SoundEarth Strategies, Inc.
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ENGINEERING DESIGN REPORT

Property:
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Prepared for:
Touchstone SLU LLC
2025 First Avenue, Suite 1212
Seattle, Washington

Report Date:
February 13, 2014

Engineering Design Report

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307 Fairview Avenue North
Seattle, Washington 98121

Prepared for:

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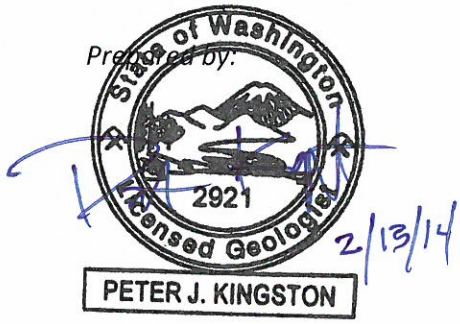
Project No.: 0731-004-04

Prepared by:



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February 13, 2014

SoundEarth Strategies

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ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
AFCEE	Air Force Center for Environmental Excellence
ARAR	applicable or relevant and appropriate requirement
AST	aboveground storage tank
bgs	below ground surface
cis-1,2-DCE	cis-1,2-dichloroethylene
COC	chemical of concern
CSM	conceptual site model
CVOC	chlorinated volatile organic compound
DHC	*Dehalococcoides* genus bacteria
DPD	(Seattle) Department of Planning and Development
DRPH	diesel-range petroleum hydrocarbons
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
EOS	edible oil substrate
EPA	U.S. Environmental Protection Agency
FS	feasibility study
GC/FID	gas chromatograph/flame ionization detector
GRPH	gasoline-range petroleum hydrocarbons
HASP	Health and Safety Plan
HVAC	heating, ventilation, and air conditioning
IAP	Draft Interim Action Plan, prepared by SoundEarth Strategies, Inc., dated August 21, 2013
mg/kg	milligrams per kilogram

ACRONYMS AND ABBREVIATIONS (CONTINUED)

mg/L	milligrams per liter
MTCA	Washington State Model Toxics Control Act
NAVD88	North American Vertical Datum of 1988
ORP	oxidation-reduction potential
ORPH	oil-range petroleum hydrocarbons
PCE	tetrachloroethylene
the Property	307 Fairview Avenue North, Seattle Washington
QA/QC	quality assurance/quality control
Revised SAP	Revised Post-Excavation Sampling and Analysis Plan
RCRA	Resource Conservation and Recovery Act RCRA
RCW	Revised Code of Washington
RI	remedial investigation
RI Report	Draft Remedial Investigation Report, prepared by SoundEarth Strategies, Inc. and dated May 2, 2012
ROW	right-of-way
SMC	Seattle Municipal Code
the Site	soil, soil vapor, and groundwater contaminated with gasoline-, diesel-, and oil-range petroleum hydrocarbons; tetrachloroethylene; trichloroethylene; cis-1,2-dichloroethylene; and/or vinyl chloride beneath the Property and beneath portions of the Boren Avenue North and Thomas Street rights-of-way, as well as trichloroethylene in groundwater beneath the Terry Avenue North right-of-way
SoundEarth	SoundEarth Strategies, Inc.
SRI	supplemental remedial investigation
SRI Report	Draft Addendum-Supplemental Remedial Investigation Report, prepared by SoundEarth Strategies, Inc., dated December 17, 2012
TCE	trichloroethylene
TESC	temporary erosion and sediment control

ACRONYMS AND ABBREVIATIONS (CONTINUED)

TIC	tentatively identified compound
Touchstone	Touchstone SLU LLC
TSDF	treatment, storage, and disposal facility
UIC	Underground Injection Control (Program)
UST	underground storage tank
VC	vinyl chloride
VI	vapor intrusion
VOC	volatile organic compound
WAC	Washington Administrative Code

1.0 INTRODUCTION

SoundEarth Strategies, Inc. (SoundEarth) has prepared this Engineering Design Report (EDR) for the Troy Laundry Property located at 307 Fairview Avenue North in Seattle, Washington (the Property). The location of the Property is shown on Figure 1. This EDR was prepared under the authority of Amended Agreed Order No. DE 8996 between Touchstone SLU LLC (Touchstone) and the Washington State Department of Ecology (Ecology). The EDR was developed to meet the relevant requirements of an engineering design report as defined by the Washington State Model Toxics Control Act (MTCA) Regulation in Section A of Part 400 of Chapter 340 of Title 173 of the Washington Administrative Code (WAC 173-340-400[a]) and also to incorporate additional information requested in the following Ecology letters:

- Interim Action Plan & Engineering Design Report at 80 Percent Completion, Troy Laundry Site, 307 Fairview North, Seattle, WA, dated October 10, 2013 (Ecology 2013b).
- Required Revisions for Engineering Design Report for Implementing the Interim Action Plan, Troy Laundry Site, 307 Fairview Avenue North, Seattle, WA, dated November 18, 2013 (Ecology 2013c).
- Engineering Design Report for the Interim Action Plan Implementation, Troy Laundry Site, 307 Fairview North, Seattle, WA, dated January 29, 2014 (Ecology 2014a).

In addition, the EDR incorporates comments and additional information requested by Ecology from meetings conducted August 8, October 9, and December 6, 2013; and email correspondence dated August 13 and October 9, 2013.

As stated in WAC 173-340-130(5), "Studies can be performed and submittals made at varying levels of detail appropriate to conditions at the site." Consistent with this provision, the Ecology letter dated October 10, 2013, conceptually approved the Interim Action Plan (IAP) and further defined the EDR scope. Accordingly, this EDR was prepared to implement the IAP. To avoid duplication of the EDR and IAP, and as requested by Ecology, the IAP will not be separately revised other than as set out in the EDR.

In accordance with WAC 173-340-120(4)(a) and 173-340-350, Touchstone has initiated a remedial investigation (RI) to define the extent of contamination and characterize the Site (as preliminarily defined below) for the purpose of developing and evaluating the selected Site cleanup action alternatives. As discussed in the Draft Remedial Investigation Report (RI Report) prepared by SoundEarth (2012a) and the Draft Addendum—Supplemental Remedial Investigation (SRI Report; SoundEarth 2012e), the Site is presently defined by the full lateral and vertical extent of contamination that has resulted from the former operation of a dry cleaning facility on the Property. The Site-wide RI is currently ongoing, however, based on the information gathered to date, the Site includes soil, soil vapor, and/or groundwater contaminated with gasoline-, diesel-, and oil-range petroleum hydrocarbons (GRPH, DRPH, and ORPH, respectively); tetrachloroethylene (PCE); trichloroethylene (TCE); vinyl chloride (VC); and/or cis-1,2-dichloroethylene (cis-1,2-DCE) beneath the Property and portions of the Boren Avenue North and Thomas Street rights-of-way (ROWs), as well as TCE in groundwater beneath portions of the Boren and Terry Avenue North ROWs (Figure 2).

This interim action is Property-specific and only constitutes a partial cleanup of the Site. Furthermore, this interim action will not supplant, interfere with, or foreclose the final Site cleanup action alternative approved by Ecology. The Site's preliminary cleanup action alternatives are summarized in the Draft Feasibility Study (SoundEarth 2012b) and Addendum to the Draft Remedial Investigation Report and the

Draft Feasibility Study (SoundEarth 2012c). The Site's preliminary cleanup action alternatives will be reevaluated upon the completion of the interim action in order to take advantage of the results and observations made during implementation of the interim action.

1.1 DOCUMENT PURPOSE AND ORGANIZATION

The purpose of this EDR is to provide sufficient information for the development and review of construction plans and specifications to implement the IAP (SoundEarth 2013a) at the Property. Pursuant to WAC 173-340-400(5):

> ...Where the information is contained in other documents it may be appropriate to incorporate those documents by reference to avoid duplication. Any document prepared to implement a cleanup may be used to satisfy these requirements provided they contain the required information (WAC 173-340-400(5).

To avoid duplication of the IAP and EDR, and in accordance with Ecology's recommendation, the IAP will remain as currently written at the conceptual level. This EDR has been expanded to include Property-specific details necessary to implement the IAP, which includes the following: sequencing tasks pre- and post-excavation, revising the Post-Excavation Evaluation Sampling and Analysis Plan (Revised SAP), adding contingency options for new discoveries, adding quality assurance/quality control (QA/QC) soil duplicate sampling, data management, and reporting.

This EDR presents a summary of information describing the known chemicals of concern, the primary source areas, extent of impacts beneath the Property, and the design of the interim action that will be implemented to address impacts beneath the Property and adjacent areas. This EDR also describes the compliance sampling that will be used to document on-Property conditions, QA/QC protocols, data management, health and safety protocols, project organization including relevant project stakeholders, and a comprehensive communication plan that will enable us to address any unforeseen discoveries and observations.

This EDR is organized into the following sections:

- **Section 2.0, Project Background.** This section provides a description of Site and Property features and location; a summary of the current and historical uses of the Property and adjoining properties; a description of the Site's environmental setting and in particular that of the Property, including the local meteorology, geology, and hydrology; previous investigations; summary of the previous interim remedial action conducted by others; and the chemicals of concern (COCs), media of concern, and the preliminary Site definition as presently understood.
- **Section 3.0, Interim Action Objectives.** This section presents the specific objectives of the interim action, applicable or relevant and appropriate requirements (ARARs), cleanup standards and remediation goals, and the relationship of the on-Property interim action with overall Site conditions and future remedial and cleanup action considerations.
- **Section 4.0, Selected Interim Action.** This section provides a description of the interim action components that will be implemented in order to remediate soil and groundwater containing concentrations of COCs exceeding the remediation levels beneath the Property.
- **Section 5.0, Interim Action Engineering Design.** This section describes the components of the interim action, including the interim action implementation documents, engineering design components, and construction activities for the Property. In addition, this section

also provides a communication/management plan that identifies key personnel of the project team and an effective means for communicating and documenting Property conditions and any unforeseen developments or necessary response actions.

- **Section 6.0, Compliance Monitoring.** This section describes the protection, performance, and confirmational monitoring that will be conducted as part of the interim action.
- **Section 7.0, Schedule.** This section describes the preliminary project schedule for the implementation of the IAP components and relevant reporting requirements and milestones.
- **Section 8.0, Documentation Requirements.** This section describes the documentation to be provided for the interim action, and also includes a discussion of document management, QA/QC protocols, waste disposal tracking, compliance reports, and Ecology letters documenting completion of the major components of the IAP and EDR.
- **Section 9.0, Limitations.** This section discusses document limitations.
- **Section 10.0, Bibliography.** This section lists the references used to prepare this document.

2.0 PROJECT BACKGROUND

The following is a brief summary of the project; more detailed information is provided in the Draft RI Report (SoundEarth 2012a), Draft Feasibility Study Report (SoundEarth 2012b), Draft Addendum—SRI Report (SoundEarth 2012e), and the IAP (SoundEarth 2013a).

2.1 PROPERTY DESCRIPTION

The Property is located on a topographically low-lying area within South Lake Union neighborhood near the downtown area of Seattle. Elevations range from 68 feet (northwest corner of the Property) to 105 feet (southeast corner of the Property) above North American Vertical Datum of 1988 (NAVD88) and slope toward the northwest. Lake Union is located approximately 0.4 miles to the north of the Site, and Elliot Bay is located approximately 1.5 miles to the west of the Site.

The Property was initially developed prior to 1893 with residences. Residences exclusively occupied the Property until 1925, when the Boren Investment Company Warehouse was constructed on the northwestern corner of the Property. The Troy Laundry Building was constructed between 1926 and 1927, and the former Mokas Building was constructed in 1960 before it was demolished in 2013. According to historical records, by 1948 the Property operated as one of the Pacific Northwest's largest laundry and dry cleaning facilities. At least 15 underground storage tanks (USTs) containing heating oil, fuel, and dry cleaning solvents, as well as several aboveground storage tanks containing propane, washwater, water-softening agents, dry cleaning solvents, and heating oil, were used on the Property (Figure 3).

Land use in the vicinity of the Property was primarily residential through the early 1900s, when the area transitioned toward commercial and light industrial use.

2.2 GEOLOGY AND HYDROGEOLOGY

The following sections summarize the geologic and hydrogeologic conditions encountered beneath the Property and the Site.

2.2.1 Property and Site Geology

Based on the results of the investigations summarized below, subsurface soil beneath the Site consists primarily of Vashon-age glacial deposits, pre-Fraser nonglacial deposits, and possible pre-Fraser glacial deposits. The locations of the borings and wells advanced at the Site are shown on Figure 4. Cross sections depicting subsurface soil characteristics and geologic units encountered in the explorations are presented as Figures 5 and 6. Detailed boring logs with well construction details are included as Appendix E of the Draft RI Report (SoundEarth 2012a) and as an attachment to the Draft—Supplemental Remedial Investigation Report (SoundEarth 2012e).

The subsurface soil beneath the Site is interpreted to consist of the following geologic units from youngest to oldest: Vashon recessional outwash deposits, ice-contact deposits of either Vashon age or pre-Fraser age, and pre-Fraser nonglacial deposits.

2.2.1.1 Vashon Recessional Outwash (Qvr)

Vashon recessional outwash deposits were encountered in many of the explorations located in the western and northern portions of the Site. The recessional outwash consists primarily of loose to medium dense, gray to brown, poorly graded fine to medium sands and sands with silt, with varying amounts of gravel. Intervals of silty sand and silt of varying thicknesses were observed throughout several of the borings advanced at the Site. Discontinuous deposits of dense to very dense gravel and sand with gravel were also encountered.

The recessional outwash deposits were encountered at the surface in borings located in the central, northern, and western portions of the Site, with thicknesses ranging from less than 10 feet to about 50 feet. The extent and thickness of the recessional outwash deposits appear to define a pre-existing northeast-southwest-oriented erosional surface margin or channel located along the western margin of the Property. The recessional outwash deposits are absent at the surface along the eastern margin of the Site and increase in thickness along the western and northwestern portions of the Site (Figures 5 and 6).

2.2.1.2 Ice-Contact Deposits (Qi)

The dense to very dense, predominantly poorly-graded silty fine sands with varying gravel contents encountered above the pre-Fraser nonglacial deposits in the southern and eastern portions of the Site are interpreted to be ice-contact deposits (Figures 5 and 6). The ice-contact deposits were encountered at the surface, or immediately beneath a thin layer of recessional outwash deposits, and overlie the pre-Fraser nonglacial deposits. The ice-contact deposits ranged from about 10 to 25 feet thick, where encountered, in the borings located along the northern and eastern margins of the Site.

The corresponding age for these deposits could not be confirmed using the available subsurface data. Associated Earth Sciences, Inc., the geotechnical consultant for Touchstone, observed that some of the samples of the ice-contact deposits were effervescent in hydrochloric acid, which is often indicative of a pre-Fraser age for ice-contact deposits or glacial till.

2.2.1.3 Pre-Fraser Nonglacial Deposits (Qpfa)

A thick sequence of undifferentiated pre-Fraser deposits, interpreted to consist primarily of nonglacial alluvial deposits, was encountered beneath the recessional outwash and ice-contact deposits (Figures 5 and 6). The soil associated with the nonglacial alluvial deposits consists of

very dense/hard, light brown to gray-brown, predominantly poorly graded fine to medium sands and sands with silts interbedded with silty fine sands. The gravel content in the samples was highly variable, with some discontinuous layers of gravel with sand. The color of these deposits is typically brown to light brown or gray-brown, with distinct, localized horizons of reddish brown oxidation that are semi-continuous across the Site. The physical characteristics observed in the samples indicate that individual layers within these pre-Fraser nonglacial deposits are discontinuous and grade laterally within specific depth intervals across the Site (Figures 5 and 6).

A bed of dark brown to orange to reddish brown silt and silty sand, with local organic-rich zones, was encountered at or near the top of the nonglacial deposits. This layer of organic-rich silt/silty sand is semi-continuous across the Site and appears to mark the interface with the overlying ice-contact or recessional outwash deposits.

The pre-Fraser deposits are at least 80 feet thick beneath the southern portion of the Site. The thickness decreases toward the north and northwest, corresponding to the increased thickness of the overlying recessional outwash deposits (Figure 6). The pre-Fraser nonglacial deposits extend to depths greater than about –21 feet NAVD88 based on the maximum depth explored (boring B31).

2.2.2 Site Hydrology

Two water-bearing zones were encountered during the previous investigations conducted on the Property and discussed below. Considering the significant elevation changes—and associated relative depths below ground surface—across the Site, discussions regarding elevation and depth are presented in elevations above NAVD88.

2.2.2.1 Perched Interval

An upper, discontinuous water-bearing zone, referred to as the perched interval, was encountered in only four of the 59 borings advanced at the Property and is generally associated with coarser permeable zones overlying the uppermost dense silt layer in the pre-Fraser nonglacial deposits at elevations of approximately 75 feet above NAVD88. Recharge to the perched interval likely occurs within the small area (120 feet by 40 feet) where the vegetated slope in the center of the Property is present at an approximate elevation of 75 feet above NAVD88, which coincides with the location of the perched water encountered during drilling.

2.2.2.2 Primary Water-Bearing Zone

A deeper continuous water-bearing zone, referred to as the primary water-bearing zone, occurs within the recessional outwash deposits and the pre-Fraser nonglacial deposits. The primary water-bearing zone comprises the shallowest contiguous aquifer beneath the Site, with elevations historically ranging from 13.4 to 18 feet above NAVD88. The primary water-bearing zone is a heterogeneous aquifer consisting of several geologic units that is hydraulically unconfined beneath most of the Site. Based on data obtained from MW16, this zone appears to transition to a semi-confined condition in the southern portion of the Site near Thomas Street. The bottom of the primary water-bearing zone was not encountered during the RI or supplemental RI activities, although an increase in silt content observed near the bottom of monitoring wells MW08, MW09, and MW12 indicates a transition to an underlying aquitard.

The general direction of groundwater flow during groundwater monitoring events conducted in 2011 and 2012 was toward the southeast under a very low gradient (Figure 7). However,

groundwater contours from the August/September 2013 monitoring event indicate that regional groundwater flow is generally toward the northwest, likely as a result of large-scale dewatering projects ongoing at 9th Avenue North and Republican Street, approximately 3 blocks northwest of the Property (Master Use Permit Number #3012563; Figure 8) that have altered the historic groundwater flow direction and reversed the low gradient water table.

In December 2012, groundwater elevations ranged from 15.28 to 16.07 feet NAVD88, except in the vicinity of wells MW01, MW04, MW07, and MW15 which are located northwest and west of the Property. The elevations of these four monitoring wells ranged from 17.44 to 18.01 feet above NAVD88 (Figure 7; Table 1). Average groundwater gradients across the Site were relatively flat, having been calculated to be approximately 0.004 feet per foot toward the southeast and east during the December monitoring event, with slightly larger gradients in the northwest part of the Site, and lower gradients in the central and southeast portions of the Site (Figure 7).

Groundwater elevations measured on August 29, 2013, ranged from 12.24 feet (monitoring well SMW09) to 14.78 feet (monitoring well MW08) below the top of the monitoring well casings (Table 1). Groundwater elevations on the Property generally ranged from 14.41 to 14.48 feet, with the exception of the elevation measured in MW08, a deep monitoring well with a screen interval located approximately 30 feet below the top of the water table. Groundwater elevations were contoured using the water level measurements collected from 24 wells covering a five-block area on August 29, 2013 (Figure 8; Table 1). The groundwater contours indicated a groundwater flow direction to the northwest with a very low average gradient of 0.002 feet per foot between MW-C and SMW06.

Prior to the 2013 monitoring event, groundwater flow directions and gradients for the primary water-bearing zone had been relatively consistent during all of the monitoring events. The groundwater flow characteristics for the primary water-bearing zone correspond to hydrogeologic conditions encountered at other sites in the South Lake Union area. Lake Union, which is located approximately 0.3 miles north of the Site, is situated at an elevation of approximately 18 to 19 feet above NAVD88 (Hart Crowser 2008; King County iMAP 2011b), and the shallow regional aquifer encountered within the South Lake Union area generally flows toward the southeast (Martin 2012). The findings of the Site investigations and the geotechnical findings for the property located adjacent to the west and southwest of the Site confirm that the primary water-bearing zone identified at the Site generally flows in a general southerly to southeasterly direction, away from Lake Union. However, groundwater elevations have dropped and the flow direction has nearly reversed toward the northwest as a result of dewatering projects ongoing near the Site and the historically low gradient of the water table.

2.3 SUMMARY OF PREVIOUS INVESTIGATIONS

The results of previous subsurface investigations, the RI, and the supplemental remedial investigation (SRI) conducted at the Site suggest that the chlorinated solvent impacts confirmed in soil and/or groundwater beneath the Property and portions of the Boren Avenue North and Thomas Street ROWs are likely the result of a release from the laundry and dry cleaning facility that operated on the Property from 1927 through 1985. Although the type and location of dry cleaning operations conducted on the Property prior to 1964 could not be confirmed, historical building plans indicated that the bulk of the dry cleaning operations after the mid-1960s were conducted on the southwest portion of the Property. Consistent with this information, the highest concentrations of chlorinated solvents are located near the

center of the Property by the loading dock. In addition, a deep zone (84 to 86 feet below ground surface [bgs]) of soil contamination has been identified within Thomas Street. The source of the contamination has not been confirmed and is inconsistent with data and observations associated with earlier investigations conducted on the Property and within the adjoining ROWs.

Concentrations of PCE and its degradation products within the primary water-bearing zone, which is located at an approximate elevation of 15 to 18 feet NAVD88, while above the applicable cleanup levels, are relatively low and fairly consistent across the Site. PCE was detected in the monitoring well installed near the source area (MW11), as well as two of the wells completed within the Boren Avenue North ROW. Concentrations of cis-1,2-DCE were confirmed above the cleanup level only in deeper wells MW06 and MW09, and VC was detected only in well MW06. Concentrations of TCE were detected above the cleanup level in groundwater samples collected from monitoring wells MW09 and MW12, which were screened 25 to 30 feet below the top of the primary water-bearing zone. The concentrations are consistent with those observed in other, shallower wells screened at the top of the primary water-bearing zone throughout the Site, and no chemical stratification is apparent.

Groundwater collected from the approximately 498-foot-deep supply well formerly located in the center of the Property did not contain detectable concentrations of chlorinated or Stoddard solvents. The results of sampling conducted at the well demonstrated that the deeper aquifer beneath the Site has not been impacted by a release from the former property operations.

The highest concentrations of PCE in soil are present beneath the center of the Property at depths ranging from 3 to 10 feet bgs. A very dense silt layer was encountered at depths between 12 and 20 feet bgs. The majority of the PCE contamination across the Property appears to be above the silt layer as evidenced by the significant drop in PCE concentrations within and beneath the silt (boring/sample P08-10 and P08-14). Considering the associated high concentration of PCE in the perched reconnaissance water sample collected from temporary boring B07 using push-probe technology, the presence of PCE as dense nonaqueous-phase liquid above this silt layer is possible.

Relatively consistent concentrations of PCE in soil appear to have migrated from the primary source area at the Property throughout the western half of the Property primarily through diffusion. Any migration upgradient of the source likely resulted from vapor-phase transport in the vadose zone over several years, as evidenced by the soil gas survey results and facilitated by the relatively loose sandy geology beneath those portions of the Site.

With the exception of the contamination found beneath Thomas Street between 84 and 86 feet bgs, PCE has generally migrated vertically through soil to depths of up to 65 feet bgs, or approximately 10 to 15 feet above the primary water-bearing zone, in the areas explored. PCE contamination in soil extends east up to approximately the centerline of the Property, and it has migrated westerly up to the Property boundary. Based on the results of soil analytical data collected on and to the west of the Property, any soil contamination extending into the adjoining Boren Avenue North ROW is likely limited in extent.

GRPH as Stoddard solvent was also observed in soil and groundwater beneath the Site. In all samples where concentrations of GRPH exceeded the MTCA Method A cleanup level in soil and groundwater, chlorinated solvents were also present.

Additional information on previous investigations conducted at the Site is provided in the RI Report prepared by SoundEarth (2012a) and the SRI Report (SoundEarth 2012e).

2.4 PRELIMINARY CONCEPTUAL SITE MODEL

This section provides a conceptual understanding of the Property and the Site derived primarily from the results of the historical research and subsurface investigations performed at the Site. Included is a discussion of the confirmed and suspected source areas, the chemicals and media of concern, the fate and transport characteristics of the release of hazardous substances, the potential exposure pathways, and the preliminary definition of the Site. The preliminary conceptual site model (CSM) serves as the basis for developing technically feasible cleanup alternatives that can be evaluated to select a final cleanup action or an effective interim action. This preliminary CSM is considered to be dynamic and may be refined throughout the cleanup action process as additional information becomes available during the interim action and completion of the RI of the Site.

This section discusses the components of the preliminary CSM developed for the Site based on the completion of multiple phases of investigation conducted by SoundEarth and others.

2.4.1 CONFIRMED AND SUSPECTED SOURCE AREAS

The following subsections provide a summary of the likely sources of the COCs identified during the RI and supplemental RI (SoundEarth 2012a and 2012e). The soil and groundwater data are summarized in Tables 1 and 2 and on Figures 9 through 14.

2.4.1.1 TCE in Groundwater

TCE was detected in groundwater samples collected from MW02, MW04, and MW15; however, unlike the contaminated groundwater identified in association with the Site, the TCE was not observed in conjunction with PCE or any of its degradation products, including cis-1,2-DCE and VC (Figure 9). The TCE detected in these three wells, located north and west of the Site, is not attributed to the Site for the following reasons:

- The wells are located hydrologically upgradient direction (historically) of the primary source area on the Property.
- Sources of TCE in groundwater are typically attributed to two scenarios: (1) as a pure TCE source, or (2) as a degradation product of PCE, in which case PCE and cis-1,2-DCE, at a minimum, would also be present (U.S. Environmental Protection Agency [EPA] 1998, Conrad 2012, McLoughlin 2012). No PCE or associated PCE degradation products other than TCE have been detected in samples collected from wells MW02, MW04, or MW15.
- Wells MW02, MW04, and MW15 exhibit relatively low concentrations of TCE in an aerobic subsurface environment; dissolved oxygen levels measured in these wells in December 2012 range from approximately 4 to 6 milligrams per liter (mg/L). The low concentrations of TCE can therefore only be attributed to reduction via dilution and not as a result of degradation (Conrad 2012). PCE cannot degrade in aerobic environments, and the degradation of TCE in aerobic environments tends to poison the microorganisms responsible for the degradation, invariably causing a stall in the degradation process (Stroo 2010). If PCE was the original source compound for the TCE identified upgradient of the Site, then it would also be present.
- If PCE was the original source of the TCE detected in these three wells, then cis-1,2-DCE also would be present. Anaerobic dechlorination can stall at cis-1,2-DCE, but has not ever been demonstrated to stall at TCE (e.g., Naval Facilities Engineering

Command 2003, Cox et al. 2012). In addition, incomplete dechlorination would result in a buildup of degradation products (commonly referred to as "DCE stall"), none of which were detected in monitoring wells MW02, MW04 or MW15.

Considering the significant differences between the contaminants identified on and upgradient of the Site, SoundEarth conducted a preliminary historical review of nearby and upgradient properties in an effort to identify potential sources of the TCE detected in wells MW02, MW04, and MW15. Although TCE is the most frequently detected groundwater contaminant in the United States as a result of its widespread use in industrial cleaning solutions and as a degreasing agent (EPA 1992, Fischer et al. 1987), it has primarily been used in both small- and large-scale industrial degreasing operations to clean metal parts (World Health Organization 2005, EPA 2012).

2.4.1.2 Chlorinated and Stoddard Solvents in Soil and Groundwater

The results of the investigations conducted at the Site suggest that the solvent impacts confirmed in soil and groundwater beneath the Property and portions of the adjoining ROWs are primarily the result of a release from the laundry and dry cleaning facility that operated on the Property from 1927 through 1985 (Figures 10 through 13). Dry cleaners began using Stoddard solvents in 1928, and it was the predominant dry cleaning solvent used in the United States through the late 1950s (State Coalition for the Remediation of Drycleaners 2009). By 1962, however, PCE surpassed Stoddard solvents as the primary dry cleaning agent. At the time, 90 percent of PCE consumed in the United States was used for dry cleaning (Chemical Engineering News 1963). Considering the scale of the laundry and dry cleaning operations conducted at the Property, it is reasonable to expect that the use of dry cleaning solvents at the Property reflected that of the rest of the country.

Although the type and location of dry cleaning operations conducted on the Property prior to 1964 could not be confirmed, historical building plans indicated that the bulk of the dry cleaning operations after the mid-1960s were conducted on the southwest portion of the Property (Figure 3). Consistent with this information, the highest concentrations of chlorinated solvents are located near the center of the Property by the loading dock; the highest concentrations of Stoddard solvents were observed to the south of the three closed-in-place USTs inside the building. The distribution of solvents in soil and groundwater suggest that the primary source of the release is located in these two areas, although additional smaller releases may have contributed to shallow solvent contamination elsewhere on the Property.

Naturally occurring biodegradation of PCE has been documented in the primary water-bearing zone beneath the Site. Biodegradation is confirmed through the presence of TCE, cis-1,2-DCE, and VC, each of which is a subsequent degradation product. Biodegradation through reductive dechlorination is facilitated by relatively low dissolved oxygen concentrations in the groundwater beneath the Site, ranging from approximately 0.5 to 3 mg/L.

The source(s) of the soil and groundwater contaminants detected in MW16, located in the Thomas Street ROW, has not been identified. Well MW16 is the only exploration completed to date that encountered a zone of contamination at an elevation of approximately 15 feet NAVD88 (Figure 12). Based on the land use history of the Property, the possibility exists that this soil contamination may result from an as-yet-unconfirmed release from the Property, in which case a release of solvents sank vertically through the soil. However, the laboratory analyses,

review of gas chromatograph/flame ionization detector (GC/FID) traces, and a library search of tentatively identified compounds (TICs) indicated that the contamination identified in B50/MW16 may be a result of an off-Site source and/or commingling of multiple potential contaminant sources.

Based on the laboratory review of the above data, it appears probable that multiple releases have impacted the Site. Although the Property is the only facility in the immediate vicinity with a confirmed or reported release of chlorinated solvents and petroleum hydrocarbons to the subsurface, it is possible that other nearby sources exist. The most likely alternative source for the contamination within the Thomas Street ROW is the former Seattle Times facility. The former Seattle Times facility includes a 1930-vintage, four-story plant building; two 1968-vintage, three- and four-story office buildings with 1978-vintage building additions; and a 1948-vintage, one-story garage and automotive repair building that faces Thomas Street. Potential sources of contamination resulting from the operation of the former Seattle Times operations are discussed in more detail in the Draft RI Report (SoundEarth 2012a).

2.4.2 CHEMICALS OF CONCERN

Based on the findings of the RI and SRI, the primary COCs at the Site are PCE and TCE (a natural degradation product of PCE) located beneath the western half of the Property and portions of the Boren Avenue North and Thomas Street ROWs. Although an elevated concentration of TCE (5.2 micrograms per liter [µg/L]) was detected in groundwater collected from monitoring well MW02 in Harrison Street in May 2011, the concentration in groundwater has since dropped and remains below the MTCA Method A cleanup level.

Secondary COCs identified for the Site include cis-1,2-DCE, VC, GRPH (as Stoddard solvents), DRPH, ORPH, and associated compounds located beneath the Property.

2.4.3 MEDIA OF CONCERN

Soil, soil vapor, and groundwater have been confirmed as affected media at the Site. Indoor air has been retained as potential media of concern based on the elevated concentrations of PCE in soil and groundwater beneath the Site.

2.4.4 PRELIMINARY CONCEPTUAL SITE MODEL SUMMARY

A summary of the geologic, hydrogeologic, and laboratory analytical data are presented on Figure 14, which display a conceptual model of Site conditions. As shown on Figures 5 and 6, the stratigraphy at the Site is distinguished by three distinct geologic units (Vashon recessional outwash deposits [Qi], ice-contact deposits [Qvr], and pre-Fraser nonglacial deposits [Qpfa]). In addition, a discontinuous perched groundwater interval occupies portions of the center of the Site, and the primary water-bearing zone is present beneath the Site at historical elevations of approximately 15 to 18 feet above NAVD88 and current elevations between 12.24 and 14.78 feet above NAVD88.

The soil analytical data collected during the investigations conducted at the Site indicate that GRPH as Stoddard solvents and chlorinated solvent concentrations were highest in the center of the Property near the loading dock, which is the probable source area. A second zone of soil containing high concentrations of PCE and Stoddard solvents was observed at depths between 84 and 86 feet during the installation of B50/MW16 within the Thomas Street ROW. The source for this second zone of contamination remains unknown.

The high concentrations of PCE in soil and perched groundwater in the vadose zone are inferred to be evidence of a release from the former dry cleaning facility that operated on the Property. Concentrations of COCs in the soil decrease rapidly—both horizontally and vertically—with distance from the source area. Beyond the high source area concentrations, which are limited vertically by a dense silt layer that appears to have restricted vertical contaminant migration, the vertical and lateral distribution of PCE concentrations is relatively consistent throughout the southwestern portion of the Property. The widespread extent of PCE in soil exhibiting relatively low concentrations is typically indicative of a long-term release via vapor-phase diffusion. The soil contamination appears to be limited to within the Property boundaries.

Impacts to groundwater within the primary water-bearing zone as a result of the release from the Property extend approximately 390 north-south and up to 240 feet east-west, generally trending west-southwest from the source area. Concentrations of chlorinated solvents within the groundwater are relatively low; the highest on-Property concentration of PCE in groundwater (21 µg/L) was collected from MW11, which was installed near the source area. Groundwater collected from the two impacted deep wells (MW09 and MW12) did not contain detectable concentrations of PCE, which is consistent with the peripheral degradation of chlorinated solvents within the primary water-bearing zone.

Data collected from wells north of the Property confirm that no risks to surface water or sediment exist as a result of the release at the Property, and that ongoing risks to human health and the environment as a result of vapor intrusion will be mitigated following excavation of the source area, as discussed in later sections of this report. The evaluation of the vertical distribution of contamination in groundwater was conducted by sampling the former supply well on the Property, which was installed to a depth of approximately 498 feet bgs. The results of sampling conducted at the well demonstrated that the deeper aquifer beneath the Site has not been impacted by a release from the former property operations.

In summary, the following exposure pathways are of concern for future human health exposure at the Site:

- **Soil Pathway.** Direct contact via dermal contact and/or ingestion by construction workers encountering contaminated soil during future construction activities on the Site. However, the soil pathway is not considered complete under the planned future use of the Property. Additional discussion of soil pathways is included in Section 6.6.1 of the RI Report (SoundEarth 2012a).
- **Groundwater Pathway.** Direct contact via dermal contact and/or ingestion by construction workers encountering contaminated perched water during future construction activities on the Site. Human health exposure via ingestion of groundwater as a potable drinking water supply is not considered to be a complete exposure pathway. Additional discussion of groundwater pathways is included in Section 6.6.2 of the RI Report (SoundEarth 2012a).
- **Vapor Pathway.** A preliminary vapor intrusion (VI) assessment suggests that there is potential for an unacceptable VI risk from contaminants in soil and groundwater intruding into existing structures at the Property and the Site, as well as short-term inhalation of volatilized contaminants by construction workers during future construction activities on the Property and the Site. Considering the planned future use of the Property, unacceptable VI impacts to indoor air are not anticipated.

Following soil excavation, groundwater contamination will be the primary VI source of concern, which will be addressed with the groundwater treatment system. Additional VI assessments will be conducted following excavation and the initial groundwater treatment injection event to determine the mitigation measures, if any, that are necessary at the future building. Additional discussion of the vapor pathway is included in Section 6.6.3 of the RI Report (SoundEarth 2012a).

Sampling activities performed as part of the interim action will be conducted in accordance with the Revised SAP, which is included as Appendix A. The results of compliance sampling will be used to update the preliminary CSM and incorporated into the ongoing RI for the Site.

3.0 INTERIM ACTION OBJECTIVES

MTCA and Amended Agreed Order No. 8996 define an interim action as:

> …technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance; that corrects a problem that may become substantially worse or cost substantially more to address if the remedial action is delayed; or that is needed to provide for completion of a site hazard assessment, remedial investigation/feasibility study or design of a cleanup action (WAC 173-340-430).

The interim action objectives have been established in consideration of the remedial alternative most likely to be effective at the Property, timeliness, substantially reducing one or more of the exposure pathways, future redevelopment and land use of the Property, and completing the Site-wide RI, feasibility study (FS), and cleanup action. The interim action objectives include the following:

- Excavate on-Property soil containing PCE and other COCs at concentrations that present a risk to human health and the environment.
- Apply in situ treatment methods to reduce COCs in groundwater during redevelopment to take advantage of the efficiencies available during ongoing excavation activities as requested by Ecology and to avoid conflicts with future planned land use.
- Prevent further off-Property migration of COCs at concentrations exceeding remediation levels.
- Prevent recontamination of the Property.
- Conduct a VI assessment following excavation and the initial groundwater treatment injection event to determine if engineering controls are necessary to reduce potential risks from COCs in soil and groundwater until remediation levels are achieved. Additional information on engineering controls is provided in Section 5.15.2.
- Collect data for the ongoing remedial investigation.
- Receive Ecology concurrence when the objectives of the interim action have been achieved.
- Facilitate meeting the regulatory requirements of Amended Agreed Order No. DE 8996.

3.1 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

According to WAC 173-340-710, interim actions must comply with applicable state and federal laws and regulations, and those requirements determined to be relevant and appropriate. This section

summarizes the identified ARARs for the interim action. The definition of ARARs and associated concepts are discussed below.

MTCA defines legally applicable requirements as:

> …those cleanup standards, standards of control, and other human health and environmental requirements, criteria, or limitations adopted under state or federal law that specifically address a hazardous substance, cleanup action, location, or other circumstance at a site (WAC 173-340-710).

MTCA defines relevant and appropriate requirements as:

> …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 circumstances 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 through 173-340-760 identifies several requirements the department shall consider relevant and appropriate for establishing cleanup standards.

In accordance with WAC 173-340-710(9)(b), interim actions conducted under an agreed order are exempt from the procedural requirements of certain state and local laws including the Washington State Clean Air Act (Chapter 70.94 Revised Code of Washington [RCW]); Washington State Solid Waste Management Act (Chapter 70.95 RCW); Washington State Hazardous Waste Management Act (Chapter 70.105 RCW); Washington State Construction Projects in Water Act (Chapter 75.20 RCW, recodified as Chapter 77.55 RCW); Washington State Water Pollution Control (Chapter 90.48 RCW); Washington State Shoreline Management Act (Chapter 90.58 RCW); and any laws requiring or authorizing local government permits or approvals for the interim action.

A detailed list of ARARs is provided in Table 3. The table includes information regarding the applicable regulations and permits and how they will be accomplished during the interim action. Touchstone has acquired applicable permits and authorizations required for the interim action and exemptions are not necessary for the interim action.

3.2 CLEANUP STANDARDS

The Property redevelopment plan involves excavating to an elevation of approximately 33 feet NAVD88 for multilevel subgrade parking. The remedial excavation will extend to approximately 19 feet NAVD88. The depth of the planned excavation is expected to incorporate all soil that exhibits COC concentrations exceeding applicable remediation levels. The soil will be transported off-Property for disposal at an appropriate land disposal site. Although soil is currently the primary medium of concern, upon the excavation and removal of the contaminated soil, groundwater will become the primary medium of concern. Secondary media of concern include soil vapor and indoor air by virtue of vapor transport from groundwater and/or soil. The primary and secondary media and associated COCs are shown in the table below.

Media of Concern	Chemicals of Concern
Soil	PCE, TCE, DRPH, ORPH, and GRPH (Stoddard solvent constituents)
Groundwater	PCE; TCE; cis-1,2-DCE; VC; and GRPH (Stoddard Solvent constituents)
Indoor Air	PCE; TCE; cis-1,2-DCE; VC; and GRPH (Stoddard solvent constituents)

NOTES:
cis-1,2-DCE = cis-1,2-dichloroethylene
DRPH = diesel-range petroleum hydrocarbons
GRPH = gasoline-range petroleum hydrocarbons
ORPH = oil-range petroleum hydrocarbons
PCE = tetrachloroethylene
TCE = trichloroethylene
VC = vinyl chloride

Although the interim action described herein has been developed primarily to remediate the Property, the interim action has also been developed to be consistent with the requirements of a cleanup action (WAC 173-340-360 through 173-340-400) to the extent possible. Therefore, the selected cleanup alternatives must comply with the MTCA cleanup regulations specified in WAC 173-340 and with applicable state and federal laws. The remediation levels selected for the Property are consistent with the remedial action objectives, which state that the remedial objective is to reduce concentrations of COCs in soil and/or groundwater to below the MTCA Method A (or B, as applicable) cleanup levels in order to mitigate risks to human health and the environment. The associated media-specific remediation levels for the identified COCs are summarized in Sections 3.2.1 and 3.2.2 below.

3.2.1 Remediation Levels

The remediation levels for the media and COCs are shown in the tables below, including the source of the standard. The proposed remediation levels for the interim action are the MTCA Method A cleanup levels for COCs in soil and groundwater. If no promulgated MTCA Method A cleanup level exists for a given chemical or medium, the proposed remediation level is the MTCA Method B Standard Formula Value for carcinogenic or noncarcinogenic compounds, depending on the carcinogenic properties of the compound.

The groundwater remediation levels presented below are protective of drinking water. Because groundwater screening levels protective of indoor air are lower than the groundwater remediation levels for GRPH and TCE, a VI assessment will be conducted to determine if groundwater concentrations are protective of indoor air. Section 5.15 provides additional information on the VI assessment.

Proposed Remediation Levels for Soil

COC	Remediation Level (mg/kg)	Source
PCE	0.05	MTCA Method A, Unrestricted; WAC 173-340-740(2)(b)(i)
TCE	0.03	MTCA Method A, Unrestricted; WAC 173-340-740(2)(b)(i)
GRPH	100	MTCA Method A, Unrestricted; WAC 173-340-740(2)(b)(i)
DRPH	2,000	MTCA Method A, Unrestricted; WAC 173-340-740(2)(b)(i)
ORPH	2,000	MTCA Method A, Unrestricted; WAC 173-340-740(2)(b)(i)

NOTES:
COC = chemicals of concern
DRPH = diesel-range petroleum hydrocarbons
GRPH = gasoline-range petroleum hydrocarbons
mg/kg = milligrams per kilogram
MTCA = Washington State Model Toxics Control Act
ORPH = oil-range petroleum hydrocarbons
PCE = tetrachloroethylene
TCE = trichloroethylene
WAC = Washington Administrative Code

Proposed Remediation Levels for Groundwater

COC	Remediation Level (µg/L)	Source
GRPH	1,000	MTCA Method A, Table Value; WAC 173-340-720(3)(b)(i)
PCE	5	MTCA Method A, Table Value; WAC 173-340-720(3)(b)(i)
TCE	5	MTCA Method A, Table Value; WAC 173-340-720(3)(b)(i)
cis-1,2-DCE	16	MTCA Method B, Standard Formula; WAC 173-340-720(4)(b)(iii)(A) (noncarcinogenic)
VC	0.2	MTCA Method A, Table Value; WAC 173-340-720(3)(b)(i)

NOTES:
µg/L = micrograms per liter
cis-1,2-DCE = cis-1,2-dichloroethylene
COC = chemicals of concern
GRPH = gasoline-range petroleum hydrocarbons
MTCA = Washington State Model Toxics Control Act
PCE = tetrachloroethylene
TCE = trichloroethylene
WAC = Washington Administrative Code

Proposed Remediation Levels for Indoor Air

COC	Remediation Level ($\mu g/m^3$)	Source
GRPH[(1)]	140	Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action, Review DRAFT, October 2009, Publication No. 09-09-047; Appendix B, Method B; PCE and TCE updated in CLARC Database on September 2012; cis-1,2-DCE updated in CLARC on April 2011.
PCE	9.6	
TCE	0.37	
cis-1,2-DCE	NR	
VC	0.28	

NOTES:
(1)This is the lowest of the three screening level values for air-phase petroleum hydrocarbon fractions.
$\mu g/m^3$ = micrograms per cubic meter
cis-1,2-DCE = cis-1,2-dichloroethylene
CLARC = Cleanup Levels and Risk Calculations
GRPH = gasoline-range petroleum hydrocarbons
NR = not researched
PCE = tetrachloroethylene
TCE = trichloroethylene
VC = vinyl chloride

3.2.2 Interim Action Goals

The interim action goals will be used to evaluate the effectiveness of the interim action and determine if remediation levels for the interim action have been achieved. Once the remediation levels have been attained at the defined interim action goals, the impacts present at the Property will no longer be considered a threat to human health or the environment.

Points of compliance will be established for the Site following the completion of the interim action and the Site-wide RI. The point of compliance is the location where the enforcement limits that are set in accordance with WAC 173-200-050 will be measured and cannot be exceeded (WAC 173-200-060). If media at the Property does not meet the interim action goals following implementation of the interim action, they will be evaluated during the Site-wide RI and FS, and addressed during the Site-wide cleanup action.

3.2.2.1 Interim Action Goal for Groundwater

The interim action goal for groundwater is defined as the uppermost level of the saturated zone extending vertically to the lowest depth that potentially could be impacted by the COCs throughout the Property. To demonstrate compliance with the interim action goal, groundwater remediation levels shall be attained in all groundwater from the outer boundary of the hazardous substance plume beneath the Property and the adjacent ROWs. The Revised SAP will be implemented to evaluate whether the interim action goal for groundwater has been achieved.

3.2.2.2 Interim Action Goal for Soil

The interim action goal for direct contact exposure is throughout the Property from the ground surface to 15 feet bgs, which is a reasonable estimate of the depth of soil that could be excavated and distributed at the soil surface as a result of development activities. All on-Property soil containing concentrations of COCs above the direct-contact threshold will be overexcavated and removed from the Property during the implementation of the interim action.

In order to be protective of groundwater, all on-Property soil containing concentrations of COCs above the remediation levels will be overexcavated. The Revised SAP will be implemented to evaluate whether the interim action goal for soil has been achieved. Contaminated soil will be transported and disposed of at a permitted facility in accordance with a contained-out determination issued by Ecology.

3.2.2.3 Interim Action Goal for Indoor Air

Cleanup standards and points of compliance for indoor air have not been promulgated as of the date of this document; however, indoor air cleanup levels have been published as draft guidance (Ecology 2009b). The interim action goal will be the standard point of compliance per WAC 173-340-750(6), which is ambient air throughout the Property. The Revised SAP will be implemented to evaluate whether the interim action goal for indoor air has been achieved.

4.0 SELECTED INTERIM ACTION

The interim action that will be implemented at the Property incorporates several active remedial technologies to ensure that risks to human health and the environment are addressed to the extent possible. The selected technologies take advantage of the previously unavailable access to the subsurface provided by the proposed redevelopment project. Additional information regarding the

implementation of each specific interim action component is provided in Section 5.0. The selected technologies include the following:

- **Excavation and Disposal of Contaminated Soil**. The entire Property will be excavated from approximately lot-line to lot-line as part of the planned redevelopment project. The portions of the Property with soil containing concentrations of COCs in excess of their respective remediation levels will be referred to as the Remedial Excavation Area. The Remedial Excavation Area is defined as the vertical and horizontal limit of the soil exhibiting contamination above remediation levels within the Property boundary (Figures 15 through 18 and 19A through 19J). The excavation of contaminated soil from the Property is anticipated to result in the removal of the ongoing source of COCs to the groundwater (Figures 15 through 18 and 19A through 19J) and it is anticipated that this will fully address on-Property contaminated soil, and reduce the potential for any ongoing impacts to the groundwater and vapor media of concern. This will greatly facilitate the environmental issues associated with the overall Site.

  Land disposal is the act of removing contaminated soil from an uncontrolled condition and placing it in a controlled condition where it will produce fewer adverse environmental impacts. A controlled condition generally refers to engineered landfills that feature low permeability liners, witness systems, and leachate collection systems to prevent the disposed soil from leaching into the environment and mitigate future liability associated with the contamination. On-Property soil containing concentrations of COCs above remediation levels will be excavated during the interim action, taking advantage of access provided by the redevelopment project, in an effort to remove any ongoing source of contamination to groundwater and vapor and provide a reasonable restoration time frame for the Site.

  The Remedial Excavation Area covers approximately 1 acre of land. Assuming an excavation elevation of 19 feet above NAVD88, the volume of soil within the Remedial Excavation Area would be approximately 97,540 tons managed as nondangerous waste under a requested contained-out determination from Ecology's Hazardous Waste & Toxics Reduction department using an Ecology-provided contingent management option. Soil would be excavated within the confines of the shoring as designed by the project civil engineer and would be directly loaded into trucks and/or containers for off-Property treatment and land disposal in accordance with the contained-out determination requirements to be issued by Ecology. The excavation process, permitting, waste management and disposal, and contingencies to address unknown contamination are discussed in Section 5.0.

- **Dewatering**. Dewatering is the process of pumping the localized, shallow perched groundwater prior to excavating through the dense silt layer, which will prevent contamination of underlying soil by eliminating the potential for soil contact with contaminated perched groundwater. As the excavation proceeds, the discontinuous but contaminated perched groundwater that was observed near the center of the Property may be encountered. The perched groundwater appears to be associated with a small vegetated slope that facilitates localized recharge (Figure 14). The excavation will be coordinated to first address the contaminated soil near the center of the source area in an effort to segregate any dangerous waste and remove the contaminated perched water prior to excavating through the dense silt layer. The dewatering system design for the perched groundwater is discussed in more detail in Section 5.8.

Construction dewatering activities will include capturing any surface water runoff at a low point in the excavation. This water will be pumped to a temporary aboveground storage tank (AST) and subsequently discharged to the municipal sewer in accordance with a King County Construction Dewatering Authorization. The permitting requirements, monitoring, and process flow for the construction dewatering system are discussed in more detail in Sections 5.1 and 5.13.

- **Reductive Dechlorination (Anaerobic Bioremediation)**. Reductive dechlorination is a proven remedial technology for addressing chlorinated solvents in groundwater and is a biotic process completed by anaerobic bacteria. The fermentation of edible oil by indigenous microorganisms injected into the groundwater produces a rapid and significant reduction in dissolved oxygen concentrations in the saturated zone. This provides the strongly negative oxidation/reduction potential necessary to treat the target COCs by reductive dechlorination. Complete dechlorination of PCE produces nontoxic chloride and carbon dioxide.

  The anaerobic zone extends far beyond the radius of influence of the edible oil itself, enhances attenuation of contaminants both upgradient and crossgradient of the active treatment zone, and serves as a barrier around the periphery of the treatment system/groundwater plume, thereby greatly reducing any potential for recontamination of groundwater beneath the Property and adjoining ROWs.

  The groundwater injection system design, edible oil case studies, evaluation of the effectiveness of the reductive dechlorination, and Ecology's UIC Program requirements are discussed further in Sections 5.1 and 5.14.

- **Interim Action Vapor Intrusion Evaluation.** The removal of all soil contamination on Property via excavation and the treatment of the dissolved-phase groundwater plume via reductive dechlorination will significantly reduce COCs beneath the Property over the next 3 to 5 years. Following the remedial excavation and the initial edible oil injection, a VI assessment will be performed in accordance with the tiered approach presented in Ecology's draft guidance document and will include evaluation of groundwater screening levels and compliance indoor air sampling.

  In addition, the following building design features will be incorporated into the VI assessment: construction of the building including five levels of below-ground parking; operation of an active ventilation system; positive pressure of the elevator shafts, elevator lobby on each parking level and occupied building space; and vapor and moisture barriers. If the VI assessment indicates that there are unacceptable VI impacts to indoor air, additional mitigation measures will be evaluated and implemented as part of the Site-wide cleanup action. Additional information on the VI assessment is provided in Section 5.15.

4.1 INTERIM ACTION SEQUENCING

The bullets below provide the overall sequence of events for the implementation of the interim action. Specific details for each of the components are provided in Section 5.0.

- Complete baseline groundwater monitoring event (conducted in August/September 2013).
- Complete permitting requirements. Applicable permits are discussed in Section 5.1.

- Notify Ecology of successful completion of Interim Action Benchmarks and Touchstone's request to proceed with the interim action.
- Obtain a contained-out determination from Ecology (submitted to Ecology in October 2013). If necessary, collect additional data that may be needed to receive a contained-out determination.
- Prepare a HASP for the interim action (provided in the IAP [SoundEarth 2013a]). Conduct a pre-construction health and safety meeting with the General Contractor and appropriate subcontractors.
- Conduct project preparation and mobilization activities; install temporary erosion and sediment controls (TESC) measures.
- Install micropiles and bracing to support portions of the south and east facades of the Troy Laundry Building and north and west facades of the Boren Investment Company Warehouse in accordance with the Demolition and Bracing Façade permit.
- Demolish the remainder of the on-Property buildings and associated infrastructure.
- Decommission wells within the excavation footprint.
- Begin installation of shoring piles.
- Install and operate dewatering wells for the perched interval.
- Excavate the source area near the loading dock and remove previously inaccessible USTs.
- Decommission perched interval dewatering wells.
- Excavate the remaining Remedial Excavation Area and Property by utilizing a conveyor belt to transport excavated material from the excavation to trucks on Thomas Street. The conveyor belt will greatly reduce the chances of cross contamination across the Site. Construction dewatering for the larger excavation will be conducted by pumping water from a low point in the excavation to holding tanks for characterization, treatment, and discharge per a King County Discharge Authorization.
- Conduct applicable compliance monitoring in accordance with the Revised SAP. Document Property conditions, provide daily or weekly progress reports to relevant members of the project team, document and communicate any unexpected conditions, and document how unexpected conditions are addressed.
- Evaluate the compliance monitoring data. If necessary, evaluate potential contingencies.
- Begin constructing building foundation.
- Install injection wells.
- Inject edible oil substrate (EOS) and *Dehalococcoides* genus bacteria (DHC), if appropriate.
- Continue to conduct quarterly groundwater compliance monitoring to evaluate the effectiveness of reductive dechlorination.
- Conduct a VI assessment to determine if there are unacceptable risks to indoor air. The VI assessment will determine if the indoor air pathway is complete.

- Evaluate compliance monitoring data, collected in accordance with the Revised SAP, to determine if the interim action objectives have been completed. If necessary, media of concern will be addressed in the RI, FS, and Cleanup Action Plan for the Site.

5.0 INTERIM ACTION ENGINEERING DESIGN

This section discusses in greater detail the engineering design, permitting requirements, system operations, safety controls, and monitoring parameters for each component of the interim action. In addition, the following subsections include discussion on determining the completion of each interim action component and the documentation necessary to support completion. At a minimum, weekly correspondence will be sent to Ecology to document the progress of the interim action.

5.1 PERMITTING REQUIREMENTS

This section summarizes the permits associated with the interim action components. The redevelopment project schedule will include a permitting task to ensure that permits are procured in a timely manner and prior to implementing each component of the interim action.

Prior to beginning redevelopment activities, Touchstone submitted a Land Use Application for the redevelopment project, which included a State Environmental Policy Act review. In addition, Touchstone submitted an application to City of Seattle's Landmarks Preservation Board for approval of the proposed new construction and partial demolition of the Troy Laundry Building and the Boren Investment Company Warehouse. The City of Seattle's Landmarks Preservation Board granted a Certificate of Approval. Following review of the Land Use Application and receipt of the City of Seattle's Landmarks Preservation Board Certificate of Approval, the City of Seattle Department of Planning and Development (DPD) issued Master Use Permit No. 3012675 on November 22, 2013. In addition to the Master Use Permit, the following permits were requested from the City of Seattle DPD: Demolition and Bracing Façade, Shoring and Excavation, Building, Structural, and Street Use and ROW Improvement. The above listed permits are issued in phases depending on the type of work being conducted as part of the redevelopment project. Permits required prior to demolition, preservation of historical facades, and excavation includes the Demolition and Bracing Façade, Shoring and Excavation, and Street Use and ROW Improvement permits.

Pursuant to Amended Agreed Order No. DE 8996, the following benchmarks will be completed prior to implementing the IAP and EDR:

- Interim Action Benchmark 1: Notification to Ecology of submittal of City of Seattle permit applications for the redevelopment project.
- Interim Action Benchmark 2: Notification to Ecology of receipt of a City of Seattle building permit for the redevelopment project.
- Interim Action Benchmark 3: Notification to Ecology of receipt of commitments for financing necessary for redevelopment project completion.

Because permits required for the redevelopment project are being completed as a phased permit, the Building and Structural permits required for construction of the parking garage and each office tower will not be approved until demolition, shoring, and excavation activities have started. This will not impact the interim action because development has already been approved with issuance of the Master Use Permit. Therefore, Interim Action Benchmark 2 will

be considered complete when the Demolition and Bracing Façade, Shoring and Excavation, and Street Use and ROW Improvement permits are issued. In addition, Ecology will be notified when the Building and Structural permits are issued by the City of Seattle.

Within 90 days of achievement of all three Interim Action Benchmarks, a letter will be prepared and submitted to Ecology indicating that all Interim Action Benchmarks have been achieved and that Touchstone is proceeding with implementation of the IAP and EDR. The notification letter will also include a schedule for implementing the IAP and EDR. Following Ecology approval, the IAP and EDR will be an integral and enforceable component of Amended Agreed Order No. DE 8996, and the interim action will commence.

Permits listed in the table below have been requested as part of the redevelopment activities.

Permits Required for Property Redevelopment

Name	Description	Granting Agency	Expiration	Restrictions, if any
Master Use Permit	Land use decision based on Seattle Land Use Code	City of Seattle Department of Planning and Development (DPD)	3 years from issuance	TBD at issuance
Demolition and Bracing Façade Permit	Required for structural bracing of existing structures historical facade and demolition of remaining structures	City of Seattle DPD	18 months from issuance	TBD at issuance
Shoring and Excavation Permit	Approval of shoring plans and mass excavation	City of Seattle DPD	18 months from issuance	TBD at issuance
Building Permits	New construction and occupancy for parking garage and each office tower	City of Seattle DPD	18 months from issuance	TBD at issuance
Structural Permits	New construction for parking garage and each office tower	City of Seattle DPD	18 months from issuance	TBD at issuance
Street Use and ROW Improvement Permit	Required for permanent improvements in the street ROW	City of Seattle Department of Transportation	18 months from issuance	TBD at issuance
Side Sewer Discharge Permit	Permit for discharging stormwater and wastewater into combined sewer system	Seattle Public Utilities (with authorization from King County)	18 months from issuance	TBD at issuance

NOTES:
DPD = Department of Planning and Development
ROW = right-of-way
TBD = to be determined

The permits listed above, and how they are integrated into each component of the interim action, are described in more detail below. Copies of all permits will be kept at the job site office.

5.1.1 Seattle Landmark Preservation and Demolition

Pursuant to Chapter 25.12 of the SMC, commercial projects over 4,000 square feet in area require a review by the City of Seattle's Landmarks Preservation Board to determine designation as "potentially eligible landmarks." Designation standards are listed in SMC 25.12.350.

In August 1995, the City of Seattle's Landmarks Preservation Board voted to approve designation of the Troy Laundry Building as a Seattle Landmark because it "embodies the distinctive visible characteristics of an architectural style, or period, or of a method of construction." The designation indicated that as a Seattle Landmark, the entire exterior façade of the original 1927 building, and the exterior facades of the 1945 and 1946 additions were required to be preserved.

As part of Touchstone's redevelopment plan, the City of Seattle's Landmarks Preservation Board was required to determine if the Boren Investment Company Warehouse met the designation standards of a Seattle Landmark. In November 2011, the Boren Investment Company Warehouse was designated a Seattle Landmark, which required the preservation of the street-side exterior façades.

Prior to issuing a Master Use Permit, the City of Seattle DPD required approval from the City of Seattle's Landmarks Preservation Board for the proposed construction and partial demolition of the Troy Laundry Building and the Boren Investment Company Warehouse. In November 2013, the City of Seattle's Landmarks Preservation Board granted a Certificate of Approval. A Demolition and Bracing Façade permit, which incorporates the partial demolition and preservation of the exterior facades, was submitted to the City of Seattle DPD.

5.1.2 Excavation and Land Disposal of Contaminated Soil

Following issuance of the Master Use Permit from the City of Seattle DPD, a Shoring and Excavation permit will be necessary for the excavation and land disposal of contaminated soil. The Shoring and Excavation permit is required for excavations that are in or near a public ROW. Shoring design will be reviewed by the City of Seattle DPD and Seattle Department of Transportation. The Street Use and ROW Improvement permits are associated with property redevelopment and the alterations that will be necessary to surrounding streets to accommodate this redevelopment. The Street Use and ROW Improvement permits will be incorporated into the interim action components during excavation activities. Portions of the Street Use and ROW permits are associated with the loading and hauling of contaminated soil along Thomas Street. The sidewalk and parking lane on Thomas will be closed for the duration of construction. The sidewalk on Harrison Street will also be closed. At this time, SoundEarth anticipates that Boren Avenue North will remain open with a covered walkway on the sidewalk. Fairview Avenue North also will remain open with a covered walkway on the sidewalk.

Although not a permit, a contained-out determination will be obtained from Ecology to facilitate the profile and disposal of soil excavated from the Property.

5.1.3 Dewatering

The perched groundwater will be extracted and transported off-Property by a qualified vacuum truck service. This process does not require a permit.

The construction dewatering that will be in place for the duration of the excavation requires an authorization to discharge recovered groundwater and surface water to the sanitary sewer. The

King County Wastewater Treatment Division has issued Minor Discharge Authorization No. 921-01, which allows for the discharge of wastewater from construction dewatering. Extracted water will be stored in settlement tanks where it will be characterized in accordance with Minor Discharge Authorization No. 921-01. Testing is required for the following parameters: pH; settleable solids; PCE; TCE; and fats, oil, and grease.

The King County Construction Dewatering request form required water balance calculations to demonstrate the quantity of water that can be expected to be generated by each construction process to ensure that there are proper facilities to store and convey water to the wastewater treatment facility. Precipitation discharge water balance equations assume a maximum daily stormwater runoff with a rainstorm event of two inches per 24 hours. Pursuant to the Minor Discharge Authorization, the General Contractor is required to have adequate water storage at the project to maintain the discharge water balance. Minor Discharge Authorization No. 921-01 allows for the discharge of 25,000 gallons of water per day.

5.1.4 Groundwater Injection System

Groundwater contamination (including the soil at the saturated zone in MW05, which is the only soil sample collected within Boren Avenue North that contained concentrations of PCE in excess of the MTCA Method A cleanup level) will be treated via injection of EOS. Before beginning the injection of EOS, the Property will be registered with Ecology's UIC Program. This registration process will include submitting information regarding the number of injection points, volume of injectate per injection point, the material safety data sheet for the injectate, and the estimated time frame for the injection program. Ecology may require that one to two downgradient wells be temporarily monitored for fats, oil, and grease.

5.2 SITE-SPECIFIC HEALTH AND SAFETY PLAN

A HASP was prepared in accordance with WAC 296-843, WAC 173-340-810, and Part 1910-120 of Title 29 of the Code of Federal Regulations and is included in the IAP (SoundEarth 2013a). Field activities for the interim action will only begin with Ecology approval of the IAP and EDR.

The HASP will be provided to contractors for their review to ensure that health and safety components related to implementing the interim action can be incorporated into each contractors health and safety plan. In addition, a pre-construction health and safety meeting with the General Contractor and appropriate subcontractors will be conducted. Each subcontractor is responsible for maintaining their respective health and safety plans to identify potential physical and chemical hazards associated with their own work practices and consistent with the General Contractor's health and safety plan.

The main hazards associated with the excavation component include contact with contaminated soil and working around heavy equipment and machinery. Field personnel will screen ambient air during the course of the excavation to monitor volatile organic compound (VOC) levels at the breathing zone of personnel and equipment operators. If VOC levels exceed the permissible exposure limits, personal protective equipment will be upgraded accordingly.

The main hazards associated with the dewatering system component include contact with contaminated water, working with pressurized piping and hoses, and electricity or compressed air that will be used to power the down-well pumps. System controls include ball valves for each discharge line to allow personnel to isolate a down-well pump or transfer pump if any of the equipment requires maintenance. The ball valves will allow water or air pressure to be slowly relieved so maintenance can then be safely

performed. A basic electric panel will allow for lock out/tag out procedures for maintenance on pumps or switches. Each motor will be equipped with a motor starter that will pop or disengage from the electrical contact if the motor tries to draw more amperage than required.

The main hazards associated with the installation of the injection wells include working around heavy equipment. The hazards associated with the injection system include working with pressurized piping and hose, and electricity to power the mixing and delivery pumps. System controls include ball valves to allow personnel to close or limit flow to one well, pressure gauge to notify personnel of back pressure building in the line, and check valve to prevent the backflow of EOS to the mixing skid or to the vault. The EOS injectate is biodegradable oil. Although it is non-toxic, face splash shields will be worn when diluting and mixing the EOS solution. A material safety data sheet for EOS is provided in Appendix B.

5.2.1 Spill Containment and Control

Use of heavy equipment during the proposed excavation activities creates the opportunity for accidental spills of fuel, lubricants, hydraulic fluid, and other petroleum products, which, if spilled, could result in minor surficial impacts.

The following measures will be implemented during the interim action to avoid and/or minimize impacts:

- A pollution control plan will be implemented to prevent pollution caused by all operations. The plan will contain the following elements:
  - The name and address of the party(s) responsible for accomplishment of the pollution control plan.
  - A description of any regulated or hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.
- A spill containment and control plan with notification procedures, specific cleanup and disposal instructions for different products, quick response containment and cleanup measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

5.3 EXCAVATION ENGINEERING DESIGN

The limits of the Remedial Excavation Area were established based on the existing soil data and CSM for the Property (Figure 14). The soil laboratory analytical results for the entire Property were entered in to a 3D modeling software program called RockWorks. This program assimilated the x-, y-, and z-coordinates for each discrete soil sample and the contaminant concentration to create a 3D model of the soil contamination beneath the Property. Once this information is in the model, one can apply a specific range of contaminant concentrations, e.g., between 0.025 mg/kg (the detection limit) and 0.5 mg/kg (the soil remediation level), and the model will provide the volume of soil that meets that criteria across the Property. Using the RockWorks model, the PCE concentrations in soil were modeled and separated into the following categories:

- Above the lab detection limit (0.025 mg/kg), but below the soil remediation level (0.05 mg/kg). This category included 18,444 cubic yards of soil.

- Above the soil remediation level (0.05 mg/kg), but below the Washington State Dangerous Waste Criteria (14 mg/kg). This category included 68,488 cubic yards of soil.

The results of the 3D RockWorks model are depicted in Table 4 and on Figures 19A through 19J. Soil management grids were created using 3D RockWorks to estimate the volume of PCE-contaminated soil and facilitate the handling and disposal of contaminated soil in 10-foot by 10-foot grid cells. Additional information on the management of contaminated soil is provided in Sections 5.4 and 5.11.

The total volume of soil to be removed from the Remedial Excavation Area is approximately 97,540 tons, excluding soil within the buffer zone. A summary of the estimated volume of contaminated soil to be removed from each 10-foot grid layer is provided in Table 4. For purposes of conversion from a volume to a weight, a 20 percent swell factor from bank cubic yards (in place material) to loose cubic yards (excavated material) and a bulk density factor of 1.6 tons per cubic yard were used.

Excavation of PCE-contaminated soil within the limits of the shoring system will result in the complete removal of the source material beneath the Property. Disposing of this material in a regulated, engineered landfill under a contained-out determination will prevent the disposed soil from leaching into the environment and mitigate the future liability associated with the contamination.

5.4 CONTAINED-OUT DETERMINATION

As discussed above, approximately 97,540 tons of soil has been identified with detectable concentrations of PCE which, if generated, would constitute a listed dangerous waste. Under the Ecology-provided contingent management option, the Contained-Out Policy, Ecology may determine that the concentrations of PCE in soil are below risk-based levels and exempt from management as dangerous wastes. Currently, PCE concentrations at the Property have been below the Washington State Dangerous Waste Criteria; therefore, a contained-out proposal was prepared and submitted to Ecology's Hazardous Waste & Toxics Reduction department requesting that approximately 97,540 tons of PCE-contaminated soil be managed as nondangerous waste. As of December 20, 2013, a contained-out determination had not been approved by Ecology.

Ecology's Hazardous Waste & Toxics Reduction department has requested additional sampling in order to provide a contained-out determination. SoundEarth will continue to communicate with Ecology to determine the scope of work that will be necessary to provide additional analytical data to determine if soil is consistent with the Contained-Out Policy. If analytical results from the additional sample locations are indicative of dangerous waste, the soil will be managed as such. Excavation and shoring activities conducted as part of the interim action will not commence until a contained-out determination is received from Ecology.

The contained-out soil would be managed in accordance with the contained-out determination provided by Ecology. At a minimum, the contained-out determination will provide transportation, disposal, and documentation requirements. Requirements of a typical contained-out determination include the following:

- Soil will transported directly to a permitted RCRA Subtitle D landfill or a Washington State solid waste landfill permitted under Chapter 173-351 WAC.
- Soil will not be used as fill at the Site or any other Property.

- Trucks and/or containers will be plastic lined and covered during transportation to the solid waste landfill. Adequate measures will be taken to prevent spills and dispersion due to wind or rain erosion.
- Soil will not be used for daily, intermediate, or final cover of the solid waste landfill. Instructions will be provided to the landfill operator.
- Copies of all signed soil waste landfill receipt records will be provided to Ecology in the specified amount of time.

5.5 SITE PREPARATION AND MOBILIZATION

Prior to initiating the redevelopment project, site controls will be established to ensure the work zone is properly secured. The entire perimeter of the Property will be fenced and points of ingress and egress will be clearly marked. The access points to the Property will be monitored by authorized personnel during construction activities and locked during non-business hours.

Prior to beginning excavation activities, TESC measures will be established as part of the larger redevelopment project. Once all TESC measures are implemented in accordance with the construction project plan, construction equipment and supplies will be mobilized to the Property. City of Seattle DPD inspections will provide approval of TESC measures.

An exclusion zone will be established around the perimeter of the PCE-contaminated soil to limit the potential for cross contamination of clean overburden soil. A truck wheel wash area will be established to allow for the washing and decontamination of equipment working in contaminated soil, and personnel will have a boot wash station to ensure proper decontamination procedures. All the washwater will be containerized and processed through the construction dewatering system.

5.6 SEATTLE LANDMARK PRESERVATION AND DEMOLITION

Prior to the demolition of buildings on the Property, micropiles and bracing will be installed in accordance with City of Seattle's Landmarks Preservation Board's Certificate of Approval and City of Seattle DPD Demolition and Bracing Façade permit. Portions of the south and east facades of the Troy Laundry Building and north and west facades of the Boren Investment Company Warehouse will be preserved and incorporated into future land use. Following installation of micropiles and bracing, the remaining buildings will be demolished. City of Seattle DPD inspections will provide approval of this task.

5.7 MONITORING WELL DECOMMISSIONING

Monitoring wells within the footprint of the excavation area, including MW06 and MW08 through MW12, will be decommissioned by a licensed well driller or under the supervision of a professional engineer in accordance with the Washington State Water Well Construction Act (1971), RCW 18.104 (WAC 173-160-460). Following decommissioning, the required paperwork will be submitted to Ecology. Excavation activities will not begin until the monitoring wells have been decommissioned.

5.8 PERCHED ZONE DEWATERING

The contaminated perched groundwater that was observed near the center of the Property will be dewatered prior to starting the excavation activities. The aerial extent of the perched interval, which is located near the center of the Property, was measured based on observations during the completion

of soil borings located in this area. The dewatering will be accomplished by advancing five 4-inch-diameter dewatering wells within the perched interval and pumping the water down until the wells are dry and recharge to the wells is limited (Figures 21 and 22). A pump test was not performed because this is a perched interval sitting on top of a hard silt aquitard; however, based on the CSM, a radius of influence of 20 feet was assumed for each dewatering well.

The dewatering well design and specifications are presented on Figure 24. Five dewatering wells will be advanced to a depth of 70 feet NAVD88 and screened from 70 to 80 feet (Figure 22). Each dewatering well will be constructed of 4-inch-diameter blank PVC casing, flush-threaded to 0.020-inch slotted well screen. The bottom of each of the wells will be fitted with a threaded PVC bottom cap, and the top of each well will be fitted with a PVC reducer bushing and connected to a 1-inch-diameter water discharge header (Figure 24).

Each dewatering well will be completed with a bentonite seal extending down from the top of casing, which will be the approximate elevation at the base of the excavation. The annulus of the dewatering wells will be filled with #10/20 silica sand extending from the bottom of the bentonite seal to total depth. The well completion will be recorded in boring logs. All wells will be completed by a licensed well driller and comply with the requirements of WAC 173-160, Minimum Standards for Construction and Maintenance of Wells.

Upon completion of drilling and dewatering well installation activities, the wells will be developed. Once the wells have been properly developed, the down-well pumps will be placed at the bottom of the well casings and dewatering activities will commence. The water generated will be transferred to a 6,800-gallon AST. The AST will be located in an area that is accessible for a qualified vacuum truck service to remove the contaminated water and transport it off-Property for treatment and disposal.

If the temporary dewatering system produces more than 5 gallons per minute, a contingency will be implemented and additional tanks will be used for added water storage capacity.

5.9 DEWATERING WELL DECOMISSIONING

The dewatering wells will be decommissioned by a licensed well driller or under the supervision of a professional engineer in accordance with the Washington State Water Well Construction Act (1971), RCW 18.104 (WAC 173-160-460). Following decommissioning, the required paperwork will be submitted to Ecology. Excavation activities will not begin until the dewatering wells have been decommissioned.

5.10 SHORING INSTALLATION

Shoring will be installed around the entire perimeter of the Property and will consist of soldier piles, lagging, walers, and tie backs. The preliminary shoring design is provided in Perkins + Will Schematic Design Drawing Set dated June 14, 2013 (Appendix C). Lagging will be installed in 5- to 10-foot increments as the excavation proceeds to facilitate the safe excavation of contaminated soil to the required depth.

5.11 EXCAVATION

The interim action involves excavating contaminated soil within the Remedial Excavation Area and transporting the excavated material off-Property for land disposal. The bulk excavation will commence after the completion of the following items.

Existing soil analytical data will be used to direct the real-time segregation and loading of haul trucks based on the following categories:

- **Dangerous Waste Soil Suitable for Land Disposal.** No soil exhibiting PCE concentrations greater than the Washington State dangerous waste criteria of 14 mg/kg is anticipated to remain on the Property following the operation of the soil vapor extraction system in 2011. If dangerous waste is discovered during the interim action, it will be managed as such.
- **Nondangerous Soil.** Soil exhibiting PCE concentrations less than 14 mg/kg but above the laboratory detection limit (0.025 mg/kg) as sourced from an F-listed waste material requires disposal as RCRA hazardous waste. In accordance with a Contained-Out Policy, the soil could potentially be managed as nondangerous waste. The estimated quantity of this material based on existing analytical data and incorporating approximate clean overburden calculations is 97,540 tons.
- **Clean Fill.** Soil that does not contain detectable concentrations of PCE will be considered clean fill material and will be taken to an appropriate facility.

The excavation contractor will use a soil management grid, which breaks the entire Remedial Excavation Area into 10-foot by 10-foot grid cells (Figures 19A through 19J), to readily identify and classify each grid cell for proper off-Property disposal and establish a trucking and disposal approach in accordance with the pre-classification of the soil that was developed based on the analytical data acquired during previous subsurface investigation activities.

The excavation will be coordinated to first address the contaminated soil near the center of the source area in an effort to safely remove the contaminated perched water. Excavation of the soil in this area will be carefully managed to ensure that the impermeable layer that the contaminated, perched interval overlies is not penetrated.

The excavation will follow shoring installation, and progress in approximate 4-foot lifts. In an effort to minimize the cross contamination of clean soil, the contractor will use a conveyor belt system to transport excavated material to the truck staging area to be directly loaded and minimize tracking of soil across the Property; establish an exclusion zone and place site controls such as tire and truck wash stations at the edge of the exclusion zone; limit the excavation on a daily or weekly basis to only remove contaminated soil to ensure proper decontamination of equipment prior to excavating clean soil; and line the truck and trailers with disposable liners.

In the event that the contamination within the Thomas Street ROW resulted from a release on the Property, the source of the contamination will be identified early in the excavation process because the source area will likely be the closed-in-place USTs, piping, or a sewer leak, all of which will be encountered/removed at a fairly shallow depth and extend downward (i.e., a chimney). If such contaminated material is encountered, soil samples will be collected to document concentrations and designate the soil for waste disposal according to the contaminant characteristics and in accordance with Ecology's Contained-Out Policy.

During excavation activities, soil and groundwater samples will be collected in accordance with the Revised SAP. Soil samples will be collected on a grid system and will provide confirmation that all soil containing concentrations of COCs in excess of the remediation level have been removed from the

Property. Groundwater samples will be collected from the excavation if it is observed infiltrating into the excavation. The Revised SAP provides a detailed description of soil and groundwater sampling activities including sampling locations, laboratory analysis requirements, QA/QC protocol, and sampling and handling procedures.

Soil samples collected along the floor of the excavation within the Remedial Excavation Area will be used to document that soil exceeding the remediation levels has been removed from the Property. Floor samples will be collected across the excavation in areas where less than two samples with concentrations below MTCA Method A cleanup levels were previously collected. The excavated soil will be handled according to the soil management grid (Figures 19A through 19J).

Soil and groundwater results collected in accordance of the Revised SAP will be used to determine if the excavation component of the interim action is complete. If analytical results indicate that soil with concentrations of COCs are above remediation levels, contingencies will be evaluated and, if feasible, implemented. Contingencies include the following:

- If soil samples collected from the excavation floor contain concentrations of COCs in excess of the remediation levels, then the soil will be overexcavated, to the extent feasible with shoring design, by approximately 6-inches and resampled until such time as concentrations of COCs are below the remediation levels.
- If soil samples collected from sidewalls of the excavation are above remediation levels, potential contingencies will be further evaluated. Overexcavation of the sidewalls will not be feasible due to the shoring wall and proximity to the ROWs. Potential options that have been evaluated include the installation of horizontal or vertical soil vapor extraction wells, but will be dependent on the location and distribution of the contaminated soil.

The excavation component of the interim action will be considered complete when soil with concentrations of COCs above remediation levels is removed from the Property and confirmed by results from soil samples collected in accordance with the Revised SAP. All data collected during the excavation component of the interim action will be provided to Ecology on a weekly basis. When Ecology is in concurrence that the excavation component is complete, the groundwater injection system component of the interim action will commence.

If remediation levels are not achieved during the interim action, the data and observations from the interim action will be incorporated into the CSM as part of the Site-wide RI and FS. The final cleanup action for the Site will achieve cleanup standards for the Site.

5.12 CONTINGENCY PLAN FOR DISCOVERIES

During excavation, there is the potential for unanticipated discoveries including contaminated soil outside the Remedial Excavation Area, USTs, and piping, Details on how the discoveries will be managed and communicated to the Project Team are discussed below. A Communication Plan is included as Figure 20.

The presence of aesthetic impacts and conditions encountered by site employees and equipment operators during the construction excavation activities at the Property may be indicative of conditions associated with contaminated media. Equipment operators will be instructed to use these criteria to alert the General Contractor of potential issues of previously unidentified contamination at the Property

in accordance with the Communication Plan (Figure 20); the General Contractor will notify the Property owner and the SoundEarth Project Manager, who will immediately notify Ecology. Any of the following occurrences are considered common sense criteria that may require a mitigation or remediation response. These criteria include, but are not limited to the following:

- Obvious petroleum staining, sheen, or colored hues in soil or standing water.
- The presence of petroleum products or leachate of other chemicals.
- The presence of utility pipe lines with sludge or trapped liquid indicating petroleum or chemical discharge sludge.
- The presence of buried pipes, conduits, USTs, or unexplained metallic objects or debris.
- Materials with a granular texture that suggests industrial origin.
- Vapors causing eye irritation or nose tingling or burning.
- White, chalky compounds or fine particulate soil layers.
- Presence of gasoline- or oil-like vapor or odor.
- Burnt debris or the presence of slag-like material.

Any criteria identified by on-Property personnel will be evaluated and, as appropriate, a sampling plan will be developed to properly characterize and manage the material in accordance with state and federal regulations.

Several subsurface anomalies were observed during the ground-penetrating radar survey conducted at the Property in 2010. In the event that a UST and/or piping is encountered during the course of the excavation activities, a UST site assessment will be conducted under the oversight of a Washington State certified UST site assessor, and the UST will be removed in accordance with the *Guidance for Site Checks and Site Assessments for Underground Storage Tanks* (Ecology 2003), *Underground Storage Tank Regulations* (WAC 173-360), and *Guidance for Remediation of Petroleum Contaminated Sites* (Ecology 2011b). In the event that impacts to soil are observed, performance and confirmational soil samples will be collected and analyzed to ensure that the contaminated soil is removed and properly characterized prior to disposal.

If unanticipated contaminated soil is discovered, the excavation operation will be moved to a different location while soil sampling and the limits of the contaminated soil are determined. The large scale of the project allows this approach. Critical to this, however, will be efficient characterization of the contaminated soil so that disposal requirements can be quickly determined and implemented, and the contractors can then return to the planned excavation sequence as quickly as possible.

5.13 CONSTRUCTION DEWATERING

Construction dewatering will be ongoing throughout the excavation component of the interim action, as necessary. Water that is generated from surface water runoff due to precipitation events and any groundwater encountered during the course of the excavation will be gathered at a low point in the excavation as determined by the General Contractor. Extracted water will then be pumped and stored in settlement tanks where it will be characterized in accordance with King County Minor Discharge

Authorization No. 921-01 (Figure 23). Testing frequency ranges from daily to weekly and will be conducted by the General Contractor.

The discharge limits for King County Minor Discharge Authorization No. 921-01 are summarized in the table below.

King County Discharge Limits

COC	Discharge Limits	Source
PCE	0.24 mg/L	King County Industrial Waste Program – Minor Discharge Authorization No. 921-01
TCE	0.5 mg/L	
pH	5.5-12 SU	
Fats, oil, and grease	100 mg/L	
Settleable Solids	7.0 ml/L	

NOTES:
COC = chemicals of concern
mg/L = milligrams per liter
ml/L = milliliters per liter
PCE = tetrachloroethylene
SU = standard unit
TCE = trichloroethylene

As discussed above, the final elevation of the remedial excavation is anticipated to be approximately 19 feet NAVD88, or approximately 3 feet above the top of the primary water-bearing zone; therefore, extensive dewatering is not anticipated. As discussed in Section 5.1.3, the General Contractor will need to ensure that there are proper facilities to store and convey water to the wastewater treatment facility prior to beginning construction dewatering activities.

5.14 GROUNDWATER INJECTION SYSTEM

Prior to the installation of the groundwater injection system, the post-excavation compliance sampling results will be evaluated to determine if any adjustments to the groundwater injection system design are needed. The Ecology Site Manager will review and agree upon the groundwater injection system layout and design prior to the installation of the system. Once the excavation component and the foundation floor are completed, the in situ groundwater treatment system will be installed (Figures 25 through 27). The following sections describe the groundwater injection system design, well installation, injection, and bioaugmentation.

5.14.1 Groundwater Injection System Design

After the final grades are achieved and the installation of the building foundation is complete, the injection wells required to treat the groundwater contamination plume using in situ reductive dechlorination will be installed. A barrier-type EOS design will be applied at the Property with a series of four transects spaced approximately 75 feet apart (a distance equivalent to the estimated distance travelled by the Site groundwater over 3 years) and perpendicular to the groundwater flow direction for the purpose of injecting an EOS and DHC to treat the extent of the confirmed solvent plume (Figure 25). As discussed in Section 2.2, the direction of groundwater flow through the primary water-bearing zone is to the south or southeast; however, groundwater levels have dropped and the flow direction has reversed toward the northwest, likely a result of large-scale dewatering projects to the northwest of the Property. In addition to the four transects, a barrier-type treatment wall will be installed along the north, south, and west Property boundaries. The footing layout for the building foundation was incorporated into the injection well layout and system design (Appendix C, Sheet S2.01).

There were no modifications to the injection well layout based on the reversal of the groundwater flow direction because the flow remains perpendicular to the injection well transects and the barrier-type treatment wall adequately addresses the plume boundary along the north, south, and west. There may be minor modifications to the injection well layout once the Perkins + Will Design Drawing Set is finalized.

EOS will be used as a carbon source to deplete dissolved oxygen present in the aquifer, generate free hydrogen, and sustain a robust anaerobic dechlorinating microbial population. The indigenous microbial population will consume oxygen and generate an anaerobic environment, which is needed for DHC-mediated reductive dechlorination to occur. Reductive dechlorination of chlorinated volatile organic compounds (CVOCs) occurs under strictly anaerobic conditions, unlike in aerobic conditions. In aerobic conditions, bacteria obtain energy by oxidizing reduced compounds (i.e., petroleum) while utilizing oxygen as the electron acceptor. Reductive dechlorination is mediated by anaerobic bacteria (e.g., DHC), which obtain energy by oxidizing hydrogen and utilizing the CVOC as the electron acceptor. Through this process, chlorine atoms within the solvent molecules are replaced by hydrogen one by one. As such, PCE is reduced to TCE, which is reduced to cis-1,2-DCE, which is reduced to VC, which is reduced to ethene as a detoxified final degradation product. The presence of degradation products in groundwater across the Site confirms that Site conditions are conducive to reductive dechlorination, and enhancing this naturally occurring process with EOS and DHC will significantly reduce the remedial time frame.

Each of the four transects will span the width of the groundwater plume beneath the Property and will include approximately 38 injection wells placed on approximately 15-foot centers with an overlapping radius of influence of 10 feet. In addition, 53 vertical barrier wells will be installed along portions of the north, south, and west Property boundaries. The barrier wells will be constructed as injection wells placed on 15-foot centers with an overlapping radius of 10 feet. The layout of the system will serve as a barrier to both on- and off-Property migration of contaminated groundwater. To address the groundwater plume beneath the Boren Avenue North and Thomas Street ROWs, approximately 12 angled injection wells will be installed beneath the ROWs; the base of the injection wells will be located at the western and southern boundaries of the ROWs, respectively (Figure 25).

The relatively wide spacing of the injection wells along each transect and along the Property boundaries is based on the estimated groundwater flow rate and direction, as well as the relatively permeable soil texture. This information, in combination with soil bulk density estimates developed by EOS Remediation LLC, was used to develop the approximate volume of EOS necessary to support a zone of anaerobic dechlorination sufficient to degrade the chlorinated solvents within groundwater beneath the Site (Appendix D). Because of the upgradient TCE source, approximately 135,000 pounds of EOS will be injected into the subsurface in an effort to address the contamination beneath the Property and to strengthen the remedial barrier within Boren Avenue North; the proposed volume will ensure that a large quantity of EOS will remain in the subsurface for several years (the EOS remains in the subsurface until it is consumed by the microbial population), thus maintaining a long-term reducing environment to remediate any solvents entering the ROW from an upgradient, off-Property source.

Approximately 1,350 pounds of EOS will be injected into each injection well. Pure EOS is usually diluted to 4 to 6 percent prior to the injection; the EOS emulsion will be mixed using a

temporary injection system and pumped via a manifold into multiple injection wells simultaneously, allowing for the delivery of up to 5,400 pounds per day (Figures 26 and 27). Actual injection rates will vary from well to well and will be monitored individually.

Each injection well will be completed flush with the parking garage surface and with a traffic-rated well monument (Figure 26). Each injection wellhead will have a ball valve, which will allow personnel to open a well for an injection and to close the well once the injection is complete. Each manifolded delivery line will have a one way flow check valve to eliminate edible oil from back flowing up the injection hose to the temporary injection mixing system or any backpressure from groundwater in the formation to flow back up the well to the injection manifold assembly (Figure 27).

5.14.1.1 Edible Oil Case Studies

As part of the evaluation of this interim action component, two recent SoundEarth projects where edible oil was injected to treat a PCE plume were assessed. The two projects are located in Seattle, Washington, and are referred to as the Ballard Property and the Capitol Hill Property. Both of these projects have shown significant reductions in concentrations of PCE in groundwater as a result of injecting EOS. A summary for each project is provided below. Charts and figures referenced herein are provided in Appendix E.

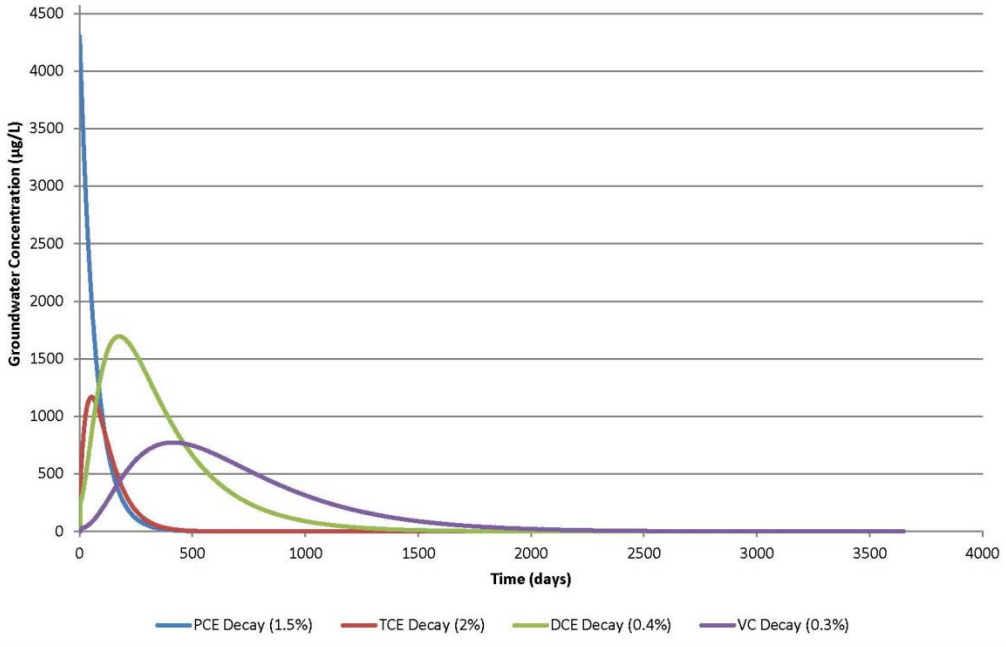
The Ballard Property was injected with edible oil in March 2010. Approximately 12,000 gallons of a 5-percent EOS solution were injected into 23 injection points over 2 days. The initial baseline concentration of PCE in groundwater was 590 µg/L and 240 µg/L in wells IW01 and IW02, respectively. Over a 2-year period, the concentrations decreased to 1.3 µg/L and 2.2 µg/L in IW01 and IW02, respectively (Charts 1 and 2 in Appendix E). The supporting information for this case study, including site layout, groundwater flow direction, and groundwater laboratory analytical data, is included in Appendix E.

Multiple injection events were conducted at the Capitol Hill Property between 2008 and 2011. During the initial event, approximately 11,000 gallons of 5 percent EOS solution were injected into 30 points over 4 days. The second and third injections were targeted toward specific wells, with 200 gallons injected at one point and 700 gallons injected into four points. The fourth injection event applied a higher concentration of EOS solution (18 percent), and approximately 3,600 gallons were injected into 14 points. PCE concentrations in samples collected from groundwater monitoring wells dropped from a high of 7,300 µg/L and 2,000 µg/L in wells MW108 and KMW1, respectively, to <0.5 µg/L (Charts 3 and 4 in Appendix E). The concentrations of cis-1,2-DCE and VC at both sites have increased over time, which suggests that reductive dechlorination processes have accelerated because of the EOS injection events. The concentrations of cis-1,2-DCE and VC will decrease over time as a result of the enhanced anaerobic environment generated by injecting EOS and increasing the microbial populations that will continue to break down the chlorinated compounds. Graph 1, below, demonstrates the reductive dechlorination rates observed at the Capitol Hill Property and the estimated remedial time frame to completely reduce PCE to ethene. The supporting information for this case study, including site layout, groundwater flow direction, and groundwater laboratory analytical data, is included in Appendix E.

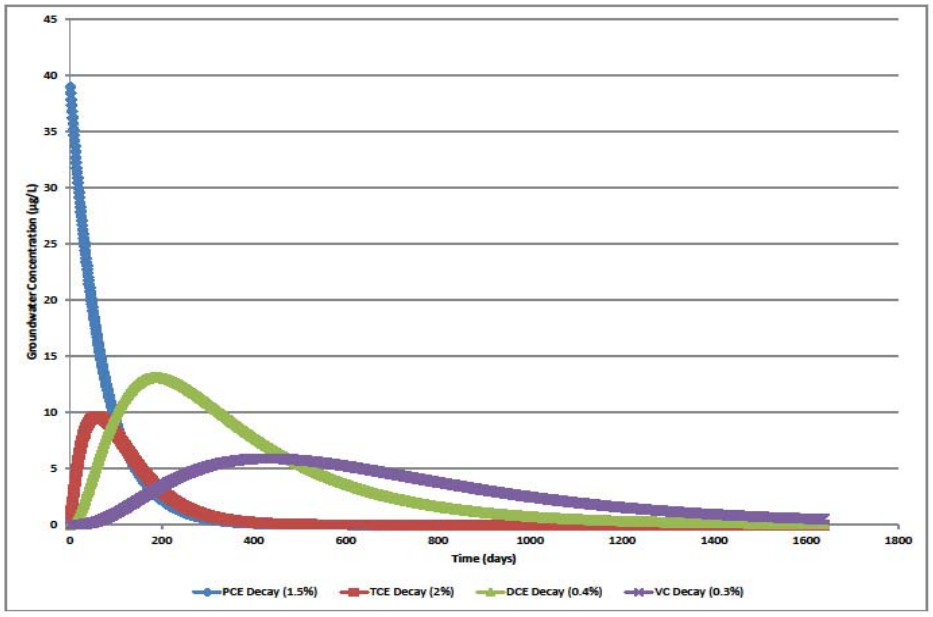
The model and decay rates from the Capitol Hill Property were used to evaluate the highest PCE groundwater concentration detected in a monitoring well for the Troy Laundry Property. The selected monitoring well was MW04, with a PCE concentration of 39 µg/L. Graph 2 shows the

results of the model using the decay rates from the Capitol Hill Property. This suggests that PCE will degrade to ethene in approximately 5 years at the Troy Laundry Property.

A comparison of the site characteristics observed beneath the Property and those of the Ballard and Capitol Hill Properties is provided in Appendix E. The evaluation of these site parameters is part of the remedial alternatives analysis to evaluate whether enhanced anaerobic bioremediation is appropriate for the Site (AFCEE 2004).



Graph 1. Empirical data demonstrating attenuation of chlorinated solvents at the Capitol Hill Property, which had higher starting concentrations and no source removal. Because the source will be excavated and removed from the Property, it is reasonable to anticipate a more rapid degradation rate than observed here.



Graph 2. Model of PCE decay at the Property based on decay rates observed at the Capitol Hill Property. The model predicts that PCE will completely degrade to ethene in approximately 5 years.

The Property exhibits favorable conditions for reductive dechlorination. Although the aquifer is not anaerobic, as stated above, the EOS will be used as a carbon source to fuel the growth of the indigenous microbial population, which will consume oxygen and generate an anaerobic environment. The anaerobic environment is necessary for DHC-mediated reductive dechlorination to occur.

Performance groundwater monitoring will be implemented to evaluate the effectiveness of the EOS injection and reductive dechlorination process. Groundwater samples will be monitored for the following parameters (AFCEE 2004):

- pH. The optimum pH range for reductive dechlorinating bacteria is 6–8 Standard Units.
- Dissolved Oxygen. Reductive dechlorination is an anaerobic process and requires that dissolved oxygen levels be less than 0.5 mg/L.
- Oxidation Reduction Potential. Anaerobic degradation will occur more readily with lower to negative oxidation-reduction potential (ORP) values.
- Temperature. Ideal temperatures for reductive dechlorination is 20 degrees Celcius; however the case studies presented in Appendix E indicate successful reductive dechlorination occurring at lower temperatures.
- Nitrate and Sulfate. High levels of competing electron donors, such as nitrate and sulfate, can inhibit reductive dechlorination.

- Dissolved Gases. Monitoring of ethene can be used to estimate the rate of degradation.
- Groundwater Trends. CVOC concentrations in groundwater will be evaluated quarterly to monitor the breakdown of PCE and TCE to degradation products. If a buildup of cis-1,2-DCE or VC is observed this may indicate a stall in the degradation pathway and will trigger an evaluation for bioaugmentation.

The monitoring frequency for each of the above parameters is discussed in further detail in Section 6.2.

5.14.2 Injection Well Installation

The preliminary injection well design and specifications are presented on Figure 24. There will be approximately 103 injection wells: 91 vertical injection wells, including 53 barrier wells, will be advanced to a depth of 35 feet below the saturated zone; 12 angled injection wells will be advanced beneath the ROW to a total vertical depth of 35 feet bgs. The angle and placement of the angled injection wells will vary by location to maximize the distribution of EOS beneath the Boren Avenue North and Thomas Street ROWs (Figure 25). The system will be designed to ensure access to the wells once the building is constructed, and the wells will be installed in an alternating fashion with the building footings, which will allow the contractor to work from the Remedial Excavation Area outward as the groundwater treatment system is installed. All wells will be completed by a licensed well driller and comply with the requirements of WAC 173-160, Minimum Standards for Construction and Maintenance of Wells.

Each injection well will be constructed of 2-inch-diameter blank PVC casing, flush-threaded to 0.020-inch slotted well screen. The bottom of each of the wells will be fitted with a threaded PVC bottom cap, and the top of each well will be fitted with a 2-inch PVC ball valve and 2-inch male cam fitting compatible with the injection manifold piping (Figures 24, 26, and 27).

Each injection well will be completed with a bentonite grout seal extending down from the top of casing, which will be the approximate elevation at the base of the excavation. The annulus of the injection wells will be filled with #10/20 silica sand extending from the bottom of the bentonite seal to total depth. The well completion will be recorded in boring logs. Upon completion of drilling and injection well installation activities, a survey of injection well locations will be performed and the wells will be developed. The horizontal and vertical injection well locations and top of casing elevations will be surveyed by Triad Associates for the purposes of providing an as-built drawing for the injection system well configuration. Elevations will be surveyed relative to the NAVD88 using City of Seattle Benchmark No. 36690702 as the source benchmark. The injection well locations and elevations will be surveyed prior to covering the injection well points and conveyance piping beneath the foundation the wells.

The injection wells will be developed by SoundEarth field staff with the use of a submersible pump and will consist of surging and purging until a minimum of five well volumes are removed and the groundwater no longer appears turbid. Turbidity will be measured visually by field staff conducting development activities. The installation of the injection wells and system piping will be completed concurrently with construction activities and prior to the installation of the slab-on-grade foundation. The estimated remedial time frame for groundwater restoration is 5 years following the initial EOS injection event.

5.14.3 Injection and Bioaugmentation

Each injection well will be flush mounted with the parking garage floor. The temporary injection system will include a smart control panel, high-speed metering pump, static mixer, and level and flow switches. Individual flowmeters will document the amount of EOS injected into each well. Check valves, level switches, ball, and gate valves will ensure the ideal ratio of EOS and water are met for the injection. The control panel and injection manifold will be mounted on one trailer, while a second trailer will be used for the bulk EOS totes.

The temporary injection system will utilize a manifold design to supply and meter EOS to several injection wells simultaneously. The temporary injection system eliminates the need for permanent injection equipment to be maintained within the parking garage and the individual well vaults make injection points accessible for future injection events. The temporary injection system will have a flow totalizer, ball valve, and pressure gauge in order to document the volume of injectate delivered and injection pressure. The individual injection wells will be readily accessible for both the initial and future injection events if necessary.

The EOS will be applied at a pressure ranging from 5 to 15 pounds per square inch. Approximately 1,350 pounds of EOS will be applied to each injection well. The initial injection event will occur once the parking garage is completed and during the construction of the above grade portion of the buildings.

Performance groundwater monitoring will be implemented to evaluate the effectiveness of the EOS injection and reductive dechlorination process. Section 5.14.1.1 provides a discussion of the groundwater parameters to be monitored.

If quarterly compliance groundwater monitoring indicates the reductive dechlorination process is stalling or build-up of 1,2-dichloroethene and VC, then samples will be collected and analyzed for DHC to determine whether the native population of DHC needs to be supplemented. If the analyses suggest that bioaugmentation is required, one of the proprietary DHC groups, KB1 or SB9, will be injected. To ensure the success of bioaugmentation the following groundwater parameters will be evaluated:

- pH range of 6–8 Standard Units
- ORP value less than -100 millivolts
- Dissolved oxygen is less than 0.5 mg/L

Prior to injecting at the Site, the individual injection wells will be registered with Ecology's UIC Program.

5.14.4 Injection Well Decommissioning

Following compliance with groundwater remediation levels, the injection wells will be decommissioned by a licensed well driller or under the supervision of a professional engineer in accordance with the Washington State Water Well Construction Act (1971), RCW 18.104 (WAC 173-160-460). Following decommissioning, the required paperwork will be submitted to Ecology.

5.15 INTERIM ACTION VAPOR INTRUSION EVALUATION

The groundwater concentrations currently beneath the Property and the Site exceed the MTCA Method B groundwater screening levels protective of indoor air quality published in Ecology's draft guidance document for evaluating soil vapor intrusion to indoor air (Ecology 2009b). The groundwater screening levels are provided in the table below.

Screening Levels for Groundwater Protective of Indoor Air

COC	Screening Level (µg/L)	Source
GRPH	2.9-1,300	Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action, Review DRAFT, October 2009, Publication No. 09-09-047; Appendix B, Method B; PCE and TCE updated in CLARC Database on September 2012
PCE[(1)]	23	
TCE[(1)]	3.7	
cis-1,2-DCE	160 (NC)	
VC	0.35	

NOTES:
[(1)]The groundwater screening levels for PCE and TCE were calculated based on the updated indoor air screening levels published in CLARC (September 2012).

µg/L = micrograms per liter
cis-1,2-DCE = cis-1,2-dichloroethylene
CLARC = Cleanup Levels and Risk Calculations
COC = chemicals of concern
GRPH = gasoline-range petroleum hydrocarbons
NC = noncarcinogenic
PCE = tetrachloroethylene
TCE = trichloroethylene
VC = vinyl chloride

The approach for the collection of compliance soil gas samples and the VI assessment for the interim action were discussed with Ecology's Site Manager in emails dated August 8 and August 13, 2013. SoundEarth and Ecology discussed the feasibility of collecting soil gas samples in the sidewalls and floor of the remedial excavation. It was determined that it was not feasible to collect soil gas samples from the sidewalls at various depths due to inaccessibility through the shoring lag wall and time required to collect a representative sample. In addition, the collection of soil gas samples from the floor of the excavation would not be representative because the excavation limits will extend within approximately 5 feet of the water table, which results in significant risks associated with collecting biased analytical results due to high soil vapor moisture content or the addition of atmospheric air. On January 29, 2014, Ecology stated that traditional soil gas sampling techniques were feasible to implement prior to the remedial excavation and interim action. A preliminary and Tier I assessment has already been completed for the Property, which confirmed the presence of COCs in soil gas and concentrations of COCs in groundwater that exceed the screening levels protective of indoor air. Based on these results, additional soil gas samples will not be collected prior to the interim action because analytical results may not be representative of conditions that will exist following the remedial excavation.

Upon completion of the remedial excavation and the initial injection event, and prior to building occupation, a VI assessment will be performed in accordance with the tiered approach presented in Ecology's draft guidance document (Ecology 2009b). The tiered approach involves three main components: preliminary assessment, which identifies whether a VOC source and occupied buildings are present in the same vicinity, or could be in the future; Tier I VI assessment, which compares groundwater and/or soil gas concentrations to screening levels and/or predictive air modeling; and Tier II VI assessment, which includes the collection of soil gas and/or indoor air and ambient air samples to quantify the actual vapor risk.

The tiered VI assessment will include an evaluation of the soil performance data from the remedial excavation, the groundwater concentration trends post remedial injection, construction schedule and anticipated occupied date, and future building design features.

The following sections describe the steps for the VI assessment post remedial excavation and initial EOS injection.

5.15.1 Evaluation of Soil and Groundwater Compliance Sampling

The results of the soil sidewall and floor compliance sampling will be evaluated to determine whether residual COCs remain beyond the limits of the engineered shoring wall.

As part of the Tier I VI assessment, concentration trends of COCs in groundwater will be evaluated quarterly and compared to the groundwater screening levels protective of indoor air. A VPH analysis will be conducted to compare aliphatic fractions to the groundwater screening levels presented above. This will allow for identification of specific groundwater screening levels for petroleum hydrocarbons.

Based on the PCE decay rate modeled presented in Section 5.14, concentrations of PCE and TCE will significantly decrease within the first year, with a total reduction from PCE to ethene in approximately 5 years. The current construction schedule shows the construction of the parking garage completed by early 2015 and the completion of the north and south buildings in 2016. The date of building occupancy is not known at this time, but at least a full year of dissolved-phase groundwater treatment will be completed before the building is occupied. The groundwater and soil data will be evaluated to determine if there are unacceptable VI impacts to indoor air and the vapor pathway is complete. If the Tier I VI assessment indicates there is unacceptable VI impacts to indoor air, then upon completion of the building and prior to occupancy, a Tier II assessment will be performed. A Tier II assessment involves the collection of indoor air samples to determine if the soil vapor to indoor air pathway is complete. The sample locations and sample duration will be discussed and agreed upon with the Ecology Site Manager.

5.15.2 Future Building Design Features

In the event that there is potential for unacceptable VI impacts to indoor air, the following future building design features may be incorporated as components of the vapor intrusion mitigation system: the concrete foundation, garage exhaust ventilation system, and positive building pressure. The Property is being redeveloped with five levels of below-grade parking. The preliminary parking structure details are provided in Appendix C. The concrete foundation and shoring system will act as a barrier to vapor intrusion, and any vapor intrusion may be further mitigated by the exhaust venting system for the garage. The garage ventilation system will be designed by a mechanical heating, ventilation, and air conditioning (HVAC) contractor to comply with Seattle DPD Mechanical Code 2009, Chapter 4 Ventilation, Section 404. The HVAC system is automatically and mechanically controlled in the garage and has minimum and maximum air exchange design settings. The table below shows the preliminary air exchange rate for each level of the parking garage.

Parking Garage Air Exchange Rate (McKinstry 2013)

Parking Level	Minimum Air Exchange Rate per Hour	Maximum Air Exchange Rate per Hour
P1	0.18	2.74
P2	0.39	5.81
P3	0.39	5.81
P4	0.39	5.81
P5	0.39	5.81

If the Tier II VI assessment confirms that there are unacceptable risks to indoor air, modifications to the parking garage air exchange system can be modified to increase the air exchange rate in the parking garage to mitigate vapor intrusion. The ventilation of the parking garage will create a negative pressure beneath the building. Therefore, a critical design element is to ensure that the elevator shafts do not act as a conduit for vapor intrusion from the parking garage to the occupied building. The COCs rate of diffusion across the concrete slab should be significantly less than the air exchange rate of the parking garage. The rate of diffusion from soil gas to the ambient air in the parking garage will be evaluated during the VI assessment to determine if the existing air exchange rate is sufficient. If necessary, the air exchange rate will be increased. The commercial buildings above the parking garage will have an HVAC system that is independent from the parking garage. The building, elevator lobby on each parking level, and elevators shafts will maintain a positive pressure compared to the parking garage, which will prevent garage air from entering the occupied space of the buildings. If necessary, the mechanical system will be programmed to operate 24 hours a day.

An EPA engineering issue states that by increasing the air exchange rate without pressurization of the space results in a modest reduction in vapor concentrations of 50 to 75 percent (EPA 2008). A study completed by Berry-Spark, et al. (2006) describes a former manufacturing facility that was redeveloped and had a vapor intrusion risk from TCE. The facility increased the air exchange rate to create positive pressure inside the building; it was concluded that the increased air exchange accounted for 20 percent of the decrease in vapors and the other 80 percent was due to the positive pressure or reduced negative pressure in the building.

If monitoring indicates that the vapor pathway is complete and there is an unacceptable risk to human health at the Property then a vapor intrusion mitigation system is warranted and it will be evaluated as part of the Site-wide cleanup action.

6.0 COMPLIANCE MONITORING

There are three types of compliance monitoring identified for remedial actions performed under MTCA (WAC 173-340-410): protection monitoring, performance monitoring, and confirmational monitoring. A paraphrased definition for each is presented below (WAC 173-340-410[1]). Performance and/or confirmational samples will be collected in accordance with an Ecology-approved Post-Excavation Evaluation Sampling and Analysis Plan. Vapor, soil, and groundwater samples will be collected on a grid system and will provide information for evaluating the vapor intrusion hazard from residual soil contamination and groundwater contamination. In addition, performance monitoring will be conducted to assess the effectiveness of the interim action. A more detailed description of sampling approach is provided in the Revised SAP, which is provided in Appendix A of the IAP (SoundEarth 2013b).

Additional details regarding procedures for sample collection, handling, and quality assurance procedures are included in the Revised SAP as Appendix A to this EDR and the HASP as Appendix B to the IAP (SoundEarth 2013b).

- **Protection Monitoring**—To evaluate whether human health and the environment are adequately protected during the interim action.
- **Performance Monitoring**—To document that the interim action has attained remediation levels at the interim action goals.
- **Confirmational Monitoring**—To evaluate the long-term effectiveness of the interim action once remediation levels or other performance standards have been attained.

6.1 PROTECTION MONITORING

A HASP has been prepared for the interim action that meets the minimum requirements for such a plan identified in federal (29 Code of Federal Regulations 1910.120, and 29 Code of Federal Regulations 1926) and state regulations (WAC 173-340-810 and WAC 296). The HASP identifies all known physical, chemical, and biological hazards; hazard monitoring protocols; and administrative and engineering controls required to mitigate the identified hazards (Appendix B of the IAP; SoundEarth 2013b).

6.2 PERFORMANCE MONITORING

Performance monitoring includes the collection of soil samples from the sidewalls and floor of the Remedial Excavation Area, soil samples during excavation and removal of any previously unidentified contamination, quarterly groundwater samples from the groundwater monitoring wells, and indoor air samples after the building is constructed.

6.2.1 Soil Performance Monitoring

The limits of the excavation were modeled using the existing soil analytical data and the results of the model are shown on Figures 19A through 19J. Performance samples will be collected from the extents of the Remedial Excavation Area. Post-excavation soil sampling will be based on a vertical and lateral grid system. Soil analytical data previously collected will be used to determine soil sampling locations. Along portions of Boren Avenue North and Thomas Street in the vicinity of areas where previous soil analytical data indicated the presence of COCs, additional sidewall samples will be collected on 5-foot vertical grids. Floor samples will be collected on an approximate 50-foot lateral grid system in areas where less than two samples with concentrations below MTCA Method A cleanup levels were collected previously. The excavation floor will be overexcavated in areas where performance samples indicate that soil contains concentrations of COCs above applicable remediation levels.

A contingency for performance samples will be retained in the event that an unknown condition is encountered during the course of the excavation, such as a UST, piping, or other unknown variance. In this case, performance monitoring for soil will be conducted and the analytical results will direct the advancement of the excavation and characterize the soil for disposal.

All non-dedicated sampling equipment will be decontaminated between uses. A detailed scope for monitoring and sampling contaminated soil is discussed in the Revised SAP which is included as Appendix A of the IAP (SoundEarth 2013b). The samples will be submitted for laboratory analysis and the analytical results will be used to assess when the interim action goals for soil have been achieved.

6.2.2 Groundwater Performance Monitoring

Upon completion of the excavation and the initial EOS injection event, the treated groundwater will be monitored for an estimated period of 5 years. The existing network of groundwater monitoring wells around the perimeter of the Property as well as select injection wells will be sampled quarterly to evaluate the progression of reductive dechlorination in groundwater beneath the Property and adjoining ROWs. In addition, replacement on-Property compliance monitoring wells will be installed, the locations of which will be determined by data collected as part of the Revised SAP and Ecology concurrence. The proposed monitoring well construction details and specifications are presented on Figure 24, and the proposed groundwater monitoring well locations/compliance points are shown on Figure 28 and summarized below. Actual depths and screen intervals will be determined based on groundwater conditions observed during drilling.

Each monitoring well will be constructed of 2-inch-diameter blank PVC casing, flush-threaded to 0.010-inch slotted well screen. The bottom of each of the wells will be fitted with a threaded PVC bottom cap, and the top of each well will be fitted with a locking compression-fit well cap. The annulus of the monitoring wells will be filled with #10/20 silica sand to a minimum height of 1 foot above the top of the screened interval. A bentonite seal with a minimum thickness of 1 foot will be installed above the sand pack. The wells will be completed at the surface with a flush-mounted, traffic-rated well box set in concrete.

Groundwater samples will be submitted to the laboratory and analyzed for chlorinated solvents and petroleum hydrocarbons. In addition, groundwater will be monitored quarterly for pH, dissolved oxygen, oxidation reduction potential, and temperature to document aquifer parameters for the microbial population. A select number of monitoring or injection wells will be monitored semi-annually for the 2 years and then annually for 3 years for dissolved gases and sulfate. The monitoring requirements for the UIC registration have not been determined, but previous registrations include monitoring 1 to 2 downgradient monitoring wells on a quarterly basis for fats, oil, and grease. If a stall out or buildup of cis-1,2-DCE and/or VC is evident from groundwater monitoring then samples will be collected from 2 to 3 monitoring or injection wells and analyzed for DHC to determine whether the native population of DHC needs to be supplemented.

The analytical results will be compared to groundwater remediation levels to determine when interim action goals have been achieved, which is anticipated to be following the collection of four consecutive quarters of compliant groundwater results.

6.2.3 Indoor Air Performance Monitoring

Indoor air performance monitoring locations and frequency are dependent on the results of the excavation component of the interim action, compliance groundwater sampling results, and concurrence with Ecology's Site Manager. Upon completion of the building and prior to use, indoor air samples will be collected from the selected locations, if necessary. Indoor air samples will be submitted to the laboratory and analyzed for chlorinated solvents and petroleum hydrocarbons. The air samples will include an air-phase petroleum hydrocarbon (APH) speciation analysis to compare the aliphatic ranges of petroleum hydrocarbons to the indoor air screening levels.

The analytical results will provide a baseline prior to building occupation for comparison of future performance monitoring.

6.2.4 Waste Profiling

Wastes generated during the interim action require analytical testing before disposal. Generally, the treatment, storage, and disposal facility (TSDF) receiving the waste specifies the minimum number of samples and analyses before accepting wastes from a site; at the Site, data generated during the RI activities is sufficient to develop a waste profile. Wastes that will be generated from the remedial action and destined for off-Property disposal include the following:

- Soil contaminated with PCE and its degradation products, GRPH (as Stoddard solvents), DRPH, ORPH, and associated compounds.
- Contaminated groundwater from excavation dewatering.
- Contaminated personal protective equipment.
- Decontamination solutions.
- Miscellaneous solid wastes.

Each waste stream will be profiled separately in accordance with the minimum waste analyses requirements of the respective permitted TSDF. Excavated contaminated soil will be handled according the soil management grid (Figures 19A through 19J). If unforeseen soil conditions are encountered, additional waste profiling may be required to ensure proper classification and disposal.

6.3 CONFIRMATIONAL MONITORING

Confirmational monitoring will commence after the analytical data from the performance monitoring indicates that remedial action objectives have been achieved.

6.3.1 Soil Confirmational Monitoring

Existing sample results will be used for soil confirmational monitoring. Additional sidewall samples will be collected along portions of Boren Avenue North and Thomas Street in the vicinity of areas where previous soil analytical data indicated the presence of elevated concentrations of COCs. Soil samples collected along the floor of the excavation within the Remedial Excavation Area will be used to document that soil exceeding the remediation levels has been removed from the Property. Floor samples will be collected across the excavation in areas where less than two samples with concentrations below MTCA Method A cleanup levels were collected previously. If samples collected from the excavation floor contain concentrations of COCs in excess of the remediation levels, then the soil will be overexcavated and resampled until such time as concentrations are below the remediation levels. A duplicate soil sample will be collected approximately every 20 samples to verify the accuracy of the data collected. The excavated soil will be handled according to the soil management grid (Figures 19A through 19J).

Soil samples collected from the south and west sidewalls of the excavation will be collected from the Property boundary, and no additional excavation beyond Property boundaries is anticipated. Soil samples will be collected in accordance with the Revised SAP. Data from the samples will be incorporated into the CSM as part of the RI.

Confirmational monitoring may be required if unforeseen soil conditions are encountered during the course of the excavation. In the event that unanticipated conditions are encountered and confirmational soil samples are required, samples will be collected from the bottom and the sidewalls of the excavation to confirm that interim action goals have been achieved.

6.3.2 Groundwater Confirmational Monitoring

It is anticipated that the Site groundwater quality will be improved by virtue of removing the source area from the Property; any residual contamination will be addressed by in situ reductive dechlorination. To evaluate the effectiveness of the interim action on groundwater quality, groundwater samples will be collected on a quarterly basis from the monitoring wells MW01 through MW05, MW07, MW13, MW14, MW15, MW16 and the new monitoring wells located on the Property (Figure 28). These wells are considered representative of groundwater conditions within and downgradient of the source area. Once four quarters of clean (e.g., concentrations of COCs are below their respective remediation levels), post-remediation groundwater analytical data are achieved, the groundwater beneath the Property will be considered to be compliant with the groundwater interim action goal.

7.0 SCHEDULE

The preliminary project schedule is provided on Table 5. Pre-field activities are anticipated to begin in Fourth Quarter 2013 and First Quarter 2014; Seattle Landmark preservation and building demolition will begin in First Quarter through Second Quarter 2014; the shoring and excavation activities will begin in Second Quarter 2014, injections during Fourth Quarter 2014, and compliance monitoring in First Quarter 2015. Once the project starts, any revisions to the project schedule will be noted in the weekly and monthly progress reports to Ecology, which are described below.

8.0 DOCUMENTATION REQUIREMENTS

Documentation of the interim action is necessary to meet MTCA requirements. The applicable and relevant documentation generated for the interim action will be submitted to Ecology for review and approval in accordance with the conditions set forth in the Amended Agreed Order No. DE 8996. Copies of the documents will be retained for a minimum of 10 years after completion of the interim action.

Weekly progress reports summarizing interim action activities including tasks completed, analytical data, and discoveries will be emailed to Ecology weekly. Monthly progress reports summarizing interim activities conducted to date will continue to be submitted to Ecology by the 10th of each month, in accordance with Amended Agreed Order No. DE 8996.

All data collected during the interim action will be uploaded to Ecology's Environmental Information Management System.

8.1 DOCUMENTATION MANAGEMENT

An established document control system to be implemented during the interim action includes the following elements, as appropriate: field report forms, excavation logs, sample summary forms, material import and export summary forms, groundwater purge and sample forms, sample chain of custody forms, waste inventory documentation, waste management labels, and sample labels. Disposal manifests for the waste generated during the interim action will be maintained and submitted with the project documentation. Additional information on document management is provided in the Revised SAP.

8.2 WASTE DISPOSAL TRACKING

Specific documentation requirements will be met for transportation and disposal of the contaminated soil and groundwater during the excavation activities to ensure compliance with state and federal regulations. The waste disposal tracking documentation includes analytical data, waste profiles, waste manifests, and bills of lading.

8.3 COMPLIANCE REPORTS

An Interim Action Progress Report will be prepared following completion of the excavation activities to demonstrate compliance for soil at the points of compliance defined for the Property. At a minimum, the report will include the following:

- A description of the excavation and construction activities and the installation and operation of the injection system and associated piping.
- Documentation of waste disposal tracking for the excavated soil, generated wastewater, and other associated materials.
- A figure depicting the final limits of the remedial excavation and the soil sample locations, as applicable.
- A summary of compliance monitoring analytical results.
- A description of planned work and deliverables for the confirmational monitoring elements of the interim action.

An Interim Action Closure Report will be prepared following completion of the final quarterly groundwater monitoring event. The Closure Report will include the following:

- A description of the quarterly groundwater monitoring activities.
- A summary of the compliance sampling analytical results for groundwater for samples collected during quarterly groundwater monitoring, including summary tables.
- A figure depicting primary Site features and points of compliance/monitoring well locations.
- SoundEarth's conclusions pertaining to the interim action following the completion of four consecutive quarters of confirmational groundwater monitoring.

When the compliance reports have been finalized, the reports will be submitted to Ecology for review and approval. Following approval, one electronic and one hard copy of each final report will be submitted to Ecology.

8.4 INTERIM ACTION LETTERS

Ecology will prepare letters for submittal to Touchstone documenting completion of the MTCA steps for the interim action. The letters will document Ecology's review and approval for the major components of the IAP and this EDR. The major components of the IAP and this EDR include compliance with the following interim action objectives:

- Excavation of contaminated soil and installation of groundwater injection system.
- Compliance with groundwater remediation levels following soil excavation and operation of the groundwater treatment system.

- Compliance with indoor air remediation levels based on compliance air samples and groundwater screening levels protective of indoor air.

9.0 LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, expressed or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. SoundEarth is not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. SoundEarth does not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

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FIGURES

P:\0731 TOUCHSTONE\0731-004 TROY LAUNDRY\TECHNICAL\CAD\FIGURE 1\0731-004-04 FIG 1 F.DWG

SoundEarth Strategies
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DATE: 06/06/2011
DRAWN BY:.....JQC
CHECKED BY:.....RMT
CAD FILE:.....0731-004-04_FIG1

PROJECT NAME: .....TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004-04
STREET ADDRESS:.....307 FAIRVIEW AVENUE NORTH
CITY, STATE:.....SEATTLE, WASHINGTON

FIGURE 1
PROPERTY LOCATION MAP

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12/17/2013

P:\0731 TOUCHSTONE\0731-004 TROY LAUNDRY\TECHNICAL\CAD\2013 EDR\0731-004 2013EDR SLC F.DWG

PN: 1983200290

PN: 1983200270

(440 TERRY AVENUE NORTH)

1983200645

NORTH-ADJOINING PROPERTY

(400 BOREN AVENUE NORTH)

PN: 1983200635

PN: 1983200626

PN: 1983200625

NORTH-ADJOINING PROPERTY

(405 FAIRVIEW AVENUE NORTH)

PN: 2467400120

(400 FAIRVIEW AVENUE NORTH)

HARRISON STREET

PN: 1986200460

PN: 1986200410

BOREN INVESTMENT COMPANY WAREHOUSE

(334 BOREN AVENUE NORTH)

PN: 1986200515

FORMER MOKAS BUILDING

(329 BOREN AVENUE NORTH)

PN: 2467400065

PN: 1986200450

PN: 1986200418

WEST-ADJOINING PROPERTY

(301 & 345 BOREN AVENUE NORTH)

PN: 1986200420

BOREN AVENUE NORTH

FAIRVIEW AVENUE NORTH

EAST-ADJOINING PROPERTY

(300-318 FAIRVIEW AVENUE NORTH)

PN: 2467400073

THE PROPERTY

(307 FAIRVIEW AVENUE NORTH)

(APPROXIMATE 108,571 SQUARE FEET)

PN: 1986200480

TROY LAUNDRY BUILDING

PN: 2467400080

PN: 1986200440

PN: 2467400085

PN: 2467400090

ZONED IC-65

ZONED IC-85

THOMAS STREET

ZONED SM/R 55/75

PN: 1986200380

(201 BOREN AVENUE NORTH)

PN: 1986200350

SOUTH-ADJOINING PROPERTY

(1120 JOHN STREET)

PN: 1986200525

PN: 2467400005

(234 FAIRVIEW AVENUE NORTH)

PN: 2467400006

N

LEGEND

- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- ZONING BOUNDARY
- BUILDINGS
- (106) 1-FOOT-INTERVAL CONTOUR LINE
- PN: 1986200480 PARCEL NUMBER

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DATE: 12/17/13
DRAWN BY: NAC
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CAD FILE: 0731-004_2013EDR_SLC

PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY,STATE: SEATTLE, WASHINGTON

REGION:

0 40 80 160

APPROXIMATE SCALE IN FEET

FIGURE 2

SITE LOCATION MAP

12/17/2013

HARRISON STREET

1100s (ODDS)

BOREN INVESTMENT COMPANY WAREHOUSE (1925)

APPROXIMATE LOCATION OF FORMER 10,000-GALLON PROPANE TANK

FORMER 8,000-GALLON GASOLINE UST

GPR ANOMALY

FORMER MOKAS BUILDING (1960)

POSSIBLE VENT LINE

GPR ANOMALY

300-GALLON UST

APPROXIMATE LOCATION OF TWO 12,000-GALLON USTs AND ONE 1,000-GALLON UST

FORMER OIL TANK

FORMER PUMP ISLAND

2,000-GALLON GASOLINE USTS

FORMER TANK

SUMP

VENT LINES

SHED

BOILER ROOM

FORMER ASTs

BRINE PIT

VENT/FILL LINES

FORMER OIL TANK

FORMER TRANSFORMER

TRENCH

INDUSTRIAL LAUNDRY (1946)

FORMER BOILERS

FORMER PRESSURIZED WATER TANK

8,000-GALLON SOLVENT UST

TRANSFORMER VAULT

2" FLOOR DRAIN

ASTs

CLEAN OUT

FORMER BOILER

DECOMMISSIONED WATER WELL

WATER SUPPLY WELL

FORMER AIR COMPRESSOR

VAULTS

VAULT

VAULT

HOT WATER BOILER

LOADING DOCK

3,000-GALLON (DUMP TANK)

VIC. SOLVENT SAVER

1,000-GALLON (CIRCULATING)

TRENCH

PUMP

350-GALLON (STA DRI TANK)

FORMER FINISHING AREA

FORMER TUMBLING AREA

FORMER DRY CLEAN AREA (EXPLOSION PROOF AREAS)

FORMER 1,000-GALLON SOLVENT STORAGE TANKS

FUR VAULT (1948)

FORMER CLEANING

FORMER SALON

FORMER VAULT ROOM

FORMER REPAIRING

AMAZON HEADQUARTERS BUILDING

BOREN AVENUE NORTH

300s (EVENS)

300s (ODDS)

FAIRVIEW AVENUE NORTH

TROY LAUNDRY BUILDING (1926)

~6'-DEEP SUMP

FLOOR DRAIN

GARAGE ADDITION (1964)

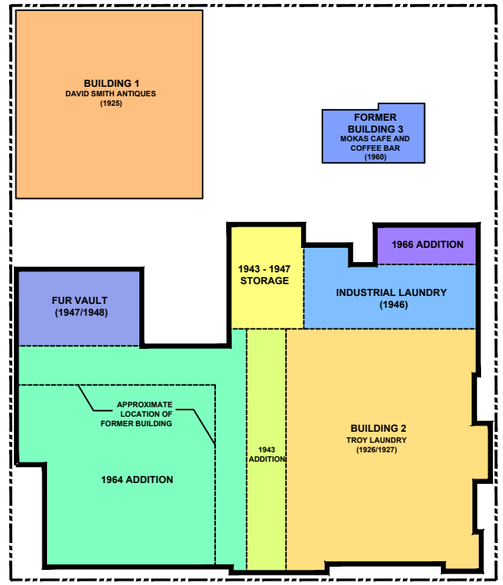
FLOOR DRAIN

RAMP

2,000-GALLON UST AND FORMER FUEL-DISPENSING PUMP ISLAND

THOMAS STREET

N



TROY LAUNDRY PROPERTY CONSTRUCTION SEQUENCE

LEGEND

- VAULT ACCESS
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- PROPERTY FEATURES
- FORMER PROPERTY FEATURES
- SOUTH LAKE UNION STREETCAR LINE
- UST — UNDERGROUND STORAGE TANK
- AST — ABOVEGROUND STORAGE TANK
- GPR — GROUND PENETRATING RADAR

LOCATIONS OF FORMER SITE FEATURES ARE APPROXIMATE

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DATE: 12/17/13
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CAD FILE: 0731-004_2013EDR_SP

PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY,STATE: SEATTLE, WASHINGTON

REGION:

0 25 50 100
APPROXIMATE SCALE IN FEET

FIGURE 3
PROPERTY PLAN

P:\0731 TOUCHSTONE\0731-004 TROY LAUNDRY\TECHNICAL\CAD\2013 EDR\0731-004 2013EDR SP F.DWG

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12/17/2013

P:\0731 TOUCHSTONE\0731-004 TROY LAUNDRY\TECHNICAL\CAD\2013 EDR\0731-004 2013EDR EL F.DWG

HARRISON STREET

THOMAS STREET

TERRY AVENUE NORTH

BOREN AVENUE NORTH

FAIRVIEW AVENUE NORTH

300s (EVENS)

300s (ODDS)

1100s (ODDS)

N

AMAZON HEADQUARTERS BUILDING

BRAVEHORSE

BIORAD

BOREN INVESTMENT COMPANY WAREHOUSE (1925)

FUR VAULT (1948)

FORMER MOKAS BUILDING (1960)

INDUSTRIAL LAUNDRY (1946)

TROY LAUNDRY BUILDING (1926)

GARAGE ADDITION (1964)

B08/ MW01

B09/ MW02

B10/ MW03

B11/ MW04

B12/ MW05

B13/ MW06

B15/ MW07

B31/ MW12

B30/ MW11

B28/ MW10

B26/ MW08

B49/ MW15

B37/ MW13

B27/ MW09

B50/ MW16

B38/ MW14

B01 B02 B03 B04 B05 B06 B07 B08 B09 B10 B11 B12 B13 B14 B15 B16 B17 B18 B19 B20 B21 B22 B23 B24 B25 B26 B27 B28 B29 B30 B31 B32 B33 B34 B35 B36 B37 B38 B39 B40 B41 B42 B43 B44 B45 B46 B47 B48

P01 P02 P03 P04 P05 P06 P07 P08 P09 P10 P11 P12 P13 P14

VAULT01 VAULT03 VAULT04

TRENCH02 TRENCH04-B PIT01 SUMP01

PIPE01 (SECOND FLOOR)

APPROXIMATE LOCATION OF FORMER 10,000-GALLON PROPANE TANK

FORMER 8,000-GALLON GASOLINE UST

GPR ANOMALY

POSSIBLE VENT LINE

APPROXIMATE LOCATION OF TWO 12,000-GALLON USTs AND ONE 1,000-GALLON UST

FORMER OIL TANK

FORMER PUMP ISLAND

VENT LINES

2,000-GALLON GASOLINE USTS

FORMER SUMP TANK

VENT/FILL LINES

TRENCH

BOILER ROOM

FORMER ASTs

FORMER OIL TANK

FORMER TRANSFORMER

FORMER BOILERS

TRANSFORMER VAULT

CLEAN OUT

FORMER BOILER

FORMER PRESSURIZED WATER TANK

DECOMMISSIONED WATER SUPPLY WELL

FORMER AIR COMPRESSOR

HOT WATER BOILER

VAULT

VAULTS

2' FLOOR DRAIN

8,000-GALLON (DIESEL TANK)

8,000-GALLON SOLVENT UST

FORMER SALON

FORMER CLEANING

FORMER REPAIRING

FORMER VAULT ROOM

LOADING DOCK

VIC. SOLVENT SAVER

TRENCH

FORMER FINISHING AREA

PUMP

FORMER TUMBLING AREA

FORMER DRY CLEAN AREA

(EXPLOSION PROOF AREAS)

1,000-GALLON (CIRCULATING)

350-GALLON (STA DRI TANK)

FORMER 1,000-GALLON SOLVENT STORAGE TANKS

EXISTING 3' X 3' VAULT

FLOOR DRAIN

RAMP

6'-DEEP SUMP

2,000-GALLON UST AND FORMER FUEL-DISPENSING PUMP ISLAND

SHED

LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- VAULT ACCESS
- PROCESS WATER SAMPLE LOCATION
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- SITE FEATURES
- SOUTH LAKE UNION STREETCAR LINE

AST ABOVEGROUND STORAGE TANK
GPR GROUND PENETRATING RADAR
SVE SOIL VAPOR EXTRACTION
UST UNDERGROUND STORAGE TANK

LOCATIONS OF FORMER SITE FEATURES ARE APPROXIMATE

SoundEarth Strategies
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DATE: 12/17/13
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CHECKED BY: PJK
CAD FILE: 0731-004_2013EDR_EL

PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY,STATE: SEATTLE, WASHINGTON

REGION:

0 25 50 100
APPROXIMATE SCALE IN FEET

FIGURE 4
EXPLORATION LOCATION PLAN

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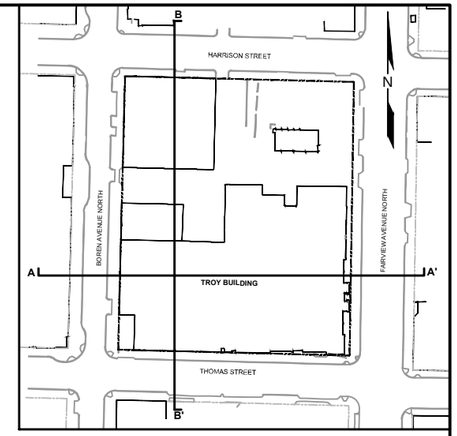
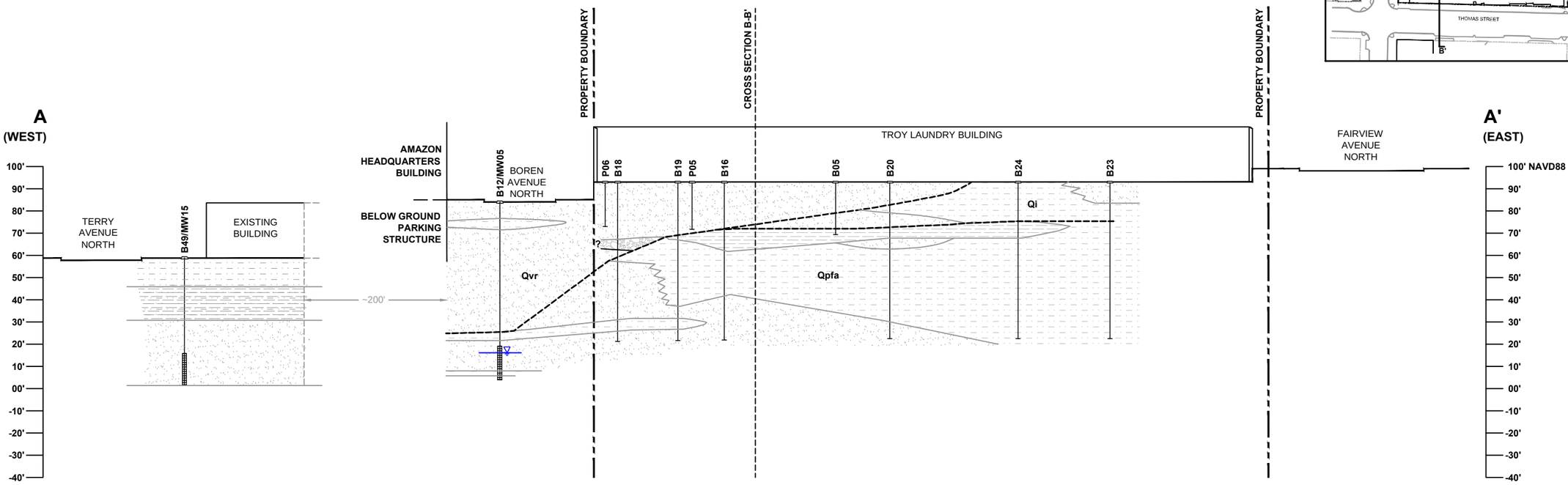
12/17/2013





LEGEND

MONITORING WELL
SCREEN INTERVAL
GROUNDWATER LEVEL (OCTOBER 20, 2011)

NOTE: ELEVATIONS ARE PRESENTED AS FEET ABOVE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS):

SP AND SP-SM: MOSTLY FINE TO MEDIUM-GRAINED SANDS AND SANDS WITH SILTS, WITH VARYING AMOUNTS OF GRAVEL.

SM: SILTY FINE TO MEDIUM SANDS WITH VARYING AMOUNTS OF GRAVEL.

ML AND SM: SILTS AND SANDY SILTS, GRADING TO SILTY SANDS. MAY LOCALLY CONTAIN VARIOUS AMOUNTS OF COARSE SAND, GRAVEL AND COBBLES.

GP: GRAVEL WITH SAND AND VARYING AMOUNTS OF SILT. SOME COBBLES. HORIZONTALLY DISCONTINUOUS.

Qvr VASHON RECESSIONAL OUTWASH DEPOSITS: PREDOMINANTLY LOOSE TO MEDIUM DENSE, FINE TO MEDIUM-GRAINED SANDS AND SANDS WITH SILTS, WITH VARYING GRAVEL CONTENTS. LOCALIZED DEPOSITS OF GRAVEL AND/OR GRAVEL RICH SANDS. TYPICALLY GRAY TO GRAYISH-BROWN OR LIGHT BROWN. MINOR, DISCONTINUOUS INTERBEDS OF SILTY SAND AND SILT.

Qi ICE-CONTACT DEPOSITS: PREDOMINANTLY VERY DENSE, SILTY FINE SANDS WITH VARYING GRAVEL CONTENTS, BROWN TO DARK BROWN OR GRAYISH-BROWN IN COLOR.

Qpfa PRE-FRASER NONGLACIAL DEPOSITS: PREDOMINANTLY VERY DENSE, FINE TO MEDIUM SANDS AND SANDS WITH SILTS, INTERBEDDED WITH AND GRADING LATERALLY INTO SILTY FIND SANDS. GRAVEL CONTENT VARIES. LOCALIZED DEPOSITS OF GRAVEL AND/OR GRAVEL-RICH ZONES. TYPICALLY BROWN TO LIGHT BROWN OR GRAY-BROWN, WITH LOCAL HORIZONS OF REDDISH-BROWN OXIDATION. AN UPPER LAYER OF DARK BROWN OXIDAL ORGANIC-RICH SILT AND SILTY SAND EXTENDS ACROSS A PORTION OF THE SITE.

SoundEarth Strategies
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DATE: 12/17/13
DRAWN BY: NAC/JQC
CHECKED BY: PJK
CAD FILE: 0731-004_2013EDR_XAA

PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY,STATE: SEATTLE, WASHINGTON

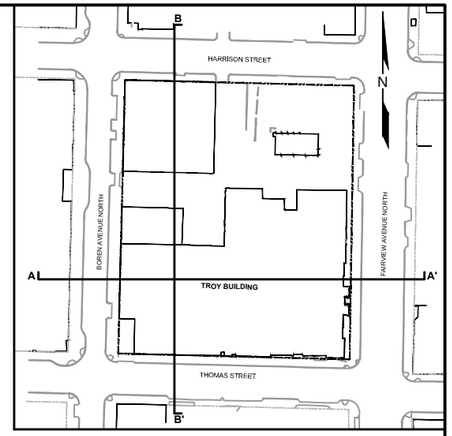
REGION:

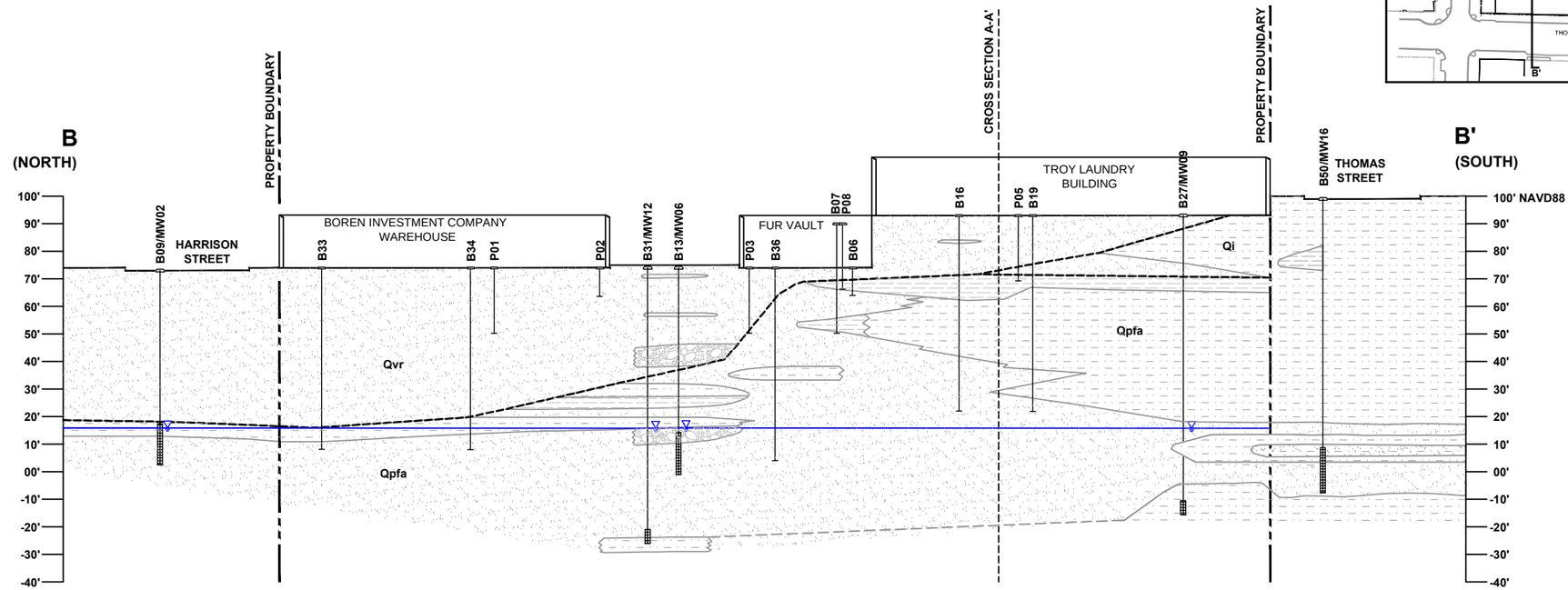
0 25 50 100
APPROXIMATE SCALE IN FEET

FIGURE 5
GEOLOGIC CROSS SECTION A-A'

P:\0731 TOUCHSTONE\0731-004 TROY LAUNDRY\TECHNICAL\CAD\2013 EDR\0731-004_2013EDR_XAA_F.DWG

12/17/2013





LEGEND

MONITORING WELL

SCREEN INTERVAL

GROUNDWATER LEVEL (OCTOBER 20, 2011)

NOTE: ELEVATIONS ARE PRESENTED AS FEET ABOVE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS):

SP AND SP-SM: MOSTLY FINE TO MEDIUM-GRAINED SANDS AND SANDS WITH SILTS, WITH VARYING AMOUNTS OF GRAVEL.

SM: SILTY FINE TO MEDIUM SANDS WITH VARYING AMOUNTS OF GRAVEL.

ML AND SM: SILTS AND SANDY SILTS, GRADING TO SILTY SANDS. MAY LOCALLY CONTAIN VARIOUS AMOUNTS OF COARSE SAND, GRAVEL AND COBBLES.

GP: GRAVEL WITH SAND AND VARYING AMOUNTS OF SILT. SOME COBBLES. HORIZONTALLY DISCONTINUOUS.

Qvr VASHON RECESSIONAL OUTWASH DEPOSITS: PREDOMINANTLY LOOSE TO MEDIUM DENSE, FINE TO MEDIUM-GRAINED SANDS AND SANDS WITH SILTS, WITH VARYING GRAVEL CONTENTS. LOCALIZED DEPOSITS OF GRAVEL AND/OR GRAVEL RICH SANDS. TYPICALLY GRAY TO GRAYISH-BROWN OR LIGHT BROWN. MINOR, DISCONTINUOUS INTERBEDS OF SILTY SAND AND SILT.

Qi ICE-CONTACT DEPOSITS: PREDOMINANTLY VERY DENSE, SILTY FINE SANDS WITH VARYING GRAVEL CONTENTS, BROWN TO DARK BROWN OR GRAYISH-BROWN IN COLOR.

Qpfa PRE-FRASER NONGLACIAL DEPOSITS: PREDOMINANTLY VERY DENSE, FINE TO MEDIUM SANDS AND SANDS WITH SILTS, INTERBEDDED WITH AND GRADING LATERALLY INTO SILTY FIND SANDS. GRAVEL CONTENT VARIES. LOCALIZED DEPOSITS OF GRAVEL AND/OR GRAVEL-RICH ZONES. TYPICALLY BROWN TO LIGHT BROWN OR GRAY-BROWN, WITH LOCAL HORIZONS OF REDDISH-BROWN OXIDATION. AN UPPER LAYER OF DARK BROWN OXIDIZED ORGANIC-RICH SILT AND SILTY SAND EXTENDS ACROSS A PORTION OF THE SITE.

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PROJECT NUMBER: 0731-004
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY,STATE: SEATTLE, WASHINGTON

REGION:

0 25 50 100
APPROXIMATE SCALE IN FEET

FIGURE 6
GEOLOGIC CROSS SECTION B-B'

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HARRISON STREET

TERRY AVENUE NORTH

FAIRVIEW AVENUE NORTH

BOREN AVENUE NORTH

AMAZON HEADQUARTERS BUILDING

BRAVEHORSE

BIORAD

BOREN INVESTMENT COMPANY WAREHOUSE (1925)

FORMER MOKAS BUILDING (1960)

FUR VAULT

INDUSTRIAL LAUNDRY (1946)

TROY LAUNDRY BUILDING

1100s (ODDS)

300s (EVENS)

300s (ODDS)

THOMAS STREET

N

MW01 (17.44)
MW02 (15.65)
MW03 (15.44)
MW04 (17.81)
MW05 (15.50)
MW06 (16.07)
MW07 (17.59)
MW10 (15.72)
MW11 (15.94)
MW12*
MW13 (15.28)
MW14 (15.74)
MW15 (18.01)
MW16 (15.55)
MW08*
MW09*

17.50'
17.00'
16.50'
16.00'
15.50'

LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- PROPERTY BOUNDARY
- (15.28) GROUNDWATER ELEVATION
- 0.5-FOOT-INTERVAL CONTOUR LINE
- GROUNDWATER FLOW DIRECTION (DEC 2012)
- MW09* MONITORING WELL INSTALLED AFTER MONITORING EVENT

NOTE: ELEVATIONS ARE PRESENTED AS FEET ABOVE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

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0 25 50 100
APPROXIMATE SCALE IN FEET

FIGURE 7
GROUNDWATER CONTOUR MAP
(DECEMBER 2012)

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REPUBLICAN STREET

HARRISON STREET

THOMAS STREET

N

FIRESTONE PROPERTY

SLU 293 PROPERTY

TROY LAUNDRY PROPERTY

BOREN AVENUE NORTH

TERRY AVENUE NORTH

WESTLAKE AVENUE NORTH

FAIRVIEW AVENUE NORTH

SMW06 (12.24)

SMW09 (12.41)

SMW02 (12.59)

SMW01 (12.67)

SMW08 (12.61)

SLU-MW01 (13.43)

SLU-MW02 (DRY)

MW01 (14.33)

MW02 (14.44)

MW03 (14.44)

MW04 (13.44)

MW07 (13.60)

MW15 (13.42)

MW05 (14.32)

MW13 (14.43)

MW09 (14.41)

MW16 (14.43)

MW14 (14.41)

MW12 (14.45)

MW06 (14.48)

MW10 (14.45)

MW11 (14.45)

MW08 (14.78)

MW-A (NM)

MW-B (NM)

MW-C (14.43)

12.25'

12.50'

12.75'

13.00'

13.25'

13.50

13.75'

14.00'

14.25'

14.50'

14.75

LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- PROPERTY BOUNDARY
- (14.43) GROUNDWATER ELEVATION
- (NM) NOT MEASURED
- 0.25-FOOT-INTERVAL CONTOUR LINE
- GROUNDWATER FLOW DIRECTION (AUGUST 29, 2013)

NOTE: ELEVATIONS ARE PRESENTED AS FEET ABOVE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

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REGION:

0 30 60 120 240
APPROXIMATE SCALE IN FEET

FIGURE 8
GROUNDWATER CONTOUR MAP
(AUGUST, 2013)

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LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- VAULT ACCESS
- PROCESS WATER SAMPLE LOCATION
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- SITE FEATURES
- SOUTH LAKE UNION STREETCAR LINE

AST	ABOVEGROUND STORAGE TANK
GPR	GROUND PENETRATING RADAR
PCE	TETRACHLOROETHYLENE
SVE	SOIL VAPOR EXTRACTION
TCE	TRICHLOROETHYLENE
UST	UNDERGROUND STORAGE TANK

- GROUNDWATER FLOW DIRECTION

TCE CONTAMINATION NO DEGRADATION PRODUCTS

PCE CONTAMINATION AND ASSOCIATED DEGRADATION PRODUCTS

HARRISON STREET

THOMAS STREET

TERRY AVENUE NORTH

BOREN AVENUE NORTH

FAIRVIEW AVENUE NORTH

B08/ MW01 · B09/ MW02 · B10/ MW03 · B11/ MW04 · B15/ MW07 · B31/ MW12 · B13/ MW06 · B28/ MW10 · B30/ MW11 · B26/ MW08 · B49/ MW15 · B12/ MW05 · B37/ MW13 · B27/ MW09 · B38/ MW14 · B50/ MW16

AMAZON HEADQUARTERS BUILDING · BRAVEHORSE TAVERN · BIORAD · AMAZON HEADQUARTERS BUILDING

BOREN INVESTMENT COMPANY WAREHOUSE (1925) · FORMER MOKAS BUILDING (1960) · INDUSTRIAL LAUNDRY (1946) · FUR VAULT (1948) · GARAGE ADDITION (1964) · TROY LAUNDRY BUILDING (1926)

P01 P02 P03 P04 P05 P06 P07 P08 P09 P10 P11 P12 P13 P14 · B01 B02 B03 B04 B05 B06 B07 B08 B09 B10 B11 B12 B13 B14 B15 B16 B17 B18 B19 B21 B22 B23 B25 B26 B27 B28 B29 B30 B31 B32 B33 B34 B35 B36 B37 B38 B39 B40 B41 B42 B43 B44 B45 B46 B47 B48 B49 B50

VAULT01 VAULT02 VAULT03 VAULT04 · SUMP01 · PIT01 · PIPE01 (SECOND FLOOR)

APPROXIMATE LOCATION OF FORMER 10,000-GALLON PROPANE TANK · FORMER 8,000-GALLON GASOLINE UST · GPR ANOMALY · POSSIBLE VENT LINE · APPROXIMATE LOCATION OF TWO 12,000-GALLON USTs AND ONE 1,000-GALLON UST · FORMER OIL TANK · FORMER PUMP ISLAND · 2,000-GALLON GASOLINE USTs · 300-GALLON UST · 8,000-GALLON SOLVENT UST · 2" FLOOR DRAIN · 1,000-GALLON SUMP TANK · 1,000-GALLON CIRCULATING · 500-GALLON STA DRI TANK · FORMER 1,000-GALLON SOLVENT STORAGE · 2,000-GALLON UST AND FORMER FUEL-DISPENSING PUMP ISLAND · 8'-DEEP SUMP · FLOOR DRAIN · RAMP · EXISTING 3' X 3' VAULT · 300s (EVENS) · 300s (ODDS) · 400s (ODDS)

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APPROXIMATE SCALE IN FEET

FIGURE 9
SOLVENT PLUME SOURCE TYPE

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HARRISON STREET

MW01 MW02 MW03

1100s (ODDS)

AMAZON HEADQUARTERS BUILDING

BRAVEHORSE

BIORAD

BOREN INVESTMENT COMPANY WAREHOUSE (1925)

FORMER MOKAS BUILDING (1960)

INDUSTRIAL LAUNDRY (1946)

FUR VAULT

TROY LAUNDRY BUILDING

MW04 MW07 MW05 MW13

MW12 MW06 B14 MW10 P10 MW11 B07 MW08 MW09 MW14

B49/ MW15

B50/ MW16

TERRY AVENUE NORTH

BOREN AVENUE NORTH

300s (EVENS)

300s (ODDS)

FAIRVIEW AVENUE NORTH

THOMAS STREET

N

LEGEND

- WATER SUPPLY WELL
- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- PROPERTY BOUNDARY

COC	CHEMICAL OF CONCERN (PCE, TCE, AND GRPH)
PCE	TETRACHLOROETHYLENE
TCE	TRICHLOROETHYLENE
GRPH	GASOLINE-RANGE PETROLEUM HYDROCARBONS
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT

HIGHEST DETECTED COC CONCENTRATION IN GROUNDWATER:

- NOT DETECTED ABOVE LABORATORY REPORTING LIMIT
- DETECTED AT OR BELOW MTCA METHOD A CLEANUP LEVEL
- DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL

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0 25 50 100
APPROXIMATE SCALE IN FEET

FIGURE 10
GROUNDWATER ANALYTICAL RESULTS FOR PCE, TCE, AND GRPH

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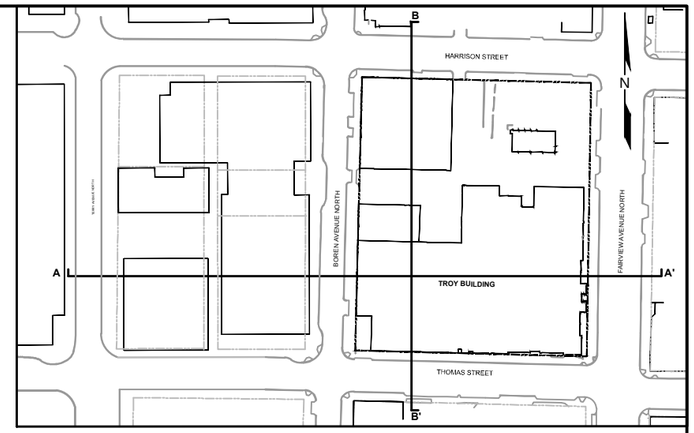

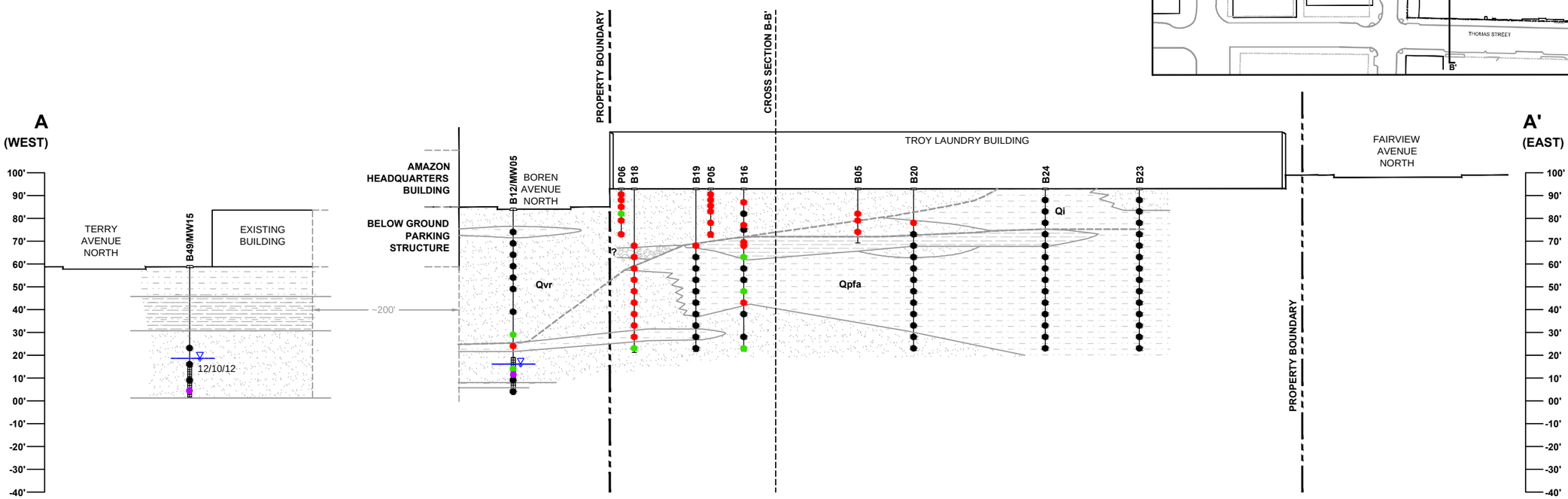

LEGEND

MONITORING WELL
SCREEN INTERVAL
GROUNDWATER LEVEL (OCTOBER 20, 2011)

TCE	TRICHLOROETHYLENE
PCE	TETRACHLOROETHYLENE
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT
mg/kg	MILLIGRAMS PER KILOGRAM
µg/L	MICROGRAMS PER LITER

NOTE: ELEVATIONS ARE PRESENTED AS FEET ABOVE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS):

- SP AND SP-SM
- SM
- ML AND SM
- GP

Qvr	VASHON RECESSIONAL OUTWASH DEPOSITS
Qi	ICE-CONTACT DEPOSITS
Qpfa	PRE-FRASER NONGLACIAL DEPOSITS

PCE CONCENTRATIONS IN SOIL (mg/kg):

- CONCENTRATION BELOW LABORATORY DETECTION LIMIT
- CONCENTRATION AT OR BELOW MTCA METHOD A CLEANUP LEVEL
- CONCENTRATION ABOVE MTCA METHOD A CLEANUP LEVEL

HIGHEST PCE/TCE CONCENTRATIONS IN GROUNDWATER (µg/L):

- CONCENTRATION BELOW MTCA METHOD A CLEANUP LEVEL
- CONCENTRATION ABOVE MTCA METHOD A CLEANUP LEVEL

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0 25 50 100
APPROXIMATE SCALE IN FEET

FIGURE 11
CROSS SECTION A-A'
CHLORINATED SOLVENTS IN SOIL AND GROUNDWATER

P:\0731 TOUCHSTONE\0731-004 TROY LAUNDRY\TECHNICAL\CAD\2013 EDR\0731-004 2013EDR XAA2 F.DWG

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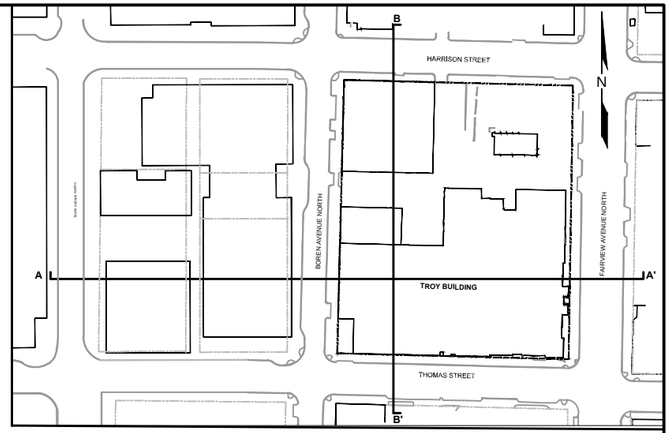

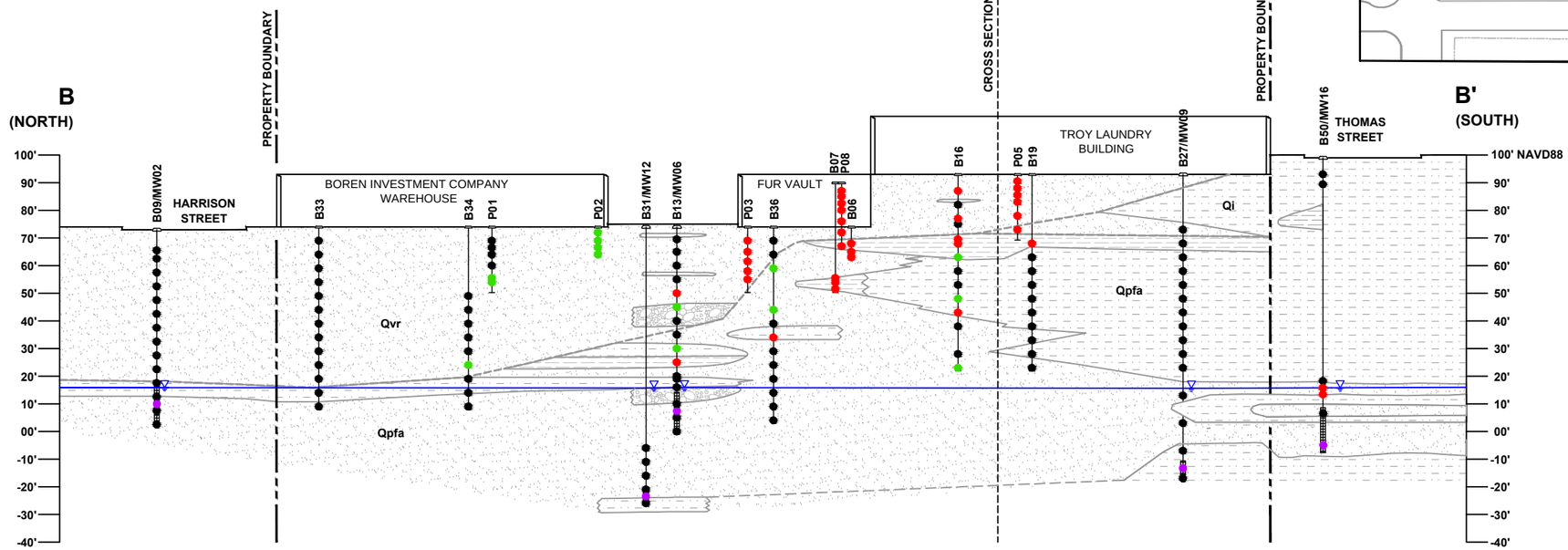

LEGEND

MONITORING WELL
SCREEN INTERVAL
GROUNDWATER LEVEL

TCE	TRICHLOROETHYLENE
PCE	TETRACHLOROETHYLENE
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT
mg/kg	MILLIGRAMS PER KILOGRAM
µg/L	MICROGRAMS PER LITER

NOTE: ELEVATIONS ARE PRESENTED AS FEET ABOVE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS):

- SP AND SP-SM
- SM
- ML AND SM
- GP

Qvr	VASHON RECESSIONAL OUTWASH DEPOSITS
Qi	ICE-CONTACT DEPOSITS
Qpfa	PRE-FRASER NONGLACIAL DEPOSITS

PCE CONCENTRATIONS IN SOIL (mg/kg):

- CONCENTRATION BELOW LABORATORY DETECTION LIMIT
- CONCENTRATION AT OR BELOW MTCA METHOD A CLEANUP LEVEL
- CONCENTRATION ABOVE MTCA METHOD A CLEANUP LEVEL

HIGHEST PCE/TCE CONCENTRATIONS IN GROUNDWATER (µg/L):

- CONCENTRATION BELOW MTCA METHOD A CLEANUP LEVEL
- CONCENTRATION ABOVE MTCA METHOD A CLEANUP LEVEL

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APPROXIMATE SCALE IN FEET

FIGURE 12
CROSS SECTION B-B'
CHLORINATED SOLVENTS IN SOIL AND GROUNDWATER

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HARRISON STREET

THOMAS STREET

TERRY AVENUE NORTH

BOREN AVENUE NORTH

FAIRVIEW AVENUE NORTH

1100s (ODDS)

300s (EVENS)

300s (ODDS)

N

AMAZON HEADQUARTERS BUILDING

BRAVEHORSE

BIORAD

BOREN INVESTMENT COMPANY WAREHOUSE (1925)

FORMER MOKAS BUILDING (1960)

FUR VAULT

INDUSTRIAL LAUNDRY (1946)

TROY LAUNDRY BUILDING

B08/ MW01
B09/ MW02
B10/ MW03
B11/ MW04
B12/ MW05
B15/ MW07
B26/ MW08
B27/ MW09
B28/ MW10
B30/ MW11
B31/ MW12
B37/ MW13
B38/ MW14
B49/ MW15
B50/ MW16
B13/ MW06

B01 B02 B03 B04 B05 B06 B07 B16 B17 B18 B19 B20 B21 B22 B23 B24 B25 B29 B32 B33 B34 B35 B36 B39 B40 B41 B42 B43 B44 B45 B46 B47 B48

P01 P02 P03 P04 P05 P06 P07 P08 P09 P10 P11 P12 P13 P14

LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY
- SVE — SOIL VAPOR EXTRACTION
- PCE — TETRACHLOROETHYLENE
- MTCA — WASHINGTON STATE MODEL TOXICS CONTROL ACT
- mg/kg — MILLIGRAMS PER KILOGRAM

HIGHEST DETECTED PCE CONCENTRATION IN SOIL:

- NOT DETECTED ABOVE LABORATORY REPORTING LIMIT
- DETECTED AT OR BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)
- DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW WASHINGTON STATE DANGEROUS WASTE CRITERIA (14 mg/kg)
- DETECTED ABOVE WASHINGTON STATE DANGEROUS WASTE CRITERIA (14 mg/kg) BUT BELOW LAND BAN (60 mg/kg)

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APPROXIMATE SCALE IN FEET

FIGURE 13
SOIL ANALYTICAL RESULTS FOR PCE

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PROPERTY/CONSTRUCTION EXCAVATION BOUNDARY

FORMER MOKAS BUILDING

TROY LAUNDRY BUILDING

DIRECT CONTACT/DUST INHALATION

INDOOR AIR/SOIL VAPOR

N

POTENTIAL SOIL TO GROUNDWATER PCE MIGRATION PATHWAYS

APPROXIMATE TROY LAUNDRY BUILDING SLAB BOTTOM ELEVATION 93'

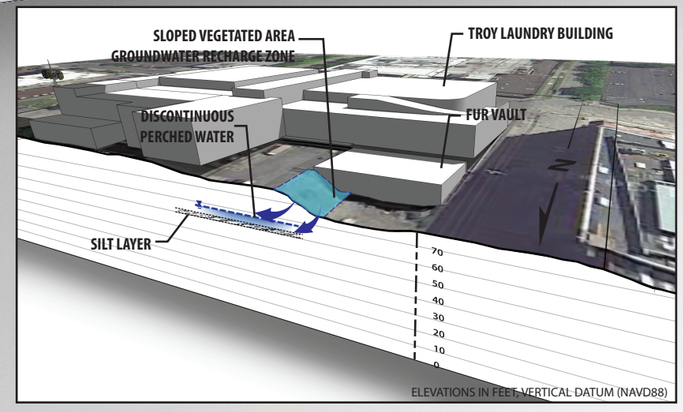
PRIMARY WATER-BEARING ZONE ELEVATION 16'

ELEVATION IN FEET (VERTICAL DATUM: NAVD88)

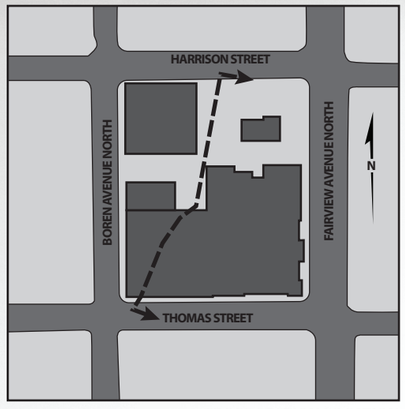
100 90 80 70 60 50 40 30 20 10 0

ANTICIPATED REMEDIAL EXCAVATION TO 19' ELEVATION

ANTICIPATED CONSTRUCTION EXCAVATION TO 18' ELEVATION



GROUNDWATER INFILTRATION DIAGRAM



CROSS SECTION LOCATION

LEGEND

- GROUNDWATER LEVEL
- PCE DETECTED AT OR BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND ABOVE LABRATORY REPORTING LIMIT
- PCE DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW WASHINGTON STATE DANGEROUS WASTE CRITERIA (14 mg/kg)
- PRIMARY WATER-BEARING ZONE
- PCE CONTAMINATION IN GROUNDWATER
- PCE TETRACHLOROETHYLENE
- mg/kg MILLIGRAMS PER KILOGRAM

*VERTICAL DATUM: NAVD88
*SURFACE ELEVATIONS FROM OCTOBER, 2011 SURVEY

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NOT TO SCALE

FIGURE 14

CONCEPTUAL SITE MODEL SHOWING
PCE-CONTAMINATED SOIL AND GROUNDWATER

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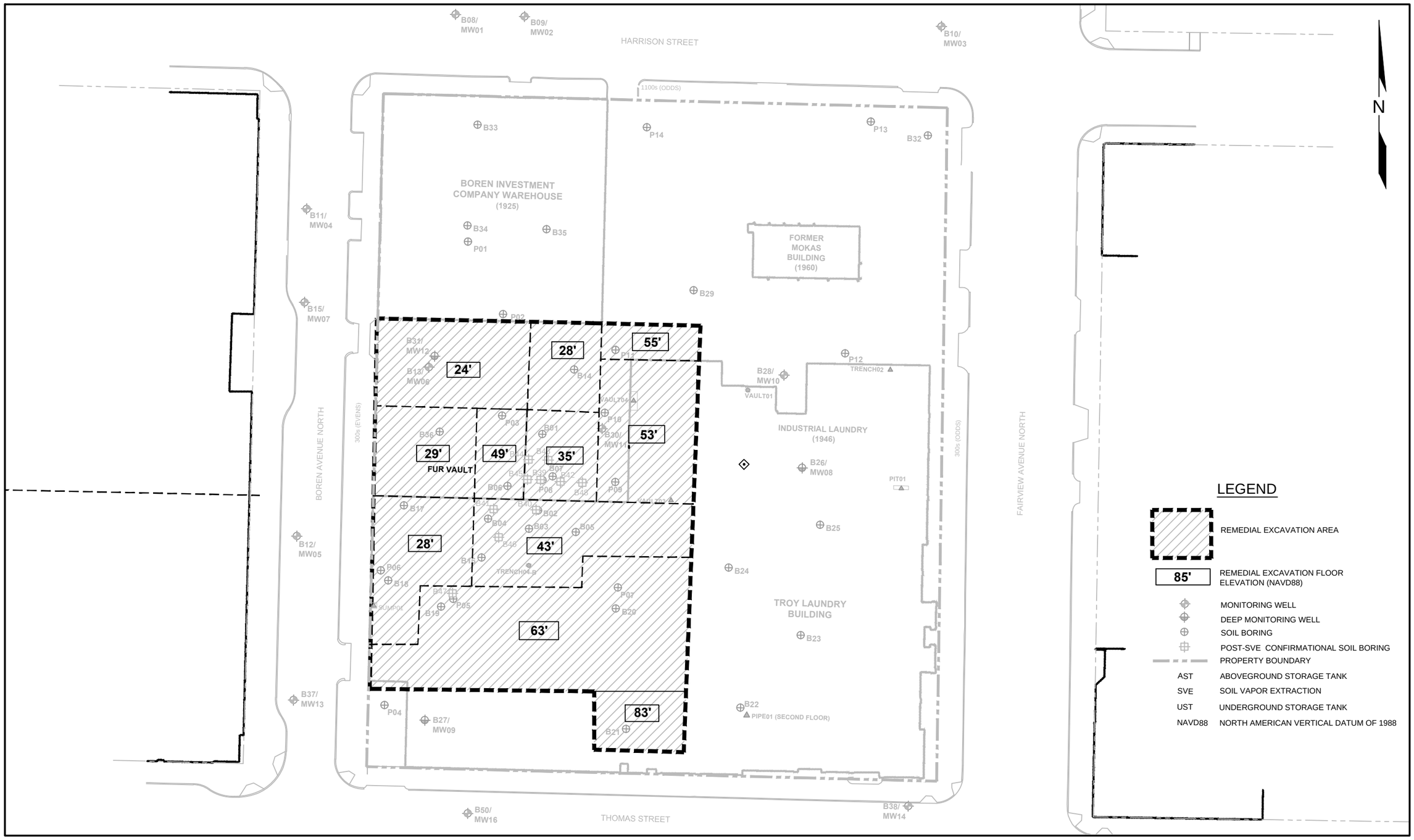

LEGEND

- REMEDIAL EXCAVATION AREA
- 85' — REMEDIAL EXCAVATION FLOOR ELEVATION (NAVD88)
- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY
- AST — ABOVEGROUND STORAGE TANK
- SVE — SOIL VAPOR EXTRACTION
- UST — UNDERGROUND STORAGE TANK
- NAVD88 — NORTH AMERICAN VERTICAL DATUM OF 1988

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FIGURE 15
ESTIMATED REMEDIAL EXCAVATION DIAGRAM (BASED ON MTCA METHOD A EXCEEDANCES FOR PCE)

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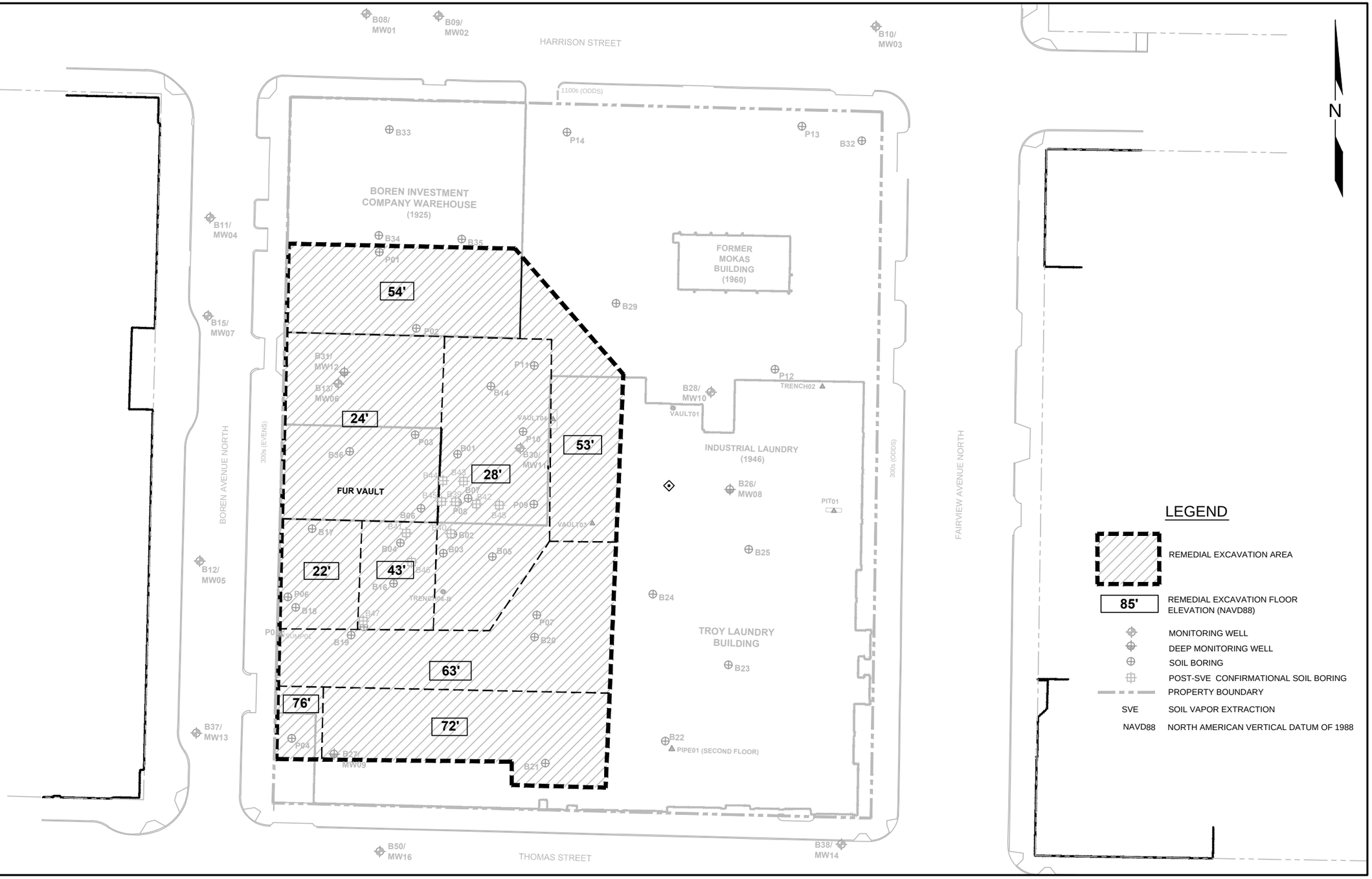

LEGEND

- REMEDIAL EXCAVATION AREA
- 85' — REMEDIAL EXCAVATION FLOOR ELEVATION (NAVD88)
- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY
- SVE — SOIL VAPOR EXTRACTION
- NAVD88 — NORTH AMERICAN VERTICAL DATUM OF 1988

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PROJECT NAME:	TROY LAUNDRY PROPERTY
PROJECT NUMBER:	0731-004
STREET ADDRESS:	307 FAIRVIEW AVENUE NORTH
CITY,STATE:	SEATTLE, WASHINGTON

REGION:

0 25 50 100

APPROXIMATE SCALE IN FEET

FIGURE 16

ESTIMATED REMEDIAL EXCAVATION DIAGRAM (BASED ON LABORATORY LIMIT EXCEEDANCES FOR PCE)

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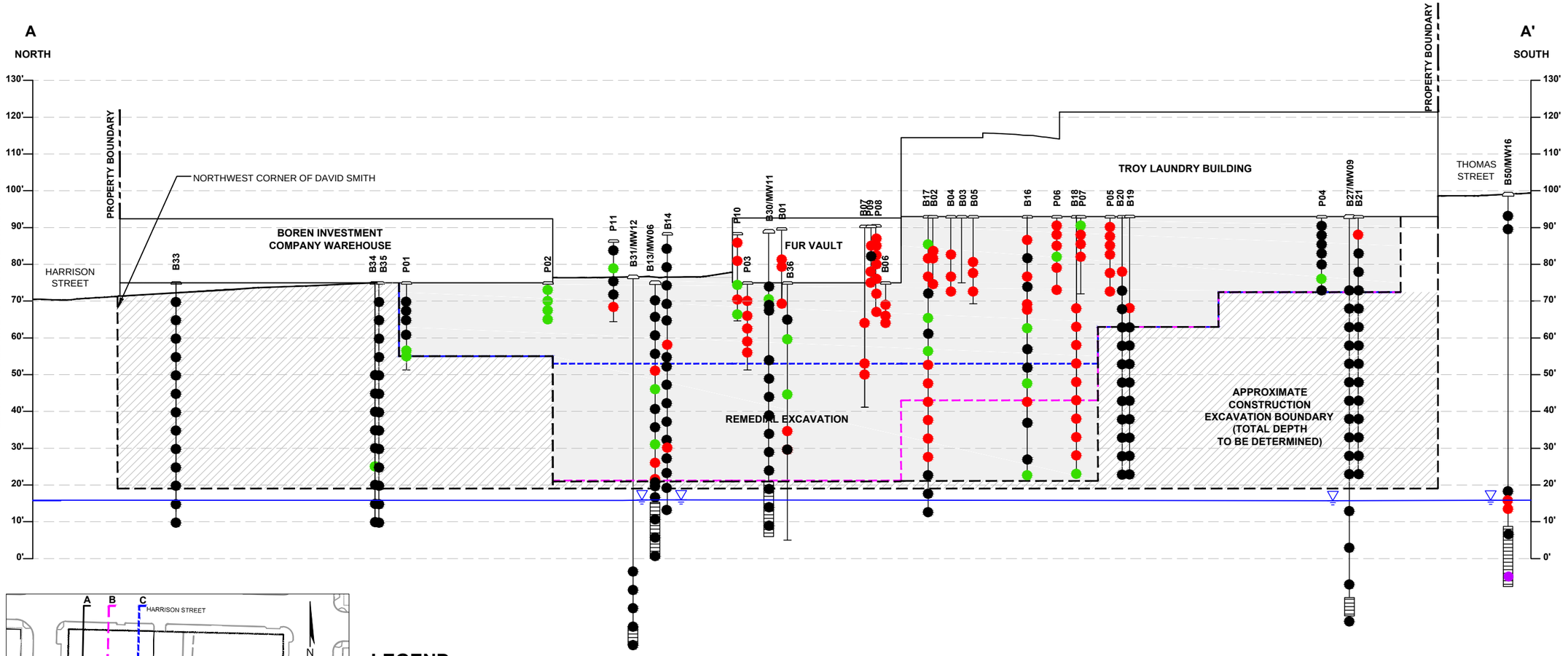
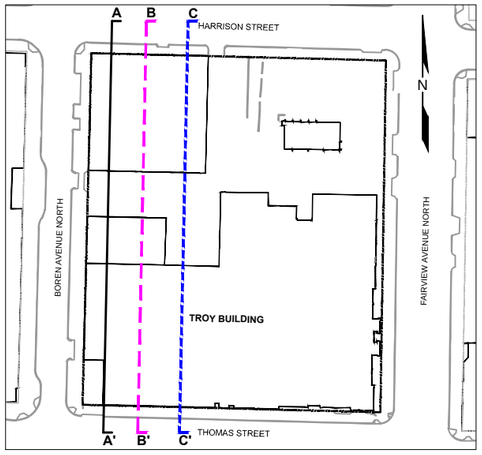




PLAN VIEW

LEGEND

- REMEDIAL EXCAVATION
- APPROXIMATE EXTENT OF CONSTRUCTION EXCAVATION
- GROUNDWATER LEVEL
- EXCAVATION EXTENT

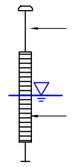
PCE CONCENTRATIONS IN SOIL (mg/kg):

- CONCENTRATION BELOW MTCA METHOD A CLEANUP LEVEL
- CONCENTRATION AT OR BELOW MTCA METHOD A CLEANUP LEVEL
- CONCENTRATION ABOVE MTCA METHOD A CLEANUP LEVEL

mg/kg	MILLIGRAMS PER KILOGRAM
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT
NAVD88	NORTH AMERICAN VERTICAL DATUM OF 1988

VERTICAL DATUM: NAVD88

MW11 (21' E) WELL OFFSET 21' EAST



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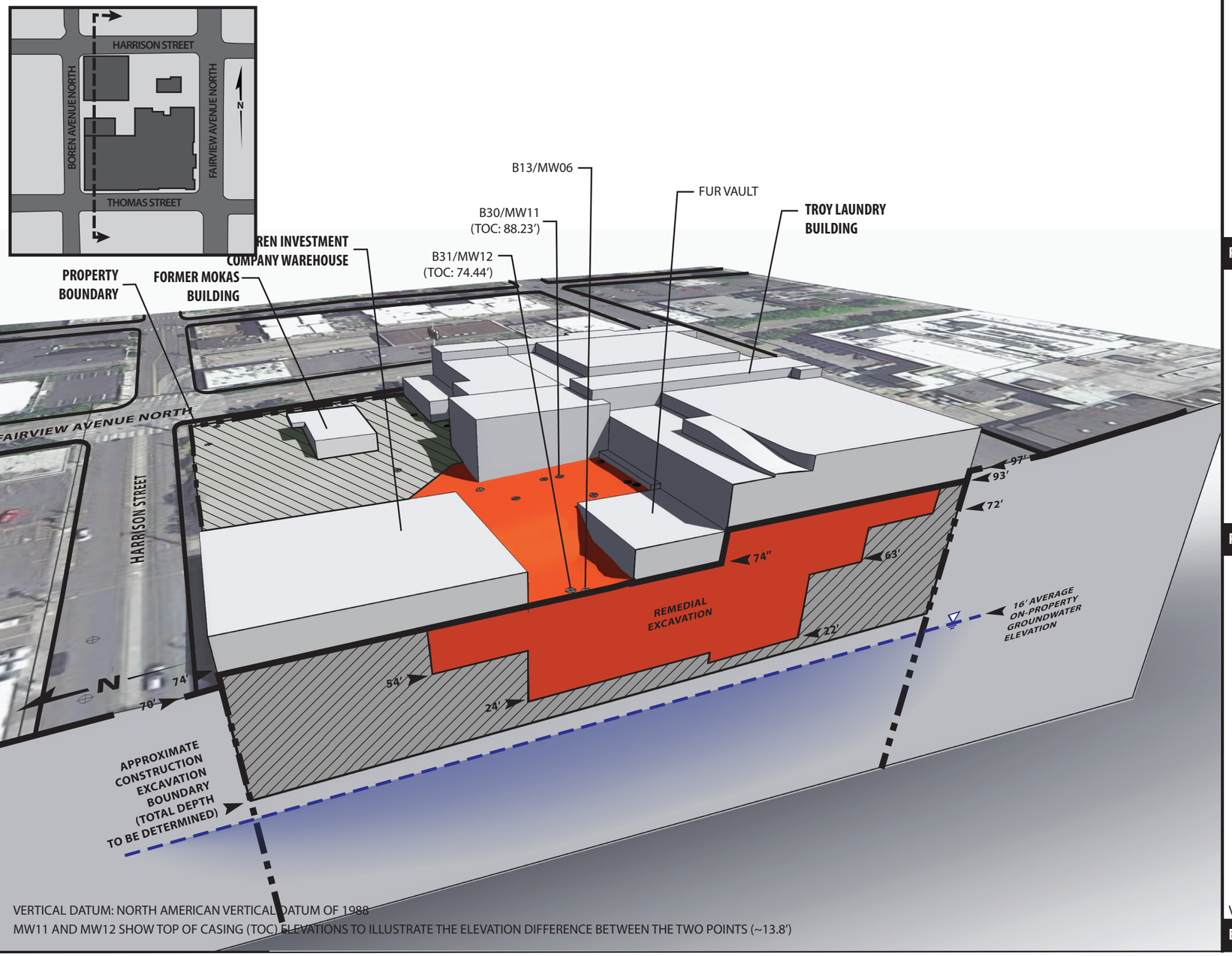
REGION:

0 15 30 60

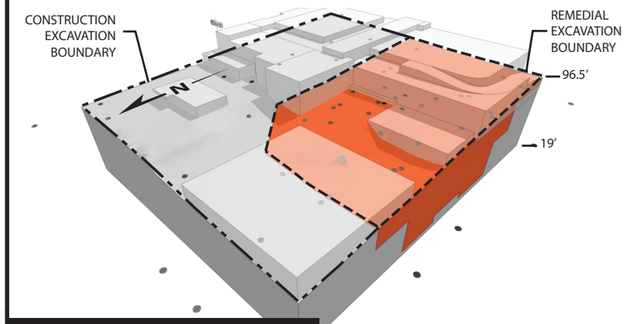
APPROXIMATE SCALE IN FEET

FIGURE 17

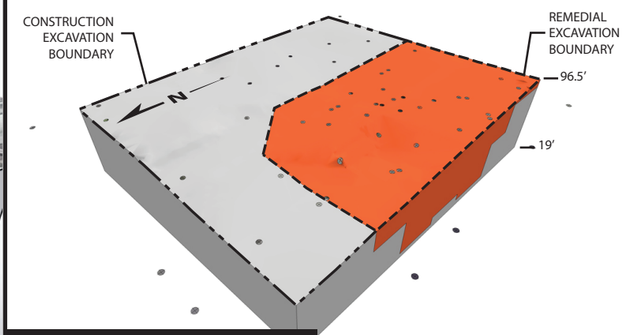
REMEDIAL EXCAVATION CROSS SECTIONS BASED ON DETECTABLE CONCENTRATIONS OF PCE



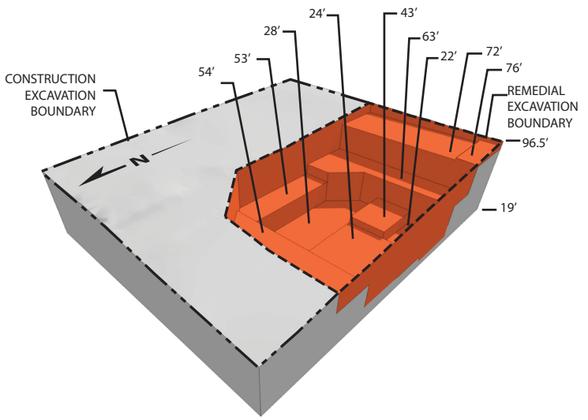
VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988
MW11 AND MW12 SHOW TOP OF CASING (TOC) ELEVATIONS TO ILLUSTRATE THE ELEVATION DIFFERENCE BETWEEN THE TWO POINTS (~13.8')



PRESENT LAND USE VIEW



POST-DEMOLITION VIEW



VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988

ESTIMATED REMEDIAL/CONSTRUCTION EXCAVATION ELEVATIONS

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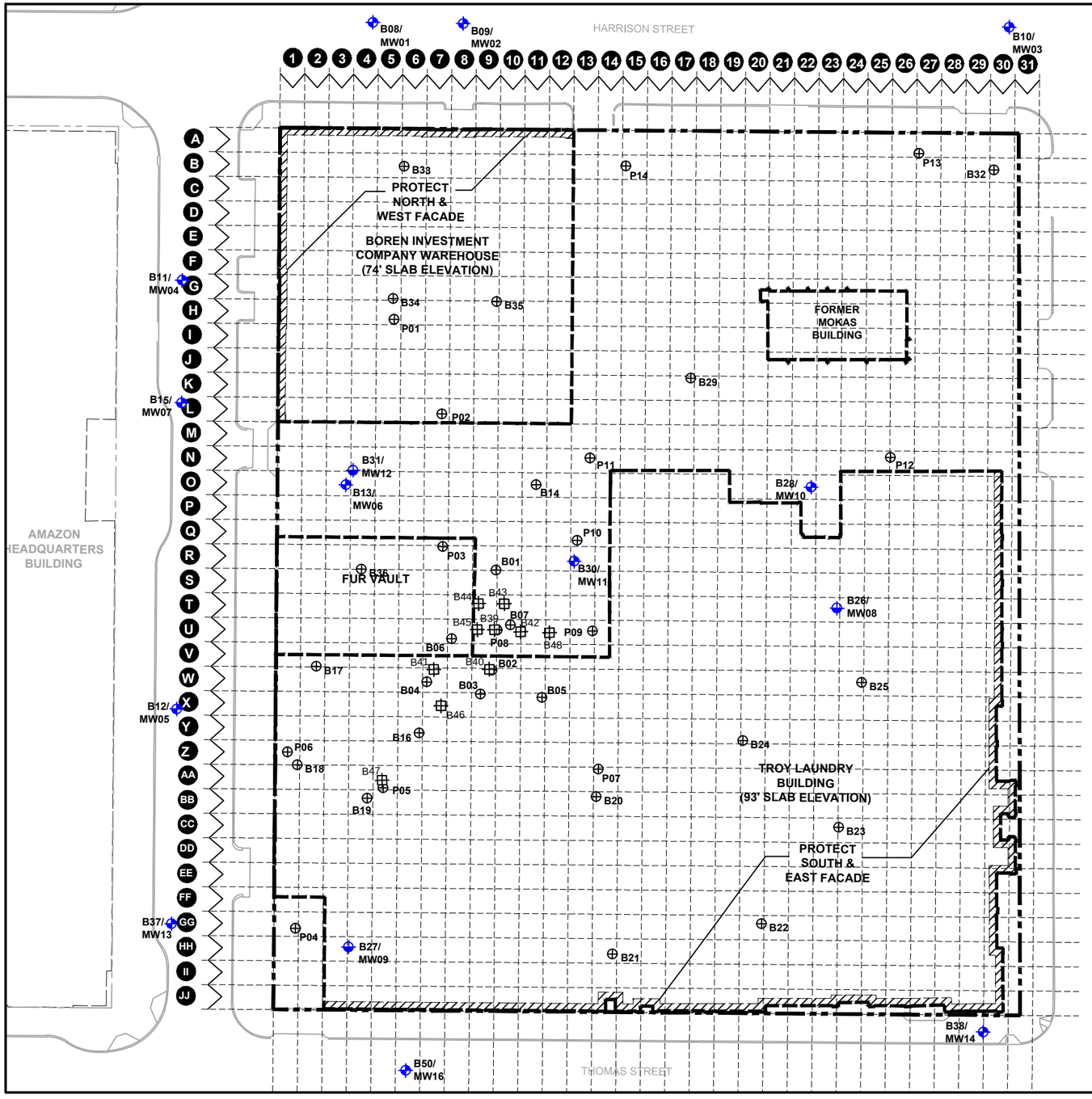
NOT TO SCALE

FIGURE 18

3D VIEW OF ESTIMATED EXCAVATION PLAN BASED ON DETECTABLE CONCENTRATIONS OF PCE



LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY

PCE	TETRACHLOROETHYLENE
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT
mg/kg	MILLIGRAMS PER KILOGRAM

1 / A / A1 — SOIL MANAGEMENT GRID (10' x 10' x 10' : 100FT³)

SOIL MANAGEMENT LAYER - 01
(105' - 100' ELEVATION - NAVD88)

PCE IN SOIL

DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)	0 FT³	0 CY
DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW WASHINGTON STATE DANGEROUS WASTE CRITERIA (14 mg/kg)	0 FT³	0 CY
10' BUFFER ZONE	0 FT³	0 CY

MODELED EXTENT OF PCE IN SOIL: *DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)*

MODELED EXTENT OF PCE IN SOIL: *DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW* WASHINGTON STATE DANGEROUS WASTE CRITERIA *(14 mg/kg)*

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REGION:

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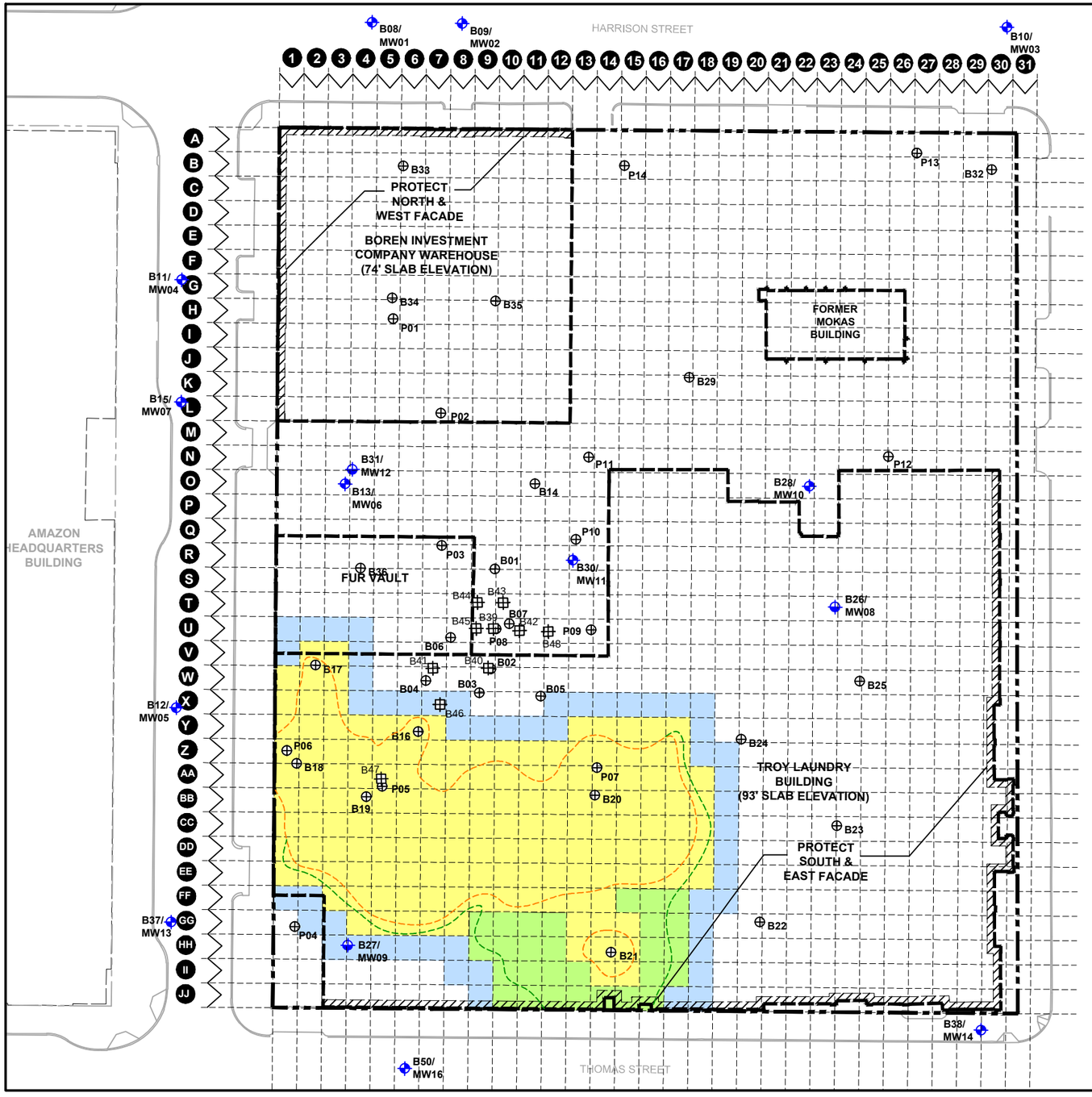
APPROXIMATE SCALE IN FEET

FIGURE 19A
SOIL MANAGEMENT GRID
LAYER - 01 (105' - 100')



LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY

PCE	TETRACHLOROETHYLENE
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT
mg/kg	MILLIGRAMS PER KILOGRAM

1 / A — SOIL MANAGEMENT GRID (10' x 10' x 10' : 100FT³)

SOIL MANAGEMENT LAYER - 02
(100' - 90' ELEVATION - NAVD88)

PCE IN SOIL

DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)	28,000 FT³	1,037 CY
DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW WASHINGTON STATE DANGEROUS WASTE CRITERIA (14 mg/kg)	152,000 FT³	5,630 CY
10' BUFFER ZONE	52,000 FT³	1,926 CY

- MODELED EXTENT OF PCE IN SOIL: *DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)*
- MODELED EXTENT OF PCE IN SOIL: *DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW* WASHINGTON STATE DANGEROUS WASTE CRITERIA *(14 mg/kg)*

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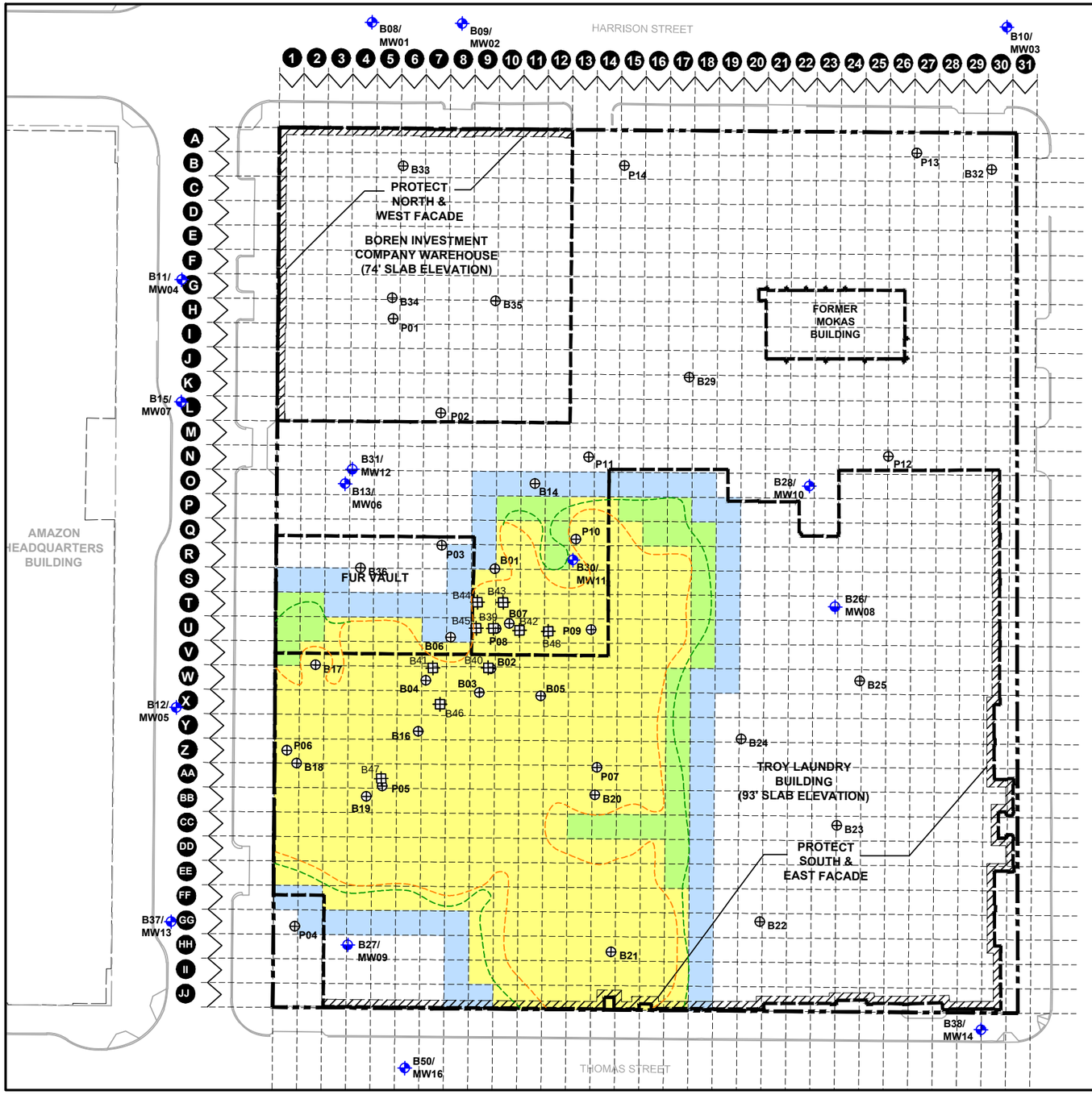
APPROXIMATE SCALE IN FEET

FIGURE 19B
SOIL MANAGEMENT GRID
LAYER - 02 (100' - 90')



LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY

PCE — TETRACHLOROETHYLENE

MTCA — WASHINGTON STATE MODEL TOXICS CONTROL ACT

mg/kg — MILLIGRAMS PER KILOGRAM

1 / A / A1 — SOIL MANAGEMENT GRID (10' x 10' x 10' : 100FT³)

SOIL MANAGEMENT LAYER - 03
(90' - 80' ELEVATION - NAVD88)

PCE IN SOIL

DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)	34,000 FT³	1,259 CY
DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW WASHINGTON STATE DANGEROUS WASTE CRITERIA (14 mg/kg)	251,000 FT³	9,296 CY
10' BUFFER ZONE	62,000 FT³	2,296 CY

- MODELED EXTENT OF PCE IN SOIL: *DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)*
- MODELED EXTENT OF PCE IN SOIL: *DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW* WASHINGTON STATE DANGEROUS WASTE CRITERIA *(14 mg/kg)*

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APPROXIMATE SCALE IN FEET

FIGURE 19C
SOIL MANAGEMENT GRID
LAYER - 03 (90' - 80')

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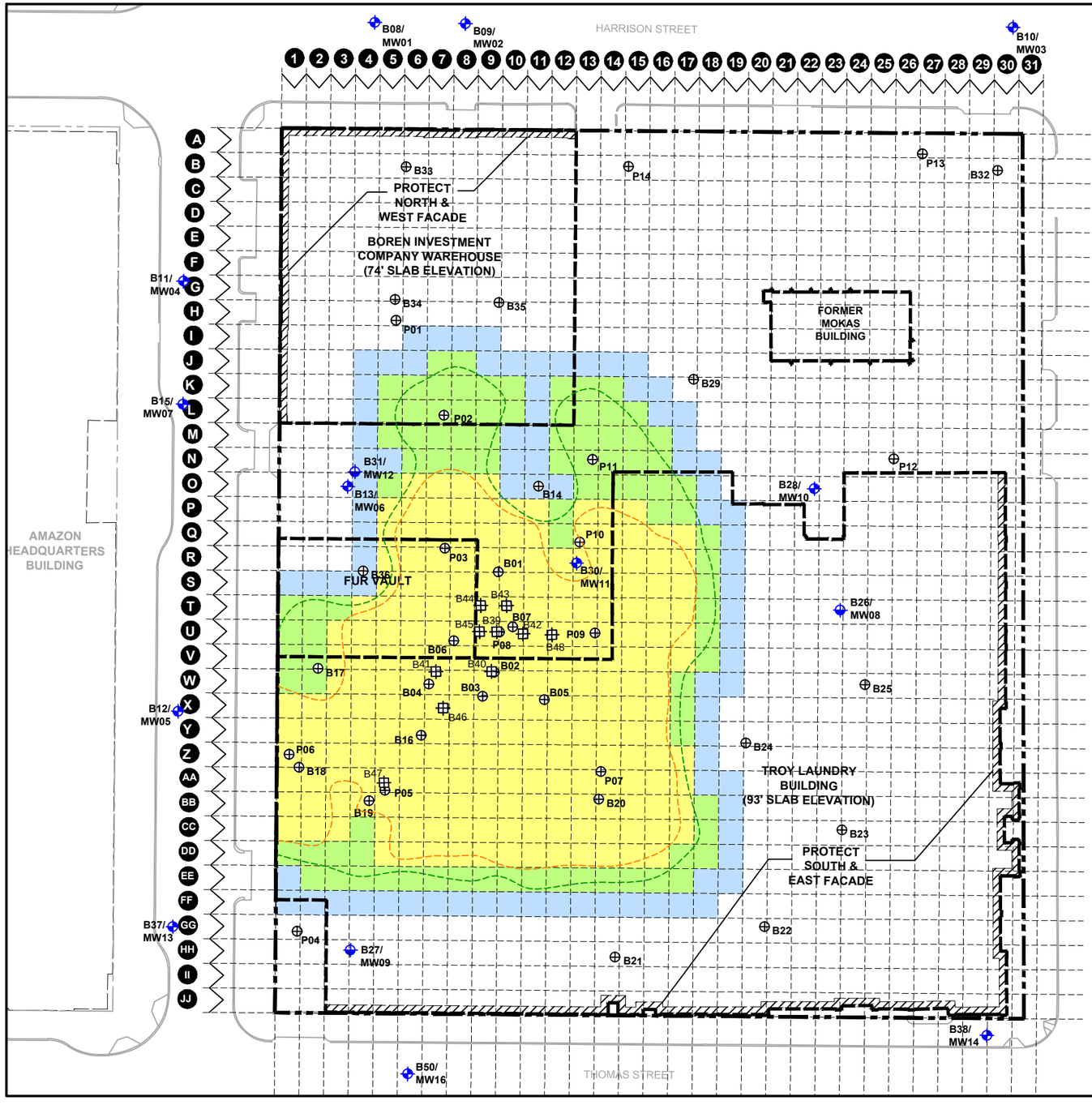

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LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY

PCE	TETRACHLOROETHYLENE
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT
mg/kg	MILLIGRAMS PER KILOGRAM

1 / A / A1 — SOIL MANAGEMENT GRID (10' x 10' x 10' : 100FT³)

SOIL MANAGEMENT LAYER - 04
(80' - 70' ELEVATION - NAVD88)

PCE IN SOIL

DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)	93,000 FT³	3,444 CY
DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW WASHINGTON STATE DANGEROUS WASTE CRITERIA (14 mg/kg)	221,000 FT³	8,185 CY
10' BUFFER ZONE	83,000 FT³	3,074 CY

- MODELED EXTENT OF PCE IN SOIL: *DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)*
- MODELED EXTENT OF PCE IN SOIL: *DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW* WASHINGTON STATE DANGEROUS WASTE CRITERIA *(14 mg/kg)*

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APPROXIMATE SCALE IN FEET

FIGURE 19D
SOIL MANAGEMENT GRID
LAYER - 04 (80' - 70')

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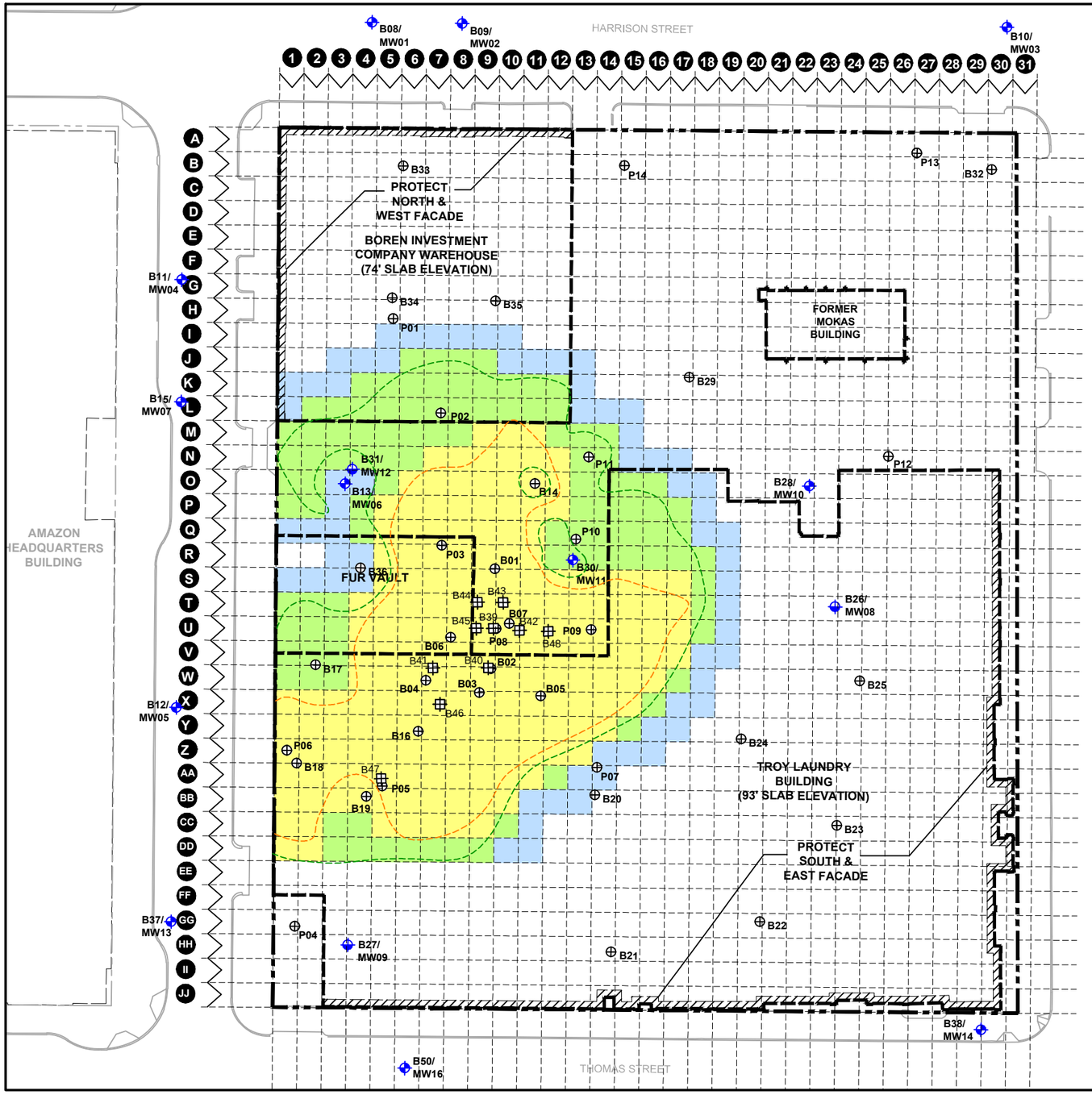

LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY
- PCE — TETRACHLOROETHYLENE
- MTCA — WASHINGTON STATE MODEL TOXICS CONTROL ACT
- mg/kg — MILLIGRAMS PER KILOGRAM
- 1 / A / A1 — SOIL MANAGEMENT GRID (10' x 10' x 10' : 100FT³)

SOIL MANAGEMENT LAYER - 05
(70' - 60' ELEVATION - NAVD88)

PCE IN SOIL

DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)	101,000 FT³	3,741 CY
DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW WASHINGTON STATE DANGEROUS WASTE CRITERIA (14 mg/kg)	178,000 FT³	6,593 CY
10' BUFFER ZONE	64,000 FT³	2,730 CY

- MODELED EXTENT OF PCE IN SOIL: *DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)*
- MODELED EXTENT OF PCE IN SOIL: *DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW* WASHINGTON STATE DANGEROUS WASTE CRITERIA *(14 mg/kg)*

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FIGURE 19E
SOIL MANAGEMENT GRID
LAYER - 05 (70' - 60')

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HARRISON STREET

B08/ MW01 B09/ MW02 B10/ MW03

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF GG HH II JJ

B11/ MW04 B15/ MW07 B12/ MW05 B37/ MW13

B33 PROTECT NORTH & WEST FACADE

BOREN INVESTMENT COMPANY WAREHOUSE (74' SLAB ELEVATION)

P14 P13 B32

B34 B35 P01

FORMER MOKAS BUILDING

B29 P02 P11 P12

B31/ MW12 B13/ MW06 B14 B28/ MW10

P10 P03 B01 B30/ MW11

B36 FUR VAULT B43 B44 B45 B39 B07 B42 P09 P08 B48 B06 B41 B40 B02 B17 B04 B03 B05 B46 B25 B26/ MW08

B16 B24

P06 B18 B47 P05 B19 P07 B20

TROY LAUNDRY BUILDING (93' SLAB ELEVATION)

B23

PROTECT SOUTH & EAST FACADE

P04 B27/ MW09 B22 B21 B38/ MW14

B50/ MW16

THOMAS STREET

AMAZON HEADQUARTERS BUILDING

FAIRVIEW AVENUE

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LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY
- PCE TETRACHLOROETHYLENE
- MTCA WASHINGTON STATE MODEL TOXICS CONTROL ACT
- mg/kg MILLIGRAMS PER KILOGRAM
- SOIL MANAGEMENT GRID (10' x 10' x 10' : 100FT³)

SOIL MANAGEMENT LAYER - 06
(60' - 50' ELEVATION - NAVD88)

PCE IN SOIL

DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)	82,000 FT³	3,037 CY
DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW WASHINGTON STATE DANGEROUS WASTE CRITERIA (14 mg/kg)	124,000 FT³	4,593 CY
10' BUFFER ZONE	84,000 FT³	3,111 CY

- MODELED EXTENT OF PCE IN SOIL: *DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)*
- MODELED EXTENT OF PCE IN SOIL: *DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW* WASHINGTON STATE DANGEROUS WASTE CRITERIA *(14 mg/kg)*

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APPROXIMATE SCALE IN FEET

FIGURE 19F
SOIL MANAGEMENT GRID
LAYER - 06 (60' - 50')

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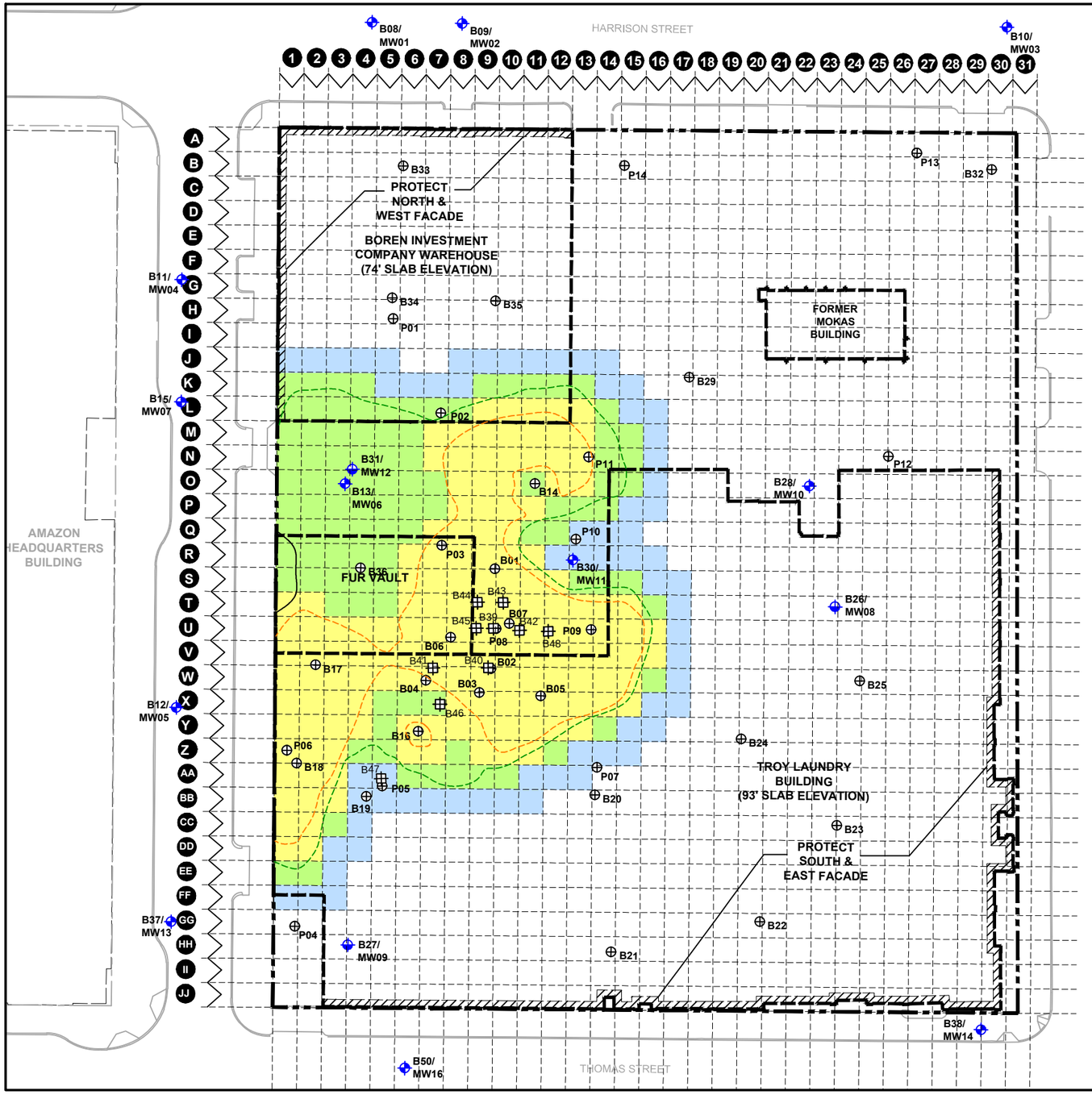

LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY

PCE	TETRACHLOROETHYLENE
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT
mg/kg	MILLIGRAMS PER KILOGRAM

1 / A — SOIL MANAGEMENT GRID (10' x 10' x 10' : 100FT³)

SOIL MANAGEMENT LAYER - 07
(50' - 40' ELEVATION - NAVD88)

PCE IN SOIL

DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)	97,000 FT³	3,593 CY
DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW WASHINGTON STATE DANGEROUS WASTE CRITERIA (14 mg/kg)	146,000 FT³	5,407 CY
10' BUFFER ZONE	66,000 FT³	2,444 CY

- MODELED EXTENT OF PCE IN SOIL: *DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)*
- MODELED EXTENT OF PCE IN SOIL: *DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW* WASHINGTON STATE DANGEROUS WASTE CRITERIA *(14 mg/kg)*

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FIGURE 19G
SOIL MANAGEMENT GRID
LAYER - 07 (50' - 40')

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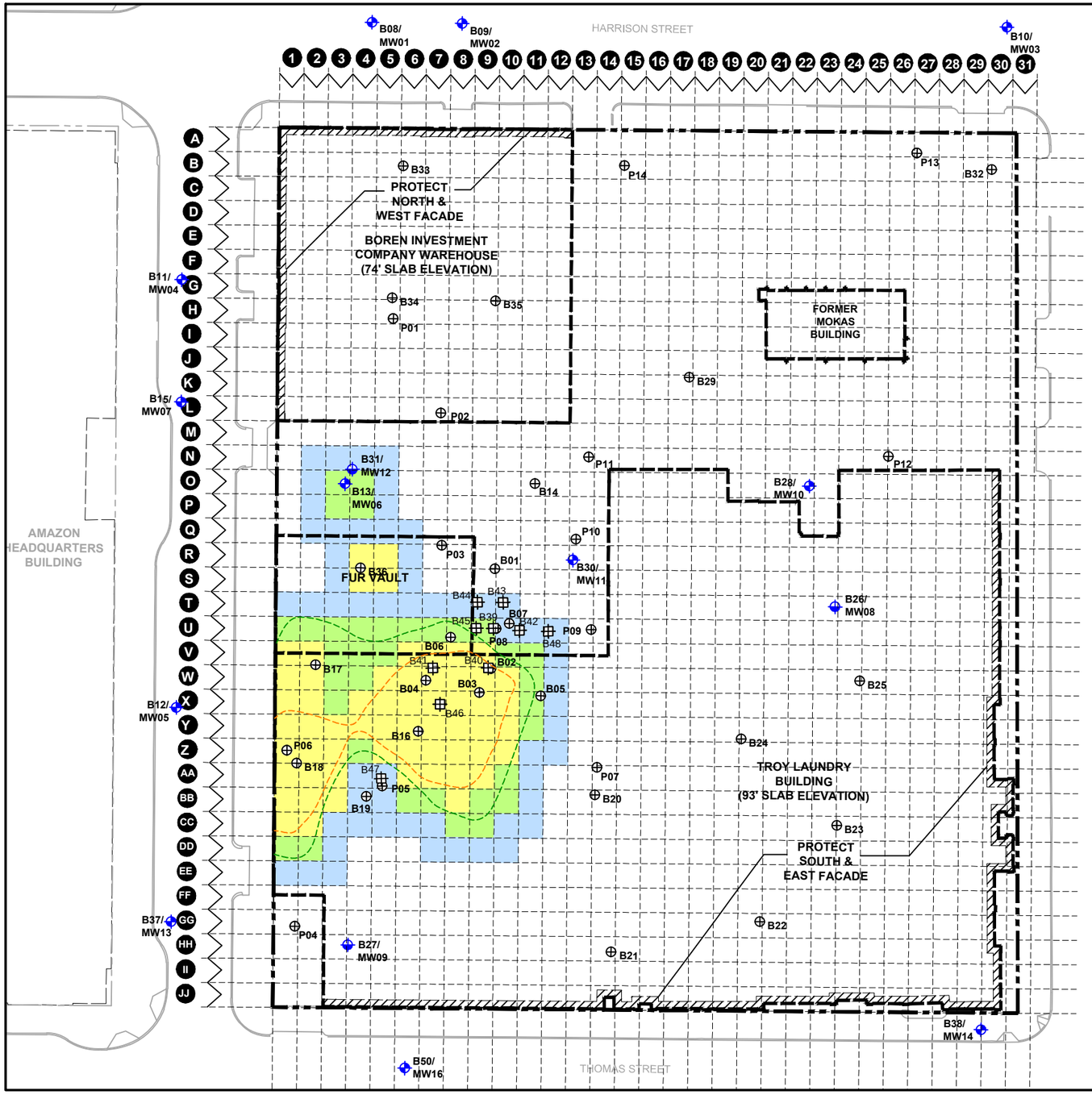

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LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY

PCE	TETRACHLOROETHYLENE
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT
mg/kg	MILLIGRAMS PER KILOGRAM

1 / A / A1 — SOIL MANAGEMENT GRID (10' x 10' x 10' : 100FT³)

SOIL MANAGEMENT LAYER - 08
(40' - 30' ELEVATION - NAVD88)

PCE IN SOIL

DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)	34,000 FT³	1,259 CY
DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW WASHINGTON STATE DANGEROUS WASTE CRITERIA (14 mg/kg)	59,000 FT³	2,185 CY
10' BUFFER ZONE	57,000 FT³	2,111 CY

- MODELED EXTENT OF PCE IN SOIL: *DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)*
- MODELED EXTENT OF PCE IN SOIL: *DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW* WASHINGTON STATE DANGEROUS WASTE CRITERIA *(14 mg/kg)*

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APPROXIMATE SCALE IN FEET

FIGURE 19H
SOIL MANAGEMENT GRID
LAYER - 08 (40' - 30')

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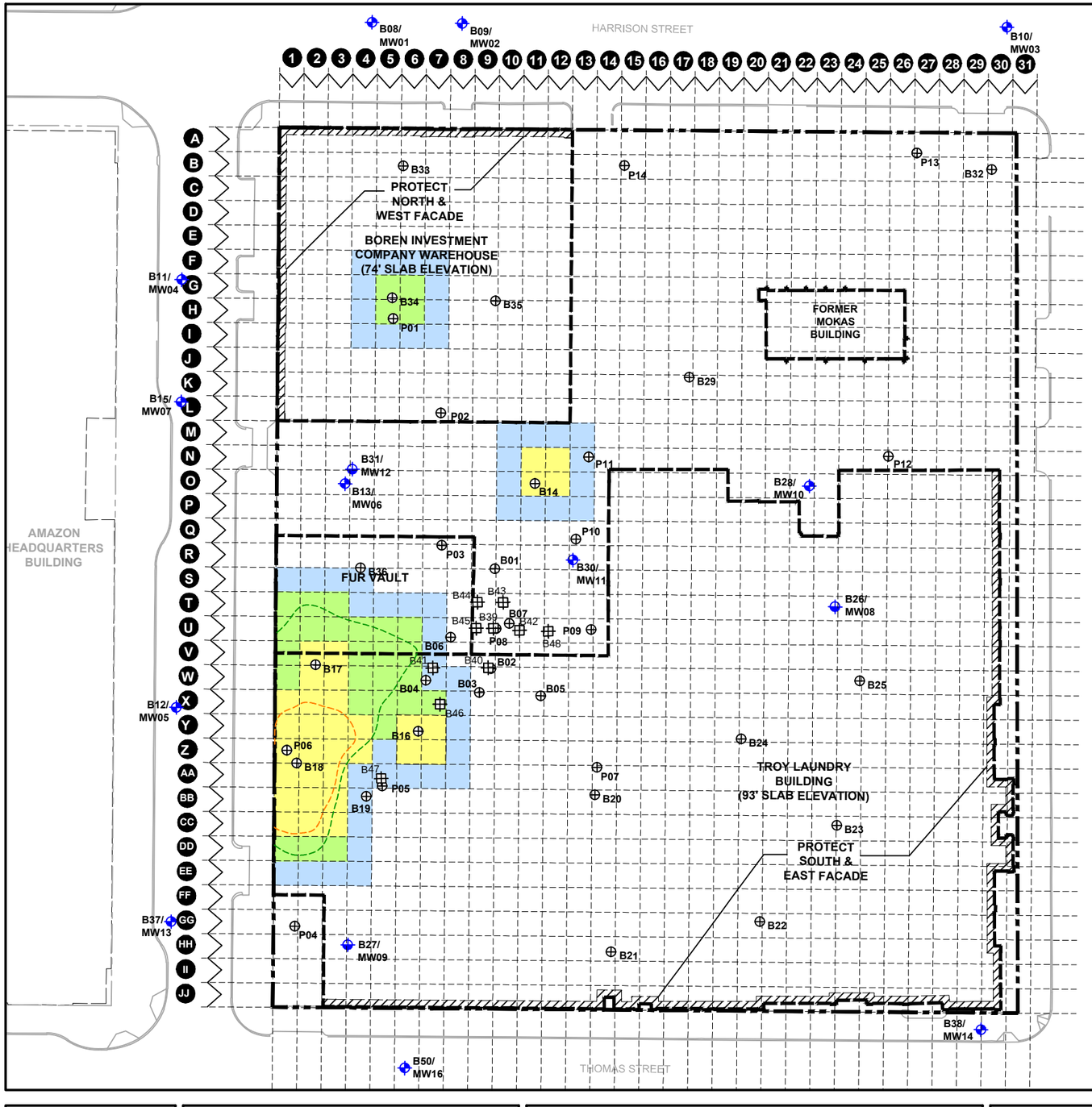

LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY

PCE	TETRACHLOROETHYLENE
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT
mg/kg	MILLIGRAMS PER KILOGRAM

1 / A — SOIL MANAGEMENT GRID (10' x 10' x 10' : 100FT³)

SOIL MANAGEMENT LAYER - 09
(30' - 20' ELEVATION - NAVD88)

PCE IN SOIL

DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)	29,000 FT³	1,074 CY
DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW WASHINGTON STATE DANGEROUS WASTE CRITERIA (14 mg/kg)	32,000 FT³	1,185 CY
10' BUFFER ZONE	52,000 FT³	1,925 CY

- MODELED EXTENT OF PCE IN SOIL: *DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)*
- MODELED EXTENT OF PCE IN SOIL: *DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW* WASHINGTON STATE DANGEROUS WASTE CRITERIA *(14 mg/kg)*

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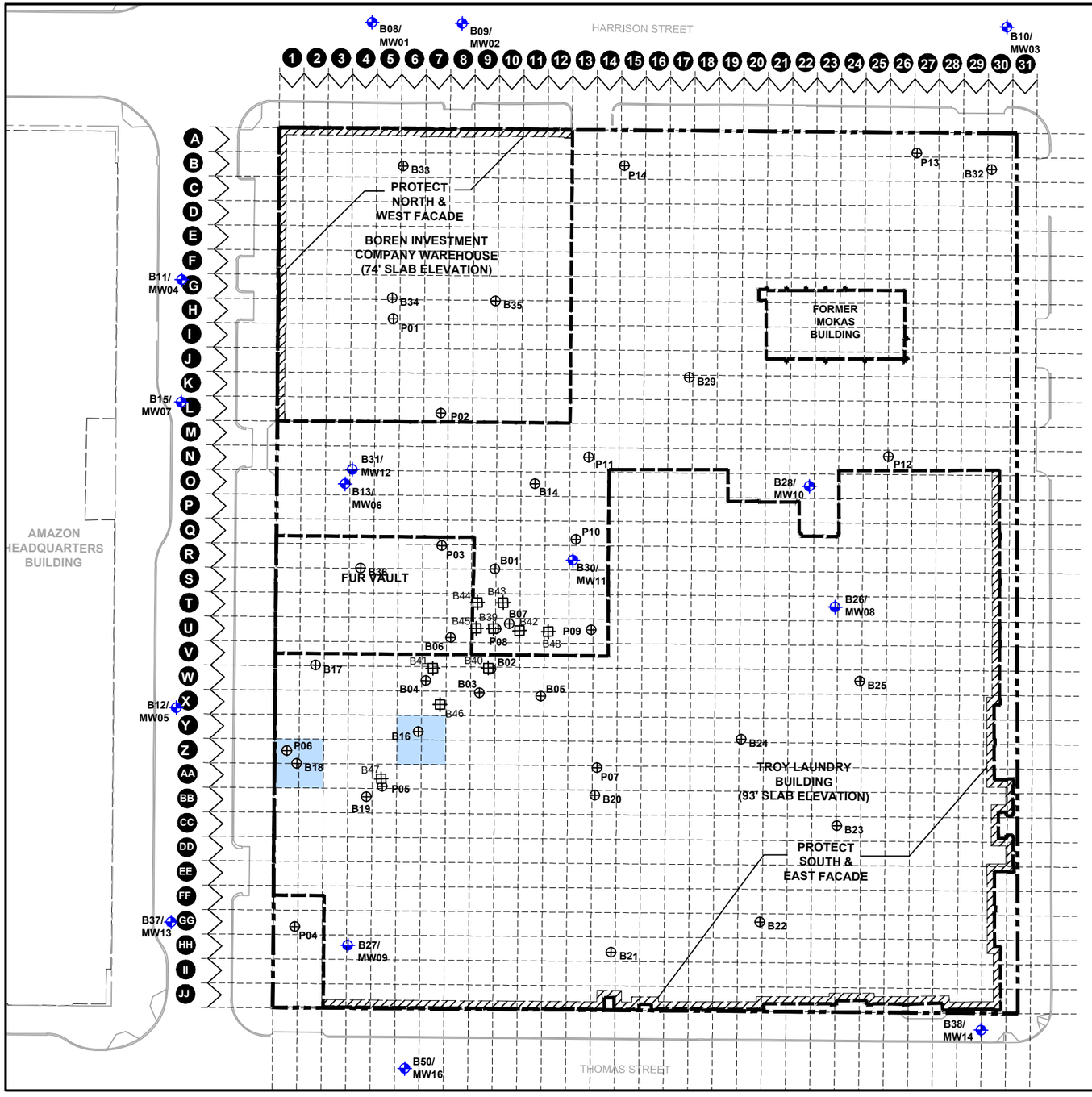
DRAWN BY:	VPB
CHECKED BY:	PJK
CAD FILE:	0731-004_2013EDR_SMP

PROJECT NAME:	TROY LAUNDRY PROPERTY
PROJECT NUMBER:	0731-004
STREET ADDRESS:	307 FAIRVIEW AVENUE NORTH
CITY,STATE:	SEATTLE, WASHINGTON

REGION:

0 25 50 100
APPROXIMATE SCALE IN FEET

FIGURE 19I
SOIL MANAGEMENT GRID
LAYER - 09 (30' - 20')



LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY

PCE — TETRACHLOROETHYLENE

MTCA — WASHINGTON STATE MODEL TOXICS CONTROL ACT

mg/kg — MILLIGRAMS PER KILOGRAM

1 / A / A1 — SOIL MANAGEMENT GRID (10' x 10' x 10' : 100FT³)

SOIL MANAGEMENT LAYER - 10
(20' - 10' ELEVATION - NAVD88)

PCE IN SOIL

DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)	0 FT³	0 CY
DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW WASHINGTON STATE DANGEROUS WASTE CRITERIA (14 mg/kg)	0 FT³	0 CY
10' BUFFER ZONE	8,000 FT³	296 CY

MODELED EXTENT OF PCE IN SOIL: *DETECTABLE CONCENTRATIONS PRESENT, BUT BELOW MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg)*

MODELED EXTENT OF PCE IN SOIL: *DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL (0.05 mg/kg) AND BELOW* WASHINGTON STATE DANGEROUS WASTE CRITERIA *(14 mg/kg)*

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DRAWN BY: VPB
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CAD FILE: 0731-004_2013ICAP_SMP

PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY,STATE: SEATTLE, WASHINGTON

REGION:

0 25 50 100
APPROXIMATE SCALE IN FEET

FIGURE 19J
SOIL MANAGEMENT GRID
LAYER - 10 (20' - 10')

2/12/2014

DECISION TREE FOR RESPONSE ACTION AND NOTIFICATION PROCEDURE

DURING EXCAVATION, COMMON SENSE CRITERIA USED TO IDENTIFY DISCOVERY OF IMPACTED SOIL OUTSIDE OF THE REMEDIAL EXCAVATION BOUNDARY?

YES →

RESPONSE ACTION SEQUENCE:

- NOTIFY SITE SUPERINTENDENT AND EXCAVATION CONTRACTOR TO STOP WORK IN AREA
- NOTIFY OWNERS, PROJECT MANAGER, CONSTRUCTION MANAGER, AND ECOLOGY
- CALL SOUNDEARTH FIELD TEAM; SOUNDEARTH NOTIFIES ECOLOGY
- ISOLATE AREA WITH BARRIER TAPE
- RESTRICT TRUCK AND TRACKHOE TRAFFIC TO AVOID SPREADING/CROSS-CONTAMINATION
- INSTALL BARRIER TO VEHICLE ENTRY AS NECESSARY
- SCREEN SUSPECT SOILS WITH FIELD TESTS TO DEFINE BOUNDARIES OF APPARENT CONTAMINATION
- MARK CONTAMINATED AREA WITH WHITE PAINT LINES AND WOOD STAKES
- TAKE PHOTOGRAPHS & SKETCH LOCATION/DIMENSIONS OF IDENTIFIED AREA
- COLLECT SOIL SAMPLES FOR LAB TESTING/MARK SAMPLE LOCATIONS
- COMPLETE FIELD DAILY FORM TO RECORD ACTIVITIES, LOCATIONS, AND SAMPLES COLLECTED
- CONFIRM LAB DATA RESULTS MEET DISPOSAL PROFILE AND DETERMINE PROPER DISPOSAL
- EXCAVATE MATERIAL, RECORD AND MARK VOLUMES BY AREA OF ORIGIN
- COMPLETE PERFORMANCE OR COMPLIANCE SAMPLING IN REMAINING AREA
- PREPARE BILL OF LADING/WASTE MANIFEST FOR TRANSPORT TO PERMITTED FACILITY

NO ↓

IS AN UNDERGROUND STORAGE TANK OR PIPING DISCOVERED OUTSIDE OF THE REMEDIAL EXCAVATION BOUNDARY?

YES →

NO ↓

PREPARE CLOSURE REPORT

DEVELOPMENT TEAM CONTACT INFORMATION:

- SHAWN PARRY, TOUCHSTONE — OFFICE: 206-727-2393
- GENERAL CONTRACTOR PROJECT MANAGER: LEASE CRUTCHER LEWIS — OFFICE: 206-689-0493

SOUNDEARTH FIELD TEAM CONTACT INFORMATION:

- PETE KINGSTON, PROJECT MANAGER — CELL: 206-200-2346
- COURTNEY PORTER, FIELD COORDINATOR — CELL: 425-213-3300
- SOUNDEARTH STRATEGIES, INC. — OFFICE: 206-306-1900

ECOLOGY CONTACT INFORMATION:

- MAURA O'BRIEN, SITE MANAGER — OFFICE: 425-649-7249

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DATE: 02/12/14
DRAWN BY: VPB/JQC
CHECKED BY: EKR
CAD FILE: 0731-004_2013EDR_COMM

PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004
STREET ADDRESS: 7800 GILLMAN STREET
CITY, STATE: REDMOND, WASHINGTON

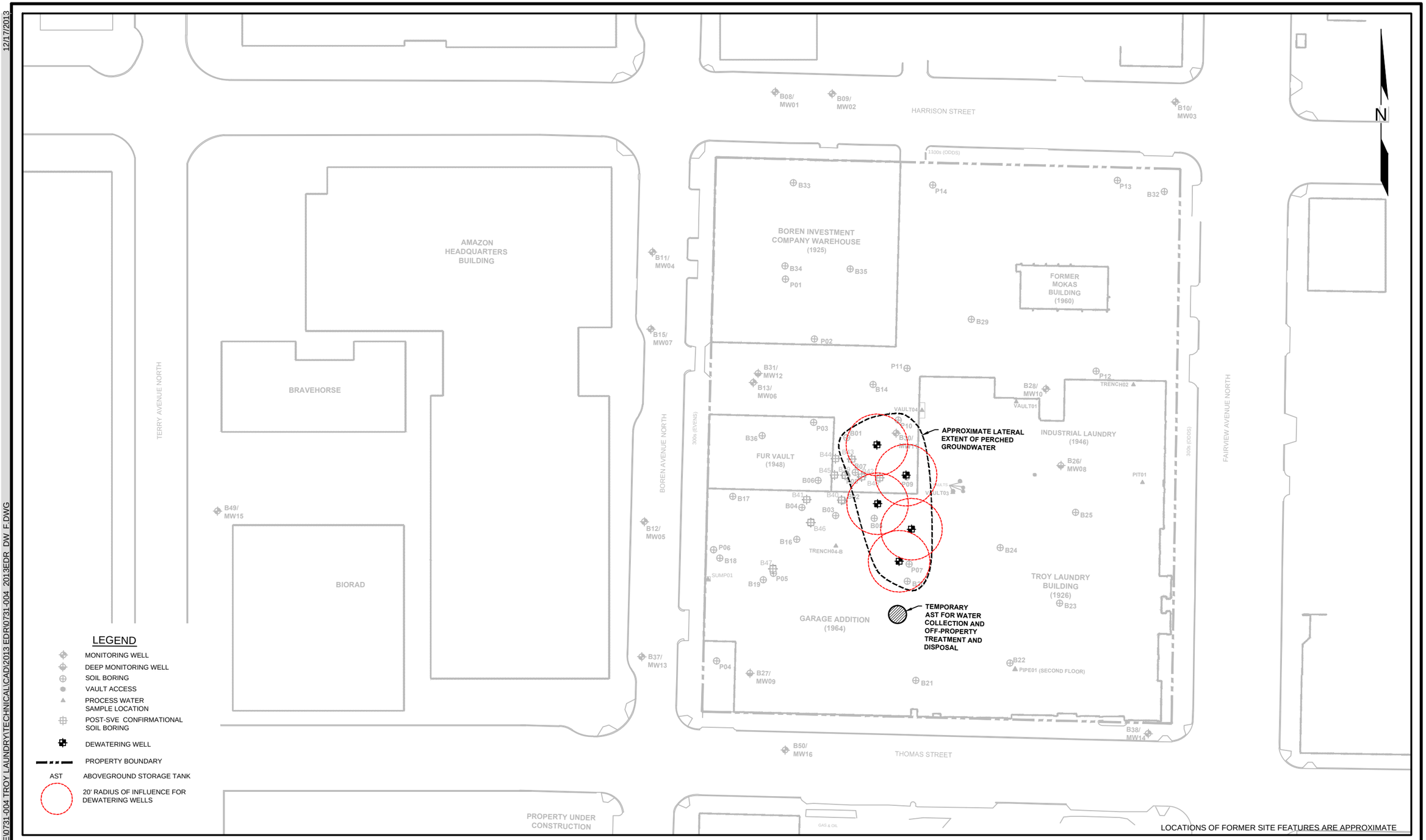
REGION:

NOT TO SCALE

FIGURE 20
COMMUNICATION PLAN

P:\0731 TOUCHSTONE\0731-004 TROY LAUNDRY\TECHNICAL\CAD\2013 EDR\0731-004_2013EDR_COMM_F.DWG

12/17/2013



LOCATIONS OF FORMER SITE FEATURES ARE APPROXIMATE

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CHECKED BY: PJK
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PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY,STATE: SEATTLE, WASHINGTON

REGION:

0 30 60 120
APPROXIMATE SCALE IN FEET

FIGURE 21
CONCEPTUAL LAYOUT FOR DEWATERING PERCHED GROUNDWATER

P:\0731 TOUCHSTONE\0731-004 TROY LAUNDRY\TECHNICAL\CAD\2013 EDR\0731-004_2013EDR_DW_F.DWG

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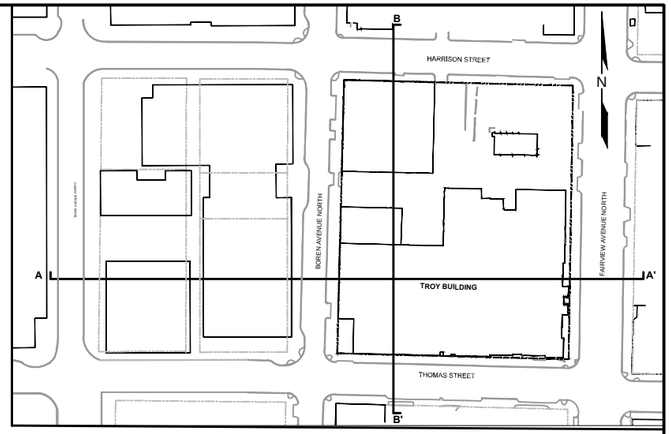

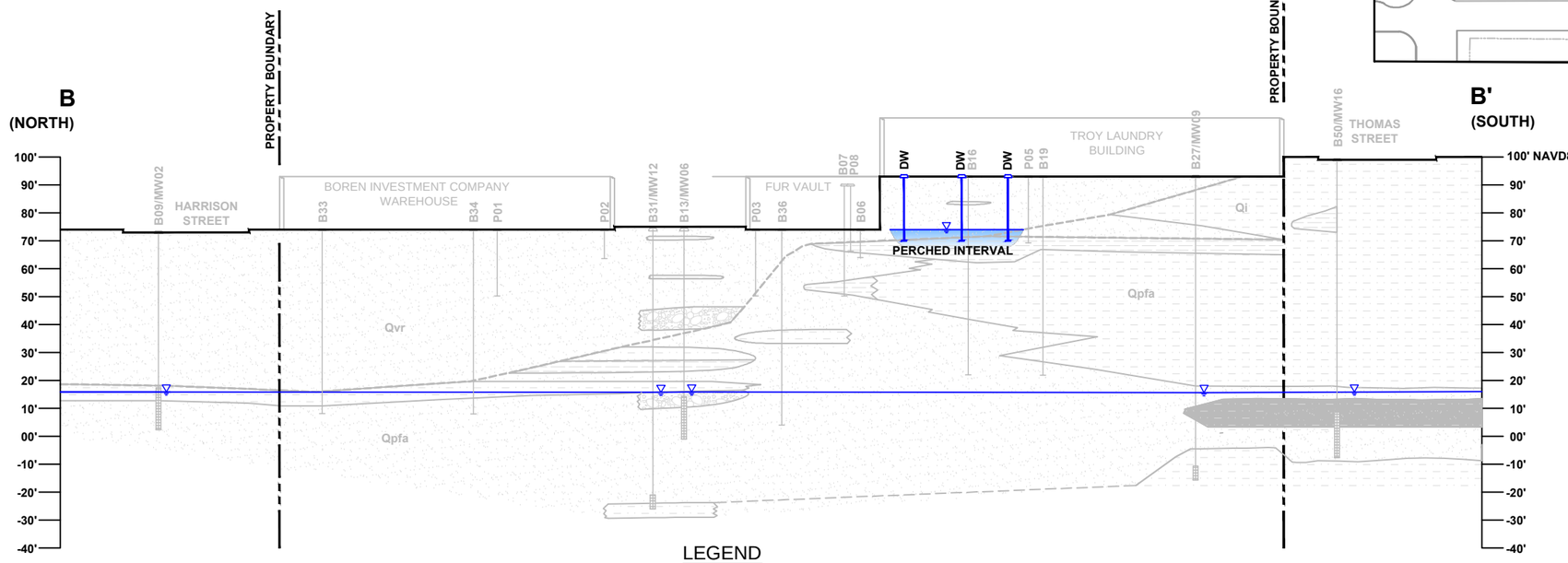

LEGEND

MONITORING WELL

SCREEN INTERVAL

GROUNDWATER LEVEL (OCTOBER 20, 2011)

DW	DEWATERING WELL
TCE	TRICHLOROETHYLENE
PCE	TETRACHLOROETHYLENE
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT
mg/kg	MILLIGRAMS PER KILOGRAM
µg/L	MICROGRAMS PER LITER

NOTE: ELEVATIONS ARE PRESENTED AS FEET ABOVE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS):

SP AND SP-SM

SM

ML AND SM

GP

Qvr	VASHON RECESSIONAL OUTWASH DEPOSITS
Qi	ICE-CONTACT DEPOSITS
Qpfa	PRE-FRASER NONGLACIAL DEPOSITS
DW	DEWATERING WELL

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DATE: 12/17/13
DRAWN BY: NAC
CHECKED BY: PJK
CAD FILE: 0731-004_2013EDR_DW_XBB2

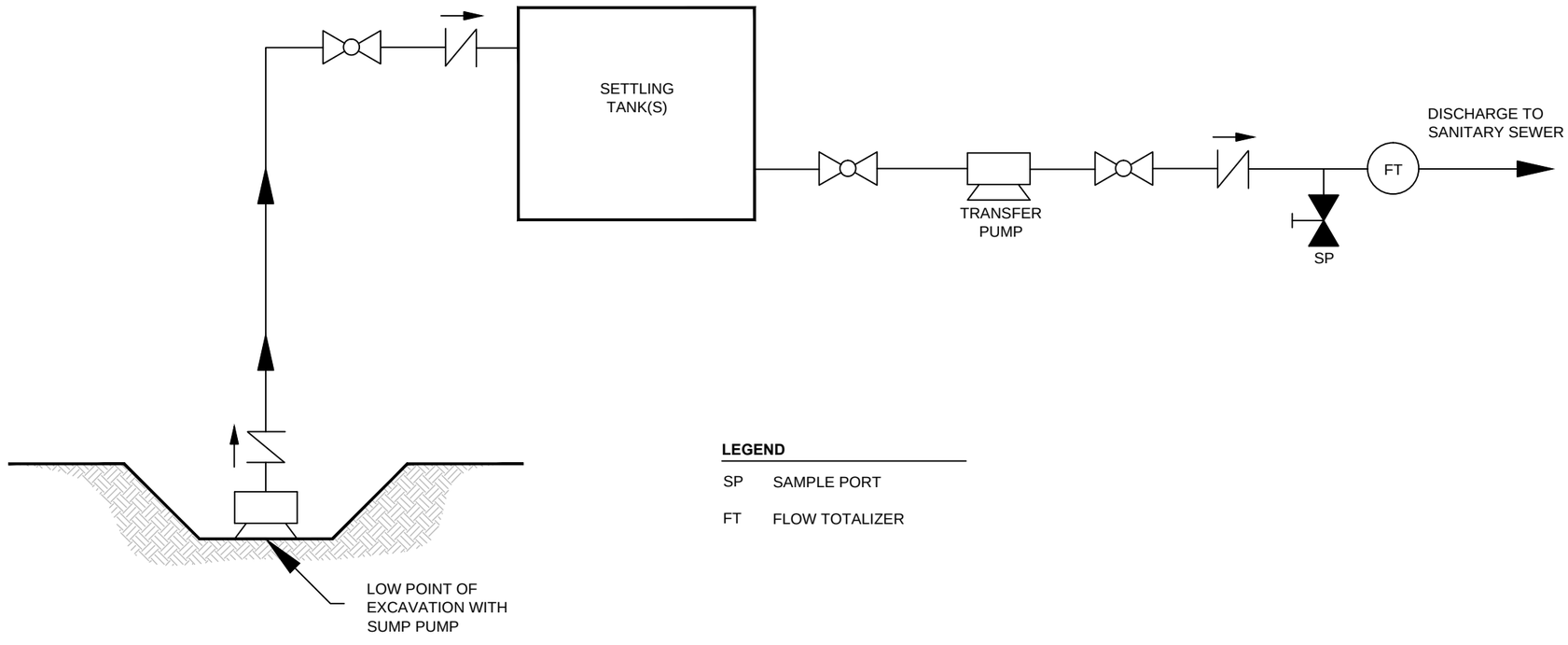
PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY,STATE: SEATTLE, WASHINGTON

REGION:

0 25 50 100
APPROXIMATE SCALE IN FEET

FIGURE 22
PERCHED INTERVAL
DEWATERING DETAIL
CROSS SECTION B-B'

P:\0731 TOUCHSTONE\0731-004 TROY LAUNDRY\TECHNICAL\CAD\2013 EDR\0731-004 2013EDR DW XBB2 F.DWG



LEGEND

SP	SAMPLE PORT
FT	FLOW TOTALIZER

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DATE:	12/17/13
DRAWN BY:	NAC/JQC
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PROJECT NAME:	TROY LAUNDRY PROPERTY
PROJECT NUMBER:	0731-004
STREET ADDRESS:	307 FAIRVIEW AVENUE NORTH
CITY,STATE:	SEATTLE, WASHINGTON

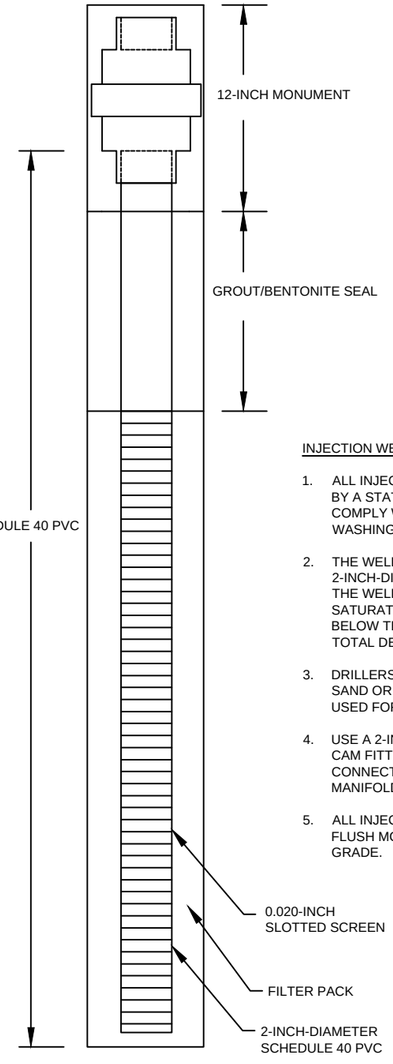
REGION:

NOT TO SCALE

FIGURE 23
CONSTRUCTION DEWATERING
PROCESS FLOW DIAGRAM

2/12/2014

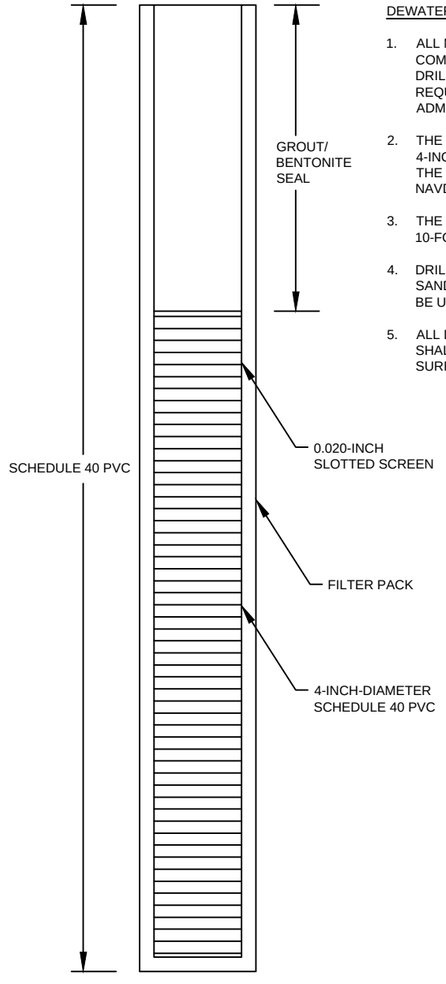
INJECTION WELL
NOT TO SCALE



INJECTION WELL CONSTRUCTION DETAILS:

1. ALL INJECTION WELLS SHALL BE COMPLETED BY A STATE LICENSED WELL DRILLER AND COMPLY WITH THE REQUIREMENTS OF WASHINGTON ADMINISTRATIVE CODE 173-160.
2. THE WELL SHALL BE CONSTRUCTED WITH 2-INCH-DIAMETER SCHEDULE 40 PVC PIPE. THE WELL SHALL EXTEND 35 FEET INTO THE SATURATED ZONE AND SCREENED FROM BELOW THE GROUT/BENTONITE SEAL TO TOTAL DEPTH.
3. DRILLERS SAND (#10-20 COLORADO SILICA SAND OR APPROVED EQUIVALENT) SHALL BE USED FOR THE FILTER PACK.
4. USE A 2-INCH BALL VALVE AND A 2-INCH MALE CAM FITTING AT TOP OF CASING FOR FUTURE CONNECTIONS TO INJECTION SYSTEM MANIFOLD.
5. ALL INJECTION WELL MONUMENTS SHALL BE FLUSH MOUNTED WITH SURROUNDING GRADE.

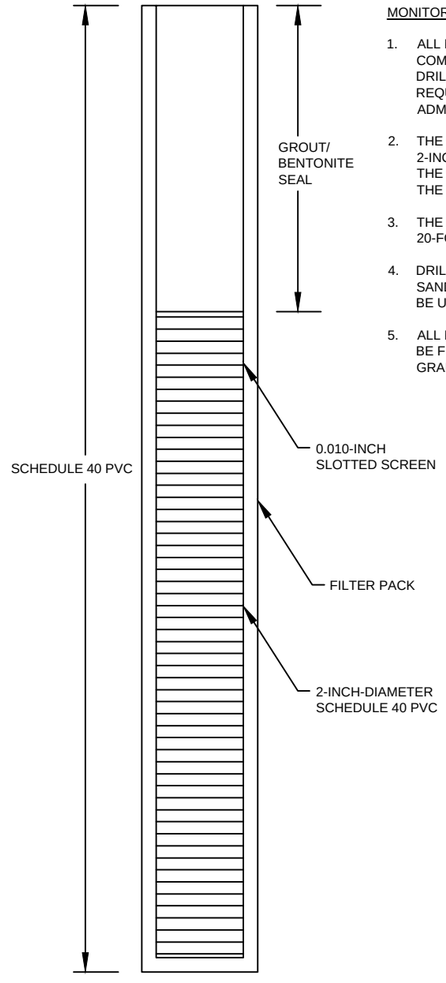
DEWATERING WELL
NOT TO SCALE



DEWATERING WELL CONSTRUCTION DETAILS:

1. ALL MONITORING WELLS SHALL BE COMPLETED BY A STATE LICENSED WELL DRILLER AND COMPLY WITH THE REQUIREMENTS OF WASHINGTON ADMINISTRATIVE CODE 173-160.
2. THE WELL SHALL BE CONSTRUCTED WITH 4-INCH-DIAMETER SCHEDULE 40 PVC PIPE. THE WELL SHALL EXTEND TO 70-FEET NAVD88.
3. THE DEWATERING WELL SHALL HAVE A 10-FOOT SCREENED SECTION.
4. DRILLERS SAND (#10-20 COLORADO SILICA SAND) OR APPROVED EQUIVALENT) SHALL BE USED FOR THE FILTER PACK.
5. ALL DEWATERING WELL MONUMENTS SHALL BE FLUSH MOUNTED WITH SURROUNDING GRADE.

MONITORING WELL
NOT TO SCALE



MONITORING WELL CONSTRUCTION DETAILS:

1. ALL MONITORING WELLS SHALL BE COMPLETED BY A STATE LICENSED WELL DRILLER AND COMPLY WITH THE REQUIREMENTS OF WASHINGTON ADMINISTRATIVE CODE 173-160.
2. THE WELL SHALL BE CONSTRUCTED WITH 2-INCH-DIAMETER SCHEDULE 40 PVC PIPE. THE WELL SHALL EXTEND 30 FEET BELOW THE TOP OF THE GROUNDWATER TABLE.
3. THE MONITORING WELL SHALL HAVE A 20-FOOT SCREENED SECTION.
4. DRILLERS SAND (#10-20 COLORADO SILICA SAND) OR APPROVED EQUIVALENT) SHALL BE USED FOR THE FILTER PACK.
5. ALL MONITORING WELL MONUMENTS SHALL BE FLUSH MOUNTED WITH SURROUNDING GRADE.

P:\0731 TOUCHSTONE\0731-004 TROY LAUNDRY\TECHNICAL\CAD\2013 EDR\0731-004_2013EDR_WELL_F.DWG

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PROJECT NAME:	TROY LAUNDRY PROPERTY
PROJECT NUMBER:	0731-004
STREET ADDRESS:	307 FAIRVIEW AVENUE NORTH
CITY,STATE:	SEATTLE, WASHINGTON

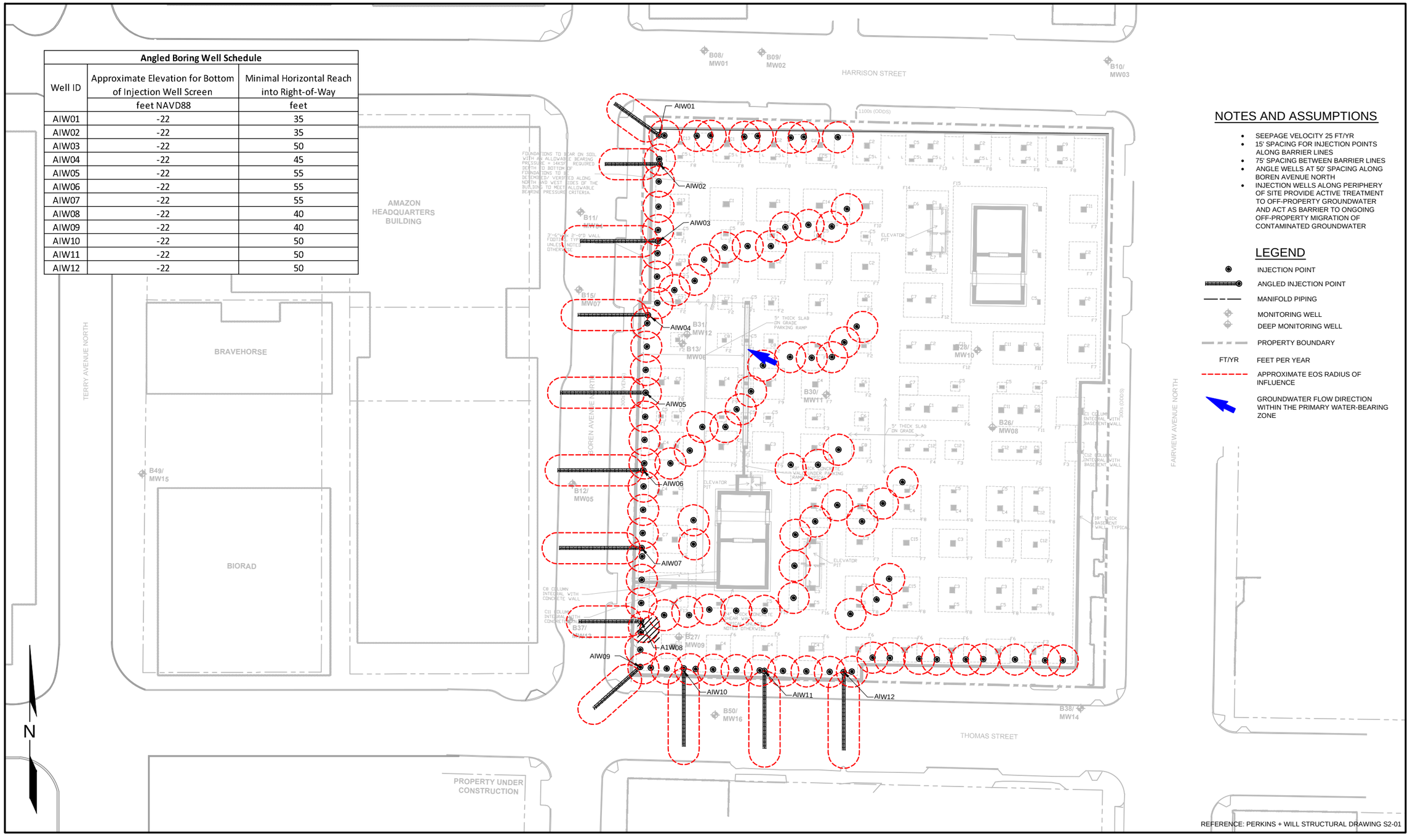
REGION:

NOT TO SCALE

FIGURE 24
INJECTION, DEWATERING, AND MONITORING WELL CONSTRUCTION DETAILS

12/17/2013

Angled Boring Well Schedule		
Well ID	Approximate Elevation for Bottom of Injection Well Screen	Minimal Horizontal Reach into Right-of-Way
	feet NAVD88	feet
AIW01	-22	35
AIW02	-22	35
AIW03	-22	50
AIW04	-22	45
AIW05	-22	55
AIW06	-22	55
AIW07	-22	55
AIW08	-22	40
AIW09	-22	40
AIW10	-22	50
AIW11	-22	50
AIW12	-22	50



NOTES AND ASSUMPTIONS

- SEEPAGE VELOCITY 25 FT/YR
- 15' SPACING FOR INJECTION POINTS ALONG BARRIER LINES
- 75' SPACING BETWEEN BARRIER LINES
- ANGLE WELLS AT 50' SPACING ALONG BOREN AVENUE NORTH
- INJECTION WELLS ALONG PERIPHERY OF SITE PROVIDE ACTIVE TREATMENT TO OFF-PROPERTY GROUNDWATER AND ACT AS BARRIER TO ONGOING OFF-PROPERTY MIGRATION OF CONTAMINATED GROUNDWATER

LEGEND

- INJECTION POINT
- ANGLED INJECTION POINT
- MANIFOLD PIPING
- MONITORING WELL
- DEEP MONITORING WELL
- PROPERTY BOUNDARY
- FT/YR — FEET PER YEAR
- APPROXIMATE EOS RADIUS OF INFLUENCE
- GROUNDWATER FLOW DIRECTION WITHIN THE PRIMARY WATER-BEARING ZONE

REFERENCE: PERKINS + WILL STRUCTURAL DRAWING S2-01

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DATE: 12/17/13
DRAWN BY: NAC/BLR
CHECKED BY: SES/PJK
CAD FILE: 0731-004_2013EDR_CL

PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY,STATE: SEATTLE, WASHINGTON

REGION:

0 30 60 120
APPROXIMATE SCALE IN FEET

FIGURE 25
GROUNDWATER TREATMENT
CONCEPTUAL LAYOUT
IN SITU REDUCTIVE DECHLORINATION

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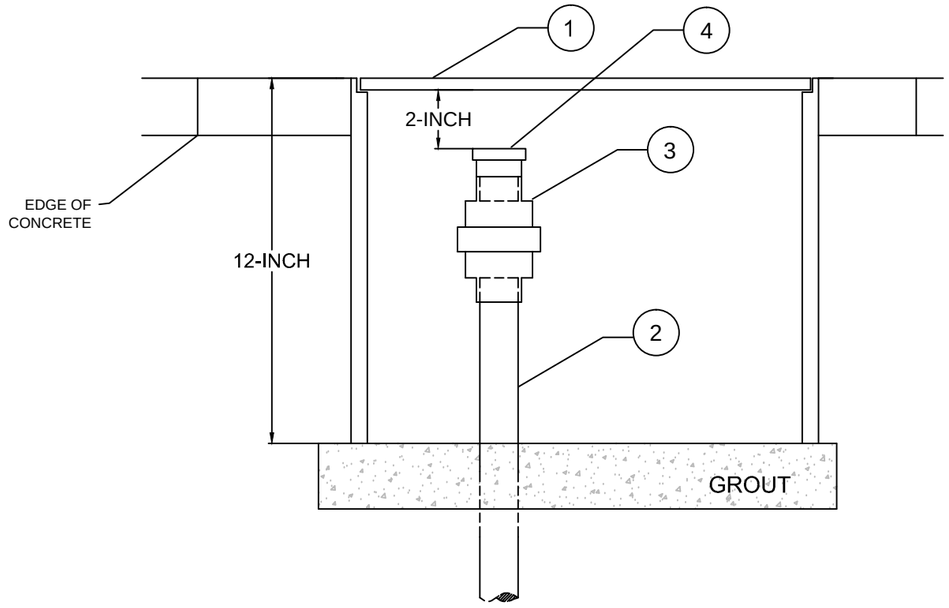

DESCRIPTION OF WELLHEAD ITEMS:

1. EMCO, OR EQUIVALENT 12-INCH STEEL BOTTOMLESS MONUMENT. THE MONUMENT SHALL BE 8-INCHES IN DIAMETER WITH A 12-INCH STEEL SKIRT, EQUIPPED WITH AN H-20 TRAFFIC RATED COVER, OR APPROVED EQUIVALENT.
2. EXISTING 2-INCH-DIAMETER SCHEDULE 40 PVC LOCKING INJECTION WELL.
3. 2-INCH DIAMETER SPEARS TRUE UNION BALL VALVE.
4. 2-INCH MALE CAM FITTING.

GENERAL NOTES:

A. THE CONTRACTOR SHALL INSTALL MONUMENTS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND GUIDELINES. CONTRACTOR WILL REMEDY ANY SUBSIDENCE THAT OCCURS WITHIN 1 YEAR WITHOUT COST TO SOUNDEARTH OR TOUCHSTONE SLU LLC.

B. THE CONTRACTOR SHALL SEAL PIPING PENETRATIONS THROUGH MONUMENT WALL AND FLOOR WITH NON-SHRINK GROUT.

C. THE CONTRACTOR SHALL AVOID PENETRATING OR DAMAGING THE EXISTING GROUTED WELL SEAL [(I.E, THE SEAL BETWEEN THE WELL CASING AND THE BOREHOLE WALL (ANNULAR SEAL)] WHILE INSTALLING THE PRECAST MONUMENT. THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF WASHINGTON ADMINISTRATIVE CODE (WAC) 173-160-450.

D. THE CONTRACTOR SHALL SET THE TOP OF MONUMENTS FLUSH WITH THE EXISTING GRADE.

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DATE: 02/12/14
DRAWN BY: NAC/JQC
CHECKED BY: SES
CAD FILE: 0731-004_2013EDR_VD

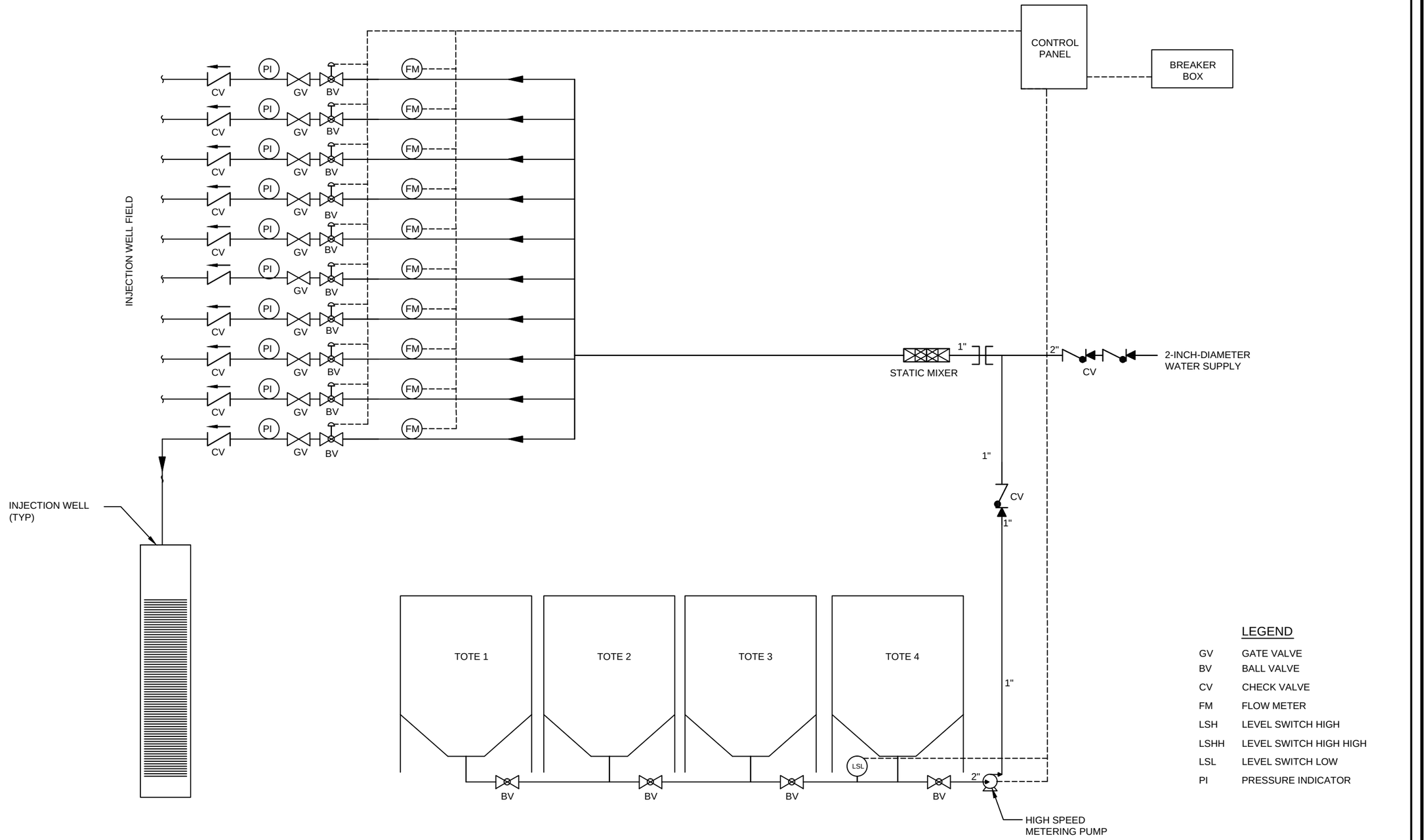
PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY,STATE: SEATTLE, WASHINGTON

REGION:

NOT TO SCALE

FIGURE 26
INJECTION SYSTEM WELLHEAD
AND VAULT DETAIL

12/17/2013



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DATE: 12/17/13
DRAWN BY: NAC
CHECKED BY: SES/TWM
CAD FILE: 0731-004_2013EDR_PFD

PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY, STATE: SEATTLE, WASHINGTON

#	DATE	REVISION
		SHEET NO.

NOT TO SCALE

FIGURE 27
INJECTION SYSTEM PROCESS FLOW DIAGRAM

P:\0731 Touchstone\0731-004 Troy Laundry\Technical\CAD\2013 EDR\0731-004_2013EDR_PFD_FTM_F.dwg

12/17/2013

PN: 1983200290

PN: 1983200270

(440 TERRY AVENUE NORTH)

1983200645

NORTH-ADJOINING PROPERTY

(400 BOREN AVENUE NORTH)

PN: 1983200635

PN: 1983200626

PN: 1983200625

NORTH-ADJOINING PROPERTY

(405 FAIRVIEW AVENUE NORTH)

PN: 2467400120

(400 FAIRVIEW AVENUE NORTH)

N

MW01

MW02

HARRISON STREET

MW03

PN: 1986200460

PN: 1986200410

PN: 1986200450

PN: 1986200418

WEST-ADJOINING PROPERTY

(301 & 345 BOREN AVENUE NORTH)

PN: 1986200420

PN: 1986200440

MW15

MW04

MW07

BOREN INVESTMENT COMPANY WAREHOUSE

(334 BOREN AVENUE NORTH)

PN: 1986200515

FORMER MOKAS BUILDING

(329 BOREN AVENUE NORTH)

MW12

MW06

MW10

MW11

MW08

MW05

MW13

MW09

THE PROPERTY

(307 FAIRVIEW AVENUE NORTH)

(APPROXIMATE 108,571 SQUARE FEET)

PN: 1986200480

TROY LAUNDRY BUILDING

MW14

MW16

BOREN AVENUE NORTH

FAIRVIEW AVENUE NORTH

PN: 2467400065

EAST-ADJOINING PROPERTY

(300-318 FAIRVIEW AVENUE NORTH)

PN: 2467400073

PN: 2467400080

PN: 2467400085

PN: 2467400090

THOMAS STREET

USTs

MW-A

MW-B

MW-C

SEATTLE TIMES REPAIR FACILITY

SOUTH-ADJOINING PROPERTY

(1120 JOHN STREET)

PN: 1986200525

PN: 1986200380

(201 BOREN AVENUE NORTH)

PN: 1986200350

PN: 2467400005

(234 FAIRVIEW AVENUE NORTH)

PN: 2467400006

LEGEND

- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- BUILDINGS
- PN: 1986200480 PARCEL NUMBER
- MONITORING WELL
- MONITORING WELL (TO BE INSTALLED)**
- EXISTING MONITORING WELL (TO BE DECOMMISSIONED)

**THE FINAL NUMBER AND LOCATION OF THE ON-PROPERTY MONITORING WELLS WILL BE DETERMINED BASED ON FINAL BUILDING CONSTRUCTION DETAILS AND ECOLOGY REVIEW AND APPROVAL.

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PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY,STATE: SEATTLE, WASHINGTON

REGION:

0 40 80 160

APPROXIMATE SCALE IN FEET

FIGURE 28

GROUNDWATER COMPLIANCE MONITORING WELLS

P:\0731 TOUCHSTONE\0731-004 TROY LAUNDRY\TECHNICAL\CAD\2013 EDR\0731-004 2013EDR COMP MW F.DWG

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TABLES

SoundEarth Strategies

Table 1
Summary of Groundwater Data for Petroleum and VOCs
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Screen Interval[1] (feet)	TOC Elevation[2] (feet)	Sample Date	Sampled By	Date of Depth to Water Measurement	Depth to Water (feet below TOC)	Groundwater Elevation (feet)	Analytical Results (µg/L)																								
								GRPH[3]	DRPH[4]	ORPH[4]	Benzene[5]	Toluene[5]	Ethylbenzene[5]	Total Xylenes[5]	Vinyl Chloride[5]	cis-1-2-DCE[5]	trans-1-2-DCE[5]	EDC[5]	TCE[5]	PCE[5]	SVOCs[6] [7]	Total Arsenic[8]	Total Barium[9]	Total Cadmium[9]	Total Chromium[9]	Total Lead[10]	Total Selenium[11]	Total Silver[9]	Total Mercury[12]	pH[13]
Troy Laundry Property																																
Supply Well[14]	Unknown	--	10/11/94	RETEC	10/11/94	73	--	420[15]			<1	<1	<1	<1	<1	<1	<1	<1	<1	13	<5.0	49	<5.0	<10	4.4	<5.0	<5.0	<2	9.38
			08/26/10[16]	SoundEarth	08/26/10	75.25	--	<100	<50	<250	<0.035	<1	<1	<3	<0.2	<1	<1	<1	<1	<2	<0.1	3.15	103	<1	1.35	4.84	<1	<1	<0.2	8.90
			08/26/10[17]	SoundEarth	08/26/10	75.25	--	<100	82[x]	370	<0.035	<1	<1	<3	<0.2	<1	<1	<1	<1	<2	<0.1	2.56	63.4	<1	1.11	2.85	<1	<1	<0.2	8.95
P10	19-21	--	10/07/10	SoundEarth	10/07/10	20	--	170	940[x]	<250	<0.35	<1	<1	<3	<0.2	67	<1	<1	15	80	--	--	--	--	--	--	--	--	--	--	--
B07	23-24	--	12/08/10	SoundEarth	12/08/10	23	--	2,300	310	200	NR	NR	NR	NR	NR	920	1.5	NR	130	4,600	--	--	--	--	--	--	--	--	--	--	--	--
B14	N/A	--	05/27/11	SoundEarth	05/27/11	69	--	<100	590	370[x]	<1	<1	<1	<3	<0.2	12	<1	<1	8.8	35	<2	--	--	--	--	--	--	--	--	--	--	--
MW06	60-75	74.78	05/31/11	SoundEarth	05/31/11	58.70	16.08	<100	330[x]	<250	<1	<1	<1	<3	0.76	150[ve]	<1	<1	8.2	3.1	<10	--	--	--	--	--	--	--	--	--	--	--
			10/12/11	SoundEarth	10/20/11	58.91	15.87	<100[18]	83[18] [x]	<250[18]	<1[18]	<1[18]	<1[18]	<3[18]	0.76	120	<1	<1	11	3.6	--	--	--	--	--	--	--	--	--	--	--	--
			12/10/12	SoundEarth	12/10/12	58.71	16.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			09/09/13	SoundEarth	08/29/13	60.30	14.48	<100	150[x]	<250	<1	<1	<1	<3	0.93	150	<1	<1	4.5	3.8	--	--	--	--	--	--	--	--	--	--	--	--	--
MW08	105-110	92.88	10/13/11	SoundEarth	10/20/11	77.18	15.70	<100	<50	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--	--
			09/10/13	SoundEarth	08/29/13	78.10	14.78	<100	120[x]	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--	--
MW09	105-110	92.92	10/13/11	SoundEarth	10/20/11	77.24	15.68	1,400	240[x]	<250	<1	<1	2.7	10	<0.2	22	<1	<1	16	<1	--	--	--	--	--	--	--	--	--	--	--	--	--
			09/10/13	SoundEarth	08/29/13	78.51	14.41	<100	<50	<250	<1	<1	<1	<3	<0.2	2.0	<1	<1	15	1.6	--	--	--	--	--	--	--	--	--	--	--	--	--
MW10	75-90	92.73	10/12/11	SoundEarth	10/20/11	77.14	15.59	<100	68[x]	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--	--
			12/10/12	SoundEarth	12/10/12	77.01	15.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			09/09/13	SoundEarth	08/29/13	78.28	14.45	<100	<50	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--	--
MW11	68-83	88.23	10/13/11	SoundEarth	10/20/11	72.43	15.80	<100	110[x]	<250	<1	<1	<1	<3	<0.2	5.6	<1	<1	2.6	21	--	--	--	--	--	--	--	--	--	--	--	--	--
			12/10/12	SoundEarth	12/10/12	72.29	15.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			09/09/13	SoundEarth	08/29/13	73.78	14.45	<100	97[x]	<250	<1	<1	<1	<3	<0.2	3.6	<1	<1	3.8	39	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW12	95-100	74.44	10/17/11	SoundEarth	10/20/11	58.71	15.73	<100	<50	<250	<1	<1	<1	<3	<0.2	1.3	<1	<1	19	<1	--	--	--	--	--	--	--	--	--	--	--	--	--
			09/09/13	SoundEarth	08/29/13	59.99	14.45	<100	<50	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	20	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Boren Avenue North																																
MW04	50-65	70.69	05/27/11	SoundEarth	05/27/11	52.22	18.47	<100	<50	<250	<1	1.3	<1	<3	<0.2	<1	<1	<1	15	<1	1.7	--	--	--	--	--	--	--	--	--	--	--	--
			10/12/11	SoundEarth	10/20/11	52.82	17.87	<100	<50	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	15	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			12/10/12	SoundEarth	12/10/12	52.88	17.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			09/09/13	SoundEarth	08/29/13	57.25	13.44	<100	<50	<250	<1	<1	<1	<3	<0.2	15	<1	<1	22	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW05	65-80	84.04	05/27/11	SoundEarth	05/27/11	67.40	16.64	<100	<50	<250	<1	<1	<1	<3	<0.2	1.8	<1	<1	16	39	2.0	--	--	--	--	--	--	--	--	--	--	--	--
			10/12/11	SoundEarth	10/20/11	67.91	16.13	<100	<50	<250	<1	<1	<1	<3	<0.2	1.5	<1	<1	14	29	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			12/10/12	SoundEarth	12/10/12	68.54	15.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			09/10/13	SoundEarth	08/29/13	69.72	14.32	<100	<50	<250	<1	<1	<1	<3	<0.2	1.9	<1	<1	13	21	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW07	55-70	74.55	05/31/11	SoundEarth	05/31/11	56.33	18.22	<100	<50	<250	<1	<1	<1	<3	<0.2	2.3	<1	<1	12	1.4	<10	--	--	--	--	--	--	--	--	--	--	--	--
			10/12/11	SoundEarth	10/20/11	56.87	17.68	<100	240[x]	<250	<1	<1	<1	<3	<0.2	1.8	<1	<1	11	2.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			12/10/12	SoundEarth	12/10/12	56.96	17.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			09/09/13	SoundEarth	08/29/13	60.95	13.60	<100	120[x]	<250	<1	<1	<1	<3	<0.2	5.4	<1	<1	33	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW13	70-85	90.66	10/20/11	SoundEarth	10/20/11	74.69	15.97	<100	150[x]	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	1.2	5.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			12/10/12	SoundEarth	12/10/12	75.38	15.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			09/10/13	SoundEarth	08/29/13	76.23	14.43	<100	<50	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	1.4	11	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MTCA Cleanup Level								**1,000/800[19] [20]**	**500[20]**	**500[20]**	**5[20]**	**1,000[20]**	**700[20]**	**1,000[20]**	**0.2[20]**	**16[21]**	**160[21]**	**5[20]**	**5[20]**	**5[20]**	**N/A**	**5[20]**	**3,200[21]**	**5[20]**	**50[20]**	**15[20]**	**80[21]**	**80[21]**	**2[20]**	**N/A**

Table 1
Summary of Groundwater Data for Petroleum and VOCs
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Screen Interval[1] (feet)	TOC Elevation[2] (feet)	Sample Date	Sampled By	Date of Depth to Water Measurement	Depth to Water (feet below TOC)	Groundwater Elevation (feet)	Analytical Results (µg/L)																							
								GRPH[3]	DRPH[4]	ORPH[4]	Benzene[5]	Toluene[5]	Ethylbenzene[5]	Total Xylenes[5]	Vinyl Chloride[5]	cis-1-2-DCE[5]	trans-1-2-DCE[5]	EDC[5]	TCE[5]	PCE[5]	SVOCs[6] [7]	Total Arsenic[8]	Total Barium[9]	Total Cadmium[9]	Total Chromium[9]	Total Lead[10]	Total Selenium[11]	Total Silver[9]	Total Mercury[12]	pH[13]
Terry Avenue North																															
MW15	41-56	58.79	12/11/12	SoundEarth	12/10/12	40.78	18.01	<100	--	--	<0.35	<1	<1	<3	<0.2	<1	<1	<1	**8.2**	<1	--	--	--	--	--	--	--	--	--	--	--
			09/10/13	SoundEarth	08/29/13	45.37	13.42	<100	<50	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	**8.6**	<1	--	--	--	--	--	--	--	--	--	--	--	--
Thomas Street																															
MW14	90-105	104.40	10/20/11	SoundEarth	10/20/11	88.81	15.59	<100	160[x]	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--
			12/10/12	SoundEarth	12/10/12	88.66	15.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			09/11/13	SoundEarth	08/29/13	89.99	14.41	<100	<50	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--
MW16	91-106	99.02	12/11/12	SoundEarth	12/10/12	83.19	15.83	640	--	--	<0.35	<1	<1	1.1	**0.69**	**220**	<1	<1	**12**	**16**	--	--	--	--	--	--	--	--	--	--	--
			09/11/13	SoundEarth	08/29/13	84.59	14.43	<100	170[x]	<250	<1	<1	<1	<3	**1.9**	**610**	<1	<1	**5.0**	**6.4**	--	--	--	--	--	--	--	--	--	--	--	--
Fairview Avenue North																															
MW-C	85-100	107.75	09/11/13	SoundEarth	08/29/13	93.32	14.43	<100	<50	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--
Harrison Street																															
MW01	45-60	68.68	05/25/11	SoundEarth	05/25/11	50.59	18.09	<100	<50	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--
			10/11/11	SoundEarth	10/20/11	51.03	17.65	<100	<50	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--
			12/10/12	SoundEarth	12/10/12	51.24	17.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			09/10/13	SoundEarth	08/29/13	54.35	14.33	<100	<50	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	1.4	<1	--	--	--	--	--	--	--	--	--	--	--	--
MW02	55-70	70.92	05/25/11	SoundEarth	05/25/11	54.84	16.08	<100	100[x]	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	**5.2**	<1	9.3	--	--	--	--	--	--	--	--	--	--
			10/11/11	SoundEarth	10/20/11	55.08	15.84	<100	<50	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	3.0	<1	--	--	--	--	--	--	--	--	--	--	--	--
			12/10/12	SoundEarth	12/10/12	55.27	15.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			09/11/13	SoundEarth	08/29/13	56.48	14.44	<100	<50	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	3.6	<1	--	--	--	--	--	--	--	--	--	--	--	--
MW03	65-80	84.65	05/27/11	SoundEarth	05/27/11	68.75	15.90	<100	130[x]	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	<1	<1	2.8	--	--	--	--	--	--	--	--	--	--
			10/11/11	SoundEarth	10/20/11	68.97	15.68	<100	<50	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--
			12/10/12	SoundEarth	12/10/12	69.21	15.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			09/11/13	SoundEarth	08/29/13	70.21	14.44	<100	<50	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--
SMW01	30-40	49.45	--	SoundEarth	08/29/13	36.78	12.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SMW02	30-40	49.26	--	SoundEarth	08/29/13	36.67	12.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SMW06	30-40	48.63	09/10/13	SoundEarth	08/29/13	36.39	12.24	400	130[x]	<250	<1	<1	3.5	3.7	<0.2	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--
SMW08	30-40	49.30	--	SoundEarth	08/29/13	36.69	12.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Westlake Avenue North																															
SMW09	30-40	48.25	09/10/13	SoundEarth	08/29/13	35.84	12.41	<100	79[x]	<250	<1	<1	<1	<3	<0.2	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--
North-Adjoining Property																															
SLU-MW01	35-45	53.43	2/29/2012[22]	SoundEarth	08/29/13	40.00	13.43	--	150	<250	--	--	--	--	<0.2	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--
SLU-MW02	30-40	52.76	2/29/2012[22]	SoundEarth	08/29/13	Dry	--	--	<50	<250	--	--	--	--	<0.2	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--
MTCA Cleanup Level								**1,000/800[19] [20]**	**500[20]**	**500[20]**	**5[20]**	**1,000[20]**	**700[20]**	**1,000[20]**	**0.2[20]**	**16[21]**	**160[21]**	**5[20]**	**5[20]**	**5[20]**	**N/A**	**5[20]**	**3,200[21]**	**5[20]**	**50[20]**	**15[20]**	**80[21]**	**80[21]**	**2[20]**	**N/A**

NOTES:

Red denotes concentrations exceeding the MTCA Method cleanup level for groundwater.

[1]Range of feet is measured from top to bottom of the screen below ground surface.

[2]TOC elevations surveyed relative to the North American Vertical Datum of 1988.

[3]Analyzed by EPA Method 418.1 or Method NWTPH-Gx.

[4]Analyzed by NWTPH-Dx. The supply well samples collected in August 2010, were passed through a silica gel column prior to analysis to remove organic interference.

[5]Analyzed by EPA Method 8260C, 8021B or 8240.

[6]Analyzed by EPA Method 8270 or 8270D.

[7]Phenol was detected in the supply well sample collected in 1994 and dimethyl phthalate was detected in samples collected from monitoring wells MW02 through MW05. The relative concentrations are presented on this table. Phenol has a MTCA Method B cleanup level of 2,400 µg/L and dimethyl phthalate does not have a MTCA Method A or B cleanup level.

[8]Analyzed by EPA Method 7060 or 200.8.

[9]Analyzed by EPA Method 6010 or 200.8.

[10]Analyzed by EPA Method 7421 or 200.8.

[11]Analyzed by EPA Method 7740 or 200.8.

[12]Analyzed by EPA Method 7470 or 1631E.

[13]Analyzed by EPA Method 9040c or in the field.

[14]The supply well was decommissioned on July 26, 2010, by Richardson Well Drilling of Puyallup, Washington.

[15]Reported as a concentration of total petroleum hydrocarbons.

[16]Reconnaissance groundwater sample collected at an approximate depth of 75 feet below the observed depth to water.

[17]Reconnaissance groundwater sample collected at an approximate depth of 490 feet below the observed depth to water.

[18]Samples collected on October 10, 2011.

[19]1,000 µg/L when benzene is not present and 800 µg/L when benzene is present.

[20]MTCA Method A Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of WAC, revised November 2007.

[21]MTCA Cleanup Regulation, Chapter 173-340 of WAC, CLARC, Groundwater, Method B, Non-Carcinogen, Standard Formula Value, CLARC Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

[22]Sample data compiled from reports on file at the Washington State Department of Ecology.

Laboratory notes:

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

[vx]Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

-- = not analyzed, measured, or calculated

< = not detected at a concentration exceeding laboratory reporting limit

µg/L = micrograms per liter

CLARC = Cleanup Levels and Risk Calculations

DCE = dichloroethylene

DRPH = diesel-range petroleum hydrocarbons

EDC = 1,2-Dichloroethane (ethylene dichloride)

EPA = U.S. Environmental Protection Agency

GRPH = gasoline-range petroleum hydrocarbons

MTCA = Washington State Model Toxics Control Act

N/A = not applicable

NR = not reported

NWTPH = northwest total petroleum hydrocarbons

ORPH = heavy oil-range petroleum hydrocarbons

PCE = tetrachloroethylene

RETEC = Remediation Technologies of Seattle, Washington

SoundEarth = SoundEarth Strategies, Inc.

SVOCs = semi-volatile organic compounds

TCE = trichloroethylene

TOC = top of casing

WAC = Washington Administrative Code

Table 2
Summary of Soil Analytical Data for Petroleum and VOCs
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Sample ID	Depth (feet)	Date Sampled	Sampled By	Analytical Results (mg/kg)													
					GRPH[1]	DRPH[2]	ORPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]	Vinyl Chloride[3]	cis-1,2-DCE[3]	Trans-1,2-DCE[3]	EDC[3]	TCE[3]	PCE[3]	SVOCs[4][5]
On Property																		
P01	P01-05	5	10/06/10	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P01-07.5	7.5			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P01-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P01-14	14			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P01-18.5	18.5			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.026	--
	P01-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.028	--
P02	P02-02	2	10/06/10	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.039	--
	P02-05	5			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.042	--
	P02-07.5	7.5			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.025	--
	P02-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.035	--
P03	P03-05	5	10/06/10	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.13**	--
	P03-09	9			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.099**	--
	P03-12.5	12.5			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.076**	--
	P03-16	16			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.057**	--
	P03-19	19			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.080**	--
P04	P04-02.5	2.5	10/06/10	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P04-05	5			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P04-07.5	7.5			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P04-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P04-13	13			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P04-17	17			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.029	--
	P04-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
P05	P05-02.5	2.5	10/06/10	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**1.4**	--
	P05-05	5			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**2.5**	--
	P05-07.5	7.5			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.073**	--
	P05-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.087**	--
	P05-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.082**	--
	P05-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.14**	--
P06	P06-02.5	2.5	10/06/10	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.15**	--
	P06-05	5			--	--	--	--		--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.68**	--
	P06-08	8			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.44**	--
	P06-11	11			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.028	--
	P06-14	14			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.063**	--
	P06-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.099**	--
P07	P07-02.5	2.5	10/06/10	SoundEarth	<2	--	--	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.03	0.047	--
	P07-05	5			<2	--	--	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.03	**0.13**	--
	P07-07.5	7.5			<2	--	--	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.03	**0.055**	--
	P01-11	11			**1,400**[x]	--	--	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.03	**0.16**	--
MTCA Cleanup Level					**100/30**[6][7]	**2,000**[7]	**2,000**[7]	**0.03**[7]	**7**[7]	**6**[7]	**9**[7]	**0.67**[8]	**160**[9]	**1,600**[9]	**11**[8]	**0.03**[7]	**0.05**[7]	**NE**

Table 2
Summary of Soil Analytical Data for Petroleum and VOCs
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Sample ID	Depth (feet)	Date Sampled	Sampled By	Analytical Results (mg/kg)													
					GRPH[1]	DRPH[2]	ORPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]	Vinyl Chloride[3]	cis-1,2-DCE[3]	Trans-1,2-DCE[3]	EDC[3]	TCE[3]	PCE[3]	SVOCs[4][5]
P08	P08-03	3	10/07/10	SoundEarth	**52**[x]	100[x]	<250	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	**0.15**	**63**	--
	P08-05	5			2.6[x]	--	--	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.03	**0.46**	--
	P08-07.5	7.5			**580**[x]	--	--	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	**0.14**	**450**	--
	P08-10	10			**150**[x]	**4,300**[x]	**3,200**	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	**0.13**	**250**	--
	P08-14	14			<2	--	--	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.03	**1.3**	--
	P08-18	18			<2	--	--	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.03	**1.6**	--
	P08-23	23			<2	<50	<250	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.03	**1.6**	--
P09	P09-05	5	10/07/10	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.098**	--
	P09-07.5	7.5			<2	<50	<250	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P09-12	12			2.3[x]	--	--	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.03	**0.076**	--
	P09-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.089**	--
P10	P10-02.5	2.5	10/07/10	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.13**	--
	P10-07.5	7.5			<2	--	--	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.03	**0.066**	--
	P10-14	14			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.038	--
	P10-18	18			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.069**	--
	P10-22	22			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.030	--
P11	P11-02.5	2.5	10/07/10	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P11-07.5	7.5			<2	<50	<250	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.03	0.039	--
	P11-11	11			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P11-14	14			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P11-18	18			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.10**	--
P12	P12-05	5	10/07/10	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P12-10	10			<2	--	--	<0.03	<0.05	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P12-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
P13	P13-02.5	2.5	10/07/10	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P13-07.5	7.5			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P13-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P13-18	18			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
P14	P14-02.5	2.5	10/07/10	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P14-07.5	7.6			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P14-14	14			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	P14-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B01	--	6-8	12/08/10	AECOM	<5.7	<5.1	<10	<0.001	NR	NR	NR	NR	<0.001	NR	NR	0.003	**0.22**	--
	--	8-10			--	--	--	<0.0012	NR	NR	NR	NR	<0.0012	NR	NR	0.0028	**0.2**	--
	--	18-20			--	--	--	<0.0009	NR	NR	NR	NR	0.0039	NR	NR	0.0058	**0.86**	--
B02	--	7-9	12/08/10	AECOM	--	--	--	0.0062	NR	NR	NR	NR	0.0013	NR	NR	**0.031**	**2.3**	--
	--	9-11			<6	<5.2	<10	0.001	NR	NR	NR	NR	0.0015	NR	NR	0.02	**2.3**	--
	--	16-18			--	--	--	<0.0011	NR	NR	NR	NR	0.0013	NR	NR	0.0046	**0.5**	--
MTCA Cleanup Level					**100/30**[6][7]	**2,000**[7]	**2,000**[7]	**0.03**[7]	**7**[7]	**6**[7]	**9**[7]	**0.67**[8]	**160**[9]	**1,600**[9]	**11**[8]	**0.03**[7]	**0.05**[7]	**NE**

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Sample Location	Sample ID	Depth (feet)	Date Sampled	Sampled By	Analytical Results (mg/kg)													
					GRPH[1]	DRPH[2]	ORPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]	Vinyl Chloride[3]	cis-1,2-DCE[3]	Trans-1,2-DCE[3]	EDC[3]	TCE[3]	PCE[3]	SVOCs[4][5]
B03	--	--	--	AECOM	No Samples Collected													
B04	--	8-10	12/08/10	AECOM	--	--	--	0.003	NR	NR	NR	NR	<0.0009	NR	NR	0.0098	**2**	--
	--	14-16			<5.2	<5	<10	<0.001	NR	NR	NR	NR	<0.001	NR	NR	0.0069	**0.69**	--
	--	18-20			--	--	--	<0.001	NR	NR	NR	NR	<0.001	NR	NR	0.003	**0.47**	--
B05	--	10-12	12/08/10	AECOM	--	--	--	<0.0009	NR	NR	NR	NR	<0.0009	NR	NR	<0.0009	**0.057**	--
	--	13-15			<5	<5.2	<10	<0.0009	NR	NR	NR	NR	<0.0009	NR	NR	0.0012	**0.34**	--
	--	18-20			--	--	--	<0.0009	NR	NR	NR	NR	<0.0009	NR	NR	0.0012	**0.42**	--
B06	--	5-7	12/08/10	AECOM	--	--	--	<0.051	NR	NR	NR	NR	<0.051	NR	NR	<0.051	**0.87**	--
	--	8-10			--	--	--	<0.047	NR	NR	NR	NR	<0.047	NR	NR	<0.047	**0.53**	--
	--	10-11.5			<4.9	<5.7	<1	<0.052	NR	NR	NR	NR	<0.052	NR	NR	<0.052	**0.43**	--
B07	--	23-26	12/08/10	AECOM	<6.2	<5.9	<12	<0.06	NR	NR	NR	NR	0.064	NR	NR	<0.06	**0.58**	--
	--	35-37			--	--	--	<0.058	NR	NR	NR	NR	<0.058	NR	NR	<0.058	**1.7**	--
	--	37-40			--	--	--	<0.0009	NR	NR	NR	NR	0.017	NR	NR	0.0071	**0.16**	--
B08/MW01	B08-05	5	05/19/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B08-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B08-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B08-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B08-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B08-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B08-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B08-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B08-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B08-50	50			<2	<50	<250	<0.2	<0.02	<0.2	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B08-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B08-60	60			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
B09/MW02	B09-07	7	05/20/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B09-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B09-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B09-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B09-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B09-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B09-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B09-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B09-45	45			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B09-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B09-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B09-60	60			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B09-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B09-70	70			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
MTCA Cleanup Level					**100/30[6][7]**	**2,000[7]**	**2,000[7]**	**0.03[7]**	**7[7]**	**6[7]**	**9[7]**	**0.67[8]**	**160[9]**	**1,600[9]**	**11[8]**	**0.03[7]**	**0.05[7]**	**NE**

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					GRPH[1]	DRPH[2]	ORPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]	Vinyl Chloride[3]	cis-1,2-DCE[3]	Trans-1,2-DCE[3]	EDC[3]	TCE[3]	PCE[3]	SVOCs[4][5]
B10/MW03	B10-05	5	05/24/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B10-10	10			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B10-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B10-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B10-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B10-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B10-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B10-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B10-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B10-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B10-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B10-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B10-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B10-75	75			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B10-80	80			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
B11/MW04	B11-05	5	05/25/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B11-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B11-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B11-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B11-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B11-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B11-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B11-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B11-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B11-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B11-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B11-60	60			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B11-65	65			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
B12/MW05	B12-10	10	05/25/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B12-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B12-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B12-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B12-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B12-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B12-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B12-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.044	ND
	B12-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.057**	ND
	B12-70	70	05/26/11		--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.035	ND
	B12-75	75			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B12-80	80			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
MTCA Cleanup Level					**100/30**[6][7]	**2,000**[7]	**2,000**[7]	**0.03**[7]	**7**[7]	**6**[7]	**9**[7]	**0.67**[8]	**160**[9]	**1,600**[9]	**11**[8]	**0.03**[7]	**0.05**[7]	**NE**

Table 2
Summary of Soil Analytical Data for Petroleum and VOCs
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Sample ID	Depth (feet)	Date Sampled	Sampled By	Analytical Results (mg/kg)													
					GRPH[1]	DRPH[2]	ORPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]	Vinyl Chloride[3]	cis-1,2-DCE[3]	Trans-1,2-DCE[3]	EDC[3]	TCE[3]	PCE[3]	SVOCs[4][5]
B13/MW06	B13-04.5	4.5	05/25/11	SoundEarth	2.8	<50	<250	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B13-09	9			<2	<50	<250	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B13-14	14			<2	<50	<250	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B13-19	19			<2	<50	<250	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B13-24	24			<2	<50	<250	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.069**	<0.3
	B13-29	29			<2	<50	<250	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.039	<0.3
	B13-34	34			<2	<50	<250	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B13-39	39			<2	<50	<250	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B13-44	44			<2	<50	<250	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.037	<0.3
	B13-49	49			**1,700**	300	<250	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.070**	<0.3
	B13-54	54			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B13-55	55	05/26/11		<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B13-58	58			<2	<50	<250	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B13-64	64			<2	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B13-69	69			<2	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B13-74	74			<2	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
B14	B14-04	4	05/26/11	SoundEarth	<2	<50	<250	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B14-09	9			<2	<50	<250	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B14-14	14			<2	<50	<250	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B14-19	19			<2	<50	<250	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B14-23.5	23.5			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B14-30	30			**1,100**	350[x]	<250	<0.2	<0.2	2.0	2.7	<0.05	<0.05	<0.05	<0.05	<0.03	**0.23**	<0.3
	B14-33.5	33.5			**930**	120[x]	<250	<0.2	<0.2	2.4	3.1	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B14-36	36			14	<50	<250	<0.02	<0.02	0.059	0.070	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B14-41	41			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	0.31
	B14-46	46	05/27/11		<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	1.2
	B14-51	51			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	0.44
	B14-56	56			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B14-58	58			**2,000**	<50	<250	<0.1	<0.1	2.7	3.9	<0.05	<0.05	<0.05	<0.05	<0.03	**0.13**	<0.3
	B14-61	61			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	1.1
	B14-65	65			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B14-69	69			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
	B14-75	75			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	<0.3
B15/MW07	B15-30	30	05/26/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B15-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B15-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B15-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B15-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B15-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B15-65	65			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
	B15-70	70			<2	<50	<250	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	ND
MTCA Cleanup Level					**100/30**[6][7]	**2,000**[7]	**2,000**[7]	**0.03**[7]	**7**[7]	**6**[7]	**9**[7]	**0.67**[8]	**160**[9]	**1,600**[9]	**11**[8]	**0.03**[7]	**0.05**[7]	**NE**

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Summary of Soil Analytical Data for Petroleum and VOCs
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Sample ID	Depth (feet)	Date Sampled	Sampled By	Analytical Results (mg/kg)													
					GRPH[1]	DRPH[2]	ORPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]	Vinyl Chloride[3]	cis-1,2-DCE[3]	Trans-1,2-DCE[3]	EDC[3]	TCE[3]	PCE[3]	SVOCs[4][5]
B16	B16-06	6	09/26/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.38**	--
	B16-11	11			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B16-16	16			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.051**	--
	B16-17	17			--	--	--	--	--	--	--	--	--	--	--	--	--	--
	B16-18	18			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B16-20	20			--	--	--	--	--	--	--	--	--	--	--	--	--	--
	B16-22	22			--	--	--	--	--	--	--	--	--	--	--	--	--	--
	B16-23.5	23.5			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.18**	--
	B16-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.085**	--
	B16-29	29			--	--	--	--	--	--	--	--	--	--	--	--	--	--
	B16-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.028	--
	B16-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B16-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B16-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.046	--
	B16-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.18**	--
	B16-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B16-65	65	09/27/11		--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B16-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.043	--
B17	B17-06	6	09/27/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.046	--
	B17-11	11			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.053**	--
	B17-16	16			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.14**	--
	B17-21	21			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B17-26	26			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.030	--
	B17-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B17-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.030	--
	B17-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.076**	--
	B17-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.082**	--
	B17-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.042**	--
	B17-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.047**	--
	B17-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.062**	--
	B17-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.067**	--
	B17-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B17-75	75			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B17-80	80			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B18	B18-25	25	09/28/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.12**	--
	B18-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.059**	--
	B18-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.054**	--
	B18-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.11**	--
	B18-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.072**	--
	B18-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.12**	--
	B18-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.11**	--
	B18-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.12**	--
	B18-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.11**	--
	B18-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.027	--
MTCA Cleanup Level					**100/30**[6][7]	**2,000**[7]	**2,000**[7]	**0.03**[7]	**7**[7]	**6**[7]	**9**[7]	**0.67**[8]	**160**[9]	**1,600**[9]	**11**[8]	**0.03**[7]	**0.05**[7]	**NE**

Table 2
Summary of Soil Analytical Data for Petroleum and VOCs
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Sample ID	Depth (feet)	Date Sampled	Sampled By	Analytical Results (mg/kg)													
					GRPH[1]	DRPH[2]	ORPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]	Vinyl Chloride[3]	cis-1,2-DCE[3]	Trans-1,2-DCE[3]	EDC[3]	TCE[3]	PCE[3]	SVOCs[4][5]
B19	B19-25	25	09/29/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.11	--
	B19-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B19-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B19-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B19-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B19-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B19-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B19-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B19-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B19-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B20	B20-15	15	09/29/11	SoundEarth	2,200	--	--	**<0.1**	<0.1	4.6	22	<0.05	<0.05	<0.05	<0.05	<0.03	0.22	--
	B20-20	20	09/30/11		<2	--	--	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B20-25	25			**34**	--	--	<0.02	<0.02	0.061	0.30	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B20-30	30			<2	--	--	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B20-35	35			<2	--	--	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B20-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B20-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B20-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B20-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B20-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B20-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B20-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B21	B21-05	5	09/30/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.28	--
	B21-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B21-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B21-20	20	10/04/11		--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B21-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B21-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B21-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B21-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B21-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B21-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B21-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B21-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B21-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B21-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
MTCA Cleanup Level					**100/30**[6][7]	**2,000**[7]	**2,000**[7]	**0.03**[7]	**7**[7]	**6**[7]	**9**[7]	**0.67**[8]	**160**[9]	**1,600**[9]	**11**[8]	**0.03**[7]	**0.05**[7]	**NE**

Table 2
Summary of Soil Analytical Data for Petroleum and VOCs
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Sample ID	Depth (feet)	Date Sampled	Sampled By	Analytical Results (mg/kg)													
					GRPH[1]	DRPH[2]	ORPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]	Vinyl Chloride[3]	cis-1,2-DCE[3]	Trans-1,2-DCE[3]	EDC[3]	TCE[3]	PCE[3]	SVOCs[4][5]
B22	B22-05	5	10/03/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B22-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B22-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B22-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B22-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B22-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B22-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B22-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B22-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B22-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B22-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B22-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B22-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B22-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B23	B23-05	5	10/05/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B23-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B23-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B23-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B23-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B23-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B23-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B23-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B23-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B23-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B23-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B23-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B23-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B23-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B24	B24-05	5	10/05/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B24-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B24-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B24-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B24-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B24-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B24-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B24-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B24-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B24-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B24-55	55	10/06/11		--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B24-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B24-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B24-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
MTCA Cleanup Level					**100/30**[6][7]	**2,000**[7]	**2,000**[7]	**0.03**[7]	**7**[7]	**6**[7]	**9**[7]	**0.67**[8]	**160**[9]	**1,600**[9]	**11**[8]	**0.03**[7]	**0.05**[7]	**NE**

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					GRPH[1]	DRPH[2]	ORPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]	Vinyl Chloride[3]	cis-1,2-DCE[3]	Trans-1,2-DCE[3]	EDC[3]	TCE[3]	PCE[3]	SVOCs[4][5]
B25	B25-05	5	10/06/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B25-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B25-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B25-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B25-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B25-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B25-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B25-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B25-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B25-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B25-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B25-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B25-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B26/MW08	B26-05	5	10/07/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-80	80			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-90	90	10/10/11		--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-100	100			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B26-110	110			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B27/MW09	B27-20	20	10/11/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B27-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B27-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B27-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B27-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B27-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B27-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B27-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B27-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B27-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B27-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B27-80	80			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B27-90	90	10/12/11		--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B27-100	100			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B27-110	110			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
MTCA Cleanup Level					**100/30[6][7]**	**2,000[7]**	**2,000[7]**	**0.03[7]**	**7[7]**	**6[7]**	**9[7]**	**0.67[8]**	**160[9]**	**1,600[9]**	**11[8]**	**0.03[7]**	**0.05[7]**	**NE**

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Seattle, Washington

Sample Location	Sample ID	Depth (feet)	Date Sampled	Sampled By	Analytical Results (mg/kg)													
					GRPH[1]	DRPH[2]	ORPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]	Vinyl Chloride[3]	cis-1,2-DCE[3]	Trans-1,2-DCE[3]	EDC[3]	TCE[3]	PCE[3]	SVOCs[4][5]
B28/MW10	B28-05	5	10/10/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-75	75			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-80	80			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-85	85			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B28-90	90			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B29	B29-15	15	10/10/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B29-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B29-25	24			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B29-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B29-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B29-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B29-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B29-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B29-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B29-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B29-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B29-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B30/MW11	B30-15	15	10/11/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B30-16.5	16.5			--	--	--	--	--	--	--	--	--	--	--	--	--	--
	B30-18	18			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.026	--
	B30-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B30-21.5	21.5			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B30-23	23			--	--	--	--	--	--	--	--	--	--	--	--	--	--
	B30-24	24			--	--	--	--	--	--	--	--	--	--	--	--	--	--
	B30-30	30			--	--	--	--	--	--	--	--	--	--	--	--	--	--
	B30-35	35			3.4	--	--	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B30-40	40			**730**	--	--	<0.1	<0.1	1.5	5.9	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B30-45	45			<2	--	--	<0.02	<0.02	<0.02	<0.06	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B30-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B30-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B30-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B30-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B30-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B30-75	75			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B30-80	80			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B30-83	83			--	--	--	--	--	--	--	--	--	--	--	--	--	--
B31/MW12	B31-80	80	10/13/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B31-85	85			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B31-90	90			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B31-95	95			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B31-100	100			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
MTCA Cleanup Level					**100/30[6][7]**	**2,000[7]**	**2,000[7]**	**0.03[7]**	**7[7]**	**6[7]**	**9[7]**	**0.67[8]**	**160[9]**	**1,600[9]**	**11[8]**	**0.03[7]**	**0.05[7]**	**NE**

Table 2
Summary of Soil Analytical Data for Petroleum and VOCs
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Sample ID	Depth (feet)	Date Sampled	Sampled By	Analytical Results (mg/kg)													
					GRPH[1]	DRPH[2]	ORPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]	Vinyl Chloride[3]	cis-1,2-DCE[3]	Trans-1,2-DCE[3]	EDC[3]	TCE[3]	PCE[3]	SVOCs[4][5]
B32	--	--	--	AESI	Geotech Boring - no samples collected													
B33	B33-05	5	10/13/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B33-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B33-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B33-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B33-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B33-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B33-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B33-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B33-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B33-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B33-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B33-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B33-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B34	B34-25	25	10/14/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B34-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B34-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B34-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B34-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B34-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.029	--
	B34-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B34-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B34-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B35	B35-05	5	10/14/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B35-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B35-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B35-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B35-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B35-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B35-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B35-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B35-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B35-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B35-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B35-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B35-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B36	B36-05	5	10/17/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B36-10	10			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B36-15	15			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.028	--
	B36-20	20			--	--	--	--	--	--	--	--	--	--	--	--	--	--
	B36-25	25			--	--	--	--	--	--	--	--	--	--	--	--	--	--
	B36-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	0.039	--
	B36-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B36-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	**0.099**	--
	B36-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B36-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B36-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B36-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B36-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B36-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
MTCA Cleanup Level					**100/30**[6][7]	**2,000**[7]	**2,000**[7]	**0.03**[7]	**7**[7]	**6**[7]	**9**[7]	**0.67**[8]	**160**[9]	**1,600**[9]	**11**[8]	**0.03**[7]	**0.05**[7]	**NE**

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Summary of Soil Analytical Data for Petroleum and VOCs
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Sample ID	Depth (feet)	Date Sampled	Sampled By	Analytical Results (mg/kg)													
					GRPH[1]	DRPH[2]	ORPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]	Vinyl Chloride[3]	cis-1,2-DCE[3]	Trans-1,2-DCE[3]	EDC[3]	TCE[3]	PCE[3]	SVOCs[4][5]
B37/MW13	B37-15	15	10/18/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B37-20	20			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B37-25	25			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B37-30	30			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B37-35	35			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B37-40	40			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B37-45	45			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B37-50	50			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B37-55	55			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B37-60	60			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B37-65	65			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B37-70	70			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B37-75	75			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B37-80	80			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B37-85	85			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B38/MW14	B38-95	95	10/19/11	SoundEarth	--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B38-100	100			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B38-105	105			--	--	--	--	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B39	B39-3-4	3-4	01/16/12	AECOM	--	--	--	--	--	--	--	<0.0011	0.0029	<0.0011	<0.0011	0.0077	**5.1**	--
	B39-7-8	7-8			--	--	--	--	--	--	--	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	**0.088**	--
	B39-11-12	11-12			--	--	--	--	--	--	--	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	0.049	--
B40	B40-7-8	7-8	01/16/12	AECOM	--	--	--	--	--	--	--	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	0.0017	--
	B40-11-12	11-12			--	--	--	--	--	--	--	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	0.0013	--
B41	B41-7-8	7-8	01/16/12	AECOM	--	--	--	--	--	--	--	<0.0009	<0.0009	<0.0009	<0.0009	0.0015	**0.180**	--
	B41-11-12	11-12			--	--	--	--	--	--	--	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	**0.130**	--
B42	B42-3-4	3-4	01/16/12	AECOM	--	--	--	--	--	--	--	<0.001	<0.001	<0.001	<0.001	<0.001	**0.053**	--
	B42-7-8	7-8			--	--	--	--	--	--	--	<0.001	<0.001	<0.001	<0.001	<0.0012	0.028	--
B43	B43-3-4	3-4	01/16/12	AECOM	--	--	--	--	--	--	--	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	**0.220**	--
	B43-7-8	7-8			--	--	--	--	--	--	--	<0.001	<0.001	<0.001	<0.001	<0.001	0.015	--
B44	B44-3-4	3-4	01/16/12	AECOM	--	--	--	--	--	--	--	<0.0009	0.019	<0.0009	<0.009	0.01	**1.7**	--
	B44-7-8	7-8			--	--	--	--	--	--	--	<0.0011	0.0013	<0.0011	<0.0011	**0.092**	**5.6**	--
	B44-11-12	11-12			--	--	--	--	--	--	--	<0.0011	<0.0011	<0.0011	<0.0011	0.0009	**0.057**	--
	B44-11-12	15-16			--	--	--	--	--	--	--	<0.0011	<0.0011	<0.0011	<0.0011	0.0007	0.045	--
B45	B45-3-4	3-4	01/16/12	AECOM	--	--	--	--	--	--	--	<0.0011	<0.063	<0.001	<0.001	0.0033	**7.7**	--
	B45-7-8	7-8			--	--	--	--	--	--	--	<0.0015	0.015	<0.0015	<0.0015	**0.035**	**11**	--
	B45-11-12	11-12			--	--	--	--	--	--	--	<0.001	0.0068	<0.001	<0.001	0.018	**6.4**	--
	B45-11-12	15-16			--	--	--	--	--	--	--	<0.0012	0.0006	<0.0012	<0.0012	0.0015	**0.078**	--
MTCA Cleanup Level					**100/30**[6][7]	**2,000**[7]	**2,000**[7]	**0.03**[7]	**7**[7]	**6**[7]	**9**[7]	**0.67**[8]	**160**[9]	**1,600**[9]	**11**[8]	**0.03**[7]	**0.05**[7]	**NE**

Table 2
Summary of Soil Analytical Data for Petroleum and VOCs
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Sample ID	Depth (feet)	Date Sampled	Sampled By	Analytical Results (mg/kg)													
					GRPH[1]	DRPH[2]	ORPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]	Vinyl Chloride[3]	cis-1,2-DCE[3]	Trans-1,2-DCE[3]	EDC[3]	TCE[3]	PCE[3]	SVOCs[4][5]
B49	B49-36	36	12/05/12	SoundEarth	<2	--	--	<0.03	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B49-41	41			<2	--	--	<0.03	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B48-46	46			<2	--	--	<0.03	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
B50	B50-06	6	12/06/12	SoundEarth	<2	--	--	<0.03	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B50-11	11			<2	--	--	<0.03	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B50-81	81	12/07/12		<2	--	--	<0.03	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
	B50-84	84			2,500	--	--	<0.03	<0.05	0.93	5	<0.05	0.12	<0.05	<0.05	0.10	2.3	--
	B50-86	86			170	--	--	<0.03	<0.05	<0.05	0.12	<0.05	<0.05	<0.05	<0.05	<0.03	0.14	--
	B50-91	91			<2	--	--	<0.03	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.03	<0.025	--
MTCA Cleanup Level					**100/30**[6][7]	**2,000**[7]	**2,000**[7]	**0.03**[7]	**7**[7]	**6**[7]	**9**[7]	**0.67**[8]	**160**[9]	**1,600**[9]	**11**[8]	**0.03**[7]	**0.05**[7]	**NE**

NOTES:

Red denotes concentration exceeds MTCA Soil cleanup level.

[1]Analyzed by NWTPH Method NWTPH-Gx.

[2]Analyzed by NWTPH Method NWTPH-Dx.

[3]Analyzed by EPA Method 8260C or 8021B.

[4]Analyzed by EPA Method 8270C.

[5]Bis(2-ethylhexyl) phthalate was the only SVOC detected, the concentrations of which are well below the MTCA Method B cleanup level of 71 mg/kg. The reported results are the highest laboratory detection limit for all SVOCs analyzed or the concentration of (2-bis(2-ethylhexyl) phthalate, if detected in the sample.

[6]100 mg/kg when benzene is not present and 30 mg/kg when benzene is present.

[7]MTCA Method A Soil Cleanup Levels for Unrestricted Land Uses, Table 740-1 of Section 900 of Chapter 173-340 of WAC, revised November 2007.

[8]MTCA Cleanup Regulation, Chapter 173-340 of WAC, CLARC, Soil, Method B, Carcinogen, Standard Formula Value, CLARC Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

[9]MTCA Cleanup Regulation, Chapter 173-340 of WAC, CLARC, Soil, Method B, Non-Carcinogen, Standard Formula Value, CLARC Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

Laboratory Note:

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

-- = not analyzed, measured, or calculated

< = analytical result does not exceed laboratory reporting limit

AECOM = AECOM Technology Corporation

AESI = Associated Earth Sciences, Inc.

CLARC = cleanup levels and risk calculations

DCE = dichloroethene

DRPH = diesel-range petroleum hydrocarbons

EDC = 1,2-dichloroethane (ethylene dichloride)

EPA = U.S. Environmental Protection Agency

GRPH = gasoline-range petroleum hydrocarbons

mg/kg = milligrams per kilogram

MTCA = Washington State Model Toxics Control Act

ND = not detected above the laboratory reporting limit

NE = not established

NR = not reported

NWTPH = northwest total petroleum hydrocarbon

ORPH = oil-range petroleum hydrocarbons

PCE = tetrachloroethylene

SoundEarth = SoundEarth Strategies, Inc.

SVOC = semivolatile organic compound

TCE = trichloroethylene

VOC = volatile organic compound

WAC = Washington Administrative Code

Table 3
Applicable or Relevant and Appropriate Requirements
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Standard, Requirement, Criterion, or Limitation	Citation or Reference	Description	Comments and Substantive Requirements
State Environmental Policy Act			
SEPA	Chapter 197-11 WAC	Provides the framework for state agencies to evaluate the environmental consequences of a project and ensure appropriate measures are taken to mitigate environmental impacts.	Applicable to the interim action and the redevelopment project. Two SEPA checklists were prepared, one for the redevelopment project and one for the interim action. Both SEPA checklists were granted a determination of nonsignificance.
Resource Conservation and Recovery Act of 1976			
Identification and Listing of Hazardous Waste	40 CFR Part 261	Defines those solid wastes which are subject to regulations as hazardous wastes and lists specific chemical and industry-source wastes.	Applicable because they define the solid wastes that are subject to regulations as hazardous wastes. A dry cleaning facility formerly operated on the Troy Laundry Property; therefore, solid waste generated as part of the interim action is considered an industry-source waste and carries an F-listing. A contained-out determination has been requested from Ecology to determine if certain areas of soil contamination no longer contain a listed waste and are exempt from management as hazardous waste under Ecology's Contained-In Policy. Hazardous waste encountered during the interim action, if any, that is not included in the contained-out determination, will be subject to these regulations.
Standards Applicable to Generators of Hazardous Waste	40 CFR Part 262	Regulates the manifesting, pre-transport requirements, and recordkeeping and reporting for hazardous waste generators.	Applicable to materials generated during the interim action. Hazardous waste encountered during the interim action, if any, that is not included in the contained-out determination, will be subject to these regulations. The generator will manifest, package, and keep sufficient records of all hazardous waste. SoundEarth will assist the generator to ensure compliance.
Standards Applicable to Transporters of Hazardous Waste	40 CFR Part 263	Establishes standards that apply to persons transporting hazardous waste if the transportation requires a manifest under RCRA.	Applicable to materials transported during the interim action. If hazardous waste is encountered that is not included in Ecology's contained-out determination, the transporter will manage the waste in accordance with these regulations. Those regulations include maintaining compliance with the manifest, obtaining a valid EPA identification number, and maintaining records. SoundEarth will assist the transporter to ensure compliance.

Table 3
Applicable or Relevant and Appropriate Requirements
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Standard, Requirement, Criterion, or Limitation	Citation or Reference	Description	Comments and Substantive Requirements
Land Disposal Restrictions	40 CFR Part 268	Establishes standards for land disposal of hazardous waste. Identifies hazardous wastes that are restricted from land disposal and defines those limited circumstances under which an otherwise prohibited waste may continue to be land disposed.	Applicable for land disposal of hazardous waste during the interim action. Specifically, if hazardous waste is generated during the interim action, the generator will determine if the waste requires treatment prior to land disposal.
Department of Transportation, Hazardous Materials and Oil Transportation			
Hazardous Materials Regulations	49 CFR Parts 171 through 174	Establishes specific DOT regulations and technical guidelines for the off-site transport of generated hazardous materials. Regulations and technical guidelines include communications, emergency response information, training requirements, and responsibilities required for transporters of hazardous waste.	Applicable because the interim action includes the off-site transport and management of generated hazardous waste. If hazardous waste is transported off-property, the transporters will be subject to these regulations.
Washington State Dangerous Waste Regulations			
Identifying Solid Waste	Chapter 173-303-016 WAC	Provides the requirements for solid waste identification.	Applicable because they define protocols necessary to determine whether generated materials are subject to Chapter 173-303-070 WAC. Specifically, soil and groundwater that have been impacted by the spent materials from the former dry cleaning facility located on the Troy Laundry Property are subject to the requirements identified in Chapter 173-303-070 WAC.
Designation of Solid Waste	Chapter 173-303-070 WAC	Establishes the procedures for determining whether a solid waste is, or is not, a dangerous waste or an extremely hazardous waste.	Applicable to solid waste encountered during the interim action. Solid waste that is generated during the interim action is subject to these regulations to ensure proper management. Soil has already been designated a dangerous waste (F002). A contained-out determination has been requested from Ecology for certain areas of soil contamination. Ecology will determine if such soil does not represent a listed waste and therefore exempt from management as hazardous waste under Ecology's Contained-In Policy. Waste generated during the interim action, if any, that is not included in Ecology's contained-out determination, will be subject to these regulations.

Table 3
Applicable or Relevant and Appropriate Requirements
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Standard, Requirement, Criterion, or Limitation	Citation or Reference	Description	Comments and Substantive Requirements
Excluded Categories of Waste	Chapter 173-303-071 WAC	Describes those categories of wastes that are excluded from the requirements of WAC 173-303.	Applicable for waste generated during construction dewatering. The waste will be discharged in accordance with 173-303-071(3)(ii) and a King County Construction Dewatering Authorization.
Land Disposal Restrictions	Chapter 173-303-140 WAC	This regulation establishes state standards for land disposal of dangerous waste and incorporates, by reference, Federal land-disposal restrictions of 40 CFR 268 that are applicable to solid waste.	Applicable to dangerous waste encountered during the interim action. Specifically, dangerous waste that is generated, if any, and removed during the interim action for offsite land disposal would be subject to the identification of applicable land-disposal restrictions at the point of generation of the waste.
Requirements for Generators of Dangerous Waste and Manifesting	Chapter 173-303-170 through 180 WAC	Establishes the requirements for dangerous waste generators.	Applicable to generators of dangerous waste. During the interim action, the generator will be responsible for designating waste by the requirements of Chapter 173-303-070 WAC and will comply with certain land disposal restrictions per Chapter 173-303-140 WAC.
Generator Recordkeeping and Reporting	Chapter 173-303-210 and 220 WAC	Establishes the recordkeeping and reporting requirements for the generator.	Applicable to dangerous waste that may be generated during the interim action. Specifically, the generator will manage hazardous waste that is not included in Ecology's contained-out determination in accordance with these regulations, which includes annual reporting, retention of waste manifests, and waste designation records.
Requirements for Transporters of Dangerous Waste; Dangerous Waste Acceptance, Transport, and Delivery; and Transporter Recordkeeping	Chapter 173-303-240 through 270 WAC	Establishes the standards that apply to persons transporting dangerous waste.	Applicable to dangerous waste that may be transported during the interim action. Specifically, the transporter will manage hazardous waste that is not included in Ecology's contained-out determination in accordance with these regulations, which includes manifesting, labeling, reporting, and spill prevention.

Table 3
Applicable or Relevant and Appropriate Requirements
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Standard, Requirement, Criterion, or Limitation	Citation or Reference	Description	Comments and Substantive Requirements
Washington State Solid Waste Management Act			
On-Site Storage, Collection, and Transportation Standards	Chapter 173-350-300 WAC	Establishes the requirements for the collection, temporary storage, and transportation of solid waste.	Applicable to collection, temporary storage, and transportation of non-hazardous waste that is generated as part of the interim action. A contained-out determination has been requested from Ecology to determine if certain areas of contamination are exempt from management as hazardous waste under Ecology's Contained-In Policy. If Ecology approves a contained-out determination, the waste will not be required to be managed as dangerous waste.

Table 3
Applicable or Relevant and Appropriate Requirements
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Standard, Requirement, Criterion, or Limitation	Citation or Reference	Description	Comments and Substantive Requirements
UIC Program			
UIC Well Classification Including Allowed and Prohibited Wells	Chapter 173-218-040 WAC	Establishes the classification system for injection wells in Washington State, including injection wells used for remediation wells receiving fluids intended to clean up, treat, of prevent subsurface contamination.	Relevant because injection wells installed as part of this interim action are considered Class V wells.
Requirements to Operate a UIC Well	Chapter 173-218-060 WAC	Establishes the protocol to operate a UIC well.	Although the injection wells will not require a permit, this regulation requires the injection wells to be registered with the UIC Program.
Rule Authorization and Registration	Chapter 173-218-070 WAC	Provides requirements for UIC wells to receive rule authorization and details on registering UIC wells with the UIC Program.	In accordance with these regulations, the injection wells will be registered and are rule authorized by the UIC Program.
The Nonendangerment Standard for UIC Wells	Chapter 173-218-080 WAC	Establishes the standards for injection wells to meet the nonendangerement standard.	In accordance with these regulations, the UIC registration will require downgradient monitoring to ensure that the injections are in compliance with this regulation.
Decommissioning a UIC Well	Chapter 173-218-120 WAC	Provides standards for decommissiong a UIC well. Class V wells that are in contact with an aquifer must be decommissioned with the most applicable method in Chapter 173-160 WAC.	Applicable to the decommissiong of the injection wells used as part of this interim action. The injection wells will be decommissioned in accordance with Chapter 173-160-460 WAC.

Table 3
Applicable or Relevant and Appropriate Requirements
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Standard, Requirement, Criterion, or Limitation	Citation or Reference	Description	Comments and Substantive Requirements
Washington State Water Well Construction Act			
General Requirements for Resource Protection Well Construction and Geotechnical Soil Borings	Chapters 173-160-400 through 173-160-450 WAC	Provides requirements for the construction of resource protection wells including minimum casing standards, equipment cleaning standards, limitations of drilling materials, and well sealing requirements.	Applicable because resource protection wells will be used for groundwater treatment injections and groundwater monitoring. The wells will be installed in accordance with these regulations.
General Requirements for Resource Protection Well Construction and Geotechnical Soil Borings - What is the Decommissioning Process for Resource Protection Wells?	Chapter 173-160-460 WAC	Provides requirements for the decommissioning of resource protection wells.	Applicable because the injection wells and confirmation monitoring wells will be decommissioned as part of this interim action. The wells will be decommissioned in accordance with these regulations.
General Requirements for Water Well Construction	Chapters 173-160-101 through 173-160-351 WAC	Provides requirements for the construction of dewatering wells including minimum casing standards, equipment cleaning standards, limitations of drilling materials, and well sealing requirements.	Applicable because temporary dewatering wells will be installed as part of the interim action. The dewatering wells will be installed in accordance with these regulations.
General Requirements for Water Well Construction - What are the Standards for Decommissioning a Well?	Chapter 173-160-381 WAC	Provides requirements for the decommissioning of water wells.	Applicable because the temporary dewatering wells will be decommissioned as part of the interim action. The wells will be decommissioned in accordance with these regulations.
Occupational Safety and Health Administration			
OSHA	OSHA 29 CFR 1910	Federal standards for the safety and health rules to protect employees from workplace hazards.	Applicable for workers and workplaces where the interim action activities are occurring. . Workers involved in the interim action will have Hazardous Waste Operations and Emergency Response certifications. Work will be conducted in accordance with site-specific health and safety plans.
Washington Industrial Safety and Health Act of 1973			
WISHA	WAC 296-62	State standards for the safety and health rules to protect employees from workplace hazards.	Applicable for workers and workplaces where the interim action activities are occurring. . Workers involved in the interim action will have Hazardous Waste Operations and Emergency Response certifications. Work will be conducted in accordance with site-specific health and safety plans.

Table 3
Applicable or Relevant and Appropriate Requirements
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Standard, Requirement, Criterion, or Limitation	Citation or Reference	Description	Comments and Substantive Requirements
Seattle Municipal Code Environmental Protection and Historic Preservation, Landmarks Preservation			
Designation of Landmark Sites	Subchapter III, Title 25.12.350 through 25.12.450 SMC	Establishes procedures to designate, preserve, protect, enhance, and perpetuate those sites, improvements and objects which reflect significant elements of the City's cultural, aesthetic, social, economic, political, architectural, engineering, historic, or other heritage, consistent with the established long-term goals and policies of the City.	The substantive requirements have been completed for buildings that were located on the Troy Laundry Property. The Landmark Preservations Board designated certain portions of the Troy Laundry Building and the Boren Investment Company Warehouse as Seattle Landmarks, which are required to be preserved during the interim action and the redevelopment project.
Alterations or Significant Changes	Subchapter VI, Title 25.12.670 through 25.12.835 SMC	Establishes procedures required to alter buildings that have been designated as Seattle Landmarks.	Portions of the substantive requirements have been completed for the redevelopment project and interim action. Touchstone has already applied for and received a Certificate of Approval from the Landmarks Preservation Board to alter portions of the Troy Laundry Building and the Boren Investment Company Warehouse. The remaining requirements are applicable to preserve the Seattle Landmarks. In accordance with the Certificate of Approval and Seattle DPD Permit #6380479, portions of the buildings will be preserved and incorporated into the final redevelopment using structural bracing.
Seattle Municipal Code Environmental Protection and Historic Preservation, Noise Control			
City of Seattle Noise Control	Title 25.08.425 SMC	Establishes working hours for construction equipment within zones in the City of Seattle and the sound levels that may not be exceeded during those working hours.	Applicable to construction conducted during the interim action. In accordance with this code, working hours will be limited between 7:00 am and 7:00 pm on weekdays and 9:00 am and 7:00 pm on weekends and holidays. If longer working hours are required, a variance will be requested per Title 25.08.460 SMC.

Table 3
Applicable or Relevant and Appropriate Requirements
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Standard, Requirement, Criterion, or Limitation	Citation or Reference	Description	Comments and Substantive Requirements
Seattle Municipal Code, Building and Construction Codes			
Grading Code	Title 22.107 SMC	Establishes standards for grading and land disturbing activity in the City of Seattle.	The substantive requirements are applicable because the interim action includes excavation of soil. The excavation will progress in accordance with these regulations which includes permitting, inspection, erosion control, safety, and property protection requirements. The City of Seattle Department of Development and Planning will be the lead inspector to ensure compliance with the grading code. A permit for shoring and excavation is currently being reviewed by Seattle DPD.
2012 Seattle Building Code			
Concrete, Minimum Slab Provisions	Section 1907	Establishes the minimum standards for concrete floor slabs.	The substantive requirements are applicable for the concrete floor slab that will be constructed during the redevelopment project. At a minimum, a vapor retarder will be placed below the concrete floor slab. If analytical results from the Revised Sampling Plan indicate that there is an unacceptable risk to receptors, a vapor barrier may be considered.
City of Seattle Mechanical Code			
Ventilation of Enclosed Motor Vehicle Occupancies	Section 404	Establishes the standards required for ventilation of parking garages and includes details on areas that must maintain positive pressure relative to the garage and air exchange rates.	The substantive requirements are applicable because a ventilation system will be installed in the parking garage of the new buildings. The requirements specify the minimum design capability of a ventilation system and that all parking garage connecting rooms, including elevator lobbies, need to be maintained at a positive pressure relative to the parking garage.
Systems Control	Section 405	Establishes the standards for control systems on mechanical ventilation systems.	The substantive requirements are applicable because a ventilation system will be installed in the parking garage of the new buildings. The ventilation systems will be equipped with programmable controls, which can be operated continuously.

Table 3
Applicable or Relevant and Appropriate Requirements
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Standard, Requirement, Criterion, or Limitation	Citation or Reference	Description	Comments and Substantive Requirements
King County Industrial Waste Local Discharge Limits			
National Pretreatment Standards and King County Industrial Waste Local Discharge Limits	Title 40 CFR Chapter 403 and King County Code 28.84.060	Establishes the national and local discharge limits for discharging to the sewer system.	The substantive requirements are applicable because construction dewatering will be discharged to the King County sewer system. A King County Construction Dewatering Authorization has been procured to discharge construction water, including contaminated runoff, to the sewer system.

NOTES:
CFR = Code of Federal Regulations
DOT = Department of Transportation
Ecology = Washington State Department of Ecology
EPA = U.S. Environmental Protection Agency
OSHA = Occupational Safety and Health Administration
RCRA = Resource Conservation and Recovery Act
SEPA = State Environmental Policy Act
UIC = Underground Injection Control
WAC = Washington Administrative Code
WISHA = Washington Industrial Safety and Health Act

Table 4
Soil Disposal Volumes by Grid Layer
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Soil Management	Depth of Layer	Reference	Concentration of PCE 0.025 mg/kg < PCE < 0.05 mg/kg	Concentration of PCE 0.05 mg/kg< PCE <14 mg/kg	Buffer Zone
Grid Layer	**ft NAVD88**	**Figure**	**bank cubic yards**	**bank cubic yards**	**bank cubic yards**
1	105–100	19A	0	0	0
2	100–90	19B	1,037	5,630	1,926
3	90–80	19C	1,259	9,296	2,296
4	80–70	19D	3,444	8,185	3,074
5	70–60	19E	3,741	6,593	2,730
6	60-50	19F	3,037	4,593	3,111
7	50–40	19G	3,593	5,407	2,444
8	40–30	19H	1,259	2,185	2,111
9	30–20	19I	1,074	1,185	1,925
10	20–10	19J	0	0	296
Total Bank Cubic Yards			18,444	43,074	19,617
Total Tons			**29,326**	**68,488**	30,995

NOTES:
ft = feet
mg/kg = milligrams per kilogram
NAVD88 = North American Vertical Datum of 1988
PCE = tetrachloroethylene

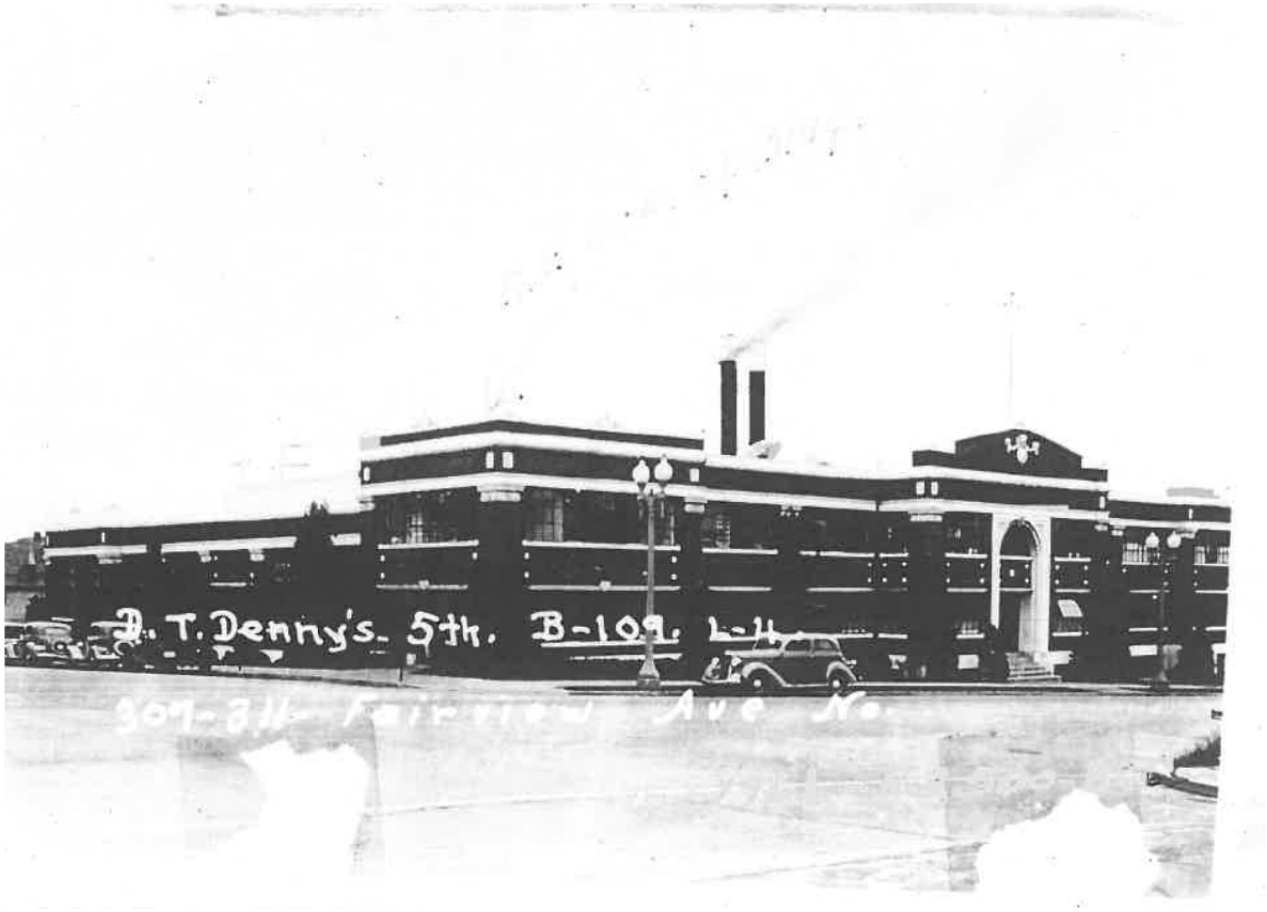
APPENDIX A

REVISED POST-EXCAVATION EVALUATION SAMPLING AND ANALYSIS PLAN

SoundEarth Strategies, Inc.
2811 Fairview Avenue East, Suite 2000
Seattle, Washington 98102

REVISED POST-EXCAVATION EVALUATION SAMPLING AND ANALYSIS PLAN

APPENDIX A OF THE ENGINEERING DESIGN REPORT



Property:
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington
Ecology Facility ID: 19135499

Prepared for:
Touchstone SLU LLC
2025 First Avenue, Suite 1212
Seattle, Washington

Report Date:
February 13, 2014

Revised Post-Excavation Evaluation Sampling and Analysis Plan

Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington 98121
Ecology Facility ID: 19135499

Prepared for:

Touchstone SLU LLC
2025 First Avenue, Suite 1212
Seattle, Washington 98121

Project No.: 0731-004

Prepared by:

Audrey Hackett
Project Scientist

Reviewed by:

Pete Kingston, LG
Associate Geologist

Berthin Q. Hyde, LG, LHG
Principal Hydrogeologist

February 13, 2014

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ATTACHMENT

ACRONYMS AND ABBREVIATIONS

%R	percent recovery
AST	aboveground storage tank
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
cis-1,2-DCE	cis-1,2-dichloroethylene
cfm	cubic feet per minute
COC	chemical of concern
CVOC	chlorinated volatile organic compound
DHC	*Dehalococcoides*
DRPH	diesel-range petroleum hydrocarbons
DQO	data quality objective
Ecology	Washington State Department of Ecology
EOS	edible oil substrate
EPA	U.S. Environmental Protection Agency
FC	Field Coordinator
GRPH	gasoline-range petroleum hydrocarbons
HASP	Health and Safety Plan
IAP	Interim Action Plan
ID	identifier
mg/kg	milligrams per kilogram
MS	matrix spike
MSD	matrix spike duplicate
MTCA	Washington State Model Toxics Control Act
NAVD88	North American Vertical Datum of 1988

ACRONYMS AND ABBREVIATIONS (CONTINUED)

NWTPH	Northwest Total Petroleum Hydrocarbon
ORPH	oil-range petroleum hydrocarbons
PCE	tetrachloroethylene
PQL	practical quantitation limit
the Property	307 Fairview Avenue North, Seattle Washington
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
ROW	right-of-way
RPD	relative percent difference
Revised SAP	Revised Post-Excavation Evaluation Sampling and Analysis Plan
the Site	soil, soil vapor, and groundwater contaminated with gasoline-, diesel-, and oil-range petroleum hydrocarbons; tetrachloroethylene; trichloroethylene; cis-1,2-dichloroethylene; and/or vinyl chloride beneath the Property and portions of the Boren Avenue North and Thomas Street rights-of-way, as well as trichloroethylene in the Terry Avenue North right-of-way
SVE	soil vapor extraction
SoundEarth	SoundEarth Strategies, Inc.
TCE	trichloroethylene
Touchstone	Touchstone SLU LLC
TSDF	treatment, storage, and disposal facility
UST	underground storage tank
VOC	volatile organic compound
WAC	Washington Administrative Code

1.0 INTRODUCTION

SoundEarth Strategies, Inc. (SoundEarth) has prepared this Revised Post-Excavation Evaluation Sampling and Analysis Plan (Revised SAP) for the implementation of the interim action at the Troy Laundry Property located at 307 Fairview Avenue North in Seattle, Washington (the Property; Figure A-1). This Revised SAP has been revised to incorporate additional information requested by the Washington State Department of Ecology (Ecology) in the following letters:

- Interim Action Plan & Engineering Design Report at 80 Percent Completion for Troy Laundry Site located at 307 Fairview North, Seattle, WA, dated October 10, 2013.
- Required Revisions for Engineering Design Report for Implementing the Interim Action Plan at the Troy Laundry Site at 307 Fairview Avenue North, Seattle, WA, dated November 18, 2013.
- Engineering Design Report for the Interim Action Plan Implementation, Troy Laundry Site, 307 Fairview North, Seattle, WA, dated January 29, 2014.

In addition, the Revised SAP incorporates comments and additional information requested by Ecology from meetings conducted August 8, October 9, and December 6, 2013; and email correspondence dated August 13 and October 9, 2013.

This Revised SAP has been prepared in accordance with the Washington State Model Toxics Control Act (MTCA) Cleanup Regulation as established in Section 820 of Chapter 173-340 of the Washington Administrative Code.

1.1 PURPOSE

The purpose of this Revised SAP is to provide specific requirements for sample collection, handling, and analysis procedures to be used during implementation of the interim action at the Property. This Revised SAP identifies specific sampling and analysis protocols, project schedule, and organization and responsibilities. It also provides detailed information regarding the sampling and data quality objectives; sample location and frequency; equipment and procedures; sample handling and analysis; procedures for management of waste; quality assurance (QA) and quality control (QC) protocols for field activities and laboratory analysis; and reporting requirements.

Specific details on each component of the interim action, as well as discussion on the transition between each component, are provided in the Engineering Design Report.

1.2 PROJECT SCHEDULE

The interim action is expected to commence in First Quarter 2014, pending approval of the Interim Action Plan and Engineering Design Report. A summary of the preliminary interim action schedule is provided in Table A-1.

2.0 PROJECT ORGANIZATION AND MANAGEMENT

This section describes the overall project management strategy for implementing the interim action.

To ensure efficient decision making for field sampling and laboratory analysis, key data collection decisions, decision criteria, process for decision making, quality assurance/quality control (QA/QC) procedures, and responsibilities are described below and detailed in Table A-2.

These decision and communication plans will be followed by field personal under direction of the Field Coordinator and Project Manager. Site QC to ensure proper communication and adherence to this Revised SAP is discussed below in Section 10.0.

The interim action is being conducted by SoundEarth on behalf of Touchstone. Ecology is providing regulatory guidance of interim action activities. The following key personnel have been identified for the project. A summary of key personnel roles and responsibilities is provided in Table A-2.

Regulatory Agency. Ecology is the lead regulatory agency for the Site, as promulgated in MTCA. The interim action is being conducted in accordance with WAC 173-340-515 of MTCA. Ecology's Site Manager for the Project is:

Ms. Maura O'Brien
Washington State Department of Ecology
3190 160th Avenue Southeast
Bellevue, Washington 98008
425-649-7249
mobr461@ecy.wa.gov

Project Contact. SoundEarth has been contracted by Touchstone to plan and implement the interim action at the Property. The Project Contact for Touchstone is:

Mr. Shawn Parry
Touchstone
2025 First Avenue, Suite 1212
Seattle, Washington 98121
206-441-2955
Fax: 206-727-2399
sparry@touchstonecorp.com

Project Principal. The Project Principal provides support for all project activities and reviews all data and deliverables prior to their submittal to the Project Contact or Regulatory Agency. The Project Principal for SoundEarth is:

Mr. Berthin Q. Hyde, LG, LHG
SoundEarth Strategies, Inc.
2811 Fairview Avenue East, Suite 2000
Seattle, Washington 98102
206-306-1900
Fax: 206-306-1907
bqhyde@soundearthinc.com

Project Manager. The Project Manager has overall responsibility for developing the Revised SAP, monitoring the quality of the technical and managerial aspects of the interim action, and implementing the Revised SAP and corresponding corrective measures, where necessary. The Project Manager for SoundEarth is:

Mr. Peter J. Kingston
SoundEarth Strategies, Inc.
2811 Fairview Avenue East, Suite 2000
Seattle, Washington 98102
206-306-1900
Fax: 206-306-1907
pkingston@soundearthinc.com

Laboratory Project Manager – Soil and Groundwater. The Laboratory Project Manager will provide soil and groundwater analytical support and will be responsible for providing certified, pre-cleaned sample containers and sample preservatives (as appropriate) and for ensuring that all chemical analyses meet the project quality specifications detailed in this Revised SAP. Friedman & Bruya Inc., of Seattle, Washington, has been contracted by Touchstone to perform the soil and groundwater chemical and physical analysis for compliance samples collected during the interim action. The Laboratory Project Manager is:

Mr. Mike Erdahl
Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, Washington 98119
206-285-8282
merdahl@friedmanandbruya.com

Laboratory Project Manager - Vapor. The Laboratory Project Manager will provide vapor analytical support and will be responsible for providing certified, pre-cleaned sample containers and sample preservatives (as appropriate) and for ensuring that all chemical analyses meet the project quality specifications detailed in this Revised SAP. Eurofins Air Toxics, Inc., of Folsom, California, has been contracted by Touchstone to perform the chemical and physical analysis for vapor compliance samples collected during the interim action. The Laboratory Project Manager is:

Ms. Kelly Buettner
180 Blue Ravine Road, Suite B
Folsom, California 95630
1-800-985-5955
kbuettner@airtoxics.com

Project QA/QC Officer. The Project QA/QC Officer has the responsibility to monitor and verify that the work is performed in accordance with the Revised SAP and other applicable procedures. The Project QA/QC Officer has the responsibility to assess the effectiveness of the QA/QC program and to recommend modifications to the program when applicable. The Project QA/QC Officer is responsible for assuring that the personnel assigned to the project are trained relative to the requirements of the QA/QC program and for reviewing and verifying the disposition of nonconformance and corrective action reports. The Project QA/QC Officer for SoundEarth is:

Ms. Jennifer Cyr
SoundEarth Strategies, Inc.
2811 Fairview Avenue East, Suite 2000
Seattle, Washington 98102
206-306-1900
Fax: 206-306-1907
jcyr@soundearthinc.com

Field Coordinator. The Field Coordinator (FC) will supervise field collection of all samples. The FC will ensure proper recording of sample locations, depths, and identification; sampling and handling requirements, including field decontamination procedures; physical evaluation and logging of samples; and completing of chain-of-custody forms. The FC will ensure that all field staff follows the Revised SAP, will ensure that the physical evaluation and logging of soil is based on the visual-manual classification method American Society for Testing and Materials D2488, and will adhere to standardized methods for sample acceptability and physical description of samples. The FC will ensure that field staff maintains records of field sampling events using the forms included as Attachment A of this Revised SAP. The FC will be responsible for proper completion and storage of field forms. The FC for SoundEarth is:

Ms. Courtney Porter
SoundEarth Strategies, Inc.
2811 Fairview Avenue East, Suite 2000
Seattle, Washington 98102
206-306-1900
Fax: 206-306-1907
cporter@soundearthinc.com

Field Staff. Members of the field staff must understand and implement the QA/QC program, coordinate and participate in the field sampling activities, coordinate sample deliveries to laboratory, and report any deviations from project plans as they relate to the interim action objectives as presented in the Revised SAP. Major deviations from the Revised SAP, such as the inability to collect a sample from a specific sampling location, obtaining an insufficient sample volume for the required analyses, or a change in sampling method, must be reported to the Project Manager.

General Contractor. Lease Crutcher Lewis is the General Contractor for the redevelopment project. The General Contractor will be providing construction services (as appropriate) that may be required to plan and implement the interim action at the Property. The Project Contact for Lease Crutcher Lewis is:

Ms. Shannon Testa
Lease Crutcher Lewis
107 Spring Street
Seattle, Washington
206-689-0493

3.0 SAMPLING OBJECTIVES

The sampling objectives for the Revised SAP are to collect sufficient compliance samples to evaluate current Property conditions during excavation and groundwater treatment activities. The data collected as part of this Revised SAP will be assessed to determine if additional work is necessary as part of the interim action or Site-wide cleanup action. The data will be incorporated into the Site-wide remedial investigation and feasibility study.

The following compliance samples will be collected as part of the interim action:

- Soil samples from the sidewalls and floor of the excavation.
- Soil samples from new discoveries including underground storage tanks, piping, or other unknown variances.
- Groundwater samples from infiltration of groundwater into the excavation.
- Groundwater samples from monitoring wells.
- Indoor air samples from the buildings that are being constructed as part of the redevelopment project.

4.0 SAMPLING PROCEDURES

As discussed in Section 3.0, the interim action will involve collecting soil, groundwater, and indoor air samples for laboratory analysis. Sampling procedures are described in more detail below.

4.1 SOIL SAMPLING

Post-excavation soil sampling locations will be based on previously collected data. Sidewall samples will be collected on vertical grid lines with locations established by a lateral grid. The lateral grid will be at approximate 50-foot intervals in areas of known contamination (along portions of Boren Avenue North and Thomas Street) and 150-foot intervals in areas without detectable concentrations of COCs, as determined by performance/confirmational sample results. Locations of the vertical grid lines are depicted on Figure A-3. Sidewall samples will be collected on an approximate 5-foot vertical grid starting in areas where samples were previously collected and contained concentrations of COCs. At each vertical grid line (first-batch grid line), sidewall samples will be collected on an approximate 5-foot vertical grid starting in areas where samples were previously collected and contained detectable concentrations of COCs. An additional vertical grid line (second-batch grid line) will be located approximately 15 feet on each side of the first batch grid line. If analytical results indicate that a sample

from the first-batch grid line is above the interim action remediation levels, the sample above and below the sample exceeding the remediation level will be analyzed. In addition, the adjacent samples on the second-batch grid lines will be analyzed. Laboratory analysis will continue in the first- and second-batch grid lines until two lateral and vertical samples in succession are below laboratory detection limits or significantly below remediation levels. Example detail of first- and second-batch grid lines and sample locations from the Boren Avenue North (west sidewall) and Thomas Street (south sidewall) are shown on Figures A-4 and A-5, respectively.

Floor samples will be collected across the bottom of the excavation on a grid system and in areas where pre-excavation samples indicated that concentrations of COCs are above the interim action remediation levels. In the event that analytical data indicates that a floor sample is above the remediation level, approximately 6-inches of soil will be over-excavated in the vicinity of the floor sample and an additional soil sample will be collected and analyzed. Overexcavation and resampling will continue until samples are below laboratory detection limits or significantly below remediation levels. Approximate locations of the floor samples are shown on Figure A-3.

Additional areas within the Remedial Excavation Area will only be sampled if required by treatment, storage, and disposal facilities or requested by Ecology to receive a contained-out determination.

A contingency for performance samples will be retained in the event that an unknown condition is encountered during the course of the excavation, such as a UST, piping, or other unknown variance. In this case, performance monitoring for soil will be conducted, the analytical results will direct the advancement of the excavation and characterize the soil for disposal.

4.1.1.1 Sample Collection Procedures – Grab Samples

Soil samples will be collected directly from the sidewalls and/or floor of the excavation using either stainless steel or plastic sampling tools. Soil samples collected at depths of less than 4 feet below ground surface (bgs) will be collected manually. Samples collected at depths below 4 feet bgs will be collected with the backhoe bucket unless engineering controls are in place that allow for manual sample collection at depths greater than 4 feet bgs. All non-dedicated sampling equipment will be decontaminated between uses.

The soil samples will be transferred directly from the sampling equipment into laboratory-supplied sample containers, as described in Table A-3. Soil samples collected for analysis of volatile organic compounds (VOCs) will be collected in accordance with the U.S. Environmental Protection Agency (EPA) Method 5035A. Care will be taken not to handle the seal or lid of the container when transferring the soil into the sample container. Each sample container will be labeled and handled following the protocols described in Section 5.0, Sample Handling and Quality Control Procedures. The chain-of-custody protocols will be maintained during sample transport and submittal to the laboratory.

4.2 GROUNDWATER SAMPLING

Groundwater samples will be collected as grab samples and low-flow samples for laboratory analysis during the interim action. Grab samples will be collected if groundwater infiltrates the excavation at depth from each point of infiltration and from the dewatering system, if necessary. Low-flow samples will be collected from monitoring wells to evaluate the effectiveness of the excavation and the groundwater injection system. Groundwater sample collection and handling procedures for grab

samples and low-flow samples are presented below and include sampling locations, frequency, and procedures.

4.2.1.1 Sample Collection Procedures – Grab Samples

Grab samples will be collected if groundwater is observed infiltrating the excavation at depth. The grab samples will be collected from each point of infiltration and from the dewatering system, if necessary. SoundEarth field staff will follow the procedures described below when collecting grab samples:

- If groundwater is observed infiltrating from sidewalls or the floor of the excavation, a grab sample will be collected from each infiltration point.
- The grab samples will be collected using bailers or a suspended container. Bailers and suspended containers will be polyethylene and dedicated for each sample location.
- The grab samples will be transferred immediately from the bailer, or similar method, into laboratory-supplied sample containers, as described in Table A-3. Care will be taken to minimize turbulence while transferring the water sample. Care will be taken not to handle the seal or lid of the container when decanting the sample into the containers. The containers will be filled completely to eliminate any headspace, and the seals/lid will be secured.
- Each sample container will be labeled and handled following the protocols described in Section 5.0, Sample Handling and Quality Control Procedures.
- The chain-of-custody protocols will be maintained during sample transport and submittal to the laboratory.
- SoundEarth field staff will be required to prepare Groundwater Purge and Sample Forms during groundwater monitoring and sampling activities. The forms will include visual and olfactory observations. In addition, the sample location, sample identification (ID), date of sample collection, and analyses will be recorded on the form. Field staff will record the location of each sample by identifying the excavation grid cell and approximate elevation. An example of the Groundwater Purge and Sample Form is included in Attachment A.

4.2.1.2 Sample Collection Procedures – Low-Flow Samples

Low-flow samples will be collected from compliance monitoring wells on a quarterly basis in accordance with the 1996 U.S. EPA guidance document, *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures* at least 24 hours following well development. SoundEarth field staff will follow the procedures described below when collecting low-flow samples:

- The locking well cap from the monitoring well will be removed and the groundwater level in the well will be allowed to equilibrate to atmospheric pressure for a minimum of 20 minutes.
- The depth to groundwater in the monitoring well will be measured relative to the top of well casing to the nearest 0.01 foot using an electronic water-level meter. The depth to the monitoring well bottom will also be measured to evaluate siltation of

the monitoring well and to calculate the estimated purge water volume. All nondisposable equipment will be decontaminated between uses.

- Each monitoring well will be purged at a low-flow rate (approximately 100 to 300 milliliters per minute) using a bladder and/or peristaltic pump and dedicated polyethylene tubing. The pump intake will be placed at the approximate center of the screened interval. Temperature, pH, specific conductivity, dissolved oxygen, and oxidation-reduction potential will be monitored during purging using a water quality meter equipped with a flow-through cell while purging to determine when stabilization of these parameters occurs.
- Groundwater samples will be collected directly from the pump outlet following stabilization of temperature, pH, specific conductance, turbidity, dissolved oxygen, and oxygen-reduction potential. If the monitoring well is completely dewatered during purging, samples will be collected when the groundwater in the well has recovered to at least 80 percent of the pre-purge casing volume.
- If low-flow sampling methods are not practical, the monitoring well will be allowed to recharge for no longer than 2 hours following cessation of purging and will be sampled using a dedicated, disposable, polyethylene bailer and sampling cord.
- The sample containers, as described in Table A-3, will be filled directly from the pump outlet into laboratory-supplied sample containers, taking care to minimize turbulence. Care will be taken not to handle the seal or lid of the container when decanting the sample into the containers. The containers will be filled completely to eliminate any headspace, and the seals/lid will be secured.
- Each sample container will be labeled and handled following the protocols described in Section 5.0, Sample Handling and Quality Control Procedures.
- The chain-of-custody protocols will be maintained during sample transport and submittal to the laboratory.
- The well cap and monument will be secured following sampling. Any damaged or defective well caps or monuments will be noted and scheduled for replacement, if necessary.
- SoundEarth field staff will be required to prepare Groundwater Purge and Sample Forms during groundwater monitoring and sampling activities. The forms will include depth to groundwater and total depth measurements, as well as water quality measurements, including pH, temperature, dissolved oxygen, specific conductance, oxidation-reduction potential, and/or turbidity. In addition, the sample identification (ID), date of sample collection, and analyses will be recorded on the form. An example of the Groundwater Purge and Sample Form is included in Attachment A.

4.3 INDOOR AIR SAMPLING

Indoor air sampling locations and frequency are dependent upon the results of the soil and groundwater data collected as part of this Revised SAP. A vapor intrusion assessment will be performed in accordance with Ecology's October 2009 *Draft Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action*. The vapor intrusion assessment process will include an evaluation of

the soil performance data from the remedial excavation, the groundwater concentration trends post remedial injection, construction schedule and anticipated occupancy date, and future building design features. The vapor intrusion assessment will be provided to the Ecology Site Manager.

If indoor air samples are required following the vapor intrusion assessment, indoor air samples will be collected from locations approved by the Site Manager. Sampling locations may include levels of the parking garage, first floor levels and above, elevator shafts, and ambient air. An additional work plan will be prepared and submitted to Ecology prior to indoor air sampling. SoundEarth field staff will follow the procedures described below when collecting indoor air samples:

4.3.1.1 Sample Collection Procedures

- Indoor air samples will be collected over an 8-hour time period; a typical day for commercial workers.
- Sampling equipment will consist of laboratory-certified 6-liter Summa canisters, vacuum pressure gauges, and pneumatic flow controllers.
- Heating, ventilation, and air conditioning systems should be operated normally.
- Parameters to record the day prior to the sampling event include the following: any open windows, openings or vents, operation of ventilation fans, operation of elevators, smoke (note distance to outdoor smoking area from building entrance), fresh paint, and distance from the building entrance to the parking area or street.
- Efforts will be made to minimize background volatile organic carbon contributions to indoor air.
- Flow controllers will be calibrated for sampling rate at the laboratory.
- The sample containers, as described in Table A-3, will be filled directly from the pneumatic flow controllers into laboratory-supplied sample containers.
- Each sample container will be labeled and handled following the protocols described in Section 5.0, Sample Handling and Quality Control Procedures.
- The chain-of-custody protocols will be maintained during sample transport and submittal to the laboratory.
- SoundEarth field staff will be required to prepare a Field Report Form during indoor air sampling activities. The forms will include sample locations, Summa canister vacuum pressure readings, and field observations. In addition, the sample ID, date of sample collection, and analyses will be recorded on the form. An example of the Groundwater Purge and Sample Form is included in Attachment A.
- Passive diffusive samplers may also be considered for collecting indoor air samples. The method of sample collection will be detailed in the work plan that will be prepared and submitted to Ecology prior to indoor air sampling.

5.0 SAMPLE HANDLING AND QUALITY CONTROL PROCEDURES

The following sections summarize sample labeling, containers, handling, chain of custody, field QC, and decontamination procedures to be applied during the interim action.

5.1 SAMPLE IDENTIFICATION

Each sample collected during the interim action will be assigned a unique sample ID and number. Sample ID labels will be filled out and affixed to appropriate containers immediately prior to sample collection. The label is filled out in indelible ink and will include the following information: media, date, time sampled, sample identification and number, project name, project number, sampler's initials, and analyte preservative(s) if any. An example of the Sample ID Label is included in Attachment A of this Revised SAP.

5.1.1 Soil

Soil samples collected during the interim action will be identified by their position relative to a grid measuring 310 feet (east-west) by 360 feet (north-south), and segregated into 1,116 discrete grid cells (A1 through JJ31), each measuring 10 feet by 10 feet.

Bottom and sidewall samples will be assigned a unique identifier that will include the components listed below:

- The grid cell identification (e.g., A1)
- The compass heading of the sidewall (e.g., N)
- The sample type (e.g., bottom "B", sidewall "SW")
- The number of samples collected in that grid cell (e.g., 01, 02, 03)
- The depth in feet bgs (e.g., 24)

For example, a soil sample collected from the floor of the excavation in grid cell A1 at a depth of 24 feet bgs would be identified as A1B01-24.

Likewise, a soil sample collected from the north side wall of grid cell JJ31 at a depth of 32 feet would be identified as JJ31NSW01-32. If this sidewall required over-excavation and further sampling within the same grid cell and depth, a second sample would be collected and would be identified as JJ31NSW02-32. The sample identification would be recorded on the Sample ID Label, Field Report form, Sample Summary Form, and Sample Chain of Custody Form.

5.1.2 Groundwater

Identification for groundwater samples collected from groundwater that has infiltrated the excavation at depth, if any, will include the components listed below:

- The grid cell identification (e.g., A1)
- The number of samples collected in that area (e.g., 01, 02, 03)
- The depth in feet bgs (e.g., 24)

For example, a groundwater sample collected from the remedial excavation in grid cell AA7 at a depth of 64 feet bgs would be identified as AA7-64.

Identification for samples collected for construction dewatering discharge sampling will include the components listed below:

- The sample port location identification (e.g., Effluent)

- The date the sample was collected (e.g., YYYYMMDD)

For example, the discharge sample collected from effluent sample port on October 22, 2013, would be numbered Effluent-20131022.

Identification for groundwater samples collected from compliance groundwater monitoring wells will include the components listed below:

- The prefix of the well identification (e.g., MW06)
- The date the sample was collected (e.g., YYYYMMDD)

For example, the groundwater sample collected from monitoring well MW06 on October 22, 2013, would be numbered MW06-20131022.

The sample identification will be placed on the Sample ID label, the Groundwater Purge and Sample Form, and the Sample Chain of Custody form.

5.1.3 Indoor Air

If necessary, indoor air samples will be collected during the interim action and will be assigned a unique sample identifier that will include the components listed below:

- Indoor air samples will begin with the letters *VS* ("vapor sample"), followed by the sample number determined by the sample's order in which it was collected
- Date the sample was collected (e.g., YYYYMMDD)

For example, the third indoor air sample collected during the interim action on July 18, 2014, would be labeled VS03-020140718. The sample identification will be placed on the Sample ID label, the Field Report Form, and the Sample Chain of Custody form.

5.2 SAMPLE CONTAINER HANDLING PROCEDURES

Required containers, preservation, and holding times for each anticipated analysis are listed in Table A-3. SoundEarth field staff and laboratory personnel will be responsible for following the container handling procedures below:

- Each sample container will be labeled and handled with the date and time sampled, well identification number, project number, and preservative(s), if any.
- All sample collection information will be documented on a Sample Chain of Custody form; the sample will be placed in a cooler chilled to near 4 degrees Celsius and transported to the laboratory.
- All sample shipped for laboratory analysis will be packaged according to applicable regulations. Samples will be expeditiously transported to the analytical laboratory after being sealed in iced coolers, as applicable. SoundEarth field staff may drive the samples to the laboratory or samples will be shipped by a same-day courier service.
- Upon transfer of the samples to laboratory personnel, the laboratory will assume responsibility for custody of the samples.
- The field coordinator will check all container labels, chain of custody for entries, and field notes for completeness and accuracy at the end of each day.

Summarize sample labeling, containers, handling, chain of custody, field QC, and decontamination procedures to be applied during the interim action.

5.3 SAMPLE CHAIN-OF-CUSTODY PROCEDURES

The written procedures that will be followed whenever samples are collected, transferred, stored, analyzed, or destroyed are designed to create an accurate written record that can be used to trace the possession and handling of the sample from the moment of its collection through analysis and reporting of analytical values. This written record, the Sample Chain of Custody form, will be filled out by SoundEarth field staff at the time the sample is obtained. An example of the Sample Chain of Custody form is included in Attachment A.

All samples submitted to the laboratory are accompanied by the Sample Chain of Custody Form. This form is checked for accuracy and completeness and then signed and dated by the laboratory sample custodian accepting the sample. At the laboratory, each sample is assigned a unique, sequential laboratory identification number that is stamped or written on the Sample Chain of Custody Form.

All samples are held under internal chain of custody in the sample control room using the appropriate storage technique (i.e., ambient, refrigeration, frozen). The Laboratory Project Manager assigned to a particular client will be responsible for tracking the status of the samples throughout the laboratory. Samples will be signed out of the sample control room in a sample control logbook by the analyst who will prepare the samples for analysis.

The Sample Chain of Custody form will include the following information: client, project name and number, date and time sampled, sample identification, sampler's initials, analysis, and analyte preservative(s), if any.

5.4 FIELD QUALITY ASSURANCE SAMPLING

Field and laboratory activities will be conducted in such a manner that the results be valid and meet the data quality objectives for this remedial action.

5.4.1 Soil

One duplicate soil sample will be collected per approximate 20 soil samples collected during the interim action. The QA/QC samples will be assigned a unique sample identifier and number. Duplicate samples will begin with the identifier "Duplicate", followed by the sample number determined by the sample's order in which it was collected. For example, the ninth soil duplicate sample collected during the interim action would be labeled Duplicate-09. SoundEarth field staff will note the locations of the field duplicates on the Field Report Form and the Soil Sample Summary.

5.4.2 Groundwater

Generally one duplicate groundwater sample will be collected per 20 samples during each performance sampling event. Based on the sampling frequency and number of groundwater samples anticipated, it is estimated that one groundwater field duplicate sample will be submitted per sampling event. The QA/QC samples will be assigned a unique sample identifier and number. The identifier will include a prefix of MW99 for field duplicates. For example, a field duplicate collected on October 22, 2013, would be labeled MW99-20131022. SoundEarth

field staff will note the locations of the field duplicates on the Groundwater Sample and Purge Form.

5.4.3 Indoor Air

Indoor air duplicate samples are not planned at this time.

QA/QC samples will be collected during the course of the groundwater monitoring to provide for data validation. QA/QC samples will consist of field duplicates. QA/QC samples will be collected and sent to the laboratory along with the primary field samples.

5.5 DECONTAMINATION PROCEDURES

Decontamination of all nondisposable tools and soil and groundwater sampling equipment will be conducted prior to each sampling event and between each sampling location, including stainless steel bowls/containers, stainless steel spoons/spatulas, and drilling equipment. Excavator buckets and conveyor belts will be decontaminated if moving between clean and contaminated areas of the excavation. A sufficient supply of pre-decontaminated small equipment will be mobilized to the sampling locations to minimize the need for performing field decontamination. Field personnel will change disposable latex or nitrile gloves before collecting each sample and before decontamination procedures and will take precautions to prevent contaminating themselves with water used in the decontamination process. The following steps will be followed to decontaminate reusable soil and groundwater sampling equipment:

- The equipment will be washed with a solution of Alconox (or an equivalent detergent) and water.
- The equipment will be rinsed with tap water.
- A final rinse will be conducted with distilled or deionized water.

Residual sample media from the equipment, used decontamination solutions and associated materials, and disposable contaminated media will be disposed of according to the procedures described in Section 7.0, Management of Investigation-Derived Waste.

6.0 ANALYTICAL TESTING

Friedman & Bruya, Inc. of Seattle, Washington, has been selected as the laboratory to conduct the analysis of soil and groundwater samples collected during the interim action. Friedman & Bruya, Inc. is Ecology-accredited laboratory and meets the QA/QC requirements of Ecology and the EPA.

Eurofins Air Toxics, Inc., of Folsom, California, has been selected as the laboratory to conduct the analysis of indoor air samples collected during the interim action. Eurofins Air Toxics, Inc. is Ecology-accredited laboratory and meets the QA/QC requirements of Ecology and the EPA.

In completing chemical analyses for this project, the laboratory will meet the following minimum requirements:

- Adhere to the methods outlined in this Revised SAP, including methods referenced for each analytical procedure.

- Provide a detailed discussion of any modifications made to previously approved analytical methods.
- Deliver PDF and electronic data as specified.
- Meet reporting requirements for deliverables.
- Meet turnaround times for deliverables.
- Implement QA/QC procedures discussed in Section 8.0, including data quality objectives (DQOs), laboratory quality control requirements, and performance evaluation testing requirements.
- Notify the Project QA/QC Manager of any QA/QC problems when they are identified to allow for quick resolution.
- Allow laboratory and data audits to be performed, if deemed necessary.

Copies of the *Laboratory Quality Assurance Manual* from Friedman & Bruya, Inc. are on file at SoundEarth's offices for review and reference and will be followed throughout the interim action. Copies of the *Laboratory Quality Assurance Manual* from Eurofins Air Toxics, Inc. will be available at their Folsom, California office. Access to laboratory personnel, equipment, and records pertaining to samples, collection, transportation, and analysis can be provided. Container requirements, holding times, and preservation methods for soil and water are summarized in Table A-3.

Sample laboratory analytical results for each analyte will be compared to regulatory limits applicable to the interim action. A detailed description of the analytical methods, laboratory practical quantitation limits (PQLs), and applicable regulatory limits for each analyte is provided in Table A-4. Additional analyses may be required during the interim action due to new discoveries or requests from disposal facilities.

6.1 SOIL

Soil samples will be submitted for laboratory analysis of chlorinated VOCs (CVOCs) by EPA Method 8260C; gasoline-range petroleum hydrocarbons (GRPH) by Method NWTPH-Gx; diesel-range petroleum hydrocarbons (DRPH) and oil-range petroleum hydrocarbons (ORPH) by Method NWTPH-Dx; and benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8021B or 8260C.

6.2 GROUNDWATER

All groundwater samples will be submitted for laboratory analysis of CVOCs by EPA Method 8260C (unpreserved sample containers will be used for vinyl chloride analyses), GRPH by Method NWTPH-Gx, DRPH and ORPH by Method NWTPH-Dx, and BTEX by EPA Method 8021B or 8260C.

Groundwater samples collected to evaluate the effectiveness of the groundwater injection system will also be submitted for laboratory analysis of total organic carbon by EPA Method 415.1; dissolved methane, ethane, and ethane by EPA Method RSK-175; and/or sulfate by EPA Method SM4500.

Water samples collected from the construction dewatering system are dependent on the King County Construction Dewatering permit. Additional analysis may include oil and grease by EPA Method 1664.

6.3 VAPOR

Vapor samples will be submitted for laboratory analysis of CVOCs and BTEX by modified EPA Method TO-15.

7.0 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

Contaminated soil, groundwater, and disposable equipment generated during the interim action will be handled in accordance with Ecology's Contained-Out Policy and/or in accordance with state and federal regulations. Wastes that will be generated from the interim action and destined for off-Property disposal include:

- Soil contaminated with PCE and its degradation products, GRPH (as Stoddard solvents), DRPH, ORPH, and associated compounds.
- Contaminated groundwater from excavation dewatering.
- Contaminated personal protective equipment.
- Decontamination solutions.
- Miscellaneous solid wastes.

Each waste stream will be profiled separately in accordance with the minimum waste analyses requirements of the respective permitted treatment, storage, and disposal facility (TSDF). The procedures for managing investigation-derived waste for the expected waste streams are discussed below.

7.1 SOIL

Prior to initiating the field activities, a contained-out determination for soils contaminated with F002-listed dangerous waste constituents will be requested from Ecology. Additional sampling may be required by Ecology, or the TSDF receiving the soil. Excavated contaminated soil will be handled according to the soil management grid. If unforeseen soil conditions are encountered, additional waste profiling may be required to ensure proper classification and disposal. The soil will be disposed of in accordance with the contained-in determination. Soil will be tracked using the Material Import and Export Summary Form.. Signed TSDF receipt records will be provided to Ecology. Records demonstrating compliance with the contained-out determination will be submitted to Ecology.

Soil waste generated during drilling will be stored in labeled 55-gallon drums or loaded onto trucks for disposal. Composite soil samples will be collected from the drums for waste characterization purposes. The drums will be labeled with the source (soil boring ID and depths) and disposed of in accordance with the requirements based on the analytical results of sampling.

7.2 WATER

A dewatering system will be established to remove and store the contaminated perched interval water located in the center of the Property. The water will be extracted and transported off-Property by a qualified vacuum truck service.

The construction dewatering that will be in place for the duration of the excavation requires a permit to discharge recovered groundwater and surface water to the sanitary sewer. The General Contractor has procured King County Minor Discharge Authorization No. 921-01 from the King County Wastewater Treatment Division. Extracted water will be stored in settlement tanks where it will be characterized in accordance with the Minor Discharge Authorization prior to discharge to the sanitary sewer. The General Contractor is responsible for all sampling and discharge related to the Minor Discharge Authorization.

All purge water will be temporarily stored in appropriately labeled containers at the Property pending receipt of waste profiling results. An estimated volume of 20 to 30 gallons of purge and decontamination water is anticipated to be generated during the development of each well and during each performance sampling event.

7.3 DISPOSABLES

Disposable personal protective clothing (e.g., Tyvek suits, rubber gloves, and boot covers) and disposable sampling devices (e.g., plastic tubing, plastic scoops, and bailers) will be placed in plastic garbage bags and disposed of as nonhazardous waste.

8.0 DATA QUALITY OBJECTIVES

Field and laboratory activities will be conducted in such a manner that the results will be valid and meet the data quality objectives for this project. Guidance for QA/QC will be derived from the protocols developed for the cited methods within EPA's documents *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (Publication SW-846) and the National Contract Laboratory Review Program, National Functional Guidelines for Organic Data Review. The data quality objectives are designed to:

- Assist the project manager and project team to focus on the factors affecting data quality during the planning stage of the project.
- Facilitate communication among field, laboratory, and project staff as the project progresses.
- Document the planning, implementation, and assessment procedures for QA/QC activities for the interim action.
- Verify that the DQOs are achieved.
- Provide a record of the project to facilitate final report preparation.

The DQOs for the project include both qualitative and quantitative objectives, which define the appropriate type of data and specify the tolerable levels of potential decision errors that will be used as a basis for establishing the quality and quantity of data needed to support the interim action. To verify that the DQOs are achieved, this Revised SAP details aspects of sample collection and analysis, including analytical methods, QA/QC procedures, and data quality reviews. This Revised SAP describes both qualitative and quantitative measures of data quality to verify that the DQOs are achieved.

Detailed QA/QC procedures in the field and at the laboratory are provided in the following sections. The DQOs for the interim action will be used to develop and implement procedures to verify that data collected is of sufficient quality to adequately address the objectives of the interim action as defined in the IAP. All observations and measurements will be made and recorded in such a manner as to yield

results representative of the media and conditions observed and/or measured. Goals for representativeness will be met by verifying that sampling locations are selected properly, that a sufficient number of samples are collected, and that field screening and laboratory analyses are conducted properly.

The quality of the laboratory data will be assessed by precision, accuracy, representativeness, completeness, comparability, and sensitivity. Definitions of these parameters and the applicable QC procedures are described in the following sections. Quantitative DQOs are provided following each definition. Laboratory DQOs have been established by the analytical laboratory. Applicable quantitative goals for these DQOs are listed in Table A-5.

8.1 PRECISION

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of two or more measurements compared to their average values. Precision is calculated from results of duplicate sample analyses. Precision is quantitatively expressed as the relative percent difference (RPD) and is calculated as follows:

$$RPD = \frac{(C_1 - C_2)}{(C_1 + C_2)/2} x\,100$$

NOTES:

C_1 = larger of the two duplicate results (i.e., the highest detected concentration)

C_2 = smaller of the two duplicate results (i.e., the lowest detected concentration)

RPD = relative percent difference

There are no specific RPD criteria for organic chemical analyses. Quantitative RPD criteria for organic analyses will be based on laboratory-derived control limits.

8.2 ACCURACY

Accuracy is a measure of the closeness (bias) of the measured value to the true value. The accuracy of chemical analytical results is assessed by "spiking" samples in the laboratory with known standards (a surrogate or matrix spike of known concentration) and determining the percent recovery. The accuracy is measured as the percent recovery (%R) and is calculated as follows:

$$\%R = \frac{(M_{sa} - M_{ua})}{C_{sa}} x\,100$$

NOTES:

%R = percent recovery

C_{sa} = actual concentration of spike added

M_{sa} = measured concentration in spiked aliquot

M_{ua} = measured concentration in unspiked aliquot

Laboratory matrix spikes and surrogates will be carried out at the analytical laboratory in accordance with EPA SW-846 and Ecology methods and procedures for inorganic and organic chemical analyses. The frequency of matrix spikes and matrix spike duplicates will each be one per batch of 20 samples or less for soil samples. Quantitative percent recovery criteria for organic analyses will be based on laboratory-derived control limits for surrogate recovery and matrix spike results.

The accuracy of sample results can also be affected by the introduction of contaminants to the sample during collection, handling, or analysis. Contamination of the sample can occur because of improperly cleaned sampling equipment, exposing samples to chemical concentrations in the field or during transport to the laboratory, or because of chemical concentrations in the laboratory. To demonstrate that the samples collected are not contaminated, laboratory method blank samples will be analyzed. The laboratory will run method blanks at a minimum frequency of 5 percent or one per batch to assess potential contamination of the sample within the laboratory.

8.3 REPRESENTATIVENESS

Representativeness is a qualitative assessment of how closely the measured results reflect the actual concentration or distribution of the constituent concentrations in the matrix sampled. The sampling plan design, sample collection techniques, sample handling protocols, sample analysis methods, and data review procedures have been developed to verify that the results obtained are representative of the Site conditions. These issues are addressed in detail in Section 6.0, Analytical Testing and Section 10.0, Quality Control Procedures.

8.4 COMPLETENESS

Completeness is defined as the percentage of measurements judged to be valid. Results will be considered valid if they are not rejected during data validation (Section 10.0, Quality Control Procedures). Completeness is calculated as follows:

$$C = \frac{(Number\ of\ Valid\ Measurements)}{(Total\ Number\ of\ Measurements)}\ x\ 100$$

Objectives for completeness are based, in part, on the subsequent uses of the data (i.e., the more critical the use, the greater the completeness objective). The objectives for completeness of samples are expressed as percentages, which refer to the minimum acceptable percentages of samples received at the laboratory in good condition and acceptable for analysis. The objectives of completeness for other samples are 95 percent for soil and water samples. These objectives will be met through the use of proper sample containers, proper sample packaging procedures to prevent breakage during shipment, proper sample preservation, and proper labeling and chain-of-custody procedures. A loss of 5 to 10 percent of intended samples is common, and the goals set are sufficient for intended data uses.

The objectives for completeness of chemical analyses are also expressed as percentages and refer to the percentages of analytical requests for which usable analytical data are produced. The initial objective for completeness of chemical analyses in the laboratory is 95 percent.

8.5 COMPARABILITY

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. The use of standard Ecology and EPA methods and procedures for both sample collection and laboratory analysis will make the data collected comparable to both internal and other data generated.

8.6 SENSITIVITY

Analytical sensitivities are measured by PQLs, which are defined as the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating

conditions. PQLs are determined by the laboratory. The specific analytes and their corresponding PQLs that will be required for the interim action are presented in Table A-4. The detection or reporting limits for actual samples may be higher depending on the sample matrix and laboratory dilution factors.

9.0 DATA COLLECTION

This section outlines the procedures to be followed for the inventory, control, storage, and retrieval of data collected during performance of the interim action. The procedures contained in this Revised SAP are designed to verify that the integrity of the collected data is maintained for subsequent use. Moreover, project-tracking data (e.g., schedules and progress reports) will be maintained to monitor, manage, and document the progress of the interim action.

9.1 DATA COLLECTION APPROACH

All sampling protocols will be performed in accordance with generally accepted environmental practices and will meet or exceed current regulatory standards and guidelines. Sampling procedures may be modified, if necessary, to satisfy amendments to current regulations, methods, or guidelines. The data collection approach for key elements of the interim action field program will verify the project DQOs are met or exceeded. The key elements include soil samples collected and analytical results used to demonstrate that the concentrations of COCs at the limits of the remedial excavation are below applicable cleanup levels as defined in the Revised SAP. The total number of samples collected and specific analyses to be performed will be based on field screening results, field observations, and analytical results for performance and confirmational monitoring.

9.2 DATA TYPES

A variety of data will be generated during the interim action, including sampling and analytical data. The laboratory analytical data will be transmitted to SoundEarth as an electronic file, in addition to a hardcopy laboratory data report. This method will facilitate the subsequent validation and analysis of these data while avoiding transcription errors that may occur with computer data entry. Examples of data types include manually recorded field data, such as boring logs, and electronically reported laboratory data.

9.3 DATA TRANSFER

Procedures controlling the receipt and distribution of incoming data packages to SoundEarth and outgoing data reports from SoundEarth include the following:

- Incoming documents will be date-stamped and filed. Correspondence and transmittal letters for all reports, maps, and data will be filed chronologically. Data packages, such as those from field personnel, laboratories (such as soil data), and surveyors (elevation data), will be filed by project task, subject heading, and date. If distribution is required, the appropriate number of copies will be made and distributed to the appropriate persons or agencies.
- A transmittal sheet will be attached to all project data and reports sent out. A copy of each transmittal sheet will be kept in the administrative file and the project file. The Project Manager and Project QA/QC Officer will review all outgoing reports and maps.

9.4 DATA INVENTORY

Procedures for filing, storage, and retrieval of project data and reports are discussed below.

9.4.1 Document Filing and Storage

As previously discussed, project files and raw data files will be maintained at SoundEarth's office. Files will be organized by project tasks or subject heading and maintained by the document control clerk. Hard copy project files will be archived for a minimum of 3 years after completion of the project. Electronic copies of files will be maintained in a project directory and backed up daily, weekly, and monthly.

9.4.2 Access to Project Files

Access to project files will be controlled and limited to Touchstone and its authorized representatives, Ecology, and SoundEarth personnel. When a hard copy file is removed for use, a sign-out procedure will be used to track custody. If a document is to be used for a long period, a copy will be used, and the original will be returned to the project file. Electronic access to final reports, figures, and tables will be write-protected in the project directory.

9.5 DATA VALIDATION

Data quality review will be performed where applicable in accordance with the current EPA guidance as set forth in *Guidance on Environmental Data Verification and Data Validation* (EPA QA/G-8). The following types of QC information will be reviewed, as appropriate:

- Method deviations
- Sample extraction and holding times
- Method reporting limits
- Blank samples (equipment rinsate and laboratory method)
- Duplicate samples
- Matrix spike/matrix spike duplicate samples (accuracy)
- Surrogate recoveries
- Percent completeness and RPD (precision)
- A quality assurance review of the final analytical data packages for samples collected during the interim action

9.6 DATA REDUCTION AND ANALYSIS

The Project Manager and Project QA/QC Officer are responsible for data review and validation. Data validation parameters are outlined as quantitative DQOs in Section 8.0, Data Quality Objectives. The particular type of analyses and presentation method selected for any given data set will depend on the type, quantity, quality, and prospective use of the data in question. The analysis of the project data will require data reduction for the preparation of tables, charts, and maps. To verify that data are accurately transferred during the reduction process, two data reviews will be performed, one by the Project QA/QC Officer or Project Manager and another by the Project Principal, prior to issuing the documents. Any incorrect transfers of data will be highlighted and changed.

10.0 QUALITY CONTROL PROCEDURES

This section provides a description of the QC procedures for both field activities and laboratory analysis. The field QC procedures include standard operating procedures for sample collection and handling, equipment calibration, and field QC samples.

10.1 FIELD QUALITY CONTROL

Field QC samples (e.g., duplicate samples) will be collected during this project and will follow the standard operating procedures during field screening activities. The procedural basis for these field data collection activities will be documented on the field report forms. Any deviations from the established protocols will be documented on the field report forms. A description of field QC samples is provided in Section 5.4.

10.2 LABORATORY QUALITY CONTROL

Analytical laboratory QA/QC procedures are provided in Friedman & Bruya, Inc. and Eurofins Air Toxics, Inc., respective *Laboratory Quality Assurance Manual* and are summarized below:

- **Laboratory Quality Control Criteria.** Results of the QC samples from each sample group will be reviewed by the analyst immediately after a sample group has been analyzed. The QC sample results will then be evaluated to determine whether control limits were exceeded. If control limits are exceeded in the sample group, corrective action (e.g., method modifications followed by reprocessing the affected samples) will be initiated prior to processing a subsequent group of samples. All primary chemical standards and standard solutions used in this project will be traceable to documented and reliable commercial sources. Standards will be validated to determine their accuracy by comparison with an independent standard. Any impurities identified in the standard will be documented.

The following paragraphs summarize the procedures that will be used to assess data quality throughout sample analysis:

- **Laboratory Duplicates.** Analytical duplicates provide information on the precision of the analysis and are useful in assessing potential sample heterogeneity and matrix effects. Analytical duplicates are subsamples of the original sample that are prepared and analyzed as a separate sample. A minimum of 1 duplicate will be analyzed per sample group or for every 20 samples, whichever is more frequent.
- **Matrix Spikes and Matrix Spike Duplicates.** Analysis of matrix spike (MS) samples provides information on the extraction efficiency of the method on the sample matrix. By performing matrix spike duplicate (MSD) analyses, information on the precision of the method is also provided for organic analyses. A minimum of 1 MS/MSD will be analyzed for every sample group or for every 20 samples, whichever is more frequent.
- **Laboratory Control Samples.** A laboratory control sample is a method blank sample carried throughout the same process as the samples to be analyzed, with a known amount of standard added. The blank spike compound recovery assesses analytical accuracy in the absence of any sample heterogeneity or matrix effects.
- **Surrogate Spikes.** All project samples analyzed for organic compounds will be spiked with appropriate surrogate compounds as defined in the analytical methods. Surrogate recoveries

will be reported by the laboratories; however, no sample result will be corrected for recovery using these values.

- **Method Blanks.** Method blanks are analyzed to assess possible laboratory contamination at all stages of sample preparation and analysis. A minimum of 1 method blank will be analyzed for every extraction batch or for every 20 samples, whichever is more frequent.

10.3 DATA QUALITY CONTROL

All data generated by Friedman & Bruya, Inc. and Eurofins Air Toxics, Inc. will undergo two levels of QA/QC evaluation: one by the laboratory and one by SoundEarth. As specified in Friedman & Bruya, Inc. and Eurofins Air Toxics, Inc. respective *Laboratory Quality Assurance Manual*, the laboratory will perform initial data reduction, evaluation, and reporting. The analytical data will then be validated at SoundEarth under the supervision of the Project QA/QC Officer. The following types of QC information will be reviewed, as appropriate:

- Method deviations
- Sample transport conditions (temperature and integrity)
- Sample extraction and holding times
- Method reporting limits
- Blank samples
- Duplicate samples
- Surrogate recoveries
- Percent completeness
- RPD (precision)

SoundEarth will review field records and results of field observations and measurements to verify procedures were properly performed and documented. The review of field procedures will include:

- Completeness and legibility of field logs
- Preparation and frequency of field QC samples
- Equipment calibration and maintenance
- Sample Chain-of-Custody forms

Corrective actions are described in Section 11.0, Corrective Actions.

10.4 DATA ASSESSMENT PROCEDURES

The Project Manager and Project QA/QC Officer are responsible for data review and validation. Upon receipt of each data package from the laboratory, calculations using the equations presented for precision, accuracy, and completeness will be performed. Results will be compared to quantitative DQOs, where established, or qualitative DQOs. Data validation parameters are outlined in Section 8.0, Data Quality Objectives.

10.5 PERFORMANCE AUDITS

Performance audits will be completed for both sampling and analysis work. Field performance will be monitored through regular review of Sample Chain-of-Custody forms, field forms, and field measurements. The Project Manager and/or the Project QA/QC Officer may also perform periodic review of work conducted as part of the interim action.

Accreditations received from Ecology for each analysis by Friedman & Bruya, Inc. and Eurofins Air Toxics, Inc. demonstrate the laboratory's ability to properly perform the requested methods. Therefore, a system audit of the analytical laboratory during the course of this interim action will not be conducted.

The Project Manager and/or Project QA/QC Officer will oversee communication with the analytical laboratory on a frequent basis while samples are being processed and analyzed at the laboratory. This will allow SoundEarth to assess progress toward meeting the DQOs and to take corrective measures if problems arise.

The analytical laboratory will be responsible for identifying and correcting, as appropriate, any deviations from performance standards as discussed in Friedman & Bruya, Inc. and Eurofins Air Toxics, Inc. respective *Laboratory Quality Assurance Manual.* The laboratory will communicate to the Project Manager or the Project QA/QC Officer all deviations to the performance standards and the appropriate corrective measures made during sample analysis. Corrective actions are discussed in Section 11.0.

11.0 CORRECTIVE ACTIONS

Corrective actions will be the joint responsibility of the Project Manager and the Project QA/QC Officer. Corrective procedures can include:

- Identifying the source of the violation.
- Reanalyzing samples, if holding time criteria permit.
- Resampling and analyzing.
- Re-measuring parameter.
- Evaluating and amending sampling and analytical procedures.
- Qualifying data to indicate the level of uncertainty.

During field sampling operations, the Project Manager and field staff will be responsible for identifying and correcting protocols that may compromise the quality of the data. All corrective actions taken will be documented in the field notes.

12.0 DOCUMENTATION AND RECORDS

Project files and raw data files will be maintained at SoundEarth's office. Project records will be stored and maintained in a secure manner. Each project team member is responsible for filing all necessary project information or providing it to the person responsible for the filing system. Individual team members may maintain files for individual tasks, but must provide such files to the central project files upon completion of each task. A project-specific index of file contents will be kept with the project files. Hard copy documents will be kept on file at SoundEarth or at a document storage facility throughout the

duration of the project, and all electronic data will be maintained in the database at SoundEarth. All sampling data will be submitted to Ecology in both printed and electronic formats pursuant to WAC 173-340-840(5) and Ecology's Toxics Cleanup Program Policy 840 (Data Submittal Requirements).

12.1 FIELD DOCUMENTATION

Documentation of field activities will be included on Field Report forms, Boring Log Forms, Groundwater Purge and Sample Forms, Sample ID Labels, Waste Material Labels, Waste Inventory Forms, Drum Inventory forms, Material Import and Export Summary Forms, Sample Summary Forms, and Sample Chain-of-Custody forms, examples of which are provided in Attachment A. Field forms will be scanned and saved to an electronic project folder. Original and copied forms will be filed in a binder that will be maintained by the Project Manager.

Field personnel will be required to keep a daily field log on a Field Report form. Field notes will be as descriptive and as inclusive as possible, allowing independent parties to reconstruct the sampling situation from the recorded information. Language will be objective, factual, and free of inappropriate terminology. A summary of each day's events will be completed on a Field Report form. At a minimum, field documentation will include the date, job number, project identification and location, weather conditions, sample collection data, personnel present and responsibilities, field equipment used, and activities performed in a manner other than specified in the Revised SAP. In addition, if other forms are completed or used (e.g., Sample Chain-of-Custody form), they will be referred to in and attached to the Field Report form. Field personnel will sign the Field Report form.

12.2 ANALYTICAL RECORDS

Analytical data records will be retained by the laboratory and stored electronically in the SoundEarth project file and project database. For all analyses, the data reporting requirements will include those items necessary to complete data validation, including copies of all raw data. The analytical laboratory will be required to report the following, as applicable: project narrative, chain-of-custody records, sample results, QA/QC summaries, calibration data summary, method blank analysis, surrogate spike recovery, matrix spike recovery, matrix duplicate, and laboratory control sample(s).

13.0 HEALTH AND SAFETY PROCEDURES

Field personnel will adhere to health and safety procedures that detailed in a project-specific Health and Safety Plan (HASP), which is included as Appendix B of the IAP. The health and safety and emergency response protocols outlined in the HASP are designed to ensure compliance with state and federal regulations governing worker safety on hazardous waste sites. The Department of Labor has published final rules (Part 1910.120 of Title 29 of the Code of Federal Regulations, March 6, 1990) that amend the existing Occupational Safety and Health Administration standards for hazardous waste operations and emergency response. Within Washington State, these requirements are addressed in WAC 296-843, Hazardous Waste Operations. These regulations apply to the activities to be performed at this Site as a site remediation, or cleanup, under RCRA 1976 and/or MTCA.

Subcontractors to SoundEarth are required to prepare and effectively implement their own HASP based on their unique scope of work and professional expertise. Each subcontractor's HASP must comply with all applicable federal, state, and local regulations. The subcontractor's HASP should employ appropriate

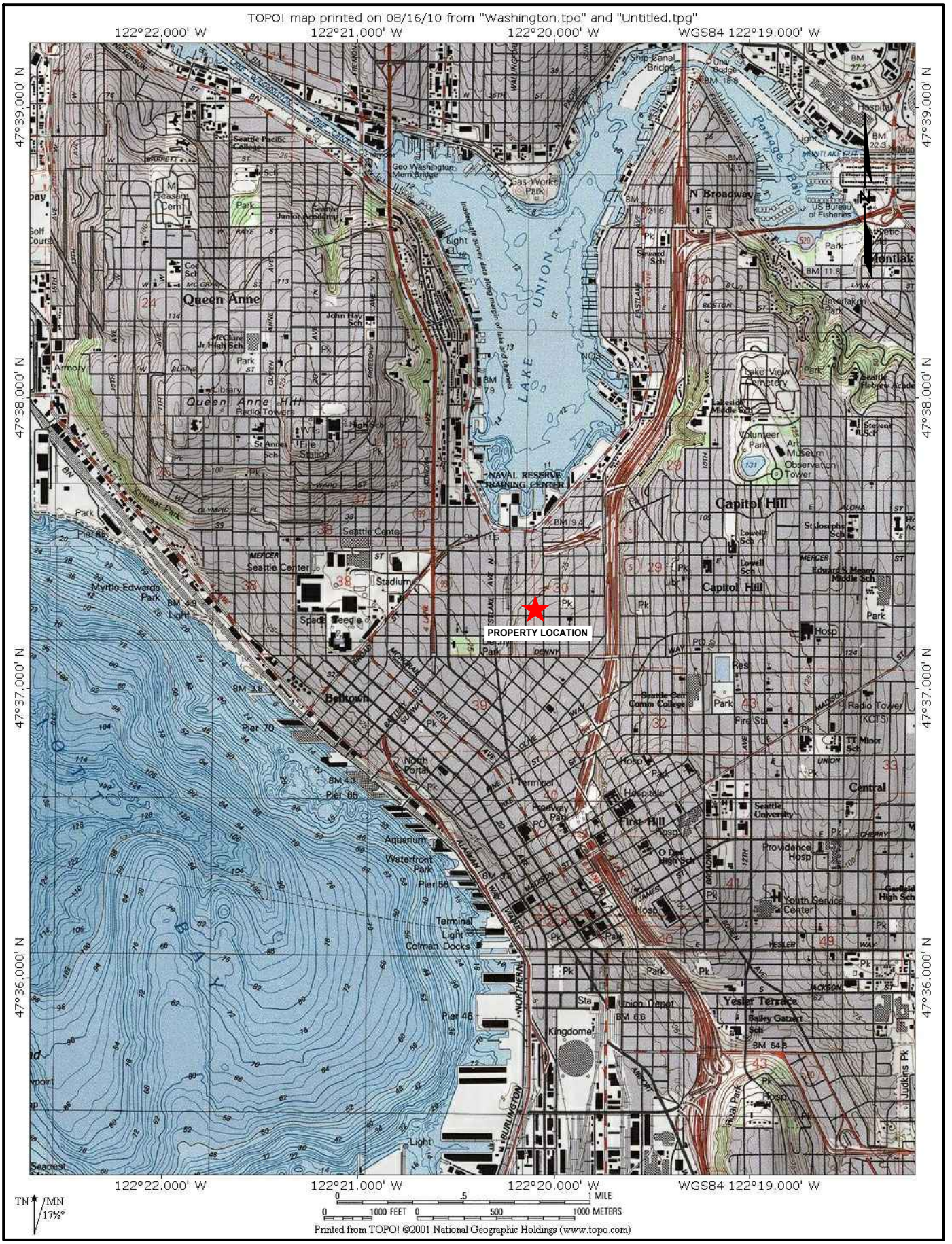
best practices to protect all personnel working on the Site, as well as the public, and to prevent negative impacts to the project or Site.

The responsibilities of SoundEarth for safety on this Site are limited to the following:

- Implementation of the provisions of this HASP for the protection of its employees and visitors on the Site to the extent that the Site and its hazards are under the control of SoundEarth.
- Protection of the Site, other personnel, and the public from damage, injury, or illness as a result of the activities of SoundEarth and its employees while on the Site.
- Provision of additional safety-related advice and/or management as contractually determined between the parties.

It is anticipated that all field work will be performed during the interim action in Level D personal protective equipment. Potential hazards that may be encountered during the interim action field activities include exposure to contaminants; traffic/mobile equipment; process hazards; unstable ground; noise exposure; overhead and underground utilities; slips, trips, and falls; powered tools and equipment; working around heavy equipment; rolling and/or pinching objects; and exposure to weather conditions.

FIGURES



SoundEarth Strategies
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DATE: 12/17/13
DRAWN BY: BLR
CHECKED BY: RMT
CAD FILE: 0731-004-2013IAP_FIGA-1

PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004-04
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY, STATE: SEATTLE, WASHINGTON

FIGURE A-1
PROPERTY LOCATION MAP

12/17/2013
P:\0731 TOUCHSTONE\0731-004 TROY LAUNDRY\TECHNICAL\CAD\2013 ICAP\2013 FINAL IAP\SAMPLING\0731-004-2013IAP FIGA-1 F.DWG
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12/17/2013

P:\0731 TOUCHSTONE\0731-004 TROY LAUNDRY\TECHNICAL\CAD\2013 ICAP\2013 FINAL IAP\SAMPLING\0731-004_2013IAP_EL_F.DWG

HARRISON STREET

B08/ MW01

B09/ MW02

B10/ MW03

N

TERRY AVENUE NORTH

BOREN AVENUE NORTH

FAIRVIEW AVENUE NORTH

300s (EVENS)

300s (ODDS)

1100s (ODDS)

AMAZON HEADQUARTERS BUILDING

BRAVEHORSE

BIORAD

BOREN INVESTMENT COMPANY WAREHOUSE (1925)

FUR VAULT (1948)

INDUSTRIAL LAUNDRY (1946)

TROY LAUNDRY BUILDING (1926)

GARAGE ADDITION (1964)

FORMER MOKAS BUILDING (1960)

B11/ MW04

B15/ MW07

B12/ MW05

B37/ MW13

B49/ MW15

B50/ MW16

B38/ MW14

B31/ MW12

B13/ MW06

B30/ MW11

B28/ MW10

B26/ MW08

B27/ MW09

B33 B34 B35 P01 P02 B29 P14 P13 B32 B25 B24 B23 B22 B21 B20 B19 B18 B17 B16 B14 B01 B02 B03 B04 B05 B06 B07 B08 B09 B36 B39 B40 B41 B42 B43 B44 B45 B46 B47 B48 P03 P04 P05 P06 P07 P08 P09 P10 P11 P12

PIPE01 (SECOND FLOOR)

PIT01

VAULT01

VAULT03

VAULT04

TRENCH02

TRENCH04-B

SUMP01

APPROXIMATE LOCATION OF FORMER 10,000-GALLON PROPANE TANK

FORMER 8,000-GALLON GASOLINE UST

GPR ANOMALY

POSSIBLE VENT LINE

APPROXIMATE LOCATION OF TWO 12,000-GALLON USTs AND ONE 1,000-GALLON UST

FORMER OIL TANK

FORMER PUMP ISLAND

VENT LINES

2,000-GALLON GASOLINE USTS

FORMER SUMP TANK

VENT/FILL LINES

BOILER ROOM

FORMER ASTs

FORMER OIL TANK

FORMER TRANSFORMER

FORMER BOILERS

TRANSFORMER VAULT

CLEAN OUT

FORMER BOILER

FORMER PRESSURIZED WATER TANK

DECOMMISSIONED WATER SUPPLY WELL

FORMER AIR COMPRESSOR

VAULT

VAULT

HOT WATER BOILER

1,000-GALLON (CIRCULATING)

350-GALLON (STA DRI TANK)

FORMER 1,000-GALLON SOLVENT STORAGE TANKS

FORMER DRY CLEAN AREA (EXPLOSION PROOF AREAS)

2,000-GALLON UST AND FORMER FUEL-DISPENSING PUMP ISLAND

EXISTING 3' X 3' VAULT

EXISTING 3' X 3' VAULT

FORMER SALON

FORMER CLEANING

FORMER VAULT ROOM

FORMER REPAIRING

8,000-GALLON SOLVENT UST

2" FLOOR DRAIN

LOADING DOCK

8,000-GALLON (DUMP TANK)

VIC. SOLVENT SAVER

TRENCH

PUMP

FORMER FINISHING AREA

FORMER TUMBLING AREA

FLOOR DRAIN

FLOOR DRAIN

RAMP

SHED

300-GALLON UST

6'-DEEP SUMP

LEGEND

- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- VAULT ACCESS
- PROCESS WATER SAMPLE LOCATION
- POST-SVE CONFIRMATIONAL SOIL BORING
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- SITE FEATURES
- SOUTH LAKE UNION STREETCAR LINE

AST	ABOVEGROUND STORAGE TANK
GPR	GROUND PENETRATING RADAR
SVE	SOIL VAPOR EXTRACTION
UST	UNDERGROUND STORAGE TANK

LOCATIONS OF FORMER SITE FEATURES ARE APPROXIMATE

SoundEarth Strategies

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DATE: 12/17/13
DRAWN BY: NAC/JQC
CHECKED BY: PJK
CAD FILE: 0731-004_2013IAP_EL

PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY,STATE: SEATTLE, WASHINGTON

REGION:

0 25 50 100

APPROXIMATE SCALE IN FEET

FIGURE A-2

PROPERTY PLAN

HARRISON STREET

THOMAS STREET

TERRY AVENUE NORTH

BOREN AVENUE NORTH

FAIRVIEW AVENUE NORTH

1100s (ODDS)

300s (EVENS)

300s (ODDS)

N

AMAZON HEADQUARTERS BUILDING

BRAVEHORSE

BIORAD

BOREN INVESTMENT COMPANY WAREHOUSE (1925)

FORMER MOKAS BUILDING (1960)

FUR VAULT

INDUSTRIAL LAUNDRY (1946)

TROY LAUNDRY BUILDING (1926)

B08/ MW01
B09/ MW02
B10/ MW03
B11/ MW04
B12/ MW05
B15/ MW07
B31/ MW12
B13/ MW06
B28/ MW10
B30/ MW11
B26/ MW08
B49/ MW15
B37/ MW13
B27/ MW09
B50/ MW16
B38/ MW14

B33, B34, B35, B01, B36, B44, B43, B45, B39, B42, B48, B06, B41, B40, B02, B17, B04, B03, B05, B46, B16, B18, B47, B19, B14, B29, B32, B24, B25, B23, B22, B21, B04

P01, P02, P03, P04, P05, P06, P07, P08, P09, P10, P11, P12, P13, P14, P15, P16, P17, P18, P19, P20

LEGEND

- VERTICAL GRID LINE
- FLOOR SAMPLE
- MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- POST-SVE CONFIRMATIONAL SOIL BORING (2012)
- PROPERTY BOUNDARY
- SVE — SOIL VAPOR EXTRACTION

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DATE:	12/17/13
DRAWN BY:	NAC/JQC
CHECKED BY:	PJK
CAD FILE:	0731-004_2013IAP_SAMPLING

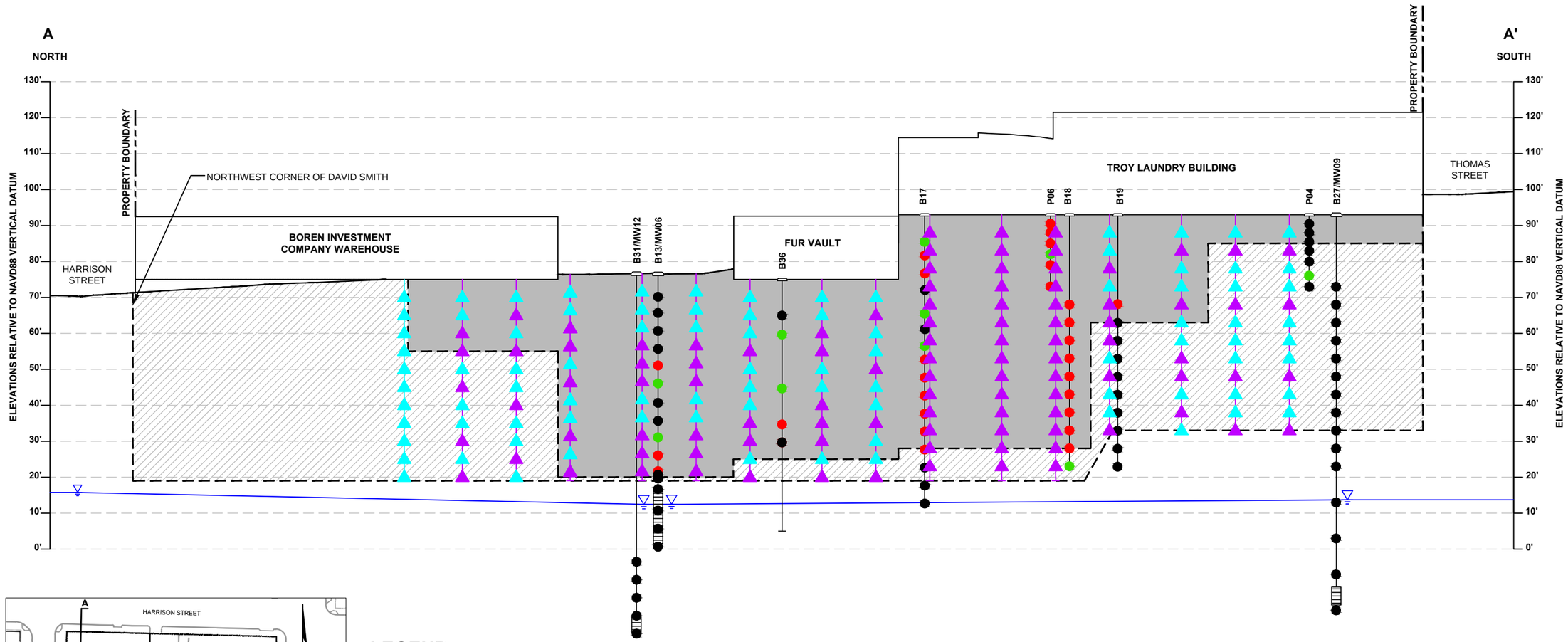
PROJECT NAME:	TROY LAUNDRY PROPERTY
PROJECT NUMBER:	0731-004
STREET ADDRESS:	307 FAIRVIEW AVENUE NORTH
CITY,STATE:	SEATTLE, WASHINGTON

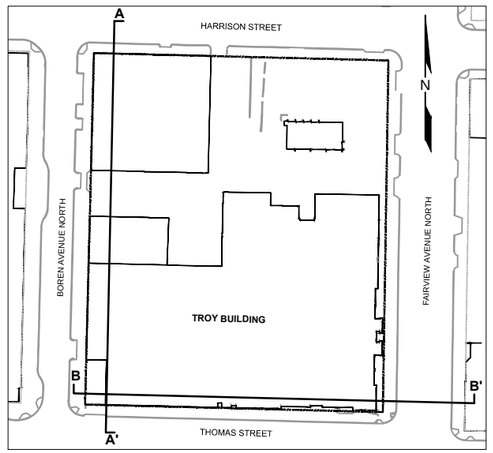
REGION:

0 25 50 100
APPROXIMATE SCALE IN FEET

FIGURE A-3

CONFIRMATIONAL SOIL SAMPLE LOCATIONS
VERTICAL GRID LINES AND
EXCAVATION FLOOR





PLAN VIEW

LEGEND

- REMEDIAL EXCAVATION
- CONSTRUCTION EXCAVATION
- GROUNDWATER LEVEL
- EXCAVATION EXTENTS

PCE CONCENTRATIONS IN SOIL (mg/kg):

- CONCENTRATION BELOW MTCA METHOD A CLEANUP LEVEL
- CONCENTRATION AT OR BELOW MTCA METHOD A CLEANUP LEVEL
- CONCENTRATION ABOVE MTCA METHOD A CLEANUP LEVEL
- < RESULT BELOW LABORATORY REPORTING LIMITS

mg/kg	MILLIGRAMS PER KILOGRAM
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT
UST	UNDERGROUND STORAGE TANK
PCE	TETRACHLOROETHYLENE

MW11 (21' E) WELL OFFSET 21' EAST

- BLANK CASING
- WATER TABLE
- WELL SCREEN INTERVAL
- WELL TERMINATION

- PROPOSED VERTICAL GRID LINE LOCATION
- PROPOSED CONTINGENCY VERTICAL GRID LINE LOCATION
- FIRST-BATCH SAMPLE POINT
- SECOND-BATCH SAMPLE POINT

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DATE: 12/17/13
DRAWN BY: NAC
CHECKED BY: PJK
CAD FILE: 0731-004_2013IAP_SW_XS

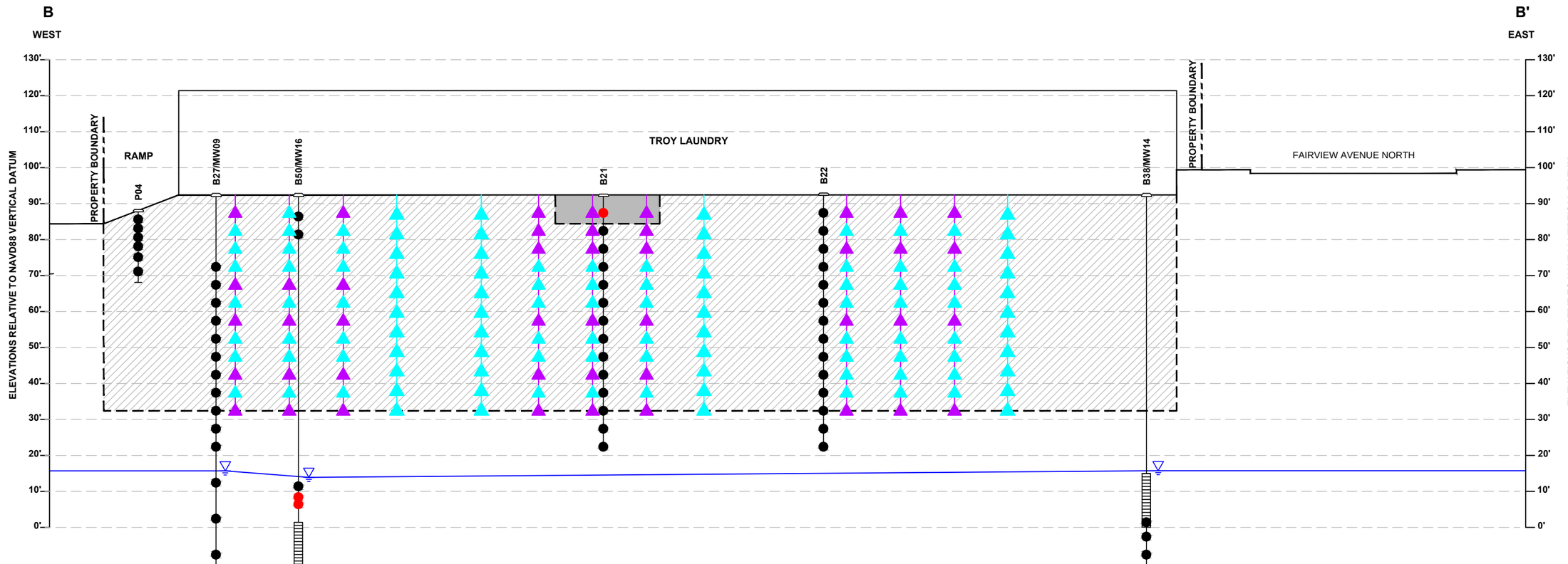
PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY, STATE: SEATTLE, WASHINGTON

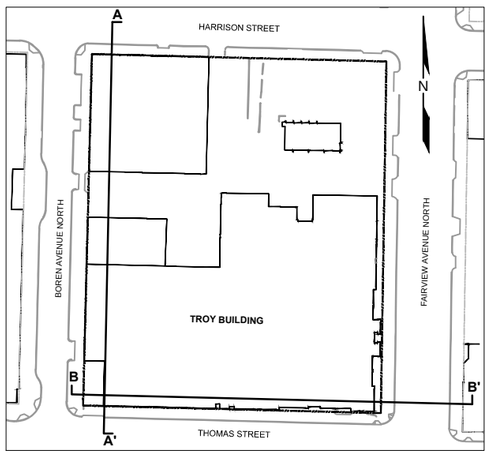
REGION:

0 15 30 60
APPROXIMATE SCALE IN FEET

FIGURE A-4
FIRST-BATCH AND SECOND-BATCH SAMPLE LOCATIONS
WEST SIDEWALL

8/20/2013
P:\0731 TOUCHSTONE\0731-004 TROY LAUNDRY\TECHNICAL\CAD\2013 ICAP\2013 FINAL IAP\SAMPLING\0731-004 2013IAP SW XS F.DWG
WWW.SOUNDEARTHINC.COM





PLAN VIEW

LEGEND

- REMEDIAL EXCAVATION
- CONSTRUCTION EXCAVATION
- GROUNDWATER LEVEL
- EXCAVATION EXTENTS

PCE CONCENTRATIONS IN SOIL (mg/kg):

- CONCENTRATION BELOW MTCA METHOD A CLEANUP LEVEL
- CONCENTRATION AT OR BELOW MTCA METHOD A CLEANUP LEVEL
- CONCENTRATION ABOVE MTCA METHOD A CLEANUP LEVEL
- < RESULT BELOW LABORATORY REPORTING LIMITS

mg/kg	MILLIGRAMS PER KILOGRAM
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT
UST	UNDERGROUND STORAGE TANK
PCE	TETRACHLOROETHYLENE

MW11 (21' E) WELL OFFSET 21' EAST

- BLANK CASING
- WATER TABLE
- WELL SCREEN INTERVAL
- WELL TERMINATION

- PROPOSED VERTICAL GRID LINE LOCATION
- PROPOSED CONTINGENCY VERTICAL GRID LINE LOCATION
- FIRST-BATCH SAMPLE POINT
- SECOND-BATCH SAMPLE POINT

SoundEarth Strategies
WWW.SOUNDEARTHINC.COM

DATE: 12/17/13
DRAWN BY: NAC
CHECKED BY: PJK
CAD FILE: 0731-004_2013IAP_SW_XS

PROJECT NAME: TROY LAUNDRY PROPERTY
PROJECT NUMBER: 0731-004
STREET ADDRESS: 307 FAIRVIEW AVENUE NORTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 15 30 60
APPROXIMATE SCALE IN FEET

FIGURE A-5
FIRST-BATCH AND SECOND-BATCH SAMPLE LOCATIONS
SOUTH SIDEWALL

12/17/2013
P:\0731 TOUCHSTONE\0731-004 TROY LAUNDRY\TECHNICAL\CAD\2013 ICAP\2013 FINAL IAP\SAMPLING\0731-004 2013IAP SW XS F.DWG
WWW.SOUNDEARTHINC.COM

TABLES

Table A-1
Preliminary Project Schedule
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Task/Scope of Work[1]	Schedule
Task 1: Prefield activities, permitting requirements, site preparation, and mobilization	Fourth Quarter 2013/First Quarter 2014
Task 2: Seattle Landmark preservation, including bracing and piling for historical facades	First Quarter 2014
Task 3: Building demolition	First through Second Quarters 2014
Task 4: Monitoring well decommissioning	Second Quarter 2014
Task 5: Perched water interval dewatering, including well installation and decommissioning	Second Quarter 2014
Task 6: Shoring installation	Second through Third Quarters 2014
Task 7: Excavation, including any underground storage tank site assessments	Second through Third Quarters 2014
Task 8: Compliance soil sampling	Second through Third Quarters 2014
Task 9: On-Property compliance well installation	Third through Fourth Quarters 2014
Task 10: Injection system design and installation	Second through Fourth Quarters 2014
Task 11: Compliance indoor air sampling	First event Fourth Quarter 2014
Task 12: Injection	Fourth Quarter 2014
Task 13: Compliance monitoring well sampling	Quarterly starting First Quarter 2015
Task 14: Cleanup action progress report	First Quarter 2015
Task 15: Site closure/final reporting	First through Second Quarters 2019
Task 16: Monitoring and injection well decommissioning	Second Quarter 2019

NOTE:

[1]Timing and conduct of the tasks will be determined by City of Seattle Entitlements process/issuance of the building permit, as well as any pre-leasing or financial requirements/limitations. Site closure and well decommissioning will be determined based on the results of compliance monitoring events.

Table A-2
Key Personnel and Responsibilities
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Project Title	Name	Project Role	Organization	Mailing Address	Email Address	Phone
Regulatory Agency	Maura O'Brien	Regulatory project management. Reviews and approves all submittals to Washington State Department of Ecology.	Washington State Department of Ecology	3190 160th Avenue Southeast Bellevue, Washington 98008	mobr461@ecy.wa.gov	(425) 649-7038
Project Contact	Shawn Parry	Property owner and project contact.	Touchstone Corporation	2025 First Avenue, Suite 1212 Seattle, Washington 98121	sparry@touchstonecorp.com	(206) 441-2955
Project Principal	Berthin Q. Hyde, LG, LHG	Reviews and oversees all project activities. Reviews all data and deliverables prior to submittal to project contact or Washington State Department of Ecology.	SoundEarth Strategies, Inc.	2811 Fairview Avenue South Suite 2000 Seattle, Washington 98102	bqhyde@soundearthinc.com	(206) 306-1900
Project Manager	Pete Kingston, LG	Overall project management, including SAP development, field oversight, document preparation and submittal, and project coordination.	SoundEarth Strategies, Inc.	2811 Fairview Avenue South Suite 2000 Seattle, Washington 98102	pkingston@soundearthinc.com	(206) 306-1900
Project QA/QC Officer	Jennifer Cyr	Coordinates with laboratory to ensure that SAP requirements are followed and that laboratory QA objectives are met.	SoundEarth Strategies, Inc.	2811 Fairview Avenue South Suite 2000 Seattle, Washington 98102	jcyr@soundearthinc.com	(206) 306-1900
Field Coordinator	Courtney Porter	Reports to the project manager. Ensures all project health and safety requirements are followed; coordinates and participates in the field sampling activities; coordinates sample deliveries to laboratory; coordinates sampling activities with site owner. Subcontractors; reports any deviations from project plans.	SoundEarth Strategies, Inc.	2811 Fairview Avenue South Suite 2000 Seattle, Washington 98102	cporter@soundearthinc.com	(206) 306-1900
Field Staff	Various licensed geologists and environmental professionals	Reports to field coordinator. Conducts sampling activities.	SoundEarth Strategies, Inc.	2811 Fairview Avenue South Suite 2000 Seattle, Washington 98102		(206) 306-1900
Data Manager	Jenny Cheng	Ensures that analytical data is incorporated into site database with appropriate qualifiers following validation.	SoundEarth Strategies, Inc.	2811 Fairview Avenue South Suite 2000 Seattle, Washington 98102	jcheng@soundearthinc.com	(206) 306-1900
Data Validation	Jennifer Cyr	Coordinates with laboratory to ensure that the SAP requirements and laboratory QA/QC objectives are met.	SoundEarth Strategies, Inc.	2811 Fairview Avenue South Suite 2000 Seattle, Washington 98102	jcyr@soundearthinc.com	(206) 306-1900
Laboratory Project Manager - Soil and Groundwater	Michael Erdahl	Provides analytical support and will be responsible for providing certified, precleaned sample containers and sample preservatives (as appropriate) and for ensuring that all soil and groundwater chemical analyses meet the project quality specifications detailed in the SAP.	Friedman & Bruya, Inc.	3012 16th Avenue West Seattle, Washington 98119	merdahl@friedmanandbruya.com	(206) 285-8282
Laboratory Project Manager - Vapor	Kelly Buettner	Provides analytical support and will be responsible for providing certified, precleaned sample containers and sample preservatives (as appropriate) and for ensuring that all vapor chemical analyses meet the project quality specifications detailed in the SAP.	Eurofins Scientific	180 Blue Ravine Road, Suite B Folsom, California 95630	kbuettner@airtoxics.com	(800) 985-5955
Site Superintendent/General Contractor	Shannon Testa	Manages the construction excavation activities throughout the duration of the redevelopment project.	Lease Crutcher Lewis	107 Spring Street Seattle, Washington	shannon.testa@lewisbuilds.com	(206) 708-8011
Surveyor (Subcontractor)	Brad Freeman	Conducts site survey of monitoring wells and key site features following the completion of well installation activities.	Triad Associates	12112 115th Avenue Northeast Kirkland, Washington	bfreeman@triadassoc.com	(425) 216-2140

NOTES:
QA/QC = quality assurance/quality control
SAP = Sampling Analysis Plan

Table A-3
Analytical Methods, Container, Preservation, and Holding Time Requirements
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Analyte and Analytical Method	Size and Type of Container	Number of Containers	Preservation Requirements	Holding Time
Soil Samples				
GRPH by Method NWTPH-Gx BTEX by EPA Method 8021B or 8260B	40-mL VOA	3	4°C/-7°C at the laboratory	48 hours/2 weeks
CVOCs by EPA Method 8260C	40-mL VOA	3	4°C/-7°C at the laboratory	48 hours/2 weeks
Water Samples				
GRPH by Method NWTPH-Gx BTEX by EPA Method 8021B	40-mL VOA vial	3	HCl/4°C	14 days
CVOCs by EPA Method 8260C	40-mL VOA vial	3	HCl and unpreserved/4°C	7 days
DRPH and ORPH by Method NWTPH-Dx	500-mL amber	1	4°C	7 days
Dissolved Methane, Ethane, and Ethene by EPA Method RSK-175	40-mL VOA vial	3	4°C	14 days
Sulfate by EPA Method SM4500	500-mL HDPE	1	4°C	7 days
TOC by EPA Method 415.1	500-mL HDPE	1	4°C	28 days
Air Samples				
VOCs by EPA Method TO-15	6-L Summa	1	NA	30 days

NOTES:
°C = degrees Celsius
BTEX = benzene, toluene, ethylbenzene, and total xylenes
CVOCs = chlorinated volatile compounds
DRPH = diesel-range petroleum hydrocarbons
EPA = U.S. Environmental Protection Agency
GRPH = gasoline-range petroleum hydrocarbons
HCl = hydrochloric acid
HDPE = high-density polyethylene
HNO3 = nitric acid
L = liter
mL = milliliter
NWTPH = Northwest Total Petroleum Hydrocarbon
ORPH = oil-range petroleum hydrocarbons
RCRA = Resource Conservation and Recovery Act
TOC = total organic carbon
VOA = volatile organic analysis

Table A-4
Analytes, Analytical Methods, Laboratory Practical Quantitation Limits, and Applicable Regulatory Limits
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Analyte	Analytical Method	Unit	Laboratory PQL[1]	Applicable Regulatory Limit[2]
Soil				
GRPH	NWTPH-Gx	mg/kg	<2	30/100[3]
Benzene	EPA Method 8021B	mg/kg	<0.02	0.03
Toluene	EPA Method 8021B	mg/kg	<0.02	7
Ethylbenzene	EPA Method 8021B	mg/kg	<0.02	6
Total xylenes	EPA Method 8021B	mg/kg	<0.06	9
PCE	EPA Method 8260C	mg/kg	<0.025	0.05
TCE	EPA Method 8260C	mg/kg	<0.03	0.03
Vinyl chloride	EPA Method 8260C	mg/kg	<0.05	0.67
cis-1,2-DCE	EPA Method 8260C	mg/kg	<0.05	160
Water				
GRPH	NWTPH-Gx	µg/L	<100	800/1,000[3]
Benzene	EPA Method 8021B	µg/L	<1	5/70[4]
Toluene	EPA Method 8021B	µg/L	<1	1,000/1,400[4]
Ethylbenzene	EPA Method 8021B	µg/L	<1	700/1,700[4]
Total xylenes	EPA Method 8021B	µg/L	<3	1,000/2,200[4]
DRPH	NWTPH-Dx	µg/L	<50	500
ORPH	NWTPH-Dx	µg/L	<250	500
PCE	EPA Method 8021B	µg/L	<1	5/240[4]
TCE	EPA Method 8260C	µg/L	<1	5/500[4]
Vinyl chloride	EPA Method 8260C	µg/L	<0.2	0.2/12[4]
cis-1,2-DCE	EPA Method 8260C	µg/L	<1	16/2,000[4]
Vapor (Indoor Air)				
Benzene	EPA Method TO-15	ppbv	<0.050	0.00032 (C)
Toluene	EPA Method TO-15	ppbv	<0.020	2.2 (NC)
Ethylbenzene	EPA Method TO-15	ppbv	<0.020	0.46 (NC)
Total Xylenes	EPA Method TO-15	ppbv	<0.040	0.046 (NC)
PCE	EPA Method TO-15	ppbv	<0.020	0.096/0.96 (C)
TCE	EPA Method TO-15	ppbv	<0.020	0.0037/0.037 (C)
Vinyl chloride	EPA Method TO-15	ppbv	<0.010	0.00028 (C)
cis-1,2-DCE	EPA Method TO-15	ppbv	<0.020	0.016 (NC)

NOTES:

[1]Standard laboratory PQLs for Friedman & Bruya, Inc. or Eurofins Air Toxics, Inc.

[2]MTCA Method A or B Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised November 2007.

[3]Cleanup levels for gasoline in soil and groundwater without benzene are 100 mg/kg and 1,000 µg/L, respectively. Cleanup levels for gasoline in soil and groundwater that also contain benzene are 30 mg/kg and 800 µg/L, respectively.

[4]King County Industrial Waste Local Discharge Limit.

< = less than

µg/L = micrograms per liter

C = carcinogenic

cis-1,2-DCE = cis-1,2-dichloroethylene

DRPH = diesel-range petroleum hydrocarbons

EPA = U.S. Environmental Protection Agency

GRPH = gasoline-range petroleum hydrocarbons

mg/kg = milligrams per kilogram

MTCA = Washington State Model Toxics Control Act

NE = no King County Industrial Waste Local Discharge Limit established

ORPH = oil-range petroleum hydrocarbons

PCE = tetrachloroethylene

ppbv = parts per billion by volume

PQL = practical quantitation limit

TCE = trichloroethylene

Table A-5
Quantitative Goals of Data Quality Objectives
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Analyte	Analytical Method	Precision[1]	Accuracy[2]			Completeness[3]	Sensitivity[4]
		RPD (%)	Surrogate (% Recovery)	MS (% Recovery)	LCS (% Recovery)	(%)	PQL[5]
Soil							
GRPH	NWTPH-Gx	20	50-150	50-150	50-150	95	<2
Benzene	EPA Method 8021B	20	50-150	50-150	50-150	95	<0.02
Toluene	EPA Method 8021B	20	50-150	50-150	50-150	95	<0.02
Ethylbenzene	EPA Method 8021B	20	50-150	50-150	50-150	95	<0.02
Total Xylenes	EPA Method 8021B	20	50-150	50-150	50-150	95	<0.06
PCE	EPA Method 8260C	20	36-160	36-160	50-150	95	<0.025
TCE	EPA Method 8260C	20	36-160	36-160	50-150	95	<0.03
Vinyl Chloride	EPA Method 8260C	20	36-160	36-160	50-150	95	<0.05
cis-1,2-DCE	EPA Method 8260C	20	36-160	36-160	50-150	95	<0.05
Water							
GRPH	NWTPH-Gx	20	50-150	50-150	50-150	95	<100
Benzene	EPA Method 8021B	20	50-150	50-150	50-150	95	<1
Toluene	EPA Method 8021B	20	50-150	50-150	50-150	95	<1
Ethylbenzene	EPA Method 8021B	20	50-150	50-150	50-150	95	<1
Total Xylenes	EPA Method 8021B	20	50-150	50-150	50-150	95	<3
DRPH	NWTPH-Dx	20	50-150	50-150	50-150	95	<50
ORPH	NWTPH-Dx	20	50-150	50-150	50-150	95	<250
PCE	EPA Method 8260C	20	36-160	36-160	50-150	95	<1
TCE	EPA Method 8260C	20	36-160	36-160	50-150	95	<1
Vinyl Chloride	EPA Method 8260C	20	36-160	36-160	50-150	95	<0.2
cis-1,2-DCE	EPA Method 8260C	20	36-160	36-160	50-150	95	<1
Vapor (Indoor Air)							
Benzene	TO-15 SIM	20	70-130	70-130	70-131	95	<0.050
Toluene	TO-15 SIM	20	70-130	70-130	70-132	95	<0.020
Ethylbenzene	TO-15 SIM	20	70-130	70-130	70-133	95	<0.020
Total Xylenes	TO-15 SIM	20	70-130	70-130	70-134	95	<0.040
PCE	TO-15 SIM	20	70-130	70-130	70-137	95	<0.020
TCE	TO-15 SIM	20	70-130	70-130	70-138	95	<0.020
Vinyl Chloride	TO-15 SIM	20	70-130	70-130	70-139	95	<0.010
cis-1,2-DCE	TO-15 SIM	20	70-130	70-130	70-140	95	<0.020

NOTES:

[1]Precision measured in RPD between sample and lab duplicate, LCS and LCS duplicate, and/or MS and MS duplicate.

[2]Laboratory to follow in accordance with the EPA SW-846 and Ecology methods and procedures for inorganic and organic chemical analyses. Method Blanks will be analyzed for each analyte in addition to the quantitative data quality objectives listed in this table.

[3]Refers to the minimum acceptable percentages of samples received at the laboratory in good condition that are acceptable for analysis.

[4]Sensitivity is measured by the laboratory PQL for each analyte.

[5]Standard PQLs for Friedman & Bruya, Inc., and Eurofins Air Toxics, Inc.

< = less than
cis-1,2-DCE = cis-1,2-dichloroethylene
DRPH = diesel-range petroleum hydrocarbons
Ecology = Washington State Department of Ecology
EPA = U.S. Environmental Protection Agency
GRPH = gasoline-range petroleum hydrocarbons
LCS = laboratory control sample
MS = matrix spike
NWTPH = Northwest Total Petroleum Hydrocarbon Method
ORPH = oil-range petroleum hydrocarbons
PCE = tetrachloroethylene
PQL = practical quantitation limit
RPD = relative percent difference
TCE = trichloroethylene

ATTACHMENT A
FIELD FORMS

FIELD REPORT

SoundEarth Strategies
2811 Fairview Avenue East, Suite 2000
Seattle, Washington 98102
P: (206) 306-1900 F: (206) 306-1907

Client & Site Name/Number:		**SoundEarth Project Number:**	**Date:**
Site Address:		**Purpose of Visit/Task #:**	**Field Report Prepared by:**
Temp/Weather:	**Permit Required to Work:**	**Time of Arrival/Departure** (2400)**:** _____ onsite to _____ offsite	**Personnel Onsite:**

Attachments:

SoundEarth Strategies

Project:
Project Number:
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG

Site Address:

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
5									
10									
15									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

Project:
Project Number:
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG

Site Address:

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15									
20									
25									
30									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

GROUNDWATER PURGE AND SAMPLE FORM
LOW FLOW PUMP

General Info

Client: _____ Project #: _____

Site Name/ #: _____ Field/Sampling Personnel: _____ **Well ID Number:** _____

Well Details

Total Depth (TD)	Depth to Water (DTW) (Immediately Prior to Purging)	Water Column (WC) =TD-DTW	Casing Diameter Volume Conversion Factor (VC)					Casing Volume =WC x VC
			0.75"	1"	2"	4"	6"	
Feet BTOC	Feet BTOC	Feet BTOC	0.023	0.041	0.16	0.65	1.44	gallons

Screened Interval: _____ to _____ Feet bgs

Screen Submerged? ☐ **NO** ⟹ Place tubing intake 2 to 3 feet below depth to water
☐ **YES** ⟹ Place tubing intake at approximate center of screen

Equipment

Pump Method: ☐ Peristaltic ☐ Other: _____ Owner/ID #: _____ **Water Quality Meter** Brand/Model: _____ Owner/ID #: _____

Water Level Instrument: ☐ WL Meter ☐ Bubbler ☐ Interface ☐ Other: _____ Owner/ID #: _____

Sampling

Depth of Tubing Intake: _____ Feet BTOC Time Start Purge: _____

Time (3-5 min intervals)	Water Level (feet) drawdown <0.33 feet	**Purge Rate** (L/min) 0.1 – 0.5	**pH**[1] *± 0.1*	**Specific Conductivity**[1] **UNITS:** _____ *± 3%*	**Turbidity**[1] (NTU) *If ≥10, ±10% if <10, stabilized*	**Dissolved Oxygen**[1] (mg/L) *If ≥1.00, ± 10% if ≤1.00, ± 0.2*	Temperature (ºC)	ORP (mV)
Minimum # of Readings								

Sample Date: _____ **Sample Time:** _____ **Field Duplicate Sample Time:** _____ **Time Sampling Ended:** _____

Sampling Comments: _____

Analytical

Sample Number/ID	Container Type	Preservative	Field Filtered?			Analysis Request
			No	0.45	0.10	
			No	0.45	0.10	
			No	0.45	0.10	
			No	0.45	0.10	
			No	0.45	0.10	
			No	0.45	0.10	

Purge Water

Sheen? ☐ NO ☐ YES **Odor?** ☐ NO ☐ YES ⟹ Describe: _____ Color (describe): _____

Total Discharged (1Gal = 3.88 liter): _____ gallons Disposal Method: ☐ Drummed ☐ Remediation System ☐ Other: _____

Well Condition

Well/Security Devices in good condition (i.e.: Monument, Bolts, Seals, J-cap, Lock)? ☐ YES ☐ NO ⟹ Describe: _____

Water in Monument? ☐ NO ☐YES ⟹ Describe: _____

Additional Well Condition Comments or Explanation of any Access Issues: _____

[1]At minimum, pH, specific conductivity, and dissolved oxygen and/or turbidity must stabilize within the limits (indicated in *italics*) for three successive readings prior to sampling.

SoundEarth Strategies

GROUNDWATER PURGE AND SAMPLE FORM
LOW FLOW PUMP – *Continued*

General Info

Client: ________________ Project #: ________________

Site Name/ #: ________________ Field/Sampling Personnel: ________________ **Well ID Number:** ________________

See Page 1 for well construction and purge water information

Sample Date: ________________ **Sample Time:** ____________ **Field Duplicate Sample Time:** ______________ **Time Sampling Ended:** ______________

Sampling *(Continued from Page 1)*

Time (3-5 min intervals)	Water Level (feet) drawdown <0.33 feet	**Purge Rate** (L/min) 0.1 – 0.5	**pH**[1] *± 0.1*	**Specific Conductivity**[1] **UNITS:** __________ *± 3%*	**Turbidity**[1] (NTU) *If ≥10, ±10%* *if <10, stabilized*	**Dissolved Oxygen**[1] (mg/L) *If ≥1.00, ± 10%* *if ≤1.00, ± 0.2*	Temperature (ºC)	ORP (mV)

Additional Sampling Comments: ____

[1]At minimum, pH, specific conductivity, and dissolved oxygen and/or turbidity must stabilize within the limits (indicated in *italics*) for three successive readings prior to sampling.

FRIEDMAN & BRUYA, INC.	
Client:	
Sample ID:	
Date Sampled:	Time:
Project:	
Analysis Request:	
Preservative:	

SAMPLE CHAIN OF CUSTODY

Send Report to _____

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, WA 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS *(signature)*	
PROJECT NAME/NO.	PO #
REMARKS	

Page # _____ of _____

TURNAROUND TIME
Standard (2 Weeks)
RUSH_____
Rush charges authorized by:
_____

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED								
								DRPH & ORPH by NWTPH-Dx	GRPH by NWTPH-Gx	VOCs by EPA 8260C	RCRA 8 Metals by EPA 200.8 & 1631E					Notes

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

DRUM INVENTORY SHEET

Site Name: _____
Site Address: _____
Reason for Site Visit: _____
Date of Inventory: _____
Field Personnel: _____
_____

Drum #[1] (eg. 001)	Content Information	Date(s) Accumulated	Fullness (%)	Sample Analysis Performed?	Composite Soil Sample (RCRA 8 metals)[2] (Y/N)	Saturated Soil[3] (Y/N)	Drum Labeled (Y/N)	Drum Location Photo (Y/N)	Drum Access[4]
Eg. 001	Soil, B05, 5'-15'	2/3/10	100%	Gx, BTEX	Y	N	Y	Y	Combo lock #xxxx
Eg. 002	Purge Water	2/3/10	100%	Gx, BTEX	N/A	N/A	Y	Y	Combo lock #xxxx

NOTES:
[1]Drum #— Write the Drum # on the drum lid, as well as on the non-hazardous or hazardous waste labels.
[2]Composite Soil Sample—For all sites, collect one composite soil sample from each drum onsite. Place sample on hold at the laboratory, for future RCRA 8 metals analysis. Collect sample in one-4 ounce jar.
[3]Saturated soil—Add bentonite chips or kitty litter to the water that has accumulated or may accumulate inside the drum. Bentonite chips available in the garage.
[4]Drum access for pickup—(eg. fenced, owner notification, lock combination?)

NON-HAZARDOUS WASTE

GENERATOR INFORMATION (Optional)

SHIPPER _____

ADDRESS _____

CITY, STATE, ZIP _____

CONTENTS _____

_____

NON-HAZARDOUS WASTE

HAZARDOUS WASTE

ACCUMULATION
START DATE _____

CONTENTS _____

HANDLE WITH CARE!

CONTAINS HAZARDOUS OR TOXIC WASTES

SoundEarth Strategies

Material Import and Export Summary

Truck Company	Truck Number	Date	Time	Volume (note: tons or yards)	Type of Material	Destination of Material

APPENDIX B
EOS MSDS

MATERIAL SAFETY DATA SHEET

EOS® Vitamin B_{12} SUPPLEMENT

D.O.T. HAZARD CLASSIFICATION: NONE

MANUFACTURER'S NAME

EOS Remediation, Inc
1101 Nowell Road
Raleigh, NC 27607

DATE OF PREPARATION
October 20, 2004

INFORMATION TELEPHONE NO.
919-873-2204

SECTION 1. CHEMICAL IDENTIFICATION

PRODUCT NAME **EOS® Vitamin B_{12} Supplement**
PRODUCT CLASS **Vitamin**
CAS NUMBER **Mixture**

SECTION 2. COMPOSITION ON INGREDIENTS

	MOLECULAR FORMULA	CAS #	%
CYANOCOBALAMIN	C63H88CoN14O14P	68-19-9	0.2 - 0.26
WATER	H20		BALANCE

SECTION 3. HEALTH HAZARDS

CAUTION:
AVOID CONTACT AND INHALATION. CONTACT WITH THE LIQUID MAY CAUSE IRRITATION OF THE EYES, SKIN AND RESPIRATORY TRACT. INGESTION OF LARGE AMOUNTS MAY CAUSE GASTRIC DISTURBANCES. SENSITIZATION MAY OCCUR IN SOME INDIVIDUALS. THERE ARE NO OTHER KNOWN CHRONIC EFFECTS ASSOCIATED WITH THIS MATERIAL.

SECTION 4. FIRST AID MEASURES

IF SWALLOWED:
IF LARGE AMOUNTS OF VITAMIN **B_{12}** ARE INGESTED, DILUTE WITH WATER AND IMMEDIATELY INDUCE VOMITING. NEVER GIVE FLUIDS OR INDUCE VOMITING IF THE VICTIM IS UNCONSCIOUS OR HAVING CONVULSIONS. GET IMMEDIATE MEDICAL ATTENTION.

IF INHALED:
MOVE TO FRESH AIR. AID IN BREATHING, IF NECESSARY, AND GET IMMEDIATE MEDICAL ATTENTION.

EYE CONTACT:
IMMEDIATELY RINSE EYES WITH RUNNING WATER FOR 15 MINUTES. IF IRRITATION DEVELOPS, GET MEDICAL ATTENTION.

SKIN CONTACT:
WASH AFFECTED AREAS WITH SOAP AND WATER. REMOVE AND LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. IF IRRITATION DEVELOPS, GET MEDICAL ATTENTION.

SPECIAL PROCEDURES:
NONE

SECTION 5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA
USE WATER, DRY EXTINGUISHING MEDIA, CARBON DIOXIDE (CO2) OR FOAM.
SPECIAL FIREFIGHTING PROCEDURES
FIREFIGHTER SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND TURN OUT GEAR.
UNUSUAL FIRE AND EXPLOSIONS HAZARDS
ENSURE ADEQUATE VENTILATION

SECTION 6. ACCIDENTAL RELEASE MEASURES

SPILLS SHOULD BE CONTAINED AND PLACED IN SUITABLE CONTAINERS FOR DISPOSAL IN A LICENSED FACILITY. THIS MATERIAL IS NOT REGULATED BY RCRA OR CERCLA ("SUPERFUND"). WEAR APPROPRIATE RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING AND PROVIDE ADEQUATE VENTILATION DURING CLEAN-UP.

SECTION 7. HANDLING AND STORAGE

GENERAL:
STORE AT MODERATE TEMPERATURES IN TIGHT CONTAINERS OUT OF DIRECT LIGHT
HANDLING:
REFER TO SECTION 8.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

CLOTHING:
GLOVES, COVERALLS, APRON, AND BOOTS AS NECESSARY TO PREVENT CONTACT.
EYES:
CHEMICAL GOGGLES
RESPIRATION:
IF DUSTS ARE GENERATED, WEAR AN APPROVED DUST RESPIRATOR.
VENTILATION:
USE LOCAL EXHAUST TO CONTROL DUSTS.
EXPLOSION PROOFING:
NONE REQUIRED.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

COLOR: RED TO DARK RED
FORM/APPEARANCE: LIQUID
ODOR: ODORLESS
SPECIFIC GRAVITY: NOT AVAILABLE
BULK DENSITY: NOT AVAILABLE
PH: NOT AVAILABLE
BOILING POINT: NOT AVAILABLE
FREEZING POINT: NOT AVAILABLE
DECOMP. TMP: NOT AVAILABLE
SOLUBILITY IN WATER DESCRIPTION:
SOLUBLE IN WATER

SECTION 10. STABILITY AND REACTIVITY
STABILITY DATA: STABLE

INCOMPATIBILITY: NONE KNOWN.
CONDITIONS/HAZARDS TO AVOID: AVOID CREATING DUST CLOUD FORMATIONS
HAZARDOUS DECOMPOSITION/POLYMERIZATION:
HAZARDOUS DECOMPOSITION PRODUCTS: NONE KNOWN.
POLYMERIZATION: DOES NOT OCCUR.

SECTION 11. TOXICOLOGICAL INFORMATION

TOXICOLOGY TEST DATA:
NOT AVAILABLE
ACUTE OVEREXPOSURE EFFECTS:
CONTACT WITH THE LIQUID MAY CAUSE IRRITATION OF THE EYES, SKIN AND RESPIRATORY TRACT. INGESTION OF LARGE AMOUNTS MAY CAUSE GASTRIC DISTURBANCES. SENSITIZATION MAY OCCUR IN SOME INDIVIDUALS.
CHRONIC OVEREXPOSURE EFFECTS:
THERE ARE NO OTHER KNOWN CHRONIC EFFECTS ASSOCIATED WITH THIS MATERIAL.

SECTION 12. ECOLOGICAL INFORMATION (FOR CYANOCOBALAMIN)

INHIBITION OF ACTIVATED SLUDGE - < OR = TO 1G/L
NO INHIBITION
BOD/COD CALCULATION FOR ELIMINABILITY - 70 PERCENT
GOOD POTENTIAL FOR ELIMINATION
GOLDEN ORFE, STATIC 96 HR LC50 - >1000 <2200MG/L
PRACTICALLY NONTOXIC

SECTION 13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL:
INCINERATE IN A LICENSED FACILITY. DO NOT DISCHARGE INTO WATERWAYS OR SEWER SYSTEM.
CONTAINER DISPOSAL:
DISPOSE OF IN A LICENSED FACILITY. RECOMMEND CRUSHING OR OTHER MEANS TO PREVENT UNAUTHORIZED REUSE.

SECTION 14. TRANSPORT INFORMATION
DOT PROPER SHIPPING NAME: N/A
DOT TECHNICAL NAME: N/A
DOT PRIMARY HAZARD CLASS: N/A
DOT SECONDARY HAZARD CLASS: N/A
DOT LABEL REQUIRED: N/A
DOT PLACARD REQUIRED: N/A
DOT POISON CONSTITUENT: N/A
BILL OF LADING DESCRIPTION:
NOT REGULATED BY THE DEPARTMENT OF TRANSPORTATION

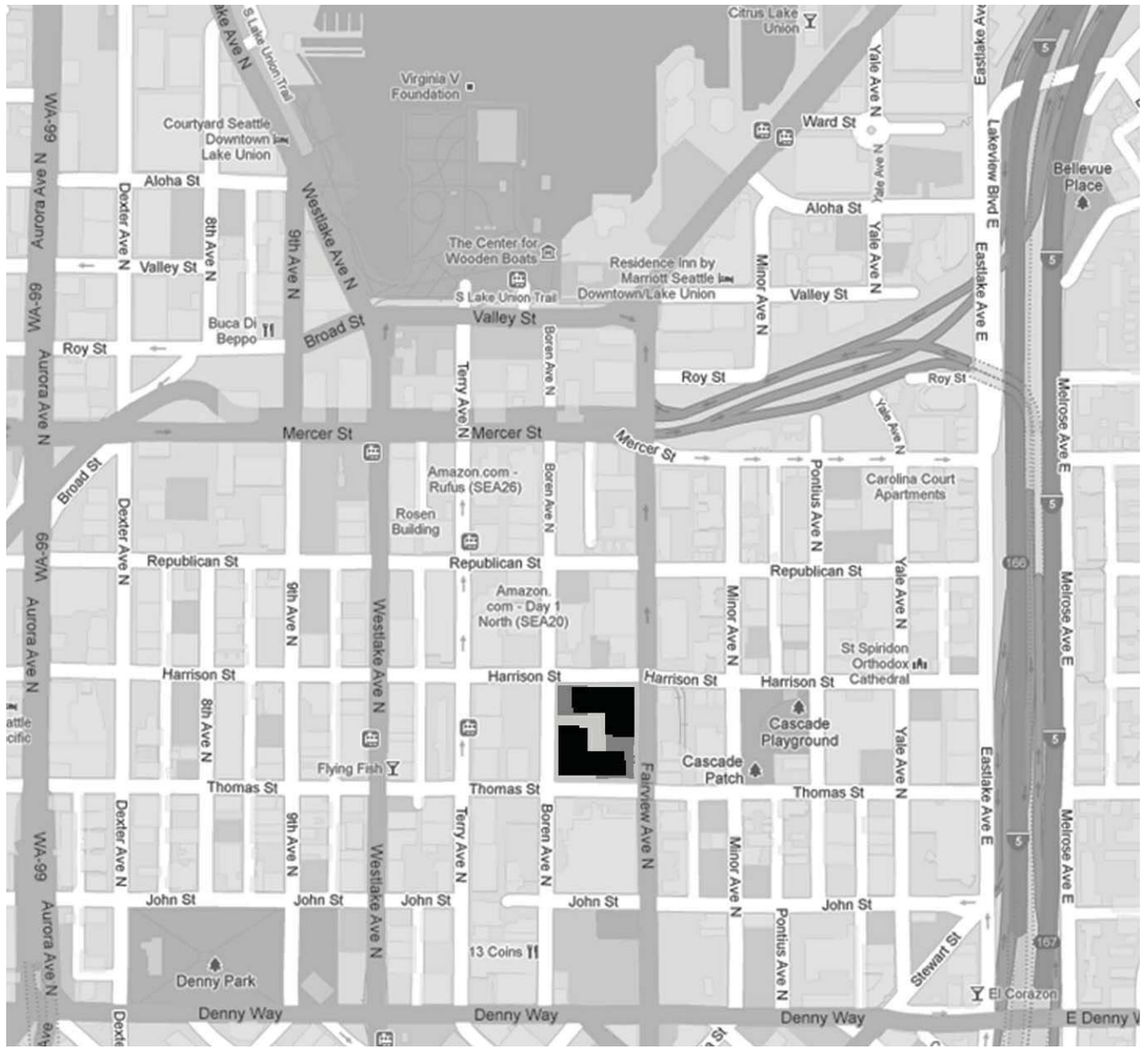
SECTION 15. REGULATORY INFORAMTION
TSCA INVENTORY STATUS
LISTED ON INVENTORY: YES

SECTION 16. OTHER INFORMATION

THE INFORMATION CONTAINED HEREIN IS BASED ON AVAILABLE DATA AND IS BELIEVED TO BE CORRECT. HOWEVER, EOS REMEDIATION, INC. MAKES NO WARRANTY, EXPRESSED OR IMPLIED, REGARDING THE ACCURACY OF THIS DATA OR THE RESULTS TO BE OBTAINED THEREOF. THIS INFORMATION AND PRODUCT ARE FURNISHED ON THE CONDITION THAT THE PERSON RECEIVING THEM SHALL MAKE HIS/HER OWN DETERMINATION AS TO THE SUITABILITY OF THE PRODUCT FOR HIS/HER PARTICULAR PURPOSE.

APPENDIX C

PERKINS + WILL SCHEMATIC DESIGN DRAWING SET DATED JUNE 14, 2013



INDEX OF DRAWINGS		
SHEET NUMBER	SHEET NAME	SCHEMATIC DESIGN
01-General		
000	COVER SHEET	•
G00-00	INDEX OF DRAWINGS	•
G00-01	TOPOGRAPHIC SURVEY	•
G00-02	TOPOGRAPHIC SURVEY	•
02-Civil		
C1.01	GENERAL NOTES, LEGENDS AND ABBREVIATIONS	•
C1.02	NOTES	•
C2.01	TEMPORARY EROSION AND SEDIMENTATION CONTROL PLAN	•
C2.11	SITE DEMOLITION PLAN	•
C2.21	SITE AND PAVING PLAN	•
C2.31	UTILITY PLAN	•
C2.41	FOUNDATION DRAINAGE PLAN	•
C3.01	SECTIONS AND DETAILS	•
C3.02	SECTIONS AND DETAILS	•
C4.01	GENERAL NOTES AND VICINITY MAP	•
C4.02	NOTES	•
C5.01	PLAN - THOMAS STREET	•
C5.02	PLAN - THOMAS STREET	•
C5.03	PLAN - FAIRVIEW STREET	•
C5.04	PLAN - FAIRVIEW STREET	•
C5.05	PLAN - HARRISON STREET	•
C5.06	PLAN - HARRISON STREET	•
C5.07	PLAN - BOREN AVENUE NORTH	•
C5.08	PLAN - BOREN AVENUE NORTH	•
C6.01	GENERAL NOTES AND VICINITY MAP	•
C6.02	GENERAL NOTES	•
C7.05	PLAN - HARRISON STREET	•
C7.08	PLAN - BOREN AVENUE NORTH	•
02.1-SHORING		
SH1.01	SHORING GENERAL NOTES	•
SH1.02	SHORING GENERAL NOTES AND TYPICAL DETAILS	•
SH2.01	SHORING PLAN	•
SH3.01	SHORING ELEVATIONS	•
SH3.02	SHORING ELEVATIONS	•
SH3.03	SHORING ELEVATIONS	•
SH3.04	SHORING ELEVATIONS	•
SH4.02	SHORING DESIGN CRITERIA	•
SH5.01	SHORING SCHEDULES AND DETAILS	•
02.2-BRACING		
BR1.01	MICROPILE NOTES AND DETAILS	•
BR2.01	EXTERNAL BRACING PLAN - BOREN INVESTMENT BULIDING	•
BR2.02	EXTERNAL BRACING PLAN - TROY LAUNDRY BULIDING	•
BR3.01	EXTERNAL BRACING ELEVATIONS - BOREN INVESTMENT BUILDING	•
BR3.02	EXTERNAL BRACING ELEVATIONS - BOREN INVESTMENT BUILDING	•
BR3.03	EXTERNAL BRACING ELEVATIONS - TROY LAUNDRY BULIDING	•
BR4.01	BRACING SECTIONS AND DETAILS	•
BR4.02	BRACING SCHEDULE AND DETAILS	•
03-Landscape		
L00-01	LANDSCAPE	•
L01-01	OVERALL SITE PLAN	•
L02-01	SITE PLAN NORTH	•
L02-02	SITE PLAN SOUTH	•
L02-03	ROOF PLAN	•
L03-01	SITE SECTIONS	•
L04-01	PLANTING DETAILS	•
04-Architectural		
A00-01	ARCHITECTURAL ABBREVIATIONS, SYMBOLS & NOTES	•
A00-10	CODE COMPLIANCE DATA	•
A00-11	CODE COMPLIANCE DIAGRAMS	•
A02-02	BOREN INVESTMENT BUILDING LEVEL 01, LEVEL ROOF DEMOLITION PLAN	•
A02-03	BOREN INVESTMENT BUILDING DEMOLITION ELEVATIONS	•
A02-04	BOREN INVESTMENT BUILDING DEMOLITION ELEVATIONS	•
A02-06	TROY LAUNDRY BUILDING LEVEL 01 DEMOLITION PLAN	•
A02-07	TROY LAUNDRY BUILDING DEMOLITION ELEVATIONS	•
A02-08	TROY LAUNDRY BUILDING DEMOLITION ELEVATIONS	•
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A03-P4	LEVEL P4 OVERALL FLOOR PLAN	•
A03-P3	LEVEL P3 OVERALL FLOOR PLAN	•
A03-P2	LEVEL P2 OVERALL FLOOR PLAN	•
A03-P1	LEVEL P1 OVERALL FLOOR PLAN	•
A03-01	LEVEL 01 OVERALL PLAN	•
A03-02	LEVEL 02 OVERALL PLAN	•
A03-04	LEVEL 04 OVERALL PLAN	•
A03-05	LEVEL 05-12 TYPICAL FLOOR PLAN	•
A03-06	LEVEL 13 OVERALL PLAN	•
A03-07	LEVEL 14 NORTH TOWER ROOF PLAN	•
A04-P5N	LEVEL P5 ENLARGED NORTH FLOOR PLAN	•
A04-P5S	LEVEL P5 ENLARGED SOUTH FLOOR PLAN	•
A04-P4N	LEVEL P4 ENLARGED NORTH FLOOR PLAN	•
A04-P4S	LEVEL P4 ENLARGED SOUTH FLOOR PLAN	•
A04-P3N	LEVEL P3 ENLARGED NORTH FLOOR PLAN	•
A04-P3S	LEVEL P3 ENLARGED SOUTH FLOOR PLAN	•
A04-P2N	LEVEL P2 ENLARGED NORTH FLOOR PLAN	•
A04-P2S	LEVEL P2 ENLARGED SOUTH FLOOR PLAN	•
A04-P1N	LEVEL P1 ENLARGED NORTH FLOOR PLAN	•
A04-P1S	LEVEL P1 ENLARGED SOUTH FLOOR PLAN	•
A04-01N	LEVEL 01 ENLARGED NORTH FLOOR PLAN	•
A04-01S	LEVEL 01 ENLARGED SOUTH FLOOR PLAN	•
A04-02N	LEVEL 02 ENLARGED NORTH FLOOR PLAN	•
A04-02S	LEVEL 02 ENLARGED SOUTH FLOOR PLAN	•
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A04-04N	LEVEL 04 NORTH ENLARGED FLOOR PLAN	•
A04-04S	LEVEL 04 SOUTH ENLARGED FLOOR PLAN	•
A04-05N	LEVEL 05-12 NORTH ENLARGED TYPICAL	•
A04-05S	LEVEL 05-12 SOUTH ENLARGED TYPICAL	•
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A04-06S	LEVEL 13 SOUTH TOWER ROOF PLAN	•
A04-07N	LEVEL 14 NORTH TOWER ROOF PLAN	•
A11-01	NORTH ELEVATION	•
A11-02	EAST ELEVATION	•
A11-03	SOUTH ELEVATION	•
A11-04	WEST ELEVATION	•
A11-10	BUILDING SECTIONS	•
A11-11	BUILDING SECTIONS	•
A11-20	EXTERIOR BUILDING ELEVATIONS	•
A11-21	EXTERIOR BUILDING ELEVATIONS	•
A11-50	EXTERIOR DETAILS	•
04-Architectural ARC		
A04-0P1 L	LEVEL P1 ARC-FLOOR-PLAN	•
A04-01 L	LEVEL 01 ARC-FLOOR-PLAN	•
A04-02 L	LEVEL 02 ARC-FLOOR-PLAN	•
A04-04 L	LEVEL 04 ARC-FLOOR-PLAN	•
05-Structural		
S0.01	GENERAL NOTES	•
S2.01	LEVEL P5 PLAN OVERVIEW	•
S2.02	LEVEL P4 PLAN OVERVIEW	•
S2.03	LEVEL P3 PLAN OVERVIEW	•
S2.04	LEVEL P2 PLAN OVERVIEW	•
S2.05	LEVEL P1 PLAN OVERVIEW	•
S2.06	LEVEL 01 PLAN OVERVIEW	•
S2.07	LEVEL 02 PLAN OVERVIEW	•
S2.08	LEVEL 03 PLAN OVERVIEW	•
S2.09	LEVEL 04 PLAN OVERVIEW	•
S2.10	LEVEL 5-12 PLAN OVERVIEW	•
S2.11	LEVEL 13 PLAN OVERVIEW	•
S2.12	LEVEL 14 PLAN OVERVIEW	•
S2.21	PARTIAL PLAN AT BOREN BUILDING LEVEL P1	•
S2.22	PARTIAL PLAN AT TROY BUILDING LEVEL 02	•
S2.23	PARTIAL PLAN AT TROY BUILDING LEVEL 03/04	•
S3.01	SHEAR WALL ELEVATIONS	•
S3.02	SHEAR WALL ELEVATIONS	•
S3.21	BOREN BUILDING ELEVATIONS	•
S3.22	TROY BUILDING ELEVATIONS	•
S4.01	COLUMN AND FOUNDATION SCHEDULE	•
09-Electrical		
ED-1	PRELIMINARY SINGLE LINE DIAGRAM	•

PROJECT DIRECTORY

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CONTACT: ANDY CLINCH

STRUCTURAL AND CIVIL ENGINEER:
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CONTACT: PETER SOMERS-STRUCTURAL
BROOK JACKSHA-CIVIL

LANDSCAPE ARCHITECT:
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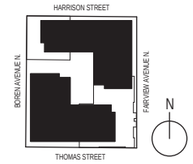
TROY BLOCK

TOUCHSTONE CORPORATION

307 Fairview Avenue North, Seattle, WA 98109



Schematic Design

June 14, 2013

Revisions

NO	ISSUE	DATE

Sheet Information

Date	06/14/2013
Job Number	161119.000
Drawn	Author
Checked	Checker
Approved	Approver

Title

INDEX OF DRAWINGS

Sheet

G00-00

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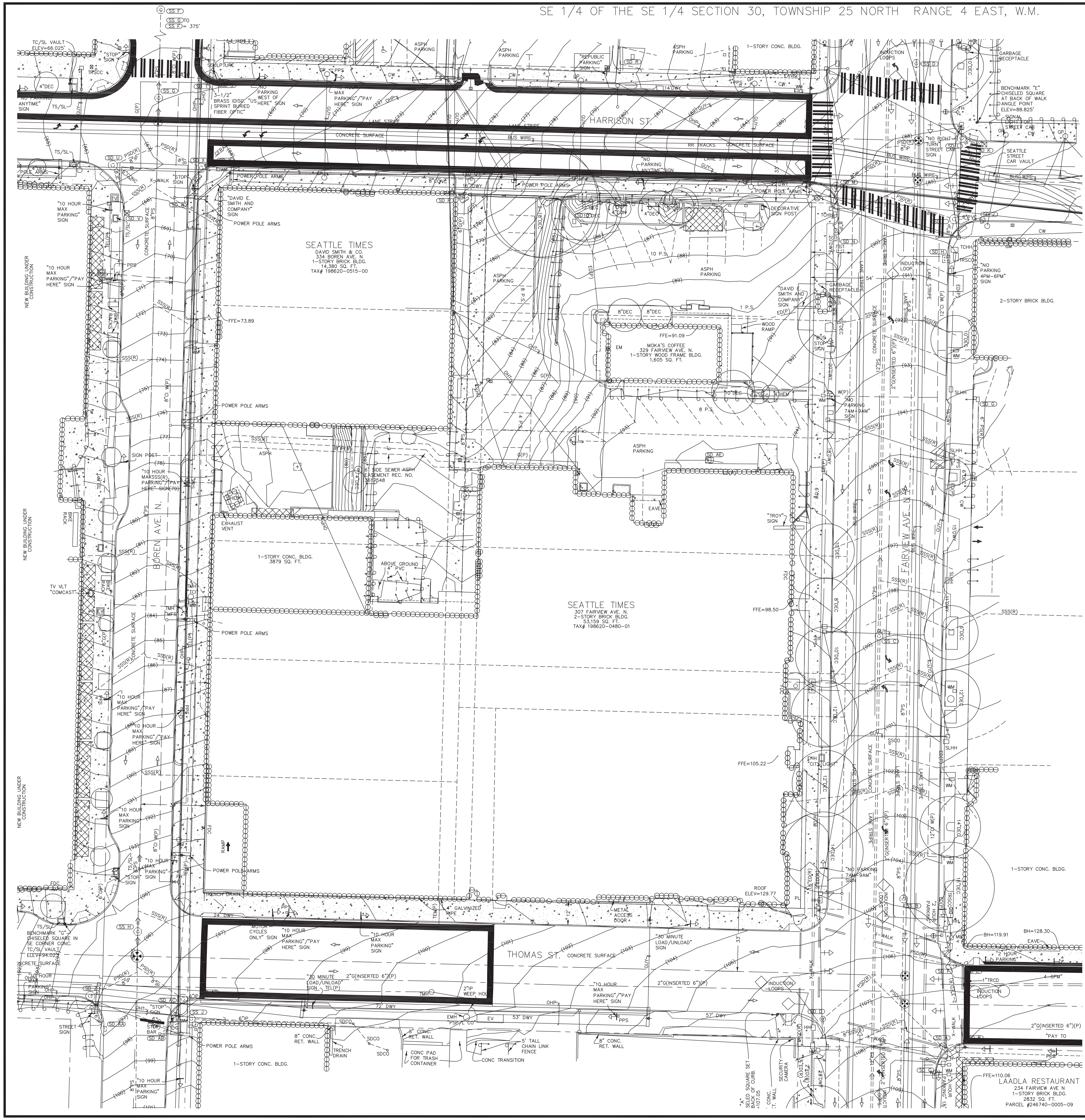
SE 1/4 OF THE SE 1/4 SECTION 30, TOWNSHIP 25 NORTH RANGE 4 EAST, W.M.



STRUCTURE CALL OUTS

SD A	48"CB(TY II) RIM=107.77 IE=105.17(6"CERAMIC E) IE=105.02(6"CERAMIC S) IE=103.47(TRAP NW)
SD B	INLET RIM=107.87 IE=107.07(6"CERAMIC W)
SD C	INLET RIM=108.10 IE=107.30(6"CERAMIC N)
SD D	36"CB(TY II) RIM=106.68 IE=103.83(6"CERAMIC S) IE=102.88(TRAP NE)
SD E	INLET RIM=105.94 IE=105.19(6"CP W)
SD F	36"CB(TY II) RIM=106.01 IE=103.56(6"CP E) IE=102.26(TRAP W)
SD G	CB(TY I) RIM=94.16 IE S=92.26(6"IP) BOT=89.36
SD H	CB(TY I) RIM=90.42 IE N=88.12(8"IP) BOT=88.02
SD I	CB(TY II 36"DIA) RIM=89.66 IE N=85.51(4"IP) IE NW=85.16(8"IP TRAP) IE NE=85.46(6"CONC.) IE E=86.86(6"PVC) IE S=86.21(8"IP) BOT=82.86
SD J	INLET RIM=89.90 IE W=89.00(6"PVC)
SD K	INLET RIM=88.54 IE W=87.14(6"PVC) BOT=87.04
SD L	CB(TY II 36"DIA) RIM=88.10 IE NE=84.80(6"CONC, PLUGGED) IE E=84.95(6"PVC) IE SE=84.90(4"PVC) IE SW=84.35(8"TRAP) BOT=81.90
SD M	CB(TY II 36"DIA) RIM=87.81 IE NE=84.06(8"TRAP) IE SE=84.71(8"IP) BOT=81.61
SD N	CB(TY I) RIM=89.34 IE N=87.14(8"IP) BOT=87.04
SD O	CB(TY I) RIM=84.75 COC=FILLED W/ SEDIMENT
SD P	CB(TY II) RIM=75.79 COC=FILLED W/ SEDIMENT
SD Q	PSD MH(TY II) RIM=76.09 COC=71.54
SD R	CB(TY I) RIM=79.55 IE S=77.60(6"PVC TRAP) BOT=74.45
SD S	INLET RIM=66.75 IE W=65.75(6"IP)
SD T	CB(TY II 36"DIA) RIM=66.66 IE E=63.11(6"IP) IE SE=63.36(4"CERAMIC) IE W=63.26(8"IP TRAP) BOT=60.51
SD U	CB(TY II 36"DIA) RIM=66.53 IE NE=63.63(8"TRAP) IE SE=64.13(6"CONC PLUGGED) IE SSE=63.73(8"IP) BOT=60.83
SD V	INLET RIM=67.91 IE W=66.16(8"IP)
SD W	INLET RIM=67.49 IE N=66.59(6"CONC)
SD X	CB(TY II 36"DIA) RIM=67.19 IE NE=64.99(4"CERAMIC) IE E=64.89(6"CONC) IE W=64.09(8"IP TRAP) IE SW=64.79(6"CONC) BOT=61.60
SD Y	INLET RIM=67.49 IE W=66.49(6"CONC)
SD Z	CB(TY II 36"DIA) RIM=95.77 IE E=93.87(8"IP TRAP) IE SE=9417(6"IP) BOT=89.97
SD AA	INLET RIM=96.61 IE N=95.76(6"IP)
SD AB	INLET RIM=97.78 IE N=96.88(6"IP)
SD AC	CB(TY II 36"DIA) RIM=97.32 IE E=94.27(6"IP) IE SW=94.52(6"IP) IE W=94.22(8"IP TRAP) BOT=91.62
SD AD	INLET RIM=97.43 IE W=96.53(6"IP)
SD AE	CB(TY I) RIM=92.60 COC=FILLED W/ SEDIMENT

SS A	MH RIM=112.83 COC=94.23 (12"CP N,S)
SS B	MH RIM=104.78 COC=90.33 (8"CP N,S)
SS C	SSMH(48"DIA) RIM=98.91 COC=80.46 (12" CP N,S)
SS D	MH(48"DIA) RIM=86.43 COC=71.45 (8" CP N,S)
SS E	MH(48"DIA) RIM=85.05 IE N=66.50(10"CONC) IE S=66.55(12"CONC)
SS F	MH(48"DIA) RIM=44.51 COC=28.16 (8" CP N,S)
SS G	MH(48"DIA) RIM=67.00 COC=43.70 (8" CP N,S)
SS H	MH(48"DIA) RIM=95.79 IE N=83.69(8"CONC) IE SE=83.79(8" CONC)
SS I	MH(36"DIA) RIM=87.24 IE N=82.19(8"CONC) IE SE=82.29(8" CONC)
SS J	MH(48"DIA) RIM=98.34 IE W=94.84(6"PVC) IE E=94.99(6"PVC) IE SE=94.94(6"PVC) COC=4.55

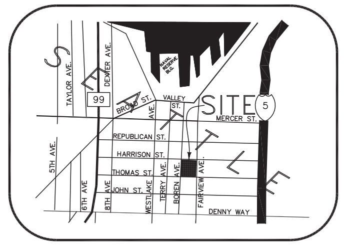
LEGEND

ASPH	ASPHALT
	EDGE OF ASPHALT
	BRICK SURFACE
	BUILDING LINE
(CITY)	CITY DATA FROM ENGINEER'S MAP
	CANOPY
	CATCH BASIN / CB WITH TRAP
CC	CONCRETE CURB
℄	CENTERLINE
CL	CITY LIGHT
CLHH	CITY LIGHT HANDHOLE
CMU	CONCRETE MASONRY UNIT
CON	CONIFEROUS TREE
	CONCRETE SURFACE
CO	CLEANOUT
CW	CONCRETE WALK
CRW	CONCRETE RETAINING WALL
DEC	DECIDUOUS TREE
DI	DUCTILE IRON
DWY	DRIVEWAY
ED	ELECTRICAL CONDUIT (BURIED)
EHH	ELECTRICAL HANDHOLE
EM	ELECTRICAL METER
EMH	ELECTRICAL MANHOLE
ET	ELECTRICAL TRANSFORMER
EV	ELECTRICAL VAULT
FFE	FINISHED FLOOR ELEVATION
	FOUND MONUMENT IN CASE
	CHAIN LINK FENCE (CLF)
	WOOD FENCE (WF)
FH	FIRE HYDRANT
FO	FIBER OPTICS
G	GAS MAIN
GM	GAS METER
	GAS VALVE
	GUARD POST
	GUY ANCHOR
GP	GUY POLE
HH	HAND HOLE
	INLET
IP	IRON PIPE
LP	LIGHT POLE
LUM	LIGHT POLE (ORNAMENTAL)
LSCAPE	LANDSCAPE PLANTER
US	MAILBOX
	PSD MANHOLE / MANHOLE
(M)	MEASURED SURVEY DATA
	MONUMENT LINE
OHP/T	OVERHEAD POWER/TELEPHONE
(P)	PAINTED UTILITY LOCATION
PPS	PARKING PAY STATION
PS	PIPE SEWER COMBINED
PS	PIPE SEWER SANITARY
PSD	PIPE STORM DRAIN
PP	POWER POLE
(R)	RECORD DATA
	SIGN
SSS	SIDE SEWER-SANITARY
SD	STORM DRAIN
SLHH	STREET LIGHT HANDHOLE
	STREET NAME SIGN
TD	TELEPHONE CONDUIT (BURIED)
TEL	TELEPHONE
TMH	TELEPHONE MANHOLE
TRSCC	TRAFFIC CONTROL CABINET
	TRAFFIC ARROW (PAINTED)
	TRAFFIC FLOW DIRECTION
TVHH	TELEVISION HANDHOLE
PP	WOOD POLE W/ LUMINAIRE
W	WATER MAIN
VCH	VALVE CHAMBER

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.



VICINITY MAP

NO SCALE

SURVEY REFEERENCES:

CITY OF SEATTLE (SEATTLE PUBLIC UTILITIES) ENGINEER'S MAP SE ¼, SECTION 30, TOWNSHIP 25 NORTH, RANGE 4 EAST, W.M.

LAYERSTATE:

NO | REVISION | DATE

BUSH, ROED & HITCHINGS, INC.
CIVIL ENGINEERS & LAND SURVEYORS
2009 MINOR AVE. EAST
SEATTLE, Washington
98102-3513
(206) 323-4144
1-800-935-0508
FAX# (206) 323-7135
WEBSITE: BRHINC.COM

TOPOGRAPHIC AND BOUNDARY SURVEY
TROY BLOCK
TOUCHSTONE CORPORATION
SEATTLE, KING COUNTY, WASHINGTON

drawn by	checked by
JBK	DAB
scale	date
1"=20'	03/02/11
job no.	
2011009.00	
sheet 1 of 2	

SE 1/4 OF THE SE 1/4 SECTION 30, TOWNSHIP 25 NORTH RANGE 4 EAST, W.M.

SITE NOTES

SITE ADDRESS:
307 FAIRVIEW AVENUE NORTH
SEATTLE, WASHINGTON

TAX ACCOUNT NO.:
198620-0480-01
198620-0515-00

ZONING:
IC-65: INDUSTRIAL COMMERCIAL - 65' HEIGHT LIMIT

ON NOVEMBER 28, 2007 A RESEARCH TECHNICIAN FROM BRH INC. VISITED THE CITY OF SEATTLE DEPARTMENT OF PLANNING AND DEVELOPMENT AND MET WITH ON DUTY LAND USE PLANNER "LARRY" AND DISCUSSED CURRENT DEVELOPMENT STANDARDS FOR SUBJECT ZONE. THE FOLLOWING IS CHARACTERIZATION OF THE INFORMATION THE TECHNICIAN GATHERED. [CODE REFERENCES ARE IN PARENTHESIS]

1. THIS SITE LIES ENTIRELY WITHIN ZONE IC-65. THIS IS AND ABBREVIATION FOR "INDUSTRIAL COMMERCIAL." [23.50, DEFINITIONS 23.84A]
2. THIS SITE LIES WITHIN NEIGHBORHOOD PLANNING SUB-AREA CALLED "SOUTH LAKE UNION URBAN CENTER." THERE SEEMED TO BE SOME AMBIGUITY AS TO WHETHER THIS WOULD BE CONSIDERED AN "URBAN VILLAGE" PER THE LAND USE CODE. THIS COULD POTENTIALLY BEAR UPON ALLOWABLE BUILDING HEIGHT.
3. GENERALLY, CURRENT REQUIRED BUILDING SETBACK FROM PROPERTY LINE ARE 0 FEET. SETBACKS FOR NEW CONSTRUCTION ALONG STREET FRONTAGES COULD BE AS MUCH AS 5 FEET, SUBJECT TO LANDSCAPING CODE PROVISIONS FOR 'STREET TREES'. SUCH A DETERMINATION COULD NOT BE MADE WITHOUT A PROPOSED SITE PLAN REVIEW. [23.50.032]
4. ALLOWABLE BUILDING HEIGHT = 65 FEET (85 FEET IF DETERMINED TO BE WITHIN "URBAN VILLAGE.")
5. PARKING REQUIREMENTS DEPEND UPON BUILDING USE. OFFSITE OR COVENANT PARKING AGREEMENTS ARE POSSIBLE TO SATISFY PARKING REQUIREMENTS. [23.54.015]
6. LANDSCAPING REQUIREMENTS EXIST. [23.50.034,036,038]
7. MAXIMUM FLOOR AREA RATIO (FAR) = 3.1
8. MAXIMUM LOT COVERAGE=NOT APPLICABLE (N/A)
9. MAXIMUM IMPERVIOUS SURFACE = N/A
10. MINIMUM LOT SIZE= NONE
11. TRANSFER OF DEVELOPMENT RIGHTS=N/A
12. BONUSES FOR THE PROVISION OF PUBLIC BENEFIT FEATURE=N/A

ZONING AGENCY:
CITY OF SEATTLE
DEPARTMENT OF PLANNING AND DEVELOPMENT
700 5TH AVENUE, SUITE 2000
SEATTLE, WA 98104
(206) 684-8600

SETBACKS:
CURRENT SETBACK REQUIREMENTS SUBJECT TO SITE PLAN REVIEW. CURRENT SETBACKS MAY DIFFER FROM THOSE IN EFFECT DURING DESIGN/CONSTRUCTION OF EXISTING IMPROVEMENTS.

THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY BY THE GOVERNING JURISDICTION INDICATES THAT STRUCTURES ON THIS PROPERTY COMPLIED WITH MINIMUM SETBACK AND HEIGHT REQUIREMENTS FOLLOWING CONSTRUCTION.

FLOOD ZONE:
THIS SITE APPEARS ON NATIONAL FLOOD INSURANCE RATE MAP, DATED MAY 16, 1995, COMMUNITY PANEL NO. 530330630F, AND IS SITUATED IN ZONE "X", AREA DETERMINED TO BE OUTSIDE 500 YEAR FLOOD PLAIN.

HORIZONTAL DATUM:
NAD 83/91

BASED ON RTK GPS OBSERVATIONS UTILIZING THE WASHINGTON STATE REFERENCE NETWORK (WSRN)

HELD THE FOUND MONUMENTS ON THOMAS STREET BETWEEN FAIRVIEW AVENUE NORTH AND BOREN AVENUE NORTH.
BEARING = NORTH 88°32'38" WEST

HORIZONTAL BENCHMARKS:

SOURCE: CITY OF SEATTLE
DESCRIPTION: 1/4" BRASS PLUG W/PUNCH IN CONCRETE, DOWN 0.7'.
LOCATION: NORTHERLY MONUMENT AT THE INTERSECTION OF THOMAS STREET AND FAIRVIEW AVENUE NORTH

SOURCE: CITY OF SEATTLE
DESCRIPTION: 3/8" TACK IN LEAD IN A 4"X4" CONCRETE PYRAMID, DOWN 0.9'.
LOCATION: THE INTERSECTION OF THOMAS STREET AND BOREN AVENUE NORTH.

VERTICAL DATUM:
NAVD 88

VERTICAL BENCHMARKS:

SOURCE: CITY OF SEATTLE
ID #: 1523
DESCRIPTION: 2" BRASS CAP STAMPED "36580301"
LOCATION: 11.3' SOUTH OF INTERSECTION OF BACK OF CONCRETE WALKS, +/- 20' NORTH OF BUS SHELTER, SOUTHEAST QUADRANT OF INTERSECTION OF FAIRVIEW AVENUE AND DENNY WAY.
ELEVATION: 132.09

SOURCE: CITY OF SEATTLE
ID #: 1602
DESCRIPTION: 2" BRAS CAP STAMPED "36690702"
LOCATION: CONCRETE WALK IN LINE WITH NORTH EDGE OF CONCRETE BASE FOR SOUTH RAILING ENTRY TO CASCADE PLAYGROUND, 12.4' SOUTH OF BACK OF CONCRETE WALK, SOUTHWEST QUADRANT OF HARRISON STREET AND PONTIUS AVENUE NORTH
ELEVATION: 109.24

BENCHMARK A:
CHISELED SQUARE SET IN BACK OF CURB, NORTHWEST QUADRANT OF FAIRVIEW AVENUE NORTH AND THOMAS STREET, +/- 20' WEST OF WEST EDGE OF FAIRVIEW AVENUE NORTH.
ELEVATION = 107.05

BENCHMARK E:
CHISELED SQUARE AT THE BACK OF SIDEWALK AT AN ANGLE POINT AT THE NORTHEAST QUADRANT OF FAIRVIEW AVENUE NORTH AND HARRISON STREET. ELEVATION = 88.83

BENCHMARK F:
CHISELED SQUARE IN THE NORTHWEST CORNER OF "TC/SL" CONCRETE VAULT AT THE NORTHWEST QUADRANT OF HARRISON STREET AND BOREN AVENUE NORTH.
ELEVATION = 66.03

BENCHMARK G:
CHISELED SQUARE IN THE SOUTHEAST CORNER OF "TC/SL" CONCRETE VAULT AT THE NORTHWEST QUADRANT OF THOMAS STREET AND BOREN AVENUE NORTH.
ELEVATION = 94.02

AREA:
SITE AS SHOWN CONTAINS 109,129 SQUARE FEET OR 2.5053 ACRES, MORE OR LESS.

PARKING SPACE COUNT:
PARKING SPACES TOTAL 30 INCLUDING 0 HANDICAP ACCESSIBLE SPACES.

SUBSTRUCTURES:
BURIED UTILITIES ARE SHOWN AS INDICATED ON RECORDS MAPS FURNISHED BY OTHERS AND VERIFIED WHERE POSSIBLE BY FEATURES LOCATED IN THE FIELD. WE ASSUME NO LIABILITY FOR THE ACCURACY OF THOSE RECORDS. FOR THE FINAL LOCATION OF EXISTING UTILITIES IN AREAS CRITICAL TO DESIGN CONTACT THE UTILITY OWNER/AGENCY.

TELECOMMUNICATIONS/FIBER OPTIC DISCLAIMER:
RECORDS OF UNDERGROUND TELECOMMUNICATIONS AND/OR FIBER OPTIC LINES ARE NOT ALWAYS AVAILABLE TO THE PUBLIC. BRH HAS NOT CONTACTED EACH OF THE MANY COMPANIES, IN THE COURSE OF THIS SURVEY, WHICH COULD HAVE UNDERGROUND LINES WITHIN ADJACENT RIGHTS-OF-WAY. THEREFORE, BRH DOES NOT ACCEPT RESPONSIBILITY FOR THE EXISTENCE OF UNDERGROUND TELECOMMUNICATIONS/FIBER OPTIC LINES WHICH ARE NOT MADE PUBLIC RECORD WITH THE LOCAL JURISDICTION. AS ALWAYS, CALL 1-800-424-5555 BEFORE CONSTRUCTION.

UTILITY PROVIDERS:

SANITARY SEWER AND STORM DRAINAGE:
SEATTLE PUBLIC UTILITIES
PROJECT MANAGEMENT AND ENGINEERING
700 5TH AVENUE
PO BOX 34018
SEATTLE, WA 98124-4018
(206) 233-7900

WATER:
SEATTLE PUBLIC UTILITIES
700 5TH AVENUE, SUITE 4900
PO BOX 34018
SEATTLE, WA 98124-4018
(206) 684-3000

POWER:
SEATTLE CITY LIGHT
700 5TH AVENUE, SUITE 3200
SEATTLE, WA 98124-4023
(206) 684-3000

NATURAL GAS:
PUGET SOUND ENERGY
10885 NE 4TH STREET, SUITE 1200
PO BOX 97034
BELLEVUE, WA 98009-9734
(425) 454-6363
(888) 225-5773

TELEPHONE:
QWEST
LDA GROUP
PO BOX 625001
LITTLETON, CO 80162
(800) 526-3557

DESCRIPTION:

PARCEL A:
LOTS 1 AND 2, BLOCK 109, D. T. DENNY'S 5TH ADDITION TO NORTH SEATTLE, ACCORDING TO THE PLAT RECORDED IN VOLUME 1 OF PLATS, PAGE 202, IN KING COUNTY, WASHINGTON;

TOGETHER WITH THAT PORTION OF VACATED ALLEY ADJOINING, VACATED UNDER ORDINANCE NO. 92708,OF THE CITY OF SEATTLE, THAT WOULD ATTACH BY OPERATION OF LAW, EXCEPT THE EAST 21 FEET THEREOF HERETOFORE CONDEMNED IN KING COUNTY SUPERIOR COURT CAUSE NO. 204496, FOR STREET PURPOSES, AS PROVIDED BY ORDINANCE NO. 51975 OF THE CITY OF SEATTLE.

PARCEL B:
LOTS 3 AND 4, BLOCK 109, D. T. DENNY'S 5TH ADDITION TO NORTH SEATTLE, ACCORDING TO THE PLAT RECORDED IN VOLUME 1 OF PLATS, PAGE 202, IN KING COUNTY, WASHINGTON;
ALSO, A TRACT OF LAND DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF SAID LOT 4;
RUNNING THENCE SOUTH ALONG THE WEST LINE OF FAIRVIEW AVENUE, 21.92 FEET, MORE OR LESS, TO THE NORTH LINE OF A TRACT OF LAND CONVEYED BY DAVID T. DENNY AND WIFE TO JULIUS KRALMER BY DEED
RECORDED IN VOLUME 7 OF DEEDS, PAGE 292, RECORDS OF KING COUNTY, WASHINGTON;

THENCE WEST ALONG NORTH LINE OF SAID CONVEYED TRACT TO ALLEY, AS SHOWN ON SAID PLAT OF D. T.DENNY'S 5TH ADDITION TO NORTH SEATTLE;

THENCE NORTH 21.92 FEET, MORE OR LESS, TO THE SOUTH LINE OF SAID LOT 4;

THENCE EAST TO BEGINNING,
EXCEPT THE EAST 21 FEET THEREOF HERETOFORE CONDEMNED BY THE CITY OF SEATTLE IN KING COUNTY SUPERIOR COURT CAUSE NO. 204496, FOR STREET PURPOSES, AS PROVIDED UNDER ORDINANCE NO. 51975,OF SAID CITY;

TOGETHER WITH THAT PORTION OF VACATED ALLEY ADJOINING, VACATED UNDER ORDINANCE NO. 92708,OF THE CITY OF SEATTLE, THAT WOULD ATTACH BY OPERATION OF LAW.

PARCEL C:
BEGINNING AT THE INTERSECTION OF THE WEST LINE OF FAIRVIEW AVENUE WITH THE NORTH LINE OF THE TRACT OF LAND DEEDED TO JULIUS KRALMER BY DEED DATED MARCH 15, 1873, AND RECORDED IN VOLUME 7 OF DEEDS, PAGE 292, RECORDS OF KING COUNTY, WASHINGTON;

THENCE WEST ALONG SAID NORTH LINE TO THE EAST LINE OF THE DONATION CLAIM OF D. T. DENNY AND WIFE;

THENCE SOUTH ALONG SAID EAST LINE 98.08 FEET, MORE OR LESS, TO THE NORTH LINE OF THOMAS STREET;
THENCE EAST ALONG SAID THOMAS STREET EXTENDED TO THE WEST LINE OF SAID FAIRVIEW AVENUE;

THENCE NORTH ALONG SAME 98.08 FEET, MORE OR LESS, TO THE PLACE OF BEGINNING;

EXCEPT THE EAST 21 FEET THEREOF HERETOFORE CONDEMNED BY THE CITY OF SEATTLE IN KING COUNTY SUPERIOR COURT CAUSE NO. 204496, FOR STREET PURPOSES, AS PROVIDED UNDER ORDINANCE NO. 51975,OF SAID CITY.

PARCEL D:
A PORTION OF THE DONATION CLAIM OF D. T. DENNY AND LOUISA DENNY, HIS WIFE, DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE NORTH LINE OF THOMAS STREET AND THE EAST LINE OF THE ALLEY IN BLOCK 109 OF D. T. DENNY'S 5TH ADDITION TO NORTH SEATTLE, ACCORDING TO THE PLAT RECORDED IN VOLUME 1 OF PLATS, PAGE 202, IN KING COUNTY, WASHINGTON;

THENCE EAST ALONG THE NORTH LINE OF SAID THOMAS STREET TO THE EAST BOUNDARY LINE OF DONATION CLAIM OF D. T. DENNY AND LOUISA DENNY;

THENCE NORTH 98.08 FEET;

THENCE WEST TO THE EAST LINE OF THE ALLEY AFORESAID;

THENCE SOUTH 98.08 FEET TO THE POINT OF BEGINNING;

TOGETHER WITH THAT PORTION OF VACATED ALLEY ADJOINING, VACATED UNDER ORDINANCE NO. 92708 OF THE CITY OF SEATTLE, THAT WOULD ATTACH BY OPERATION OF LAW.

PARCEL E:
LOTS 7 AND 8, BLOCK 109, D. T. DENNY'S 5TH ADDITION TO NORTH SEATTLE, ACCORDING TO THE PLAT RECORDED IN VOLUME 1 OF PLATS, PAGE 202, IN KING COUNTY, WASHINGTON.

TOGETHER WITH THAT PORTION OF VACATED ALLEY ADJOINING, VACATED UNDER ORDINANCE NO. 92708,OF THE CITY OF SEATTLE, THAT WOULD ATTACH BY OPERATION OF LAW.

PARCEL F:
LOTS 9 AND 10, BLOCK 109, D. T. DENNY'S 5TH ADDITION TO NORTH SEATTLE, ACCORDING TO THE PLAT RECORDED IN VOLUME 1 OF PLATS, PAGE 202, IN KING COUNTY, WASHINGTON;

TOGETHER WITH THAT PORTION OF VACATED ALLEY ADJOINING, VACATED UNDER ORDINANCE NO. 92708,OF THE CITY OF SEATTLE, THAT WOULD ATTACH BY OPERATION OF LAW.

PARCEL G:
LOTS 11 AND 12, BLOCK 109, D. T. DENNY'S 5TH ADDITION TO NORTH SEATTLE, ACCORDING TO THE PLAT RECORDED IN VOLUME 1 OF PLATS, PAGE 202, IN KING COUNTY, WASHINGTON;

TOGETHER WITH THAT PORTION OF VACATED ALLEY ADJOINING, VACATED UNDER ORDINANCE NO. 92708,OF THE CITY OF SEATTLE, THAT WOULD ATTACH BY OPERATION OF LAW.

TITLE REPORT REFERENCE:
THIS SURVEY WAS CONDUCTED ACCORDING TO THE DESCRIPTION SHOWN, FURNISHED BY FIRST AMERICAN TITLE INSURANCE COMPANY, FILE NO. NCS-352861-WA1, DATED JULY 12, 2010. THE EASEMENTS SHOWN OR NOTED HEREON RELATE TO THIS COMMITMENT.

NOTE: EASEMENTS CREATED OR RESCINDED AFTER THIS DATE ARE NOT SHOWN OR NOTED HEREON.

TITLE REPORT SCHEDULE B EXCEPTIONS:
ITEMS CIRCLED ARE SHOWN ON MAP.

6. RESTRICTIONS, CONDITIONS, DEDICATIONS, NOTES, EASEMENTS AND PROVISIONS, IF ANY, AS CONTAINED AND/OR DELINEATED ON THE FACE OF THE PLAT OF D.T. DENNY'S 5TH ADDITION RECORDED IN VOLUME 1 OF PLATS, PAGE 202, IN KING COUNTY, WASHINGTON.

7. RIGHTS GRANTED TO THE CITY OF SEATTLE TO RECONSTRUCT, MAINTAIN AND OPERATE ANY EXISTING OVERHEAD OR UNDERGROUND UTILITIES IN SAID ALLEY UNTIL THE BENEFICIARIES OF SAID VACATION ARRANGE WITH THE OWNERS THEREOF FOR THEIR REMOVAL AS PROVIDED IN VACATION ORDINANCE NO. 92708.

8. RIGHT OF THE CITY HEREIN NAMED TO DAMAGE SAID PREMISES BY CHANGING AND ESTABLISHING STREET GRADES UNDER JUDGMENT ON VERDICTS
ENTERED: OCTOBER 22, 1928
CASE NO.: 204496
PROVIDED BY ORDINANCE NO.: 51975
IN FAVOR OF: CITY OF SEATTLE

(9) SIDE SEWER EASEMENT, INCLUDING TERMS AND PROVISIONS CONTAINED THEREIN:
LOCATION: ALONG THE LINE AS CONSTRUCTED
WIDTH: 6 FEET WIDE
RECORDING NO.: OCTOBER 14, 1946 UNDER RECORDING NO. 3617548

11. THE TERMS AND PROVISIONS CONTAINED IN THE DOCUMENT ENTITLED "ORDINANCE NO. 118047" RECORDED APRIL 5, 1996 AS RECORDING NO. 9604050873 OF OFFICIAL RECORDS.

(AFFECTS PARCELS A THROUGH F)

16. A DOCUMENT ENTITLED "TIEBACK AND CRANE BOOM EASEMENT AGREEMENT", EXECUTED BY AND BETWEEN THE SEATTLE TIMES COMPANY AND CITY PLACE IV, LLC RECORDED JANUARY 23, 2009, AS INSTRUMENT NO.20090123001326 OF OFFICIAL RECORDS.

CERTIFICATION:

SURVEY IDENTIFICATION NO.: BRH JOB NO. 2011009.00

REGISTERED LAND SURVEYOR NO.: 37546

SURVEYOR'S ADDRESS & COMPANY: BUSH, ROED & HITCHINGS, INC.
2009 MINOR AVENUE EAST
SEATTLE, WA 98102-3513

TELEPHONE: (206) 323-4144

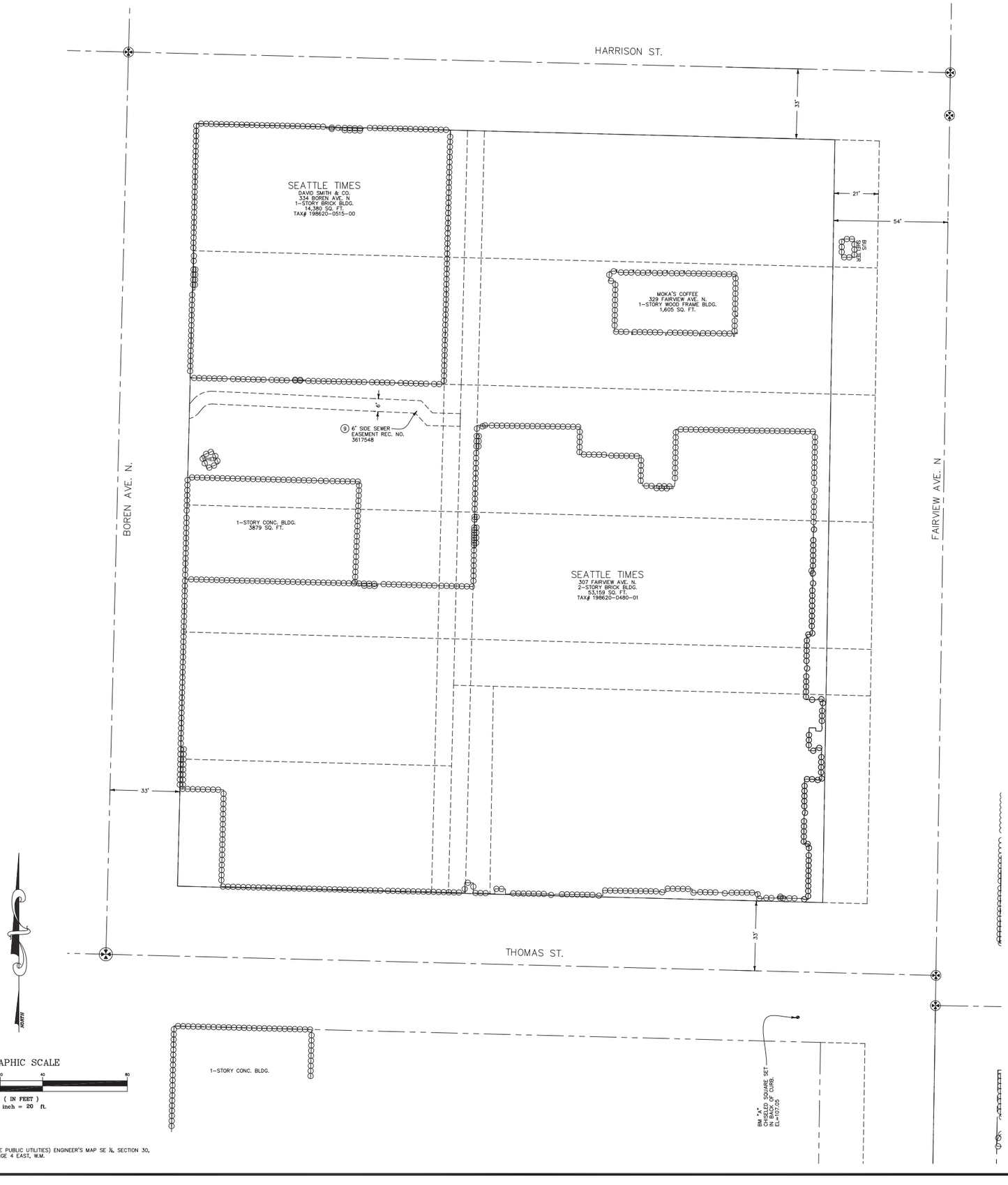
TO TOUCHSTONE CORPORATION AND FIRST AMERICAN TITLE INSURANCE COMPANY:

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2011 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 2,3,4,5,6,7A,7B1,7C,8,9,10,11,11B,13,14, AND 21 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON 03/03/11

DATE OF PLAT OR MAP: 03/03/11

DAKIN A. BELL, P.L.S. NO. 37546

THE ABOVE CERTIFICATE IS BASED UPON WORK PREPARED IN ACCORDANCE WITH GENERALLY ACCEPTED PROFESSIONAL SURVEY PRACTICE. WE MAKE NO OTHER WARRANTY, EITHER EXPRESSED OR IMPLIED.



GRAPHIC SCALE

20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

SURVEY REFEERENCES:

CITY OF SEATTLE (SEATTLE PUBLIC UTILITIES) ENGINEER'S MAP SE ¼, SECTION 30, TOWNSHIP 25 NORTH, RANGE 4 EAST, W.M.

DATE
REVISION
NO

DAKIN A. BELL — STATE OF WASHINGTON — 37546 — REGISTERED PROFESSIONAL LAND SURVEYOR

HITCHINGS, INC. — CORPORATE SEAL — 1969 — WASHINGTON

BUSH, ROED & HITCHINGS, INC.
CIVIL ENGINEERS & LAND SURVEYORS
2009 MINOR AVE. EAST
Seattle, Washington
98102-3513
(206) 323-4144
(206) 323-7135
FAX# (206) 323-7135
WEBSITE: BRHINC.COM

BRH

TOPOGRAPHIC AND BOUNDARY SURVEY
TROY BLOCK
TOUCHSTONE CORPORATION
KING COUNTY, WASHINGTON
SEATTLE,

drawn by	checked by
JBK	DAB
scale	date
1"=20'	03/02/11

job no. 2011009.00

sheet 2 of 2

LAYERSTATE:

&	AND	MAINT	MAINTENANCE
@	AT	MATL	MATERIAL
ø	DIAMETER	MAX	MAXIMUM
#	NUMBER	MECH	MECHANICAL
		MH	MANHOLE
AB	ANCHOR BOLT	MIN	MINIMUM
ABAN	ABANDON (-ED)	MISC	MISCELLANEOUS
AC	ASPHALT CONCRETE	MON	MONUMENT
ACP	ASPHALT CONCRETE PAVEMENT		
ADDL	ADDITIONAL	N	NORTH
ADJ	ADJACENT	N/A	NOT APPLICABLE
ALT	ALTERNATE, ALTERNATIVE	NTS	NOT TO SCALE
APPROX	APPROXIMATE (-LY)		
ARCH	ARCHITECT (-URAL)	OC	ON CENTER
ASPH	ASPHALT	OD	OUTSIDE DIAMETER
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	OPP	OPPOSITE (HAND)
AWPA	AMERICAN WOOD PRODUCTS ASSOCIATION		
AWS	AMERICAN WELDING SOCIETY	PE	POLYETHYLENE
		PL	PROPERTY LINE, PLATE
BLDG	BUILDING	PLC	PLACE
BM	BENCH MARK	PROP	PROPERTY
BOT	BOTTOM	PSF	POUNDS PER SQUARE FOOT
BSMT	BASEMENT	PSI	POUNDS PER SQUARE INCH
BTWN	BETWEEN	PVC	POLYVINYL CHLORIDE
		PVMT	PAVEMENT
CANT	CANTILEVER		
CB	CATCH BASIN	R	RADIUS
CDF	CONTROLLED DENSITY FILL	REINF	REINFORCE (-D,-MENT), REINFORCING
CI	CAST IRON	REQD	REQUIRED
CIP	CAST-IN-PLACE	RT	RIGHT
CL	CENTERLINE	R/W	RIGHT-OF-WAY
CLR	CLEAR (-ANCE)		
CONC	CONCRETE	S	SLOPE, SOUTH
COND	CONDUIT	SAN	SANITARY
CONN	CONNECT (-ION)	SAN MH	SANITARY MANHOLE
CONT	CONTINUE, CONTINUOUS	SCL	SEATTLE CITY LIGHT
COORD	COORDINATE, COORDINATION	SD	STORM DRAIN
CP	COMPLETE PENETRATION WELD - ULTRASONIC TEST	SDMH	STORM DRAIN MANHOLE
CTR	CENTER	SECT	SECTION
		SHT	SHEET
DEPT	DEPARTMENT	SIM	SIMILAR
DET	DETAIL	SL	SLOPE
DIA	DIAMETER	SOG	SLAB ON GRADE
DIM	DIMENSION	SPC	SPACE
DW	DOMESTIC WATER	SPEC	SPECIFICATION
DWG	DRAWING	SQ	SQUARE
		SS	SANITARY SEWER
E	EAST	SSMH	SANITARY SEWER MANHOLE
EA	EACH	SSS	SIDE SEWER - SANITARY
EL	ELEVATION	ST	STREET
ELEC	ELECTRICAL	STA	STATION
EMBED	EMBED (-DED,-MENT)	STD	STANDARD
ENGR	ENGINEER	STL	STEEL
EQ	EQUAL	STRUC	STRUCTURAL
EQUIP	EQUIPMENT		
EXCAV	EXCAVATION	TB	TIEBACK
EXIST	EXISTING	TE	TOP ELEVATION
		TEL	TELEPHONE
FIG	FIGURE	TEMP	TEMPORARY
FIN	FINISH (-ED)	TYP	TYPICAL
FL	FLOOR		
FT	FOOT, FEET	UG	UNDERGROUND
FTG	FOOTING	UNO	UNLESS NOTED OTHERWISE
FW	FIRE WATER		
		VERT	VERTICAL
G	GAS		
GR	GRADE	W	WATER, WEST, WIDTH, WIRE
GWL	GROUND WATER LEVEL	W/	WITH
		WABO	WASHINGTON ASSOCIATION OF BUILDING OFFICIALS
H	HEIGHT, HORIZONTAL	W/O	WITHOUT
HORIZ	HORIZONTAL	WP	WORK POINT
HP	HIGH POINT		
		XS	EXTRA STRONG
ID	INSIDE DIAMETER	XXS	DOUBLE EXTRA STRONG
IE	INVERT ELEVATION		
INV	INVERT		
JT	JOINT		
K	KIP (1,000 POUNDS)		
KSF	KIPS PER SQUARE FOOT		
KSI	KIPS PER SQUARE INCH		
LB	POUND		
LF	LINEAR FEET		
LP	LOW POINT		
LT	LEFT		

ABBREVIATIONS

SHORING DRAWING LIST

GENERAL

RELATED DOCUMENTS:

DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 1 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.

SUMMARY:

COORDINATE WORK WITH THAT OF OTHER TRADES AFFECTING OR AFFECTED BY WORK OF THIS SECTION AND COOPERATE WITH SUCH TRADES TO ENSURE THE STEADY PROGRESS OF THE WORK.

A. PROVIDE LABOR, MATERIALS, AND EQUIPMENT REQUIRED FOR EXCAVATION OF SOILS AND PLACEMENT OF SHORING SYSTEM.

B. VERIFY ALL EXISTING GRADES AND NOTIFY THE OWNER'S REPRESENTATIVE OF ANY VARIATION WHICH WOULD MODIFY THE SHORING WALL.

C. IF, DURING CONSTRUCTION, SUBSURFACE CONDITIONS DIFFERENT FROM THOSE ENCOUNTERED IN THE EXPLORATORY HOLES ARE OBSERVED OR APPEAR TO BE PRESENT BENEATH EXCAVATIONS, NOTIFY THE OWNER'S REPRESENTATIVE AND OWNER'S GEOTECHNICAL ENGINEER AT ONCE SO THAT A REVIEW CAN BE MADE OF THESE CONDITIONS BY THE OWNER'S GEOTECHNICAL ENGINEER.

RELATED SPECIFICATION SECTIONS:

A. ALL DIVISION 1 SECTIONS

B. SECTION 02 41 00: SELECTIVE SITE DEMOLITION

C. SECTION 03 30 00: CAST-IN-PLACE CONCRETE

D. SECTION 05 12 00: STRUCTURAL STEEL FRAMING

E. SECTION 31 23 20: EARTHWORK FOR SITE AND PAVEMENTS

APPROVAL OF ALTERNATIVE AND/OR SUBSTITUTE PRODUCTS WILL BE CONSIDERED ONLY UNDER TERMS AND CONDITIONS SPECIFIED IN DIVISION 1.

SEE PROJECT CIVIL DRAWINGS FOR TEMPORARY EROSION AND SEDIMENTATION CONTROL REQUIREMENTS.

CODE REQUIREMENTS

THE LATEST VERSIONS OF THE PUBLICATIONS LISTED BELOW FORM A PART OF THIS SPECIFICATION: COMPLY WITH PROVISIONS OF THESE PUBLICATIONS EXCEPT AS OTHERWISE SHOWN OR SPECIFIED.

ALL DESIGN AND CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS OF THE INTERNATIONAL BUILDING CODE, 2012 EDITION, WITH THE CITY OF SEATTLE AMENDMENTS.

REFERENCE DOCUMENTS:

A. SITE SURVEY BY BUSH, ROED & HITCHINGS, INC, DATED JUNE 7, 2011.

B. GEOTECHNICAL ENGINEERING DESIGN STUDY BY ASSOCIATED EARTH SCIENCES, INC DATED DECEMBER 1, 2011.

C. TECHNICAL MEMORANDUM BY ASSOCIATED EARTH SCIENCES, INC, DATED JUNE 11, 2013.

D. AMERICAN SOCIETY FOR TESTING & MATERIALS (ASTM):

1. ASTM A36: STANDARD SPECIFICATION FOR CARBON STRUCTURAL STEEL
2. ASTM A53: STANDARD SPECIFICATION FOR PIPE, STEEL, BLACK AND HOT DIPPED, ZINC-COATED, WELDED AND SEAMLESS
3. ASTM A307: STANDARD SPECIFICATION FOR CARBON STEEL BOLTS AND STUDS, 60,000 PSI TENSILE STRENGTH
4. ASTM A325: STANDARD SPECIFICATION FOR HIGH-STRENGTH BOLTS FOR STRUCTURAL STEEL JOINTS
5. ASTM A490: STANDARD SPECIFICATION FOR HEAT-TREATED STEEL STRUCTURAL BOLTS, 150 KSI MINIMUM TENSILE STRENGTH
6. ASTM A500: STANDARD SPECIFICATION FOR COLD-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING IN ROUNDS AND SHAPES
7. ASTM A501: STANDARD SPECIFICATION FOR HOT-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING
8. ASTM A572: STANDARD SPECIFICATION FOR HIGH-STRENGTH LOW-ALLOY COLUMBIUM-VANADIUM STRUCTURAL STEEL
9. ASTM A588: STANDARD SPECIFICATION FOR HIGH-STRENGTH LOW-ALLOY STRUCTURAL STEEL WITH 50 KSI MINIMUM YIELD POINT TO 4 IN. THICK
10. ASTM A992: STANDARD SPECIFICATION FOR STRUCTURAL STEEL SHAPES

D. AMERICAN WELDING SOCIETY (AWS):

1. AWS D1.1: STRUCTURAL WELDING CODE - STEEL

E. AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)

1. AWPA U1-08: LUMBER PRODUCTS - PRESERVATIVE TREATMENT BY PRESSURE PROCESS

SPECIAL CONDITIONS

SUBSURFACE CONDITIONS: RESULTS OF EXPLORATIONS ARE AVAILABLE. SUCH INVESTIGATIONS ARE FOR THE INFORMATION OF THE BIDDERS ONLY AND NEITHER THE OWNER NOR THE GEOTECHNICAL OR STRUCTURAL ENGINEER WILL BE RESPONSIBLE FOR VARIATIONS IN SUBSOIL QUALITY AT LOCATIONS OTHER THAN THOSE INVESTIGATED OR FOR CHANGES WHICH MAY HAVE OCCURRED AFTER THE INVESTIGATIONS WERE MADE.

WEATHER: PROTECT BEARING UNDER FOUNDATIONS: KEEP EARTH FREE FROM MOISTURE. SHOULD BEARING SURFACES BECOME SOFTENED, REEXCAVATE TO SOLID BEARING AND FILL WITH CONCRETE, OF MIX AND STRENGTH AS APPROVED, TO ELEVATIONS AS INDICATED AT CONTRACTOR'S EXPENSE.

IF EXCESSIVE WATER IS ENCOUNTERED AND DRILLING/EXCAVATION OPERATIONS MUST BE HALTED, SUBMIT AND REVIEW ALTERNATE METHODS OF CONSTRUCTION BEFORE PROCEEDING WITH THE GEOTECHNICAL AND STRUCTURAL ENGINEERS.

ANY EXISTING UNDERGROUND UTILITY LINES AND FOUNDATIONS SHOWN ON THE DRAWINGS ARE SHOWN FROM THE BEST POSSIBLE INFORMATION AVAILABLE AND SHALL BE VERIFIED PRIOR TO ANY EXCAVATION OR GRADING WORK.

A. KNOWN UTILITIES AND FOUNDATIONS HAVE BEEN SHOWN ONLY WHERE THEIR EXISTENCE IS KNOWN FROM RECORD DRAWINGS. PRECISE LOCATION OF THESE LINES, AS WELL AS CAREFUL RECONNAISSANCE OF ALL AREAS FOR BOTH ABOVE AND BELOW GROUND UTILITIES AS WELL AS PROTECTION OF SAME, SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

B. EXISTING UTILITY LINES AND FOUNDATIONS TO BE RETAINED AND SHOWN ON THE DRAWINGS, OR THE LOCATION OF WHICH ARE MADE KNOWN TO THE CONTRACTOR PRIOR TO EXCAVATION OPERATIONS, SHALL BE PROTECTED FROM DAMAGE DURING EXCAVATION, FILLING AND BACKFILLING, AND IF DAMAGED, SHALL BE REPAIRED BY THE CONTRACTOR, AT HIS EXPENSE, AND IN SUCH A MANNER AS MAY BE DIRECTED BY THE OWNER'S GEOTECHNICAL OR STRUCTURAL ENGINEER.

THE CONTRACTOR SHALL BE PREPARED TO ENCOUNTER DRILLING OBSTRUCTIONS WHEN AUGERING AND/OR DRILLING HOLES FOR SOLDIER PILES AND TIEBACKS. OBSTRUCTIONS MAY BE PRESENT WHICH ARE NOT SHOWN ON THE DRAWINGS. THIS COULD INCLUDE BUT IS NOT LIMITED TO THE FOLLOWING: EXISTING BURIED CONCRETE AND DEMOLITION SPOILS, EXISTING CONCRETE SLABS, WALLS, AND FOUNDATIONS, AND NATURAL OBSTRUCTIONS SUCH AS BOULDERS.

THE CONTRACTOR SHALL TAKE ANY NECESSARY PRECAUTIONS CONCERNING THE PRESERVATION OF ADJACENT PROPERTIES AND PORTIONS OF EXISTING BUILDING TO REMAIN. FURTHERMORE, THE CONTRACTOR SHALL FIRST DETERMINE THAT THE STRUCTURES ARE SOUND AND AGREE TO ASSUME RESPONSIBILITY FOR THE SAFETY AND PRESERVATION OF THE ADJOINING PROPERTY. THE LOCATIONS AND ELEVATIONS OF EXISTING BUILDINGS, FOOTINGS, UNDERGROUND UTILITIES, AND OTHER STRUCTURES ARE SHOWN ON THE DRAWINGS FOR REFERENCE ONLY. ALL INFORMATION PERTAINING TO EXISTING STRUCTURES HAS BEEN OBTAINED FROM EXISTING DRAWINGS AND MAY NOT BE COMPLETE OR ACCURATE. USE OF DATA SHOWN ON DRAWINGS AND RELATING TO EXISTING STRUCTURES SHALL BE AT CONTRACTOR'S OWN RISK. THE CONTRACTOR SHALL VERIFY ALL PERTINENT INFORMATION PRIOR TO DRILLING OPERATIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES. THE OUTSIDE DIAMETER OF THE TIEBACKS SHALL CLEAR UTILITIES BY A MINIMUM OF 5 FEET ABOVE AND 3 FEET BELOW. IF UTILITY LINES ARE DAMAGED DURING CONSTRUCTION, REPAIRS BY THE CONTRACTOR SHALL BE DONE AT NO ADDITIONAL COST TO THE OWNER.

THE LOCATIONS OF EXISTING SITE FEATURES ARE SHOWN FOR INFORMATION ONLY. DETERMINE BEFORE COMMENCING WORK THE EXACT LOCATION OF ALL EXISTING FEATURES WHICH MAY BE DISRUPTED BY THE SHORING WALL, INCLUDING EXISTING UNDERGROUND UTILITIES. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE CAUSED BY CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE EXISTING SITE FEATURES.

WATER AND CAVING/HEAVING SOIL CONDITIONS: WHERE CAVING/HEAVING CONDITIONS ARE ENCOUNTERED, NO FURTHER DRILLING OR OTHER EXCAVATION WILL BE ALLOWED UNTIL THE CONTRACTOR IMPLEMENTS MEASURES TO PREVENT CAVING OR HEAVING. TAKE IMMEDIATE ACTION AS REQUIRED TO PROTECT EXISTING FACILITIES.

THE CONTRACTOR SHALL VERIFY EXISTING GRADES AND NOTIFY THE ENGINEER OF ANY VARIATION WHICH WOULD MODIFY THE SHORING WALL.

THE CONTRACTOR SHALL ALSO VERIFY ALL DIMENSIONS OF EXISTING STRUCTURES IN THE FIELD AND SHALL NOTIFY THE ENGINEER OF ALL FIELD CHANGES PRIOR TO FABRICATION AND INSTALLATION.

EXCAVATION

THE CONTRACTOR SHALL TAKE ANY NECESSARY PRECAUTIONS IN NOT EXCEEDING THE BOTTOM OF EXCAVATION INDICATED ON THE SHORING PLAN. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER IF THE BOTTOM OF EXCAVATION IS EXCEEDED. IF IT IS EXCEEDED, THE CONTRACTOR IS RESPONSIBLE FOR THE COST OF THE ENGINEER'S REDESIGN.

IF, DURING CONSTRUCTION, SUBSURFACE CONDITIONS DIFFERENT FROM THOSE ENCOUNTERED IN THE EXPLORATORY HOLES ARE OBSERVED, THE GEOTECHNICAL REPRESENTATIVE SHALL BE ADVISED AT ONCE SO THAT A REVIEW CAN BE MADE OF THESE CONDITIONS BY THE GEOTECHNICAL ENGINEER.

REFER TO "SHORING INSTALLATION AND CONSTRUCTION PROCEDURES" FOR ADDITIONAL INFORMATION.

DEWATERING OF EXCAVATION

PER THE GEOTECHNICAL REPORT, SIGNIFICANT GROUNDWATER IS NOT EXPECTED FOR THIS EXCAVATION. A SUMP PUMP AND BAKER TANK SHALL BE USED FOR ALL TEMPORARY DEWATERING FOR PROVIDED GROUNDWATER FLOWS. IF GROUNDWATER FLOWS ARE HIGHER THAN EXPECTED IN THE FIELD, A REVISED DEWATERING PLAN WITH MONITORING WELL LOCATIONS SHALL BE SUBMITTED TO DPD FOR APPROVAL. ANY GROUND WATER SHALL BE LOWERED TO A MINIMUM OF 2 FEET BELOW THE BOTTOM OF ALL EXCAVATION ELEVATIONS. THE CONTRACTOR SHALL SUBMIT TO THE GEOTECHNICAL ENGINEER A DETAILED PLAN FOR DEWATERING PRIOR TO START OF EXCAVATION.

SUBMITTALS

SUBMITTALS AFTER AWARD OF SHORING CONTRACT:

A. SUBMIT IN ACCORDANCE WITH DIVISION 1.

B. THE CONTRACTOR SHALL SUBMIT WRITTEN VERIFICATION THAT THE ANCHOR LENGTHS ARE ACCEPTABLE FOR DEVELOPING THE DESIGN LOADS SHOWN IN THE SHORING SCHEDULE.

C. SHOP DRAWINGS: SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING:

1. SHOP DRAWINGS FOR STEEL SOLDIER PILES SHALL INCLUDE PILE LENGTHS, TIEBACK POCKET DETAILS, SPLICE LOCATIONS, WALER DETAILS (IF APPLICABLE), AND ALL OTHER MISCELLANEOUS STEEL NOTED ON THE DRAWINGS.
2. SHOP DRAWINGS FOR TIEBACKS SHALL INDICATE THE TYPE, LOCATION, NO LOAD, ANCHOR, AND TOTAL LENGTH, AND COMPUTED ELONGATION OF ALL TIEBACK ANCHORS. CONTRACTOR SHALL PROVIDE A WRITTEN PROCEDURE FOR MEASURING ELONGATION.
3. PROCEDURE FOR REPLACEMENT OF TIEBACKS: SUBMIT PLANS OR PROCEDURE FOR REPLACING TIEBACKS THAT FAIL TO MEET THE ACCEPTANCE CRITERIA. SOME OF THE PROCEDURES THAT COULD BE CONSIDERED INCLUDE DRILLING ADDITIONAL TIEBACKS AND INSTALLING WALERS, DEVELOPING ADDITIONAL CAPACITY FROM THE NEXT TIEBACK, OR POST-GROUTING ANCHORS. ANY TIEBACK WHICH REQUIRES REPLACEMENT FOR ANY REASON SHALL BE DONE AT NO ADDITIONAL COST TO THE OWNER.
4. CERTIFIED CALIBRATION DATA FOR THE HYDRAULIC JACK AND PRESSURE GAGE SYSTEM CALIBRATED WITHIN THE PREVIOUS 60 DAYS, INCLUDING AT LEAST ONE SPARE PRESSURE GAGE AND A DIMENSIONED COPY OF THE MANUFACTURER'S JACK DRAWING. JACKS SHALL BE CALIBRATED AND LOAD VERSUS GAGE PRESSURE CURVES PROVIDED FOR EACH PRESSURE GAGE FOR 25 PERCENT AND 75 PERCENT OF THE MAXIMUM JACK EXTENSION FOR TWO CYCLES OF LOADING OVER THE FULL RANGE OF EXPECTED LOAD USAGE. AT LEAST SIX LOAD INCREMENTS SHALL BE APPLIED AND ALL MEASURED POINTS SHALL BE SHOWN ON THE CALIBRATIONS.
5. INDEPENDENT, CERTIFIED CALIBRATIONS FOR EACH PRESSURE GAGE.
6. SHOP DRAWINGS SHALL SHOW ALL WELDING WITH AWS A2.4 SYMBOLS.

D. CONCRETE MIX DESIGN: SUBMIT CONCRETE MIX DESIGN FOR APPROVAL IN ACCORDANCE WITH SPECIFICATION SECTION 03 30 00 AND THE CITY OF SEATTLE REQUIREMENTS.

E. CERTIFICATES: FURNISH AFFIDAVIT STATING THAT THE WOOD LAGGING HAS BEEN TREATED IN ACCORDANCE WITH SPECIFICATIONS: INCLUDE CHEMICAL USED AND RETENTION OBTAINED IN POUNDS PER CUBIC FOOT: TREATED LUMBER SHALL CONFORM TO AWPA U1-08, UC4B.

F. MILL TESTS: SUBMIT CERTIFICATION OF MATERIALS WITH COPIES OF MILL REPORTS FOR EACH TYPE OF STEEL USED FOR ENGINEERS RECORDS ONLY.

G. AS-BUILT DRAWINGS: CONTRACTOR SHALL FURNISH THE OWNER'S REPRESENTATIVE WITH AS BUILT DRAWINGS SHOWING THE LOCATION AND EXTENT OF ALL TIEBACKS AND ANCHORS UNDER ANY STRUCTURES/ PAVEMENTS/ETC.

H. DE-WATERING: SUBMIT GENERAL PROCEDURES FOR DE-WATERING SOLDIER PILES AND THE SITE FROM SURFACE WATER, GROUND WATER AND/OR WATER FROM ADJACENT STRUCTURES.

STRUCTURAL STEEL

ALL STEEL SHALL CONFORM TO THE FOLLOWING:

ALL STEEL, UNLESS NOTED OTHERWISE	ASTM A588, Fy=50 KSI OR A992
ALL ANGLES, UNLESS NOTED OTHERWISE	ASTM A36, Fy=36 KSI
SQUARE OR RECTANGULAR STRUCTURAL TUBE	ASTM A500 GRADE B, Fy=46 KSI
STEEL PIPE DIAMETER LESS THAN OR EQUAL TO 12"	ASTM A53, GRADE B, Fy=35 KSI

ALL WORK SHALL BE IN ACCORDANCE WITH THE AISC "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS" AND AWS D1.1-98. ALL STEEL MEMBERS EMBEDDED IN CONCRETE SHALL BE LEFT UNPAINTED.

ALL WELDING SHALL BE DONE BY AWS/WABO CERTIFIED WELDERS AND IN ACCORDANCE WITH AWS D1.1 AND D1.4. WELDS SHOWN ON THE DRAWINGS ARE THE MINIMUM SIZES. INCREASE WELD SIZE TO AWS MINIMUM SIZES, BASED ON PLATE THICKNESS. MINIMUM WELDING SHALL BE ¼ INCH. ALL WELDS SHALL BE MADE USING LOW-HYDROGEN ELECTRODES WITH MINIMUM TENSILE STRENGTH OF 70 KSI. WELDING PROCEDURES SHALL BE SUBMITTED TO THE OWNER'S TESTING AGENCY FOR REVIEW BEFORE STARTING FABRICATION OR ERECTION. ALL COMPLETE-PENETRATION WELDS SHALL BE ULTRASONICALLY TESTED.

PROTECT STEEL, CABLES, ANCHORS, ACCESSORIES, ETC, FROM DAMAGE DURING SHIPPING AND STORAGE. STORE IN DRY LOCATIONS AND PROTECT FROM DAMAGE UNTIL INSTALLED.

CONCRETE

MIXING AND PLACING OF ALL CONCRETE AND SELECTION OF MATERIALS SHALL BE IN ACCORDANCE WITH THE BUILDING CODE AND THE SPECIFICATIONS. MAXIMUM SIZE OF AGGREGATE SHALL BE 3/4 INCH, LEAN MIX SHALL BE 1.5 SACK MINIMUM OR AS APPROVED. FOR 4000 PSI CONCRETE, (f'c) SHALL BE BASED ON STANDARD 28-DAY CYLINDER TESTS. MAXIMUM SLUMP SHALL BE AS FOLLOWS:

f'c	MAXIMUM SLUMP	LOCATION (UNLESS NOTED OTHERWISE)
LEAN CONC (150 PSI MIN)	N/A	SOLDIER PILES ABOVE AND BELOW BOTTOM OF EXCAVATION UNLESS NOTED OTHERWISE
LEAN CONC/CDF (400 PSI MIN)	N/A	AREAWAY BACKFILL
4,000 PSI	8 INCHES	TIEBACK ANCHOR ZONE AND SELECT SOLDIER PILES BELOW BOTTOM OF EXCAVATION, AS NOTED

STRUCTURAL FILL

ALL FILL PLACED IN OVER-EXCAVATED AREAS SHALL BE AS SPECIFIED IN SPECIFICATION SECTION 31 23 20, "EARTHWORK FOR SITE AND PAVEMENTS."

BACKFILL VOIDS BEHIND LAGGING GREATER THAN 1 INCH WITH SAND, PEA GRAVEL OR LOCALLY WITH A WEAK CONTROLLED DENSITY FILL (CDF).

WOOD LAGGING

ALL LAGGING BOARDS SHALL BE DOUGLAS-FIR NO. 1 OR BETTER IN GOOD CONDITION. MINIMUM REFERENCE ALLOWABLE STRESSES SHALL BE AS FOLLOWS:

LAGGING SIZE	Fb (PSI)*	Fv (PSI)*
4X - LAGGING	1200	180

*ALL APPLICABLE ADJUSTMENT FACTORS SHALL BE APPLIED.

TIEBACK STEEL

TIEBACKS SHALL BE PRESTRESSING STRANDS. STRAND TIEBACKS SHALL BE UNCOATED SEVEN WIRE STRESS-RELIEVED STRAND CONFORMING TO ASTM A-416, OR UNCOATED SEVEN WIRE COMPACTED STRESS RELIEVED STRAND CONFORMING TO ASTM A-779. ULTIMATE STRAND TENSILE STRENGTH (Fpu) SHALL BE 270 ksi MINIMUM.

TIEBACK ANCHORS

THE CONTRACTOR IS RESPONSIBLE FOR SELECTING THE METHOD OF ANCHOR INSTALLATION (OPEN HOLE, CASED, ETC), METHOD OF GROUTING (TREMIE, PRIMARY LOW PRESSURE, SECONDARY HIGH PRESSURE), ANCHOR DIAMETER AND BOND LENGTHS IN ORDER TO DEVELOP THE DESIGN LOADS SHOWN IN THE SHORING SCHEDULE. THE MINIMUM REQUIRED UNBONDED LENGTHS ARE SHOWN ON THE PLANS. DESTRESS TEMPORARY TIEBACKS FOLLOWING CONSTRUCTION OF THE BASEMENT STRUCTURE AND FLOOR SLABS TO FINISHED GRADE OR ABOVE. NOTIFY STRUCTURAL ENGINEER FOR APPROVAL PRIOR TO DESTRESSING TIEBACKS.

PRECONSTRUCTION

A PRE-CONSTRUCTION MEETING WITH SDOT SHORING REVIEW AND INSPECTION, SEPARATE FROM ANY DPD PRE-CONSTRUCTION MEETING, WILL BE REQUIRED PRIOR TO THE START OF EXCAVATIONS ADJACENT TO THE PUBLIC ROW. ATTENDEES SHALL INCLUDE REPRESENTATIVES OF THE OWNER, GENERAL CONTRACTOR, EXCAVATION AND SHORING SUBCONTRACTORS, THE PROJECT GEOTECHNICAL ENGINEER, PROJECT SURVEYORS, SDOT SHORING REVIEW AND INSPECTION PERSONNEL, ETC.

DRILLED-IN CONCRETE ANCHORS (DICA)

ACCEPTABLE DRILLED-IN CONCRETE ANCHORS, OF SIZE, NUMBER, AND SPACING AS SHOWN ON THE DRAWINGS, SHALL BE AS FOLLOWS: HILTI "KWIK-BOLT-II" CARBON STEEL WEDGE ANCHORS (ICC-ES ER-4627): "WEJ-IT ANCHOR BOLT" (ICC-ES ER-1821): "ITW RAMSET/RED HEAD TRUBOLT CARBON STEEL WEDGE ANCHORS" (ICC-ES ER-1372): OR AN APPROVED ALTERNATIVE ANCHOR WITH A CURRENT ICC-ES EVALUATION REPORT. MINIMUM EMBEDMENT DEPTH SHALL BE PER ICC-ES REPORTS, UNLESS NOTED OTHERWISE ON DRAWINGS. ANCHORS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE APPROVED ICC-ES REPORT. NO REINFORCEMENT SHALL BE CUT TO INSTALL ANCHORS. DEFECTIVE HOLES SHALL BE GROUTED WITH EPOXY ADHESIVE.

SHORING NOTES

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June 14, 2013

Not for Construction

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Revisions

Sheet Information

Date	
Job Number	
Drawn	
Checked	
Approved	

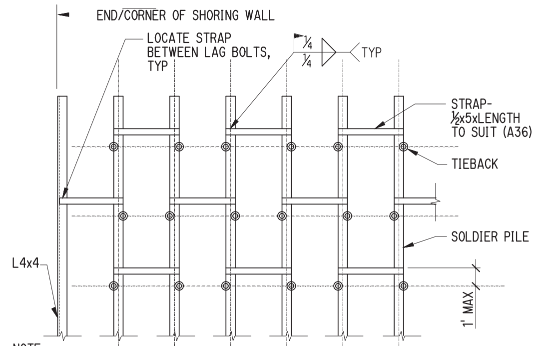
Title

SHORING GENERAL NOTES

Sheet

SH1.01

6/14/2013 1:28 PM USER: jdj PATH: .._TroyBlockShr\Sheets\SH1.01.dwg SHEET SIZE: 30x42



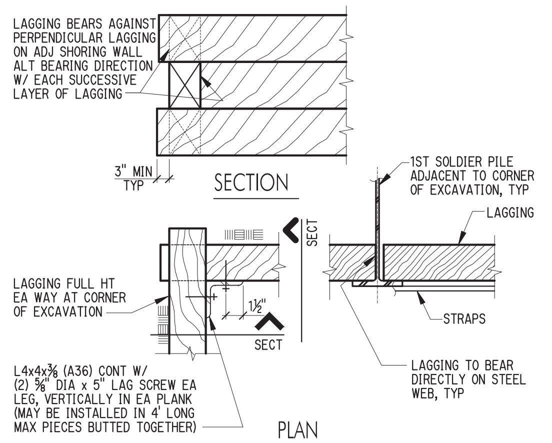
NOTE:

1. STRAPS MUST BE INSTALLED PRIOR TO JACKING. SEE SHORING NOTES UNDER "SHORING INSTALLATION & CONSTRUCTION PROCEDURES, SECTION D" FOR ADDITIONAL INFORMATION.

2. STRAPS ARE REQUIRED FOR ROW A TIEBACKS ON ALL PILES.

3. FOR ROW B AND LOWER TIEBACK ANCHORS WITH FORCES LESS THAN 150 KIPS, STRAPS MAY BE INSTALLED AT THE CONTRACTOR'S OPTION, PENDING APPROVAL OF SOLDIER PILE DEFLECTIONS/ ROTATIONS BY GEOTECHNICAL ENGINEER.

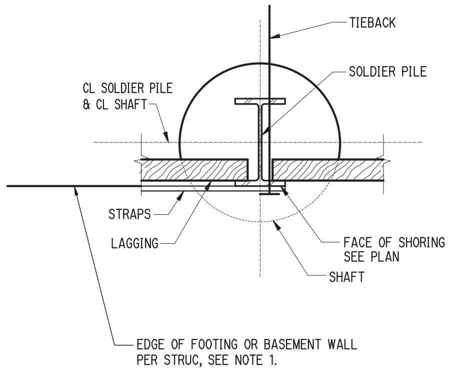
NTS — TYP TIEBACK STRAPPING — 1



NOTES:

1. L4x4 NOT SHOWN FOR CLARITY.

NTS — TYP INSIDE CORNER LAGGING SUPPORT — 2



NOTES:

1. WHERE EDGE OF FOOTING OR FACE OF BASEMENT WALL DOES NOT EXIST SEE PLAN FOR FACE OF SHORING DIMENSIONS.

NTS — SOLDIER PILE PLACEMENT — 3

SHORING INSTALLATION AND CONSTRUCTION PROCEDURES

THE DESIGN OF THE SHORING WALLS IS BASED ON THE SEQUENCE OF CONSTRUCTION OUTLINED BELOW. SEE DRAWINGS FOR ADDITIONAL REQUIREMENTS AND DETAILS.

A. GENERAL:

1. HOLES FOR THE SOLDIER PILES SHALL BE MACHINE AUGERED. HOLES SHALL BE DRILLED TO THE DIAMETERS INDICATED ON THE DRAWINGS AND SHALL BE EXCAVATED TO THE ELEVATIONS INDICATED ON DRAWINGS AND THEN DEEPER IF AUTHORIZED BY THE OWNER'S ENGINEERS AND REQUIRED TO ACHIEVE SUITABLE SOIL CAPACITIES AS DETERMINED BY THE OWNER'S GEOTECHNICAL ENGINEER.

2. IF DEEPER EXCAVATIONS ARE REQUIRED DUE TO SOIL DISTURBANCE CAUSED BY CONTRACTOR'S EXCAVATION METHODS, THE EXTRA COSTS SHALL BE BORNE BY CONTRACTOR. THIS INCLUDES UNAUTHORIZED DEEPER EXCAVATIONS.

3. THE CONTRACTOR SHALL BE PREPARED TO ENCOUNTER DRILLING OBSTRUCTIONS WHEN AUGERING AND/OR DRILLING HOLES FOR SOLDIER PILES. OBSTRUCTIONS MAY BE PRESENT WHICH ARE NOT SHOWN ON THE DRAWINGS. THIS COULD INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING: EXISTING BURIED CONCRETE AND DEMOLITION SPOILS, EXISTING CONCRETE SLABS, WALLS, AND FOUNDATIONS, AND NATURAL OBSTRUCTIONS SUCH AS BOULDERS. AUGERING AND/OR DRILLING THROUGH THESE OBSTRUCTIONS SHALL BE ACCOMPLISHED AT NO ADDITIONAL COST TO THE OWNER.

4. GROUNDWATER SEEPAGE MAY CAUSE LOCAL CAVING OR HEAVING. PROVIDE TEMPORARY CASINGS AND/OR SLURRY AS REQUIRED TO PREVENT LOSS OF GROUND. AFTER DRILLING TO FINAL DEPTH, HOLES SHALL BE THOROUGHLY CLEANED OF ALL SLOUGH AND WATER PRIOR TO PLACING STEEL SECTIONS AND CONCRETE.

B. SOLDIER PILE AND TIEBACK HOLE DRILLING: SOLDIER PILE AND TIEBACK HOLES SHALL BE DRILLED WITHOUT LOSS OF GROUND AND WITHOUT ENDANGERING PREVIOUSLY INSTALLED PILES AND TIEBACKS. THIS MAY INVOLVE CASING THE HOLES OR OTHER METHODS OF PROTECTION FROM CAVING. NO OPEN HOLE SYSTEMS WILL BE ALLOWED WITHIN 10 FEET OF EXISTING UTILITIES. THE MAXIMUM PERMISSIBLE VARIATION IN LOCATION OF DRILLED SOLDIER PILE HOLES AT THE TOP OF THE EXCAVATION SHALL BE PLUS OR MINUS 1 INCH. THE MAXIMUM OUT-OF-PLUMB VARIATION OF THE SHAFT SHALL NOT EXCEED PLUS OR MINUS 3 INCHES. THE SIDES OF THE PILE HOLES OUT-OF-PLUMB MAY BE SHAVED AS REQUIRED TO OBTAIN THE REQUIRED TOLERANCE.

C. SOLDIER PILE PLACEMENT:

1. ADJACENT AUGERED SOLDIER PILE HOLES SHALL NOT BE PLACED CLOSER THAN 10 FEET CENTER-TO-CENTER UNTIL THE CONCRETE MIX HAS SET FOR A MINIMUM OF 24 HOURS.

2. STEEL SOLDIER PILES SHALL BE SET TO WITHIN PLUS OR MINUS 1/2 INCH OF THE REQUIRED PLAN LOCATION AT THE TOP OF THE HOLE AND EXTEND VERTICALLY TO THE BOTTOM OF THE HOLE. AT LOCATIONS WHERE THE DRILLED PILE HOLE IS OUT-OF-PLUMB BY THE ALLOWABLE TOLERANCE INDICATED ABOVE, THE STEEL PILE WILL HAVE TO BE PLACED AGAINST THE SIDE OF THE HOLE AT THE BOTTOM AND SLOPE UP TO THE REQUIRED GRID LOCATION AT THE TOP OF THE HOLE. THE STEEL SOLDIER PILE SHALL NOT BE OUT OF PLUMB BY MORE THAN PLUS OR MINUS 3 INCHES LATERALLY AND 1 INCH INTO OR OUT OF THE SITE EXCAVATION AT THE BOTTOM OF THE EXCAVATION. THE TOP OF THE SOLDIER PILE SHALL BE 6 INCHES ABOVE EXISTING GRADE, UNLESS OTHERWISE NOTED.

3. AFTER THE SOLDIER PILE HAS BEEN PLACED IN THE AUGERED HOLE, THE HOLE SHALL BE BACKFILLED WITH CONCRETE, AS SPECIFIED, UP TO THE BOTTOM OF THE EXCAVATION, UNLESS NOTED OTHERWISE. ABOVE THIS LOCATION, THE AUGERED HOLE SHALL BE BACKFILLED WITH A LEAN CONCRETE MIX. THE STEEL SOLDIER PILE SURFACES SHALL BE CLEAN OF OIL, GREASE, LOOSE RUST, LOOSE MILL SCALE, AND OTHER FOREIGN MATTER THAT WOULD IMPAIR THE BOND BETWEEN THE STEEL AND CONCRETE. NO MORE THAN 2 INCHES OF LOOSE MATERIAL SHALL BE IN HOLES PRIOR TO BACKFILL PLACEMENT. PLACE CONCRETE CONTINUOUSLY FROM THE BOTTOM TO THE TOP IN ONE OPERATION TO DEVELOP FULL LATERAL PRESSURE OF THE FLUID CONCRETE COLUMN. THE CONTRACTOR SHALL BRING THE CONCRETE LEVEL UP ALL SIDES OF THE SOLDIER PILE AT THE SAME TIME TO KEEP THE PILE PLUMB. MAINTAIN A SUFFICIENT HEAD OF CONCRETE TO PREVENT REDUCTION IN DIAMETER OF SOLDIER PILE HOLE BY EARTH PRESSURE AND TO PREVENT EXTRANEOUS MATERIAL FROM MIXING WITH FRESH CONCRETE.

D. STANDARD TIEBACK AND LAGGING SEQUENCE:

1. AFTER THE SOLDIER PILES ARE INSTALLED, EXCAVATION SHALL PROCEED TO A MAXIMUM OF 2 FEET BELOW THE FIRST ROW OF TIEBACKS. EXCAVATION SHALL PROCEED IN 4-FOOT MAXIMUM HEIGHT LIFTS WITH EACH 4-FOOT LIFT LAGGED AND BACKFILLED PRIOR TO PROCEEDING. NO EXCAVATED LIFT IS TO REMAIN UNLAGGED AT THE END OF A WORK DAY. IN AREAS WHERE EXISTING REMNANT BASEMENT WALLS OCCUR AT THE PROPERTY LINE, DEMOLISH WALLS IN 2-FOOT LIFTS AND REPLACE WITH LAGGING IMMEDIATELY.

2. TIMBER LAGGING SHALL BE INSTALLED AT ALL SHORING WALLS. VOIDS BETWEEN LAGGING AND SOIL SHALL BE BACKFILLED IMMEDIATELY AFTER LAGGING INSTALLATION WITH SAND, PEA GRAVEL OR A WEAK CDF. DRAINAGE BEHIND THE WALL MUST BE MAINTAINED. THE CONTRACTOR SHOULD PROVIDE MEANS, SUCH AS 1/8 TO 1/4 INCH WEEP HOLES, TO PREVENT THE BUILDUP OF HYDROSTATIC PRESSURES BEHIND SHORING WALLS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LIMIT THE AMOUNT OF EXPOSED SOIL WITHOUT LAGGING TO AVOID LOSS OF SOIL. WHEN PLACING BACKFILL TO FILL VOIDS BEHIND WOOD LAGGING, USE A METHOD OR DEVICE THAT WILL PREVENT BACKFILL FROM RUNNING WHEN EXCAVATING BELOW THE INSTALLED LAGGING BUT WILL NOT INTERFERE WITH THE SPECIFIED FREE DRAINAGE SYSTEM. SUBJECT TO THE OWNER'S GEOTECHNICAL ENGINEER'S APPROVAL, USE OF LEAN CONCRETE MAY BE PERMITTED FOR FILLING OF SMALL VOIDS.

3. DRILL AND INSTALL TIEBACKS WITHIN 6 INCHES OF LOCATIONS SHOWN ON DRAWINGS. NOTIFY ENGINEER IF THIS IS EXCEEDED. THE CONTRACTOR IS RESPONSIBLE FOR COST OF ENGINEER'S REDESIGN OF SHORING IF MISLOCATION IS DUE TO CONTRACTOR ERROR.

4. CONTRACTOR SHALL PRESSURE GROUT TIEBACKS TO MAXIMIZE TIEBACK ADHESION AND MEET DESIGN ASSUMPTIONS PER NOTE 7 OF DETAIL 6/SH5.01.

5. INSTALL STRAPS AS INDICATED IN THE TYPICAL DETAILS.

6. STRESS TEST AND LOCK OFF TIEBACKS AT 100% OF THE DESIGN LOAD AFTER ANCHOR REACHES DESIGN STRENGTH.

7. EXCAVATE NEXT STRIP AND FOLLOW PROCEDURES AS OUTLINED IN ITEMS 1 THROUGH 5 ABOVE. DESTRESS TEMPORARY TIEBACKS PER THE "TIEBACK ANCHORS" SECTION. REMOVE ALL TEMPORARY SHORING ELEMENTS, INCLUDING SOLDIER PILES, LAGGING, AND DEBRIS AS FOLLOWS.

SHORING REMOVAL

FOR SHORING IN STREET RIGHT-OF-WAY: REMOVE DOWN TO A MINIMUM OF FOUR FEET BELOW FINISHED GRADE OR AS REQUIRED FOR CONSTRUCTION OF BUILDING OVER TOP OF SHORING PRIOR TO FINAL SITE GRADING AND SIDEWALK INSTALLATION. FOR SHORING ON SITE: REMOVE DOWN TO ELEVATION REQUIRED FOR CONSTRUCTION OF BUILDING OVER TOP OF SHORING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE PILE CUT-OFF ELEVATIONS WITH BUILDING CONSTRUCTION.

QUALITY ASSURANCE

INSTALLER MUST HAVE A MINIMUM OF 5 YEARS EXPERIENCE IN THE DESIGN AND CONSTRUCTION OF A SHORING SYSTEM SIMILAR TO THAT REQUIRED FOR THIS PROJECT; INSTALLER MUST SUBMIT HIS QUALIFICATIONS TO THE OWNER'S REPRESENTATIVE AT THE SAME TIMES BIDS ARE RECEIVED: QUALIFICATIONS MUST BE APPROVED BY THE OWNER'S STRUCTURAL AND GEOTECHNICAL ENGINEERS. PRECONSTRUCTION CONFERENCE: THE CONTRACTOR SHALL CONVENE A PRECONSTRUCTION MEETING IN ACCORDANCE WITH DIVISION 1. THE PURPOSE OF THIS MEETING WILL BE TO REVIEW PROCEDURES, METHODS, SCHEDULE, EQUIPMENT REQUIREMENTS, QUALITY CONTROL/MONITORING, ETC, WITH ALL NECESSARY PARTIES INCLUDING BUT NOT LIMITED TO THE CONTRACTOR, EXCAVATION/SHORING SUBCONTRACTOR, ARCHITECT, STRUCTURAL ENGINEER, CITY OF SEATTLE REPRESENTATIVES, AND OWNER'S GEOTECHNICAL ENGINEER.

TESTING AND INSPECTION

INSPECTION BY A QUALIFIED GEOTECHNICAL ENGINEER OR APPROVED TESTING LAB WILL BE PROVIDED BY THE OWNER FOR SOLDIER PILE PLACEMENT, TIEBACK PLACING AND STRESSING, AND SOILS COMPACTION. REFER TO CONTRACT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

SHORING MONITORING

THE CONTRACTOR SHALL COOPERATE WITH THE OWNER'S INSPECTOR AT ALL TIMES, AND SHALL PROVIDE THE OWNER'S REPRESENTATIVE FREE ACCESS TO ALL PARTS OF THE WORK.

A. THE CONTRACTOR SHALL ESTABLISH A CONSTRUCTION MONITORING PROGRAM UNDER THE DIRECTION OF THE OWNER'S GEOTECHNICAL ENGINEER WHICH INCLUDES A MONITORING SCHEDULE, REVIEWING AND INTERPRETING DATA, AND REPORTING AS REQUIRED TO ENSURE SAFETY OF THE EXISTING ADJACENT BUILDINGS, ROADS, SIDEWALKS, AND ALL OTHER STRUCTURES. ALL SURVEYING FOR VERTICAL AND HORIZONTAL MOVEMENTS OF EXISTING STRUCTURES AND THE SHORING WALL SHALL BE CONDUCTED BY A REGISTERED SURVEYOR. THE STRUCTURAL AND GEOTECHNICAL ENGINEER SHALL HAVE THE RIGHT TO RECOMMEND WORK BE SUSPENDED AT ANY TIME WHEN, IN THEIR JUDGMENT, THE SAFETY OR STABILITY OF EXISTING STRUCTURES OR ROADWAYS ARE IN QUESTION.

B. THE MONITORING PROGRAM SHALL CONSIST OF GENERAL OBSERVATION OF CONSTRUCTION AND INSTALLATION PROCEDURES: 1. SYSTEMATIC INSPECTION OF EXISTING STRUCTURES, ROADS, SIDEWALKS, AND OTHER ADJACENT FACILITIES FOR EVIDENCE OF MOVEMENT OR DAMAGE. 2. THRICE-WEEKLY MEASUREMENTS, AT A MINIMUM, OF BOTH VERTICAL AND HORIZONTAL SOLDIER PILE MOVEMENT DURING SHORING AND EXCAVATION. 3. MONITORING SHALL INCLUDE THE OPTICAL MEASUREMENT OF HORIZONTAL AND VERTICAL MOVEMENTS OF EXISTING STRUCTURES AND THE SHORING WALL. REFERENCE POINTS ON THE EXISTING STRUCTURES SHOULD BE PLACED AS LOW AS POSSIBLE ON THE EXTERIOR WALLS ADJACENT TO THE EXCAVATION. THE MEASURING SYSTEM SHOULD HAVE AN ACCURACY OF AT LEAST 1/16 INCH. AT A MINIMUM, THE MONITORING PROGRAM SHOULD INCLUDE THE FOLLOWING:

1. CONDITION SURVEYS AND CRACK MONITORING AT EXISTING ADJACENT BUILDINGS.

2. HORIZONTAL AND VERTICAL DISPLACEMENTS OF EVERY OTHER SOLDIER PILE AND OF TIEBACK-SUPPORTED AREAWAYS ALONG 8TH AVE AND LENORA ST.

3. DEFLECTION MEASUREMENTS OF SELECTED LAGGING (SELECTED BY THE OWNER'S GEOTECHNICAL ENGINEER) ON THE SHORING WALLS DURING EXCAVATION.

4. HORIZONTAL AND VERTICAL DISPLACEMENTS ALONG TWO (2) OFFSET REFERENCE LINES. THE REFERENCE LINES SHOULD BE ESTABLISHED AT HORIZONTAL DISTANCES BEHIND THE FACE OF SHORING OF 1/3 H AND H, WHERE H IS THE FINAL EXCAVATION HEIGHT.

C. SURVEYOR: A LICENSED SURVEYOR SHALL PERFORM ALL OPTICAL MONITORING AT INTERVALS STATED BELOW:

1. PRIOR TO STARTING CONSTRUCTION, THE SURVEYOR SHALL ESTABLISH A SERIES OF POINTS LOCATED NO GREATER THAN EVERY 50 FEET ALONG THE SHORING WALL BEHIND THE EXCAVATION AND NO MORE THAN 2 FEET BEHIND THE SHORING WALLS. TWO ADDITIONAL SETS SHALL BE ESTABLISHED 15 AND 30 FEET BEHIND THE WALL FACE.

2. MONITORING POINTS SHALL BE ESTABLISHED ALONG THE CURBLINE AND CENTERLINE OF ADJACENT ROADWAYS WHERE MONITORING SHALL OCCUR WHEN TOTAL WALL MOVEMENTS REACH 0.5 INCHES OR AT SDOT REQUEST.

3. WHEN CONSTRUCTION STARTS, THE SURVEYOR SHALL ESTABLISH A SERIES OF POINTS ADJACENT TO EXISTING BUILDINGS AS REQUIRED BY THE OWNER'S GEOTECHNICAL ENGINEER TO BE USED FOR HORIZONTAL AND VERTICAL DISPLACEMENT MEASUREMENTS. THESE MEASUREMENTS SHALL BE MADE AS OFFSETS FROM A BASELINE ESTABLISHED FROM POINTS WELL OUTSIDE THE INFLUENCE OF THE EXCAVATION USING CONVENTIONAL OPTICAL SURVEYING EQUIPMENT. SEVERAL SETS OF MEASUREMENTS SHOULD BE TAKEN PRIOR TO STARTING THE GENERAL EXCAVATION IN ORDER TO DEVELOP A DATA BASELINE FROM WHICH TO DETERMINE CHANGES. AS A MINIMUM, READINGS SHOULD BE TAKEN ONCE A WEEK THROUGHOUT CONSTRUCTION UNTIL THE SHORING WALLS ARE COMPLETED. CONTINUE READINGS ONCE A WEEK OR AS REQUIRED BY GEOTECHNICAL ENGINEER, THROUGHOUT CONSTRUCTION UNTIL THE PERMANENT, PERIMETER BASEMENT WALLS AND FLOOR SLABS ARE CONSTRUCTED TO THE TOP OF SHORING LEVEL AND THE BASEMENT WALLS ARE BRACED BY THE FLOOR SLABS. MORE FREQUENT READINGS MAY BE REQUIRED AT CRITICAL TIMES DURING CONSTRUCTION OR IF SIGNIFICANT MOVEMENT IS INDICATED. ALL READINGS SHOULD BE REVIEWED BY THE OWNER'S GEOTECHNICAL ENGINEER. THE SURVEY FREQUENCY SHALL BE DETERMINED BY THE GEOTECHNICAL ENGINEER AFTER REVIEW AND APPROVAL BY DPD AND SDOT.

4. WHEN CONSTRUCTION STARTS, INCLINOMETERS SHALL BE PLACED AS REQUIRED BY THE GEOTECHNICAL ENGINEER AT THE ADJACENT BUILDINGS NEAR EAST AND SOUTH SHORING WALLS.

5. THE GEOTECHNICAL ENGINEER SHALL REVIEW SURVEY DATA AND PROVIDE AN EVALUATION OF WALL PERFORMANCE ALONG WITH SURVEY DATA TO DPD AND SDOT ON AT LEAST A WEEKLY BASIS. IMMEDIATELY AND DIRECTLY, NOTIFY DPD AND SDOT IF ANY UNUSUAL OR SIGNIFICANTLY INCREASED MOVEMENT OCCURS.THE GEOTECHNICAL ENGINEER SHALL ALSO PROVIDE WEEKLY REPORTS OF ALL MONITORING TO THE ARCHITECT AND THE STRUCTURAL ENGINEER. IF HORIZONTAL MOVEMENTS ARE OBSERVED TO BE 1/2 INCH BETWEEN SUCCESSIVE READINGS OR 1 INCH CUMULATIVE MOVEMENT ALONG LENORA STREET OR 8TH AVENUE SHORING WALLS, CONSTRUCTION OF THE SHORING WALLS SHOULD BE STOPPED TO DETERMINE THE CAUSE OF MOVEMENT AND TO ESTABLISH THE TYPE AND EXTENT OF REMEDIAL CONSTRUCTION. THE CONTRACTOR SHALL IMMEDIATELY AND DIRECTLY NOTIFY THE GEOTECHNICAL ENGINEER,

SHORING MONITORING CONT...

STRUCTURAL ENGINEER, WALL DESIGNER, DPD, AND SDOT IF CONSECUTIVE READINGS SHOW 1/2 INCH OF MOVEMENT AND WHEN TOTAL MOVEMENTS REACH 1/2 INCH. SHOULD THE STRUCTURAL OR GEOTECHNICAL ENGINEER DETERMINE ANY SIGNS OF DAMAGE, THEY SHALL IMMEDIATELY NOTIFY THE ARCHITECT AND ALL SUCH WORK WHICH MAY HAVE CAUSED SUCH DAMAGE SHALL BE STOPPED.

6. SIMILAR TO NOTE C.5, FOR SHORING WALLS ON THE EAST AND SOUTH OF THE PROJECT SITE, WHERE EXISTING BUILDINGS MAY BE AFFECTED, ALL PARTIES SHALL BE NOTIFIED IMMEDIATELY ONCE THE HORIZONTAL DEFLECTION REACHES 1/2 INCH ON SUCCESSIVE MEASUREMENTS OR 3/4 INCH CUMULATIVE OR IF THE SURVEY MONITORING AT EXISTING BUILDINGS SHOW 1/2-INCH OR GREATER SETTLEMENT. AT THIS TIME, ALL WORK THAT MAY CAUSE FURTHER DEFLECTION OF THE WALL AND/OR SETTLEMENT OF THE ADJACENT BUILDINGS MUST STOP. THE TYPE AND EXTENT OF REMEDIAL CONSTRUCTION SHALL BE DETERMINED BY THE PARTIES MENTIONED ABOVE.

D. PRECONSTRUCTION SURVEY: PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL MAKE A COMPLETE INSPECTION OF THE EXISTING ADJACENT STRUCTURES. THE INSPECTION SHOULD BE DIRECTED TOWARD DETECTING ANY EXISTING SIGNS OF DAMAGE, PARTICULARLY THOSE CAUSED BY SETTLEMENT. NOTES AND PHOTOGRAPHS SHOULD BE TAKEN. WHERE NECESSARY, CRACK MONITORING GAGES SHOULD BE INSTALLED. TWO COPIES OF THE REPORT SHALL BE PROVIDED TO THE ARCHITECT.

E. SITE ACCESS: COOPERATE WITH THE OWNER'S INSPECTOR, THE STRUCTURAL ENGINEER, AND THE OWNER'S GEOTECHNICAL ENGINEER AT ALL TIMES AND PROVIDE THEM WITH FREE ACCESS TO ALL PARTS OF THE WORK.

F. INSPECTION AND TEST DRILLING: THE OWNER'S GEOTECHNICAL ENGINEER SHALL PROVIDE CONTINUOUS INSPECTION DURING DRILLING AND CONCRETE PLACEMENT OF THE SOLDIER PILES.

G. INSPECTION AND TESTS BY THE OWNER'S TESTING LABORATORY:

1. WELDING: THE INSPECTOR SHALL INSPECT ALL FIELD WELDS AS SPECIFIED UNDER SPECIFICATION SECTION 05 12 00, "STRUCTURAL STEEL FRAMING."

2. CONCRETE SLUMP TESTS: TESTS WILL BE CONDUCTED IN ACCORDANCE WITH IBC REQUIREMENTS.

TIEBACK TESTING

TESTS SHALL BE PERFORMED BY THE CONTRACTOR IN THE PRESENCE OF THE OWNER'S TESTING LABORATORY AND GEOTECHNICAL ENGINEER.

A. PERFORMANCE TEST: SUCCESSFUL PERFORMANCE TESTS ARE REQUIRED FOR THE TIEBACKS ON THIS PROJECT TO CONFIRM THE DESIGN ADHESION VALUES AND CREEP CHARACTERISTICS. A MINIMUM OF TWO PERFORMANCE TESTS PER SOIL TYPE (EXISTING SOILS AND GLACIALLY CONSOLIDATED SOILS) SHOULD BE PERFORMED FOR THIS PROJECT. ADDITIONALLY, FOUR REPRESENTATIVE AREAWAY WALL SUPPORTING ANCHORS (TWO ALONG 8TH AVE AND TWO ALONG LENORA STREET) SHALL BE INSTALLED AND LOAD TESTED PRIOR TO ANCHOR INSTALLATION AND AREAWAY BACKFILL WITH CDF. PERFORMANCE TESTS SHOULD BE CONDUCTED ACCORDING TO THE FOLLOWING PROCEDURE:

1. THE GEOTECHNICAL ENGINEER WILL SELECT THE TESTING LOCATIONS WITH INPUT FROM THE SHORING SUBCONTRACTOR PRIOR TO SHORING CONSTRUCTION.

2. PERFORM TESTS WITHOUT BACKFILL AHEAD OF THE ANCHOR, IF THE HOLE WILL REMAIN OPEN, TO AVOID ANY CONTRIBUTORY RESISTANCE BY THE BACKFILL. IF THE HOLE WILL NOT REMAIN OPEN DURING TESTING, PROVIDE A BOND BREAKER ON THE ANCHOR STEEL AND BACKFILL THE NO-LOAD ZONE WITH A NON-COHESIVE MIXTURE.

3. THE MAXIMUM STRESS IN THE PRESTRESSING STEEL SHOULD NOT EXCEED 80 PERCENT OF THE ULTIMATE TENSILE STRENGTH FOR GRADE 270 KSI STEEL, OR 90 PERCENT OF THE YIELD STRENGTH FOR GRADE 60 OR 75 KSI STEEL DURING PERFORMANCE TESTING AS RECOMMENDED IN THE POST TENSIONING INSTITUTE (PTI) MANUAL. THE SOLDIER PILE AND TIEBACK SYSTEM MAY REQUIRE EXTRA REINFORCEMENT OR STRANDS TO PERMIT STRESSING TO 200 PERCENT OF DESIGN LOAD AS REQUIRED FOR THE PERFORMANCE TEST.

4. THE PERFORMANCE TEST WILL MEASURE ANCHOR STRESS AND DISPLACEMENT INCREMENTALLY TO VALUES OF UNIT SKIN FRICTION EQUAL TO 200 PERCENT OF THE DESIGN STRESS. LOAD THE ANCHOR AND MEASURE DISPLACEMENT AS FOLLOWS:

LOAD THE ANCHORS IN INCREMENTS OF 25 PERCENT OF THE DESIGN LOAD (DL) AND RETURN TO THE ALIGNING LOAD (AL) AFTER EACH INCREMENT (I.E., AL, 0.25 DL, AL, 0.50 DL, AL, 0.75 DL, AL, 1.00 DL, AL, 1.25 DL, AL, 1.50 DL, AL, 1.75 DL, AL, 2.00 DL, AL, LOCK OFF AT DL). ENSURE THAT THE DEFLECTION READINGS STABILIZE FOR INTERMEDIATE LOAD INCREMENTS (I.E. 0.25 DL AND 0.50 DL, WHEN THE NEW MAXIMUM IS 0.75 DL). EACH LOAD INCREMENT SHOULD BE HELD FOR AT LEAST 5 MINUTES. OBTAIN AN RECORD DEFLECTION MEASUREMENT DURING LOADING AT INTERVALS OF 30 SECONDS, 1 MINUTE, 2 MINUTES, 3 MINUTES, AND 5 MINUTES. MEASUREMENTS SHALL BE MADE TO AN ACCURACY OF 0.01 INCH OR LESS.

5. PERFORM A CREEP TEST AT THE 200 PERCENT OF THE DESIGN LOAD BY HOLDING THE LOAD CONSTANT TO WITHIN 50 PSI AND RECORDING READINGS AT 12 SECONDS, 30 SECONDS, 1 MINUTE, 2 MINUTES, 3 MINUTES, 5 MINUTES, AND 10 MINUTES; ALSO RECORD AT 20 MINUTES, 30 MINUTES, 40 MINUTES, 50 MINUTES, AND 60 MINUTES IF THE CREEP CRITERIA (SEE 6 BELOW) ARE NOT MET AT THE 10-MINUTE INTERVAL. PERFORMANCE TESTS ON AREAWAY WALL SUPPORTING ANCHORS SHOULD INCLUDE EXTENDED CREEP TESTS WITH HOLD PERIODS OF 10, 15, 30, 30, 30, AND 100 SECONDS AT 0.25DL, 0.50DL, 0.75DL, 1.00DL, 1.20DL AND 1.33DL RESPECTIVELY.

6. A SUCCESSFUL TEST IS ONE THAT EXHIBITS A LINEAR OR NEAR-LINEAR RELATIONSHIP BETWEEN UNIT STRESS AND MOVEMENT OVER THE ENTIRE 200 PERCENT RANGE, HOLDS THE MAXIMUM TEST UNIT STRESS WITHOUT NOTICEABLE CREEP, AND SATISFIES THE APPARENT FREE LENGTH CRITERIA. NOTICEABLE CREEP IS DEFINED AS A RATE OF MOVEMENT OF MORE THAN 0.04 INCH BETWEEN THE 1- AND 10 MINUTE READINGS, OR MORE THAN 0.08 INCH BETWEEN 6- AND 60-MINUTE READINGS. IF THE READING DOES NOT STABILIZE TO 0.08 INCHES OR LESS PER LOG CYCLE, THE TEST SHALL BE CONSIDERED TO FAIL THE CREEP TEST. APPARENT FREE LENGTH CRITERIA ARE AS FOLLOWS:

- MINIMUM APPARENT FREE LENGTH, BASED ON THE MEASURED ELASTIC AND RESIDUAL MOVEMENT, SHOULD BE GREATER THAN THE JACK LENGTH PLUS 80 PERCENT OF THE DESIGN FREE LENGTH.
- MAXIMUM APPARENT FREE LENGTH, BASED ON THE MEASURED ELASTIC AND RESIDUAL MOVEMENT, SHOULD BE LESS THAN THE JACK LENGTH PLUS THE DESIGN FREE LENGTH PLUS 50 PERCENT OF THE ANCHOR LENGTH PLUS UP TO 1/2 INCH OF SOIL MOVEMENT.

7. FOLLOWING SUCCESSFUL PERFORMANCE LOADING , LOCK OFF EACH TIEBACK ANCHOR 100 PERCENT OF THE DESIGN LOAD, UNLESS SPECIFIED OTHERWISE.

TIEBACK TESTING CONT...

PROOF TEST: ALL PRODUCTION ANCHORS SHOULD BE TESTED, FOLLOW THE PROOF TESTING PROCEDURES OUTLINED BELOW:

1. LOAD EACH ANCHOR TO 130 PERCENT OF THE DESIGN LOAD IN INCREMENTS OF APPROXIMATELY 25 PERCENT OF THE DESIGN LOAD (I.E., AL, 0.25 DL, 0.50 DL, 0.75 DL, 1.00 DL, 1.30 DL, AL, LOCK OFF AT DL). THE MAXIMUM STRESS IN THE ANCHOR STEEL SHOULD NOT EXCEED 80 PERCENT OF THE ULTIMATE TENSILE STRENGTH FOR 270 KSI STEEL, OR 90 PERCENT OF THE YIELD STRENGTH FOR GRADE 60 OR 75 KSI STEEL DURING PROOF TESTING.

2. HOLD INCREMENTAL LOADS FOR A PERIOD LONG ENOUGH TO OBTAIN A STABLE DEFLECTION MEASUREMENT WHILE RECORDING DEFLECTIONS AT EACH INCREMENTAL LOAD. HOLD THE 130 PERCENT LOAD FOR A MINIMUM OF 5 MINUTES, RECORDING THE MOVEMENT AT 12 SECONDS, 30 SECONDS, 1 MINUTE, 2 MINUTES, AND 5 MINUTES.

3. A SUCCESSFUL TEST IS ONE THAT EXHIBITS A LINEAR OR NEAR-LINEAR RELATIONSHIP BETWEEN UNIT STRESS AND MOVEMENT OVER THE ENTIRE STRESS RANGE, HOLDS THE MAXIMUM TEST UNIT STRESS WITHOUT NOTICEABLE CREEP, AND SATISFIES THE APPARENT FREE LENGTH CRITERIA AS INDICATED FOR THE PERFORMANCE TESTING. NOTE THAT THE CREEP PORTION OF THE TEST NEED NOT EXCEED 10 MINUTES IF THE 10-MINUTE CREEP CRITERIA IS MET.

TYPICALLY, MOVEMENT OF THE ANCHOR IN EXCESS OF ABOUT 3 INCHES IS INDICATIVE OF DEFICIENCIES IN INSTALLATION AND TOTAL MOVEMENT IN EXCESS OF 8 TO 12 INCHES IS CONSIDERED A FAILURE REQUIRING REPLACEMENT. THE GEOTECHNICAL AND STRUCTURAL ENGINEERS SHOULD REVIEW ANCHORS WITH A TOTAL MOVEMENT BETWEEN 3 AND 12 INCHES TO DETERMINE WETHER A REPLACEMENT OR SUPPLEMENTAL ANCHOR IS REQUIRED.

FOLLOWING SUCCESSFUL PROOF LOADING, LOCK OFF EACH TIEBACK ANCHOR AT 100 PERCENT OF THE DESIGN LOAD, UNLESS SPECIFIED OTHERWISE.

SPECIAL INSPECTION

THE FOLLOWING ITEMS REQUIRE SPECIAL INSPECTION AND TESTING PER IBC SECTION 1704. THIS WORK SHALL BE PERFORMED BY A SPECIAL INSPECTOR CERTIFIED BY THE CITY OF SEATTLE TO PERFORM THE TYPES OF INSPECTIONS AND TESTS SPECIFIED. THE FREQUENCY OF INSPECTIONS AND TESTING SHALL BE AS OUTLINED IN THE IBC TABLE ITEMS LISTED BELOW. DEFICIENCIES SHALL BE REPORTED DAILY TO THE CONTRACTOR. SUMMARY REPORTS SHALL BE DISTRIBUTED WEEKLY TO THE OWNER, ARCHITECT, CONTRACTOR, BUILDING OFFICIAL, AND STRUCTURAL ENGINEER.

ITEM	DESCRIPTION (REFER TO IBC SECTION 1704)	IBC TABLE REQUIREMENTS
CONCRETE	CONCRETE THAT IS USED FOR PILE BACKFILL	TABLE 1704.4, ITEMS 5, 6, 7
STRUCTURAL STEEL AND WELDING	A. STRUCTURAL STEEL THAT IS PART OF THE STRUCTURE.	TABLE 1704.3, ITEM 3
	B. WELDING OF MEMBERS OR CONNECTIONS.	TABLE 1704.3, ITEMS 4 AND 5

MISCELLANEOUS

ALL LIGHT CONSTRUCTION TRAFFIC SHALL MAINTAIN A 2-FOOT MINIMUM CLEARANCE FROM EDGE OF WHEEL TO NEAREST EDGE OF LAGGING.

SHORING NOTES — 4

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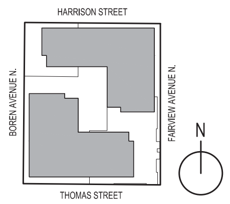

Schematic Design

June 14, 2013

Not for Construction

Revisions

Sheet Information

Date
Job Number
Drawn
Checked
Approved

Title

SHORING GENERAL NOTES AND TYPICAL DETAILS

Sheet

SH1.02

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NOTES:

1. PILE AND TIEBACK LAYOUT IS SHOWN FOR CONCEPTUAL PURPOSE. LAYOUT IS SUBJECT TO CHANGE WITH FULL DESIGN.
2. SEE SHORING PROFILES FOR PERIMETER DEPTH OF ELEVATION.

SHORING WALL INBOARD OF EXIST BOREN INVESTMENT BLDG FACADE

1:1 TYP

BOT OF EXCAV
VARIES, SEE FOUNDATION PLAN

BOT OF EXCAV
20.00

1:1 TYP

TIEBACKS TO AVOID EXIST PSS. MAINTAIN
5' CLR ABOVE AND 3' BELOW, TYP

SHORING WALL INBOARD OF
EXIST TROY BLDG FACADE

TIEBACKS TO AVOID EXIST PSS. MAINTAIN
5' CLR ABOVE AND 3' BELOW, TYP

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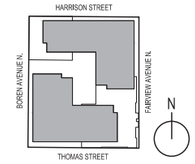

Schematic Design

June 14, 2013

Not for Construction

DREW ALAN GANGNES
STATE OF WASHINGTON
REGISTERED
PROFESSIONAL ENGINEER

Revisions

Sheet Information	
Date	
Job Number	
Drawn	
Checked	
Approved	

Title

SHORING PLAN

Sheet

SH2.01

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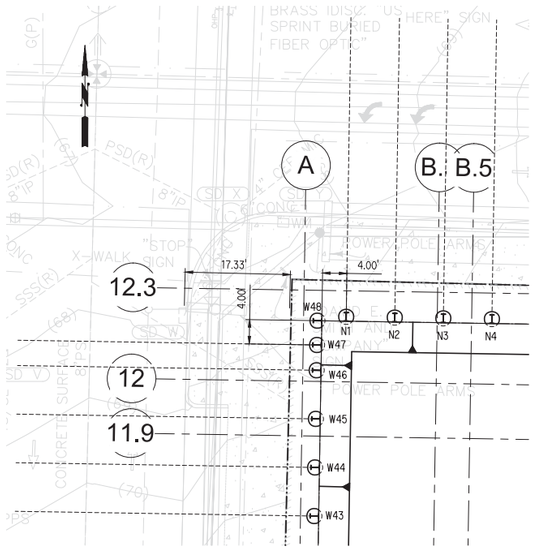
NOTES:
1. PILE AND TIEBACK LAYOUT IS SHOWN FOR CONCEPTUAL PURPOSE. LAYOUT IS SUBJECT TO CHANGE WITH FULL DESIGN.



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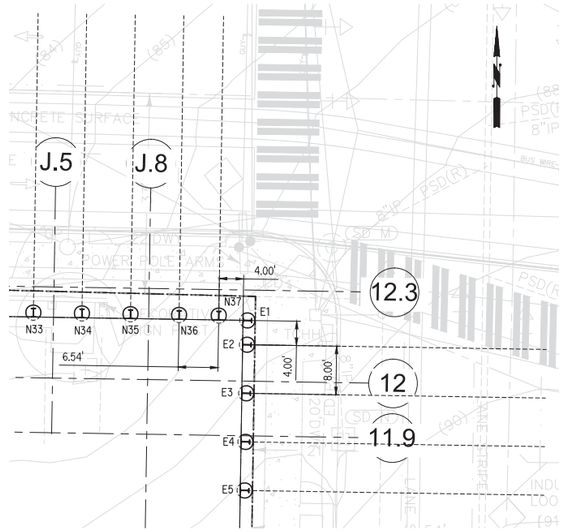

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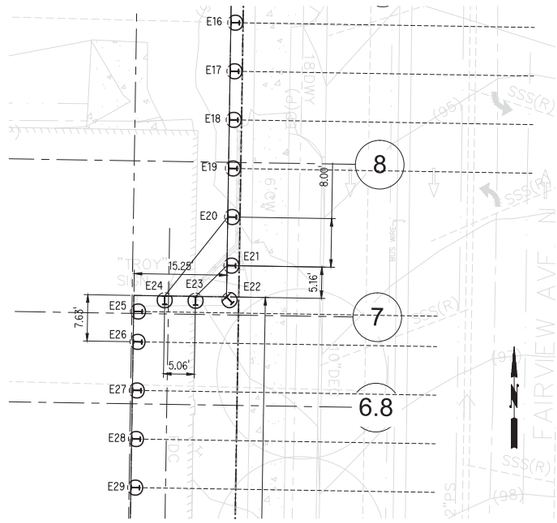

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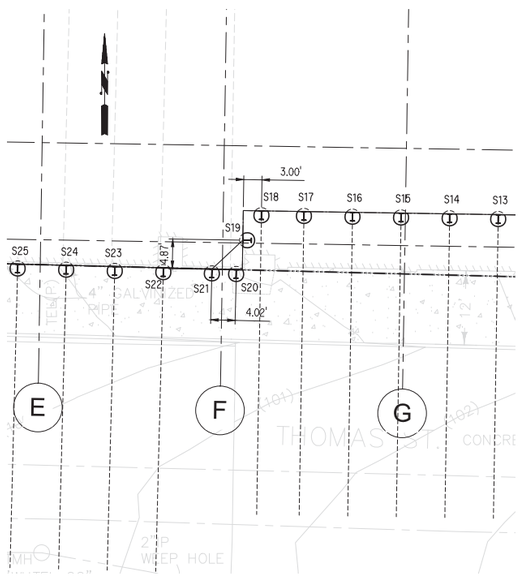

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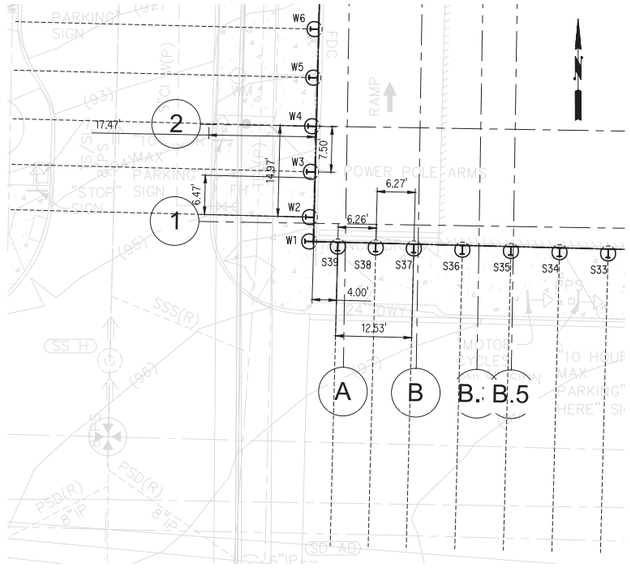

ENLARGED PLAN, SW CORNER 5
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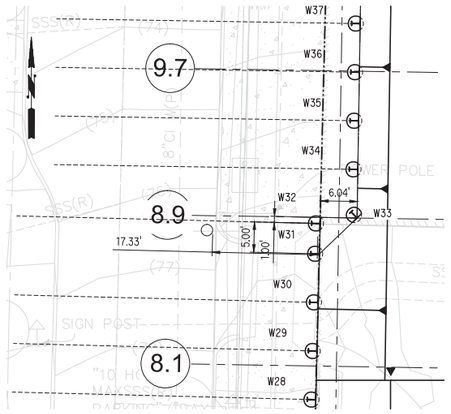

ENLARGED PLAN, WEST SIDE 6
1"=10' SH2.02 | SH2.01

10 5 0 10 20
scale 1" = 10' feet

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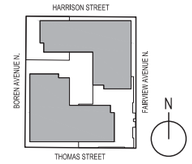

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June 14, 2013

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SHORING PLAN

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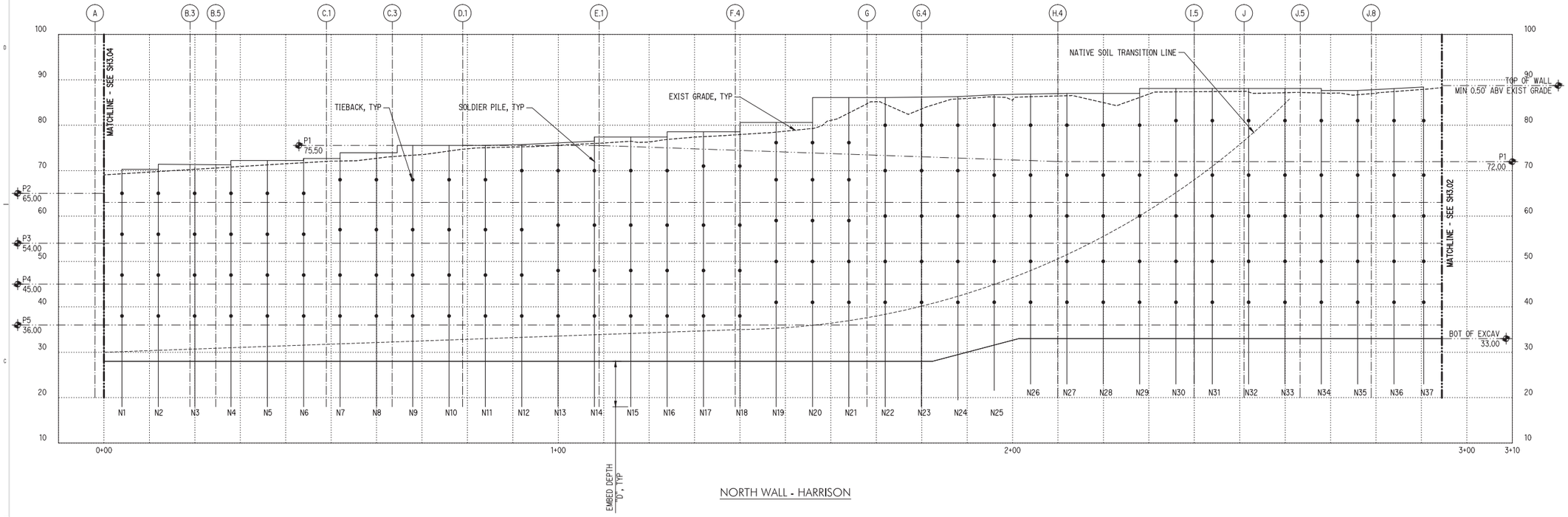

NORTH WALL - HARRISON

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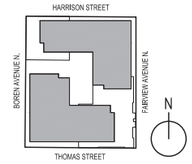

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SHORING ELEVATIONS - NORTH WALL

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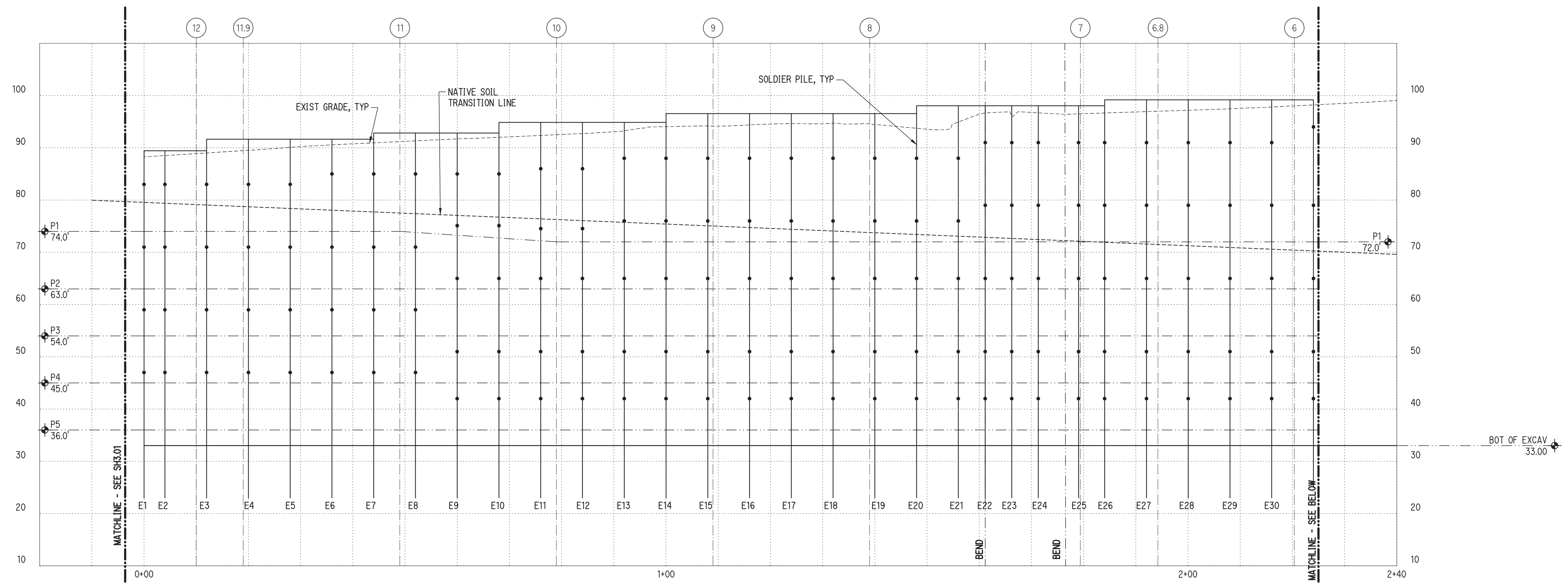
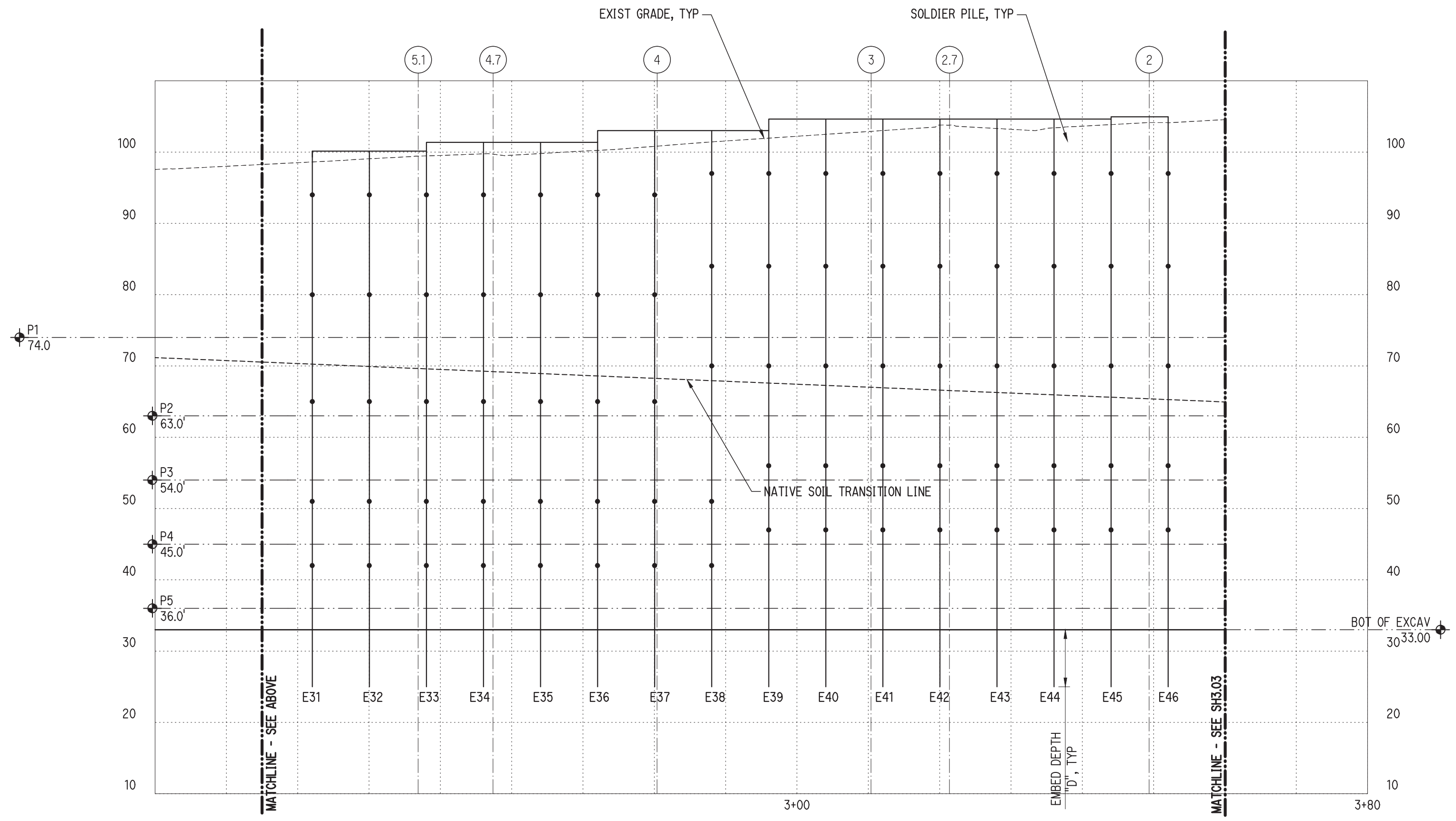


EAST WALL - FAIRVIEW



EAST WALL - FAIRVIEW (CONT)

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HARRISON STREET
BOREN AVENUE N.
FAIRVIEW AVENUE N.
THOMAS STREET
N

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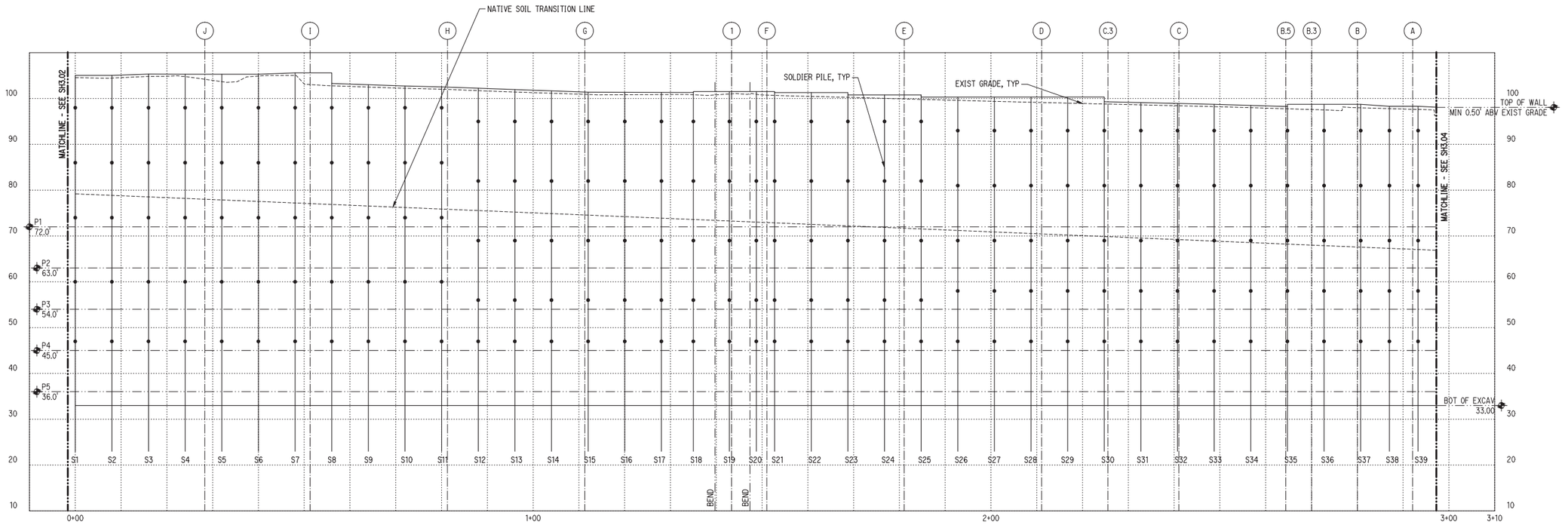
SHORING ELEVATIONS

Sheet

SH3.02



SOUTH WALL

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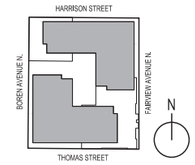

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SHORING ELEVATIONS - SOUTH WALL

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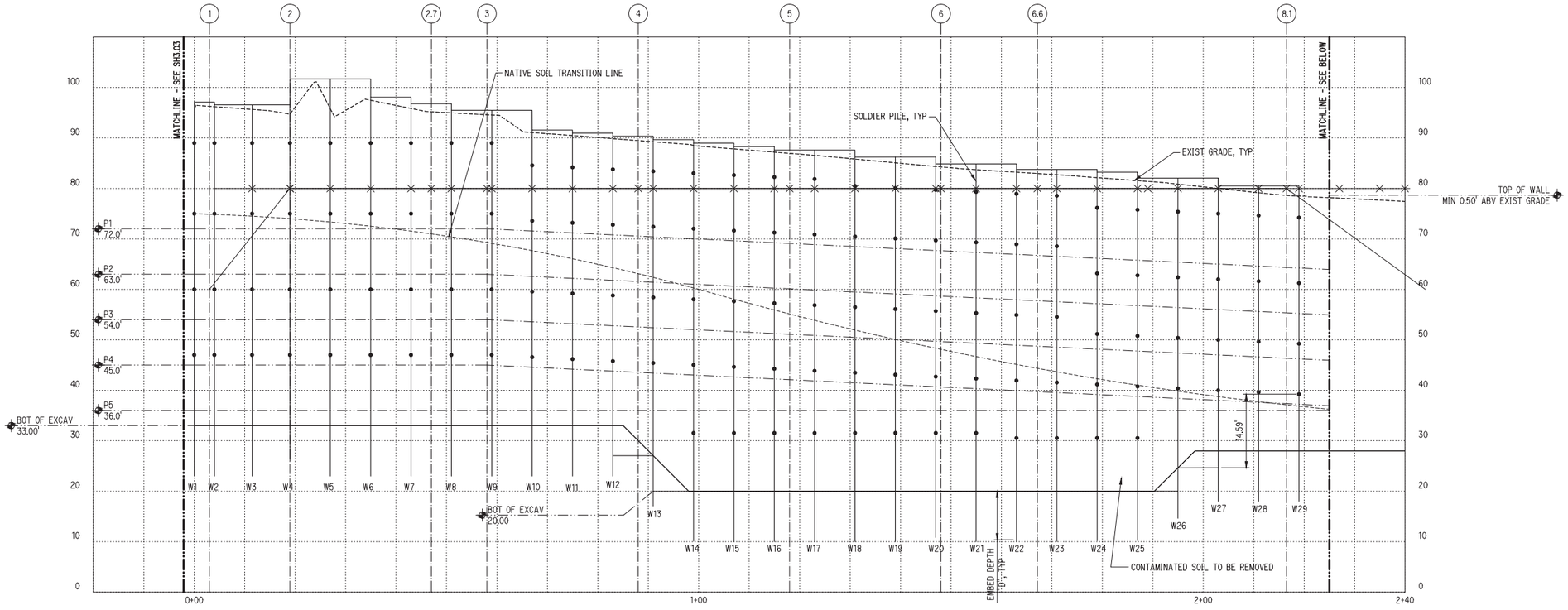
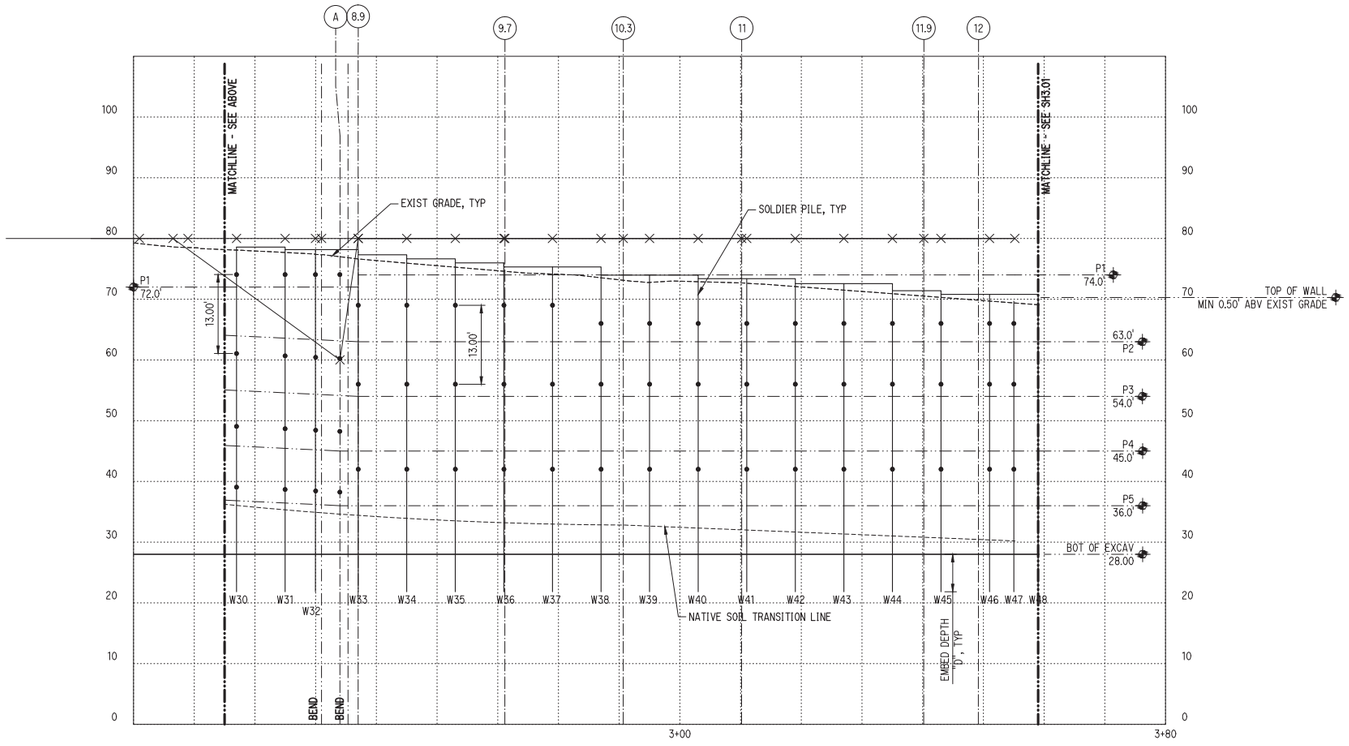
SH3.03



WEST WALL - BOREN



WEST WALL - BOREN (CONT)

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SHORING ELEVATIONS - WEST WALL

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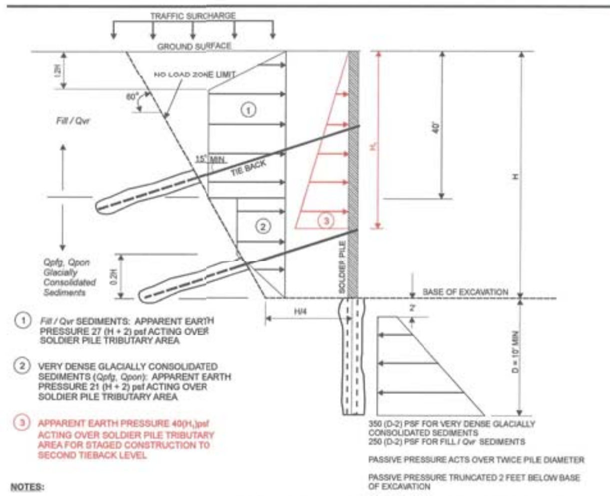
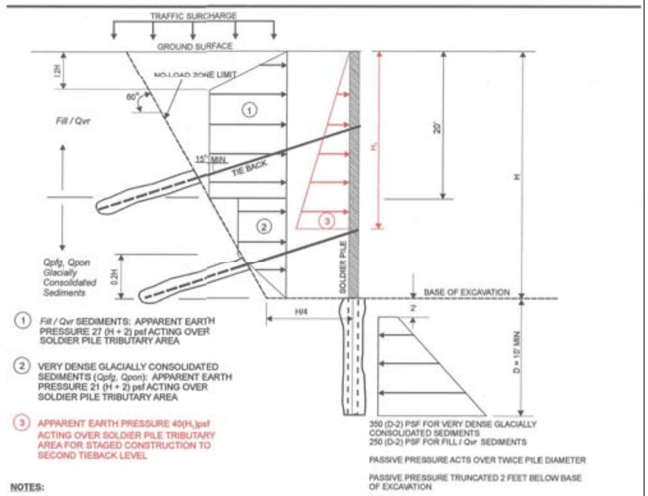


NOTES:

1. SOLDIER PILE EMBEDMENT DEPTH "D" SHOULD CONSIDER NECESSARY VERTICAL CAPACITY, KICKOUT, AND OVERTURNING RESISTANCE.
2. ALL TIEBACK ANCHORS SHALL BE PRESTRESSED TO 130 PERCENT OF DESIGN LOAD AND LOCKED OFF AT 100 PERCENT OF DESIGN LOAD. AT LEAST TWO ANCHORS PER SIDE AT THE EXCAVATION SHALL BE PRESTRESSED TO 200 PERCENT AND MONITORED FOR CREEP. TIEBACK ANCHOR ZONE IS TO BE LOCATED BEHIND THE NO-LOAD ZONE.
3. ALLOWABLE TIEBACK - SOIL ADHESION = SEE REPORT TEXT.
4. PASSIVE PRESSURES INCLUDE A FACTOR OF SAFETY OF 1.5.
5. ALLOWABLE SKIN FRICTION OF SOLDIER PILE - 1,500 PSF (FOR PORTION OF PILE EMBEDDED IN GLACIALLY CONSOLIDATED SEDIMENTS) OR 1,000 PSF (FOR PORTION OF PILE EMBEDDED IN *Fill / Qvr* SEDIMENTS) OVER DEPTH "D-2". ALLOWABLE END BEARING = 15,000 PSF TEMPORARY, 30,000 PSF PERMANENT.
6. DIAGRAM DOES NOT INCLUDE HYDROSTATIC PRESSURES AND ASSUMES WALLS ARE SUITABLY DRAINED TO PREVENT BUILDUP OF HYDROSTATIC PRESSURE WITH NO SLOPE AT TOP OF WALL.
7. DIAGRAM IS ILLUSTRATIVE OF THE REFERENCED WALL SEGMENT BUT NOT TO A PARTICULAR LOCATION.
8. DIAGRAM DOES NOT INCLUDE PRESSURES DUE TO SURFACE SURCHARGES FROM ANY ADJACENT STRUCTURES, SLOPES, OR STOCKPILED MATERIALS. THESE PRESSURES MUST BE PROVIDED BY THE STRUCTURAL ENGINEER AND ADDED TO THE PRESSURES SHOWN ON THE DIAGRAM.
9. BASE OF EXCAVATION SHALL BE DEFINED AS THE FOUNDATION SUBGRADE ELEVATION.

Associated Earth Sciences, Inc. | SOLDIER PILE WALL DESIGN CRITERIA - WALL 'A' | FIGURE 7
TROY LAUNDRY PROPERTY
SEATTLE, WASHINGTON | DATE 6/13 | PROJ. NO. KE110254A

110254 Fairview and Thomas 1-2 | 110254 Soldier Walls 6-13.cdr PAGE 1 Wall A



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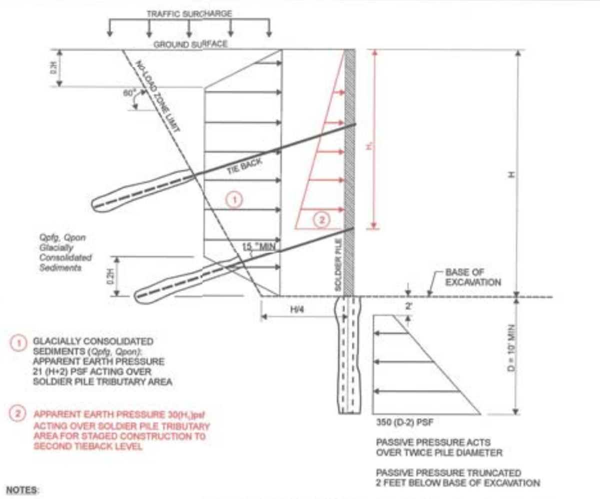
9. BASE OF EXCAVATION SHALL BE DEFINED AS THE FOUNDATION SUBGRADE ELEVATION.

Associated Earth Sciences, Inc. | SOLDIER PILE WALL DESIGN CRITERIA - WALL 'B' | FIGURE 8
TROY LAUNDRY PROPERTY
SEATTLE, WASHINGTON | DATE 6/13 | PROJ. NO. KE110254A

110254 Fairview and Thomas 1-2 | 110254 Soldier Walls 6-13.cdr PAGE 1 Wall B



NOTES:

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3. ALLOWABLE TIEBACK - SOIL ADHESION = SEE REPORT TEXT
4. PASSIVE PRESSURES INCLUDE A FACTOR OF SAFETY OF 1.5.
5. ALLOWABLE SKIN FRICTION OF SOLDIER PILE - 2,000 PSF OVER DEPTH "D-2". ALLOWABLE END BEARING = 15,000 PSF TEMPORARY, 30,000 PSF PERMANENT.
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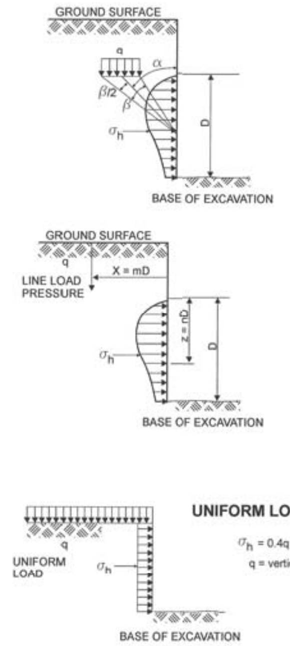
9. BASE OF EXCAVATION SHALL BE DEFINED AS THE FOUNDATION SUBGRADE ELEVATION.

Associated Earth Sciences, Inc. | SOLDIER PILE WALL DESIGN CRITERIA - WALL 'C' | FIGURE 9
TROY LAUNDRY PROPERTY
SEATTLE, WASHINGTON | DATE 6/13 | PROJ. NO. KE110254A

110254 Fairview and Thomas 1-2 | 110254 Soldier Walls 6-13.cdr PAGE 3 Wall C



ISOLATED FOOTING

$\sigma_h = 0.64q(\beta - \sin\beta\cos 2\alpha)$

CONTINUOUS FOOTING PARALLEL TO EXCAVATION

(FOR m>0.4)

$\sigma_h = \frac{1.28q}{D}\,\frac{m^2 n}{(m^2+n^2)^2}$

(FOR m≤0.4)

$\sigma_h = \frac{q}{D}\,\frac{0.2n}{(0.16+n^2)^2}$

UNIFORM LOAD DISTRIBUTION

$\sigma_h = 0.4q$

q = vertical pressure in psf

DEFINITIONS AND UNITS

- D Excavation depth below footing in feet
- σ_h Lateral soil pressure in psf
- q Unit loading pressure in psf
- β Radians

Associated Earth Sciences, Inc. | SURCHARGE PRESSURES ON ADJACENT WALLS
TROY LAUNDRY
SEATTLE, WASHINGTON | DATE 6/13 | PROJ. NO. KE110254A

110254 Fairview and Thomas 1-2 | 110254 SURCHARGE PRESSURE2.cdr

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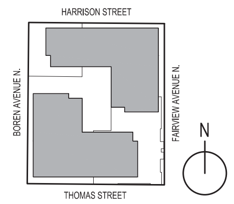

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SHORING DESIGN CRITERIA

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SH4.02

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PILE #	SHAFT DIA (INCHES)	PILE SIZE (UNO)	ROW A					ROW B					ROW C					ROW D					TOP OF PILE ELEV (FT)	BOT OF EXCAV ELEV (FT)	MIN EMBEDMENT D+2 (FT)	PILE LENGTH (FT)
			ELEV (FT)	F (KIPS)	L (FT)	A (FT)	ANGLE	ELEV (FT)	F (KIPS)	L (FT)	A (FT)	ANGLE	ELEV (FT)	F (KIPS)	L (FT)	A (FT)	ANGLE	ELEV (FT)	F (KIPS)	L (FT)	A (FT)	ANGLE				

NOTE: PRELIMINARY PILE SIZING OF W14x68 IS ANTICIPATED.

SOLDIER PILE AND TIEBACK SCHEDULE

1

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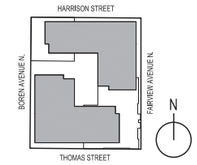

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SHORING SCHEDULE

Sheet

SH5.01

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FOUNDATIONS TO BEAR ON SOIL WITH AN ALLOWABLE BEARING PRESSURE = 14KSF. REQUIRED DEPTH TO BOTTOM OF FOUNDATIONS TO BE DETEMINED/ VERIFIED ALONG NORTH AND WEST SIDES OF THE BUILDING TO MEET ALLOWABLE BEARING PRESSURE CRITERIA.

3'-6"W x 2'-0"D WALL FOOTING, TYPICAL UNLESS NOTED OTHERWISE

5" THICK SLAB ON GRADE PARKING RAMP

5" THICK SLAB ON GRADE

18" THICK CONCRETE WALL UNDER PARKING RAMP, TYPICAL

ELEVATOR PIT

ELEVATOR PIT

C8 COLUMN INTEGRAL WITH CONCRETE WALL

C11 COLUMN INTEGRAL WITH CONCRETE WALL

24" THICK CONCRETE SHEAR WALL, TYPICAL UNLESS NOTED OTHERWISE

C1 COLUMN INTEGRAL WITH BASEMENT WALL

C12 COLUMN INTEGRAL WITH BASEMENT WALL

18" THICK BASEMENT WALL, TYPICAL

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TOUCHSTONE CORPORATION

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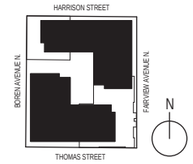

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LEVEL P5 PLAN OVERVIEW

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APPENDIX D
EOS CALCULATIONS

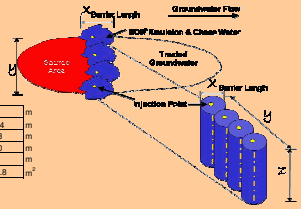
EOS® BARRIER DESIGN WORKSHEET

EOS Remediation, Inc.

U.S. Version 2.1e, Rev. Date: February 6, 2008
www.EOSRemediation.com

Help

Site Name:	Troy
Location:	Seattle Washington
Project No.:	



Step 1: Select a Substrate from the EOS® Family of Bioremediation Products

Substrate Selected (pick from drop down list): EOS® 598B42 (Preferred for Chlorinateds)
For Product Literature Click Here

Step 2: EOS® Consumption During Contaminant Biodegradation / Biotransformation

Section A: Treatment Area Dimensions

Length of treatment area parallel to groundwater flow, "x"	15	ft	4.6	m
Width of treatment area perpendicular to groundwater flow, "y"	700	ft	213.4	m
Minimum depth to contamination	70	ft	21.3	m
Maximum depth of contamination	95	ft	29.0	m
Treatment thickness, "z"	25	ft	7.6	m
Treatment zone cross-sectional area, A = y * z	17,500	ft²	1625.8	m²

Section B: Groundwater Flow Rate / Site Data

Soil Characteristics

Nominal Soil Type (pick from drop down list)	Sand			
Total Porosity (accept default or enter n)	0.38	(decimal)		
Effective Porosity (accept default or enter n_e)	0.23	(decimal)		
Soil bulk density; (1-n)*2.65 g/cc (accept calculated or enter dry bulk density)	1.64	g/cc	103	lbs / ft³

Hydraulic Characteristics

Hydraulic Conductivity (accept default or enter K)	1	ft/day	3.5E-04	cm/sec
Hydraulic Gradient (accept default or enter i)	0.026	ft/ft		

Note: Since the hydraulic gradient ($i = dh/dx$) is negative, we ask you to enter $-i$ in the EOS® Design Tool so that you can enter a positive number for convenience.

Non-reactive Transport Velocity, $V_x = -(K \times i) / n_e$	0.11	ft/day	0.034	m/day
Groundwater flow rate through treatment zone, $Q = -KiA$	3403.40	gallons/day	12,884.17	L/day

Section C: Calculated Contact Length

Contact time (τ) between oil and contaminants (accept default or enter τ)	60	typical values 60 to 180 days, see comment		
Calculated Contact Length (x) = τ * V_x	6.8	ft	2.1	m
Treatment zone volume	262,500	ft³	7,433.2	m²
Treatment zone groundwater volume (volume * effective porosity)	451,605	gallons	1,709,630	L

Section D: Design Lifespan For One Application

	10	year(s)	typical values 5 to 10 years	
Estimated total groundwater volume treated over design life	12,874,015	gallons	48,736,833	L

Section E: Electron Acceptors

Inputs	Typical Value	GW Conc. (mg/L)	MW (g/mole)	e⁻ equiv./ mole	Stoichiometry *Contaminant/H₂ (wt/wt H_2)*	Hydrogen Demand *(g H_2)*
Dissolved Oxygen (DO)	0 to 8	5	32.0	4	7.94	30702.30982
Nitrate Nitrogen (NO_3^- - N)	1 to 10	10	62.0	5	12.30	39611.26747
Sulfate (SO_4^{2-})	10 to 500	50	96.1	8	11.91	204551.6589
Tetrachloroethene (PCE), C_2Cl_4		1	165.8	8	20.57	2369.687932
Trichloroethene (TCE), C_2HCl_3		1.5	131.4	6	21.73	3364.794759
cis-1,2-dichloroethene (c-DCE), $C_2H_2Cl_2$		0.5	96.9	4	24.05	1013.408873
Vinyl Chloride (VC), C_2H_3Cl		0.1	62.5	2	31.00	157.193201
Carbon tetrachloride, CCl_4			153.8	8	19.08	
Chloroform, $CHCl_3$			119.4	6	19.74	
sym-tetrachloroethane, $C_2H_2Cl_4$			167.8	8	20.82	
1,1,1-Trichloroethane (TCA), CH_3CCl_3			133.4	6	22.06	
1,1-Dichloroethane (DCA), CH_3CHCl_2			99.0	4	24.55	
Chloroethane, C_2H_5Cl			64.9	2	32.18	
Perchlorate, ClO_4^-			99.4	8	12.33	
Hexavalent Chromium, Cr[VI]			52.0	3	17.20	
User added						
User added						
User added						

Section F: Additional Hydrogen Demand and Carbon Losses

Generation (Potential Amount Formed)	Typical Value	GW Conc. (mg/L)	MW (g/mole)	e⁻ equiv./ mole	Stoichiometry *Contaminant / H_2 (wt/wt H_2)*	Hydrogen Demand *(g H_2)*	DOC Released *(moles)*
Estimated Amount of Fe^{2+} Formed	10 to 100	50	55.8	1	55.41	43980.52965	
Estimated Amount of Manganese (Mn^{2+}) Formed		5	54.9	2	27.25	8941.325416	
Estimated Amount of CH_4 Formed	5 to 20	10	16.0	8	1.99	244957.0696	
Target Amount of DOC to Release	60 to 100	100	12.0				405768.32

Design Safety Factor: 2.0 typical values 1 to 3

Calculations assume:
1.) all reactions go to completion during passage through emulsified edible oil treated zone; and,
2.) perfect reaction stoichiometry.

EOS® Requirement Calculations Based on Hydrogen Demand and Carbon Losses

Stoichiometric Hydrogen Demand	2,553.5	pounds
DOC Released	46,332.2	pounds

EOS® Requirement Based on Hydrogen Demand and Carbon Loss
57,969 lbs

Step 3: EOS® Requirement Based on Attachment by Aquifer Material

Soil Characteristics

Effective treatment thickness, "z_e" (typically less than 40%)	0.25	
For Additional Information on Effective Thickness, Click Here		
Weight of sediment to be treated	6,731,100	lbs
Adsorptive Capacity of Soil (accept default or enter site specific value)	0.0010	lbs EOS® / lbs sediment

EOS® Attachment by Aquifer Material†
- Fine sand with some clay 0.001 to 0.002 lbs EOS® / lbs soil
- Sand with higher silt/clay content 0.002 to 0.004 lbs EOS® / lbs soil

†Default values provided based on laboratory studies completed by NCSU

For Additional Data, Click Here

EOS® Requirement Based on Oil Entrapment by Aquifer Material
6,731 lbs

Summary – How much EOS® do you need?

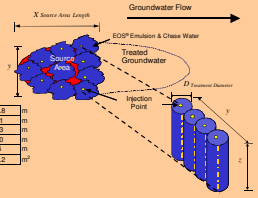
Suggested Quantity of EOS® for Your Project: 139 drums

EOS® SOURCE AREA & DNAPL DESIGN WORKSHEET

U.S. Version 2.1e, Rev. Date: February 6, 2008
www.EOSRemediation.com

Help

Site Name:	Troy
Location:	Seattle WA
Project No.:	



Step 1: Select a Substrate from the EOS® Family of Bioremediation Products

Substrate Selected (pick from drop down list): EOS® 598B42 (Preferred for Chlorinateds)
For Product Literature Click Here

Step 2: EOS® Consumption During Contaminant Biodegradation / Biotransformation

Section A: Source Area Dimensions

Length of treatment area parallel to groundwater flow, "x"	380	ft	115.8	m
Width of treatment area perpendicular to groundwater flow, "y"	230	ft	70.1	m
Minimum depth to contamination	70	ft	21.3	m
Maximum depth of contamination	95	ft	29.0	m
Treatment thickness, "z"	25	ft	7.6	m
Treatment zone cross-sectional area, $A = y * z$	5,750	ft²	534.2	m²

Section B: Groundwater Flow Rate / Site Data

Soil Characteristics

Nominal Soil Type (pick from drop down list)	Sand			
Total Porosity (accept default or enter n)	0.38	(decimal)		
Effective Porosity (accept default or enter n_e)	0.23	(decimal)		
Soil bulk density; (1-n)*2.65 g/cc (accept calculated or enter dry bulk density)	1.64	g/cc	103	lbs / ft³
Fraction of organic carbon: foc	0.0050	range: 0.0001 to 0.01		

Hydraulic Characteristics

Hydraulic Conductivity (accept default or enter K)	1	ft/day	3.5E-04	cm/sec
Hydraulic Gradient (accept default or enter i)	0.02	ft/ft		

Note: Since the hydraulic gradient ($i = dh/dx$) is negative, we ask you to enter -i in the EOS® Design Tool so that you can enter a positive number for convenience.

Non-reactive Transport Velocity, $V_x = -(K \times i) / n_e$	0.09	ft/day	0.027	m/day
Groundwater flow rate through treatment zone, $Q = -KiA$	860.20	gallons/day	3,256.44	L/day

Section C: Calculated Contact Length

Contact time (τ) between oil and contaminants (accept default or enter τ)		180	typical values 60 to 180 days, see comment	
Calculated Contact Length (x) $= \tau * V_x$		15.7	ft	4.8 m

Treatment zone volume	2,185,000	ft³	61,872	m³
Treatment zone groundwater volume (volume * porosity)	6,210,644	gallons	23,511,478	L

Section D: Design Lifespan For One Application

Estimated total groundwater volume treated over design life	20	year(s)	typical values 5 to 10 years
	12,490,104	gallons	47,283,470 L

Section E: Electron Acceptors

Dissolved Phase Electron Donor Demand

Inputs	Typical Value	GW Conc. (mg/L)	MW (g/mole)	e⁻ equiv./ mole	Stoichiometry Contaminant/ H_2 (wt/wt H_2)	Hydrogen Demand (g H_2)
Dissolved Oxygen (DO)	0 to 8	1	32.0	4	7.94	5957.349633
Nitrate Nitrogen (NO_3 - N)	1 to 10	2	62.0	5	12.30	7686.00705
Sulfate (SO_4^{2-})	10 to 500	20	96.1	8	11.91	79380.72133
Tetrachloroethene (PCE), C_2Cl_4		0.5	165.8	8	20.57	1149.511194
Trichloroethene (TCE), C_2HCl_3		0.05	131.4	6	21.73	108.8151507
cis-1,2-dichloroethene (c-DCE), $C_2H_2Cl_2$		0.005	96.9	4	24.05	9.83188401
Vinyl Chloride (VC), C_2H_3Cl		0.05	62.5	2	31.00	76.25280183
Carbon tetrachloride, CCl_4			153.8	8	19.08	
Chloroform, $CHCl_3$			119.4	6	19.74	
sym- tetrachloroethane, $C_2H_2Cl_4$			167.8	8	20.82	
1,1,1-Trichloroethane (TCA), CH_3CCl_3			133.4	6	22.06	
1,1-Dichloroethane (DCA), CH_3CHCl_2			99.0	4	24.55	
Chloroethane, C_2H_5Cl			64.9	2	32.18	
Perchlorate, ClO_4			99.4	8	12.33	
Hexavalent Chromium, Cr[VI]			52.0	3	17.20	
User added						
User added						
User added						

Sorbed Phase Electron Donor Demand

The concentration of the sorbed contaminant can be estimated by: $C_{SOIL} = K_{OC} \times f_{oc} \times C_{WATER}$

Where: K_{oc} is partition coefficient with respect to organic carbon.
f_{oc} (fraction organic carbon) is the mass of organic matter in soil divided by the total mass of soil
C_{WATER} is the concentration of the contaminant in the groundwater

Default values for Koc taken from: US EPA, Superfund Section, APPENDIX K, Soil Organic Carbon (Koc) / Water (Kow) Partition Coefficients (Average Value Used)

Inputs (Adjust K_{OC} as necessary to provide site specific estimates or enter sediment concentration (C_{SOIL}))	K_{oc} (L/kg)	C_{SOIL} (mg/Kg)	Mass (g)	Hydrogen Demand (g H_2)
Tetrachloroethene (PCE), C_2Cl_4	272	0.68	69126.30	3361.07
Trichloroethene (TCE), C_2HCl_3	97	0.02	2465.17	113.46
cis-1,2-dichloroethene (c-DCE), $C_2H_2Cl_2$	38	0.00	96.57	4.02
Vinyl Chloride (VC), C_2H_3Cl	241	0.06	6124.79	197.55
Carbon tetrachloride, CCl_4	158			
Chloroform, $CHCl_3$	53			
sym- tetrachloroethane, $C_2H_2Cl_4$	79			
1,1,1-Trichloroethane (TCA), CH_3CCl_3	139			
1,1-Dichloroethane (DCA), CH_3CHCl_2	54			
User added				
User added				
User added				

Section F: Additional Hydrogen Demand and Carbon Losses

Generation (Potential Amount Formed)	Typical Value	GW Conc. (mg/L)	MW (g/mole)	e⁻ equiv./ mole	Stoichiometry Contaminant / H_2	Hydrogen Demand (g H_2)	DOC Released (moles)
Estimated Amount of Fe^{2+} Formed	10 to 100	50	55.8	1	55.41	42669.00336	
Estimated Amount of Manganese (Mn^{2+}) Formed		5	54.9	2	27.25	8674.689624	
Estimated Amount of CH_4 Formed	5 to 20	10	16.0	8	1.99	237652.3	
Target Amount of DOC to Release	60 to 100	100	12.0				393668.06

Design Safety Factor: 3.0 typical values 1 to 3

Calculations assume:
1.) all reactions go to completion during passage through emulsified edible oil treated zone; and,
2.) perfect reaction stoichiometry.

EOS® Requirement Calculations Based on Hydrogen Demand and Carbon Losses

Stoichiometric Hydrogen Demand	2,557.5	pounds
DOC Released	67,425.8	pounds

EOS® Requirement Based on Hydrogen Demand and Carbon Loss
79,081 lbs

Step 3: EOS® Requirement Based on Attachment by Aquifer Material

Soil Characteristics

Effective treatment thickness, "z_e" (typically less than 40%): 0.25
For Additional Information on Effective Thickness, Click Here

Weight of sediment to be treated: 56,028,392 lbs

Adsorptive Capacity of Soil (accept default or enter site specific value): 0.0010 lbs EOS® / lbs sediment

EOS® Attachment by Aquifer Material†
- Fine sand with some clay 0.001 to 0.002 lbs EOS® / lbs soil
- Sand with higher silt/clay content 0.002 to 0.004 lbs EOS® / lbs soil

†Default values provided based on laboratory studies completed by NCSU
For Additional Data, Click Here

EOS® Requirement Based on Oil Entrapment by Aquifer Material
56,028 lbs

Summary – How much EOS® do you need?

Suggested Quantity of EOS® for Your Project: 189 drums

APPENDIX E

EOS CASE STUDIES SUPPORTING DOCUMENTATION

MW06	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
06/01/11	<1	<1	<1	<0.2
08/11/11	<1	<1	<1	<0.2
11/10/11	<1	<1	<1	<0.2
02/03/12	<1	<1	<1	<0.2

MW04	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
06/01/11	27	<1	<1	<0.2
08/12/11	27	<1	<1	<0.2
11/10/11	36	1.4	<1	<0.2
02/03/12	33	3.2	<1	<0.2

IW02	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
06/01/11	6.2	2.2	220	2.2
08/12/11	2.2	<1	150	1.4
11/10/11	1.1	<1	140	1.5
02/03/12	<1	<1	190	2.1

MW09	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
05/04/10	3.2	<1	<1	<0.2
08/05/10	4.0	<1	<1	<0.2
11/02/10	2.3	<1	<1	<0.2
02/02/11	2.3	<1	<1	<0.2

MW10	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
08/05/10	<1	<1	<1	<0.2
11/02/10	<1	<1	<1	<0.2
02/02/11	<1	<1	<1	<0.2
06/01/11	<1	<1	<1	<0.2

MW07	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
06/01/11	360	82	70	1.4
08/12/11	190	130	250	1.2
11/10/11	10	<1	390	2.2
02/03/12	4.9	1.6	400	3.5

MW08	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
05/04/10	4.1	<1	<1	<0.2
08/05/10	4.3	<1	<1	<0.2
11/02/10	2.7	<1	12	<0.2
02/02/11	<1	<1	5.6	<0.2

MW11	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
06/01/11	2.5	<1	410	2.6
08/11/11	<1	<1	510	2.2
11/10/11	1.1	<1	760	2.5
02/03/12	<1	<1	510	2.9

MW05	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
11/10/11	1.1	<1	<1	<0.2

MW02	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
04/05/10	1.3	<1	<1	<0.2
08/05/10	2.1	<1	<1	<0.2
11/02/10	1.4	<1	<1	<0.2
02/02/11	1.3	<1	<1	<0.2

MW01	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
04/05/10	2.0	<1	<1	<0.2
08/05/10	2.6	<1	<1	<0.2
11/02/10	2.2	<1	<1	<0.2
02/02/11	1.7	<1	<1	<0.2

MW12	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
06/01/11	38	1.8	<1	<0.2
08/12/11	60	3.4	<1	<0.2
11/10/11	73	4.2	<1	<0.2
02/03/12	50	2.6	<1	<0.2

MW13	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
2/2/2011	<1	<1	<1	<0.1
06/01/11	<1	<1	<1	<0.2
08/11/11	<1	<1	<1	<0.2
11/10/11	<1	<1	<1	<0.2

MW15	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
06/01/11	15	4.2	3.8	<0.2
08/11/11	14	3.5	2.7	<0.2
11/10/11	17	4.2	2.3	<0.2
02/03/12	12	3.1	1.5	<0.2

IW01	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
06/01/11	9.7	2.2	360	0.96
08/11/11	1.3	<1	280	1.9
11/10/11	<1	<1	250	1.5
02/03/12	47	25	420	1.3

MW14	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
2/2/2011	<1	<1	<1	<0.2
06/01/11	<1	<1	<1	<0.2
08/11/11	<1	<1	<1	<0.2
11/10/11	<1	<1	<1	<0.2

LEGEND

- SV02 — SOIL GAS VAPOR WELL
- B10 — SOIL BORING
- MW04 — MONITORING WELL
- IW01 — INJECTION WELL
- PROPERTY BOUNDARY
- BUILDINGS
- WALLS
- STREETS
- PARCEL BOUNDARY
- GAS LINE
- WATER LINE
- SEWER LINE
- STORMWATER LINE
- UNDERGROUND TV/CABLE LINE
- LOT LINES
- TRANSFORMERS
- CATCH BASIN
- INFERRED GROUNDWATER FLOW DIRECTION (FEBRUARY 3, 2012)
- GREEN — DENOTES FOUR CONSECUTIVE QUARTERS OF CONCENTRATION REPORTED BELOW MTCA METHOD A CLEANUP LEVEL FOR GROUNDWATER
- RED — DENOTES CONCENTRATION EXCEEDS MTCA METHOD A/B CLEANUP LEVEL FOR GROUNDWATER
- < — NOT DETECTED AT CONCENTRATION ABOVE LABORATORY REPORTING LIMIT
- MTCA — WASHINGTON STATE MODEL TOXICS CONTROL ACT
- PCE — TETRACHLOROETHENE
- TCE — TRICHLOROETHENE

GROUNDWATER ANALYTICAL RESULTS ARE MICROGRAMS PER LITER (ug/L).

GROUNDWATER CLEANUP LIMITS

LIMIT	PCE	TCE	Cis-1,2-Dichloroethene	Vinyl Chloride
MTCA METHOD A	5	5		0.2
MTCA METHOD B			80	

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DATE: 02/15/12
DRAWN BY: JQC/BLR
CHECKED BY: SKB
CAD FILE: 0627-003_2012Q1_GD

PROJECT NAME: BALLARD PROPERTY
PROJECT NUMBER:
STREET ADDRESS:
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 30 60
APPROXIMATE SCALE IN FEET

FIGURE 1
BALLARD PROPERTY
GROUNDWATER ANALYTICAL RESULTS

P:\0566 Former Olympia Dry Cleaners\Deliverables\2011_draft Feasibility Study Report\2012_Response to Ecology\0627-003_2012Q1_GD_F.dwg
4/11/2012
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N

LEGEND

- SV02 — SOIL GAS VAPOR WELL
- B10 — SOIL BORING
- MW04 — MONITORING WELL
- IW01 — INJECTION WELL
- PROPERTY BOUNDARY
- BUILDINGS
- WALLS
- STREETS
- PARCEL BOUNDARY
- GAS LINE
- WATER LINE
- SEWER LINE
- STORMWATER LINE
- UNDERGROUND TV/CABLE LINE
- LOT LINES
- TRANSFORMERS
- CATCH BASIN
- INFERRED GROUNDWATER FLOW DIRECTION (MAY 02, 2012)
- (80.93') — GROUNDWATER ELEVATION
- 1-FOOT-ELEVATION CONTOUR LINE
- (NA) — NOT ANALYZED

* MONITORING WELL MW10 IS A DEEP WELL. ELEVATION DATA FOR MW10 IS NOT INCLUDED IN GROUNDWATER CONTOURS.

RESIDENCE
PARKING LOT
MW06 (89.89')
MW09 (90.51')
STORM DRAIN
B16
B17
MW04 (89.87')
SV01
B05
BATHROOM
MW03 (91.51')
B01
B13
FORMER DRY CLEANER BOUNDARY
STORAGE
BATHROOM
IW02 (88.64')
KITCHEN
FLOWER SHOP
B06
B02
B03
B07
B08
B12
MW10* (83.10')
MW07 (88.59')
SV02
(VACANT)
MW05 (NA)
B04
B14
B15
BAR / LOUNGE
BAR / LOUNGE
ALLEY
B11
B09
RESTAURANT
RESTAURANT (FORMER DRY CLEANING FACILITY)
B10
MW08 (87.55')
MW02 (88.03')
MW01 (87.38')
MW12 (87.40')
IW01 (86.01')
MW11 (86.19')
MW15 (82.31')
RETAIL STORE
PARKING LOT
RETAIL STORE
MW13 (84.75')
MW14 (80.93')
RETAIL STORE

91.00' 90.00' 89.00' 88.00' 87.00' 86.00' 85.00' 84.00' 83.00' 82.00' 81.00'

UTV — 48" UTILITY VAULT UTV
SV — 12" STORM SV
SV — 48" STORM SV

SoundEarth Strategies WWW.SOUNDEARTHINC.COM	
DATE: 05/23/12	PROJECT NAME: BALLARD PROPERTY
DRAWN BY: JQC	PROJECT NUMBER:
CHECKED BY: DMM	STREET ADDRESS:
CAD FILE: 0627-003_2012Q2_CM	CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 30 60
APPROXIMATE SCALE IN FEET

FIGURE 2
BALLARD PROPERTY
GROUNDWATER CONTOUR MAP

P:\0566 Former Olympia Dry Cleaners\Deliverables\2011_draft Feasibility Study Report\2012_Response to Ecology\Ballard_Contour Map.dwg 6/13/2012

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P:\0566 Former Olympia Dry Cleaners\Deliverables\2011_draft Feasibility Study Report\2012_Response to Ecology\Ballard_Injection Locs.dwg 6/13/2012

N

LEGEND

- SV02 — SOIL GAS VAPOR WELL
- B10 — SOIL BORING
- MW04 — MONITORING WELL
- IW01 — INJECTION WELL
- IP01 — INJECTION POINT
- PROPERTY BOUNDARY
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- WALLS
- STREETS
- PARCEL BOUNDARY
- GAS LINE
- WATER LINE
- SEWER LINE
- STORMWATER LINE
- UNDERGROUND TV/CABLE LINE
- LOT LINES
- TRANSFORMERS
- CATCH BASIN

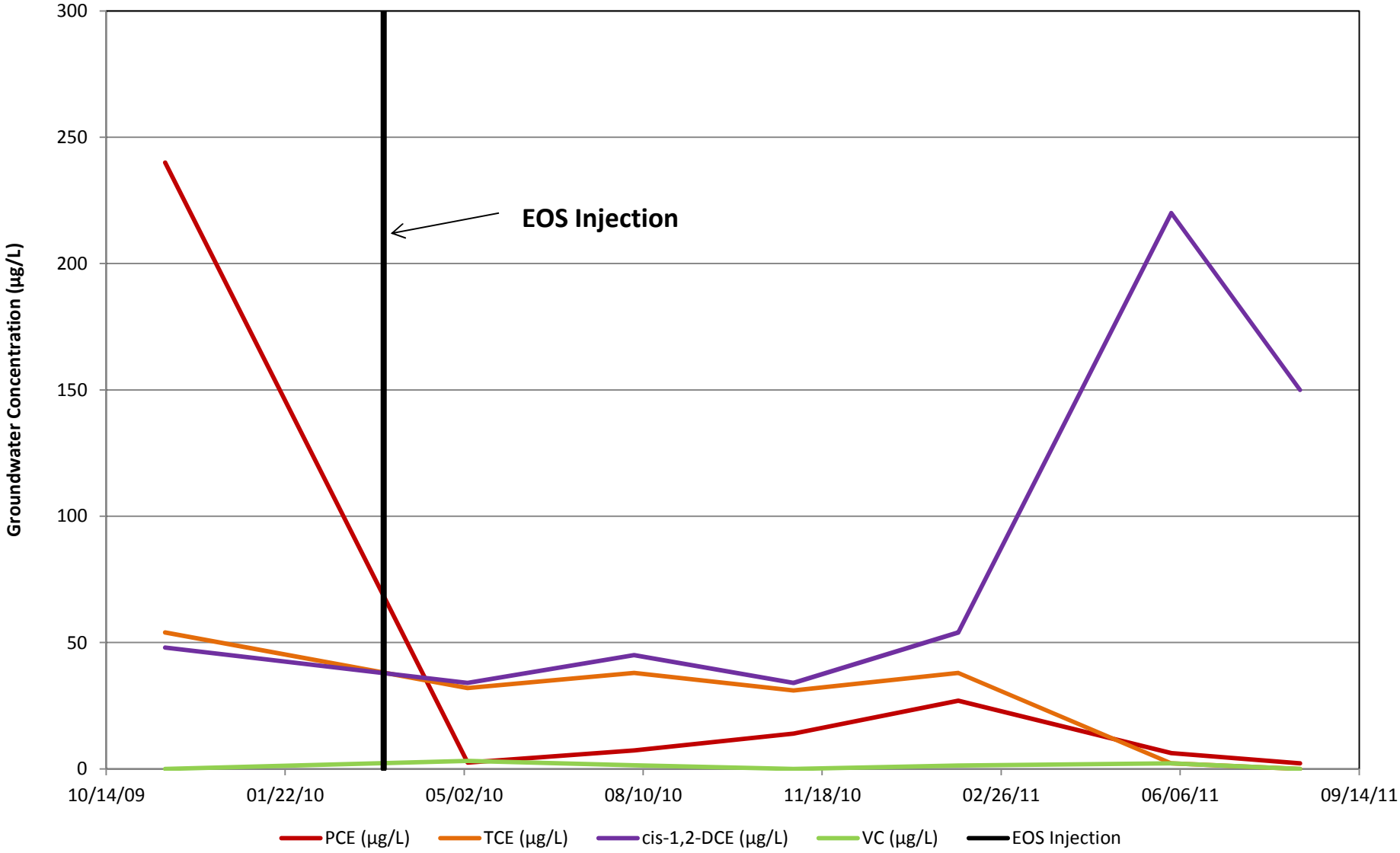
RESIDENCE
PARKING LOT
FLOWER SHOP
(VACANT)
RETAIL STORE
BATHROOM
KITCHEN
STORAGE
FORMER DRY CLEANER BOUNDARY
BAR / LOUNGE
BAR / LOUNGE
RESTAURANT
RESTAURANT (FORMER DRY CLEANING FACILITY)
ALLEY
STORM DRAIN
- 12" STORM -
- 48" STORM -

MW01 MW02 MW03 MW04 MW05 MW06 MW07 MW08 MW09 MW10 MW11 MW12 MW13 MW14 MW15
B01 B02 B03 B04 B05 B06 B07 B08 B09 B10 B11 B12 B13 B14 B15 B16 B17
IP01 IP02 IP03 IP04 IP05 IP06 IP07 IP08 IP09 IP10 IP11 IP12 IP13 IP14A IP14B IP15 IP16 IP17 IP18 IP19 IP20 IP21 IP22 IP23
IW01 IW02
SV01 SV02

SoundEarth Strategies WWW.SOUNDEARTHINC.COM	DATE: 08/30/11 DRAWN BY: JQC/NAC CHECKED BY: SKD CAD FILE:	PROJECT NAME: BALLARD PROPERTY PROJECT NUMBER: STREET ADDRESS: CITY, STATE: SEATTLE, WASHINGTON	REGION:	0 30 60 APPROXIMATE SCALE IN FEET	**FIGURE 3** BALLARD PROPERTY INJECTION POINT LOCATIONS

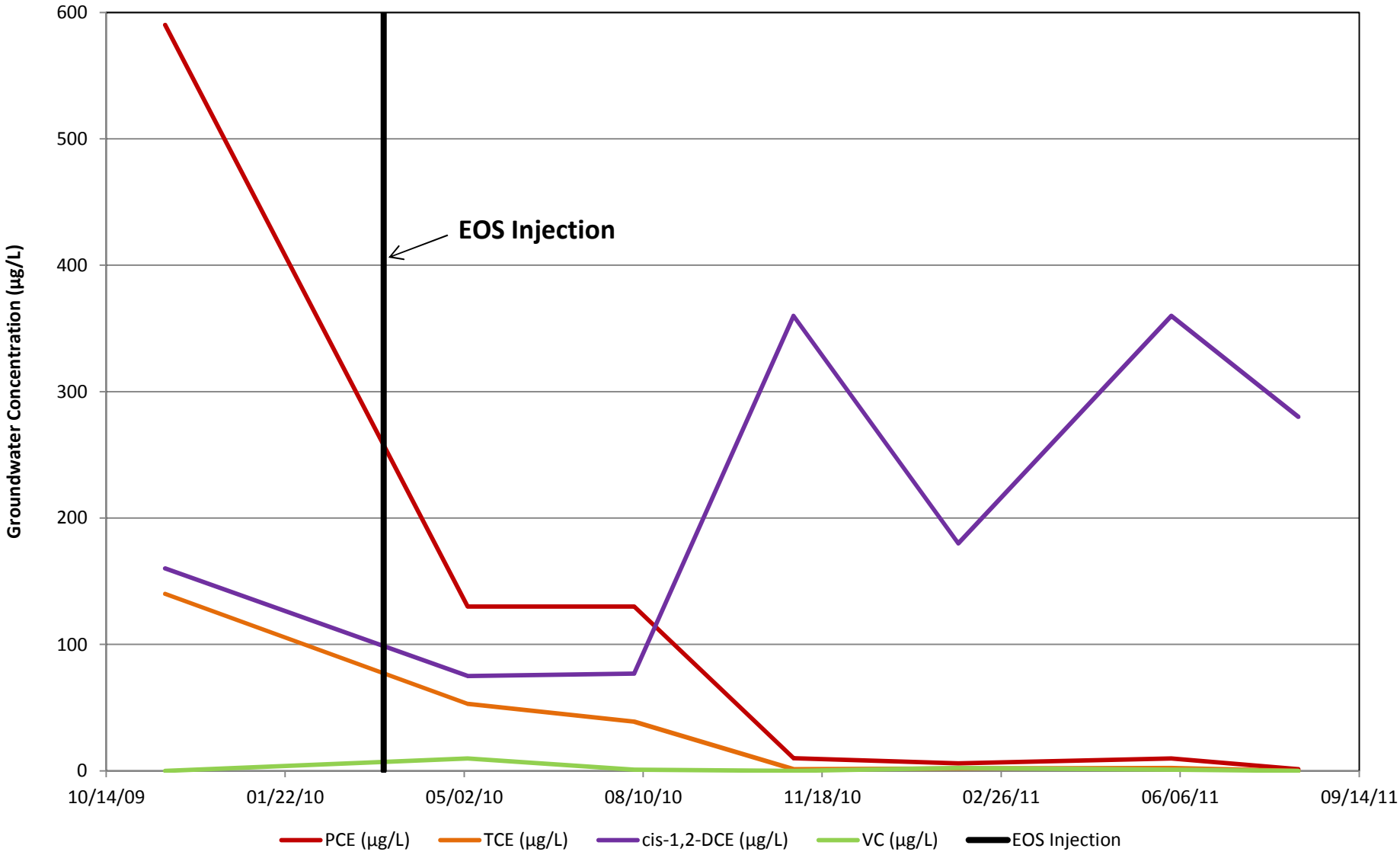
SOUNDEARTHINC.COM

Chart 2
Case Study: Ballard Property
Chlorinated Compounds in Groundwater for IW02
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington



SoundEarth Strategies

Chart 1
Case Study: Ballard Property
Chlorinated Compounds in Groundwater for IW01
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington



Appendix E
Table 1
Case Study: Ballard Property
Summary of Groundwater Analytical Data
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Well ID	Sample Date	Depth to Water[1] (feet)	Groundwater Elevation[2] (feet)	Chlorinated Volatile Organic Compounds[3] (micrograms per liter)										
				PCE	TCE	1,1,1-Trichloroethane	EDC	cis-1,2-DCE	1,1-Dichloroethane	trans-1,2-DCE	Methylene chloride	1,1-Dichloroethene	Chloroethane	Vinyl chloride
MW01	10/03/08	14.02	85.98	1.6	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
TOC Elevation	04/20/09	13.15	86.85	**8.8**	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
100 feet	07/23/09	13.76	86.24	**9.7**	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	05/04/10	11.39	88.61	2.0	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	08/05/10	12.54	87.46	2.6	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	11/02/10	12.99	87.01	2.2	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	02/02/11	12.11	87.89	1.7	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	06/01/11	12.89	87.11	--	--	--	--	--	--	--	--	--	--	--
	08/11/11	13.81	86.19	--	--	--	--	--	--	--	--	--	--	--
	11/10/11	13.79	86.21	--	--	--	--	--	--	--	--	--	--	--
	02/03/12	12.73	87.27	--	--	--	--	--	--	--	--	--	--	--
MW02	10/03/08	14.57	86.91	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
TOC Elevation	04/20/09	13.85	87.63	1.4	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
101.48 feet	07/23/09	14.40	87.08	--	--	--	--	--	--	--	--	--	--	--
	05/04/10	12.35	89.13	1.3	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	08/05/10	13.90	87.58	2.1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	11/02/10	13.87	87.61	1.4	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	02/02/11	13.03	88.45	1.3	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	06/01/11	13.43	88.05	--	--	--	--	--	--	--	--	--	--	--
	08/11/11	14.14	87.34	--	--	--	--	--	--	--	--	--	--	--
	11/10/11	14.35	87.13	--	--	--	--	--	--	--	--	--	--	--
	02/03/12	13.42	88.06	--	--	--	--	--	--	--	--	--	--	--
MW03	10/03/08	13.07	89.82	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
TOC Elevation	04/20/09	11.75	91.14	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
102.89 feet	07/23/09	12.66	90.23	--	--	--	--	--	--	--	--	--	--	--
	05/04/10	10.84	92.05	--	--	--	--	--	--	--	--	--	--	--
	08/05/10	12.05	90.84	--	--	--	--	--	--	--	--	--	--	--
	11/02/10	12.07	90.82	--	--	--	--	--	--	--	--	--	--	--
	02/02/11	10.72	92.17	--	--	--	--	--	--	--	--	--	--	--
	06/01/11	11.18	91.71	--	--	--	--	--	--	--	--	--	--	--
	08/11/11	12.27	90.62	--	--	--	--	--	--	--	--	--	--	--
	11/10/11	12.79	90.10	--	--	--	--	--	--	--	--	--	--	--
	02/03/12	11.44	91.45	--	--	--	--	--	--	--	--	--	--	--
MW04	10/03/08	12.32	87.34	**86**	**18**	<1	<1	13	<1	<1	<5	<1	<1	<0.2
TOC Elevation	04/20/09	10.74	88.92	**510**	**56**	<1	<1	4.8	<1	<1	<5	<1	<1	<0.2
99.66 feet	07/23/09	11.61	88.05	--	--	--	--	--	--	--	--	--	--	--
	05/04/10	9.60	90.06	**110**	2.7	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	08/05/10	10.47	89.19	**130**	**5.5**	<1	<1	1.1	<1	<1	<5	<1	<1	<0.2
	11/02/10	11.16	88.50	**76**	**7.0**	<1	<1	2.7	<1	<1	<5	<1	<1	<0.2
	02/02/11	9.10	90.56	**56**	2.0	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	06/01/11	9.65	90.01	**27**	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	08/12/11	10.84	88.82	**27**	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2[pr]
	11/10/11	11.76	87.90	**36**	1.4	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	02/03/12	10.29	89.37	**33**	3.2	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
MW05	10/03/08	14.03	87.93	1.1	<1	<1	<1	1.3	<1	<1	<5	<1	<1	<0.2
TOC Elevation	04/20/09	13.00	88.96	2.0	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
101.96 feet	07/23/09	13.86	88.10	--	--	--	--	--	--	--	--	--	--	--
	05/04/10	--	--	--	--	--	--	--	--	--	--	--	--	--
	08/05/10	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/02/10	--	--	--	--	--	--	--	--	--	--	--	--	--
	02/02/11	--	--	--	--	--	--	--	--	--	--	--	--	--
	06/01/11	--	--	--	--	--	--	--	--	--	--	--	--	--
	08/11/11	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/10/11	13.69	88.27	1.1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	02/03/12	--	--	--	--	--	--	--	--	--	--	--	--	--
MTCA Cleanup Levels for Groundwater				**5[a]**	**5[a]**	**200[a]**	**5[a]**	**80[b]**	**NE**	**NE**	**5[a]**	**NE**	**NE**	**0.2[a]**

Appendix E
Table 1
Case Study: Ballard Property
Summary of Groundwater Analytical Data
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Well ID	Sample Date	Depth to Water[1] (feet)	Groundwater Elevation[2] (feet)	Chlorinated Volatile Organic Compounds[3] (micrograms per liter)										
				PCE	TCE	1,1,1-Trichloroethane	EDC	cis-1,2-DCE	1,1-Dichloroethane	trans-1,2-DCE	Methylene chloride	1,1-Dichloroethene	Chloroethane	Vinyl chloride
MW06	05/07/09	11.10	88.98	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
TOC Elevation	07/23/09	11.89	88.19	--	--	--	--	--	--	--	--	--	--	--
100.08 feet	05/04/10	10.14	89.94	--	--	--	--	--	--	--	--	--	--	--
	08/05/10	10.87	89.21	--	--	--	--	--	--	--	--	--	--	--
	11/02/10	--	--	--	--	--	--	--	40942.00	--	--	--	--	--
	02/02/11	9.48	90.60	--	--	--	--	--	--	--	--	--	--	--
	06/01/11	10.01	90.07	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	08/11/11	11.27	88.81	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2[pr]
	11/10/11	12.54	87.54	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	02/03/12	10.82	89.26	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
MW07	05/07/09	11.79	87.66	1,100	230	<1	<1	260	<1	1.9	<5	<1	<1	<0.2
TOC Elevation	07/23/09	12.69	86.76	540	100	<1	<1	99	<1	<1	<5	<1	<1	<0.2
99.45 feet	05/04/10	10.49	88.96	110	130	<1	<1	120	<1	1.3	<5	1.1	<1	15
	08/05/10	11.44	88.01	150	110	<1	<1	54	<1	<1	<5	<1	<1[ca]	1.9[ca]
	11/03/10	12.02	87.43	190	69	<1	<1	39	<1	<1	<5	<1	<1	2.0[ca]
	02/02/11	10.33	89.12	370	90	<1	<1	74	<1	<1	<5	<1	<1	3.0
	06/01/11	10.77	88.68	360	82	<1	<1	70	<1	<1	<5	<1	<1	1.4
	08/12/11	11.92	87.53	190	130	<1	<1	250	<1	<1	<5	<1	<1	1.2[pr]
	11/10/11	13.72	85.73	10	<1	<1	<1	390	<1	<1	<5	<1	<1	2.2
	02/03/12	11.30	88.15	4.9	1.6	<1	<1	400	<1	<1	<5	<1	<1	3.5
MW08	05/07/09	12.24	86.70	45	3.3	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
TOC Elevation	07/23/09	12.97	85.97	48	3.3	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
98.94 feet	05/04/10	10.45	88.49	4.1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	08/05/10	11.73	87.21	4.3	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	11/03/10	12.03	86.91	2.7	<1	<1	<1	12	<1	<1	<5	<1	<1	<0.2
	02/02/11	10.88	88.06	<1	<1	<1	<1	5.6	<1	<1	<5	<1	<1	<0.2
	06/01/11	11.35	87.59	--	--	--	--	--	--	--	--	--	--	--
	08/12/11	12.36	86.58	--	--	--	--	--	--	--	--	--	--	--
	11/10/11	12.86	86.08	--	--	--	--	--	--	--	--	--	--	--
	02/03/12	11.66	87.28	--	--	--	--	--	--	--	--	--	--	--
MW09	06/24/09	11.01	89.28	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
TOC Elevation	07/23/09	11.54	88.75	--	--	--	--	--	--	--	--	--	--	--
100.29 feet	05/04/10	9.55	90.74	3.2	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	08/05/10	10.48	89.81	4.0	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	11/02/10	11.22	89.07	2.3	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	02/02/11	9.01	91.28	2.3	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	06/01/11	9.63	90.66	--	--	--	--	--	--	--	--	--	--	--
	08/11/11	10.84	89.45	--	--	--	--	--	--	--	--	--	--	--
	11/10/11	11.82	88.47	--	--	--	--	--	--	--	--	--	--	--
	02/03/12	10.18	90.11	--	--	--	--	--	--	--	--	--	--	--
MW10 - Deep Well	06/24/09	16.30	83.16	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
TOC Elevation	07/23/09	16.50	82.96	--	--	--	--	--	--	--	--	--	--	--
99.46 feet	05/04/10	15.13	84.33	--	--	--	--	--	--	--	--	--	--	--
	08/05/10	15.87	83.59	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	11/03/10	16.27	83.19	<1	<1	<1	<1	<1	<1	<1	5.1[lc]	<1	<1	<0.2
	02/02/11	14.97	84.49	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	06/01/11	15.19	84.27	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	08/11/11	16.12	83.34	--	--	--	--	--	--	--	--	--	--	--
	11/10/11	16.88	82.58	--	--	--	--	--	--	--	--	--	--	--
	02/03/12	16.42	83.04	--	--	--	--	--	--	--	--	--	--	--
MTCA Cleanup Levels for Groundwater				**5[a]**	**5[a]**	**200[a]**	**5[a]**	**80[b]**	**NE**	**NE**	**5[a]**	**NE**	**NE**	**0.2[a]**

Appendix E
Table 1
Case Study: Ballard Property
Summary of Groundwater Analytical Data
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Well ID	Sample Date	Depth to Water[1] (feet)	Groundwater Elevation[2] (feet)	Chlorinated Volatile Organic Compounds[3] (micrograms per liter)										
				PCE	TCE	1,1,1-Trichloroethane	EDC	cis-1,2-DCE	1,1-Dichloroethane	trans-1,2-DCE	Methylene chloride	1,1-Dichloroethene	Chloroethane	Vinyl chloride
MW11	06/24/09	11.35	85.23	430	70	<1	<1	68	<1	1.2	<5	<1	<1	<0.2
TOC Elevation	07/23/09	11.65	84.93	320	68	<1	<1	69	<1	1.2	<5	<1	<1	<0.2
96.58 feet	05/04/10	8.95	87.63	89	32	<1	<1	37	<1	1.2	<5	<1	<1	3.3
	08/05/10	10.44	86.14	140	42	<1	<1	34	<1	<1	<5	<1	<1	<0.2
	11/02/10	10.58	86.00	250	45	<1	<1	26	<1	<1	<5	<1	<1	0.59[ca]
	02/02/11	9.96	86.62	11	<1	<1	<1	350	<1	<1	<5	<1	<1	3.2
	06/01/11	10.37	86.21	2.5	<1	<1	<1	410	<1	<1	<5	<1	<1	2.6
	08/11/11	11.36	85.22	<1	<1	<1	<1	510	<1	<1	<5	<1	<1	2.2[pr]
	11/10/11	11.74	84.84	1.1	<1	<1	<1	760	<1	<1	<5	<1	<1	2.5
	02/03/12	10.33	86.25	<1	<1	<1	<1	510	<1	<1	<5	<1	<1	2.9
MW12	11/16/09	11.40	87.16	36	1.7	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
TOC Elevation	05/04/10	10.20	88.36	41	1.5	<1	<1	<1	<1	1.2	<5	<1	<1	<0.2
98.56 feet	08/05/10	11.55	87.01	39	1.8	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	11/02/10	11.73	86.83	71	3.8	<1	<1	1.2	<1	<1	<5	<1	<1	<0.2
	02/02/11	10.74	87.82	38	1.2	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	06/01/11	11.12	87.44	38	1.8	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	08/12/11	12.09	86.47	60	3.4	<1	<1	<1	<1	<1	<5	<1	<1	<0.2[pr]
	11/10/11	12.50	86.06	73	4.2	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	02/03/12	11.25	87.31	50	2.6	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
MW13	02/02/11	11.44	84.84	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
TOC Elevation	06/01/11	11.70	84.58	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
96.28 feet	08/11/11	12.46	83.82	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2[pr]
	11/10/11	12.77	83.51	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	02/03/12	11.66	84.62	--	--	--	--	--	--	--	--	--	--	--
MW14	02/02/11	14.42	81.01	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
TOC Elevation	06/01/11	14.42	81.01	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
95.43 feet	08/11/11	14.85	80.58	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2[pr]
	11/10/11	15.06	80.37	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<0.2
	02/03/12	14.36	81.07	--	--	--	--	--	--	--	--	--	--	--
MW15	06/01/11	12.93	82.39	15	4.2	<1	<1	3.8	<1	<1	<5	<1	<1	<0.2
TOC Elevation	08/11/11	13.42	81.90	14	3.5	<1	<1	2.7	<1	<1	<5	<1	<1	<0.2[pr]
95.32 feet	11/10/11	13.72	81.60	17	4.2	<1	<1	2.3	<1	<1	<5	<1	<1	<0.2
	02/03/12	11.96	83.36	12	3.1	<1	<1	1.5	<1	<1	<5	<1	<1	<0.2
IW01	11/16/09	11.52	85.02	590	140	<1	<1	160	<1	2.0	<5	<1	<1	<0.2
TOC Elevation	05/04/10	9.26	87.28	130	53	<1	<1	75	<1	<1	<5	<1	<1	9.7
96.54 feet	08/05/10	10.55	85.99	130	39	<1	<1	77	<1	<1	<5	<1	<1	0.96
	11/02/10	10.87	85.67	9.9	1.3	<1	<1	360	<1	<1	<5	<1	<1	3.5[ca]
	02/02/11	10.07	86.47	6.0	1.9	<1	<1	180	<1	<1	<5	<1	<1	2.3
	06/01/11	10.50	86.04	9.7	2.2	<1	<1	360	<1	<1	<5	<1	<1	0.96
	08/11/11	11.55	84.99	1.3	<1	<1	<1	280	<1	<1	<5	<1	<1	1.9[pr]
	11/10/11	11.93	84.61	<1	<1	<1	<1	250	<1	<1	<5	<1	<1	1.5[j]
	02/03/12	10.58	85.96	47	25	<1	<1	420	<1	<1	<5	<1	<1	1.3
IW02	11/16/09	13.79	85.81	240	54	<1	<1	48	<1	<1	<5	<1	<1	<0.2
TOC Elevation	05/04/10	11.70	87.90	2.5	32	<1	<1	34	<1	<1	<5	<1	<1	3.2
99.60 feet	08/05/10	11.51	88.09	7.3	38	<1	<1	45	<1	<1	5.7[lc]	<1	<1	1.4
	11/02/10	12.12	87.48	14	31	<1	<1	34	<1	<1	6.5[lc]	<1	<1	0.93[ca]
	02/02/11	10.34	89.26	27	38	<1	<1	54	<1	<1	<5	<1	<1	1.3
	06/01/11	10.80	88.80	6.2	2.2	<1	<1	220	<1	<1	<5	<1	<1	2.2
	08/12/11	11.99	87.61	2.2	<1	<1	<1	150	<1	<1	<5	<1	<1	1.4[pr]
	11/10/11	12.85	86.75	1.1	<1	<1	<1	140	<1	<1	<5	<1	<1	1.5
	02/03/12	11.43	88.17	<1	<1	<1	<1	190	<1	<1	<5	<1	<1	2.1
MTCA Cleanup Levels for Groundwater				5[a]	5[a]	200[a]	5[a]	80[b]	NE	NE	5[a]	NE	NE	0.2[a]

NOTES:

Red denotes concentration exceeding MTCA Method A or B cleanup level for groundwater.

Samples analyzed by Friedman & Bruya, Inc., of Seattle, Washington.

[1]Depth to groundwater as measured from a fixed spot on the well casing rim.

[2]Elevations measured relative to a temporary benchmark with an assumed elevation of 100.00 feet.

[3]Analyzed by U.S. Environmental Protection Agency Method 8260B or 8260C.

[a]MTCA Method A Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised November 2007.

[b]CLARC, Groundwater, Method B, Non-Carcinogen, Standard Formula Value, CLARC website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

Laboratory Notes:

[ca]The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

[j]The result is below normal reporting limits. The value reported is an estimate.

[lc]The presence of the compound indicated is likely due to laboratory contamination.

[pr]The sample was received with incorrect preservation. The value reported should be considered an estimate.

-- = not analyzed/not measured

< = not detected at concentrations exceeding the laboratory reporting limit

cis-1,2-DCE = cis-1,2-dichloroethene

CLARC = Cleanup Levels and Risk Calculations

EDC = 1,2-dichloroethane

MTCA = Washington State Model Toxics Control Act

NE = not established

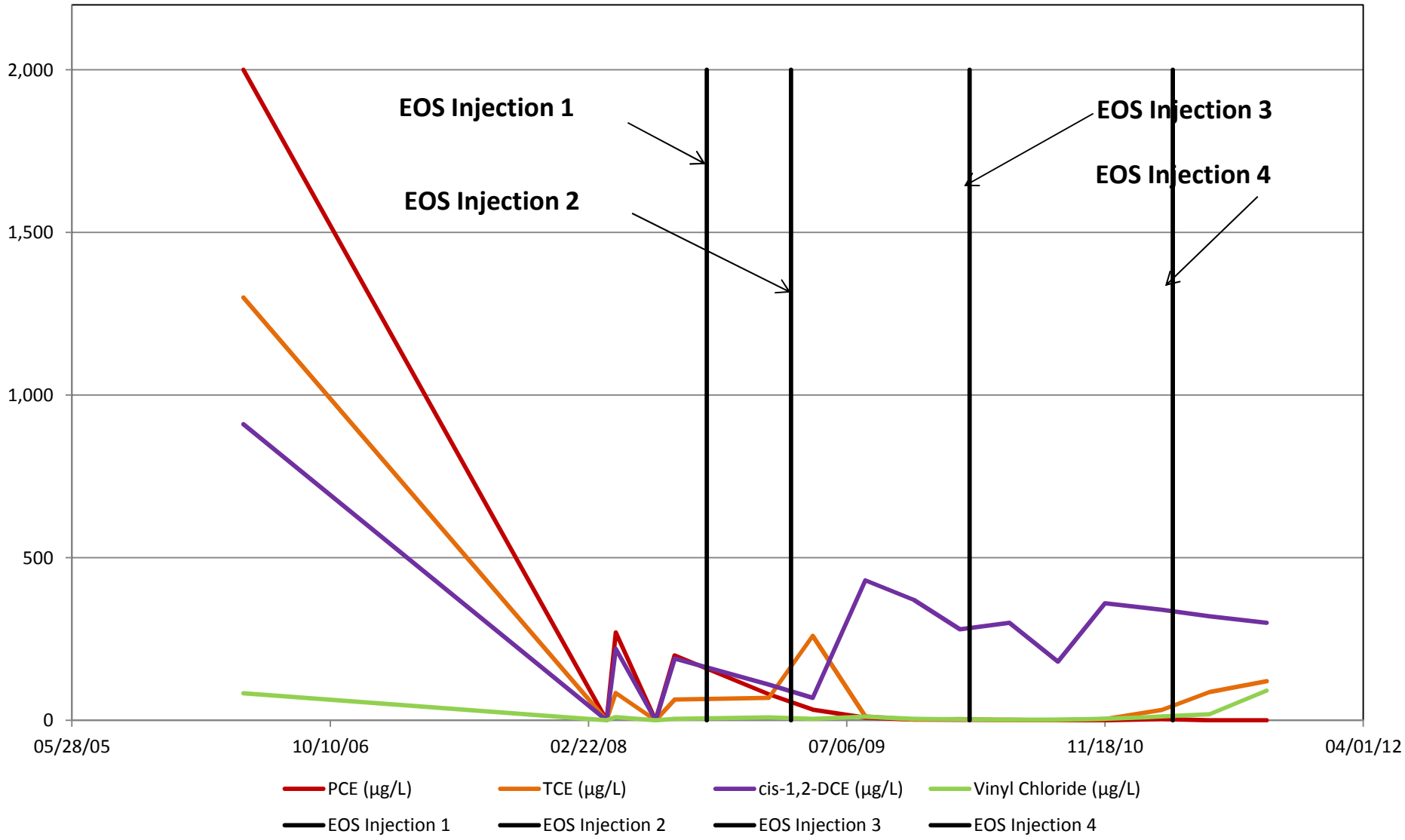
PCE = tetrachloroethene

TCE = trichloroethene

TOC = top of casing

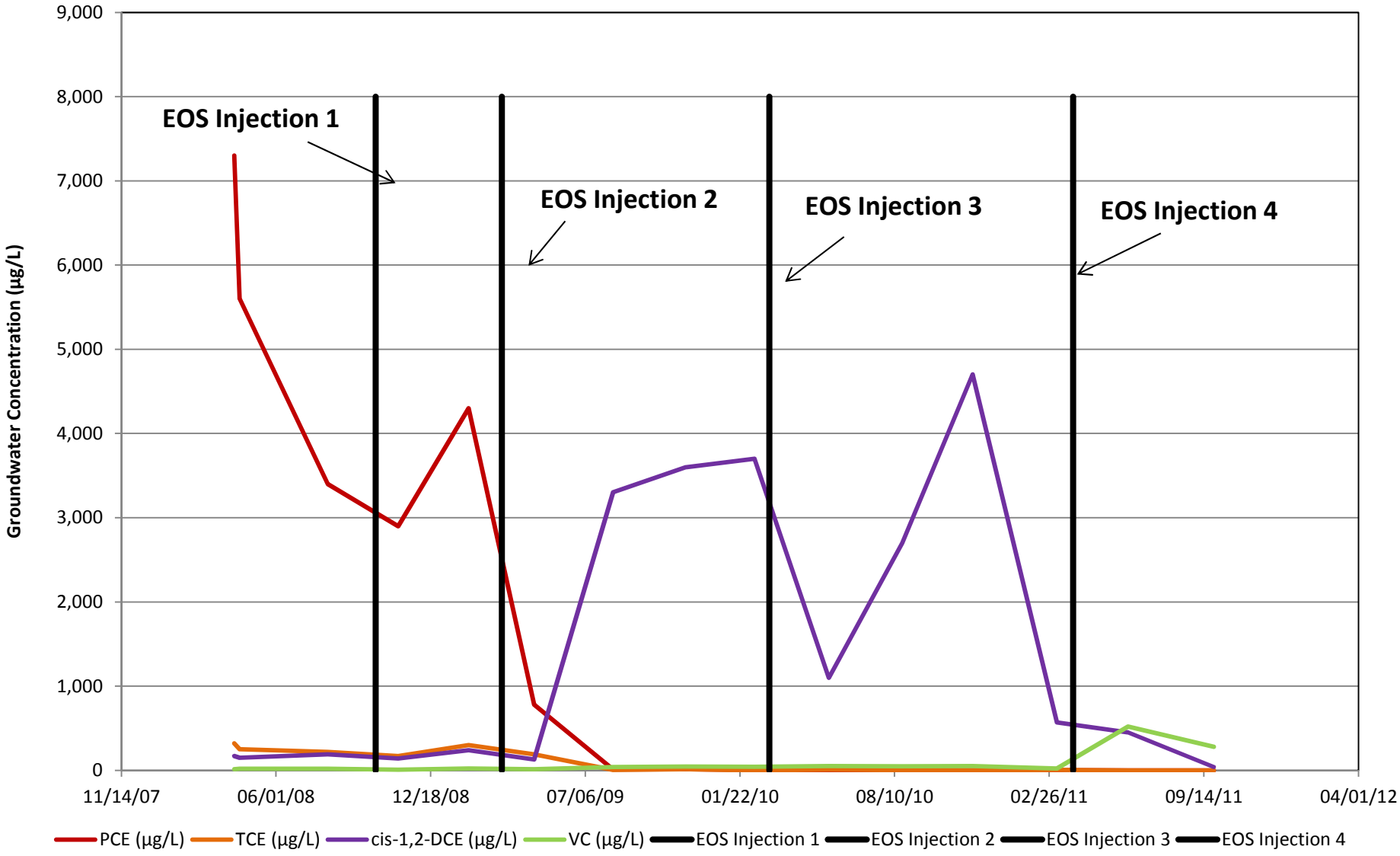
trans-1,2-DCE = trans-1,2-dichloroethene

Chart 4
Case Study: Capitol Hill Property
Chlorinated Compounds in Groundwater for KMW1
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington



SoundEarth Strategies

Chart 3
Case Study: Capitol Hill Property
Chlorinated Compounds in Groundwater for MW108
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington



Appendix E
Table 2
Case Study: Capitol Hill Property
Summary of Groundwater Analytical Results
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Date Sampled	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Sampled By	Analytical Results (micrograms per liter) [1] PCE	TCE	cis 1,2-Dichloroethene	Vinyl Chloride
Reconnaissance Groundwater Samples								
KGP-2	04/26/06	--	--	Kane	**1,200**	**110**	**92**	**1.1**
KGP-4	04/26/06	--	--	Kane	1.3	<1	5.4	**0.8**
Piezometers								
GB-1	04/25/06	--	--	Kane	**3,600**	**73**	29	<0.2
	03/28/08	19.50	--	SoundEarth	--	--	--	--
	04/15/08	19.41	--		**4,500**	**80**	49	**2.2**
	08/07/08	20.54	--		**3,700**	**65**	38	**2.3**
	02/06/09	--	--	SoundEarth	**670**	**35**	30	<2
	05/01/09	18.98	--		**810**	**1,500**	42	<2
	08/11/09	19.94	--		**18**	**3,100**	**560**	**8.2**
	11/13/09	20.88	--		**14**	**85**	**4,500**	**45**
	02/10/10	17.56	--		**45**	**77**	**2,900**	**17**
	05/17/10	18.33	--		**140**	**660**	**1,800**	**8.4**
	08/20/10	19.43	--		**130**	**450**	**1,500**	**6**
	11/19/10	19.31	--		**210**	**450**	**1,300**	**6.7**
	03/08/11	16.95	--		**260**	**210**	**450**	**15**
	Decommissioned April 2011							
GB-2	04/25/06	--	--	Kane	<10	<1	<1	<0.2
GB-3	04/25/06	--	--	Kane	<10	<1	<1	<0.2
Monitoring Wells								
KMW-1	04/25/06	--	--	Kane	**2,000**	**1,300**	**910**	**83**
TOC: 342.16 feet	03/28/08	18.85	323.31	SoundEarth	--	--	--	--
	04/15/08	--	--		**270**	**84**	**220**	**9.6**
	07/01/08	19.67	322.49		--	--	--	--
	08/07/08	19.98	322.18		**200**	**64**	**190**	**4.3**
	02/05/09	--	--	SoundEarth	**80**	**69**	**110**	**8.7**
	05/01/09	15.81	326.35		**33**	**260**	69	**4.9**
	08/11/09	16.47	325.69		**8.4**	**12**	**430**	**11**
	11/13/09	18.89	323.27		2.2	2.1	**370**	**4.8**
	02/10/10	14.88	327.28		1.9	3.5	**280**	**2.3**
	05/17/10	13.53	328.63		1.3	<1	**300**	**2.3**
	08/19/10	16.67	325.49		<1	1.1	**180**	**2.0**
	11/18/10	18.33	323.83		<1	3.5	**360**	**4.9**
	03/08/11	15.29	326.87		4.1	**32**	**340**	**12**
	06/08/11	15.62	326.54		<5 j	**87**	**320**	**19**
	09/26/11	18.53	323.63		<5 j	**120**	**300**	**91**
	12/08/11	19.07	323.09		3.4	**63**	**160**	**49**
KMW-2	04/25/06	--	--	Kane	<1	<1	<1	<0.2
TOC: 343.83 feet	03/28/08	20.36	323.47	SoundEarth	--	--	--	--
	07/01/08	21.18	322.65		--	--	--	--
	05/01/09	20.39	323.44	SoundEarth	--	--	--	--
	08/11/09	21.25	322.58		--	--	--	--
	11/13/09	22.03	321.8		--	--	--	--
	02/10/10	19.53	324.3		--	--	--	--
	05/17/10	19.65	324.18		--	--	--	--
	08/19/10	20.63	323.2		--	--	--	--
	11/18/10	20.95	322.88		--	--	--	--
	03/08/11	18.44	325.39		--	--	--	--
	09/26/11	20.64	323.19		--	--	--	--
	12/08/11	21.21	322.62		<1	<1	<1	<0.2
KMW-3	04/25/06	--	--	Kane	<1	<1	<1	<0.2
TOC: 343.90 feet	03/28/08	20.22	323.68	SoundEarth	--	--	--	--
	07/01/08	21.04	322.86		--	--	--	--
	05/01/09	20.27	323.63	SoundEarth	--	--	--	--
	08/11/09	21.15	322.75		--	--	--	--
	11/13/09	22.00	321.9		--	--	--	--
	02/10/10	19.39	324.51		--	--	--	--
	05/17/10	19.53	324.37		--	--	--	--
	08/19/10	20.52	323.38		--	--	--	--
	11/18/10	20.95	322.95		--	--	--	--
	03/08/11	18.3	325.6		--	--	--	--
	09/26/11	20.51	323.39		--	--	--	--
	12/08/11	21.09	322.81		--	--	--	--
MTCA Cleanup Level for Groundwater					**5** [2]	**5** [2]	**80** [3]	**0.2** [2]

Appendix E
Table 2
Case Study: Capitol Hill Property
Summary of Groundwater Analytical Results
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Date Sampled	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Sampled By	Analytical Results (micrograms per liter) [1]			
					PCE	TCE	cis 1,2-Dichloroethene	Vinyl Chloride
KMW-4	04/25/06	--	--	Kane	<1	<1	<1	<0.2
TOC: 341.44 feet	03/28/08	19.62	321.82	SoundEarth	--	--	--	--
	07/01/08	21.02	320.42		--	--	--	--
	05/01/09	18.55	322.89	SoundEarth	--	--	--	--
	08/11/09	21.01	320.43		--	--	--	--
	11/13/09	21.41	320.03		--	--	--	--
	02/10/10	18.83	322.61		1.9	--	--	**2.3**
	05/17/10	18.52	322.92		1.3	--	--	**2.3**
	08/19/10	20.46	320.98		<1	--	--	**2.0**
	11/18/10	19.69	321.75		<1	--	--	**4.9**
	03/08/11	15.79	325.65		<1	<1	<1	<0.2
	06/08/11	16.80	324.64		<1	<1	<1	<0.2
	09/26/11	21.06	320.38		<1	<1	<1	<0.2
	12/08/11	21.05	320.39		<1	<1	<1	<0.2
MW-101	06/16/06	--	--	SoundEarth	**1,400**	**18**	5.1	<0.2
TOC: 341.60 feet	10/12/07	20.76	320.84		--	--	--	--
	03/28/08	--	--		--	--	--	--
	08/07/08	20.54	321.06		**650**	**6.2**	<1	<0.2
	11/06/08	--	--	SoundEarth	**22**	<1	<1	<0.2
	02/05/09	--	--		<1	<1	**85**	**2.1**
	05/01/09	19.04	322.56		2.1	2.2	**97**	**2.5**
	08/10/09	20.19	321.41		1.5	<1	**96**	**18**
	11/13/09	20.2	321.4		<1	<1	15	**29**
	02/10/10	17.17	324.43		2.2	2.3	57	**41**
	05/17/10	18.05	323.55		<1	<1	14	**79**
	08/20/10	19.55	322.05		<1	<1	2.4	**27**
	11/19/10	19.14	322.46		<1	<1	1.7	**30**
	03/08/11	15.78	325.82		<1	<1	21	**100**
	06/08/11	17.10	324.5		<1	<1	8.8	**49**
	09/26/11	19.83	321.77		<1	<1	1.5	**23**
	12/08/11	20.02	321.58		<1	<1	1.4	**8.9**
MW-102	06/16/06	--	--	SoundEarth	**1,100**	**23**	37	**3.7**
TOC: 340.95 feet	10/12/07	20.90	320.05		--	--	--	--
	01/11/08	--	--		**770**	**29**	33	**3**
	03/28/08	19.85	321.10		--	--	--	--
	04/15/08	--	--		**1,100**	**25**	35	**1.9**
	07/01/08	19.50	321.45		--	--	--	--
	08/07/08	20.71	320.24		**720**	**18**	26	**0.88**
	05/01/09	19.87	321.08	SoundEarth	**210**	<100	<100	<20
	08/10/09	20.6	320.35		--	--	--	--
	11/13/09	20.92	320.03		**110**	1.8	1.3	<0.2
	02/10/10	19.09	321.86		**1,300**	**59**	55	**5.0**
	05/17/10	19.26	321.69		**22**	**5.5**	69	**6.2**
	08/20/10	20.03	320.92		3.7	**230**	**120**	**7.5**
	11/18/10	20.26	320.69		2.9	**500**	**150**	**9.6**
	03/08/11	18.24	322.71		1.3	**71**	**1,700**	**31**
	06/08/11	19.35	321.60		<1	**6.0**	**1,500**	**27**
	09/26/11	20.34	321.61		<1	1.1	3.1	**36**
	12/08/11	20.50	321.45		<1	1.0	2.2	**13**
MW-103	06/16/06	--	--	SoundEarth	**20**	<1	<1	<0.2
TOC: 340.81 feet	04/15/08	--	--		**27**	<1	<1	<0.2
	03/28/08	19.40	321.41		--	--	--	--
	07/01/08	21.38	319.43		--	--	--	--
	08/07/08	20.75	320.06		**24**	<1	<1	<0.2
	11/06/08	--	--	SoundEarth	**27**	<1	<1	<0.2
	02/05/09	--	--		**19**	<1	<1	<0.2
	05/01/09	18.70	322.11		**15**	<1	<1	<0.2
	08/10/09	20.37	320.44		**19**	<1	<1	<0.2
	11/13/09	20.92	319.89		**34**	<1	<1	<0.2
	02/10/10	17.19	323.62		**35**	<1	<1	<0.2
	05/17/10	18.31	322.50		**44**	<1	<1	<0.2
	08/20/10	19.83	320.98		**25**	<1	<1	<0.2
	11/19/10	21.5	319.31		**22**	<1	<1	<0.2
	03/08/11	15.72	325.09		**50**	<1	<1	<0.2
	06/08/11	16.59	324.22		**53**	<1	<1	<0.2
	09/26/11	20.28	320.53		**36**	<1	<1	<0.2
	12/08/11	20.28	320.53		**35**	<1	<1	<0.2
MTCA Cleanup Level for Groundwater					**5** [2]	**5** [2]	**80** [3]	**0.2** [2]

Appendix E
Table 2
Case Study: Capitol Hill Property
Summary of Groundwater Analytical Results
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Date Sampled	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Sampled By	Analytical Results (micrograms per liter) [1]			
					PCE	TCE	cis 1,2-Dichloroethene	Vinyl Chloride
MW-104	08/17/06	--	--		<1	<1	<1	<0.2
TOC: 339.40 feet	10/12/07	22.76	316.64		--	--	--	--
	01/11/08	--	--		**6.7**	<1	<1	<0.2
	03/28/08	22.36	317.04	SoundEarth	--	--	--	--
	04/08/08	--	--		**5.6**	<1	<1	<0.2
	07/01/08	22.59	316.81		--	--	--	--
	08/07/08	22.66	316.74		4.3	<1	<1	<0.2
	11/06/08	--	--		**6.0**	<1	<1	<0.2
	05/01/09	22.37	317.03		--	--	--	--
	08/10/09	22.67	316.73		--	--	--	--
	11/13/09	22.61	316.79		<1	<1	<1	<0.2
	02/11/10	21.85	317.55		1.7	<1	<1	<0.2
	05/17/10	22.07	317.33	SoundEarth	--	--	--	--
	08/20/10	22.46	316.94		--	--	--	--
	11/19/10	--	--		--	--	--	--
	03/08/11	--	--		--	--	--	--
	06/08/11	21.77	317.63		**11**	<1	<1	<0.2
	09/26/11	22.61	316.79		**9.4**	<1	<1	<0.2
	12/08/11	22.23	317.17		**10**	<1	<1	<0.2
MW-105	03/28/08	20.25	321.33		--	--	--	--
TOC: 341.58 feet	04/08/08	--	--	SoundEarth	3.7	<1	2.1	<0.2
	04/15/08	--	--		4.4	<1	2.1	**0.21**
	07/01/08	20.88	320.7		--	--	--	--
	08/07/08	21.12	320.46	SoundEarth	3.7	<1	1.5	<0.2
	11/06/08	--	--		4.5	<1	1.5	**0.23**
	02/05/09	--	--		**5.5**	<1	1.5	<0.2
	05/01/09	20.24	321.34		**6.8**	<1	1.7	**0.22**
	08/10/09	20.97	320.61		**8.2**	<1	1.6	**0.37**
	11/13/09	21.5	320.08		**9.1**	<1	2.2	**0.32**
	02/10/10	19.49	322.09		**11.0**	<1	1.8	**0.41**
	05/17/10	19.62	321.96	SoundEarth	**14.0**	<1	2.2	**0.43**
	08/20/10	20.46	321.12		**9.2**	<1	1.9	<0.2
	11/18/10	20.62	320.96		**15**	<1	15	**0.61**
	03/08/11	18.62	322.96		**8.3**	<1	39	**0.41**
	06/08/11	18.85	322.73		**11**	1.2	74	**0.79**
	09/26/11	20.49	321.09		**11**	1.5	**100**	**1.4**
	12/08/11	20.73	320.85		**9.8**	1.1	**88**	**0.33**
MW-106	04/08/08	--	--		**7.9**	<1	<1	<0.2
TOC: 340.72 feet	04/15/08	--	--	SoundEarth	**7.3**	<1	<1	<0.2
	07/01/08	20.41	320.31		--	--	--	--
	08/07/08	20.72	320		4.0	<1	<1	<0.2
	11/06/08	--	--		4.4	<1	<1	<0.2
	05/01/09	19.50	321.22		--	--	--	--
	08/10/09	20.51	320.21		--	--	--	--
	11/13/09	20.99	319.73		--	--	--	--
	02/11/10	18.59	322.13		2.3	<1	<1	<0.2
	05/17/10	19.06	321.66	SoundEarth	--	--	--	--
	08/20/10	20.00	320.72		--	--	--	--
	11/18/10	20.02	320.7		--	--	--	--
	03/08/11	17.79	322.93		--	--	--	--
	06/08/11	18.10	322.62		**7.9**	<1	<1	<0.2
	09/26/11	20.26	320.46		2.1	<1	<1	<0.2
	12/08/11	20.42	320.30		2.5	<1	<1	<0.2
MW-107	04/08/08	--	--		**400**	**16**	30	<0.2
TOC: 340.05 feet	04/15/08	--	--	SoundEarth	**650**	**21**	44	**0.27**
	07/01/08	23.01	317.04		--	--	--	--
	08/07/08	23.07	316.98		**380**	**17**	35	<0.2
	11/06/08	--	--		**1,100**	**20**	43	<0.2
	02/05/09	--	--		**230**	**11**	23	<0.2
	05/01/09	22.71	317.34		**400**	**17**	32	**0.34**
	08/11/09	22.96	317.09		**480**	**20**	38	**1.0**
	11/13/09	23.12	316.93		**480**	**25**	44	**1.0**
	02/10/10	22.45	317.6	SoundEarth	**100**	3.7	6.3	<0.2
	05/17/10	22.51	317.54		<1	<1	<1	<0.2
	08/19/10	27.70	312.35		<1	<1	<1	<0.2
	11/18/10	22.85	317.20		1.6	<1	<1	<0.2
	03/08/11	21.46	318.59		<1	<1	<1	<0.2
	09/26/11	22.88	317.17		<1	<1	<1	<0.2
	12/08/11	22.97	317.08		2.3	1.7	<1	<0.2
MTCA Cleanup Level for Groundwater					**5** [2]	**5** [2]	**80** [3]	**0.2** [2]

Appendix E
Table 2
Case Study: Capitol Hill Property
Summary of Groundwater Analytical Results
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Date Sampled	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Sampled By	Analytical Results (micrograms per liter) [1]			
					PCE	TCE	cis 1,2-Dichloroethene	Vinyl Chloride
MW-108	04/08/08	--	--	SoundEarth	**7,300**	**320**	**170**	**13**
TOC: 342.06 feet	04/15/08	--	--		**5,600**	**250**	**150**	**18**
	07/01/08	19.79	322.27		--	--	--	--
	08/07/08	20.03	322.03		**3,400**	**220**	**190**	**18**
	11/06/08	--	--	SoundEarth	**2,900**	**170**	**140**	**8.5**
	02/05/09	--	--		**4,300**	**300**	**240**	**23**
	05/01/09	18.62	323.44		**780**	**190**	**130**	**14**
	08/11/09	19.72	322.34		**11**	4.0	**3,300**	**39**
	11/13/09	20.61	321.45		**13**	**14**	**3,600**	**44**
	02/10/10	17.44	324.62		**7.3**	<5	**3,700**	**42**
	05/17/10	17.73	324.33		<1	**8.1**	**1,100**	**52**
	08/20/10	19.08	322.98		1.6	2.0	**2,700**	**49**
	11/19/10	19.42	322.64		1.4	<1	**4,700**	**52**
	03/08/11	15.88	326.18		1	**6**	**570**	**22**
	06/08/11	17.02	325.04		<1	<1	**450**	**520**
	09/26/11	20.01	322.05		<5j	<5j	39	**280**
	12/08/11	19.46	322.60		<1	<1	21	**150**
KMW-1D	04/25/06	--	--	Kane	**22**	<1	<1	<0.2
TOC: 342.93 feet	05/15/06	--	--		**5.6**	--	--	--
	05/25/06	--	--		4.3	--	--	--
	03/28/08	19.50	323.43	SoundEarth	--	--	--	--
	07/01/08	20.28	322.65		--	--	--	--
	10/06/08	--	--		1.6	<1	<1	<0.2
	Decommissioned April 2011							
MW-108D	05/01/09	18.60	--	SoundEarth	<1	<1	<1	<0.2
	08/10/09	19.46	--		<1	<1	<1	<0.2
	06/08/11	16.74	--		<1	<1	<1	<0.2
	12/08/11	19.36	--		--	--	--	--
MW-109	04/15/08			SoundEarth	1.2	<1	<1	<0.2
TOC: 340.10 feet	07/01/08	13.2	326.9		--	--	--	--
	08/07/08	16.75	323.35		<1	<1	<1	<0.2
	02/11/10	--	--		--	--	--	--
	09/26/11	14.77	325.33	SoundEarth	--	--	--	--
	12/08/11	16.14	323.96		--	--	--	--
MW-110	04/15/08	--	--	SoundEarth	1.1	<1	<1	**1.3**
TOC: 342.88 feet	07/01/08	20.36	322.52		--	--	--	--
	08/07/08	20.65	322.23		<1	<1	2.3	<0.2
	11/06/08	--	--	SoundEarth	<1	<1	3.4	**1.1**
	02/05/09	--	--		<1	<1	4.1	**1.6**
	05/01/09	19.55	323.33		<1	<1	4.1	**0.30**
	08/10/09	20.43	322.45		<1	<1	3.5	**0.64**
	11/13/09	21.2	321.68		<1	<1	3.2	<0.2
	02/10/10	18.69	324.19		<1	<1	4.9	**1.2**
	05/17/10	18.82	324.06		<1	<1	4.8	**0.24**
	08/19/10	19.83	323.05		<1	<1	5.1	**0.81**
	11/19/10	20.12	322.76		--	--	--	--
	03/08/11	17.63	325.25		<1	<1	6.2	**1.1**
	06/08/11	17.69	325.19		<1	<1	4.1	<0.2
	09/26/11	19.85	323.03		<1	<1	4.9	**0.70**
	12/08/11	20.33	322.55		<1	<1	5.1	**0.80**
MW-111	05/05/08	--	--	SoundEarth	<1	<1	<1	<0.2
	07/01/08	21.79	--		--	--	--	--
	12/08/11	21.73	--	SoundEarth	<1	<1	<1	<0.2
RW01	10/06/08	--	--	SoundEarth	<1	<1	<1	<0.2
	02/11/10	21.95	--	SoundEarth	<1	<1	<1	<0.2
	05/17/10	22.13	--		<1	<1	<1	<0.2
	08/19/10	22.31	--		<1	<1	<1	<0.2
	11/19/10	--	--		--	--	--	--
	03/08/11	21.73	--		--	--	--	--
	06/08/11	21.90	--		<1	<1	<1	<0.2
	09/26/11	22.56	--		<1	<1	<1	<0.2
	12/08/11	22.36			<1	<1	<1	<0.2
MTCA Cleanup Level for Groundwater					**5** [2]	**5** [2]	**80** [3]	**0.2** [2]

Appendix E
Table 2
Case Study: Capitol Hill Property
Summary of Groundwater Analytical Results
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Sample Location	Date Sampled	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Sampled By	Analytical Results (micrograms per liter) [1]			
					PCE	TCE	cis 1,2-Dichloroethene	Vinyl Chloride
RW02	10/06/08	--	--	SoundEarth	<1	<1	<1	<0.2
	02/11/10	22.12	--	SoundEarth	**40**	1.2	<1	<0.2
	05/17/10	22.28	--		**39**	1.2	1.2	<0.2
	08/20/10	22.64	--		**40**	1.2	1.3	<0.2
	11/19/10	22.64	--		**42**	1.2	1.4	<0.2
	03/08/11	21.89	--		**45**	1.4	2.5	<0.2
	06/08/11	22.03	--		**45**	1.6	2.9	<0.2
	09/26/11	22.78	--		**59**	2.0	4.1	<0.2
	12/08/11	22.74			**55**	1.7	3.7	<0.2
RW03	10/06/08	--	--	SoundEarth	**19**	<1	<1	<0.2
	02/11/10	21.68	--	SoundEarth	**18**	<1	<1	<0.2
	05/17/10	21.8	--		**15**	<1	<1	<0.2
	08/20/10	22.09	--		**13**	<1	<1	<0.2
	11/19/10	22.03	--		**16**	<1	<1	<0.2
	03/08/11	21.51	--		**11**	<1	<1	<0.2
	06/08/11	21.62	--		**11**	<1	<1	<0.2
	09/26/11	22.23	--		**13**	<1	<1	<0.2
	12/08/11	22.07			**13**	<1	<1	<0.2
RW04	10/06/08	--	--	SoundEarth	**170**	**7.3**	19	**0.29**
	02/11/10	22.26	--	SoundEarth	**6.7**	<1	<1	<0.2
	05/17/10	22.37	--		2.1	<1	<1	<0.2
	08/20/10	22.73	--		1.3	<1	<1	<0.2
	11/18/10	23.02	--		2.1	<1	<1	<0.2
	03/08/11	20.53	--		<1	<1	<1	<0.2
	12/08/11	23.18			<1	<1	70	**0.53**
Safeway Submersible Sump								
Safeway Sump	3/30/10	--	--	SoundEarth	**15**	<1	<1	<0.2
	12/09/11	--	--		4.5	<1	<1	<0.2
MTCA Cleanup Level for Groundwater					**5** [2]	**5** [2]	**80** [3]	**0.2** [2]

NOTES:

Red denotes concentration exceeding the MTCA Method A cleanup level.

Gray shaded rows indicate baseline groundwater analytical data sampled prior to remedial action.

[1]Analyzed by U.S. Environmental Protection Agency Method 82608.

[2]MTCA Cleanup Regulation, Method A Cleanup Levels for Groundwater, Chapter 173-340 of the Washington Administrative Code (revisedNovember 2007).

[3]CLARC, Groundwater, Method B, Non-Carcinogen, Standard Formula Value, CLARC website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

[ca]The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

[lc]The presence of the compound indicated is likely due to laboratory contamination.

[j]The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

-- = not analyzed/not measured

< = concentration not detected above laboratory reporting limit

CLARC = Cleanup Levels and Risk Calculation

EPA = U.S. Environmental Protection Agency

Kane = Kane Environmental Inc.

MTCA = Washington State Model Toxics Control Act

PCE = tetrachloroethylene

SoundEarth = SoundEarth Strategies Inc. (formerly Sound Environmental Strategies Corporation)

TCE = trichloroethylene

LEGEND

- CATCH BASIN
- MAN HOLE
- 2040 — ADDRESSES
- MW-104 — MONITORING WELL
- KMW-1 — MONITORING WELL (KANE ENVIRONMENTAL, 2006)
- MW-112 — PROPOSED SHALLOW MONITORING WELL
- PROPOSED SITE POINT OF COMPLIANCE WELL
- RW04 — REMEDIATION WELL
- GB-1 — PIEZOMETER (GEOENGINEERS, 2004)
- KMW-1D — DECOMMISSIONED MONITORING WELL
- KGP-4 — GEOPROBE BORING (KANE ENVIRONMENTAL, 2006)

LIMIT	PCE	VC
MTCA A	5	0.2

- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- FORMER SITE FEATURES
- SEWER DRAIN
- STORM DRAIN
- GAS LINE
- OVERHEAD POWER LINE
- BURIED ELECTRIC LINE
- FIBER OPTIC LINE
- SEWER LINE MIGRATION PATHWAY
- RED — DENOTES CONCENTRATION EXCEEDS MTCA METHOD A CLEANUP LEVEL
- MTCA A — WASHINGTON STATE MODEL TOXICS CONTROL ACT METHOD A
- PCE — TETRACHLOROETHYLENE
- VC — VINYL CHLORIDE

RESULTS ARE IN MICROGRAMS PER LITER

N

KMW-4	PCE	VC
05/17/10	1.3	2.3
08/19/10	<1	2.0
11/19/10	<1	4.9
03/08/11	<1	<0.2
06/08/11	<1	<0.2
9/26/2011	<1	<0.2
12/08/11	<1	<0.2

MW-103	PCE	VC
02/10/10	35	<0.2
05/17/10	44	<0.2
08/20/10	25	<0.2
11/19/10	22	<0.2
03/08/11	50	<0.2
06/08/11	53	<0.2
09/26/11	36	<0.2
12/08/11	35	<0.2

MW-106	PCE	VC
11/06/08	4.4	<0.2
02/11/10	2.3	<0.2
06/08/11	7.9	<0.2
09/26/11	2.1	<0.2
12/08/11	2.5	<0.2

MW-109	PCE	VC
10/06/08	1.2	<0.2
02/11/10	<1	<0.2

GB-1	PCE	VC
02/10/10	45	17
05/17/10	140	8.4
08/20/10	130	6.0
11/19/10	210	6.7
03/08/11	260	15.0

RW04	PCE	VC
02/11/10	6.7	<0.2
05/17/10	2.1	<0.2
08/20/10	1.3	<0.2
11/18/10	2.1	<0.2
03/08/11	<1	<0.2
12/08/11	<1	0.53

RW01	PCE	VC
02/11/10	<1	<0.2
05/17/10	<1	<0.2
08/19/10	<1	<0.2
06/08/11	<1	<0.2
09/26/11	<1	<0.2
12/08/11	<1	<0.2

MW-108D	PCE	VC
05/01/09	<1	<0.2
08/10/09	<1	<0.2
06/08/11	<1	<0.2

MW-101	PCE	VC
02/10/10	2.2	41
05/17/10	<1	79
08/20/10	<1	27
11/19/10	<1	30
03/08/11	<1	100
06/08/11	<1	49
09/26/11	<1	23
12/08/11	<1	8.9

KMW-1D	PCE	VC
10/06/08	1.6	<0.2

KMW-1	PCE	VC
05/17/10	1.3	2.3
08/19/10	<1	2.0
11/18/10	<1	4.9
03/08/11	4.1	12
06/08/11	<5	19
9/26/2011	<5	91
12/08/11	3.4	49

MW-102	PCE	VC
02/10/10	1,300	5
05/17/10	22	6.2
08/20/10	3.7	7.5
11/18/10	2.9	9.6
03/08/11	<1	31
06/08/11	<1	27
09/26/11	<1	36
12/08/11	<1	13

MW-107	PCE	VC
02/10/10	100.0	<0.2
05/17/10	<1	<0.2
08/19/10	<1	<0.2
11/18/10	1.6	<0.2
03/08/11	<1	<0.2
09/26/11	<1	<0.2
12/08/11	2.3	<0.2

SUMP	PCE	VC
03/30/10	15	<0.2
12/09/11	4.5	<0.2

MW-111	PCE	VC
12/08/11	<1	<0.2

RW03	PCE	VC
02/11/10	18	<0.2
05/17/10	15	<0.2
08/20/10	13	<0.2
11/19/10	16	<0.2
3/8/2011	11	<0.2
06/08/11	11	<0.2
09/26/11	13	<0.2
12/08/11	13	<0.2

MW-110	PCE	VC
11/13/09	<1	<0.2
02/10/10	<1	1.2
05/17/10	<1	0.24
08/19/10	<1	0.81
03/08/11	<1	1.10
06/08/11	<1	<0.2
09/26/11	<1	0.70
12/08/11	<1	0.80

MW-108	PCE	VC
02/10/10	7.3	42
05/17/10	<1	52
08/20/10	1.6	49
11/19/10	1.4	52
03/08/11	1	22
06/08/11	<1	520
09/26/11	<5	280
12/08/11	<1	150

MW-105	PCE	VC
02/10/10	11.0	0.41
05/17/10	14.0	0.43
08/20/10	9.2	<0.02
11/18/10	15	0.61
3/8/2011	8.3	0.41
06/08/11	11	0.79
09/26/11	11	1.4
12/08/11	9.8	0.33

RW02	PCE	VC
02/11/10	40	<0.2
05/17/10	39	<0.2
08/20/10	40	<0.2
11/19/10	42	<0.2
3/8/2011	45	<0.2
06/08/11	45	<0.2
09/26/11	59	<0.2
12/08/11	55	<0.2

MW-104	PCE	VC
11/13/09	<1	<0.2
02/11/10	1.7	<0.2
06/08/11	11	<0.2
09/26/11	9	<0.2
12/08/11	10	<0.2

KMW-2	PCE	VC
12/08/11	<1	<0.2

2100 — MIXED USE: GROCERY (SAFEWAY) AND RESIDENTIAL APARTMENTS

2023 — 1720 FORMER LAUNDROMAT AND DRY CLEANING FACILITY (1969-1988)

2030 2032 — 2034 (FORMER DRY CLEANERS) 2036 — 2201 — FORMER SHOE CLEANING AND DYEING

SAFEWAY SUBMERSIBLE SUMP PUMP

VACATED ALLEY; UST; PARKING; SIDEWALK; KMW-4; GB-3; MW-103; MW-106; MW-109; MW-112; GB-1; KMW-1D; KGP-4; KGP-2; KMW-1; MW-108D; MW-101; MW-108; RW01; RW04; MW-102; MW-105; RW02; RW03; MW-107; MW-111; GB-2; KMW-2; MW-110; MW-104

0 45 90
APPROXIMATE SCALE IN FEET

SoundEarth Strategies
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DATE: 12/2/11
DRAWN BY: BLR/NAC
CHECKED BY: SKB
CAD FILE:

PROJECT NAME: CAPITOL HILL PROPERTY
PROJECT NUMBER:
STREET ADDRESS:
CITY, STATE: SEATTLE, WASHINGTON

REGION:

FIGURE 1
CAPITOL HILL PROPERTY
GROUNDWATER ANALYTICAL RESULTS

6/15/2012

P:\10566 FORMER OLYMPIA DRY CLEANERS\DELIVERABLES\2011 DRAFT FEASIBILITY STUDY REPORT\2012 RESPONSE TO ECOLOGY\CAP HILL CONTOUR MAP.DWG

LEGEND

- CATCH BASIN
- MAN HOLE
- 2040 ADDRESSES
- SVE-3 SOIL VAPOR EXTRACTION WELL
- MW-104 MONITORING WELL
- KMW-1 MONITORING WELL (KANE ENVIRONMENTAL, 2006)
- RW04 REMEDIATION WELL
- KMW-1D DECOMMISSIONED MONITORING WELL
- SGP-03 SOIL BORING
- SB-1 SOIL BORING
- KGP-1 GEOPROBE BORING (KANE ENVIRONMENTAL, 2006)
- GB-1 PIEZOMETER (GEOENGINEERS, 2004)
- B-5 SOIL BORING
- B-2 SOIL BORING (RILEY GROUP, 1998)
- B113 SOIL BORING
- TP01 TEST PITS
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- CONCRETE CONDUIT CONTAINING VARIOUS UTILITIES
- FORMER SITE FEATURES
- SS SEWER DRAIN
- SD STORM DRAIN
- GAS GAS LINE
- OHP OVERHEAD POWER LINE
- E BURIED ELECTRIC LINE
- FB FIBER OPTIC LINE
- 1-FOOT-INTERVAL GROUNDWATER CONTOUR (DECEMBER 8, 2011)
- GROUNDWATER FLOW DIRECTION (DECEMBER 8, 2011)

N

RESIDENTIAL UST 300 GALLONS (DECOMMISSIONED)

1,000 GALLON HEATING OIL UST (DECOMMISSIONED)

1,500 GALLON BUNKER OIL UST (DECOMMISSIONED)

VACATED ALLEY

ALLEY

PARKING

SIDEWALK

DECK

2100

2051

2040

2038

2036

2034

2030 2032

2026 2028

2024 1/2

2023

2020

2018

2015

2201

1806

1802

(FORMER DRY CLEANERS)

PRESENT MIXED USE: GROCERY (SAFEWAY) AND RESIDENTIAL APARTMENTS

FORMER SHOE CLEANING/ DYEING

SAFEWAY SUBMERSIBLE SUMP PUMP

1720
FORMER LAUNDROMAT AND DRY CLEANING FACILITY
(1969-1988)

FORMER BUILDING LAYOUT

FORMER DRY CLEANING AREA

NOTE: SOME LOCATIONS ARE APPROXIMATE

SoundEarth Strategies WWW.SOUNDEARTHINC.COM	DATE: 11/30/11 DRAWN BY: NAC CHECKED BY: SKB CAD FILE: 0521-001-07_XSLOC
PROJECT NAME: CAPITOL HILL PROPERTY PROJECT NUMBER: STREET ADDRESS: CITY, STATE: SEATTLE, WASHINGTON	REGION:
0 25 50 100 APPROXIMATE SCALE IN FEET	**FIGURE 2** CAPITOL HILL PROPERTY GROUNDWATER CONTOUR MAP

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6/13/2012

P:\0566 FORMER OLYMPIA DRY CLEANERS\DELIVERABLES\2011 DRAFT FEASIBILITY STUDY REPORT\2012 RESPONSE TO ECOLOGY\CAP HILL INJECTION LOCS.DWG

LEGEND

- CATCH BASIN
- MAN HOLE
- 2040 ADDRESSES
- MW-104 MONITORING WELL
- KMW-1 MONITORING WELL (KANE ENVIRONMENTAL, 2006)
- RW04 REMEDIATION WELL
- GB-1 PIEZOMETER (GEOENGINEERS, 2004)
- KMW-1D DECOMMISSIONED MONITORING WELL
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- FORMER SITE FEATURES
- SS SEWER DRAIN
- SD STORM DRAIN
- GAS GAS LINE
- OHP OVERHEAD POWER LINE
- E BURIED ELECTRIC LINE
- FO FIBER OPTIC LINE
- BOUNDARY OF SOURCE SOIL AREA
- BOUNDARY OF PROPOSED LARGE AREA EXCAVATION
- EOS INJECTION WELL OCTOBER 2008
- MARCH 2009
- MARCH 2010
- MARCH 2011
- POTASSIUM PERMANGANATE INJECTION WELL 2008

N

PRESENT MIXED USE: GROCERY (SAFEWAY) AND RESIDENTIAL APARTMENTS

FORMER SHOE CLEANING AND DYEING

1720 FORMER LAUNDROMAT AND DRY CLEANING FACILITY (1969-1988)

VACATED ALLEY

PARKING

SIDEWALK

DECK

2023 2040 2038 2030 2032 2034 (FORMER DRY CLEANERS) 2036 2028 2026 2201

KMW-4 MW-103 MW-106 MW-109 MW-108D MW-108 MW-101 MW-102 MW-107 MW-105 MW-110 MW-104 GB-2 RW01 RW04 RW02 RW03

IP19 IP20 IP30 IP27 IP08 IP29 IP07 IP28 IP26 IP05 IP24 IP25 SVE-1 IP06 IP23 GB-1 IP05 IP07 SVE-2 IP22 IP04 KMW-1D IP03 IP09 IP06 IP21 SVE-3 IP02 IP17 IP05 IP16 IP15 IP01 IP10 IP13 IP11 IP04 IP14 IP02 IP01 IP08 IP03 IP12 IP18 KMW-1

SoundEarth Strategies
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DATE: 05/11/11
DRAWN BY: JQC/BLR
CHECKED BY: SKB
CAD FILE:

PROJECT NAME: CAPITOL HILL PROPERTY
PROJECT NUMBER:
STREET ADDRESS:
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 15 30 60
APPROXIMATE SCALE IN FEET

FIGURE 3
CAPITOL HILL PROPERTY
INJECTION WELL LOCATIONS

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Appendix E
Table 3
Subsurface Characteristics For Comparison with Case Studies
Troy Laundry Property
307 Fairview Avenue North
Seattle, Washington

Parameter	AFCEE Site Characteristics for Evaluation of Enhanced Anaerobic Bioremediation	Troy Laundry Property	Ballard Property	Capital Hill Property
Plume Size	A few acres or less.	87,900 sq ft (2 acres)	17,000 sq ft (0.4 acres)	50,000 sq ft (1.1 acres)
On or Near Site Infrastructure	Evaluate risk of vapor intrusion from contaminants.	Vapor intrusion pathway will be evaluated once the source area has been removed and the Property redeveloped.	Vapor intrusion pathway evaluated based on aerial extent of groundwater plume and close proximity of buildings.	Vapor intrusion pathway evaluated based on aerial extent of groundwater plume and close proximity of buildings.
Evidence of Anaerobic Dechlorination	Slow or stalled dechlorination.	Presence of cis,1-2-DCE and vinyl chloride indicate this site is suitable for enhanced bioremediation.	Presence of cis,1-2-DCE and vinyl chloride indicate this site is suitable for enhanced bioremediation.	Presence of cis,1-2-DCE and vinyl chloride indicate this site is suitable for enhanced bioremediation.
Soil Profile	--	0–80 ft overlays of mostly fine to medium-grained sand (SP-SM) and silt grading to silty sand (ML); may locally contain varying amounts of gravel and cobbles	0–5 ft is silt with trace sand and gravel (ML) 6–20 ft is dense silty sand (SM)	12 ft of fill overlying dense to very dense silty sand with gravel (SM)
Hydraulic Conductivity	>1 ft/day or >$3x10^{-4}$ cm/s	$1x10^{-3}$ cm/s ($4.72x10^{-1}$ ft/day)	$3.40x10^{-4}$ cm/s ($9.64x10^{-1}$ ft/day)	$6.75x10^{-5}$ cm/s ($1.91x10^{-1}$ ft/day)
Porosity[(1)]	--	0.3	0.3	0.3
Groundwater Seepage Velocity	30 ft/yr to 5 ft/day	$6.85x10^{-2}$ ft/day	$9.64x10^{-2}$ ft/day	$2.55x10^{-2}$ ft/day
Depth to Groundwater	<50 feet to water	Ranges from 50–75 ft bgs or 15.28-–18.47 ft NAVD88	Approximately 12 ft bgs	Approximately 19 ft bgs
Groundwater Temperature	20 °C	14.52–17.09 °C	16.67–20.62 °C	11.3–14.4 °C
pH	6–8	6.20-7.10	6.21–6.48	6.08–8.01
Sulfate Concentration	<500 ppm	Not Available	Not Available	Not Available
Total Organic Carbon	--	Not Available	Not Available	Not Available

NOTES:

[(1)]Porosity was estimated for the each site based on soil profile (Freeze and Cherry 1979).

-- = not applicable

AFCEE = Air Force Center for Environmental Excellence

bgs = below ground surface

°C = degrees Celsius

cis-1,2-DCE = cis-1,2-dichloroethylene

cm/s = centimeters per second

ft = feet

ft/day = feet per day

ft/yr = feet per year

NAVD88 = North American Vertical Datum of 1988

ppm = parts per million

sq ft = square feet