	3	0.50	3
		Env	Environmental—Adverse weather	Adm	Atmospheric monitoring (use weather app on phone to monitor for potential storms)										
		Phys	Sharp or rough surfaces (laceration/puncture) (phragmites, briar bush)	PPE	Hand—Gloves (cut/puncture resistant)					PPE	Field staff will wear safety glasses at all times.				
		Bio	Insect bites	PPE	Protective clothing and insect repellent										
		Bio	Plant infection (e.g., poison ivy)	PPE	PPE—Safety glasses; nitrile gloves and long sleeves										
		Env	Environmental—Uneven terrain	PPE	Foot—Safety shoes										
Soil core collection		Phys	Ergonomics—Heavy lifting (material handling)	Adm	Sprain/strain protection—Proper lifting techniques / body posture	2	2	0.25	1			1	3	0.25	0.75
		Phys	Slip/trip/fall—Same level	Adm	Foot—Safety shoes					Adm	Slip/trip/fall protection—"Eyes on path"				
		Phys	Pinch points or moving parts (finger in corer or grab sampler)	PPE	Hand—Gloves (cut/puncture resistant)					PPE	Field staff will wear safety glasses at all times.				
		Env	Environmental—Uneven terrain	PPE	Foot—Safety shoes					Adm	Housekeeping (describe)				
		Env	Environmental—Hazardous waste	PPE	Hand—Gloves (chemical resistant)										
		Env	Environmental—Nonhazardous waste	PPE	Hand—Gloves (chemical resistant)										
		Env	Environmental—Adverse weather	Adm	Atmospheric monitoring (use weather app on phone to monitor for potential storms)										
Sample processing		Phys	Ergonomics—Awkward postures (static or transient)	Adm	Job rotation (describe)	2	2	0.25	1			1	3	0.25	0.75
		Phys	Slip/trip/fall—Same level	Adm	Foot—Safety shoes					Adm	Slip/trip/fall protection—"Eyes on path"				
		Phys	Pinch points or moving parts (finger in corer or grab sampler)	PPE	Hand—Gloves (cut/puncture resistant)					PPE	Field staff will wear safety glasses at all times.				
		Env	Environmental—Uneven terrain	PPE	Foot—Safety shoes					Adm	Housekeeping (describe)				
		Env	Environmental—Hazardous waste	PPE	Hand—Gloves (chemical resistant)										
		Env	Environmental—Nonhazardous waste	PPE	Hand—Gloves (chemical resistant)										
		Env	Environmental—Adverse weather	Adm	Atmospheric monitoring (use weather app on phone to monitor for potential storms)										

Job Hazard Analysis Potential Hazard List

Physical	Chemical	Environmental	Biological
Compressed air equipment (use of / vicinity of)	Chemical eye contact	Environmental—Adverse weather	Animal attack/bite
Contact with energized electrical circuits	Chemical—Other (specify)	Environmental—Air emissions	Biological waste exposure
Cutting, sawing, shearing, or severing action (lacerations)	Exposure to airborne particulates	Environmental—Confined spaces	Biological—Other (specify)
Drilling, milling, or boring action	Exposure to ionizing radiation sources (alpha, beta, gamma, neutron, x-ray)	Environmental—Dust	Blood-borne pathogens
Electrostatic charges from improper bonding/grounding	Exposure to non-ionizing radiation sources (infrared, ultraviolet, lasers, microwaves)	Environmental—Hazardous waste	Fish spine puncture
Entrainment of clothes or objects in moving equipment/parts	Exposure to splashes or spills of cold material or cryogenic gases	Environmental—Heights	Insect bites
Ergonomics—Awkward postures (static or transient)	Hazardous chemical exposure to eyes	Environmental—Nonhazardous waste	Oyster bed cuts
Ergonomics—Excessive force required (striking/pulling/pushing)	Hazardous chemical exposure to skin	Environmental—Other (specify)	Plant infection (e.g., poison ivy)
Ergonomics—Heavy lifting (material handling)	Hazardous chemical skin absorption	Environmental—Rough water (overwater work)	Slips from algae
Ergonomics—Highly repetitive musculoskeletal actions	Ingestion of hazardous chemicals	Environmental—Sanitary, process, or storm water	Venomous reptiles
Exposure to molten metal	Inhalation of hazardous chemicals	Environmental—Spills/releases	
Extreme hot/cold work environment		Environmental—Uneven terrain	
Falls from a height >4 ft		Environmental—Work in remote areas	
Fire hazard / hot work			
Heavy equipment / drill rigs			
High noise levels			
Hot surfaces			
Ignition of flammable gases/vapors			
Impact with or strike by moving, flying, or falling object			
Impalement or penetration			
Low clearance—Head bump exposure			
Manual movement of heavy items (>40 lb)			
Object or machine that may crush or pinch a body or body part			
Overboard			
Physical—Other (specify)			
Pinch points or moving parts			
Pressurized systems			
Sharp or rough surfaces (laceration/puncture)			
Slip/trip/fall—Same level			
Stored energy/gravity			
Toxic or oxygen-deficient atmosphere			
Traffic			
Unexpected start-up			
Vibration—Hand or whole body			

Job Hazard Analysis Control List

Engineering	Administrative	Personal Protective Equipment (PPE)
Electrical safety—Lockout/tagout	Administrative control—Other (specify)	Electrical safety—Arc flash PPE / tools
Engineering control—Other (specify)	Alarms—Audible or visible	Fall protection—Arrest system (describe)
Ergonomics—Ergonomically designed tools	Allow cool time	Fall protection—Positioning (describe)
Ergonomics—Mechanical lifting devices	Atmospheric monitoring (describe)	Foot—Safety shoes
Flying projectile protection—Shields/barriers	Buddy system (describe)	Foot—Safety shoes (electrical rated)
Machine guarding (describe)	Contaminant protection—Personal hygiene practices	Foot—Safety shoes with metatarsal protection
Physical barrier (describe)	Crush/pinch/abrasion protection—"Body out of line of fire"	Hand—Gloves (chemical resistant)
Ventilation (describe)	Designated walking paths	Hand—Gloves (cotton)
	Documentation—Job safety analysis / risk assessment	Hand—Gloves (cut/puncture resistant)
	Documentation—Permit (describe)	Hand—Gloves (heat resistant up to 2,600ºF)
	Documentation—Standard operating procedures / work instructions	Hand—Gloves (heat resistant up to 600ºF)
	Ergonomics—Assisted lifts (>40 lb)	Hand—Gloves (leather)
	Housekeeping (describe)	Hand—Gloves (vibration resistant)
	Job rotation (describe)	Head/face—Aluminized hood (high heat)
	Overhead protection—Prohibit lifting loads overhead	Head/face—Aluminized hood (low heat)
	Pre-shift or use inspection	Head/face—Chemical goggles
	Safety training/briefing—Job/task/hazard–specific	Head/face—Face shield
	Slip/trip/fall protection—"Eyes on path"	Head/face—Hard hat
	Sprain/strain protection—Proper lifting techniques / body posture	Head/face—Safety glasses with side shields (ANSI Z71)
		Head/face—Tinted/filtered safety glasses
		Head/face—Welding helmet/goggles
		Hearing—Ear muffs
		Hearing—Ear plugs
		PPE—Other (specify)
		Respiratory—Full-face APR
		Respiratory—Half-face APR
		Respiratory—NIOSH N95 dust mask (voluntary)
		Torso—Chemical-resistant apron
		Torso—Chemical-resistant suit
		Torso—Fire-retardant clothing
		Torso—Leather welders apron
		Torso—Tyvek suit

Notes:
ANSI = American National Standards Institute
APR = air purifying respirator
NIOSH = National Institute for Occupational Safety and Health

Attachment 6

Safety Guidelines

SAFETY GUIDELINE SG-02

SLIPS, TRIPS, AND FALLS PREVENTION

Slips, trips, and falls constitute the second most common of general industry accidents, second only to motor vehicle accidents. Slips, trips, and falls can result in head injuries, back injuries, broken bones, cuts and lacerations, or sprained muscles. Nearly half of falls occur on stairs. At Integral, slips, trips, and falls and are responsible for the most significant accident costs at Integral to date. Greater than the economic loss is pain and suffering and potential disability on the part of the injured employee. For both office and field personnel, the following are necessary to eliminate slips, trips, and falls hazards:

- An understanding of how fall accidents happen
- Identifying the areas in which falls may occur
- Eliminating or minimizing hazards of falling.

Statistics show that the majority (60 percent) of falls happen on the same level resulting from slips and trips. The remaining 40 percent are falls from a height (discussed in safety guideline SG-24, "Fall Protection Awareness").

Slips can happen where there is too little friction or traction between the footwear and the walking surface. Common causes of slips are wet or oily surfaces, weather hazards (snow or ice), loose rugs or walk-off mats, spills, and changing walking surface characteristics.

Trips can happen when your foot strikes or hits an object, causing you to lose balance and eventually fall. Common causes of tripping are curbs in parking lots or uneven asphalt, obstructed views, poor lighting, and clutter or objects in the pathway one is accustomed to taking. Dirt clods, wiring or other projecting debris, open bottom drawers, and uneven walking surfaces also contribute slips, trips, and falls.

Falls occur when you are too far off balance for recovery.

The following are examples of sound slip and trip prevention guidelines. Note that every condition and location is different.

- Survey a new project site for all walking surface hazards posed during the scope of work.
- Wear footwear that is well fit and appropriate to the environs, season, and planned tasks. No footwear's anti-slip properties are appropriate for every condition.

- Ensure proper illumination for walking and performing tasks; auxiliary lighting should be carried or provided whenever task or project lighting is inadequate.
- Ensure that items being carried do not impair clear view of obstructions, spills, etc. Backpacks or other carrying arrangements are preferred as they leave hands free to better balance yourself.
- Pay attention to the walking surface and adjust your step size accordingly.
- Walk using small steps and do not run. Point your feet slightly outward, keeping your center of balance under you. Get your feet under your body quickly to maintain balance after the initial step.
- Use handrails or other stable objects where available.
- Exercise an abundance of caution when walking over snow or ice, uneven pavement, and frozen ground.
- If you do fall, protect your head, spine, and neck. If you fall backward, tuck your chin so that your head does not strike the ground with full force. Try to avoid using your arms to break your fall.
- Be cognizant of vehicular traffic and wear a reflective vest to be easily seen.
- Watch out for curbs, ramps, cracked asphalt, potholes, uneven sidewalks, and black ice.
- Slow down when moving between light and dark areas so your eyes will have sufficient time to adjust.
- If it is necessary to temporarily run cables, wires, or ropes across foot paths, ensure that the items are well marked and that field personnel are made aware of the routing.

SAFETY GUIDELINE SG-03

PERSONAL PROTECTIVE EQUIPMENT OVERVIEW

The proper use of personal protective equipment (PPE) is vital to protect personnel from contacting hazardous materials at a site. Safety guideline SG-03 provides an overview of Integral's program for the use of PPE. Additional details on respiratory protection, eye protection, and hearing protection are covered in safety guidelines SG-04, SG-05, and SG-06, respectively.

Integral has implemented the following guidelines to ensure the proper selection, use, and availability of PPE for site projects.

LEVELS OF PROTECTION

It is Integral's policy not to conduct fieldwork requiring Level A or B PPE. Fieldwork requiring Level A or B PPE will be subcontracted to qualified firms. Integral field personnel may use either of two levels of PPE as described below:

- **Level C** requires an air-purifying respirator (APR) and use of a cartridge that is specific to the types of materials or chemicals of concern (COCs). It should be noted that APRs cannot be used in an oxygen-deficient environment and cartridges may not be approved/available for some COCs present at a site. The degree of dermal protection depends on anticipated hazards and tasks; it may include disposable protective coveralls, gloves, and boot covers.
- **Level D** (and Modified D) is the basic work uniform, described below, as modified for work at the site.

SELECTION

Selection of appropriate PPE is included in the site safety planning process and documented in the site-specific HSP. The PPE choices are subject to approval by the corporate health and safety manager (CHSM). The selection of PPE will be based on the following criteria:

- Chemical hazards—No single type of coveralls, rubber boots, or gloves provides protection against all chemical hazards. During the preparation of the HSP, project personnel (generally the site safety officer [SSO], with guidance from the CHSM and project manager) must identify the site-specific COCs and select the proper PPE for the specific exposure hazard. Field personnel may refer to manufacturer's testing data, reference sources, and previous experience when selecting appropriate PPE.
- Physical hazards—No one personal protective garment (e.g., steel-toe boots, hard hat, knee pads) provides protection against all physical hazards. During the preparation of the HSP, field personnel (generally the SSO, with guidance from the CHSM and project manager) must identify the physical hazards at the site and physical hazards that may be encountered during the field activity, and select the proper PPE for the specific physical hazard.
- Concentration of contaminants—Diluted mixtures of contaminants pose less of a threat than pure product. Project personnel must evaluate the concentration of contaminants present at the site and select PPE accordingly. The SSO or CHSM can provide guidance on the concentrations of contaminants that are anticipated to be present at the site.
- Physical state of contaminants—Field personnel must evaluate the physical state of contaminants present at the site. Liquids may pose a hazard to field personnel because of the potential for spilling, splashing, and permeating PPE. If exposure to contaminants in liquid form is possible, impermeable PPE will be required. Gas and dust inhalation may also pose significant hazards to field personnel and may require that respirators be donned at the site.
- Level of activity—Some field tasks pose greater risk of exposure to chemical hazards than others. Sample collection (e.g., groundwater or sediment sampling) poses a significant risk for contact with the contaminated media, and field personnel collecting samples will require greater chemical protection in their PPE than those performing field oversight or site survey work. Field personnel must evaluate the level of activity required for the project and select appropriate PPE. Note: If the project requires that field personnel perform strenuous activities in hot climates, then the HSP must attempt to balance the need for durable and impermeable PPE against the increased risk of heat-related illness.

TRAINING

All Integral field personnel are trained in the use of PPE as a part of the 40-hour training and annual refresher program. This training includes:

- Procedures for inspecting PPE prior to use
- Selecting appropriate PPE

- Recognizing PPE failure and limitations (e.g., breakthrough, degradation, physical failure)
- Preventing heat stress, cold stress, and other physical hazards associated with the use of PPE.

PURCHASING

Disposable PPE is purchased on an as-needed basis, with the purchase price charged directly to the project that is using the PPE. Disposable PPE includes such items as respirator cartridges, earplugs, nitrile gloves, dust masks, and Tyvek suits. Integral's daily health and safety charge covers the costs of non-disposable PPE, such as rain gear, safety glasses, hardhats, air purifying respirators, steel shank boots, and steel-toe boots. These items require preauthorization by an Integral office manager and are to be charged directly to the health and safety overhead charge number (OH26).

SAFETY GUIDELINE SG-07

SITE CONTROL

Field activities at uncontrolled hazardous waste sites may result in the offsite transport of contaminants and contaminated equipment unless proper precautions are taken. Uncontrolled hazardous materials may also pose a threat to public health. To prevent human exposure to chemical and physical hazards and the migration of contamination to previously clean areas, strict site control procedures must be implemented at all potentially contaminated sites.

Provisions must be made for site control at all potential and known hazardous materials sites. These provisions are usually detailed during preparation of the site-specific health and safety plan (HSP), prior to initiating site activities. Key elements of a site control program are described in safety guideline SG-07.

SITE MAPS

A site map with northerly direction indicated should be prepared for every field project and included in the site-specific HSP. The map should include a scale, and identify key site features and hazards, access, site control zones, command post or support facilities, contours or other indications of topography, any surface waters on or adjacent to the site, and adjacent land uses. If appropriate, key climate variables should be indicated (e.g., predominant wind directions).

SITE WORK ZONES

Site work zones must be established for all sites that may contain hazardous materials. Designated site work zones help prevent unauthorized access into contaminated areas and prevent the transport of contaminated materials into clean areas. Work zone boundaries should be clearly indicated using highly visible means such as flagging, fencing, or other barriers. Site work zones are as follows:

- Exclusion zones—Contaminated or potentially contaminated areas where protective equipment and/or air monitoring, training, and medical surveillance are required. Activities performed inside the exclusion zone include sampling, drum or other material handling, waste inventory, and remediation activities. No unauthorized personnel are allowed inside the exclusion zone. The boundary of the exclusion zone is known as the "hot line."

- Contamination reduction zone (CRZ)—The transition between contaminated and clean areas. Decontamination facilities are located within this zone, although every effort should be made to limit or prevent the spread of contamination from the exclusion zone to the contamination reduction zone. This can be accomplished by allowing only field personnel who have removed contamination at or near the hot line to proceed into the CRZ. Where possible, decontamination facilities should include an appropriate degree of containment, such as a concrete decontamination pad with curbing for truck washing, or a washtub for boot washing. In addition to decontamination facilities, some support facilities may be located within the CRZ. Such facilities may include the following:
  - Sample packaging stations.
  - Emergency response equipment.
  - Protective equipment (e.g., replacement air bottles and gloves).
  - An equipment drop (i.e., an area designated for placing contaminated sampling or other equipment where field personnel can pick up the equipment again when they return from breaks).
  - Field personnel rest areas, including toilet facilities, benches or chairs, coolers with beverages for liquids replenishment, shade for hot weather, and heat for cold weather.
  - Storage of decontamination and other wastes generated during field activities, pending offsite disposal. Only properly trained and protected personnel may enter the CRZ.
- Support zone—An uncontaminated area used for staging equipment or otherwise supporting field operations. Protective equipment is not required in this area, but access is normally limited to authorized personnel.

BUDDY SYSTEM

Any field person in the exclusion zone should be accompanied by a buddy who can perform the following actions:

- Provide his or her partner with assistance and rescue, if necessary
- Observe his or her partner for symptoms of chemical or heat exposure
- Monitor the integrity of his or her partner’s personal protective equipment (i.e., watch for tears or other damage)
- Notify support personnel if help is needed.

The buddy system is enforced at the site entry point. Field personnel must stay within sight of their buddy. In some situations, two field persons can be out of direct sight, as long as they are in the general vicinity of one another and maintain voice or radio contact.

SITE COMMUNICATIONS

Communication is an essential element in site control. Specific signals should be developed and practiced prior to fieldwork. Internal site communications, which may include hand signals, air horns, or radios, are used to perform the following:

- Alert other field personnel in emergency situations
- Relay safety information, such as time remaining until rest periods
- Communicate any changes in the scheduled field task
- Exchange information with personnel in the support zone without having to complete decontamination.

External site communications usually involve a cellular phone, a facility phone or permanently installed telephone, or radios, which can be used to perform the following:

- Request emergency services
- Contact the project manager or corporate health and safety manager during an emergency or change in site conditions.

IDENTIFICATION OF NEARBY MEDICAL ASSISTANCE

Every site-specific HSP must provide names and telephone numbers for the following emergency services:

- Police
- Fire department
- Ambulance
- Hospital.

Site safety plans for all field investigation activities must also provide the address and driving directions to the nearest hospital emergency room (not necessary for site visits or walk-through inspections). It is generally not necessary to notify local emergency personnel prior to conducting field operations. However, the site safety officer (SSO) must notify emergency medical services prior to conducting any acutely hazardous tasks such as working in environments immediately dangerous to life and health or opening unknown containers. The SSO must confirm that the hospital listed in the HSP is still in operation and that it has an emergency room. It is required that the SSO drive to the hospital so that the directions are practiced and understood prior to initiating fieldwork.

SAFETY GUIDELINE SG-08

DECONTAMINATION

Appropriate decontamination is essential to preventing field personnel exposure to and offsite transport of hazardous materials at hazardous sites. These guidelines provides an overview of decontamination procedures. Actual decontamination procedures are established on a site-specific basis.

The following sections outline the requirements for decontamination.

HAZARDOUS SUBSTANCE CONTAMINATION

Personnel working at hazardous waste sites may become contaminated in a number of ways, including the following:

- Contacting vapors, gases, mists, or particulates in the air
- Splashing from materials while sampling or opening containers
- Walking through spilled liquids or contaminated soils
- Kneeling or leaning against contaminated surfaces during sample collection
- Using contaminated instruments or equipment.

Protective equipment and respirators help prevent field personnel from contacting or inhaling contaminants, while good work practices help reduce contamination of protective equipment, instruments, and equipment.

Even with these safeguards, contamination may occur. Harmful materials can be transferred into clean areas, exposing unprotected personnel. When removing contaminated equipment, field personnel may contact or inhale contaminants from the clothing. To prevent such occurrences, methods to reduce contamination and decontamination procedures must be developed and implemented before anyone enters a site and must continue (modified when necessary) throughout site operations.

Decontamination consists of physically removing contaminants or rendering them chemically innocuous. The more potentially harmful the contaminant or the extent of contamination, the more extensive and thorough decontamination must be.

To minimize cross-contamination from one area to another, from equipment to personnel, and from protective equipment to wearer, field personnel must observe site work zones, use correct methods for taking off personal protective equipment (PPE), protect instruments with disposable wraps, and follow all decontamination procedures listed in the site-specific health and safety plan (HSP).

DECONTAMINATION PLANNING

The initial decontamination plan is based on the assumption that all personnel and equipment leaving the exclusion zone (area of potential contamination) are grossly contaminated. A system is, therefore, set up to wash and rinse (at least once) all PPE worn. This process is performed in combination with a sequential removal of equipment, starting at the first station with the most heavily contaminated articles and progressing to the last station with the least contaminated articles. Each piece of equipment and operation requires a separate station.

The spread of contaminants during the washing and removal process is further reduced by separating decontamination stations by a minimum of 3 ft. Ideally, contamination decreases as a person moves from one station to the next along the line.

Less elaborate decontamination procedures may be required if the site poses minimal chemical hazards (i.e., the site is covered with snow) or if preventative measures are taken, including the following:

- Not opening containers by hand
- Bagging monitoring instruments
- Using drum grapplers to move drums
- Watering down dusty areas
- Placing drop cloths if kneeling on contaminated surfaces is required
- Not walking through areas of obvious contamination.

The initial decontamination plan is based on a worst-case scenario (if no information is available about the situation). Specific conditions are then evaluated, including the following:

- Type of contaminants
- Concentrations of contaminants
- Physical characteristics of contaminants
- Weather conditions (dusty, cold, snow-covered)
- Levels of protection required
- Type of PPE to be worn.

The initial plan may be modified to reflect specific conditions, as described in "Modifications to Decontamination Plans," below.

CONTAMINATION REDUCTION ZONE

The contamination reduction zone (CRZ) is the area between the exclusion zone (area of greatest contamination) and the support zone (clean area). An area within the CRZ is designated the contamination reduction corridor (CRC). The CRC controls access into and out of the exclusion zone and confines personal decontamination activities to a limited area. The size of the corridor depends on the number of stations used in the decontamination procedure, the overall dimensions of work control zones, and the amount of space available at the site. A corridor of 75 x 15 ft should be adequate for full decontamination. Whenever possible, it should be a straight path.

The CRC boundaries are conspicuously marked, with entry and exit restricted. The far end is the hot line (i.e., the boundary between the exclusion zone and the CRZ). Personnel exiting the exclusion zone must go through the CRC. Anyone in the CRC should be wearing the level of protection designated for decontamination station personnel (generally one level lower than those in the exclusion zone.) Another corridor may be required for the entrance and exit of heavy equipment requiring decontamination. Within the CRC, distinct areas are set aside and marked for decontamination of personnel, portable field equipment, removed clothing, and other similar items. All activities within the corridor are confined to decontamination.

PPE, respirators, monitoring equipment, and sampling supplies are all maintained outside the CRC. Personnel put on their clean PPE away from the CRC and enter the exclusion zone through a separate access point at the hot line.

MODIFICATIONS TO DECONTAMINATION PLANS

Decontamination plans must often be adapted to specific site conditions based on the assessment of a competent person. These conditions may require more or less personal decontamination than planned, depending on a number of factors, including the following:

- Type of contaminants—The extent of personal decontamination depends on the effects the contaminants may have on the body. The more toxic a substance, the more extensive or thorough decontamination must be. Whenever it is known or suspected that personnel can become contaminated with highly toxic, dermally absorbed, or dermally active substances, a full decontamination procedure is followed (note that in cases of highly toxic, dermally active substances, Saranex® [or equivalent] coveralls must be donned). If less hazardous materials are involved, the procedure can be downgraded.
- Extent of contamination—The amount of contamination on protective equipment can often be determined visually. If protective equipment is badly contaminated, a thorough decontamination is generally required. Gross material remaining on the protective equipment for an extended period of time may degrade or permeate it. The likelihood of this occurring increases with elevated airborne concentrations and greater

quantities of liquid contamination. Gross contamination also increases the probability of personal contact.

- Level of protection—The level of protection and specific pieces of equipment worn determine a preliminary layout of the decontamination line. Each level of protection presents different problems in decontamination and removal of the equipment. For example, the use of disposable boot covers adds to the cost of PPE used on a project, but could eliminate the need for a boot washing station. Equipment variations and different levels of protection may require adding or deleting stations in the original decontamination line.
- Work function—The nature of the work each person performs determines the potential for contact with hazardous materials. The potential for contact dictates the layout of the decontamination line. For example, observers, photographers, air samplers, operators, or others in the exclusion zone performing tasks that do not bring them in contact with contaminants may not require extensive decontamination. Instead, they may be able to simply remove and discard relatively clean disposable garments. Other field personnel in the exclusion zone who have the potential for direct contact with hazardous materials require more thorough decontamination. Different decontamination lines could be set up for different job functions or certain stations in a line could be omitted for personnel performing certain tasks.
- Location of contamination—Contamination on the upper areas of protective equipment poses a greater risk to field personnel because volatile compounds or particulate matter may generate a breathing hazard for field personnel and for decontamination personnel. There is also an increased probability for contact with skin when taking off respirators and upper-body equipment.
- Reason for leaving the site—The field person's reason for leaving the exclusion zone also determines the need for and extent of decontamination. A field person leaving the exclusion zone to pick up or drop off tools or instruments in the CRZ and immediately returning may not require decontamination. A field person leaving to get a new air cylinder or change a respirator cartridge or canister will require at least some decontamination. Field personnel departing the CRC for a break, lunch, or at the end of the day must be thoroughly decontaminated. Emergencies in which field personnel are injured should be decontaminated in accordance with the extent of contamination and the severity of the injuries. Scissors should be kept in the CRZ to cut off PPE, if necessary.
- Weather—Winter conditions may also affect the decontamination procedure. Subfreezing temperatures or the presence of snow on the ground may reduce the potential for contact with contaminants (depending on the type of work or contaminants present). For example, site reconnaissance surveys at a snow-covered site where lead is of concern will require little decontamination as there is little potential for exposure.

However, personnel involved in groundwater sampling at a creosote site during subfreezing temperatures will still require decontamination. Extremes in weather will also affect the physical establishment of the CRC, as it may become necessary to provide hot water (to prevent decontamination solutions from freezing) and a heated shelter in cold weather or shade in hot weather.

- Project duration—Although of lesser importance than the work function and type of contaminants, the duration of the project is also a factor when determining decontamination procedures. Extended field operations involving contact with contaminants will require more extensive and perhaps more permanent decontamination facilities, including storage tanks, running water, electricity, shower facilities, and decontamination pads for cleaning heavy equipment. Operations within the scope of Code of Federal Regulations (CFR) 29 CFR Part 1910.120 lasting 6 months or longer must have onsite showers available. Field surveys lasting 1 or 2 days and involving little or no exposure to hazardous materials may only require trash bags for placement of used protective coveralls, gloves, and boot covers.

INSTRUCTIONS TO FIELD PERSONNEL

Once decontamination procedures have been established, all personnel requiring decontamination must be given precise instructions and practice, if necessary. Compliance with decontamination must be frequently checked. Also, the time required for decontamination must be determined. Decontamination times may also be a factor in hot weather when personnel are limited in the amount of time they can work between rest periods.

EFFECTIVENESS OF DECONTAMINATION

There is no good method for immediately determining the effectiveness of decontamination procedures in removing contaminants. Discoloration, stains, corrosive effects, and substances adhering to objects may indicate that contaminants have not been removed. However, observable effects indicate only surface contamination, not possible permeation of contaminants into clothing or equipment. In addition, many contaminants are not easily observed. For this reason, most field projects rely on disposable protective gear.

One method to determine the effectiveness of decontamination procedures is to collect a rinsate sample. This process involves pouring distilled or deionized water over the decontaminated sampling tool (or other object) and collecting the rinsate in a clean bowl for placement in a suitable sample jar. The rinsate sample is then submitted to a qualified laboratory for analysis. The presence of contaminants in the rinsate sample indicates the presence of contaminants on the object. Depending on the contaminants present, it may be necessary to leave equipment onsite pending the results of the rinsate sample analysis.

PPE FOR DECONTAMINATION PERSONNEL

The level of protection worn by decontamination personnel generally should be no greater than one level below the PPE worn by the entrants. The level of protection is also determined by the following conditions:

- Expected or visible contamination on field personnel or equipment
- Type of contamination on field personnel or equipment
- Total vapor and gas concentrations in the CRC
- Particulate concentrations in the CRC
- Specific inorganic and organic vapors in the CRC
- Results of wipe tests
- The presence or suspected presence of highly toxic or skin-destructive materials.

The following is a description of appropriate levels of protection for field personnel in the CRC:

- Modified Level D (chemical-resistant coveralls and boots, gloves, hardhat, and safety glasses or splash shield)—Appropriate for fully characterized sites where contaminants pose a contact hazard, but no respiratory hazard.
- Level C (chemical-resistant coveralls and boots, gloves, hard hat, safety glasses or splash shield, and air-purifying respirator [APR])—Appropriate for fully characterized sites where contaminants pose a potential but limited respiratory hazard (within the limitations for use of an APR).
- Level B[1] (chemical-resistant coveralls and boots, gloves, hard hat, safety glasses or splash shield, and supplied air)—Appropriate where field personnel may be contaminated with unknown chemicals, highly volatile liquids, or highly toxic materials. It is recommended that field personnel wear chemical-resistant aprons to protect self-contained breathing apparatus harnesses and straps from contamination.

DECONTAMINATION SUPPLIES

Selection of decontamination equipment, materials, and supplies is generally based on availability, ease of decontamination, and disposability. Most decontamination supplies can be easily procured. For example, soft-bristle scrub brushes or long-handled brushes are used to remove contaminants; water is stored in washtubs or garden sprayers for rinsing; and large plastic or galvanized washtubs, stock tanks, or even wading pools can be used to hold wash and rinse solutions. Large plastic garbage cans lined with plastic bags can be used to

[1] Note Level B protection is not an authorized protection level according to Integral Policies and Procedures. This level of protection would require special approval from the corporate health and safety manager.

consolidate contaminated equipment, and paper towels can be used for wiping and drying instruments or other items. Contaminated liquids (i.e., waste decontamination wash waters) can be stored temporarily in metal or plastic cans or drums. Decontamination equipment may be obtained from safety and supply companies, restaurant or laboratory supply houses (e.g., brushes and tubs), auto parts stores (e.g., buckets and wheel-cleaning brushes), and farm supply or hardware stores (e.g., buckets, brushes, and washtubs).

DECONTAMINATION SOLUTIONS

Chemical decontamination solutions may be required for decontaminating equipment, particularly at sites with water-reactive contaminants and sites with heavy oil or other contaminants requiring solvents or stronger cleaning agents. In such cases it is essential to identify the contaminant(s), and then select the safest solution that effectively removes or neutralizes the contaminant without posing a greater threat to field personnel.

When using chemicals for decontamination, it is essential that field personnel use appropriate respiratory protection and chemical-resistant equipment, contain solvent rinsate for proper disposal, and avoid the use of either carcinogenic or other acutely hazardous chemical agents such as benzene or methylene chloride.

DECONTAMINATION OF EQUIPMENT

Wherever possible, measures should be taken to prevent contamination of sampling and monitoring equipment. Sampling devices become contaminated in routine use, but monitoring instruments should be protected from contaminants. Once contaminated, instruments are difficult to clean without causing damage. Any electronic or otherwise delicate instrument should be protected from contaminants during use. This may be accomplished by placing the instrument in a large, clear plastic bag and securing the bag with tape. Openings must be made for the sample intake and exhaust.

General procedures for decontaminating equipment are provided below (and site-specific procedures should be provided in the HSP):

- Steel or aluminum sampling tools (including augers, spoons, and bowls)—Should be cleaned with detergents to remove contaminants and rinsed with potable water, then distilled water. Quality assurance and quality control protocols may require additional rinses with solvents. Caution should be exercised in the selection and use of solvents for decontamination.
- Sampling tools with wooden handles (including shovels, hammers, and picks)—Difficult to decontaminate because the wood may absorb contaminants. Such tools should be kept onsite and handled only by protected field personnel. At the end of the field project, wooden tools should be discarded.

- Respirators—Must be cleaned and sanitized after each use. Some respirator components, including fabric and leather harness components, are difficult to clean. The use of equipment constructed with such materials should be avoided. Rubber or silicone components can be soaked in soap and water while scrubbing with a soft brush. After scrubbing, the respirator should be rinsed and then sanitized with a disinfectant. Respirators may also be cleaned using a combination cleaner/disinfectant recommended by the manufacturer. Persons decontaminating respiratory protective equipment must be familiar with the inspection, use, and maintenance of such equipment (see safety guideline SG-04, "Respiratory Protection"*)*.
- Heavy equipment (including bulldozers, trucks, backhoes, and forklifts)—Difficult to decontaminate because of their size. Large equipment is generally cleaned by parking the equipment in a contained area (i.e., concrete or steel decontamination pad or tray) and then pressure washing or steam cleaning the equipment. Depending on the contaminants, additional solvent rinses or scrubbing may be necessary to clean surfaces that may have come in contact with contaminants. All wash water should be contained for appropriate disposal. Because of the effort expended and the volume of wash water generated in cleaning heavy equipment, it is recommended that heavy equipment not be moved into and out of the exclusion zone more than is absolutely necessary.
- Persistent contamination—In some instances, clothing and equipment may be contaminated with substances that cannot be removed by normal decontamination procedures. A solvent may be required to remove such contamination from equipment if it does not destroy or degrade the protective material (e.g., hexane may damage an interface probe and cable; check with the operation manual). If persistent contamination is expected, disposable garments should be used. Reusable items and equipment may be tested to evaluate the adequacy of decontamination.
- Disposal of contaminated materials—All materials and equipment used for decontamination must be disposed of properly. Clothing, tools, buckets, brushes, and all other contaminated equipment must be secured in drums or other containers and labeled (see safety guideline SG-10, "Hazardous Waste Management"*)*. PPE not completely decontaminated onsite should be secured in plastic bags before being removed from the site. Contaminated wash and rinse solutions should be contained in appropriate containers (i.e., washtubs or wading pools) during use. Unless other arrangements have been made, all waste decontamination solutions must be transferred into drums that are labeled and disposed of with other residual chemical wastes or contaminated substances.

DECONTAMINATION OF PERSONNEL DURING MEDICAL EMERGENCIES

Part of overall planning for hazardous materials work is managing medical emergencies. The site health and safety planning process should provide the following:

- Field team members fully trained in first aid and cardiopulmonary resuscitation
- Identification of the nearest emergency medical services and ambulance to the site
- Notification of arrangements with the nearest hospital and ambulance for transport and treatment of injured persons or persons suffering chemical exposure or heat stress (notification is required for extended projects and those projects involving acute hazards such as confined space entry and conditions immediately dangerous to life and health)
- Emergency eyewash and showers or wash stations when working with liquid chemical products or wastes
- First-aid kit and emergency blanket.

In addition, the plan should establish methods for decontaminating persons with medical conditions and injuries. Decontamination measures may aggravate the injury or cause more serious health effects. If prompt life-saving first aid or medical treatment is required, decontamination procedures should be omitted, unless highly toxic agents are present. A knowledgeable person should accompany contaminated victims to the medical facility to advise on decontamination. Decontamination will be a more significant issue at sites with acutely hazardous chemicals or radiation. However, decontamination may not be necessary at sites with minimal chemical contamination.

Physical Injury

Depending on the seriousness of the injury, treatment may be given at the site by trained personnel. Additional assistance may be required at the site or at a medical facility for more serious injuries. For minor medical problems or injuries, the normal decontamination procedure should be followed.

Life-saving care, if needed, is generally instituted immediately without considering decontamination. However, the presence of highly toxic agents would require decontamination prior to providing even urgent care. These situations should be clearly identified in the site-specific HSP. The outside garments can be removed if this does not cause delay, interfere with treatment, or aggravate the problem. Respiratory masks and backpack assemblies must always be removed (by cutting, if necessary). If the outer contaminated garments cannot be safely removed, the individual should be wrapped in polyethylene sheeting or blankets to help prevent contaminating aid cars and medical personnel. Outside garments are then removed at the medical facility. No attempt should be made to wash or rinse the victim unless it is known that he or she has been contaminated with an extremely toxic or corrosive substance that could cause severe injury or loss of life.

Heat Stress

Heat stress illnesses range from fatigue to heat stroke. Heat stroke requires prompt treatment to prevent irreversible damage or death. Protective equipment may have to be removed or cut away. Less serious forms of heat stress require prompt attention or they may lead to heat stroke. Unless the victim is obviously contaminated, decontamination should be minimized and treatment begun immediately.

In the event of heat stress, it is imperative to cool the victim as quickly as possible. This usually involves immediate removal of protective equipment and sometimes undershirts.

Cold Stress/Hypothermia

Hypothermia is the gradual lowering of the body temperature, which may result in loss of coordination, confusion, sleep, and death. Unlike frostbite, hypothermia may occur at temperatures above freezing. Do not remove dry PPE or clothing for emergency decontamination procedures in cold temperatures.

Chemical Exposure

There are two categories of chemical exposure:

- Injury from direct contact, such as acid burns or inhalation of toxic chemicals
- Injury from indirect contact, such as gross contamination of clothing or equipment.

For an inhaled contaminant, treatment can be determined only by qualified physicians. However, the victim should be removed to fresh air as quickly as possible. If the contaminant is on the skin or in the eyes, immediate measures must be taken to counteract the effect of the substance. First-aid treatment usually includes flooding the affected area with water. However, for some chemicals, water may cause more severe injuries. Specified first-aid treatment should be noted in the site-specific HSP.

When protective equipment is grossly contaminated, contaminants may be transferred to treatment personnel or the wearer, causing injuries. Unless severe medical problems have occurred simultaneously with splashes, the protective equipment should be washed off as rapidly as possible and carefully removed.

SAFETY GUIDELINE SG-10

HAZARDOUS WASTE MANAGEMENT

Chemicals that are not completely consumed on projects should be considered project wastes and the property of the client. **Integral does not sign waste manifests for project-generated waste materials.** The waste manifests are only signed by the client or the client's attorney.

Field activities often generate the following hazardous waste materials:

- Contaminated personal protective equipment (PPE)
- Extra samples
- Drill cuttings
- Well development and purge water
- Decontamination wash water
- Decontamination solvents.

Hazardous wastes generated during sampling or other field activities must be handled, stored, labeled, and disposed of in accordance with federal, state, local, and contractual requirements, including Code of Federal Regulations (CFR) 49 CFR Part 173 and 40 CFR Part 264.

Safety guideline SG-21 ("Restricted Article Shipment Awareness") provides guidance on determining if a material is a hazardous waste (i.e., restricted article). Residual waste refers to the chemicals that were purchased for a project but not utilized.

At a minimum, the following guidelines are required for hazardous waste management:

- Waste minimization (see of the *Corporate Health and Safety Program Plan* main text, Section 2.4 ,"Chemical Storage and Disposal")
- Transfer of residuals and hazardous wastes into U.S. Department of Transportation-approved containers or drums labeled by chemical family or waste type
- Analysis of residuals and waste for characterization
- Identification of waste by sample number, date of collection, location of site and sample, waste description, volume or quantity of waste, generation dates, waste generation process, and the name and phone number of the party responsible for the waste

- An inventory of all hazardous (or potentially hazardous) waste materials generated at the site, including the container location, size, contents, date generated, identification number, relevant analytical information, and final disposition
- Disposal of all disposable and contaminated PPE as hazardous waste, when appropriate
- Disposal of decontamination solutions as hazardous waste, as determined by analysis
- Sealing and securing of waste drums at the end of each day
- Staging and storing of wastes for a maximum of 90 days in an approved temporary storage area before disposition to an approved Resource Conservation and Recovery Act (RCRA) disposal facility or recycler (as appropriate, based on analysis or characterization)
- Manifesting of the wastes on a U.S. Environmental Protection Agency uniform manifest form
- Transporting of wastes to a RCRA-approved hazardous waste treatment or disposal facility.

SAFETY GUIDELINE SG-13

SAFE WORK PRACTICES

Safe work practices can help reduce exposure of field personnel to hazardous materials in the work place. The following safe work practices must be observed by Integral field personnel for all field activities:

- All personnel will behave in a professional manner at all times.
- No personnel will be allowed to participate in field activities at potential hazardous materials sites without proper training, equipment, and identification (see safety guideline SG-07, "Site Control").
- All personnel will follow procedures established in safety guideline SG-13 and the site-specific health and safety plan. Personnel will also comply with facility or contractual procedures, where appropriate. Any field person who fails to comply with established procedures will be dismissed from the site.
- Working under the influence of drugs or alcohol is strictly prohibited. Field personnel should consult with their physician regarding use of any prescription medications while engaged in field activities at hazardous materials sites.
- Possession or use of firearms, ammunition, fireworks, or explosives is prohibited.
- Climbing, riding, or standing on heavy equipment or machinery is prohibited, unless seats, platforms, or ladders are provided for that purpose.
- The buddy system will be used during all field activities or work in remote areas (see SG-07). In some situations, this requirement may be satisfied by using site personnel, radios or cellular phones to provide emergency communications.
- No person will eat, drink, or chew gum or tobacco in potentially contaminated areas. Drink containers and drinking of replacement fluids for heat stress control will be allowed only in areas that are free from contamination (i.e., designated areas within the contamination reduction zone, support areas, or offsite).
- Smoking is prohibited in all areas of the site.
- The number of personnel and the amount of equipment in contaminated areas should be minimized.

- Contact with contaminated or potentially contaminated materials should be avoided. Support activities (including sample processing and decontamination) should be placed upwind of contamination sources. Field personnel should avoid walking through puddles, across stained soils, or through other potentially contaminated areas.
- Personnel should not climb on drums or other containers, unless the container is designed for that purpose (e.g., Baker tanks with handrails).
- Proper decontamination procedures must be followed before leaving the site (possible exceptions include medical or other emergency situations).
- Field instruments, notebooks, and other equipment must be decontaminated prior to being removed from potentially contaminated areas. Where possible, these items should be wrapped in plastic or otherwise protected from contamination.
- Long hair will be secured away from the face so it does not interfere with respirator fit or become entangled in machinery.
- All personnel leaving potentially contaminated areas will shower (including washing hair) and change into clean clothing as soon as possible after leaving the site.
- It is incumbent on the employer (Integral safety management) to maintain a list of all hazardous chemicals on a job site. This includes maintaining safety data sheets on all hazardous chemicals in office settings as well as those on field projects. A list of hazardous chemicals is also maintained in all health and safety plans drafted for field work. Labels and other forms of warning documentation will be kept in good order on the chemical containers at all times and will not be removed nor will be defaced. The employer and Integral staff shall not remove or deface incoming containers of hazardous chemicals.

SAFETY GUIDELINE SG-25

HEAT STRESS

Heat stress is a general term that includes heat cramps, heat exhaustion, and heat stroke. Heat exhaustion and heat stroke can pose a serious threat to the health of field personnel conducting hazardous material investigations at industrial and other facilities. This threat is increased for field personnel wearing personal protective equipment (PPE), as the impermeable clothing does not allow sweat to evaporate and cool the body. Other important factors include degrees of acclimation to work, general physical fitness, water intake, and work/rest regimens.

Depending on ambient conditions, work in the sun (radiant heat load), the work being performed, and other factors, heat stress may affect field personnel at temperatures as low as 70°F (adjusted for humidity and radiant heat) and can occur rapidly, with field personnel suffering acute symptoms in less than 15 minutes. Even relatively minor symptoms of heat stress can result in impaired functional ability, threatening the safety of the field person and his or her companions. Thus, heat stress can present a greater health risk to field personnel than chemical hazards or recognized physical hazards.

The sections below provide information and guidelines for monitoring and preventing heat stress.

HEAT-RELATED ILLNESSES

A common factor in heat-related illnesses is the failure of the field personnel to recognize the symptoms of heat stress. All personnel should become familiar with the symptoms of heat stress and appropriate first-aid precautionary measures.

Table 1 provides information on the types of heat-related disorders and procedures for treating them. Heat stress can result in minor symptoms such as heat rash, heat cramps, discomfort, and drowsiness. Prolonged heat stress can result in more severe effects, such as heat exhaustion and heat stroke. Heat rash is a relatively minor form of early heat stress that results from prolonged contact with wet clothing. Heat rash can be prevented by allowing the skin to dry completely during rest periods and by showering as soon as possible at the end of the work day. Heat cramps and drowsiness symptoms may result in impaired functional ability, which in turn may threaten the safety of the individual and coworkers.

Heat cramps, heat syncope (fainting spell), heat exhaustion, and heat stroke all result from excessive loss of body fluids and electrolytes and impaired ability to cool the body through sweating. The symptom of heat cramps is spasms in the abdomen or limbs. Heat syncope is a pooling of blood in the lower extremities, which may result in fainting when standing up suddenly. Heat exhaustion, caused by more severe dehydration, has the following symptoms: pale, clammy skin; profuse sweating; weakness; headache; and nausea. Heat stroke (sometimes called "sunstroke") is a life-threatening condition that occurs when the body's temperature-regulating system no longer functions properly. Heat stroke requires immediate lowering of body temperature and medical attention. Symptoms of heat stroke include hot, dry skin; a high fever (often 106°F or more); dizziness; nausea; rapid pulse; and unconsciousness. Brain damage and death may follow if the body temperature is not reduced.

Table 1. Heat-Related Disorders and Treatments

Disorder	Cause	Signs	Treatment
Heat rash	Heavy sweating; drinking large volumes of water without replacing salt loss	Profuse tiny raised vesicles; prickly skin	Remove from source of heat; allow skin to dry completely during rest periods; shower as soon as possible after work day
Heat syncope	Lack of acclimatization; pooling of blood in the legs	Fainting while standing, immobile in heat	Remove to cooler area
Heat cramps	Heavy sweating; drinking large volumes of water without replacing salt loss	Painful spasms of muscles used during work; cool, moist skin	Provide fluids that replace salts and protein; allow 1–3 days of rest, depending on the severity of the attack
Heat exhaustion	Sustained exertion in heat; lack of acclimatization; failure to replace water and/or salt	Fatigue; nausea; headache; moist and clammy skin; pale complexion; delirium; diarrhea; cramps	Remove to cooler area; provide cool water and salted fruit or protein drinks
Heat stroke	Sustained exertion in heat; excessive exposure to heat; lack of physical fitness; alcoholism; drug abuse; dehydration; cardiovascular disease	Headache; rapid pulse; dizziness; nausea; confusion; convulsions; flushed, dry skin; high body temperature; loss of consciousness; coma	Call emergency medical services (often 911) immediately; place the worker in a cool, shady area; remove his or her clothing, then sprinkle his or her entire body with cool water; also cool by fanning; treat for shock

Field personnel must learn to recognize that dizziness, nausea, headaches, skin rashes, muscle cramps, and pale or clammy skin are symptoms of heat stress and act promptly when suffering these symptoms. Field personnel may not realize the risk they face by ignoring these symptoms and staying in the work area until overcome by heat stress or other impairments related to heat. Critical factors in the prevention of heat stress include a proper work regimen and the intake of adequate replacement fluids and electrolytes.

FACTORS INFLUENCING HEAT STRESS

Many factors determine an individual's susceptibility to heat stress. Environmental factors include the ambient temperature, humidity, and presence or absence of cooling breezes or shade. The nature of the work being performed—including the level of physical activity, the degree of permeability of protective equipment, the number of layers of protective equipment, and the time of day that the work is being performed—affects the level of heat stress.

Some individuals are predisposed towards suffering heat stress. Factors that could increase a field person's susceptibility to heat stress include previous heat-related conditions, degree of physical fitness, lack of acclimatization, age, dehydration, obesity, alcohol or drug use, infection, sunburn, diarrhea, and chronic disease.

Field personnel who have acclimated to working in hot climates or in PPE will be less likely to suffer heat stress. Acclimated individuals typically have lower heart rates and body temperatures than non-acclimated field personnel. Acclimated field personnel also sweat sooner and more profusely than those not acclimated to high temperatures or the use of PPE (acclimated individuals may sweat more profusely when wearing PPE than non-acclimated field personnel, thus increasing their risk of dehydration).

The National Institute for Occupational Safety and Health (NIOSH) recommends a progressive 6-day regimen to allow field personnel to acclimate to work in a hot environment, especially when wearing PPE (this program begins with 50 percent exposure, then lengthens the staying time by 10 percent each subsequent day). An individual's capacity to work in hot environments generally decreases with age. According to NIOSH, however, an older person in peak physical condition may have a greater work capacity than a less fit, younger individual. Thus, physical fitness is a more significant factor than age when determining an individual's work capacity. Weight is usually a significant factor when determining the ability of an individual to work in a heated environment, because overweight people have lower surface area to mass ratio and thus cannot dissipate heat as well as slimmer people. Weight is not as significant a factor when wearing PPE, as the impermeable garments impede the dissipation of body heat through evaporation of sweat regardless of the individual's weight.

MONITORING FOR HEAT STRESS

To ensure the safety of field personnel wearing impermeable or semipermeable encapsulating PPE, NIOSH recommends that heat stress monitoring be implemented at temperatures about 70°F, using an "adjusted temperature." The adjusted temperature is calculated by determining the ambient temperature (using a standard thermometer, shielded from heat) and adding the total of 13 × the percentage of sunshine (complete overcast = 0 percent sunshine, and no cloud cover = 100 percent sunshine). For example, for an ambient temperature of 80°F and 80 percent sunshine, the adjusted temperature would be 90.4°F (80+(13×0.80) = 90.4). The effect of heat stress on the body may be monitored using the techniques described below. Recommended intervals for physiological monitoring when wearing permeable or impermeable work clothes are shown in Table 2.

HEART RATE

To monitor the effect of heat stress using the heart rate method, field personnel must measure their heart rate over a 30-second period at the beginning of each rest break. The pulse should be taken at the radial (wrist) artery, not the carotid (neck) artery. When monitoring heart rate, the following guidelines apply:

- If the individual's heart rate does not exceed 110 beats/minute, proceed as before
- If the individual's heart rate exceeds 110 beats/minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same
- If the individual's heart rate exceeds 110 beats/minute at the beginning of the next rest period, shorten the next work cycle by another one-third
- Integral recommends the use of heart rate monitoring as the minimum heat stress monitoring technique.

Table 2. Suggested Frequency of Physiological Monitoring for Fit and Acclimatized Field Personnel[a]

Adjusted Air Temperature[b]	Normal Work Ensemble[c]	Impermeable Ensemble[d]
90°F or above (32.2°C)	After each 45 minutes of work	After each 15 minutes of work
87.5–90°F (30.8–32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5–87.5°F (28.1–30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5–82.5°F (25.3–28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5–77.5°F (22.5–25.3°C)	After each 150 minutes of work	After each 120 minutes of work

Source: NIOSH. 1985. Occupational safety and health guidance manual for hazardous waste site activities. Prepared by the National Institute for Occupational Safety and Health, Occupational Safety and Health Administration, U.S. Coast Guard, and U.S. Environmental Protection Agency, Washington, DC.

Notes:

[a] For work level of 250 kilocalories/hour (moderate work activity).

[b] Calculate the adjusted air temperature (ta adj) by using this equation: ta adj °F + (13 x % sunshine). Measure air temperature (ta) with a standard, mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent of time the sun is not covered by clouds that are thick enough to produce a shadow (100 percent sunshine = no cloud cover and sharp, distinct shadows; 0 percent sunshine = no shadows).

[c] A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

[d] An impermeable ensemble consists of polyvinyl chloride-coated Tyvek® or Saranex® coveralls.

Oral Temperature

To monitor the effect of heat stress on the field person using the oral temperature method, the individual should use a clinical thermometer (3 minutes under the tongue) at the end of each work period, but before taking a drink. When monitoring oral temperature, the following guidelines apply:

- If the oral temperature does not exceed 99.6°F, no action is needed
- If the oral temperature exceeds 99.6°F at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same
- If the oral temperature exceeds 99.6°F at the beginning of the next rest period, shorten the following work period by one-third
- If the oral temperature exceeds 100.6°F at the beginning of any rest period, the field person should not be permitted to wear impermeable equipment.

Body Water Loss

To monitor the effect of heat stress on field personnel by measuring body water loss, the field personnel must weigh themselves with a scale accurate to within 0.25 pounds at the beginning and end of each work day. Their weight for the beginning and the end of the work shift should be taken while wearing similar clothing or, for the greatest accuracy, when nude. Fluctuations in weight (between the beginning of the shift and the end of the shift) indicate the gain or loss of body fluids, thus revealing if fluid replenishment has been effective. Body weight loss in a work day should not exceed 1.5 percent of total body weight. Where such weight losses occur, more attention should be given to fluid replacement during subsequent work shifts.

Electronic Monitors

Electronic monitors that constantly monitor a field person's heart rate and core temperature have recently been developed. These devices utilize sensors that are held in place on the field person's chest with an elastic band and are programmed to account for the field person's age and type of protective equipment. The field person's heart rate and core temperature are monitored. Lights illuminate on a small pad (worn outside of the PPE) to indicate one of the following conditions: the field person may continue as before; the field person has only a limited amount of work time left; or the field person should exit the work area immediately. These devices also include audible alarms and can be set to download heat stress data to a printer at the end of the shift.

Other electronic monitors are designed to measure adjusted (ambient) temperatures and can be programmed to account for the level of individual activity and type of protective equipment. These devices can calculate stay times (the amount of time field personnel in the area may remain in that area at the current activity levels) and can also log conditions encountered.

These devices do not actually monitor the effects of heat stress on field personnel but may be used to implement heat stress prevention measures.

Heat Stress Prevention

Several means are available to decrease or prevent the effects of heat stress.

An effective means of preventing heat stress is to schedule work in the cool parts of the day—early mornings, evenings, or at night. If the heat source is mechanical (e.g., caused by a power plant or production equipment), it may be possible to schedule the work during hours when the facility is inoperative.

Engineering methods may be used to cool field personnel regardless of the time of day. These methods frequently involve the use of cool vests (ice packs worn under PPE in a special vest), forehead and neck cooling wraps, circulating air (often associated with powered air-purifying respirators that utilize hoods rather than sealed facepieces), compressed air vortex cooling systems, or in extreme cases, circulating liquids through specially designed suits. Other engineering controls to prevent heat stress include erecting a shelter to protect field personnel from direct sunlight or circulating air through the workplace. In some instances, deluge showers can be constructed within the exclusion zone or in the decontamination area that allow field personnel wearing fully encapsulating PPE to stand under a shower of cold water. The deluge shower is an efficient means of providing relief to the field person without requiring the field person to proceed through decontamination and exit from the work area. The water would need to be containerized for proper disposal.

A critical element in an effective heat stress prevention program is to ensure that field personnel maintain a normal level of fluids within their bodies. To prevent heat-related illness, the field person's intake of fluids must approximate the amount of fluid lost (e.g., the field person must drink 8 ounces of water for every 8-ounce decrease in body weight). The sensation of thirst is not a reliable indicator of fluid loss. When heavy sweating occurs, it is essential that field personnel increase their fluid intake. The following guidelines may be useful:

- Provide fluid replenishment beverages at the work site, cooled to 50–60°F (appropriate beverages include water and diluted fruit juices or Gatorade®).
- Have field personnel drink 16 ounces of fluid prior to working in a hot environment.
- Have field personnel drink 8 to 16 ounces of liquids every 15 to 20 minutes, or at each rest break. NIOSH recommends that field personnel consume a total of 1 to 1.5 gallons of fluids a day, although a greater quantity may be required.

Scheduling rest periods to break up work periods is essential to prevent heat-related illnesses. It is imperative that rest periods be taken in an environment cooler than the work area from which respite is sought (e.g., has shade, fans, water, etc.). It is difficult to establish a rigid schedule that spells out the staying time and rest breaks based on temperature alone because other factors, such as the level of physical activity and the type of protective equipment, play a significant role in determining an individual's susceptibility to heat stress. The recommended course of action is to use the guidelines for physiological monitoring provided in Table 2 to schedule the initial work period, then vary the length of the break and the next work period based on the physiological responses of individual field personnel to the work load. If field personnel are engaged in strenuous activities, are not acclimated to the work environment, or are not in peak physical condition, the work interval should be shortened significantly, and monitoring continued.

Individual Responsibilities

In preventing heat stress, it is essential that field personnel monitor their own symptoms and promptly take steps to remedy any signs of heat stress. Field personnel should be aware of the human tendency to discount symptoms of heat stress. Such steps include notifying coworkers of their condition and taking whatever measures may be necessary to alleviate the symptoms by taking a break, increasing the intake of fluids, instituting environmental controls (such as the use of cool vests or circulating air), assuming less strenuous duties, or implementing appropriate first-aid procedures as indicated in Table 1. No field monitoring program can substitute for the individual's sense of his or her own health and physical limits.

SAFETY GUIDELINE SG-26

COLD STRESS AND ADVERSE WEATHER CONDITIONS

Adverse weather conditions are an important consideration in planning and conducting site operations and field activities. Extreme weather can cause physical discomfort, loss of efficiency, and personal injury. Adverse weather conditions include heat (discussed in safety guideline SG-25), cold, and snow and electrical storms. The sections below provide information regarding work in cold environments and electrical storms.

COLD WEATHER

Performing field activities in cold climates may cause severe injury to the surface of the body or may result in profound generalized cooling (hypothermia) that can result in death. Work in cold climates may also increase physical hazards, such as slips/trips and vehicle accidents.

Frostbite is caused by the actual freezing of tissue and is usually caused by exposing skin to extremely cold temperatures. Frost nip or incipient frostbite is characterized by sudden blanching or whitening of the skin. With superficial frostbite, the skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient. Deep frostbite is an extremely serious injury, characterized by tissues that are cold, pale, and solid.

Hypothermia is the gradual lowering of the body temperature, which may result in loss of coordination, confusion, sleep, and death. Unlike frostbite, hypothermia may occur at temperatures above freezing. Symptoms are usually exhibited in five stages:

- Shivering
- Apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95°F
- Glassy stare, slow pulse, slow respiratory rate, and unconsciousness
- Freezing of extremities
- Death.

Three factors influence the development of a cold injury: ambient temperature, wind velocity, and moisture. Wind chill is used to describe the chilling effect of moving air in combination with low temperatures. For example, an ambient temperature of 10°F with a wind of 15 mph has the equivalent chilling effect of still air at -18°F. Additionally, water conducts heat 240 times faster than air. Thus the body cools much faster when wearing damp or wet clothing.

Other cold-related hazards include slips and trips on snow-covered or frozen surfaces, falling through ice into lakes or ponds, and motor vehicle accidents. Cold weather also can hamper field operations by freezing decontamination solutions, and restricting the use of monitoring instruments (cold causes condensation to form on the lamps of photoionization detectors and can significantly reduce battery life).

Field personnel can implement many practices to prevent cold weather–related injuries or illnesses. Appropriate measures must be included in the site-specific health and safety plan. Precautionary measures include the following:

- Avoid work in adverse weather conditions.
- Dress warmly and stay dry, using rain gear and wool or synthetic insulated clothing (do not wear cotton).
- Provide warm liquids and shelter for breaks.
- Stay off frozen ponds or lakes.
- Exercise caution when walking on frozen or snow-covered surfaces.
- Obtain hot water for decontamination solutions.
- Provide portable heaters for decontamination.
- Provide shelter from wind or snow for field sampling activities.
- Select appropriate, well-maintained vehicles for winter driving (i.e., four-wheel-drive trucks with high clearance) and provide tire chains or other approved traction devices.
- Obtain appropriate emergency supplies when working in remote areas, including extra clothes, radio or cellular telephone, blankets, emergency shelter, food, and other survival supplies, as dictated by local terrain and climate.

ELECTRICAL STORMS

Lightening can pose a hazard during outdoor operations, especially for personnel handling metal equipment or working near drill rigs or other elevated equipment. To protect against this hazard, field personnel should observe local weather conditions and suspend field activities during electrical storms. Other precautions are as follows:

- Provide lightning protection on structures.
- Do not handle flammable liquids or gases during an electrical storm.
- If traveling by vehicle, stay inside the vehicle during an electrical storm.
- Do not use electrical equipment or telephones during electrical storms.

SAFETY GUIDELINE SG-27

NATURAL AND BIOLOGICAL HAZARDS

Personnel conducting fieldwork are subject to a variety of natural hazards, including insect bites and stings, snake bites, rodent bites, animal wastes and carcasses, and poisonous plants. The sections below outline procedures for preventing and treating these field hazards.

INSECT BITES AND STINGS

Field personnel may incur bites or stings from many common insects, including spiders, bees and wasps, mosquitoes, and flies. Common insect bites or stings may result in the following symptoms: redness, rash, swelling, chills, fever, diarrhea, and vomiting. Minor symptoms, such as redness and irritation of the skin in the vicinity of the bite, may be treated by washing the bite with cold water, applying ice packs, or applying calamine lotion or other readily available treatments. Any field person who has been stung or bitten and shows any of the more severe symptoms listed above should seek medical assistance immediately. Any field personnel who have allergies to bee stings or other insect bites should advise their supervisor prior to engaging in field activities. If the individual is hypersensitive to stings or bites, a physician will decide if the individual is required to carry an appropriate antidote kit.

Insect bites or stings may be prevented by the following means:

- Wear long-sleeved pants and shirt.
- Wear a hat.
- Wear gloves.
- Avoid wearing brightly colored clothing.
- Use insect repellant (follow the label instructions).

TICKS AND CHIGGERS

Field personnel working in vegetated areas during summer months may risk contact with ticks or chiggers. Ticks are small insects that range in size up to 0.25 inches long and are relatively easy to see. Ticks bury their heads and pincers into the victim's skin and feed on the victim's blood. Ticks can carry Lyme disease, Rocky Mountain spotted fever, and other diseases. Chiggers are small red mites that burrow into skin causing an intense itching sensation.

Chiggers cannot be seen, but victims may notice small red sores near their belt line or sleeves and on their knees or ankles.

Contact with ticks and chiggers can best be prevented by wearing long-sleeved clothing and ankle-length boots and by avoiding excessive contact with tall brush or grass. Personnel may also use insect repellant on the skin (exposed skin, ankles, and wrists) and on clothing (sleeves and pant legs). Personnel should change clothes and inspect their skin and scalp for ticks after each day of fieldwork (ticks may be easily removed if detected before they burrow into the victim's skin).

Bathing after fieldwork can help reduce the frequency of chigger bites. If individuals discover a tick embedded in their skin, they should try to remove it as soon as possible. The best treatment is to get the tick to "let go" of the victim, without squeezing the tick, breaking off the head, or releasing fluids from the tick. The proper means of removal is to use blunt tweezers to grasp the tick as close to the person's skin as possible, and then exerting a slow, even pressure. Pulling too quickly can leave portions of the tick's jaws in the wound. After removing the tick, the field person should gently scrub the area (with soap and water) from which the tick has been removed. (Home remedies such as the application of grease or oil over the tick or the use of heat to remove the tick are not recommended.) Chigger bites may be treated with Kwell®, a prescription medication. In addition, the individual should keep the sores clean and soak them with warm water daily. Topical lotions (including calamine) may reduce the itching sensation caused by chigger bites.

If bitten by a tick, the field person should note the date of the bite and watch for the following symptoms for a month after the bite: fever, chills, rashes (especially around the site of the bite), and aches. If these symptoms occur, a doctor should be consulted.

SNAKE AND RODENT BITES

Field personnel may encounter snakes or rodents during fieldwork. Of all snakes that may be encountered in the intermountain west, the rattlesnake poses the greatest hazard. Rodents, including mice, rats, and gophers, and other mammals, including skunks, may also pose a hazard to field personnel if the animal carries rabies or other diseases.

The potential for bites from these animals can be greatly reduced by using the following procedures:

- Wear ankle-high leather boots.
- Wear long-sleeved shirts and long pants.
- Do not reach into burrows or dens, or under rocks, logs, or open pitfall traps with bare hands.

When conducting fieldwork that may require the use of pitfall traps or otherwise increase field personnel's exposure to bites, field personnel should be equipped with leather gloves and long-handled tools. The long-handled tools can be used to roll over rocks or open pitfall traps. If a snake or unwanted rodent is encountered, personnel should leave the trap open and wait for the animal to leave. (Once the trap is uncovered, it no longer provides shelter for the animal.) Personnel may have to leave a stick or other means to allow skunks or snakes to climb out of the trap.

- In case of snake bite, field personnel are advised to seek prompt medical assistance. The injured field person should rest while awaiting (or being transported to) medical assistance. The use of snake bite kits is not advised in normal circumstances.
- In case of rodent bite, field personnel are also advised to seek prompt medical assistance. Rodents may carry rabies; therefore, medical testing may be required.

ANIMAL WASTES AND CARCASSES

Contact with live rodents and rodent feces may also pose a hazard to field personnel. In 1993, evidence was found linking deer mice feces with the hantavirus, which can be fatal to humans. This hazard was recognized following an outbreak of the virus in the southwest United States. While little is known about the geographic distribution of the virus, it has been detected in at least nine western states. Rodents and other wild animals may also carry rabies and other diseases. Thus, field personnel may be at risk from encountering animals or animal wastes during fieldwork. Additional information on hantavirus and procedures for the collection of rodent tissue samples is provided in safety guideline SG-28.

Pigeon feces and carcasses can also harbor several pathogens. Personnel must exercise caution to prevent contact with animal carcasses and animal wastes. When working around such debris, personal protective equipment (PPE) should include a high-efficiency particulate aerosol (HEPA) respirator, disposable coveralls, and gloves. Personnel must also exercise good hygiene practices (i.e., washing their hands thoroughly following any contact with animals and animal waste, and washing their body thoroughly at the end of each field day). Extreme caution is required to prevent the disturbance or transport of rodent feces or urine. Surfaces and equipment that may have contacted animal tissue or wastes must be disinfected and the wastes disposed of in accordance with local regulations.

COMMON HAZARDOUS PLANTS

In some areas, poison ivy, poison oak, or poison sumac may grow. Field personnel should be trained to recognize indigenous flora, and contact with such plants should be avoided. When working around such plants, PPE should include a HEPA respirator, disposable coveralls, and disposable gloves. Urushiol oil is the compound found in poison ivy, poison oak, and poison sumac (and others) which may cause allergic reactions. To remove plant oils, decontamination should include thorough body washing and washing of any nondisposable PPE with soap and water. Washing with Tecnu or Zanfel may be more effective at removing the Urushiol oil than soap and water.

Attachment 7

Field Safety Tailgate Briefing Form

September 23, 2021

FIELD SAFETY TAILGATE BRIEFING FORM

Corporate Health and Safety Manager:
Matthew Behum
(667) 225-5412

Date: ____________ Project name: ______________________________ Project number: ______________

Meeting conductor: ____________________ Site safety officer: ____________________ Project manager: ____________________

Items discussed (check all that apply):

- ☐ HSP review and location
- ☐ Lines of authority
- ☐ Chemical hazards and exposure routes
- ☐ Flammable hazards
- ☐ Lifting techniques
- ☐ Buddy system
- ☐ Self and coworker monitoring
- ☐ Biological/plant/animal hazards
- ☐ Slips, trips, and falls
- ☐ Heat and cold stress
- ☐ Overhead hazards
- ☐ Vessel safety protocols
- ☐ Proper use of PPE
- ☐ Safety equipment location
- ☐ Proper safety equipment use
- ☐ Fire extinguisher location
- ☐ Eye wash station location
- ☐ Emergency procedures and evacuation route
- ☐ Directions to hospital
- ☐ Emergency decontamination procedures
- ☐ Site communication
- ☐ Work zones
- ☐ Vehicle safety and driving/road conditions
- ☐ Other: __________________________

____

Daily work scope: ______________________________

Site-specific hazards: ______________________________

Weather conditions: ______________________________

Field staff health and safety concerns: ______________________________

Attendees

Printed Name	Signature

Attachment 8

COVID-19 Field Program Management Plan

COVID-19 Field Program Management Plan

This document provides operational guidance for planning and conducting field programs during the second year of the SARS-CoV-2 virus (COVID-19) pandemic. As the economy reopens in stages and COVID-19 vaccinations are available for much of the population, the U.S. Centers for Disease Control and Prevention (CDC) recommends that all people (even those vaccinated) continue taking steps to protect themselves and others. This plan reflects CDC recommendations and will be updated as the CDC continues its research and revises guidance for both vaccinated and unvaccinated people.

Background

The World Health Organization declared the COVID-19 outbreak a global pandemic on March 11, 2020. In response, the federal government, states, and local jurisdictions issued emergency orders that included stay-at-home orders, travel restrictions, and other public health mandates. Although the economy is reopening in stages on a state-by-state basis, community-based transmission of COVID-19 continues to be experienced in areas where Integral Consulting Inc. (Integral) operates and conducts field-related activities. Restrictions and orders vary by state, county, and city. Civil authorities update their restrictions and orders (ease or tighten) as they see fit in response to changes in local health conditions. Depending on local transmission rates, civil authorities may restrict services to essential critical infrastructure business sectors only or they may limit or eliminate restrictions altogether.[1] At the same time, COVID-19 vaccinations are available to most age groups. Those who are fully vaccinated are able to resume many pre-pandemic activities with modifications. Reopening while vaccinations are incomplete makes for a dynamic period in the pandemic.

COVID-19 Vaccination Policy

All employees are strongly encouraged to receive a COVID-19 vaccination that is either authorized for emergency use or fully approved by the U.S. Food and Drug Administration

[1] Homeland Security, Cybersecurity and Infrastructure Security Agency *Guidance on the Essential Critical Infrastructure Workforce Ensuring Community and National Resilience in COVID-19 Response*, dated August 10, 2021, Version 4.1 (https://www.cisa.gov/sites/default/files/publications/essential_critical_infrastructure_workforce-guidance_v4.1_508.pdf)

(FDA) as soon as possible. As required in Integral's Vaccination Policy, all employees must comply with the requirements in this document based on their vaccination status.

Vaccination Information and Resources

People are considered fully vaccinated for COVID-19 two or more weeks after they have received the second dose in a two-dose series (Pfizer-BioNTech or Moderna) or after they have received a single-dose vaccine (e.g., Johnson and Johnson/Janssen). COVID-19 vaccines are effective in preventing COVID-19 and in preventing serious illness even if a person contracts COVID-19. Fully vaccinated staff are required to comply with all CDC guidelines, applicable state and local requirements, this COVID-19 Field Program Management Plan, the COVID-19 Business Travel Policy, and the COVID-19 Reoccupancy Plan as applicable. Staff must submit proof of vaccination to Human Resources (HR@integral-corp.com) to be considered fully vaccinated for purposes of this document. Please note that some state and local requirements do not align with federal CDC guidelines regarding masking and physical distancing.

The CDC indicates the following based on current science:

- COVID-19 vaccinations are effective in preventing COVID-19 disease, especially severe illness and death, and at reducing the risk of people spreading the disease.
- COVID-19 vaccinations are effective against severe disease and death from variants of the virus that causes COVID-19 disease, including the Delta variant.
- If an individual becomes infected with the Delta variant, that individual can spread the virus to others.
- People with weakened immune systems or who take immunosuppressive medications may not be protected from the disease even if vaccinated.

Studies are still under way to understand how long the COVID-19 vaccines can protect people.

Guidance for Fully Vaccinated Staff

Per the CDC, fully vaccinated people are able to do the following:

- Resume many pre-pandemic activities.
- Resume activities without wearing a mask or staying 6 feet apart, except where required by federal, state, local, tribal, or territorial laws, rules, and regulations, including those required by individual businesses and workplaces.

- Resume domestic travel and refrain from testing before or after travel or self-quarantine after travel.

A small percentage of fully vaccinated individuals may become infected with the virus that causes COVID-19 (i.e., "vaccine breakthrough"). When these infections occur among vaccinated people, the symptoms tend to be mild. Because of this, the CDC recommends that fully vaccinated people wear a mask indoors in public if located in an area of substantial or high transmission to reduce the risk of becoming infected or spreading the virus to others.

Guidance for Unvaccinated and Partially Vaccinated Staff

Staff who have not obtained a vaccine or who are partially vaccinated but do not yet meet the definition of fully vaccinated are not allowed to enter an Integral workplace, conduct fieldwork, travel for a business-related purpose, or attend an in-person meeting or work-related social event, including, but not limited to, meals and social gatherings with other Integral employees, clients, and/or other external parties. All work must be conducted remotely.

COVID-19 Travel Policy

Integral's COVID-19 Business Travel Policy applies to non-local business travel involving transit by a public carrier and any overnight business-related travel. As required in the policy, all employees who are fully vaccinated and who have provided proof of vaccination to Human Resources in accordance with Integral's COVID-19 Vaccination Policy are authorized to travel on approved company or client-related business, including fieldwork.

For those staff who are partially vaccinated or unvaccinated, Integral will authorize staff business travel only in circumstances where travel is necessary to meet essential business needs. Scheduling a business-related trip for an unvaccinated or partially vaccinated staff member requires the following:

- An Integral Travel Agreement that covers destination-specific COVID-19 mandates, travel health and safety, and post-travel testing. Contact Sandy Browning to initiate an Integral Travel Agreement.
- Approval by the President or his delegate to proceed with the business trip.

Staff are required to comply with travel-related COVID-19 guidance issued by the CDC, this Field Program Management Plan, and any applicable state and local restrictions.

COVID-19 Site and Preventive Measure Plans

Integral and its subcontractors will take proper precautions to minimize to every extent possible the transmission of COVID-19 during site investigation activities. These activities may include site visits, construction oversight, sediment and soil sampling, groundwater monitoring, and the deployment and retrieval of in-water remote sensing instrumentation. This Field Program Management Plan may be used as an addendum to the existing project-specific Health and Safety Plan and shall remain in effect until superseded by further updates.

Guidelines presented herein are consistent with the recommendations provided by the CDC and the COVID-19 planning guidance provided by the Occupational Safety and Health Administration.

Each field effort will require discussions between the project manager and client to address specific requirements associated with local orders and directives that could impact travel and health and safety. The following lists general CDC recommendations followed by steps Integral and its subcontractors will take to reduce the transmission of COVID-19.

Traveling to Site

Staff may travel to a work site via personal vehicle, rental vehicle, rideshare, or by airplane.

Staff requiring rental cars for any sort of business travel, including fieldwork, are to take the following precautions when taking possession of the vehicle for the first time, and at the start of each day while renting the vehicle:

- Use a disinfecting wipe to wipe down main contact areas, including:
  - Door handles (inside and outside)
  - Steering wheel
  - Dashboard
  - Clock and entertainment surface, including knobs
  - Gear shifting knob
  - Blinker and windshield wiper knob
  - Window control switch or lever
  - Rear view mirror and mirror control knobs
  - Center console
  - Odometer acrylic screen
  - Glove compartment external door.

- Sanitize hands immediately after refueling and after returning the rental vehicle.

When fully vaccinated employees share a ride in the same vehicle, masks are not required. However, when employees hire a taxi or rideshare, masks must be worn at all times. Follow this practical guidance:

- Limit passengers in the vehicle to only those traveling with you.
- Sit in the back seat in larger vehicles and diagonally across from the driver.
- Ask the driver to improve the ventilation in the vehicle if possible by opening the windows or setting the air ventilation on non-recirculation.
- Avoid contact with surfaces frequently touched by passengers or drivers, such as the door frame and handles, windows, and other vehicle parts.
- Refrain from eating or drinking in a rideshare vehicle to ensure mask use at all times.
- After leaving the vehicle, use hand sanitizer containing at least 60 percent alcohol, and when you arrive at your destination, wash your hands with soap and water for at least 20 seconds.

The Transportation Security Administration extended the face mask requirement for individuals utilizing public transportation throughout the United States, including at airports, onboard commercial aircraft, and on buses and rail systems through January 18, 2022. Be sure to take hand sanitizer with at least 60 percent alcohol when using public transportation and wash hands often.

Before Entering Site

Some site owners may require that field staff undergo body temperature screening prior to entering the site. If it is required and an individual chooses not to participate, the individual should discuss the decision with the project manager, field lead, or site safety officer. The client has the right to deny access to the facility if a temperature scan is refused.

Other actions to be taken before entering a site include the following:

- Completion of a health questionnaire that assesses the suitability of individuals for fieldwork. This questionnaire must be completed, each day, by all staff of Integral and subcontractors, including their subcontractors, prior to commencing work on site. Procedures for maintaining custody of the health forms and their transfer to Integral's Human Resources department are also provided.
- If a staff member is feeling well but has a sick family member at home, the staff member should notify the project manager and follow CDC-recommended care.

Fully-vaccinated employees need not quarantine or test for COVID-19 in this situation unless the employee has symptoms.

- Any staff member showing any signs of a respiratory ailment (cough, sore throat, fever/chills, shortness of breath, or difficulty breathing) is required to stay home and not report to work. Symptoms of COVID-19 may include these symptoms or combinations of symptoms: cough, shortness of breath or difficulty breathing, fever, chills, fatigue, muscle pain or body aches, headache, sore throat, and new loss of taste/smell, congestion or runny nose, nausea or vomiting, or diarrhea as described on the CDC website. It is recommended that the individual contact a health care provider for medical advice. If COVID-19 is suspected or confirmed, staff must stay home for a minimum of 14 days.

Minimizing Chance of Exposure on the Site

- Wear a face covering per CDC guidelines and state and local requirements.
- Information needed to minimize exposure and prevent the spread of COVID-19 will be included in each day's health and safety meeting. Field crew meetings should be conducted outside, if possible.
- Workers will follow site-specific health and safety plan requirements for the use of personal protective equipment (PPE). PPE is not to be shared.
- If symptoms consistent with COVID-19 are noticeable during the sampling day, the employee or subcontractor should excuse him- or herself from further work, leave the site immediately, and follow CDC guidance.
- Workers will wash hands often with soap and water for at least 20 seconds. If soap and water are not available, hand sanitizer with at least 60 percent alcohol will be made available in multiple locations, as needed. Frequent hand-washing is recommended throughout the day.
- Workers are to avoid touching eyes, nose, and mouth with unwashed hands.
- Workers who cough or sneeze should cover mouth and nose with a tissue or use the inside of one's elbow.
- Frequently touched objects and surfaces, such as workstations, keyboards, telephones, handrails, and doorknobs, will be cleaned and disinfected. The frequency and scope of the cleaning program for project facilities (office trailers, bathrooms, other buildings, and work areas) will be reviewed and increased as necessary. Cleaning products used will be those recommended by the U.S. Environmental Protection Agency and deemed as effective against the SARS-CoV-2 virus.

- Workers will avoid using other employees' phones or other work tools and equipment, when possible. If necessary, workers will clean and disinfect them before and after use.

Managing Visitor Access and Movement in Sampling Area

- Only staff directly involved in sample collection or equipment deployment will be permitted within the sampling zone.
- All visitors present outside the collection or deployment area will maintain at least a 6-foot distance from fellow visitors or sampling staff, even after operations are complete.
- Sequential work practices with appropriate physical distancing are to be considered and implemented wherever possible.
- Group meetings are to be minimized whenever possible.

Implementing Environmental Control

- Appropriate disinfectant wipes and cleaners and hand sanitizer will be made available at each job site.
- Sampling staff will clean the sampling zone and surrounding environment to ensure no sampling waste or other trash is left behind. After trash is bagged, staff will sanitize hands and exit the sampled property.

Wearing Face Coverings

Only fully vaccinated employees and subcontractors may remove masks while performing fieldwork, except when:

- The field team consists of vaccinated, partially vaccinated, and unvaccinated people
- The fieldwork is conducted in a public setting or in a crowded place
- State and local public health guidance requires the use of masks at all work sites.

Partially vaccinated or unvaccinated employees and subcontractors must wear masks and practice physical distancing while in the presence of others, while performing fieldwork, while traveling for work-related reasons, and while performing any other job-related duties where others are present.

The CDC evidence for effectiveness of masks is based on the current understanding about the role respiratory droplets play in the spread of the virus paired with evidence from clinical and laboratory studies showing that masks reduce the spray of droplets when worn over the nose and mouth. Cloth face coverings may help slow the spread of the COVID-19 virus from individuals who do not have symptoms of illness but may be infected. Further, the CDC conducted a study in a laboratory that tested the performance of different mask combinations.

Masks recommended by the CDC include disposable medical masks, multilayered cloth masks, cloth masks with an inner filter pocket and filter, and FDA-approved KN95 masks. Cloth masks should be made of tightly woven fabric (two or three layers) that also allows breathability. KN95 masks are filtering respirators similar to N95 masks that are commonly made and used in China. KN95 masks may be preferable in some situations that require prolonged close contact with others. The CDC does not recommend using NIOSH-approved N95 respirators needed by health care professionals.

There are two important points to effective masking. One is fit. There should be no significant gaps between the mask material and face where respiratory droplets can get in or out. The second is layering. Additional mask layers will stop more potentially infectious respiratory droplets.

The CDC has several recommendations to improve the effectiveness of a mask. One is to use a mask with a nose wire to prevent air leaks around the nose. Another way to prevent air leaks is to wear a mask fitter which helps the mask remain close to the contours of the face. Tying ear loops can also improve fit. Another option is to wear two masks with a disposable mask as a bottom filter layer and a cloth mask over the disposable mask. The cloth mask helps hold the disposable mask to the face and improve fit. CDC guidance does not recommend doubling up disposable masks. It also does not recommend combining a KN95 mask or NIOSH-approved respirator with any other mask.

The CDC website provides additional information on the types of masks, as well as face shields, and exceptions for who should not wear a mask (e.g., children under 2). The CDC does not recommend using masks with exhalation valves or vents because this type of mask may not prevent you from spreading COVID-19 to others. Face shields with large gaps around the face are not to be used either. If gaiters are worn, they should have two layers, cover a second mask, or be folded over to create a multilayer thickness. Integral provides appropriate face coverings to all staff involved in fieldwork.

Guidance for wearing and caring for cloth masks is as follows:

- Wash or sanitize hands before donning or removing the covering.
- Only touch the face covering by the ear loops, ties, or bands.
- Do not put the outer surface against the face.
- Be sure that the mask fully covers nose and mouth and has a snug fit.
- Discard used disposable face coverings in the trash.
- Wash reusable masks per manufacturer instructions at the end of each day of use.

- Store clean cloth masks in bags or face down on a clean surface.
- Replace cloth masks if they become wet.

Integral's Corporate Health and Safety Officer will work with the field team lead to identify the best type of face covering for use on the project.

COVID-19 Confirmed Case Response Plan

Multiple variants of the SARS-CoV-2 virus that causes COVID-19 have been documented in the United States and globally. Information about the characteristics of these variants is rapidly emerging. Scientists are working to learn more about how easily the variants spread, whether they could cause more severe illness, and whether currently authorized vaccines will protect people against them. This section describes the management actions to be taken by fully vaccinated field staff under different potential COVID-19 exposure scenarios. Prompt identification and isolation of potentially infectious individuals are critical in the protection of workers and visitors at the work site.

Exposure Scenarios and Specific Actions

Person-to-person transmission of COVID-19 can occur via primary, secondary, and tertiary exposure pathways:

- Primary exposure—Employee tested positive for the virus.
- Secondary exposure—Employee who within the last 14 days had direct contact with someone outside of the field team who has been diagnosed with COVID-19.
- Tertiary exposure—Employee had direct contact with someone outside of the field team who has been quarantined as a result of close contact within the last 14 days with someone who has been diagnosed with or is being tested for COVID-19.

In the unlikely event there is a confirmed case of a fully vaccinated employee becoming infected with COVID-19 (**primary exposure**), the field lead and site safety officer will take the following immediate actions:

- Instruct the employee, if still at the site, to enter home isolation immediately.
- Notify Integral's COVID-19 Response Team immediately.
- Notify those who may have been exposed to the virus based on close prolonged contact with the diagnosed individual, while maintaining confidentiality as required by the Health Insurance Portability and Accountability Act. Close, prolonged contact may include one or more of the following scenarios:
  - Individual was within 6 feet of someone who has COVID-19 for a cumulative total of 15 minutes or more over a 24-hour period

  - Individual provided care at home to someone who is sick with COVID-19
  - Individual had direct physical contact with the person
  - Individual shared eating or drinking utensils
  - Individual sneezed, coughed, or somehow got respiratory droplets on another individual.

- Restrict access to areas where the employee worked and mark them as off limits to all site personnel. Areas will be disinfected following CDC guidelines.
- Ask field staff who were in close contact with the individual to self-quarantine unless field staff are fully vaccinated.

In the event of **secondary exposure**, the vaccinated employee should remain home and get tested 3 to 5 days after exposure, even if there are no symptoms. The employee is also required to wear face coverings in indoor public places for 14 days after exposure unless they test negative for COVID-19. If the employee tests positive, the individual should isolate for 10 days. The individual should self-monitor during this period. Self-monitoring means the individual will take temperature readings twice daily to monitor for fever and remain alert to cough or difficulty breathing.

In addition, the following actions should be taken in the event of secondary exposure:

- The field lead or site safety officer will notify Integral's COVID-19 Response Team immediately.
- The field team will continue cleaning common touch areas with recommended disinfectants.
- If the employee is confirmed positive, this becomes a primary exposure scenario. Staff who were in close contact will be notified, and procedures for primary exposure will be followed.

In the event of **tertiary exposure**, communication with the field team is recommended. The individual will be asked to self-monitor.

- The field lead or site safety officer will notify Integral's COVID-19 Response Team immediately.
- The field team will continue cleaning common touch areas with recommended disinfectants.
- If the acquaintance is confirmed to be infected, this becomes a secondary exposure scenario. Steps for secondary exposure will be followed going forward.

All employees need to be vigilant regarding potential exposure and transmission of COVID-19. Curbing this outbreak is considered a team effort as much as the field event is itself.

Discontinuation of Home Isolation

For individuals with symptoms who are confirmed or suspected of having COVID-19, home isolation may be discontinued under the following conditions:

- At least 10 days have passed since symptoms first appeared, and
- At least 24 hours has passed without fever-reducing medication, and
- Other symptoms of COVID-19 are improving (although loss of taste and smell may persist for weeks or months after recovery and need not delay the end of isolation).

A limited number of persons with severe illness may produce replication-competent virus beyond 10 days that may warrant extending the duration of isolation and precautions for up to 20 days after symptom onset; in this case, consultation with infection control experts should be pursued.

Individuals with laboratory-confirmed COVID-19 and no symptoms may discontinue home isolation when at least 10 days have passed since the outcome of their positive test result and have had no subsequent illness. Most people do not require testing to decide when they can leave isolation; however, some health care providers may recommend testing.

COVID-19 Field Program Management Plan Acknowledgment

Project Number: ____

Project Name: ____

My signature below certifies that I have read and understand the policies and procedures specified in this COVID-19 Field Program Management Plan.

Date	Name	Signature	Company

Integral Consulting Inc.
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Suite 1450
Seattle, WA 98104

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MEMORANDUM

To:	Allison Crowley
From:	Shannon Ashurst
Date:	March 8, 2022
Subject:	Addendum to Former Georgetown Steam Plant Flume Property Transfer Sampling and Analysis Plan
Project No.:	CF1408-0106

This Sampling and Analysis Plan (SAP) addendum was prepared for Seattle City Light (SCL) to conduct additional soil and groundwater sampling at the Former Georgetown Steam Plant Flume Property (Project Site) located immediately adjacent (to the east) of 1001 South Myrtle Street, Seattle, WA 98108 (the southernmost segment of Parcel 7006700570). The objective of this additional investigation is to determine the horizontal and vertical extent of carcinogenic polycyclic aromatic hydrocarbon (cPAH) concentrations in soil in the vicinity of location GTF_S6, and concentrations of PAHs and polychlorinated biphenyls (PCBs) in groundwater upgradient, downgradient, and at the location of GTF_S6. Integral Consulting Inc. (Integral) will collect additional soil samples at GTF_S6 (deeper than 2 ft below ground surface [bgs]) and at three new step-out locations bracketing the GTF_S6 sample location on three sides, starting at 1.5 ft bgs. Integral will also collect low-flow groundwater samples from temporary wells at three locations, including one co-located with the original GTF_S6.

SAMPLING PREPARATION

All utility lines will be located and marked before fieldwork begins. Field crew will avoid drilling near marked utilities. To avoid interference with the 8-in. gas service line under the sidewalk along E. Marginal Way, if drilling is within 5 ft of the sidewalk, field crew will call inspector Troy Peterson at (206) 396-0739. Applied Professional Services, Inc., will perform a private utility clearance before drilling begins.

Ecology blocks will be moved the day before the field event by SCL to allow access. SCL will then secure the area with a locked chain, and will provide Integral field crew the access code ahead of the event.

ADDITIONAL SOIL SAMPLING APPROACH

Target sample location coordinates are presented in Table 1 and Figure 1. Cascade Environmental will use a direct push drill rig (e.g., Geoprobe) to collect cores at the sample locations. GTF_S6 will be revisited as GTF_S6_B; sampling will begin at 2 ft bgs and go to 4.5 ft bgs. Three new step-out locations will be sampled from 1.5 ft to 4.5 ft bgs. Samples will be collected in 0.5-ft intervals, beginning at 1.5 ft bgs. Samples to be analyzed or archived are presented in Table 1.

Quality control samples for soil will include two field duplicate samples, a matrix spike/matrix spike duplicate, and two field blanks. Groundwater quality control samples will include one field duplicate and one field blank. A complete field sampling matrix is provided in Table 2.

Two investigation-derived waste (IDW) drums will be provided by Cascade Environmental, one for solids and one for liquids. Field crew will sample IDW produced for disposal in accordance with the sample matrix (Table 2). The field crew will coordinate with SCL to store the drums securely at the Georgetown Steam Plant property immediately following the event. Drums will be picked up and disposed of by ACTEnviro after analytical results are received.

All procedures, practices, and standards included in the original SAP will be applied to this additional sampling effort. Tables 3 and 4 present the analytical laboratory analyses and method detection limits and reporting limits, respectively.

GROUNDWATER SAMPLING APPROACH

Target sample locations and coordinates are presented in Table 1 and Figure 1. Groundwater standard operating procedures (SOPs) are provided in Attachment 1. A revised Job Hazard Analysis form covering groundwater sampling is provided in Attachment 2. The groundwater field form is provided in Attachment 3.

Groundwater is anticipated to be encountered between 8 and 11 ft bgs. Groundwater samples will be collected from a temporary well casing installed in each direct push borehole. The temporary well casing will be constructed of 3/4-in.-diameter stainless steel and stainless steel Geoprobe SP22 well screen. Each well assembly will be measured prior to placement in the borehole. The screen assembly will be advanced such that the top of the screen is approximately at the groundwater table. Prior to sample collection, water level, and, if present, nonaqueous-phase liquid measurements will be collected from each boring location using an electronic water level interface probe and measured from the top of the well casing in accordance with SOP-GW-02 (Attachment 1). The length of the well casing from the ground surface will be noted by the field team.

Following water level measurements, the temporary well will be purged and sampled using low-flow sampling techniques in accordance with SOP GW-03 (Attachment 1). A peristaltic pump or equivalent pump will be used to purge and sample the wells. New low-density polyethylene tubing will be placed inside the well to the approximate middle of the groundwater screen. Water quality parameters (temperature, pH, dissolved oxygen, and specific conductance) will be collected through a flow-through cell and allowed to stabilize in according with the criteria in SOP GW-03 (Attachment 1) prior to sampling. Purge data and water quality parameters will be recorded in the groundwater field form (Attachment 3). A sample will be collected once parameters have stabilized or three well volume casings have been purged. The flow-through cell will be removed before sampling, and the peristaltic pump will be used to transfer the groundwater directly to laboratory-supplied sample containers. Samples will be stored in a cooler on ice prior to shipment to the laboratory for PCB and PAH analysis in accordance with SOPs AP-01 and AP-03 (original SAP Appendix A).

Groundwater decontamination procedures will follow SOP GW-01 (Attachment 1). Stainless steel reusable temporary well equipment will be steam-cleaned in between locations. New tubing will be used at each location.

Tables 3 and 4 present the analytical laboratory analyses and method detection limits and reporting limits, respectively.

SCHEDULE AND CONTACTS

Sampling event will be performed on March 9, 2022.

Role	Name	Organization	Contact Information
Principal	David Livermore, R.G., L.H.G.	Integral Consulting Inc.	(503) 943-3613
Project Manager	Shannon Ashurst	Integral Consulting Inc.	(206) 957-0373
Client Contact	Allison Crowley	Seattle City Light	(206) 684-3167 Cell: (206) 719-8160
Field Lead/Site Safety Officer	Mauri Fabio	Integral Consulting Inc.	(503) 780-9502

Role	Name	Organization	Contact Information
Field Staff	Kelsey Kirkland	Integral Consulting Inc.	(206) 957-0308
Laboratory Quality Assurance Coordinator	Glenn Esler	Integral Consulting Inc.	(503) 943-3617
Chemistry Laboratory	Sue Dunnihoo	Analytical Resources, Inc.	(206) 695-6207
Drilling Contractor	Kasey Goble	Cascade Environmental	(425) 485-8908 ext. 2126
Private Utility Locator	Trandin Murray	Applied Professional Services Inc.	(425) 786-4067
Drum Disposal	Kyle Satterthwaite	ACTEnviro	(253) 334-9256
Marginal Way Gas Line	Troy Peterson	Puget Sound Energy	(206) 396-0739
Portable Toilet	Shirley	Green Latrine Portable Toilets	(206) 397-0336

FIGURES

Figure 1. Soil and Groundwater Sampling Locations

TABLES

Table 1. Sample Locations, Coordinates, Rationales, and Depth Intervals

Table 2. Sample Matrix

Table 3. Laboratory Analyses

Table 4. Method Detection Limits and Reporting Limits

ATTACHMENTS

Attachment 1. Standard Operating Procedures for Groundwater Sampling

Attachment 2. Revised Job Hazard Analysis Form

Attachment 3. Groundwater Field Form

Figures and Tables

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integral consulting inc.

Figure 1.
Soil and Groundwater Sampling Locations

Table 1. Sample Locations, Coordinates, Rationales, and Depth Intervals

Location	X[a]	Y[a]	Chemistry Sampling Rationale	Soil 1.5 to 2 ft	Soil 2 to 2.5 ft	Soil 2.5 to 3 ft	Soil 3 to 3.5 ft	Soil 3.5 to 4 ft	Soil 4 to 4.5 ft	Groundwater
GTF_S6_B	1273411.13354	199862.052501	Determine the vertical extent of cPAH concentrations	not needed [b]	X	A	A	A	A	
GTF_GW1 (colocated)			Determine the concentrations of PAHs and PCBs in groundwater							X
GTF_S22	1273406.13093	199902.860818	Determine the horizontal and vertical extent of cPAH concenrations	X	X	A	A	A	A	
GTF_S23	1273431.98028	199861.501649	Determine the horizontal and vertical extent of cPAH concenrations	X	X	A	A	A	A	
GTF_S24	1273417.11680	199838.236932	Determine the horizontal and vertical extent of cPAH concenrations	X	X	A	A	A	A	
GTF_GW2	1273476.10970	199938.44228	Determine the concentrations of PAHs and PCBs in groundwater							X
GTF_GW3	1273425.23390	199797.82724	Determine the concentrations of PAHs and PCBs in groundwater							X

Notes:

[a] Coordinates are in Washington State Plan North NAD83 feet (EPSG 2285)
[b] A 1.5-2 ft sample was collected at this location in September 2021.
A = archive sample collection for pending analysis
cPAH = carcinogenic polycyclic aromatic hydrocarbon
X = sample collection for planned analysis

Table 2. Sample Matrix

Station	Location Type	Sample ID	Sample Number	Sample Type	Approximate Sample Volume Required	Sample Date	Sample Time	Sample Interval	Chemical Delineation - soil and groundwater					IDW Solids						IDW Liquids			Equipment Blanks
									Archive Samples	Percent Solids (SM 2540G)	PAHs (EPA 8270E SIM)	PAHs (EPA8270E SIM)	PCBs (EPA8082A)	PAHs (EPA 8270E SIM)	pH/Corosivity (SM4500-H+ B) Ignitability/Flashpoint (ASTM D93)	Reactive Cyanides (SM4500-CN)	Reactive Sulfides (SM4500-S2)	TCLP (SVOC/Metals/Pesticides/ Herbicides)	TCLP (VOCs)	PAHs (EPA 8270E SIM)	RCRA (8) Metals	VOCs (TCLP list)	PAHs (EPA 8270E SIM)
									4 oz WMG	4 oz WMG		2 x 500 mL AG	2 x 500 mL AG	4 oz WMG	32 oz WMG				2 oz WMG	500 mL AG	250 mL HDPE	3x40 mL Vials	500 mL AG
									≤6° C	≤6° C		≤6° C	≤6° C	≤6° C	≤6° C	≤6° C	≤6° C	≤6° C	≤6° C, with septa	≤6° C	≤6° C, pH < 2 w/HNO3	≤6° C, pH < 2 w/HCl	≤6° C
GTF_S6_B	Soil core to 4.5 ft	GTF_S6_B_2-2.5ft	GTF_SL056	Normal	4 oz					○	○												
		GTF_S6_B_2.5-3ft	GTF_SL057	Archive	4 oz				○														
		GTF_S6_B_3-3.5ft	GTF_SL058	Archive	4 oz				○														
		GTF_S6_B_3.5-4ft	GTF_SL059	Archive	4 oz				○														
		GTF_S6_B_4-4.5ft	GTF_SL060	Archive	4 oz				○														
GTF_S22	Soil core to 4.5 ft	GTF_S22_1.5-2ft	GTF_SL061	Normal	4 oz					○	○												
		GTF_S22_2-2.5ft	GTF_SL062	Normal	4 oz					○	○												
		GTF_S22_2.5-3ft	GTF_SL063	Archive	4 oz				○														
		GTF_S22_3-3.5ft	GTF_SL064	Archive	4 oz				○														
		GTF_S22_3.5-4ft	GTF_SL065	Archive	4 oz				○														
		GTF_S22_4-4.5ft	GTF_SL066	Archive	4 oz				○														
GTF_S23	Soil core to 4.5 ft	GTF_S23_1.5-2ft	GTF_SL067	Normal	4 oz					○	○												
		GTF_S23_2-2.5ft	GTF_SL068	Normal	4 oz					○	○												
		GTF_S23_2.5-3ft	GTF_SL069	Archive	4 oz				○														
		GTF_S23_3-3.5ft	GTF_SL070	Archive	4 oz				○														
		GTF_S23_3.5-4ft	GTF_SL071	Archive	4 oz				○														
		GTF_S23_4-4.5ft	GTF_SL072	Archive	4 oz				○														

Table 2. Sample Matrix

									Chemical Delineation - soil and groundwater					IDW Solids						IDW Liquids			Equipment Blanks
									Archive Samples	Percent Solids (SM 2540G)	PAHs (EPA 8270E SIM)	PAHs (EPA8270E SIM)	PCBs (EPA8082A)	PAHs (EPA 8270E SIM)	pH/Corosivity (SM4500-H+ B) Ignitability/Flashpoint (ASTM D93)	Reactive Cyanides (SM4500-CN)	Reactive Sulfides (SM4500-S2)	TCLP (SVOC/Metals/Pesticides/ Herbicides)	TCLP (VOCs)	PAHs (EPA 8270E SIM)	RCRA (8) Metals	VOCs (TCLP list)	PAHs (EPA 8270E SIM)
									4 oz WMG	4 oz WMG		2 x 500 mL AG	2 x 500 mL AG	4 oz WMG	32 oz WMG				2 oz WMG	500 mL AG	250 mL HDPE	3x40 mL Vials	500 mL AG
Station	Location Type	Sample ID	Sample Number	Sample Type	Approximate Sample Volume Required	Sample Date	Sample Time	Sample Interval	≤6° C	≤6° C		≤6° C	≤6° C	≤6° C	≤6° C	≤6° C	≤6° C	≤6° C	≤6° C, with septa	≤6° C	≤6° C, pH < 2 w/HNO3	≤6° C, pH < 2 w/HCl	≤6° C
GTF_S24	Soil core to 4.5 ft	GTF_S24_1.5-2ft	GTF_SL073	Normal	4 oz					○	○												
		GTF_S24_2-2.5ft	GTF_SL074	Normal	4 oz					○	○												
		GTF_S24_2.5-3ft	GTF_SL075	Archive	4 oz				○														
		GTF_S24_3-3.5ft	GTF_SL076	Archive	4 oz				○														
		GTF_S24_3.5-4ft	GTF_SL077	Archive	4 oz				○														
		GTF_S24_4-4.5ft	GTF_SL078	Archive	4 oz				○														
GTF_GW1	Groundwater probe sample	GTF_GW1_1	GTF_SL079	Normal	2 L							○	○										
GTF_GW2	Groundwater probe sample	GTF_GW2_1	GTF_SL080	Normal	2 L							○	○										
GTF_GW3	Groundwater probe sample	GTF_GW3_1	GTF_SL081	Normal	2 L							○	○										
	Field duplicate groundwater probe sample	GTF_GW3_1_DUP	GTF_SL082	QC sample	2 L							○	○										
	Field duplicate sample 1.5-2 ft	GTF_S23_1.5-2ft_DUP	GTF_SL083	QC sample	4 oz					○	○												
	Field duplicate core 2-2.5 ft	GTF_S6_B_2-2.5ft_DUP	GTF_SL084	QC sample	4 oz					○	○												
	Equipment Rinse Blank	GTF_SLEB_9_ _ _	GTF_SL085	QC sample	500 mL																		○
	Equipment Rinse Blank	GTF_SLEB_9_ _ _	GTF_SL086	QC sample	500 mL																		○
	Equipment Rinse Blank - GW Equipment	GTF_SLEB_9_ _ _	GTF_SL087	QC sample	2 L							○	○										
	IDW grab	GTF_IDW_ _ _ _ _ _ _ _	GTF_SL088	QC sample	44 oz / ~0.5 gal									○	○	○	○	○	○				
	IDW grab	GTF_IDW_ _ _ _ _ _ _ _	GTF_SL089	QC sample	44 oz / ~0.5 gal															○	○	○	

Notes:
AG = amber glass
ASTM = ASTM International
EPA = U.S. Environmental Protection Agency
IDW = investigation-derived waste
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
QC = quality control
SIM = selective ion monitoring
SM = Standard Methods for the Examination of Water and Wastewater
SVOC = semivolatile organic compound
TCLP = toxicity characteristic leaching procedure
VOC = volatile organic compound
WMG = wide mouth glass

Table 3. Laboratory Analyses

Analysis	Matrix	Method	Container Type	Preservation	Holding Time
Chemical Delineation					
Percent Solids	Soil	SM2540G	Glass WM, Clear, 4 oz	Cool ≤6˚C	7 days
PAHs	Soil	EPA 8270E SIM			14/40 days[b]
Investigation-Derived Waste					
PAHs	Soil	EPA 8270E SIM	Glass WM, Clear, 4 oz	Cool ≤6˚C	14/40 days[b]
pH/Corrosivity	Soil	SM4500-H+ B	Glass WM, Clear, 32 oz	Cool ≤6˚C	24 hours
Ignitability/Flashpoint	Soil	ASTM D93		Cool ≤6˚C	14 days
Reactive Cyanide	Soil	SM4500-CN		Cool ≤6˚C	14 days
Reactive Sulfide	Soil	SM4500-S2		Cool ≤6˚C	14 days
TCLP SVOCs	Soil	EPA 1311/8270D		Cool ≤6˚C	14/7/40 days[c]
TCLP Pesticides	Soil	EPA 1311/8270D		Cool ≤6˚C	14/7/40 days[c]
TCLP Herbicides	Soil	EPA 1311/8015A		Cool ≤6˚C	14/7/40 days[c]
TCLP Metals	Soil	EPA 1311/7470A/6010D		Cool ≤6˚C	180(28)/180(28) days[d]
TCLP VOCs	Soil	EPA 1311/8260C	Glass WM, Clear, 4 oz with septa	Cool ≤6˚C	14/14 days[e]
PAHs	Water	EPA 8270E SIM	500 mL AG	Cool ≤6˚C	7/40 days[f]
RCRA Metals	Water	EPA 7470A/6010D	250 ml HDPE	Cool ≤6˚C pH<2 w/HNO3	180 days
VOCs (TCLP list)	Water	EPA 8260C	40 mL Glass Vial with septa	Cool ≤6˚C pH<2 w/HCl	14 days
Groundwater					
PCB Aroclors	Water	EPA 8082A	500 mL AG	Cool ≤6˚C	7/40 days[f]
PAHs	Water	EPA 8270E SIM	500 mL AG	Cool ≤6˚C	7/40 days[f]

Table 3. Laboratory Analyses

Analysis	Matrix	Method	Container Type	Preservation	Holding Time
Equipment Blank					
PCB Aroclors	Water	EPA 8082A	500 mL AG	Cool ≤6˚C	7/40 days[f]
PAHs	Water	EPA 8270E SIM	500 mL AG	Cool ≤6˚C	7/40 days[f]

Notes:
AG = amber glass
ASTM = ASTM International
EPA = U.S. Environmental Protection Agency
HCl = hydrochloric acid
HNO3 = nitric acid
HPDE = high density polyethylene
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SIM = selective ion monitoring
SM = Standard Methods for the Examination of Water and Wastewater
SVOC = semivolatile organic compound
TCLP = toxicity characteristic leaching procedure
VOC = volatile organic compound
WM = wide mouth

[a] 1 year to extraction, 40 days to analysis
[b] 14 days to extraction, 40 days to analysis
[c] 14 days to TCLP extraction, 7 days to extraction, 40 days to analysis
[d] 180 days to TCLP extraction, 180 days to analysis (28/28 days for mercury)
[e] 14 days to TCLP extraction, 14 days to analysis
[f] 7 days to extraction, 40 days to analysis

Table 4. Method Detection Limits and Reporting Limits

Analysis	Units	Method Detection Limits	Reporting Limits
Soils			
PAHs (EPA 8270E SIM)			
Naphthalene	µg/kg	1.28	5
2-Methylnaphthalene	µg/kg	1.1	5
1-Methylnaphthalene	µg/kg	0.401	5
Acenaphthylene	µg/kg	1.08	5
Acenaphthene	µg/kg	0.571	5
Dibenzofuran	µg/kg	1.38	5
Fluorene	µg/kg	0.631	5
Phenanthrene	µg/kg	0.718	5
Anthracene	µg/kg	0.871	5
Fluoranthene	µg/kg	0.47	5
Pyrene	µg/kg	0.626	5
Benzo(a)anthracene	µg/kg	0.824	5
Chrysene	µg/kg	1.05	5
Benzo(b)fluoranthene	µg/kg	1.37	5
Benzo(k)fluoranthene	µg/kg	0.76	5
Benzo(j)fluoranthene	µg/kg	0.68	5
Benzofluoranthenes, Total	µg/kg	3.01	10
Benzo(a)pyrene	µg/kg	0.614	5
Indeno(1,2,3-cd)pyrene	µg/kg	1.05	5
Dibenzo(a,h)anthracene	µg/kg	0.891	5
Benzo(g,h,i)perylene	µg/kg	1.06	5
General Chemistry			
Reactive Cyanide (SM4500-CN)	mg/kg	0.01	0.01
Reactive Sulfide (SM4500-S2)	mg/kg	0.1	0.1
Percent Solids (SM2540G)	%	0.1	0.1
TCLP SVOCs (EPA 1311/8270D)			
o-Cresol	mg/L	0.00037	0.01
m-Cresol	mg/L	0.00037	0.01
p-Cresol	mg/L	0.00037	0.01
1,4-Dichlorobenzene	mg/L	0.01	0.01
2,4-Dinitrotoluene	mg/L	0.00021	0.01
Hexachlorobenzene	mg/L	0.0002	0.01
Hexachlorobutadiene	mg/L	0.00011	0.01
Hexachloroethane	mg/L	0.0001	0.01
Nitrobenzene	mg/L	0.0002	0.005
Pentachlorophenol	mg/L	0.0002	0.01
Pyridine	mg/L	0.01	0.1
2,4,5-Trichlorophenol	mg/L	0.01	0.01
2,4,6-Trichlorophenol	mg/L	0.00016	0.01

Table 4. Method Detection Limits and Reporting Limits

Analysis	Units	Method Detection Limits	Reporting Limits
TCLP Pesticides (EPA 1311/8270D)			
Chlordane	mg/L	0.01	0.01
Endrin	mg/L	0.01	0.01
Heptachlor	mg/L	0.005	0.01
Heptachlor Epoxide	mg/L	0.005	0.005
Lindane	mg/L	0.0003	0.01
Methoxychlor	mg/L	0.01	0.01
Toxaphene	mg/L	0.5	0.5
TCLP Herbicides (EPA 1311/8015A)			
2,4-D	mg/L	0.0005	0.005
2,4,5-TP (Silvex)	mg/L	0.0005	0.005
TCLP Metals (EPA 1311/7470A/6010D)			
Arsenic	mg/L	0.008	0.025
Barium	mg/L	0.001	0.002
Cadmium	mg/L	0.0006	0.01
Chromium	mg/L	0.001	0.01
Lead	mg/L	0.006	0.01
Mercury	mg/L	0.0005	0.0005
Selenium	mg/L	0.008	0.013
Silver	mg/L	0.001	0.01
Aluminum	mg/L	0.1	0.01
Copper	mg/L	0.01	0.02
Nickel	mg/L	0.001	0.04
Zinc	mg/L	0.001	0.005
TCLP VOCs (EPA 1311/8260C)			
Benzene	mg/L	0.0005	0.005
Carbon Tetrachloride	mg/L	0.0005	0.005
Chlorobenzene	mg/L	0.0005	0.005
Chloroform	mg/L	0.0005	0.005
1,2-Dichloroethane	mg/L	0.0005	0.005
1,1-Dichloroethylene	mg/L	0.0005	0.005
Methyl Ethyl Ketone	mg/L	0.0005	0.02
Tetrachloroethylene	mg/L	0.0005	0.005
Trichloroethylene	mg/L	0.0005	0.005
Vinyl Chloride	mg/L	0.0005	0.005

Table 4. Method Detection Limits and Reporting Limits

Analysis	Units	Method Detection Limits	Reporting Limits
Waters			
PCB Aroclors (EPA 8082A)			
Aroclor 1016	µg/L	0.13	1.0
Aroclor 1221	µg/L	0.147	1.0
Aroclor 1232	µg/L	0.147	1.0
Aroclor 1242	µg/L	0.147	1.0
Aroclor 1248	µg/L	0.13	1.0
Aroclor 1254	µg/L	0.13	1.0
Aroclor 1260	µg/L	0.147	1.0
Aroclor 1262	µg/L	0.147	1.0
Aroclor 1268	µg/L	0.147	1.0
PAHs (EPA 8270E SIM)			
Naphthalene	µg/L	0.0169	0.100
2-Methylnaphthalene	µg/L	0.0259	0.100
1-Methylnaphthalene	µg/L	0.0196	0.100
Acenaphthylene	µg/L	0.0232	0.100
Acenaphthene	µg/L	0.0203	0.100
Dibenzofuran	µg/L	0.0217	0.100
Fluorene	µg/L	0.0161	0.100
Phenanthrene	µg/L	0.0243	0.100
Anthracene	µg/L	0.0228	0.100
Fluoranthene	µg/L	0.0161	0.100
Pyrene	µg/L	0.0254	0.100
Benzo(a)anthracene	µg/L	0.0458	0.100
Chrysene	µg/L	0.0552	0.100
Benzo(b)fluoranthene	µg/L	0.0854	0.100
Benzo(k)fluoranthene	µg/L	0.0864	0.100
Benzo(j)fluoranthene	µg/L	0.0309	0.100
Benzofluoranthenes, Total	µg/L	0.191	0.200
Benzo(a)pyrene	µg/L	0.0559	0.100
Indeno(1,2,3-cd)pyrene	µg/L	0.0840	0.100
Dibenzo(a,h)anthracene	µg/L	0.0900	0.100
Benzo(g,h,i)perylene	µg/L	0.0721	0.100

Notes:
EPA = U.S. Environmental Protection Agency
EPA = U.S. Environmental Protection Agency
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SIM = selective ion monitoring
SVOC = semivolatile organic compound
TCLP = toxicity characteristic leaching procedure
VOC = volatile organic compound

Attachment 1

Standard Operating Procedures for Groundwater Sampling

STANDARD OPERATING PROCEDURE (SOP) GW-01

DECONTAMINATION OF GROUNDWATER SAMPLING EQUIPMENT

SCOPE AND APPLICATION

This SOP describes procedures for decontaminating sampling equipment used for groundwater sampling that could come in contact with contaminated media. To prevent potential cross contamination of samples, all reusable groundwater sampling and processing equipment will be decontaminated before each use. At the sample collection site, a decontamination area will be established in a clean location, upwind of actual sampling locations, if possible. This decontamination area is where all groundwater sampling and processing equipment will be cleaned. Decontaminated equipment will be stored away from areas that may cause recontamination. When handling decontamination chemicals, field personnel will follow all relevant procedures and will wear protective equipment as stipulated in the site-specific health and safety plan.

This SOP describes procedures for decontaminating sampling and processing equipment contaminated by either inorganic or organic materials. General procedures were adopted from the Standard Practice for Decontamination of Field Equipment Used at Waste Sites (ASTM 2002).

EQUIPMENT AND REAGENTS REQUIRED

- Plastic sheeting
- 55-gal, U.S. Department of Transportation-approved drums (if required)
- Alconox® or Liquinox® detergent
- Acid rinses (for inorganic constituent sampling); either reagent-grade diluted nitric or hydrochloric acid (if required)
- Solvent rinses (for organic constituent sampling); either pesticide-grade hexane, isopropanol, or acetone (if required)
- Deionized/distilled water (generally provided by laboratory) and potable water
- 5-gal buckets or other appropriate containers

- 4-ft length of 2-in. polyvinyl chloride (PVC) tubing with an end cap (if required)
- Scrub brushes
- Personal protective equipment, including appropriate gloves and goggles.

PROCEDURES

The following sections detail the procedures for decontaminating sampling equipment that has been, or could be, contaminated with inorganic or organic chemicals and for decontaminating the submersible pump.

Inorganic Chemicals—Decontamination of Sampling Equipment

1. Wipe equipment free of gross solids.
2. Wash equipment with an Alconox® or Liquinox® solution, scrubbing off any residue.
3. Rinse generously with potable water.
4. Rinse equipment with acid (0.1 N nitric or hydrochloric) if specified in the site sampling and analysis plan (SAP).
5. Rinse with deionized water.
6. Allow to air dry, if practical.
7. Wrap equipment in new aluminum foil if it will not be used promptly.
8. Place all sampling equipment, gloves, and other disposable materials in garbage bags after decontaminating. The wash and rinse must be placed in containers for proper disposal.

Organic Chemicals—Decontamination of Sampling Equipment

1. Wipe equipment free of gross solids.
2. Wash equipment with an Alconox® or Liquinox® solution, scrubbing off any residues.
3. Rinse generously with tap water.
4. Rinse equipment with solvent (pesticide-grade hexane, isopropanol, or acetone) if specified in the site SAP.
5. Rinse with deionized water.
6. Allow to air dry, if practical.
7. Wrap equipment in new aluminum foil if it will not be used promptly.

8. Place all sampling equipment, gloves, and other disposable materials in garbage bags after decontaminating. Place wash and rinse fluids in containers for proper disposal.

Decontamination of Submersible Pump

1. Place the pump in a 5-gal bucket containing potable water and a small amount of Alconox® or Liquinox® detergent. Place discharge hose into same bucket.
2. Turn on the system and pump water through the sampling system. Add more potable water as needed and pump for 2 minutes.
3. Place the pump into a second 5-gal bucket containing tap water leaving the discharge hose in the first bucket. Turn on the system and pump until the soapy water is purged from the pump and tubing. Place the discharge hose into the second 5-gal bucket of water and pump for 1 minute.
4. Turn off system and place the pump into the 4-ft section of 2-in. inside diameter PVC tubing fitted with an end cap. Pour organic-free deionized water into the decontamination tube. Stand by with additional deionized water.
5. Turn on the pump and pull deionized water through the system. Add more water until at least 3 L of deionized water is pumped through the system.
6. Remove the pump from the decontamination tube.
7. Place all sampling equipment, gloves, and other disposable materials in garbage bags after decontaminating. Place wash and rinse fluids in containers for proper disposal.

REFERENCE

ASTM. 2002. Standard practice for decontamination of field equipment used at waste sites. D5088-02. American Society for Testing and Materials, West Conshohocken, PA.

STANDARD OPERATING PROCEDURE (SOP) GW-02

MEASUREMENT OF DEPTH TO WATER

SCOPE AND APPLICATION

This SOP describes the required equipment and the procedures used for the collection of water level data. Alternate equipment may be used if necessary, as long as the general procedures described below are followed. Typically water levels are collected from all the site wells as expeditiously as possible so that the water level data can be used to create potentiometric surface maps that are representative of a “single” point in time. This SOP does not address interpretation of water level data and the special care and hydraulic expertise that should be used to interpret water level data sets in unique environments (i.e., tidally influenced wells).

Depth to groundwater surface is measured using an electric water level meter. A light on the water level meter illuminates and an alarm sounds when the weighted probe tip contacts the water surface in the well and completes an electronic circuit. The measured depth to water is determined to within 0.01 ft by noting the point on the probe cable that corresponds to the measuring point at the top of the well/piezometer casing at the initial point of contact. The measuring point should be notched at the lip of the casing, typically either on the high side or on the north side.

EQUIPMENT AND REAGENTS REQUIRED

- Electronic water level indicator (Solinst® or equivalent)
- Potable and distilled/deionized water
- Alconox® or Liquinox® detergent
- Tape measure with stainless steel weights
- Disposable bailer (if light, nonaqueous-phase liquid [LNAPL] conditions are unknown)

PROCEDURES

Water Level Measurements

1. Check the operation of the meter by turning on the indicator switch and pressing the test button.
2. Open well cap to allow equilibration with ambient atmospheric pressure.
3. Monitor air quality at the well head if volatile contaminants are or may be present, or as specified by the project-specific health and safety plan.
4. Check for possible presence of LNAPL using a new 3-ft long disposable bailer affixed to nylon rope if conditions are unknown. Gradually lower the bailer until the bottom of the bailer is approximately 2 ft below the top of the water surface. Slowly raise the bailer to the surface and measure the product thickness using a tape measure. Record the measurement in the field logbook. Properly dispose of the bailer.
5. Decontaminate the probe and graduated cable with an Alconox® or Liquinox® solution followed by a distilled or deionized water rinse.
6. Hold the water level indicator and cable reel above the well casing and lower indicator probe and cable gradually into well until a tone (e.g., buzzer) and/or the indicator light illuminates, denoting that the indicator probe has made contact with the water surface. Stop lowering the cable.
7. Note the point on the graduated cable that corresponds to the measuring point at the top of the casing when the electronic circuit is first completed. If necessary, grasp tape with thumb and index finger exactly at the measuring point marked at the top of the well casing. Pull tape out of well slowly and read the measurement.
8. Draw the cable about 1 ft above the surface of the water, then lower it and repeat Steps 6 through 8. If the two readings differ by more than 0.01 ft, repeat until the measured readings stabilize. Water level records should always use the measurement taken as the indicator is lowered into the well, not as it is raised.
9. Remove the cable from the well or piezometer.
10. Record the stabilized depth-to-water measurement in the field logbook.
11. Decontaminate the probe and graduated cable with Alconox® and tap-water wash and distilled or deionized water, as appropriate.

12. Lower a weighted steel measuring tape slowly from center of well or piezometer if the total depth of the well needs to be measured. Alternately, the water level meter can be used to measure the total depth of the well. However, when measuring the total depth, the depth from the measuring point of the probe to the bottom of the probe must be **added** to the measurement because the graduated cable is referenced to the point of the probe where the electronic circuit is completed. Sounding the bottom of the well prior to sampling of the well is **NOT** recommended because of the potential for resuspension of settled formation solids in the well.
13. Draw tape up very slowly until it is taut again when the weight hits the bottom or until the tape slackens noticeably.
14. Note the tape reading at level of casing top. Record this as well depth in the field logbook to the nearest 0.01 ft.

STANDARD OPERATING PROCEDURE (SOP) GW-03

LOW-FLOW GROUNDWATER SAMPLING

SCOPE AND APPLICATION

This SOP presents the methods to be used for monitoring well purging and groundwater sampling using low-flow (minimal drawdown) sampling methods. The procedures outlined in this SOP are in accordance with groundwater sampling methods recommended by USEPA (1992, 1996). Details on site-specific sampling activities, equipment selection (i.e., pumps), site-specific field parameters, field quality control and quality assurance (QA/QC) samples, and laboratory analyses are presented in the work plan, field sampling plan (FSP), or quality assurance program plan (QAPP). Where possible, sampling should first be conducted in areas least affected by chemicals of interest, followed by increasingly affected areas (i.e., clean to dirty).

EQUIPMENT REQUIRED

- Electronic water level meter
- Groundwater parameter meter capable of measuring field parameters required by the FSP or the QAPP
- Flow-through cell
- Sampling equipment (one from list):
  - Submersible pump (bladder or Grundfos®): pump, control box, power source (typically a portable generator or 12V battery)
  - Peristaltic pump: pump with pump head, silicone tubing, tubing connectors, power source (typically 12 V battery)
- Decontamination equipment and supplies (buckets, scrub brushes, deionized or distilled water, potable water, and Liquinox® or Alconox® detergent)
- Groundwater sampling forms and logbook
- Sample tubing (type and length are project- and site-dependent)
- Sample tags/labels and appropriate documentation (e.g., chain-of-custody forms, logbook, and groundwater sample collection forms)

- Insulated cooler(s), chain-of-custody seals, Ziploc® bags
- Sample containers with preservative (if required), coolers, and ice.

PROCEDURES

The following sections provide guidelines for preparation for purging, well purging, and groundwater sampling.

Preparation for Purging

Preparation for purging includes inspecting the condition of the well, monitoring health and safety conditions, and calibrating and decontaminating sampling equipment. General procedures are presented below:

1. Ensure that the area around well head is clean and free of debris. If necessary, place a plastic drop cloth around well head to prevent sampling equipment from coming into contact with the ground surface.
2. Inspect condition of well (e.g., well in locked position, tightness of cap, measuring point well marked, disturbance of surface casing, straightness of well casing, condition of concrete pad). Indicate condition of well on the sampling form.
3. Remove well cap. If the site health and safety plan (HSP) identifies organic compounds as potential contaminants of concern, screen well headspace and breathing-zone headspace (if specified in the HSP) for organic vapors using the appropriate field monitoring instrument (e.g., photoionization detector).
4. Decontaminate all equipment (as specified in the FSP, QAPP, or in accordance with SOP GW-01) before use in each well. Wear nitrile gloves and/or other protective equipment as specified in the site-specific HSP during possible water-contact or equipment-contact activities. At a minimum, change gloves between each well or when it is possible for potential contaminants to be introduced into the well.
5. Measure water level using a decontaminated electronic water level meter as described in SOP GW-02 when the water level in the well has equilibrated.
6. Obtain a sample from the well using a bailer and observe the contents for evidence of free floating product (SOP GW-02), if suspected (see FSP or QAPP). Alternatively, measure free product thickness using an oil–water interface probe.
7. Calculate the well casing volume as follows:

$$\text{well casing volume (gal)} = \pi(r^2)(h)(7.48\ \text{gal/ft}^3)$$

Where:

h	=	height of water in the well casing (i.e., depth to bottom of the well minus depth to water) in feet
r	=	radius of the inside of the well casing in feet.

8. Calibrate water quality meters for measuring field parameters as appropriate. At a minimum, collect temperature, pH, and specific conductance measurements during purging and prior to sampling. Other field parameters, including dissolved oxygen, redox potential, and turbidity (recommended for inorganics) may be required as specified in the work plan or FSP. Record equipment calibration and maintenance in the field logbook. Decontaminate meters between wells by rinsing with distilled or deionized water. Manage rinsate water used for these measurements in the same manner as purge water, as defined in the work plan or FSP.

Well Purging

Monitoring wells are purged before groundwater samples are collected for analyses. The purpose of well purging is to remove stagnant groundwater from the well. Field parameters (i.e., pH, temperature, specific conductance, redox potential, dissolved oxygen, and turbidity) are measured during the purging process to verify that stagnant water has been removed and that groundwater conditions are stable prior to sampling to ensure a representative groundwater sample is collected. A variety of pumps can be used to purge and sample the monitoring well (refer to the FSP or QAPP for the specified pump type). Refer to the manufacturer's instructions for operation of the specified pump. General procedures for purging are as follows:

1. Remove well cap.
2. Connect pump.

   Submersible Pump (bladder or Grundfos):

   a. Remove the pump from the pump holder and rinse with distilled water.

   b. Connect appropriate length of tubing to pump.

   c. Connect the pump to control box.

   d. Connect the control box to the power supply.

   Peristaltic Pump:

   a. Connect new or pre-cleaned tubing to peristaltic pump.

   b. Connect the pump to the power supply.

c. Lower the pump intake or intake tubing (as applicable) into the water column. The pump intake should be placed at the middle or slightly above the middle of the screened interval in confined aquifers (USEPA 1996) or in unconfined aquifers not screened across the water table. Place the pump intake near the top of the water column for unconfined aquifers screened across the water table (USEPA 1996).

3. Insert multimeter into flow-through cell. Connect the discharge hose from the pump to the flow-through cell. Direct discharge from flow-through cell to an appropriately sized container to manage purge water. **DO NOT** immerse water quality meter probes into purge water containing free product because this may damage the probes.

4. Turn on the pump. Conduct purging at a rate that will minimize drawdown in the well (i.e., purge at a rate less than or equal to recharge, if possible). Recommended purge rates are generally less than 0.13 gal/min (0.5 L/min) (USEPA 1996), or a rate that results in minimal (i.e., less than 0.3 ft) of drawdown in the well. Actual purge rates will vary based on aquifer material and well construction.

5. Record field parameters on the groundwater sampling form or logbook every 3 to 5 minutes. Purging should continue at a constant rate until the water quality parameters have stabilized for three successive measurements according to the stabilization criteria provided in the table below (USEPA 1996). In the event that even very low purge rates result in evacuation of the well, collect groundwater samples for laboratory analyses as soon as sufficient groundwater accumulates in the well, regardless of the stabilization of field parameters.

Field Parameter	Stabilization Criteria
Temperature	± 1°C
pH	± 0.1 standard units
Specific Conductance	± 3 percent
Dissolved Oxygen	± 10 percent
Redox Potential	± 10 mV
Turbidity (nephelometric turbidity units)	± 10 percent

Groundwater Sample Collection

Groundwater sampling is conducted following proper purging of the well. Where possible, groundwater samples for analyses should be collected directly from the pump discharge at the lowest rate possible to minimize cross contamination, suspension of solids, and aeration of the sample.

Sample groundwater after the water quality parameters have stabilized. The general procedures for groundwater sample collection are as follows:

1. Turn down flow rate on the control box so that water flow is stopped or minimal while maintaining sufficient pressure in the system to prevent water in the tubing or flow-through cell from flowing back into the well. If a peristaltic pump is used, turn off the pump. Take care not to release the pump head because the loss of suction will cause the water in the tubing to drain back into the well.
2. Disconnect the pump discharge hose from flow-through cell or cut the tubing just before the connection to the flow-through cell.
3. Introduce groundwater samples directly from the pump discharge tube into the proper sample container and fill it to capacity. Place a bucket beneath the sampling tube to catch any unsampled water. Target analytes, container types, and preservatives are specified in the FSP or QAPP.
4. Collect groundwater samples for multiple compounds in the recommended following order (USEPA 1992):
   - Volatile organic compounds (VOCs)
   - Dissolved gases and total organic carbon (TOC)
   - Semivolatile organic compounds (SVOCs)
   - Metals and cyanide
   - Major water quality cations and anions
   - Radionuclides.
5. Increase pump flow rate slightly so that the flow rate is approximately the same as was used for purging and fill necessary sample bottles. If sampling for VOCs, flow rate should be just enough to create a trickle of water. If sampling for other analytes, flow rate may be increased. When collecting samples for VOCs, direct the flow from the pump discharge down the side of the sample container to minimize aeration. Hold caps in hand to minimize contamination of sample. Fill all VOC sample containers to the top. A positive meniscus at the top of the container will help ensure that no air is trapped inside when cap is screwed down on the container. No air bubbles should be trapped in the sample when the container is sealed. VOC sample bottles must be checked after filling to ensure no air bubbles are present. Invert the bottle and lightly tap it to release any bubbles beneath the cap. If an air bubble is present, the VOC sample must be retaken using a fresh bottle.

6. Conduct field filtration, if required by the FSP or QAPP (recommended for inorganic analytes). If applicable, attach a new, disposable filter cartridge (typically 0.45 μm) to the discharge line. Collect filtered samples last and pre-rinse them by running a minimum of 0.25 gal of groundwater through them prior to collecting the sample (USEPA 1996). Introduce filtered water directly into the appropriate sample container. Note that alternate field filtration methods may be specified in the FSP or QAPP.
7. Collect QA/QC samples (i.e., duplicate, equipment rinsate, trip blank, laboratory matrix spike, and laboratory matrix spike duplicate, as applicable) at the same time by filling all bottles from the same flow. The number and types of QA/QC samples are specified in the FSP or QAPP.
8. Label sample bottles with date, sample number, time, sampler's name, and type of preservative, as described in the project-specific QAPP and in accordance with SOP AP-04. Place sample bottles in a cooler or on ice to keep samples cool (4°C). Samples must be cooled continuously from the time of collection to the time of receipt at the laboratory, as described in SOP AP-01.
9. Reconnect the discharge tubing to the flow-through cell with the multimeter. Continue pumping for 1 to 2 minutes and collect a set of post-sampling field parameters. Record the parameters on the groundwater sampling form or in the logbook.
10. Remove pump and/or tubing from the well. Close and lock the well. Decontaminate the sampling equipment in accordance with SOP GW-01. Purge, wash, and rinse water should be managed as specified in the FSP or QAPP.
11. Complete chain-of-custody form, package samples for shipment, and ship samples or arrange for courier to laboratory.
12. Document all field observations made and data generated in conjunction with the sample collection on the groundwater field sampling form.

REFERENCES

USEPA. 1992. RCRA ground-water monitoring: draft technical guidance. U.S. Environmental Protection Agency, Office of Solid Waste, Washington, DC.

USEPA. 1996. Low-flow (minimal drawdown) ground-water sampling procedures. EPA/540/S-95/504. U.S. Environmental Protection Agency, Office of Research and Development, Office of Solid Waste and Emergency Response, Washington, DC.

Attachment 2

Revised Job Hazard Analysis Form

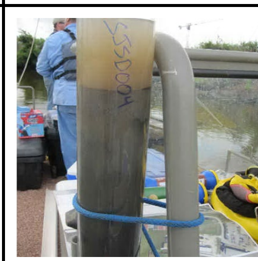
Job Hazard Analysis (JHA) Assessment Form

JHA Title: Former Georgetown Steam Plant Flume Investigation
JHA Number: 5
Date: March 8, 2022

Job Description: Soil and groundwater collection
Project Number: CF1408

General Personal Protective Equipment (PPE) Required: Nitrile gloves, bibs, steel-toe boots, sunscreen, class 2 safety vest
Additional PPE Required: Insect repellent, cut resistant gloves, safety glasses
JHA Team Names: Shannon Ashurst, Kelsey Kirkland, Mauri Fabio

Approved by:
Matthew Behum - 3/8/2022

Job Steps	Photographs	Hazard Type	Potential Hazards	Control Type	Existing Controls	SEV	OCC	EFF	HPN	Control Type	Recommended Controls	SEV	OCC	EFF	HPN
Drill rig positioning		Phys	Heavy equipment / drill rigs	Adm	Crush/pinch/abrasion protection—"Body out of line of fire"	2	3	0.50	3			2	3	0.50	3
		Env	Environmental—Adverse weather	Adm	Atmospheric monitoring (use weather app on phone to monitor for potential storms)										
		Phys	Sharp or rough surfaces (laceration/puncture) (phragmites, briar bush)	PPE	Hand—Gloves (cut/puncture resistant)					PPE	Field staff will wear safety glasses at all times.				
		Bio	Insect bites	PPE	Protective clothing and insect repellent										
		Bio	Plant infection (e.g., poison ivy)	PPE	PPE—Safety glasses; nitrile gloves and long sleeves										
		Env	Environmental—Uneven terrain	PPE	Foot—Safety shoes										
Soil core collection		Phys	Ergonomics—Heavy lifting (material handling)	Adm	Sprain/strain protection—Proper lifting techniques / body posture	2	2	0.25	1			1	3	0.25	0.75
		Phys	Slip/trip/fall—Same level	Adm	Foot—Safety shoes					Adm	Slip/trip/fall protection—"Eyes on path"				
		Phys	Pinch points or moving parts (finger in corer or grab sampler)	PPE	Hand—Gloves (cut/puncture resistant)					PPE	Field staff will wear safety glasses at all times.				
		Env	Environmental—Uneven terrain	PPE	Foot—Safety shoes					Adm	Housekeepi ng (describe)				
		Env	Environmental—Hazardous waste	PPE	Hand—Gloves (chemical resistant)										
		Env	Environmental—Nonhazardous waste	PPE	Hand—Gloves (chemical resistant)										
		Env	Environmental—Adverse weather	Adm	Atmospheric monitoring (use weather app on phone to monitor for potential storms)										
Sample processing		Phys	Ergonomics—Awkward postures (static or transient)	Adm	Job rotation (describe)	2	2	0.25	1			1	3	0.25	0.75
		Phys	Slip/trip/fall—Same level	Adm	Foot—Safety shoes					Adm	Slip/trip/fall protection—"Eyes on path"				
		Phys	Pinch points or moving parts (finger in corer or grab sampler)	PPE	Hand—Gloves (cut/puncture resistant)					PPE	Field staff will wear safety glasses at all times.				
		Env	Environmental—Uneven terrain	PPE	Foot—Safety shoes					Adm	Housekeepi ng (describe)				
		Env	Environmental—Hazardous waste	PPE	Hand—Gloves (chemical resistant)										
		Env	Environmental—Nonhazardous waste	PPE	Hand—Gloves (chemical resistant)										
		Env	Environmental—Adverse weather	Adm	Atmospheric monitoring (use weather app on phone to monitor for potential storms)										
Low-flow groundwater sampling		Phys	Ergonomics—Awkward postures (static or transient)	Adm	Job rotation (describe)	2	2	0.25	1			1	3	0.25	0.75
		Phys	Slip/trip/fall—Same level	Adm	Slip/trip/fall protection—"Eyes on path"					Adm	Housekeeping (describe) - keep area clear of tubing/ equipment trip hazards				
		Phys	Pinch points or moving parts (finger in corer or grab sampler)	PPE	Hand—Gloves (cut/puncture resistant)					PPE	Hand—Gloves (cut/puncture resistant)				
		Chem	Exposure to splashes or spills of cold material or cryogenic gases	PPE	Head/face—Safety glasses with side shields (ANSI Z71)					PPE	Field staff will wear safety glasses at all times.				
		Env	Environmental—Hazardous waste	PPE	Hand—Gloves (chemical resistant)										
		Env	Environmental—Nonhazardous waste	PPE	Hand—Gloves (chemical resistant)										
		Env	Environmental—Adverse weather	Adm	Atmospheric monitoring (use weather app on phone to monitor for potential storms)										

Attachment 3

Groundwater Field Form

GROUNDWATER SAMPLE COLLECTION FORM

integral consulting inc.
719 2nd Avenue, Suite 1450
Seattle, WA 98104
(206) 230-9600

Well ID	Project Name
Sample ID	Project Number
Date	Sampler

Well Information

Monument Condition	☐ Good	☐ Needs Repair________________		
Well Cap Condition	☐ Good	☐ Locked	☐ Replaced	☐ Needs Replacement
Elevation Mark	☐ Yes	☐ Added	☐ other	
Well Diameter	☐ 2-inch	☐ 4-inch	☐ 6-inch	☐ Other

Odor ☐ Comments ____________________________________

Purge Data

Total Well Depth ______ ft ☐ Clean Bottom ☐ Muddy Bottom ☐ Not Measured

Depth to Water ______ ft

Casing Volume ______ ft (H20) X ________ gpf = ______ X 3 = __________ gallons

3/4 " = 0.02 gpf 1"= 0.04 gpf 2" = 0.16 gpf 4"=0.65 gpf 6"=1.47 gpf

Purge Method

Pump Type:	Peristaltic	Tubing: Dedicated Teflon-lined LDPE	Total volume purged __________
Sample Intake Depth	____________		Purge Rate __________
Purge Start Time	____________	Purge Stop Time ____________	Sample Rate __________

Field Parameters

Time	Gallons	pH	Temperature (°C)	ORP (mvolts)	Turbidity (NTU)	Conductivity (mS/cm)	D.O. (mg/L)	Comments

Sampling Device Peristaltic pump, Dedicated Teflon-lined LDPE tubing.

Filter Type: Size:

Sample Containers Collection Time___________

Tag No.	Type	Preservative	Analytical Method	QA Remarks
	☐ Poly (1 L)	--	EPA 160.2	
	☐ Poly (1 L)	--	EPA 160.1	
	☐ Poly (500 mL)	--	EPA 310.1	
	☐ Poly (500 mL)	--	120.1, 300.0	
	☐ Poly (500 mL)	H_2SO_4	415.1	
	☐ Poly (500 mL)	HNO_3	6010B, 200.8, 7470A	
	☐ Poly (500 mL)	HNO_3	6010B, 200.8, 7470A	Filtered
	☐ Poly (500 mL)	--	7196	
	☐ 2 VOA (40 mL vial)	HCL	TPH-Gx	
	☐ 2 VOA (40 mL vial)	HCL	VPH	
	☐ 2 Amber (500 mL)	HCL	TPH-Dx	
	☐ 1 Amber (500 mL)	HCL	EPH	
	☐ 2 Amber (500 mL)	--	8270C	
	☐ 2 Amber (500 mL)	--	8270-SIM	
	☐ 3 VOA (40 mL vial)	HCL	8260	
	☐ 2 Amber (1 L)	--	8082	
	☐ 2 Amber (500 mL)	--	8081A	

Samplers' Signature____ Date ______________

Appendix G

Georgetown Steam Plant Partial Property Transfer—Data Summary Report

Georgetown Steam Plant Partial Property Transfer

Data Summary Report

Prepared for
City of Seattle
700 5th Ave
Seattle, WA, 98104

Prepared by
integral consulting inc.
719 2nd Avenue
Suite 1450
Seattle, WA 98104

May 27, 2022

CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

ARI	Analytical Resources, Inc.
bgs	below ground surface
cPAH	carcinogenic polycyclic aromatic hydrocarbon
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
IDW	investigation-derived waste
Integral	Integral Consulting Inc.
LDW	Lower Duwamish Waterway
MDL	method detection limit
MTCA	Model Toxics Control Act
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
Project Site	Georgetown Steam Plant Former Flume Property (partial), east of 1001 South Myrtle Street, Seattle, WA 98108
SAP	sampling and analysis plan
SCL	Seattle City Light
SDOT	Seattle Department of Transportation
SPR	Seattle Parks and Recreation
TCLP	toxicity characteristic leaching procedure
VOC	volatile organic compound

1 INTRODUCTION

Integral Consulting Inc. (Integral) investigated soil and groundwater conditions at the southern portion of the Georgetown Steam Plant Former Flume Property (Project Site, east of 1001 South Myrtle Street, Seattle, WA 98108) (Figure 1-1). The work was conducted during two sampling events conducted on September 29, 2021, and March 9, 2022. The Project Site is at the margin of the North Boeing Field/Georgetown Steam Plant Site that is undergoing a remedial investigation and feasibility study under Agreed Order No. DE 5685 (Ecology 2008) between the Washington State Department of Ecology (Ecology), the Boeing Company, the City of Seattle, and King County.

The investigation was conducted to support transfer of the property from Seattle City Light (SCL) to Seattle Parks and Recreation (SPR) and the Seattle Department of Transportation (SDOT), which plan to redevelop the Project Site into a community amenity featuring an off-leash pet area and bicycle/pedestrian path, long requested by community advocates. Details regarding site redevelopment are presented in the main text of the Interim Action Work Plan.

1.1 SITE BACKGROUND

The Project Site was part of the former flume removal action completed in 2009 (Herrera 2010). The purpose of the removal action was to remove contamination from within and adjacent to the flume, provide for stormwater conveyance for the Georgetown Steam Plant and the South Myrtle Street right-of-way, and implement controls so that the flume would no longer act as a potential conveyance for contamination to Slip 4 of the Lower Duwamish Waterway (LDW).

A review of the post-removal action data for the Project Site by SCL during the initial planning stages of this property redevelopment identified data gaps in some areas of the Project Site. To support transfer of the Project Site to SPR and SDOT, SCL sought additional site characterization to address data gaps from previous site investigations and to facilitate additional soil removal and disposal to support site redevelopment.

1.2 INVESTIGATION SUMMARY

The Project Site sampling events were performed in accordance with the *Former Georgetown Steam Plant Property Transfer Sampling and Analysis Plan* (SAP) (Integral 2021) and the SAP Addendum (Integral 2022) prepared for SCL. The expected Project Site users are people and their pets accessing the site in a recreational capacity. The expected soil exposure depth for a recreator is no greater than 0.5 ft, based on common convention.[1] The sampling objectives were as follows:

1. Characterize the 0- to 1-ft below ground surface (bgs) interval through the collection of composite samples for soil disposal characterization. Four composite subareas—Trail and Right-of-Way (Area 1), Off-Leash Area (Area 2), Former Ellis Substation (Area 3), and Stormwater Facility (Area 4)—are defined by the area's past and/or future use and are presented on Figure 1-2.
2. Characterize the soil below 1 ft bgs using a set of discrete samples to determine whether the "remaining" soil surface would pose any residual human health or ecological risk or an impediment to unrestricted site use. Results from the first round of sampling showed subsurface concentrations above target screening levels up to 2 ft bgs at one location (GTF_S6), so a second round of sampling was implemented to further delineate subsurface soil characteristics at and in the vicinity of this location. Discrete sample locations are presented on Figure 1-2.
3. Characterize groundwater in the vicinity of location GTF_S6, which was found during the first sampling event to have soil concentrations above target screening levels to at least 2 ft bgs. Groundwater samples were collected upgradient of, at, and downgradient of location GTF_S6.

[1] Chapter 173-340-740(6)(d) indicates that the point of compliance for soil cleanup levels based on human exposure via direct contact "shall be established in the soils throughout the site from the ground surface to fifteen feet below the ground surface. This represents a reasonable estimate of the depth of soil that could be excavated and distributed at the soil surface as a result of site development activities." However, recreational users (or their pets) would not be excavating in the soil and would not reasonably have the potential to come into contact with soils deeper than 0.5 ft. The minimum proposed excavation depth (which will be replaced with clean fill to design grade) is 1.0 ft. Recreators (or their pets) have no direct pathway to soils deeper than the clean backfill will extend. Further, the sampling was done to confirm that the "remaining" surface soil post-excavation (which will be re-covered with clean material to design grade) meets Model Toxics Control Act (MTCA) Methods A and B criteria; excavation beyond 2 ft will not be necessary, as detailed in the discussion of results.

2 FIELD INVESTIGATION

The two field events are described below. Field documentation is provided in appendices, as indicated.

2.1 FIELD EVENT SUMMARY

The first field event took place on September 29, 2021, and was implemented in accordance with the SAP. Borings were completed at 21 locations. Field duplicate samples were collected at GTF_S13 and GTF_S19 (no further than 6 in. from parent boring), for a total of 23 boring locations. Each boring location was sampled using a direct push drill rig by a driller licensed in the State of Washington. Samples were collected from the top 2 ft of soil. Target boring recovery was 75 percent (i.e., 1.5 ft of recovery on a 2.0-ft drive); this requirement was satisfied for all boring locations. Soil samples were delivered under chain-of-custody protocols to Analytical Resources, Inc. (ARI) for analysis. Actual sample locations are shown in Figure 1-2.

Four composite soil samples were collected from each subarea, Area 1 through Area 4. Equal aliquots of soil from 0-1 ft bgs were collected from each boring location[2] within a subarea and placed in a stainless steel bowl. Once all boring locations had been sampled for each area, the composite material was thoroughly mixed prior to soil being placed in sample containers. The composite samples represent the soil proposed for excavation and disposal from 0–1 ft bgs for each of these subareas. The composite samples were analyzed for polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), pH/corrosivity, ignitability/flashpoint, reactive cyanides, reactive sulfides, and toxicity characteristic leaching procedure (TCLP) semivolatile organic compounds, volatile organic compounds (VOCs), pesticides, herbicides, and 12 metals.

Twenty-three discrete samples (21 locations plus 2 field duplicates) collected from 1 to 1.5 ft bgs were analyzed for PCBs and PAHs. The remaining cores from 1.5 to 2 ft bgs were archived for potential future analysis if needed, pending receipt of the 1- to 1.5-ft bgs results. Archived 1.5- to 2-ft bgs samples were later analyzed for five locations with soil concentrations above target screening levels at 1.5 ft bgs.[3] Of these, all but the sample at location GTF_S6 were below target screening levels in the 1.5- to 2.0-ft depth interval.

The second field event took place on March 9, 2022, and was implemented in accordance with the SAP and SAP Addendum (Integral 2021, 2022). Soil samples were collected at three new locations (GTF-22, GTF-23, and GTF-24) surrounding location GTF_S6. For the second field event, samples were collected from the new boreholes in 0.5-ft intervals beginning at 1.5 ft bgs

[2] Each subarea had between four and seven discrete boring locations. See Table 1 of the SAP (Integral 2021).
[3] Locations GTF_S2, GTF_S4, GTF_S6, GTF_S7, and GTF_S21. These are further discussed in Section 4.

down to 4.5 ft bgs. GTF_S6 was reoccupied (within 2 ft) and samples were collected in 0.5 ft intervals beginning at 2 ft bgs down to 4.5 ft bgs. All samples up to 2.5 ft bgs were submitted for analysis. All remaining soil samples (collected in 0.5-ft intervals) were archived at the analytical laboratory.

Equipment rinse blank samples for a sampling spoon, sampling bowl, and drill head were collected during both field events as described in the SAP and SAP Addendum.

Attachment 1 includes the field notes, boring logs, and chains-of-custody for both field events.

2.2 INVESTIGATION-DERIVED WASTE

Investigation-derived waste (IDW) samples for both solid and liquid waste were collected for both field events. The solid IDW samples were analyzed for PCBs, PAHs, pH/corrosivity, ignitability/flashpoint, reactive cyanides, reactive sulfides, and TCLP (same analytes as for the four 0–1 ft bgs composite soil samples). The liquid IDW samples were analyzed for PAHs, Resource Conservation and Recovery Act metals, and TCLP VOCs. Solid and liquid IDW was placed in two drums for disposal (one drum per sample medium). IDW drums from the September 2021 event were removed from the Project Site by an unknown party before they could be properly disposed of; consequently, IDW drums from the March 2022 event were immediately moved to the secure Georgetown Steam Plant property at the conclusion of sampling activities. This IDW will be disposed of in accordance with all applicable regulations and guidelines. Integral has arranged for ACTEnviro to dispose of the waste drums within 30 days following receipt of waste characterization data from ARI.

2.3 FIELD EVENT DEVIATIONS

There were no major field event deviations during either sampling event. Several sample locations did require step-outs of 1.5 to 10 ft from the proposed coordinates; however, because target locations for each area were spread at roughly equidistant intervals from each other to provide even coverage across the area, these step-outs were inconsequential to the study design. Sample location adjustments were necessary at target locations with poor recovery, drill rig obstructions (e.g., overhead power lines), or underground utilities. Final sample locations are shown on Figure 1-2.

3 SAMPLE ANALYSIS AND VALIDATION

Sample analysis and data validation are described below. Laboratory reports are available upon request and validation reports are attached.

3.1 SAMPLE ANALYSIS

Laboratory analysis was performed by ARI, a Washington State-accredited laboratory. Composite and discrete soil samples were analyzed according to the methods specified in the SAP; groundwater samples were analyzed according to the methods in the SAP Addendum. Laboratory reports are available upon request.

Archived samples will be stored for 6 months for potential future analysis if deemed necessary.

3.2 DATA VALIDATION

Integral validated all laboratory data. The majority of the data underwent Stage 2b validation described in the U.S. Environmental Protection Agency's (EPA's) *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (USEPA 2009). The IDW sample data underwent Stage 2a validation. The data were validated using procedures described in the following EPA guidance documents for data validation:

- *Guidance on Environmental Data Verification and Data Validation* (USEPA 2002)
- *National Functional Guidelines for Organic Superfund Methods Data Review* (USEPA 2020a)
- *National Functional Guidelines for Inorganic Superfund Methods Data Review* (USEPA 2020b).

The accuracy and completeness of the database were verified at the laboratory when the electronic data deliverables were prepared and again as part of independent data validation. In addition to verification of field and laboratory data and information, final validation data qualifier entries into the database were verified. Any discrepancies were resolved before the final database was released for use. The validation report is provided in Attachment 3.

A total of 1,756 results were reported. A total of 475 results (27 percent) were qualified as estimated or not detected. The September 2021 TCLP pyridine result in Sample GTF-SL054 was rejected because of very low recovery in the associated matrix spike analysis. Further, the laboratory reported a number of reanalysis results. In these cases, because a more appropriate result was reported, a total of 255 of results were rejected as do-not-report. These results were not used in the percentage and completeness calculations.

The data meet the criteria set forth in the method and referenced quality assurance documents, with the exceptions noted in the data validation report. All other results, except the rejected result, are acceptable for their intended use, as qualified. Completeness was statistically 100 percent.

4 RESULTS

Analytical results are summarized below.

4.1 COMPOSITE SOIL SAMPLES

Analytical results for the 0–1 ft composite samples are provided in Table 4-1. Most analytes were non-detected or "J-flagged" as estimate concentrations. These results characterize the top foot of soil, by area, across the site and will be submitted to the offsite disposal facility for waste characterization purposes for the removed soil.

4.2 DISCRETE SOIL SAMPLES

Analytical results for the discrete samples are provided in Table 4-2 and summarized on Figure 1-2. Results were compared to Model Toxics Control Act (MTCA) Method A unrestricted land use criteria as a conservative assessment of potential exposure (the property currently qualifies as industrial). Results were also compared to MTCA Method B criteria, as requested by Ecology.

4.2.1 PCBs

No samples exceeded the PCB MTCA Method A unrestricted land use criterion. One sample (location GTF_S2 in Area 1 [Trail and Right-of-Way]) exceeded the PCB MTCA Method B criterion in the 1- to 1.5-ft bgs sample. Because the MTCA Method A unrestricted land use criterion for total PCBs was met at this location, the 1.5- to 2.0-ft bgs sample was not analyzed.

4.2.2 Carcinogenic PAHs

Soil samples from the September 2021 field event were initially analyzed for the 1- to 1.5-ft bgs interval. This analysis indicated four samples in Area 1 (Trail and Right-of-Way) and one sample in Area 4 (Stormwater Facility) exceeded the carcinogenic PAH (cPAH) MTCA Method A unrestricted land use criterion.[4] As a result, the archived 1.5- to 2-ft bgs samples at these locations were analyzed for cPAHs. In all locations except GTF_S6, the 1.5- to 2-ft bgs soil sample was below the MTCA Method A criterion. The GTF_S6 soil concentration exceeded the Method A criterion in the 1.5 to 2.0 ft sample.

As discussed previously, a second field event was conducted in March 2022 to obtain soil from deeper soil intervals at location GTF_S6, as well as at three new sample locations bracketing

[4] The MTCA Method B cPAH criteria are higher than the MTCA Method A cPAH criterion (Table 2), so this discussion focuses on the MTCA Method A criterion, as it is the most conservative.

GTF_S6. For the three new locations, samples in three depth ranges (1 to 1.5 ft bgs; 1.5 to 2 ft bgs; and 2 to 2.5 ft bgs) were analyzed for cPAHs. At location GTF_S6, one sample from 2 to 2.5 ft bgs was analyzed for cPAHs. Results for locations GTF_22 and GTF_23 were below the MTCA Method A criterion in the 1 to 1.5 ft bgs sample. The sample collected at GTF_24 was below the MTCA Method A criterion in the 1.5 to 2 ft sample. The sample collected at GTF_S6 was below the MTCA Method A criterion in the 2 to 2.5 ft sample. Soil concentrations at all four locations were below the MTCA Method A criterion at the 2 to 2.5 ft bgs interval.

4.3 GROUNDWATER

Groundwater samples were collected from three temporary groundwater sample locations during the second field event. Samples were collected upgradient of, at, and downgradient of location GTF_S6. Groundwater analytical results are provided in Table 4-3. PCBs and cPAHs were non-detect in all samples. The laboratory method detection limit (MDL) for PCBs was equal to the MTCA Method B cancer criterion, which is the lowest of the PCB Method A and Method B screening criteria. The cPAH MDL was below the MTCA Method A and Method B non-cancer criteria, but slightly above the Method B cancer criterion. The laboratory was not able to achieve lower detection limits. The consistent non-detected results meeting the unrestricted land use criterion (MTCA Method A) in this industrial area indicate that there have been no impacts to groundwater from soil at this location.

4.4 WASTE CHARACTERIZATION

IDW results are provided in Attachment 4. The IDW results will be used to ensure proper disposal of the residual waste.

5 FINDINGS

Overall findings from the two sampling events are summarized here. These results will be used to refine the site redevelopment design and are presented in the main text of the Interim Action Work Plan. The composite soil characterization results will assist in soil handling requirements for the planned soil excavation.

5.1 SOIL

Soil in Areas 1 through 4 met the MTCA Method A total PCB criterion at a depth of 1 ft bgs.

Soil in Areas 1 through 4 met the MTCA Method A and Method B cPAH criteria at a depth no deeper than 2 ft bgs, as depicted on Figure 1-2 and summarized below:

Depths at Which Soil Concentration Was Below MTCA Method A and MTCA Method B cPAH Criteria, by Location

1–1.5 ft bgs	1.5–2 ft bgs	2–2.5 ft bgs
Area 1: Trail and Right-of-Way		
GTF_S1, GTF_S3, GTF_S5	GTF_S2, GTF_S4, GTF_S7	GTF_S22, GTF_S6, GTF_S24
Area 2: Off-Leash Area		
GTF_S8, GTF_S9, GTF_S10, GTF_S11, GTF_S12	NA	NA
Area 3: Former Ellis Substation		
GTF_S13, GTF_S14, GTF_S15, GTF_S16, GTF_S17	NA	NA
Area 4: Stormwater Facility		
GTF_S18, GTF_S19, GTF_S20	GTF_S23, GTF_S21	NA

Notes:
NA = not applicable; all samples met MTCA criteria at a shallower depth.

5.2 GROUNDWATER

Groundwater results collected upgradient, at, and downgradient of location GTF_S6 were non-detect for the Project Site chemicals of concern, PCBs and cPAHs, indicating there is no evidence of leaching to groundwater for these chemicals from the vicinity soils.

6 REFERENCES

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Figures

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Figure 1-1.
Project Site Vicinity Map

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Figure 1-2.
Soil and Groundwater Sample Locations

Tables

Table 4-1. Georgetown Steam Plant Former Flume Property (Partial): Analytical Results for Composite Soil Samples (0-1 ft)

	Sample ID	GTF_AREA1_ 0-1ft_comp	GTF_AREA2_ 0-1ft_comp	GTF_AREA3_ 0-1ft_comp	GTF_AREA4_ 0-1ft_comp
	Sample Number	GTF-SL001	GTF-SL002	GTF-SL003	GTF-SL004
	Sample Date	09/29/21	09/29/21	09/29/21	09/29/21
Analyte	Units	Result	Result	Result	Result
Polychlorinated Biphenyls					
Aroclor 1016	mg/kg	0.020 *U*	0.020 *UJ*	0.020 *UJ*	0.020 *U*
Aroclor 1221	mg/kg	0.020 *U*	0.020 *UJ*	0.020 *UJ*	0.020 *U*
Aroclor 1232	mg/kg	0.020 *U*	0.020 *UJ*	0.020 *UJ*	0.020 *U*
Aroclor 1242	mg/kg	0.020 *U*	0.020 *UJ*	0.020 *UJ*	0.020 *U*
Aroclor 1248	mg/kg	0.020 *U*	0.020 *UJ*	0.020 *UJ*	0.020 *U*
Aroclor 1254	mg/kg	0.036	0.019 *J*	0.011 *J*	0.016 *J*
Aroclor 1260	mg/kg	0.23	0.047 *J*	0.027 *J*	0.044
Aroclor 1262	mg/kg	0.020 *U*	0.020 *UJ*	0.020 *UJ*	0.020 *U*
Aroclor 1268	mg/kg	0.020 *U*	0.020 *UJ*	0.020 *UJ*	0.020 *U*
Total PCB Aroclors	mg/kg	0.26	0.066 *J*	0.038 *J*	0.059 *J*
Polycyclic Aromatic Hydrocarbons					
1-Methylnaphthalene	mg/kg	0.00093 *UJ*	0.0019 *UJ*	0.024	0.0025 *UJ*
2-Methylnaphthalene	mg/kg	0.0014 *UJ*	0.0029 *UJ*	0.025	0.0049 *UJ*
Acenaphthene	mg/kg	0.00069 *UJ*	0.00098 *UJ*	0.035	0.0016 *UJ*
Acenaphthylene	mg/kg	0.0050 *U*	0.0012 *J*	0.0071 *J*	0.0020 *J*
Anthracene	mg/kg	0.0015 *J*	0.0018 *J*	0.082	0.0039 *J*
Benzo(a)anthracene	mg/kg	0.012	0.017	0.30	0.037
Benzo(a)pyrene	mg/kg	0.017	0.025	0.33	0.045
Benzo(b)fluoranthene	mg/kg	0.018	0.025	0.29	0.056
Benzo(g,h,i)perylene	mg/kg	0.021 *J*	0.038 *J*	0.25 *J*	0.078 *J*
Benzo(j)fluoranthene	mg/kg	0.0072	0.0091	0.12	0.021
Benzo(k)fluoranthene	mg/kg	0.0094	0.011	0.15	0.026
Benzofluoranthenes	mg/kg	0.034	0.045	0.53	0.10
Chrysene	mg/kg	0.017	0.024	0.34	0.070
Dibenzo(a,h)anthracene	mg/kg	0.0036 *J*	0.0048 *J*	0.065	0.011
Dibenzofuran	mg/kg	0.0050 *U*	0.0050 *U*	0.023	0.0031 *J*
Fluoranthene	mg/kg	0.018	0.024	0.56	0.073
Fluorene	mg/kg	0.0050 *U*	0.00071 *J*	0.036	0.0020 *J*

Table 4-1. Georgetown Steam Plant Former Flume Property (Partial): Analytical Results for Composite Soil Samples (0-1 ft)

	Sample ID	GTF_AREA1_ 0-1ft_comp	GTF_AREA2_ 0-1ft_comp	GTF_AREA3_ 0-1ft_comp	GTF_AREA4_ 0-1ft_comp
	Sample Number	GTF-SL001	GTF-SL002	GTF-SL003	GTF-SL004
	Sample Date	09/29/21	09/29/21	09/29/21	09/29/21
Analyte	Units	Result	Result	Result	Result
Indeno(1,2,3-cd)pyrene	mg/kg	0.014	0.020	0.19	0.034
Naphthalene	mg/kg	0.0013 *UJ*	0.0026 *UJ*	0.023	0.0051
Phenanthrene	mg/kg	0.0069	0.010	0.44	0.033
Pyrene	mg/kg	0.017 *J*	0.025 *J*	0.48 *J*	0.062 *J*
cPAH TEQ	mg/kg	0.023 *J*	0.033 *J*	0.43	0.062
Waste Characterization / TCLP					
pH	ph units	5.96 *J*	6.46 *J*	6.67 *J*	6.74 *J*
Flashpoint	deg f	212 *UJ*	212 *UJ*	212 *UJ*	212 *UJ*
Cyanide	percent	0.5 *UJ*	0.5 *UJ*	0.5 *UJ*	0.5 *UJ*
Sulfide	percent	0.1 *UJ*	0.1 *UJ*	0.1 *UJ*	0.1 *UJ*
Arsenic	mg/L	0.025 *U*	0.025 *U*	0.025 *U*	0.025 *U*
Barium	mg/L	0.38 *J*	0.25 *J*	0.20 *J*	0.23 *J*
Cadmium	mg/L	0.010 *U*	0.010 *U*	0.010 *U*	0.010 *U*
Chromium	mg/L	0.010 *U*	0.010 *U*	0.010 *U*	0.010 *U*
Lead	mg/L	0.045	0.043	0.025	0.024
Selenium	mg/L	0.0080 *U*	0.0080 *U*	0.0080 *U*	0.0080 *U*
Silver	mg/L	0.010 *U*	0.010 *U*	0.010 *U*	0.010 *U*
Mercury	mg/L	0.00020 *U*	0.00020 *U*	0.00020 *U*	0.00020 *U*
1,1-Dichloroethene	mg/L	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
1,2-Dichloroethane	mg/L	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
1,4-Dichlorobenzene	mg/L	0.010 *U*	0.010 *U*	0.010 *U*	0.010 *U*
Benzene	mg/L	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Carbon tetrachloride	mg/L	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Chloroform	mg/L	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Tetrachloroethene	mg/L	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Trichloroethene	mg/L	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Vinyl chloride	mg/L	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
1,4-Dichlorobenzene	mg/L	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
2,4,5-Trichlorophenol	mg/L	0.010 *U*	0.010 *UJ*	0.010 *U*	0.010 *U*

Table 4-1. Georgetown Steam Plant Former Flume Property (Partial): Analytical Results for Composite Soil Samples (0-1 ft)

	Sample ID	GTF_AREA1_ 0-1ft_comp	GTF_AREA2_ 0-1ft_comp	GTF_AREA3_ 0-1ft_comp	GTF_AREA4_ 0-1ft_comp
	Sample Number	GTF-SL001	GTF-SL002	GTF-SL003	GTF-SL004
	Sample Date	09/29/21	09/29/21	09/29/21	09/29/21
Analyte	Units	Result	Result	Result	Result
2,4,6-Trichlorophenol	mg/L	0.010 *U*	0.010 *UJ*	0.010 *U*	0.010 *U*
2,4-D	mg/L	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
2,4-Dinitrotoluene	mg/L	0.010 *U*	0.010 *U*	0.010 *U*	0.010 *U*
2-Methylphenol	mg/L	0.010 *U*	0.010 *UJ*	0.010 *U*	0.010 *U*
4-Methylphenol	mg/L	0.010 *U*	0.010 *UJ*	0.010 *U*	0.010 *U*
Chlordane (cis & trans)	mg/L	0.010 *U*	0.010 *U*	0.010 *U*	0.010 *U*
Chlorobenzene	mg/L	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Endrin	mg/L	0.010 *U*	0.010 *U*	0.010 *U*	0.010 *U*
Heptachlor	mg/L	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Heptachlor epoxide	mg/L	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Hexachlorobenzene	mg/L	0.010 *U*	0.010 *U*	0.010 *U*	0.010 *U*
Hexachlorobutadiene	mg/L	0.010 *U*	0.010 *U*	0.010 *U*	0.010 *U*
Hexachloroethane	mg/L	0.010 *U*	0.010 *U*	0.010 *U*	0.010 *U*
Methoxychlor	mg/L	0.010 *U*	0.010 *U*	0.010 *U*	0.010 *U*
Methylethyl ketone	mg/L	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Nitrobenzene	mg/L	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Pentachlorophenol	mg/L	0.010 *U*	0.010 *UJ*	0.010 *U*	0.010 *U*
Pyridine	mg/L	0.010 *UJ*	0.010 *UJ*	0.010 *UJ*	0.010 *UJ*
Silvex	mg/L	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Toxaphene	mg/L	0.50 *U*	0.50 *U*	0.50 *U*	0.50 *U*
gamma-Hexachlorocyclohexane	mg/L	0.010 *U*	0.010 *U*	0.010 *U*	0.010 *U*

Notes:
cPAH TEQs were calculated in accordance with Washington State Department of Ecology Implementation Memorandum #10 (April 20, 2015).

cPAH = carcinogenic PAH
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCLP = toxicity characteristic leaching procedure
TEQ = toxicity equivalence

Qualifiers:
J = The reported value was an estimate.
U = The analyte was not detected. The associated numerical value is the reporting limit.

Table 4-2. Georgetown Steam Plant Former Flume Property (Partial): Analytical Results for Discrete Soil

				Area	1: Trail and Right-of-Way									
				Location ID	GTF_S1		GTF_S2		GTF_S3		GTF_S4		GTF_S5	
				Sample ID	GTF_S1_1-1.5ft	GTF_S1_1.5-2ft	GTF_S2_1-1.5ft	GTF_S2_1.5-2ft	GTF_S3_1-1.5ft	GTF_S3_1.5-2ft	GTF_S4_1-1.5ft	GTF_S4_1.5-2ft	GTF_S5_1-1.5ft	GTF_S5_1.5-2ft
				Sample Number	GTF-SL005	GTF-SL006	GTF-SL007	GTF-SL008	GTF-SL009	GTF-SL010	GTF-SL011	GTF-SL012	GTF-SL013	GTF-SL014
				Sample Date	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21
		MTCA Method A	MTCA Method B	Sample Type	N	N	N	N	N	N	N	N	N	N
Analyte	Units	Unrestricted Land Use	Noncancer (Eq. 740-1)	Cancer (Eq. 740-2)	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Polychlorinated Biphenyls														
Aroclor 1016	mg/kg		5.6	14	0.020 *U*	NA	0.10 *U*	NA	0.020 *U*	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1221	mg/kg				0.020 *U*	NA	0.10 *U*	NA	0.020 *U*	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1232	mg/kg				0.020 *U*	NA	0.10 *U*	NA	0.020 *U*	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1242	mg/kg				0.020 *U*	NA	0.10 *U*	NA	0.020 *U*	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1248	mg/kg				0.020 *U*	NA	0.10 *U*	NA	0.020 *U*	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1254	mg/kg		1.6	0.5	0.020 *U*	NA	0.14 *J*	NA	0.041	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1260	mg/kg			0.5	0.020 *U*	NA	0.89	NA	0.093	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1262	mg/kg				0.020 *U*	NA	0.10 *U*	NA	0.020 *U*	NA	0.020 *U*	NA	0.020 *U*	NA
Aroclor 1268	mg/kg				0.020 *U*	NA	0.10 *U*	NA	0.020 *U*	NA	0.020 *U*	NA	0.020 *U*	NA
Total PCB Aroclors	mg/kg	1		0.5	0.020 *U*	NA	**1.0 *J***	NA	0.13	NA	0.020 *U*	NA	0.020 *U*	NA
Polycyclic Aromatic Hydrocarbons														
1-Methylnaphthalene	mg/kg		5600	34	0.0016 *UJ*	0.0018 *UJ*	0.0048 *UJ*	0.0020 *UJ*	0.0015 *UJ*	0.00044 *UJ*	0.0045 *UJ*	0.0037 *UJ*	0.0050 *U*	0.0050 *U*
2-Methylnaphthalene	mg/kg		320		0.0019 *UJ*	0.0019 *J*	0.0064	0.0020 *J*	0.0027 *UJ*	0.0050 *U*	0.0055	0.0042 *J*	0.0050 *U*	0.0050 *U*
Acenaphthene	mg/kg		4800		0.0011 *UJ*	0.0013 *UJ*	0.012	0.0050 *U*	0.0011 *UJ*	0.0050 *U*	0.0012 *UJ*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Acenaphthylene	mg/kg				0.0050 *U*	0.0012 *J*	0.014	0.0050 *U*	0.0023 *J*	0.0050 *U*	0.0022 *J*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Anthracene	mg/kg		24000		0.0050 *U*	0.0050 *U*	0.044	0.0014 *J*	0.0041 *J*	0.0050 *U*	0.0051	0.0050 *U*	0.0050 *U*	0.0050 *U*
Benzo(a)anthracene	mg/kg				0.0050 *U*	0.0050 *U*	0.38	0.0044 *J*	0.036	0.0020 *J*	0.19	0.0050 *U*	0.0050 *U*	0.0050 *U*
Benzo(a)pyrene	mg/kg				0.00071 *J*	0.0050 *U*	0.39	0.0052	0.056	0.0030 *J*	0.39	0.00081 *J*	0.0014 *J*	0.0050 *U*
Benzo(b)fluoranthene	mg/kg				0.0014 *J*	0.0050 *U*	0.44	0.0052	0.091	0.0036 *J*	0.40	0.0050 *U*	0.0021 *J*	0.0050 *U*
Benzo(g,h,i)perylene	mg/kg				0.0012 *J*	0.0050 *U*	0.31	0.0044 *J*	0.080	0.0049 *J*	0.33	0.0050 *U*	0.0022 *J*	0.0050 *U*
Benzo(j)fluoranthene	mg/kg				0.0050 *U*	0.0050 *U*	0.17	0.0024 *J*	0.032	0.0014 *J*	0.14	0.0050 *U*	0.00081 *J*	0.0050 *U*
Benzo(k)fluoranthene	mg/kg				0.0050 *U*	0.0050 *U*	0.21	0.0030 *J*	0.039	0.0022 *J*	0.19	0.0050 *U*	0.00084 *J*	0.0050 *U*
Benzofluoranthenes	mg/kg				0.0100 *U*	0.010 *U*	0.73	0.011	0.15	0.0070 *J*	0.65	0.0100 *U*	0.0033 *J*	0.010 *U*
Chrysene	mg/kg				0.0011 *J*	0.0050 *U*	0.44	0.0054	0.074	0.0028 *J*	0.16	0.0050 *U*	0.0011 *J*	0.0050 *U*
Dibenzo(a,h)anthracene	mg/kg				0.0050 *U*	0.0050 *U*	0.086	0.0010 *J*	0.017	0.00099 *J*	0.067	0.0050 *U*	0.0050 *U*	0.0050 *U*
Dibenzofuran	mg/kg		80		0.0050 *U*	0.0050 *U*	0.0061	0.0050 *U*	0.0018 *J*	0.0050 *U*	0.0016 *J*	0.0016 *J*	0.0050 *U*	0.0050 *U*
Fluoranthene	mg/kg		3200		0.0013 *J*	0.00088 *J*	0.60	0.0080	0.050	0.0030 *J*	0.034	0.00085 *UJ*	0.0013 *J*	0.0050 *U*
Fluorene	mg/kg		3200		0.00090 *UJ*	0.0011 *UJ*	0.011	0.0050 *U*	0.00069 *UJ*	0.00099 *UJ*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Indeno(1,2,3-cd)pyrene	mg/kg				0.0012 *J*	0.0050 *U*	0.26	0.0035 *J*	0.055	0.0028 *J*	0.24	0.0050 *U*	0.0019 *J*	0.0050 *U*
Naphthalene	mg/kg		1600		0.0019 *UJ*	0.0017 *J*	0.010	0.0016 *UJ*	0.0039 *UJ*	0.0050 *U*	0.0047 *UJ*	0.0029 *UJ*	0.0050 *U*	0.0050 *U*
Phenanthrene	mg/kg				0.0018 *UJ*	0.0018 *J*	0.22	0.0063	0.020	0.0020 *J*	0.0077	0.0026 *J*	0.0019 *UJ*	0.0012 *J*
Pyrene	mg/kg		2400		0.0013 *J*	0.00092 *J*	0.59	0.0085	0.068	0.0031 *J*	0.081	0.0010 *J*	0.0011 *J*	0.0050 *U*
cPAH TEQ	mg/kg	0.1	24	0.19	0.0017 *J*	0.0050 *U*	**0.53**	0.0070 *J*	0.081	0.0042 *J*	**0.50**	0.0021 *J*	0.0024 *J*	0.0050 *U*

Table 4-2. Georgetown Steam Plant Former Flume Property (Partial): Analytical Results for Discrete Soil

				Area	1: Trail and Right-of-Way									
				Location ID	GTF_S22		GTF_S6				GTF_S24		GTF_S7	
				Sample ID	GTF_S22_1.5-2ft	GTF_S22_2-2.5ft	GTF_S6_1-1.5ft	GTF_S6_1.5-2ft	GTF_S6_B_2-2.5ft	GTF_S6_B_2-2.5ft_DUP	GTF_S24_1.5-2ft	GTF_S24_2-2.5ft	GTF_S7_1-1.5ft	GTF_S7_1.5-2ft
				Sample Number	GTF-SL061	GTF-SL062	GTF-SL015	GTF-SL016	GTF-SL056	GTF-SL084	GTF-SL073	GTF-SL074	GTF-SL017	GTF-SL018
				Sample Date	03/09/22	03/09/22	09/29/21	09/29/21	03/09/22	03/09/22	03/09/22	03/09/22	09/29/21	09/29/21
				Sample Type	N	N	N	N	N	FD	N	N	N	N
		MTCA Method A	MTCA Method B											
Analyte	Units	Unrestricted Land Use	Noncancer (Eq. 740-1)	Cancer (Eq. 740-2)	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Polychlorinated Biphenyls														
Aroclor 1016	mg/kg		5.6	14	NA	NA	0.020 *U*	NA	NA	NA	NA	NA	0.020 *U*	NA
Aroclor 1221	mg/kg				NA	NA	0.020 *U*	NA	NA	NA	NA	NA	0.020 *U*	NA
Aroclor 1232	mg/kg				NA	NA	0.020 *U*	NA	NA	NA	NA	NA	0.020 *U*	NA
Aroclor 1242	mg/kg				NA	NA	0.020 *U*	NA	NA	NA	NA	NA	0.020 *U*	NA
Aroclor 1248	mg/kg				NA	NA	0.020 *U*	NA	NA	NA	NA	NA	0.020 *U*	NA
Aroclor 1254	mg/kg		1.6	0.5	NA	NA	0.048	NA	NA	NA	NA	NA	0.020 *U*	NA
Aroclor 1260	mg/kg			0.5	NA	NA	0.082	NA	NA	NA	NA	NA	0.018 *J*	NA
Aroclor 1262	mg/kg				NA	NA	0.020 *U*	NA	NA	NA	NA	NA	0.020 *U*	NA
Aroclor 1268	mg/kg				NA	NA	0.020 *U*	NA	NA	NA	NA	NA	0.020 *U*	NA
Total PCB Aroclors	mg/kg	1		0.5	NA	NA	0.13	NA	NA	NA	NA	NA	0.018 *J*	NA
Polycyclic Aromatic Hydrocarbons														
1-Methylnaphthalene	mg/kg		5600	34	0.0019 *UJ*	0.0015 *UJ*	0.0099	0.0035 *UJ*	0.00095 *UJ*	0.0010 *UJ*	0.012	0.0050 *U*	0.028	0.0031 *UJ*
2-Methylnaphthalene	mg/kg		320		0.0025 *J*	0.0015 *J*	0.011	0.0055	0.0050 *U*	0.0050 *U*	0.0096	0.0050 *U*	0.029	0.0033 *J*
Acenaphthene	mg/kg		4800		0.0047 *UJ*	0.0012 *UJ*	0.048	0.0068	0.00059 *UJ*	0.0050 *U*	0.032	0.0050 *U*	0.16	0.0021 *UJ*
Acenaphthylene	mg/kg				0.0021 *J*	0.0013 *J*	0.0061	0.0036 *J*	0.0050 *U*	0.0050 *U*	0.0042 *J*	0.0050 *U*	0.0032 *J*	0.0015 *J*
Anthracene	mg/kg		24000		0.012	0.0015 *J*	0.080	0.021	0.0050 *U*	0.0050 *U*	0.055	0.0050 *U*	0.29	0.0021 *J*
Benzo(a)anthracene	mg/kg				0.066	0.0065	0.44	0.13	0.0022 *J*	0.0026 *J*	0.11	0.0012 *J*	0.75	0.0057
Benzo(a)pyrene	mg/kg				0.077	0.029	0.44	0.17	0.0043 *J*	0.0056	0.097	0.0016 *J*	0.63	0.0069
Benzo(b)fluoranthene	mg/kg				0.069	0.026	0.41	0.15	0.0045 *J*	0.0051	0.069	0.0015 *J*	0.67	0.0075
Benzo(g,h,i)perylene	mg/kg				0.070	0.029	0.43	0.16	0.0048 *J*	0.0063	0.062	0.0022 *J*	0.45	0.0078
Benzo(j)fluoranthene	mg/kg				0.029	0.0087	0.23	0.072	0.0017 *J*	0.0023 *J*	0.035	0.00076 *J*	0.35	0.0029 *J*
Benzo(k)fluoranthene	mg/kg				0.035	0.011	0.30	0.092	0.0017 *J*	0.0028 *J*	0.040	0.00087 *J*	0.47	0.0035 *J*
Benzofluoranthenes	mg/kg				0.13	0.044	0.95	0.31	0.0083 *J*	0.0099 *J*	0.14	0.0031 *J*	1.1	0.014
Chrysene	mg/kg				0.076	0.0091	0.50	0.16	0.0033 *J*	0.0036 *J*	0.11	0.0015 *J*	0.85	0.0081
Dibenzo(a,h)anthracene	mg/kg				0.014	0.0053	0.13	0.036	0.0011 *J*	0.0012 *J*	0.020	0.0050 *U*	0.20	0.0014 *J*
Dibenzofuran	mg/kg		80		0.0026 *J*	0.0050 *U*	0.021	0.0050	0.0050 *U*	0.0050 *U*	0.012	0.0050 *U*	0.11	0.0022 *J*
Fluoranthene	mg/kg		3200		0.12	0.0047 *J*	0.87	0.21	0.0022 *J*	0.0023 *J*	0.17	0.0020 *J*	2.0	0.013
Fluorene	mg/kg		3200		0.0040 *J*	0.00079 *J*	0.039	0.0062	0.0050 *U*	0.0050 *U*	0.023	0.0050 *U*	0.19	0.0013 *J*
Indeno(1,2,3-cd)pyrene	mg/kg				0.052	0.020	0.39	0.14	0.0027 *J*	0.0040 *J*	0.053	0.0015 *J*	0.45	0.0054
Naphthalene	mg/kg		1600		0.0039 *J*	0.0017 *J*	0.013	0.0087	0.0050 *U*	0.0013 *J*	0.011	0.0050 *U*	0.042	0.0032 *UJ*
Phenanthrene	mg/kg				0.071	0.0029 *J*	0.58	0.11	0.0024 *J*	0.0028 *J*	0.18	0.0012 *J*	1.9	0.014
Pyrene	mg/kg		2400		0.13	0.0059	0.90	0.27	0.0024 *J*	0.0027 *J*	0.20	0.0024 *J*	1.5	0.011
cPAH TEQ	mg/kg	0.1	24	0.19	0.10	0.036	**0.61**	**0.23**	0.0055 *J*	0.0072 *J*	0.13	0.0024 *J*	**0.89**	0.0093 *J*

Table 4-2. Georgetown Steam Plant Former Flume Property (Partial): Analytical Results for Discrete Soil

				Area	2: Off-Leash Area					3: Former Ellis Substation					
				Location ID	GTF_S8	GTF_S9	GTF_S10	GTF_S11	GTF_S12	GTF_S13		GTF_S14	GTF_S15	GTF_S16	GTF_S17
				Sample ID	GTF_S8_1-1.5ft	GTF_S9_1-1.5ft	GTF_S10_1-1.5ft	GTF_S11_1-1.5ft	GTF_S12_1-1.5ft	GTF_S13_1-1.5ft	GTF_S13_1-1.5ft_DUP	GTF_S14_1-1.5ft	GTF_S15_1-1.5ft	GTF_S16_1-1.5ft	GTF_S17_1-1.5ft
				Sample Number	GTF-SL019	GTF-SL021	GTF-SL023	GTF-SL025	GTF-SL027	GTF-SL029	GTF-SL047	GTF-SL031	GTF-SL033	GTF-SL035	GTF-SL037
				Sample Date	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21
				Sample Type	N	N	N	N	N	N	FD	N	N	N	N
		MTCA Method A	MTCA Method B												
Analyte	Units	Unrestricted Land Use	Noncancer (Eq. 740-1)	Cancer (Eq. 740-2)	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Polychlorinated Biphenyls															
Aroclor 1016	mg/kg		5.6	14	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Aroclor 1221	mg/kg				0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Aroclor 1232	mg/kg				0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Aroclor 1242	mg/kg				0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Aroclor 1248	mg/kg				0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Aroclor 1254	mg/kg		1.6	0.5	0.020 *U*	0.012 *J*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Aroclor 1260	mg/kg			0.5	0.083	0.026	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.036	0.012 *J*	0.020 *U*	0.034
Aroclor 1262	mg/kg				0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Aroclor 1268	mg/kg				0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*
Total PCB Aroclors	mg/kg	1		0.5	0.083	0.038 *J*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.020 *U*	0.036	0.012 *J*	0.020 *U*	0.034
Polycyclic Aromatic Hydrocarbons															
1-Methylnaphthalene	mg/kg		5600	34	0.0018 *UJ*	0.0050 *U*	0.00098 *UJ*	0.0050 *U*	0.0050 *U*	0.00076 *UJ*	0.0050 *U*	0.00082 *UJ*	0.00056 *UJ*	0.00084 *UJ*	0.0011 *UJ*
2-Methylnaphthalene	mg/kg		320		0.0031 *UJ*	0.0050 *U*	0.0011 *UJ*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0012 *UJ*	0.0015 *UJ*
Acenaphthene	mg/kg		4800		0.0019 *UJ*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.00074 *UJ*	0.0050 *U*	0.00072 *UJ*	0.0050 *U*	0.0050 *U*	0.00098 *UJ*
Acenaphthylene	mg/kg				0.0043 *J*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Anthracene	mg/kg		24000		0.0028 *J*	0.0050 *U*	0.0050 *U*	0.0025 *J*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0011 *J*
Benzo(a)anthracene	mg/kg				0.012	0.0045 *J*	0.0029 *J*	0.0050 *U*	0.0012 *J*	0.0050 *U*	0.0015 *J*	0.0030 *J*	0.0019 *J*	0.0012 *J*	0.0049 *J*
Benzo(a)pyrene	mg/kg				0.021	0.0069	0.0048 *J*	0.0050 *U*	0.0021 *J*	0.0050 *U*	0.0014 *J*	0.0047 *J*	0.0028 *J*	0.0022 *J*	0.0059
Benzo(b)fluoranthene	mg/kg				0.027	0.0098	0.0056	0.0050 *U*	0.0024 *J*	0.0050 *U*	0.0050 *U*	0.0063	0.0022 *J*	0.0024 *J*	0.0078
Benzo(g,h,i)perylene	mg/kg				0.024	0.0092	0.012	0.0050 *U*	0.0046 *J*	0.0050 *U*	0.0017 *J*	0.0071 *J*	0.0027 *J*	0.0030 *J*	0.0080 *J*
Benzo(j)fluoranthene	mg/kg				0.0084	0.0033 *J*	0.0021 *J*	0.0050 *U*	0.00096 *J*	0.0050 *U*	0.0050 *U*	0.0024 *J*	0.00087 *J*	0.00098 *J*	0.0027 *J*
Benzo(k)fluoranthene	mg/kg				0.0097	0.0047 *J*	0.0026 *J*	0.0050 *U*	0.0014 *J*	0.0050 *U*	0.0050 *U*	0.0032 *J*	0.0011 *J*	0.0016 *J*	0.0039 *J*
Benzofluoranthenes	mg/kg				0.041	0.016	0.0092 *J*	0.010 *U*	0.0044 *J*	0.0100 *U*	0.0100 *U*	0.011	0.0046 *J*	0.0048 *J*	0.014
Chrysene	mg/kg				0.025	0.0080	0.0052	0.0050 *U*	0.0026 *J*	0.0050 *U*	0.0016 *J*	0.0037 *J*	0.0028 *J*	0.0020 *J*	0.0071
Dibenzo(a,h)anthracene	mg/kg				0.0053	0.0024 *J*	0.0012 *J*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0018 *J*	0.0050 *U*	0.0050 *U*	0.0018 *J*
Dibenzofuran	mg/kg		80		0.0015 *J*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Fluoranthene	mg/kg		3200		0.020	0.0072	0.0048 *J*	0.00063 *J*	0.0021 *J*	0.00062 *UJ*	0.0026 *J*	0.0050	0.0027 *UJ*	0.0023 *UJ*	0.0088
Fluorene	mg/kg		3200		0.00092 *UJ*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*
Indeno(1,2,3-cd)pyrene	mg/kg				0.018	0.0065	0.0065	0.0050 *U*	0.0027 *J*	0.0050 *U*	0.0011 *J*	0.0048 *J*	0.0023 *J*	0.0021 *J*	0.0059
Naphthalene	mg/kg		1600		0.0039 *UJ*	0.0050 *U*	0.0015 *UJ*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0014 *UJ*
Phenanthrene	mg/kg				0.013	0.0032 *UJ*	0.0039 *UJ*	0.0025 *UJ*	0.0019 *UJ*	0.00097 *J*	0.0025 *J*	0.0026 *J*	0.0023 *J*	0.0016 *J*	0.0046 *J*
Pyrene	mg/kg		2400		0.027	0.0087	0.0069	0.00075 *J*	0.0028 *J*	0.00067 *J*	0.0025 *J*	0.0051 *J*	0.0032 *J*	0.0024 *J*	0.0082 *J*
cPAH TEQ	mg/kg	0.1	24	0.19	0.028	0.0097 *J*	0.0067 *J*	0.0050 *U*	0.0032 *J*	0.0050 *U*	0.0024 *J*	0.0066 *J*	0.0039 *J*	0.0032 *J*	0.0084 *J*

Table 4-2. Georgetown Steam Plant Former Flume Property (Partial): Analytical Results for Discrete Soil

				Area	4: Stormwater Facility								
				Location ID	GTF_S23			GTF_S18	GTF_S19		GTF_S20	GTF_S21	
				Sample ID	GTF_S23_1.5-2ft	GTF_S23_1.5-2ft_DUP	GTF_S23_2-2.5ft	GTF_S18_1-1.5ft	GTF_S19_1-1.5ft	GTF_S19_1-1.5ft_DUP	GTF_S20_1-1.5ft	GTF_S21_1-1.5ft	GTF_S21_1.5-2ft
				Sample Number	GTF-SL067	GTF-SL083	GTF-SL068	GTF-SL039	GTF-SL041	GTF-SL049	GTF-SL043	GTF-SL045	GTF-SL046
				Sample Date	03/09/22	03/09/22	03/09/22	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21	09/29/21
				Sample Type	N	FD	N	N	N	FD	N	N	N
		MTCA Method A	MTCA Method B										
Analyte	Units	Unrestricted Land Use	Noncancer (Eq. 740-1)	Cancer (Eq. 740-2)	Result	Result	Result	Result	Result	Result	Result	Result	Result
Polychlorinated Biphenyls													
Aroclor 1016	mg/kg		5.6	14	NA	NA	NA	0.020 *U*	0.020 *U*	0.020 *U*	0.099 *U*	0.10 *U*	NA
Aroclor 1221	mg/kg				NA	NA	NA	0.020 *U*	0.020 *U*	0.020 *U*	0.099 *U*	0.10 *U*	NA
Aroclor 1232	mg/kg				NA	NA	NA	0.020 *U*	0.020 *U*	0.020 *U*	0.099 *U*	0.10 *U*	NA
Aroclor 1242	mg/kg				NA	NA	NA	0.020 *U*	0.020 *U*	0.020 *U*	0.099 *U*	0.10 *U*	NA
Aroclor 1248	mg/kg				NA	NA	NA	0.020 *U*	0.020 *U*	0.020 *U*	0.099 *U*	0.10 *U*	NA
Aroclor 1254	mg/kg		1.6	0.5	NA	NA	NA	0.020 *U*	0.021	0.020 *U*	0.099 *U*	0.10 *U*	NA
Aroclor 1260	mg/kg			0.5	NA	NA	NA	0.018 *J*	0.044	0.020 *U*	0.11	0.10 *U*	NA
Aroclor 1262	mg/kg				NA	NA	NA	0.020 *U*	0.020 *U*	0.020 *U*	0.099 *U*	0.10 *U*	NA
Aroclor 1268	mg/kg				NA	NA	NA	0.020 *U*	0.020 *U*	0.020 *U*	0.099 *U*	0.10 *U*	NA
Total PCB Aroclors	mg/kg	1		0.5	NA	NA	NA	0.018 *J*	0.064	0.020 *U*	0.11	0.10 *U*	NA
Polycyclic Aromatic Hydrocarbons													
1-Methylnaphthalene	mg/kg		5600	34	0.0050 *U*	0.0050 *U*	0.00046 *UJ*	0.00081 *UJ*	0.0013 *UJ*	0.0012 *UJ*	0.0015 *UJ*	0.13	0.0027 *UJ*
2-Methylnaphthalene	mg/kg		320		0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0024 *UJ*	0.0018 *UJ*	0.0029 *UJ*	0.092	0.0035 *J*
Acenaphthene	mg/kg		4800		0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.00086 *UJ*	0.00096 *UJ*	0.59	0.0016 *UJ*
Acenaphthylene	mg/kg				0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.040	0.0050 *U*
Anthracene	mg/kg		24000		0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0014 *J*	0.00088 *J*	0.0016 *J*	0.99	0.0010 *J*
Benzo(a)anthracene	mg/kg				0.0050 *U*	0.0050 *U*	0.0015 *J*	0.0041 *J*	0.0082	0.0051	0.015	3.9	0.0026 *J*
Benzo(a)pyrene	mg/kg				0.00072 *J*	0.0008 *J*	0.0015 *J*	0.0064	0.011 *J*	0.0066 *J*	0.019	3.7	0.0027 *J*
Benzo(b)fluoranthene	mg/kg				0.0050 *U*	0.0050 *U*	0.0020 *J*	0.0078	0.017 *J*	0.0075 *J*	0.028	2.8	0.0028 *J*
Benzo(g,h,i)perylene	mg/kg				0.0050 *U*	0.0012 *J*	0.0024 *J*	0.0099 *J*	0.021 *J*	0.013 *J*	0.026 *J*	2.1 *J*	0.0028 *J*
Benzo(j)fluoranthene	mg/kg				0.0050 *U*	0.0050 *U*	0.00079 *J*	0.0034 *J*	0.0059	0.0026 *J*	0.0068	1.1	0.0014 *J*
Benzo(k)fluoranthene	mg/kg				0.0050 *U*	0.0050 *U*	0.00084 *J*	0.0045 *J*	0.0073	0.0035 *J*	0.0080	1.4	0.0016 *J*
Benzofluoranthenes	mg/kg				0.010 *U*	0.0100 *U*	0.0036 *J*	0.016	0.030 *J*	0.013 *J*	0.050	5.6	0.0059 *J*
Chrysene	mg/kg				0.0014 *J*	0.0015 *J*	0.0026 *J*	0.0063	0.015 *J*	0.0073 *J*	0.057	3.7	0.0033 *J*
Dibenzo(a,h)anthracene	mg/kg				0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0019 *J*	0.0031 *J*	0.0016 *J*	0.0041 *J*	0.66	0.0012 *J*
Dibenzofuran	mg/kg		80		0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0015 *J*	0.18	0.0016 *J*
Fluoranthene	mg/kg		3200		0.00099 *J*	0.0011 *J*	0.0035 *J*	0.0074	0.017	0.010	0.021	6.5	0.0043 *UJ*
Fluorene	mg/kg		3200		0.0050 *U*	0.0007 *J*	0.0050 *U*	0.0050 *U*	0.00073 *J*	0.0050 *U*	0.00080 *J*	0.46	0.00087 *J*
Indeno(1,2,3-cd)pyrene	mg/kg				0.0050 *U*	0.0050 *U*	0.0015 *J*	0.0061	0.013 *J*	0.0076 *J*	0.0093	2.0	0.0024 *J*
Naphthalene	mg/kg		1600		0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0050 *U*	0.0021 *UJ*	0.0050 *U*	0.0023 *UJ*	0.11	0.0032 *UJ*
Phenanthrene	mg/kg				0.00087 *J*	0.0013 *J*	0.0027 *J*	0.0036 *J*	0.0087	0.0066	0.011	5.3	0.0047 *J*
Pyrene	mg/kg		2400		0.00099 *J*	0.0012 *J*	0.0033 *J*	0.0073 *J*	0.016 *J*	0.0098 *J*	0.019 *J*	6.1 *J*	0.0042 *J*
cPAH TEQ	mg/kg	0.1	24	0.19	0.0020 *J*	0.0021 *J*	0.0024 *J*	0.0089 *J*	0.016 *J*	0.0092 *J*	0.026 *J*	**4.8**	0.0038 *J*

Notes
MTCA soil values as provided in the Washington Department of Ecology Cleanup Levels and Risk Calculation (CLARC) tables: https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Contamination-clean-up-tools/CLARC/Data-tables

cPAH TEQs were calculated in accordance with Washington Department of Ecology Implementation Memorandum #10 (April 20, 2015).
= *exceedance of MTCA Method A value*
bold = exceedance of the lowest MTCA Method B value

cPAH = carcinogenic PAH
FD = field duplicate
MTCA = Model Toxics Control Act
N = normal sample
NA = not analyzed / not applicable
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TEQ = toxicity equivalence

Qualifiers:
J = The reported value was an estimate.
U = The analyte was not detected. The associated numerical value is the reporting limit.

Table 4-3. Georgetown Steam Plant Former Flume Property (Partial): Analytical Results for Groundwater Samples

				Location ID	GTF_GW1	GTF_GW2	GTF_GW3	
				Sample ID	GTF_GW1_1	GTF_GW2_1	GTF_GW3_1	GTF_GW3_1_DUP
				Sample Number	GTF-SL079	GTF-SL080	GTF-SL081	GTF-SL082
				Sample Date	03/09/22	03/09/22	03/09/22	03/09/22
				Sample Type	N	N	N	FD
			MTCA Method B					
Analyte	Units	MTCA Method A	Noncancer (Eq. 720-1)	Cancer (Eq. 720-2)	Result	Result	Result	Result
Polychlorinated Biphenyls								
Aroclor 1016	µg/L		1.1	1.3	0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1221	µg/L				0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1232	µg/L				0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1242	µg/L				0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1248	µg/L				0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1254	µg/L		0.32	0.044	0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1260	µg/L			0.044	0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1262	µg/L				0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Aroclor 1268	µg/L				0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Total PCB Aroclors	µg/L	0.1		0.044	0.044 *U*	0.044 *UJ*	0.044 *U*	0.044 *UJ*
Polycyclic Aromatic Hydrocarbons								
1-Methylnaphthalene	µg/L		560	1.5	0.020 *UJ*	0.030 *UJ*	0.020 *UJ*	0.020 *UJ*
2-Methylnaphthalene	µg/L		32		0.030 *UJ*	0.030 *J*	0.030 *UJ*	0.030 *UJ*
Acenaphthene	µg/L		960		0.020 *UJ*	0.020 *UJ*	0.020 *UJ*	0.020 *UJ*
Acenaphthylene	µg/L				0.020 *UJ*	0.020 *UJ*	0.020 *UJ*	0.020 *UJ*
Anthracene	µg/L		4800		0.020 *UJ*	0.040 *J*	0.050 *J*	0.050 *J*
Benzo(a)anthracene	µg/L				0.050 *UJ*	0.050 *UJ*	0.050 *UJ*	0.050 *UJ*
Benzo(a)pyrene	µg/L				0.060 *UJ*	0.060 *UJ*	0.060 *UJ*	0.060 *UJ*
Benzo(b)fluoranthene	µg/L				0.090 *UJ*	0.090 *UJ*	0.090 *UJ*	0.090 *UJ*
Benzo(g,h,i)perylene	µg/L				0.070 *UJ*	0.070 *UJ*	0.070 *UJ*	0.070 *UJ*
Benzo(j)fluoranthene	µg/L				0.030 *UJ*	0.030 *UJ*	0.030 *UJ*	0.030 *UJ*
Benzo(k)fluoranthene	µg/L				0.090 *UJ*	0.090 *UJ*	0.090 *UJ*	0.090 *UJ*
Benzofluoranthenes	µg/L				0.19 *UJ*	0.19 *UJ*	0.19 *UJ*	0.19 *UJ*
Chrysene	µg/L				0.060 *UJ*	0.060 *UJ*	0.060 *UJ*	0.060 *UJ*
Dibenzo(a,h)anthracene	µg/L				0.090 *UJ*	0.090 *UJ*	0.090 *UJ*	0.090 *UJ*
Dibenzofuran	µg/L		16		0.020 *UJ*	0.020 *UJ*	0.020 *UJ*	0.020 *UJ*
Fluoranthene	µg/L		640		0.020 *UJ*	0.020 *J*	0.070 *J*	0.070 *J*
Fluorene	µg/L		640		0.020 *UJ*	0.12 *J*	0.040 *UJ*	0.030 *UJ*

Table 4-3. Georgetown Steam Plant Former Flume Property (Partial): Analytical Results for Groundwater Samples

				Location ID	GTF_GW1	GTF_GW2	GTF_GW3	
				Sample ID	GTF_GW1_1	GTF_GW2_1	GTF_GW3_1	GTF_GW3_1_DUP
				Sample Number	GTF-SL079	GTF-SL080	GTF-SL081	GTF-SL082
				Sample Date	03/09/22	03/09/22	03/09/22	03/09/22
				Sample Type	N	N	N	FD
			MTCA Method B					
Analyte	Units	MTCA Method A	Noncancer (Eq. 720-1)	Cancer (Eq. 720-2)	Result	Result	Result	Result
Indeno(1,2,3-cd)pyrene	µg/L				0.080 *UJ*	0.080 *UJ*	0.080 *UJ*	0.080 *UJ*
Naphthalene	µg/L	160	160		0.020 *UJ*	0.40 *J*	0.020 *UJ*	0.020 *UJ*
Phenanthrene	µg/L				0.020 *UJ*	0.050 *J*	0.16 *J*	0.15 *J*
Pyrene	µg/L		480		0.030 *UJ*	0.050 *J*	0.090 *J*	0.090 *J*
cPAH TEQ	µg/L	0.1	4.8	0.023	0.060 *UJ*	0.060 *UJ*	0.060 *UJ*	0.060 *UJ*

Notes
MTCA soil values as provided in the Washington Department of Ecology Cleanup Levels and Risk Calculation (CLARC) tables: https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Contamination-clean-up-tools/CLARC/Data-tables
cPAH TEQs were calculated in accordance with Washington Department of Ecology Implementation Memorandum #10 (April 20, 2015).
Non-detects are reported to the method detection limit
= exceedance of MTCA Method A value

cPAH = carcinogenic PAH
FD = field duplicate
MTCA = Model Toxics Control Act
N = normal sample
NA = not analyzed / not applicable
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TEQ = toxicity equivalence

Qualifiers:
J = The reported value was an estimate.
U = The analyte was not detected. The associated numerical value is the reporting limit.

Attachment 1

Field Records

9/28 Former Georgetown Steam plant property Transfer CF1408 -0106 5

weather: ~68° Cloudy/windy Vocate

Integral personnel: Mauri Fabio & Kelsey Kirkland
onsite: ~~X~~ MF 9/28 1442

Flagging & Marking all 21 proposed sampling locations in preparation for tomorrow's field event

offsite: 1556

MF

Scale: 1 square =________

Rite in the Rain

9/29 Former Georgetown Steam plant Property transfer CF1408 -0106 7

soil sampling

Weather: ~60° Cloudy

Integral personnel: Mauri Fabio & Kelsey Kirkland
On site: 0715
Setup Sampling Station: 0730
Cascade Environment Onsite: 0755
APS locate onsite: 0815

H&S Meeting: 0820

-Starting to ~~Drill~~ Extrude (MF 9/29) S8: 0845 - No ~~Devat~~ (MF 9/29) Deviations
~~-Start~~ Starting to Extrude S1: 0855 - less then 75% recovery. Need to perform second attempt for greater than 75% recovery.
-Starting to extrude S9: 0900 - No deviations
-Starting to extrude S13: 0930 - ~~Parent~~ (MF 9/29) Parent core of Dup
-Starting to extrude S13-Dup: 0940 - 6" from parent core
-Starting to extrude S14: 0950 - No Deviations
-Starting to extrude S15: 0955 - No Deviations → Honey Bucket Delivered portable potty @1000
-Starting to extrude S16: 1005 - No Deviations
-Starting to extrude S17: 1020 - No Deviations
-Starting to extrude S2: 1030 - No Deviations
-Starting to extrude S3: 1040 - proposed sample location too close to tree for drill rig - step out ~2-3 ft.

Scale: 1 square = ________ Rite in the Rain

- Starting to extrude S10: 1050 - No Deviations
- Starting to extrude S11: 1100 - No Deviations
- Starting to extrude S12: 1110 - No Deviations
- Starting to extrude S18: 1120 - No Deviations
- Starting to extrude S19: 1130 - Parent of Dup.
  Lunch @ 1130 for integral Staff (~30 mins)
- Starting to extrude S19-Dup: 1140 - 6" from parent core
- Starting to extrude S20: 1200 - No deviations
- Starting to extrude S21: 1210 - Ecology block too close to proposed sample location for drill rig. Step-out ~ 2-3 ft.

~~Starting~~ Collect Area 3 & Area 2 composite sample: 1220 1215

Starting to extrude S7: 1230 - No Deviations

Lunch for cascade Environmental: 1240

MF 9/29 ~~Starting to extrude~~ Collect Area 4 Composite Sample: 1310

- Starting to extrude S6: 1315 - No Deviations
- Starting to extrude S5: 1330 - No deviations
- Starting to extrude S4: 1340 - Overhead cable/power lines in way of drill rig - Step-out ~ 2-3 ft. from proposed Sample location
- Starting to extrude Attempt 2 of S1: 1350 - Accepted Core since over 75% recovery. Step-out ~ 2-3 ft. from proposed sample locations.
- Collect Area 1 composite sample: 1415

9/29 Former Georgetown Steam plant Property transfer CF1408-0106 Soil Sampling 9

- Collection of IDW Solids (GTF-IDW-SL20210929) 1430
- Collection of Equipment Blank (GTF-SLEB-902C): 1435
- Collection of ~~Equipment Blank~~ (GTF-900s & GTF-901s) 1440 & 1445
- Collection of IDW Liquids (GTF-IDW-AQ20210929): 1500
- Record ~~Actual~~ MF 9/29 Actual sample location w/ GPS: ~~1520~~ 1530
- Clean up/pack: 1550
- Complete & Review COCs: ~~1540~~ MF 9/29 1610

~~Offsite~~ offsite: 1645

Delivered samples ~~fo~~ MF 9/29 to lab: 1656

MF

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF-S1 (Attempt 1)
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION												
			FIELD-ESTIMATED %									
			Gravel		Sand							
Sample ID	% Recovery	Sheen	Coarse	Fine	Coarse	Medium	Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)	
		N/A					10 / 85%	90% / 15%	2 ft.		0-1ft. Slough, organics (grass)	
											1-1.7ft. Brown, dry, loose, SILT (ML), 90% fines, ~~10%~~ Fine sand	
											@ 1.2ft - 1" gravel-sub angular	
											@ 1.6-1.7ft. layer of concrete	
											1.7-2ft. Brown, dry, loose, POORLY GRADED SAND WITH SILT (SP-SM) 85% fine sand, 15% fines	

MF

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push
Sampling Equipment: Macrocore Sampler
Start/End Time: 0855/0900
Latitude: —
Longitude: —
Notes: less than 75% recovery, need to perform a second attempt to get target recovery

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF-S1 (Attempt 2)

Project Name: Fromer Georgetown Steam Plant Flume Property Transfer

Project Number: CF1408

Logged by: MF & KK

Date: 9/29/21

Page 1 of 1

SAMPLE INFORMATION

Sample ID	% Recovery	Sheen	FIELD-ESTIMATED % Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol
		N/A					100%	100%	2ft	

Soil Description
(USCS group name, minor components, color, moisture, additional descriptions)

0-0.4 ft Brown, dry, loose, SILT (ML) 100% fines, trace gravel ~ .5" sub angular

@ 0-0.2 ft organics (grass)

0.4-2 ft. Brown, dry, loose, POORLY GRADED SAND (SP) 100% fine sand

MF

MF

Drilling Contractor: Cascade Environmental

Drilling Method: Direct Push

Sampling Equipment: Macrocore Sampler

Start/End Time: 1350/1355

Latitude: 47.53928226

Longitude: -122.31920275

Notes: Second Attempt to obtain greater than 75% recovery. Step out of proposed sample location of ~ 2-3 ft.

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF_S2
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION											
Sample ID	% Recovery	Sheen	FIELD-ESTIMATED % Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
		N/A					~~100%~~	100%	2ft		0-1.2ft. Dark brown to Brown, Dry, loose SILT (ML) 100% fines, trace gravel ~~0-0.~~ 0-0.5" Sub angular (0-0.6ft Dark MF 9)
											1.2-2ft. Brown, dry, loose, POORLY GRADED SAND (SP) 100% fine ~~SAND~~ MF 9/29 sand, Trace fines
MF											MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push
Sampling Equipment: Macrocore Sampler
Start/End Time: 1030/1035
Latitude: 47.53905527
Longitude: -122.31925526
Notes: N/A

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF_S3
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION

Sample ID	% Recovery	Sheen	FIELD-ESTIMATED % Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol
		N/A					~~75~~ 100%	~~5~~ 100%	2 ft.	

MF

Soil Description
(USCS group name, minor components, color, moisture, additional descriptions)

0-1.7 ft Brown, dry, loose, SILT (ML) 95% fines, 5% fine sand, trace organics (leaves)

MF 9/29 ~~8~~ 1.7 ft-2 ft Brown, dry, loose, POORLY GRADED SAND (SP) 100% fine sand, trace organics, trace fines

@ 1.5-1.6 ft. layer of organics-woody debris (root?)

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push
Sampling Equipment: Macrocore Sampler
Start/End Time: 1040/1045
Latitude: 47.53887224
Longitude: -122.31930116
Notes: proposed sample location was too close to the trees for the drill rig - step out of ~2-3 ft

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF_S4
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

Page 1 of 1

SAMPLE INFORMATION

Sample ID	% Recovery	Sheen	Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
		N/A					100%	100%	2ft.		0-0.9ft. Brown, dry, loose, SILT (ML) 100% fines, trace fine sand, trace gravel
											@ 0.7ft charcoal-like fragments
											0.9-2ft Brown, dry, loose, POORLY GRADED SAND (SP) 100% fine sand

MF

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push
Sampling Equipment: Macrocore Sampler
Start/End Time: 1340/1345
Latitude: ~~47.53866~~ 9/29 MF 47.53865598
Longitude: -122.31929705
Notes: Overhead cable/power lines in way of drill rig - Step out ~2-3ft from proposed sample location

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF-S5
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION												
Sample ID	% Recovery	Sheen	FIELD-ESTIMATED % Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
		N/A					100%	100%	2ft		0-0.6ft Brown, dry, loose, SILT (ML) 100% fines, trace fine sand 0.6-2ft Brown, dry, loose, POORLY GRADED SAND (SP) 100% fine sand
MF											MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push
Sampling Equipment: Macrocore Sampler
Start/End Time: 1350/1335
Latitude: 47.53843737
Longitude: -122.31930065
Notes: N/A

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF_S6
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION												
Sample ID	% Recovery	Sheen	FIELD-ESTIMATED % Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
		N/A					~~100%~~	100%	2ft		0-1.6 ft Brown, dry, loose, SILT (ML) 100% fines, ~~trace fine Sand~~, organics on Top of 0-0.1 ft of core (grass)
											@ 0.75 ft. ~1.5" gravel sub angular
											1.6 ft-2 ft Brown, dry, loose, POORLY GRADED SAND (SP) 100% fine Sand
MF											MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push
Sampling Equipment: Macrocore Sampler
Start/End Time: 1315/1320
Latitude: 47.53819763
Longitude: -122.31926106
Notes: N/A

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF_S7
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION

Sample ID	% Recovery	Sheen	Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
		N/A					15% / 100%	85%	2ft		0-1.5ft Dark Brown, Damp, loose, SILT WITH SAND (ML) 85% fines, 15% fine sand, trace gravel, trace organics of top 0.5" of core (grass)
											1.5-2ft grey, dry, loose, POORLY GRADED SAND (SP) 100% fine sand

MF

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push
Sampling Equipment: Macrocore Sampler
Start/End Time: 1230/1235
Latitude: 47.53806065
Longitude: -122.3191941
Notes: N/A

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF-S8
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION

Sample ID	% Recovery	Sheen	FIELD-ESTIMATED % Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol
		N/A						100%		
							85%	15%	2ft.	

MF

Soil Description
(USCS group name, minor components, color, moisture, additional descriptions)

0-1.7ft. Brown, dry, loose, SILT(ML)
100% fines

@0.5ft & 0.9ft. ~1" gravel - sub angular

1.7-2ft. Brown, dry, loose, POORLY GRADED SAND WITH SILT(SP-SM) 85% fine sand, 15% fines

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct push
Sampling Equipment: Macrocore sampler
Start/End Time: 0845/0850
Latitude: 47.53928842
Longitude: -122.31894444
Notes: N/A

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF-S9

Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION

Sample ID	% Recovery	Sheen	Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol
								100%		
		N/A					15%	85%	2ft.	
							85	15		

Soil Description
(USCS group name, minor components, color, moisture, additional descriptions)

0-1ft. Brown, dry, loose, SILT (ML), 100% fines

@ 0.8 - 0.10 ft. layer of gravel, ~1" Sub-angular

1-1.8ft. Brown, dry, loose, SILT WITH SAND (ML) 85% fines, 15% fine Sand

1.8ft - 2ft Brown, dry, loose, POORLY GRADED SAND WITH SILT (SP-SM) 85% fine sand, 15% fines

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push
Sampling Equipment: Macrocore Sampler
Start/End Time: 0900/0905
Latitude: 47.53913715
Longitude: -122.31901892
Notes: N/A

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF_S10
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION

Sample ID	% Recovery	Sheen	FIELD-ESTIMATED % Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
								100%			0-0.9 ft. Brown, damp, Medium stiff, SILT (ML) 100% fines
		N/A					95%	5%	2ft		0.9-2ft. Brown, damp, loose, POORLY GRADED SAND (SP) 95% fine sand, 5% fines

MF

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push
Sampling Equipment: Macrocore sampler
Start/End Time: 1050 / ~~1100~~ MF 9/29 1055
Latitude: 47.53875217
Longitude: -122.31908770
Notes: N/A

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF_S11

Project Name: Fromer Georgetown Steam Plant Flume Property Transfer

Project Number: CF1408

Logged by: MF & KK

Date: 9/29/21

SAMPLE INFORMATION			FIELD-ESTIMATED %								
			Gravel		Sand						
Sample ID	% Recovery	Sheen	Coarse	Fine	Coarse	Medium	Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
		N/A					100%	100%	2ft.		0-0.5ft. Brown, damp, Medium stiff, SILT(ML) 100% fines, trace gravel ~.5" subangular
											0.5-2ft. Brown, dry to damp, loose, POORLY GRADED SAND (SP), 100% fine sand, Trace fines
		MF									MF

Drilling Contractor: Cascade Environmental

Drilling Method: Direct Push

Sampling Equipment: Macrocore Sampler

Start/End Time: 1000/1105

Latitude: 47.53861067

Longitude: -122.31909122

Notes: N/A

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF_S12
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION											
Sample ID	% Recovery	Sheen	FIELD-ESTIMATED % Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
							5%	95%			0-1.2ft Brown, dry, Medium Stiff, SILT (ML) 95% fines, 5% fine sand, trace gravel ~1" sub angular, slight oxidation
		N/A					100%		2ft		@0.9ft scrap rubber debri
											1.2-2ft light brown, dry, loose, POORLY GRADED SAND (SP) 100% fine sand
MF											MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push
Sampling Equipment: Macrocore sampler
Start/End Time: 1110/1115
Latitude: 47.53847625
Longitude: -122.31909490
Notes: N/A

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF-S13
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION

Sample ID	% Recovery	Sheen	FIELD-ESTIMATED %: Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol
								100		
		N/A					95%	5%	2ft.	

Soil Description
(USCS group name, minor components, color, moisture, additional descriptions)

0-0.5ft Brown, Damp, loose, SILT (ML) 100% fines, trace Fine sand

0.5-2ft. Brown, ~~Damp~~, loose, POORLY GRADED SAND (SP), 95% Fine Sand, 5% fines

MF

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push
Sampling Equipment: Macrocore Sampler
Start/End Time: 0930/0935
Latitude: 47.53899548
Longitude: -122.31912794
Notes: Parent core

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF-SI3-DUP
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION			FIELD-ESTIMATED %								
			Gravel		Sand						
Sample ID	% Recovery	Sheen	Coarse	Fine	Coarse	Medium	Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
		N/A						100			0-0.5ft Brown, Damp, loose, SILT (ML) 100% fines, trace fine sand
							95%	5%	2ft		0.5-2ft Brown, Damp, loose, POORLY GRADED SAND (SP), 95% fine sand, 5% fines

MF

MF

Drilling Contractor: Cascade Environmental
Drilling Method: ~~Macrocore sampler~~ MF 9/29 Direct Push
Sampling Equipment: Macrocore Sampler
Start/End Time: 0940/0945
Latitude: ~~47.538~~ MF 9/29
Longitude: —
Notes: Dup - 6" from Parent core

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF-S14
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION			FIELD-ESTIMATED %								
			Gravel		Sand						
Sample ID	% Recovery	Sheen	Coarse	Fine	Coarse	Medium	Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
								100%			0-1 ft. Brown, Damp, loose, SILT (ML) 100% fines, trace Fine Sand
		N/A					85%	15%	2 ft.		~~0~~ MF 9/29 1-2 ft. Brown, Damp, loose, POORLY GRADED SAND WITH SILT (SP-SM) 85% fine sand, 15% fines, Trace gravel (Sub angular)

MF

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct push
Sampling Equipment: Macrocore Sampler
Start/End Time: 0950/0955
Latitude: 47.53901042
Longitude: -122.31899268
Notes: N/A

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTFSIS
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

Sample ID	% Recovery	Sheen	Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
		N/A					95%	100% / 5%	2ft		0-0.9 ft Brown, Dry, loose, SILT (ML) 100% fines, Trace Fine Sand, trace gravel (~1.5"-sub angular)
											0.9ft-2ft Brown, dry, loose, POORLY GRADED SAND (SP), 95% fine Sand, 5% fines

MF

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push
Sampling Equipment: Macrocore Sampler
Start/End Time: 0955/1000
Latitude: 47.53895607
Longitude: -122.31906686
Notes: N/A

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF_S16
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION

Sample ID	% Recovery	Sheen	Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
								100%			0-0.7ft. Brown, damp, loose, SILT (ML) 100% fines, trace gravel
		N/A					95%	5%	2ft.		0.7-2ft. Brown, damp, loose, POORLY GRADED SAND (SP) 95% fine sand, 5% fines

MF

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push
Sampling Equipment: Macro sampler
Start/End Time: 1005/1010
Latitude: 47.53883379
Longitude: -122.31910916
Notes: N/A

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF-S17

Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION											
			FIELD-ESTIMATED %								
			Gravel		Sand						
Sample ID	% Recovery	Sheen	Coarse	Fine	Coarse	Medium	Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
								100%			0-0.9 ft. Brown, damp, loose, SILT (ML) 100% fines, trace organics (roots, grass)
		N/A					95%	5%	2 ft.		@ 0.8-0.9 ft. layer of gravel/ ~.5-1" ~~subang~~ sub angular MF 2/2
											0.9-2 ft. Brown, damp, loose, POORLY GRADED SAND (SP), 95% fine sand, 5% fines, trace gravel - sub angular
MF											MF

Drilling Contractor:	Cascade Environmental
Drilling Method:	Direct Push
Sampling Equipment:	Macrocore Sampler
Start/End Time:	1020/1025
Latitude:	47.53889465
Longitude:	-122.31902119
Notes:	N/A

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF_S18

Project Name: Fromer Georgetown Steam Plant Flume Property Transfer

Project Number: CF1408

Logged by: MF & KK

Date: 9/29/21

SAMPLE INFORMATION			FIELD-ESTIMATED %									
			Gravel		Sand							
Sample ID	% Recovery	Sheen	Coarse	Fine	Coarse	Medium	Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
		N/A					100%	100%	2ft		0-1.1ft Tan, dry, loose to Medium stiff, SILT (ML) 100% fines; @ 0.1-0.4ft layer of gravel ~0.5-1" Sub angular. 1.1-2ft. gray, dry, loose, POORLY GRADED SAND(SP) 100% fine sand, Trace gravel

MF

MF

Drilling Contractor: Cascade Environmental

Drilling Method: Direct Push

Sampling Equipment: Macrocore sampler

Start/End Time: 1120/1125

Latitude: 47.53819888

Longitude: -122.31902655

Notes: N/A

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF-S19
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION

Sample ID	% Recovery	Sheen	FIELD-ESTIMATED % Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
								100%			0-0.9 ft. Dark Brown, damp, loose, SILT (ML) 95% fines, 5% fine sand
		NA					20%	80%	2 ft		0.9-2 ft light brown, dry, loose, SILT WITH SAND (ML) 80% fines, 20% fine sand, trace gravel ~0.5" sub angular

MF

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push
Sampling Equipment: Macrocore Sampler
Start/End Time: 1130/1135
Latitude: 47.53811510
Longitude: -122.31894486
Notes: Parent core of Dup.

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF_S19_Dup
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION			FIELD-ESTIMATED %								
			Gravel		Sand						
Sample ID	% Recovery	Sheen	Coarse	Fine	Coarse	Medium	Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
		N/A					5%	~~100%~~ 95% MF 2/2/21			0-0.7 ft. Dark Brown, damp, loose, SILT (ML) 95% fines, 5% fine Sand
							20%	80%	2 ft		0.7 ft - 2 ft. light brown, dry, loose, ~~SILT~~ MF 2/2/21 SILT WITH SAND (ML), 80% fines, 20% fine Sand, Trace gravel

MF

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push
Sampling Equipment: Macrocore Sampler
Start/End Time: 1140/1145
Latitude: —
Longitude: —
Notes: Dup. 6" from parent core

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF_S20

Project Name: Fromer Georgetown Steam Plant Flume Property Transfer

Project Number: CF1408

Logged by: MF & KK

Date: ~~9/29/30~~ MF 9/29 9/29/21

SAMPLE INFORMATION			FIELD-ESTIMATED %								
			Gravel		Sand						
Sample ID	% Recovery	Sheen	Coarse	Fine	Coarse	Medium	Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
		N/A		15%				85%			0-1.5ft Dark brown, damp, loose to med stiff, SILT ~~(ML)~~ MF 9/29 WITH GRAVEL (ML) 85% fines, 15% gravel ~0.5" sub angular fine gravel
							100%		2ft		1.5-2ft. Brown, damp, loose, POORLY GRADED SAND (SP), 100% fine sand, Trace fines

MF

MF

Drilling Contractor: Cascade Environmental

Drilling Method: Direct Push

Sampling Equipment: Macrocore Sampler

Start/End Time: 1200/1205

Latitude: 47.53797155

Longitude: -122.31893093

Notes: N/A

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF_S21

Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 9/29/21

SAMPLE INFORMATION												
			FIELD-ESTIMATED %									
			Gravel		Sand							
Sample ID	% Recovery	Sheen	Coarse	Fine	Coarse	Medium	Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
		N/A					20% / 100%	80%	2ft		0-1.2ft. Brown, damp, loose, SILT WITH SAND (ML), 80% fines, 20% fine sand @ 0.3-0.5ft layer of fine gravel ~0.5" sub angular 1.2ft-2ft Brown, Damp, loose, POORLY GRADED SAND (SP) 100% fine sand

MF

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct push
Sampling Equipment: Macrocore Sampler
Start/End Time: 1220/1225
Latitude: 47.53792638
Longitude: -122.31907992
Notes: Ecology blocks are too close for the drill rig. Needed to step out ~2-3 ft from proposed sample location

Location Sketch

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number:	Turn-around Requested: 15 business days
ARI Client Company: Integral	Phone: 503-943-3617
Client Contact: Glenn Esler	
Client Project Name: Former Georgetown Steam Plant Flume Property Transfer	
Client Project #: CF1408	Samplers: Mauri Fabio, Kelsey Kirkland

Page: 1	of 1
Date: 9/29/21	Ice Present? Yes
No. of Coolers: 1	Cooler Temps: 2.1

Sample ID	Date	Time	Matrix	No. Containers	PCBs	PAHs	pH/FP/PCN/RSulf/TCLP	TCLP (VOCs)	RCRA Metals				Notes/Comments
GTF_SL001	9/29/21	14:15	soil	3	X	X	X	X					PCBs/PAHs: 8oz.
GTF-SL002		12:15		3	X	X	X	X					
GTF-SL003		12:20		3	X	X	X	X					
GTF-SL004		13:10		3	X	X	X	X					
GTF-SL051		14:47		2	X	X							
GTF-SL052		14:40		2	X	X							
GTF-SL053		14:35		2	X	X							
GTF-SL054		14:30		3	X	X	X	X					
GTF-SL055		15:00		5		X		X	X				

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) D. Lomi[illegible]	(Signature)	(Signature)
	Printed Name: Kelsey Kirkland	Printed Name: Dimitri Laminacke	Printed Name:	Printed Name:
	Company: Integral	Company: ARI	Company:	Company:
	Date & Time: 9/29/21 5:00 PM	Date & Time: 09/29/21 1700	Date & Time:	Date & Time:

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:		Turn-around Requested:	15 business days
ARI Client Company:	Integral	Phone:	503-943-3617
Client Contact:	Glenn Esler		
Client Project Name:	Former Georgetown Steam Plant Flume Property Transfer		
Client Project #:	CF1408	Samplers:	Marti Fabi Kelsey Kirkland

Page:	1	of	3
Date:	9/29/21	Ice Present?	Yes
No. of Coolers:	1	Cooler Temps:	4.7

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Percent Solids (TS)	PCBs	PAHs	Archive					Notes/Comments
GTF_SL005	9/29/21	13:55	soil	1	X	X	X						
GTF_SL006	↓	14:00	↓	1				X					
GTF_SL007		10:25		1	X	X	X						
GTF_SL008		10:26		1				X					
GTF_SL009		10:35		1	X	X	X						
GTF_SL010		10:36		1				X					
GTF_SL011		13:50		1	X	X	X						
GTF_SL012		13:45		1				X					
GTF_SL013		13:46		1	X	X	X						
GTF_SL014	↓	13:40	↓	1				X					

Comments/Special Instructions

	Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature)	[signature]	D. Lomi[illegible]		
Printed Name:	Kelsey Kirkland	Dimitri Lominadze		
Company:	Integral	ARI		
Date & Time:	9/29/21 5:00 PM	09/29/21 1700		

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: 15 business days
ARI Client Company: Integral	Phone: 503-943-3617
Client Contact: Glenn Esler	
Client Project Name: Former Georgetown Steam Plant Fimme Property Transfer	
Client Project #: GF1408	Samplers: Mauri Favr, Kelsey Kirkland

Page: 2	of 3		
Date: 9/29/21	Ice Present? yes		
No. of Coolers: 1	Cooler Temps: 4.7		

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www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Percent Solids (TS)	PCBs	PAHs	Archive					Notes/Comments
GTF_SL015	9/29/21	13:30	soil	1	X	X	X						
GTF_SL016	↓	13:35	↓	1				X					
GTF_SL017		13:25		1	X	X	X						
GTF_SL018		13:20		1				X					
GTF_SL019		8:45		1	X	X	X						
GTF_SL020		8:46		1				X					
GTF_SL021		9:20		1	X	X	X						
GTF_SL022		9:22		1				X					
GTF_SL023		10:45		1	X	X	X						
GTF_SL024	↓	10:46	↓	1				X					

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) D. Lom...	(Signature)	(Signature)
	Printed Name: Kelsey Kirkland	Printed Name: Dimitri Lomidze	Printed Name:	Printed Name:
	Company: Integral	Company: ARI	Company:	Company:
	Date & Time: 9/29/21 5:00PM	Date & Time: 09/29/21 1700	Date & Time:	Date & Time:

Chain of Custody Record & Laboratory Analysis Request

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206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number:	Turn-around Requested: 15 business days
ARI Client Company: Integral	Phone: 503·943·3617
Client Contact: Glenn Esler	
Client Project Name: Former Georgetown Steam Plant Flume Property Transfer	
Client Project #: CF1408	Samplers: Mauri Fabio, Kelsey Kirkland

Page: 3	of 3
Date: 9/29/21	Ice Present? Yes
No. of Coolers: 1	Cooler Temps: 4.7

Sample ID	Date	Time	Matrix	No. Containers	Percent Solids	PCBs	PAHs	Archive					Notes/Comments
GTF_SL025	9/29/21	10:56	Soil	1	X	X	X						
GTF_SL026	↓	10:57	↓	1				X					
GTF_SL027	↓	11:20	↓	1	X	X	X						
GTF_SL028	↓	11:15	↓	1				X					

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) D. Lomnacke	(Signature)	(Signature)
	Printed Name: Kelsey Kirkland	Printed Name: Dimitri Lomnacke	Printed Name:	Printed Name:
	Company: Integral	Company: ARI	Company:	Company:
	Date & Time: 9/29/21 5:00PM	Date & Time: 09/29/21 1700	Date & Time:	Date & Time:

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: 15 business days
ARI Client Company: Integral	Phone: 503-943-3617
Client Contact: Glenn Esler	
Client Project Name: Former Georgetown Steam Plant Flume Property Transfer	
Client Project #: CF1408	Samplers: Mauri Fabin, Kelsey Kirkland

Page: 1	of 3
Date: 9/29/21	Ice Present? yes
No. of Coolers: 1	Cooler Temps: 3.8

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206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Percent Solids (TS)	PCBs	PAHs	Archive					Notes/Comments
GTF-SL029	9/29/21	9:42	soil	1	X	X	X						
GTF-SL030	↓	9:40	↓	1				X					
GTF-SL031		9:55		1	X	X	X						
GTF-SL032		9:56		1				X					
GTF-SL033		10:02		1	X	X	X						
GTF-SL034		10:00		1				X					
GTF-SL035		10:10		1	X	X	X						
GTF-SL036		10:12		1				X					
GTF-SL037		10:20		1	X	X	X						
GTF-SL038		10:22		1				X					

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) D. Lomi	(Signature)	(Signature)
	Printed Name: Kelsey Kirkland	Printed Name: Dimitri Lomnache	Printed Name:	Printed Name:
	Company: Integral	Company: ARI	Company:	Company:
	Date & Time: 9/29/21 5:09 PM	Date & Time: 09/29/21 1700	Date & Time:	Date & Time:

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: 15 business days
ARI Client Company: Integral	Phone: 503.943.3617
Client Contact: Glenn Esler	
Client Project Name: Former Georgetown Steam Plant Flume Property Transfer	
Client Project #: CF1405	Samplers: Mauri Fabio, Kelsey Kirkland

Page: 2	of 3		
Date: 9/29/21	Ice Present? yes		
No. of Coolers: 1	Cooler Temps: 3.8		

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www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Percent Solids (TS)	PCBs	PAHs	Archive	3	3			Notes/Comments
GTF-SL039	9/29/21	11:40	soil	1	X	X	X						
GTF-SL040	↓	11:42	↓	1				X					
GTF-SL041	↓	11:55	↓	1	X	X	X						
GTF-SL042	↓	11:58	↓	1				X					
GTF-SL043	↓	12:30	↓	1	X	X	X						
GTF-SL044	↓	12:35	↓	1				X					
GTF-SL045	↓	12:40	↓	1	X	X	X						
GTF-SL046	↓	12:45	↓	1				X					
GTF-SL047	↓	9:45	↓	1	X	X	X						
GTF-SL048	↓	9:46	↓	1				X					

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) D.Lomi	(Signature)	(Signature)
	Printed Name: Kelsey Kirkland	Printed Name: Dimitri Lominadze	Printed Name:	Printed Name:
	Company: Integral	Company: ARI	Company:	Company:
	Date & Time: 9/29/21 5:00 PM	Date & Time: 09/29/21 1700	Date & Time:	Date & Time:

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206-695-6200 206-695-6201 (fax)
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ARI Assigned Number:	Turn-around Requested: 15 business days
ARI Client Company: Integral	Phone: 503-943-3617
Client Contact: Glenn Esler	
Client Project Name: Former Georgetown Steam Plant Flume ~~Plant~~ Property Transfer	
Client Project #: CF1408	Samplers: Mauri Table, Kelsey Kirkland
Page: 3 of 3	
Date: 9/29/21	Ice Present? yes
No. of Coolers: 1	Cooler Temps: 3.8

Sample ID	Date	Time	Matrix	No. Containers	Percent Solids (TS)	PCBs	PAHs	Archive					Notes/Comments
GTF-SL049	9/29/21	11:52	Soil	1	X	X	X						
GTF_SL050	9/29/21	11:50	Soil	1				X					

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Kelsey Kirkland	Printed Name: Dimitri Lominadze	Printed Name:	Printed Name:
	Company: Integral	Company: ARI	Company:	Company:
	Date & Time: 9/29/21 5:00 PM	Date & Time: 09/29/21 1700	Date & Time:	Date & Time:

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Location ________ Date 3/9/22

Project / Client Former Georgetown Steam plant (GTF) property transfer / CF/408-010-6 Soil / GW Sampling ~~Scale~~

Weather: ~50°F Partly Sunny
Integral Personnel: M. Fasio, K. Kirkland
Onsite: 0715
Setup sampling Station: 0730
Cascade En. onsite: 0800
APS locate onsite: 0800
Cascade personnel: T. watson
H&S meeting: 0845

Starting to extrude GTF-S22 - 0910/0915
No Deviations

Starting to extrude GTF-S23 - ~~0935/0940~~ 0945/0950
Step-out NE Due to drum, APS located
2-3 ft.
Dup @ 1.5-2 ft. (GTF-S23-1.5-2f-Dup)

Starting to extrude GTF-S24 - 1010/1015
Step-out 10 ft. S due to overhead powerlines

Starting to extrude ~~GTF-S6~~ GTF-S6-B - 1030/1035
No Deviations
Dup @ 2.0-2.5 ft
(GTF-S6-B-2-2.5ft-Dup)

Location

Date 3/9/22

Project / Client GTF / CF1408-0106

GW/soil sampling

~~Calibrating~~ MF Calibrating Hach 2100Q 1110

20 NTU -> ~~15.5 NTU~~ MF 21.1 NTU

100 NTU -> 102 NTU

800 NTU -> 872 NTU

Calibrating YSI pro plus 1125

conductivity ~~1.20~~ 1.68 mS/cm Adjusted to 1.41

ORP: 245.8 ~~~~ mV

Adjusted to 240

pH4:

pH7:

pH10:

* Issues w/ calibrations
Pine bring different unit to site

Equipment Blank for Drill Head @ 1310
SL085

Equipment blank for SS bowl & spoon @ 1315

-> 1332 Calibration YSI w/ Pine
(see data sheet)

Starting to purge GW3 1400
Dup for GW3

Location ________ Date 3/9/22

Project / Client GTF/CF1408-0106

GW/soil sampling

Starting to purge GW 2 ~~1315~~ 1515

Equipment Blank for GW 1603-1608

Starting Purging GW3 1618

Collected IDW Soild: 1100-1104

Collected IDW liquids: 1725

GPS Actual sample location 1715

Demob. 1730

Left Site 1800

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF-S22
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 3/9/22
Page 1 of 1

SAMPLE INFORMATION											
Sample ID	% Recovery	Sheen	FIELD-ESTIMATED % Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
		NA					90	10	1–5	SP	0-4.5ft. loose, damp, dark brown, POORLY GRADED SAND (SP) 90% fine Sand, Trace Fines @ 1.5ft. 1" layer of clay (light brown) @ 3.5ft. grades to med. Sand end of core @ 4.5ft

MF

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push-Geoprobe
Sampling Equipment: Macrocore Sampler-7822
Start/End Time: 0910/0915
Latitude:
Longitude:
Notes: No Deviations

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF-S23
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 3/9/22

Page 1 of 1

SAMPLE INFORMATION			FIELD-ESTIMATED %								
			Gravel		Sand						
Sample ID	% Recovery	Sheen	Coarse	Fine	Coarse	Medium	Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
		NA					90	10	1 2 3 4 5	SP	0-4.5ft loose, damp, dark brown, POORLY GRADED SAND (SP) 90% fine sand, 10% silt, grades to Med. Sand @1-1.3ft Angular gravel @1.5-2.5ft pockets of sub-rounded gravel @2-2.3 ft coarse/med sand @3ft grades to med. Sand End of core @ 4.5ft

MF

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push-Geoprobe
Sampling Equipment: Macrocore Sampler-7822
Start/End Time: 0945/0950
Latitude:
Longitude:
Notes: Step-out NE ~2-3ft. Dup collected at 1.5-2ft.

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF-24
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 3/9/22

SAMPLE INFORMATION			FIELD-ESTIMATED %								
			Gravel		Sand						
Sample ID	% Recovery	Sheen	Coarse	Fine	Coarse	Medium	Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
								100	1		
									2	ML	0-1.7ft loose, damp, blackish dark brown, SILT (ML), 90% fines, 10% fine Sand, trace gravel, No odor
		NA					100		3		@ 1.5ft small fragments of brick like material
									4		
									5	SP	1.7-4.5ft loose, damp, dark brown, POORLY GRADED SAND (SP), 100% fine Sand
											End of core @ 4.5ft.

MF

MF

Drilling Contractor: Cascade Environmental

Drilling Method: Direct Push - Geoprobe

Sampling Equipment: Macrocore Sampler - 7822

Start/End Time: 1010/1015

Latitude:

Longitude:

Notes: Step-out ~10ft South due to overhead Powerlines

Location Sketch

integral

719 2nd Ave, Suite #1450
Seattle, WA 98104
(206) 957-0373

Log of Boring: GTF-S6-B
Project Name: Fromer Georgetown Steam Plant Flume Property Transfer
Project Number: CF1408
Logged by: MF & KK
Date: 3/9/22

SAMPLE INFORMATION											
Sample ID	% Recovery	Sheen	Gravel Coarse	Gravel Fine	Sand Coarse	Sand Medium	Sand Fine	Fines	Depth (Feet)	Symbol	Soil Description (USCS group name, minor components, color, moisture, additional descriptions)
								100	1	ML	0-1 ft. loose, damp, dark brown, SILT (ML), 100% fines, trace fine sand
		NA					100		2		@ 0.2-0.4 ft, Subrounded gravel
									3		1-4.5 ft, loose, damp, dark brown, POORLY GRADED SAND (SP) 100% fine sand, trace fines
									4		End of core @ 4.5 ft
									5	SP	

MF

MF

Drilling Contractor: Cascade Environmental
Drilling Method: Direct Push-Geoprobe
Sampling Equipment: Macrocore Sampler - 7822
Start/End Time: 1030/1035
Latitude:
Longitude:
Notes: No Deviations. Dup collected @ 2-2.5 ft.

Location Sketch

integral consulting inc.

Water Quality Meter Field Calibration Log

Site: Former GTSP Flume Site
Project #: CF1408
Date/Time: 3/9/22 **Begin:** 13:32 **End:** 13:48 **Meter Source:** Pine Env **Model #:** YSI Pro Plus
Sampler: MF / KK **Vendor #:** **Serial #:**
Weather: Sunny, 40° F

Parameter	Standard	Unit	Initial Reading		Adjusted To:	Time	Lot #	Exp. Date	Comments	
pH	pH 4.00	S.U.	3.84	+/-0.05 Ok	4	13:36	1GH562	08/23	Std. Temp.:	
	pH 7.00	S.U.	7.0	+/-0.05 Ok	7	13:32	1GI1017	09/23	Std. Temp.:	
	pH 10.00	S.U.	10.03	+/-0.05 Ok	10	13:40	1GL764	12/23	Std. Temp.:	
	pH 7.00 Immediate Check	S.U.		+/-0.10 Ok					Std. Temp.:	
	pH 7.00 3 Hour Check	S.U.	1.416	+/-0.20 Ok					Std. Temp.:	
Specific Conductivity		mS/cm	~~1.154~~	+/-1% Ok	1.413	13:44	1GL1141	12/22	Std. Temp.:	
	ORP	mV ~~mS/cm~~	238.3	+/-1% Ok	240	13:48	1GK536	08/22	Std. Temp.:	
Backscatter		NTU		+/-1% Ok					Std. Temp.:	
CDOM-fDOM		QSE		+/-1% Ok					Std. Temp.:	
Chlorophyll		ug/L Chl								
Turbidity	D.I. Water or 0 NTU Blank	NTU		+/-10% Ok						
		NTU		+/-10% Ok						
ORP	Zobell ________	mV		+/-10mV Ok					Std. Temp.:	
				+/- % Ok					Std. Temp.:	
Dissolved Oxygen	Zero % Solution	mg/L		+/-0.3 Ok					Std. Temp.:	
	Saturated Air	mg/L & % Sat.					NA	NA	Air Temp.:	Baro. Pres.:
	Air Saturated Water	mg/L & % Sat.					NA	NA	Water Temp.:	Baro. Pres.:

Comments: conductivity was recalibrated

Lab Certification #: **Checked By:** **Date:**

integral consulting inc.

GROUNDWATER SAMPLE COLLECTION FORM

719 2nd Ave #700
Seattle, WA 98104
(206) 957-0373

Well ID GW-1
Sample ID ~~GTF-SL079~~ MF GTF-GW1-1
Date: 3/9/2022

Project Name: Former GTF Property
Project Number: CF1408
Sampler: MF & KK

Temporary Well Information

Drilling Contractor: Cascade
Borehole Depth: 15 ft
Casing Length: 15 ft
Screen Interval: 11 - 15 ft
Sand Pack:
Product Noted (Y/N):
Odor ☐

Driling Method Direct push geoprobe
Borehole Diameter: 2.5"
Casing Diameter: 2.25"
Well Screen Type/Slot Size: 4/1000

DT-Product:
Comments ____

Purge Data

Total Well Depth 15 ft ☐ Clean Bottom ☐ Muddy Bottom ☐ Not Measured
Depth to Water 9.45 ft
Casing Volume ____ ft (H20) X ____ gpf = ____ X 3 = ____ gallons
3/4 " = 0.02 gpf 1"= 0.04 gpf 2" = 0.16 gpf 4"=0.65 gpf 6"=1.47 gpf

Purge Method

Pump Type: Peristaltic
Sample ~~Intake~~ Depth 14.5 Ft
Purge Start Time 16:18
Tubing: Dedicated Teflon-lined LDPE
Purge Stop Time 16:57
Total volume purged 4.7 gallons
Purge Rate 375 mL/min
Sample Rate 375 mL/min

Field Parameters

Time	DTW (ft)	Gallons	pH	Temperature (oC)	ORP (mvolts)	Turbidity (NTU)	Conductivity (mS/cm)	D.O. (mg/L)	Water Quality
16:21	9.45	0.4	6.24	11.2	45.7	623.0	143.6	3.42	milky/cloudy
16:24		0.8	6.21	11.2	51.4	363.0	140.9	2.90	"
16:27		1.4	6.17	11.3	58.5	229.0	139.2	3.10	little cloudy
16:30		1.6	6.17	11.3	62.6	159.0	138.2	3.27	"
16:33		2.0	6.11	11.2	65.7	121.0	137.4	3.37	"
16:36		2.4	6.17	11.3	69.2	95.2	136.6	3.44	clearer
16:39		2.7	6.16	11.2	71.7	79.2	136.1	3.53	"
16:42		3.1	6.16	11.2	74.0	64.9	135.8	3.48	"
16:45		3.5	6.15	11.2	75.5	53.5	135.5	3.52	"
16:48		3.8	6.13	11.2	77.0	71.8	135.2	3.63	"
16:51		4.1	6.14	11.2	77.8	42.2	135.1	3.54	"
16:54		4.4	6.14	11.2	79.7	27.8	135.0	3.53	clear
16:57		4.7	6.14	11.2	79.8	22.9	134.9	3.53	"

Sampling Device Peristaltic pump, Dedicated Teflon-lined LDPE tubing.
Filter Type: Size:

Sample Containers Collection Time____
Sample ID: Dup ID:

Date	Time	Amount	Type	Preservative	Analytical Method	QA Remarks
			☐ Poly (125 mL)	HNO_3	Total Metals (6010A and C)	
			☐ Poly (125 mL)	HNO_3	Dissolved Metals (6010A and C)	Filtered
			☐ 3 VOA (40 mL vial)	HCL	NWTPH-Gx	
			☐ 2 Amber (500 mL)	HCL	NWTPH-Dx	
			☐ 3 VOA (40 mL vial)	HCL	VOCs (8260C)	
			☐ 2 Amber (1 L)	--	PCBs (8082A)	

Samplers' Signature [signature] Date 3/9/22

integral consulting inc.

GROUNDWATER SAMPLE COLLECTION FORM

719 2nd Ave #700
Seattle, WA 98104
(206) 957-0373

Well ID GW-2
Sample ID ~~GTP-SL080~~ MF GTF-GW2-1
Date: 3/9/2022

Project Name: Former GTF Property
Project Number: CF1408
Sampler: MF & KK

Temporary Well Information

Drilling Contractor: Cascade
Drilling Method: Direct push geoprobe
Borehole Depth: 15 ft
Borehole Diameter: 2.5"
Casing Length: 15 ft
Casing Diameter: 2.25"
Screen Interval: 11-15 ft
Well Screen Type/Slot Size: 4 / 1000
Sand Pack:
Product Noted (Y/N):
DT-Product:
Odor ☐
Comments GTP-SL080

Purge Data

Total Well Depth 15 ft ☐ Clean Bottom ☐ Muddy Bottom ☐ Not Measured
Depth to Water 10.6 ft
Casing Volume ~~15~~ ft (H20) X ______ gpf = ______ X 3 = ______ gallons water flowing @ 10.6 ft
3/4" = 0.02 gpf 1"= 0.04 gpf 2" = 0.16 gpf 4"=0.65 gpf 6"=1.47 gpf

Purge Method

Pump Type: Peristaltic
Tubing: Dedicated Teflon-lined LDPE
Total volume purged 3.2 gallons
Sample ~~Intake~~ Depth 15 ft
Purge Rate 375 mL/min
Purge Start Time ~~15:10~~ 15:15
Purge Stop Time 15:42
Sample Rate 375 mL/min

Field Parameters

Time	DTW (ft)	Gallons	pH	Temperature (oC)	ORP (mvolts)	Turbidity (NTU)	Conductivity (mS/cm)	D.O. (mg/L)	Water Quality	
15:18	10.6	0.4	6.64	11.9	-78.7	59.1	273.5	1.56	little cloudy	
15:21	↓	0.6	6.56	11.9	-80.4	34.9	268.8	0.93	"	
15:24		1.1	6.40	11.9	-82.4	29.9	266.4	0.75	"	
15:27		1.5	6.48	11.9	-86.0	25.6	264.8	0.66	"	
15:30		1.9	6.42	11.8	-88.0	17.3	263.6	0.61	more clarity	
15:33		2.3	6.54	11.8	-90.0	13.9	263.0	0.57	"	
15:36		2.4	6.47	11.8	-92.2	12.0	261.3	0.57	"	
15:39		2.8	6.49	11.8	-92.9	10.8	261.0	0.56	"	
15:42	↓	3.2	6.44	11.7	-93.6	10.9	259.0	0.56	"	

Sampling Device Peristaltic pump, Dedicated Teflon-lined LDPE tubing.
Filter Type: Size:

Sample Containers Collection Time______

Sample ID: **Dup ID:**

Date	Time	Amount	Type	Preservative	Analytical Method	QA Remarks
			☐ Poly (125 mL)	HNO_3	Total Metals (6010A and C)	
			☐ Poly (125 mL)	HNO_3	Dissolved Metals (6010A and C)	Filtered
			☐ 3 VOA (40 mL vial)	HCL	NWTPH-Gx	
			☐ 2 Amber (500 mL)	HCL	NWTPH-Dx	
			☐ 3 VOA (40 mL vial)	HCL	VOCs (8260C)	
			☐ 2 Amber (1 L)	--	PCBs (8082A)	

Samplers' Signature______ Date 3/9/22

integral consulting inc.

GROUNDWATER SAMPLE COLLECTION FORM

719 2nd Ave #700
Seattle, WA 98104
(206) 957-0373

Well ID GW-3
Sample ID GTF-GW3-1
Date: 3/9/2022

Project Name: Former GTF Property
Project Number: CF1408
Sampler: MF & KK

Temporary Well Information

Drilling Contractor: Cascade
Driling Method Direct push, geoprobe
Borehole Depth: 15 ft
Borehole Diameter: 2.5"
Casing Length: 15 ft
Casing Diameter: 2.25"
Screen Interval: 11-15 ft
Well Screen Type/Slot Size: ~~[illegible]~~ 4/1000
Sand Pack:
Product Noted (Y/N):
DT-Product:
Odor ☐
Comments * Sample IDs GTF-SL081 + Field Dup GTF-SL082

Purge Data

Total Well Depth 15 ft ☐ Clean Bottom ☐ Muddy Bottom ☐ Not Measured
Depth to Water 8.8 ft
Casing Volume ______ ft (H20) X ________ gpf = ______ X 3 = __________ gallons
3/4 " = 0.02 gpf 1"= 0.04 gpf 2" = 0.16 gpf 4"=0.65 gpf 6"=1.47 gpf

Purge Method

Pump Type: Peristaltic
Tubing: Dedicated Teflon-lined LDPE
Total volume purged 4.2 gallons
Sample ~~Intake~~ Depth 13 ft
Purge Rate 375 mL/min
Purge Start Time 14:00
Purge Stop Time 14:33
Sample Rate 375 mL/min

Field Parameters

Time	DTW (ft)	Gallons	pH	Temperature (oC)	ORP (mvolts)	Turbidity (NTU)	Conductivity (mS/cm)	D.O. (mg/L)	Water Quality	
14:03	8.8	0.4	6.54	12.9	-17.9	44.7	232.6	1.04	little cloudy	
14:06		0.8	6.64	13.0	-7.3	20.9	228.4	0.82	"	
14:09		1.4	6.20	13.1	-4.9	20.3	231.7	0.67	"	
14:12		1.6	6.29	13.0	-4.8	17.4	230.3	0.64	"	
14:15		2.0	6.35	13.0	-7.3	20.3	231.3	0.58	"	
14:18		2.4	6.25	13.0	-10.4	20.7	232.9	0.59	"	
14:21		2.8	6.40	13.0	-11.9	22.1	233.1	0.58	"	
14:24		3.2	6.39	13.1	-15.2	25.4	235.1	0.57	"	
14:27 ~~14:27~~		3.6	6.43	13.2	-18.6	32.6	235.8	0.53	"	
14:30		3.8	6.42	13.1	-21.6	37.6	235.9	0.60	"	
14:33	↓	4.2	6.43	13.1	-25.1	46.9	236.0	0.47	"	

Sampling Device Peristaltic pump, Dedicated Teflon-lined LDPE tubing.
Filter Type: Size:

Sample Containers Collection Time__________
Sample ID:
Dup ID:

Date	Time	Amount	Type	Preservative	Analytical Method	QA Remarks
			☐ Poly (125 mL)	HNO_3	Total Metals (6010A and C)	
			☐ Poly (125 mL)	HNO_3	Dissolved Metals (6010A and C)	Filtered
			☐ 3 VOA (40 mL vial)	HCL	NWTPH-Gx	
			☐ 2 Amber (500 mL)	HCL	NWTPH-Dx	
			☐ 3 VOA (40 mL vial)	HCL	VOCs (8260C)	
			☐ 2 Amber (1 L)	--	PCBs (8082A)	

Samplers' Signature [signature]
Date 3/9/22

CHAIN OF CUSTODY FORM

Project: CF1408 - Fromer Georgetown Steam Plant Flume Property Transfer

Samplers: Mauri Fabio & Kelsey Kirkland

Integral Contact: Glenn Esler (gesler@integral-corp.com)
Phone (503) 943-3617

Ship to:
Lab Name Analytical Resources, Inc.
Address 4611 S 134th Pl #100
Tukwila, WA 9818

Contact Sue Dunnihoo
Phone (206) 695-6207

integral consulting inc.

ANALYSES REQUESTED

Sample No.	Tag #	Date	Time	Matrix	Percent Solids (SM2540G)	PAHs (EPA 8270E SIM)							Extra Container	Archive	Comments
GTF-SL056		3/9/22	10:51	Soil	X	X									
GTF-SL057		3/9/22	10:49	Soil										X	
GTF-SL058		3/9/22	10:47	Soil										X	
GTF-SL059		3/9/22	10:45	Soil										X	
GTF-SL060		3/9/22	10:41	Soil										X	
GTF-SL084		3/9/22	10:53	Soil	X	X									
GTF-SL061		3/9/22	09:30	Soil	X	X									Field Duplicate GTF-SL084
GTF-SL062		3/9/22	09:32	Soil	X	X									
GTF-SL063		3/9/22	09:34	Soil										X	
GTF-SL064		3/9/22	09:36	Soil										X	
GTF-SL065		3/9/22	09:38	Soil										X	
GTF-SL066		3/9/22	09:40	Soil										X	
GTF-SL067		3/9/22	10:06	Soil	X	X									
GTF-SL068		3/9/22	10:08	Soil	X	X									
GTF-SL069		3/9/22	09:59	Soil										X	
GTF-SL070		3/9/22	09:58	Soil										X	
GTF-SL071		3/9/22	09:54	Soil										X	
GTF-SL072		3/9/22	09:50	Soil										X	
GTF-SL083		3/9/22	10:10	Soil	X	X									

Analysis Turn Time: **Normal** **Rush** **Rush Results Needed By:**

Shipped by: **Shipping Tracking No.**

Condition of Samples Upon Receipt: **Custody Seal Intact?**

Matrix Code:
SL - Soil
SD - Sediment
GW - Groundwater
SW - Surface water
Other:

Relinquished by: [signature] (signature) **Date/Time:** 3/10/22 8:25 **Received by:** A Paist (signature) **Date/Time:** 3/10/22 0825

Relinquished by: ________ (signature) **Date/Time:** ________ **Received by:** ________ (signature) **Date/Time:** ________

Special Instructions:

CHAIN OF CUSTODY FORM

Project: CF1408 - Fromer Georgetown Steam Plant Flume Property Transfer

Samplers: Mauri Fabio & Kelsey Kirkland

Integral Contact: Glenn Esler (gesler@integral-corp.com)
Phone (503) 943-3617

Ship to:
Lab Name Analytical Resources, Inc.
Address 4611 S 134th Pl #100
Tukwila, WA 9818

Contact Sue Dunnihoo
Phone (206) 695-6207

integral consulting inc.

Sample No.	Tag #	Date	Time	Matrix	Percent solids (SM2540G)	PAHs (EPA8270E SIM)	pH/corrosivity/ignitability/Flash point	Reactive cyanides	Reactive sulfides	TCLP (SVOC, metals, pesticides/herbicides)	TCLP VOC	RCRA Metals	PCBs ~~Extra Container~~	Archive	Comments
GTF-SL073		3/9/22	10:31	Soil	X	X									
GTF-SL074		3/9/22	10:29	Soil	X	X									
GTF-SL075		3/9/22	10:26	Soil										X	
GTF-SL076		3/9/22	10:24	Soil										X	
GTF-SL077		3/9/22	10:22	Soil										X	
GTF-SL078		3/9/22	10:18	Soil										X	
GTF-SL086		3/9/22	11:00	Soil			X	X	X	X					IDW
GTF-SL088		3/9/22	11:02	Soil		X									IDW
GTF-SL088		3/9/22	11:04	Soil							X				IDW
GTF-SL086		3/9/22	13:05	Soil		X									Equipment Blank
GTF-SL085		3/9/22	13:10	Soil		X									Equipment Blank
GTF-SL081		3/9/22	14:38	GW									X		
GTF-SL081		3/9/22	14:40	GW									X		
GTF-SL081		3/9/22	14:41	GW		X									
GTF-SL082		3/9/22	14:44	GW		X									Field Duplicate
GTF-SL082		3/9/22	14:45	GW									X		Field Duplicate
GTF-SL082		3/9/22	14:46	GW		X									Field Duplicate
GTF-SL082		3/9/22	14:47	GW									X		Field Duplicate
GTF-SL081		3/9/22	14:43	GW		X									

Analysis Turn Time: Normal Rush **Rush Results Needed By:**

Shipped by: **Shipping Tracking No.**

Condition of Samples Upon Receipt: **Custody Seal Intact?**

Matrix Code: GW - Groundwater
SL - Soil SW - Surface water
SD -Sediment Other:

Relinquished by: [signature] (signature) **Date/Time:** 3/10/22 8 25 **Received by:** [signature] (signature) **Date/Time:** 3/10/22 0825

Relinquished by: ______ (signature) **Date/Time:** ______ **Received by:** ______ (signature) **Date/Time:** ______

Special Instructions:

CHAIN OF CUSTODY FORM

Project: CF1408 - Fromer Georgetown Steam Plant Flume Property Transfer

Samplers: Mauri Fabio & Kelsey Kirkland

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integral consulting inc.

Ship to:
Lab Name Analytical Resources, Inc.
Address 4611 S 134th Pl #100
Tukwila, WA 9818

Contact Sue Dunnihoo
Phone (206) 695-6207

ANALYSES REQUESTED

Sample No.	Tag #	Date	Time	Matrix	PCBs	PAHs	RCRA Metals	VOCs TCLP List					Extra Container	Archive	Comments
GTF_SL080		3/9/22	15:43	GW	X										
GTF-SL080		3/9/22	15:45	GW	X										
GTF-SL080		3/9/22	15:47	GW		X									
GTF-SL080		3/9/22	15:49	GW		X									
GTF-SL087		3/9/22	16:03	GW		X									
GTF-SL087		3/9/22	16:06	GW	X										Equipment Blank
GTF-SL087		3/9/22	16:07	GW		X									Equipment Blank
GTF-SL087		3/9/22	16:08	GW	X										Equipment Blank
GTF-SL079		3/9/22	17:00	GW	X										Equipment Blank
GTF-SL079		3/9/22	17:02	GW		X									
GTF-SL079		3/9/22	17:03	GW	X										
GTF-SL079		3/9/22	17:04	GW		X									
GTF-SL089		3/9/22	17:25	GW		X									IDW
GTF-SL089		3/9/22	17:26	GW			X								IDW
GTF-SL089		3/9/22	17:27	GW				X							IDW
GTF-SL089		3/9/22	17:28	GW				X							IDW
GTF-SL089		3/9/22	17:29	GW				X							IDW

Analysis Turn Time: Normal Rush **Rush Results Needed By:**

Shipped by: **Shipping Tracking No.**

Condition of Samples Upon Receipt: **Custody Seal Intact?**

Matrix Code:
GW - Groundwater
SL - Soil
SW - Surface water
SD -Sediment
Other:

Relinquished by: [signature] (signature) **Date/Time:** 3/10/22 8:25 **Received by:** [signature] (signature) **Date/Time:** 3/10/22 08:25

Relinquished by: ________ (signature) **Date/Time:** ________ **Received by:** ________ (signature) **Date/Time:** ________

Special Instructions:

Attachment 2

Laboratory Reports

Available upon request.

Attachment 3

Validation Reports

DATA VALIDATION REPORT

Former Georgetown Steam Plant Flume Property Transfer

Prepared for
Seattle City Light

Prepared by

integral consulting inc.

319 SW Washington Street
Suite 1150
Portland, OR 97204

December 3, 2021

CONTENTS

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

CCV	continuing calibration verification
EPA	U.S. Environmental Protection Agency
ICV	initial calibration verification
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MS/MSD	matrix spike and matrix spike duplicate
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
QA/QC	quality assurance and quality control
RPD	relative percent difference
SAP	sampling and analysis plan
SDG	sample delivery group
SVOC	semivolatile organic compound
TCLP	toxicity characteristic leaching procedure
VOC	volatile organic compound

1 INTRODUCTION

This report presents the findings of the data validation of soil samples and associated quality control samples analyzed for polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), flash point, pH, reactivity, toxicity characteristic leaching procedure (TCLP) metals, TCLP herbicides, TCLP pesticides, TCLP semivolatile organic compounds (SVOCs), TCLP volatile organic compounds (VOCs), and VOCs. The sample delivery groups (SDGs) reviewed are summarized in Table 1-1, and the laboratories, parameters, and analytical methods are listed in Table 1-2.

The majority of the samples received a Stage 2B validation, which included a review of all laboratory summary forms of quality control and instrument performance data. The pH, flash point, reactivity, and TCLP data received a Stage 2A validation, which included a review of all laboratory summary forms of quality control data. The data validation was based upon criteria described in the U.S. Environmental Protection Agency (EPA) National Functional Guidelines for Organic Superfund Methods Data Review (USEPA 2020a), National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA 2020b), and the referenced analytical methods.

The quality assurance and quality control (QA/QC) parameters reviewed are discussed in Section 2. The electronic data deliverables were compared to the hard copy data packages, and 10 percent of the results were verified. Qualifiers resulting from the validation process were entered into the project database. A reason code indicating the reason for qualification was also entered into the database. The definitions of the data qualifiers used are provided in Table 1-3, and descriptions of the reason codes used are provided in Table 1-4. For example, if a data point was estimated due to imprecision, the qualifier "J" and the reason code "REP" were entered into the database, indicated as J, REP in the discussion of findings in Section 2.

2 FINDINGS

The data validation findings are provided in this section.

2.1 PARAMETERS REVIEWED

The QA/QC parameters reviewed for each analytical parameter are discussed below and listed in Table 2-1.

2.2 SAMPLE RECEIPT AND HOLDING TIMES

Samples were received with complete chain-of-custody forms and in good condition, with the following exceptions:

- Water samples GTF-51, GTF-52, GTF-53 and GTF-SL055 submitted with SDG 21J0026 were misidentified on the chain-of-custody form as a soils. The laboratory logged in these samples as waters.
- For the samples submitted to AMTEST associated with SDG 21J0026, the sample receipt temperature was recorded at 10.6°C. The flash point and reactivity results for Samples GTF-SL001, GTF-SL002, GTF-SL003, GTF-SL004, and GTF-SL054 were qualified as estimated (UJ-HT).
- Not all pages of the chain-of-custody forms submitted with SDG 21-38213 were signed by EDGE Analytical as received.

All analyses were conducted within the holding times specified in the referenced methods or in the sampling and analysis plan (SAP; Integral 2021), with the following exceptions:

- Flash point and reactivity for Samples GTF-SL001, GTF-SL002, GTF-SL003, GTF-SL004, and GTF-SL054, submitted with SDG 21J0026, were analyzed 8 to 12 days past the method-recommended 14-day holding time from sample collection to analysis. These results were qualified as estimated (UJ-HT).
- The pH for Samples GTF-SL001, GTF-SL002, GTF-SL003, GTF-SL004, and GTF-SL054, submitted with SDG 21-38213, was analyzed 8 days from sample collection. These results were qualified as estimated (J-HT).

2.3 BLANKS

All results from the laboratory method blanks and equipment blanks were reported as less than the laboratory method detection limits with the following exceptions:

- Naphthalene, 2-methylnaphthalene, 1-methylnaphthalene, acenaphthene, and fluoranthene were detected in the method blank submitted with SDG 21I0433. The detected results in the following samples were qualified as not detected (U-LB):
  - Naphthalene: GTF-SL037, GTF-SL041, GTF-SL043
  - 2-Methylnaphthalene: GTF-SL035, GTF-SL037, GTF-SL041, GTF-SL043, GTF-SL049
  - 1-Methylnaphthalene: GTF-SL029, GTF-SL031, GTF-SL033, GTF-SL035, GTF-SL037, GTF-SL039, GTF-SL041, GTF-SL043, GTF-SL049
  - Acenaphthene: GTF-SL029, GTF-SL031, GTF-SL037, GTF-SL043, GTF-SL049
  - Fluoranthene: GTF-SL041 and GTF-SL043
- Acenaphthene, 2-methylnaphthalene, 1-methylnaphthalene, and naphthalene were detected in one method blank, and naphthalene was detected in another method blank submitted with SDG 21J0026.
  - The detected naphthalene result in equipment blank Sample GTF-SL052 was qualified as not detected (U-LB).
  - The detected results in the following samples were qualified as not detected (U-LB):
    - 2-Methylnaphthalene and 1-methylnaphthalene: GTF-SL001, GTF-SL002, GTF-SL004
    - Acenaphthene: GTF-SL055
    - Naphthalene: GTF-SL001, GTF-SL002, GTF-SL052.
- Naphthalene was detected in equipment blank sample GTF-SL051 submitted with SDG 21J0026 at a concentration greater than the reporting limit. The naphthalene results for Samples GTF-SL001, GTF-SL002, GTF-SL005, GTF-SL009, GTF-SL011, GTF-SL019, GTF-SL023, GTF-SL037, GTF-SL041, and GTF-SL043 were qualified as not detected (U-EB).

2.4 SURROGATE RECOVERY

Surrogates were added to all samples for analysis of PAHs, PCBs, VOCs, TCLP VOCs, TCLP herbicides, and TCLP SVOCs. All surrogate percent recoveries were within the laboratory control limits with the following exceptions:

- Two phenol surrogate recovery values were less than the laboratory control limits in the TCLP SVOC analysis of Sample GTF-SL002 submitted with SDG 21-38213. The results for all TCLP phenolic compounds for Sample GTF-SL002 were qualified as estimated (UJ-SSR).

- The percent recovery value for the PAH surrogate dibenzo[*a,h*]anthracene-d14 was greater than the laboratory control limits in laboratory control sample (LCS) BJJ0279-BSD1 submitted with SDGs 21J0026 and 21I0433. Because the sample was a quality control sample no qualifiers were assigned.
- The percent recovery value for the PAH surrogate dibenzo[*a,h*]anthracene-d14 was greater than the laboratory control limits in one matrix spiked submitted with SDG 21I0432. Because the sample was a quality control sample no qualifiers were assigned.
- The percent recovery values for the PCB surrogate tetrachloro-m-xylene were less than the laboratory control limits in Samples BJJ0278-BLK1, BJJ0278-BS1, BJJ0278-BSD1 submitted with SDGs 21J0026 and 21I0433. Because these were quality control samples, no qualifiers were assigned.
- The percent recovery values for the PCB surrogate tetrachloro-m-xylene were less than the laboratory control limits in Samples GTF-SL002 and GTF-SL003 submitted with SDG 21J0026. The PCB results for Samples GTF-SL002, and GTF-SL003 were qualified as estimated (J/UJ-SSR).
- The percent recovery value for the PCB surrogate tetrachloro-m-xylene was less than the laboratory control limits in Sample GTF-SL047 submitted with SDG 21I0433. Because the percent recovery values for dichlorobiphenyl and tetrachloro-m-xylene (on the 2nd column) were within limits, no qualifiers assigned.

2.5 LABORATORY CONTROL SAMPLES

The percent recoveries and relative percent difference (RPD) values of all laboratory control samples were within the laboratory control limits with the following exceptions:

- The percent recovery value for TCLP pyridine in the LCS submitted with SDG 21-38213 was less than the laboratory control limits. The TCLP pyridine result in Samples GTF-SL001, GTF-SL002, GTF-SL003, GTF-SL004, and GTF-SL054 were qualified as estimated (UJ-LCS).
- The percent recovery value for dibenzo[*a,h*]anthracene in the one LCS submitted with SDG 21J0026 was greater than the laboratory control limits. The dibenzo[*a,h*]anthracene result in Sample GTF-SL055 was qualified as estimated (J-LCS).
- The percent recovery values for benzo[*g,h,i*]perylene in one LCS/laboratory control sample duplicate (LCSD) submitted with SDGs 21J0026 and 21I0433 were greater than the laboratory control limits. In addition, the percent recovery values for

benzo[*k*]fluoranthene, total benzofluoranthenes, indeno[1,2,3-*cd*]pyrene, and dibenzo[*a,h*]anthracene in the LCSD were greater than the laboratory control limits.

– The detected benzo[*g,h,i*]perylene results in Samples GTF-SL001, GTF-SL002, GTF-SL003, GTF-SL004, GTF-SL054, GTF-SL031, GTF-SL033, GTF-SL035, GTF-SL037, GTF-SL039, GTF-SL041, GTF-SL043, GTF-SL045, GTF-SL047, and GTF-SL049 were qualified as estimated (J-LCS).

– Because the benzo[*k*]fluoranthene, total benzofluoranthenes, indeno[1,2,3-*cd*]pyrene, and dibenzo[*a,h*]anthracene LCS percent recovery values were within limits and the LCSD recovery values were within 10 points of the control limits, no qualifiers were assigned.

2.6 MATRIX SPIKES/MATRIX SPIKE DUPLICATES

The percent recoveries and RPDs of all matrix spikes and matrix spike duplicates (MS/MSDs) were within the laboratory control limits, with the following exceptions:

- The percent recovery value for reactive cyanide was less than the laboratory control limits in the MSD submitted with SDG 21J0026. Because the percent recovery of the matrix spike was within in the laboratory control limits and the percent recovery value of the MSD was within 10 points of the laboratory control limits, no qualifiers were assigned.
- The percent recovery values for barium and lead were greater than the laboratory control limits in the matrix spike submitted with SDG 21J0026. Because the sample concentrations were greater than 4 times the concentration of the spike added, no qualifiers were assigned.
- The percent recovery values for TCLP pyridine were less than 10 percent in the matrix spike submitted with SDG 21-38213. Because the percent recovery value was less than 10 percent, the TCLP pyridine result in Sample GTF-SL054 was rejected (R-MS).

2.7 REPLICATES

Two sets of field replicates were submitted: samples GTF-SL029 and GTF-SL047, and samples GTF-SL041 and GTF-SL049. EPA has not established control limits for field replicates. For this project, the target control limit for field replicates is an RPD less than 50 percent for values greater than 5 times the MRL. For values less than 5 times the MRL, the absolute difference should be less than the MRL. These control limits were met for all analytes with the following exceptions:

- The chrysene, benzo[*b*]fluoranthene, total benzofluoranthenes, benzo[*a*]pyrene, and indeno[1,2,3-*cd*]pyrene results did not meet the control limits in Samples GTF-SL041 and GTF-SL049 and were qualified as estimated (J-REP).

The RPD values for all laboratory duplicate analyses were within laboratory control limits with the following exceptions:

- The RPD value for selenium was greater than the laboratory control limit in the duplicate analysis of Sample GTF-SL055 submitted with SDG 21J0026. Because both results were less than the reporting limit, no qualifiers were assigned.
- The RPD value for TCLP barium was greater than the laboratory control limit in the duplicate analysis of Sample GTF-SL002 submitted with SDG 21-38213. The TCLP barium results in Samples GTF-SL001, GTF-SL002, GTF-SL003, GTF-SL004, and GTF-SL054 were qualified as estimated (J-REP).
- The percent difference value between dual-column PCB results for Aroclor 1254 in Sample GTF-SL007 submitted with SDG 21I0432 was outside the method control limits. The Aroclor 1254 result in Sample GTF-SL007 was qualified as estimated (J-REP).

2.8 METHOD REPORTING LIMITS AND METHODOLOGY

The reporting limits specified in the SAP (Integral 2021) were met for all analyses with the following exceptions:

- Several samples for PAH and PCB analysis were analyzed at dilutions and the reporting limits were adjusted accordingly.
- A number of samples were reanalyzed at dilutions because of high concentrations of PAHs in the samples. The laboratory reported both the initial and diluted results. Only one set of results was qualified as reportable and the other set was qualified as do-not-report (R-DNR) because a more appropriate result was available.
- The laboratory reported results from both columns in the electronic data deliverable submitted with SDG 21J0026. The associated results not reported on the summary forms in the laboratory report were qualified as do-not-report (R-DNR) because there was a more appropriate result available.
- Sample GTF-SL055 submitted with SDG 21J0026 was analyzed at 5-fold dilution because of the high levels of metals in the sample, and the reporting limits were elevated accordingly.

2.9 INSTRUMENT PERFORMANCE

The gas chromatograph/mass spectrometer instrument performance checks ("tune") were analyzed before each initial calibration, and the method-specified acceptance criteria were met.

2.10 INITIAL CALIBRATION

Initial calibrations were analyzed on all instruments and met the acceptance criteria stated in the associated methods, with the following exceptions:

- Benzo[*j*]fluoranthene was not included in the initial calibration verifications (ICVs) submitted for PAH analysis. This analyte was included in the associated continuing calibration verifications (CCVs), which met criteria, and no qualifiers were assigned.
- The vinyl chloride percent difference was less than the acceptance limits, and the hexachloro-1,3-butadiene percent difference was greater than the acceptance limits in the VOC ICV submitted with SDG 21J0026.
  - The vinyl chloride result in Sample GTF-SL055 was qualified as estimated (UJ-Ci).
  - Because the potential analytical bias was high and hexachloro-1,3-butadiene was not detected in the associated sample, no qualifiers were assigned.
- The percent difference for PAH surrogate dibenzo[*a,h*]anthracene-d14 was outside the control limits, biased high, in one ICV submitted with SDG 21J0026. Because the surrogate recovery values in the associated samples were within control limits, no qualifiers were assigned.
- The percent difference for pyrene was outside the control limits, biased low, in the ICVs submitted with SDGs 21J0026 and 21I0433. The pyrene results in Samples GTF-SL001, GTF-SL002, GTF-SL003, GTF-SL004, GTF-SL054, GTF-SL029, GTF-SL031, GTF-SL033, GTF-SL035, GTF-SL037, GTF-SL038, GTF-SL039, GTF-SL041, GTF-SL043, GTF-SL045, GTF-SL047, and GTF-SL049 were qualified as estimated (J/UJ-Ci).

2.11 CONTINUING CALIBRATION

Continuing calibrations were analyzed on all instruments and met the acceptance criteria stated in the associated methods, with the following exceptions:

- The recovery value for barium in the calibration verification submitted with SDG 21J0026 was less than the method control limits. The barium result for Sample GTF-SL055 was qualified as estimated (J-Cc).
- The percent differences for PAH surrogate dibenzo[*a,h*]anthracene-d14 were outside the control limits, biased high, in two CCVs submitted with SDG 21J0026. Because the

surrogate recovery values in the associated samples were within control limits, no qualifiers were assigned.

- A number of percent difference values were outside the control limits, biased high, in one low-level CCV submitted with SDGs 21J0026 and 21I0433. The following results were qualified as estimated (J-Cc):
  - Fluorene: GTF-SL002, GTF-SL004, GTF-SL055; GTF-SL041, GTF-SL043
  - Anthracene: GTF-SL001, GTF-SL002, GTF-SL004, GTF-SL055, GTF-SL037, GTF-SL041, GTF-SL043, GTF-SL049
  - Dibenzo[*a,h*]anthracene: GTF-SL001, GTF-SL002. GTF-SL031, GTF-SL037, GTF-SL039, GTF-SL041, GTF-SL043, GTF-SL049
  - Phenanthrene: GTF-SL029, GTF-SL031, GTF-SL033, GTF-SL035, GTF-SL037, GTF-SL039, GTF-SL047
  - Fluoranthene, pyrene: GTF-SL029, GTF-SL033, GTF-SL035, GTF-SL047
  - Benzo[*a*]anthracene: GTF-SL031, GTF-SL033, GTF-SL035, GTF-SL037, GTF-SL039, GTF-SL047
  - Chrysene, benzo[*a*]pyrene: GTF-SL031, GTF-SL033, GTF-SL035, GTF-SL047
  - Benzo[*b*]fluoranthene, total benzofluoranthenes, indeno[1,2,3-*cd*]pyrene: GTF-SL033, GTF-SL035
  - Benzo[*k*]fluoranthene: GTF-SL031, GTF-SL033, GTF-SL035, GTF-SL037, GTF-SL039, GTF-SL049
  - Benzo[*g,h,i*]perylene: GTF-SL033, GTF-SL035, GTF-SL047.
- The percent difference values for anthracene and dibenzo[*a,h*]anthracene were outside the control limits, biased high, in one low-level CCV submitted with SDG 21I0433. The anthracene and dibenzo[*a,h*]anthracene results in Sample GTF-SL043 were qualified as estimated (J-Cc).

2.12 INTERNAL STANDARDS

Internal standards were added to all samples for PAH, PCB, and VOC analysis, and the areas and retention times of all internal standards were within the method-specified control limits.

3 OVERALL ASSESSMENT

An overall assessment of the data is provided below.

3.1 DATA QUALIFICATION

A total of 1,197 results were reported. A total of 220 results (18 percent) were qualified as estimated or not detected; the number of results qualified is summarized by reason in Table 3-1. One result was rejected, and completeness was statistically 100 percent. A total of 255 of results were qualified as do-not-report. These results were not used in the percentage and completeness calculations because a more appropriate result was available. A summary of all qualified results is presented in Table 3-2.

3.2 DATA USABILITY

The data meet the criteria set forth in the method and referenced quality assurance documents, with the exceptions noted above. All other results, except rejected results, are acceptable for their intended use, as qualified.

4 REFERENCES

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Tables

Table 1-1. SDGs Reviewed, Number of Samples, and Validation Level

SDG	Number of Samples	Validation Level
21I0432	24 soils	Stage 2B
21I0433	22 soils	Stage 2B
21J0026	4 soils, 2 IDW, 3 equipment blanks	Stage 2A/2B

Notes:
IDW = investigation derived wastes
SDG = sample delivery group

Table 1-2. Analytical Parameters and Methods

Laboratory	Analytical Parameter	Analytical Method	Reference
ARI	PAHs	EPA 8270E SIM	USEPA (2018b)
	PCBs	EPA 8082A	USEPA (2007)
	VOCs	EPA 8260D	USEPA (2018a)
	Metals	EPA 6020B	USEPA (2014a)
	Mercury	EPA 7470A	USEPA (1994)
AmTest Laboratories	Flash Point	EPA 1020A	USEPA (1992a)
	Reactivity	EPA SW-846 Chapter 8	USEPA (2020c)
EDGE Analytical	pH	EPA 9045D	USEPA (2004)
	TCLP metals	EPA 1311/6010D	USEPA (1992b, 2014b)
	TCLP mercury	EPA 1311/7470A	USEPA (1992b, 1994)
	TCLP VOCs	EPA 1311/8260C	USEPA (1992b, 2006)
	TCLP Pesticides/SVOCs	EPA 1311/8270D	USEPA (1992b, 2014c)
	TCLP Herbicides	EPA 1311/8151A	USEPA (1992b, 1996)

Notes:
ARI = Analytical Resources, LLC
EPA = U.S. Environmental Protection Agency
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SIM = selective ion monitoring
SVOC = semivolatile organic compound
TCLP = toxicity characteristic leaching procedure
VOC = volatile organic compound

Table 1-3. Definition of Data Qualifiers

Data Qualifier	Definition
J	The associated numerical value is an estimated quantity.
R	Rejected
U	The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.
UJ	Estimated and not detected. The analyte is considered not detected at the reported value, and the associated numerical value is an estimated value.

Table 1-4. Definition of Data Validation Reason Codes

Reason Code	Definition
Cc	Continuing calibration outlier
Ci	Initial calibration outlier
DNR	Do-not-report
EB	Equipment blank contamination
HT	Holding time exceeded
LB	Laboratory blank contamination
LCS	Laboratory control sample outliers
MS	Matrix spike outlier
REP	Replicate imprecision
SSR	Surrogate outlier

Table 2-1. QA/QC Parameters Reviewed

QA/QC Parameter	Analysis						
	PAHs	PCBs	VOCs	Metals	Reactivity/FP	pH	TCLP
Sample Receipt and Holding Times	D	D	D	D	Q	Q	D
Blanks	Q	+	+	+	+	NA	+
Surrogate Recovery	D	Q	+	NA	NA	NA	Q
LCS	Q	+	+	+	+	+	Q
MS/MSD	+	+	+	D	D	NA	Q
Replicates	Q	Q	NA	D	+	+	Q
Method Reporting Limits and Methodology	Q	Q	+	D	+	+	+
Instrument Performance	+	NA	+	NA	+	+	+
ICAL	Q	+	Q	+	NA	NA	NA
CCAL	Q	+	+	Q	NA	NA	NA
Internal Standard	+	+	+	NA	NA	NA	NA

Notes:
+ = All QA/QC criteria met
D = Data are discussed in the report. QA/QC criteria were not met; however no data were qualified.
Q = Data were qualified and are discussed in the report.

CCAL = continuing calibration
FP = flash point
ICAL = initial calibration
LCS = laboratory control sample
MS/MSD = matrix spike and matrix spike duplicate
NA = not applicable
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
QA/QC = quality assurance and quality control
TCLP = toxicity characteristic leaching procedure
VOC = volatile organic compound

Table 3-1. Summary of Qualified Data Points by Reason

Data Qualification Reason	Number of Data Points Estimated	Number of Data Points Qualified Not Detected	Number of Data Points Rejected
Continuing calibration outlier	71	--	--
Initial calibration outlier	17	--	--
Do-not-report	--	--	255
Equipment blank contamination	--	10	--
Holding time exceeded	20	--	--
Laboratory blank contamination	61	--	--
Laboratory control sample outliers	20	--	--
Matrix spike outlier	--	--	1
Replicate imprecision	16	--	--
Surrogate outlier	24	--	--

Notes:
-- = none

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
21J0026	GTF-SL001	Flashpoint		212	U	UJ	HT	deg f
21J0026	GTF-SL001	Cyanide		0.5	U	UJ	HT	percent
21J0026	GTF-SL001	Sulfide		0.1	U	UJ	HT	percent
21J0026	GTF-SL001	Barium	0.378	0.002		J	REP	mg/l
21J0026	GTF-SL001	Aroclor 1254	34.1	19.9		R	DNR	ug/kg
21J0026	GTF-SL001	Aroclor 1016		19.9	Ua	R	DNR	ug/kg
21J0026	GTF-SL001	Aroclor 1221		19.9	Ua	R	DNR	ug/kg
21J0026	GTF-SL001	Aroclor 1232		19.9	Ua	R	DNR	ug/kg
21J0026	GTF-SL001	Aroclor 1242		19.9	Ua	R	DNR	ug/kg
21J0026	GTF-SL001	Aroclor 1248		19.9	Ua	R	DNR	ug/kg
21J0026	GTF-SL001	Aroclor 1260	171	19.9		R	DNR	ug/kg
21J0026	GTF-SL001	Aroclor 1262		19.9	Ua	R	DNR	ug/kg
21J0026	GTF-SL001	Aroclor 1268		19.9	Ua	R	DNR	ug/kg
21J0026	GTF-SL001	Pyridine	0.01	0.01		UJ	LCS	mg/l
21J0026	GTF-SL001	1-Methylnaphthalene	0.93	4.98	J	U	LB	ug/kg
21J0026	GTF-SL001	2-Methylnaphthalene	1.43	4.98	J	U	LB	ug/kg
21J0026	GTF-SL001	Acenaphthene	0.69	4.98	J	U	LB	ug/kg
21J0026	GTF-SL001	Anthracene	1.49	4.98	J	J	Cc	ug/kg
21J0026	GTF-SL001	Benzo(g,h,i)perylene	21.3	4.98		J	LCS	ug/kg
21J0026	GTF-SL001	Dibenzo(a,h)anthracene	3.61	4.98	J	J	Cc	ug/kg
21J0026	GTF-SL001	Naphthalene	1.31	4.98	J	U	EB,LB	ug/kg
21J0026	GTF-SL001	Pyrene	17.2	4.98	Q	J	Ci	ug/kg
21J0026	GTF-SL001	pH	5.96			J	HT	ph units
21J0026	GTF-SL002	Flashpoint		212	U	UJ	HT	deg f
21J0026	GTF-SL002	Cyanide		0.5	U	UJ	HT	percent
21J0026	GTF-SL002	Sulfide		0.1	U	UJ	HT	percent
21J0026	GTF-SL002	Barium	0.253	0.002		J	REP	mg/l
21J0026	GTF-SL002	Aroclor 1016		19.9	Ua	UJ	SSR	ug/kg
21J0026	GTF-SL002	Aroclor 1221		19.9	Ua	UJ	SSR	ug/kg
21J0026	GTF-SL002	Aroclor 1232		19.9	Ua	UJ	SSR	ug/kg
21J0026	GTF-SL002	Aroclor 1242		19.9	Ua	UJ	SSR	ug/kg
21J0026	GTF-SL002	Aroclor 1248		19.9	Ua	UJ	SSR	ug/kg
21J0026	GTF-SL002	Aroclor 1254	17.6	19.9	J	R	DNR	ug/kg
21J0026	GTF-SL002	Aroclor 1260	47.2	19.9		J	SSR	ug/kg

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
21J0026	GTF-SL002	Aroclor 1262		19.9	Ua	UJ	SSR	ug/kg
21J0026	GTF-SL002	Aroclor 1268		19.9	Ua	UJ	SSR	ug/kg
21J0026	GTF-SL002	Aroclor 1016		19.9	Ua	R	DNR	ug/kg
21J0026	GTF-SL002	Aroclor 1221		19.9	Ua	R	DNR	ug/kg
21J0026	GTF-SL002	Aroclor 1232		19.9	Ua	R	DNR	ug/kg
21J0026	GTF-SL002	Aroclor 1242		19.9	Ua	R	DNR	ug/kg
21J0026	GTF-SL002	Aroclor 1248		19.9	Ua	R	DNR	ug/kg
21J0026	GTF-SL002	Aroclor 1254	19.1	19.9	J	J	SSR	ug/kg
21J0026	GTF-SL002	Aroclor 1260	40.6	19.9		R	DNR	ug/kg
21J0026	GTF-SL002	Aroclor 1262		19.9	Ua	R	DNR	ug/kg
21J0026	GTF-SL002	Aroclor 1268		19.9	Ua	R	DNR	ug/kg
21J0026	GTF-SL002	2,4,5-Trichlorophenol	0.01	0.01		UJ	SSR	mg/l
21J0026	GTF-SL002	2,4,6-Trichlorophenol	0.01	0.01		UJ	SSR	mg/l
21J0026	GTF-SL002	2-Methylphenol	0.01	0.01		UJ	SSR	mg/l
21J0026	GTF-SL002	4-Methylphenol	0.01	0.01		UJ	SSR	mg/l
21J0026	GTF-SL002	m+p methylphenol	0.01	0.01		UJ	SSR	mg/l
21J0026	GTF-SL002	Pentachlorophenol	0.01	0.01		UJ	SSR	mg/l
21J0026	GTF-SL002	Pyridine	0.01	0.01		UJ	LCS	mg/l
21J0026	GTF-SL002	1-Methylnaphthalene	1.91	4.99	J	U	LB	ug/kg
21J0026	GTF-SL002	2-Methylnaphthalene	2.88	4.99	J	U	LB	ug/kg
21J0026	GTF-SL002	Acenaphthene	0.98	4.99	J	U	LB	ug/kg
21J0026	GTF-SL002	Anthracene	1.81	4.99	J	J	Cc	ug/kg
21J0026	GTF-SL002	Benzo(g,h,i)perylene	37.8	4.99		J	LCS	ug/kg
21J0026	GTF-SL002	Dibenzo(a,h)anthracene	4.82	4.99	J	J	Cc	ug/kg
21J0026	GTF-SL002	Fluorene	0.71	4.99	J	J	Cc	ug/kg
21J0026	GTF-SL002	Naphthalene	2.62	4.99	J	U	EB,LB	ug/kg
21J0026	GTF-SL002	Pyrene	25.1	4.99	Q	J	Ci	ug/kg
21J0026	GTF-SL002	pH	6.46			J	HT	ph units
21J0026	GTF-SL003	Flashpoint		212	U	UJ	HT	deg f
21J0026	GTF-SL003	Cyanide		0.5	U	UJ	HT	percent
21J0026	GTF-SL003	Sulfide		0.1	U	UJ	HT	percent
21J0026	GTF-SL003	Barium	0.2	0.002		J	REP	mg/l
21J0026	GTF-SL003	Aroclor 1016		20	Ua	UJ	SSR	ug/kg
21J0026	GTF-SL003	Aroclor 1221		20	Ua	UJ	SSR	ug/kg

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
21J0026	GTF-SL003	Aroclor 1232		20	Ua	UJ	SSR	ug/kg
21J0026	GTF-SL003	Aroclor 1242		20	Ua	UJ	SSR	ug/kg
21J0026	GTF-SL003	Aroclor 1248		20	Ua	UJ	SSR	ug/kg
21J0026	GTF-SL003	Aroclor 1254		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL003	Aroclor 1260	26.8	20		J	SSR	ug/kg
21J0026	GTF-SL003	Aroclor 1262		20	Ua	UJ	SSR	ug/kg
21J0026	GTF-SL003	Aroclor 1268		20	Ua	UJ	SSR	ug/kg
21J0026	GTF-SL003	Aroclor 1016		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL003	Aroclor 1221		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL003	Aroclor 1232		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL003	Aroclor 1242		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL003	Aroclor 1248		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL003	Aroclor 1254	10.9	20	J	J	SSR	ug/kg
21J0026	GTF-SL003	Aroclor 1260	23.4	20		R	DNR	ug/kg
21J0026	GTF-SL003	Aroclor 1262		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL003	Aroclor 1268		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL003	Pyridine	0.01	0.01		UJ	LCS	mg/l
21J0026	GTF-SL003	Benzo(g,h,i)perylene	250	14.9	D	J	LCS	ug/kg
21J0026	GTF-SL003	Pyrene	481	14.9	Q D	J	Ci	ug/kg
21J0026	GTF-SL003	pH	6.67			J	HT	ph units
21J0026	GTF-SL004	Flashpoint		212	U	UJ	HT	deg f
21J0026	GTF-SL004	Cyanide		0.5	U	UJ	HT	percent
21J0026	GTF-SL004	Sulfide		0.1	U	UJ	HT	percent
21J0026	GTF-SL004	Barium	0.23	0.002		J	REP	mg/l
21J0026	GTF-SL004	Aroclor 1016		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL004	Aroclor 1221		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL004	Aroclor 1232		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL004	Aroclor 1242		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL004	Aroclor 1248		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL004	Aroclor 1254	13.6	20	J	R	DNR	ug/kg
21J0026	GTF-SL004	Aroclor 1260	35.9	20		R	DNR	ug/kg
21J0026	GTF-SL004	Aroclor 1262		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL004	Aroclor 1268		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL004	Pyridine	0.01	0.01		UJ	LCS	mg/l

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
21J0026	GTF-SL004	1-Methylnaphthalene	2.49	5	J	U	LB	ug/kg
21J0026	GTF-SL004	2-Methylnaphthalene	4.94	5	J	U	LB	ug/kg
21J0026	GTF-SL004	Acenaphthene	1.63	5	J	U	LB	ug/kg
21J0026	GTF-SL004	Anthracene	3.93	5	J	J	Cc	ug/kg
21J0026	GTF-SL004	Benzo(g,h,i)perylene	77.5	5		J	LCS	ug/kg
21J0026	GTF-SL004	Fluorene	2	5	J	J	Cc	ug/kg
21J0026	GTF-SL004	Pyrene	62	5	Q	J	Ci	ug/kg
21J0026	GTF-SL004	pH	6.74			J	HT	ph units
21I0432	GTF-SL005	1-Methylnaphthalene	1.55	4.98	J	U	LB	ug/kg
21I0432	GTF-SL005	2-Methylnaphthalene	1.88	4.98	J	U	LB	ug/kg
21I0432	GTF-SL005	Acenaphthene	1.07	4.98	J	U	LB	ug/kg
21I0432	GTF-SL005	Fluorene	0.9	4.98	J	U	LB	ug/kg
21I0432	GTF-SL005	Naphthalene	1.86	4.98	J	U	EB	ug/kg
21I0432	GTF-SL005	Phenanthrene	1.8	4.98	J	U	LB	ug/kg
21I0432	GTF-SL007	Aroclor 1254	143	100	D	J	REP	ug/kg
21I0432	GTF-SL007	1-Methylnaphthalene	4.81	5	J	U	LB	ug/kg
21I0432	GTF-SL007	Chrysene	508	5	E	R	DNR	ug/kg
21I0432	GTF-SL007	Fluoranthene	644	5	E	R	DNR	ug/kg
21I0432	GTF-SL007	Pyrene	739	5	E	R	DNR	ug/kg
21I0432	GTF-SL007	1-Methylnaphthalene	5.11	25	D J	R	DNR	ug/kg
21I0432	GTF-SL007	2-Methylnaphthalene	6.89	25	D J	R	DNR	ug/kg
21I0432	GTF-SL007	Acenaphthene	10.6	25	D J	R	DNR	ug/kg
21I0432	GTF-SL007	Acenaphthylene	13	25	D J	R	DNR	ug/kg
21I0432	GTF-SL007	Anthracene	45.3	25	D	R	DNR	ug/kg
21I0432	GTF-SL007	Benzo(a)anthracene	331	25	D	R	DNR	ug/kg
21I0432	GTF-SL007	Benzo(a)pyrene	351	25	D	R	DNR	ug/kg
21I0432	GTF-SL007	Benzo(b)fluoranthene	380	25	D	R	DNR	ug/kg
21I0432	GTF-SL007	Benzo(g,h,i)perylene	283	25	D	R	DNR	ug/kg
21I0432	GTF-SL007	Benzo(j)fluoranthene	146	25	D	R	DNR	ug/kg
21I0432	GTF-SL007	Benzo(k)fluoranthene	206	25	D	R	DNR	ug/kg
21I0432	GTF-SL007	Benzofluoranthenes	655	50	D	R	DNR	ug/kg
21I0432	GTF-SL007	Dibenzo(a,h)anthracene	91.7	25	D	R	DNR	ug/kg
21I0432	GTF-SL007	Dibenzofuran		25	D U	R	DNR	ug/kg
21I0432	GTF-SL007	Fluorene	10.2	25	D J	R	DNR	ug/kg

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
21I0432	GTF-SL007	Indeno(1,2,3-cd)pyrene	243	25	D	R	DNR	ug/kg
21I0432	GTF-SL007	Naphthalene	11.1	25	D J	R	DNR	ug/kg
21I0432	GTF-SL007	Phenanthrene	196	25	D	R	DNR	ug/kg
21I0432	GTF-SL009	1-Methylnaphthalene	1.52	4.99	J	U	LB	ug/kg
21I0432	GTF-SL009	2-Methylnaphthalene	2.69	4.99	J	U	LB	ug/kg
21I0432	GTF-SL009	Acenaphthene	1.06	4.99	J	U	LB	ug/kg
21I0432	GTF-SL009	Fluorene	0.69	4.99	J	U	LB	ug/kg
21I0432	GTF-SL009	Naphthalene	3.86	4.99	J	U	EB	ug/kg
21I0432	GTF-SL011	1-Methylnaphthalene	4.47	4.97	J	U	LB	ug/kg
21I0432	GTF-SL011	Acenaphthene	1.19	4.97	J	U	LB	ug/kg
21I0432	GTF-SL011	Naphthalene	4.74	4.97	J	U	EB	ug/kg
21I0432	GTF-SL013	Phenanthrene	1.91	4.98	J	U	LB	ug/kg
21I0432	GTF-SL015	Benzo(a)pyrene	528	4.98	E	R	DNR	ug/kg
21I0432	GTF-SL015	Benzo(b)fluoranthene	540	4.98	E	R	DNR	ug/kg
21I0432	GTF-SL015	Chrysene	620	4.98	E	R	DNR	ug/kg
21I0432	GTF-SL015	Fluoranthene	1050	4.98	E	R	DNR	ug/kg
21I0432	GTF-SL015	Phenanthrene	717	4.98	E	R	DNR	ug/kg
21I0432	GTF-SL015	Pyrene	1180	4.98	E	R	DNR	ug/kg
21I0432	GTF-SL015	1-Methylnaphthalene	8.5	24.9	D J	R	DNR	ug/kg
21I0432	GTF-SL015	2-Methylnaphthalene	7.25	24.9	D J	R	DNR	ug/kg
21I0432	GTF-SL015	Acenaphthene	48.8	24.9	D	R	DNR	ug/kg
21I0432	GTF-SL015	Acenaphthylene	6.96	24.9	D J	R	DNR	ug/kg
21I0432	GTF-SL015	Anthracene	77.7	24.9	D	R	DNR	ug/kg
21I0432	GTF-SL015	Benzo(a)anthracene	358	24.9	D	R	DNR	ug/kg
21I0432	GTF-SL015	Benzo(g,h,i)perylene	388	24.9	D	R	DNR	ug/kg
21I0432	GTF-SL015	Benzo(j)fluoranthene	188	24.9	D	R	DNR	ug/kg
21I0432	GTF-SL015	Benzo(k)fluoranthene	237	24.9	D	R	DNR	ug/kg
21I0432	GTF-SL015	Benzofluoranthenes	747	49.8	D	R	DNR	ug/kg
21I0432	GTF-SL015	Dibenzo(a,h)anthracene	106	24.9	D	R	DNR	ug/kg
21I0432	GTF-SL015	Dibenzofuran	17.8	24.9	D J	R	DNR	ug/kg
21I0432	GTF-SL015	Fluorene	35.1	24.9	D	R	DNR	ug/kg
21I0432	GTF-SL015	Indeno(1,2,3-cd)pyrene	343	24.9	D	R	DNR	ug/kg
21I0432	GTF-SL015	Naphthalene	13.1	24.9	D J	R	DNR	ug/kg
21I0432	GTF-SL017	Benzo(a)anthracene	932	4.98	E	R	DNR	ug/kg

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
21I0432	GTF-SL017	Benzo(a)pyrene	804	4.98	E	R	DNR	ug/kg
21I0432	GTF-SL017	Benzo(b)fluoranthene	912	4.98	E	R	DNR	ug/kg
21I0432	GTF-SL017	Benzo(g,h,i)perylene	534	4.98	E	R	DNR	ug/kg
21I0432	GTF-SL017	Benzofluoranthenes	1530	9.96	E	R	DNR	ug/kg
21I0432	GTF-SL017	Chrysene	1060	4.98	E	R	DNR	ug/kg
21I0432	GTF-SL017	Fluoranthene	2420	4.98	E	R	DNR	ug/kg
21I0432	GTF-SL017	Indeno(1,2,3-cd)pyrene	549	4.98	E	R	DNR	ug/kg
21I0432	GTF-SL017	Phenanthrene	2560	4.98	E	R	DNR	ug/kg
21I0432	GTF-SL017	Pyrene	2110	4.98	E	R	DNR	ug/kg
21I0432	GTF-SL017	1-Methylnaphthalene	29.4	49.8	D J	R	DNR	ug/kg
21I0432	GTF-SL017	2-Methylnaphthalene	26.4	49.8	D J	R	DNR	ug/kg
21I0432	GTF-SL017	Acenaphthene	174	49.8	D	R	DNR	ug/kg
21I0432	GTF-SL017	Acenaphthylene		49.8	D U	R	DNR	ug/kg
21I0432	GTF-SL017	Anthracene	263	49.8	D	R	DNR	ug/kg
21I0432	GTF-SL017	Benzo(j)fluoranthene	261	49.8	D	R	DNR	ug/kg
21I0432	GTF-SL017	Benzo(k)fluoranthene	355	49.8	D	R	DNR	ug/kg
21I0432	GTF-SL017	Dibenzo(a,h)anthracene	158	49.8	D	R	DNR	ug/kg
21I0432	GTF-SL017	Dibenzofuran	99.7	49.8	D	R	DNR	ug/kg
21I0432	GTF-SL017	Fluorene	158	49.8	D	R	DNR	ug/kg
21I0432	GTF-SL017	Naphthalene	42.6	49.8	D J	R	DNR	ug/kg
21I0432	GTF-SL019	1-Methylnaphthalene	1.76	4.99	J	U	LB	ug/kg
21I0432	GTF-SL019	2-Methylnaphthalene	3.06	4.99	J	U	LB	ug/kg
21I0432	GTF-SL019	Acenaphthene	1.86	4.99	J	U	LB	ug/kg
21I0432	GTF-SL019	Fluorene	0.92	4.99	J	U	LB	ug/kg
21I0432	GTF-SL019	Naphthalene	3.87	4.99	J	U	EB	ug/kg
21I0432	GTF-SL021	Phenanthrene	3.22	4.98	J	U	LB	ug/kg
21I0432	GTF-SL023	1-Methylnaphthalene	0.98	5	J	U	LB	ug/kg
21I0432	GTF-SL023	2-Methylnaphthalene	1.12	5	J	U	LB	ug/kg
21I0432	GTF-SL023	Naphthalene	1.49	5	J	U	EB	ug/kg
21I0432	GTF-SL023	Phenanthrene	3.91	5	J	U	LB	ug/kg
21I0432	GTF-SL025	Phenanthrene	2.53	5	J	U	LB	ug/kg
21I0432	GTF-SL027	Phenanthrene	1.94	4.99	J	U	LB	ug/kg
21J0026	GTF-SL051	Aroclor 1016		1	Ua	R	DNR	ug/l
21J0026	GTF-SL051	Aroclor 1221		1	Ua	R	DNR	ug/l

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
21J0026	GTF-SL051	Aroclor 1232		1	Ua	R	DNR	ug/l
21J0026	GTF-SL051	Aroclor 1242		1	Ua	R	DNR	ug/l
21J0026	GTF-SL051	Aroclor 1248		1	Ua	R	DNR	ug/l
21J0026	GTF-SL051	Aroclor 1254		1	Ua	R	DNR	ug/l
21J0026	GTF-SL051	Aroclor 1260		1	Ua	R	DNR	ug/l
21J0026	GTF-SL051	Aroclor 1262		1	Ua	R	DNR	ug/l
21J0026	GTF-SL051	Aroclor 1268		1	Ua	R	DNR	ug/l
21J0026	GTF-SL052	Aroclor 1016		1	Ua	R	DNR	ug/l
21J0026	GTF-SL052	Aroclor 1221		1	Ua	R	DNR	ug/l
21J0026	GTF-SL052	Aroclor 1232		1	Ua	R	DNR	ug/l
21J0026	GTF-SL052	Aroclor 1242		1	Ua	R	DNR	ug/l
21J0026	GTF-SL052	Aroclor 1248		1	Ua	R	DNR	ug/l
21J0026	GTF-SL052	Aroclor 1254		1	Ua	R	DNR	ug/l
21J0026	GTF-SL052	Aroclor 1260		1	Ua	R	DNR	ug/l
21J0026	GTF-SL052	Aroclor 1262		1	Ua	R	DNR	ug/l
21J0026	GTF-SL052	Aroclor 1268		1	Ua	R	DNR	ug/l
21J0026	GTF-SL052	Naphthalene	0.04	0.1	J	U	LB	ug/l
21J0026	GTF-SL053	Aroclor 1016		1	Ua	R	DNR	ug/l
21J0026	GTF-SL053	Aroclor 1221		1	Ua	R	DNR	ug/l
21J0026	GTF-SL053	Aroclor 1232		1	Ua	R	DNR	ug/l
21J0026	GTF-SL053	Aroclor 1242		1	Ua	R	DNR	ug/l
21J0026	GTF-SL053	Aroclor 1248		1	Ua	R	DNR	ug/l
21J0026	GTF-SL053	Aroclor 1254		1	Ua	R	DNR	ug/l
21J0026	GTF-SL053	Aroclor 1260		1	Ua	R	DNR	ug/l
21J0026	GTF-SL053	Aroclor 1262		1	Ua	R	DNR	ug/l
21J0026	GTF-SL053	Aroclor 1268		1	Ua	R	DNR	ug/l
21J0026	GTF-SL054	Flashpoint		212	U	UJ	HT	deg f
21J0026	GTF-SL054	Cyanide		0.5	U	UJ	HT	percent
21J0026	GTF-SL054	Sulfide		0.1	U	UJ	HT	percent
21J0026	GTF-SL054	Barium	0.232	0.002		J	REP	mg/l
21J0026	GTF-SL054	Aroclor 1016		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL054	Aroclor 1221		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL054	Aroclor 1232		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL054	Aroclor 1242		20	Ua	R	DNR	ug/kg

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
21J0026	GTF-SL054	Aroclor 1248		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL054	Aroclor 1254	12.7	20	J	R	DNR	ug/kg
21J0026	GTF-SL054	Aroclor 1260	59.4	20		R	DNR	ug/kg
21J0026	GTF-SL054	Aroclor 1262		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL054	Aroclor 1268		20	Ua	R	DNR	ug/kg
21J0026	GTF-SL054	Pyridine	0.01	0.01		R	MS	mg/l
21J0026	GTF-SL054	Benzo(g,h,i)perylene	107	4.99		J	LCS	ug/kg
21J0026	GTF-SL054	Pyrene	145	4.99	Q	J	Ci	ug/kg
21J0026	GTF-SL054	pH	6.84			J	HT	ph units
21J0026	GTF-SL055	Acenaphthene	0.02	0.1	J	U	LB	ug/l
21J0026	GTF-SL055	Barium	125	2.5	D	J	Cc	ug/l
21J0026	GTF-SL055	Vinyl chloride		1	Ua	UJ	Ci	ug/l
21J0026	GTF-SL055	Dibenzo(a,h)anthracene	0.11	0.1		J	LCS	ug/l
21I0433	GTF-SL029	Aroclor 1260		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL029	Aroclor 1016		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL029	Aroclor 1221		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL029	Aroclor 1232		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL029	Aroclor 1242		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL029	Aroclor 1248		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL029	Aroclor 1254		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL029	Aroclor 1262		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL029	Aroclor 1268		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL029	1-Methylnaphthalene	0.76	4.99	J	U	LB	ug/kg
21I0433	GTF-SL029	Acenaphthene	0.74	4.99	J	U	LB	ug/kg
21I0433	GTF-SL029	Fluoranthene	0.62	4.99	J	UJ	LB,Cc	ug/kg
21I0433	GTF-SL029	Phenanthrene	0.97	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL029	Pyrene	0.67	4.99	J	J	Ci,Cc	ug/kg
21I0433	GTF-SL031	Aroclor 1254		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL031	Aroclor 1016		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL031	Aroclor 1221		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL031	Aroclor 1232		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL031	Aroclor 1242		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL031	Aroclor 1248		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL031	Aroclor 1260	32.4	19.9		R	DNR	ug/kg

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
21I0433	GTF-SL031	Aroclor 1262		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL031	Aroclor 1268		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL031	1-Methylnaphthalene	0.82	4.98	J	U	LB	ug/kg
21I0433	GTF-SL031	Acenaphthene	0.72	4.98	J	U	LB	ug/kg
21I0433	GTF-SL031	Benzo(a)anthracene	2.96	4.98	J	J	Cc	ug/kg
21I0433	GTF-SL031	Benzo(a)pyrene	4.68	4.98	J	J	Cc	ug/kg
21I0433	GTF-SL031	Benzo(g,h,i)perylene	7.08	4.98		J	LCS	ug/kg
21I0433	GTF-SL031	Benzo(k)fluoranthene	3.15	4.98	J	J	Cc	ug/kg
21I0433	GTF-SL031	Chrysene	3.73	4.98	J	J	Cc	ug/kg
21I0433	GTF-SL031	Dibenzo(a,h)anthracene	1.76	4.98	J	J	Cc	ug/kg
21I0433	GTF-SL031	Indeno(1,2,3-cd)pyrene	4.82	4.98	J	J	Cc	ug/kg
21I0433	GTF-SL031	Phenanthrene	2.63	4.98	J	J	Cc	ug/kg
21I0433	GTF-SL031	Pyrene	5.13	4.98	Q	J	Ci,Cc	ug/kg
21I0433	GTF-SL033	Aroclor 1016		20	U	R	DNR	ug/kg
21I0433	GTF-SL033	Aroclor 1221		20	U	R	DNR	ug/kg
21I0433	GTF-SL033	Aroclor 1232		20	U	R	DNR	ug/kg
21I0433	GTF-SL033	Aroclor 1242		20	U	R	DNR	ug/kg
21I0433	GTF-SL033	Aroclor 1248		20	U	R	DNR	ug/kg
21I0433	GTF-SL033	Aroclor 1254		20	U	R	DNR	ug/kg
21I0433	GTF-SL033	Aroclor 1260	11	20	J	R	DNR	ug/kg
21I0433	GTF-SL033	Aroclor 1262		20	U	R	DNR	ug/kg
21I0433	GTF-SL033	Aroclor 1268		20	U	R	DNR	ug/kg
21I0433	GTF-SL033	1-Methylnaphthalene	0.56	4.99	J	U	LB	ug/kg
21I0433	GTF-SL033	Benzo(a)anthracene	1.91	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL033	Benzo(a)pyrene	2.83	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL033	Benzo(b)fluoranthene	2.2	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL033	Benzo(g,h,i)perylene	2.65	4.99	J	J	LCS,Cc	ug/kg
21I0433	GTF-SL033	Benzo(k)fluoranthene	1.14	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL033	Benzofluoranthenes	4.55	9.99	J	J	Cc	ug/kg
21I0433	GTF-SL033	Chrysene	2.78	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL033	Fluoranthene	2.72	4.99	J	UJ	LB,Cc	ug/kg
21I0433	GTF-SL033	Indeno(1,2,3-cd)pyrene	2.28	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL033	Phenanthrene	2.25	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL033	Pyrene	3.21	4.99	J	J	Ci,Cc	ug/kg

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
21I0433	GTF-SL035	Aroclor 1016		19.7	U	R	DNR	ug/kg
21I0433	GTF-SL035	Aroclor 1221		19.7	U	R	DNR	ug/kg
21I0433	GTF-SL035	Aroclor 1232		19.7	U	R	DNR	ug/kg
21I0433	GTF-SL035	Aroclor 1242		19.7	U	R	DNR	ug/kg
21I0433	GTF-SL035	Aroclor 1248		19.7	U	R	DNR	ug/kg
21I0433	GTF-SL035	Aroclor 1254		19.7	U	R	DNR	ug/kg
21I0433	GTF-SL035	Aroclor 1260		19.7	U	R	DNR	ug/kg
21I0433	GTF-SL035	Aroclor 1262		19.7	U	R	DNR	ug/kg
21I0433	GTF-SL035	Aroclor 1268		19.7	U	R	DNR	ug/kg
21I0433	GTF-SL035	1-Methylnaphthalene	0.84	4.99	J	U	LB	ug/kg
21I0433	GTF-SL035	2-Methylnaphthalene	1.22	4.99	J	U	LB	ug/kg
21I0433	GTF-SL035	Benzo(a)anthracene	1.17	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL035	Benzo(a)pyrene	2.19	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL035	Benzo(b)fluoranthene	2.35	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL035	Benzo(g,h,i)perylene	3.01	4.99	J	J	LCS,Cc	ug/kg
21I0433	GTF-SL035	Benzo(k)fluoranthene	1.63	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL035	Benzofluoranthenes	4.81	9.99	J	J	Cc	ug/kg
21I0433	GTF-SL035	Chrysene	1.96	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL035	Fluoranthene	2.25	4.99	J	UJ	LB,Cc	ug/kg
21I0433	GTF-SL035	Indeno(1,2,3-cd)pyrene	2.08	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL035	Phenanthrene	1.58	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL035	Pyrene	2.4	4.99	J	J	Ci,Cc	ug/kg
21I0433	GTF-SL037	Aroclor 1016		20	U	R	DNR	ug/kg
21I0433	GTF-SL037	Aroclor 1221		20	U	R	DNR	ug/kg
21I0433	GTF-SL037	Aroclor 1232		20	U	R	DNR	ug/kg
21I0433	GTF-SL037	Aroclor 1242		20	U	R	DNR	ug/kg
21I0433	GTF-SL037	Aroclor 1248		20	U	R	DNR	ug/kg
21I0433	GTF-SL037	Aroclor 1254		20	U	R	DNR	ug/kg
21I0433	GTF-SL037	Aroclor 1260	29.8	20		R	DNR	ug/kg
21I0433	GTF-SL037	Aroclor 1262		20	U	R	DNR	ug/kg
21I0433	GTF-SL037	Aroclor 1268		20	U	R	DNR	ug/kg
21I0433	GTF-SL037	1-Methylnaphthalene	1.12	4.99	J	U	LB	ug/kg
21I0433	GTF-SL037	2-Methylnaphthalene	1.54	4.99	J	U	LB	ug/kg
21I0433	GTF-SL037	Acenaphthene	0.98	4.99	J	U	LB	ug/kg

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
21I0433	GTF-SL037	Anthracene	1.06	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL037	Benzo(a)anthracene	4.92	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL037	Benzo(g,h,i)perylene	7.95	4.99		J	LCS	ug/kg
21I0433	GTF-SL037	Benzo(k)fluoranthene	3.85	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL037	Dibenzo(a,h)anthracene	1.76	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL037	Naphthalene	1.35	4.99	J	U	LB,EB	ug/kg
21I0433	GTF-SL037	Phenanthrene	4.56	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL037	Pyrene	8.24	4.99	Q	J	Ci,Cc	ug/kg
21I0433	GTF-SL039	Aroclor 1260	17.7	19.9	J	R	DNR	ug/kg
21I0433	GTF-SL039	Aroclor 1016		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL039	Aroclor 1221		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL039	Aroclor 1232		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL039	Aroclor 1242		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL039	Aroclor 1248		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL039	Aroclor 1254		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL039	Aroclor 1262		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL039	Aroclor 1268		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL039	1-Methylnaphthalene	0.81	4.97	J	U	LB	ug/kg
21I0433	GTF-SL039	Benzo(a)anthracene	4.09	4.97	J	J	Cc	ug/kg
21I0433	GTF-SL039	Benzo(g,h,i)perylene	9.87	4.97		J	LCS	ug/kg
21I0433	GTF-SL039	Benzo(k)fluoranthene	4.46	4.97	J	J	Cc	ug/kg
21I0433	GTF-SL039	Dibenzo(a,h)anthracene	1.91	4.97	J	J	Cc	ug/kg
21I0433	GTF-SL039	Phenanthrene	3.62	4.97	J	J	Cc	ug/kg
21I0433	GTF-SL039	Pyrene	7.26	4.97	Q	J	Ci,Cc	ug/kg
21I0433	GTF-SL041	Aroclor 1016		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL041	Aroclor 1221		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL041	Aroclor 1232		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL041	Aroclor 1242		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL041	Aroclor 1248		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL041	Aroclor 1254	19.2	19.9	J	R	DNR	ug/kg
21I0433	GTF-SL041	Aroclor 1260	38.5	19.9		R	DNR	ug/kg
21I0433	GTF-SL041	Aroclor 1262		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL041	Aroclor 1268		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL041	1-Methylnaphthalene	1.25	4.99	J	U	LB	ug/kg

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
21I0433	GTF-SL041	2-Methylnaphthalene	2.4	4.99	J	U	LB	ug/kg
21I0433	GTF-SL041	Anthracene	1.42	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL041	Benzo(a)pyrene	11.3	4.99		J	REP	ug/kg
21I0433	GTF-SL041	Benzo(b)fluoranthene	16.8	4.99		J	REP	ug/kg
21I0433	GTF-SL041	Benzo(g,h,i)perylene	20.9	4.99		J	LCS	ug/kg
21I0433	GTF-SL041	Benzofluoranthenes	29.6	9.99		J	REP	ug/kg
21I0433	GTF-SL041	Chrysene	14.6	4.99		J	REP	ug/kg
21I0433	GTF-SL041	Dibenzo(a,h)anthracene	3.1	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL041	Fluorene	0.73	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL041	Indeno(1,2,3-cd)pyrene	12.6	4.99		J	REP	ug/kg
21I0433	GTF-SL041	Naphthalene	2.08	4.99	J	U	LB,EB	ug/kg
21I0433	GTF-SL041	Pyrene	16.3	4.99	Q	J	Ci,Cc	ug/kg
21I0433	GTF-SL043	Aroclor 1016		99	D U	R	DNR	ug/kg
21I0433	GTF-SL043	Aroclor 1221		99	D U	R	DNR	ug/kg
21I0433	GTF-SL043	Aroclor 1232		99	D U	R	DNR	ug/kg
21I0433	GTF-SL043	Aroclor 1242		99	D U	R	DNR	ug/kg
21I0433	GTF-SL043	Aroclor 1248		99	D U	R	DNR	ug/kg
21I0433	GTF-SL043	Aroclor 1254		99	D U	R	DNR	ug/kg
21I0433	GTF-SL043	Aroclor 1260	85.6	99	D J	R	DNR	ug/kg
21I0433	GTF-SL043	Aroclor 1262		99	D U	R	DNR	ug/kg
21I0433	GTF-SL043	Aroclor 1268		99	D U	R	DNR	ug/kg
21I0433	GTF-SL043	1-Methylnaphthalene	1.48	4.96	J	U	LB	ug/kg
21I0433	GTF-SL043	2-Methylnaphthalene	2.87	4.96	J	U	LB	ug/kg
21I0433	GTF-SL043	Acenaphthene	0.96	4.96	J	U	LB	ug/kg
21I0433	GTF-SL043	Anthracene	1.63	4.96	J	J	Cc	ug/kg
21I0433	GTF-SL043	Benzo(g,h,i)perylene	25.7	4.96		J	LCS	ug/kg
21I0433	GTF-SL043	Dibenzo(a,h)anthracene	4.05	4.96	J	J	Cc	ug/kg
21I0433	GTF-SL043	Fluorene	0.8	4.96	J	J	Cc	ug/kg
21I0433	GTF-SL043	Naphthalene	2.28	4.96	J	U	LB,EB	ug/kg
21I0433	GTF-SL043	Pyrene	18.5	4.96	Q	J	Ci	ug/kg
21I0433	GTF-SL045	Aroclor 1260		100	D U	R	DNR	ug/kg
21I0433	GTF-SL045	Aroclor 1016		100	D U	R	DNR	ug/kg
21I0433	GTF-SL045	Aroclor 1221		100	D U	R	DNR	ug/kg
21I0433	GTF-SL045	Aroclor 1232		100	D U	R	DNR	ug/kg

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
21I0433	GTF-SL045	Aroclor 1242		100	D U	R	DNR	ug/kg
21I0433	GTF-SL045	Aroclor 1248		100	D U	R	DNR	ug/kg
21I0433	GTF-SL045	Aroclor 1254		100	D U	R	DNR	ug/kg
21I0433	GTF-SL045	Aroclor 1262		100	D U	R	DNR	ug/kg
21I0433	GTF-SL045	Aroclor 1268		100	D U	R	DNR	ug/kg
21I0433	GTF-SL045	Benzo(a)anthracene	3050	15	E D	R	DNR	ug/kg
21I0433	GTF-SL045	Benzo(a)pyrene	3110	15	E D	R	DNR	ug/kg
21I0433	GTF-SL045	Benzo(b)fluoranthene	2450	15	E D	R	DNR	ug/kg
21I0433	GTF-SL045	Benzo(g,h,i)perylene	2180	15	E D	R	DNR	ug/kg
21I0433	GTF-SL045	Benzofluoranthenes	4970	29.9	E D	R	DNR	ug/kg
21I0433	GTF-SL045	Chrysene	3020	15	E D	R	DNR	ug/kg
21I0433	GTF-SL045	Fluoranthene	3110	15	E D	R	DNR	ug/kg
21I0433	GTF-SL045	Indeno(1,2,3-cd)pyrene	1710	15	E D	R	DNR	ug/kg
21I0433	GTF-SL045	Phenanthrene	2560	15	E D	R	DNR	ug/kg
21I0433	GTF-SL045	Pyrene	3150	15	Q E D	R	DNR	ug/kg
21I0433	GTF-SL045	1-Methylnaphthalene	146	74.8	D	R	DNR	ug/kg
21I0433	GTF-SL045	2-Methylnaphthalene	99.1	74.8	D	R	DNR	ug/kg
21I0433	GTF-SL045	Acenaphthene	652	74.8	D	R	DNR	ug/kg
21I0433	GTF-SL045	Acenaphthylene	42.5	74.8	D J	R	DNR	ug/kg
21I0433	GTF-SL045	Anthracene	1180	74.8	D	R	DNR	ug/kg
21I0433	GTF-SL045	Benzo(g,h,i)perylene	2110	74.8	D	J	LCS	ug/kg
21I0433	GTF-SL045	Benzo(j)fluoranthene	1280	74.8	D	R	DNR	ug/kg
21I0433	GTF-SL045	Benzo(k)fluoranthene	1560	74.8	D	R	DNR	ug/kg
21I0433	GTF-SL045	Dibenzo(a,h)anthracene	714	74.8	D	R	DNR	ug/kg
21I0433	GTF-SL045	Dibenzofuran	194	74.8	D	R	DNR	ug/kg
21I0433	GTF-SL045	Fluorene	510	74.8	D	R	DNR	ug/kg
21I0433	GTF-SL045	Naphthalene	122	74.8	D	R	DNR	ug/kg
21I0433	GTF-SL045	Pyrene	6130	74.8	Q D	J	Ci	ug/kg
21I0433	GTF-SL047	Aroclor 1016		19.8	U	R	DNR	ug/kg
21I0433	GTF-SL047	Aroclor 1221		19.8	U	R	DNR	ug/kg
21I0433	GTF-SL047	Aroclor 1232		19.8	U	R	DNR	ug/kg
21I0433	GTF-SL047	Aroclor 1242		19.8	U	R	DNR	ug/kg
21I0433	GTF-SL047	Aroclor 1248		19.8	U	R	DNR	ug/kg
21I0433	GTF-SL047	Aroclor 1254		19.8	U	R	DNR	ug/kg

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
21I0433	GTF-SL047	Aroclor 1260		19.8	U	R	DNR	ug/kg
21I0433	GTF-SL047	Aroclor 1262		19.8	U	R	DNR	ug/kg
21I0433	GTF-SL047	Aroclor 1268		19.8	U	R	DNR	ug/kg
21I0433	GTF-SL047	Benzo(a)anthracene	1.48	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL047	Benzo(a)pyrene	1.38	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL047	Benzo(g,h,i)perylene	1.74	4.99	J	J	LCS,Cc	ug/kg
21I0433	GTF-SL047	Chrysene	1.61	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL047	Fluoranthene	2.59	4	J	J	Cc	ug/kg
21I0433	GTF-SL047	Indeno(1,2,3-cd)pyrene	1.1	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL047	Phenanthrene	2.5	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL047	Pyrene	2.49	4.99	J	J	Ci,Cc	ug/kg
21I0433	GTF-SL049	Aroclor 1016		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL049	Aroclor 1221		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL049	Aroclor 1232		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL049	Aroclor 1242		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL049	Aroclor 1248		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL049	Aroclor 1254		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL049	Aroclor 1260		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL049	Aroclor 1262		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL049	Aroclor 1268		19.9	U	R	DNR	ug/kg
21I0433	GTF-SL049	1-Methylnaphthalene	1.22	4.99	J	U	LB	ug/kg
21I0433	GTF-SL049	2-Methylnaphthalene	1.78	4.99	J	U	LB	ug/kg
21I0433	GTF-SL049	Acenaphthene	0.86	4.99	J	U	LB	ug/kg
21I0433	GTF-SL049	Anthracene	0.88	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL049	Benzo(a)pyrene	6.59	4.99		J	REP	ug/kg
21I0433	GTF-SL049	Benzo(b)fluoranthene	7.45	4.99		J	REP	ug/kg
21I0433	GTF-SL049	Benzo(g,h,i)perylene	12.7	4.99		J	LCS	ug/kg
21I0433	GTF-SL049	Benzo(k)fluoranthene	3.5	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL049	Benzofluoranthenes	13.4	9.99		J	REP	ug/kg
21I0433	GTF-SL049	Chrysene	7.34	4.99		J	REP	ug/kg
21I0433	GTF-SL049	Dibenzo(a,h)anthracene	1.57	4.99	J	J	Cc	ug/kg
21I0433	GTF-SL049	Indeno(1,2,3-cd)pyrene	7.58	4.99		J	REP	ug/kg
21I0433	GTF-SL049	Pyrene	9.84	4.99	Q	J	Ci,Cc	ug/kg

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units

Notes:
DV = data validation
Cc = continuing calibration outlier
Ci = Initial calibration outlier
DNR = do-not-report
EB = equipment blank contamination
HT = holding time exceeded
LB = laboratory blank contamination
LCS = laboratory control sample outliers
MS = matrix spike outlier
REP = replicate imprecision
SSR = surrogate outlier

J = The associated numerical value is an estimated quantity.
R = Rejected
U = The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.
UJ = Estimated and not detected. The analyte is considered not detected at the reported value, and the associated numerical value is an estimated value.

DATA VALIDATION REPORT

Former Georgetown Steam Plant Flume Property Transfer

Prepared for
Seattle City Light

Prepared by

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May 18, 2022

CONTENTS

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

CCV	continuing calibration verification
EPA	U.S. Environmental Protection Agency
GC/MS	gas chromatograph/mass spectrometer
ICV	initial calibration verification
IDW	investigation-derived waste
LCS	laboratory control sample
MRL	method reporting limit
MS/MSD	matrix spike and matrix spike duplicate
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
QA/QC	quality assurance and quality control
RPD	relative percent difference
SAP	sampling and analysis plan
SDG	sample delivery group
SVOC	semivolatile organic compound
TCLP	toxicity characteristic leaching procedure
VOC	volatile organic compound

1 INTRODUCTION

This report presents the findings of the data validation of soil and groundwater samples and associated quality control samples analyzed for polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), metals, total solids, flash point, pH, reactivity, toxicity characteristic leaching procedure (TCLP) metals, TCLP herbicides, TCLP pesticides, TCLP semivolatile organic compounds (SVOCs), TCLP volatile organic compounds (VOCs), and VOCs. The sample delivery groups (SDGs) reviewed are summarized in Table 1-1, and the laboratories, parameters, and analytical methods are listed in Table 1-2.

The majority of the samples received a Stage 2B validation, which included a review of all laboratory summary forms of quality control and instrument performance data. The pH, flash point, reactivity, and TCLP data received a Stage 2A validation, which included a review of all laboratory summary forms of quality control data. The data validation was based upon criteria described in the U.S. Environmental Protection Agency (EPA) National Functional Guidelines for Organic Superfund Methods Data Review (USEPA 2020a), National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA 2020b), and the referenced analytical methods.

The quality assurance and quality control (QA/QC) parameters reviewed are discussed in Section 2. The electronic data deliverables were compared to the hard copy data packages, and 10 percent of the results were verified. Qualifiers resulting from the validation process were entered into the project database. A reason code indicating the reason for qualification was also entered into the database. The definitions of the data qualifiers used are provided in Table 1-3, and descriptions of the reason codes used are provided in Table 1-4. For example, if a data point was estimated due to a holding time issue, the qualifier "J" and the reason code "HT" were entered into the database, indicated as J-HT in the discussion of findings in Section 2.

2 FINDINGS

The data validation findings are provided in this section. Details of the QA/QC parameters reviewed are discussed below and listed in Table 2-1.

2.1 SAMPLE RECEIPT AND HOLDING TIMES

Samples were received with complete chain-of-custody forms and in good condition, with the one exception. Water samples GTF-SL085, and GTF-SL086 submitted with SDG 21J0026 were misidentified on the chain-of-custody form as a soil. The laboratory logged in these samples as water samples.

All analyses were conducted within the holding times specified in the referenced methods or in the sampling and analysis plan (SAP; Integral 2021), with the following exceptions:

- Samples GTF-SL079, GTF-SL080, GTF-SL081, GTF-SL082, GTF-SL085, GTF-SL086, GTF-SL087, and GTF-SL089 submitted with SDG 22C0280 were extracted for PAHs 2 days past the method-recommended 7-day holding time from sample collection to analysis. These results were qualified as estimated (J/UJ-HT).
- Investigation-derived waste (IDW) Sample GTF-SL088 submitted with SDG A004227 was analyzed for flash point, pH, reactivity, TCLP pesticides, and TCLP herbicides past the method-recommended holding times from sample collection to analysis. These results were qualified as estimated (J/UJ-HT).
- IDW Sample GTF-SL088 submitted with SDG 2205032, was analyzed for TCLP SVOCs past the method-recommended holding times from sample collection to analysis. These results were qualified as estimated (UJ-HT).

PAH analysis was requested for archived Samples GTF_SL006, GTF_SL010, and GTF_SL01 on April 7, 2022.

2.2 BLANKS

All results from the laboratory method blanks and equipment blanks were reported as less than the laboratory method detection limits with the following exceptions:

- Arsenic, naphthalene, 1-methylnaphthalene, acenaphthene, and fluorene were detected in the aqueous method blanks submitted with SDG 22C0280. Arsenic was not detected in the associated sample, and no qualifiers were assigned. The detected results in the following samples were qualified as not detected (U-LB):

- 1-Methylnaphthalene: GTF-SL080, GTF-SL081, GTF-SL089
- Acenaphthene and naphthalene: GTF-SL089
- Fluorene: GTF-SL081, GTF-SL082, GTF-SL089.

- 1-Methylnaphthalene and acenaphthene were detected in the soil method blank submitted with SDG 22C0280. The detected results in the following samples were qualified as not detected (U-LB):
  - 1-Methylnaphthalene: GTF-SL056, GTF-SL061, GTF-SL062, GTF-SL068, GTF-SL084
  - Acenaphthene: GTF-SL056, GTF-SL061, GTF-SL062.
- Acenaphthene, 1-methylnaphthalene, and naphthalene were detected in the method blank submitted with SDG 22D0128. The detected results in the following samples were qualified as not detected (U-LB):
  - 1-Methylnaphthalene and fluorene: GTF-SL006, GTF-SL010
  - Acenaphthene: GTF-SL006.

2.3 SURROGATE RECOVERY

Surrogates were added to all samples for analysis of PAHs, PCBs, VOCs, TCLP VOCs, TCLP herbicides, and TCLP SVOCs. All surrogate percent recoveries were within the laboratory control limits with the following exceptions:

- The percent recovery value for the PAH surrogate 2-methylnaphthalene-d10 was less than the laboratory control limits in Sample GTF-SL088 submitted with SDG 22C0280. The PAH results for this sample were qualified as estimated (J/UJ-SSR).
- The percent recovery values for the PCB surrogate tetrachloro-*m*-xylene were less than the laboratory control limits in Samples GTF-SL082, GTF-SL080, GTF-SL087, and method blank BKD0155-BLK1 submitted with SDG 22C0280.
  - The PCB results for Samples GTF-SL082, GTF-SL080, and GTF-SL087 were qualified as estimated (UJ-SSR).
  - No qualifiers were assigned to the method blank.

2.4 LABORATORY CONTROL SAMPLES

The percent recoveries and relative percent difference (RPD) values of all laboratory control samples were within the laboratory control limits with the following exceptions:

- The percent recovery value for carbon tetrachloride for the laboratory control sample (LCS) submitted with SDG 22C0280 was greater than the laboratory control limits. This analyte was not detected in the associated sample and no qualifiers were assigned on the basis of the potentially high analytical bias.
- The percent recovery value for mercury in the LCS submitted with SDG 22C0280 was less than the laboratory control limits. The mercury result for Sample GTF-SL089 was qualified as estimated (J-LCS).

2.5 MATRIX SPIKES/MATRIX SPIKE DUPLICATES

The percent recoveries and RPDs of all matrix spikes and matrix spike duplicates (MS/MSDs) were within the laboratory control limits, with one exception.: The percent recovery value for indeno[1,2,3-*cd*]pyrene was less than the laboratory control limits in the MSD submitted with SDG 22C0280. Because the percent recovery of the matrix spike was within in the laboratory control limits and the percent recovery value of the MSD was within 10 points of the laboratory control limits, no qualifiers were assigned.

2.6 REPLICATES

Two sets of field replicates were submitted: Samples GTF-SL056 and GTF-SL084 and Samples GTF-SL081 and GTF-SL082. EPA has not established control limits for field replicates. For this project, the target control limit for field replicates is an RPD less than 35 percent (50 percent for soils) for values greater than 5 times the method reporting limit (MRL). For values less than 5 times the MRL, the absolute difference should be less than the MRL (2 times the MRL for soils). These control limits were met for all analytes.

The RPD values for all laboratory duplicate analyses were within laboratory control limits with one exception. The RPD value for TCLP barium was greater than the laboratory control limit in the duplicate analysis submitted with SDG A004227. Because a non-project batch quality control sample was used for the duplicate analysis, no qualifiers were assigned.

2.7 METHOD REPORTING LIMITS AND METHODOLOGY

The reporting limits specified in the SAP (Integral 2021) were met for all analyses.

The laboratory M-flagged the chloroform result for Sample GTF-SL089 submitted with SDG 22C0280 as an estimated value for a gas chromatograph/mass spectrometer (GC/MS) analyte detected and confirmed by an analyst but with low spectral match parameters. This result was qualified as estimated and tentatively identified (NJ-Other).

The laboratory reported PCB results from both columns in the electronic data deliverable. The associated results not reported on the summary forms in the laboratory report were qualified as do-not-report (R-DNR) because there was a more appropriate result available.

Integral Consulting Inc. requested that the PCB sample extracts submitted with SDG 22C0280 be reanalyzed to achieve lower detection limits. The extracts were concentrated and the sample extracts rerun using a calibration with a lower curve point bounding the lower limit. The laboratory reported both results. The original results were qualified as do-not-report (R-DNR).

The laboratory reported extraneous TCLP SVOC, TCLP pesticide, TCLP herbicide, and TCLP VOC results in the electronic data deliverable for Sample GTF-SL088. These results were qualified as do-not-report (R-DNR) because there was a more appropriate result available.

2.8 INSTRUMENT PERFORMANCE

The GC/MS instrument performance checks (“tune”) were analyzed before each initial calibration, and the method-specified acceptance criteria were met.

2.9 INITIAL CALIBRATION

Initial calibrations were analyzed on all instruments and met the acceptance criteria stated in the associated methods, with the following exceptions:

- Benzo[*j*]fluoranthene was not included in the initial calibration verifications (ICVs) submitted for PAH analysis. This analyte was included in the associated continuing calibration verifications (CCVs), which met the criteria, and no qualifiers were assigned.
- The carbon tetrachloride percent difference was greater than the acceptance limits in the VOC ICV submitted with SDG 22C0280. This analyte was not detected in the associated sample, and no qualifiers were assigned on the basis of the potentially high analytical bias.

2.10 CONTINUING CALIBRATION

Continuing calibrations were analyzed on all instruments and met the acceptance criteria stated in the associated methods, with the following exceptions:

- The percent difference values for vinyl chloride, chloroform, carbon tetrachloride, and hexachloro-1,3-butadiene were outside the control limits, biased high, in two CCVs submitted with SDG 22C0280.
  - The chloroform result in Sample GTF-SL089 was qualified as estimated (J-Cc).

- Vinyl chloride, carbon tetrachloride, and hexachloro-1,3-butadiene were not detected in the associated sample, and no qualifiers were assigned on the basis of the potentially high analytical bias.

2.11 INTERNAL STANDARDS

Internal standards were added to all samples for PAH, PCB, and VOC analysis, and the areas and retention times of all internal standards were within the method-specified control limits.

3 OVERALL ASSESSMENT

An overall assessment of the data is provided below.

3.1 DATA QUALIFICATION

A total of 559 results were reported. A total of 255 results (46 percent) were qualified as estimated or not detected; the number of results qualified is summarized by reason in Table 3-1. No results were rejected, and completeness was 100 percent. Results qualified as do-not-report were not used in the percentage and completeness calculations because a more appropriate result was available. A summary of all qualified results is presented in Table 3-2.

3.2 DATA USABILITY

The data meet the criteria set forth in the method and referenced quality assurance documents, with the exceptions noted above. All results, except rejected results, are acceptable for their intended use, as qualified.

4 REFERENCES

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USEPA. 2018b. SW-846: Test methods for evaluating solid wastes physical/chemical methods, Method 8270E, Semivolatile organic compounds by gas chromatography/mass spectrometry. Revision 6, June. U.S. Environmental Protection Agency, Washington, DC.

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USEPA. 2020b. National functional guidelines for inorganic Superfund methods data review. OLEM 9240.1-66. EPA 542-R-20-006. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation, Washington, DC. November.

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Tables

Table 1-1. SDGs Reviewed, Number of Samples, and Validation Level

SDG	Number of Samples	Validation Level
22C0280	24 soils, 5 groundwaters, 2 IDW, 3 equipment blanks	Stage 2B
22D0128	3 soils	Stage 2B
A004227	1 IDW	Stage 2A
2205032	1 IDW	Stage 2A

Notes:
IDW = investigation derived waste
SDG = sample delivery group

Table 1-2. Analytical Parameters and Methods

Laboratory	Analytical Parameter	Analytical Method	Reference
ARI	PAHs	EPA 8270E SIM	USEPA (2018b)
	PCBs	EPA 8082A	USEPA (2007)
	VOCs	EPA 8260D	USEPA (2018a)
	Metals	EPA 6010D	USEPA (2018c)
	Mercury	EPA 7470A	USEPA (1994)
	Total Solids	SM 2540 G-97	APHA (1997)
AmTest Laboratories	Flash Point	EPA 1020	USEPA (1992a)
	Reactivity	EPA SW-846 Chapter 8	USEPA (2020c)
	pH	EPA 9045D	USEPA (2004)
	TCLP metals	EPA 1311/6020B	USEPA (1992b, 2014a)
	TCLP VOCs	EPA 1311/624	USEPA (1992b, 1984a)
	TCLP Pesticides	EPA 1311/608	USEPA (1992b, 1984b)
	TCLP Herbicides	EPA 1311/615	USEPA (1992b, 1992c)
Fremont Analytical	TCLP SVOCs	EPA 1311/8270	USEPA (1992b, 2014b)

Notes:
APHA = American Public Health Association
ARI = Analytical Resources, LLC
EPA = U.S. Environmental Protection Agency
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SIM = selective ion monitoring
SVOC = semivolatile organic compound
TCLP = toxicity characteristic leaching procedure
VOC = volatile organic compound

Table 1-3. Definition of Data Qualifiers

Data Qualifier	Definition
J	The result is an estimated quantity.
NJ	Tentative identification or presumptive evidence of the presence of the material at an estimated quantity.
R	Rejected. The data are unusable.
U	The material was analyzed for, but was not detected.
UJ	Estimated and not detected. The analyte is considered not detected at the reported value, and the associated numerical value is an estimated value.

Table 1-4. Definition of Data Validation Reason Codes

Reason Code	Definition
DNR	Do-not-report
Cc	Calibration (continuing)
HT	Holding time exceeded
LB	Laboratory blank contamination
LCS	Laboratory control sample outliers
Other	Described in report
SSR	Surrogate outlier

Table 2-1. QA/QC Parameters Reviewed

QA/QC Parameter	Analysis						
	PAHs	PCBs	VOCs	Metals	Reactivity/FP	pH	TCLP
Sample Receipt and Holding Times	Q	D	+	+	Q	Q	Q
Blanks	Q	+	+	D	+	NA	+
Surrogate Recovery	Q	Q	+	NA	NA	NA	NA
LCS	+	+	D	Q	+	+	+
MS/MSD	D	+	NA	NA	+	NA	+
Replicates	+	+	NA	NA	NA	+	D
Method Reporting Limits and Methodology	+	Q	Q	+	+	+	D
Instrument Performance	+	+	+	NA	NA	NA	NA
ICAL	D	+	D	+	NA	NA	NA
CCAL	+	+	Q	+	NA	NA	NA
Internal Standard	+	+	+	NA	NA	NA	NA

Notes:
+ = All QA/QC criteria met
D = Data are discussed in the report. QA/QC criteria were not met; however no data were qualified.
Q = Data were qualified and are discussed in the report.

CCAL = continuing calibration
FP = flash point
ICAL = initial calibration
LCS = laboratory control sample
MS/MSD = matrix spike and matrix spike duplicate
NA = not applicable
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
QA/QC = quality assurance and quality control
TCLP = toxicity characteristic leaching procedure
VOC = volatile organic compound

Table 3-1. Summary of Qualified Data Points by Reason

Data Qualification Reason	Number of Data Points Estimated	Number of Data Points Qualified Not Detected	Number of Data Points Rejected
Holding time exceeded	192		--
Laboratory blank contamination	--	21	--
Laboratory control sample outliers	--	1	--
Described in report	--	1	--
Surrogate outlier	--	1	--

Notes:
-- = none

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
22D0128	GTF-SL006	1-Methylnaphthalene	1.76	5	B J	U	LB	µg/kg
22D0128	GTF-SL006	Acenaphthene	1.27	5	B J	U	LB	µg/kg
22D0128	GTF-SL006	Fluorene	1.06	5	B J	U	LB	µg/kg
22D0128	GTF-SL010	1-Methylnaphthalene	0.44	4.99	B J	U	LB	µg/kg
22D0128	GTF-SL010	Fluorene	0.99	4.99	B J	U	LB	µg/kg
22C0280	GTF-SL056	1-Methylnaphthalene	0.95	0.95	B J	U	LB	µg/kg
22C0280	GTF-SL056	Acenaphthene	0.59	0.59	B J	U	LB	µg/kg
22C0280	GTF-SL061	1-Methylnaphthalene	1.86	1.86	B J	U	LB	µg/kg
22C0280	GTF-SL061	Acenaphthene	4.74	4.74	B J	U	LB	µg/kg
22C0280	GTF-SL062	1-Methylnaphthalene	1.51	1.51	B J	U	LB	µg/kg
22C0280	GTF-SL062	Acenaphthene	1.15	1.15	B J	U	LB	µg/kg
22C0280	GTF-SL068	1-Methylnaphthalene	0.46	0.46	B J	U	LB	µg/kg
22C0280	GTF-SL079	1-Methylnaphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	2-Methylnaphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Acenaphthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Acenaphthylene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Benz[a]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Benzo[a]pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Benzo[b]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Benzo[ghi]perylene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Benzo[j]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Benzo[k]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Benzofluoranthenes	0.2	0.2	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Chrysene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Dibenz[a,h]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Dibenzofuran	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Fluorene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Indeno[1,2,3-cd]pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Naphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Phenanthrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL079	Pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL080	Aroclor 1016	0.1	0.1	U	UJ	SSR	µg/L

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
22C0280	GTF-SL080	Aroclor 1221	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL080	Aroclor 1232	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL080	Aroclor 1242	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL080	Aroclor 1248	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL080	Aroclor 1254	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL080	Aroclor 1260	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL080	Aroclor 1262	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL080	Aroclor 1268	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL080	1-Methylnaphthalene	0.03	0.1	H B J	UJ	HT,LB	µg/L
22C0280	GTF-SL080	2-Methylnaphthalene	0.03	0.1	H J	J	HT	µg/L
22C0280	GTF-SL080	Acenaphthene	0.01	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL080	Acenaphthylene	0.01	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL080	Anthracene	0.04	0.1	H J	J	HT	µg/L
22C0280	GTF-SL080	Benz[a]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL080	Benzo[a]pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL080	Benzo[b]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL080	Benzo[ghi]perylene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL080	Benzo[j]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL080	Benzo[k]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL080	Benzofluoranthenes	0.2	0.2	H U	UJ	HT	µg/L
22C0280	GTF-SL080	Chrysene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL080	Dibenz[a,h]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL080	Dibenzofuran	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL080	Fluoranthene	0.02	0.1	H J	J	HT	µg/L
22C0280	GTF-SL080	Fluorene	0.12	0.1	H B	J	HT	µg/L
22C0280	GTF-SL080	Indeno[1,2,3-cd]pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL080	Naphthalene	0.4	0.1	HM B	J	HT	µg/L
22C0280	GTF-SL080	Phenanthrene	0.05	0.1	H J	J	HT	µg/L
22C0280	GTF-SL080	Pyrene	0.05	0.1	H J	J	HT	µg/L
22C0280	GTF-SL081	1-Methylnaphthalene	0.02	0.1	H B J	UJ	HT,LB	µg/L
22C0280	GTF-SL081	2-Methylnaphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL081	Acenaphthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL081	Acenaphthylene	0.1	0.1	H U	UJ	HT	µg/L

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
22C0280	GTF-SL081	Anthracene	0.05	0.1	H J	J	HT	µg/L
22C0280	GTF-SL081	Benz[a]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL081	Benzo[a]pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL081	Benzo[b]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL081	Benzo[ghi]perylene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL081	Benzo[j]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL081	Benzo[k]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL081	Benzofluoranthenes	0.2	0.2	H U	UJ	HT	µg/L
22C0280	GTF-SL081	Chrysene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL081	Dibenz[a,h]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL081	Dibenzofuran	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL081	Fluoranthene	0.07	0.1	H J	J	HT	µg/L
22C0280	GTF-SL081	Fluorene	0.04	0.1	H B J	UJ	HT,LB	µg/L
22C0280	GTF-SL081	Indeno[1,2,3-cd]pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL081	Naphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL081	Phenanthrene	0.16	0.1	H	J	HT	µg/L
22C0280	GTF-SL081	Pyrene	0.09	0.1	H J	J	HT	µg/L
22C0280	GTF-SL082	Aroclor 1016	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL082	Aroclor 1221	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL082	Aroclor 1232	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL082	Aroclor 1242	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL082	Aroclor 1248	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL082	Aroclor 1254	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL082	Aroclor 1260	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL082	Aroclor 1262	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL082	Aroclor 1268	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL082	1-Methylnaphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL082	2-Methylnaphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL082	Acenaphthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL082	Acenaphthylene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL082	Anthracene	0.05	0.1	H J	J	HT	µg/L
22C0280	GTF-SL082	Benz[a]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL082	Benzo[a]pyrene	0.1	0.1	H U	UJ	HT	µg/L

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
22C0280	GTF-SL082	Benzo[b]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL082	Benzo[ghi]perylene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL082	Benzo[j]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL082	Benzo[k]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL082	Benzofluoranthenes	0.2	0.2	H U	UJ	HT	µg/L
22C0280	GTF-SL082	Chrysene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL082	Dibenz[a,h]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL082	Dibenzofuran	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL082	Fluoranthene	0.07	0.1	H J	J	HT	µg/L
22C0280	GTF-SL082	Fluorene	0.03	0.1	H B J	UJ	HT,LB	µg/L
22C0280	GTF-SL082	Indeno[1,2,3-cd]pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL082	Naphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL082	Phenanthrene	0.15	0.1	H	J	HT	µg/L
22C0280	GTF-SL082	Pyrene	0.09	0.1	H J	J	HT	µg/L
22C0280	GTF-SL084	1-Methylnaphthalene	1.03	1.03	B J	U	LB	µg/kg
22C0280	GTF-SL085	1-Methylnaphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	2-Methylnaphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Acenaphthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Acenaphthylene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Benz[a]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Benzo[a]pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Benzo[b]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Benzo[ghi]perylene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Benzo[j]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Benzo[k]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Benzofluoranthenes	0.2	0.2	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Chrysene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Dibenz[a,h]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Dibenzofuran	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Fluorene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Indeno[1,2,3-cd]pyrene	0.1	0.1	H U	UJ	HT	µg/L

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
22C0280	GTF-SL085	Naphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Phenanthrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL085	Pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	1-Methylnaphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	2-Methylnaphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Acenaphthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Acenaphthylene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Benz[a]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Benzo[a]pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Benzo[b]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Benzo[ghi]perylene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Benzo[j]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Benzo[k]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Benzofluoranthenes	0.2	0.2	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Chrysene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Dibenz[a,h]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Dibenzofuran	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Fluorene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Indeno[1,2,3-cd]pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Naphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Phenanthrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL086	Pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Aroclor 1016	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL087	Aroclor 1221	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL087	Aroclor 1232	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL087	Aroclor 1242	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL087	Aroclor 1248	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL087	Aroclor 1254	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL087	Aroclor 1260	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL087	Aroclor 1262	0.1	0.1	U	UJ	SSR	µg/L
22C0280	GTF-SL087	Aroclor 1268	0.1	0.1	U	UJ	SSR	µg/L

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
22C0280	GTF-SL087	1-Methylnaphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	2-Methylnaphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Acenaphthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Acenaphthylene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Benz[a]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Benzo[a]pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Benzo[b]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Benzo[ghi]perylene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Benzo[j]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Benzo[k]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Benzofluoranthenes	0.2	0.2	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Chrysene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Dibenz[a,h]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Dibenzofuran	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Fluorene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Indeno[1,2,3-cd]pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Naphthalene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Phenanthrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL087	Pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL088	1-Methylnaphthalene	4.98	4.98	U	UJ	SSR	µg/kg
22C0280	GTF-SL088	2-Methylnaphthalene	4.98	4.98	U	UJ	SSR	µg/kg
22C0280	GTF-SL088	Acenaphthene	4.98	4.98	U	UJ	SSR	µg/kg
22C0280	GTF-SL088	Acenaphthylene	4.98	4.98	U	UJ	SSR	µg/kg
22C0280	GTF-SL088	Anthracene	4.98	4.98	U	UJ	SSR	µg/kg
22C0280	GTF-SL088	Benz[a]anthracene	3.45	4.98	J	J	SSR	µg/kg
22C0280	GTF-SL088	Benzo[a]pyrene	5.24	4.98		J	SSR	µg/kg
22C0280	GTF-SL088	Benzo[b]fluoranthene	5.4	4.98		J	SSR	µg/kg
22C0280	GTF-SL088	Benzo[ghi]perylene	6.06	4.98		J	SSR	µg/kg
22C0280	GTF-SL088	Benzo[j]fluoranthene	2.19	4.98	J	J	SSR	µg/kg
22C0280	GTF-SL088	Benzo[k]fluoranthene	2.4	4.98	J	J	SSR	µg/kg
22C0280	GTF-SL088	Benzofluoranthenes	9.62	9.96	J	J	SSR	µg/kg

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
22C0280	GTF-SL088	Chrysene	4.29	4.98	J	J	SSR	µg/kg
22C0280	GTF-SL088	Dibenz[a,h]anthracene	1.32	4.98	J	J	SSR	µg/kg
22C0280	GTF-SL088	Dibenzofuran	4.98	4.98	U	UJ	SSR	µg/kg
22C0280	GTF-SL088	Fluoranthene	5.29	4.98		J	SSR	µg/kg
22C0280	GTF-SL088	Fluorene	0.85	4.98	J	J	SSR	µg/kg
22C0280	GTF-SL088	Indeno[1,2,3-cd]pyrene	4.43	4.98	J	J	SSR	µg/kg
22C0280	GTF-SL088	Naphthalene	4.98	4.98	U	UJ	SSR	µg/kg
22C0280	GTF-SL088	Phenanthrene	3.69	4.98	J	J	SSR	µg/kg
22C0280	GTF-SL088	Pyrene	5.48	4.98		J	SSR	µg/kg
22C0280	GTF-SL089	Mercury	0.00012	0.0001		J	LCS	mg/L
22C0280	GTF-SL089	Chloroform	0.58	0.2	M	NJ	Cc,Other	µg/L
22C0280	GTF-SL089	1-Methylnaphthalene	0.04	0.1	H B J	UJ	HT,LB	µg/L
22C0280	GTF-SL089	2-Methylnaphthalene	0.04	0.1	H J	J	HT	µg/L
22C0280	GTF-SL089	Acenaphthene	0.08	0.1	H B J	UJ	HT,LB	µg/L
22C0280	GTF-SL089	Acenaphthylene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL089	Anthracene	0.05	0.1	H J	J	HT	µg/L
22C0280	GTF-SL089	Benz[a]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL089	Benzo[a]pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL089	Benzo[b]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL089	Benzo[ghi]perylene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL089	Benzo[j]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL089	Benzo[k]fluoranthene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL089	Benzofluoranthenes	0.2	0.2	H U	UJ	HT	µg/L
22C0280	GTF-SL089	Chrysene	0.07	0.1	H J	J	HT	µg/L
22C0280	GTF-SL089	Dibenz[a,h]anthracene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL089	Dibenzofuran	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL089	Fluoranthene	0.15	0.1	H	J	HT	µg/L
22C0280	GTF-SL089	Fluorene	0.06	0.1	H B J	UJ	HT,LB	µg/L
22C0280	GTF-SL089	Indeno[1,2,3-cd]pyrene	0.1	0.1	H U	UJ	HT	µg/L
22C0280	GTF-SL089	Naphthalene	0.03	0.1	H B J	UJ	HT,LB	µg/L
22C0280	GTF-SL089	Phenanthrene	0.12	0.1	H	J	HT	µg/L
22C0280	GTF-SL089	Pyrene	0.21	0.1	H	J	HT	µg/L
A004227	GTF-SL088	Cyanide	0.5	0.5	U	UJ	HT	mg/kg

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
A004227	GTF-SL088	Sulfide	0.1	0.1	U	UJ	HT	mg/kg
A004227	GTF-SL088	Flashpoint	212	212	>	J	HT	°F
A004227	GTF-SL088	Chlordane (cis & trans)	0.01	0.01	U	UJ	HT	mg/L
A004227	GTF-SL088	Endrin	0.01	0.01	U	UJ	HT	mg/L
A004227	GTF-SL088	gamma-Hexachlorocyclohexane	0.01	0.01	U	UJ	HT	mg/L
A004227	GTF-SL088	Heptachlor	0.01	0.01	U	UJ	HT	mg/L
A004227	GTF-SL088	Methoxychlor	0.2	0.2	U	UJ	HT	mg/L
A004227	GTF-SL088	Toxaphene	0.02	0.02	U	UJ	HT	mg/L
A004227	GTF-SL088	2,4-D	0.2	0.2	U	UJ	HT	mg/L
A004227	GTF-SL088	Silvex	0.02	0.02	U	UJ	HT	mg/L
A004227	GTF-SL088	pH	0.01	0.01		J	HT	ph units
2205032	GTF-SL088	Pyridine	ND	2.58	U	UJ	HT	µg/L
2205032	GTF-SL088	1,4-Dichlorobenzene	ND	0.258	U	UJ	HT	µg/L
2205032	GTF-SL088	2-Methylphenol (o-cresol)	ND	0.258	U	UJ	HT	µg/L
2205032	GTF-SL088	Hexachloroethane	ND	0.194	U	UJ	HT	µg/L
2205032	GTF-SL088	3&4-Methylphenol (m,p-cresol)	ND	0.516	U	UJ	HT	µg/L
2205032	GTF-SL088	Nitrobenzene	ND	0.645	U	UJ	HT	µg/L
2205032	GTF-SL088	Hexachlorobutadiene	ND	0.194	U	UJ	HT	µg/L
2205032	GTF-SL088	2,4,6-Trichlorophenol	ND	0.387	U	UJ	HT	µg/L
2205032	GTF-SL088	2,4,5-Trichlorophenol	ND	0.387	U	UJ	HT	µg/L
2205032	GTF-SL088	2,4-Dinitrotoluene	ND	0.258	U	UJ	HT	µg/L
2205032	GTF-SL088	Hexachlorobenzene	ND	0.387	U	UJ	HT	µg/L
2205032	GTF-SL088	Pentachlorophenol	ND	1.29	U	UJ	HT	µg/L

Notes:

DV = data validation
Cc = continuing calibration outlier
DNR = do-not-report
HT = holding time exceeded
LB = laboratory blank contamination
LCS = laboratory control sample outlier
Other = described in report
SSR = surrogate outlier

J = The associated numerical value is an estimated quantity.
NJ = Tentative identification or presumptive evidence of the presence of the material at an estimated quantity.
U = The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.
UJ = Estimated and not detected. The analyte is considered not detected at the reported value, and the associated numerical value is an estimated value.

Attachment 4

Investigation-Derived Waste Results

Table 1. Georgetown Steam Plant Former Flume Property (Partial): Analytical Results for Investigation-Derived Waste (Solids)

	Sample ID	GTF_IDW_054	GTF_IDW_088
	Sample Date	09/29/21	03/09/22
Analyte	Units	Result	Result
Polychlorinated Biphenyls			
Aroclor 1016	mg/kg	0.020 U	NA
Aroclor 1221	mg/kg	0.020 U	NA
Aroclor 1232	mg/kg	0.020 U	NA
Aroclor 1242	mg/kg	0.020 U	NA
Aroclor 1248	mg/kg	0.020 U	NA
Aroclor 1254	mg/kg	0.010 J	NA
Aroclor 1260	mg/kg	0.070	NA
Aroclor 1262	mg/kg	0.020 U	NA
Aroclor 1268	mg/kg	0.020 U	NA
Polycyclic Aromatic Hydrocarbons			
1-Methylnaphthalene	mg/kg	0.020	0.0050 UJ
2-Methylnaphthalene	mg/kg	0.020	0.0050 UJ
Acenaphthene	mg/kg	0.0083	0.0050 UJ
Acenaphthylene	mg/kg	0.0023 J	0.0050 UJ
Anthracene	mg/kg	0.020	0.0050 UJ
Benzo(a)anthracene	mg/kg	0.10	0.0035 J
Benzo(a)pyrene	mg/kg	0.11	0.0052 J
Benzo(b)fluoranthene	mg/kg	0.10	0.0054 J
Benzo(g,h,i)perylene	mg/kg	0.10 J	0.0061 J
Benzo(j)fluoranthene	mg/kg	0.040	0.0022 J
Benzo(k)fluoranthene	mg/kg	0.050	0.0024 J
Benzofluoranthenes	mg/kg	0.20	0.0096 J
Chrysene	mg/kg	0.12	0.0043 J
Dibenzo(a,h)anthracene	mg/kg	0.020	0.0013 J
Dibenzofuran	mg/kg	0.0080	0.0050 UJ
Fluoranthene	mg/kg	0.17	0.0053 J
Fluorene	mg/kg	0.0065	0.0009 J
Indeno(1,2,3-cd)pyrene	mg/kg	0.070	0.0044 J
Naphthalene	mg/kg	0.030	0.0050 UJ
Phenanthrene	mg/kg	0.090	0.0037 J
Pyrene	mg/kg	0.14 J	0.0055 J
General Chemistry			
Flashpoint	deg f	212 UJ	> 212 J
pH	ph units	6.84 J	6.30 J
Cyanide	mg/kg	NA	0.5 UJ
Cyanide	percent	0.5 UJ	NA
Sulfide	mg/kg	NA	0.1 UJ
Sulfide	percent	0.1 UJ	NA
TCLP Metals			
Arsenic	mg/l	0.02 U	0.05
Barium	mg/l	0.23 J	0.2
Cadmium	mg/l	0.01 U	0.05
Chromium	mg/l	0.01 U	0.05
Lead	mg/l	0.02	0.1
Mercury	mg/l	0.0002 U	0.01
Selenium	mg/l	0.008 U	0.05
Silver	mg/l	0.01 U	0.05

Table 1. Georgetown Steam Plant Former Flume Property (Partial): Analytical Results for Investigation-Derived Waste (Solids)

	Sample ID	GTF_IDW_054	GTF_IDW_088
	Sample Date	09/29/21	03/09/22
Analyte	Units	Result	Result
TCLP Pesticides			
Chlordane (cis & trans)	mg/l	0.010 U	0.010 UJ
Endrin	mg/l	0.010 U	0.010 UJ
Heptachlor	mg/l	0.0050 U	0.010 UJ
Heptachlor epoxide	mg/l	0.0050 U	NA
Lindane	mg/l	0.010 U	0.010 UJ
Methoxychlor	mg/l	0.010 U	0.20 UJ
Toxaphene	mg/l	0.50 U	0.020 UJ
TCLP Herbicides			
2,4-D	mg/l	0.0050 U	0.20 UJ
Silvex	mg/l	0.0050 U	0.020 UJ
TCLP Volatile Organic Compounds			
1,1-Dichloroethene	mg/l	0.0050 U	0.10 U
1,2-Dichlorobenzene	mg/l	NA	0.10 U
1,2-Dichloroethane	mg/l	0.0050 U	0.10 U
1,4-Dichlorobenzene	mg/l	0.010 U	NA
Benzene	mg/l	0.0050 U	0.10 U
Carbon tetrachloride	mg/l	0.0050 U	0.10 U
Chlorobenzene	mg/l	0.0050 U	2.0 U
Chloroform	mg/l	0.0050 U	0.10 U
Methylethyl ketone	mg/l	NA	3.0 U
Tetrachloroethene	mg/l	0.0050 U	0.10 U
Trichloroethene	mg/l	0.0050 U	0.10 U
Vinyl chloride	mg/l	0.0050 U	0.10 U
TCLP Semivolatile Organic Compounds			
1,4-Dichlorobenzene	mg/l	0.0050 U	0.00025 UJ
2,4,5-Trichlorophenol	mg/l	0.010 U	0.00038 UJ
2,4,6-Trichlorophenol	mg/l	0.010 U	0.00038 UJ
2,4-Dinitrotoluene	mg/l	0.010 U	0.00025 UJ
2-Methylphenol	mg/l	0.010 U	0.00025 UJ
4-Methylphenol	mg/l	0.010 U	NA
m+p methylphenol	mg/l	NA	0.00051 UJ
Hexachlorobenzene	mg/l	0.010 U	0.00038 UJ
Hexachlorobutadiene	mg/l	0.010 U	0.00029 UJ
Hexachloroethane	mg/l	0.010 U	0.00019 UJ
Methylethyl ketone	mg/l	0.020 U	NA
Nitrobenzene	mg/l	0.0050 U	0.00064 UJ
Pentachlorophenol	mg/l	0.010 U	0.0013 UJ
Pyridine	mg/l	NA	0.0026 UJ

Notes:
NA = not analyzed
TCLP = toxicity characteristic leaching procedure

Qualifiers:
J = The reported value was an estimate.
U = The analyte was not detected. The associated numerical value is the reporting limit.

Table 2. Georgetown Steam Plant Former Flume Property (Partial): Analytical Results for Investigation-Derived Waste (Liquids)

	Sample ID	GTF-SL055	GTF-SL089
	Sample Date	09/29/21	03/09/22
Analyte	Units	Result	Result
Polycyclic Aromatic Hydrocarbons			
1-Methylnaphthalene	µg/L	0.020 U	0.040 UJ
2-Methylnaphthalene	µg/L	0.030 U	0.040 J
Acenaphthene	µg/L	0.020 UJ	0.080 UJ
Acenaphthylene	µg/L	0.020 U	0.020 UJ
Anthracene	µg/L	0.070 J	0.050 J
Benzo(a)anthracene	µg/L	0.23	0.050 UJ
Benzo(a)pyrene	µg/L	0.32	0.060 UJ
Benzo(b)fluoranthene	µg/L	0.42	0.090 UJ
Benzo(g,h,i)perylene	µg/L	0.33	0.070 UJ
Benzo(j)fluoranthene	µg/L	0.19	0.030 UJ
Benzo(k)fluoranthene	µg/L	0.23	0.090 UJ
Benzofluoranthenes	µg/L	0.75	0.19 UJ
Chrysene	µg/L	0.32	0.070 J
Dibenzo(a,h)anthracene	µg/L	0.11 J	0.090 UJ
Dibenzofuran	µg/L	0.020 U	0.020 UJ
Fluoranthene	µg/L	0.56	0.15 J
Fluorene	µg/L	0.030 J	0.060 UJ
Indeno(1,2,3-cd)pyrene	µg/L	0.25	0.080 UJ
Naphthalene	µg/L	0.020 U	0.030 UJ
Phenanthrene	µg/L	0.30	0.12 J
Pyrene	µg/L	0.42	0.21 J
RCRA Metals			
Arsenic	µg/L	12.2	4.6 U
Barium	µg/L	125 J	420
Cadmium	µg/L	1.29	0.7 U
Chromium	µg/L	34.2	200
Lead	µg/L	295	60
Mercury	µg/L	0.134	0.122 J
Selenium	µg/L	1.21 J	20 J
Silver	µg/L	0.24 J	0.8 U
TCLP Volatile Organic Compounds			
1,1-Dichloroethene	µg/L	0.38 U	0.080 U
1,2-Dichlorobenzene	µg/L	0.42 U	0.080 U
1,3-Dichlorobenzene	µg/L	0.38 U	0.080 U
1,4-Dichlorobenzene	µg/L	0.52 U	0.10 U
Benzene	µg/L	0.27 U	0.050 U
Carbon tetrachloride	µg/L	0.43 U	0.090 U
Chlorobenzene	µg/L	0.29 U	0.060 U
Chloroform	µg/L	0.27 U	0.58 NJ
Hexachlorobutadiene	µg/L	2.1 U	1.0 U
Methylethyl ketone	µg/L	8.9 U	1.8 U
Tetrachloroethene	µg/L	0.46 U	0.090 U
Trichloroethene	µg/L	0.35 U	0.070 U
Vinyl chloride	µg/L	0.41 UJ	0.080 U

Table 2 Notes

Notes:
RCRA = Resource Conservation and Recovery Act
TCLP = toxicity characteristic leaching procedure

Qualifiers:
J = The reported value was an estimate.
NJ = Tentative identification or presumptive evidence of the presence of the material at an estimated quantity.
U = The analyte was not detected. The associated numerical value is the reporting limit.

Appendix H

Geotechnical Memorandum—
Georgetown Flume Off-Leash
Area Infiltration Feasibility Study

Seattle Public Utilities
Geotechnical Engineering

MEMORANDUM

Date: **May 28, 2021**

To: **Mike Schwindeller, PLA**
Seattle Parks and Recreation

From: **Megan Higgins, P.E.**
SPU Geotechnical Engineering

Subject: **Geotechnical Memorandum – Georgetown Flume Off-Leash Area Infiltration Feasibility Study**

This geotechnical memorandum presents the results of our infiltration feasibility study for the Georgetown Flume Off-leash Area Development Project (project). The project location is shown on Figure 1.

PROJECT UNDERSTANDING

We understand that the project is a joint effort between Seattle Parks and Recreation (Parks) and the Seattle Department of Transportation (SDOT) to develop a parcel at 1035 S Myrtle Street into an off-leash area and a paved shared-use path. In accordance with the 2017 City of Seattle Stormwater Manual (Stormwater Manual), the project must include on-site stormwater management if feasible. To meet this requirement, Parks is considering installing shallow infiltration facilities to manage stormwater runoff from the approximately 35,000 square feet of new plus replaced hard surfaces that are included in the project. We understand that the bottom of the infiltration facilities would be approximately 3 feet below ground surface (bgs).

SURFACE CONDITIONS

The project site is in an industrial area along the north bank of the Duwamish Waterway in the Georgetown neighborhood of Seattle. The parcel is bounded by S Myrtle Street and E Marginal Way to the north and south, respectively, and commercial properties including Boeing Field, the Aero Motel, and a warehouse to the east and west.

The parcel was historically the site of a wood lined open channel flume (Georgetown Flume) that transported water from the Duwamish Waterway to the Georgetown Steam Plant until it ended operation in 1975. In 2009, SCL and Seattle Public Utilities (SPU) completed a project to remove the flume and associated contaminated sediment and soil.

The topography in the area surrounding the parcel generally slopes down gradually from the toe of Beacon Hill in the northeast towards the Duwamish Waterway in the southwest. The ground surface within the parcel is flat with an elevation of approximately 14 feet. All elevations in this report are referenced to the NAVD88 vertical datum, unless noted otherwise.

SUBSURFACE CONDITIONS

We based our interpretation of subsurface conditions at the site on published geologic maps and information obtained from historical subsurface explorations. The location of relevant historical explorations is shown on Figure 1. The conclusions and analyses presented in this memorandum are based on subsurface soil conditions interpreted from these explorations. The nature and extent of variations between the explorations and current conditions may not become evident until additional explorations are performed, or construction begins.

GENERAL GEOLOGY

The general geologic condition of Seattle is a result of glacial and non-glacial activity that occurred over the course of millions of years. Review of the geologic map of Seattle (Troost, et al, 2005) indicates that the Project site is underlain by alluvium deposits. Alluvium deposits generally consist of interbedded layers of loose to dense or soft to stiff sand, silt, gravel, and cobbles deposited by streams and running water. The subsurface conditions indicated on historical exploration logs generally agree with the mapped geology.

SOIL CONDITIONS

Based on our interpretation of relevant historical explorations, we anticipate that the site soil consists of up to 5 feet of loose to medium dense sand with silt (fill) overlying very loose to medium dense sand to silty sand with occasional layers of medium stiff sandy silt with organics (alluvium).

GROUNDWATER CONDITIONS

The log for historical boring B-4 indicates that at the time of drilling groundwater was encountered 7 feet below ground surface (bgs), which corresponds to elevation 7 feet. Typically, groundwater levels fluctuate throughout the year and are highest during the late winter and spring seasons and lowest during the late summer and early fall seasons. In addition, groundwater levels can be affected by tidal fluctuations in nearby bodies of water, like the Duwamish Waterway which is approximately 250 to 1,000 feet south of the project site.

The SPU Materials Laboratory monitored the effects of seasonal and tidal fluctuations at the project site between April and November 2007 by installing a groundwater monitoring well in boring B-4 and recording groundwater elevation data at 1-hour intervals using a pressure transducer. A plot of recorded groundwater elevations for the full monitoring period and a plot comparing tide elevations and groundwater elevations that were recorded between September 7 and September 14, 2007 are included in Appendix B.

Based on the available information, groundwater is generally located between elevation 5.6 and 6.9 feet and tidally influenced fluctuations of up to 0.5 foot can be expected at the north extent of the project site. In general, we anticipate that the magnitude of tidal influence will be greater at the south extent of the project site which is closer to the Duwamish Waterway. In addition, groundwater elevation contour maps from environmental studies completed at nearby parcels, which are included in Appendix B, indicate that groundwater generally flows from northwest to southeast towards Slip 4 of the Duwamish Waterway.

ENVIRONMENTAL CONTAMINATION

The Environmental Protection Agency (EPA) Superfund National Priorities List Where You Live Map online mapping tool and database indicates that the project site is within or adjacent to the Lower Duwamish Waterway Superfund Site. In addition, the Washington Department of Ecology (Ecology) What's in My Neighborhood online mapping tool and database indicates that three confirmed contaminated sites are within 500 downgradient of the project site, with respect to the anticipated groundwater flow direction. A summary of each downgradient site is provided below, and the Ecology Cleanup Site Details form for each site is provided in Appendix C. The mapped location of all known contaminated sites in the vicinity of the project site are shown on Figure 1.

- <u>Crowley Marine 8th Avenue S</u>: Based on our review of the Remedial Investigation (RI) that was completed for the site in August 2019, soil and/or groundwater samples collected from the northeast corner of the parcel contained various contaminants (Arsenic, Copper, Vinyl Chloride, Selenium, cPAHs, total petroleum hydrocarbons) at concentrations exceeding screening levels.
- <u>Evergreen Marine Leasing Parcel E</u>: Based on our review of the limited data that is available in the Ecology database, the site contained a leaking underground storage tank (LUST) that was remediated, and the site received No Further Action (NFA) status from Ecology in 1997. However, a restrictive covenant limiting the site to industrial use remains in place because the concentration of total petroleum hydrocarbons remaining in the soil exceed MTCA Method A cleanup levels for industrial sites.
- <u>Vic Markov Tire Co</u>: Based on our review of the limited data that is available in the Ecology database, in 1993, a LUST was reported at the site and it was confirmed that petroleum contaminants were present in groundwater at concentrations exceeding cleanup levels.

STORMWATER INFILTRATION FEASIBILITY

We evaluated the feasibility of using shallow infiltration facilities to manage stormwater runoff from approximately 35,000 square feet of hard surfaces at the project site in accordance with recommendations provided in the Stormwater Manual. Section 3.2 of the Stormwater Manual includes recommended horizontal and vertical setbacks when installing infiltrating facilities to reduce the risk of adversely impacting adjacent structures and slopes or mobilizing existing subsurface contaminants.

Based on our review of the available surface and subsurface information, we determined that infiltrating stormwater is not feasible at the site due to the presence of contaminated sites within the minimum setbacks recommended in the Stormwater Manual. The Stormwater Manual indicates that for sites receiving stormwater runoff from more than 5,000 square feet of impervious surface area, infiltration is not feasible where soil and/or groundwater contamination has been identified or within 100 feet downgradient or 500 feet upgradient of contaminated sites. As indicated above, the site is within the Lower Duwamish Waterway Superfund Site and as indicated above and shown on Figure 1, several known contaminated sites are within 100 feet upgradient or 500 feet downgradient of the project site. As a result, we recommend that green stormwater infrastructure at the site is lined to prevent potential transport of contaminants by infiltrating stormwater. We also recommend that non-infiltrating (lined) facilities are designed with the bottom of facility (liner) above elevation 8 feet.

Additional Considerations

Construction Drawings for the Georgetown Flume Demolition, Removal, and Drainage Project, which was completed in 2008, indicate that an approximately 200-foot-long area along the west side of the project site is a suspected drain field for the Aero Motel. In accordance with the Stormwater Manual, infiltrating facilities are not allowed within 10 feet of this drain field. The approximate location of the suspected drain field is shown on Figure 1.

CLOSURE

This geotechnical memorandum is intended to provide information and recommendations to support design engineering activities for this project. The conclusions and interpretations presented in this report should not be construed as a warranty of the subsurface conditions.

We recommend that an experienced geotechnical engineer from SPU Geotechnical Engineering review the Project Manual to verify that our recommendations have been interpreted and implemented as intended. Recommendations for design changes will be provided should conditions revealed during construction differ from those anticipated and to verify that the geotechnical aspects of construction comply with the Project Manual.

If you have any questions, please do not hesitate to contact me: Megan Higgins (206-684-5914).

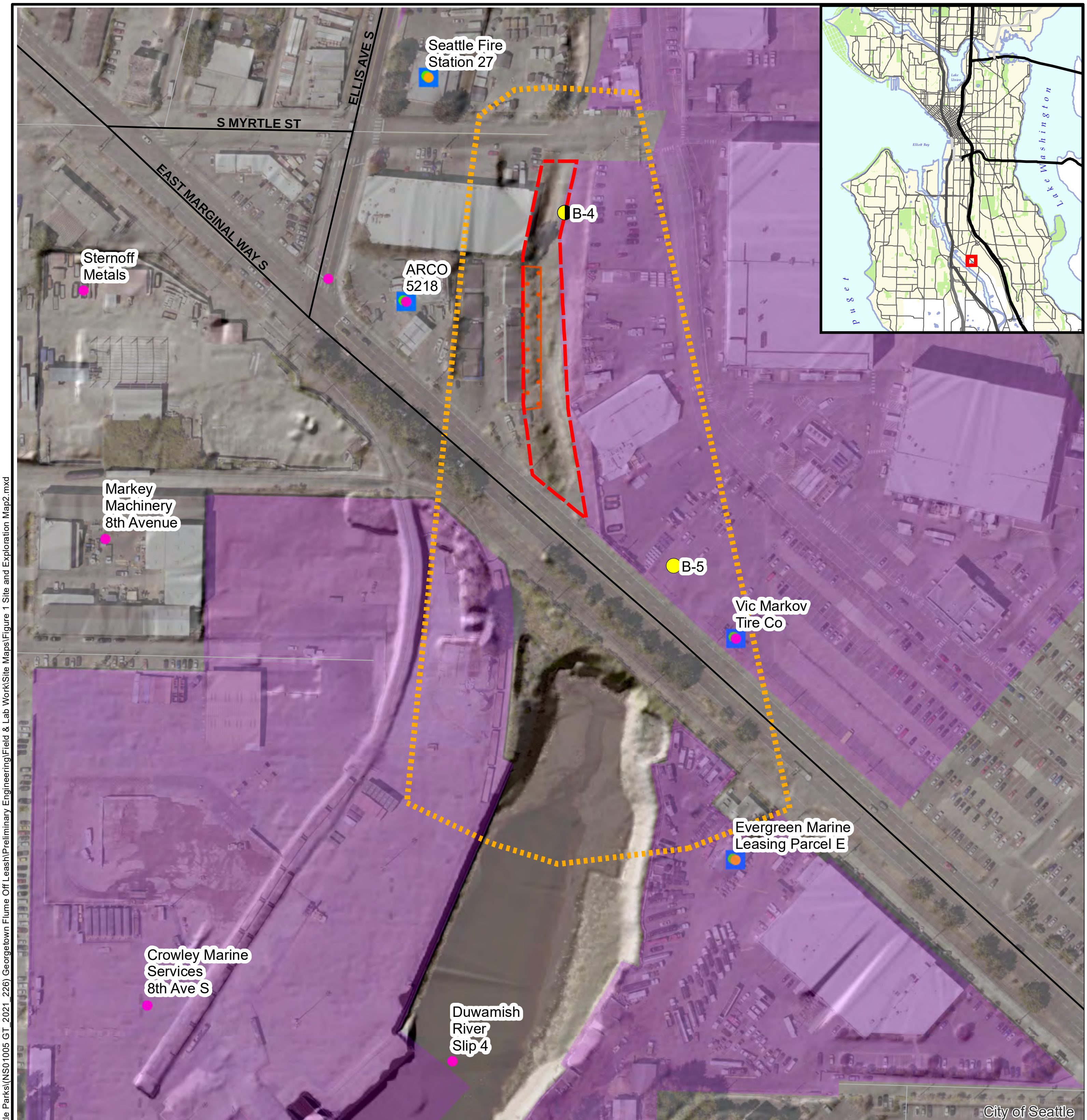
REFERENCES

City of Seattle, 2017. Stormwater Manual, Volume 3, Project Stormwater Control; Appendix D, Subsurface Characterization and Infiltration Testing for Infiltration Facilities.

Environmental Protection Agency Superfund National Priorities List (NPL) Where You Live Map, online application. Accessed May 2021. https://www.epa.gov/superfund/search-superfund-sites-where-you-live#map.

Troost, K.G., Booth, D.B., Wisher, A.P., and Shimel, S.A.,2005. *The geologic map of Seattle* - U. S. Geological Survey Open file report 2005-1252, scale 1:24,000.

Washington Department of Ecology, What's in My Neighborhood, online application. Accessed May 2021. https://fortress.wa.gov/ecy/neighborhood/.



LEGEND

- Boring
- Boring with Piezometer
- Approximate Project Extents
- Residential Streets
- Contaminated Site Horizontal Setback
- Contaminated Parcels within Horizontal Setback
- Potential Motel Drainfield
- Confirmed and Suspected Contaminated Sites
- No Further Action Clean-up Sites
- Regulated Underground Storage Tanks
- Leaking Underground Storage Tanks

Georgetown Flume Off-Leash Area
Infiltration Feasibility Study
Seattle, Washington

SITE & EXPLORATION MAP

Seattle Public Utilities
Geotechnical Engineering

Figure 1
May 2021
Project No. NS01005 GT_2021_226

100 50 0 100 200
Feet

N W E S

NAVD88

Document Path: P:\Geotech\GEOTECH\Geotechnical Projects\Seattle Parks\NS01005 GT_2021_226) Georgetown Flume Off Leash\Preliminary Engineering\Field & Lab Work\Site Maps\Figure 1 Site and Exploration Map2.mxd

APPENDIX A

HISTORICAL EXPLORATIONS

APPENDIX A

HISTORICAL EXPLORATIONS

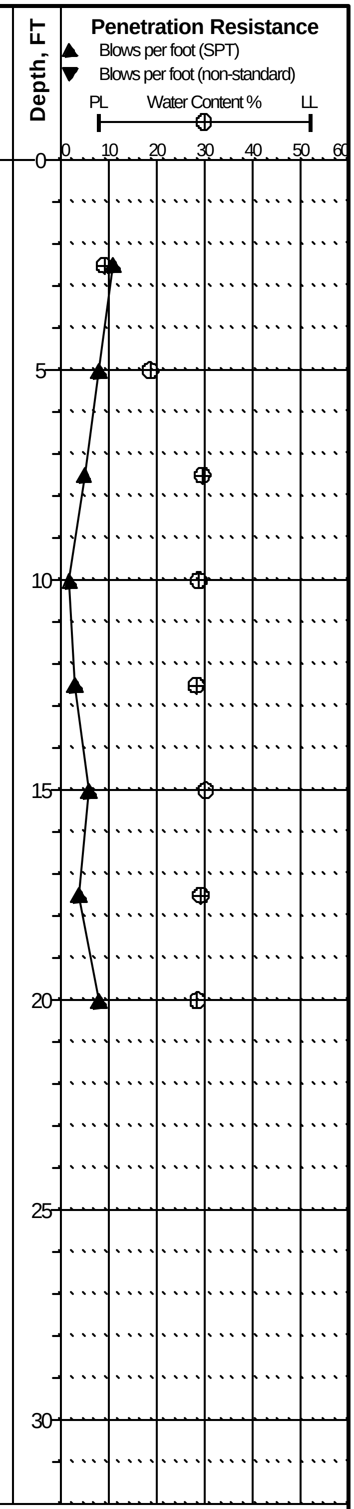
We identified and reviewed historical explorations completed by others to gain an understanding of the subsurface conditions at the site. The approximate locations of relevant explorations are shown on Figure 1. The exploration logs are presented in this appendix. These exploration logs are presented for reference only and SPU Geotechnical Engineering is not responsible for their accuracy or completeness.

SOIL DESCRIPTION

Surface Elevation: 14 NAVD 88

Depth, FT	Soil Description	USCS	Sample	Blows/6"	Lab tests
0	Surface is 3-in. gravel.	GP			
	FILL Medium dense, dark brown, fine to medium SAND, trace silt; moist; numerous red sand grains, homogenous. Possible reworked native material.	SP	1	3,5,6	
5	**ALLUVIUM** Loose, dark brown, fine to medium, SILTY SAND; moist; scattered laminations.	SM	2	3,4,4	GSD
	Becomes black and dark brown, wet, colors seperated by 1-in. layer of wood debris.		3	3,3,2	
	Very loose, black, fine to medium, SAND, trace silt; wet; numerous red sand grains, homogenous.	SP	4	0,1,1	
	Scattered seams of brown silt.		5	1,1,2	
15	Becomes loose, scattered layers of bedded dark brown organic silt, scattered seams of brown silt.		6	1,2,4	
	Becomes very loose to loose, scattered fine grained layers and partings of organics.		7	1,2,2	
20			8	2,3,5	
	Bottom of boring at 21.5 feet below ground surface. Groundwater encountered at 7 feet below ground surface at time of drilling. Piezometer installed.				

Ground Water: ATD



Date Completed: April 19, 2007
Driller: Cascade Drilling, Inc.
Equipment: Truck-mounted CME 75
Drilling Method: 4.25-in. ID HSA
Hammer System: Auto-trip hammer

Approximate Location: 120 ft. W of centerline of Myrtle Ave. S, 23.5 ft. N of fence line. (N: 1273457.25 E: 200193.05)

Georgetown Flume
Seattle, WA

Seattle Public Utilities Materials Laboratory

LOG OF BORING B-4

C307019 FIGURE A-5

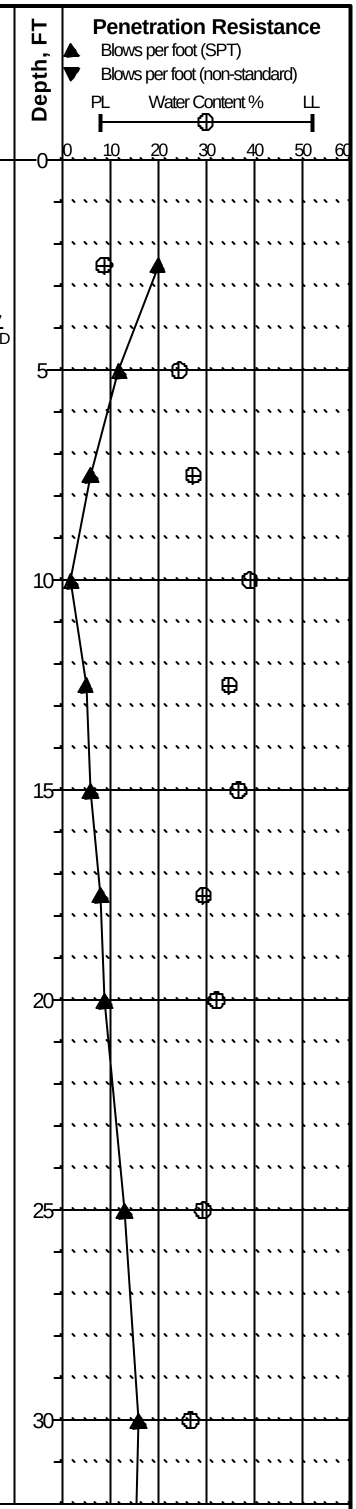
Logged by: TS Reviewed by: CAN

SOIL DESCRIPTION

Surface Elevation: 16 NAVD 88

Soil Description	USCS	Sample	Blows/6"	Lab tests
Surface is asphalt.				
FILL Brown SILT; moist.	ML			
ALLUVIUM Medium dense, black, SAND, trace silt and fine gravel; moist.	SP	1	9,10,10	
Becomes wet, numerous red sand grains, scattered partings of brown silt.		2	6,6,6	
Medium stiff, gray and brown, SANDY SILT; wet; numerous rust staining, scattered partings of organics.	ML	3	3,3,3	GSD
Becomes very soft to soft, scattered layers of dark brown fine sand.		4	0,1,1	
Loose, black, fine SAND, trace silt; wet; homogenous.	SP	5	2,2,3	
Loose, black, fine SILTY SAND; wet; numerous seams of dark brown fine sandy silt.	SM	6	2,2,4	GSD
Loose, black, SAND, trace silt; wet; homogenous.	SP	7	2,4,4	
		8	4,4,5	
Medium dense, fine to medium SAND, trace silt; wet; numerous red sand grains, scattered partings of brown silt.	SP	9	6,6,7	GSD
		10	6,8,8	

Ground Water: ATD (approx. 4 ft)



(Continued)

Date Completed: April 20, 2007
Driller: Cascade Drilling, Inc.
Equipment: Truck-mounted CME 75
Drilling Method: 3 7/8-in. bit Mud Rotary
Hammer System: Auto-trip hammer

Approximate Location: 29.5 ft. SE, 41 ft. NE of Boeing fence line on E Marginal Wy. (N: 1273623.91 E: 199654.86)

Georgetown Flume
Seattle, WA

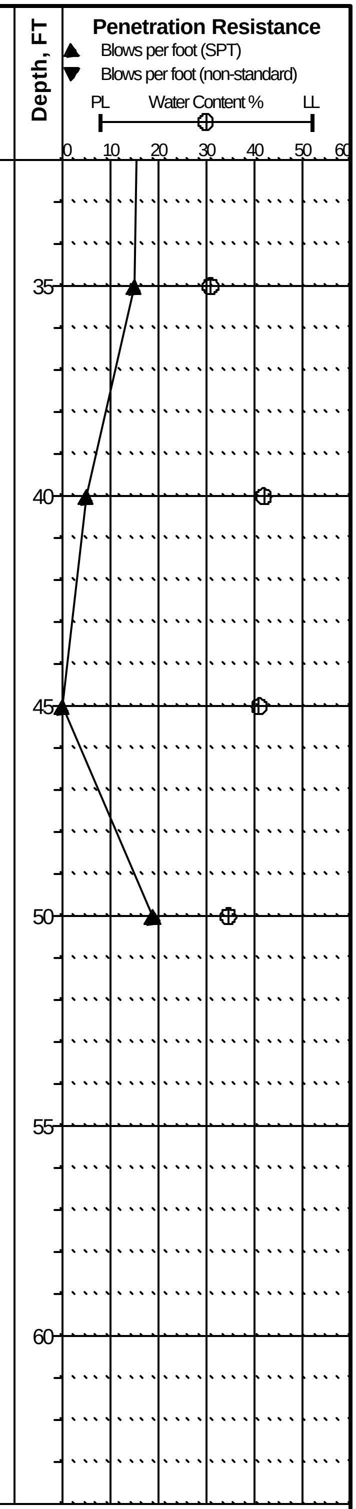
Seattle Public Utilities Materials Laboratory

LOG OF BORING B-5

C307019

FIGURE A-6

SOIL DESCRIPTION	Depth, FT	USCS	Samples	Blows/6"	Lab tests	Ground Water
Surface Elevation: 16 NAVD 88						
(continued from previous page)						
Increased silt.	35		11	9,8,7		
Medium stiff, dark brown, ORGANIC SILT WITH SAND; wet; scattered roots.	40	OL	12	2,1,4		
Becomes very soft, scattered wood debris, dilatent.	45		13	0		
Becomes very stiff, numerous layers of black fine and fine to coarse sand, scattered partings of organics.	50		14	5,8,11		
Bottom of boring at 51 feet below ground surface. Perched groundwater encountered at 4 feet below ground suface at time of drilling. Boring backfilled with bentonite.						
	55					
	60					



Date Completed: April 20, 2007
Driller: Cascade Drilling, Inc.
Equipment: Truck-mounted CME 75
Drilling Method: 3 7/8-in. bit Mud Rotary
Hammer System: Auto-trip hammer

Approximate Location: 29.5 ft. SE, 41 ft. NE of Boeing fence line on E Marginal Wy. (N: 1273623.91 E: 199654.86)

Georgetown Flume
Seattle, WA

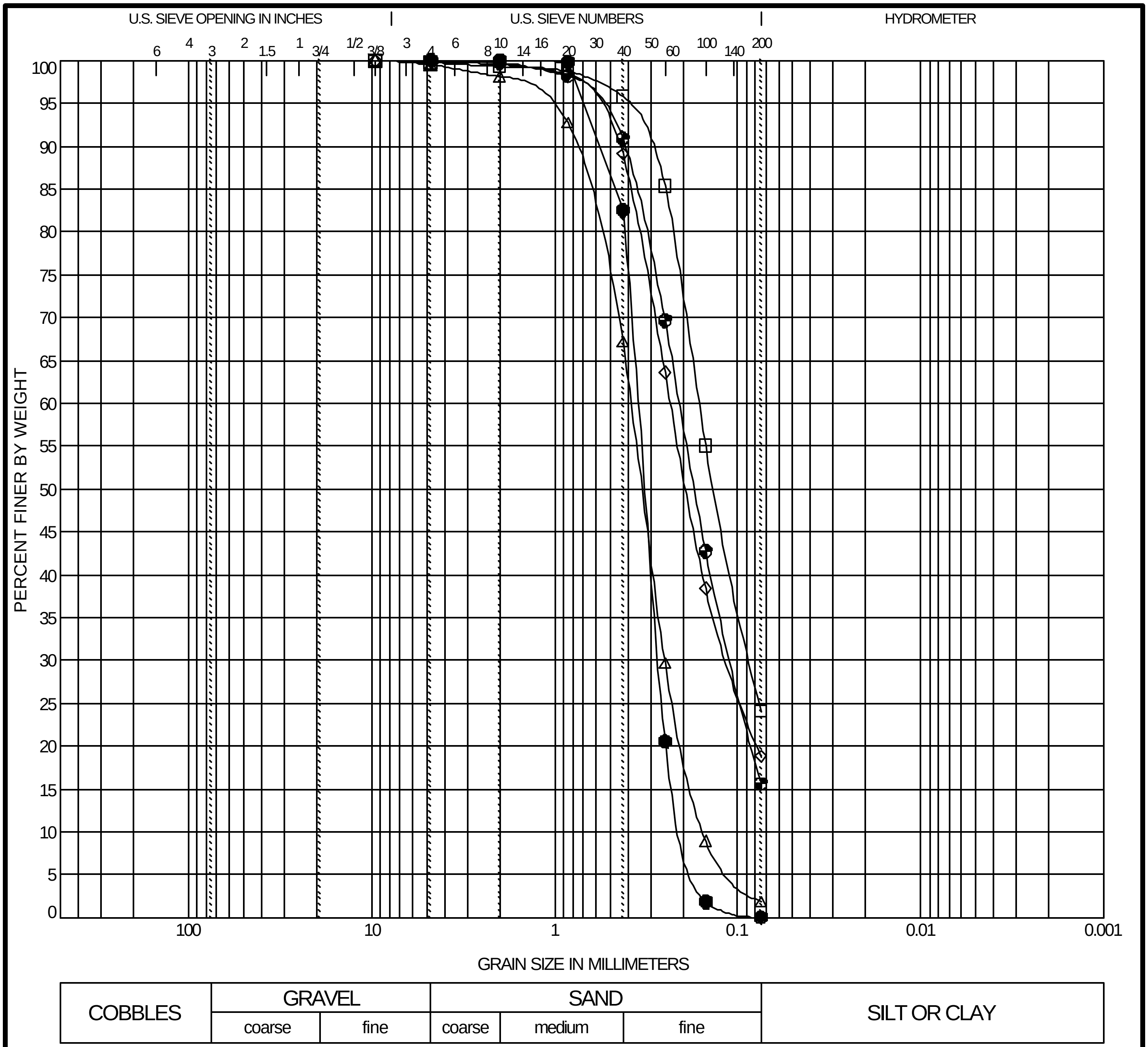
Seattle Public Utilities Materials Laboratory

LOG OF BORING B-5

C307019

FIGURE A-6

Logged by: TS Reviewed by: CAN



	Sample ID	Depth	Classification	LL	PL	PI	Cc	Cu
●	B-1; 3	7.5	Black, fine to medium SAND (SP)				1.1	1.9
□	B-1; 6	15.0	Black, fine SILTY SAND (SM)					
△	B-2; 4	12.5	Black, SAND, trace silt and fine gravel (SP)				1.1	2.5
◇	B-3; 2	5.0	Brown, fine to medium SILTY SAND (SM)					
⊕	B-4; 2	5.0	Dark brown, fine to medium SILTY SAND (SM)					

	Sample ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-1; 3	7.5	4.75	0.35	0.27	0.187	0.0	100.0	0.0	
□	B-1; 6	15.0	9.5	0.16	0.09		0.2	75.7	24.1	
△	B-2; 4	12.5	9.5	0.38	0.25	0.154	0.5	97.6	1.9	
◇	B-3; 2	5.0	9.5	0.23	0.11		0.1	81.1	18.8	
⊕	B-4; 2	5.0	4.75	0.21	0.11		0.0	84.4	15.6	

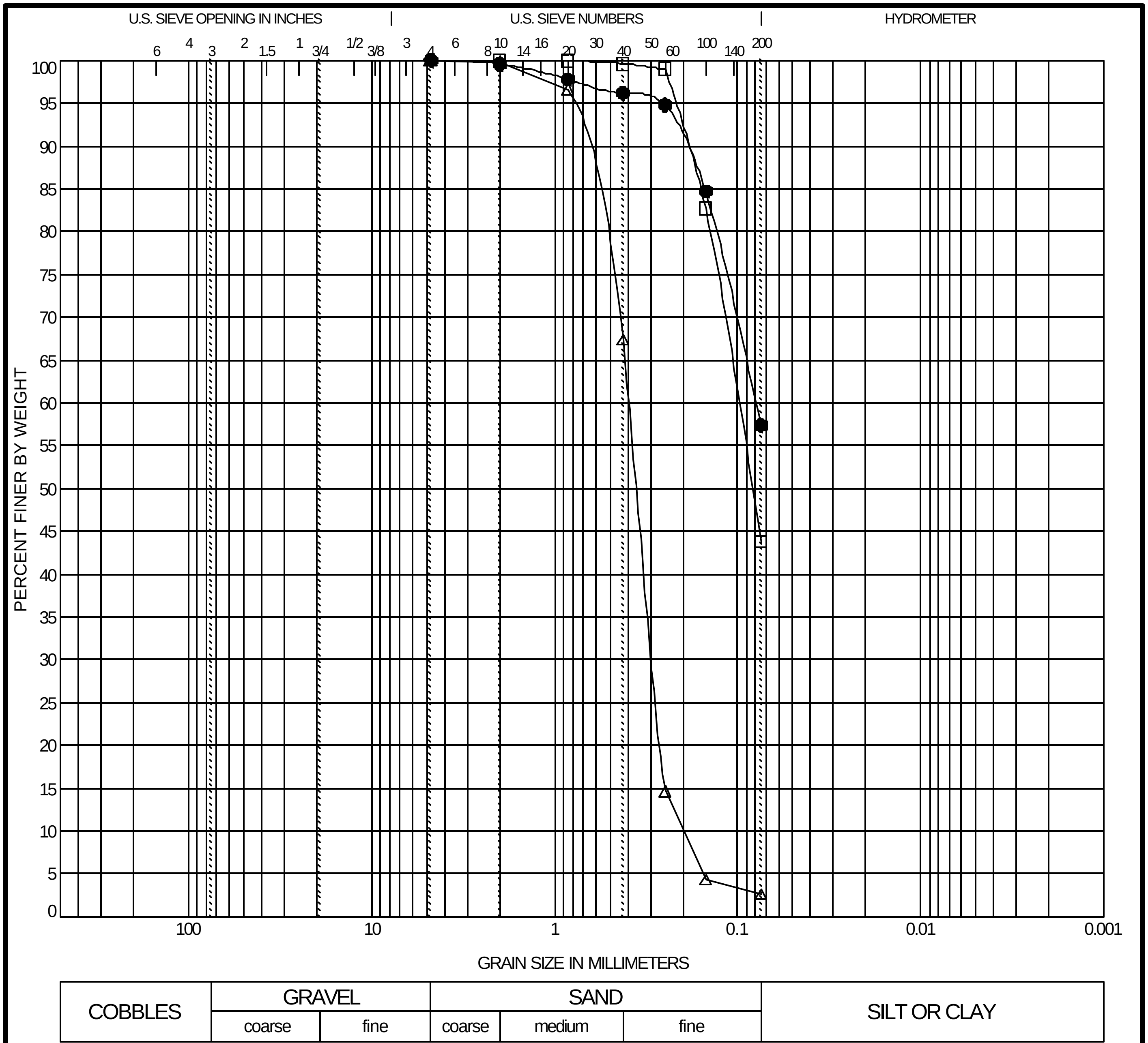
Seattle Public Utilites Materials Laboratory

WA No.: C307019

GRAIN SIZE DISTRIBUTION (ASTM D422)

Georgetown Flume
Seattle, WA

FIGURE: B-1



	Sample ID	Depth	Classification	LL	PL	PI	Cc	Cu
●	B-5; 3	7.5	Dark brown, SANDY SILT (ML)					
□	B-5; 6	15.0	Black, fine SILTY SAND (SM)					
△	B-5; 9	25.0	Black, fine to medium SAND, trace silt (SP)				1.1	2.0

	Sample ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-5; 3	7.5	4.75	0.08			0.0	42.6	57.4	
□	B-5; 6	15.0	2	0.1			0.0	56.2	43.8	
△	B-5; 9	25.0	4.75	0.39	0.29	0.199	0.0	97.4	2.6	

Seattle
Public Utilites
Materials Laboratory

WA No.: C307019

GRAIN SIZE DISTRIBUTION (ASTM D422)

Georgetown Flume
Seattle, WA

FIGURE: B-2

US GRAIN SIZE GEORGETOWN FLUME.GPJ US EVAL.GDT 5/22/07

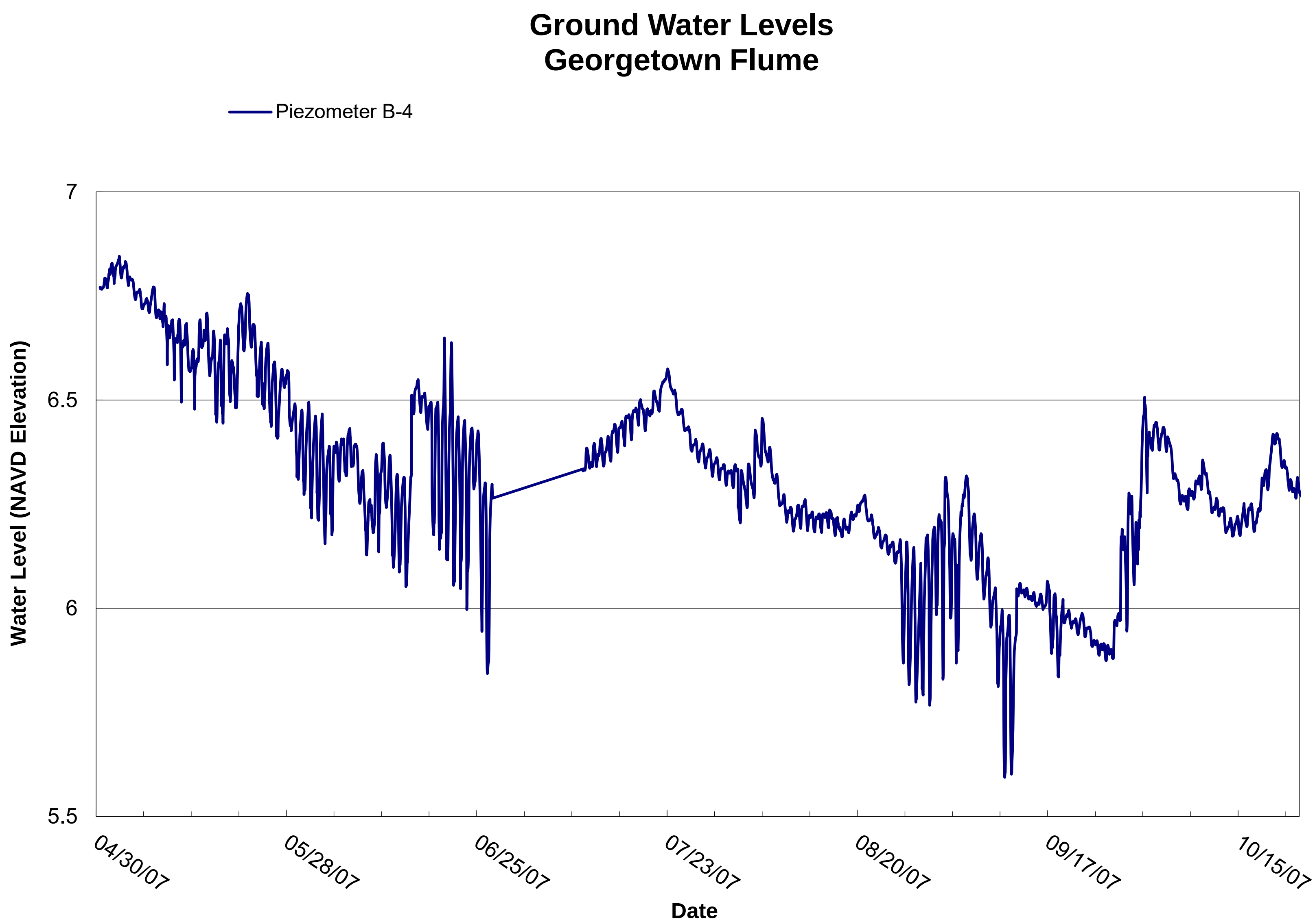
APPENDIX B

HISTORICAL GROUNDWATER MONITORING RESULTS

APPENDIX B

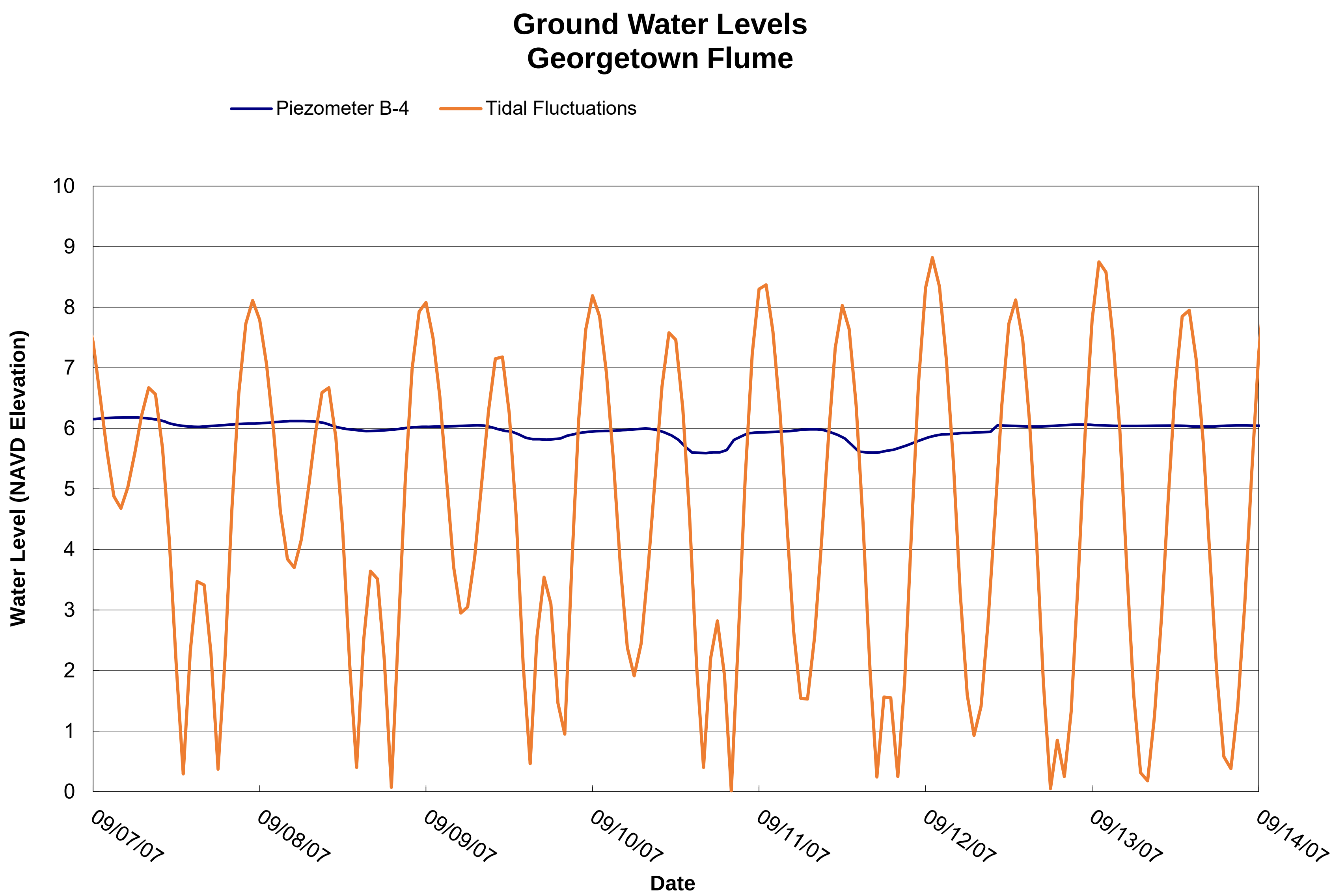
HISTORICAL GROUNDWATER MONITORING RESULTS

We identified and reviewed historical groundwater monitoring results completed by others to gain an understanding of the groundwater conditions at the site. Groundwater plots and figures are presented in this Appendix for reference only and SPU Geotechnical Engineering is not responsible for their accuracy or completeness.



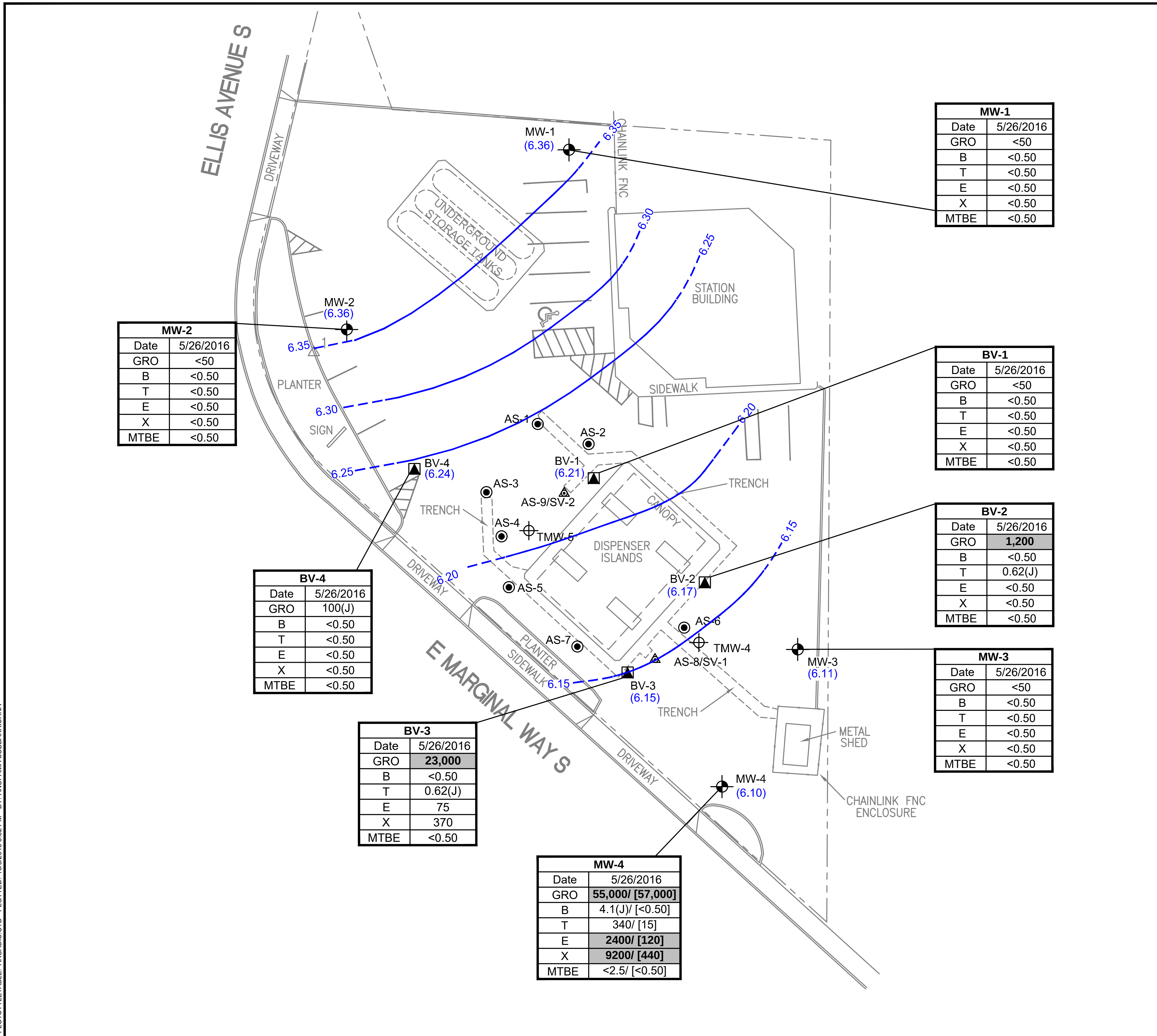
B-4 Pressure Transducer Data

SPU Materials Laboratory



B-4 Pressure Transducer and Tidal Data

SPU Materials Laboratory



MW-1	
Date	5/26/2016
GRO	<50
B	<0.50
T	<0.50
E	<0.50
X	<0.50
MTBE	<0.50

MW-2	
Date	5/26/2016
GRO	<50
B	<0.50
T	<0.50
E	<0.50
X	<0.50
MTBE	<0.50

BV-1	
Date	5/26/2016
GRO	<50
B	<0.50
T	<0.50
E	<0.50
X	<0.50
MTBE	<0.50

BV-2	
Date	5/26/2016
GRO	**1,200**
B	<0.50
T	0.62(J)
E	<0.50
X	<0.50
MTBE	<0.50

BV-4	
Date	5/26/2016
GRO	100(J)
B	<0.50
T	<0.50
E	<0.50
X	<0.50
MTBE	<0.50

BV-3	
Date	5/26/2016
GRO	**23,000**
B	<0.50
T	0.62(J)
E	75
X	370
MTBE	<0.50

MW-3	
Date	5/26/2016
GRO	<50
B	<0.50
T	<0.50
E	<0.50
X	<0.50
MTBE	<0.50

MW-4	
Date	5/26/2016
GRO	**55,000/ [57,000]**
B	4.1(J)/ [<0.50]
T	340/ [15]
E	**2400/ [120]**
X	**9200/ [440]**
MTBE	<2.5/ [<0.50]

LEGEND

APPROXIMATE PROPERTY LINE
MW-2 MONITORING WELL LOCATION
TMW-4 TEMPORARY MONITORING WELL LOCATION
SV-1 VAPOR EXTRACTION WELL LOCATION
BV-1 AIR SPARGE / VAPOR EXTRACTION WELL LOCATION
AS-1 AIR SPARGE (AS) WELL LOCATION
APPROXIMATE LOCATION OF AS/SVE PIPING
6.25 GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
(6.36) GROUNDWATER ELEVATION (FEET ABOVE NAVD 88)
NAVD 88 NORTH AMERICAN VERTICAL DATUM 1988
< ANALYTE NOT DETECTED VALUE SHOWN IS REPORTING LIMIT

Location ID	
Date	Date Collected
GRO	Total Petroleum Hydrocarbons in the Gasoline Range Organics (µg/L) / [Duplicate (µg/L)]
B	Benzene (µg/L) / [Duplicate (µg/L)]
T	Toluene (µg/L) / [Duplicate (µg/L)]
E	Ethylbenzene (µg/L) / [Duplicate (µg/L)]
X	Total Xylenes (µg/L) / [Duplicate (µg/L)]
MTBE	Methyl Tert-Butyl Ether (µg/L) / [Duplicate (µg/L)]

NOTES:

ALL CONCENTRATIONS ARE MEASURED IN MICROGRAMS PER LITER (µg/L)

BOLD ANALYTE CONCENTRATION EXCEEDS MODEL TOXICS CONTROL ACT (MTCA) METHOD A CLEANUP LEVEL

THIS MAP PREPARED FROM FIELD SURVEYS BY OTAK SURVEYING, INC., IN 2010 AND 2011.

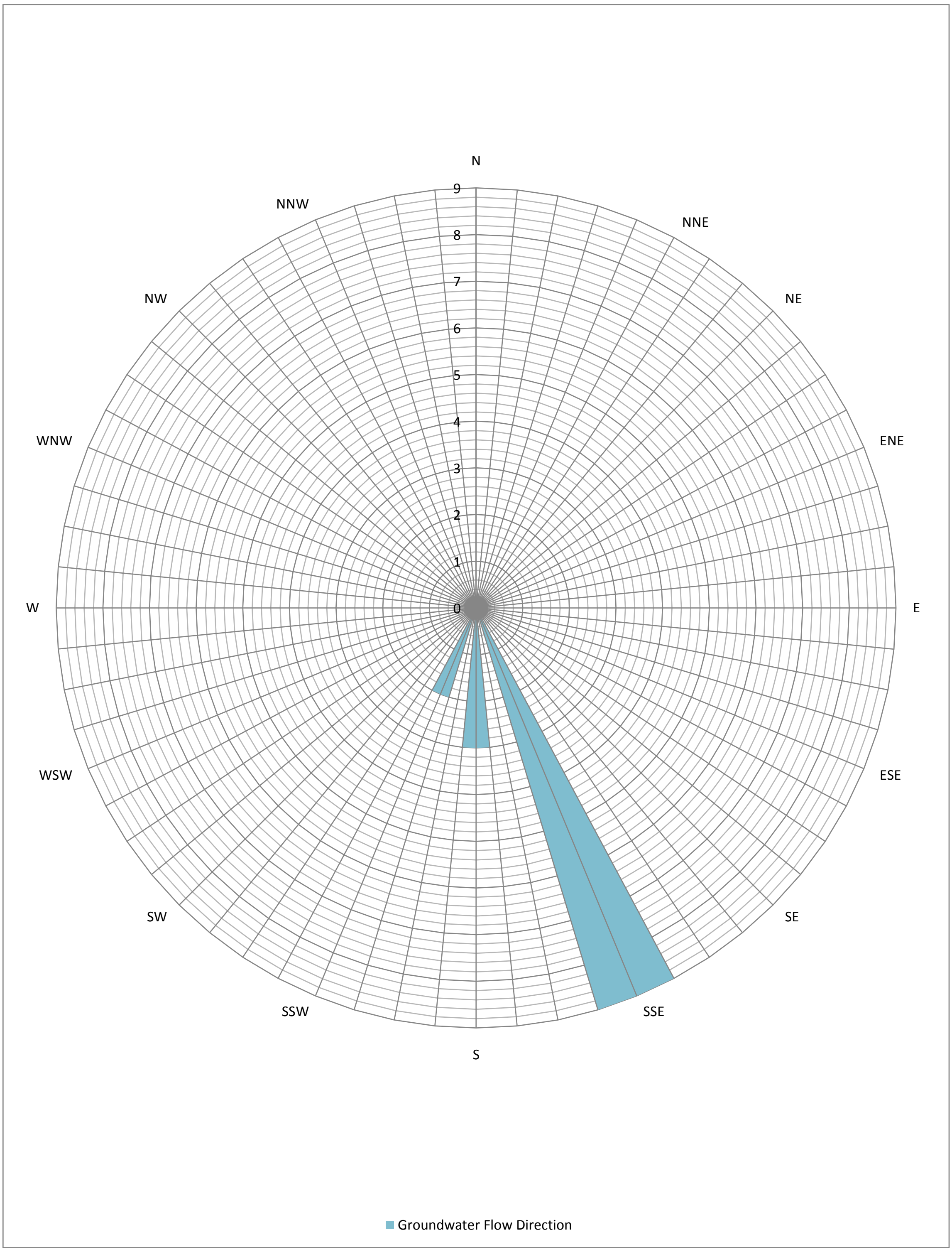
0 30' 60'
GRAPHIC SCALE

BP WEST COAST PRODUCTS LLC.
ARCO STATION No. 5218
7200 E MARGINAL WAY SOUTH, SEATTLE, WASHINGTON
2016 ANNUAL SITE STATUS REPORT

GROUNDWATER CONTOUR MAP WITH ANALYTICAL RESULTS MAY 26, 2016

ARCADIS Design & Consultancy for natural and built assets

FIGURE 2



Legend

N=North
NNE= North Northeast
NE= Northeast
ENE= East Northeast
E= East
ESE= East Southeast
SE=Southeast
SSE= South Southeast
S= South
SW= Southwest
SSW= South Southwest
WSW= West South West
W= West
WNW= West Northwest
NW=Northwest
NNW= North Northwest

Note

Rose diagram based on flow direction calculations from groundwater monitoring events, conducted by ARCADIS since top of casing survey in March 2010.

Number of Events Observed = 14

ARCO FACILITY NO. 5218
7200 EAST MARGINAL WAY SOUTH SEATTLE, WASHINGTON

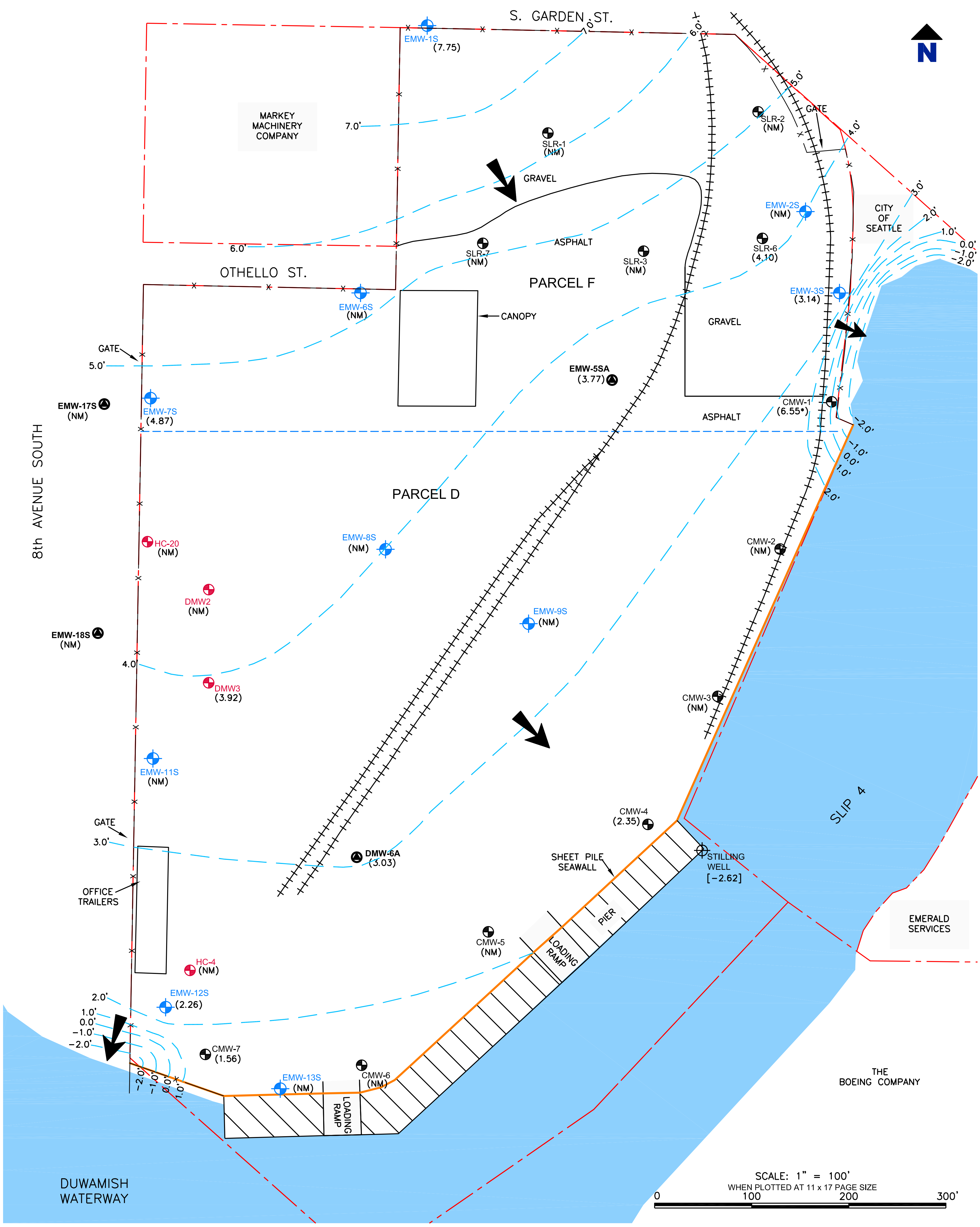
2016 ANNUAL SITE STATUS REPORT

HISTORICAL GROUNDWATER GRADIENT DIRECTION ROSE DIAGRAM

ARCADIS Design & Consultancy for natural and built assets

FIGURE

3



LEGEND

- PARCEL D/PARCEL F BOUNDARY
- PROPERTY BOUNDARIES
- RAIL LINE
- FENCE
- SHEET PILE SEAWALL
- 2008 SHALLOW GROUNDWATER MONITORING WELL
- 2013 SHALLOW GROUNDWATER MONITORING WELL
- 2014 SHALLOW GROUNDWATER MONITORING WELL
- [−2.62] SLIP 4 SURFACE WATER ELEVATION (IN FEET) ABOVE NAVD 88 DATUM
- (3.92) SHALLOW GROUNDWATER ELEVATION (IN FEET) ABOVE NAVD 88 DATUM
- (NM) NOT MEASURED
- 2.0' INFERRED SHALLOW GROUNDWATER ELEVATION CONTOUR LINE (IN FEET)
- GENERAL SHALLOW GROUNDWATER FLOW DIRECTION

NOTES

1. DRAWING COMPILED FROM TRIAD ASSOCIATES, KIRKLAND, WA. SURVEY PLAN, DRAWING 06133-CC052908.DWG
2. GROUNDWATER ELEVATION DATA COLLECTED DURING THE PHASE 2 TIDAL STUDY.
3. * = THE GROUNDWATER ELEVATION WAS ANOMALOUS AND NOT USED FOR CONTOURING.

8TH AVENUE TERMINALS, INC. SITE
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Drawing
SHALLOW GROUNDWATER ELEVATION CONTOUR MAP - LOW TIDE CONDITIONS

Date	June 5, 2018	Scale	AS SHOWN	Fig. No.
File Name	01-14.dwg	Project No.	101.00205.00037	14

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N:\Bothell\1 PROJECTS\Crowley - 205\00037 Prepare Final RI Report\Figures\01-14.dwg

APPENDIX C

RELEVANT ENVIRONMENTAL DOCUMENTS

APPENDIX C

RELEVANT ENVIRONMENTAL DOCUMENTS

We reviewed the Washington Department of Ecology What's in My Neighborhood online mapping tool and database to determine if known contaminated sites are located within 500 feet of the project. The approximate location of known contaminated sites is shown on Figure 1. We did not complete a comprehensive review of the site environmental history. Relevant documents for the contaminated sites, that we obtained from the Ecology database, are presented in this appendix for reference only and SPU Geotechnical Engineering is not responsible for their accuracy or completeness.

Cleanup Site Details

Cleanup Site ID: 2520

Cleanup Site ID: 2520 **Facility/Site ID:** 1940187 **UST ID:** N/A [Site Page] [Site Documents] [View Map]

Cleanup Site Name: Crowley Marine Services 8th Ave S [Glossary]

Alternate Names: Crowley Marine Services 8th Ave S, CROWLEY MARINE SERVICES INC 8TH AVE S, CROWLEY TERMINAL 8TH AVE S

LOCATION

Address: 7400 8TH AVE S **City:** SEATTLE **Zip Code:** 98108 **County:** King

Latitude: 47.53577 **Longitude:** -122.32156 **WRIA:** 9 **Legislative District:** 11 **Congressional District:** 9 **TRS:** 24N 4E 29

DETAIL

Status: Cleanup Started **NFA Received?** No **Is PSI site?** No

Statute: MTCA **NFA Date:** N/A **Current VCP?** No **Past VCP?** No

Site Rank: 2 - Moderate-High Risk **NFA Reason:** N/A **Brownfield?** No

Site Manager: Sutton, Victoria **Responsible Unit:** Northwest **Active Institutional Control?** No

CLEANUP UNITS

Cleanup Unit Name	Unit Type	Unit Status	Resp Unit	Unit Manager	Current Process
CROWLEY MARINE SERVICES INC 8TH AVE S	Upland	Cleanup Started	NW	Sutton, Victoria	Ecology-supervised or conducted
CROWLEY MARINE SERVICES INC 8TH AVE S	Sediment	Awaiting Cleanup	NW	Sutton, Victoria	Ecology-supervised or conducted

ACTIVE INSTITUTIONAL CONTROLS

Instrument Type	Restriction Media	Restrictions/Requirements	Date	Recording Number	Recording County	Tax Parcel
There are no current Institutional Controls in effect for this site.						

AFFECTED MEDIA & CONTAMINANTS

	MEDIA					
Contaminant	**Soil**	**Groundwater**	**Surface Water**	**Sediment**	**Air**	**Bedrock**
Arsenic	C	C				
Base/Neutral/Acid Organics	C	C		C		
Metals Priority Pollutants	C	C		C		
Petroleum Products-Unspecified	C	S		S		
Phenolic Compounds	S	S		S		
Polychlorinated biPhenyls (PCB)	C	S		C		
Polycyclic Aromatic Hydrocarbons	C	C		C		

Key:
B - Below Cleanup Level
S - Suspected
C - Confirmed Above Cleanup Level
R - Remediated
RA - Remediated-Above
RB - Remediated-Below

SITE ACTIVITIES

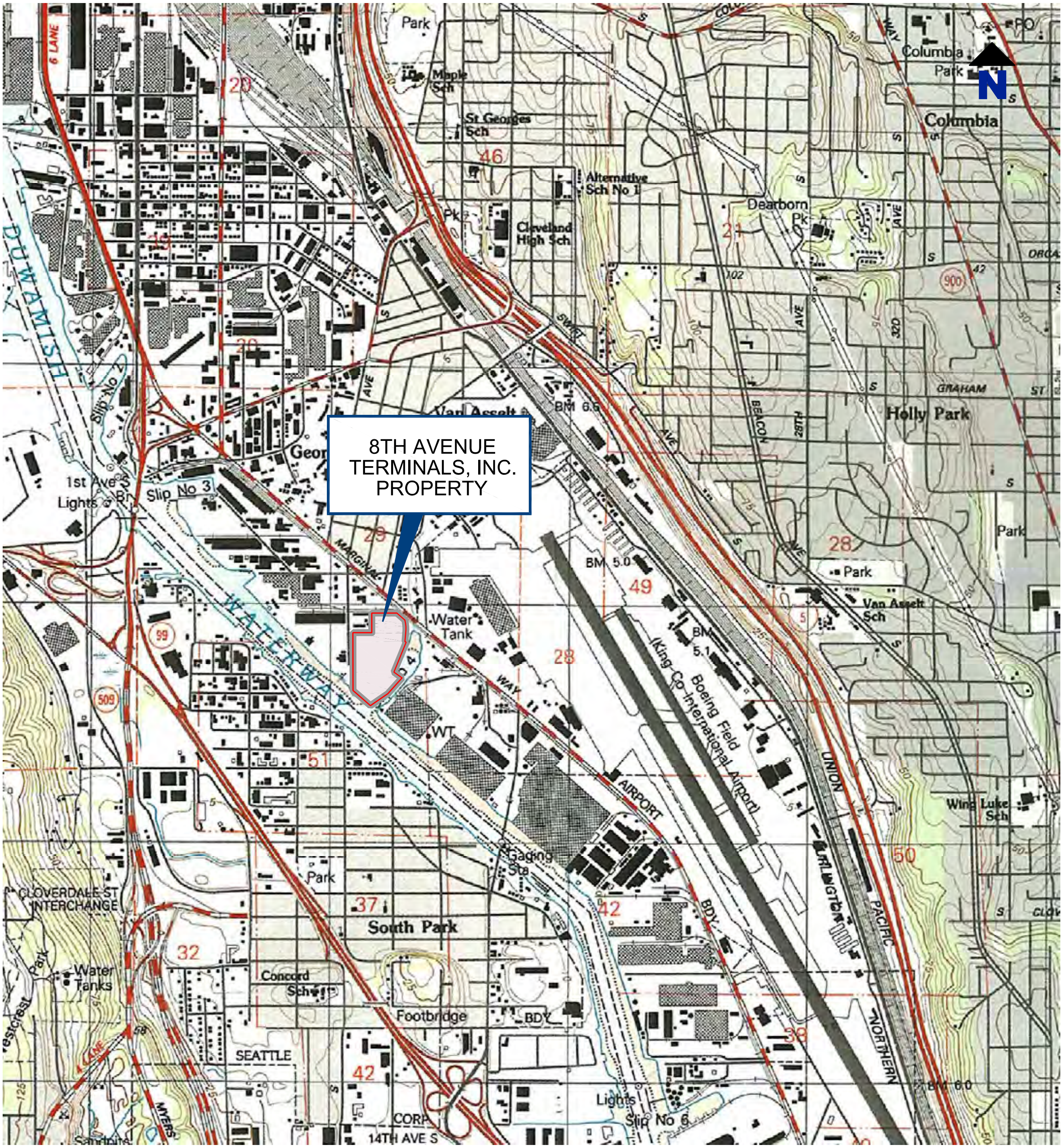
Activity	Status	Start Date	End Date/ Completion Date
Order/Decree/Amendment	In Process		
Site Discovery/Release Report Received	Completed		1/4/1993

Cleanup Site Details

Cleanup Site ID: 2520

SITE ACTIVITIES

Activity	Status	Start Date	End Date/ Completion Date
Initial Investigation / Federal Preliminary Assessment	Completed		6/21/2007
Early Notice Letter(s)	Completed		7/31/2007
Site Hazard Assessment/Federal Site Inspection	Completed	9/6/2007	2/5/2008
Hazardous Sites Listing/NPL	Completed		2/5/2008
Remedial Investigation and/or FS Work Plan	Completed	10/12/2009	10/1/2012
Remedial Investigation and/or Feasibility Study	In Process	10/1/2012	
Placement of Lien	Completed	10/9/2015	



SUBJECT PROPERTY BOUNDARY

SCALE: 1" = 2000'
WHEN PLOTTED AT 8.5 x 11 PAGE SIZE

0 2000 4000' 6000'

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SEATTLE, WASHINGTON

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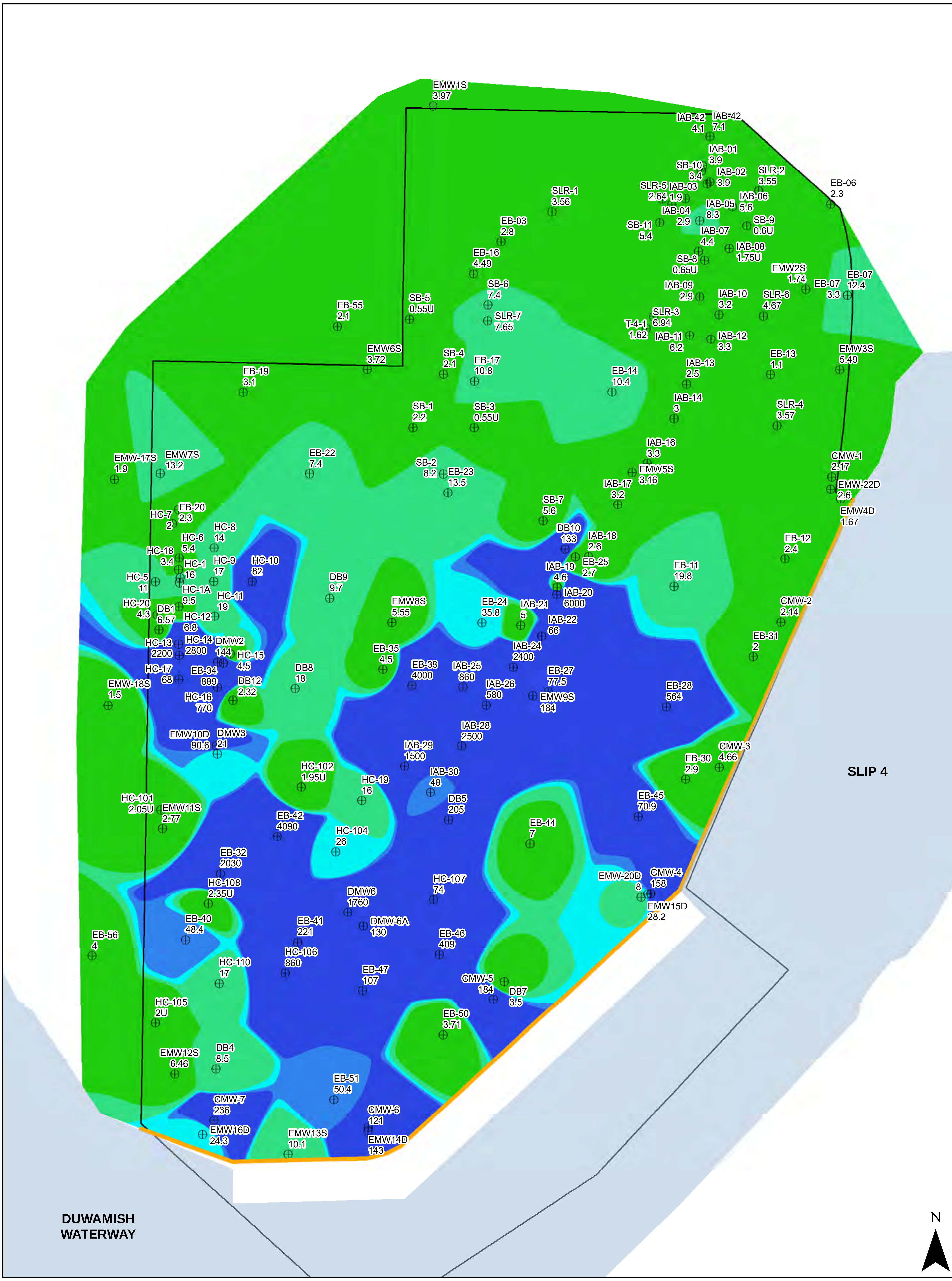
Drawing	SUBJECT PROPERTY LOCATION MAP		
Date	April 19, 2018	Scale	AS SHOWN
File Name	01-01	Project No.	101.00205.00037
Fig. No.	1		



Document Path: N:\Bothell\Apps\GIS\Crowley - 205 00037\MXD\F21_S_Ar_6.mxd

LEGEND

- Sheet Pile Seawall
- Property Boundary
- ⊕ Investigation Location

Arsenic (mg/kg)

- < 7.3 (screening level based on natural background concentration)
- 7.3 - 20
- 20 - 40
- 40 - 60
- > 60

U = 1/2 of the highest method reporting limit at each location was used for contouring.

0 50 100 200 Feet

1 inch = 100 feet

8TH AVENUE TERMINALS, INC. SITE
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SEATTLE, WASHINGTON

Figure

MAXIMUM CONCENTRATIONS OF ARSENIC IN SOIL SAMPLES COLLECTED BETWEEN 0 AND 6 FEET BGS

Project No.	Figure No.
101.00205.00037	21

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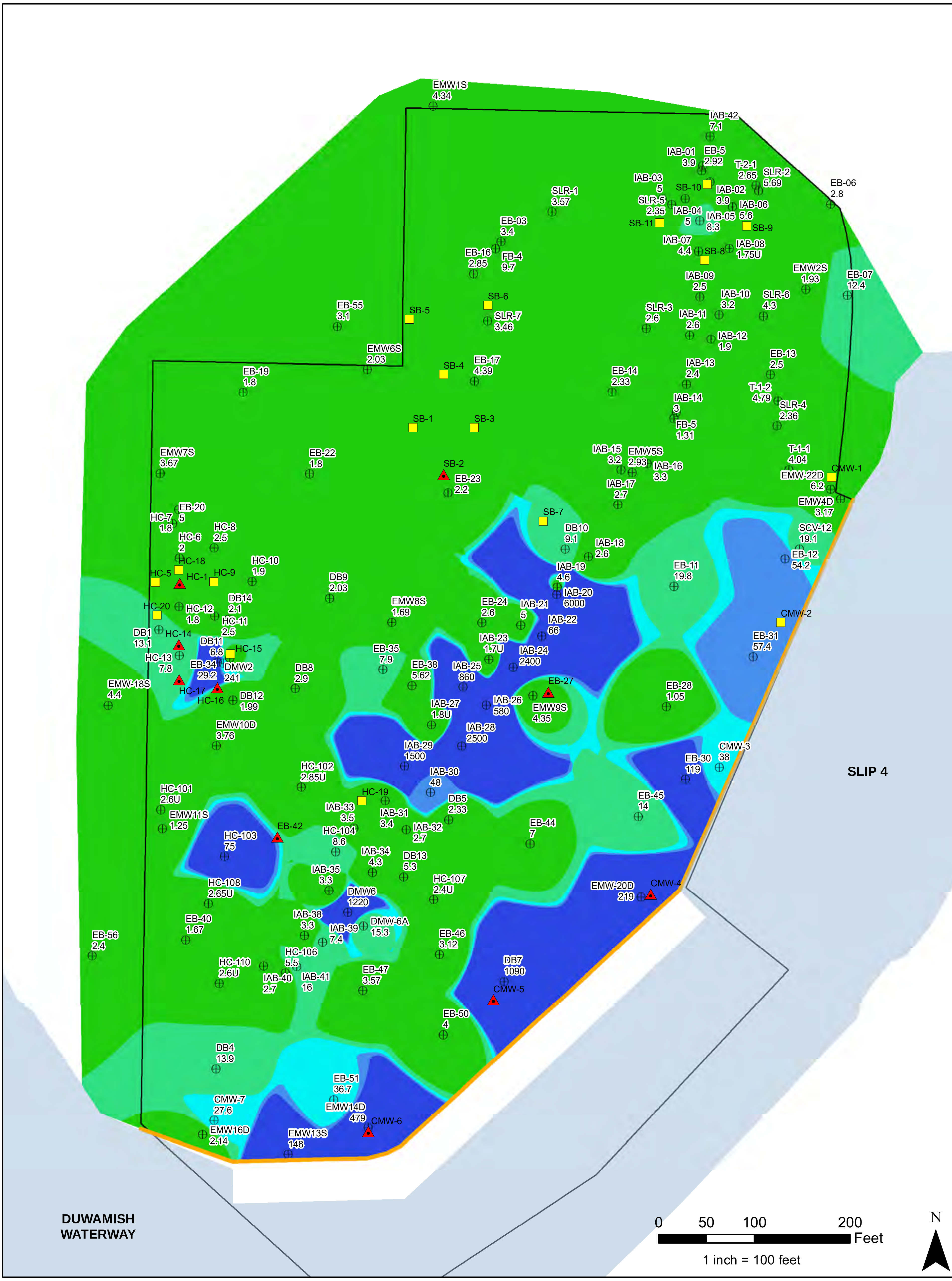

Document Path: N:\Bothell\Apps\GIS\Crowley - 205 00037\MXD\F22_S_Ar_12.mxd

LEGEND

- ▲ The deepest sample from this location was collected at a depth less than 6 feet bgs, and contained a concentration above the screening level
- ■ The deepest sample from this location was collected a a depth less than 6 feet bgs, and contained a concentration below the screening level
- Sheet Pile Seawall
- Property Boundary
- ⊕ Investigation Location

Arsenic (mg/kg)

- < 7.3 (screening level based on natural background concentration)
- 7.3 - 20
- 20 - 40
- 40 - 60
- > 60

8TH AVENUE TERMINALS, INC. SITE
7400 8TH AVENUE SOUTH
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Figure

MAXIMUM CONCENTRATIONS OF ARSENIC IN SOIL SAMPLES COLLECTED BETWEEN 6 AND 12 FEET BGS

Project No.	Figure No.
101.00205.00037	22

SLR
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BOTHELL, WA 98021
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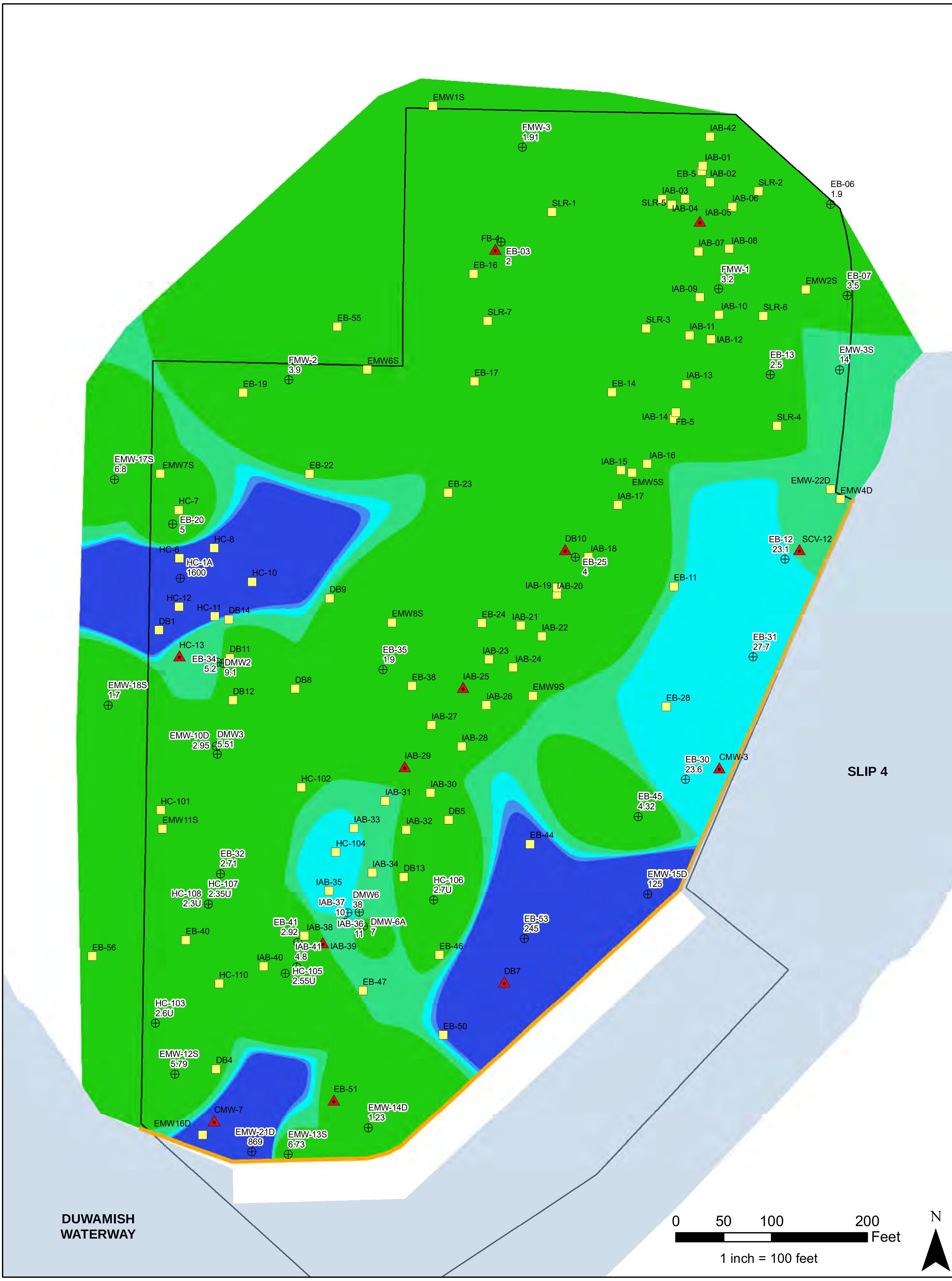

LEGEND

▲ The deepest sample from this location was collected at a depth less than 12 feet bgs, and contained a concentration above the screening level

■ The deepest sample from this location was collected at a depth less than 12 feet bgs, and contained a concentration below the screening level

⊕ Investigation Location

Sheet Pile Seawall

Property Boundary

Arsenic (mg/kg)

- < 7.3 (screening level based on natural background concentrations)
- 7.3 - 20
- 20 - 40
- 40 - 60
- > 60

U = 1/2 of the highest method reporting limit at each location was used for contouring.

8TH AVENUE TERMINALS, INC. SITE
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Figure
MAXIMUM CONCENTRATIONS OF ARSENIC IN SOIL SAMPLES COLLECTED AT DEPTHS GREATER THAN 12 FEET BGS

Project No.	Figure No.
101.00205.00037	23

SLR
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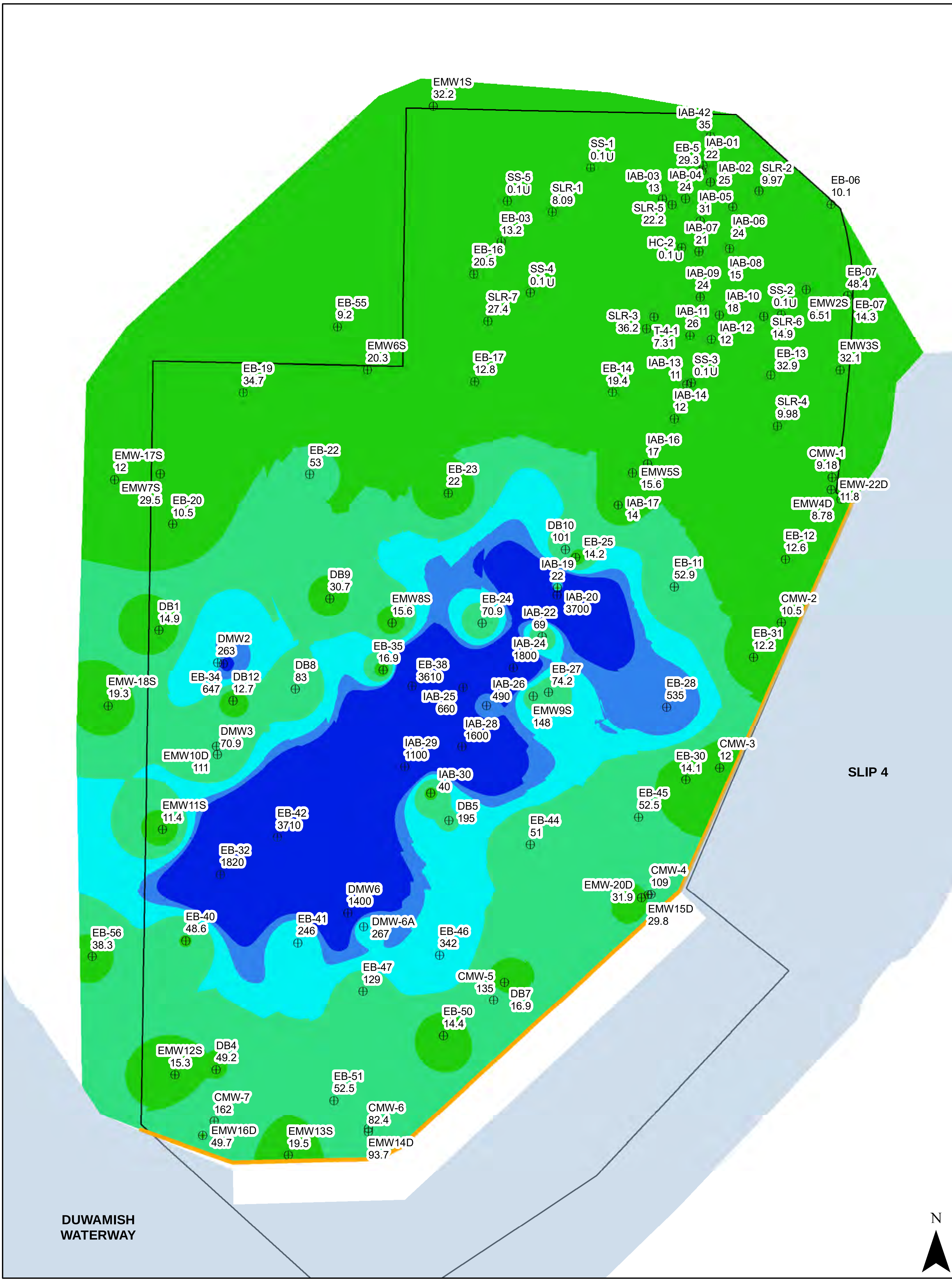
Document Path: N:\Bothell\Apps\GIS\Crowley - 205 00037\MXD\F23_S_Ar_D.mxd



LEGEND

SHEET PILE SEAWALL

PROPERTY BOUNDARY

⊕ INVESTIGATION LOCATION

Copper (mg/kg)

- < 50
- 50 - 200
- 200 - 400
- 400 - 550
- > 550 (screening level)

0 50 100 200
Feet

1 inch = 100 feet

8TH AVENUE TERMINALS, INC. SITE
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Figure

MAXIMUM CONCENTRATIONS OF COPPER IN SOIL SAMPLES COLLECTED BETWEEN 0 AND 6 FEET BGS

Project No. 101.00205.00037

Figure No. 24

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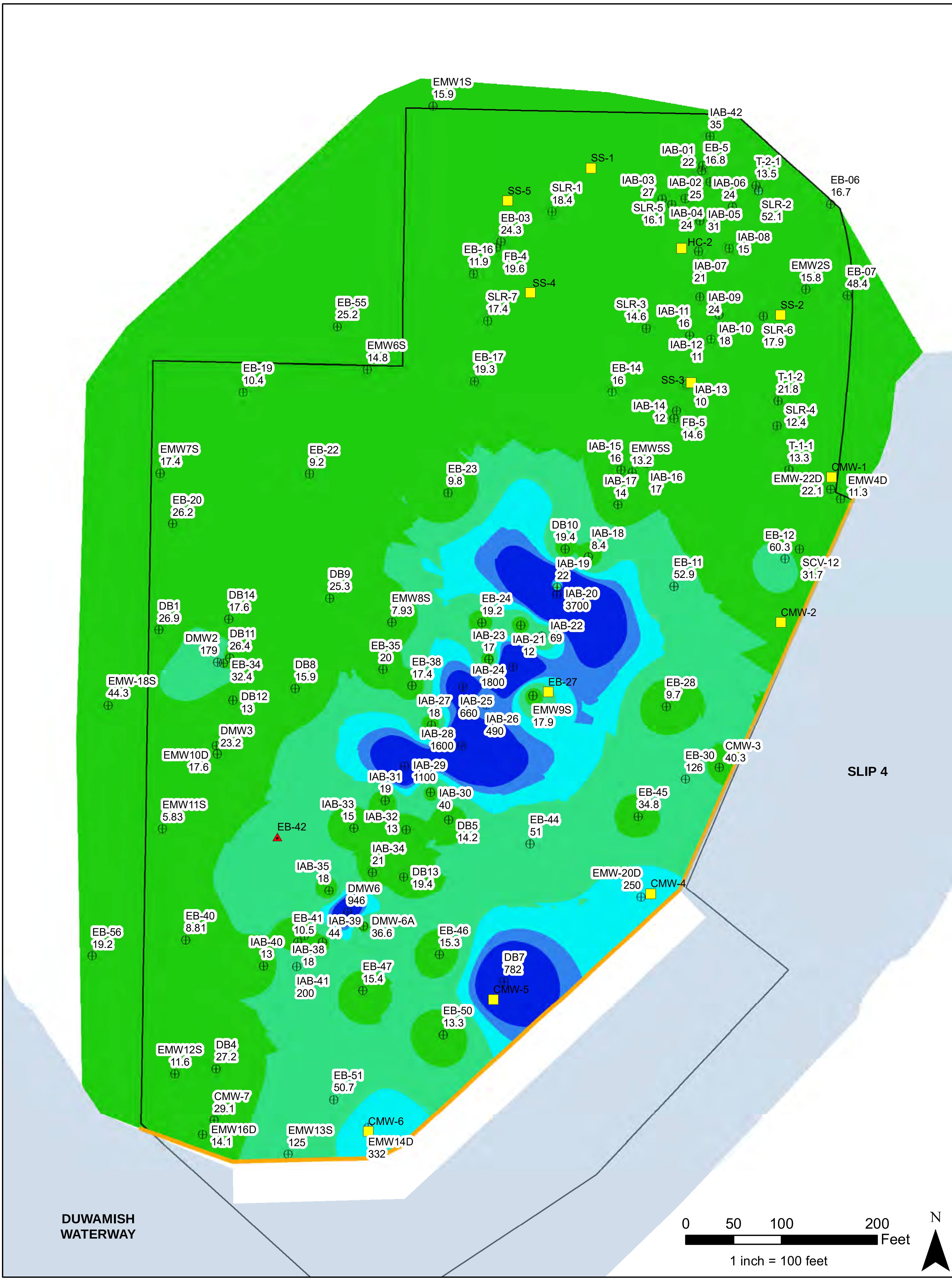
Document Path: N:\Bothell\Apps\GIS\Crowley - 205 00037\MXD\F24_S_Cp_6.mxd



LEGEND

- ▲ The deepest sample from this location was collected at a depth less than 6 feet bgs, and contained a concentration above the screening level
- ■ The deepest sample from this location was collected at a depth less than 6 feet bgs, and contained a concentration below the screening level
- Sheet Pile Seawall
- Property Boundary
- ⊕ Investigation Location

Copper (mg/kg)

- < 50
- 50 - 200
- 200 - 400
- 400 - 550
- > 550 (screening level)

8TH AVENUE TERMINALS, INC. SITE
7400 8TH AVENUE SOUTH
SEATTLE, WASHINGTON

Figure
MAXIMUM CONCENTRATIONS OF COPPER IN SOIL SAMPLES COLLECTED BETWEEN 6 AND 12 FEET BGS

Project No.	Figure No.
101.00205.00037	25

SLR

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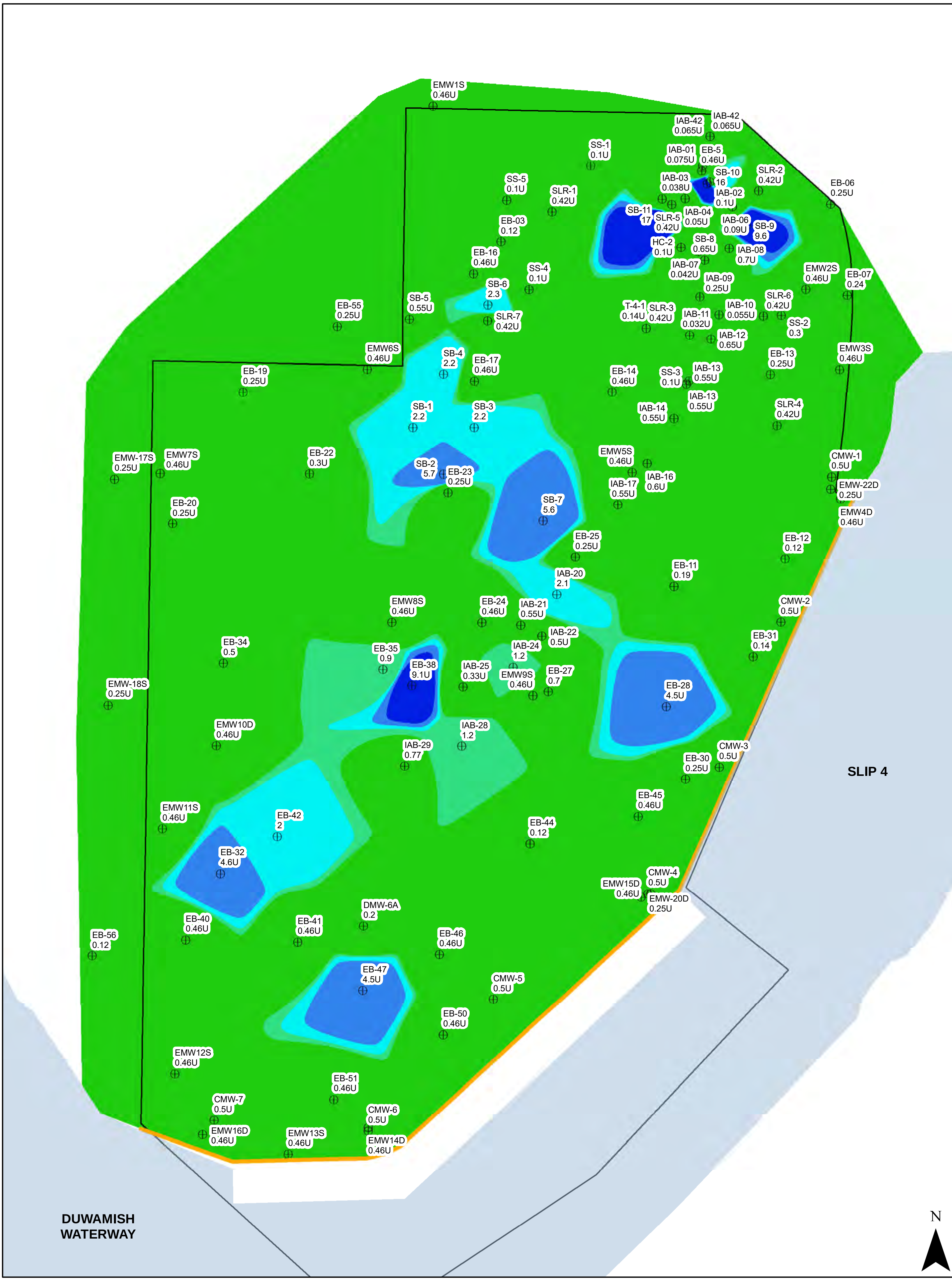
Document Path: N:\Bothell\Apps\GIS\Crowley - 205 00037\MXD\F25_S_Cp_12.mxd



LEGEND

- Sheet Pile Seawall
- Property Boundary
- Investigation Location

Selenium (mg/kg)

- <0.8 (screening level)
- 0.8 - 1.6 (2x)
- 1.6 - 4.0 (5x)
- 4.0 - 8.0 (10x)
- > 8.0

U = 1/2 of the highest method reporting limit at each location was used for contouring.

0 50 100 200 Feet

1 inch = 100 feet

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Figure

MAXIMUM CONCENTRATIONS OF SELENIUM IN SOIL SAMPLES COLLECTED BETWEEN 0 AND 6 FEET BGS

Project No. 101.00205.00037

Figure No. 30

SLR
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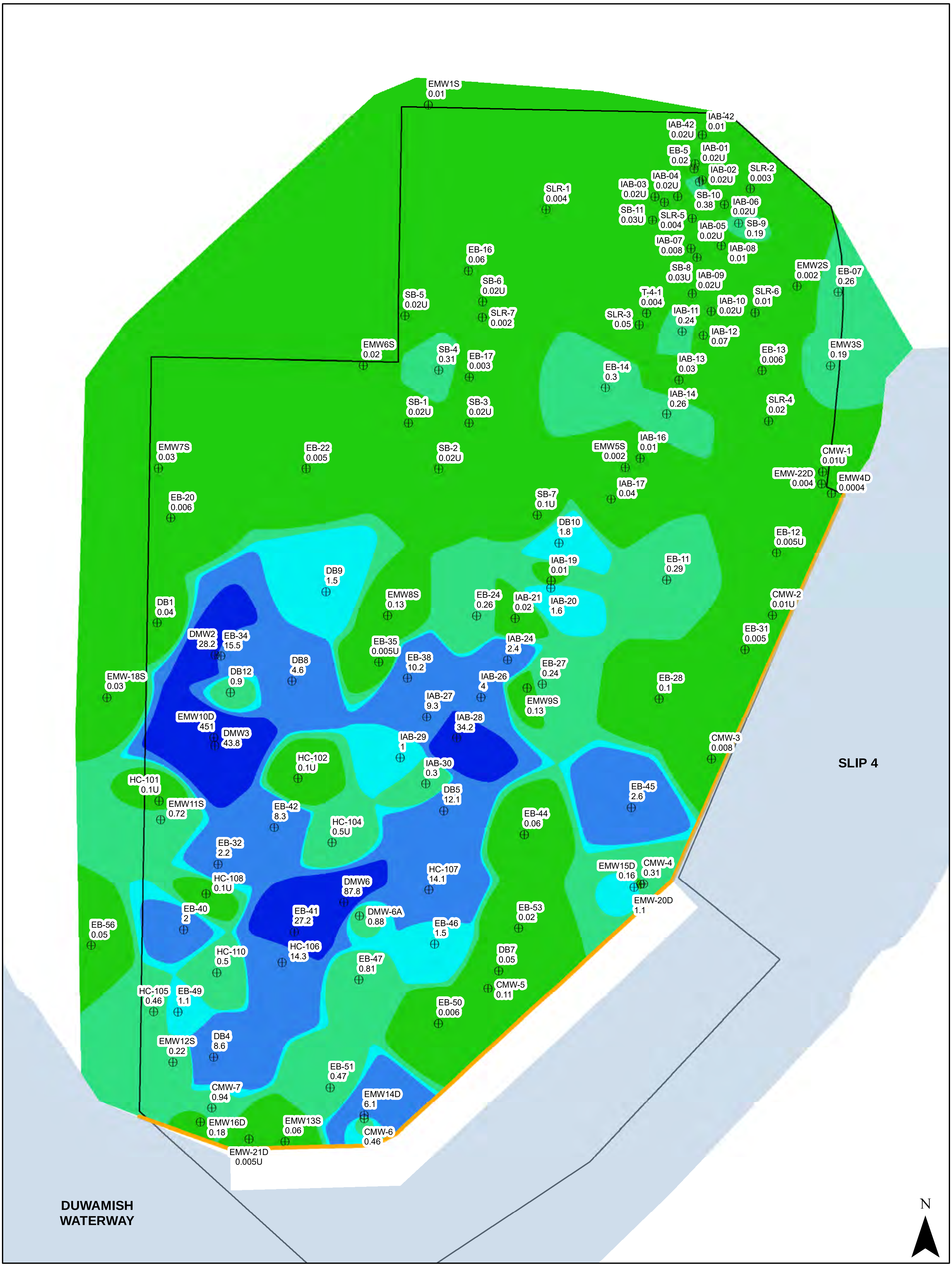

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LEGEND

Sheet Pile Seawall

Property Boundary

⊕ Investigation Location

Total cPAH TEQ (mg/kg)

- < 0.19 (screening level)
- 0.19 - 0.95 (5x)
- 0.95 - 1.9 (10x)
- 1.9 - 19 (100x)
- > 19

U = For a non-detect value, 1/2 of the highest method reporting limit at each location was used for contouring.

0 50 100 200 Feet

1 inch = 100 feet

8TH AVENUE TERMINALS, INC. SITE
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SEATTLE, WASHINGTON

Figure
MAXIMUM CONCENTRATIONS OF TOTAL cPAHs TEQ IN SOIL SAMPLES COLLECTED BETWEEN 0 AND 6 FEET BGS

Project No. 101.00205.00037

Figure No. 36

SLR
22118 20TH AVE SE
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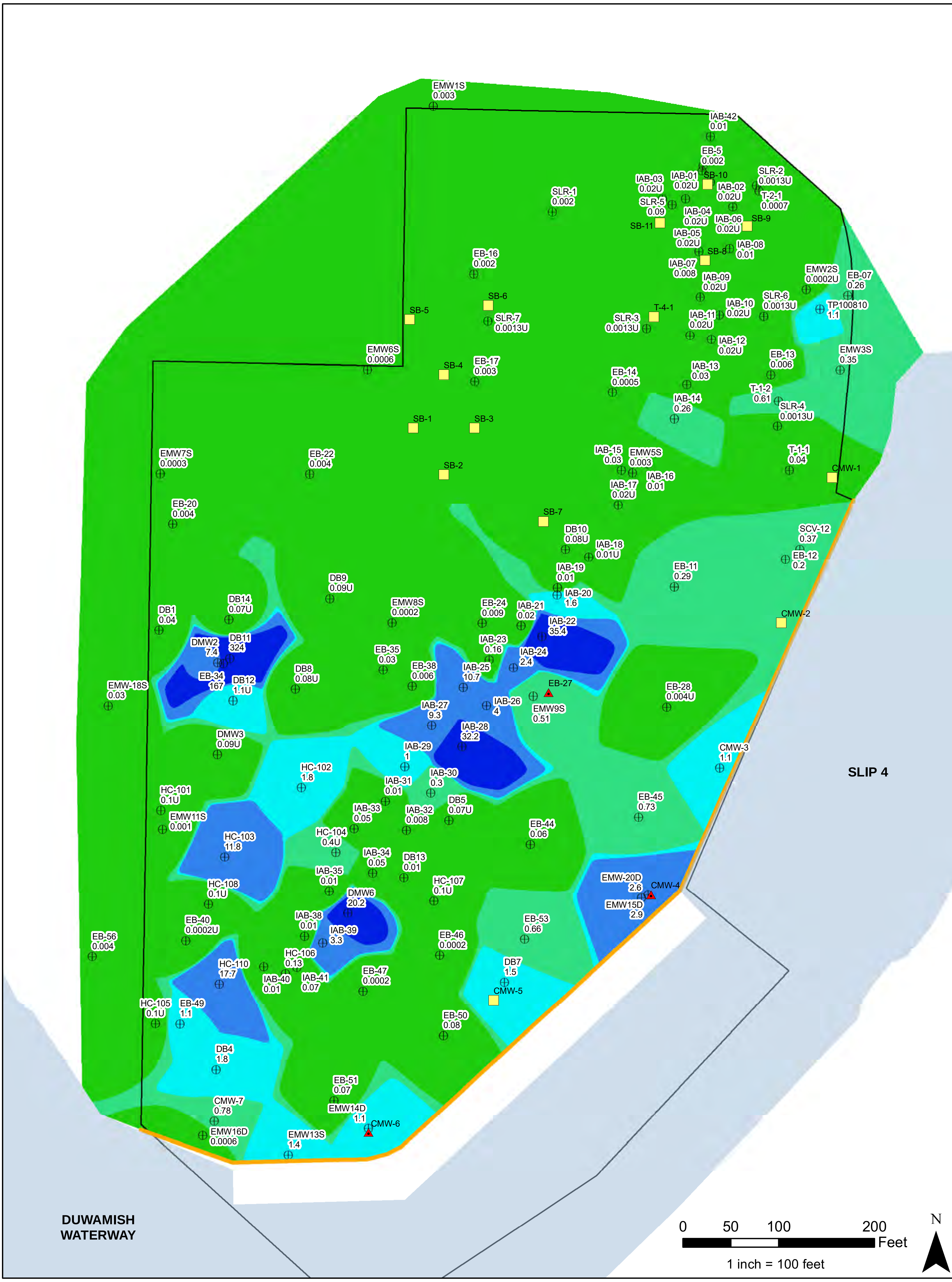

LEGEND

▲ The deepest sample from this location was collected at a depth less than 12 feet bgs, and contained a concentration above the screening level

■ The deepest sample from this location was collected at a depth less than 12 feet bgs, and contained a concentration below the screening level

Sheet Pile Seawall

Property Boundary

Investigation Location

Total cPAH TEQ (mg/kg)

- < 0.19 (SL)
- 0.19 - 0.95 (5x)
- 0.95 - 1.9 (10x)
- 1.9 - 19 (100x)
- > 19

U = For a non-detect value, 1/2 of the highest method reporting limit at each location was used for contouring.

8TH AVENUE TERMINALS, INC. SITE
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SEATTLE, WASHINGTON

Figure

MAXIMUM CONCENTRATIONS OF TOTAL cPAHs TEQ IN SOIL SAMPLES COLLECTED BETWEEN 6 AND 12 FEET BGS

Project No.	Figure No.
101.00205.00037	37

SLR
22118 20TH AVE SE
BLDG. G, SUITE 202
BOTHELL, WA 98021
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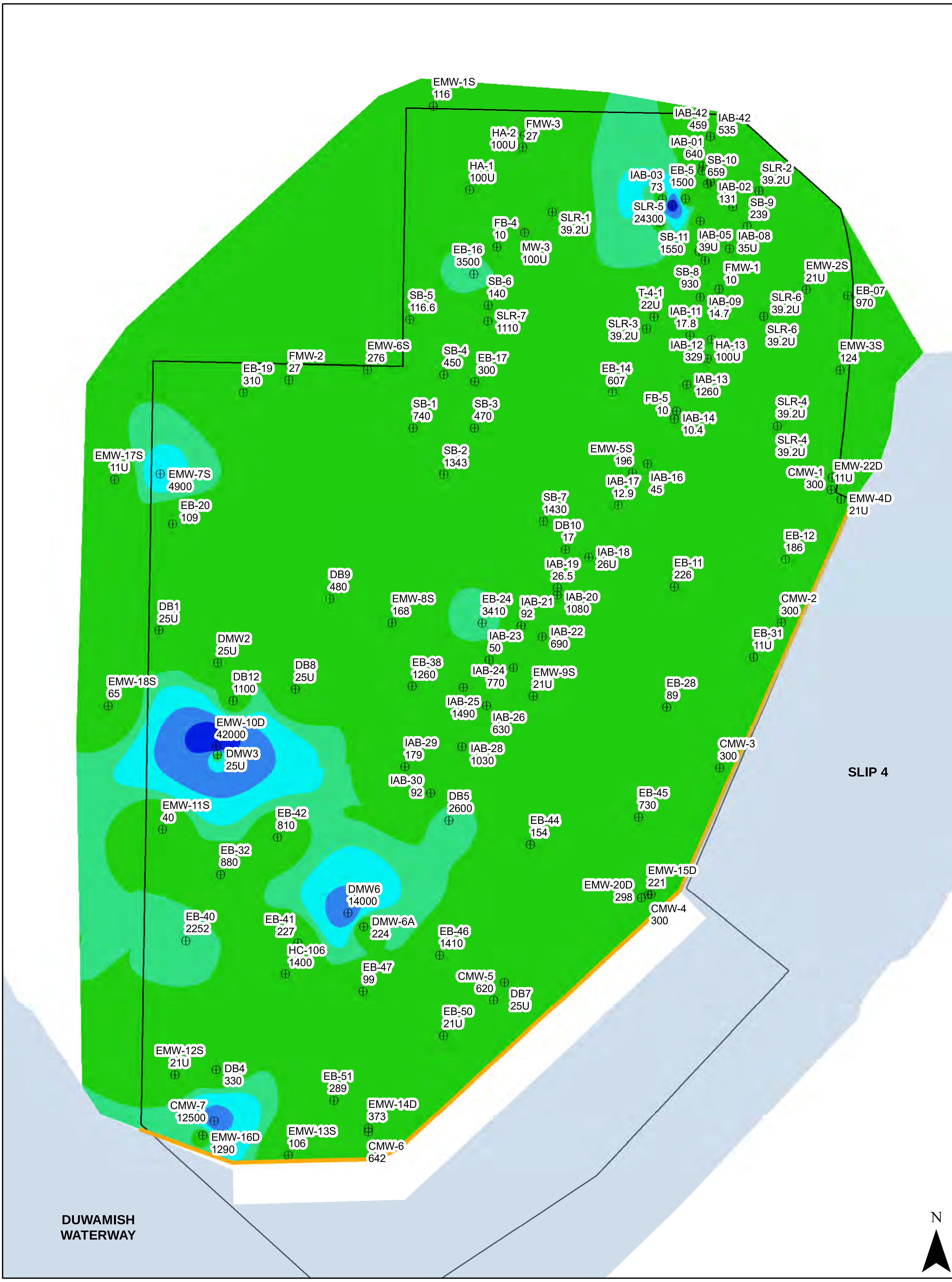

LEGEND

SHEET PILE SEAWALL

PROPERTY BOUNDARY

⊕ INVESTIGATION LOCATION

Total Semi-volatile Petroleum Hydrocarbons (DRO + ORO) (mg/kg)

- < 2,000 (screening level)
- 2,000 - 4,000 (2x)
- 4,000 - 10,000 (5x)
- 10,000 - 20,000 (10x)
- > 20,000

U = For a non-detect value, 1/2 of the highest method reporting limit at each location was used for contouring.

0 50 100 200 Feet

1 inch = 100 feet

8TH AVENUE TERMINALS, INC. SITE
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Figure MAXIMUM CONCENTRATIONS OF TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS (DRO + ORO) IN SOIL SAMPLES COLLECTED BETWEEN 0 AND 6 FEET BGS

Project No. 101.00205.00037

Figure No. 45

SLR
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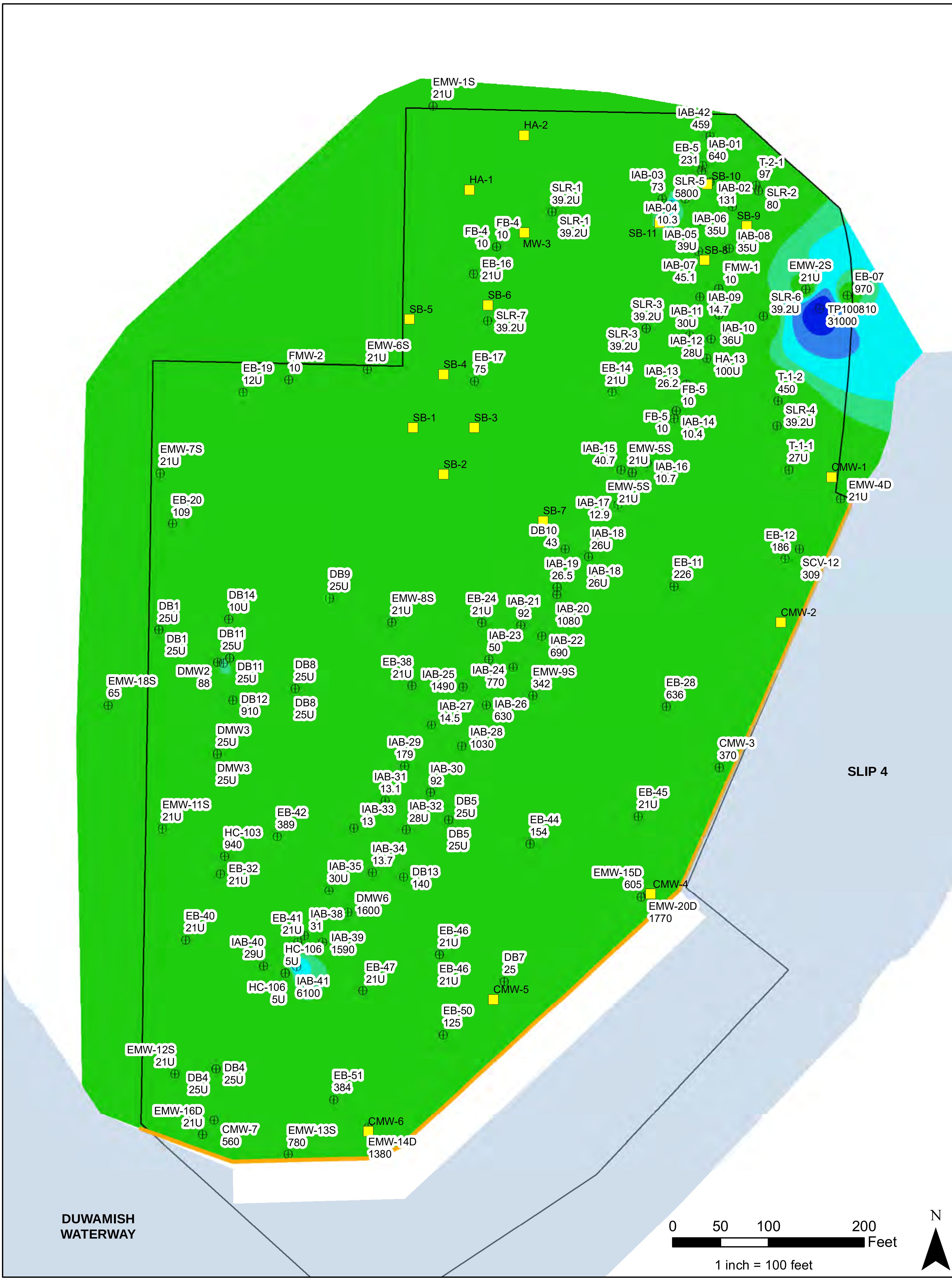
Document Path: N:\Bothell\Apps\GIS\Crowley - 205 00037\MXD\F45_S_DRO_6.mxd



LEGEND

- The deepest sample from this location was collected at a depth less than 6 feet bgs, and contained a concentration below the screening level
- Sheet Pile Seawall
- Property Boundary
- ⊕ Investigation Location

Total Semi-volatile Petroleum Hydrocarbons (DRO + ORO) (mg/kg)

- < 2,000 (screening level)
- 2,000 - 4,000 (2x)
- 4,000 - 10,000 (5x)
- 10,000 - 20,000 (10x)
- > 20,000

U = For a non-detect value, 1/2 of the highest method reporting limit at each location was used for contouring.

8TH AVENUE TERMINALS, INC. SITE
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SEATTLE, WASHINGTON

Figure

MAXIMUM CONCENTRATIONS OF TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS (DRO + ORO) IN SOIL SAMPLES COLLECTED BETWEEN 6 AND 12 FEET BGS

Project No.	Figure No.
101.00205.00037	46

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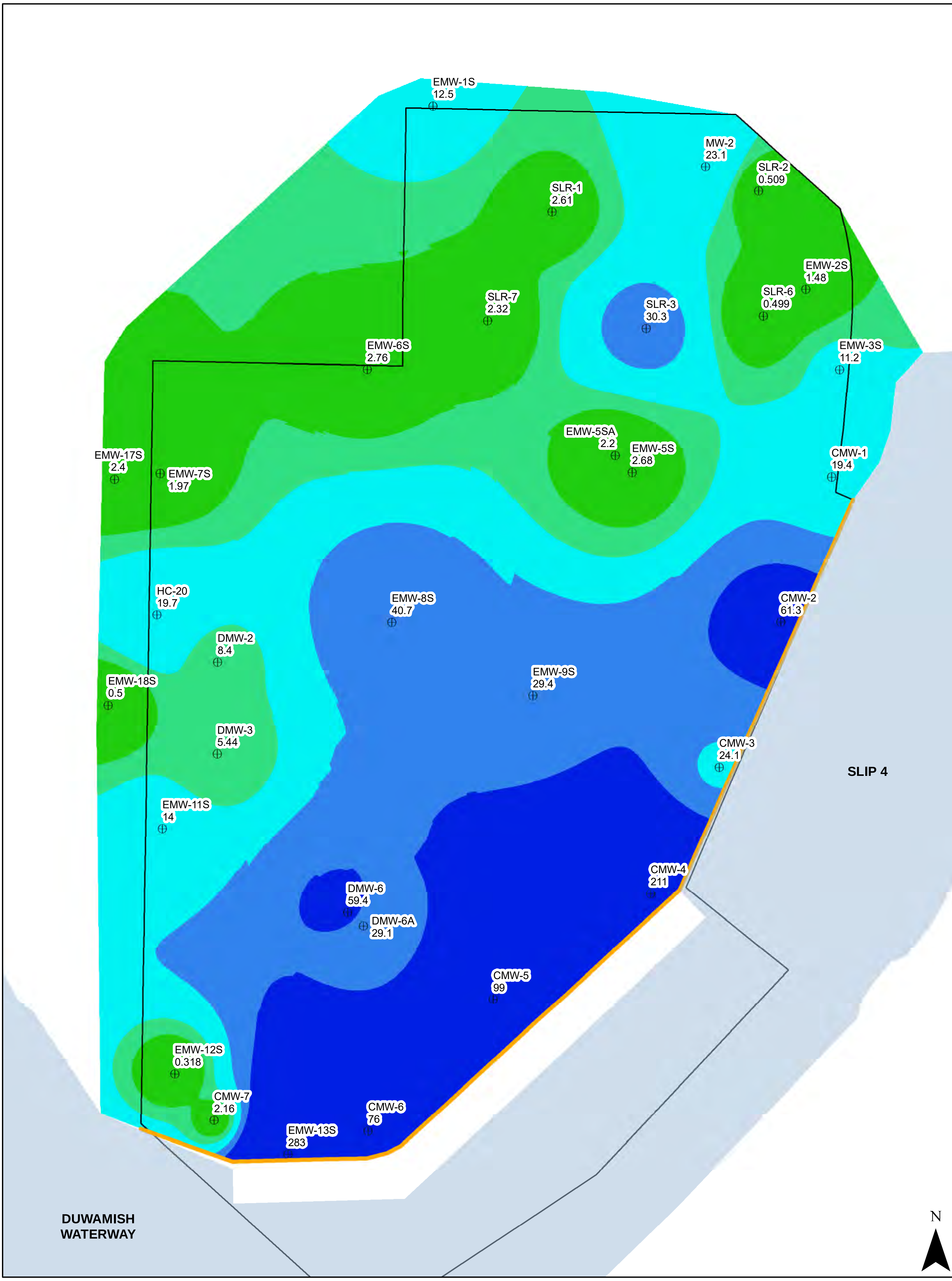
Document Path: N:\Bothell\Apps\GIS\Crowley - 205 00037\MXD\F46_S_DRO_12.mxd



Document Path: N:\Bothell\Apps\GIS\Crowley - 205 00037\MXD\F51_D_Ar_S.mxd

LEGEND

- SHEET PILE SEAWALL
- PROPERTY BOUNDARY
- ⊕ SHALLOW MONITORING WELL LOCATION

DISSOLVED ARSENIC (µg/L)

- < 5 (screening level)
- 5 - 10 (2x)
- 10 - 25 (5x)
- 25 - 50 (10x)
- > 50

0 50 100 200
Feet

1 inch = 100 feet

8TH AVENUE TERMINALS, INC. SITE
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SEATTLE, WASHINGTON

Figure
MAXIMUM CONCENTRATIONS OF DISSOLVED ARSENIC IN RI GROUNDWATER SAMPLES FROM SHALLOW MONITORING WELLS

Project No. 101.00205.00037

Figure No. 51

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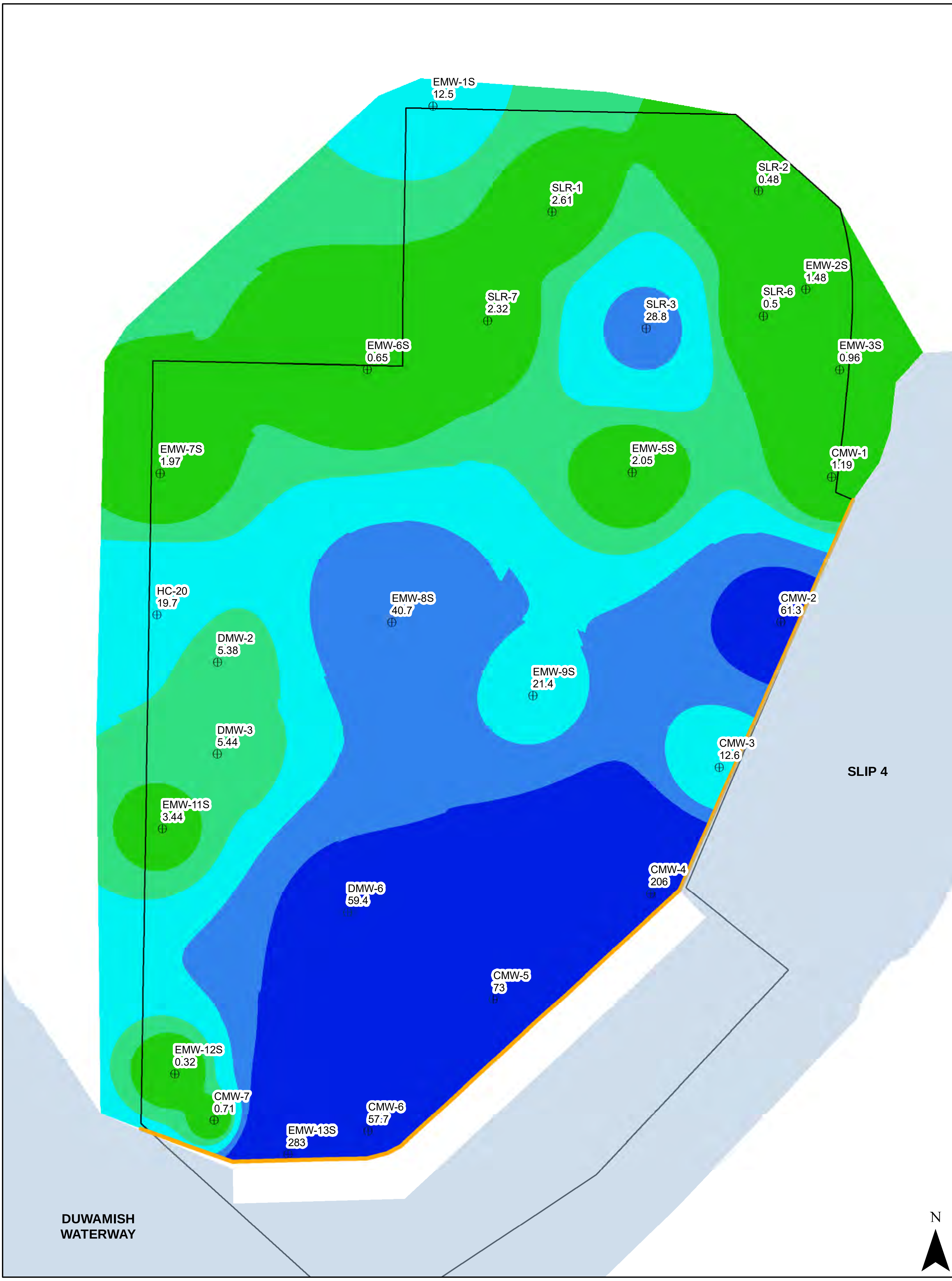

LEGEND

SHEET PILE SEAWALL

PROPERTY BOUNDARY

⊕ SHALLOW MONITORING WELL LOCATION

DISSOLVED ARSENIC * (µg/L)

< 5 (screening level)

5 - 10 (2x)

10 - 25 (5x)

25-50 (10x)

> 50

* Analysis performed via inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS).

0 50 100 200 Feet

1 inch = 100 feet

8TH AVENUE TERMINALS, INC. SITE
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SEATTLE, WASHINGTON

Figure DISSOLVED ARSENIC CONCENTRATIONS IN RI GROUNDWATER SAMPLES FROM SHALLOW MONITORING WELLS - SEPTEMBER AND OCTOBER 2013

Project No. 101.00205.00037

Figure No. 53

SLR
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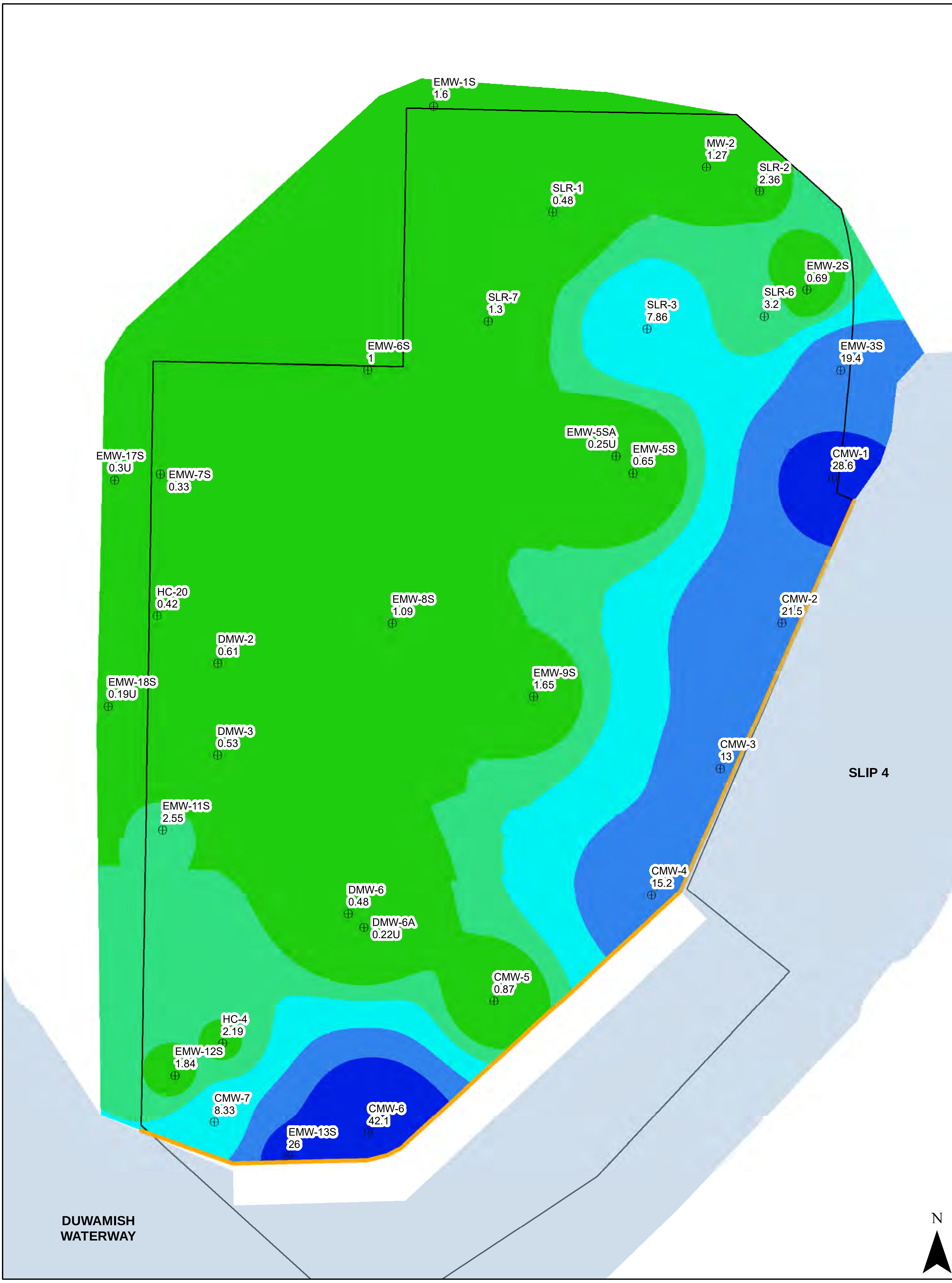


LEGEND

SHEET PILE SEAWALL

PROPERTY BOUNDARY

SHALLOW MONITORING WELL LOCATION

Dissolved Copper (µg/L)

< 2.4 (screening level)

2.4 - 4.8 (2x)

4.8 - 12 (5x)

12 - 24 (10x)

> 24

U = Dissolved copper was not detected in any of the groundwater samples; 1/2 of the lowest method reporting limit was used for contouring.

0 50 100 200 Feet

1 inch = 100 feet

8TH AVENUE TERMINALS, INC. SITE
7400 8TH AVENUE SOUTH
SEATTLE, WASHINGTON

Figure

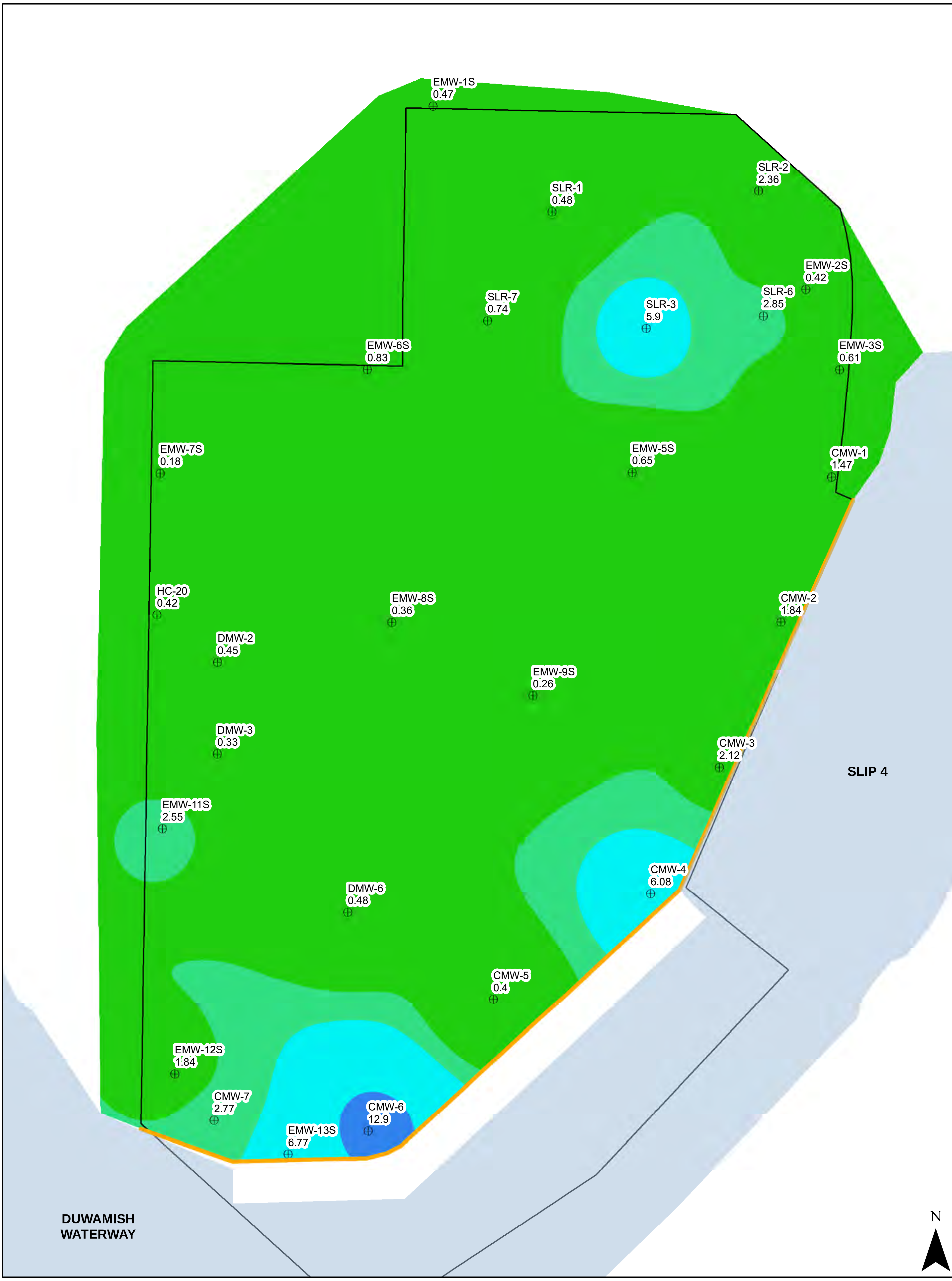
MAXIMUM CONCENTRATIONS OF DISSOLVED COPPER IN RI GROUNDWATER SAMPLES FROM SHALLOW MONITORING WELLS

Project No. 101.00205.00037

Figure No. 56

SLR
22118 20TH AVE SE
BLDG. G, SUITE 202
BOTHELL, WA 98021
T: 425-402-8800

Document Path: N:\Bothell\Apps\GIS\Crowley - 205 00037\MXD\F56_D_Cp_S.mxd



Document Path: N:\Bothell\Apps\GIS\Crowley - 205 00037\MXD\F57_D_Cp_ICP_S.mxd

LEGEND

SHEET PILE SEAWALL

PROPERTY BOUNDARY

⊕ SHALLOW GROUNDWATER MONITORING WELL LOCATION

Dissolved Copper* (μg/L)

- < 2.4 (screening level)
- 2.4 - 4.8 (2x)
- 4.8 - 12 (5x)
- 12 - 24 (10x)
- > 24

* Analysis performed via inductively coupled plasma reaction cell mass spectrometry (ICP-DRC-MS).

0 50 100 200 Feet

1 inch = 100 feet

8TH AVENUE TERMINALS, INC. SITE
7400 8TH AVENUE SOUTH
SEATTLE, WASHINGTON

Figure DISSOLVED COPPER CONCENTRATIONS IN RI GROUNDWATER SAMPLES FROM SHALLOW MONITORING WELLS - SEPTEMBER AND OCTOBER 2013

Project No. 101.00205.00037

Figure No. 57

SLR
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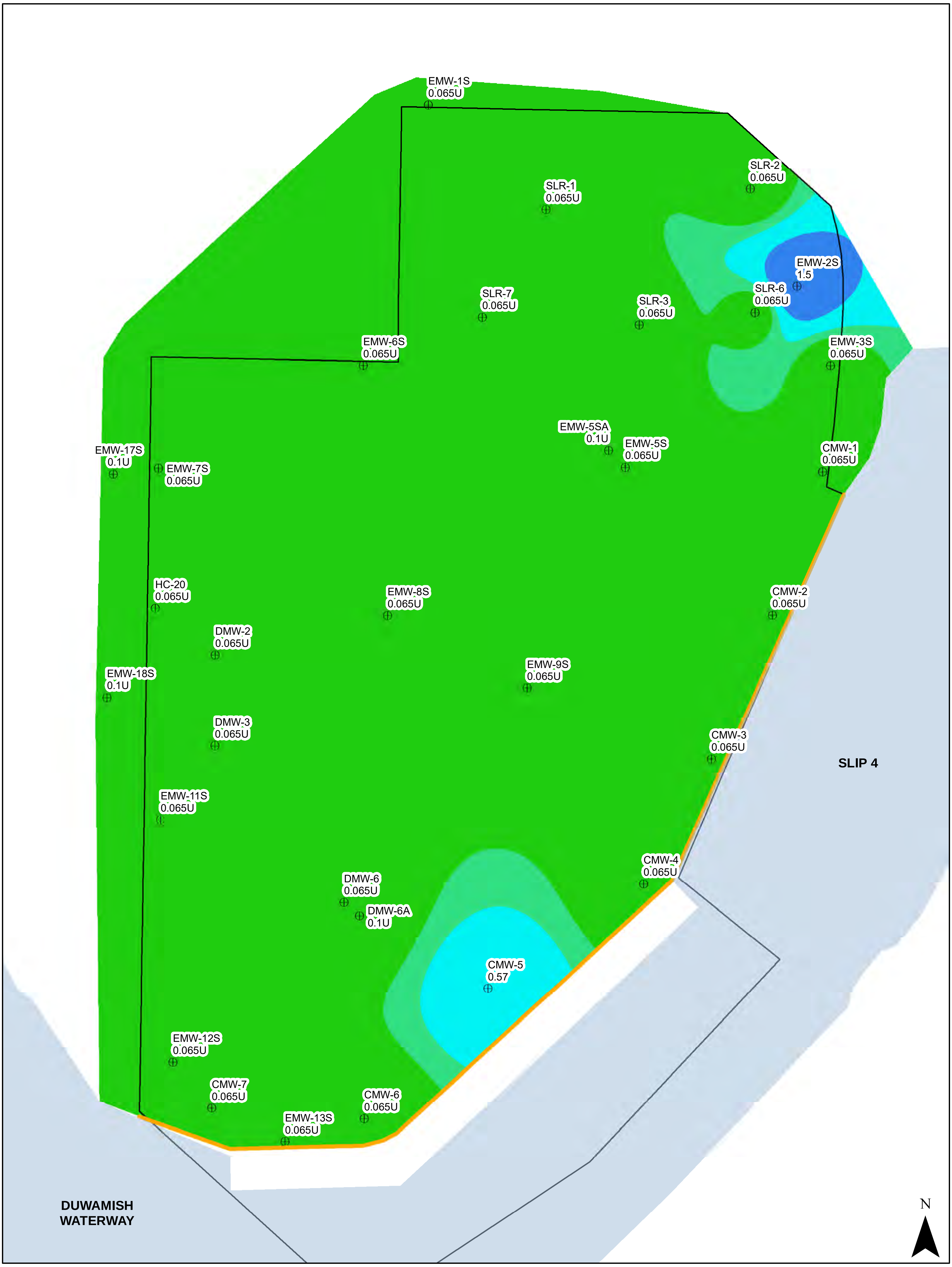


Document Path: N:\Bothell\Apps\GIS\Crowley - 205 00037\MXD\F61_VC_S.mxd

LEGEND

SHEET PILE SEAWALL

PROPERTY BOUNDARY

⊕ SHALLOW GROUNDWATER MONITORING WELL LOCATION

Vinyl Chloride (µg/L)

- < 0.18 (screening level)
- 0.18 - 0.36 (2x)
- 0.36 - 0.90 (5x)
- 0.90 - 1.80 (10x)
- > 1.80

U = Vinyl chloride was not detected in any of the groundwater samples; 1/2 of the lowest method reporting limit was used for contouring.

0 50 100 200
Feet

1 inch = 100 feet

8TH AVENUE TERMINALS, INC. SITE
7400 8TH AVENUE SOUTH
SEATTLE, WASHINGTON

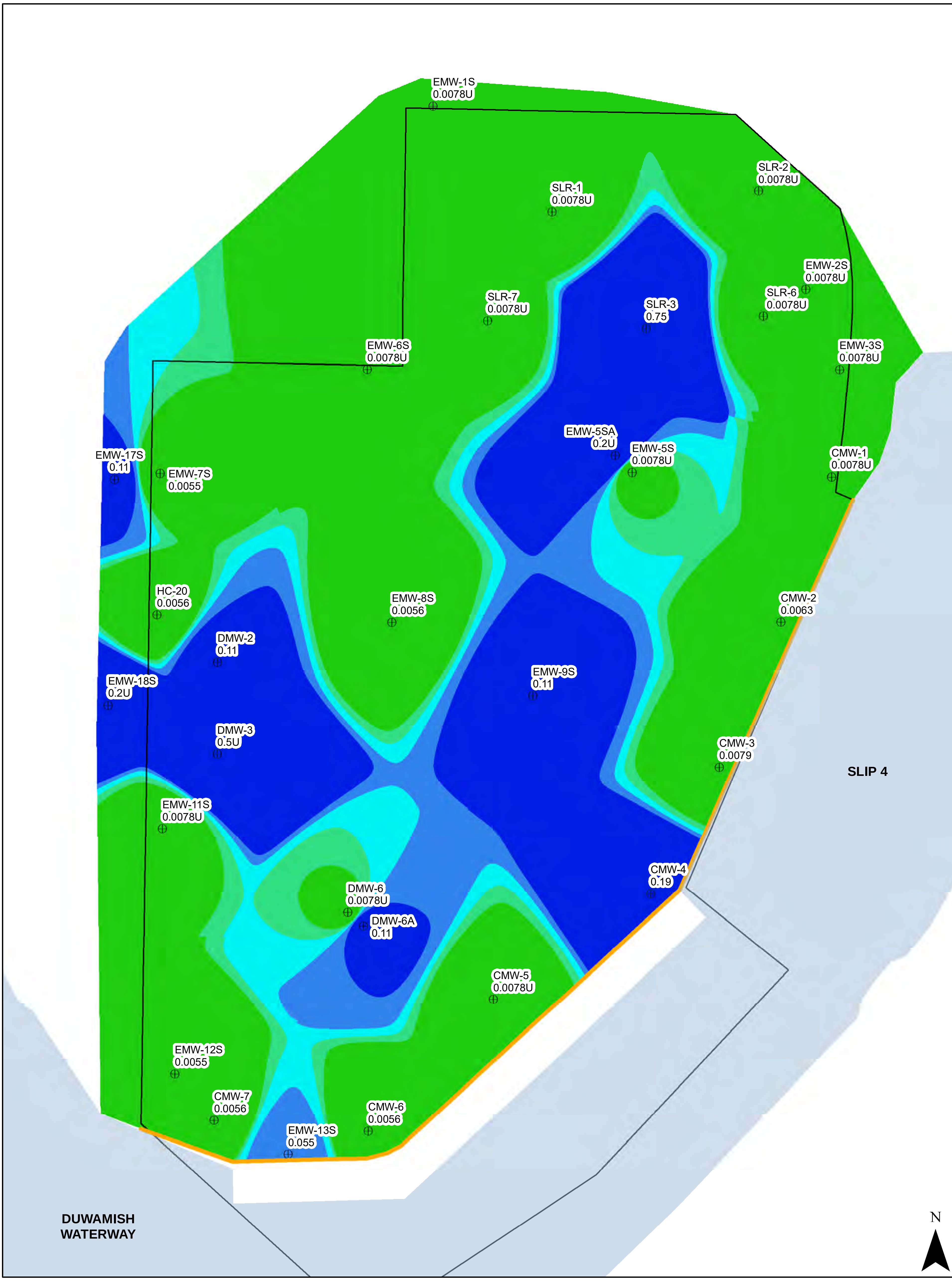
Figure

MAXIMUM CONCENTRATIONS OF VINYL CHLORIDE IN RI GROUNDWATER SAMPLES FROM SHALLOW MONITORING WELLS

Project No. 101.00205.00037

Figure No. 61

SLR
22118 20TH AVE SE
BLDG. G, SUITE 202
BOTHELL, WA 98021
T: 425-402-8800



LEGEND

SHEET PILE SEAWALL

PROPERTY BOUNDARY

⊕ SHALLOW GROUNDWATER MONITORING WELL LOCATION

Total cPAHs TEQ (µg/L)

- < 0.01 (screening level)
- 0.01 - 0.02 (2x)
- 0.02 - 0.05 (5x)
- 0.05 - 0.1 (10x)
- > 0.10

For a non-detect cPAH value, 1/2 of the method detection limit was used to calculate the total cPAH TEQ concentration.

0 50 100 200 Feet

1 inch = 100 feet

8TH AVENUE TERMINALS, INC. SITE
7400 8TH AVENUE SOUTH
SEATTLE, WASHINGTON

Figure

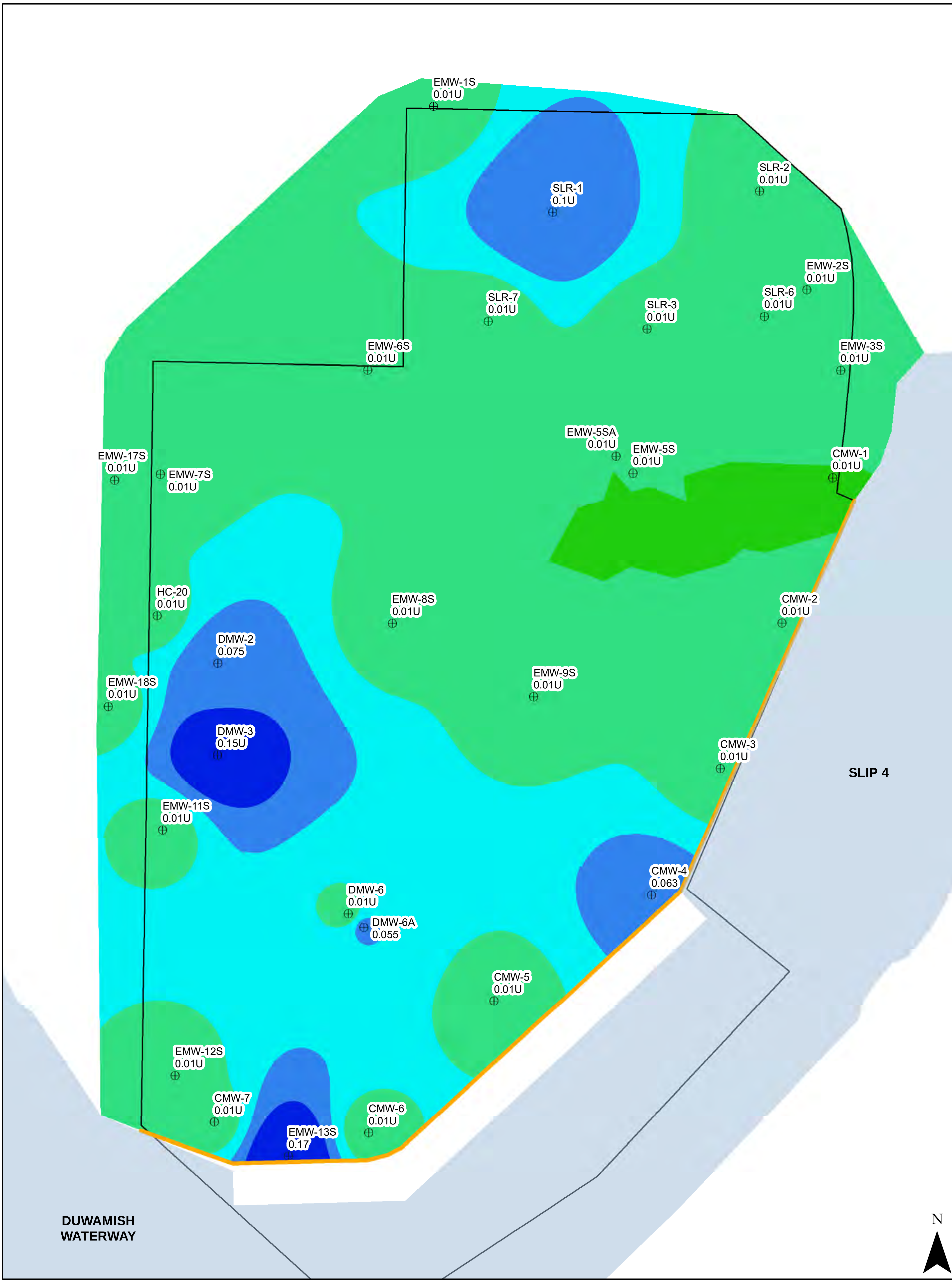
MAXIMUM CONCENTRATIONS OF TOTAL cPAHs TEQ IN RI GROUNDWATER SAMPLES FROM SHALLOW MONITORING WELLS

Project No. 101.00205.00037

Figure No. 64

SLR
22118 20TH AVE SE
BLDG. G, SUITE 202
BOTHELL, WA 98021
T: 425-402-8800

Document Path: N:\Bothell\Apps\GIS\Crowley - 205 00037\MXD\F64_cPAH_S.mxd



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LEGEND

SHEET PILE SEAWALL

PROPERTY BOUNDARY

⊕ SHALLOW GROUNDWATER MONITORING WELL LOCATION

Total PCBs (µg/L)

- <0.01 (screening level)
- 0.01 - 0.02 (2x)
- 0.02 - 0.05 (5x)
- 0.05 - 0.10 (10x)
- > 0.10

For a non-detect PCB value, 1/2 of the method detection limit was used to calculate the total PCB concentration.

0 50 100 200 Feet

1 inch = 100 feet

8TH AVENUE TERMINALS, INC. SITE
7400 8TH AVENUE SOUTH
SEATTLE, WASHINGTON

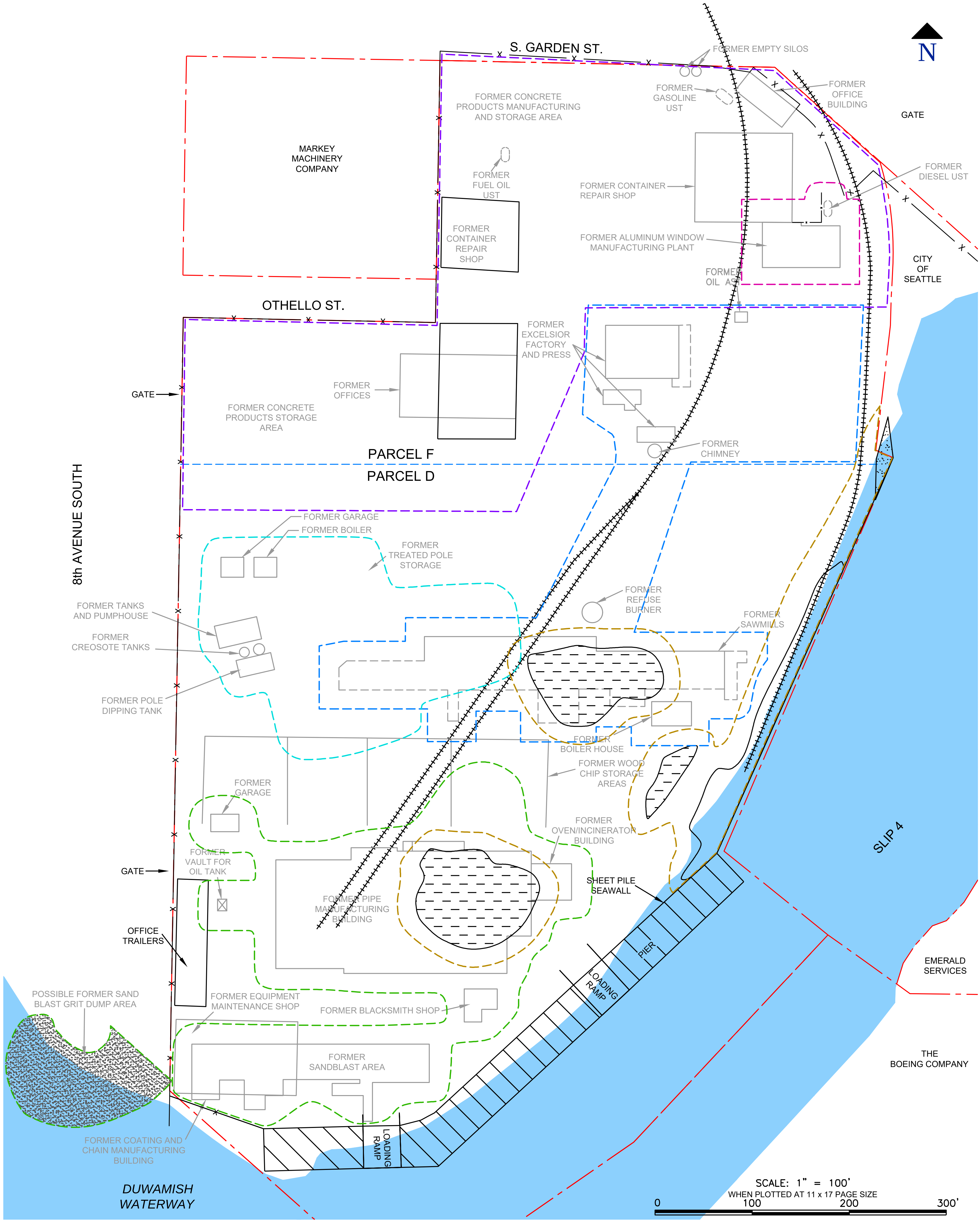
Figure

MAXIMUM CONCENTRATIONS OF TOTAL PCBs IN RI GROUNDWATER SAMPLES FROM SHALLOW MONITORING WELLS

Project No. 101.00205.00037

Figure No. 67

SLR
22118 20TH AVE SE
BLDG. G, SUITE 202
BOTHELL, WA 98021
T: 425-402-8800



NOTES
1. DRAWING COMPILED FROM TRIAD ASSOCIATES, KIRKLAND, WA. SURVEY PLAN, DRAWING 06133-CC052908.DWG
2. LOCATIONS OF HISTORIC OPERATIONS FROM HART CROWSER (1991), SEACOR (1994), AND AERIAL PHOTOGRAPHS.

LEGEND

PARCEL D/PARCEL F BOUNDARY

PROPERTY BOUNDARIES

FENCE

SHEET PILE SEAWALL

APPROX. LOCATION OF DREDGE FILL AREA

APPROX. LOCATION OF SAND AND DREDGE FILL AREA

POTENTIAL SOURCE AREA ASSOCIATED WITH FORMER WOOD TREATING OPERATIONS

POTENTIAL SOURCE AREA ASSOCIATED WITH DREDGE FILL

POTENTIAL SOURCE AREA ASSOCIATED WITH FORMER SAWMILL AND EXCELSIOR FACTORY AND PRESS OPERATIONS

POTENTIAL SOURCE AREA ASSOCIATED WITH FORMER ALUMINUM WINDOW MANUFACTURING PLANT

POTENTIAL SOURCE AREA ASSOCIATED WITH FORMER PIPE AND CHAIN MANUFACTURING OPERATIONS

POTENTIAL SOURCE AREA ASSOCIATED WITH FORMER CONCRETE PRODUCTS MANUFACTURING AND STORAGE OPERATIONS

8TH AVENUE TERMINALS, INC. SITE
7400 8TH AVENUE SOUTH
SEATTLE, WASHINGTON

Drawing LOCATIONS OF POTENTIAL CONTAMINANT SOURCE AREAS

Date August 2, 2019	Scale AS SHOWN	Fig. No. 78
File Name 01-78	Project No. 101.00205.00037	

SLR
22118 20th AVE SE
BLDG. G, SUITE 202
BOTHELL, WA 98021
T: 425-402-8800
F: 425-402-8488

N:\Bothell\1 PROJECTS\Crowley - 205\00037 Prepare Final RI Report\Figures\01-78.dwg

Cleanup Site Details

Cleanup Site ID: 5109

Cleanup Site ID: 5109 **Facility/Site ID:** 2462 **UST ID:** 6485 [Site Page] [Site Documents] [View Map]

Cleanup Site Name: Evergreen Marine Leasing Parcel E [Glossary]

Alternate Names: Cedar Grove Compost Seattle, Crowley Maritime, EVERGREEN MARINE LEASING, EVERGREEN MARINE LEASING PARCEL E, Seattle Terminal Parcel E, SEGALE ASPHALT SITE FORMER

LOCATION

Address: 7343 E MARGINAL WAY S **City:** SEATTLE **Zip Code:** 98108 **County:** King

Latitude: 47.53642 **Longitude:** -122.31795 **WRIA:** 9 **Legislative District:** 11 **Congressional District:** 9 **TRS:** 24N 4E 29

DETAIL

Status: No Further Action
NFA Received? Yes
Is PSI site? No
Statute: MTCA
NFA Date: 10/21/1997
Current VCP? No **Past VCP?** No
Site Rank: N/A
NFA Reason: Independent Remedial Action Program Review
Brownfield? No
Site Manager: Forson, Ben
Responsible Unit: Northwest
Active Institutional Control? Yes

CLEANUP UNITS

Cleanup Unit Name	Unit Type	Unit Status	Resp Unit	Unit Manager	Current Process
EVERGREEN MARINE LEASING	Upland	No Further Action Required	NW	Forson, Ben	IRAP

ACTIVE INSTITUTIONAL CONTROLS

Instrument Type	Restriction Media	Restrictions/Requirements	Date	Recording Number	Recording County	Tax Parcel
Environmental Covenant	Soil	Restrict Land Use, Prohibit Soil Disturbance, Prevent the Reuse or Relocation of Site Soil, Ongoing Maintenance of Remedy	11/25/1997	9725112184	King	292404-9043-05

Institutional Control documents may be available under the 'Site Documents' link at the top of the page. For more details on Institutional Controls, please see the **Environmental Covenants Registry List**.

AFFECTED MEDIA & CONTAMINANTS

	MEDIA					
Contaminant	**Soil**	**Groundwater**	**Surface Water**	**Sediment**	**Air**	**Bedrock**
Base/Neutral/Acid Organics		C				
Metals - Other	C	C				
Metals Priority Pollutants	C	C				
Petroleum-Other	C	C				
Phenolic Compounds	C					
Polycyclic Aromatic Hydrocarbons	C	C				

Key:
B - Below Cleanup Level
S - Suspected
C - Confirmed Above Cleanup Level
R - Remediated
RA - Remediated-Above
RB - Remediated-Below

SITE ACTIVITIES

Activity	Status	Start Date	End Date/ Completion Date
LUST - Notification	Completed		8/29/1990
LUST - Report Received	Completed		10/22/1991
Site Discovery/Release Report Received	Completed		1/22/1993

SITE ACTIVITIES

Activity	Status	Start Date	End Date/ Completion Date
Independent Report Review - Paid	Completed	12/2/1993	2/22/1994
Initial Investigation / Federal Preliminary Assessment	Completed		1/12/1994
Early Notice Letter(s)	Completed		3/16/1994
Site Status Changed to NFA	Completed		10/21/1997
LUST - Report Received	Completed		3/9/1998
LUST - Report Received	Completed		3/9/1998

RECEIVED
OCT 24 1997
MARTEN & BROWN LLP

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office, 3190 - 160th Ave S.E. • Bellevue, Washington 98008-5452 • (206) 649-7000

October 21, 1997

WEBSTER STREET

Ms. Robin K. Rock
MARTEN & BROWN, LLP
1191 Second Avenue, Suite 2200
Seattle, Washington 98101

RE: Request for No Further Action Determination
Former Evergreen Marine Leasing Property – Parcel E
7343 East Marginal Way, Seattle, Washington

Dear Ms. Rock:

Enclosed are a "No Further Action" (NFA) letter and a Restrictive Covenant for the above-referenced facility.

Please note that the NFA determination is contingent upon filing the Restrictive Covenant, with a legal description of the property attached, with the auditor's office in King County.

If you have any questions, please contact me at (425) 649-7099.

Sincerely,

Ben Amoah-Forson
Toxics Cleanup Program

RESTRICTIVE COVENANT

FIRST SOUTH PROPERTIES LLC
Former Evergreen Marine Leasing Property
At 7343 East Marginal Way, Seattle, Washington

This Declaration of Restrictive Covenant is made pursuant to RCW 70.105D.030(1)(f) and (g) and WAC 173-340-440 by FIRST SOUTH PROPERTIES LLC, its successors and assigns, and the State of Washington Department of Ecology, its successors and assigns (hereafter "Ecology").

An independent remedial action (hereafter "Remedial Action") occurred at the property that is the subject of this Restrictive Covenant. The Remedial Action conducted at the property is described in the following documents:

* Underground Tank Removal and Groundwater/Soil Quality report - Parcel E, dated October 22, 1991,and prepared by HartCrowser.

* Additional Independent Remedial Action report Former Evergreen Marine Leasing Property - Parcel E, Seattle, Washington, dated July 17, 1996,and prepared by Hart Crowser,

These documents are on file at Ecology's Northwest Regional Office.

This Restrictive Covenant is required because the Remedial Action resulted in residual concentrations of total petroleum hydrocarbons as diesel (TPH-D) which exceed the Model Toxics Control Act Method A Industrial Cleanup Level for soil established under WAC 173-340-740

The undersigned, FIRST SOUTH PROPERTIES LLC, is the fee owner of real property (hereafter "Property") in the County of King, State of Washington, that is subject to this Restrictive Covenant. The Property is legally described in Attachment A of this Restrictive Covenant and made a part hereof by reference

FIRST SOUTH PROPERTIES LLC makes the following declaration as to limitations, restrictions, and uses to which the Property may be put and specifies that such declarations shall constitute covenants to run with the land, as provided by law and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in the Property (hereafter "Owner").

Section 1. The Property shall be used only for traditional industrial uses, as described in RCW 70.105D.020(23) and defined in and allowed under the County of King's zoning regulations codified in the King County Zoning Regulation as of the date of."

Section 2. Any activity on the Property that may interfere with the integrity of the Remedial Action and continued protection of human health and the environment is prohibited.

Section 3. Any activity on the Property that may result in the release or exposure to the environment of a hazardous substance that remains on the Property as part of the Remedial Action, or create a new exposure pathway, is prohibited without prior written approval from Ecology.

Section 4. The Owner of the property must give thirty (30) day advance written notice to Ecology of the Owner's intent to convey any interest in the Property. No conveyance of title, easement, lease, or other interest in the Property shall be consummated by the Owner without adequate and complete provision for continued monitoring, operation, and maintenance of the Remedial Action.

Section 5. The Owner must restrict leases to uses and activities consistent with the Restrictive Covenant and notify all lessees of the restrictions on the use of the Property.

Section 6. The Owner must notify and obtain approval from Ecology prior to any use of the Property that is inconsistent with the terms of this Restrictive Covenant. Ecology may approve any inconsistent use only after public notice and comment.

Section 7. The Owner shall allow authorized representatives of Ecology the right to enter the Property at reasonable times for the purpose of evaluating the Remedial Action; to take samples, to inspect remedial actions conducted at the property, and to inspect records that are related to the Remedial Action.

Section 8. The Owner of the Property reserves the right under WAC 173-340-440 to record an instrument that provides that this Restrictive Covenant shall no longer limit use of the Property or be of any further force or effect. However, such an instrument may be recorded only if Ecology, after public notice and opportunity for comment, concurs.

____

[FIRST SOUTH PROPERTIES LLC]

____

[DATE SIGNED]

Cleanup Site Details

Cleanup Site ID: 3987

Cleanup Site ID: 3987 **Facility/Site ID:** 4256186 **UST ID:** 8342 Site Page Site Documents View Map

Cleanup Site Name: Vic Markov Tire Co Glossary

Alternate Names: King Co Airport Old Gas Station, King Co International Airport Old Gas Station, VIC MARKOV TIRE CO

LOCATION

Address: 7300 E MARGINAL WAY S **City:** SEATTLE **Zip Code:** 98108 **County:** King

Latitude: 47.53735 **Longitude:** -122.31797 **WRIA:** 9 **Legislative District:** 11 **Congressional District:** 9 **TRS:** 24N 4E 29

DETAIL

Status: Cleanup Started **NFA Received?** No **Is PSI site?** No

Statute: MTCA **NFA Date:** N/A **Current VCP?** No **Past VCP?** No

Site Rank: N/A **NFA Reason:** N/A **Brownfield?** No

Site Manager: Northwest Region **Responsible Unit:** Northwest **Active Institutional Control?** No

CLEANUP UNITS

Cleanup Unit Name	Unit Type	Unit Status	Resp Unit	Unit Manager	Current Process
Vic Markov Tire Co	Upland	Cleanup Started	NW	Northwest Region	Independent Action

ACTIVE INSTITUTIONAL CONTROLS

Instrument Type	Restriction Media	Restrictions/Requirements	Date	Recording Number	Recording County	Tax Parcel
There are no current Institutional Controls in effect for this site.						

AFFECTED MEDIA & CONTAMINANTS

	MEDIA					
Contaminant	**Soil**	**Groundwater**	**Surface Water**	**Sediment**	**Air**	**Bedrock**
Petroleum Products-Unspecified	S	C				
Petroleum-Gasoline	S	C				

Key:
B - Below Cleanup Level C - Confirmed Above Cleanup Level RA - Remediated-Above
S - Suspected R - Remediated RB - Remediated-Below

SITE ACTIVITIES

Activity	Status	Start Date	End Date/ Completion Date
LUST - Report Received	Completed		3/16/1993
LUST - Report Received	Completed		3/16/1993
Site Discovery/Release Report Received	Completed		3/16/1993
LUST - Notification	Completed		5/19/1993
Initial Investigation / Federal Preliminary Assessment	Completed		3/12/2009
Site Hazard Assessment/Federal Site Inspection	Canceled	2/27/2014	10/29/2015

Appendix I

SEPA Environmental Checklist and Determination of Non-Significance—Georgetown Flume Off-Leash Area

WAC 197-11-970 Determination of Nonsignificance (DNS)

DETERMINATION OF NON-SIGNIFICANCE

Description: **Georgetown Flume Park Development –** The Georgetown Flume Off-Leash Area and multi-use trail development project is a multi-agency City project. Seattle City Light has transferred the property to the Seattle Department of Transportation and Seattle Parks and Recreation as part of a public benefit for a street vacation. The combined development will create a dog off-leash area, a multi-use trail, and large bio-retention cell to manage stormwater for the site, and plant approximately 80 new trees. The multi-use trail will be a link of the Georgetown to South Park Trail. Improvements include pedestrian scaled lighting and six parking spaces, including one accessible parking space in the South Myrtle Street right-of-way on the north side of the site. The project will also construct a new 12" water main from Ellis Avenue South along Myrtle Street to bring water to the site and includes approximately 1,000 cu.yds of grading.

Proponent: **Seattle Parks and Recreation**

Location: **7242 East Marginal Way South, Seattle WA 98108**

Lead agency: **Seattle Parks and Recreation**

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

☐ There is no comment period for this DNS.

☒ This DNS is issued under 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date of publication (December 23, 2021).

Written comments must be submitted by **January 10, 2022**.

Responsible official: Andy Sheffer
Position/title: Director, Planning, Development & Maintenance Division, Seattle Parks and Recreation
Phone: (206) 684-7041
Address: 300 Elliott Avenue West, Suite 100, Seattle, WA 98119

Date: 12/17/2021 Signature: ASheff

Please contact: David Graves, Strategic Advisor, Seattle Parks and Recreation if you have questions or written comments about this determination. **Phone:** (206) 684-7048; **Fax:** (206) 233-3949; or, **e-mail:** david.graves@seattle.gov. You may appeal this determination to **Office of the Hearing Examiner** at **PO Box 94729, Seattle, WA 98124-4729** or 700 Fifth Avenue, Suite 4000, Seattle, WA 98104 no later than **5:00 pm** on **January 18, 2022** by **Appeal Letter** and **$85.00 fee**. You should be prepared to make specific factual objection. Contact the Seattle Examiner to read or ask about the procedures for SEPA appeals.

SEPA ENVIRONMENTAL CHECKLIST

A. Background

1. Name of proposed project, if applicable:
   Georgetown Flume Dog Off Leash Area and Trail

2. Name of applicant:
   City of Seattle, Dept of Parks and Recreation

3. Address and phone number of applicant and contact person:
   Mike Schwindeller, Sr. Capitol Projects Coordinator
   c/o Seattle Parks and Recreation
   Planning, Development & Maintenance Division
   300 Elliott Ave W, South Suite 100
   Seattle, Washington 98119
   (206) 615-1165

4. Date checklist prepared:
   12/8/21

5. Agency requesting checklist:
   City of Seattle, Seattle Parks and Recreation (SPR)

6. Proposed timing or schedule (including phasing, if applicable):
   Construction is proposed to start in the summer of 2022 with completion in Spring 2023

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.
   No

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.
   The following documents will be prepared directly related to this proposal: **Storm Water Drainage Report, Property Transfer Soil Sampling Memo, SWPPP and a Geotechnical Memo**

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.
   None known

10. List any government approvals or permits that will be needed for your proposal, if known.
   City of Seattle, Drainage Review
   City of Seattle, Construction Permit
   City of Seattle ECA Exemption (Prepared by SPR)

City of Seattle, Seattle Public Utilities (SPU) review of water main extension

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

To summarize:

The Georgetown Flume Off-Leash Area (OLA) and multi-use trail development project is a multi city agency project. Seattle City Light (SCL) has transferred the linear property between East Marginal Way S and S Myrtle Street to Seattle Department of Transportation (SDOT) (9,989 sq ft) and Seattle Parks and Recreation (SPR) (36,349 sq ft) as a part of a public benefit for SCL;s Diagonal Ave S Street Vacation at their South Service Center location. The combined development will create a dog off-leash area, a multi-use trail, and large bio-retention cell to manage stormwater for the site, and plant at least 80 new trees. The multi-use trail will be a link of the Georgetown to South Park Trail and will have 12 pedestrian scaled lights. There will be six parking spaces, including one accessible parking space in the ROW on the north side.

The OLA will include two separate areas for dogs, the small and shy dog area will be approximately 3,000 sq ft and the main OLA will be approximately 17,000 sq ft. The remaining area on SPR property will be split between the bioretention cell and a planting buffer on the south side to increase tree canopy and buffer the OLA from E Marginal Way S. The small and shy area will feature a set of “airlock” or double gates and the main OLA will include three sets of gates spread out at the north centeral and southern portions. Each access point will be fully accessible to people with disabilities and a concrete pad with seating will be located at each access point. The project will also construct a new 12” water main (approximately 320’) from Ellis Ave S along S Myrtle St to bring water to the site for dogs and for irrigation. During construction the project will remove the top 9” of existing soil from the surface and import clean fill and aggregate for the park.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The proposal site is currently known as Georgetown Flume Off Leash Area (Park to be named at a future date), and is located at 7242 E Marginal Way S, Seattle, Washington 98108, King County.

Legal:

(PER FIRST AMERICAN 1TTIE INSURANCE COMPANY FILE NO.; 4209-3352852
EFFECTIVE DATE SEPTEMBER 1 O, 2020 AT 8:00 A.M.)
CITY OF SEATTLE, A MUNICIPAL. CORPORATION OF THE STATE OF WASHINGTON
THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE COUNTY OF KING, STATE OF WA. AND IS DESCRIBED AS FOLLOWS:

THAT PORTION OF LAND WITH THE NORTHEAST QUARTER &: THE SOUTHEAST

QUARTER OF SECTION 29, TOWNSHIP 24 NORTH, RANGE 4 EAST, W.M.,RECORDS OF KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:
BEGINNING AT THE POINT OF INTERSECTION OF GOVERNMENT MEANDER LINE AND THE SOUTHERN LINE OF SOUTH MYRTLE STREET;
THENCE SOUTHERLY SOUTH 09"49'16• WEST A DISTANCE OF 108.333 FEET;
THENCE SOUTHERLY SOUTH 01•45•40• EAST A DISTANCE OF 201.015 FEET;
THENCE SOUTH 09'38'02• EAST A DISTANCE OF 122.173 FEET TO A POINT THAT IS COINCIDENT WITH THE NORTHERLY BOUNDARY OF EAST MARGINAL WAY SOUTH;
THENCE SOUTHEASTERLY SOUTH 49'00'00• EAST A DISTANCE OF 130.00 FEET;
THENCE NORTHERLY NORTH 06'57'48• WEST A DISTANCE OF 309.801 FEET;
THENCE NORTH 03'34'03• EAST A DISTANCE OF 218.131 FEET;
THENCE NORTHEASTERLY NORTH 12'14'45• EAST TO THE SOUTHERN LINE OF SOUTH MYRTLE STREET;
THENCE WESTERLY TO THE POINT OF BEGINNING.

Parcel: 700670-0570

B. Environmental Elements

1. *Earth*

a. General description of the site:
The Georgetown Flume site was acquired from Seattle City Light. It is an empty lot with no structures. The entire site is generally flat, with a slight slope from the northeast corner of the property to the southwest corner.

(circle one): Flat, rolling, hilly, steep slopes, mountainous, other: **FLAT**

b. What is the steepest slope on the site (approximate percent slope)?
The steepest slope on the site is approximately 8% for a drainage swale.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.
Site soil consists of up to 5 feet of loose to medium dense sand with silt (fill) overlying very loose to medium dense sand to silty sand with occasional layers of medium stiff sandy silt with organics (alluvium).

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.
None known.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.
The following estimated quantities of earth moving in cubic yards (cy) are approximate at the time of writing:

Finished grades OLA area will be gently mounded up to 2 feet at the high point. Imported material will include type 17 fill material, bioretention soil, planting soil and crushed rock. Additional earthwork will be required beyond the parcel extents for the right-of-way improvements coordinated by SDOT. Approximate earthwork numbers are as follows:
Cut: 263 CY
Fill: 723 CY
Max Cut: 1 FT
Max Fill: 2 FT
Disposal of unsuitable materials will be at a permitted fill site.

Engineered aggregates will be sourced from licensed, permitted commercial sand & gravel pits or quarries.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.
Surface erosion is always a possibility as a result of clearing and grading operations. Minor localized erosion may occur as a result of construction activities, however these impacts will be prevented from extending beyond the project limits, groundwater, or local utilities by Storm Water Pollution Prevention Plan (SWPPP) best management practices. Use of on-site

erosion control measures such as silt fence, a construction exit, catch basin inlet protection, interceptor swales, mulching, dust control, and other standard construction erosion control practices, as well as seasonal limitations of construction will control potential on-site erosion.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?
Approximately 15% of the entire site (both ROW and SPR property) will be covered with impervious surfaces after the project is completed including concrete and asphalt paths.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:
To the extent possible the disturbed area of the Proposal site will be limited to minimize erosion potential. Structural practices to control erosion include a stabilized construction exit, filter fabric fence for perimeter siltation control, temporary interceptor trenches, check dams and a sediment settling tank. All catch basins in the vicinity of the work will have erosion protection throughout the construction period. All work will be performed in compliance with local and state code and permitting requirements.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.
During construction, emissions to the air in the form of dust and exhaust from transportation and construction equipment can be expected to occur. Earth moving activities and resulting airborne dust are restricted by state and local code, however there will be an increase in passenger vehicle trips to and from the site during the construction work week. No additional emissions than currently exist on the site would result following completion of construction.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.
The adjacent Boieng Field is a source of emissions, but is not likely to affect this project.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:
All work will be performed in compliance with Federal, State and Local Codes, and permitting requirements. BMPs such as spraying water to control dust on site will be used.

3. Water

a. Surface Water:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.
There are no known surface water bodies located within the project area or immediate vicinity. The Duwamish Waterway is approximately 270' to the nearest waterway access point and 1400' to the main Duwamish waterway channel.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.
No.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.
Not Applicable.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.
No, the project will not require surface water withdrawals or diversions.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.
No, the project site is not within a 100-year floodplain.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.
No, the project does not propose discharges of waste materials to surface waters.

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.
No, there are no onsite wells and water service will be through Seattle Public Utilities.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.
No waste materials will be discharged into the ground water due this project.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.
The source of runoff will be storm water runoff from walkways/gathering areas, seating areas, landscaped areas and the multi-use trail. Stormwater will be treated and managed with an onsite bioretention cell. The stormwater overflow from the bioretention cell and the other new improvements will be collected and conveyed to the municipal storm system under the site, which discharges to the Duwamish Waterway via outfall.

2) Could waste materials enter ground or surface waters? If so, generally describe.
No waste material is anticipated to be discharged to groundwater as a result of the proposed project. Stormwater best management practices will be in place per the stormwater code, including signage and pet waste bags to avoid pet waste from entering the drainage system.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.
The proposal will enhance the drainage patterns in the vicinity of the site by providing a new curb and gutter system in the right-of-way as well as slowing and treating on site stormwater in the bioretention cell.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:
During the construction phase, appropriate temporary erosion control best management practices will be implemented and maintained to control runoff. Permanent measures to reduce and control runoff from the completed project will include catch basins, underground conveyance pipe, swales, and an infiltrating bioretention cell.

4. Plants

a. Check the types of vegetation found on the site:

__x__deciduous tree: poplar
____evergreen tree: none
____shrubs
__x__grass
____pasture
____crop or grain
____ Orchards, vineyards or other permanent crops.
____ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
____water plants: water lily, eelgrass, milfoil, other
____other types of vegetation:

b. What kind and amount of vegetation will be removed or altered?
Removal is limited to two multi-stemmed Lombardy Poplar trees on the site and they will be replaced by approximately 80 new trees.

c. List threatened and endangered species known to be on or near the site.
None known or observed.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:
The park development proposes to plant 80 trees on the site. All disturbed areas on the site not receiving surfaces as described previously will be restored with erosion control and hydroseeding or new landscaping consistent with public use.

e. List all noxious weeds and invasive species known to be on or near the site.
None known.

5. Animals

a. <u>List</u> any birds and <u>other</u> animals which have been observed on or near the site or are known to be on or near the site.

Examples include:

birds: hawk, heron, eagle, songbirds, other: **birds typical of suburban environments such as jays, crows, sparrows, etc are likely to be on or near the site.**

mammals: deer, bear, elk, beaver, other: **Small mammals typical of suburban environments such as rodents/squirrels, raccoons, are likely to be seen or on near the site.**
fish: bass, salmon, trout, herring, shellfish, other: **None.**

b. List any threatened and endangered species known to be on or near the site.
None known

c. Is the site part of a migration route? If so, explain.
The Pacific Flyway, one of two major migratory bird routes in North America, covers much of the West coast including the proposed site. Key rest stops are not known to be located within this site.

d. Proposed measures to preserve or enhance wildlife, if any:
None proposed.

e. List any invasive animal species known to be on or near the site.
None known

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.
The local utility Seattle City Light provides electricity to the site for lighting and general convenience power. Power to the trail lighting system and automatic irrigation system shall be provided. No other energy sources are used on this site.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.
No, not with the initial development. There are no structures proposed on this site that would obscure adjacent property building roofs from obtaining solar power. Over time the proposed trees may grow tall enough to partially shade adjacent properties to the west. However the properties to the west is a warehouse and a motel and are not likely to be affected.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

Planting of drought tolerant plants to reduce the need for irrigation. LED light fixtures.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

1) Describe any known or possible contamination at the site from present or past uses.
   The project site is part of the former Georgetown Steam Plant flume. The portion of the flume on the property was removed in 2009. The purpose of the removal was to remove contamination from within and adjacent to the flume, provide for stormwater conveyance for the Georgetown Steam Plant and the South Myrtle Street right of way, and implement controls so that the flume no longer acted as a potential conveyance for contamination from the Georgetown Steam Plant to reach Slip 4 of the Duwamish Waterway, an Early Action Area in the Lower Duwamish Waterway Superfund Site. Confirmation samples collected after the removal project were all below the Remedial Action Objectives.

   There is no known soil contamination in the right-of-way where the water line will be installed; however, sampling conducted as part of the North Boeing Field/Georgetown Steam Plant Remedial Investigation found some low level volatile organic compound (VOC) contamination in shallow groundwater.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.
   There are no known underground hazardous liquid and gas transmission pipelines located within the project area.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.
   None known.

4) Describe special emergency services that might be required.
   The project health and safety plan outlines a protocol for any emergency services that could result from an accident during construction.

5) Proposed measures to reduce or control environmental health hazards, if any:
   A stamped site survey has reviewed the utilities in the area including gas lines. The contractor will complete 811 locates prior to any excavation. Any remaining soil

contamination discovered during the Property Transfer Soil Investigation will be disposed of appropriately or otherwise remediated prior to park construction.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?
Existing ambient and peak noise levels produced off site are generally limited to traffic and neighboring industrial use. Noise from Boieng Field could have some impacts on the Proposal.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.
Short-term noise impacts from the Proposal are all construction related and will occur as allowed under the City of Seattle Construction Permit, 7:00 a.m. - 6:00 p.m., weekdays. 9:00 a.m. - 6:00 p.m., weekends and holidays only with expressed written consent from owner.

Long term operation of the facility will not result in significant changes to current noise levels. As a public park, it will generate noise typically associated with recreational activities such as children yelling and shouting, playing basketball and occasional crowd noise for gatherings such as picnics.

Public Park operations have certain exemptions from the general noise ordinance. Park operations and park users are subject to Seattle Municipal Code Section 25.08.520.

3) Proposed measures to reduce or control noise impacts, if any:
Short term noise impacts will be mitigated to some degree by local noise ordinances regulating hours of construction, of operation and maximum noise levels.

Long term, noise effects are mitigated largely by limiting the hours of operation of the Park. SPR policies require that the park closes at 11:30pm.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.
The site is currently vacant. Surrounding industrial uses appear consistent with the zoning classifications.The proposal will not affect current land uses on nearby or adjacent properties.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?
There is no documented farm or forest land use on this site.

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:
There are no nearby working farms or forest lands.

c. Describe any structures on the site.
There are no structures on the site.

d. Will any structures be demolished? If so, what?
No

e. What is the current zoning classification of the site?
The zoning classification for the site is Industrial - IG2 U/85. Park and open spaces uses are allowed uses in this zone.

f. What is the current comprehensive plan designation of the site?
City Owned Open Space

g. If applicable, what is the current shoreline master program designation of the site?
Not applicable.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.
The site has been classified only as a Liquefaction Prone area (ECA5).

i. Approximately how many people would reside or work in the completed project?
No one will reside or work in the completed project.

j. Approximately how many people would the completed project displace?
None.

k. Proposed measures to avoid or reduce displacement impacts, if any:
None proposed.

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:
The project is intended to develop a park in a neighborhood that was identified as having a park and open space gap by the 2017 Park and Open Space Plan.

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:
None proposed. There are no agricultural or forest lands of significance that will be impacted by this proposal.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.
None.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.
None.

c. Proposed measures to reduce or control housing impacts, if any:
None proposed.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?
No structures are being added with the current proposal.

b. What views in the immediate vicinity would be altered or obstructed?
There will be minimal blockage of views due to new trees planted and twelve pedestrian light poles. However, given the topography, the views are of adjacent development.

c. Proposed measures to reduce or control aesthetic impacts, if any:
None proposed.

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?
The proposal will utilize LED pedestrian lighting on poles.

b. Could light or glare from the finished project be a safety hazard or interfere with views?
For adjacent residential properties, no safety issues or interference with views are anticipated.

c. What existing off-site sources of light or glare may affect your proposal?
The parking lot lighting of the industrial property to the east will create some glare on the site.

d. Proposed measures to reduce or control light and glare impacts, if any:
City of Seattle has light and glare standards (SMC23.47A.022 - Light and Glare standards) that the City of Seattle Parks & Recreation will adhere to. The proposal utilizes high efficiency LED pedestrian lights designed to reduce light and glare impacts.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?
The Proposal site will be a new neighborhood/community Park that provides a variety of recreational opportunities. There is nearby Oxbow Park.

b. Would the proposed project displace any existing recreational uses? If so, describe.
The proposal will not displace existing recreational uses since there are none currently.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:
Not applicable.

13. Historic and cultural preservation

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers ? If so, specifically describe.
No.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.
None known.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.
Research tools used include:

- **Washington State Department of Archeology and Historic Preservation WISAARD (Washington Information System for Architectural and Archeological Records Data)**
- **City of Seattle – Seattle Municipal Archive**
- **City of Seattle Cultural & Historical Database (data.seattle.gov)**
- **City of Seattle GIS Data**

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.
None proposed.

14. Transportation

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.
The public streets surrounding the site are E Marginal Way S to the south, and S Myrtle St to the north. E Marginal Way S is an arterial.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?
King County Metro Bus Route 60 and 124 serves the area from two blocks to the west at E Marginal Way S and Ellis Ave S

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?
There are no formal parking spaces currently. The project proposes to formalize the street parking and provide six parking stalls, including one accessible parking stall and access aisle. No parking will be eliminated.

e. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).
Yes, the project will construct a new multi-use bicycle trail on the west side of the site.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.
This project does not occur near water or rail transportation. It is adjacent to Boeing Field for air transportation.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and no passenger vehicles). What data or transportation models were used to make these estimates?
Converting the site to a public park that serves the immediate neighborhood will likely create a minor increase in the number of vehicle trips generated by the site as many visitors will access the park on foot or bicycle. The proposed six parking stalls and adjacent on-street parking and a road network will accommodate those individuals who do drive to and from the park.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.
No - There is no nearby movement of agricultural and forest products.

h. Proposed measures to reduce or control transportation impacts, if any:
No proposed measures. The effect of that added traffic on peak period street and intersection operating quality is expected to be minimal.

15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.
These services are currently provided and the additional need is predicted to be minimal.

b. Proposed measures to reduce or control direct impacts on public services, if any.
None proposed.

16. Utilities

a. Circle utilities currently available at the site:
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other ___________
Electrical, domestic water, storm drainage.

f. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

The proposed electrical service to the site will be provided by Seattle City Light. New water service will be required for water for dogs and for irrigation provided by Seattle Public Utilities and is anticipated to be run from S Myrtle St to the north side of the site.

C. Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: Mike Schwindeller

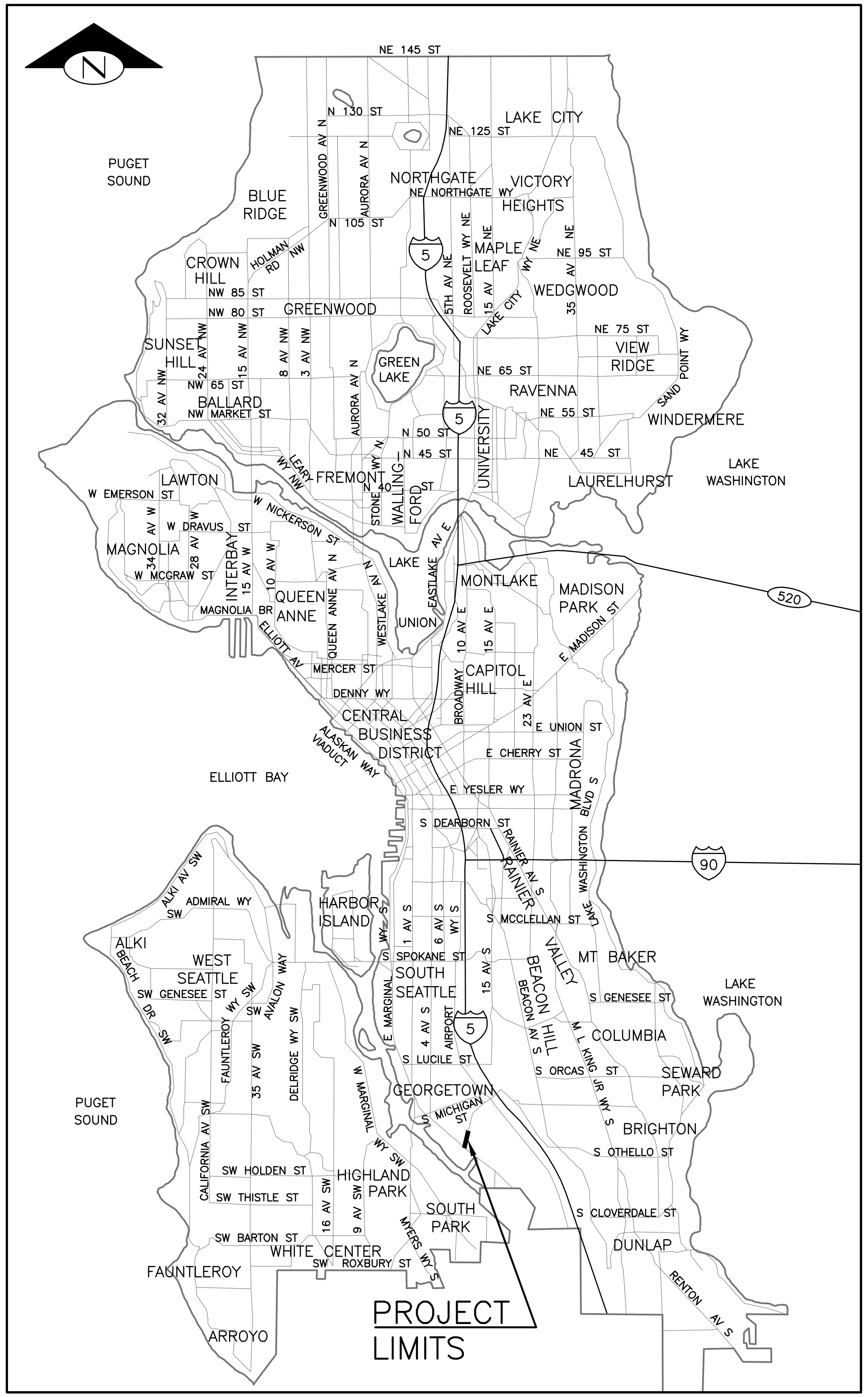
Name of signee: Mike Schwindeller

Position and Agency/Organization: Sr. Capital Project Coordinator

Date Submitted: 12/8/21

Appendix J

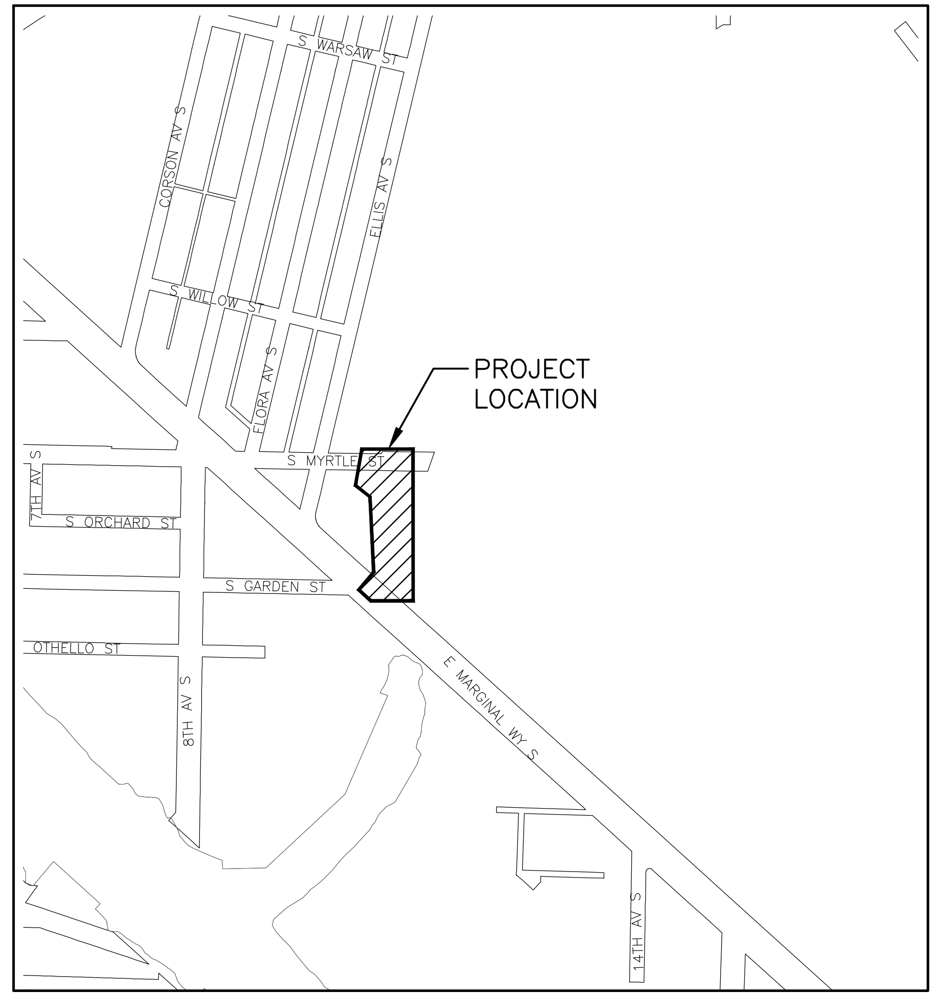
City of Seattle Georgetown Flume Off-Leash Area Plan Set



VICINITY MAP

1 0 1 2

SCALE: 1" = 1 MILE



SHEET LOCATION MAP

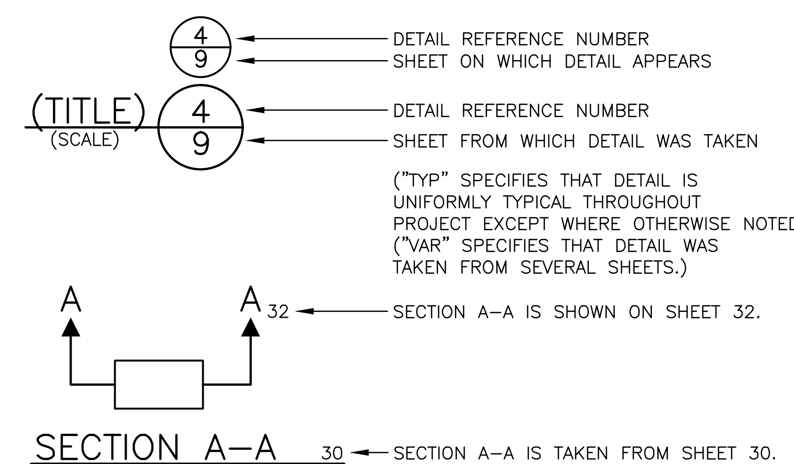
SCALE: 1"=400'

SHEET INDEX

ZONE IG2/U85

PROJECT INCLUDES CONTAMINATED SOIL EXCAVATION, REMOVAL AND BACKFILL, AND THE CONSTRUCTION OF AN ACCESSIBLE MULTI-USE PATH, AN ACCESSIBLE DOG OFF-LEASH AREA, AND SEVERAL ACCESSIBLE ACCESS POINTS BETWEEN THE MULTI-USE PATH AND THE DOG OFF-LEASH AREA. IN ADDITION, THE PROJECT INCLUDES THE CONSTRUCTION OF PEDESTRIAN LIGHTING ALONG THE TRAIL, DRAINAGE IMPROVEMENTS THROUGHOUT THE SITE, AND IMPROVED ACCESS FOR MAINTENANCE VEHICLES.

DETAIL AND SECTION REFERENCING



VAULT SERIAL NO.	DATE	MARK	NATURE REVISIONS	MADE	CHK'D	REV'D
38361						

P:\SDOTCP\TRC0140_Georgetown to South Park Connection\A-Plot Sheets\FLUME\TRC0140_P-COVR_flume.dwg Apr-21-22 3:46pm

100% SUBMITTAL NOT FOR CONSTRUCTION
APRIL 2022

COVER

PW#: 2020-XXX

APPROVED FOR ADVERTISING
LIZ ALZEER
DEPARTMENT OF FINANCE & ADMINISTRATIVE SERVICES
SEATTLE, WASHINGTON . . . . 20 . .

BY: . . . .
PURCHASING AND CONTRACTING DIRECTOR

INITIALS AND DATE	INITIALS AND DATE
DESIGNED	REVIEWED:
CHECKED	DES. CONST.
	SDOT PROJ. MGR.
DRAWN	RECEIVED
CHECKED	REVISED AS BUILT

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0-02.3 OF THE PROJECT MANUAL.

Seattle Department of Transportation

ORDINANCE NO. PW NO. 2020–xxx
SUBPROJECT ID:
SCALE: 1"=20'

GEORGETOWN FLUME OFF–LEASH AREA

JOB	PC	TRC0140
	CO	TRC0140
VPI #		792–265
CV1		
SHEET 1 OF 30		

GENERAL NOTES
UNLESS OTHERWISE NOTED ON THE DRAWINGS:

1. ALL WORK MUST CONFORM TO THE 2020 EDITION OF THE CITY OF SEATTLE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION, THE 2020 EDITION OF THE CITY OF SEATTLE STANDARD PLANS FOR MUNICIPAL CONSTRUCTION, AND THE SEATTLE DEPARTMENT OF TRANSPORTATION DIRECTOR'S RULE 01-2017 FOR STREET AND SIDEWALK PAVEMENT OPENING AND RESTORATION. A COPY OF THESE DOCUMENTS MUST BE ONSITE DURING CONSTRUCTION.
2. FOR REQUIREMENTS REGARDING THE PROTECTION AND RESTORATION OF PUBLIC AND PRIVATE PROPERTY SEE SECTIONS 1-07.16 & 1-07.17.
3. TREES, SHRUBS AND OTHER PLANT MATERIAL NOT DESIGNATED FOR REMOVAL MUST BE PROTECTED FROM DAMAGE. SEE SECTIONS 1-07.16(2) AND 8-01 FOR REQUIREMENTS REGARDING THE TREE, VEGETATION AND SOIL PROTECTION PLAN.
4. THE PROJECT WILL INVOLVE EXCAVATION OVER CHARGED WATER MAINS. FOR PROTECTION OF THIS INFRASTRUCTURE, SEE SECTIONS 1-07.16(1) AND 2-02.3(3)C. CONTRACTOR MUST NOT REPAIR DAMAGE TO CHARGED WATER MAINS OR SERVICES BUT MUST IMMEDIATELY NOTIFY THE SPU EMERGENCY DISPATCHER AT 206-386-1800.
5. RESTORATION OF CONTRACTOR DAMAGE TO EXISTING UTILITIES MUST BE AT THE CONTRACTOR'S EXPENSE. SEE SECTIONS 1-07.13 AND 1-07.16.
6. THE CONTRACTOR MUST NOTIFY THE UTILITIES FOR UNDERGROUND UTILITY LOCATIONS BEFORE COMMENCEMENT OF ANY EXCAVATION. ADVANCE NOTIFICATION IS REQUIRED. SEE SECTION 1-07.28.
7. FOR NOTIFICATION AND COORDINATION REQUIREMENTS, INCLUDING COMMUNICATION WITH METRO TRANSIT, SEE SECTIONS 1-07.17 AND 1-07.28.
8. ALL EXCAVATIONS ADJACENT TO SEATTLE CITY LIGHT POLES OR OTHER FACILITIES (VAULTS, HANDHOLES, ETC.) MUST COMPLY WITH WAC 296-155 PART N, EXCAVATION, TRENCHING AND SHORING. POLE PROTECTION/ SUPPORTING SYSTEMS USED WHILE EXCAVATING MUST COMPLY WITH WAC 296-155-655, GENERAL PROTECTION REQUIREMENTS, ITEM (9) AND MUST NOT AFFECT THE STRUCTURAL INTEGRITY OF POLES WHILE THE SYSTEMS ARE IN PLACE OR AFTER THE SYSTEMS HAVE BEEN REMOVED.
9. WORK LOCATED OUTSIDE OF THE PUBLIC RIGHT OF WAY SHALL BE REVIEWED AND PERMITTED THROUGH SDCI.

SURVEY NOTES
UNLESS OTHERWISE NOTED ON THE DRAWINGS:

1. DATUM: NAVD88 AND NAD 83 (2011) 2010.00 EPOCH.
2. THE CONTRACTOR IS RESPONSIBLE FOR REFERENCING AND REPLACING ALL SURVEY MONUMENTS THAT MAY BE DISTURBED, DESTROYED OR REMOVED BY THE PROJECT AND AT LEAST 2 WORKING DAYS PRIOR TO THE WORK, MUST FILE AN APPLICATION FOR PERMIT TO REMOVE OR DESTROY A SURVEY MONUMENT WITH THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES, PURSUANT TO WAC 332-120. THE CONTRACTOR MUST PROVIDE THE ENGINEER AND SPU LAND SURVEY WITH A COPY OF THE APPROVED PERMIT AND COMPLETION REPORT. SEE STANDARD SPECIFICATION 1-07.28 ITEM 17.
3. PERFORM NO WORK WHICH WOULD REMOVE, ADJUST, DESTROY OR OTHERWISE MAKE A SURVEY MONUMENT NO LONGER VISIBLE OR READILY ACCESSIBLE WITHOUT A PERMIT FROM THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES. SEE SECTION 1-07.16(1).

METRO COORDINATION NOTES

1. TO SCHEDULE BUS SHELTER REMOVAL BY METRO, CONTACT PLANSREVIEW@KINGCOUNTY.GOV. ADVANCE NOTIFICATION OF 3 WEEKS IS REQUIRED. SEE SECTION 1-07.28 ITEM 4.
2. ALL METRO SHELTER FOOTINGS MUST BE INSPECTED BY METRO BEFORE ANY CONCRETE IS POURED. CONTACT METRO INSPECTORS AT 206-263-1370 OR 206-947-1574 OR PAUL.MILLER@KINGCOUNTY.GOV. ADVANCE NOTICE OF 3 WORKING DAYS IS REQUIRED.
3. AFTER BUS SHELTER FOOTINGS ARE INSTALLED, CONTACT PLANSREVIEW@KINGCOUNTY.GOV TO SCHEDULE BUS SHELTER FRAME INSTALLATION AND BUS STOP FLAG POST INSTALLATION.

ROADWAY NOTES
UNLESS OTHERWISE NOTED ON THE DRAWINGS:

1. PAVEMENT, SIDEWALK AND CURB REMOVALS MUST EXTEND TO EXISTING JOINTS, TO LIMITS IDENTIFIED AS "SAWCUT" ON THE DRAWINGS, OR TO LIMITS DETERMINED BY THE ENGINEER. SEE SECTION 2-02.3.
2. ALL JOINTS AT THE MEET LINES OF NEW CONSTRUCTION AND EXISTING SURFACES MUST BE BUTT JOINTS. SEE SECTION 5-04.3(10)B.
3. LONGITUDINAL JOINTS MUST BE COORDINATED WITH THE CHANNELIZATION DRAWINGS. LONGITUDINAL JOINTS MUST BE AT A LANE LINE OR EDGE OF TRAVELED WAY UNLESS APPROVED OTHERWISE IN WRITING BY THE ENGINEER. SEE SECTION 5-05.3(8)E2.
4. PAVING AROUND INLETS AND CATCH BASINS MUST BE SLOPED TO ESTABLISH A DRAINAGE TRANSITION ZONE PER STANDARD PLAN 260A.
5. WMA SURFACE COURSE FOR ROADWAY MUST BE CLASS 1/2", PG58V-22 FOR 10 MILLION ESAL'S.
6. IF AN EXISTING WATER VALVE BOX REQUIRES ADJUSTMENT, IT MUST BE DONE BY EXCAVATING THE CASTING AND VERTICALLY ADJUSTING THE TOP SECTION OF THE VALVE BOX. THE FLANGE MUST BE CAST IN TO SURROUNDING PAVEMENT AS SHOWN ON STD PLAN 315. DO NOT USE EXTENSION RINGS. SEE SECTION 7-20.3(1)A.
7. CONTRACTOR MUST ADJUST CASTINGS IN ACCORDANCE WITH SECTION 7-20. CASTINGS MUST BE ADJUSTED TO FINISH GRADE PRIOR TO CONSTRUCTION OF FINAL SURFACE COURSE PER SECTION 5-04.3(9)B. WORN OR BROKEN CASTINGS TO BE REPLACED MUST BE REPLACED PRIOR TO INSTALLATION OF THE FINAL SURFACE.
8. NEW LOOP DETECTORS MUST BE INSTALLED IN THE PAVEMENT SUBLAYER PRIOR TO FINAL WEARING COURSE PAVING. SEE SECTION 8-31.3(5)A. WHEN INSTALLING IN NEW FULL DEPTH CONCRETE PAVEMENT WITHOUT ASPHALT SURFACING, THE LOOPS MUST BE PREFORMED PER SECTION 8-31.3(5)B.

CURB RAMP NOTES:
UNLESS OTHERWISE NOTED ON THE DRAWINGS:

1. ALL NEWLY CONSTRUCTED PEDESTRIAN ACCESS ROUTES INCLUDING SIDEWALK AND CURB RAMPS MUST MEET CURRENT ADA STANDARDS AND GUIDELINES (2010 ADA STANDARDS, PROWAG 2011) TO THE MAXIMUM EXTENT FEASIBLE.
2. WHERE THE DRAWINGS DENOTE "MEF" FOR CURB RAMP ELEMENTS, THIS DESIGNATION IS FOR THE REFERENCE ONLY AND MUST BE FIELD VERIFIED BY THE ENGINEER. THE CONTRACTOR MUST NOTIFY THE ENGINEER PER SECTION 8-14.3(7) AND ALLOW THE ENGINEER THE OPPORTUNITY TO INSPECT THE CURB RAMP LAYOUT AND DIRECT ADJUSTMENTS AS NECESSARY. EVERY EFFORT WILL BE MADE TO ACHIEVE AN ADA COMPLIANT RAMP.
3. THE CONTRACTOR MUST NOTIFY THE ENGINEER IF A CURB RAMP CANNOT BE CONSTRUCTED PER THE DRAWINGS, RESULTING IN A NON-COMPLIANT SLOPES AN/OR DIMENSIONS. PRIOR TO INSTALLING THE CURB RAMP, THE ENGINEER MUST APPROVE THE CURB RAMP LAYOUT.
4. PEDESTRIAN ACCESS THROUGH THE PROJECT MUST BE MAINTAINED IN COMPLIANCE WITH SDOT PEDESTRIAN MOBILITY IN AND AROUND WORK ZONES, DIRECTOR'S RULE 10-2015, AND SDOT 2018 TRAFFIC CONTROL MANUAL FOR IN-STREET WORK.
5. FOR ASSET MANAGEMENT PURPOSES, THIS PROJECT INCLUDES THE FOLLOWING:

NEW CURB RAMPS	44
REBUILT CURB RAMPS	xx
PROJECT TOTAL	44

KING COUNTY WASTEWATER TREATMENT DIVISION NOTES:

1. THE LOCAL PUBLIC AGENCY (LPA) PROGRAM MUST BE CONTACTED AT 206-477-5414 OR LPA.TEAM@KINGCOUNTY.GOV AT LEAST FIVE (5) WORKING DAYS IN ADVANCE OF THE PRE-CONSTRUCTION CONFERENCE FOR THIS PROJECT.
2. THE LPA PROGRAM MUST BE CONTACTED AT 206-477-5414 OR

SIGNAL NOTES
UNLESS OTHERWISE NOTED ON THE DRAWINGS:

1. THE CONTRACTOR MUST IMMEDIATELY REPORT ANY DAMAGE TO THE TRAFFIC SIGNAL SYSTEM, INCLUDING CONDUIT AND THE DETECTOR LOOPS. SEE SECTION 1-07.28 NOTE 16.
2. THE TRAFFIC SIGNAL SYSTEM INTERCONNECT CABLE AND SIGNAL WIRE SERVICE, VIDEO, OR MASTER CABLE MUST NOT BE SPICED. SEE SECTIONS 8-31.3(8)A AND 8-31.3(9)B.
3. THE CONTRACTOR MUST CONTACT SDOT TRAFFIC SIGNAL OPERATIONS WHEN THE TRAFFIC SIGNAL SYSTEMS OR THE TRAFFIC DETECTOR LOOPS MAY BE IMPACTED BY CONSTRUCTION. ADVANCE NOTIFICATION IS REQUIRED. SEE SECTION 1-07.28, SIGNALIZED INTERSECTIONS.
4. THE CONTRACTOR MUST PROVIDE PRELIMINARY LAYOUT FOR THE TRAFFIC DETECTION. THE LAYOUT MUST BE VERIFIED BY THE ENGINEER PRIOR TO SAW CUTTING. ADVANCE NOTIFICATION IS REQUIRED. SEE SECTION 8-31.3(5)A.

SIGNING & CHANNELIZATION NOTES
UNLESS OTHERWISE NOTED ON THE DRAWINGS:

1. TO ORDER SDOT PROVIDED SIGNS, OR TO COORDINATE SDOT'S INSTALLATION OF SIGNS, SEE SECTION 8-21.3(1). ADVANCE NOTIFICATION IS REQUIRED. CONTACT SDOT SIGNS AND MARKING SHOP AT (206)233-7104.
2. FOR REQUIREMENTS ON LAYOUT AND VERIFICATION OF CHANNELIZATION FEATURES, SEE SECTION 8-22.3(1). ADVANCE NOTIFICATION IS REQUIRED. CONTACT CARTER DANNE AT (206)684-0817 FOR CHAN REVIEW.
3. FOR SIGNING AND STRIPING DETAILS NOT SHOWN IN THESE DRAWINGS, SEE 600 SERIES AND 700 SERIES STANDARD PLANS.
4. TELESPAR SIGN POSTS MUST BE PERFORATED (PRE-PUNCHED).

DRAINAGE NOTES
UNLESS OTHERWISE NOTED ON THE DRAWINGS:

1. FOR INLET CONNECTION BEND AND SLOPE RESTRICTIONS, SEE SECTION 7-08.3(5).
2. WHEN CONNECTING TO EXISTING SEWER AND DRAINAGE LINES, THE CONTRACTOR MUST VERIFY INVERT ELEVATIONS PRIOR TO CONSTRUCTION. DISCREPANCIES IN INVERT ELEVATIONS MUST BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ENGINEER.
3. BEDDING FOR INLET CONNECTION AND CATCH BASIN CONNECTION PIPES MUST BE CLASS B. SEE STD PLAN 285.
4. ALL INLET AND CATCH BASIN PIPE RECONNECTIONS MUST USE FLEXIBLE GASKETED COUPLINGS WITH STAINLESS STEEL SHIELDS PER SPECIFICATION 9-05.18.
5. SEATTLE PUBLIC UTILITIES (SPU) APPROVAL IS REQUIRED FOR ALL PROPOSED NEW CATCH BASINS, INLETS AND PIPES PRIOR TO FINAL SURFACE RESTORATION. CONTACT THE ENGINEER, 48 HOURS IN ADVANCE.
6. DUCTILE IRON PIPE MUST BE ANSI A21.51 CLASS 50 WITH PUSH-ON JOINTS. FITTINGS FOR DUCTILE IRON PIPE MUST BE PER ANSI A21.10 OR ANSI A21.53 WITH PUSH-ON JOINTS. GLANDS ON MECHANICAL JOINT PIPE AND FITTINGS MUST BE DUCTILE. SEE SECTION 9-05.3.

STORMWATER POLLUTION PREVENTION NOTES
UNLESS OTHERWISE NOTED ON THE DRAWINGS:

1. THE CONTRACTOR MUST PREPARE A CONSTRUCTION STORMWATER AND EROSION CONTROL PLAN (CSECP), A TREE, VEGETATION AND SOIL PROTECTION PLAN (TVSPP) AND A SPILL PLAN (SP) FOR APPROVAL BY THE ENGINEER PRIOR TO CONSTRUCTION. SEE SECTIONS 1-07.15 AND 8-01.
2. THE CONTRACTOR MUST COMPLY WITH ALL NPDES PERMIT REQUIREMENTS. SEE SECTIONS 1-07.15 AND 8-01.

100% SUBMITTAL NOT FOR CONSTRUCTION
APRIL 2022

GENERAL NOTES

PW#: 2020-XXX

APPROVED FOR ADVERTISING
LIZ ALZEER
DEPARTMENT OF FINANCE & ADMINISTRATIVE SERVICES
SEATTLE, WASHINGTON . . . . 20 . .
BY: . . . .
PURCHASING AND CONTRACTING DIRECTOR

INITIALS AND DATE
DESIGNED
CHECKED
DRAWN
CHECKED

INITIALS AND DATE
REVIEWED:
DES. CONST.
SDOT PROJ. MGR.
RECEIVED
REVISED AS BUILT

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0-02.3 OF THE PROJECT MANUAL.

PETER TRINH, STATE OF WASHINGTON, 51781, REGISTERED PROFESSIONAL ENGINEER

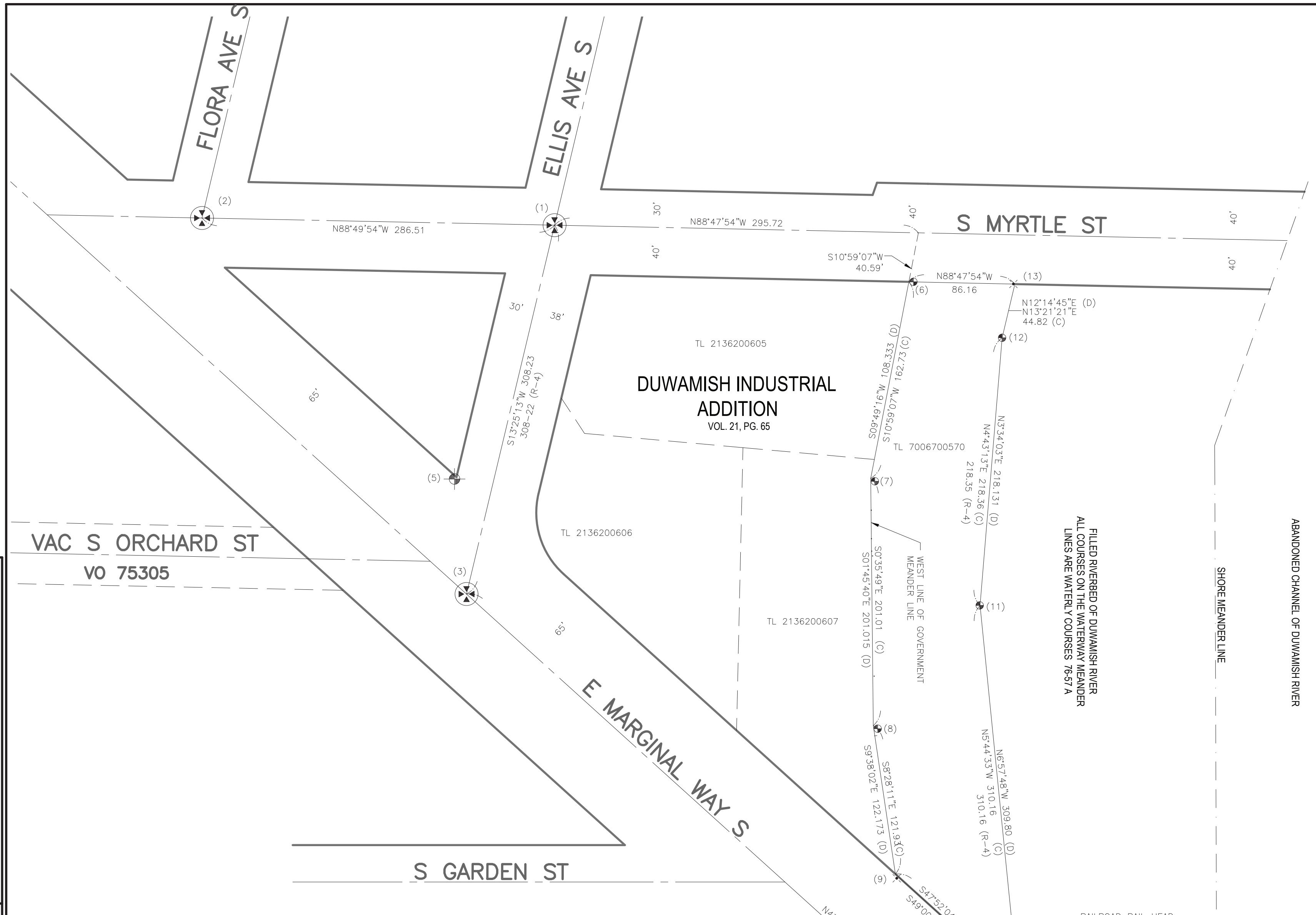
Seattle Department of Transportation
ORDINANCE NO. PW NO. 2020-xxx
SUBPROJECT ID:
SCALE: 1"=20'

GEORGETOWN FLUME OFF-LEASH AREA

JOB PC TRC0140
CO TRC0140
VPI # 792-265
NT1
SHEET 2 OF 30

VAULT SERIAL NO. 38361 | DATE | MARK | NATURE REVISIONS | MADE | CHK'D | REV'D

P:\SDOTCP\trc0140_georgetown to south park connection\a-plot sheets\FLUME\TRC0140_P-COVR_flume.dwg
Apr-20-22 12:53pm



RECORD LEGAL DESCRIPTION:

(PER FIRST AMERICAN TITLE INSURANCE COMPANY FILE NO.; 4209–3352852
EFFECTIVE DATE SEPTEMBER 10, 2020 AT 8:00 A.M.)

CITY OF SEATTLE, A MUNICIPAL CORPORATION OF THE STATE OF WASHINGTON THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE COUNTY OF KING, STATE OF WA, AND IS DESCRIBED AS FOLLOWS:

THAT PORTION OF LAND WITH THE NORTHEAST QUARTER & THE SOUTHEAST QUARTER OF SECTION 29, TOWNSHIP 24 NORTH, RANGE 4 EAST, W.M.,RECORDS OF KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

BEGINNING AT THE POINT OF INTERSECTION OF GOVERNMENT MEANDER LINE AND THE SOUTHERN LINE OF SOUTH MYRTLE STREET;
THENCE SOUTHERLY SOUTH 09°49'16" WEST A DISTANCE OF 108.333 FEET;
THENCE SOUTHERLY SOUTH 01°45'40" EAST A DISTANCE OF 201.015 FEET;
THENCE SOUTH 09°38'02" EAST A DISTANCE OF 122.173 FEET TO A POINT THAT IS COINCIDENT WITH THE NORTHERLY BOUNDARY OF EAST MARGINAL WAY SOUTH;
THENCE SOUTHEASTERLY SOUTH 49°00'00" EAST A DISTANCE OF 130.00 FEET;
THENCE NORTHERLY NORTH 06°57'48" WEST A DISTANCE OF 309.801 FEET;
THENCE NORTH 03°34'03" EAST A DISTANCE OF 218.131 FEET;
THENCE NORTHEASTERLY NORTH 12°14'45" EAST TO THE SOUTHERN LINE OF SOUTH MYRTLE STREET;
THENCE WESTERLY TO THE POINT OF BEGINNING.

700670–0570

VACANT LAND
SEATTLE, WASHINGTON.

SCHEDULE B EXCEPTIONS

(PER FIRST AMERICAN TITLE INSURANCE COMPANY FILE NO.; 4209–3352852
EFFECTIVE DATE SEPTEMBER 10, 2020 AT 8:00 A.M.)

1. ANY DEFECT, LIEN, ENCUMBRANCE, ADVERSE CLAIM, OR OTHER MATTER THAT APPEARS FOR THE FIRST TIME IN THE PUBLIC RECORDS OR IS CREATED, ATTACHES, OR IS DISCLOSED BETWEEN THE COMMITMENT DATE AND THE DATE ON WHICH ALL OF THE SCHEDULE B, PART I–REQUIREMENTS ARE MET.
2. TAXES OR ASSESSMENTS WHICH ARE NOT SHOWN AS EXISTING LIENS BY THE RECORDS OF ANY TAXING AUTHORITY THAT LEVIES TAXES OR ASSESSMENTS ON REAL PROPERTY OR BY THE PUBLIC RECORDS.
3. ANY FACTS, RIGHTS, INTERESTS, OR CLAIMS WHICH ARE NOT SHOWN BY THE PUBLIC RECORDS BUT WHICH COULD BE ASCERTAINED BY AN INSPECTION OF THE LAND OR BY MAKING INQUIRY OF PERSONS IN POSSESSION THEREOF.
4. EASEMENTS, CLAIMS OF EASEMENT OR ENCUMBRANCES WHICH ARE NOT SHOWN BY THE PUBLIC RECORDS.
5. DISCREPANCIES, CONFLICTS IN BOUNDARY LINES, SHORTAGE IN AREA, ENCROACHMENTS, OR ANY OTHER FACTS WHICH A CORRECT SURVEY WOULD DISCLOSE, AND WHICH ARE NOT SHOWN BY THE PUBLIC RECORDS.
6. (A) UNPATENTED MINING CLAIMS; (B) RESERVATIONS OR EXCEPTIONS IN PATENTS OR IN ACTS AUTHORIZING THE ISSUANCE THEREOF; (C) WATER RIGHTS, CLAIMS OR TITLE TO WATER; WHETHER OR NOT THE MATTERS EXCEPTED UNDER (A), (B) OR (C) ARE SHOWN BY THE PUBLIC RECORDS; (D) INDIAN TRIBAL CODES OR REGULATIONS, INDIAN TREATY OR ABORIGINAL RIGHTS, INCLUDING EASEMENTS OR EQUITABLE SERVITUDES.
7. ANY LIEN, OR RIGHT TO A LIEN, FOR SERVICES, LABOR OR MATERIALS OR MEDICAL ASSISTANCE HERETOFORE OR HEREAFTER FURNISHED, IMPOSED BY LAW AND NOT SHOWN BY THE PUBLIC RECORDS.
8. ANY SERVICE, INSTALLATION, CONNECTION, MAINTENANCE, CONSTRUCTION, TAP OR REIMBURSEMENT CHARGES/COSTS FOR SEWER, WATER, GARBAGE OR ELECTRICITY.
9. LIEN OF REAL ESTATE EXCISE TAX UPON SALE OF SAID PREMISES, OR TRANSFER OF A CONTROLLING INTEREST, IF UNPAID AS OF THE DATE HEREIN, THE EXCISE TAX RATES ARE AS FOLLOWS:LEVY/AREA CODE: 0010
10. EASEMENT, INCLUDING TERMS AND PROVISIONS CONTAINED THEREIN:
    RECORDING INFORMATION: 212109
    IN FAVOR OF: KING COUNTY
    FOR: ROAD
11. EASEMENT, INCLUDING TERMS AND PROVISIONS CONTAINED THEREIN:
    RECORDING INFORMATION: 972310
    IN FAVOR OF: PUGET SOUND TRACTION LIGHT & POWER COMPANY
    FOR: 2 LINES OF POLES
12. THE TERMS AND PROVISIONS CONTAINED IN THE CITY OF SEATTLE ORDINANCE NO. 81931, DATED APRIL 17, 1953.
13. THE TERMS AND PROVISIONS CONTAINED IN THE CITY OF SEATTLE ORDINANCE NO. 84344, DATED AUGUST 16, 1955.
14. THE TERMS AND PROVISIONS CONTAINED IN THE CITY OF SEATTLE ORDINANCE NO. 100940, DATED APRIL 27, 1972.
15. THE TERMS AND PROVISIONS CONTAINED IN THE CITY OF SEATTLE ORDINANCE NO. 123964, DATED SEPTEMBER 10, 2012.

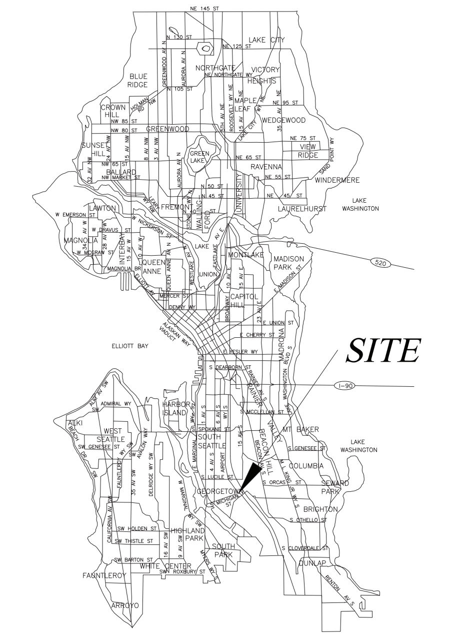
16 CONDITIONS, NOTES, EASEMENTS, PROVISIONS AND/OR ENCROACHMENTS CONTAINED OR DELINEATED ON THE FACE OF THE SURVEY RECORDED UNDER RECORDING NO. 20190806900007.

17. ANY QUESTION THAT MAY ARISE DUE TO THE SHIFTING AND/OR CHANGING IN THE COURSE OF DUWAMISH RIVER.
18. PARAMOUNT RIGHTS AND EASEMENTS IN FAVOR OF THE UNITED STATES FOR COMMERCE, NAVIGATION, FISHERIES AND THE PRODUCTION OF POWER.
19. RIGHTS OF THE STATE OF WASHINGTON IN AND TO THAT PORTION OF SAID PREMISES, IF ANY, LYING IN THE BED OR FORMER BED OF DUWAMISH RIVER, IF IT IS NAVIGABLE.
20. ANY PROHIBITION OR LIMITATION ON THE USE, OCCUPANCY OR IMPROVEMENTS OF THE LAND RESULTING FROM THE RIGHT OF THE PUBLIC OR RIPARIAN OWNERS TO USE ANY WATERS WHICH MAY COVER THE LAND OR TO USE ANY PORTION OF THE LAND WHICH IS NOW OR MAY FORMERLY HAVE BEEN COVERED BY WATER.

REFERENCES:

1. SEATTLE ENGINEER'S QUARTER SECTION MAP 245–161–1
2. SEATTLE ENGINEER'S QUARTER SECTION MAP 159
3. SEATTLE ENGINEER'S QUARTER SECTION MAP 161
4. RECORD OF SURVEY, AFN 20080422900001
5. RECORD OF SURVEY, AFN 20190806900007
6. PLAT OF DUWAMISH INDUSTRIAL ADDITION TO THE CITY OF SEATTLE, VOL. 21, PG. 65
7. RECORD OF SURVEY, AFN 9010089015
8. RECORD OF SURVEY, AFN 7906269008
9. STATUTORY WARRANTY DEED, AFN 20050126000261
10. QUIT CLAIM DEED, AFN 20110627000139
11. SPECIAL WARRANTY DEED, AFN 20171204002045

VICINITY MAP NTS



UTILITY PROVIDERS:

COMCAST CABLE

KING CNTY METRO SEWER

LEVEL 3 NOW CENTURYLINK
CONTACT NAME : CENTURYLINK ENGINEERING
CONTACT PHONE: 877–366–8344
CONTACT EMAIL: NATIONALRELO@CENTURYLINK.COM

ZAYO FNA ABOVENET

PUGET SOUND ENERGY GAS
CONTACT NAME : LANNY NESMITH
CONTACT PHONE: 425–456–2202

CTLQL–CENTURYLINK
CONTACT NAME : CENTURYLINK ENGINEERING
CONTACT PHONE: 877–366–8344
CONTACT EMAIL: NATIONALRELO@CENTURYLINK.COM

SEATTLE CITY LIGHT

SEATTLE PUBLIC UTILITIES–WATER

SEATTLE D.O.T.

SEATTLE PUBLIC UTILITIES

SURVEY NOTE:

THE PURPOSE OF THIS SURVEY IS TO RESURVEY THE FLUME PARCEL AS DESCRIBED UNDER TITLE REPORT REFERENCED HEREON. IN RESEARCHING THE HISTORICAL DOCUMENTS, THE SUBJECT PARCEL IS ONLY A PORTION OF THE ORIGINAL FLUME PARCEL FROM THE GEORGETOWN STEAM PLANT ENCOMPASSING THE FILLED RIVERBED OF THE DUAMISH WATERWAY. KING COUNTY D.O.T. PERFORMED A SURVEY OF THE EAST ADJOINING PARCEL FOR THE KING COUNTY AIRPORT FILED UNDER RECORD OF SURVEY 20080422900001 AND WAS USED AS THE BASIS OF THE EAST LINE OF SUBJECT PARCEL IS INTENDED TO BE THE EAST MEANDER LINE FOR THE FILLED RIVERBED AND WAS CALCULATED USING THE PARCEL DESCRIPTION AND ADJOINER DEEDS WHICH ARE ALL CONSISTENT IN THE CALLS.

FURTHER, MONUMENTS WERE FOUND ALONG THE WEST LINE AS SET BY THAT SURVEYOR UNDER RECORD OF SURVEY 20190806900007 BUT WERE NOT HELD AS TO THE ORIGINAL MEANDER LINE.

NOTES:

HORIZONTAL DATUM: NAD 83 – EPOCH 2011**
VERTICAL DATUM; NAVD 88 (CITY OF SEATTLE)
**BASED ON RTK GPS MEASUREMENTS CONSTRAINED USING THE WASHINGTON STATE REFERENCE NETWORK AND MEASURED AT THE MONUMENTS REFERRED TO ON THIS SHEET.

ALL DISTANCES SHOWN ARE GROUND DISTANCES UNLESS OTHERWISE NOTED.

THE LOCATION AND DESCRIPTION OF ALL SURVEY MARKERS SHOWN HEREON ARE BASED ON FIELD OBSERVATIONS TAKEN IN AUGUST, 2020, UNLESS OTHERWISE INDICATED.

WORK PERFORMED IN CONJUNCTION WITH THIS SURVEY UTILIZED THE FOLLOWING EQUIPMENT AND PROCEDURES: (A) 1" TRIMBLE S7 SERIES ELECTRONIC TOTAL STATION, MAINTAINED TO THE MANUFACTURER'S SPECIFICATIONS PER W.A.C. 332–130–100. (B) TRIMBLE R10 GPS SYSTEM (AUGUST, 2020) (C) FIELD TRAVERSE, EXCEEDING REQUIREMENTS SET FORTH IN W.A.C. 332–130–090.

THIS TOPOGRAPHIC SURVEY DRAWING ACCURATELY PRESENTS SURFACE FEATURES LOCATED DURING THE COURSE OF THIS SURVEY. UNDERGROUND UTILITIES SHOWN HEREON ARE BASED SOLELY UPON INFORMATION PROVIDED BY OTHERS AND PACE ENGINEERS, INC. DOES NOT ACCEPT RESPONSIBILITY OR ASSUME LIABILITY FOR THEIR ACCURACY OR COMPLETENESS. CONTRACTOR/ENGINEERS SHALL VERIFY EXACT SIZE AND LOCATION PRIOR TO CONSTRUCTION.
CALL FOR LOCATE: UTILITY LOCATION SERVICE: 811.

SDCI ########, SDOT ########

HORIZONTAL & VERTICAL CONTROL MONUMENTS

(1) OWNER: CITY OF SEATTLE
DESCRIPTION: MONUMENT IN CASE BRASS PLUG WITH PUNCH (DN–1.1)
LOCATION: THE INTERSECTION OF S MYRTLE STREET AND ELLIS AVE S.
NORTHING: 200,317.61858
EASTING: 1,273,134.50766
ELEVATION: 16.43'

(2) OWNER: CITY OF SEATTLE (HELD)
DESCRIPTION: MONUMENT IN CASE BRASS PLUG WITH PUNCH (DN–1.0)
LOCATION: THE INTERSECTION OF S MYRTLE STREET AND FLORA AVE S
NORTHING: 200,323.46148
EASTING: 1,272,848.02312
ELEVATION: 17.69'

(3) OWNER: CITY OF SEATTLE
DESCRIPTION: MONUMENT IN CASE BRASS PLUG WITH PUNCH (DN–1.35)
LOCATION: THE INTERSECTION OF ELLIS AVE S AND E. MARGINAL WY S.
NORTHING: 200017.7660'
EASTING: 1,273,062.9500'
ELEVATION: 17.98'

(4) OWNER: CITY OF SEATTLE
DESCRIPTION: MONUMENT IN CASE BRASS PLUG WITH PUNCH (DN–1.35)
LOCATION: THE INTERSECTION OF E. MARGINAL WY S. AND 16TH AVE S
NORTHING: 198,387.787
EASTING: 1,274,864.923
ELEVATION: 15.43'

(5) OWNER: CITY OF SEATTLE BENCHMARK 3773–513 ID 48484
DESCRIPTION: BRASS CAP
LOCATION: THE NW CORNER INTERSECTION OF E. MARGINAL WY S. AND ELLIS AVE S
NORTHING: 200,111.294
EASTING: 1,273,053.210
ELEVATION: 18.769

OWNER: CITY OF SEATTLE BENCHMARK SNV 5410 ID 2901
DESCRIPTION: BRASS CAP
LOCATION: THE NE CORNER INTERSECTION OF E. MARGINAL WY S. AND CORSON AVE S
NORTHING: 200,742.7870
EASTING: 1,272,373.4150'
ELEVATION: 22.333'

(6) FOUND 5/8" REBAR & CAP "APS LS 29293" 3.7' E. OF CORNER VISITED 2–17–21

(7) FOUND 5/8" REBAR & CAP "APS LS 29293" 3.4' E. & 2.4' S. OF CORNER VISITED 2–17–21

(8) FOUND 5/8" REBAR & CAP "APS LS 29293" 3.5' E. & 2.5' S. OF CORNER VISITED 2–17–21

(9) FOUND LEAD & TACK 1.1' E. & 3.4' S. OF CORNER VISITED 2–17–21

(10) FOUND RAILROAD RAIL VISITED 2–17–21

(11) FOUND 5/8" REBAR & CAP "KING COUNTY LS 18922" 0.25' W. OF CORNER VISITED 2–17–21

(12) FOUND 5/8" REBAR & CAP "KING COUNTY LS 18922" 0.08' S. OF CORNER VISITED 2–17–21

(13) FOUND MAG NAIL & WASHER 1.2' W. & 0.1' N. OR CORNER VISITED 2–17–21

LEGEND

CENTER LINES
RIGHT-OF-WAY LINES
PROPERTY LINES
BOUNDARY LINES
EASEMENT AND VACATION LINES

FOUND MONUMENT
FOUND SURFACE MONUMENT
FOUND REBAR AND CAP AS NOTED
FOUND PK NAIL OR TACK & LEAD
(C) CALCULATED
(D) DEED

N

60 30 0 60 120
SCALE IN FEET

CONTROL

REVISIONS PER PARK COMMENTS 5–20–21			
REVISIONS PER CLIENT 1–7–22			
NATURE	MADE	CHK'D	REV'D
REVISIONS			
VAULT SERIAL NO.	DATE	MARK	

PACE
An Engineering Services Company
11255 Kirkland Way, Suite 300
Kirkland, WA 98033
p. 425.827.2014 | f. 425.827.5043
Civil | Structural | Planning | Survey
www. paceengrs.com

SDCI ########, SDOT ########
REVIEWED BY SPU/WATER ENGINEERING .... 20.....
REVIEWED BY SPU/DRAINAGE .... 20.....
APPROVED BY SDOT STREET IMPROVEMENT PERMITTING .... 20.....

APPROVED FOR ADVERTISING
LIZ ALZEER
DEPARTMENT OF FINANCE & ADMINISTRATIVE SERVICES
SEATTLE, WASHINGTON . . . . 20 . . .
BY: . . . .
CITY PURCHASING & CONTRACTING SERVICES DIRECTOR

INITIALS AND DATE		INITIALS AND DATE	
DESIGNED		REVIEWED:	
CHECKED		DES.	CONST.
		SDOT	PROJ. MGR.
DRAWN	GW/DMB 3–5–21	RECEIVED	
CHECKED	AAB 3–5–21	REVISED AS BUILT	

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0–02.3 OF THE PROJECT MANUAL.

AARON B. BLAISDELL
STATE OF WASHINGTON
41278
REGISTERED
PROFESSIONAL LAND SURVEYOR

Seattle Department of Transportation
ORDINANCE NO. PW NO.
SCALE: 1"=60'

GEORGETOWN FLUME TOPOGRAPHIC SURVEY

JOB	PC
	CO
VPI #	
	S1
SHEET	03 OF 30

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Jan-06-22 8:41am

SITE

SDCI ########. SDOT ########

VAULT SERIAL NO. | DATE | MARK | NATURE REVISIONS | MADE | CHK'D | REV'D

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Jan-06-22 8:41am

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APPROVED BY SDOT STREET IMPROVEMENT PERMITTING .... 20.....

APPROVED FOR ADVERTISING
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SEATTLE, WASHINGTON .... 20 ....
BY: ....
CITY PURCHASING & CONTRACTING SERVICES DIRECTOR

INITIALS AND DATE		INITIALS AND DATE	
DESIGNED		REVIEWED:	
CHECKED		DES.	CONST.
		SDOT	PROJ. MGR.
DRAWN	GW/DMB 3-5-21	RECEIVED	
CHECKED	AAB 3-5-21	REVISED AS BUILT	

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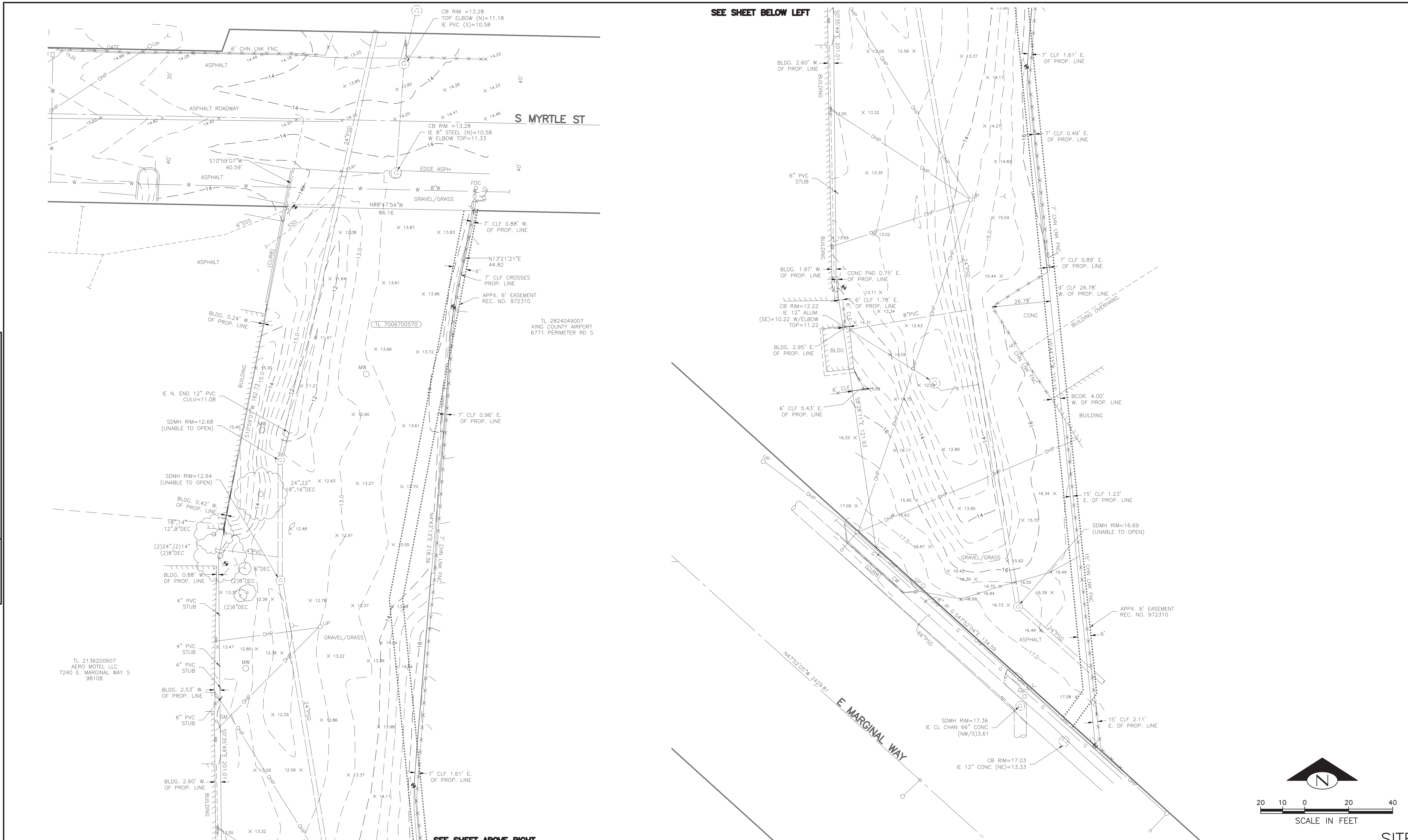
AARON B. BLAISDELL — STATE OF WASHINGTON — 41276 — REGISTERED PROFESSIONAL LAND SURVEYOR

Seattle Department of Transportation
ORDINANCE NO. PW NO.
SCALE: 1"=20'

GEORGETOWN FLUME TOPOGRAPHIC SURVEY

JOB PC CO
VPI #
S2
SHEET 04 OF 30



SDCI ########. SDOT ########	APPROVED FOR ADVERTISING	INITIALS AND DATE	INITIALS AND DATE	
REVIEWED BY SPU/WATER ENGINEERING .... 20....	LIZ ALZEER	DESIGNED	REVIEWED:	
REVIEWED BY SPU/DRAINAGE .... 20....	DEPARTMENT OF FINANCE & ADMINISTRATIVE SERVICES	CHECKED	DES. CONST.	
APPROVED BY SDOT STREET IMPROVEMENT PERMITTING .... 20....	SEATTLE, WASHINGTON .... 20....	DRAWN GW/DMB 3-5-21	SDOT PROJ. MGR.	
	BY:	CHECKED AAB 3-5-21	RECEIVED	
	CITY PURCHASING & CONTRACTING SERVICES DIRECTOR	ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0-02.3 OF THE PROJECT MANUAL.	REVISED AS BUILT	

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AARON B. BLAISDELL
STATE OF WASHINGTON
41275
REGISTERED
PROFESSIONAL LAND SURVEYOR

Seattle Department of Transportation
ORDINANCE NO. PW NO.
SCALE: 1"=20'

GEORGETOWN FLUME TOPOGRAPHIC SURVEY

JOB PC CO
VPI #
S3
SHEET 05 OF 30

VAULT SERIAL NO.	DATE	MARK	NATURE	MADE	CHK'D	REV'D
			REVISIONS			

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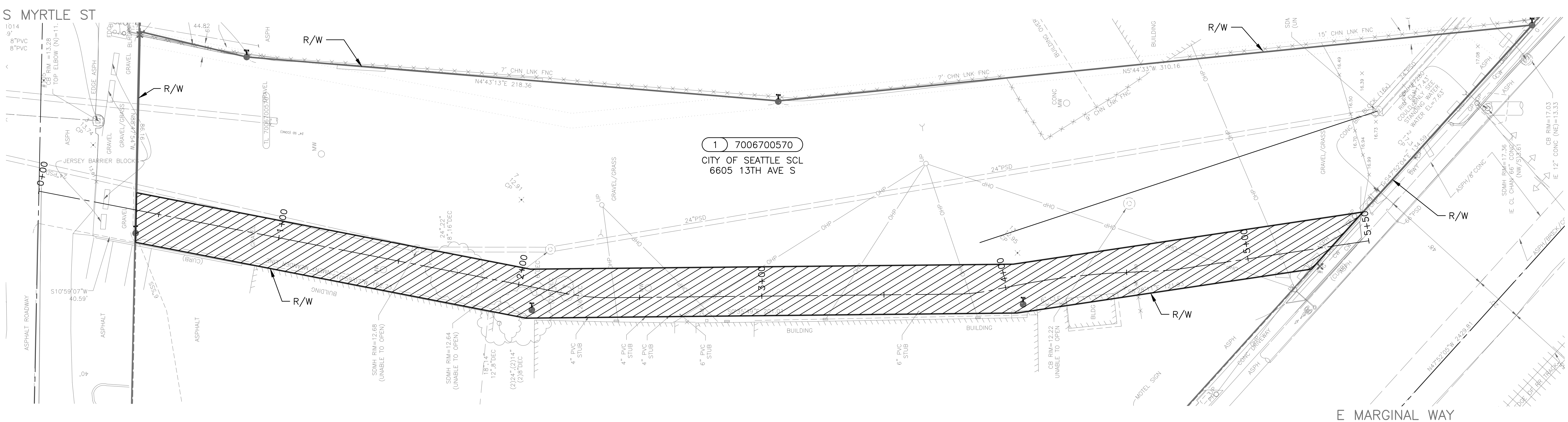
Jan-06-22 8:41am

SDCI ########, SDOT ########

NE SEC 29, TWN 24, R 04



ROW TABLE									
PROJECT PARCEL NUMBER	SHEET	PARCEL NUMBER	PARCEL ADDRESS	OWNERSHIP (TAXPAYER)	OWNERSHIP TOTAL AREA (SF)	PERMANENT EASEMENT (SF)	MUTUAL BENEFIT TEMPORARY CONSTRUCTION EASEMENT (SF)	TOTAL TEMPORARY CONSTRUCTION EASEMENT (SF)	REMAINDER (SF)
1	RW1	7006700570	6605 13TH AVE S	CITY OF SEATTLE SCL	317,500	0	TJO–9,921	TJO–9,921	317,500

LEGEND:

MUTUAL BENEFIT TEMPORARY CONSTRUCTION EASEMENT

PERMANENT EASEMENT

R/W

(RIGHT OF WAY LINE)

(PROPERTY LOT LINE)

PROJECT PARCEL NUMBER

1 1234567890

TAX PARCEL NUMBER

N

20 10 0 20 40

SCALE IN FEET

100% SUBMITTAL NOT FOR CONSTRUCTION
APRIL 2022

RIGHT OF WAY

PW#2020-xxx

APPROVED FOR ADVERTISING
LIZ ALZEER
DEPARTMENT OF FINANCE & ADMINISTRATIVE SERVICES
SEATTLE, WASHINGTON . . . . 20 . .

BY: . . . .
PURCHASING AND CONTRACTING DIRECTOR

INITIALS AND DATE	INITIALS AND DATE
DESIGNED	REVIEWED:
CHECKED	DES. / CONST.
	SDOT / PROJ. MGR.
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PETER TRINH · STATE OF WASHINGTON · 51781 · REGISTERED PROFESSIONAL ENGINEER

Seattle Department of Transportation
ORDINANCE NO. PW NO. 2020-xxx
SUBPROJECT ID:
SCALE: 1"=20'

GEORGETOWN FLUME
OFF–LEASH AREA

JOB PC TRC0140
CO TRC0140
VPI # 792–265
RW1
SHEET 6 OF 30

DATE	MARK	NATURE REVISIONS	MADE	CHK'D	REV'D

VAULT SERIAL NO. 38361

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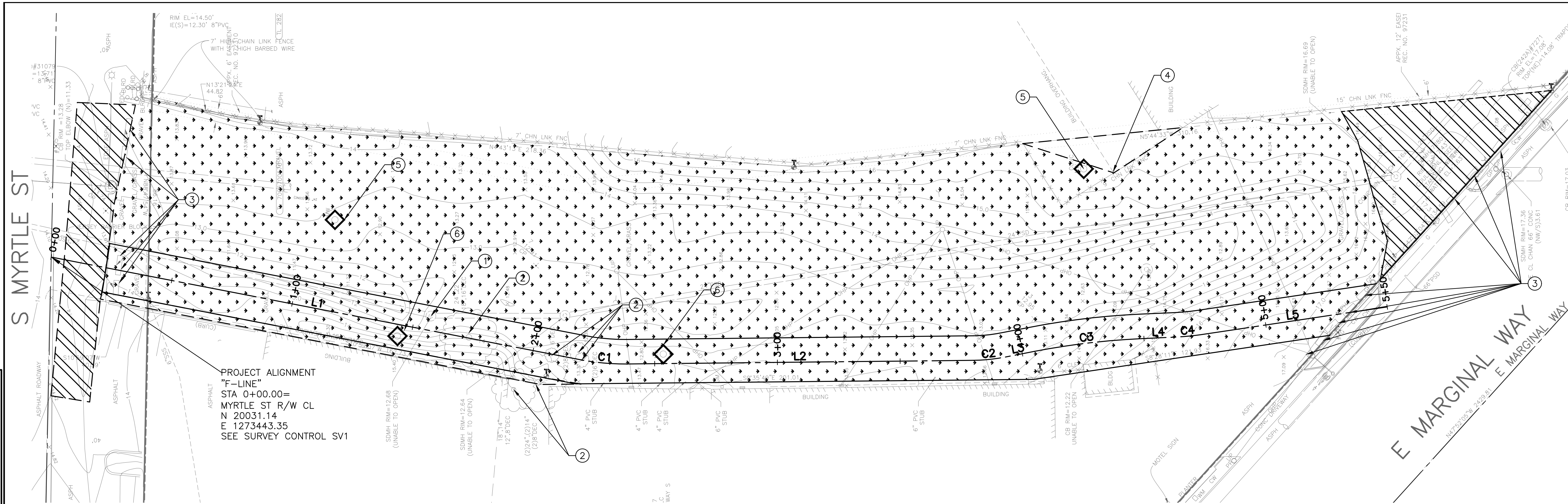

F-LINE											
SEGMENT	START STATION	END STATION	BEARING	BEGIN NORTHING	BEGIN EASTING	END NORTHING	END EASTING	DELTA	RADIUS	TANGENT	LENGTH
L1	0+00.00	2+19.62	S10° 59' 07.10"W	200311.14	1273443.35	200095.55	1273401.50			S10° 59' 07.10"W	219.62
C1	2+19.62	2+38.62		200095.55	1273401.50	200076.66	1273399.78	011°34'56.00"	94.00	S05° 11' 39.10"W	19.00
L2	2+38.62	3+79.89	S00° 35' 48.90"E	200076.66	1273399.78	199935.40	1273401.25			S00° 35' 48.90"E	141.27
C2	3+79.89	3+92.64		199935.40	1273401.25	199922.73	1273402.54	010°26'16.91"	70.00	S05° 48' 57.35"E	12.75
L3	3+92.64	4+04.74	S11° 02' 05.81"E	199922.73	1273402.54	199910.85	1273404.86			S11° 02' 05.81"E	12.10
C3	4+04.74	4+48.88		199910.85	1273404.86	199867.07	1273410.10	008°25'44.72"	300.00	S06° 49' 13.44"E	44.13
L4	4+48.88	4+63.28	S02° 36' 21.08"E	199867.07	1273410.10	199852.68	1273410.75			S02° 36' 21.08"E	14.40
C4	4+63.28	4+72.90		199852.68	1273410.75	199843.11	1273411.68	005°51'49.81"	94.00	S05° 32' 15.99"E	9.62
L5	4+72.90	5+50.00	S08° 28' 10.90"E	199843.11	1273411.68	199766.85	1273423.03			S08° 28' 10.90"E	77.10

GENERAL NOTES

1. PRESERVE AND PROTECT ALL EXISTING FEATURES UNLESS NOTED OTHERWISE. SEE 1-07.16 AND 1-07.17.
2. THIS DRAWING INDICATES THE REMOVAL WORK TO DO DONE. FOR METHOD OF PAYMENT, SEE INDIVIDUAL PAYMENT SECTION IN THE SPECIFICATIONS.
3. FOR REMOVAL/RELOCATION OF SIGN POSTS, SEE CHANNELIZATION AND SIGNING PLAN.
4. RESET MONUMENT AND ADJUST CASTING, SEE PAVING PLANS.
5. REFER TO INTERMEDIATE GRADING PLAN FOR EXCAVATION DEPTHS.

N

20 10 0 20 40
SCALE IN FEET

REMOVAL LEGEND

- REMOVE PAVEMENT
- REMOVE SIDEWALK
- CLEAR AND GRUB, AND COMMON EX.
- SUBGRADE PREPARATION FOR BIORETENTION AREA. SEE SHEET 13 FOR LIMITS.
- SAWCUT FULL DEPTH

REMOVAL NOTES

1. ADJUST EX MH, CB, INLET OR VC
2. REMOVE TREE
3. REMOVE CONCRETE BLOCKS
4. REMOVE FENCE
5. PRESERVE AND PROTECT WATER MONITORING WELL
6. REMOVE SOIL VAPOR MONITORING WELL

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SITE PREPARATION

PW#2020-xxx

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PETER TRINH
STATE OF WASHINGTON
51781
REGISTERED
PROFESSIONAL ENGINEER

Seattle Department of Transportation
ORDINANCE NO. PW NO. 2020-xxx
SUBPROJECT ID:
SCALE: 1"=20'

GEORGETOWN FLUME
OFF-LEASH AREA

JOB PC TRC0140
CO TRC0140
VPI # 792-265
SP1
SHEET 7 OF 30

VAULT SERIAL NO. 38361
DATE MARK NATURE REVISIONS MADE CHK'D REV'D

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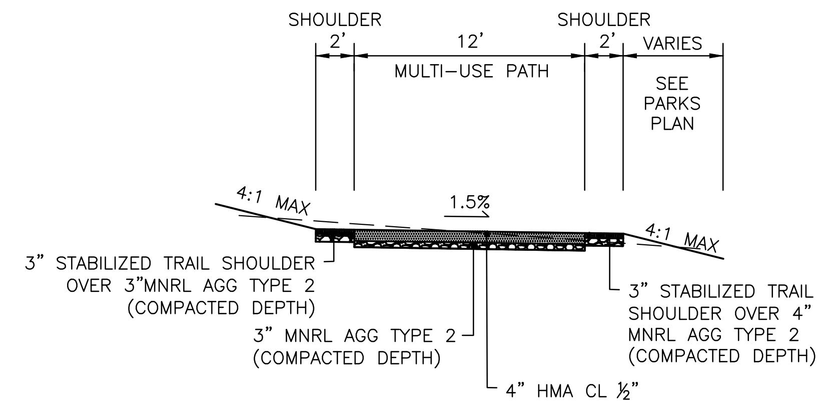
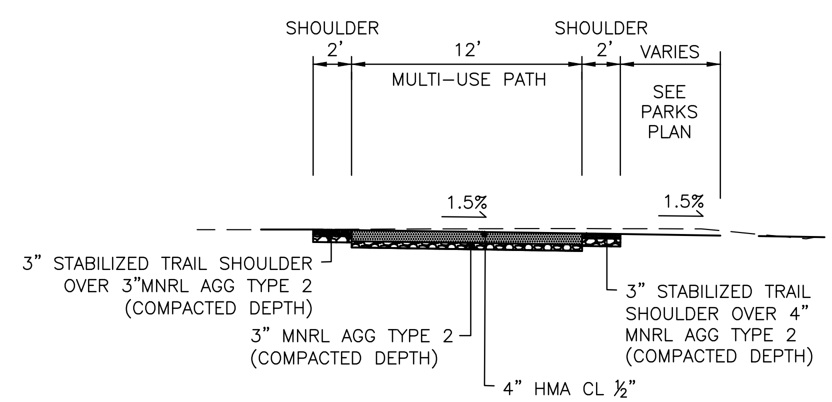


TRAIL SECTION A–A

LOOKING NORTH
NTS



TRAIL SECTION B–B

LOOKING NORTH
NTS

VAULT SERIAL NO.	DATE	MARK	NATURE REVISIONS	MADE	CHK'D	REV'D
38361						

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SECTIONS

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Seattle Department of Transportation
ORDINANCE NO. PW NO. 2020–xxx
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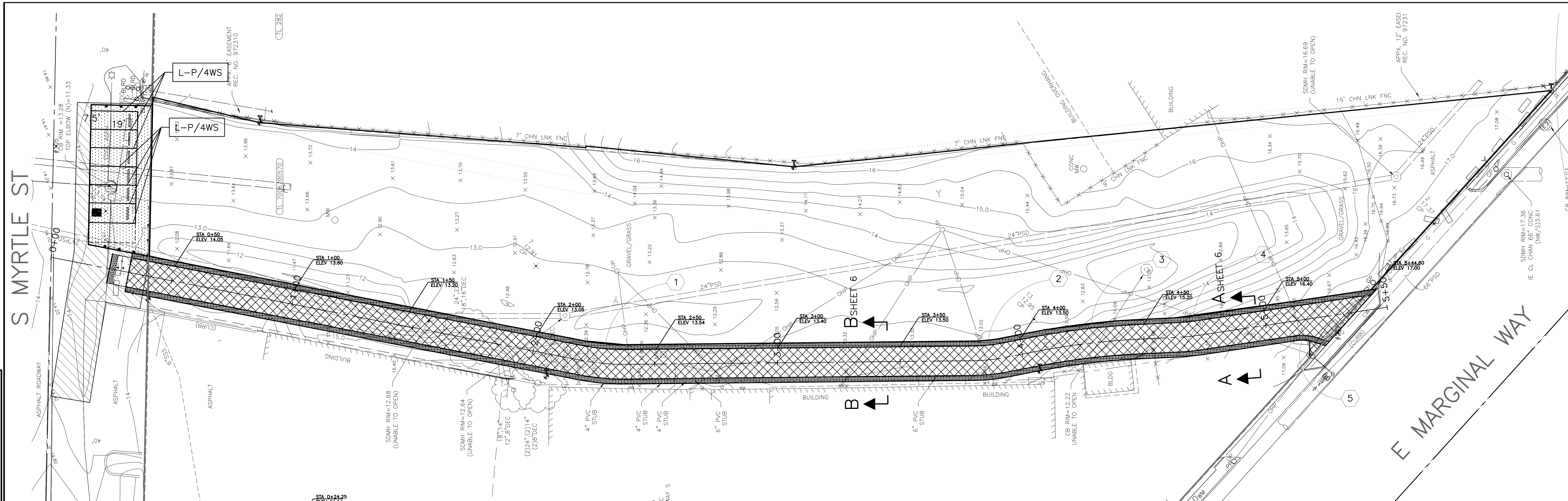
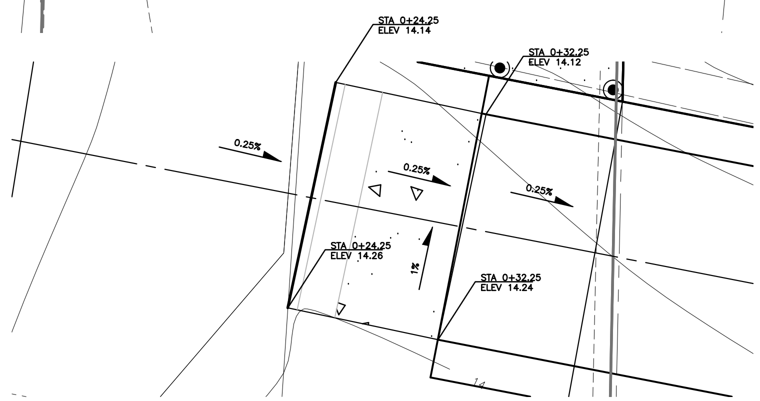
GEORGETOWN FLUME OFF–LEASH AREA

JOB		
PC	TRC0140	
CO	TRC0140	
VPI #	792–265	
RS1		
SHEET	8	OF 30





PAVING LEGEND

- CEM CONC SIDEWALK OR MEDIAN W/ 25% POZZOLANS, PER STD PLAN 420
- PAVEMENT, 2" HMA CL ½", OVER 10" ROADWAY CEM CONC. OVER MINERAL AGG. TYPE 2, 6" COMPACTED DEPTH
- 10" ROADWAY CEM CONC. OVER MINERAL AGG. TYPE 2, 6" COMPACTED DEPTH
- HMA CL ½" 3" OVER MINERAL AGG. TYPE 2, 4" COMPACTED DEPTH
- 3" STABILIZED TRAIL SHOULDER OVER MINERAL AGG. TYPE 2, 4" COMPACTED DEPTH
- LANDSCAPING W/ TREES 40' O.C.
- 6" CEM CONC DRIVEWAY, HES (24 HRS), PER COS STD PLAN 430 & 431
- CURB RAMP W/25% POZZOLANS AND DETECTABLE WARNING, SEE CR SHEETS.
- CURB AND CUTTER CEM. CONC. CURB W/ 25% POZZOLANS PER COS STD. PLAN 410B
- DETECTABLE WARNING PLATE
- L-P/4WS 4" PAINT WHITE PARKING STALL STRIPE

CONSTRUCTION NOTES

1. MATCH EX SIDEWALK/LANDING OR PAVEMENT
2. MATCH EX CURB
3. CONCRETE DRIVEWAY PER COS STD PLAN 430B

CURVE DATA

	PC – STA	PT – STA	RADIUS	LENGTH	Δ	PC	1/4	1/2	3/4	PT
1	2+19.62	2+38.62	88.00'	17.79'	11.58	SEE DRAWING				
2	3+79.89	3+92.64	64.00'	11.66'	10.44	SEE DRAWING				
3	3+92.64	4+07.74	306.00'	45.02'	8.43	SEE DRAWING				
4	4+48.88	4+63.28	88.00'	9.01'	5.86	SEE DRAWING				
5	4+63.28	4+72.90	19.00'	8.67'	26.15	SEE DRAWING				

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PAVING

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GEORGETOWN FLUME OFF-LEASH AREA

JOB PC TRC0140 CO TRC0140
VPI # 792-265
PV1
SHEET 9 OF 30

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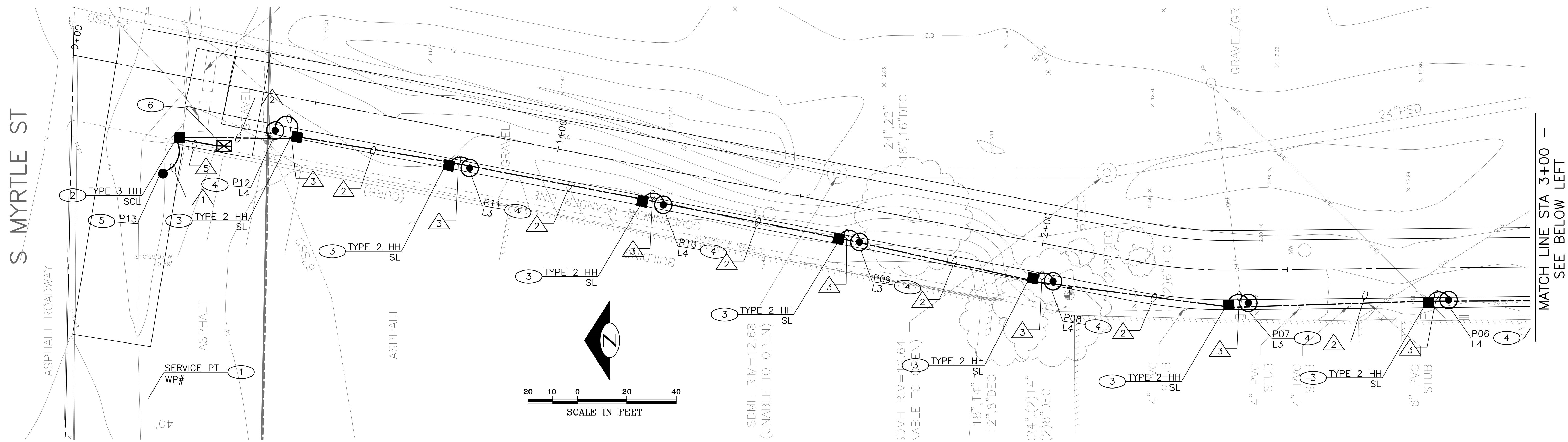

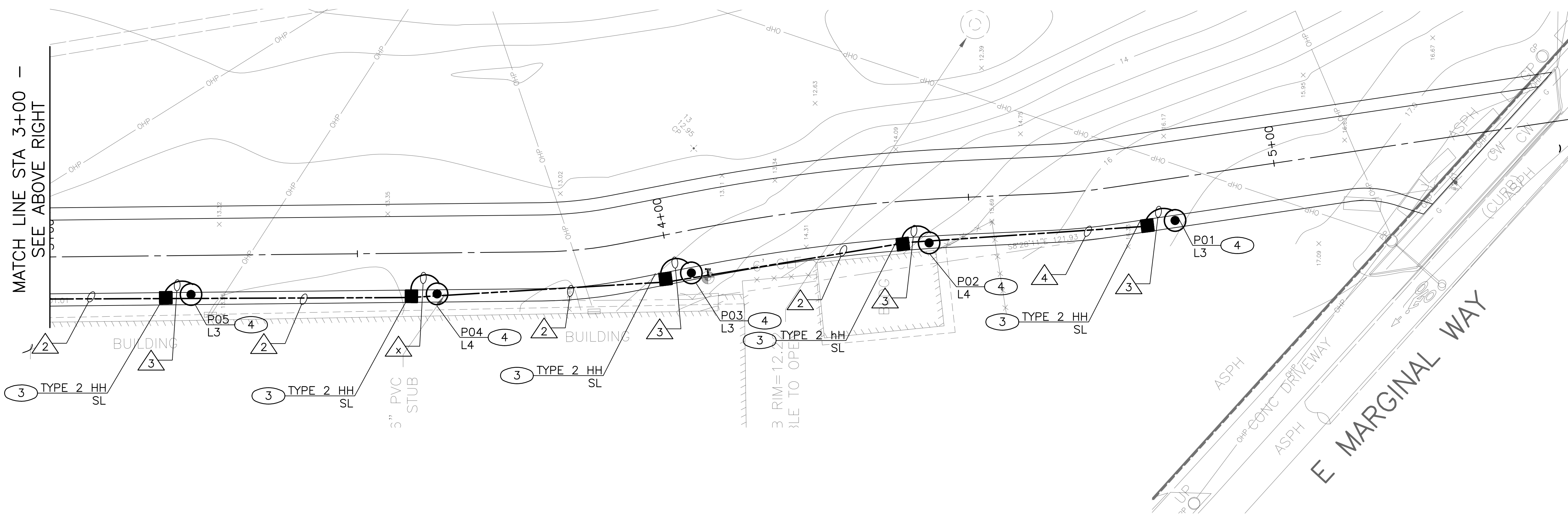

CONSTRUCTION NOTES

INSTALL:

1. SERVICE POINT. COORDINATE WITH SCL CREWS. SCL CREWS WILL RUN WIRE FROM P13 TO EX WP FOR SERVICE
2. IDISTRIBUTION HANDHOLE (SLDHH) PER SCL STD 1716.07. INSTALL 10A. FUSE AT EACH HOTLEG AND CONNECT CIRCUITS
3. HANDHOLE PER SCL STD 1716.07 AND 1714.50. GROUNDING AND BONDING SHALL START FROM SLDHH PER SCL STD 1714.50
4. PEDESTRIAN LIGHT POLE, LUMINAIRE, FOUNDATION AND 4X4 SQUARE PAD AROUND FOUNDATION. FOUNDATION AND PAD MUST BE INSTALLED LEVEL. FIXTURE: ARIETA SIDE-MOUNT LUMINIARE, DK BRONZE STOCK #013420 (SCL MAT'L STD 5723.23) POLE: 14' HINGED POLE, DK BRONZE STOCK #014382 (SCL MAT'L STD 5723.23)
5. CLASS 3 WOOD POLE ID# POLEDF40CL3 PER SCL 01.007 (LOCATED IN APPENDIX). POLE MUST BE EMBEDDED 7 FT. 200 FT OF SERVICE WIRE MUST BE COILED AT THE TOP OF THE POLE. INSTALLV2-3" RISERS FOR SERVICE TO PED LIGHTING AND SERVICE CABINET. COORDINATE THRU THE ENGINEER FOR SERVICE CONNECTION AND INSPECTION
6. SERVICE CABINET AND FOUNDATION FOR FUTURE

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LIGHTING AND ELECTRICAL

PW#2020-xxx

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JOCELYN MAMCHUR
STATE OF WASHINGTON
49491
REGISTERED
PROFESSIONAL ENGINEER

Seattle Department of Transportation
ORDINANCE NO. PW NO. 2020-xxx
SUBPROJECT ID:
SCALE: 1"=20'

GEORGETOWN FLUME
OFF-LEASH AREA

JOB PC	TRC0140
CO	TRC0140
VPI #	792-265
	EL1
SHEET 10 OF 30	

VAULT SERIAL NO.	DATE	MARK	NATURE REVISIONS	MADE	CHK'D	REV'D
38361						

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WIRING SCHEDULE – PEDESTRIAN LIGHTING

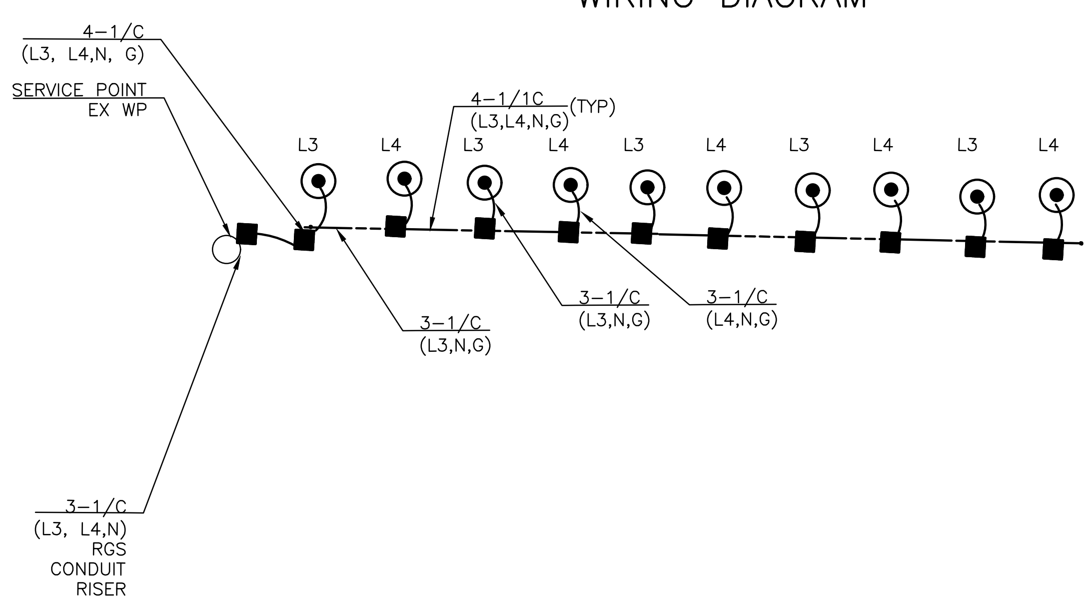
RUN NO.**	CONDUIT SIZE	PED LIGHTING	SVC	GND	REMARKS
1	2–3" RISER		3–#2	**	NEW SERVICE FOR PED LIGHTING
2	2–2" LIGHTING	3–#6 (L3,L4,N, G)		#6	
3	1–2" LIGHTING	2–#12 (L, N)		#6	FEED INTO POLE
4	2–2" LIGHTING	2–#6 (L, N)		#6	
5	1–3" SCL		3–#2	#6	SERVICE FOR CABINET

1. ** INDICATES THAT GROUNDING MUST BE PER SCL STANDARD 0231.01
2. ALL GROUNDWIRE MUST BE #6 AWG, UNLESS OTHERWISE NOTED. ALL CONDUIT WITH A CONDUCTOR SHALL CONTAIN A GROUNDWIRE
3. ALL MATERIALS MUST MEET SCL MATERIAL STANDARDS (http://www.seattle.gov/light/engineerstd/)
4. ALL STREETLIGHTING MUST BE GROUND PER SCL STANDARD 1714.50
5. #4 CU AWG GROUNDWIRE MUST BE INSTALLED IN ALL TRENCHES AND TIED TO GROUND RODS. REFER TO SCL STD 1714.50, PART 6

POLE SCHEDULE

POLE NO.	LOCATION: STATION	OFFSET	LT/RT	POLE TYPE	POLE LENGTH (FT)	FOUNDATION TYPE	CIRCUIT
P01	STA 4+82.76, 6.86' RT			PEDESTRIAN AL	14	STD PLAN 543B	L3
P02	STA 4+43.14 7.10' RT			PEDESTRIAN AL	14	STD PLAN 543B	L4
P03	STA 4+03.25, 6.89' RT			PEDESTRIAN AL	14	STD PLAN 543B	L3
P04	STA 3+62.90, 6.68' RT			PEDESTRIAN AL	14	STD PLAN 543B	L4
P05	STA 3+22.89 6.36' RT			PEDESTRIAN AL	14	STD PLAN 543B	L3
P06	STA 2+82.61 6.53' RT			PEDESTRIAN AL	14	STD PLAN 543B	L4
P07	STA 2+42.03, 6.68' RT			PEDESTRIAN AL	14	STD PLAN 543B	L3
P08	STA 2+03.52, 7.18' RT			PEDESTRIAN AL	14	STD PLAN 543B	L4
P09	STA 1+63.52, 6.84' RT			PEDESTRIAN AL	14	STD PLAN 543B	L3
P10	STA 1+23.08, 7.02' RT			PEDESTRIAN AL	14	STD PLAN 543B	L4
P11	STA 0+83.20, 7.17' RT			PEDESTRIAN AL	14	STD PLAN 543B	L3
P12	STA 0+43.07, 7.23' RT			PEDESTRIAN AL	14	STD PLAN 543B	L4
P13	STA 155+84.9, 19' RT			CLASS 3 WOOD POLE	40	EMBEDDED PER SCL STD 0100.7 (7 FT)	NA

WIRING DIAGRAM



HANDHOLE SCHEDULE

DESCRIPTION	QUANTITY	LABEL
TYPE 2 HH	12	SL
TYPE 3 HH	1	SCL

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LIGHTING AND ELECTRICAL

PW#2020-xxx

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JOCELYN MANCHUR, STATE OF WASHINGTON, 49491, REGISTERED PROFESSIONAL ENGINEER

Seattle Department of Transportation
ORDINANCE NO. PW NO. 2020–xxx
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GEORGETOWN FLUME OFF–LEASH AREA

JOB PC TRC0140
CO TRC0140
VPI # 792–265
EL2
SHEET 11 OF 30

VAULT SERIAL NO. 38361
DATE | MARK | NATURE REVISIONS | MADE | CHK'D | REV'D

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CONSTRUCTION STORMWATER CONTROL (CSC) GENERAL NOTES

1. A FIRST GROUND DISTURBANCE INSPECTION IS REQUIRED PRIOR TO START OF WORK ON ALL SITES WITH LAND DISTURBING ACTIVITY. SCHEDULE A FIRST GROUND DISTURBANCE INSPECTION FOR AN ISSUED BUILDING PERMIT AT 206-684-8900 OR ONLINE AS DESCRIBED AT http://www.seattle.gov/sdci/inspections/site-development-inspections
2. THE APPLICANT SHALL DESIGNATE AN EROSION AND SEDIMENT CONTROL (ESC) SUPERVISOR WHO SHALL BE RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPS). FOR LARGE CONSTRUCTION PROJECTS, THE ESC SUPERVISOR SHOULD BE A CERTIFIED EROSION AND SEDIMENT CONTROL LEAD (CESCL). PROVIDE THE NAME AND PHONE NUMBER OF THE ESC SUPERVISOR TO THE SITE INSPECTOR AT THE FIRST GROUND DISTURBANCE INSPECTION.
3. BMPS SHALL BE INSTALLED PRIOR TO STARTING CONSTRUCTION TO ENSURE SEDIMENT-LADEN WATER DOES NOT LEAVE THE PROJECT SITE OR ENTER ROADSIDE DITCHES, STORM DRAINS, SURFACE WATERS, OR WETLANDS.
4. THE BMPS INCLUDED IN THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. THE APPLICANT IS RESPONSIBLE FOR ENSURING THAT BMPS ARE MODIFIED AS NEEDED FOR UNEXPECTED STORM EVENTS OR OTHER UNFORESEEN CIRCUMSTANCES, AND TO ACCOUNT FOR CHANGING SITE CONDITIONS.
5. ANY AREAS OF DISTURBED SOIL THAT WILL NOT BE WORKED FOR TWO CONSECUTIVE DAYS DURING THE WET SEASON (OCT 1 TO APRIL 30) OR SEVEN DAYS DURING THE DRY SEASON (MAY 1 TO SEPT 30) SHALL BE IMMEDIATELY STABILIZED WITH APPROVED BMPS METHODS (E.G. STRAW, MULCH, PLASTIC COVERING, COLD MIX, ETC.)
6. GRADING AND/OR SOIL DISTURBING ACTIVITIES MAY BE LIMITED OR PROHIBITED FOR CERTAIN SITES SUBJECT TO ECA STANDARDS (I.E. ECA STEEP SLOPES, LANDSLIDE PRONE AREAS, ETC.) BETWEEN OCTOBER 31ST AND APRIL 1ST. IF NOTED IN THE GEOTECHNICAL SPECIAL INSPECTIONS REQUIREMENTS, A GRADING SEASON EXTENSION LETTER (GSEL) ISSUED BY SDCI IS REQUIRED FOR ALL GRADING AND/OR SOIL DISTURBING ACTIVITIES DURING THIS PERIOD. THE GEOTECHNICAL SPECIAL INSPECTOR MUST SUBMIT ELECTRONIC APPLICATIONS FOR A GSEL USING THE SDCI PROJECT PORTAL. ALLOW FOUR TO SIX WEEKS FOR PROCESSING. FAILURE TO OBTAIN THE GSEL PRIOR TO OCTOBER 31 MAY RESULT IN A WORK STOPPAGE.
7. CITY STREETS AND SIDEWALKS SHALL BE KEPT CLEAN AT ALL TIMES. NO MATERIAL SHALL BE STORED ON CITY STREETS OR SIDEWALKS WITHOUT A STREET USE PERMIT FROM THE SEATTLE DEPARTMENT OF TRANSPORTATION (SDOT).
8. POLLUTION CONTROL MEASURES SHALL BE FOLLOWED TO ENSURE THAT NO LIQUID PRODUCTS OR CONTAMINATED WATER ENTERS ANY STORM DRAINAGE FACILITIES OR OTHERWISE LEAVES THE PROJECT SITE. ANY HAZARDOUS MATERIALS OR LIQUID PRODUCTS THAT HAVE THE POTENTIAL TO POLLUTE RUNOFF SHALL BE STORED AND DISPOSED OF PROPERLY.
9. ENSURE THAT WASHOUT FROM CONCRETE TRUCKS IS PERFORMED OFF-SITE OR IN DESIGNATED CONCRETE WASHOUT AREAS ONLY. DO NOT WASH OUT CONCRETE TRUCKS ONTO THE GROUND, OR TO STORM DRAINS OR OPEN DITCHES. DO NOT DUMP EXCESS CONCRETE ONSITE, EXCEPT IN DESIGNATED CONCRETE WASHOUT AREAS.
10. ALL AREAS OF DISTURBED SOIL SHALL BE FULLY STABILIZED WITH THE APPROPRIATE SOIL AMENDMENT AND COVER MEASURES AT COMPLETION OF THE PROJECT. TYPICAL COVER MEASURES INCLUDE LANDSCAPING OR HYDROSEED WITH MULCH.

CONSTRUCTION STORMWATER CONTROL (CSC) PLAN REQUIREMENTS / NARRATIVE

SHOW TEMPORARY AND PERMANENT BEST MANAGEMENT PRACTICES (BMPS) IN THE PLAN VIEW OF THIS SHEET THAT WILL ACCOMPLISH THE MINIMUM REQUIREMENTS DESCRIBED IN THE NARRATIVE BELOW. THE BMPS SHOWN IN THE PLAN VIEW OF THIS PLAN ARE THE MINIMUM REQUIRED. ADDITIONAL BMPS ARE REQUIRED WHEN MINIMUM CONTROLS ARE NOT SUFFICIENT TO PREVENT EROSION OR TRANSPORT OF SEDIMENT OR OTHER POLLUTANTS FROM THE SITE.

- MARK CLEARING LIMITS
- DELINEATE ENVIRONMENTALLY CRITICAL AREAS
- RETAIN TOP LAYER AND NATIVE VEGETATION
- ESTABLISH CONSTRUCTION ACCESS
- PROTECT DOWNSTREAM PROPERTIES AND RECEIVING WATERS
- PREVENT EROSION AND SEDIMENT TRANSPORT FROM THE SITE
- STABILIZE SOILS
- PROTECT SLOPES
- PROTECT STORM DRAINS
- STABILIZE CHANNEL AND OUTLETS
- CONTROL POLLUTANTS
- CONTROL DEWATERING
- MAINTAIN AND INSPECT BMPs
- EXECUTE CONSTRUCTION STORMWATER CONTROL PLAN
- MINIMIZE OPEN TRENCHES
- PHASE THE PROJECT
- INSTALL PERMANENT FLOW CONTROL AND WATER QUALITY FACILITIES
- PROTECT STORMWATER BMPs PRIOR TO, DURING, AND AFTER CONSTRUCTION

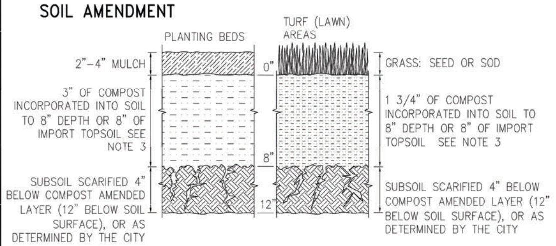
POST CONSTRUCTION SOIL MANAGEMENT PLAN

AT THE END OF PROJECT, ALL AREAS DISTURBED AND NOT COVERED WITH A HARD SURFACE MUST BE AMENDED PER THE SOIL AMENDMENT DETAIL BELOW AND PROBE TO 12-INCHES AT THE SITE FINAL INSPECTION.

LABEL ALL AREAS DISTURBED AND NOT COVERED WITH A HARD SURFACE AS ONE OF THE FOLLOWING: SA (SOIL AMENDMENT AREA) or ND (NON-DISTURBED AREA).

- NON-DISTURBED AREA (ND): VEGETATED AREAS THAT WILL NOT BE SUBJECT TO LAND DISTURBING ACTIVITY DO NOT REQUIRE SOIL AMENDMENT IF THEY ARE FENCED AND CONTINUOUSLY PROTECTED THROUGHOUT CONSTRUCTION. THE FENCING MUST BE IN PLACE AT THE FIRST GROUND DISTURBANCE INSPECTION. NO DISTURBANCE, INCLUDING VEHICLE TRAFFIC OR MATERIAL STORAGE, IS ALLOWED IN THESE AREAS UNTIL FINAL INSPECTION.
- SOIL AMENDMENT AREA (SA): VEGETATED OR COMPOST AREAS (TURF AND LANDSCAPE) MUST BE AMENDED PER THE SOIL AMENDMENT DETAIL. THIS INCLUDES AREAS IMPACTED BY CLEARING AND GRADING, STOCKPILING, SITE ACCESS, PATHWAYS AND MATERIALS OR EQUIPMENT STORAGE.

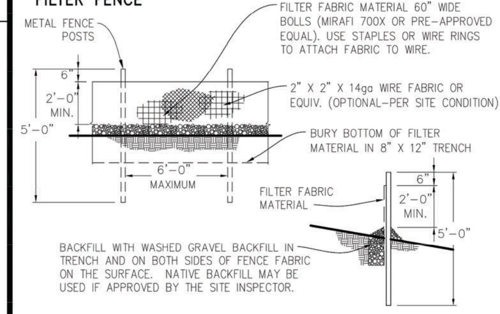
SOIL AMENDMENT



NOTES:
1. POST CONSTRUCTION SOIL AMENDMENT IS REQUIRED ON ALL AREAS NOT COVERED BY HARD SURFACE WHERE SOIL IS DISTURBED DURING CONSTRUCTION.
2. SOIL AMENDMENT MUST PASS A 12 INCH MINIMUM PROBE TEST.
3. IMPORT TOPSOIL, IF USED, MUST MEET THE REQUIREMENTS OF THE SEATTLE STORMWATER MANUAL, VOL. 1, SECTIONS 5.1.5.1 AND 5.1.5.3.

SYMBOL: (SA) AREA REQUIRING SOIL AMENDMENT (ND) NON-DISTURBED AREA (SOIL AMENDMENT NOT REQUIRED)

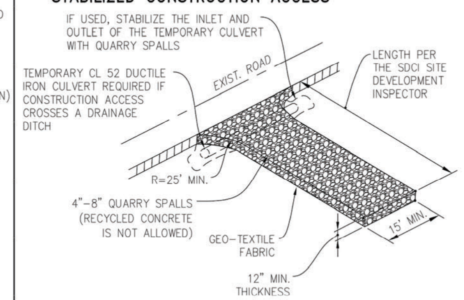
FILTER FENCE



NOTE: ANGLE SILT FENCE BACK UP THE SLOPE AT THE END OF RUN.

SYMBOL: (FF)

STABILIZED CONSTRUCTION ACCESS



STABILIZED ACCESS SHALL BE USED IN ALL AREAS OF THE SITE WITH VEHICLE TRAFFIC AND PARKING, INCLUDING PLANTING STRIPS. RECYCLED CONCRETE IS NOT ALLOWED.

SYMBOL: (CE)

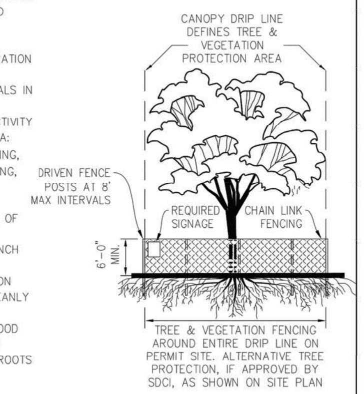
TREE & VEGETATION PROTECTION

TREE PROTECTION FENCING AND SIGN

1. CHAIN LINK FENCE REQUIRED (NO ORANGE CONSTRUCTION FENCE OR PLYWOOD)
2. MINIMUM 6' HIGH
3. FENCE SHALL BE SUPPORTED BY RIGID POSTS DRIVEN INTO THE GROUND AT 8' MAXIMUM INTERVALS
4. MUST BE INSTALLED PRIOR TO DEMOLITION OR GROUND DISTURBANCE
5. KEPT IN PLACE FOR THE DURATION OF CONSTRUCTION
6. NO DUMPING OF ANY MATERIALS IN THE PROTECTION AREA
7. NO SOIL DISTURBANCE OR ACTIVITY ALLOWED WITHIN FENCED AREA: MATERIAL STORAGE/STOCKPILING, PARKING, EXCAVATION, DUMPING, OR WASHING
8. MODIFICATIONS OF THESE REQUIREMENTS BY APPROVAL OF SDCI PLANNER ONLY
9. IF ROOTS GREATER THAN 2 INCH FOUND OUTSIDE OF FENCING, PROTECT BY HAND EXCAVATION AND, IF NECESSARY, CUT CLEANLY AND KEEP MOIST
10. USE 3 INCHES OR DEEPER WOOD CHIP MULCH OUTSIDE FENCED AREAS TO PROTECT FEEDER ROOTS

VEGETATION PROTECTION (DOES NOT APPLY TO TREES)

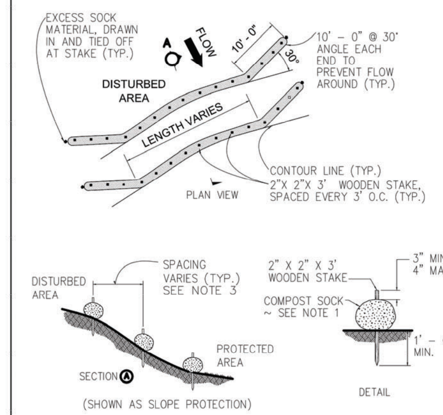
1. ORANGE MESH OR SIMILAR OPEN MATERIAL
2. PROTECT VEGETATION OUTSIDE CONSTRUCTION ZONE WITH FENCING AS SHOWN



LINK TO REQUIRED TREE PROTECTION SIGNAGE:

SYMBOL: (VEG)

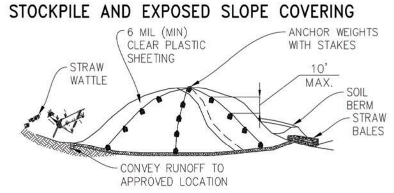
COMPOST SOCK

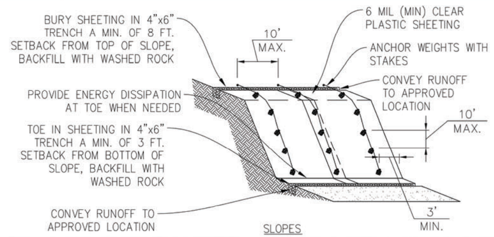


1. COMPOST SOCK SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATION 9.14.4(9). COMPOST SOCK SHALL BE A MINIMUM OF 10" IN DIAMETER OR SIZED TO SUIT CONDITIONS AS SPECIFIED BY THE ENGINEER.
2. ALWAYS INSTALL COMPOST SOCK PERPENDICULAR TO SLOPE AND ALONG CONTOUR LINES.
3. REMOVE SEDIMENT FROM THE UP SLOPE SIDE OF THE COMPOST SOCK WHEN ACCUMULATION HAS REACHED 1/2 OF THE EFFECTIVE HEIGHT OF THE COMPOST SOCK.
4. MAY BE USED IN PLACE OF FILTER FENCE FOR PREMIER CONTROL.

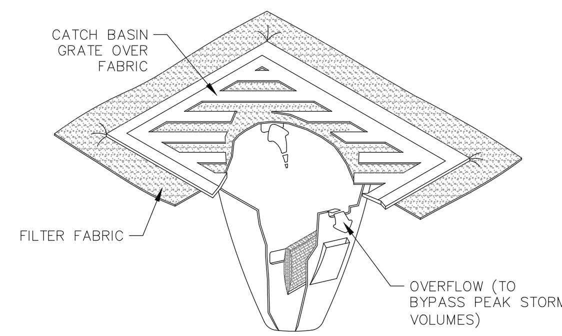
SYMBOL: (CS)

STOCKPILE AND EXPOSED SLOPE COVERING





SYMBOL: (SP)



NOTES:
1. STORM DRAIN INLETS NEED TO BE REMOVED AT THE END OF THE JOB.
2. STORM DRAIN INLETS ARE ONLY TO BE INSTALLED IN DRAINAGE DEVICES PER THE MANUFACTURER'S RECOMMENDATIONS. CATCH BASIN INSERTS ARE NOT TO BE INSTALLED IN CURB INLETS.
3. INSERTS SHALL BE INSPECTED AND MAINTAINED WHEN A 1/2 INCH RAIN ACCUMULATES WITHIN A 24 HOUR PERIOD. CLEAN AND/OR REPLACE INSERT WHEN HALF OF THE TRAP IS FILLED WITH SEDIMENTS.

PURPOSE: TO PREVENT SEDIMENT FROM ENTERING STORM DRAINAGE SYSTEMS PRIOR TO PERMANENT STABILIZATION OF THE DISTURBED AREA.

CATCH BASIN INSERT
SCALE: NOT TO SCALE

SCALE: 1" = 10' NORTH ARROW

CONSTRUCTION STORMWATER CONTROL & POST CONSTRUCTION SOIL MANAGEMENT (CSC/SOIL)PLAN

NOTE: THIS PLAN IDENTIFIES THE MINIMUM MEASURES REQUIRED; ADDITIONAL MEASURES MAY BE REQUIRED BASED ON CONSTRUCTION METHODS AND ACTUAL AREA OF DISTURBANCE.

DPD APPROVAL STAMP

TEMPLATE VERSION: 2021-06-18

CITY OF SEATTLE
DEPARTMENT OF CONSTRUCTION AND INSPECTIONS

STANDARD CONSTRUCTION STORMWATER CONTROL AND POST CONSTRUCTION SOIL MANAGEMENT (CSC/SOIL) PLAN
APPLICANT PLAN SET

SDCI PERMIT NO.: 6______-CN
ADDRESS: ------
SEATTLE, WA
DESIGNED BY:
DRAWN BY:
CHECKED BY:
DATE: 00/00/0000

STANDARD CSC/SOIL PLAN
SHEET CSC

VAULT SERIAL NO.	DATE	MARK	NATURE	MADE	CHK'D	REV'D
			REVISIONS			

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Apr-21-22 3:00pm

04/20/2022
NOT FOR CONSTRUCTION

APPROVED FOR ADVERTISING
LIZ ALZEER
DEPARTMENT OF FINANCE & ADMINISTRATIVE SERVICES
SEATTLE, WASHINGTON . . . . 21 . .
BY: . . . .
PURCHASING AND CONTRACTING DIRECTOR

INITIALS AND DATE		INITIALS AND DATE	
DESIGNED EA		REVIEWED:	
CHECKED SS		DES.	CONST.
		SDOT	PROJ. MGR.
DRAWN DB		RECEIVED	
CHECKED SS		REVISED AS BUILT	

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0-02.3 OF THE PROJECT MANUAL.

EDUARDO H. ALBAN, STATE OF WASHINGTON, REGISTERED PROFESSIONAL ENGINEER

Seattle Parks & Recreation
ORDINANCE NO. PW NO. PRK730312-02
SUBPROJECT ID:
SCALE: 1:20

GEORGETOWN FLUME OFF-LEASH AREA

JOB PC CO
VPI # C1.0
TESC PLAN
SHEET 12 OF 30

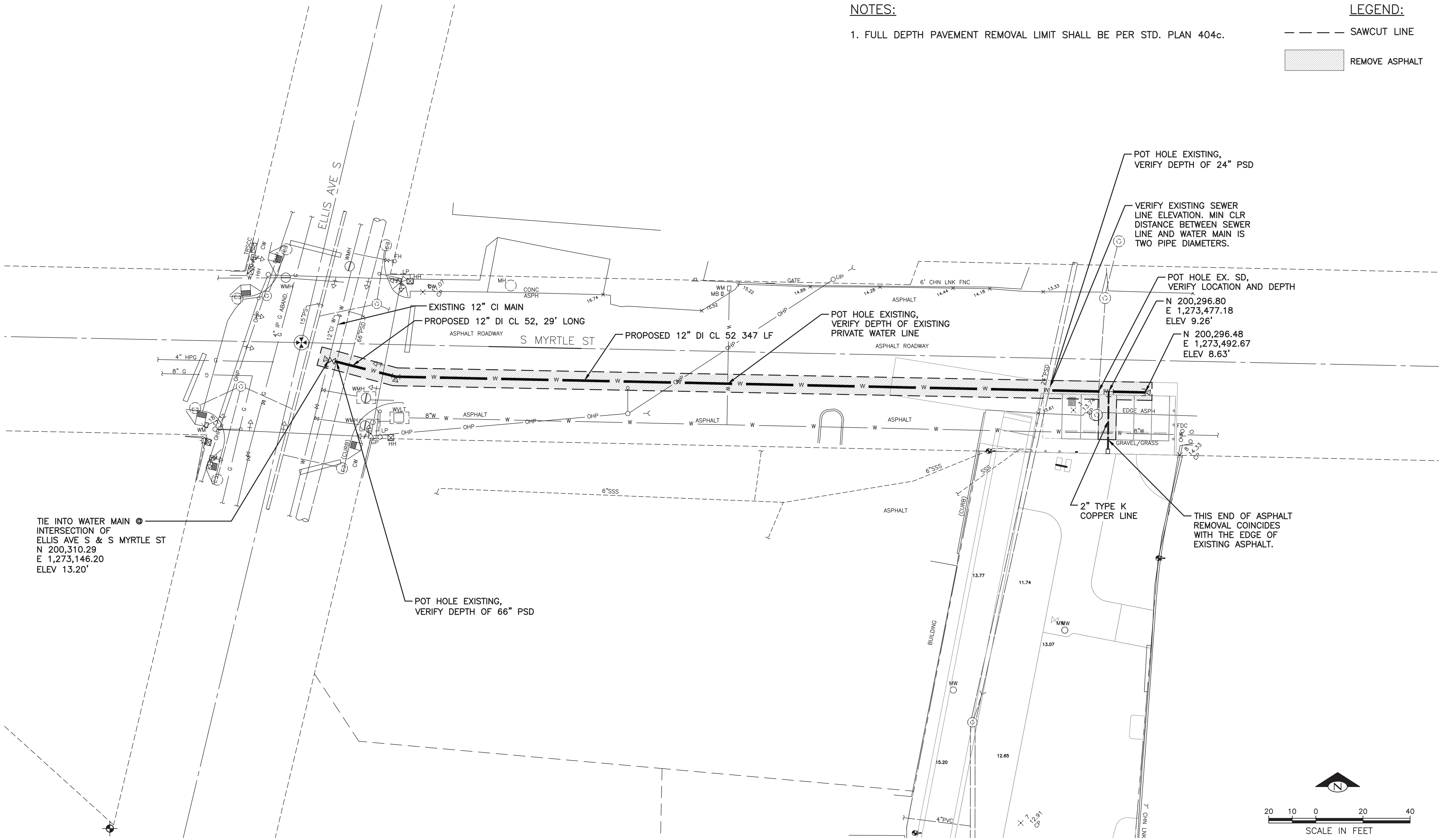
NOTES:

1. FULL DEPTH PAVEMENT REMOVAL LIMIT SHALL BE PER STD. PLAN 404c.

LEGEND:

SAWCUT LINE

REMOVE ASPHALT



VAULT SERIAL NO.	DATE	MARK	NATURE	MADE	CHK'D	REV'D
			REVISIONS			

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Apr-21-22 3:01pm

04/20/2022
NOT FOR CONSTRUCTION

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DEPARTMENT OF FINANCE & ADMINISTRATIVE SERVICES
SEATTLE, WASHINGTON .... 21 ...

BY: ....
PURCHASING AND CONTRACTING DIRECTOR

INITIALS AND DATE	INITIALS AND DATE
DESIGNED EA	REVIEWED: DES. CONST.
CHECKED SS	SDOT PROJ. MGR.
DRAWN –	RECEIVED
CHECKED SS	REVISED AS BUILT

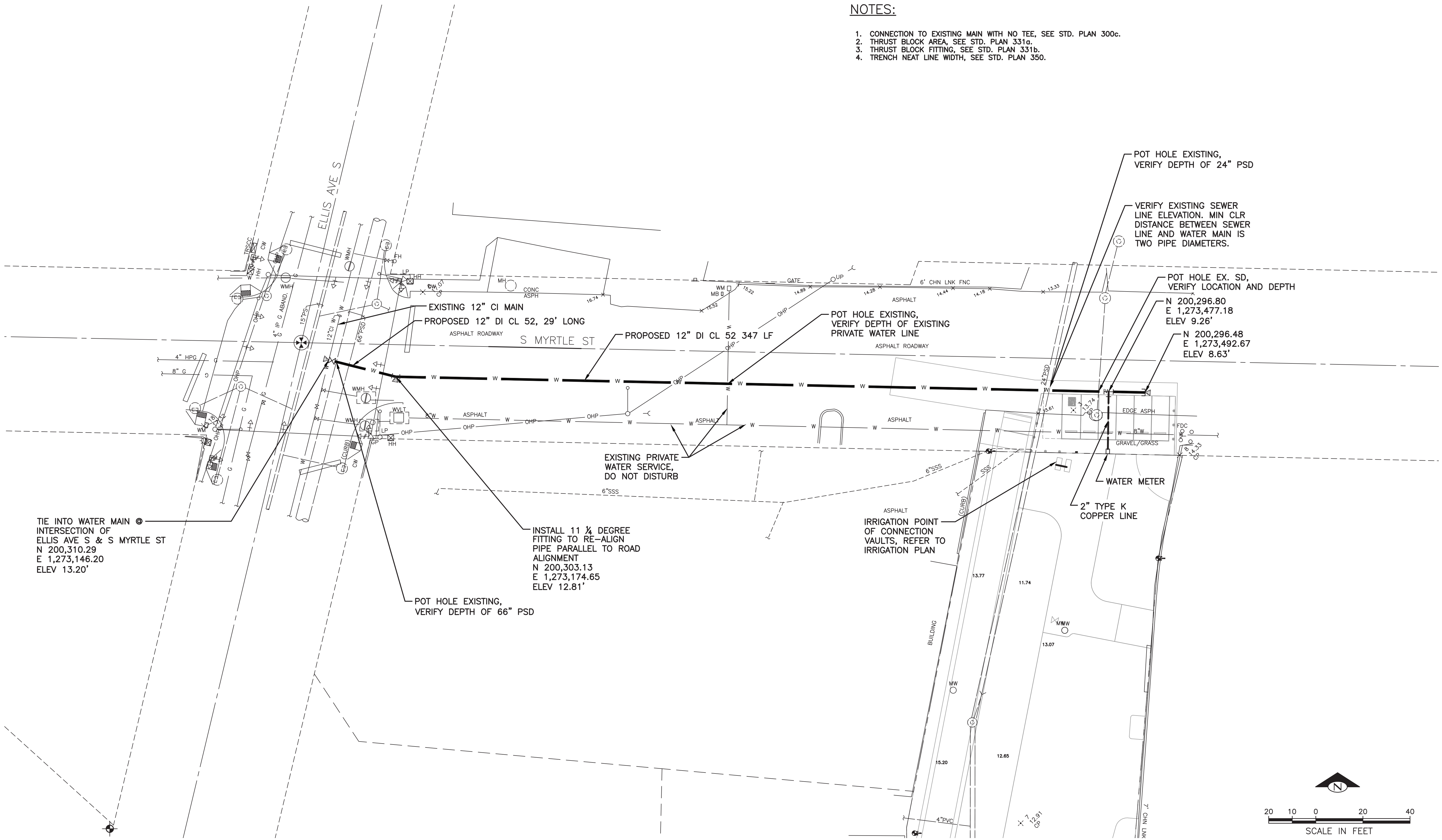
ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0-02.3 OF THE PROJECT MANUAL.

Seattle Parks & Recreation

ORDINANCE NO.
PW NO. PRK730312-02
SUBPROJECT ID:
SCALE: 1:20

GEORGETOWN FLUME OFF-LEASH AREA

JOB PC CO
VPI # C2.0
WATERMAIN SITE PREPARATION
SHEET 13 OF 30



NOTES:

1. CONNECTION TO EXISTING MAIN WITH NO TEE, SEE STD. PLAN 300c.
2. THRUST BLOCK AREA, SEE STD. PLAN 331a.
3. THRUST BLOCK FITTING, SEE STD. PLAN 331b.
4. TRENCH NEAT LINE WIDTH, SEE STD. PLAN 350.

VAULT SERIAL NO.	DATE	MARK	NATURE	MADE	CHK'D	REV'D
			REVISIONS			

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Apr-21-22 3:01pm

04/20/2022
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SEATTLE, WASHINGTON . . . . 21 . .

BY: . . . .
PURCHASING AND CONTRACTING DIRECTOR

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DESIGNED EA		REVIEWED:	
CHECKED SS		DES.	CONST.
		SDOT	PROJ. MGR.
DRAWN –		RECEIVED	
CHECKED SS		REVISED AS BUILT	

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0-02.3 OF THE PROJECT MANUAL.

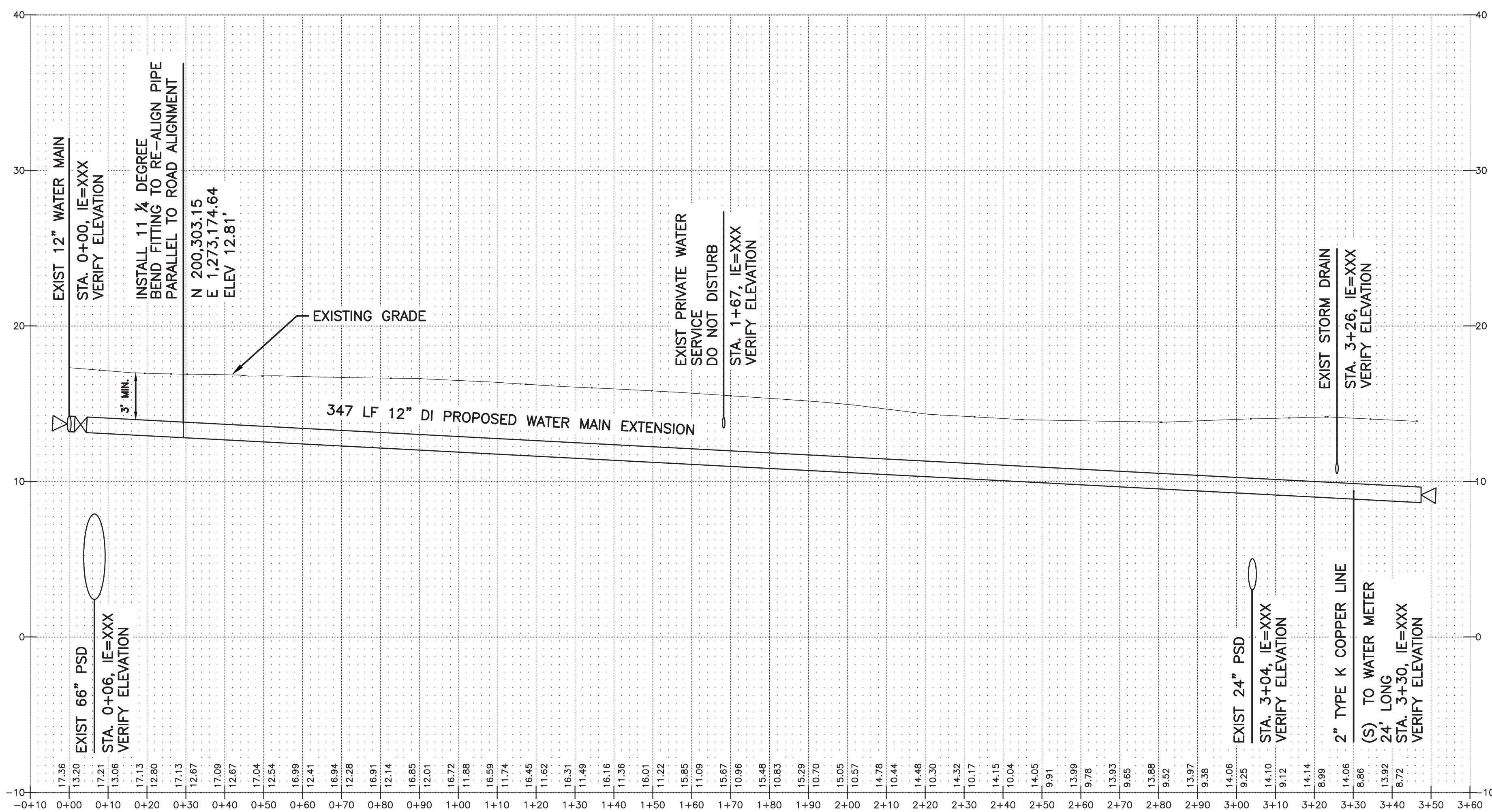
Seattle Parks & Recreation
ORDINANCE NO. PW NO. PRK730312-02
SUBPROJECT ID:
SCALE: 1:20

GEORGETOWN FLUME OFF-LEASH AREA

JOB	PC
	CO
VPI #	C2.1
WATERMAIN PLAN	
SHEET 14 OF 30	

NOTES:

1. ALL EXISTING UTILITY LINE CROSSING ELEVATIONS MUST BE FIELD VERIFIED.



PROFILE VIEW: WATER MAIN EXTENSION

SCALE H: 1"= 20'
V: 1"= 5'

VAULT SERIAL NO.	DATE	MARK	NATURE	MADE	CHK'D	REV'D
			REVISIONS			

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Apr-21-22 3:01pm

04/20/2022
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SEATTLE, WASHINGTON . . . . 21 . . .

BY: . . . .
PURCHASING AND CONTRACTING DIRECTOR

INITIALS AND DATE	INITIALS AND DATE
DESIGNED EA	REVIEWED: DES. CONST.
CHECKED SS	SDOT PROJ. MGR.
DRAWN –	RECEIVED
CHECKED SS	REVISED AS BUILT

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0-02.3 OF THE PROJECT MANUAL.

Seattle Parks & Recreation

ORDINANCE NO.
PW NO. PRK730312-02
SUBPROJECT ID:
SCALE: 1:20

GEORGETOWN FLUME OFF-LEASH AREA

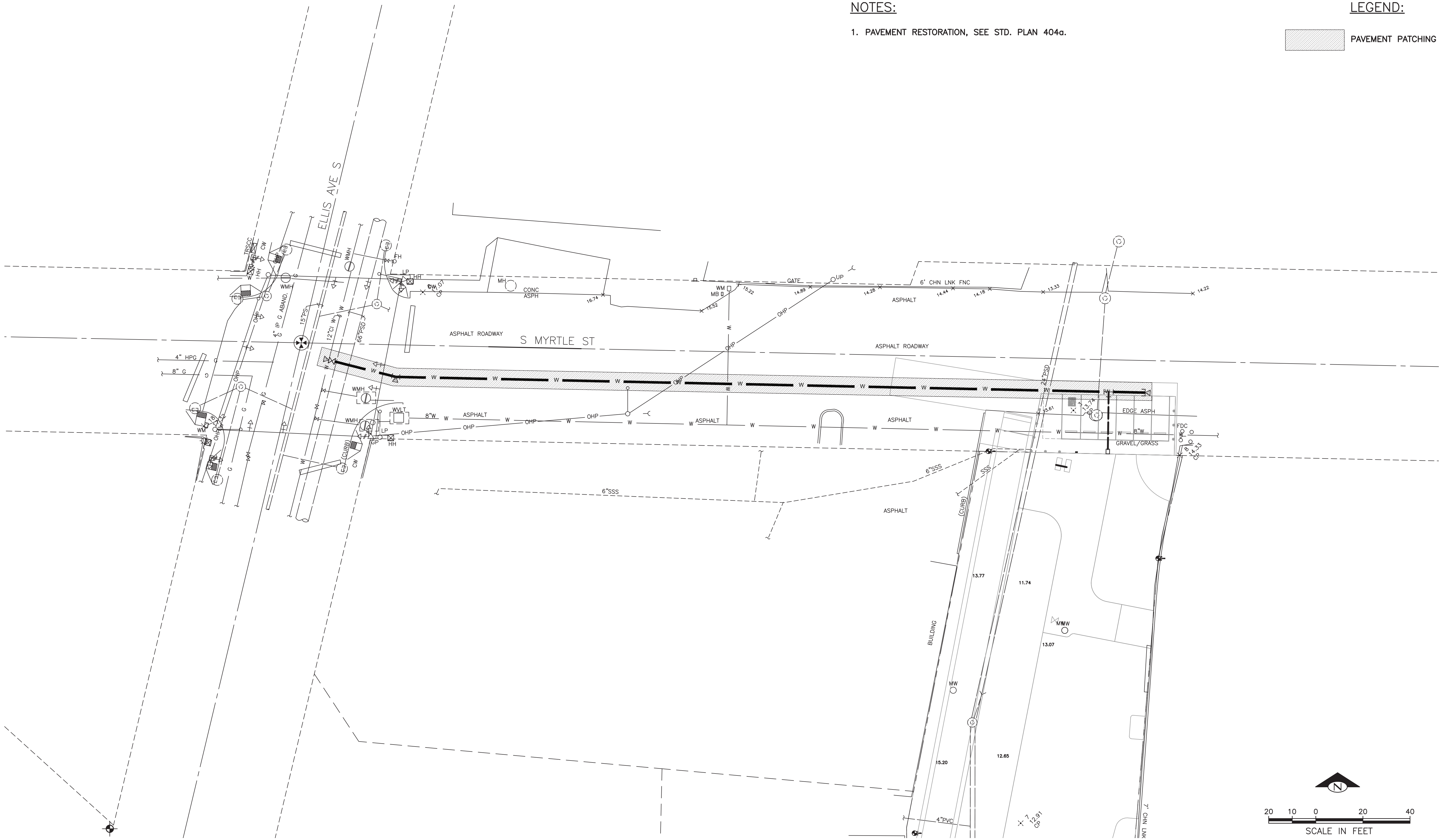
JOB PC CO
VPI # C2.2
WATERMAIN PROFILE
SHEET 15 OF 30

NOTES:

1. PAVEMENT RESTORATION, SEE STD. PLAN 404a.

LEGEND:

PAVEMENT PATCHING



04/20/2022
NOT FOR CONSTRUCTION

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DEPARTMENT OF FINANCE & ADMINISTRATIVE SERVICES
SEATTLE, WASHINGTON . . . . 21 . . .

BY: . . . .
PURCHASING AND CONTRACTING DIRECTOR

INITIALS AND DATE	INITIALS AND DATE
DESIGNED EA CHECKED SS	REVIEWED: DES. CONST. SDOT PROJ. MGR.
DRAWN – CHECKED SS	RECEIVED REVISED AS BUILT

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0-02.3 OF THE PROJECT MANUAL.

Seattle Parks & Recreation

ORDINANCE NO. PW NO. PRK730312-02
SUBPROJECT ID:
SCALE: 1:20

GEORGETOWN FLUME OFF-LEASH AREA

JOB PC CO
VPI # C2.3
WATERMAIN PAVEMENT PATCHING
SHEET 16 OF 30

VAULT SERIAL NO.	DATE	MARK	NATURE	MADE	CHK'D	REV'D

REVISIONS

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Apr-21-22 3:02pm

DRAINAGE & WASTEWATER CONTROL PLAN REQUIREMENTS

THIS PLAN SHALL SHOW A SITE PLAN INCLUDING ALL DRAINAGE FEATURES (HARD SURFACES, BMPS, DRAIN LINES, CATCH BASINS, INLETS, PUMPS, ETC.) AND ALL SIDE SEWER FEATURES (SERVICE DRAIN SIDE SEWERS AND SANITARY SIDE SEWERS AND THEIR APPROVED POINTS OF CONNECTION).

SEE VOLUME 1, CHAPTER 8 OF THE 2021 SEATTLE STORMWATER MANUAL FOR SITE AND DRAINAGE ELEMENTS REQUIRED ON THIS PLAN. THE STORMWATER MANUAL AND CAD TEMPLATES FOR THIS PLAN ARE AVAILABLE AT THE FOLLOWING LINK:
http://www.seattle.gov/sdci/codes/codes-we-enforce-(a-z)/stormwater-code

SITE AND DRAINAGE CONTROL SUMMARY SHEET

COMPLETE THE ELECTRONIC ON-SITE STORMWATER MANAGEMENT CALCULATOR AND INSERT THE SITE AND DRAINAGE CONTROL SUMMARY SHEET BELOW. THE ELECTRONIC DOCUMENT IS AVAILABLE ON THE DPD STORMWATER CODE WEBSITE:
http://www.seattle.gov/sdci/codes/codes-we-enforce-(a-z)/stormwater-code

SEE THE INSTRUCTIONS TAB IN THE EXCEL FILE FOR GUIDANCE TO SELECT AND DOCUMENT THE ON-SITE STORMWATER MANAGEMENT BMPS IF REQUIRED.

On-site Stormwater Management Calculator
Site and Drainage Control Summary
Version 06-2021

To use the On-Site List Calculator you must select "Enable Content" when the Security Warning appears.

Project Information

Site Address	7242 E Marginal Way S	SDCI Project Number	
Primary Contact	Eduardo Aban	SDOT Project Number	
Project Type	Parcel-Based	Primary Contact E-mail or Phone	eduardo.aban@seattle.gov

Is this project "Closely Related" to other SDCI construction permits/projects? ○ Yes ◉ No
"Closely Related" SDCI Construction Permit Numbers
Is this project associated with a Short Plat or Subdivision? ○ Yes ◉ No SDCI MUP Number
Was the project lot created or altered in size after Jan 1, 2016? No

Total Site Area	38,629	sf	Total Closely Related and/or Short Plat/Subdivision Site Area	sf
Total Existing Hard Surface Area	0	sf		
Total New plus Replaced Hard Surface Area (NPRHS)	19,423	sf	Total Closely Related and/or Short Plat/Subdivision NPRHS	sf
Total New and/or Replaced Lawn/Landscaping	19,206	sf		
Undisturbed and Protected Site Area	0	sf		

Site Information
Note: Reference the Preliminary Assessment Report (PAR) to complete this section.
Approved Point of Stormwater Discharge: Public Storm Drain Main
Drainage Basin: Designated Receiving Water
Is the downstream drainage system considered Capacity Constrained by SPU? No
Approved Point of Wastewater Discharge: Public Sanitary Sewer Main
Approved Point of Sub-Surface Discharge: Public Storm Drain Main
Required Flow Control Standard: ☐ Pre-Developed Pasture ☐ Pre-Developed Forest ☐ Peak Control ☐ Wetland Protection ☐ Existing Conditions ☑ None
Project will permanently discharge groundwater? No
Required Water Quality Treatment Standard: ☐ Oil Control ☐ Enhanced ☐ Basic ☑ None
Total Pollution Generating Hard Surface Area: 0 sf — w/ Closely Related/Short Plat/Subdiv. sf
Total Pollution Generating Pervious Surface Area: 0 sf — w/ Closely Related/Short Plat/Subdiv. sf
Environmentally Critical Areas: No
☐ Steep Slope ☐ Potential Slide ☐ Riparian Corridor ☐ Wetland ☐ Liquefaction ☐ Flood Prone
☐ Landfill ☐ Known Landslide ☐ Fish / Wildlife ☐ Peat / Groundwater Management ☐ Shoreline Habitat
Is there soil and/or groundwater contamination on this site? No — Source Control is required: Yes

Infiltration Information
Is infiltration investigation required? No — Why? Other
Is infiltration on the site feasible? — Explain:
Site Measured Infiltration Rate x Infiltration Rate Correction Factor 0.5 = 0 Site Design Inf Rate

On-site Stormwater Management (select List Approach or Performance Standard)
◉ On-site List Approach (Pre-sized) Calculator -- Complete the Surface tabs and BMP Sizing tabs (Most commonly used)
○ On-site Performance Standard -- Stormwater modeling by Civil Engineer (Also for No Off-site Point of Discharge)
Number of roof areas: 0
Number of other surface areas: 1

Surface	Surfaces Description	On-site BMP	Contrib. Area (sf)	Facility Size (sf)	Facility Configuration
1	Surface:	Non-Infiltrating Bioretention	19,423	89 sf	Sloped sides 12 inch

Total New/Replaced Roof Area	0	Total Roof Area Managed	0
Total New/Replaced Other Surface Area	19,423	Total Other Surface Managed	19,423
Total Area Managed	19,423 sf	Total Volume Managed On Site	0 gal
Estimated compost required for soil amendment	119.077 cy	*Volume of compost will be verified by the Inspector.*	

seattle.gov

ON-SITE STORMWATER MANAGEMENT PLANTINGS

PLANTING GENERAL NOTES
1. PLANTS SHALL BE SITED ACCORDING TO SUN, SOIL, WIND AND MOISTURE REQUIREMENTS.
2. AT A MINIMUM, PROVISIONS MUST BE MADE FOR SUPPLEMENTAL IRRIGATION DURING THE FIRST TWO GROWING SEASONS.

BIORETENTION CELLS, PLANTERS AND RAIN GARDEN NOTES
1. FOR A LIST OF APPROVED PLANTS FOR BIORETENTION/RAIN GARDEN FACILITIES, SEE APPENDIX E, SECTION E-9 OF THE SEATTLE STORMWATER MANUAL.
2. VEGETATION COVERAGE OF SELECTED PLANS MUST ACHIEVE 90-PERCENT COVERAGE WITHIN 2 YEARS OR ADDITIONAL PLANTINGS SHALL BE PROVIDED. UNLESS DESIGNED BY A LICENSED LANDSCAPE ARCHITECT, PROVIDE A MINIMUM OF 1 PLANT PER EVERY 2 SQUARE FEET OF BIORETENTION BOTTOM AND SLOPED SIDE AREA.
3. PROVIDE A MINIMUM OF THREE DIFFERENT SPECIES OF SHRUBS AND HERBACEOUS PLANTS IN EACH FACILITY.

VEGETATED ROOF NOTES
1. APPROPRIATE PLANTS INCLUDE SUCCULENTS, GRASSES, HERBS, AND WILDFLOWERS THAT ARE ADAPTED TO HARSH CONDITIONS. PLANTS MAY BE INSTALLED AS PRE-GROWN MATS, INDIVIDUAL PLUGS, CUTTINGS, OR SPREAD AS SEEDS.
2. VEGETATION COVERAGE OF SELECTED PLANS MUST ACHIEVE 80-PERCENT COVERAGE WITHIN 2 YEARS OR ADDITIONAL PLANTINGS SHALL BE PROVIDED.
3. A LANDSCAPE MANAGEMENT PLAN SHALL BE DEVELOPED AND IMPLEMENTED.

STORMWATER FACILITIES/CONTROL OPERATIONS & MAINTENANCE REQUIREMENTS

ALL STORMWATER FACILITIES/CONTROLS SHALL BE OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2021 SEATTLE STORMWATER MANUAL, APPENDIX G.

SIDE SEWER AND DRAINAGE PERMIT NOTES

1. SIDE SEWERS AND DRAINAGE FACILITIES SHALL BE CONSTRUCTED PER THE "REQUIREMENTS FOR DESIGN OF SIDE SEWERS (DRAINAGE & WASTEWATER)" DIRECTORS' RULE DPD 4-2011/2011-004 AND PER THE "2021 SEATTLE STORMWATER MANUAL" DIRECTORS' RULE SDCI 10-2021/SPU DWW-200.
2. A SEPARATE DRAINAGE AND SIDE SEWER PERMIT IS REQUIRED FOR ALL ONSITE DRAINAGE ELEMENTS AND SIDE SEWERS/SERVICE DRAINS. APPROVAL OF THIS PLAN IS REQUIRED PRIOR TO OBTAINING A DRAINAGE AND SIDE SEWER PERMIT.
3. RE-USE OF EXISTING SIDE SEWERS WHEN THERE WILL BE AN INCREASE IN LIVING UNITS REQUIRES THE EVALUATION AND CERTIFICATION (PE EVAL/CERT) OF THE EXISTING SIDE SEWER BY A PROFESSIONAL ENGINEER PRIOR TO FINALIZING THE SIDE SEWER AND DRAINAGE PERMIT. IN MOST CASES, THE SIDE SEWER MUST BE LINED ALL THE WAY TO THE MAIN. SEE DIRECTORS RULE 4-2011V.M AND SMC 21.16.240.
4. IN ORDER TO ADD UNITS TO AN EXISTING SIDE SEWER, A CERTIFIED LETTER STATING THE INTENT TO ADD UNITS TO THE SHARED SIDE SEWER MUST BE SENT TO ALL PROPERTY OWNERS OF PARCELS SERVED BY THE SHARED SIDE SEWER AT LEAST 30 DAYS PRIOR TO APPLYING FOR THE SIDE SEWER PERMIT. SMC 21.16.240.C. A RECEIPT OF CERTIFIED MAILING AND THE CERTIFICATION/ATTESTATION OF MAILING NOTIFICATION MUST BE SUBMITTED TO SDCI PRIOR TO PERMIT ISSUANCE.
5. DEVIATIONS FROM THE APPROVED DRAINAGE AND WASTEWATER CONTROL PLAN REQUIRE A FORMAL POST-SUBMITTAL REVISION FOR PLAN REVIEW AND APPROVAL. POST-SUBMITTAL REVISIONS MUST BE SUBMITTED ELECTRONICALLY THROUGH THE SDCI PROJECT PORTAL.

AS-BUILT MEASUREMENTS / NOTES

THIS SECTION IS TO BE COMPLETED AFTER THE DRAINAGE, WASTEWATER, AND SIDE SEWER FEATURES HAVE BEEN INSTALLED. FOR INSTRUCTIONS TO PREPARE THE AS-BUILT PLAN, SEE SDCI TIP #504.

SDCI SIDE SEWER AND DRAINAGE PERMIT # ______

MEASUREMENTS IN THE RIGHT-OF-WAY
1. DISTANCE FROM CENTERLINE OF DOWSTREAM MH TO CENTERLINE OF NEW SERVICE CONNECTION ______
2. SIDE SEWER INTERSECTION WITH PROPERTY LINE - DEPTH ______
3. SIDE SEWER INSTERSECTION WITH PROPERTY LINE - DISTANCE ______

PIPE LINERS
☐ PIPE LINER INSTALLED ON PRIVATE PROPERTY
☐ PIPE LINER INSTALLED IN THE RIGHT-OF-WAY

GENERAL NOTES:

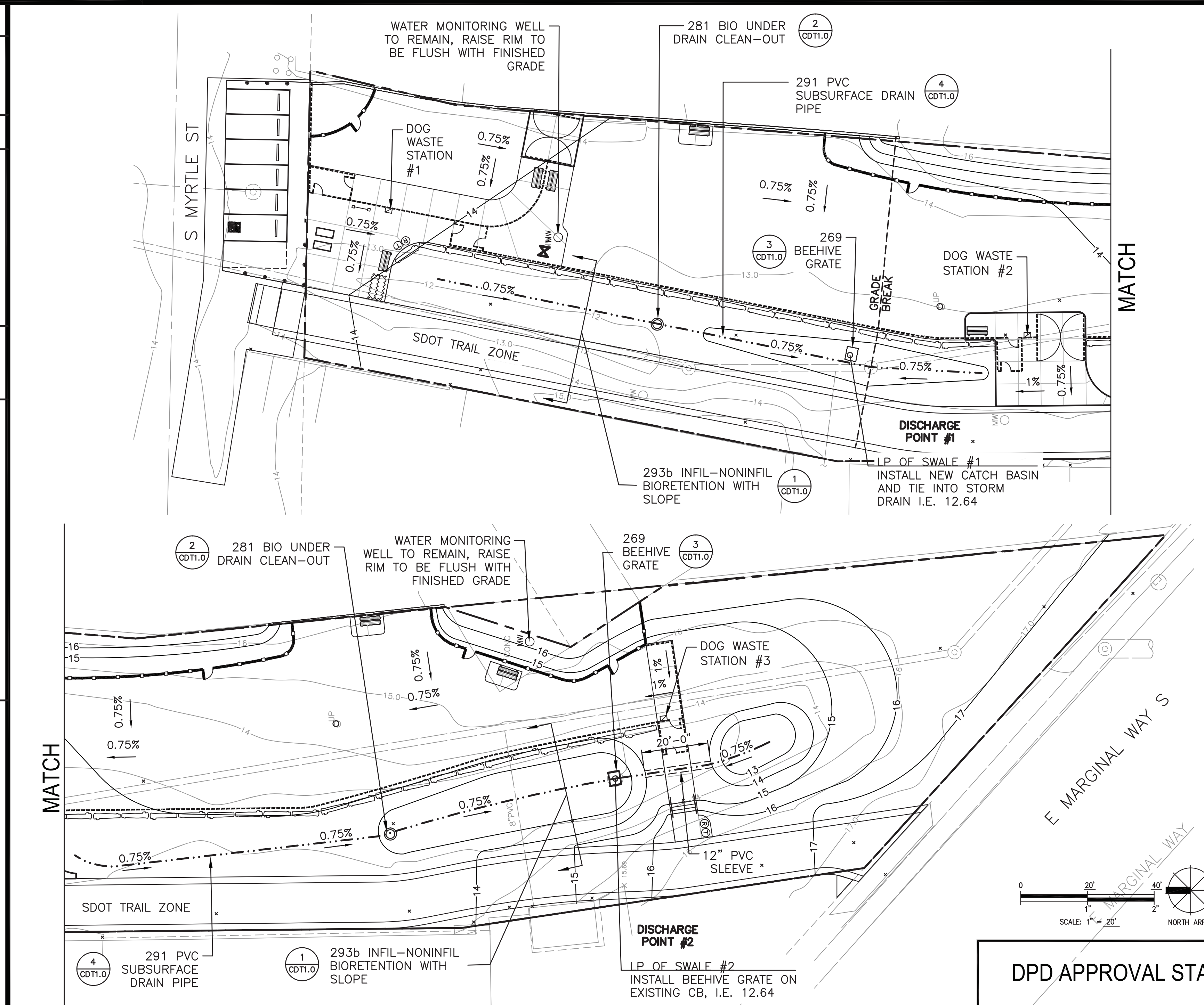
1. APPROVED POINT OF STORMWATER DISCHARGE: PUBLIC STORM DRAIN MAIN.
2. DRAINAGE BASIN: DESIGNATED RECEIVING WATER.
3. APPROVED POINT OF WASTEWATER DISCHARGE: PUBLIC SANITARY SEWER MAIN.
4. APPROVED POINT OF SUB-SURFACE DISCHARGE: PUBLIC STORM DRAIN MAIN.

NOTES FOR PLAN VIEW

DETAILS: SELECT THE APPLICABLE DETAILS AND SHOW THEM HERE. PROVIDE AN ADDITIONAL SHEET IF NEEDED.

BMP S440
DOG WASTE STATION
– AT EACH DOG WASTE STATION, SIGNS WILL BE PROVIDED REMINDED RESIDENTS AND VISITORS TO PICK-UP AFTER THEIR PETS, REFER TO PLAN FOR LOCATIONS.

04/20/2022
NOT FOR CONSTRUCTION



DRAINAGE AND WASTEWATER CONTROL PLAN

DPD APPROVAL STAMP

TEMPLATE VERSION: 2021-06-18

Seattle Parks & Recreation

GEORGETOWN FLUME OFF-LEASH AREA

APPLICANT PLAN SET

ABBREVIATIONS

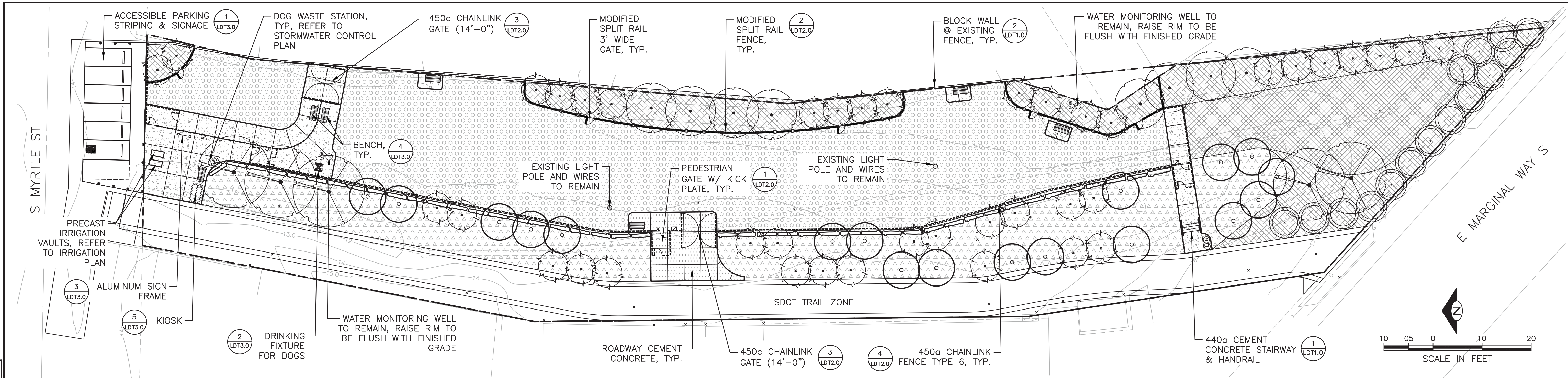
SSS SANITARY SIDE SEWER
SD STORM SERVICE DRAIN/ DRAINAGE SIDE SEWER
FD FOOTING DRAIN PUBLIC
PSD STORM DRAIN MAINLINE
PS PUBLIC COMBINED MAINLINE
PSS PUBLIC SANITARY SEWER MAINLINE

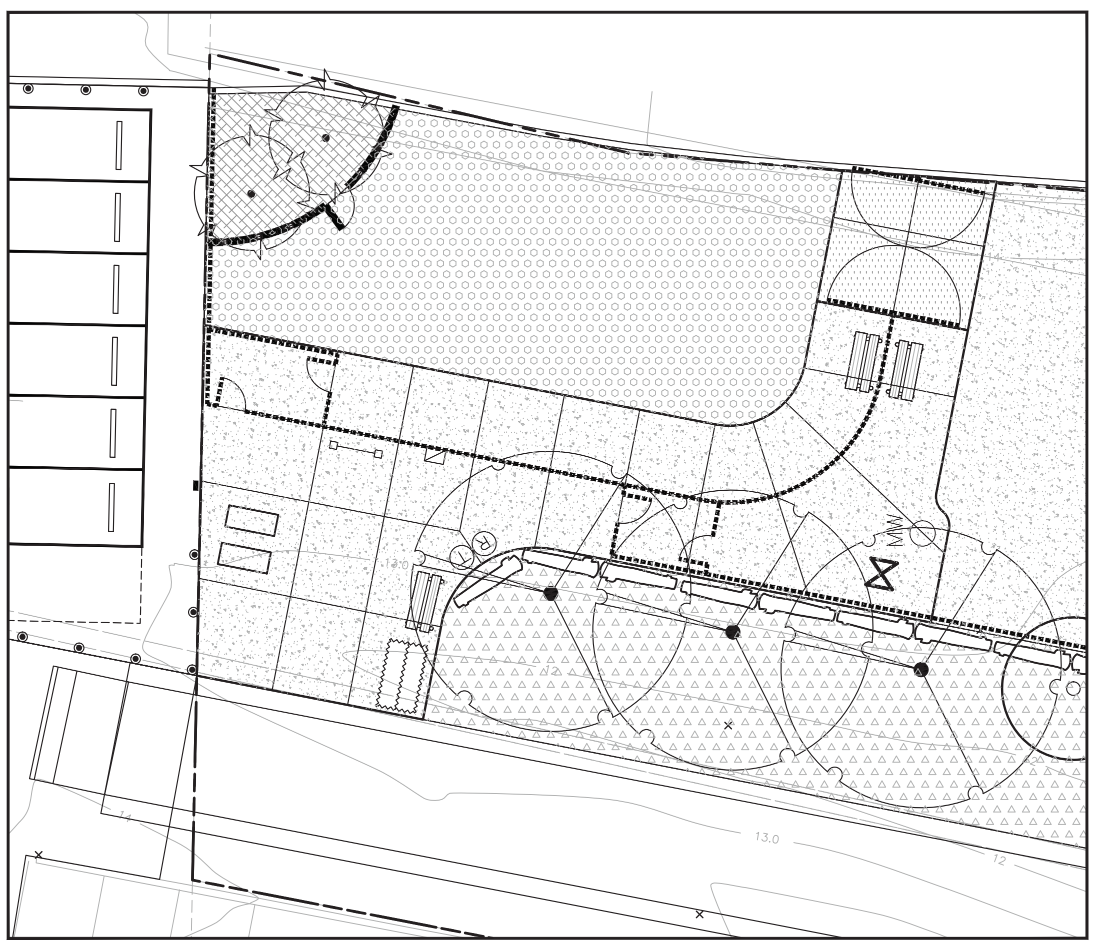
EDUARDO H. ABAN STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER

SDCI PERMIT NO.: 6______-CN
ADDRESS: ------
SEATTLE, WA

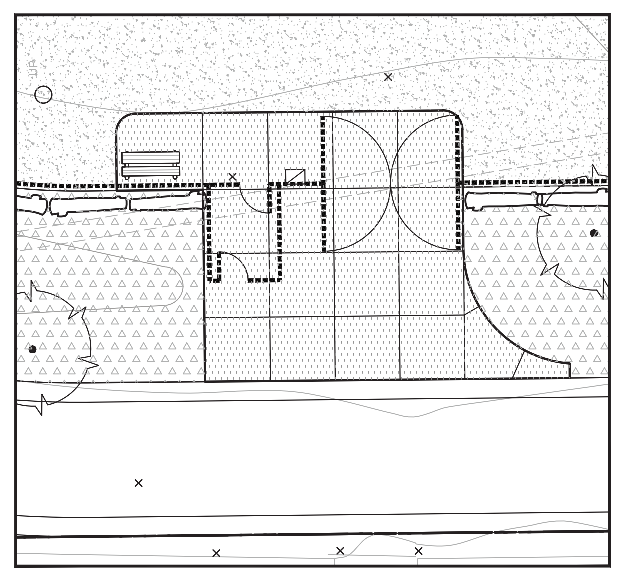
DESIGNED BY: EA
DRAWN BY: DB
CHECKED BY: SS

C3

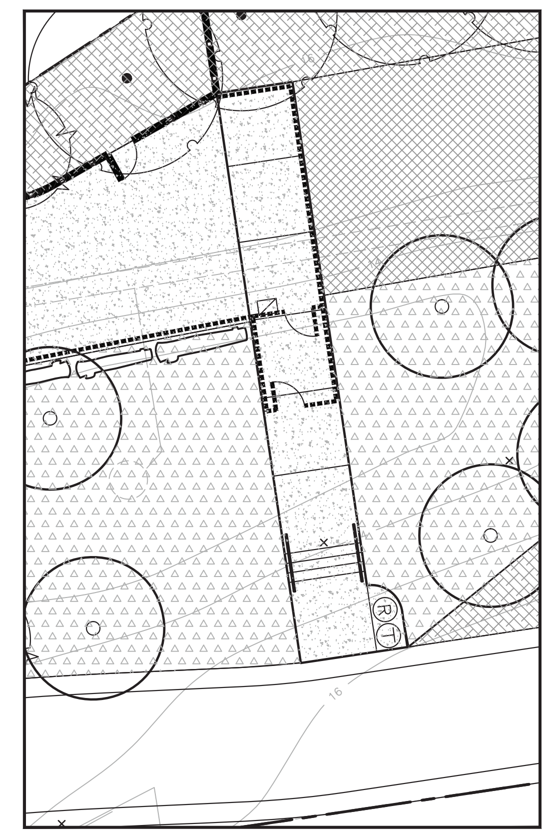




1 PLAN ENLARGEMENT 1
SCALE: 1:10



2 PLAN ENLARGEMENT 2
SCALE: 1:10



3 PLAN ENLARGEMENT 3
SCALE: 1:10

LEGEND

- ARBORIST WOOD CHIP MULCH, REFER TO SOILS PLAN
- TYPE 23 1/2" MINUS CRUSHED GRAVEL
- REFER TO PLANTING & SOILS PLANS
- REFER TO PLANTING & SOILS PLANS
- CEMENT CONCRETE SIDEWALK
- ROADWAY CEMENT CONCRETE
- MODIFIED SPLIT RAIL FENCE
- CURB WALL @ EXISTING FENCE
- PROPERTY LINE
- CHAINLINK FENCE TYPE 6
- LOG EDGING FURNISHED BY OWNER INSTALLED BY CONTRACTOR
- ALUMINUM SIGN FRAME
- BENCH
- TRASH RECEPTACLE
- RECYCLING RECEPTACLE
- KIOSK
- MW WATER MONITORING WELL TO REMAIN, REFER TO SITE PREPARATION PLAN
- TREES

VAULT SERIAL NO.	DATE	MARK	NATURE REVISIONS	MADE	CHK'D	REV'D

U:\PDD\01-Project Files\Georgetown Steam Plant_Flume Off-Leash Area Development\3-Design\3g-ConstrDocs\CAD\FLUME_18_Materials Plan.dwg
Apr-21-22 3:03pm

04/20/2022
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LIZ ALZEER
DEPARTMENT OF FINANCE & ADMINISTRATIVE SERVICES
SEATTLE, WASHINGTON . . . . 20 . .

BY: . . . .
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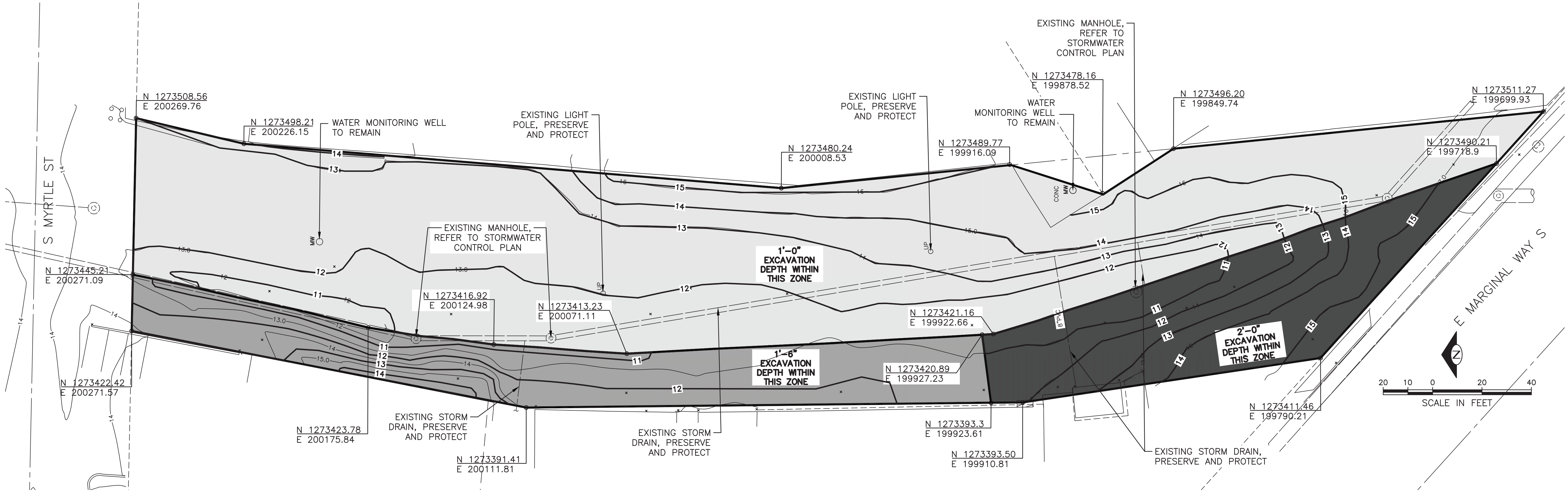
INITIALS AND DATE	INITIALS AND DATE
DESIGNED DB CHECKED ML	REVIEWED: DES. CONST. SDOT PROJ. MGR.
DRAWN DB CHECKED ML	RECEIVED REVISED AS BUILT

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0–02.3 OF THE PROJECT MANUAL.

Seattle Parks & Recreation
ORDINANCE NO. PW NO. PRK730312–02
SUBPROJECT ID:
SCALE: MULTIPLE

GEORGETOWN FLUME OFF–LEASH AREA

JOB PC CO
VPI # L1.0
MATERIALS PLAN
SHEET 18 OF 30



LEGEND

- 1'–0" EXCAVATION DEPTH
- 1'–6" EXCAVATION DEPTH
- 2'–0" EXCAVATION DEPTH

VAULT SERIAL NO.	DATE	MARK	NATURE	MADE	CHK'D	REV'D
			REVISIONS			

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Apr-21-22 3:04pm

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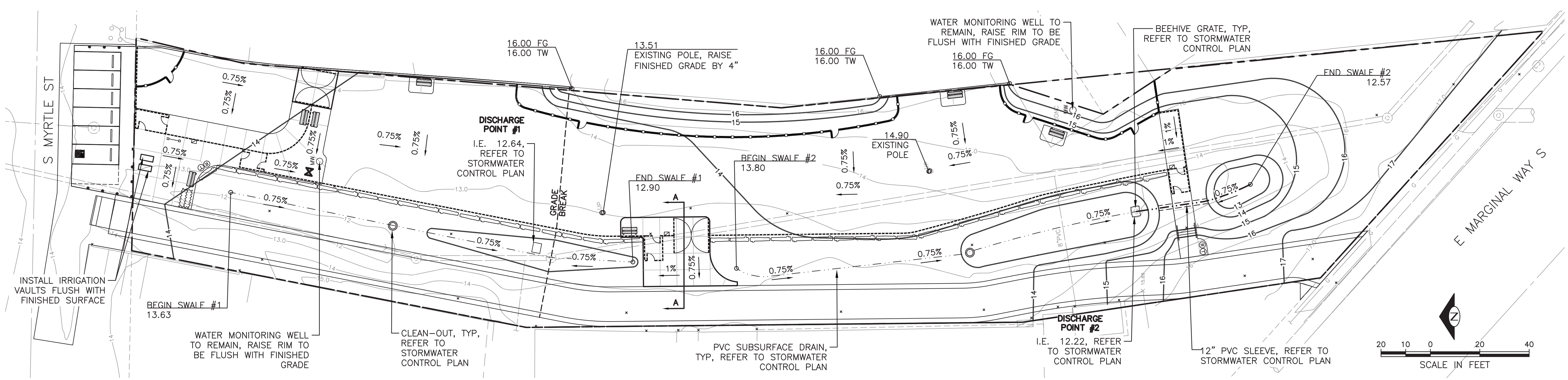
Seattle Parks & Recreation
ORDINANCE NO. PW NO. PRK730312-02
SUBPROJECT ID:
SCALE: MULTIPLE

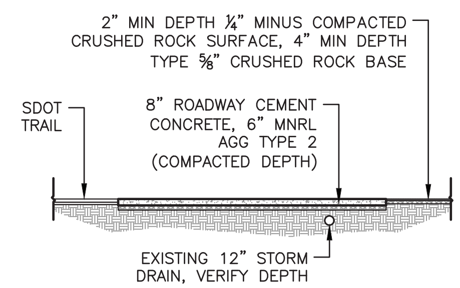
GEORGETOWN FLUME OFF-LEASH AREA

JOB PC CO
VPI # L1.0
INTERMEDIATE GRADING PLAN
SHEET 19 OF 30

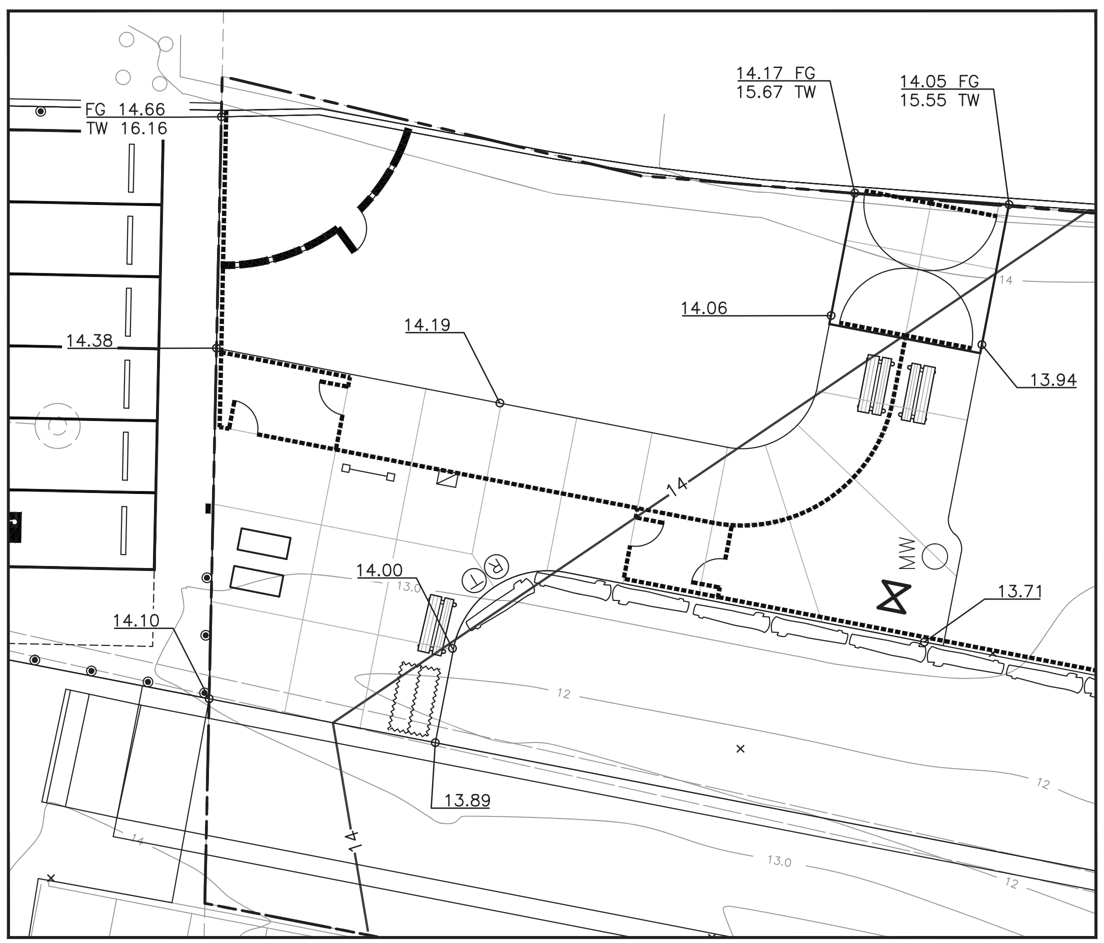


GRADING & DRAINAGE NOTES:

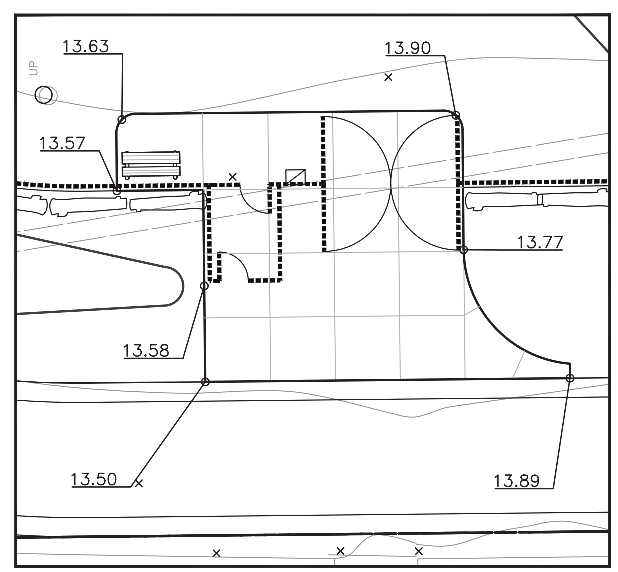
A. "TW" = TOP OF WALL
B. "FG" = FINISH GRADE
C. "IE" = INVERT ELEVATION
D. "TS" = TOP PF STAIRS
E. "BS" =BOTTOM OF STAIRS"
F. VERIFY ALL UNDERGROUND UTILITIES PRIOR TO DIGGING.
G. NOTIFY THE ENGINEER OF SLOPE/GRADING DISCREPANCIES IMMEDIATELY. DO NOT PROCEED WITH WORK WHICH MAY RESULT IN ACCUMULATED ERROR.
H. DATUM PER CITY OF SEATTLE, DEPARTMENT OF PARKS AND RECREATION, BASED ON CITY OF SEATTLE DATUM (NAVD 88). LOCATE, PRESERVE, AND PROTECT VERTICAL CONTROL POINT.
I. PLAN SHOWS ALL FINISH GRADE ELEVATIONS. PROVIDE APPROPRIATELY COMPACTED SUBGRADES OF NATIVE SOIL OR APPROVED FILL.
J. COORDINATE GRADING WORK WITH WORK OF OTHER TRADES, OR WORK BY OTHERS AS REQUIRED TO COMPLETE THE PROJECT.
K. REFER TO PLANS FOR LOCATIONS WHERE CONCRETE SIDEWALK IS CROSSED SLOPED.
L. EXCESS MATERIALS SHALL BE REMOVED FROM SITE. SUBGRADE SHALL BE COMPACTED AS REQUIRED.



SECTION AA
NOT TO SCALE



1 PLAN ENLARGEMENT 1
SCALE: 1:10



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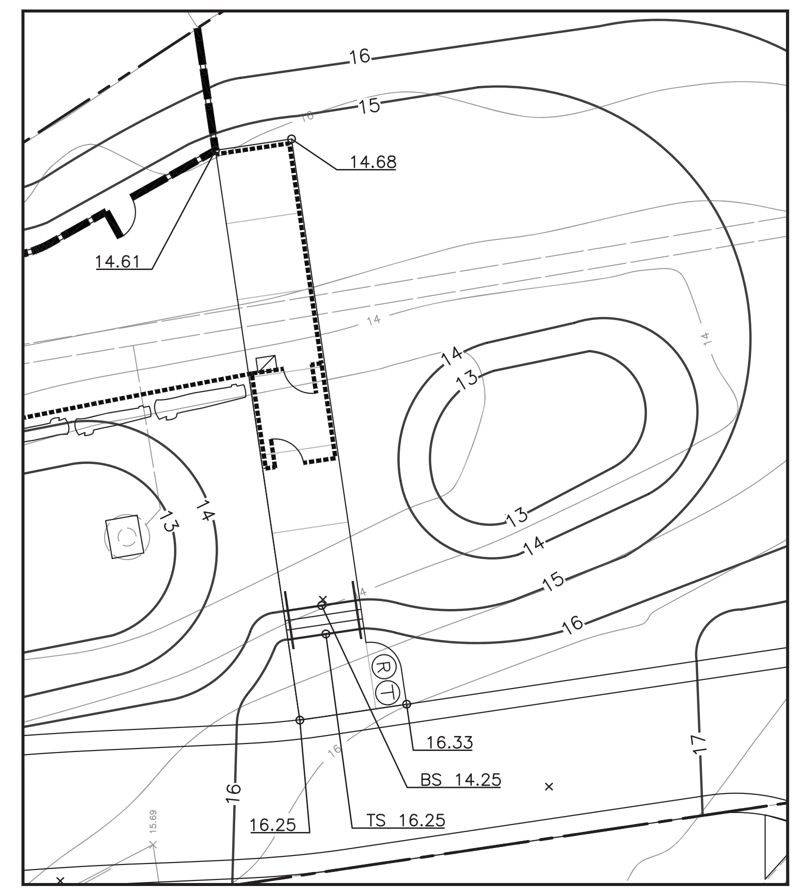

3 PLAN ENLARGEMENT 3
SCALE: 1:10

VAULT SERIAL NO.	DATE	MARK	NATURE	MADE	CHK'D	REV'D
			REVISIONS			

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Apr-21-22 3:04pm

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BY: ....
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		SDOT	PROJ. MGR.
DRAWN DB		RECEIVED	
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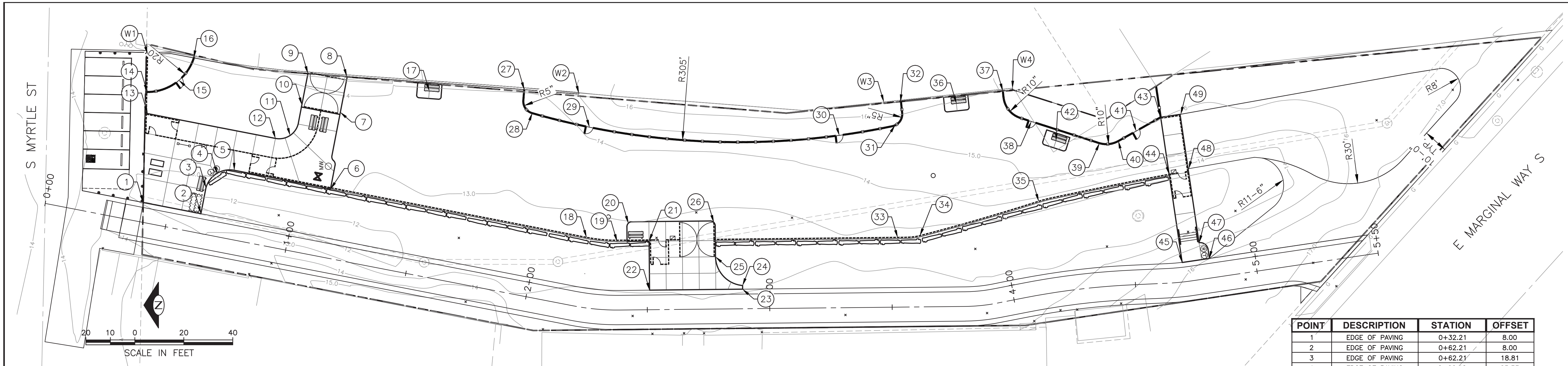
Seattle Parks & Recreation
ORDINANCE NO. PW NO. PRK730312-02
SUBPROJECT ID:
SCALE: MULTIPLE

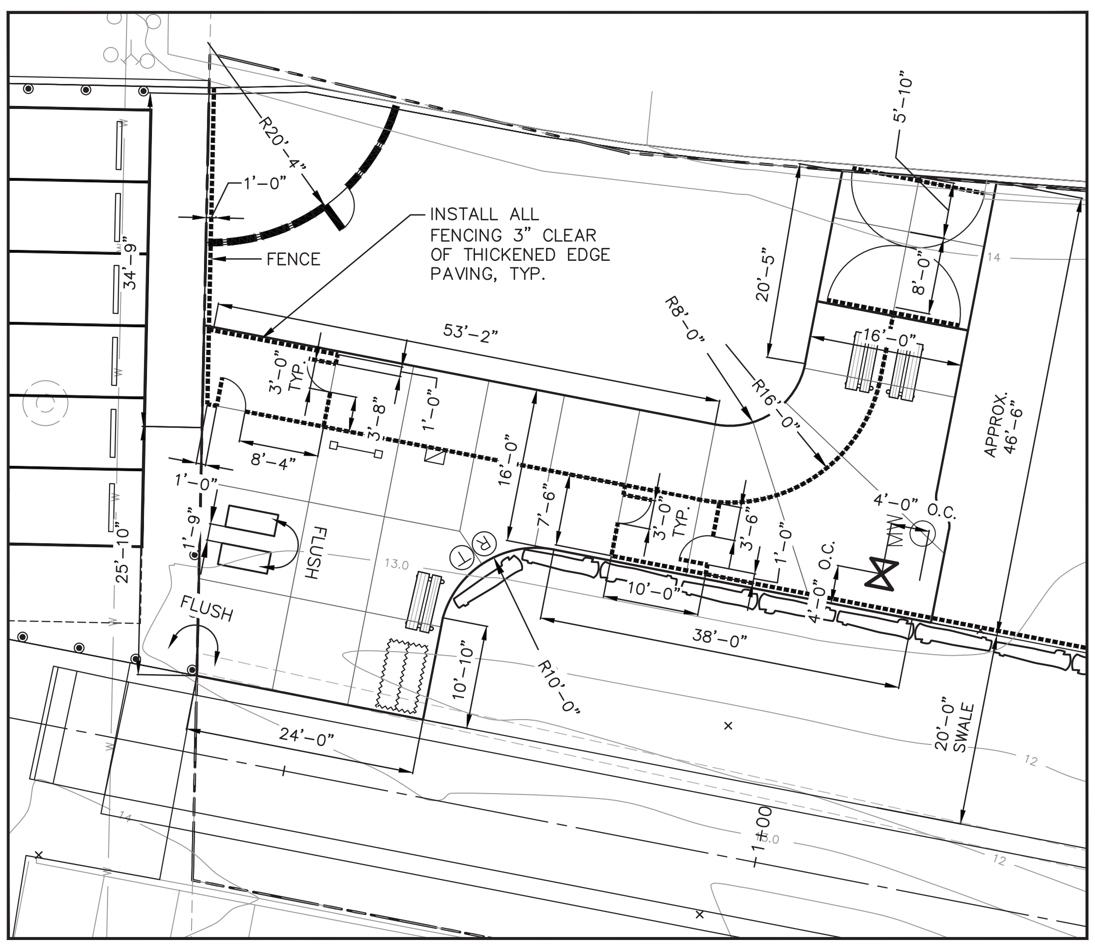
GEORGETOWN FLUME
OFF-LEASH AREA

JOB PC CO
VPI # L2.0
GRADING AND DRAINAGE PLAN
SHEET 20 OF 30

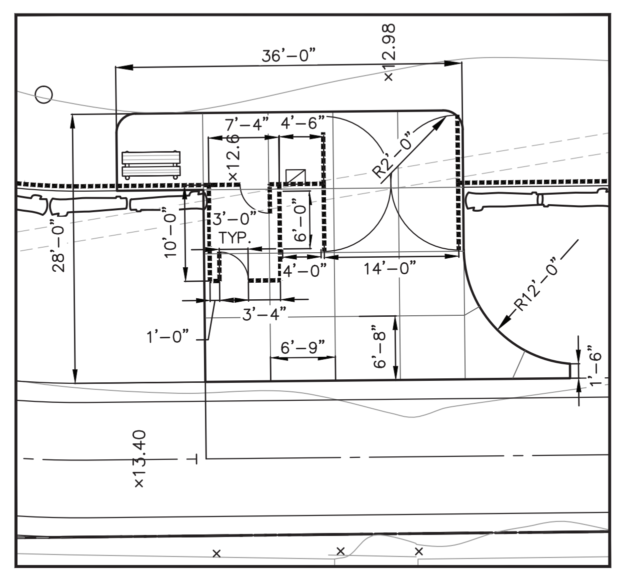


NOTES:

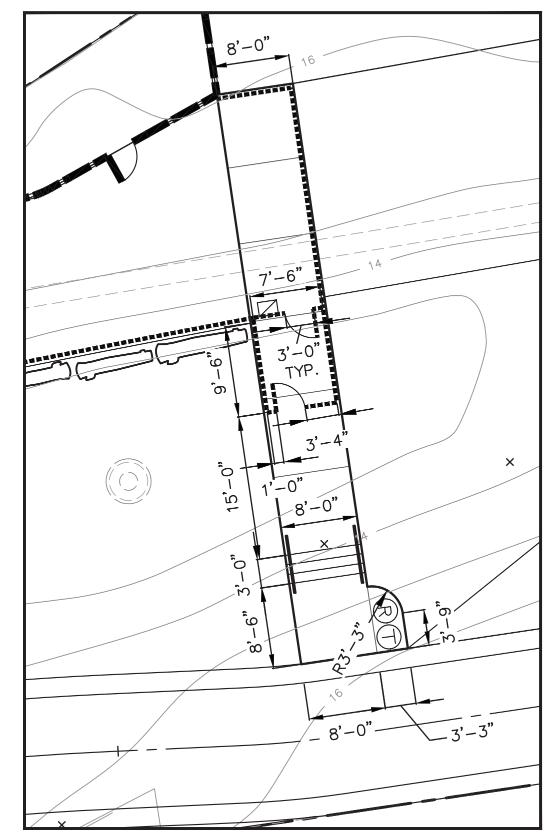
1. ESTABLISH HORIZONTAL BASELINES AND OFFSET LINES PARALLEL AND PERPENDICULAR AS INDICATED FROM THE EXISTING CONTROL POINTS SET BY OWNER. VERTICAL CONTROL IS RELATIVE WITHIN THE WORKSITE. ESTABLISH SPECIFIC VERTICAL RELATIONSHIPS PRIOR TO STARTING WORK. ESTABLISH A MINIMUM OF TWO VERTICAL CONTROL POINTS AND MAINTAIN THEM THROUGHOUT THE PROJECT. THE BASELINES AND OFFSET LINES ARE TO BE ESTABLISHED AS SHOWN ON THE PLAN.
2. ALL CURVED LINES INDICATED ON THE LAYOUT SHALL BE CONTINUOUS AND WITHOUT DEVIATION. ABRUPT VERTICAL OR HORIZONTAL CHANGES ARE NOT ACCEPTABLE. STAKE CONCRETE FORMS ADEQUATELY TO PREVENT SUDDEN BENDS.
3. NOTIFY THE ENGINEER OF HORIZONTAL OR VERTICAL DISCREPANCIES IMMEDIATELY. DO NOT PROCEED WITH WORK WHICH MAY RESULT IN ACCUMULATED ERROR.
4. STAKE OUT PAVING AND SITE FURNISHINGS PRIOR TO THE INSTALLATION OF THESE ITEMS. INSTALLATION MAY PROCEED AFTER SECURING APPROVAL FROM THE ENGINEER.



1 PLAN ENLARGEMENT 1
SCALE: 1:10



2 PLAN ENLARGEMENT 2
SCALE: 1:10



3 PLAN ENLARGEMENT 3
SCALE:1:10

POINT	DESCRIPTION	STATION	OFFSET
1	EDGE OF PAVING	0+32.21	8.00
2	EDGE OF PAVING	0+62.21	8.00
3	EDGE OF PAVING	0+62.21	18.81
4	EDGE OF PAVING	0+66.42	25.33
5	EDGE OF PAVING	0+73.21	28.00
6	EDGE OF PAVING	1+13.22	30.00
7	EDGE OF PAVING	1+11.21	59.50
8	EDGE OF PAVING	1+11.21	74.50
9	EDGE OF PAVING	0+95.21	72.50
10	EDGE OF PAVING	0+95.21	59.50
11	EDGE OF PAVING	0+92.86	46.33
12	EDGE OF PAVING	0+87.21	44.00
13	EDGE OF PAVING	0+34.0	44.00
14	SPLIT RAIL	0+32.21	52.66
15	SPLIT RAIL GATE	0+44.00	59.75
16	SPLIT RAIL	0+48.25	69.90
17	CENTER OF PAD	1+45.18	75.00
18	FENCE	2+19.61	28.50
19	FENCE	2+37.66	28.50
20	EDGE OF PAVING	2+42.60	35.50
21	EDGE OF PAVING	2+51.00	28.00
22	EDGE OF PAVING	2+51.00	8.00
23	EDGE OF PAVING	2+89.00	8.00
24	EDGE OF PAVING	2+89.00	9.50
25	EDGE OF PAVING	2+78.00	21.50
26	EDGE OF PAVING	2+77.50	35.50
27	SPLIT RAIL	1+83.16	82.90
28	SPLIT RAIL	1+88.18	74.10
29	SPLIT RAIL GATE	2+12.22	72.94
30	SPLIT RAIL GATE	3+29.11	70.44
31	SPLIT RAIL	3+51.90	74.28
32	SPLIT RAIL	3+54.25	83.86
33	FENCE	3+52.50	28.50
34	FENCE	3+61.66	29.12
35	FENCE	4+16.12	37.85
36	CENTER OF PAD	3+77.10	83.00
37	SPLIT RAIL	4+10.25	84.75
38	SPLIT RAIL GATE	4+17.75	70.50
39	SPLIT RAIL	4+39.75	58.58
40	SPLIT RAIL	4+46.25	59.00
41	SPLIT RAIL GATE	4+53.12	62.70
42	CENTER OF PAD	4+25.12	61.33
43	EDGE OF PAVING	4+63.70	67.85
44	EDGE OF PAVING	4+68.00	44.33
45	EDGE OF PAVING	4+70.00	8.00
46	EDGE OF PAVING	4+81.50	8.00
47	EDGE OF PAVING	4+78.33	15.00
48	EDGE OF PAVING	4+78.66	45.50
49	EDGE OF PAVING	4+78.66	28.20
W1	BEGIN CURB WALL	0+28.90	67.75
W2	END CURB WALL	2+5.33	85.66
W3	BEGIN CURB WALL	3+47.50	83.88
W4	END CURB WALL	4+13.50	84.85

STA. / OFFSET POINT TABLE

VAULT SERIAL NO.	DATE	MARK	NATURE	MADE	CHK'D	REV'D
			REVISIONS			

U:\PDD\01-Project Files\Georgetown Steam Plant_Flume Off-Leash Area Development\3-Design\3g-ConstrDocs\CAD\FLUME_21_Layout Plan.dwg
Apr-21-22 3:05pm

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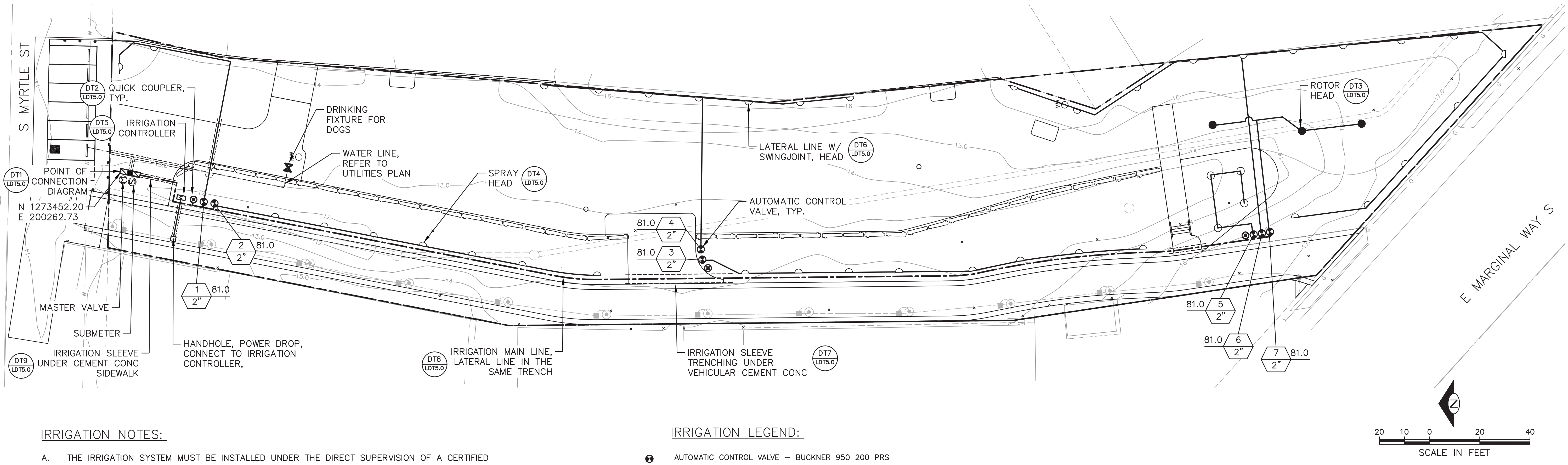
Seattle Parks & Recreation
ORDINANCE NO.
PW NO. PRK730312-02
SUBPROJECT ID:
SCALE: MULTIPLE

GEORGETOWN FLUME OFF-LEASH AREA

JOB PC CO
VPI # L3.0
LAYOUT PLAN
SHEET 21 OF 30



IRRIGATION NOTES:

A. THE IRRIGATION SYSTEM MUST BE INSTALLED UNDER THE DIRECT SUPERVISION OF A CERTIFIED IRRIGATION TECHNICIAN OR JOURNEY PLUMBER. ALL WORK PERFORMED ON DOMESTIC WATER SYSTEMS MUST BE PERFORMED BY OR UNDER THE DIRECT SUPERVISION OF A LICENSED PLUMBER.
B. ALL WORK SHALL MEET THE REQUIREMENTS OF APPLICABLE CODES.
C. LAYOUT OF HEADS AND PIPING ON IRRIGATION PLANS IS DIAGRAMMATIC. ALL PIPES AND VALVES SHOWN IN PAVED OR BUILDING AREAS ARE FOR CLARITY ONLY. INSTALL IN APPROPRIATE LAWN OR SHRUB AREAS PER DETAILS AND/OR AS CALLED OUT ON IRRIGATION EQUIPMENT SCHEDULE.
D. NOTIFY ENGINEER OF ANY DISCREPANCIES BETWEEN EXISTING SITE CONDITIONS AND PROPOSED DESIGN PRIOR TO CONSTRUCTION.
E. ALL PIPING INSTALLED UNDER PAVED AREAS SHALL BE INSTALLED IN PVC SLEEVES (2X LARGER THAN PIPE SIZE). WIRES SHALL BE INSTALLED IN SEPARATE SLEEVES.
F. NO ROCKS, BOULDERS, DEBRIS, STICKS OR FOREIGN CONSTRUCTION MATERIAL SHALL BE USED IN BACKFILLING OF TRENCHES.
G. ALL LINES SHALL BE THOROUGHLY FLUSHED OUT PRIOR TO PRESSURE TESTING AND INSTALLATION OF HEADS OR OTHER EQUIPMENT.
H. ADJUST AND RELOCATE IRRIGATION LINES AND SPRINKLER HEADS AS NECESSARY TO OBTAIN FULL COVERAGE AND CONTROL PAVEMENT OVERTHROW (AS DESIGNED).
I. ALL VALVE CONTROL WIRES SHALL BE A DIFFERENT COLOR THAN GROUND WIRES AND SHALL BE PLACED IN MAINLINE PIPE TRENCHES PER DETAILS. WIRE COLORS SHALL BE PER SPECIFICATIONS.
J. ALL VALVE CONTROL WIRE SPLICES SHALL BE MADE USING APPROVED WATERTIGHT CONNECTORS (PER SPECIFICATIONS).
K. EACH CONTROL VALVE ASSEMBLY SHALL BE INSTALLED IN AN APPROVED JUMBO VALVE BOX WITH LOCKING LID (MAX. 1 VALVE ASSEMBLY PER BOX).
L. PRIOR TO INSTALLATION, VERIFY FUNCTION OF EXISTING IRRIGATION SYSTEM.
M. PROTECT EXISTING IRRIGATION SYSTEMS AND INDIVIDUAL SYSTEM COMPONENTS DURING CONSTRUCTION (AS APPLICABLE).
N. WHERE MORE THAN ONE PIPE IS SHOWN IN THE SAME TRENCH, PIPE SHALL BE SEPARATED BY 6" HORIZONTAL AND VERTICAL SEPARATION (PER DETAILS).
O. USE EXTREME CARE AND HAND DIG TRENCHES WITHIN DRIP LINES OF TREES AND SHRUBS, TUNNELING UNDER LARGE ROOTS WHEN ENCOUNTERED (USE OF AIR SPADE OR VACTOR MAY BE
P. WHEN UPDATING AN EXISTING SYSTEM, CONTRACTOR SHALL REPROGRAM CONTROLLER FOR ENTIRE SITE, INCLUDING NEW AND OLD ZONES. PROVIDE ACCURATE ZONE CHART (PER SPECIFICATIONS).
Q. CONDUCT IRRIGATION COVERAGE TEST PRIOR TO CONSTRUCTION TO VERIFY EXISTING IRRIGATION SYSTEM FUNCTION.

IRRIGATION LEGEND:

- AUTOMATIC CONTROL VALVE – BUCKNER 950 200 PRS
  - Valve Callout: Valve Number, Valve Flow, Valve Size
- QUICK COUPLER – BUCKNER QB44LRC-10 1"
- IRRIGATION CONTROLLER – RAINBIRD ESP-24SAT-2S, STAINLESS STEEL PEDESTAL
- BACKFLOW PREVENTION DEVICE – FEBCO MASTER SERIES MODEL 850U DOUBLE CHECK VALVE ASSEMBLY
- SUB METER – INSTALL PER SPU
- MASTER VALVE – SUPERIOR SERIES #3100
- ROTOR HEAD – HUNTER I-20, 360° 2.60 GPM @ 30 PSI
- ROTOR HEAD – HUNTER I-20, 180° 1.30 GPM @ 30 PSI
- SPRAY HEAD – RAINBIRD 1800-SAM-PRS U10 SERIES 360° 1.64 GPM @ 30 PSI
- SPRAY HEAD – RAINBIRD 1800-SAM-PRS U10 SERIES 180° 1.64 GPM @ 30 PSI
- PIPE SLEEVE – PVC SCH 40, 2X PIPE DIA
- MAIN LINE – PVC SCH 40 SIZE PER PLAN
- LATERAL LINE – PVC SCH 40 SIZE PER PLAN

VAULT SERIAL NO.	DATE	MARK	NATURE	MADE	CHK'D	REV'D
			REVISIONS			

04/20/2022
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BY: . . . .
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DRAWN DB CHECKED ML	RECEIVED REVISED AS BUILT

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Seattle Parks & Recreation
ORDINANCE NO. XXXX-XXX PW NO. PRK730312-02
SUBPROJECT ID:
SCALE: ----

GEORGETOWN FLUME OFF-LEASH AREA

JOB PC CO
VPI #
IRRIGATION PLAN
SHEET 22 OF 30

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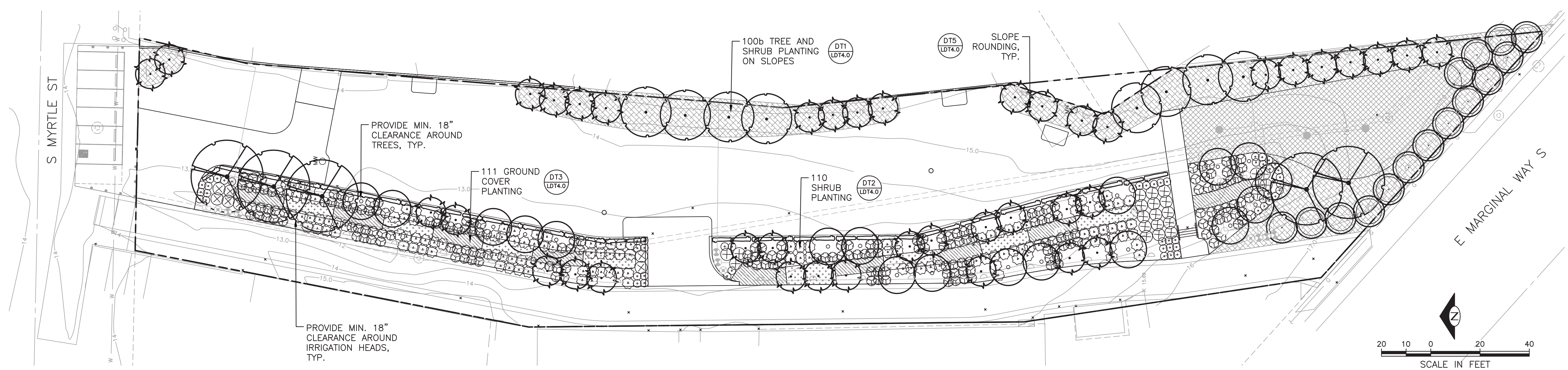

PLANTING NOTES:

A. NEW TREES AND PLANTS DELIVERED TO THE SITE SHALL BE STORED IN A SECURE, SHADY AREA FOR INSPECTION. CALL ENGINEER FOR INSPECTION MINIMUM 48 HOURS PRIOR TO PLANTING.
B. ENGINEER TO FIELD VERIFY ALL PLANTING BED LAYOUTS.
C. STAKE TREES FOR ENGINEER'S FIELD APPROVAL.
D. UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO START OF WORK.
E. CONTRACTOR SHALL PLACE PLANT MATERIALS SO THEY DO NOT INTERFERE WITH IRRIGATION SYSTEM OR INHIBIT REQUIRED COVERAGE. PLANT LOCATIONS MAY BE ADJUSTED AS LONG AS DESIGN INTENT IS NOT COMPROMISED. IF A CONFLICT OCCURES, CONTRACTOR SHALL NOTIFY ENGINEER FOR APPROVAL OF ANY MAJOY MODIFICATIONS.
F. CONTRACTOR SHALL GUARANTEE PLANT MATERIAL FOR A PERIOD OF ONE YEAR AFTER THE DATE OF PHYSICAL COMPLETION. CONTRACTOR SHALL REPLACE, AT HIS OWN EXPENSE, ANY PLANTS THAT ARE DEAD OR, AS DETERMINED BY THE ENGINEER, ARE IN AN UNHEALTHY OR UNSIGHTLY CONDITION.

LEGEND

- ARBORIST WOOD CHIP MULCH
- Seed mix #5 dought tolerant grass and herbaceous mix
- Carex obnupta, Slough Sedge
  1 gal pot, 2' o.c., 560 total
- Juncus effusus, Rush
  1 gal pot, 2' o.c., 530 total
- Gaultheria shallon, Salal
  2 gal pot, 3' o.c., 30 total
- Mahonia nervosa, Low Oregon Grape
  1 gal pot, 2' o.c., 54 total
- Polystichum munitum, Sword Fern
  1 gal pot, 3' o.c., 198 total
- viburnum davidii, David Viburnum
  1 gal pot, 3' o.c., 133 total
- Acer rubrum "Armstrong" – Armstrong Maple
  2½" Caliper, Balled–and–Burlapped, Staked, 18 Total
- Nyssa sinensis, "Chinese Tupelo"
  2½" Caliper, Balled–and–Burlapped, Staked, 5 Total
- Calocedrus decurrens, Incense Cedar
  2½" Caliper, Balled–and–Burlapped, Staked, 8 Total
- Prunus x hillieri 'Spire', Spire Cherry
  2½" Caliper, Balled–and–Burlapped, Staked, 15 Total
- Pseudotsuga menziesii, Douglas Fir
  2½" Caliper, Balled–and–Burlapped, Staked, 40 Total

VAULT SERIAL NO.	DATE	MARK	NATURE REVISIONS	MADE	CHK'D	REV'D

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Apr–21–22 3:06pm

PRK730312-02

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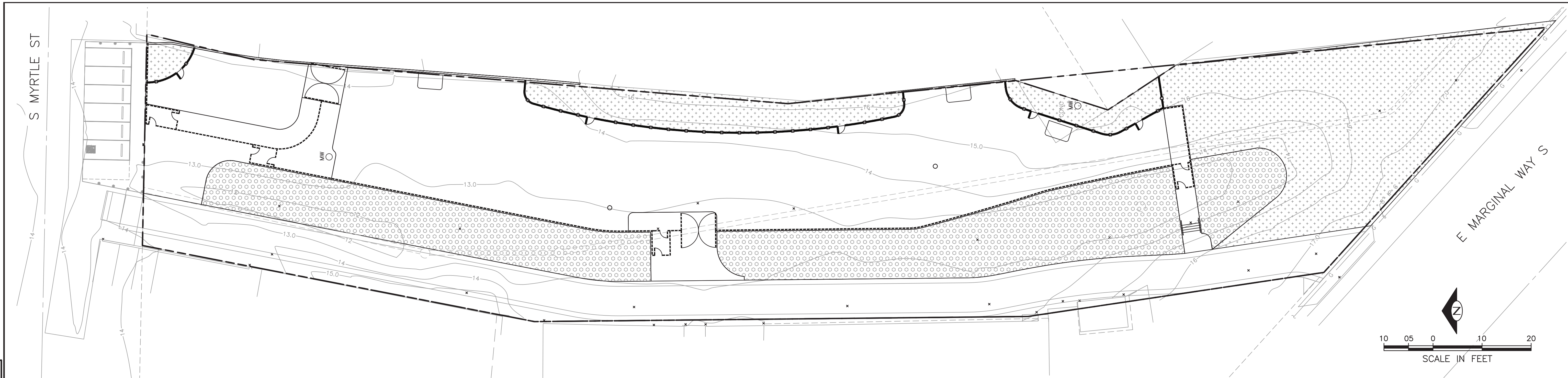
ORDINANCE NO. XXXX–XXX PW NO. PRK730312–02
SUBPROJECT ID:
SCALE: ––––

GEORGETOWN FLUME OFF–LEASH AREA

JOB PC CO
VPI # L5.0
PLANTING PLAN
SHEET 23 OF 30



PLANTING NOTES:

A. FOR ALL NEW PLANTED AREAS, REFER TO DETAILS FOR FINISHED SURFACE CONDITION.

LEGEND

BIORETENTION SOIL

REUSED AND AMENDED SITE SOIL

VAULT SERIAL NO.	DATE	MARK	NATURE REVISIONS	MADE	CHK'D	REV'D

U:\PDD\01-Project Files\Georgetown Steam Plant_Flume Off-Leash Area Development\3-Design\3g-ConstrDocs\CAD\FLUME_24_Soils Plan.dwg
Apr-21-22 3:06pm

PRK730312-02

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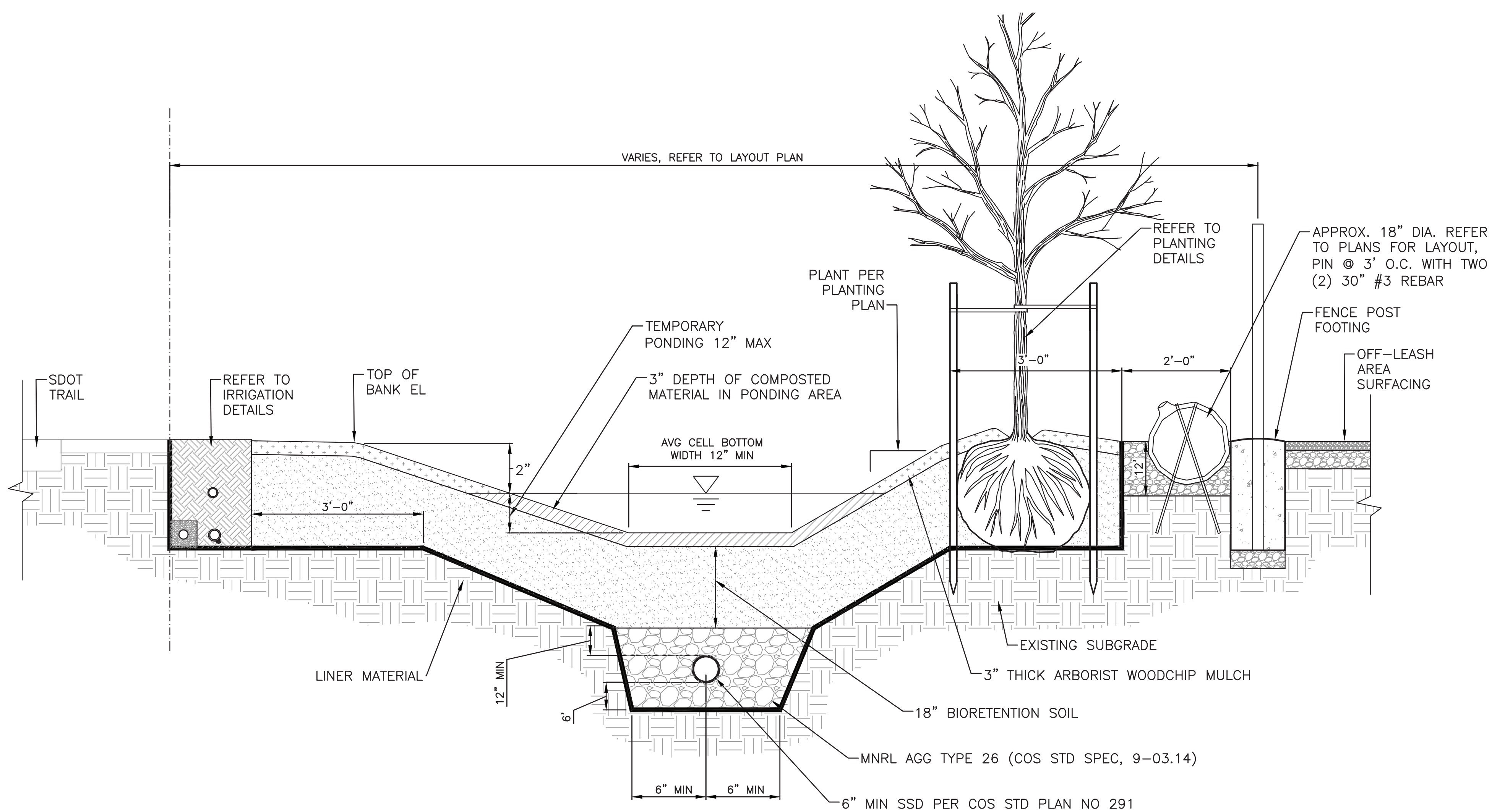
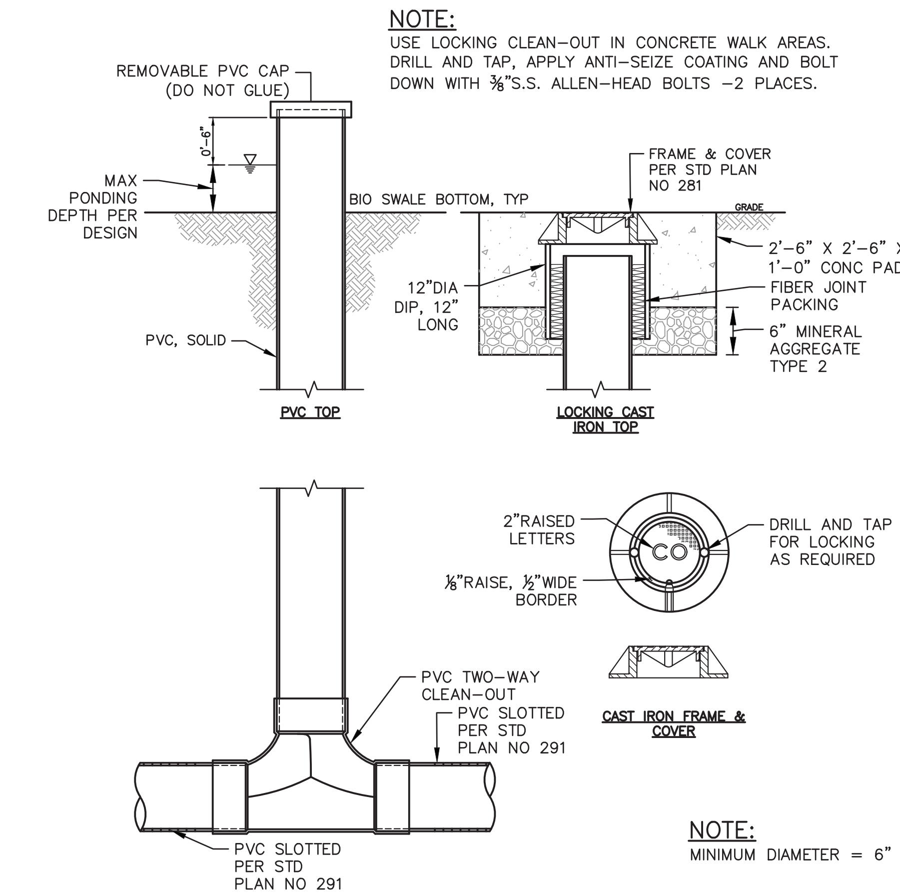
SCALE: ----

GEORGETOWN FLUME OFF-LEASH AREA

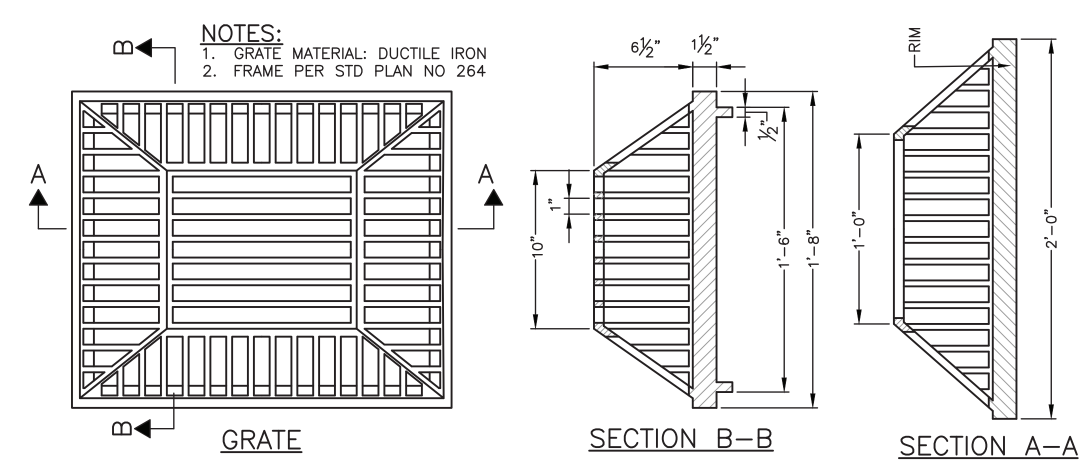
JOB PC CO
VPI # L6.0
SOILS PLAN
SHEET 24 OF 30



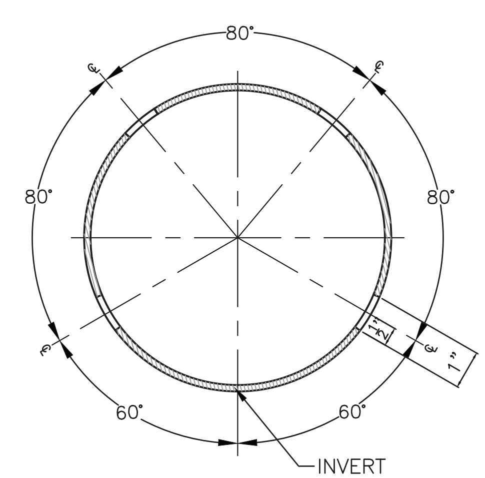
1 293b INFIL-NONINFIL BIORETENTION WITH SLOPE
SCALE: 3/4" = 1'-0"



2 281 BIO UNDER DRAIN CLEAN-OUT
SCALE: 1" = 1'-0"



3 269 BEEHIVE GRATE
SCALE: 2" = 1'-0"



4 291 PVC SUBSURFACE DRAIN PIPE
SCALE: NOT TO SCALE

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SEATTLE, WASHINGTON . . . . 20 .
BY: . . . .
PURCHASING AND CONTRACTING DIRECTOR

INITIALS AND DATE	INITIALS AND DATE
DESIGNED EA CHECKED ML	REVIEWED: DES. CONST. SDOT PROJ. MGR.
DRAWN DB CHECKED ML	RECEIVED REVISED AS BUILT

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Seattle Parks & Recreation
ORDINANCE NO. XXXX-XXX PW NO. PRK730312-02
SUBPROJECT ID:
SCALE: ----

GEORGETOWN FLUME OFF-LEASH AREA

JOB PC CO
VPI # L6.0
DETAILS
SHEET 25 OF 30

VAULT SERIAL NO.	DATE	MARK	NATURE REVISIONS	MADE	CHK'D	REV'D

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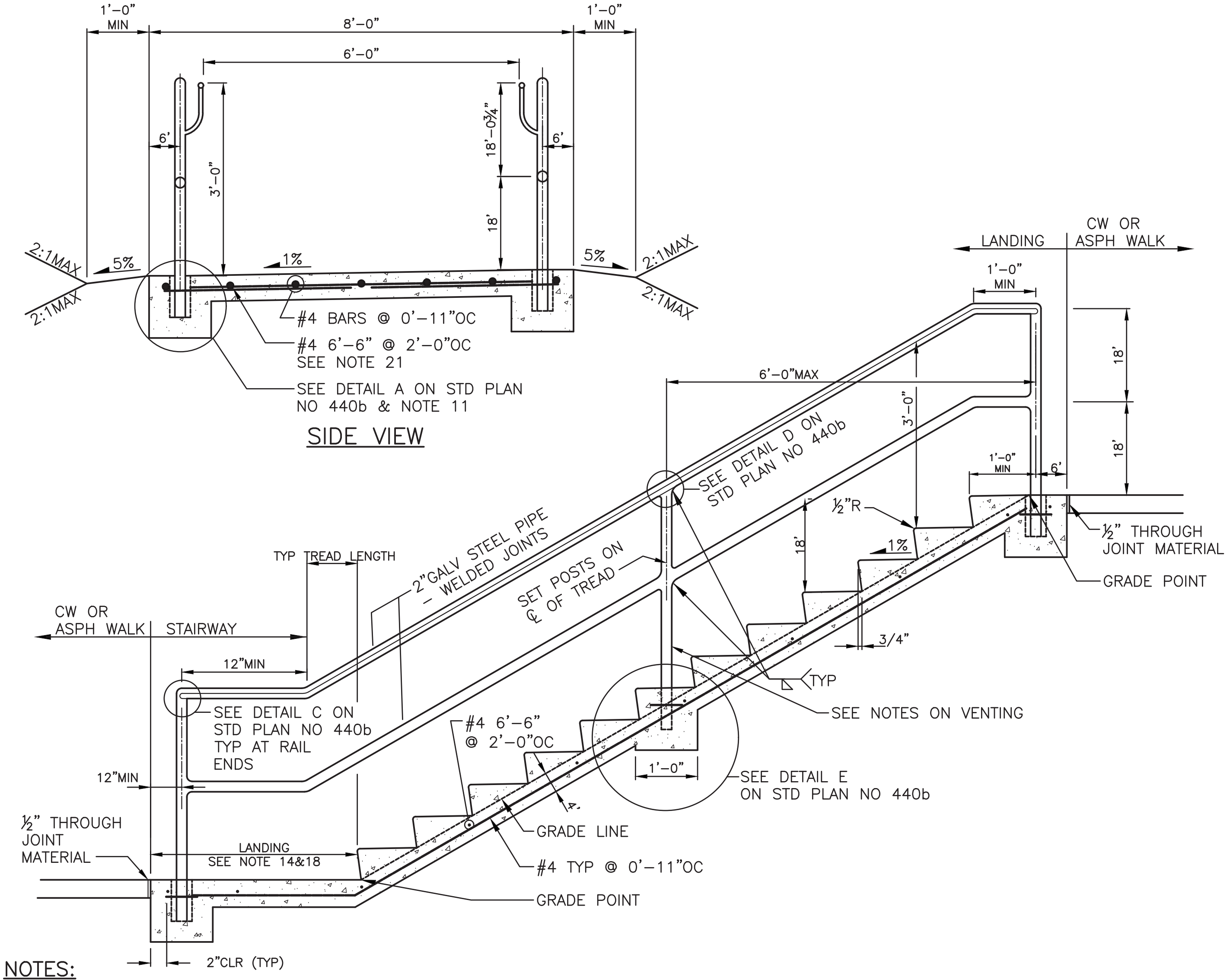
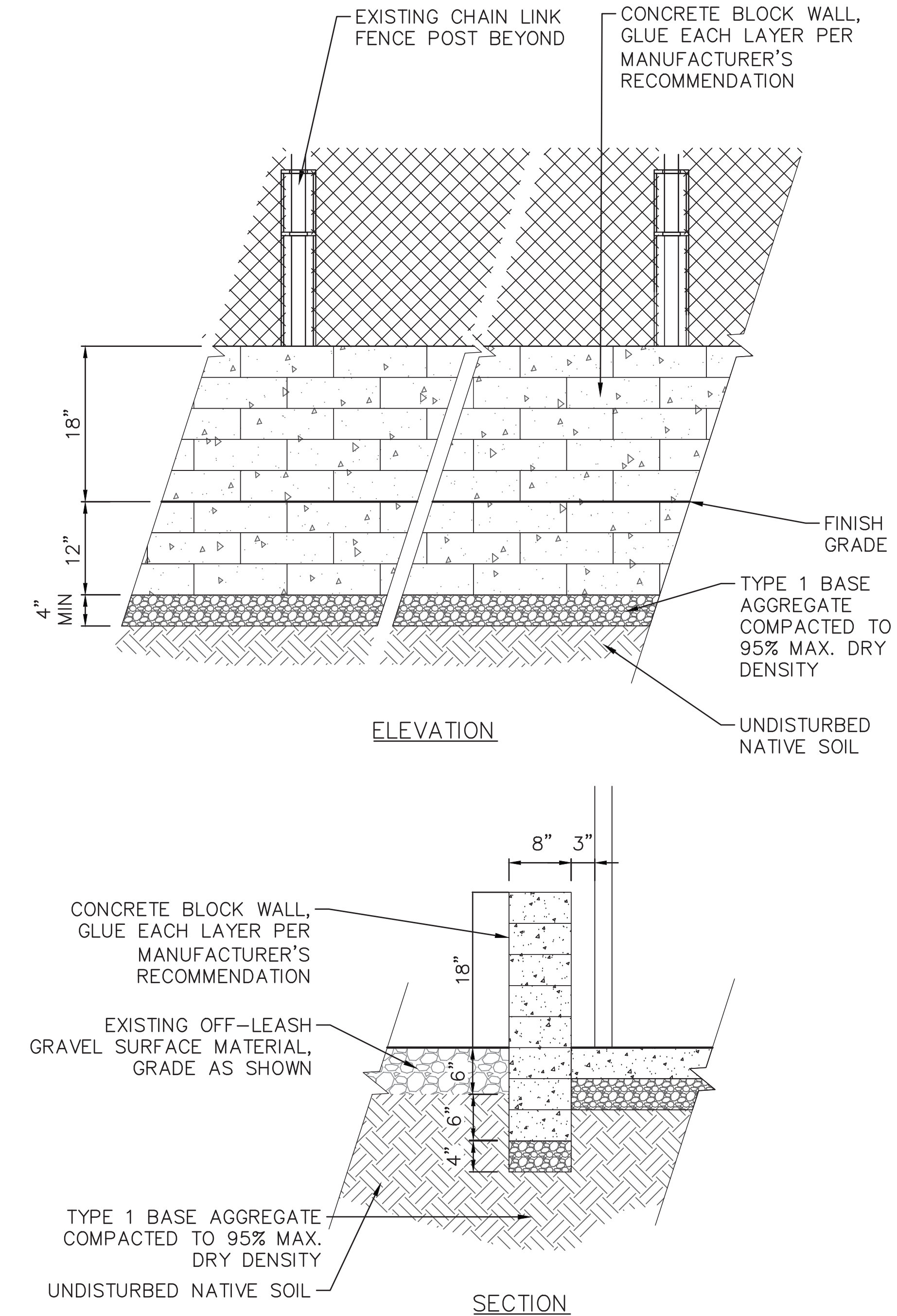


NOTES:
1. FLIGHTS OF STAIRS MUST HAVE MAX VERTICAL RISE OF 12' BEFORE A LANDING.
2. AVOID FEWER THAN 2 RISERS PER FLIGHT.
3. STEPS IN FLIGHT MUST HAVE UNIFORM TREAD RUNS AND UNIFORM RISER HEIGHTS WITH TOLERANCE OF ±3/8".
4. TREADS MUST BE 11"MIN, 12"MAX. RISERS MUST BE 5"MIN, 7"MAX.
5. LANDINGS BETWEEN FLIGHTS OF RISERS MUST HAVE SAME WIDTH AS STEPS AND A MIN LENGTH OF 4'-0".
6. STAIRWAYS WITH 1 OR MORE RISERS MUST HAVE HANDRAILS ON BOTH SIDES.
7. HANDRAILS MUST BE CONTINUOUS ACROSS LANDINGS BETWEEN FLIGHTS OF STEPS.
8. ALL STEEL MUST BE HOT DIPPED GALVANIZED.
9. PIPE MATERIAL MUST BE ASTM A53 AND ROUND BAR ASTM A36.
10. REINFORCING STEEL MUST BE ASTM A615 GR 60.
11. FOR FORMAL DRAINAGE PICK-UP SEE DETAIL B ON STD PLAN NO 440b (THIS IS OPTIONAL AND MUST BE CALLED OUT ON DRAWINGS).
12. PIPE DIAMETERS SHOWN CORRESPOND TO PIPE "SHAPE" AS DEFINED IN AMERICAN INSTITUTE OF STEEL CONSTRUCTION MANUAL.
13. CONCRETE CLASS CL3000.
14. LANDINGS MUST BE 0.5%MIN FOR A MIN LENGTH OF 4', ADJACENT SIDEWALK MAY BE PART OF LANDING IF SLOPE CRITERIA AND SETBACKS FROM HANDRAILS ARE MET.
15. TREAD SURFACE MUST HAVE GROOVES AT THE NOSE FOR TRACTION.
16. IF LANDING IS ELEVATED, LANDING MUST HAVE VERTICAL RAILING PER RIGHT OF WAY IMPROVEMENT MANUAL.
17. STAIRWAYS DEVIATING FROM STANDARD PLAN TO ACCOMMODATE BICYCLE FEATURES MAY BE USED PER STD PLAN NO 440C OR 440D.
18. DIMENSION FROM THE BOTTOM LANDING RAILING TO THE NOSE OF THE TREAD MUST BE 12"MIN + 1 TREAD LENGTH.
19. HANDRAIL GRIPPING SURFACE AND ADJACENT SURFACES MUST BE FREE FROM SHARP OR ABRASIVE ELEMENTS AND MUST HAVE ROUNDED EDGES.
20. BOTTOM HANDRAIL EXTENSION MUST EXTEND ONE TREAD LENGTH MINIMUM PARALLEL TO THE SLOPE OF THE STAIR BEYOND BOTTOM STAIR NOSING.
21. TOP HANDRAIL EXTENSION MUST EXTEND HORIZONTALLY ABOVE LANDING 12" MINIMUM BEYOND TOP STAIR NOSING.
22. REBAR SIZING AND SPACING MAY CHANGE FOR WIDER OR NARROWER STAIRWAYS.
23. EXTERNAL VENT HOLES MUST BE AS CLOSE TO THE WELD AS POSSIBLE AND MUST BE 25% THE SIZE OF THE I.D. OF THE PIPE, BUT NOT LESS THAN ⅜" IN DIA.
24. VENT HOLES IN END SECTIONS OR IN SIMILAR SECTIONS MUST BE ½" IN DIA.
25. ENDS MUST BE LEFT COMPLETELY OPEN. ANY DEVICE USED FOR FIELD-ERECTION THAT PREVENTS FULL OPENINGS ON ENDS OF HORIZONTAL RAILS AND VERTICAL LEGS MUST BE GALVANIZED SEPARATELY AND ATTACHED AFTER GALVANIZING.

(1) 440a CEMENT CONCRETE STAIRWAY & HANDRAIL
SCALE: $\frac{3}{32}$" = 1'-0"



NOTES:
1. SAWCUT EXISTING ASPHALT EDGE TO 3" FROM FENCE POSTS.
2. ALL DIMENSIONS ARE APPROXIMATE, VERIFY PRIOR TO INSTALLATION.
3. PERFORM UTILITY LOCATE PRIOR TO BEGINNING WORK.
4. PROVIDE THE ENGINEER WITH PRODUCT SUBMITTALS FROM THE SUPPLIER FOR ALL FENCE ITEMS. INSTALLATION MAY PROCEED AFTER SECURING APPROVAL FROM THE ENGINEER.
5. INSTALL PRODUCTS PER MANUFACTURER'S RECOMMENDATION.
6. DO NO DAMAGE TO FENCE DURING INSTALLATION.

(5) BLOCK WALL @ EXISTING FENCE
SCALE: $\frac{3}{4}$" = 1'-0"

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Seattle Parks & Recreation
ORDINANCE NO. PW NO. PRK730312-02
SUBPROJECT ID:
SCALE: ----

GEORGETOWN FLUME
OFF-LEASH AREA

JOB PC CO
VPI # LDT1.0
DETAILS
SHEET 26 OF 30

VAULT SERIAL NO.	DATE	MARK	NATURE REVISIONS	MADE	CHK'D	REV D

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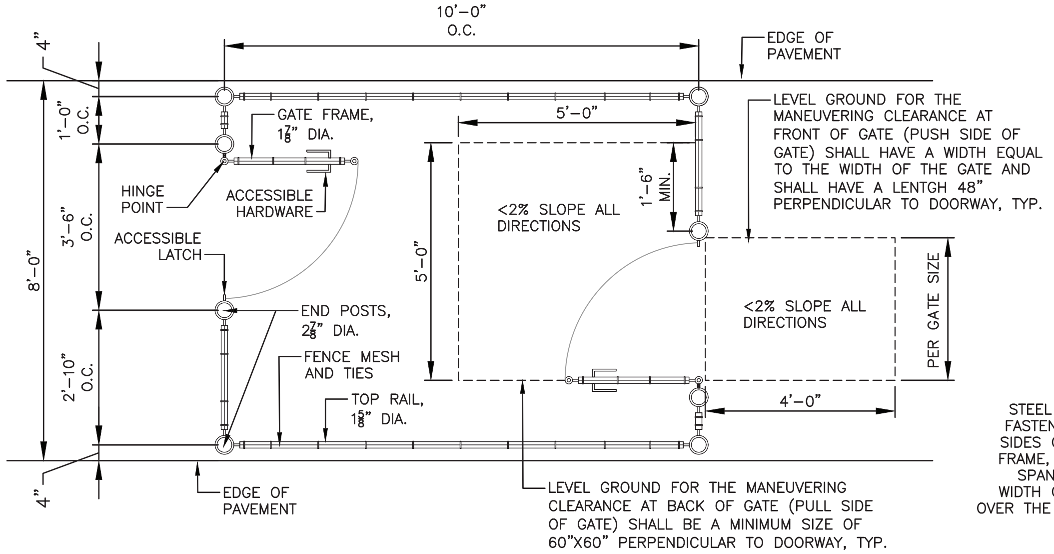
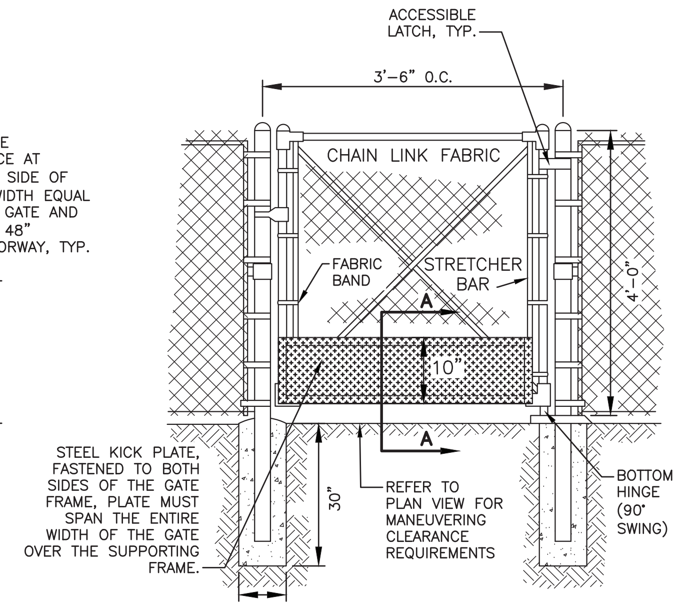
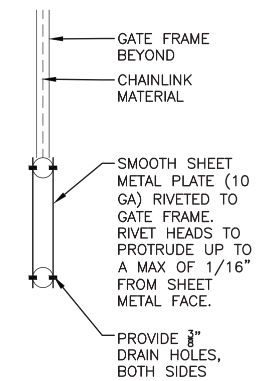
NOTES:
1. ALL GATES SHALL BE SELF-CLOSING WITH ADJUSTABLE CLOSING SPEED.
2. REFER TO DASHED LINE FOR TYPICAL MANEUVERING CLEARANCES AT PUSH AND PULL SIDE OF GATES (SHOWN ON ONE GATE ONLY FOR GRAPHIC CLARITY).
3. REFER TO LAYOUT PLAN FOR SPECIFIC FENCE LOCATIONS.
4. INSTALL GATE POSTS AT 3'-6" O.C., ENSURE A MINIMUM OF 32" OPENING WHEN GATE IS OPENED TO 90°.
5. CAVITIES CREATED BY STEEL KICK PLATE SHALL BE CAPPED.



PLAN VIEW

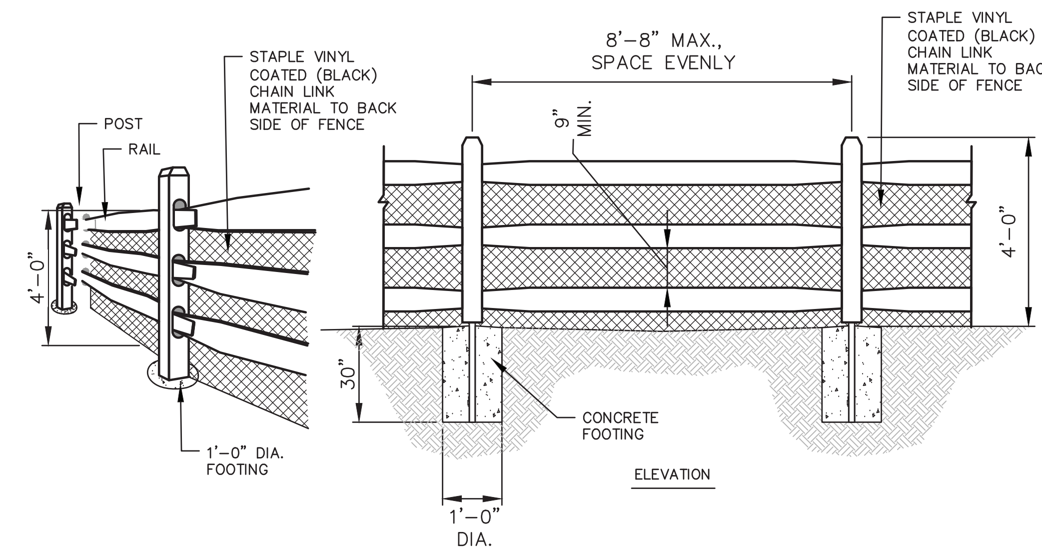


ELEVATION VIEW



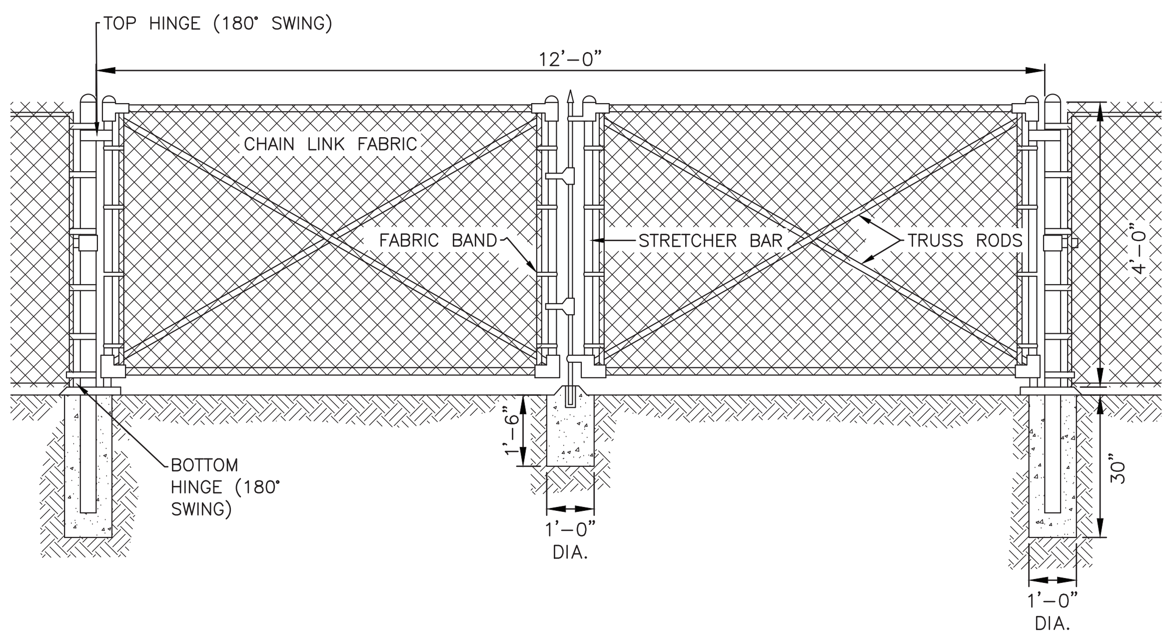
SECTION VIEW

1 PEDESTRIAN GATE W/ KICK PLATE
NOT TO SCALE

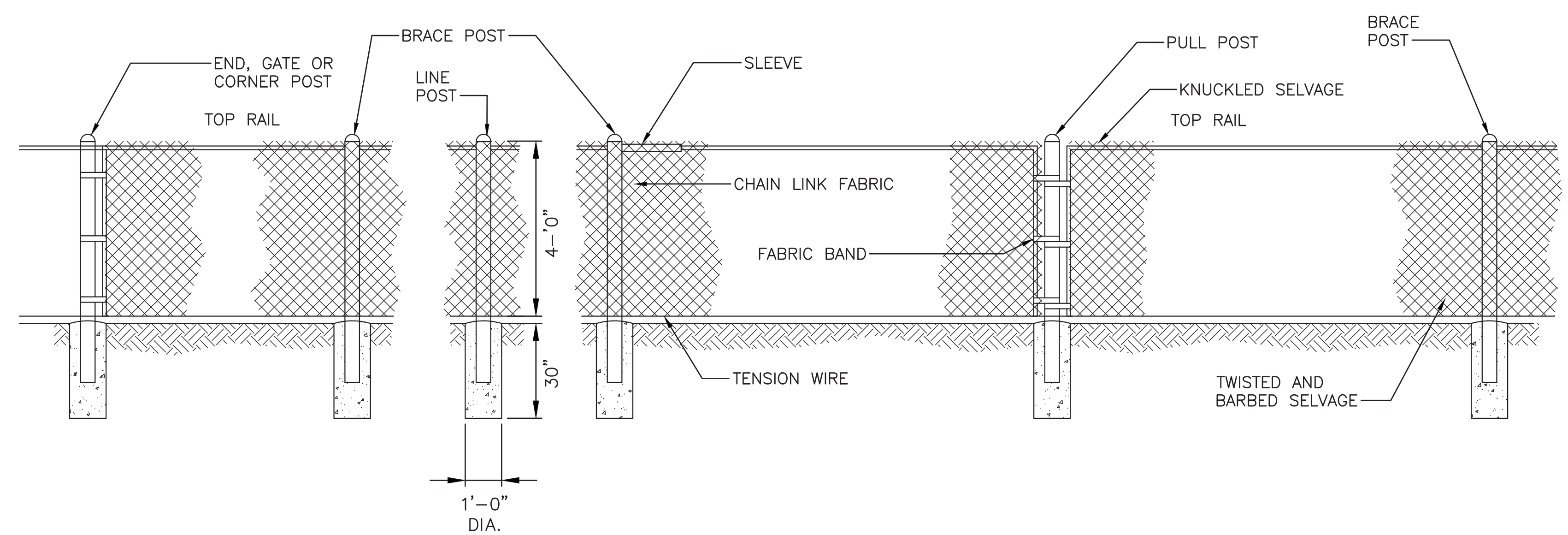


2 MODIFIED SPLIT RAIL FENCE
NOT TO SCALE

NOTES:
1. CHAIN LINK FENCING MATERIAL SHALL BE VINYL COATED (BLACK)
2. MINIMUM POST LENGTH: 8'-8"
3. CONCRETE OR GROUT AROUND POST AT GROUND LINE MUST BE MOUNDED FOR DRAINAGE



3 450c CHAINLINK GATE (14'-0")
NOT TO SCALE



4 450c CHAINLINK FENCE TYPE 6
NOT TO SCALE

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ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0-02.3 OF THE PROJECT MANUAL.

VAULT SERIAL NO.	DATE	MARK	NATURE REVISIONS	MADE	CHK'D	REV'D

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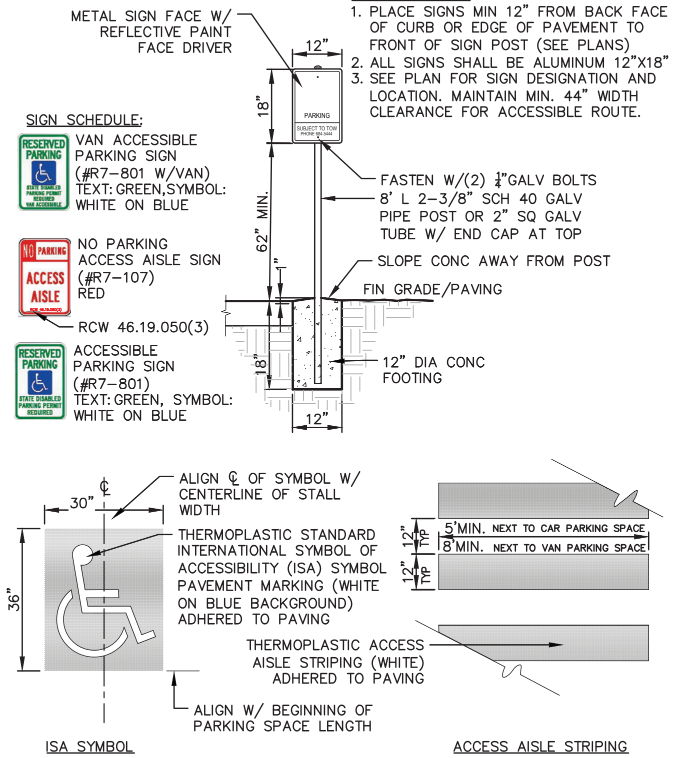
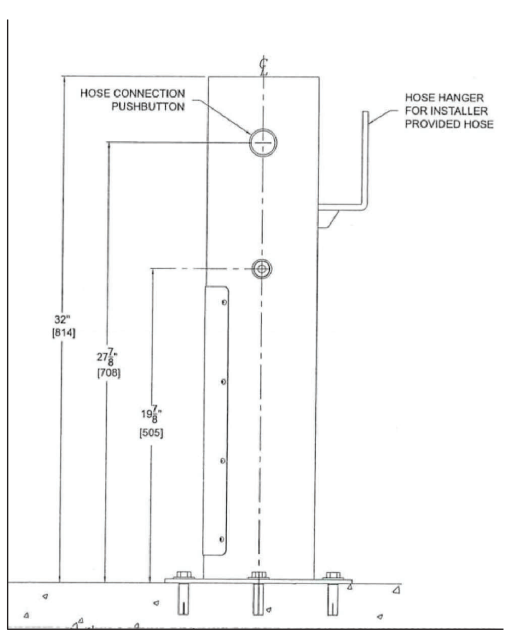
GENERAL NOTES
1. PLACE SIGNS MIN 12" FROM BACK FACE OF CURB OR EDGE OF PAVEMENT TO FRONT OF SIGN POST (SEE PLANS)
2. ALL SIGNS SHALL BE ALUMINUM 12"X18"
3. SEE PLAN FOR SIGN DESIGNATION AND LOCATION. MAINTAIN MIN. 44" WIDTH CLEARANCE FOR ACCESSIBLE ROUTE.

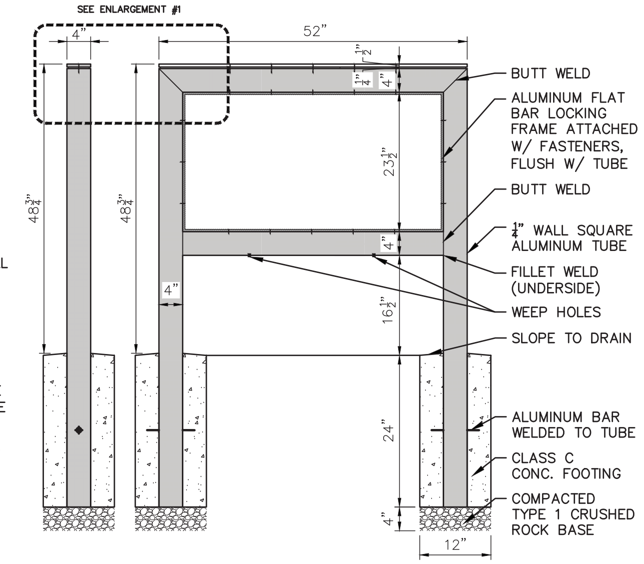


1 ACCESSIBLE PARKING STRIPING & SIGNAGE
SCALE: 1" = 1'-0"

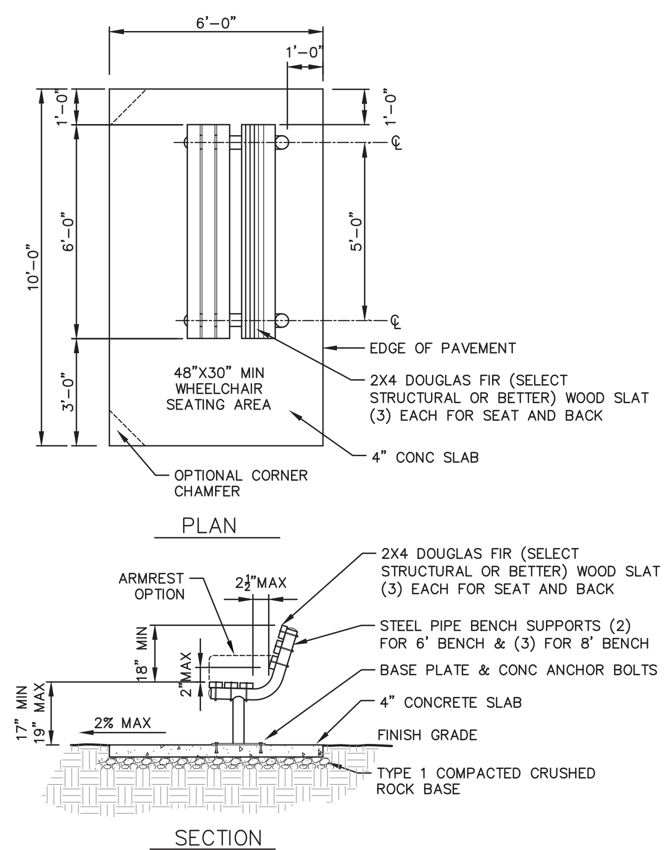


2 DRINKING FIXTURE FOR DOGS
SCALE: 1" = 1'-0"

NOTES:
1. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION.
2. SAND ALL WELDED JOINTS SMOOTH.
3. INSTALL LEVEL AND PLUMB.
4. SEE SPECIFICATIONS / SCHEDULE FOR COLORS, TEXT AND SIGN FACE DETAILS, UNLESS SHOWN ON THIS DRAWING
5. ¼" REVEAL COMPOSED OF ¼" FLAT BAR RECESSED ¼" ON ALL SIDES.
6. ALUMINUM FLAT BAR LOCKING FRAME SHALL BE RECESSED SUCH THAT THE SIGN PANEL FITS SNUGLY AGAINST THE 1"X⅛" ALUMINUM FLAT BAR FRAME.
7. CONCRETE FOOTINGS SHALL BE CLASS C, 12" DIAMETER, SLOPE SURFACE TO DRAIN.
8. BASE AGGREGATE SHALL BE COMPACTED TO 95% MAX. DRY DENSITY.

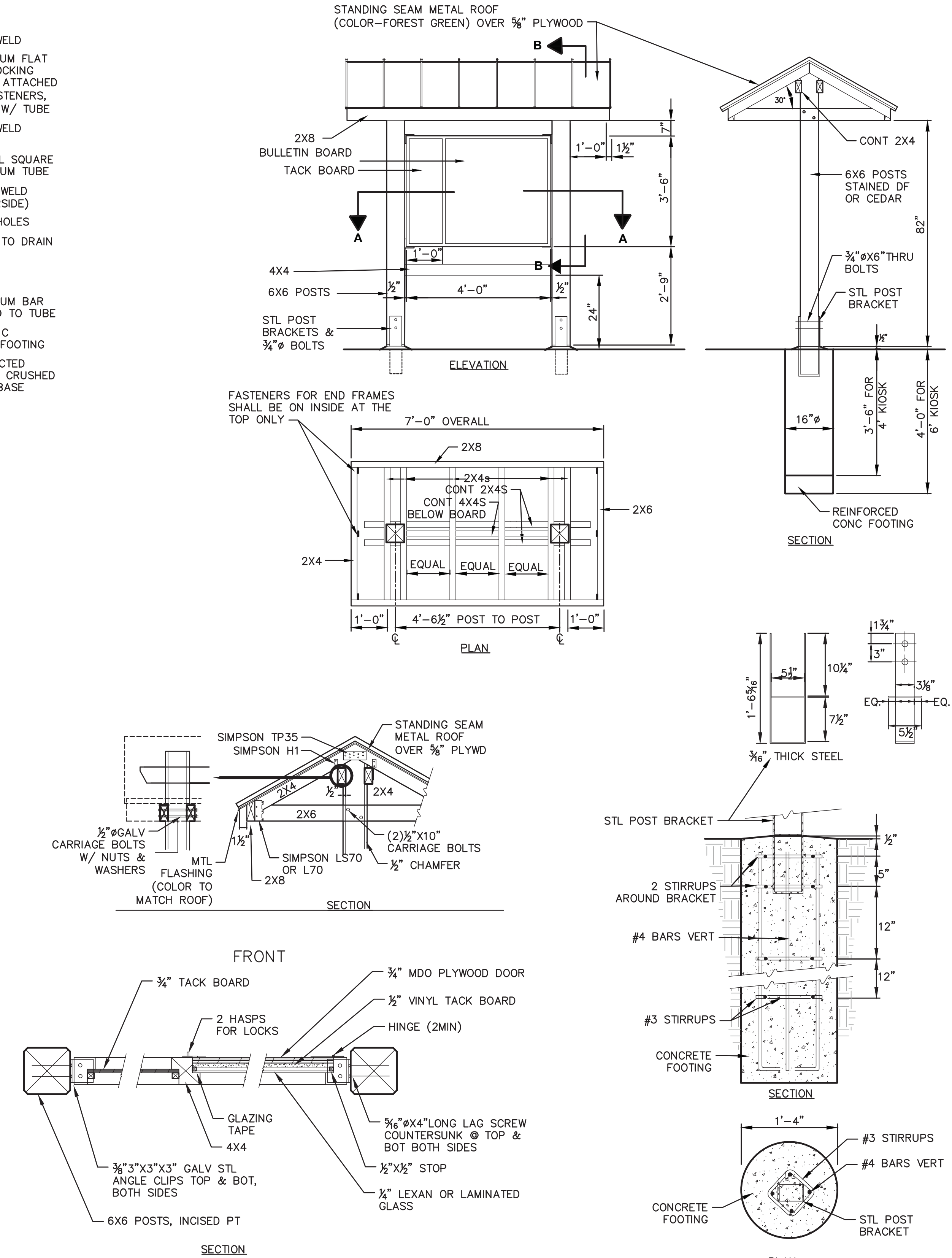


3 ALUMINUM SIGN FRAME
SCALE: ¾" = 1'-0"



NOTES:
1. STAKE BENCH INSTALLATION LOCATION FOR THE ENGINEER'S APPROVAL PRIOR TO BEGINNING SITE PREPARATION.
2. STEEL PIPE BENCH FRAME(S) AND ALL HARDWARE SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION.
3. IN AREAS OF TURF GRASS, CORNERS OF CONCRETE SLAB MUST BE CHAMFERED AT 45° AS SHOWN.
4. PROVIDE ARMRESTS PER PROJECT REQUIREMENTS.

4 BENCH
SCALE: $\frac{3}{32}$" = 1'-0"



5 KIOSK
SCALE: $\frac{3}{32}$" = 1'-0"

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ORDINANCE NO. PW NO. PRK730312-02
SUBPROJECT ID:
SCALE: ----

GEORGETOWN FLUME OFF-LEASH AREA

JOB PC CO
VPI # LDT3.0
DETAILS
SHEET 28 OF 30

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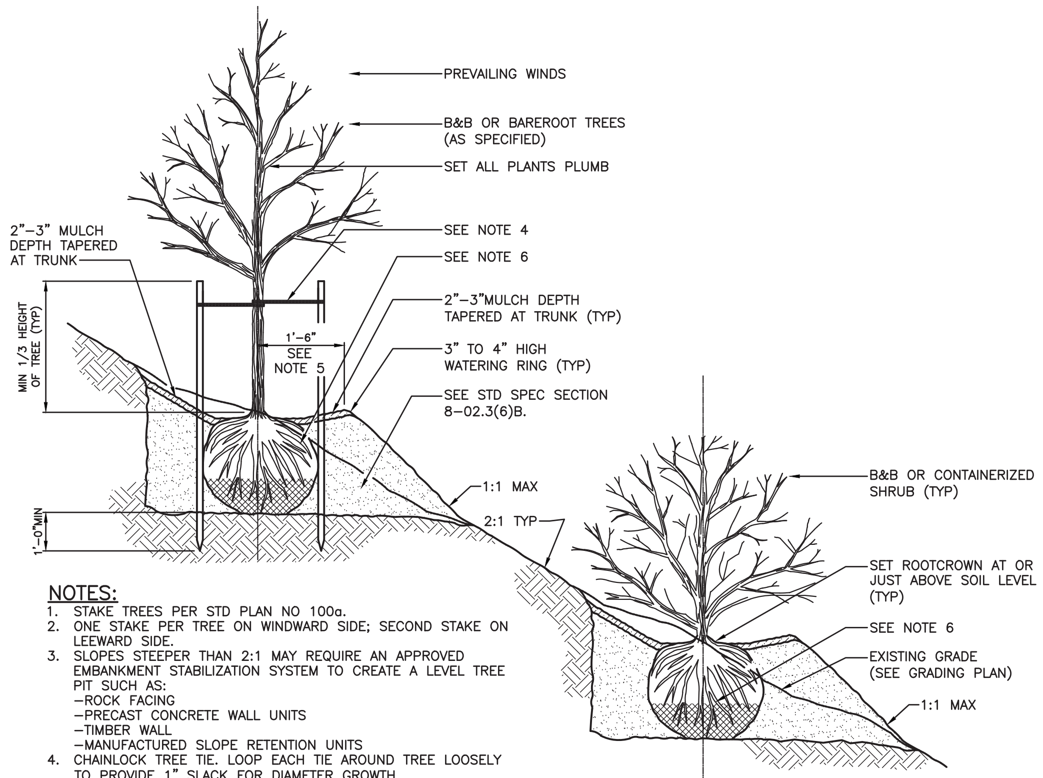
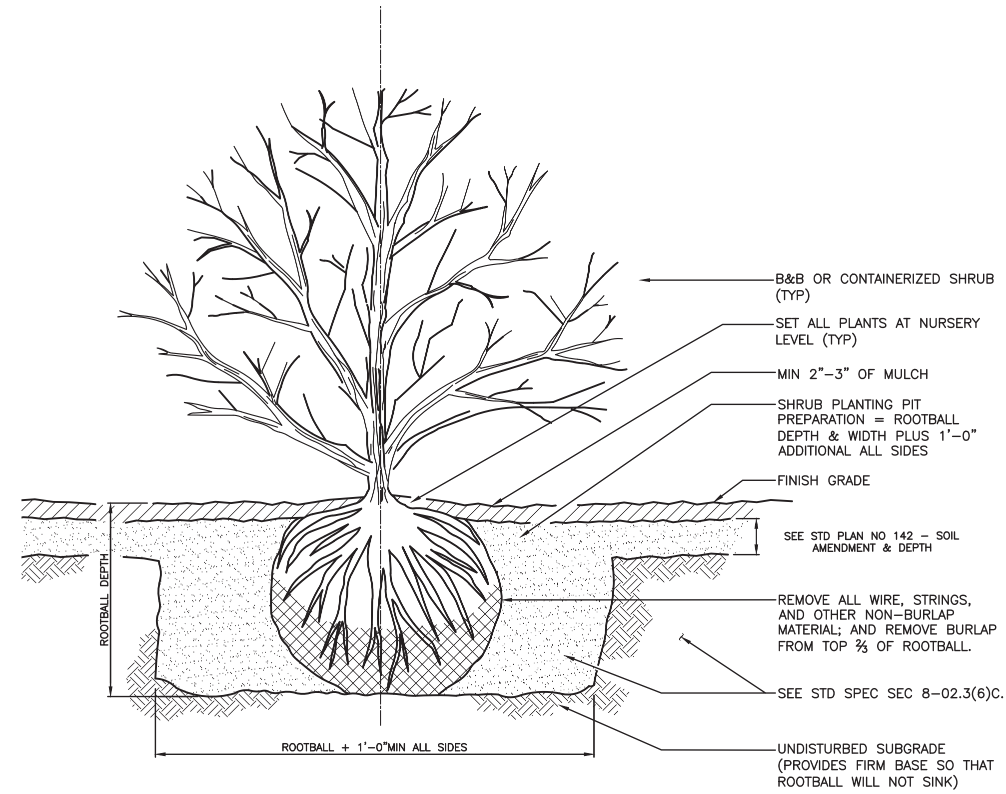
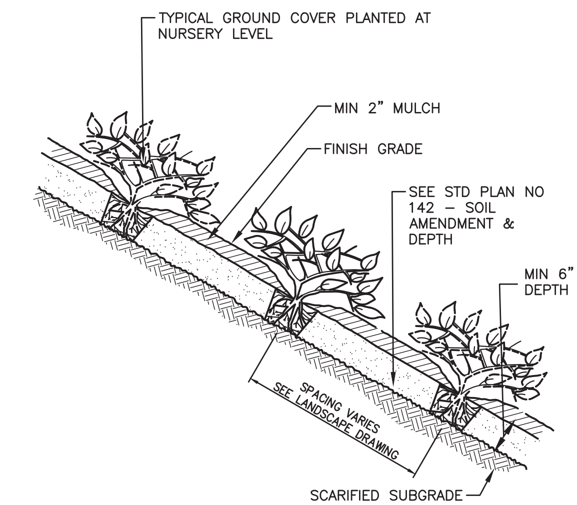


NOTES:
1. STAKE TREES PER STD PLAN NO 100a.
2. ONE STAKE PER TREE ON WINDWARD SIDE; SECOND STAKE ON LEEWARD SIDE.
3. SLOPES STEEPER THAN 2:1 MAY REQUIRE AN APPROVED EMBANKMENT STABILIZATION SYSTEM TO CREATE A LEVEL TREE PIT SUCH AS:
   - –ROCK FACING
   - –PRECAST CONCRETE WALL UNITS
   - –TIMBER WALL
   - –MANUFACTURED SLOPE RETENTION UNITS
4. CHAINLOCK TREE TIE. LOOP EACH TIE AROUND TREE LOOSELY TO PROVIDE 1" SLACK FOR DIAMETER GROWTH.
5. SHAPE SOIL TO PROVIDE 3' DIAMETER OR ROOTBALL DIAMETER, WHICHEVER IS GREATER, WATERING RING.
6. REMOVE AL WIRE, STRINGS AND OTHER NON–BURLAP MATERIAL; AND REMOVE BURLAP FROM TOP ⅔ OF ROOTBALL.

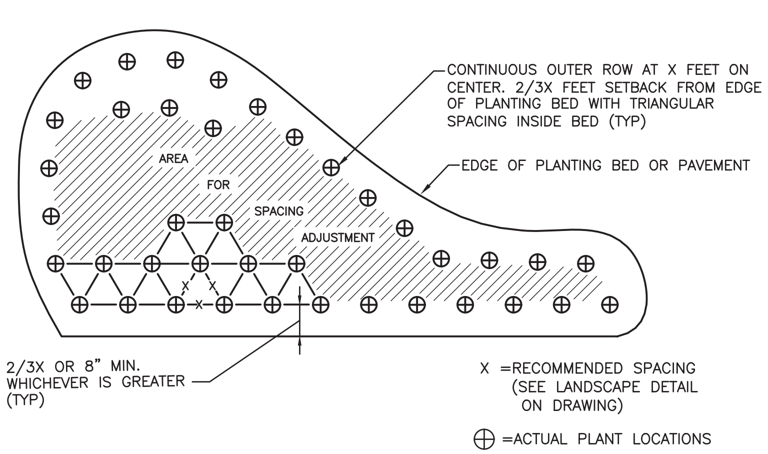
1 100b TREE AND SHRUB PLANTING ON SLOPES
SCALE: ⅜" = 1'-0"



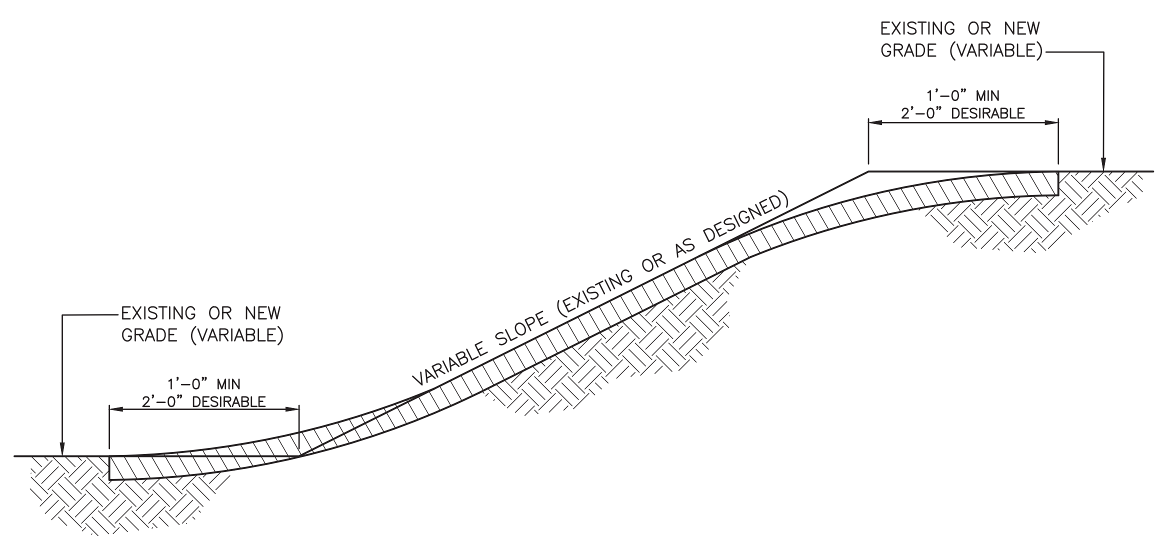
2 110 SHRUB PLANTING
SCALE: ⅜" = 1'-0"



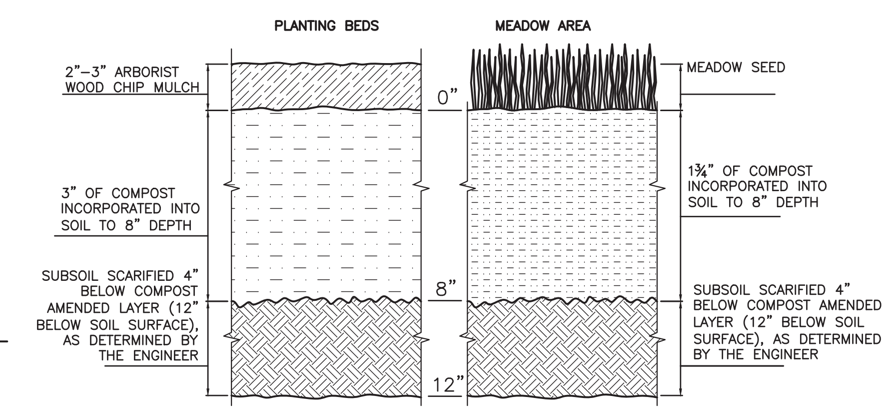
3 111 GROUND COVER PLANTING
SCALE: 1" = 1'-0"



4 112 PLANTING PATTERN
SCALE: ⅜" = 1'-0"



5 140 SLOPE ROUNDING
SCALE: 1" = 1'-0"



NOTES:
1. ALL SOIL AREAS DISTURBED OR COMPACTED DURING CONSTRUCTION, AND NOT COVERED BY BUILDINGS OR PAVEMENT, MUST BE AMENDED WITH COMPOST AS DESCRIBED BELOW.
2. SUBSOIL SHOULD BE SCARIFIED (LOOSENED) 4 INCHES BELOW AMENDED LAYER, TO PRODUCE 12–INCH DEPTH OF UN–COMPACTED SOIL, EXCEPT WHERE SCARIFICATION WOULD DAMAGE TREE ROOTS OR AS DETERMINED BY THE ENGINEER.
3. COMPOST MUST BE TILLED IN TO 8 INCH DEPTH INTO EXISTING SOIL, OR PLACE 8 INCHES OF COMPOST–AMENDED SOIL, PER SOIL SPECIFICATION.
4. TURF AREAS MUST RECEIVE 1.75 INCHES OF COMPOST TILLED IN TO 8–INCH DEPTH, OR MAY SUBSTITUTE 8" OF IMPORTED SOIL CONTAINING 20–25% COMPOST BY VOLUME. THEN PLANT GRASS SEED OR SOD PER SPECIFICATION.
5. PLANTING BEDS MUST RECEIVE 3 INCHES OF COMPOST TILLED IN TO 8–INCH DEPTH, OR MAY SUBSTITUTE 8" OF IMPORTED SOIL CONTAINING 35–40% COMPOST BY VOLUME. MULCH AFTER PLANTING, WITH 2–3 INCHES OF ARBORIST WOOD CHIP MULCH OR APPROVED EQUAL.
6. SETBACKS: TO PREVENT UNEVEN SETTLING, DO NOT COMPOST–AMEND SOILS WITHIN 3 FEET OF UTILITY INFRASTRUCTURES (POLES, VAULTS, METERS ETC.). WITHIN ONE FOOT OF PAVEMENT EDGE, CURBS AND SIDEWALKS SOIL SHOULD BE COMPACTED TO APPROXIMATELY 90% PROCTOR TO ENSURE A FIRM SURFACE.

6 142 SOIL AMENDMENT AND DEPTH
SCALE: 3" = 1'-0"

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BY: . . . .
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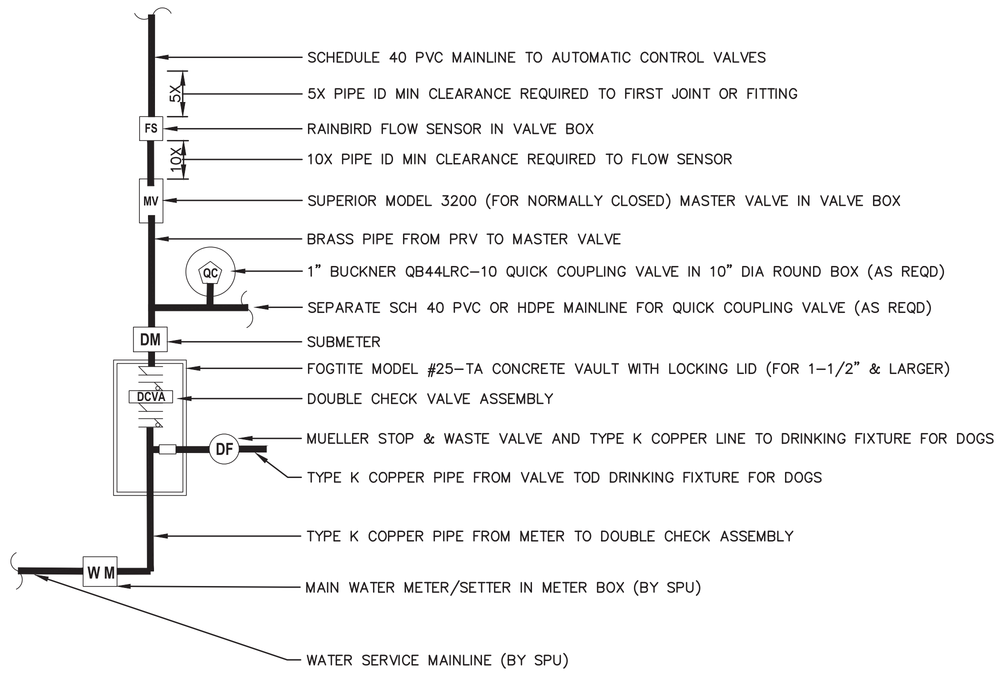
ORDINANCE NO. XXXX–XXX PW NO. PRK730312–02
SUBPROJECT ID:
SCALE: ––––

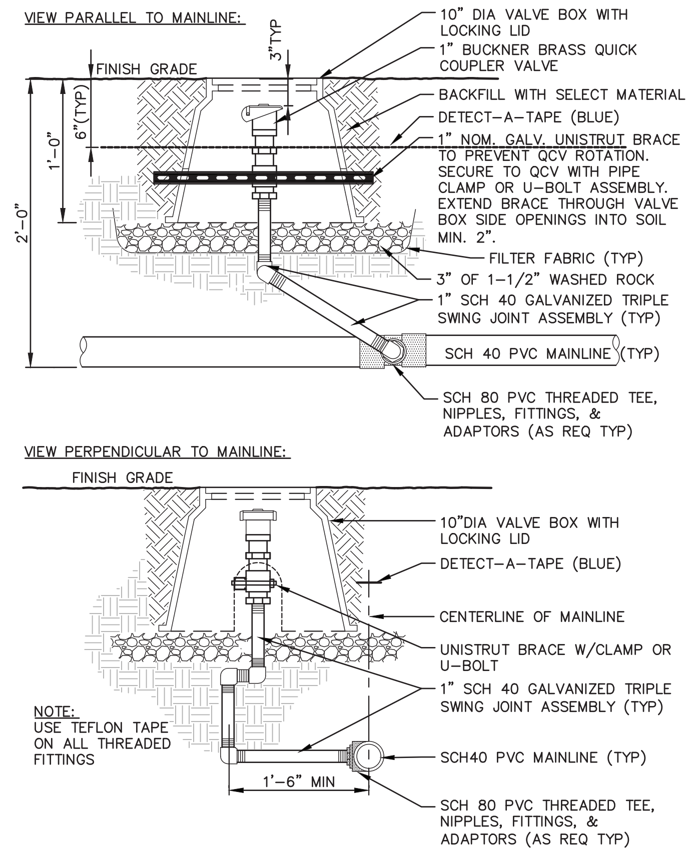
GEORGETOWN FLUME
OFF–LEASH AREA

JOB	PC CO
VPI #	LDT4.0
DETAILS	
SHEET 29 OF 30	

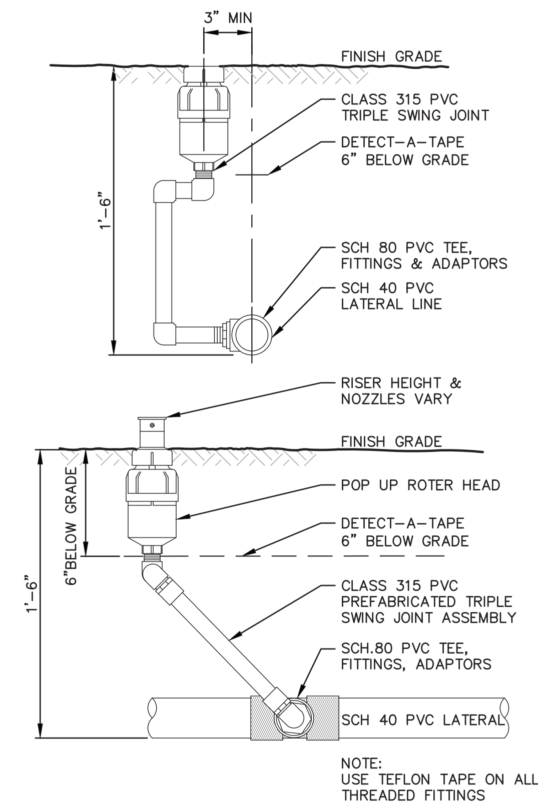


NOTES:
1. ALL COMPONENTS OF SCHEMATIC POINT OF CONNECTION SHALL BE INSTALLED PER SPR STANDARD DETAILS.
2. BACKFLOW PREVENTION DEVICE INSTALLATIONS REQUIRE INSPECTION, TESTING, AND CERTIFICATION BY SPU INSPECTION SERVICES.
3. FOR 1-1/4" AND SMALLER SIZED PRV/DCVA APPLICATIONS, USE FOGTITE #2 METER BOX

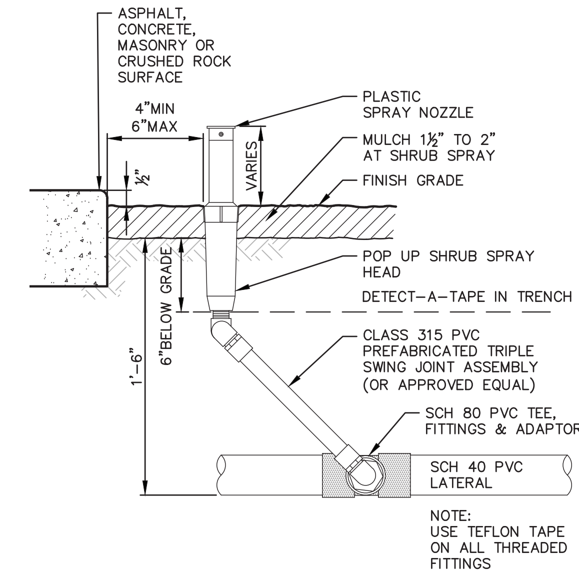
1 POINT OF CONNECTION DIAGRAM
SCALE: 3/4" = 1'-0"



2 QUICK COUPLER
SCALE: 1 1/2" = 1'-0"

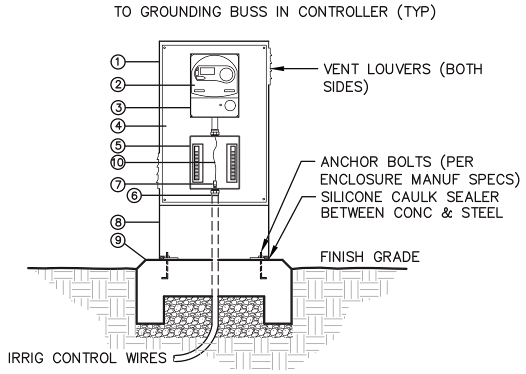


3 ROTOR HEAD
SCALE: 2" = 1'-0"

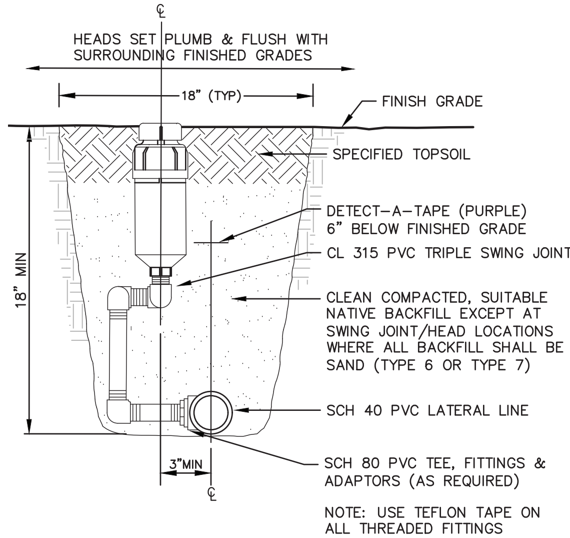


4 SPRAY HEAD
SCALE: 2" = 1'-0"

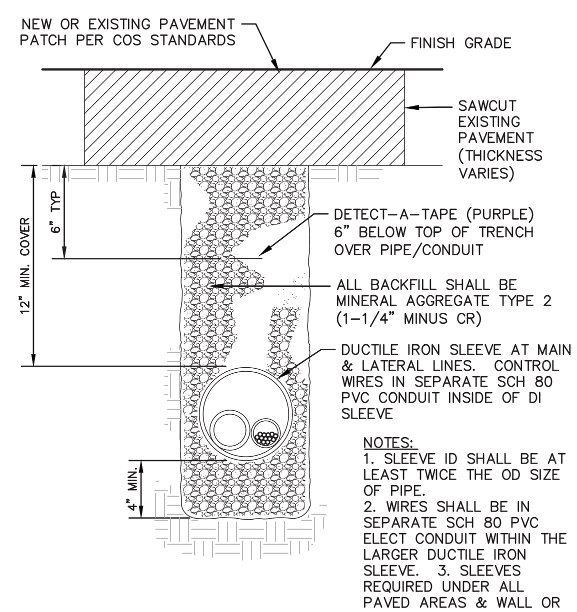
IRRIGATION CONTROLLER ENCLOSURE
1. STRONG BOX SB-18CR (18"Wx36"Hx12"D) POWDER-COATED (DK. GREEN), 12GA. STEEL ENCLOSURE WITH LOCKABLE DOOR
2. (6,9,or12STA.) MOTOROLA 'MIRACLE DC' CONTROLLER, MODEL #25-MR-DC-(06, 09, 12), WITH 9V LITHIUM BATTERY
3. 25-MRP-PROF-CAB PLASTIC CABINET
4. ALUMINUM BACK PANEL
5. TERMINAL BOX WITH TERMINAL STRIPS
6. 2" CONDUIT FOR STATION FIELD WIRES
7. GROUND LUG
8. STRONG BOX PED-18CR (18"Wx10"Hx12"D) PEDESTAL
9. PREFABRICATED CONCRETE BASE
10. GROUND WIRE CONNECTS FROM GROUND LUG TO GROUNDING BUSS IN CONTROLLER (TYP)



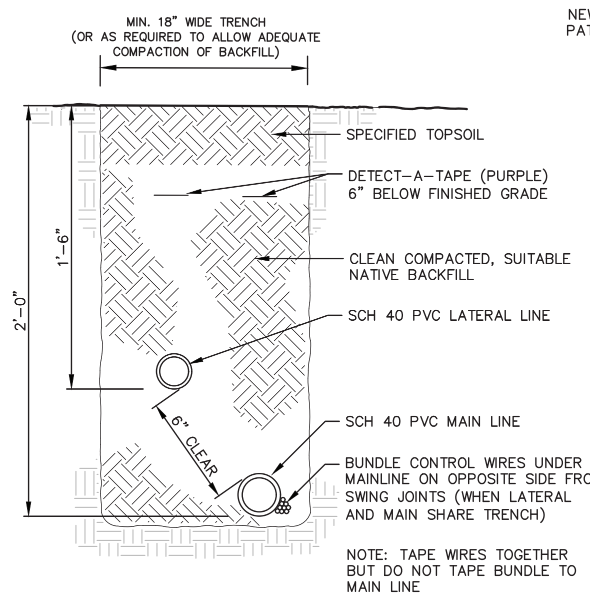
5 IRRIGATION CONTROLLER
SCALE: 3/4" = 1'-0"



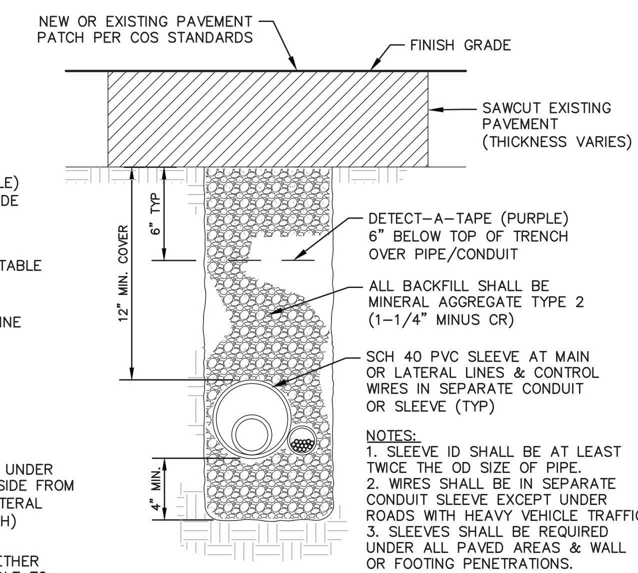
6 LATERAL LINE W/ SWINGJOINT, HEAD
SCALE: 2" = 1'-0"



7 IRRIGATION SLEEVE TRENCHING UNDER VEHICULAR CEMENT CONC
SCALE: 2" = 1'-0"



8 IRRIGATION MAIN LINE, LATERAL LINE IN THE SAME TRENCH
SCALE: 2" = 1'-0"



9 IRRIGATION SLEEVE UNDER CEMENT CONC SIDEWALK
SCALE: 2" = 1'-0"

VAULT SERIAL NO.	DATE	MARK	NATURE	MADE	CHK'D	REV'D

REVISIONS

U:\PDD\01-Project Files\Georgetown Steam Plant_Flume Off-Leash Area Development\3-Design\3g-ConstrDocs\CAD\FLUME_30_Details.dwg
Apr-21-22 3:07pm

04/20/2022
NOT FOR CONSTRUCTION

APPROVED FOR ADVERTISING
LIZ ALZEER
DEPARTMENT OF FINANCE & ADMINISTRATIVE SERVICES
SEATTLE, WASHINGTON . . . . 20 .
BY: . . . .
PURCHASING AND CONTRACTING DIRECTOR

INITIALS AND DATE	INITIALS AND DATE
DESIGNED DB CHECKED ML	REVIEWED: DES. CONST. SDOT PROJ. MGR.
DRAWN DB CHECKED ML	RECEIVED REVISED AS BUILT

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0-02.3 OF THE PROJECT MANUAL.

Seattle Parks & Recreation
ORDINANCE NO. XXXX-XXX PW NO.
SUBPROJECT ID:
SCALE: ----

GEORGETOWN FLUME OFF-LEASH AREA

JOB PC CO
VPI # LDT5.0
DETAILS
SHEET 30 OF 30

Appendix K

Stormwater Technical Memorandum—Georgetown Flume Dog Off-Leash Park (90% Submittal)

STORMWATER

TECHNICAL MEMORANDUM

GEORGETOWN FLUME DOG OFF-LEASH PARK

90% SUBMITTAL

JANUARY 2022

PREPARED BY: EDUARDO ABAN, PE

TABLE OF CONTENTS

1 PROJECT DESCRIPTION

The Flume site, currently owned by Seattle City Light (SCL), was the historic site of the conveyance that transported water from the Duwamish River to the Georgetown Steam Plant until it ended operation in 1975. SCL is offering the eastern piece of this property to Seattle Parks and Recreation (SPR) and the western piece to Seattle Department of Transportation (SDOT) as part of a public benefit package in exchange for a street vacation SCL has proposed for a segment of Diagonal Avenue South.

The eastern portion of the site will be owned and maintained by SPR and developed into a new off-leash area. This project will also build a surface water non-infiltrating bioswale, irrigation, perimeter fencing, on-street parking, and landscaping.

Refer to Figure 1 for project location.

1.1 PURPOSE

The purpose of this memorandum is to identify the minimum requirements and design criteria for the plan preparation of the eastern portion of the site which is the Georgetown Flume Off-Leash Area. These proposed improvements will result in the construction of new and replaced hard surfaces, which require drainage condition analysis. The following memorandum documents the requirements of the 2021 City of Seattle Stormwater Code as it applies to the proposed improvements and describes the project treatment measures.

1.2 DESIGN STANDARDS

This project is required to comply with the City's 2021 Stormwater Code contained in the Seattle Municipal Code (SMC), Chapters 22.800-22.808, the 2016 Stormwater Manual, and associated Directors' Rules.

2 PROJECT CLASSIFICATION

Per the 2021 Stormwater Code, the boundary of the project site is the full area of the parcel. The Georgetown Flume Off-Leash Area project is the eastern portion of the site that is located within Seattle City Light property. For the purpose of stormwater analysis, the project will be classified as two separate project types. Per the 2021 Stormwater Code, under the SMC, Section 22.801.170 – "Parcel-based project" means any project that is not a single-family residential project, roadway project, sidewalk project, or trail project. This eastern portion within Seattle City Light property is classified as a parcel-based project.

3 BASIN DELINEATION

The drainage basin and associated receiving water were identified using the City of Seattle Development Services Water and Sewer Map, Seattle Public Utilities GIS, field verification, and existing topography. The project is located within the Georgetown flume drainage sub-basin which is the in downstream end of the 24" drainage sewer that runs within the parcel towards E Marginal Way S. Based on preliminary discussion with Seattle Public Utilities (SPU), it is assumed that SPU maintains, and will continue to maintain drainage infrastructure within SCL property limits. Further investigation will be completed to determine if an easement will be required for SPU to maintain structures. Refer to Table 1 for the basin summary. Stormwater runoff from the parcel will be treated in a non-infiltrating bioswale, then is conveyed via the public storm sewer that discharges onto the Duwamish Waterway.

Table 1 – Basin Summary

Basin	Project Site	Downstream Conveyance	Receiving Water Body
1	Parcel (S Myrtle to E Marginal Way S)	Storm Sewer Seattle City Light Property	Duwamish Waterway

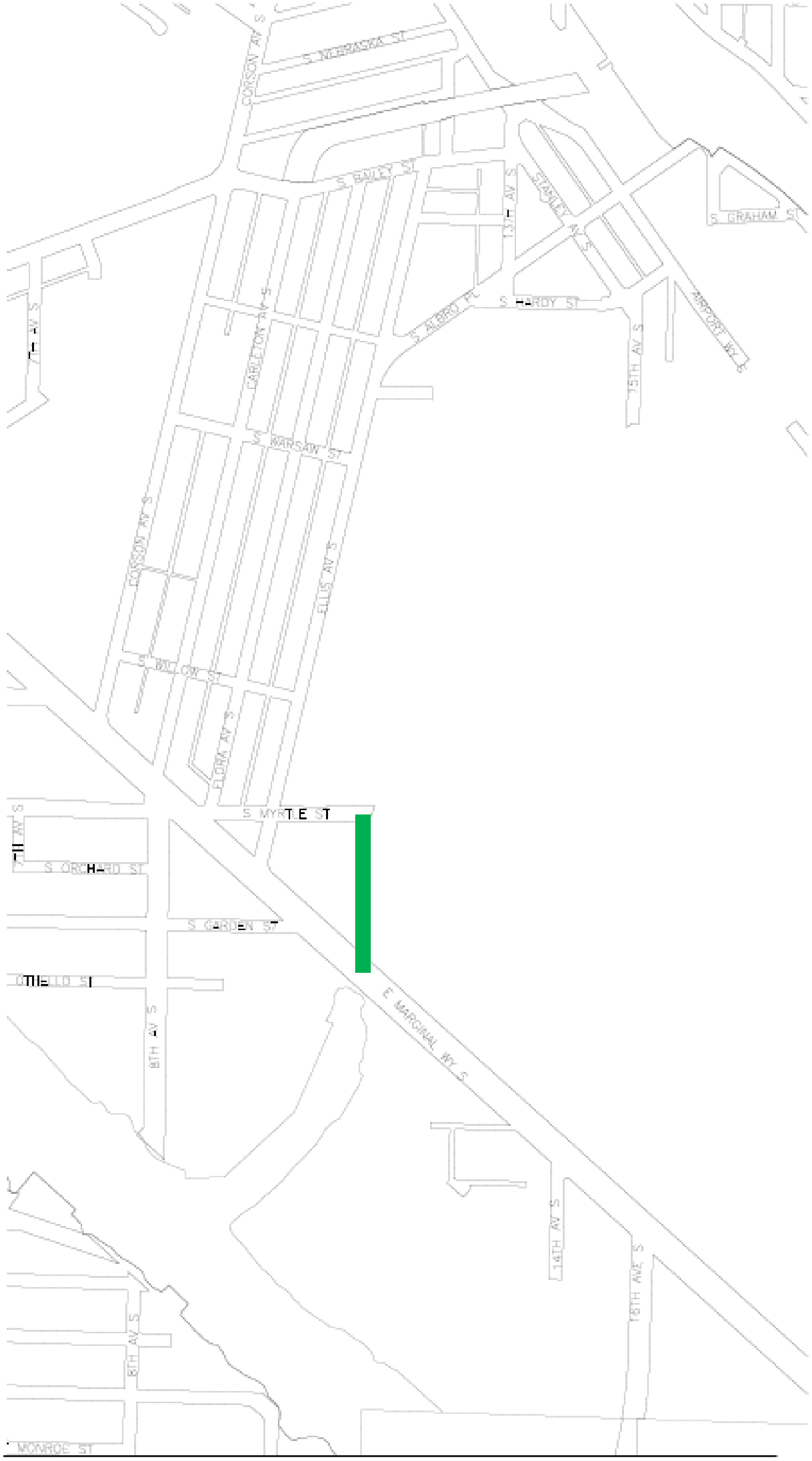


Figure 1 – Location Map

4 STORMWATER CODE MINIMUM REQUIREMENTS

The City of Seattle 2021 Stormwater Manual and Seattle Municipal Code (SMC) were used to determine the minimum requirements for this project. Parcel-based project triggers the same minimum requirements. The main sections of the code which define stormwater requirements applicable to this project are as follows:

- SMC Section 22.805.020 Minimum Requirements for All Projects
- SMC Section 22.805.050 Minimum Requirements for Parcel-based Projects

4.1 Minimum Requirements (SMC 22.805)

4.1.1 SMC 22.805.020 Minimum Requirements for All Projects

A. Maintain Natural Drainage Patterns: This project will not change the existing condition.
B. Maintain Discharge Points: This project will maintain the existing discharge location.
C. Do Not Intensify Flood-prone Areas: This project is not located in a flood-prone area.
D. Prevent Construction Site Stormwater Pollution: Construction will use catch basin inserts and street sweeping.
E. Protect Wetlands: There are no wetlands within the construction limits.
F. Protect Streams and Creeks: Discharge from the disturbed areas is not tributary to a creek.
G. Protect Shorelines: There are no shorelines in the vicinity of the project.
H. Ensure Sufficient Capacity: This project is not large enough to require this analysis.
I. Install Source Control BMPs: During construction, pollution generating activities will be controlled and monitored to enclose or contain any pollutants.
J. Do Not Obstruct Watercourses: There are no watercourses within the construction limits.
K. Comply with Side Sewer Code: Private side sewers and service drains will not be affected.

4.1.2. SMC 22.805.050 Minimum Requirements for Parcel-based Projects

A. SMC 22.805.050 Soil Amendment: All disturbed areas will be restored with amended soils.
B. SMC 22.805.070 On-Site Stormwater Management: Each project that exceeds 1,500 square feet of new plus replaced hard surface or 7,000 square feet or more of land disturbing activity must meet the Minimum Requirements for On-Site Stormwater Management.

On-Site Stormwater Management BMP’s will be analyzed using the On-Site Stormwater Management – List Approach Calculator. Non-Infiltrating Bioretention may be a feasible BMP option to install. See Appendix for On-Site Stormwater Management – List Approach Calculator.

5 CONSTRUCTION STORMWATER CONTROL

This project has over 19,000 square feet of new plus replaced hard surface that triggered the Construction Stormwater Control Plan. Applicable stormwater control BMPs in each of the 19 elements is selected that will be implemented during construction. The selection is outlined in the next Section.

5.1 Project Construction BMPs

The table for the Stormwater Construction Plan follows in the next page.

Element Number	Required Element		BMP Selection	Reason, if not applicable
1	Mark Clearing Limits and Environmentally Critical Areas		E1.30 Preserving Natural Vegetation (Section 4.1.2.1)	No natural vegetation exists.
			E1.35 Buffer Zones (Section 4.1.2.2)	No stream, receiving water or natural swale near or at the site.
			E1.50 High Visibility Fencing (Section 4.1.2.5)	The entire site will be under construction.
2	Retain Top Layer		Within the boundaries of the project site, retain the duff layer, top soil, and native vegetation, if there is any, in an undisturbed state to the maximum extent feasible. If it is not feasible to retain the top layer in place, stockpile on site, cover to prevent erosion, and replace immediately upon completion of the ground disturbing activities to the maximum extent feasible.	The top 6-inch layer will be removed and disposed offsite for remediation purpose.
3	Establish Construction Access	X	E2.10 Stabilized Construction Access (Section 4.2.1.1)	
			E2.15 Tire Wash (Section 4.2.1.2)	The existing adjacent street will be swept and vacuumed whenever sediments are tracked onto it.
		X	E2.20 Construction Road Stabilization (Section 4.2.1.3)	
4	Protect Downstream Properties and Receiving Waters		Ecology BMP C241 Sediment Pond (Temporary)	No receiving water near the site.
5	Prevent Erosion and Sediment Transport from the Site		E3.10 Filter Fence (Section 4.3.1)	The site and the immediate surrounding terrain is relatively flat. Temporary
			Ecology BMP C231 Brush Barrier	
			E3.20 Gravel Filter Berm (Section 4.3.2)	
6	Prevent Erosion and Sediment Transport from the Site by Vehicles	X	E3.65 Cleaning Inlets and Catch Basins (Section 4.3.9)	
		X	E3.70 Street Sweeping and Vacuuming (Section 4.3.10)	
7	Stabilize Soils		E1.10 Temporary Seeding (Section 4.1.1.1)	The top 6-inch layer of the entire site will be removed and huled offsite for remediation. Materials will be imported to the site, and the site will be regraded.
			E1.15 Mulching, Matting, and Compost Blankets (Section 4.1.1.2)	
			E1.20 Clear Plastic Covering (Section 4.1.1.3)	
			E1.40 Permanent Seeding and Planting (Section 4.1.2.3)	
			E1.45 Sodding (Section 4.1.2.4)	
			E2.45 Dust Control (Section 4.2.1.6)	
			Ecology BMP C130 Surface Roughening	
			Ecology BMP C131 Gradient Terracing	
			Ecology BMP C126 Polyacrylamide for Soil Erosion Protection	
8	Protect Slopes (refer to Environmentally Critical Areas ordinance [SMC 25.09.180] for additional requirements and development standards for steep slope)		Level Spreader (Appendix E)	The site and its surrounding is relatively flat, and it's not located in an Environmentally Critical Area.
			E2.35 Check Dams (Section 4.2.1.4)	
			E2.40 Triangular Silk Dike (Geotextile-encased Check Dam) (Section 4.2.1.5)	
			Pipe Slope Drains (Appendix E)	
			E2.70 Subsurface Drains (Section 4.2.3.1)	
			E2.80 Earth Dike and Drainage Swale (Section 4.2.3.2)	
			Ecology BMP C130 Surface Roughening	
			Ecology BMP C131 Gradient Terracing	
			Ecology BMP C201 Grass-lined Channels	
9	Protect Storm Drains	X	E3.25 Inlet Protection (Section 4.3.3)	
		X	E3.65 Cleaning Inlets and Catch Basins (Section 4.3.9)	
		X	E3.70 Street Sweeping and Vacuuming (Section 4.3.10)	
10	Stabilize Channels and Outlets		Level Spreader (Appendix E)	No existing channels onsite or near the site.
			E2.35 Check Dams (Section 4.2.1.4)	
			E2.80 Earth Dike and Drainage Swale (Section 4.2.3.2)	
			Outlet Protection (Appendix E)	
			Ecology BMP C201 Grass-lined Channels	
			Ecology BMP C202 Riprap Channel Lining	
			Ecology BMP C203 Water Bars	
11	Control Pollutants		C1.15 Material Delivery, Storage, and Containment (Section 5.1.1)	This project will not be dealing with hazardous materials.
			C1.20 Use of Chemicals During Construction (Section 5.1.2)	Will not use any chemicals in this project.
			C1.25 Demolition of Buildings (Section 5.1.3)	No existing buildings onsite.
			C1.30 Building Repair, Remodeling, and Construction (Section 5.1.4)	
		X	C1.35 Sawcutting and Surfacing Pollution Prevention (Section 5.1.5)	

11	Control Pollutants		C1.45 Solid Waste Handling and Disposal (Section 5.1.7)	No solid waste onsite.
			C1.50 Disposal of Asbestos and Polychlorinated Biphenyls (PCBs) (Section 5.1.8)	This project will not be dealing with asbestos and PCBs.
			C1.55 Airborne Debris Curtain (Section 5.1.9)	No existing buildings onsite.
			C1.56 Concrete Handling (Section 5.1.10)	No existing concrete onsite.
			C1.58 Concrete Washout Area (Section 5.1.11)	
			C1.59 High pH Neutralization Using CO2 (Section 5.1.12)	
12	Control Dewatering		C1.40 Temporary Dewatering (Section 5.1.6)	This project will not be dealing with groundwater.
13	Maintain BMPs	X	Maintain and repair all temporary and permanent erosion and sediment control BMPs as needed to assure continued performance of their intended function.	
14	Inspect BMPs	X	Inspect, maintain, and repair all BMPs as needed to assure continued performance of their intended function.	
		X	Certified Erosion and Sediment Control Lead (Section 2.3): For projects over 1 acre; inspections should be conducted by the Certified Erosion and Sediment Control Lead indentified in the Large Project Construction Stormwater Control Plan.	
15	Execute Construction Stormwater Control Plan	X	Retain the Large Project Construction Stormwater Control Plan on site or within reasonable access to the site. Modify the plan as needed.	
		X	Remove all temporary erosion and sediment control BMPs within 5 business days after final site stabilization is achieved, or after they are no longer needed, whichever is later.	
16	Minimize Open Trenches	X	In the contruction of underground utility lines, where feasible, no more than one hundred and fifty (150) feet of trench should be opened at one time, unless soil is replaced within the same working day. Where consistent with safety and space considerations, place excavated material on the uphill side of trenches. Trench dewatering devices should discharge into a sediment trap or sediment pond.	
17	Phase the Project	X	Phase development projects where feasible in order to prevent soil erosion and, to the maximum extent practicable, the transport of sediment from the site during construction.	
		X	From October 31 through April 1, clearing, grading, and other soil disturbing activities will be subject to additional limitations.	
18	Install Permanent Flow Control and Water Quality Facilities	X	Refer to Volume 1 for applicable minimum requirements and Volume 3 for BMP design.	
19	Protect Stormwater BMPs	X	General: Protect all stormwater BMPs from sedimentation through installation and maintenance of erosion and sediment control BMPs. Restore the BMPs to their fully functioning condition if they accumulate sediment during construction. Restoring the stormwater BMP must include removal of sediment and any sediment-laden soils, and replacing the removed soils with soils meeting design specification.	
			Sediment Control: Protect infiltration BMPs from sedimentation that can clog the facility and reduce infiltration capacity.	No infiltration is expected on this project.

On-site Stormwater Management Calculator
Site and Drainage Control Summary

Version 06-2021

To use the On-Site List Calculator you must select "Enable Content" when the Security Warning appears.

Project Information

Site Address	7242 E Marginal Way S	SDCI Project Number	
Primary Contact	Eduardo Aban	SDOT Project Number	
Project Type	Parcel-Based	Primary Contact E-mail or Phone	eduardo.aban@seattle.gov

Is this project "Closely Related" to other SDCI construction permits/projects? ◯ Yes ◉ No

"Closely Related" SDCI Construction Permit Numbers

Is this project associated with a Short Plat or Subdivision? ◯ Yes ◉ No SDCI MUP Number

Was the project lot created or altered in size after Jan 1, 2016? No

Total Site Area	38,629	sf	Total Closely Related and/or Short Plat/Subdivision Site Area		sf
Total Existing Hard Surface Area	0	sf			
Total New plus Replaced Hard Surface Area (NPRHS)	19,423	sf	Total Closely Related and/or Short Plat/Subdivision NPRHS		sf
Total New and/or Replaced Lawn/Landscaping	19,206	sf			
Undisturbed and Protected Site Area	0	sf			

Site Information

Note: Reference the Preliminary Assessment Report (PAR) to complete this section.

Approved Point of Stormwater Discharge: Public Storm Drain Main

Drainage Basin: Designated Receiving Water

Is the downstream drainage system considered Capacity Constrained by SPU? No

Approved Point of Wastewater Discharge: Public Sanitary Sewer Main

Approved Point of Sub-Surface Discharge: Public Storm Drain Main

Required Flow Control Standard: ☐ Pre-Developed Pasture ☐ Pre-Developed Forest ☐ Peak Control ☐ Wetland Protection ☐ Existing Conditions ☑ None

Project will permanently discharge groundwater? No

Required Water Quality Treatment Standard: ☐ Oil Control ☐ Enhanced ☐ Basic ☑ None

Total Pollution Generating Hard Surface Area 0 sf w/ Closely Related/Short Plat/Subdiv. sf

Total Pollution Generating Pervious Surface Area 0 sf w/ Closely Related/Short Plat/Subdiv. sf

Environmentally Critical Areas: No

☐ Steep Slope ☐ Potential Slide ☐ Riparian Corridor ☐ Wetland ☐ Liquefaction ☐ Flood Prone
☐ Landfill ☐ Known Landslide ☐ Fish / Wildlife ☐ Peat / Groundwater Management ☐ Shoreline Habitat

Is there soil and/or groundwater contamination on this site? No Source Control is required: Yes

Infiltration Information

Is infiltration investigation required? No Why? Other

Is infiltration on the site feasible? Explain:

Site Measured Infiltration Rate x Infiltration Rate Correction Factor 0.5 = 0 Site Design Inf Rate

On-site Stormwater Management (select List Approach or Performance Standard)

◉ On-site List Approach (Pre-sized) Calculator -- Complete the Surface tabs and BMP Sizing tabs (Most commonly used)

◯ On-site Performance Standard -- Stormwater modeling by Civil Engineer (Also for No Off-site Point of Discharge)

Number of roof areas: 0

Number of other surface areas: 1

Surface	Surfaces Description	On-site BMP	Contrib. Area (sf)	Facility Size (sf)	Facility Configuration
1	Surface:	Non-Infiltrating Bioretention	19,423	89 sf	Sloped sides 12 inch

Total New/Replaced Roof Area	0		Total Roof Area Managed	0
Total New/Replaced Other Surface Area	19,423		Total Other Surface Managed	19,423
Total Area Managed	19,423	sf	Total Volume Managed On Site	0 gal
Estimated compost required for soil amendment	119.077	cy	*Volume of compost will be verified by the Inspector.*	

On-site Stormwater Management Calculator - List Approach
Surface Identification and BMP Evaluation for Parcel-Based Projects

Project No. **0**

Hard Surface Number	1
Hard Surface Type	Non-Roof
Hard Surface Description	
Surface Area (sf)	19,423

Category 1 (Select 1 BMP from Category 1, order does not matter, or move to Category 2)

BMP	Feasibility	Infeasibility Criteria (see infeasibility criteria tab for full text)
Full Dispersion		
Infiltration Trench Evaluation is not required but allowed.		
Dry Well Evaluation is not required but allowed.		

Category 2

BMP	Feasibility	Infeasibility Criteria
Rain Garden *Evaluation not allowed when project requires flow control or water quality treatment or >5000 SF hard surface is infiltrated onsite.*		
Infiltrating Bioretention		
Rainwater Harvesting - Category 2 Sizing *Evaluation not allowed for non-roof surfaces.*		
Permeable Pavement Facility		
Permeable Pavement Surface		
Sidewalk/Trail Compost-Amended Strip		

Category 3

BMP	Feasibility	Infeasibility Criteria
Sheet Flow Dispersion		
Concentrated Flow Dispersion		
Splashblock Downspout Dispersion *Evaluation not allowed for non-roof surfaces.*		
Trench Downspout Dispersion *Evaluation not allowed for non-roof surfaces.*		

Category 4

BMP	Feasibility	Infeasibility Criteria
Non-Infiltrating Bioretention	**Use BMP**	**Go to BMP Sizing**
Rainwater Harvesting - Category 4 Sizing *Evaluation not allowed for non-roof surfaces.*		
Vegetated Roof System *Evaluation not allowed for non-roof surfaces.*		

Category 5

BMP	Feasibility	Infeasibility Criteria
Perforated Stub-out Connection *Evaluation not allowed for non-roof surfaces.*		
Trees		

On-site Stormwater Management Calculator - List Approach
BMP Sizing

Version 06-2021

More than one surface can drain to the same BMP. For example, a garage roof and driveway may be managed by a single infiltration trench. Please indicate which surfaces are draining to which BMPs in the dropdown menus.

Surface	Area (sf)	Select BMP
1	19,423	Non-Infiltrating Bioretention #1

BMP	BMP Facility Inputs		BMP Size and Credit
Non-Infiltrating Bioretention #1	Contributing Area (sf)	19,423	89 sf
	Ponding Depth (inch)	12	140,355 gal managed/year
	Sideslopes	Sloped sides	