ENGINEERING DESIGN REPORT

Time Oil Bulk Terminal
Seattle, Washington

June 28, 2021

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PREPARED FOR:
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Chicago, Illinois 60608

PREPARED BY:

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Acronyms and Abbreviations

AOC	Area of concern
ARAR	Applicable or Relevant and Appropriate Requirement
ASKO Property	ASKO Hydraulic Property
BDI Plus	Bio-Dechlor INOCULUM Plus
bgs	Below ground surface
BNSF	BNSF Railway Company
BTEX	Benzene, toluene, ethylbenzene, and xylenes
CAA	Cleanup action area
CAP	Cleanup Action Plan
CCMP	Construction Compliance Monitoring Plan
cPAH	Carcinogenic polycyclic aromatic hydrocarbon
CPOC	Conditional point of compliance
CUL	Cleanup level
cVOC	Chlorinated volatile organic compound
CY	Cubic yards
DAHP	Washington State Department of Archaeology and Historic Preservation
DCA	Disproportionate cost analysis
DCE	Dichloroethene
DNR	Washington State Department of Natural Resources
DOT	United States Department of Transportation
DPE	Dual-phase extraction
DRO	Diesel-range organics
DPT	Direct Push Technologies
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
EPH	Extractable petroleum compounds
FBI	Freidman & Bruya, Inc.
FS	Feasibility Study
F|S	Floyd|Snider

ft/ft	Feet per foot
GMP	Groundwater Monitoring Plan
gpm	Gallons per minute
GRO	Gasoline-range organics
gZVI	Granular zero-valent iron
IC	Institutional control
IDP	Inadvertent Discovery Plan
IHS	Indicator hazardous substance
ISS	In situ solidification and stabilization
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
LNAPL	Light non-aqueous-phase liquid
LTCMP	Long-Term Compliance Monitoring Plan
m/day	Meters per day
MCL	Maximum contaminant level
µg/L	Micrograms per liter
mg/kg	Milligrams per kilogram
MS	Matrix spike
MSD	Matrix spike duplicate
MTCA	Model Toxics Control Act
mZVI	Microscale zero-valent iron
NAVD 88	North American Vertical Datum of 1988
ng/kg	Nanograms per kilogram
ORO	Oil-range organics
PAH	Polycyclic aromatic hydrocarbon
PCE	Tetrachloroethene
PCUL	Preliminary cleanup level
penta	Pentachlorophenol
PID	Photoionization detector
POC	Point of compliance
PPCD	Prospective Purchaser Consent Decree
PSCAA	Puget Sound Clean Air Agency
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective

RACA	Remedial Action Completion Report
RCRA	Resource Conservation and Recovery Act
RRS	REGENESIS Remediation Services
REL	Remediation level
RI	Remedial Investigation
RI Work Plan	Supplemental Upland Remedial Investigation Work Plan
ROW	Right of way
SDG	Sample delivery group
SF	Square feet
Site	Time Oil Bulk Terminal Site, also referenced as Property
SREMP	Soil and Remedial Element Management plan
SVOC	Semivolatile organic compound
TCE	Trichloroethene
TEE	Terrestrial ecological evaluation
TOC	TOC Holdings Co.
TOCST	TOC Seattle Terminal 1, LLC
TPH	Total petroleum hydrocarbons
UCS	Unconfined compressive strength
USEPA	U.S. Environmental Protection Agency
VC	Vinyl chloride
VCP	Voluntary Cleanup Program
VOC	Volatile organic compound
VPH	Volatile petroleum compounds
WAC	Washington Administrative Code
WBZ	Water-bearing zone
WPTP	West Point Treatment Plant
ZVI	Zero-valent iron

Professional Certification

Engineer Design Report
Time Oil Bulk Terminal - 2737-2805 West Commodore Way in Seattle

Based on direct observation made by CRETE Consulting, Inc. (CRETE) personnel, the material and data in this report were prepared under the supervision and direction of the undersigned.

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1 Introduction

This Engineering Design Report (EDR) has been prepared for the TOC Seattle Terminal 1, LLC (TOCST) for the former Time Oil Bulk Terminal[1] (Property) located on W. Commodore Way in Seattle, Washington. The Property generally consists of four separate parcels (commonly identified as the Bulk Terminal parcel, ASKO Hydraulic parcel [ASKO parcel], East Waterfront parcel, and West Waterfront parcel) that were acquired by TOCST in November 2020 under the terms of a Prospective Purchaser Consent Decree (PPCD) entered in King County Cause No. 20-2-15215-3 SEA (as amended). These parcels are collectively termed the Property for purposes of this EDR. The general location of the Property is shown on Figure 1, and its surroundings are shown on Figure 2. The legal definition of the Site is set forth in the PPCD.

This EDR has been prepared to document the engineering concepts and criteria used for design of the cleanup action described in the September 2020 Cleanup Action Plan (CAP; Ecology 2020a). This EDR has been prepared in accordance with the Washington State Department of Ecology (Ecology) PPCD and Washington Administrative Code (WAC) 173-340-400.

This EDR has been prepared by Crete Consulting (CRETE) on behalf of TOC Seattle Terminal 1, LLC and was developed using information presented in the Cleanup Action Plan (Ecology 2020a) and the Supplemental Upland Remedial Investigation/Feasibility Study (RI/FS; Floyd|Snider [F|S] 2020a), as well as information collected during pre-remedial design investigation activities in accordance with the Pre-Remedial Design Work Plan (Floyd|Snider 2020b). The EDR satisfies the requirements of WAC 173-340-400(4) (a) through (c) and has been prepared under the direct supervision of a registered Professional Engineer. The Long-Term Compliance Monitoring Plan (LTCMP) will be prepared after the remedial construction is completed and will include details related to post cleanup action monitoring and maintenance.

The cleanup action includes soil excavation and off-site disposal, non-aqueous phase liquid (NAPL) removal, in-situ soil solidification, capping, in-situ groundwater treatment, and installation of an interceptor trench and permeable reactive barrier (PRB).

1.1 Site/Property Definitions

The Site, as defined under the Model Toxics Control Act (MTCA; Washington Administrative Code [WAC] 1730-340), is generally defined by where a hazardous substance has been deposited, stored, disposed of, or placed, or has otherwise come to be located. The Site includes multiple parcels where hazardous substances were released or have come to be located from industrial operations and is legally defined in the PPCD. Investigations show

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[1] The parcels include King County Parcel Nos. 1125039050, 1125039081, 1125039120, and 4237900405, also referenced as Property for purposes of this EDR. The legal definition of the Site is set forth in the PPCD.

that multiple releases from former operations have commingled. The CAP includes a detailed summary of the Property and should be referenced for additional details. This section provides a summary of the information presented in the CAP.

The Property encompasses a total of 10.42 acres, with 5.67 acres south of W. Commodore Way and 4.75 acres north of the roadway and along the Salmon Bay shoreline. W. Commodore Way runs between the Bulk Terminal and ASKO parcels to the south and the East Waterfront and West Waterfront parcels to the north (Figure 2).

The Property is composed of four King County tax parcels as noted: Bulk Terminal parcel (No. 1125039050); ASKO parcel (No. 4237900405); East Waterfront parcel (No.1125039120); and West Waterfront parcel (No. 1125039081):

- The 4.10-acre Bulk Terminal parcel on the south side of W. Commodore Way at 2737 W. Commodore Way is bounded to the east by W. Fort Street and beyond by a multi-tenant warehouse building. An active BNSF mainline borders the Bulk Terminal parcel on the south.
- The 1.57-acre ASKO parcel located on the south side of W. Commodore Way at 2805 W. Commodore way is bounded to the west by a multi-tenant warehouse building and beyond by 31st Avenue West. The BNSF mainline also borders this parcel on the south.
- The 3.17-acre East Waterfront parcel located on the north side of W. Commodore Way at 2750 W. Commodore Way is bounded to the east by the Port of Seattle Maritime Industrial Center. Its northern boundary is within Salmon Bay.
- The 1.58-acre West Waterfront parcel north of W. Commodore Way at 2800 W. Commodore Way is bounded to the west by the Lockhaven Apartments and Marina.

The Site as defined in the PPCD also includes certain adjoining BNSF Railway Company (BNSF) property (BNSF parcel) and a Washington State Department of Natural Resources (DNR) Aquatic Waterway Use parcel (DNR parcel as shown on Figure 2). The BNSF and DNR parcels were not acquired by TOCST, however Waterway Use Authorization No. 20-A10919 for the DNR parcel was assigned to TOCST. Cleanup of the BNSF parcel will be the subject of a separate legal agreement(s) between BNSF and Ecology. Sediment areas of Salmon Bay, including the DNR parcel, are not included in this EDR and are the subject of certain terms in the PPCD; cleanup activities for the Property will not extend beyond ordinary high water (OHW) mark of Salmon Bay (shown on the drawings, Appendix A). The cleanup action for the Property will extend into the right-of-way (ROW) of West Commodore Way along a portion of the Bulk Terminal parcel.

1.2 Organization

This EDR includes the following subsections:

- Section 1 – Introduction: Provides the purpose of the EDR report, regulatory status/MTCA process, and the organization of the report.
- Section 2 – Site Conditions: Provides a general description of the project and data collected during the design process.
- Section 3 – Design Criteria: Presents the cleanup and remediation levels (RELs), permitting requirements, and applicable or relevant and appropriate requirements (ARARs).
- Section 4 – Design Basis: Outlines the design assumptions and configuration that were incorporated to achieve the design criteria.
- Section 5 – Scope of Work: Describes the process by which cleanup construction is expected to be implemented.
- Section 6 – Construction Compliance Monitoring Plan: Provides a description of testing that will be performed to document that the cleanup was performed in compliance with performance criteria.
- Section 7 – Long-Term Compliance Monitoring and Contingencies: Provides a brief overview of what will be included the long-term compliance monitoring plan. The plan will be developed after cleanup construction activities.
- Section 8 – Schedule and Reporting: Provides a schedule for implementing the cleanup action and a description of reporting activities.
- Section 9 – References: Lists the sources of information referenced in the document.

The following information is attached to the EDR:

- Appendix A – Drawings: Includes drawings that detail the cleanup action. The drawings include documentation of existing site conditions and construction plans, sections, and details.
- Appendix B – PRDI Data Results: Provides the results of the additional data collection activities completed in the fall of 2020.
- Appendix C – Substantive Compliance Documentation: Includes copies of applications and documentation from the permitting agencies completed prior to construction.
- Appendix D – Inadvertent Discovery Protocol: This plan includes an inadvertent discovery protocol and monitoring/treatment plan should cultural resources be identified during construction.
- Appendix E – Groundwater Modeling Report
- Appendix F – REGENESIS Remediation Services Groundwater Treatment Details
- Appendix G – Construction Compliance Monitoring Plan SAP/QAPP

2 Site Conditions

2.1 Site Background and Current Conditions

TOC Holdings Co. (TOC) entered the Property into Ecology's Voluntary Cleanup Program (VCP) for technical advice and assistance on independent remedial actions for a period of time between approximately 2002 and 2007, and re-enrolled portions of the Property in the VCP in 2015. TOC filed for bankruptcy protection in 2017.

In July 2018 and as part of the due diligence process, the original prospective purchaser, Cantera Development Group, LLC (Cantera), enrolled the property into the VCP. Ecology accepted the VCP application on July 10, 2018 and identified the Site as Time Oil Bulk Terminal with VCP Project No. NW3201. A draft Supplemental Upland RI Work Plan (RI Work Plan) was submitted to Ecology by Cantera in October 2018. The RI Work Plan was finalized in March 2019 and approved by Ecology in correspondence dated April 8, 2019 (Floyd|Snider 2019).

The supplemental upland RI field investigation collected groundwater and soil data between March and August 2019 to fill the remaining data gaps necessary to complete the Supplemental Upland RI/FS for the Property. A draft Supplemental Upland RI/FS was submitted by Cantera in September 2019 and finalized in June 2020.

Following the public comment period, the final RI/FS was issued in September 2020 (Floyd|Snider 2020). The CAP was finalized by Ecology in September 2020 and was included as Exhibit C of the PPCD. After the RI/FS and CAP were finalized, additional field work was completed in the fall of 2020 in accordance with the Ecology-approved Pre-Remedial Design Work Plan (Floyd|Snider 2020b), as summarized in Section 2.3.

Current Site conditions are detailed in the September 2020 RI/FS (Floyd|Snider 2020). Chemicals of interest were identified as part of the RI/FS and indicator hazardous substances (IHS) that pose the greatest risk to human health and the environment were identified in soil and groundwater and include total petroleum hydrocarbons (TPH) gasoline-, diesel-, and oil- range organics (GRO, DRO, and ORO), arsenic, benzene, trichloroethene (TCE), vinyl chloride (VC), and pentachlorophenol (penta). The nature and extent of these IHSs has been sufficiently delineated through the former RIs and the Supplemental Upland RI/FS to investigate the Property and provide the basis for selection of a final cleanup action in accordance with MTCA and its implementing regulations (WAC 173-340-350(1)). The final cleanup action is presented in the approved CAP and is the basis for the cleanup action detailed in this EDR.

2.2 Summary of Cleanup Action

The portions of the Property where cleanup actions will be implemented per the CAP are referred to as the Cleanup Action Areas (CAAs) and are shown on Figures 3 and 4. The remedial actions in the CAAs are shown on Figure 5 and the following provides a summary, as described in the CAP (Ecology 2020a):

- Excavation and off-site disposal of soil with indicator hazardous substance (IHS) concentrations greater than remediation levels (RELs) to the maximum extent practicable in CAA-1, CAA-2.b, and CAA-3
- Light non-aqueous-phase liquid (LNAPL) removal in CAA-1.a and CAA-2.b
- In situ solidification and stabilization (ISS) to address source area soil with IHS concentrations greater than RELs in CAA-2.a and CAA-4, and LNAPL in CAA-2.a
- In situ groundwater treatment of the TCE groundwater plume using a trademarked colloidal biomatrix (PlumeStopTM) mixed with sulfidated microscale zero-valent iron (mZVI) injected along the northern border of CAA-5 and along the northern border of the ASKO parcel
- Installation of an interceptor trench and permeable reactive barrier (PRB) wall adjacent to and upgradient of the ISS monolith in CAA-4.a and CAA-4.b to capture and treat groundwater containing IHSs greater than the CULs from the adjacent BNSF parcel. Treatment of the intercepted groundwater will occur in a PRB wall backfilled with granular zero-valent iron (gZVI) reactive media.
- Excavation and offsite disposal of contaminated soil with IHS concentrations greater than CULs in CAA-6 and CAA-7
- In-situ groundwater treatment in the NE corner of CAA-2.b through application of an oxygen releasing pellet compound to treat approximately 150 cubic yards of soil that will remain beneath utilities in the ROW[2]
- Capping and institutional controls for the Upland Area of Concern

2.3 PRDI Summary and Results

In 2020 a Pre-Remedial Design Work Plan (PD Work Plan) was developed to provide details for additional soil and groundwater data collection at the Property to support the engineering design of the cleanup action (Floyd|Snider 2020b). Pre-remedial design data collection was focused in three areas as shown on Figure 5 to verify design parameters of the interceptor trench and PRB wall (CAA-4), to verify the design parameters for the PlumeStopTM in-situ groundwater treatment (CAA-5), and to delineate the lateral and vertical extent of shallow soil excavation for metals (CAA-7). Field work was completed in November and December 2020 and is documented in the Pre-Remedial Design Investigation (PRDI) Summary Report included in Appendix B.

The results of the PRDI were used to support the design for these elements and were incorporated into this EDR. As a result of the PRDI, the CAA-7 footprint was modified from the CAP and has been expanded to include the full extent of soil with arsenic concentrations that exceed the CUL (refer to Appendix B). In addition, the depth of the CAA-7 excavation was increased to 2 feet bgs in a localized hotspot area. The updated excavation footprint for CAA-7 is shown on Figure 5. It should be noted that additional soil samples will be collected prior to, or at the time of remediation, to confirm that the arsenic

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[2] This reflects a change in the cleanup action as presented in the CAP. The modifications presented in this EDR for CAA-2.b were approved by Ecology (Ecology 2020). See Section 4.2 for further details.

CUL has been achieved consistent with the approach detailed in Section 6.2.3. Updated soil removal depths are discussed in Section 5.3.

2.4 Future Property Use

Following the cleanup action, the Property will be redeveloped. Per Section 2.3.3 of the CAP, the mixed industrial zoning prohibits residential development, absent zoning changes in the future. Therefore, property use will be limited to commercial and industrial development. Development options are currently being considered for the Property. Future development and site use will accommodate any long term monitoring and maintenance required by the cleanup action.

3 Design Criteria and Considerations

The remedial design and associated long-term operation and monitoring approach were developed based on regulatory and other requirements. Regulatory requirements include remedial action objectives (RAOs), cleanup standards and RELs presented in the CAP, permitting requirements, substantive requirements of permits exempted due to the work being performed under a PPCD, and ARARs.

3.1 Remedial Action Objectives

The cleanup action was developed to achieve compliance with the project RAOs as described in Section 6.3 of the CAP (Ecology 2020a). RAOs developed for the Property include the following:

- Address public concerns by facilitating the cleanup and redevelopment of an underutilized property located in a prime industrial shoreline setting.
- Address soil contamination to protect human health and the environment (ecological receptors) from exposure to hazardous substances via direct contact.
- Reduce concentrations of IHSs in soil on the Property that are long-term sources of continuing groundwater contamination.
- Remediate LNAPL from the Bulk Terminal parcel and the adjacent W. Commodore Way ROW to improve groundwater and air quality.
- Reduce concentrations of volatile compounds in soil and groundwater to reduce or eliminate the potential for vapor intrusion.
- Reduce concentrations of IHSs in groundwater to protect surface water quality in Salmon Bay.
- Eliminate potential future contaminated soil erosion into Salmon Bay sediment.
- Comply with local, state, and federal laws and site-specific cleanup standards.
- Provide for compliance monitoring and contingency plans to ensure continued protection of human health and the environment following active cleanup actions.

3.2 Summary of Cleanup Standards and Remediation Levels

3.2.1 Cleanup Standards

As discussed in Section 3.2 of the CAP, cleanup standards are defined under MTCA as a CUL combined with a point of compliance (POC) where the CUL must be met, in conjunction with any additional regulatory requirements that apply (WAC 173-340-200).

POCs for groundwater and soil were established in accordance with MTCA (WAC 173-340-720) as follows:

- Air: The POC for air is throughout the Site, both outdoors and indoors, including subsurface structures or other structures large enough to fit a person.

- Groundwater: The standard POC under MTCA is throughout the Site to the maximum depth of potentially impacted groundwater. However, the planned remedial action will not result in groundwater meeting CULs within a reasonable restoration time frame at the standard POC. Because it has been demonstrated under WAC 173-340-350 through -390 that it is not practicable to meet the CUL throughout the Site within a reasonable restoration time frame, a conditional POC (CPOC) is appropriate and must be set as close as practicable to the source of contamination. Because the intent is to completely clean up soil and groundwater in the Shoreline AOC within a reasonable restoration time frame, the groundwater CPOC will be at the downgradient edge of the Upland AOC within the W. Commodore Way ROW.
- Soil: The standard POC for soil cleanup levels based on protection of groundwater is throughout the Site. The standard POC for soil cleanup levels based on terrestrial ecological exposures is the upper 15 feet.

Cleanup actions for unrestricted land use that rely on containment will often not achieve soil CULs at the standard POC. Pursuant to MTCA, Ecology can determine that a soil cleanup action complies with cleanup standards provided certain conditions are met. Among these are the selection of a remedy that is permanent to the maximum extent practicable, the cleanup action is protective of human health and terrestrial ecological receptors, ICs are put in place to protect the remedy, and compliance monitoring and periodic reviews are required to ensure that the containment remains protective (WAC 173-340-740 [6][f]).

The Supplemental Upland RI/FS proposed one TPH CUL for Total DRO+ORO for protection of human health. A subsequent terrestrial ecological evaluation re-evaluation indicated the need for additional DRO and ORO CULs for protection of terrestrial species (Ecology 2020a).

Table 1: Summary of Cleanup Standards for Indicator Hazardous Substances[1]

Indicator Hazardous Substance	Value	Unit	Basis	Point of Compliance
Groundwater				
Arsenic	5	µg/L	Statewide natural background	Conditional—At W. Commodore Way
GRO	800	µg/L	Protection of drinking water	
Total DRO+ORO	500	µg/L	Protection of drinking water	
Benzene	0.44	µg/L	Protection of surface water	
TCE	0.5	µg/L	Protection of surface water (PQL-based)	
Vinyl Chloride	0.2	µg/L	Protection of surface water (PQL-based)	
Penta	0.2	µg/L	Protection of surface water (PQL-based)	
Soil(a)				
Arsenic	7.3	mg/kg	Statewide natural background	Regulatory Determination
GRO	30	mg/kg	Protection of terrestrial species	
DRO	570	mg/kg	Protection of terrestrial species	
ORO	1,600	mg/kg	Protection of terrestrial species	
Total DRO+ORO	2,000	mg/kg	Protection of drinking water	
Benzene	0.02	mg/kg	Protection of surface water (PQL-based)	
TCE	0.02	mg/kg	Protection of surface water (PQL-based)	
Penta	0.05	mg/kg	Protection of surface water (PQL-based)	
Air(b)				
GRO+DRO(c)	140	µg/m^3	Inhalation (Implementation Memo 18)	Indoor and Outdoor Air Throughout Site
Benzene	0.32	µg/m^3	Inhalation (MTCA Eq. 750-2)	
TCE	0.33	µg/m^3	Inhalation (MTCA Eq. 750-2 modified for early life exposure)	
Vinyl Chloride	0.28	µg/m^3	Inhalation (MTCA Eq. 750-2)	

Notes:

µg/L Micrograms per liter

mg/kg Milligrams per kilogram

µg/m^3 Micrograms per cubic meter

MTCA - Model Toxics Control Act

Penta – Pentachlorophenol

GRO - Gasoline-range organics

DRO - Diesel-range organics

ORO - Oil-range organics

TCE - Trichloroethene

[1] This table was presented in the CAP as Table 3-1 (Ecology 2020)

(a) A soil CUL will be established for tributyltin (TBT), if soils tested for this compound, as described in Section 3.4 of the CAP, detect TBT at concentrations at or above the 26 mg/kg Method B CUL for protection of human direct contact.(d)

(b) If site-specific measurements of outdoor background air concentrations exceed these health-based levels, the cleanup levels must be adjusted up to the outdoor background air concentrations.

(c) The CUL provided for GRO and DRO is the generic indoor air cleanup level for total petroleum hydrocarbons (TPH) provided in Ecology's Implementation Memo 18 for Petroleum Vapor Intrusion. A site-specific CUL for TPH will be established during vapor intrusion assessment using Site petroleum hydrocarbon data in accordance with Appendix B of Implementation Memo 18 or the most current Ecology guidance at the time of assessment.

(d) The PRDI results confirmed that TBT was not present at concentrations of concern and does not warrant further assessment or cleanup. Refer to Appendix B of this EDR.

3.2.2 Remediation Levels

Per Section 3.3 of the CAP and in accordance with WAC 173 340-200, a REL "means a concentration of a hazardous substance in soil, air, water, or sediment above which a particular cleanup action component will be required as part of a cleanup action at a site." RELs may be developed as a tool at sites where a combination of cleanup action components are used to achieve CULs. RELs are not the same as CULs but define the concentration or other method of identification of an IHS above which a contaminated medium must be remediated in some manner. RELs exceed CULs but provide a level at which a particular cleanup action component will be used. A cleanup action that uses RELs must meet the requirements of MTCA, including a cleanup action that uses permanent solutions to the maximum extent practicable and provides for a reasonable restoration time frame. Soil RELs have been established for this cleanup action as presented in the CAP and summarized in Table 2 below.

Table 2: Summary of Remediation Levels[1]

Indicator Hazardous Substance	Upland AOC Soil Remediation Level	Units	Point of Compliance
GRO	5,000	mg/kg	Upland AOC
Total DRO+ORO	12,000	mg/kg	
Benzene	GRO compliance with soil REL		
TCE	1	mg/kg	
LNAPL	No visual LNAPL		

Notes:

mg/kg Milligrams per kilogram
DRO - Diesel-range organics
LNAPL – Light non-aqueous-phase liquid
TCE – Trichloroethene

AOC – Area of Concern
GRO - Gasoline-range organics
ORO - Oil-range organics
REL – Remediation Level

[1] This table was presented in the CAP as Table 3-2 (Ecology 2020a)

3.3 Permitting, Exemptions, and Other Design Considerations

All remedial actions being performed under the PPCD are exempt from the procedural requirements of certain State and all local permits (WAC 173-340-710[9][b]). However, exempted actions will be conducted in a manner that meets substantive permit requirements. Copies of substantive compliance documentation obtained or submitted to meet substantive requirements prior to construction are included in Appendix C, while others that are obtained after this EDR is approved but are pertinent to the construction will be provided in the Remedial Action Completion Report. The exemption from procedural requirements applies to the following:

- Washington Clean Air Act (Chapter 70.94 RCW)
- Solid Waste Management Act (Chapter 70.95 RCW)
- Hazardous Waste Management Act (Chapter 70.105 RCW)

- Water Pollution Control Act (Chapter 90.48 RCW)
- Shoreline Management Act (Chapter 90.58 RCW)
- Any laws requiring or authorizing local government permits or approvals

The cleanup action must comply with MTCA cleanup regulations, federal laws, and substantive requirements of applicable local and state laws. The cleanup action has been designed to comply with all applicable local, state, and federal laws that were included in Table 6.1 of the CAP. In addition, other relevant requirements which generally do not require specific permits or notifications were also considered as part of design and will be incorporated into remedy implementation/construction.

A State Environmental Policy Act (SEPA) Checklist and Determination of Non-Significance (DNS) was issued by Ecology on June 26, 2020 (Ecology as the lead agency) for the cleanup action. The SEPA Checklist and DNS public comment period occurred concurrent with the RI/FS, CAP, and PPCD comment period in July 2020.

Per Section B.13 of the SEPA Checklist, it was determined that the contractor would implement a project-specific Inadvertent Discovery Plan (IDP) to protect unknown historical or cultural resources during ground-disturbing activities associated with remedy implementation. A copy of the IDP is included in Appendix D.

3.3.1 Substantive Compliance Regulations

As previously discussed, all remedial actions described herein must comply with the substantive requirements of the applicable permits; therefore, engagement is needed with State and local jurisdictional authorities to obtain the substantive requirements. This section provides a summary of the applicable State and local permits substantive requirements for this project.

3.3.1.1 Construction Stormwater General Permit

A Construction Stormwater General Permit (CSWGP), issued by Ecology, is required for all projects disturbing an acre or more of land where there is the possibility that stormwater could run off the site or enter a conveyance system that leads to surface waters. The project will be disturbing an acre or more of land and there will be a possibility that stormwater could enter a surface water; however, the project is exempt from procedural requirements but will need to comply with substantive requirements including public notices. The project will not include discharge to a receiving water body; all collected stormwater will be discharged through existing sewers, infiltration, or transported to an off-site facility for disposal.

This permit includes elements of several federal and local laws and regulations including the following:

- National Pollutant Discharge Elimination System (CWA Section 402 (33 U.S.C_1342) and 40 CFR Parts 122, 125,131 and 149) - These regulations establish the National

Pollutant Discharge Elimination System (NPDES), which issues permits for direct discharges to navigable waters. This includes federal and state requirements. The State of Washington implements this program under Chapter 173-220 WAC. Construction stormwater requirements will be satisfied for upland handling of soil, including development of a Storm Water Pollution Prevention Plan and implementation of best management practices (BMPs). NPDES requirements do not apply to any water collected that will be transported to an offsite commercial facility or discharged to a municipality (i.e., discharge to King County sanitary sewer would require a separate discharge authorization discussed below). Construction stormwater NPDES requirements for utilization of BMPs are applicable.

3.3.1.2 Underground Injection Control

Ecology's Underground Injection Control (UIC) program regulates the discharge of fluids from UIC injection wells. The UIC program — authorized by the Safe Drinking Water Act — is administered under Title 40 Code of Federal Regulations (CFR) parts 144, 145, 146, and 147. This project is exempt from the procedural requirements of the permit, but the substantive requirements of Ecology's UIC permit will be incorporated into the design documents (i.e., construction drawings and specifications, as further detailed in Section 5 of this EDR). This will include registering of injection wells associated with outflow to gravity wells, interceptor trench, or PlumeStopTM injections, before construction. The UIC program does require that any UIC wells be registered with Ecology prior to construction. Discharged water must meet non-endangerment standard, as determined by Ecology.

3.3.1.3 Asbestos/Demolition Notification

Puget Sound Clean Air Agency (PSCAA), Regulation III – Article 4: Asbestos Control Standards require that notification of demolition be submitted to PSCAA prior to the start of construction. Regulations require that before beginning any demolition project in areas under the jurisdiction of the PSCAA, including City of Seattle, the following requirements apply:

- The property owner or representative must conduct an asbestos survey or obtain survey results. For commercial properties, the survey must be conducted by an inspector certified by the Asbestos Hazard and Emergency Response Act.
- A summary of the survey results will be communicated to workers and anyone else who may come in contact with the material to be disturbed.
- All asbestos-containing waste will be taken to an Asbestos Disposal Waste Facility authorized to receive the waste. A complete asbestos waste material shipment record will accompany the waste to the disposal site. The final certificate of disposal will be maintained with project records (included in completion reporting documentation).

This work was conducted prior to demolition of the buildings, which was completed March 22 through May 20, 2021.

3.3.1.4 Seattle Municipal Code

This project is exempt from the procedural elements of the local permits, but the substantive requirements of these permits will be incorporated into the design.

- Grading Permit application is required based on the scope of work. The cleanup action will be designed to include the substantive requirements of the grading permit review process. The grading permit will include work in the City right-of-way, and a separate street use permit is not expected. Grading permits were submitted in December 2020 and are under review.
- Electrical Permit and Fire Hydrant Permit may be required based on the final design elements or based on if water is pulled from local fire hydrants. These permits will likely be obtained by the Contractor and are 'over the counter' typically pulled once construction has started and nearly completed.
- Side Sewer Permit/Discharge Authorization will be required if construction water is collected and treated and sent off-site for disposal. This authorization will permit the discharge of treated contact water and stormwater through the City of Seattle/King County utilities. The site currently has an active discharge permit with King County (the permitting authority) for the ASKO/Bulk Terminal which includes discharging groundwater and stormwater. Water generated during construction activities may include groundwater collected during dewatering activities and stormwater; these waters are consistent with the current approved waste streams. The existing permit will be modified with King County for the ASKO/Bulk Terminal construction stormwater activities to include updated water treatment options. Work on the East Waterfront Property may trigger a modification to the existing ASKO/Bulk Terminal discharge permit or a new permit may be required for dewatering activities. Collected water may also be transported to an off-site facility for disposal, in which case a permit modification or new permit for the East Waterfront would not be required. The side sewer will also need to be terminated to complete some of the ISS and excavation work (CAA-2.b). This work will be done in accordance with City of Seattle regulations.

3.3.1.5 Shoreline Substantive Compliance Regulations

Cleanup work within Shoreline Jurisdiction (East Waterfront Property) will include the following items:

- Demolition of structures on the East Waterfront Property
- Excavation of approximately 2,000 cy of material from the East Waterfront Property

These elements are exempt from the following permits, but the substantive requirements of these permits will be incorporated into the design documents. The following regulations will be addressed in the design documents.

- The Washington Shoreline Management Act Chapter 90.85 Revised Code of Washington [RCW]), authorized under the federal Coastal Zone Management Act

(16 USC 1451 et seq.; CZMA), establishes requirements for substantial development occurring within waters of the State or within 200 ft of a shoreline. Substantive compliance with the CZMA and state and local shoreline development regulations will be included in design documents, as further detailed in Section 5.

- The Shoreline Management Act (RCW 90.58 and related rules) manages appropriate uses and developments along shorelines of the state via state-monitored, locally administered permitting programs. The act establishes preferences for water-dependent uses, protection of shoreline ecological resources, and public access with the shoreline jurisdiction, defined as aquatic areas and lands within 200 feet of the ordinary high water mark of Salmon Bay. Consistent with state Enrolled Senate Bill 1653, shoreline critical areas are regulated under the local Shoreline Master Program regulations. Substantive compliance with the Shoreline Management Act and state and local shoreline development regulations will be included in design documents, as further detailed in Section 5.

3.3.2 Relevant Requirements

The following are federal and state laws that do not require permits/authorization but these laws and regulations will be considered and included in the design elements.

Resource Conservation and Recovery Act Regulations

The Resource Conservation and Recovery Act (RCRA) apply to the identification, generation, transportation, and disposal of any hazardous wastes generated. All wastes generated from the property are expected to be non-hazardous and will be characterized and disposed of at the appropriate disposal facility (e.g., Subtitle D), in accordance with RCRA. A waste characterization evaluation will be performed as part of the profiling process to confirm that the excavated soil is suitable for Subtitle D disposal.

Washington Hazardous Waste Management Act (Chapter 70.105 RCW) and Dangerous Waste Regulations (WAC 173-303) set forth requirements for designating solid wastes to determine whether they are “dangerous waste” or “extremely hazardous waste” and for handling such waste. State and federal laws prohibit land disposal of certain hazardous or dangerous wastes. Excavated soil will be disposed of in compliance with disposal site criteria.

All wastes will be properly characterized prior to off-site disposal. Wastes are not expected to be designated as hazardous or dangerous wastes.

Occupational Safety and Health Administration and Washington Industrial Safety and Health Act

Occupational Safety and Health Administration (OSHA) forty-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training, with current annual 8-hour refresher, will be required for all onsite workers with the exception of truck drivers and surveyors (unless their activities require potential exposure to impacted materials). Truck drivers will receive orientation on the Site-Specific Construction HASP; no other health and safety training will be required, provided that all out-of-cab activities are restricted to covering of loads, necessary vehicle inspections, and signing of manifests. Detailed health and safety training requirements, and details on how the Contractor will comply with OSHA standards, will be included in the Construction HASP.

The Washington Industrial Safety and Health Act (WISHA; WAC 296-155) sets safety standards for construction. This code specifies health and safety standards for responding to releases or substantial threats of release of hazardous substances at hazardous waste sites. WISHA requirements are generally more stringent than OSHA requirements. All cleanup activities will adhere to WISHA standards. Detailed health and safety training requirements, and details on how the Contractor will comply with WISHA standards, will be included in the Construction HASP.

Air quality requirements for workers are governed by OSHA and ambient air quality requirements for the Puget Sound region are governed by the Puget Sound Clean Air Agency (PSCAA). PSCAA Regulation I includes criteria for visual emissions, suspended particulates less than 10 microns in diameter, and carbon monoxide.

Transportation and Disposal Requirements

Minimum Functional Standards for Solid Waste Handling (WAC 173-304) are applicable to non-hazardous waste management generated during remedial activities, excavation, and disposal of solid wastes. Non-hazardous soil will be handled and disposed in accordance with these requirements.

The United States Department of Transportation (DOT) regulates transportation of hazardous wastes. To comply with DOT regulations, material requiring transportation and disposal will be dewatered or solidified, as needed, so that it does not contain free liquids during transportation.

The cleanup will use existing permitted disposal and recycling facilities that are compliant with the solid waste disposal regulations and are permitted to accept impacted materials.

Local Noise and Lighting Codes

Seattle Municipal Code (SMC); Chapter 25.08 restricts maximum permissible sound levels for sound sources located within the City of Seattle. For the purposes of this project, it will be assumed that construction noise will be generated from an industrial source (excavation on lands zoned as industrial) with the receiving property being commercial. In addition, the noise-producing activity is Construction, as defined by the Seattle Municipal Code. Using these assumptions, and based on the applicable codes, the maximum permissible sound level for the residential area is 85 dB(A) for Industrial to Residential noise generation between the hours of 7:00 am and 10:00 pm on weekdays and 9:00 am and 10:00 pm on weekends and legal holidays (New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and the day after, and Christmas Day). The maximum permissible sound levels are measured from the real property of another person or at a distance of 50 ft from the equipment, whichever is greater. Specific permissible sound levels associated with various equipment used on construction sites are described in SMC 25.08.425.

The proposed work hours for this project will comply with these orders. Efforts to minimize noise will be implemented to the extent practical during construction.

Lights may be required for winter work when the sun sets around 5:00 pm. Per City of Seattle Municipal Code (SMC 23.50.046), performance standards for acceptable light emissions for this project for receiving properties are:

- For urban residential areas: 0.5 foot candles
- For commercial/industrial areas: 1.0 foot candle.

The design will be completed to comply with all SMC requirements.

4 Design Basis

An overview of the cleanup action and the cleanup action areas (CAAs) is shown on Figure 5. The selected remedy consists of the following elements:

- **East Waterfront parcel.** Soil excavation for TPH, benzene, and arsenic to cleanup levels.
- **Bulk Terminal parcel.** Soil excavation and ISS for TPH, LNAPL removal or encapsulation, capping, and ICs (including Soil and Remedial Element Management Plan [SREMP]).
- **ASKO parcel.** Minor soil excavation coupled with ISS for cVOCs, TPH, and arsenic (excavation only). This parcel also includes a passive in situ groundwater treatment zone to treat cVOCs in groundwater near the CPOC, an interceptor trench with PRB wall containing ZVI to treat cVOCs in groundwater entering the Property from the BNSF parcel, capping, and ICs (including SREMP).

CAA-specific cleanup actions are itemized as follows:

- Excavation and off-site disposal of soil with IHS concentrations greater than RELs to the maximum extent practicable in CAA-1, CAA-2.b, and CAA-3
- Removal of LNAPL in CAA-1.a and CAA-2.b as part of excavation activities
- ISS to address LNAPL in CAA-2.a and source area soil with IHS concentrations greater than RELs in CAA-2.a and CAA-4
- Installation of an interceptor trench and PRB wall along the upgradient edge of CAA-4 to capture and treat groundwater containing IHSs greater than the CULs that are migrating from the adjacent BNSF parcel
- Excavation and off-site disposal of soil with IHS concentrations greater than the CUL in CAA-5 and in-situ groundwater treatment along the northern border of this CAA
- Excavation and offsite disposal of contaminated soil with IHS concentrations greater than CULs in CAA-6 and CAA-7
- In situ groundwater treatment of the TCE groundwater plume using a trademarked colloidal biomatrix (PlumeStopTM) mixed with sulfidated microscale zero-valent iron (mZVI) injected along the northern border of CAA-5 and along the northern border of the ASKO parcel
- In-situ groundwater treatment in the NE corner of CAA-2.b through application of an oxygen releasing pellet compound to treat approximately 150 cubic yards of soil that will remain beneath utilities in the ROW
- Capping and ICs for the Upland AOC

Building demolition occurred between March 22 and May 20, 2021. All building structures above grade level have been properly abated and demolished. Any floor slabs, foundation footings, or concrete retaining walls within the remediation footprints will be removed at the time of remediation. The following sections further detail the various types of remediation proposed for the Property.

4.1 LNAPL Removal/Immobilization

Multiple methods will be used to address LNAPL. At CAA-1.a, in the area of the former tank farm, and at CAA-2.b in the W. Commodore Way ROW, LNAPL will be removed using a combination of excavation and vacuum extraction. At CAA-2.a, LNAPL will be immobilized by encapsulation using ISS technology, as described in Section 4.3.

Standard excavation means and methods will be used to remove soil containing LNAPL from areas CAA-1.a and CAA-2.b (see Section 4.2). In addition, a vacuum truck will be used to extract any LNAPL that accumulates in the excavated areas during the soil removal activities. LNAPL and associated soil removed from these areas will be transported offsite to a permitted facility for disposal or recycling (for LNAPL). These activities are expected to remove (or encapsulate) approximately 13,000 gallons of LNAPL from CAA-1 and approximately 77,000 gallons of LNAPL from CAA-2. Groundwater encountered while removing LNAPL will be removed, treated, and discharged to the sanitary sewer under a King County Industrial Wastewater Discharge Authorization. Significant amounts of LNAPL will be collected separately and disposed of at a TPH recycling facility.

4.2 Soil Excavation with Offsite Disposal

Contaminated soil will be excavated from CAA-1, CAA-2.b, CAA-3, CAA-5, CAA-6, and CAA-7, as shown on Figure 5, using standard excavation means and methods. The initial excavation limits (horizontal and vertical), grades, and profiles are shown on the construction Drawings (Appendix A) and excavation performance sampling will be performed during cleanup as discussed in Section 6 to assess compliance with the RELs or CULs.

An Inadvertent Discovery Plan was prepared to provide direction to the Contractor and Engineer regarding excavation observation for culturally or historically significant items and procedures for contacting the project archaeologist in the event a potential observation has been made (Appendix D).

Excavated contaminated soil shall be transported offsite to a permitted Subtitle D landfill for disposal. Once the final limits are reached, the excavated areas on the Property will be backfilled with clean imported material and restored with a gravel surface. Note that excavations on the Upland parcels will eventually be capped during redevelopment. The excavated area within the W. Commodore Way ROW will be backfilled with clean imported fill and restored with a pavement section meeting City of Seattle requirements.

The following is a summary of the estimated volumes and anticipated depths expected for contaminated soil removal at each area.

- CAA-1: Approximately 1,300 CY of soil will be excavated to 5 feet bgs at CAA-1.a and approximately 800 CY of soil will be excavated to 10 feet bgs at CAA-1.b to remove GRO, Total DRO+ORO, and benzene at concentrations greater than the RELs.
- CAA-2.b: Approximately 1,950 CY of soil will be excavated to 15 feet bgs to remove GRO, Total DRO+ORO, and benzene at concentrations greater than the RELs.
- CAA-3: Approximately 800 CY of soil will be excavated to 5 feet bgs to remove GRO and Total DRO+ORO at concentrations greater than the RELs. Removal of this soil will also remove collocated benzene and TCE concentrations in this CAA.
- CAA-5: Approximately 200 CY of soil will be excavated to 5 feet bgs to remove Total DRO+ORO and arsenic at concentrations greater than the CULs.
- CAA-6: Approximately 1,000 CY of soil will be excavated to 21 feet NAVD88 (approximately 6 feet bgs for most of the excavation footprint, deeper depths at the south end), with a small portion to 17 feet NAVD88 (approximately 4 to 6 feet bgs), at CAA-6.a to remove GRO, Total DRO+ORO, and benzene at concentrations greater than the CULs. At CAA-6.b, approximately 300 CY of soil will be excavated to 15.5 feet NAVD88 (approximately 3 feet bgs) to remove GRO, Total DRO+ORO, and benzene at concentrations greater than CULs.
- CAA-7: Approximately 600 CY of surficial soil will be excavated to 1 to 2 feet bgs to remove arsenic at concentrations greater than the CULs.

Excavation sidewalls will be cut as steeply as possible to remain stable during the timeframe when performance monitoring samples are being analyzed and evaluated.

Excavation limits have been modified slightly from the CAP in the following areas:

- CAA-2.b - For the CAA-2.b excavation in the ROW, shoring will be required around the perimeter of the excavation area, as shown on Drawing C-3 included in Appendix A. ISS at CAA-2.a shall occur prior to excavation in this area and the ISS will be allowed to cure for a minimum of 14 days to allow the ISS to be used as shoring along the Bulk Terminal side of the excavation. Soldier pile and lagging will be used along most of the perimeter of the excavation towards the ROW and trench boxes will be used where the ROW excavation is narrow, to the west. The northeast corner of the excavation has been modified since the CAP in coordination with Ecology. Modification to the CAA-2.b boundary eliminated approximately 150 cy of soil due to the presence of major active utilities within this area, potentially significant traffic impacts, cost and schedule impacts, and additional health and safety concerns. Based on discussions with Ecology it was determined that the small north-eastern corner could be removed from the excavation footprint. Amendments will be added prior to or during backfilling activities in the northeast corner to enhance biodegradation of any remaining petroleum (Ecology 2020b).

REGENESIS® has proposed using Oxygen Release Compound Advanced® (ORC Advanced) amendment in the excavation, details are discussed in Section 5.4.3 and included in Appendix F. The lagging (and any CDF that may have been used behind the lagging) beneath the groundwater table will be removed from this section of shoring to allow the amendments to contact any residual petroleum in soil or groundwater that may be present outside the modified shoring alignment.

- CAA-6.a - Excavation in CAA-6.a has been updated since the CAP based on a review of site topography, borehole logs, soil analytical data, and the SoundEarth interim action completed between September 2013 and January 2014. The new excavation footprint, shown on Figure 6, has been expanded to include areas that were not excavated during the interim action. As a first step, the access road from W. Commodore Way will need to be partially removed to provide access to the excavation area. Excavation will occur down to 21 feet NAVD88 through most of excavation CAA-6.a; this is consistent with about 6 feet bgs under the existing building slabs. The excavation in this area has also been expanded to the west slightly to capture interim action performance sample G7 (7 feet bgs) that was left in place at the conclusion of the interim action. The northern tip of CAA-6.a will be excavated to 17 feet NAVD88 (approximately 4 to 6 feet bgs).
- CAA-6.b - Excavation at CAA-6.b will occur up to the OHW line adjacent to Salmon Bay (Figure 6).The lowest ground surface elevation along the OHW line for the north border of CAA-6.b is approximately 18.2 feet NAVD88. Per the PPCD, the demarcation between the upland and Salmon Bay sediments is the OHW mark. The surface water elevation in Salmon Bay varies between 16.75 to 18.75 feet NAVD88 (20 to 22 feet USACE datum) seasonally at the Chittenden Locks. The water level is typically highest in May and June and lowest in December and January. The preferred excavation timeframe will be when the surface water level is below about 17.5 feet NAVD88 (20.75 feet USACE datum), which typically occurs at about the beginning of September but could be as late as late-October. One side of the excavation runs parallel to Salmon Bay, for this portion of the excavation, the sidewall will be stabilized using quarry spalls or rip-rap immediately after the excavation depth has been achieved to help prevent failure of the northern excavation sidewall. Excavation in CAA-6.b will extend to 15.5 feet NAVD88.
- CAA-7 - Excavation at CAA-7 has expanded since the CAP was finalized based on additional data collected during the PRDI. The PRDI data is provided in Appendix B. Figure 7 illustrates the updated extent of the excavation based on the data presented in the PRDI. Per the PPCD, the demarcation between the upland and Salmon Bay sediments is the OHW mark.

All other excavation areas have remained consistent with the information presented in the CAP.

4.3 In Situ Solidification

ISS will be implemented at CAA-2.a and CAA-4 to encapsulate source area soil and a portion of the LNAPL remaining at the Bulk Terminal parcel. Figures 8a and 8b illustrate the extent and depth of the ISS treatment area. Volumes of contaminated material to be treated by ISS in each area are summarized as follows:

- CAA-2.a: Approximately 9,500 CY of soil contaminated with GRO, Total DRO+ORO, and benzene at concentrations greater than the proposed RELs. These volumes include extending the ISS a foot deeper into the silt contact to key the ISS mass into the underlying soil.
- CAA-4: Approximately 6,800 CY of soil in CAA-4.a and approximately 11,600 CY of soil in CAA-4.b contaminated with TCE, GRO, Total DRO+ORO, and benzene at concentrations greater than the proposed RELs. These volumes include extending the ISS a foot deeper into the silt contact along the perimeter mixing cells to key the ISS mass into the underlying soil.

The lateral extent of ISS was defined in the CAP. Preliminary ISS amendment mixes were evaluated during treatability testing and reporting (GeoSyntec 2019). The results of the treatability testing indicated that all of the test mixtures easily exceeded typical performance criteria for hydraulic conductivity (1×10^{-6} cm/s) and unconfined compressive strength (UCS) (>50 psi).

Additional bench-scale testing will be performed by the selected ISS contractor. This bench testing will include a wider range of amendment mixtures to bracket the performance criteria and optimize the ISS amendment mixture. The final ISS amendment mixture will include a combination of ground granulated blast furnace slag (GGBFS) and normal (Type I) Portland cement, with an amendment ratio of about 3:1, respectively. ISS performance criteria are:

- Hydraulic conductivity less than 1×10^{-6} cm/s
- UCS of greater than 30 psi at 28 days, with a 50 psi target along the north edge of CAA-2.a, where the ISS mass will be exposed during future excavations, and along the south edge of CAA-4, where these initial cells will contribute to the shoring for ISS mixing to the north.

The process for evaluating compliance with the performance criteria during cleanup is provided in Section 6, the Construction Compliance Monitoring Plan (CCMP).

ISS treatment will consist of mixing contaminated media with the amendment mixture in cells using an excavator to create a homogenous monolith that encapsulates and solidifies contaminants. Specifications for implementing ISS are discussed in Section 5.4.2. The mixing and performance monitoring cells are described in Section 6.2.4.

The width of the mixing cells along the south side of CAA-4 from about 15 to 40 feet bgs (see below) are narrower than the other cells, to allow slots to be mixed to complete the shoring system along the BNSF property line. For the interior cells, ISS mixing will occur to the lowest elevation of the contact with silt in each cell. For the perimeter cells, mixing will occur to 1 foot below the lowest elevation of the contact with silt in each cell to key the ISS mixture into the silt. Figures 8a and 8b show the top of silt for each ISS area.

Due to the added volume of grout and the mixing process, swell material is expected to be approximately 20 to 30 percent of the total ISS volume. Swell material is contained during mixing through benching of the ISS treatment areas prior to ISS implementation (i.e., excavation of surface soils to allow swell management within the treatment area; note that these surface soils will be treated and incorporated into the swell management area). At CAA-2.b, the bench depth will be limited to the removal depth of surface pavement and aggregate. At CAA-4 soldier piles and lagging will be used to shore the upper 15 feet of soil along the BNSF property line. These upper 15 feet will be treated in a first phase (described in Section 5.4.2.1) and will be relocated to the swell management area described in Section 5.4.2; the lagging will be placed as part of this process. This will create a swell containment area and will allow the next phase of ISS to occur in a second phase to a maximum depth of 25 feet to reach the total maximum ISS depth of about 40 feet. For all ISS areas, swell material will be moved to the swell management area as needed to create space to contain the swell generated from future cells.

4.4 Groundwater Modeling Summary

Modeling was performed to evaluate the remedial design for the interception trench in the Perched water bearing zone (WBZ) and to evaluate the influence of the ISS system in the Shallow WBZ. This section provides a brief summary of the groundwater modeling report provided in Appendix E.

Soils are unsaturated between the Perched WBZ and Shallow WBZ thus a model like MODFLOW, which assumes fully saturated conditions, is not suitable for representing both aquifers in a single model. For this reason, two models were developed for this remedial design evaluation:

- A two-dimensional (2D) groundwater flow model representing the Perched WBZ; and
- A separate 2D groundwater flow model representing the underlying Shallow WBZ.

MODFLOW-NWT was used to simulate both models under steady-state, saturated conditions. A “drain” boundary condition was incorporated into the Perched WBZ to represent the downgradient boundary of this unit, and the corresponding water discharged from this zone was simulated in a recharge boundary in the underlying Shallow WBZ model. In this manner, the two aquifers were hydraulically connected for both the pre-remediation and remedial design scenarios.

The base case scenario was calibrated to match pre-remediation conditions based on the April/May 2019 groundwater elevations documented in the Supplemental RI/FS (Floyd|Snider 2020). Key metrics to be included in the calibration of each aquifer model include:

- General groundwater flow directions;
- Range of horizontal hydraulic gradients observed in each aquifer; and
- Residual statistics associated with groundwater monitoring well targets.

The remedial design modeling evaluation included an assessment of the capture zone associated with the interception trench based on varying bottom elevation designs, as well as a water balance of discharge from the Perched to the Shallow WBZ, and the reduced flow in the Shallow WBZ as a result of ISS implementation. An evaluation of pH dilution downgradient of the ISS components was also conducted.

The post-ISS groundwater model potentiometric surface contours for the Shallow WBZ are shown on Figure 9. Based on an ISS hydraulic conductivity of $1x10^{-6}$ cm/s, the flow through the ISS areas was compared before and after ISS implementation. For CAA-2.a, groundwater flow through the ISS area was reduced from 1.1 to 0.01 gpm for a 99.1% reduction in flow. For CAA-4, groundwater flow through the ISS area was reduced from 2 to 0.005 gpm for a 99.75% reduction in flow.

During the PRDI, a borehole was advanced and soil samples from the Perched WBZ were submitted for grain size analysis to better estimate the hydraulic flow parameters in the model. For the Perched WBZ modelling effort, flow through the ISS area was reduced from 0.3 to 0.0006 gpm for a 99.8% reduction in flow. The Perched WBZ model was also used to calculate an approximate flow to the interceptor trench of about 0.34 gpm, as discussed in Section 4.5.

4.5 Interceptor Trench and Permeable Reactive Treatment

An interceptor trench will be constructed at the ASKO/BNSF boundary to capture and treat impacted groundwater migrating within the Perched WBZ on the BNSF parcel. Prior to ISS, this water would migrate onto the ASKO parcel then migrate down to the Shallow WBZ within about 100 feet of the property boundary. Once ISS treatment is implemented in CAA-4, this groundwater flow path will be cut off. The trench will be installed along the southern edge of CAA-4 to prevent a buildup of contaminated groundwater in the Perched WBZ that could migrate around the ISS monolith. Figure 10 shows the interceptor trench capture zone based on a trench discharge water level of 45 feet NAVD88.

The interceptor trench will be constructed a total length of approximately 90 feet and will be approximately 3 feet wide and 15 feet deep (Figure 11). Since the ISS area will have been excavated down to 15 feet bgs, the interceptor trench will be built from the bottom up at the same time that ISS material is being placed immediately downgradient of the trench. In the primary flow channel of the Perched WBZ, as indicated by the light blue area on Figure 3.12 in Appendix E, the wooden lagging will be removed from this approximately 50-foot wide area to facilitate Perched WBZ groundwater flow into the trench.

The interceptor trench will be constructed of bedding sand (ASTM C33) from the bottom of the trench (45 feet NAVD88) to approximately 54 feet NAVD88, then backfilled to grade with clean import fill. Bedding sand was selected for the interceptor trench because it satisfies the filtering and piping requirements for sand drain design (Cedergren 1989) and eliminates the need for geotextile fabric between the native soil in the Perched WBZ and the interceptor trench. The top elevation was derived by reviewing groundwater gauging data from MW-70 and MW-71, located in the Perched WBZ at the location of the interceptor trench; these data indicate that water elevations fluctuate between about 46.5 and 52.2 feet NAVD88.

The concept outlined in the RI/FS and CAP was that a permeable reactive barrier would be included after the interceptor trench. Evaluation of this approach during design indicated that the shallow soil could not accept this flow since the Perched WBZ was essentially eliminated. The modified approach is to have the intercepted groundwater flow through the same granular zerovalent iron (gZVI) media but the media would be placed in a precast concrete vault and the treated effluent would proceed to a gravity well to allow the water to drain into the shallow WBZ as it has done prior to cleanup activities. The gravity well will be a 6-inch diameter PVC well, screened from about 20 to 35 feet NAVD88. An additional evaluation was performed during groundwater modelling to assess where the treated groundwater would flow once it was introduced to the Shallow WBZ. Figure 3.10 of Appendix E indicates that the treated water will flow north and will pass through the in situ groundwater treatment zone just south of Commodore Way, as further detailed in Section 4.6.

The goal of the gZVI treatment is to reduce the TCE concentration from the estimated influent concentration of 1.15 mg/L to a discharge concentration of 0.5 microgram per liter (µg/L). The bench testing (SiRem 2019) work estimated the TCE half-life at between 1.3 and 2.2 hours. The groundwater modeling report estimated that the flow though the Perched WBZ to the trench is 0.34 gpm using wet season (April/May) groundwater elevations and assuming drawdown to 45 feet NAVD88. The porosity of the 8 to 50 mesh gZVI used in the treatability study was 0.53. Using a half-life estimate of 2.2 hours, a Perched WBZ groundwater flow rate of 0.34 gpm, and a porosity of 0.53, the required volume of gZVI to achieve the treated water effluent goal is 950 gallons.

Over time, the effectiveness of the ZVI will be reduced. Mineral precipitation will foul the ZVI and reduce porosity. Other fouling, such as biological growth, can also reduce the effectiveness of the ZVI. Results presented in the bench testing were confounded by the presence of petroleum that was attributed to the ZVI itself. This petroleum physically sorbed to the ZVI and triggered anaerobic microbial activity that caused biofouling. In order to limit precipitation and fouling, the following design elements will be included:

- An impermeable liner will be placed between the ISS and the trench to prevent the ISS from increasing the groundwater pH and increasing precipitation
- The ZVI used for the project will be required to be certified clean and a sample of the ZVI will be submitted for TPH and BTEX testing before it is placed

A simple sensitivity analysis was performed to assess the volume of ZVI required assuming losses of porosity and ZVI reactivity. Results of the sensitivity analysis are summarized below.

Table 3 ZVI Media Sensitivity Analysis

	Sensitivity Analysis			
Half-Life (hours)	2.2	2.2	3.3	3.3
Porosity	0.53	0.265	0.3975	0.265
ZVI Volume (gallons)	950	1900	1900	2850

In order to address the uncertainty, the PRB has been designed as follows:

- The primary ZVI treatment will occur within a concrete vault. 1,025 gallons of ZVI will be placed in the vault and will treat groundwater consistent with the low volume (950 gallons of ZVI) scenario. 1,025 gallons of ZVI will be used rather than 950 gallons due to the incremental sizing of the precast concrete vaults.
- A small area of bedding sand immediately upgradient of the vault will allow flow equalization and will provide an area where limited precipitation and fouling will occur.
- Pretreatment of the groundwater will occur within a 50-foot section of the trench using a 2:1 mix of bedding sand and gZVI (1,125 gallons). When combined with the primary ZVI treatment volume, this satisfies the moderate sensitivity ZVI volume requirement (total ZVI volume of 2,150 gallons versus 1,900 gallons from the sensitivity analysis) and allows for precipitation and fouling to occur within the blended media where flow will be less impacted, as opposed to precipitation and fouling of the primary ZVI treatment within the vault itself.

Contingencies have been incorporated into the PRB design to allow the design life of the PRB to extend for as long as possible:

- Precipitation and fouling primarily occur at the influent end of the PRB. Should pretreatment zone fouling occur, the groundwater will be able to flow over the top of the pretreatment zone and flow back into the pretreatment zone beyond the fouled area.
- The treatment media within the vault can be removed and replaced if precipitation and fouling impact performance of the primary ZVI treatment media.

Overall, the goal is to have the PRB function for 10 to 15 years to provide adequate time for BNSF to perform cleanup of the upgradient Perched WBZ.

The precast concrete vault (Oldcastle 5106 GA, or equivalent) will include a ZVI treatment portion and a downgradient clear well prior to overflow to the gravity well. The vault will have access points at ground surface to allow inspection, sampling, and potential media replacement. Groundwater will enter the treatment vault at an elevation of about 47 feet NAVD88 so that water in the Perched WBZ will be drawn down to the lower end of the previous gauging results (46.5 feet NAVD88).

4.6 Groundwater Treatment

In situ groundwater treatment will be conducted north of the proposed excavation area in CAA-5 to address the TCE and VC plume and residual dissolved benzene on the ASKO parcel immediately upgradient of the W. Commodore Way ROW. Treatment fluids will be injected into the subsurface through a series of direct-push borings to create a passive treatment zone of chemical reduction and bioremediation. Fluids will be injected at each location under low pressure using a direct-push drill rig to provide even distribution within the target treatment zone. Injection depths are expected to be in the range of 20 to 30 feet bgs within the Shallow WBZ. The proposed in situ treatment zone will be approximately 175 feet long and 15 feet wide, as shown on Figure 5, detailed in the PRDI summary included as Appendix B.

REGENESIS® remediation products are proposed for the in situ groundwater treatment, detailed in Appendix F and include the following key components*:*

- S-MicroZVI is a 2 to 5um micro-scale zero valent iron has a sulfidation coating and is suspended in a polymer creating a colloid which allows it to flow with water and through pore spaces. S-MicroZVI acts as an abiotic destruction method limiting the amount of daughter products produced.
- BDI Plus is an enriched, natural microbial consortium containing species of *Dehalococcoides* sp. which are capable of completely dechlorinating contaminants during in situ anaerobic bioremediation processes.
- PlumeStop is 1-2um activated carbon coated in a polymer which creates a flowable colloid. PlumeStop creates an *in-situ* passive treatment zone where groundwater will be able to flow through the treatment zone while at the same time contaminants will be extracted from the groundwater. Once injected the PlumeStop liquid activated carbon coats aquifer soil particles with a very thin layer of carbon. PlumeStop begins working immediately by allowing sorption of contaminants from the dissolved phase to the thin layer of carbon resulting in rapid reductions of contaminant concentrations from groundwater (i.e. the extraction phase). Naturally bacteria will congregate at the PlumeStop injection area and degrade contaminants.

As discussed above, modification to the CAA-2.b boundary eliminated approximately 150 cy of soil removal. ORC Advanced amendments will be added during backfilling activities in the northeast corner to enhance biodegradation of any remaining petroleum in the groundwater (Ecology 2020b). Additional details from REGENESIS® regarding ORC Advanced are provided in Appendix F and implementation details are discussed in Section 5.4.3.

4.7 Interim Surface Cover

At the completion of cleanup construction activities, impacted soil greater than the CULs will remain on the bulk terminal and ASKO parcels. Project development will be in the design and permitting phase and development construction may not start on the Bulk Terminal and ASKO parcels for 1 to 2 years after cleanup. The interim soil cover on the Bulk Terminal and ASKO parcels will be used to prevent direct contact with ISS treated soil and to prevent turbid or elevated pH discharges to stormwater. Figure 12 identifies the types of interim surface covers that will be in place at the completion of cleanup construction.

In general, the surface of all excavation backfills will be coarse rock with limited fines, such as ballast rock. All ISS treatment areas (i.e., CAA-2.a and CAA-4) will be covered with a woven geotextile fabric, which will be anchored, and 6 inches of crushed rock or ballast rock, as appropriate. The ISS swell area will be sloped and covered with an anchored woven geotextile fabric to facilitate stormwater run-off with limited contact with the ISS material. The geotextile fabric provides a barrier between surface water and ISS material so that water that flows off the top of the ISS swell area will not have been in direct contact with ISS material. If ISS swell area is unused in the interim, it will be fenced to limit access. If an interim use occurs within the ISS swell area, the woven fabric will be covered by 6 inches of crushed rock or ballast rock, as appropriate.

Existing paved, gravel, and vegetated surfaces that are not disturbed during remedial construction will remain in place.

During the interim period between completion of the cleanup construction activities and start of site development, the interim surfaces will be maintained and stormwater runoff will continue as it did prior to site cleanup.

4.8 Project Development Grading

Grading for development construction will remove the remaining paved surfaces and potentially expose contaminated soil and ISS treated material on the Bulk Terminal and ASKO parcels. Any contaminated soil that remains in place or is moved during development grading will be placed under the final cap for the Upland AOC as described in Section 4.10. If there is no room for this soil under the final cap, the soil will be disposed at a Subtitle D landfill. Any ISS treated material that is disturbed during development grading will be disposed at a Subtitle D landfill; the final grading plan for the remedial construction is intended to keep the ISS treated material below elevations that are anticipated to be disturbed based on the conceptual property development plan shown on Figure 13.

4.9 Vapor Intrusion Assessment

A vapor intrusion assessment will be needed where buildings will be constructed over areas with TCE, benzene, and GRO remaining above CULs or where they are present in ISS treated material.

Once the building footprints have been determined and the remedial action has been completed, the following potential measures will be completed to address the potential vapor intrusion risk for buildings on the ASKO and Bulk Terminal parcels. For all buildings proposed to be built over areas with TCE, benzene, or GRO remaining above CULs, the following activities will occur:

- An initial assessment will be performed to determine whether contaminant concentrations in soil gas or groundwater exceed the applicable screening levels at locations sufficiently close to the planned building(s) to pose a potential risk for vapor intrusion.
- A vapor barrier will be installed beneath the building, consistent with EPA guidance, if required. The specific product will be selected during site development and specifications confirming its chemical resistant properties will be provided to Ecology for review and approval. Buildings will also be evaluated for additional engineering controls that could be installed during construction to enhance air exchange and support possible future vapor mitigation controls (based on initial assessment).

Results of the vapor intrusion assessment(s) will be included in the LTCMP Annual Report, as part of the VI Contingency Plan, if needed.

4.10 Final Capping

Placement of a cap will be required for the Upland AOC to mitigate direct contact exposures to contaminants that will remain in place (to 15 feet bgs) above the CULs following implementation of the above-described actions. Capping in the Upland AOC is expected to include a combination of pavement, constructed landscape areas, and buildings to be installed during Property development. In conjunction with the cap, ICs that require maintenance of the cap as a physical barrier in perpetuity will be implemented as described in Section 4.11. Figure 13 illustrates the conceptual development plan for the Upland AOC. Figure 14 presents a variety of final environmental cap sections that protect human health and the environment and are consistent with the conceptual development plan for the Upland AOC. The intent of providing these cap sections in the EDR is to allow development design and permitting to proceed with the understanding that, as long as the development plan complies with these cap sections. Typical sections are provided on Figure 14 and will be discussed with Ecology during the development of the RACR (discussed in Section 8.2.1)..

Because cleanup of the Shoreline AOC is intended to achieve the soil CULs, a protective cap is not required as part of the remedy in this area. Following soil excavation and ground surface restoration, best management practices will be employed to maintain surface gravel and any existing pavement and vegetation that remains on the East Waterfront parcel as a stabilization measure to control soil erosion until redevelopment occurs. Future development will include measures to prevent erosion if warranted based on post-remedy soil concentrations.

4.11 Institutional and Other Property Controls

ICs are measures undertaken to limit or prohibit activities that may interfere with the integrity of the cleanup action or that may result in exposures to hazardous substances. ICs in the form of an Environmental Covenant will be required for the Upland AOC parcels. The Environmental Covenant will impose restrictions on future uses of the ASKO and Bulk Terminal parcels consistent with industrial land use and will prohibit the use of groundwater as drinking water. It is anticipated the Environmental Covenant will be for any areas where a cap is present to limit direct contact with, and prevent surface infiltration of water through, contaminated soils that will remain in place at concentrations greater than CULs.

Ecology will prepare the Environmental Covenant consistent with WAC 173-340-440 and RCW 64.70 and in consultation with the grantor or other parties.

In addition to the Environmental Covenant, Property controls will include a SREMP for any future ground-disturbing activities on the Property. This plan will also be part of the LTCMP described in Section 7 and will be prepared upon completion of active cleanup action construction activities, prior to Property redevelopment.

4.12 Contingent Actions

The extent of the cleanup actions have been defined based on extensive site investigation and environmental sampling; however, unforeseen environmental conditions may arise. Equipment operators will be instructed to use the following criteria to alert the Engineer of potential issues of previously unidentified contamination at the Property. These criteria include, but are not limited to, the following:

- Obvious petroleum staining, sheen, or colored hues in soil or standing water in areas outside of known TPH contaminated areas.
- The presence of petroleum products or leachate of other chemicals in areas outside of known TPH contaminated areas.
- The presence of utility pipelines with sludge or trapped liquid indicating petroleum or chemical discharge sludge.
- The presence of buried pipes, conduits, tanks, 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.

- The presence of gasoline- or oil-like vapor or odor in areas outside of known TPH contaminated areas, or solvent odors in areas outside of known cVOC contaminated areas.
- The presence of burnt debris or slag-like material.

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

5 Scope of Work

5.1 Contractor Technical Execution Plan

A Technical Execution Plan (TEP) will be prepared by the Contractor prior to kick off of cleanup construction. The TEP will outline the implementation of the cleanup action. The Engineer will review the Contractor’s TEP and request any additional information so that the plan is comprehensive and meets all of the specified requirements; this document will not be submitted to Ecology for review. The Contractor’s TEP will include specific plans for completing the work. At a minimum, the TEP will include the following elements:

- Construction sequence and schedule
- Temporary Erosion and Sedimentation Control measures
- Traffic Control Plan
- Construction Water Management Approach
- Specific equipment and means and methods to complete the scope of work
- Shoring approach
- Excavation and Dewatering Plan for excavations that will encounter saturated conditions (CAA-2.b, CAA-6.a, and CAA-6.b).
- ISS mix design testing results and proposed amendment mixture
- Construction Quality Control Plan
- Site-specific Construction Health and Safety Plan (HASP)
- Survey Approach

5.2 Mobilization and Project Preparation

The contractor shall mobilize to the Project all the necessary equipment, labor, and materials to perform the work described in the following sections. Project preparation shall include the following activities:

- **Temporary facilities and access controls –** Typical temporary site facilities and controls include worker facilities, a decontamination area, and site access controls. Potable water, portable toilets, and a job site trailer(s) will be installed by the Contractor. Portable toilets will be placed on site for use by site personnel in accordance with WISHA guidelines included in WAC 296-155-140. A decontamination area will be established on site for vehicle, shoring, equipment, and personnel decontamination. All vehicles, shoring, equipment, and personnel that contact impacted materials will be decontaminated prior to exiting any site exclusion zones.
- **Utility locates and utility protection –** Prior to commencing any on-site activities, all underground public and private lines will be located and marked with paint. The gas line located within the ROW of West Commodore Way, adjacent to the CAA-2.b

removal area, shall be potholed to verify the location prior to starting any work in this area. The markings in CAA-2.b shall be surveyed and the markings maintained during construction within this CAA. The City of Seattle side sewer within the CAA-2 excavation will need to be located and capped prior to starting work in CAA-2. Water and gas lines on the East Waterfront parcel that serve the dock area are located within the CAA-6.a footprint; these lines will need to be disconnected at Commodore Way, all disconnects will be made in coordination with the utility owner. Drawings show the location of all known utility lines on the property (Appendix A, Drawings G-8 and G-9).

- **Project preparation –** The contractor shall complete any site grading and landscape grubbing, prior to the start of excavation activities. Due to the size of the project, it is possible that site preparation may be going on at the same time as remediation work in a different area of the project.

- **Erosion and sedimentation controls –** Temporary erosion and sedimentation controls will include best management practices (BMPs) for construction activities as shown on the construction Drawings G-11 through G-14 (Appendix A). No construction site stormwater runoff shall drain as untreated surface runoff to Salmon Bay. Stormwater resulting from construction activities will be collected, characterized, and disposed of at an offsite disposal facility or treated and discharged to the sanitary sewer under an approved discharge permit. If on-site treatment and discharge is used it shall comply with the King County Discharge Authorization (Appendix C).

- **Decommissioning of existing project monitoring wells –** Select monitoring wells located within excavation footprints, within work areas, or previously damaged were decommissioned on March 19-23, 2021, as shown on the Drawings (G-11 and G-12). The list of wells to be removed was approved by Ecology via electronic communication from Mark Adams on March 23, 2021. In addition to the monitoring wells, 106[3] injection and thermal remediation well points, associated with the 2010-2016 subsurface combined chemical oxidation and thermal heating via electrical resistance heating field work, were also decommissioned. All Project wells and injection points were decommissioned in accordance with the Ecology's Water Well Construction Act (1971), RCW 18.104 (WAC 173-160-460). Additional monitoring wells that are located in West Commodore Way that could not be accessed for decommissioning without traffic controls will be decommissioned immediately prior to or concurrent with construction and include 01MW-49, 01MW50, 01MW87, 01MW47, and 01MW52. Remaining monitoring wells will be marked for protection during construction as shown on the Drawings (G-11 and G-12).

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[3] This number has been revised from 144 to account for injection points which were decommissioned and documented in SES field notes.

- **Demolition of building foundations and asphalt/concrete in remediation areas including the treated wood bulkhead –** Above ground site features will be removed prior to the start of the environmental work. The remediation contractor will demolish select portions of building slabs and pavement that overlap with cleanup action areas, shown on the construction Drawings G-11 and G-12. The contractor will also demolish the treated wood bulkhead and perform site preparation grading to allow for excavation of CAA-6.a (Drawing G-11 and C-5).

- **ISS equipment work areas (ISS batch plant) –** The ISS contractor will mobilize equipment and reagents, and construct a batch plant. The batch plant location and associated staging area for equipment and materials will be determined by the Contractor and will be dependent on the sequence of work. The batch plant allows for precise measurement of the water and reagents on a weight basis**.** After completion of the ISS work, the Contractor shall remove the batch plant and clean any areas that may have been disturbed by batch plant operations.

- **Health and Safety Plan –** The Contractor shall have a health and safety plan reviewed by the Engineer prior to commencing on-site activities. A health and safety plan that includes preconstruction work, field oversight, and environmental sampling is included in Appendix H.

- **Traffic Control** – The Contractor shall prepare a traffic control plan to comply with the City substantive requirements for cleanup work performed in the ROW[4].

5.3 Temporary Erosion and Sedimentation Controls

BMPs will be installed down-slope and adjacent to all disturbed areas. All BMPs will comply with applicable portions of the Washington Department of Ecology, Stormwater Management Manual for Western Washington (Ecology 2019).

The Contractor shall not clear, grub, grade, or perform any earthwork until the following has been installed per plans or as directed by the Engineer:

- Silt fence or other perimeter controls are in place.
- Areas not to be disturbed are delineated with safety fence.
- Water flows from off site are tight lined and directed away from work area.
- All construction entrances are stabilized and tire wash systems in place.
- Catch basin inserts are installed in all catch basins that receive drainage from the site.
- Materials are on hand in quantities sufficient to cover all bare soil, divert all flows, contain all sediments, and prevent turbid discharges from the site during all stages of construction. These materials include, but are not limited to:

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[4] Work in the ROW is being completed under the City of Seattle Shoring Permit (included in Appendix C), this permit included review and acceptance from Seattle Department of Transportation.

  - Plastic sheeting
  - Straw
  - Drain pipe
  - Sand bags.

The following subsections describe general BMPs by area of the site.

5.3.1 Erosion and Sedimentation Controls

Silt fences or silt dikes will be placed along all work areas to prevent offsite transport of soils or other materials by stormwater. In paved work areas, sand bags (or other equivalent BMPs) will be installed along the upgradient side of the excavation areas to prevent, to the extent possible, run-on from entering the excavations. The sand bags will be placed such that no gaps between sand bags are evident. All existing site catch basins within active work areas will either be removed or will be blocked or protected, prior to excavation activities, shown on Drawings G-11 and G-12 (Appendix A). No Contractor-generated water may enter catch basins. All soil contact water, stormwater, decontamination fluids, and wheel wash water must be contained and either treated onsite or hauled offsite for treatment.

5.3.2 Stockpile and Truck Loading Areas

The Contractor may direct load excavated soil into trucks or may stockpile soils for loading. The proposed erosion control BMPs for the stockpile and truck loading areas will be determined by the Contractor based on specifications provided in the Drawings (Drawings G-10 through G-14, Appendix A) and will likely include:

- Installation of a berm or other controls to prevent run-on or run-off
- Installation of Ecology blocks along three sides of the stockpile areas
- Water will accumulate in the stockpile area as a result of gravity drainage of wet soil. This drainage water shall be contained and pumped on a regular basis and scheduled by the rate of settlement of pile drainage water and transferred to the construction water treatment system constructed for this project or trucked offsite for disposal.
- Decontamination of trucks and tires will be performed prior to trucks exiting the site to prevent track-out of impacted soil. Decontamination will include visual inspection and brushing or a wheel wash, as needed.
- Stockpiling only on impermeable surfaces, such as concrete, asphalt, or plastic sheeting.
- Covering with plastic sheeting during lengthy periods of inactivity or periods of rain to prevent moisture from entering the stockpiles and to minimize dust and odor, per Ecology’s 2019 Stormwater Management Manual for Western Washington and the TESC Plan (Drawing G-14, Appendix A).
- All export loads of contaminated soil shall be securely covered before leaving the site.

Stormwater controls, such as berms or swales, will be installed, within the limits of the work area to avoid any stormwater runoff from the Exclusion Zone, and to avoid any stormwater run-on into the Exclusion Zone. If truck wheel washing is used, water from wheel washing will be maintained separate from other impacted water and will be shipped to an offsite treatment and disposal facility unless the construction water treatment system is designed to treat for metals (see specifications included on Drawing G-3, under Construction Water Management, included in Appendix A).

5.4 Work Elements

5.4.1 Soil Excavation with Offsite Disposal

Soil excavation will be completed in the following cleanup action areas:

- CAA-1 (total depth 10 feet bgs) - Soil removal at CAA-1 will include removal to 5 feet bgs (CAA-1.a) and to 10 feet bgs (CAA-1.b). Limited dewatering may be required to complete the portion below the water table (CAA-1.b). The sidewalls will be sloped for stability during excavation. Excavation design specifications are illustrated on Drawing C-2 (Appendix A). Excavation in CAA-1 shall be completed prior to placement of any ISS swell material (discussed in Section 5.4.2).
- CAA-2.b (total depth 15 feet bgs) - Soil removal in CAA-2.b will be in the ROW of W. Commodore Way and will require shoring around the perimeter of the excavation area. Excavation at CAA-2.b will occur after ISS work at CAA-2.a as the cured ISS monolith will shore the Bulk Terminal side of the excavation. The ISS monolith at CAA-2.a will be allowed to cure for a minimum of 14 days prior to starting excavation work at CAA-2.b. Soldier pile and lagging will be used along the remainder of the perimeter of the excavation toward the ROW and trench boxes will be used where the ROW excavation is narrow, to the west, as shown on Drawing C-3. Soldier pile and lagging details for this area are provided on Shoring Plans SS2.0 and SS3.0 in Appendix A. In the northeast corner of CAA-2.b, ORC Advanced amendments will be added during backfilling activities to enhance biodegradation of any remaining petroleum (see Appendix F and Section 5.4.3). The lagging (and any CDF that may have been used behind the lagging) beneath the groundwater table will be removed from this section of shoring (concurrent with backfilling) to allow the amendments to contact any residual petroleum that may remain outside of the modified shoring alignment.
- CAA-3 and CAA-5 (total depth 5 feet bgs) – Soil in CAA-3 and CAA-5 will extend 5 feet bgs as shown on Drawing C-4. These excavations will not require shoring or dewatering. The sidewalls will be sloped for stability. Work at CAA-3 will require coordination with the ISS work at CAA-4. Though these two cleanup actions are not dependent on each other, they are in close proximity and space constraints may not allow concurrent work.

- CAA-6.a (total depth 6 feet bgs from building slab elevation) - Soil removal design specifications for CAA-6 are shown on Drawing C-5. Prior to excavation in this area, portions of the existing access road which overlaps with CAA-6.a will be removed and the treated timber wall that runs through the work area (shown on the Drawing) will be removed and disposed. The excavation sidewalls will be sloped for stability.
- CAA-6.b (total depth 3 feet bgs) - Excavation at CAA-6.b will occur up to the OHW line. Design specifications for this area are included on Drawing C-5. Due to the potential for surface water to inundate the excavation, excavation will not be performed until the seasonal water level at the Chittenden Docks is below 17.5 feet NAVD88 (20.75 feet USACE datum). This typically occurs at the beginning of September but could occur as late as late-October. The contractor will propose means and methods to complete this excavation and comply with the construction Drawings and TESC specifications. The excavation along the OHW line will be stabilized immediately after excavation using quarry spalls or rip-rap to help prevent failure of the excavation sidewall. Excavation in CAA-6.b is expected to extend to 15.5 feet NAVD88 at its lowest point along the north edge.
- CAA-7 (total depth 2 feet bgs). Soil removal at CAA-7 will extend 0.5to 2 feet bgs as shown on Drawing C-6. Soil will be removed to a depth of 2 feet bgs in an area located northeast of the former Icicle Seafoods building that is approximately 35 to 40 feet wide and extends to the shoreline. The other areas surrounding the 2-foot excavation area and surrounding the building will be excavated to 0.5 to 1 foot bgs. These excavations will not require shoring or dewatering. Soil excavation will not extend under structures that pre-date Icicle Seafoods operations (shown on Figure 7). Other pavement will be removed during excavation for access.

All excavation equipment will be decontaminated prior to starting on another CAA.

Standard excavation means and methods will be used to remove soil containing LNAPL from areas CAA-1.a and CAA-2.b. All excavations, with the exception of CAA-2.b, will be completed with excavators and sidewalls will be cut as steeply as possible to remain stable during the timeframe when performance monitoring samples are being analyzed and evaluated. In addition, a vacuum truck will be used to extract any LNAPL that accumulates in the excavated areas during the soil removal activities. LNAPL and associated soil removed from these areas will be transported offsite to a permitted facility for disposal or recycling (for LNAPL). Groundwater encountered while removing LNAPL will be removed, treated, and discharged to the sanitary sewer under a King County Industrial Wastewater Discharge Authorization, included in Appendix C.

Shoring and Dewatering

At a minimum, shoring will be required in CAA-2.b, along W. Commodore Way and along the BNSF property boundary (CAA-4). A shoring design is included in Appendix A and will include soldier piles and wooden lagging. Shoring will also include the use of trench boxes in the western portion of CAA-2.b, as noted above. Limited dewatering may be required to complete excavations below the water table and to install shoring. The Contractor shall prepare a dewatering plan to address these areas and include details in the TEP (discussed in Section 5.1).

Shoreline Stabilization

As mentioned above, excavation extends along a portion of the shoreline in CAA-6.b and CAA-7. These excavations will be conducted at low water levels in Salmon Bay to minimize risk of slope stability issues. The water level in Salmon Bay is controlled by the Chittenden Docks and excavation, along the shoreline only, will be conducted in CAA-7 when the water level is below 18.0 feet NAVD88 (21.25 feet USACE datum) and in CAA-6.b when the water level is below 17.5 feet NAVD88 (20.75 feet USACE datum). This generally occurs at the end of September.

The excavation along the OHW line will be stabilized immediately after excavation using quarry spalls or rip-rap to help prevent failure of the excavation sidewall. Excavation will be done in small sections to allow for immediate backfilling.

Backfilling

Prior to delivery of backfill materials to the Project, the Contractor must provide documentation demonstrating that the materials meet the chemical quality and gradation requirements specified in the Drawings (see General Notes provided on Drawing G-4) and discussed in Section 6.2. Each sample of backfill material must have concentrations of the IHS listed on Table 1 (see Section 3.2.1) below the CULs.

Soil Stockpiling/Staging Area

The Contractor shall determine the location and design of stockpile areas, in accordance with the specifications included in the Drawings (Appendix A, Drawing G-4). These areas may be moved based on the sequence of work. The Contractor may choose to use existing project features such as paved areas or building foundations. Any stockpile area is required to provide the following:

- Surge capacity to ensure that offsite hauling does not delay soil excavation.
- Contractor flexibility to excavate soils during off-hours when trucks may not be present onsite.
- Gravity drainage of wet soil excavated from the bank and deeper excavations.

Truck loading will occur within the stockpiling and staging areas if the Contractor is not direct loading. Truck loading and associated decontamination will occur, to the maximum extent possible, by confining trucks to a clean surface (pavement or gravel roadway), where the wheels and chassis do not come into contact with any soil. Visual inspection and limited brushing would be an appropriate level of decontamination for this approach. Trucks that drive through work areas with disturbed soil will be required to pass through a wheel wash prior to exit from the project if the stabilized construction access does not sufficiently remove soil from the tires to prevent sediment from being tracked offsite (shown on Drawing G-14, Appendix A).

Aggregate Storage Area

The aggregate storage area will be used as a stockpiling and staging area for clean import material to be used as backfill. The clean import material area shall be clearly separated from any export staging areas. This area will likely need to be relocated during construction to accommodate the excavation/backfilling areas. Clean import material shall be covered when not in use to minimize the potential of contamination per the stockpiling notes included on Drawing G-4.

5.4.2 In Situ Solidification

ISS construction activities will require careful planning and flexibility to optimize the means, methods, and sequencing with other Project cleanup activities. ISS work will be completed as a performance-based specification requirement where the selected contractor will determine the ISS means and methods to achieve the performance requirements. The contractor will be required to demonstrate that their proposed mix design can achieve the specification requirements identified in Section 4.3 and that their mixing means and methods are suitable for site soil. The following sections describe the general approach for implementing ISS over the areas shown on construction Drawings C-7 and C-8 (Appendix A). The ISS contractor will develop construction planning documentation to address:

- Additional bench-scale ISS mix testing and rationale as needed to confirm mix design;
- ISS test cell(s) to demonstrate the efficacy of ISS means and methods (likely 1 to 3 test cells per CAA);
- The layout and sequencing of grid cells for ISS application;
- Debris removal from the ISS footprint;
- Handling of wastes generated during ISS (grout wastes, equipment wash water, etc.); and,
- QA/QC protocols including sampling and performance testing during ISS batching and application.

The contractor will document reagent quantities and proportions during ISS batching and mixing processes. The contractor will collect samples of the freshly mixed ISS-treated soil in test cylinders for QA/QC testing during the ISS test cell(s) and full-scale construction, discussed in Section 6.2.4.

The ISS contractor will be responsible for determining a final ISS mix design that can be implemented in the field and meets the performance criteria for hydraulic conductivity and unconfined compressive strength (UCS). The final mix design is intended to be applied over the range of Project conditions to be encountered.

5.4.2.1 ISS Test Cells

ISS is anticipated to be completed in a systematic manner based on a grid cell system and sequential progression to be developed by the contractor. The contractor will establish a test cell or cells for ISS application prior to full-scale implementation. The test cell(s) will be located within the ISS footprint and will become part of the final ISS area after testing. The contractor will use the test cell information to demonstrate that the selected ISS approach can be effectively implemented to meet performance criteria prior to proceeding with full-scale ISS construction. Key to this demonstration is confirming that the ISS mixing method is expected to be implementable and effective at full scale using excavators or other methods to be determined by the contractor.

ISS in the test cell(s) will be observed to evaluate the completeness of mixing of the soil containing LNAPL (at CAA-2.a) and the extent to which debris, if encountered, is adequately incorporated into the final mixture. Representative samples of the ISS batch mix and ISS-soil mixture will be collected and tested to determine if the mixture meets the required performance criteria using the contractor selected mix design and ISS construction means and methods. The final test cell objectives and parameters will be detailed in future design phases and contract specifications. Test cell results will be used to confirm that the ISS process is suitable for full-scale implementation over the range of Project conditions to be encountered. Test cell ISS-soil mixtures not meeting performance requirements may require remixing, and in some cases using different methods and/or modified mix design, to demonstrate suitability for ISS implementation.

CAA-2.a is approximately 12,000 sq. feet and includes treatment down to approximately 25 feet bgs (elevation 20 feet NAVD88), as shown on Figure 8a. Approximate bottom depth elevations for the ISS treatment cells are indicated on Drawing C-7.

CAA-4 (CAA-4.a and CAA-4.b) is approximately 15,000 sq. feet and includes treatment down to approximately 40 feet bgs (elevation 17 feet NAVD88), shown on Figure 8b. Approximate bottom depth elevations for the ISS treatment cells are indicated on Drawing C-8. The southwestern boundary of this treatment area includes a slope up to the adjacent BNSF property. Soldier piles with lagging down to 15 feet bgs will be installed along the BNSF property boundary (see Appendix A, Drawings SS1.0 through SS4.0). The slope includes an elevation gain of approximately 13 feet over the treatment area. Within this slope, where ISS treatment is required to a depth greater than about 25 feet, ISS treatment will occur in two phases. In the first phase, soil from the surface to approximately 15 feet bgs along the BNSF property line, will be ISS treated in-place then moved to the ISS swell management area shown on Drawing C-8. Essentially the top 15 feet of soil will be treated by ISS methods and moved prior to solidification to the ISS Swell area. This will create a benched working surface for the second phase of treatment to full depth. The second phase will start at approximately 15 ft below the pre construction surface and extend to the treatment depth. Most soil mixed in the second phase of treatment will remain within the ISS footprint and will not be moved.

5.4.2.2 ISS Grid Cells and Sequencing

The contractor will determine the layout, required overlap, and sequential progression of ISS grid cells across the ISS footprint shown on Figure 8 and construction Drawings C-7 and C-8. It is anticipated that each grid cell will represent an area suitable for full-depth ISS during a work shift or other time duration to be determined. ISS-soil mixing will continue in a specific cell until the entire soil mass targeted for ISS in that cell is treated. Performing ISS in discrete cells will also help to promote relatively uniform curing.

The grid cell sequence will also consider:

- Appropriate cell overlaps for uniform blending of the ISS-soil mass across the ISS footprint;
- The need for modified mixing approaches in locations where soil conditions are different or more variable than expected;
- Management of the expected vertical expansion of the ISS-soil mixture above the application surface; and,
- Removal, handling, and disposition of debris that cannot be incorporated into the ISS mix because of type or size.

Debris Management

Debris, if encountered, within the ISS footprint will require removal of material greater than about 1 to 2 feet in the largest dimension, or if otherwise incompatible with the ISS method and curing. Oversized debris will be downsized and incorporated into the ISS mix if feasible or will be removed from the ISS footprint. The contractor will determine if and how debris can be downsized or otherwise removed from the ISS footprint.

Swell Management

A swell management area will be established in the southeastern corner of the Bulk Terminal parcel, as shown on Figure 12 and construction Drawings C-9. This area will be established after excavation and backfilling activities have been completed at CAA-1.

Due to the added volume of grout and the mixing process, swell material is expected to be approximately 20 to 30 percent of the total ISS volume. Swell material is contained during mixing through benching of the ISS treatment areas (i.e., excavation of treated surface soils to allow swell management within the treatment area, these surface soils will be incorporated into the swell management area). At CAA-2.b, the bench depth will be limited to the removal depth of surface pavement and aggregate. At CAA-4, soldier piles and lagging will be used to shore the upper 15 feet of soil along the BNSF property line. These upper 15 feet will be treated in a first phase (described in Section 5.4.2.1) and will be relocated to the swell management area described below; the lagging will be placed as part of this process. This will create a swell containment area and will allow the next phase of ISS to occur in a second phase to a maximum depth of 25 feet to reach the total maximum ISS depth of about 40 feet. For all ISS areas, swell material will be moved to the swell management area as needed to create space to contain the swell generated from future cells.

A swell management area has been defined in the southeastern corner of the Bulk Terminal parcel (Figure 12). Due to the presence of contaminants in the ISS swell, this area was selected in consultation with Ecology because it is elevated above groundwater, and it is upgradient and away from potential receptors. Swell will be moved to the swell management area within 24 to 48 hours of mixing, early in the curing process so that the material is still workable. The ISS swell will be placed and compacted in lifts to create a uniform mass that will meet the performance criteria to limit any potential leaching and provide a suitable subgrade for project development.

The ISS swell area will be sloped to the north and covered with an anchored woven geotextile fabric to facilitate stormwater run-off with limited contact with the ISS material. The geotextile fabric provides a barrier between surface water and ISS material, water that flows off the top of the ISS swell area will not have been in contact with ISS material. If an interim use occurs within the ISS swell area, the woven fabric will be covered by 6 inches of crushed rock or ballast rock, as appropriate.

5.4.3 **Groundwater Treatment**

The groundwater treatment program has been developed based on input from REGENESIS Remediation Services (RRS) and is included in Appendix F and the PRDI Work Plan (Appendix B). In situ groundwater treatment will be focused along the northern boundary of the ASKO parcel, generally north of CAA-5, in the area shown on Figure 5 and Drawing C-1. This treatment will include direct injection utilizing a standard size direct push rig (DPT) of a reagent mixture designed to capture incoming contaminants, rapidly remove them from groundwater and create a treatment zone of chemical reduction and bioremediation. The injected material will be Sulfidated Micro Zero Valent Iron (S-MicroZVI) and Bio-Dechlor INOCULUM Plus (BDI Plus) and PlumeStop Colloidal Biomatrix (PlumeStop™). Reagents will be injected through 50 injection points with a target top injection depth of 20 feet below current ground surface and a bottom target injection depth of 28 feet below current ground surface. Injection points will be installed along 2 rows, with about 7 feet between rows, over a distance of 165 feet. The proposed configuration of injection points is illustrated on Figure 1 in Appendix F.

During the application, real-time information will be collected and analyzed to verify design assumptions and subsurface reagent distribution. Data collected and analyzed will consist of groundwater quality parameters (i.e., pH, conductivity, DO, ORP, etc.), depth to water measurements, visual indicators through groundwater samples, and in-field injection concentration test kits. No samples from the injection verification will be submitted for lab analysis.

In CAA-2.b, dry amendments will be added during backfilling activities in the northeast corner, shown on Figure 5.1 in Appendix F. ORC Advanced pellets are designed for use in excavations and will be spread with mechanical equipment or by hand. Pellets will be spread evenly across the northeast corner of the excavation area both horizontally and vertically within the saturated zone. The Contractor will follow all applicable guidelines for ORC application and the safety requirements provided in Appendix F.

5.4.4 Interceptor Trench and Permeable Reactive Treatment

An interceptor trench will be constructed at the ASKO/BNSF boundary to capture and treat impacted groundwater migrating within the Perched WBZ on the BNSF parcel. The location of the trench is shown on construction Drawing C-1 and design specifications are provided on Drawing C-10.

The interceptor trench will be approximately 90 feet long and will be approximately 3 feet wide and 15 feet deep. Since ISS area CAA-4 will be excavated down to 15 feet bgs along the BNSF property boundary, the interceptor trench will be built from the bottom up at the same time that ISS swell material (from the area of the trench) is being placed immediately downgradient of the trench. The lagging from the shoring will be removed from an approximately 50 foot wide area to facilitate Perched WBZ groundwater flow into the trench. The lagging will be removed in vertical increments of about 2 feet and the ISS swell and trench backfill will be placed and compacted in successive lifts to fill the interval from where the lagging was removed. The ISS swell lifts will include geotextile fabric or a polyethylene liner, similar to mechanically stabilized earth wall construction. The bottom and downgradient wall of the trench will be lined with an impermeable liner to prevent the captured groundwater from contacting the ISS treated soil. The interceptor trench backfill will be bedding sand (ASTM C33) from the bottom of the trench (45 feet NAVD88) to 54 feet NAVD88. Lagging above 54 feet NAVD88 will not be required to be removed. The remainder of the trench will be backfilled to grade with clean import fill.

Granular zerovalent iron (gZVI) media will be placed in a precast concrete vault and the treated effluent will proceed to a gravity well to allow the water to drain into the shallow WBZ. The pre-cast concrete vault will be placed at the west end of the interceptor trench. The vault will be a 1,500-gallon grease interceptor (Oldcastle 5106 GA, or ,equivalent), or similar. 1,025 gallons of gZVI will be placed in the vault and will treat groundwater. A small area of bedding sand immediately upgradient of the vault will be installed and pretreatment of the groundwater will occur within a 50-foot section of the trench using a 2:1 mix of bedding sand and gZVI (1,125 gallons). The gZVI will be a certified clean 8 to 50 mesh product that is suitable for this application. Details of this design are included on Drawing C-10 provided in Appendix A.

5.4.5 Stabilization Surfaces

After cleanup actions are completed, the project will be returned to a stabilized condition prior to development. Interim stabilization will include restoring and temporarily maintaining site surfaces, and will be required on all disturbed areas of the project which include soil excavation areas, ISS areas (including but not limited to swell management); building foundations which overlap work areas, and stockpile areas. Figure 12 and Drawing

C-11 show the interim project stabilization plan and backfilled surfaces at each area of the Upland AOC. Perimeter fencing in accessible areas will also be maintained during the interim stabilization period to limit property access.

5.5 Disposal of Wastes

Excavated soil will be direct loaded to trucks or stockpiled for subsequent loading. Contaminated soil will be disposed at a Subtitle D landfill, such as Roosevelt Regional Landfill near Roosevelt, Washington or Columbia Ridge Landfill in Arlington, Oregon. Soil and LNAPL will be properly profiled for disposal prior to the start of excavation activities. Supplemental waste characterization data may be collected if required by the receiving permitted landfill. Truck traffic will be controlled for both volume and individual load size to ensure suitability for local roads. Loads will be kept within the frame of each truck bed and covered in conformance with Washington State Department of Transportation (WSDOT) standards to mitigate dust emissions. The Contractor will be responsible for properly covering and managing all stockpiled materials.

Table 4 identifies the disposition of all anticipated waste streams and the criteria that each must achieve before offsite shipment or reuse. Concrete, asphalt, building materials, and clean fill that are to be recycled or reused must be free of soil or staining/contamination.

Table 4 Management of Surface and Subsurface Debris

Material	Source	Criteria	Disposition
Project Soils	Soil excavation areas	No criteria	Subtitle D landfill
Concrete	Building foundations, slabs and debris, catch basins, curbing	No visual impacts or facility acceptance criteria	Crush and reuse on site or concrete recycling facility
Asphalt	Pavement	Facility acceptance criteria	Asphalt recycling facility
Treated wood	Piles, walls, and other wood debris	No criteria	Subtitle D landfill
LNAPL	LNAPL removed from excavations	Facility acceptance criteria	Petroleum recycler
Metals	Debris and piping; building materials	Facility acceptance criteria	Metal Recycler; Subtitle D landfill if not accepted for recycling
Bank rip-rap, gravel and boulders	Existing shoreline, existing access road	No visual impacts	Reuse onsite

6 Construction Compliance Monitoring Plan

Compliance monitoring to ensure the protectiveness of the cleanup action will be implemented in accordance with WAC 173-340-410. Compliance monitoring includes three types of monitoring – protection, performance, and confirmation. This CCMP describes protection and performance monitoring that will be performed during cleanup construction. Monitoring activities will be documented during cleanup construction and results will be presented in the Remedial Action Completion Report (RACR).

After cleanup construction, groundwater performance monitoring and long-term groundwater confirmation monitoring will be addressed in the Long-Term Compliance Monitoring Plan (LTCMP) that includes the Soil and Remedial Element Management Plan (SREMP), the revised Groundwater Monitoring Plan (GMP), and the Vapor Intrusion (VI) Contingency Plan, if needed. The LTCMP will be updated after property development to reflect the developed site conditions.

6.1 Protection Monitoring

Health and safety protection monitoring during construction will be addressed in the Contractor's site-specific Health and Safety Plan (HASP). Appendix H includes the HASP for the consultant performing field oversight and environmental sampling activities. All contractors and subcontractors are required to use workers trained for hazardous waste work and to comply with the HASP included in Appendix H. It is the remedial Contractor's responsibility to meet the requirements of WAC 296-155, Safety Standards for Construction Work, and the applicable provision of the hazardous waste operation regulations, WAC 296-62, Part P (General Occupational Health Standards) and 29 CFR 1910.120 (Hazardous waste operations and emergency response). The Contractor's HASP will include written documentation of employee training and medical certifications as required under WAC 296-62, Part P. The selected Contractor will provide this document as part of pre-construction documentation. The HASP will include the following items for each site worker where work falls under the requirements of WAC 296-62, Part P:

- Initial 40-hour OSHA HAZWOPER training and annual 8-hour refresher training
- Eight-hour OSHA supervisory training, required for the field supervisor
- Medical clearance from the licensed physician certifying that the worker is fit to participate in field activities and use personal protective equipment
- Current respirator fit test certification (if applicable)
- Current CPR and first aid certification for at least one member of the crew
- Provision of personal protective equipment for each worker at the highest level of protection required for each specific activity at the site.

The Contractor will also have a site health and safety (H&S) officer who will ensure that all Contractor personnel adhere to the H&S regulations.

6.2 Performance Standards

The purpose of performance monitoring per WAC 173-340-410(1)(b) is to “confirm that the interim action or cleanup action has attained cleanup standards and, if appropriate, remediation levels or other performance standards.”

The following sections identify performance standards for activities at the site including testing requirements that will be applicable during site cleanup activities. Specific sampling protocols to document compliance with MTCA cleanup levels and remediation levels and ISS performance criteria are described in the Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) included in Appendix G. Field confirmation procedures for installation of the PlumeStop^{TM} groundwater treatment system are described in Appendix F.

6.2.1 **Emission Controls**

Excavation, surface pavement and slab demolition and removal, grading, and capping activities will be carried out in a manner that minimizes fugitive dust emissions. The Contractor shall provide measures (e.g. water truck) to suppress fugitive dust generated during cleanup activities that the Engineer deems excessive based on visual criteria (in accordance with Puget Sound Clean Air Agency Regulation 1, Section 9.15). The Engineer will monitor the on-site activities to ensure compliance with these standards and regulations. Stockpiles will be covered to the extent practicable to further minimize dust during construction.

6.2.2 **Water Discharge**

Collected stormwater, water from excavations and stockpile areas, and water from equipment/personnel decontamination will be consumed in the in-situ solidification and stabilization process or discharged to the sanitary sewer under the treatment and discharge requirements of a King County Sewer Discharge Authorization or Permit. The approved King County Industrial Wastewater Discharge permit is provided in Appendix C. Discharge samples will be collected in accordance with the permit to confirm compliance with discharge limits.

For the East Waterfront parcel, there will be no stormwater discharged to Salmon Bay from active cleanup areas during remedial activities. Construction stormwater from other areas of the East Waterfront parcel will be routed to collection and infiltration areas to the maximum amount possible. To the extent that stormwater cannot be collected, the stormwater will be managed in accordance with the Construction NPDES permit. Each week or within 24 hours following a rain event during construction, the BMPs will be inspected and stormwater will be sampled per the requirements of the permit. The inspections and sampling activities will be conducted as outlined in the Stormwater Pollution Prevention Plan.

6.2.3 **Excavation**

Confirmation soil sampling will be conducted independently in each of the excavation areas, shown on Figure 5 (CAA-1, CAA-2.b, CAA-3, CAA-5, CAA-6, and CAA-7). The SAP/QAPP (Appendix G) describes sampling protocols for completing excavation activities. The confirmation soil sampling approach uses existing data and proposes new samples when existing data is not available. Refer to SAP figures in Appendix G for the locations of existing data that will be used for confirmation purposes, as well as proposed additional confirmation sample locations.

Each excavation soil sample will be analyzed on an expedited turn-around basis to minimize the time that excavations are open. No backfilling of a particular area may begin until these data have been received and evaluated, unless the existing data is being used for confirmation. The data will be used to determine if and where additional excavation passes are needed. These data will be draft and not validated at the time field decisions are made.

The sequence of sample collection will be guided by the manner in which the Contractor stages the site work. These data will be used to determine whether excavation is complete (i.e., performance criteria are met) or additional excavation is required.

Confirmation soil samples will be collected from the bottom and sidewalls of the remedial excavation once the design depth and extents have been reached. Confirmation samples will be collected from within the excavation areas to confirm that concentrations of IHSs are below the applicable soil cleanup or remediation levels. Existing data will also be used to confirm the excavation extents. The SAP, included in Appendix G, includes detailed figures showing the existing and proposed sample locations at each CAA. Samples will be collected following excavation after it has been confirmed by the Contractor that design elevations and extents have been achieved. Excavation confirmation sample locations may be adjusted to collect samples at the locations with the strongest field indications of contamination (i.e. odor, sheen, staining, or elevated headspace volatiles concentrations), if present.

Excavation bottom samples will be collected from the proposed bottom depth of the excavation in each CAA. For excavations within the vadose zone only, sidewall samples will be collected from about the vertical mid-point corresponding to the zone of contamination removed. For petroleum excavations that extend to the saturated zone, sidewall samples will be collected vertically from within the smear zone. Sidewall samples will not be collected from the following areas: 1) excavation sidewalls adjacent to clean backfill from previous excavations; 2) shored excavation sidewalls; 3) excavations adjacent to the OHW line; 4) excavation sidewalls adjacent to ISS areas; 5) locations with existing soil data; and 6) excavation sidewalls adjacent to improvements that were in place prior to operations that caused arsenic contamination to shallow soil in CAA-7. Specific sample locations are identified in the SAP (Appendix G).

Some existing soil sample data will be used for CAA-7 to demonstrate statistical compliance with cleanup standards. These data are summarized in the PRDI summary report included in Appendix B, and confirmation soil samples sampling locations are discussed in Appendix G. The relevant IHS analytes and performance criteria for soil excavation areas are summarized on Table 5.

Table 5 Soil Excavation Performance Criteria

AOC	Indicator Hazardous Substance	Performance Criteria (mg/kg)
CAA-1 and CAA-2.b	GRO	5,000 (REL)
	Total DRO+ORO	12,000 (REL)
CAA-3	GRO	5,000 (REL)
	Total DRO+ORO	12,000 (REL)
	TCE[1]	1.0 (REL)
CAA-5	Total DRO+ORO	2,000 (CUL)
	Arsenic	7.3 mg/kg (CUL)
CAA-6.a (see note 2)	GRO	30 (CUL)
	Total DRO+ORO	2,000 (CUL)
	DRO	570 (CUL)
	ORO	1,600 (CUL)
	Benzene	0.02 (CUL)
CAA-6.b (see note 2)	GRO	30 (CUL)
	Total DRO+ORO	2,000 (CUL)
	DRO	570 (CUL)
	ORO	1,600 (CUL)
	Benzene	0.02 (CUL)
CAA-7	Arsenic	7.3 mg/kg (CUL)

Notes:

mg/kg Milligrams per kilogram	AOC – Area of Concern
DRO - Diesel-range organics	GRO - Gasoline-range organics
CUL – Cleanup Level	ORO - Oil-range organics
TCE – Trichloroethene	REL – Remediation Level

[1] Most of the confirmation samples from CAA-3 will be analyzed for GRO and Total DRO+ORO. Two sidewall confirmation samples from the south-west sidewall and the southernmost base sample, which is adjacent to the location of historical TCE detections in soil greater than the REL will additionally be analyzed for TCE.

[2] Arsenic in soil is not listed as an IHS for CAA-6 in Section 4.2 of the CAP; therefore, soil confirmation samples in CAA-6 will not be analyzed for arsenic.

6.2.3.1 Compliance with Cleanup Standards

The confirmation soil sampling dataset for excavations performed in each CAA to achieve CULs will be evaluated for compliance with the cleanup standard for each soil IHS using the

Model Toxics Control Act (MTCA) three-part rule defined in WAC 173-340-740(7), as follows, except where the CUL is based on the natural background concentration:

- No sample may exceed two times the soil CUL for each IHS.
- No more than 10% of the samples for each IHS may exceed the CUL.
- The 95% upper confidence limit (UCL) on the sample mean (for each IHS) may not exceed the criterion.

Specifically, this statistical evaluation procedure applies to the CAA-6.a and CAA-6.b excavations.

For confirmation sampling within CAA-7, the CUL is based on natural background concentrations for arsenic. When that is the case, the three-part rule may be modified per WAC 173-340-740(e)(i) and (ii) to control the false positive error rate at 5%, subject to approval by Ecology. Specifically, the exceedance factor may be increased above 2 and the percentage of samples exceeding the CUL may exceed 10%, consistent with the procedures outlined the Statistical Guidance for Ecology Site Managers (Ecology 1992). Section 4.3.5 of the guidance document states that “for relatively small compliance monitoring sample sizes (n<30), not more than 20 percent of the samples should exceed a standard based on the 90th percentile background value.” For this EDR, the acceptable percentage of samples exceeding the CUL based on the natural background concentration is proposed to be <20% based on the referenced text in the guidance document. Based on the existing and proposed additional confirmation locations, the anticipated total number of samples is 48. That sample quantity allows for 8 samples (16%) to exceed the CUL and an exceedance factor of 2.9x (max concentration of 21 mg/kg) to be applied. Details regarding the CAA-7 confirmation data set and the calculations supporting the above analysis are provided in Appendix G (refer to Figure G-8). These calculations will be verified using the entire confirmation soil data set after excavation and additional confirmation sampling is performed.

The first part of the three-part rule represents an objective decision-making step. If the allowable exceedance factor is exceeded in any sample, the excavation area will be expanded to remove the soil associated with the sample. New data will be collected at the bottom and/or sidewall of the expanded portion of the excavation. These new data will replace the data representing the excavated soil, and the statistics for each IHS will be recalculated. If either of the second two parts of the three-part rule are exceeded, additional excavation will be performed at areas with the highest remaining concentrations.

Soil samples collected from the bottom and sidewalls of excavations performed to achieve RELs will be evaluated by direct comparison to the REL. In addition, the REL for GRO and DRO+ORO is based on an estimate of residual saturation such that the excavation will remove all free product. The Engineer will visually observe for the presence of free product during excavation where excavation shoring is not present. Post-excavation groundwater concentrations where a standard point of compliance applies (i.e. CAA-6, CAA-7) will serve as empirical demonstration that confirmation sample concentrations are protective of groundwater.

6.2.4 **In Situ Solidification**

The Contractor shall complete ISS mixing in each compliance grid cell to the elevations shown on Drawings C-7 and C-8 (Appendix A). The Engineer will direct the Contractor to collect each performance sample from a specific location and depth within each compliance grid cell. The Contractor will not be provided this information until ISS mixing in that area has been completed. Sampling will occur within 4 hours of mixing completion, before the ISS mix cures. ISS performance testing will include the following:

- Each ISS perimeter grid cell will meet the following performance standards for all samples tested. Grid cells that do not meet the performance testing requirements will be re-mixed, re-sampled, and re-tested at the Contractor's sole expense until the grid cell meets the performance requirements:
    - Hydraulic Conductivity less than $1\text{x}10^{-6}$ cm/sec and unconfined compressive strength (UCS; 28 days) greater than 50 psi. Up to 10% of interior ISS grid cells may fail the above criteria but each grid cell must have a hydraulic conductivity no greater than 10^{-5} cm/s and a UCS no less than 30 psi. Laboratory Proctor testing of mixed ISS material will be performed on samples collected from the test grid cells.
- Contractor will complete a minimum of two test grid cells, within both CAA-2a and CAA-4, prior to mixing the remaining cells to confirm that the performance standards will be achieved using the methods and mix design submitted to the Engineer.
- The top elevation for ISS treatment and bottom elevation for ISS treatment are shown on Drawings C-7 and C-8 and Figures 8a and 8b. The Contractor will not deviate from the elevations shown by greater than 0.5 feet without written authorization by the Engineer.

The volume of the ISS treatment areas is anticipated to expand by about 20 to 30% due to treatment activities. A specific area of the Bulk Terminal parcel has been identified for placement of ISS swell material. Contractor shall move ISS swell material to the designated area while the swell material is still workable. The swell material will be placed in 8-inch lifts and will be compacted using mechanical equipment to at least 95 percent of its maximum dry density, as determined by the American Society of Testing and Materials (ASTM) standard D-1557 (Modified Proctor).

6.2.5 Import Fill

Prior to delivery of backfill materials, the Contractor shall provide documentation demonstrating that the materials meet the chemical quality and gradation requirements specified.

For excavations that extend below the water table that have standing water, backfill will consist of 3 to 4-inch minus structural fill (WSDOT Specification 9-03.12(2)) or quarry spalls to above the standing water level. The backfill shall be compacted with a hoe-pack compactor over the entire area or by at least 3 passes with a 10-ton vibratory compactor.

For fill activities in vadose zone excavations or above the structural fill (or quarry spalls) in deeper excavations, backfill will consist of gravel borrow (WSDOT specification 9-03.14(1)).

Gravel borrow will be placed in 8-inch, successive, loose horizontal lifts and compacted using mechanical equipment to at least 95 percent of its maximum dry density in the top 2 feet, as determined by the American Society of Testing and Materials (ASTM) standard D-1557 (Modified Proctor). Below 2 feet, the gravel borrow is to be compacted to 90 percent of its maximum dry density. The procedure to achieve the specified minimum relative compaction depends on the size and type of compacting equipment, the number of passes, thickness of the layer being compacted, and certain soil properties. Before fill control can begin, the compaction characteristics of the fill material must be determined from representative samples of the fill and laboratory Proctor testing.

The upper 2 feet of some excavation areas will be backfilled with ballast rock (WSDOT Specification 9-03.9(1)). These areas include soil excavation areas where the goal is to minimize the potential to generate turbid stormwater. For ISS treated areas, a temporary cover will be placed over exposed areas for soil stabilization purposes as described in Sections 4 and 5.

6.3 Construction Documentation

During construction activities, the Contractor will be required to submit daily reports to the Engineer. These submittals are for informational purposes only and are intended to summarize daily work conditions, deviations, and corrective measures. The specifications also describe Contractor submittal requirements in detail.

After the completion of construction activities, the Contractor will be required to submit record drawings for various elements of the construction, including the as-builts showing limits of excavation, final surface elevations, ISS performance sampling results, backfilling and compaction results, and soil disposal documentation. The Contractor will also submit certificates of conformance for import materials. The Contractor will submit these materials to the Engineer, and they will be included in the RACR submitted to Ecology.

7 Long Term Compliance Monitoring

The Long-Term Compliance Monitoring Plan (LTCMP) will document the post-construction and post-property development monitoring and will include a revised Groundwater Monitoring Plan (GMP, a draft is included in the CAP), Soil and Remedial Element Management Plan (SREMP), and VI Assessment and Contingency Plan, if needed. The LTCMP will be prepared after the remedial construction is complete (i.e., upon completion of interim stabilization surfaces) and will be revised, as needed, after Property development. Specific plans include the following information:

- A draft GMP was included in the CAP and will be finalized with the LTCMP. The GMP will outline the location of new groundwater monitoring wells, discuss installation and development of new monitoring wells, the use of existing monitoring wells, and the groundwater sampling program at the Project.
- The SREMP will identify the locations and depths of soils exceeding cleanup levels on the Upland AOC and best management practices for soil handling and disposal and worker protection in the event that future property operational or construction activities disturb these soils. As discussed in Section 6.1.8 of the CAP, the SREMP will include the following elements:
    - Procedures for inspection, maintenance and repair of the cap;
    - Best management practices for unpaved areas of the property to prevent soil erosion to the storm drains system or directly to sediment in Salmon Bay, if warranted by post-remediation conditions; and
    - Protocols for notifying Ecology of planned (or proposed) ground disturbing activities as well as any instances in which a site control measure fail, resulting in a release or new exposure pathway.
- The VI Contingency Plan will address areas of the site where contaminants remain in soil and groundwater above the VI guidance levels in the Upland AOC and detail vapor intrusion assessment methods. A vapor intrusion assessment will be needed for buildings that will be constructed over areas with TCE, benzene, and GRO remaining above CULs or ISS treated material.

The GMP will document groundwater monitoring locations, frequency, and analytes, data analysis procedures, and will include contingency remedial actions for groundwater. As stated in the CAP, the potential exists that groundwater will not meet CULs at the CPOC within 15 years. If extrapolations from the groundwater compliance monitoring data indicate that IHS concentrations are not declining at a rate sufficient to reach CULs within 15 years, contingency action(s) will be evaluated and undertaken as directed by Ecology to correct the situation. If a contingency evaluation is necessary, consideration will be given to factors such as the severity of predicted CUL exceedances, the volumetric proportion of groundwater not expected to reach CULs, and whether data analysis suggests the plume is shrinking, stable, or expanding. The decision point for determining whether to implement contingency measures will be 5 years from the end of remedial construction, or directly after Property development if the latter causes a potentially significant disruption of the groundwater recharge and flow regime. If a contingency evaluation is necessary, the schedule for completing and reporting that work will be established between Ecology and the Project Coordinator. The results of the contingency evaluation may be included in the annual report for that year or a separate document. The appropriate type and degree of contingent action will be subject to review and approval by Ecology.

8 Schedule and Reporting

8.1 Implementation Schedule

Below is an anticipated timeline from bidding through construction completion.

- **March 22 to May 20, 2021 – Abatement and Demolition.** Abatement and demolition of the aboveground structures was performed under a separate contract prior to the cleanup contractor mobilizing. All documentation of this work will be included in the RACRs (Section 8.2.1).
- **Early summer 2021 – Contract Award and Contract Execution**. TOCST selection of Contractor. Upon full execution of the construction contract, the Contractor will develop critical contract submittals, but will not mobilize to the Project until critical submittals have been approved by TOCST.
- **July 6, 2021 – Notice-to-Proceed**. Upon receipt of all required permits and approvals of substantive requirements for the critical submittals, the Contractor will be given notice to proceed.
- **July 6 to November 31, 2021 – Remedial Construction Activities[5].** The Contractor will implement the cleanup action. Excavation work at CAA-6.b, along Salmon Bay, may extend into November to allow implementation at low water stage in Salmon Bay.
- **Per the CAP schedule – Submit Draft and Final Long Term Compliance Monitoring Plan.** The draft will be submitted 90 days following the remedial construction completion and the final will be submitted 45 days following the receipt of Ecology's final comments on the draft LTCMP.
- **Per the CAP schedule – Remedial Action Completion Report(s)**. This may include multiple report submittals depending on how the cleanup action is phased (see Section 8.2.1). A report will be prepared once the Contractor has completed all remedial construction activities. This will detail the results of the remedial action completed for the project. This will be submitted 150 days following completion of the construction action.
- **Per the CAP schedule - Implement Final LTCMP.** Groundwater compliance monitoring will begin no later than 1 year after completion of the active remedial construction completion activities, which may be prior to completion of Property redevelopment and placement of the final cap. Other components of the LTCMP

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[5] Does not include construction of the cap, which will be completed concurrent with redevelopment of the Property after all other remedial construction activities have been completed.

(SREMP and VI Contingency) will be implemented per the schedule established in the LTCMP.

8.2 Reporting

Reports will be prepared and issued to Ecology to document work performed for compliance with the PPCD and to meet MTCA regulatory requirements for the cleanup action.

8.2.1 Remedial Action Completion Reports

After completion of each phase of cleanup construction activities, a Remedial Action Completion Report (RACR) will be prepared to meet the requirements of WAC 173-340-400(6)(b). A report will be submitted to Ecology within 150 days following construction completion for each phase of remedial action construction[6] as follows:

- RACR for the waterfront parcels - 150 days following remediation construction completion on the waterfront parcels
- Interim RACR for the ASKO and Bulk Terminal - 150 days following construction of the interim surface
- Final RACR for the ASKO and Bulk Terminal - 150 days following cap construction completion.

Each report will document construction activities performed to complete the remedial actions described in this EDR. Deviations from design construction Drawings and/or specifications will be described in the RACR; the rationale for deviations will also be documented. The report will describe construction techniques, as appropriate, and will include results of relevant tests and measurements made during remedy construction, including quality assurance testing and applicable compliance sampling.

Each RACR will be prepared under the oversight of a Professional Engineer licensed in Washington State. The report will include an opinion by the Professional Engineer as to whether the cleanup action has been constructed in substantial compliance with the construction Drawings (Appendix A) and related documents included in this EDR. The Professional Engineer’s opinion will be based upon observations, testing, inspections, and compliance sample results.

8.2.2 Quarterly Progress Reports

Progress reports will be prepared on a quarterly basis, in accordance with the requirements of the PPCD, and submitted to Ecology via email no later than the 15th day

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[6] The placement of pavement or buildings as part of the Upland AOC remedy will occur during Property redevelopment. Remedy implementation will not be considered complete for the Upland AOC until redevelopment is complete.

following each quarterly reporting period (April 15, July 15, October 15 and January 15). The progress reports will document work completed and planned for implementing the cleanup action, and will also include all other information specified in Section XII of the PPCD.

8.2.3 Annual Reports

Following Ecology's approval of the LTCMP, annual LTCMP reports will be prepared and submitted to Ecology to document post-remedy monitoring activities. The annual reports will include, at a minimum:

- A summary of all monitoring activities and data collected per the LTCMP for the previous year, including the results of vapor intrusion assessment(s) and a summary of contingency actions if warranted;
- An assessment of compliance with CULs and cleanup standards;
- Indications of organic contaminant degradation;
- Long-term groundwater quality trends and flow patterns;
- Recommendations for updates to monitoring locations or frequency (as appropriate);
- Summary of inspection and maintenance activities performed in accordance with the SREMP, including actions taken to address issues identified in the previous year.
- Summary of Property modifications, including any changes in use, accidents, or upsets that could affect components of the remedial action.

These reports will be submitted by March 1 for the prior calendar year.

9 References

Cedergren 1989. Seepage, Drainage, and Flow Nets. Harry R. Cedergren, 1989.

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Floyd|Snider 2019. Supplemental Remedial Investigation and Feasibility Study. Prepared by Floyd|Snider, September 25, 2020.

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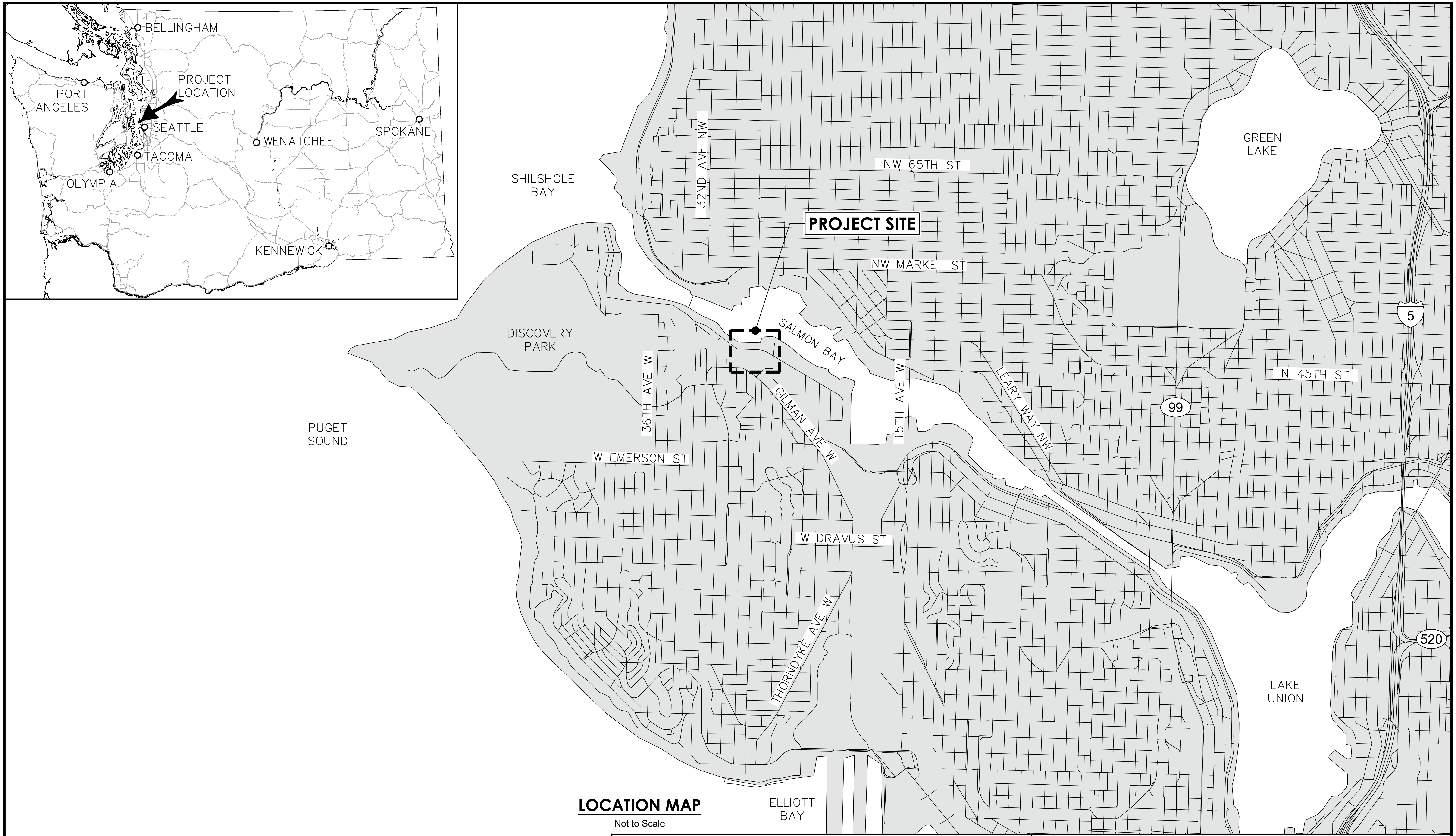
GeoSyntec 2019. Results of In situ Stabilization/Solidification (ISS) Treatability Study for Time Oil Company, 2737, 2750, 2800, 2805 West Commodore Way; Seattle, WA. GeoSyntec September 12, 2019

SiRem 2019. Treatability Study Report - Column Study to Evaluate Remediation of Chlorinated Solvents in Groundwater Using Zero Valent Iron. SiRem. August 22, 2019.

Figures



LOCATION MAP

Not to Scale

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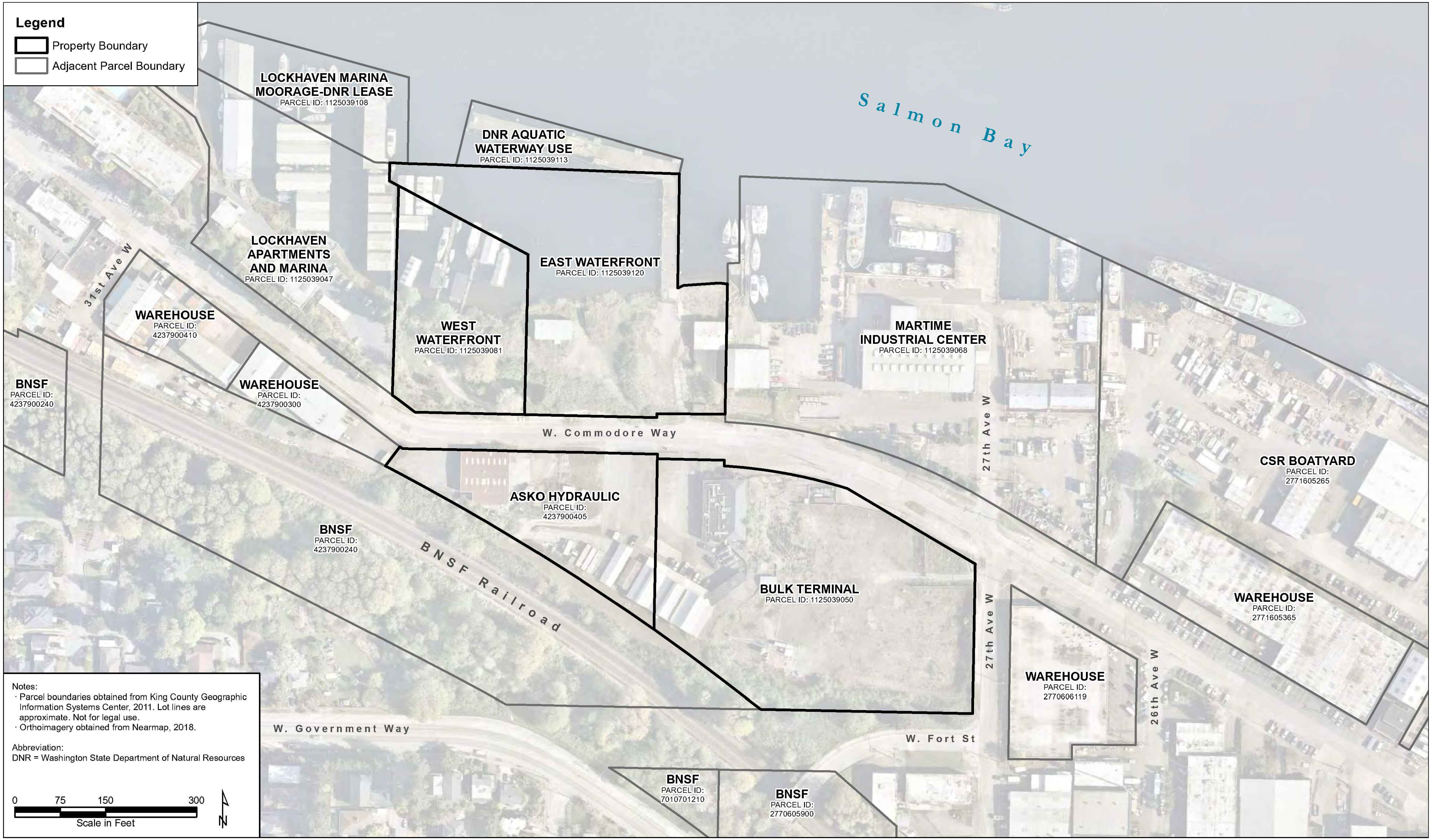
Engineering Design Report
Time Oil Bulk Terminal
Seattle, Washington

Figure 1
Property Location



Notes:
- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

Abbreviation:
DNR = Washington State Department of Natural Resources

File: D:_Projects\Crete\Time Oil Seattle\Time Oil_EDR Fig Prop Map.dwg Date: 4/28/2021 Author: Cabryn

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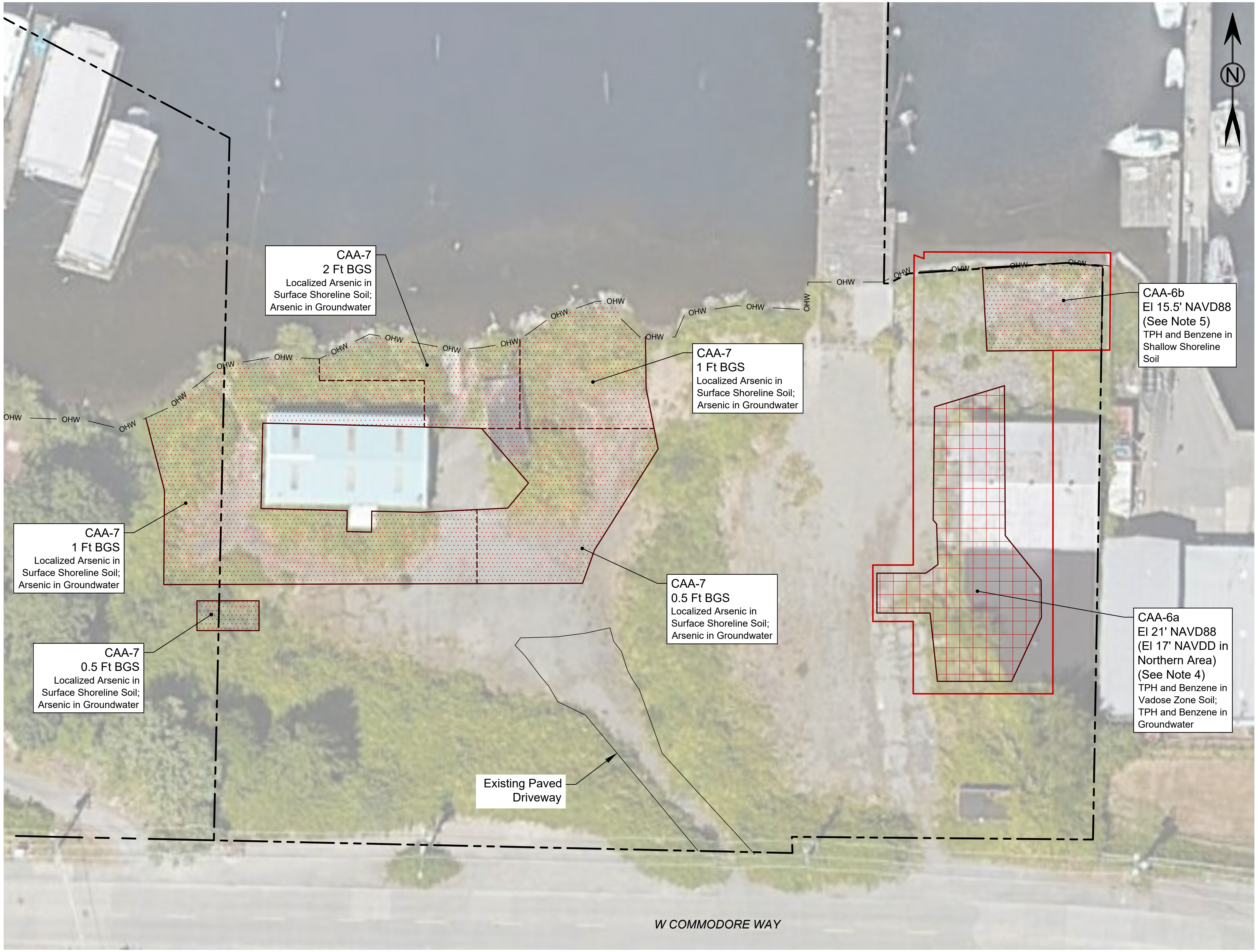
Seattle, Washington

Figure 2
Property Map



LEGEND

🟥 Cleanup Action Area (CAA)

CAA Sub-Areas (See Note 1)

▦ Continuous Area of Soil Impacts

▒ Isolated and Discontinuous Area of Shallow Soil Impacts

— OHW — Ordinary High Water

— — — Parcel Boundary for
TOC Seattle Terminal 1, LLC Properties

NOTES

1. CAA depth is determined by the vertical extent of continuous soil contamination in the CAA and does not include outlier exceedances.
2. Parcel boundaries obtained from King County GIS Center, 2011. Lot lines are approximate. Not for legal use.
3. Elevations listed in NAVD88.
4. The surface elevation at CAA-6a varies from 35' NAVD88 to 22' NAVD88. Elevations are provided to ensure final depths are achieved. The excavation will be approximately 15' ft bgs at the northern extent and 5' bgs at the southern extent.
5. The surface elevation in CAA-6b varies slightly, an elevation is provided to ensure that the excavation depth is reached throughout the excavation. The excavation will be approximately 3 ft bgs.

ABBREVIATIONS

AOC = Area of Concern
CAA = Cleanup Action Area
CPOC = Conditional Point of Compliance
Ft BGS = Feet Below Ground Surface
TPH = Total Petroleum Hydrocarbons
OHW = Ordinary High Water Mark

0 40 80
SCALE IN FEET

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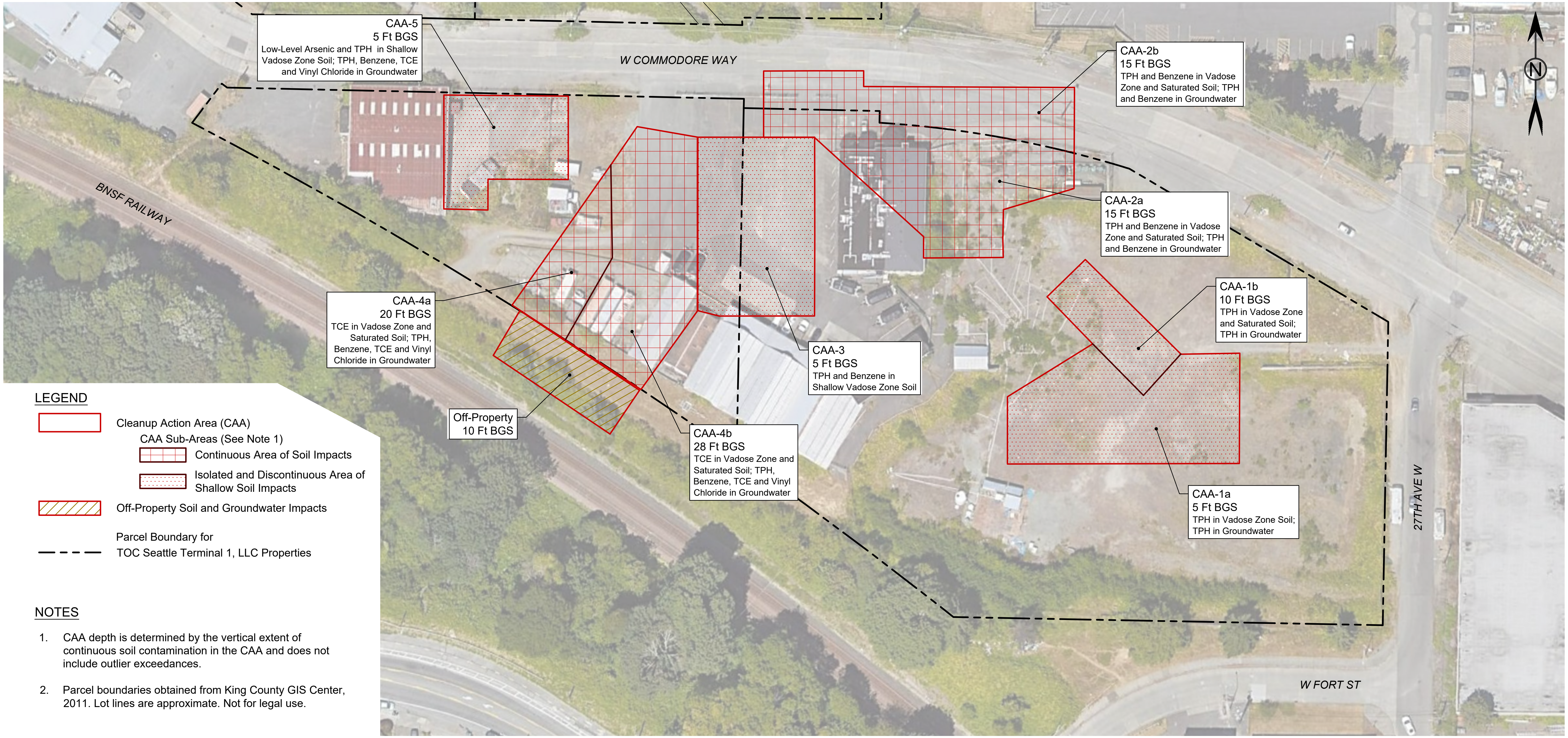
Time Oil Bulk Terminal
Seattle, Washington

Figure 3
Shoreline AOC Cleanup Action Areas
and Contaminant Depths/Distributions

File: D:_Projects\Crete\Time Oil Seattle\Time Oil_EDR Figs-Crete.dwg Date: 4/28/2021 Author: Cabryn



LEGEND

🟥 Cleanup Action Area (CAA)

CAA Sub-Areas (See Note 1)

▦ Continuous Area of Soil Impacts

▒ Isolated and Discontinuous Area of Shallow Soil Impacts

▨ Off-Property Soil and Groundwater Impacts

– – – Parcel Boundary for TOC Seattle Terminal 1, LLC Properties

NOTES

1. CAA depth is determined by the vertical extent of continuous soil contamination in the CAA and does not include outlier exceedances.
2. Parcel boundaries obtained from King County GIS Center, 2011. Lot lines are approximate. Not for legal use.

ABBREVIATIONS

AOC = Area of Concern
CAA = Cleanup Action Area
Ft BGS = Feet Below Ground Surface
TCE = Trichloroethene
TPH = Total Petroleum Hydrocarbons

0 80 160
SCALE IN FEET

File: D:_Projects\Crete\Time Oil Seattle\Time Oil_EDR Figs-Crete.dwg Date: 4/28/2021 Author: Cabryn

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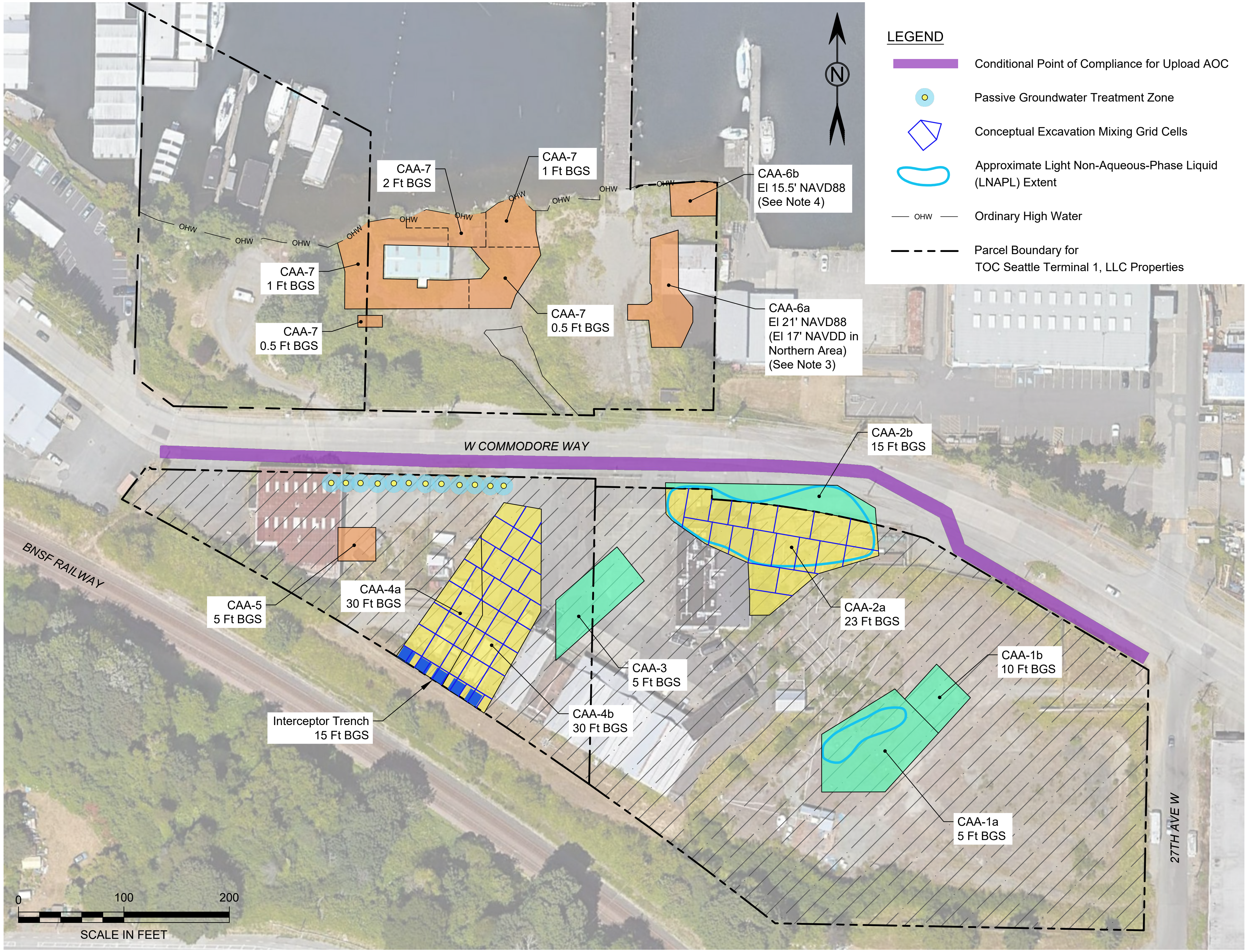
Figure 4
Upland AOC Cleanup Action Areas
and Contaminant Depths/Distributions



LEGEND

▬ Conditional Point of Compliance for Upload AOC

● Passive Groundwater Treatment Zone

◇ Conceptual Excavation Mixing Grid Cells

○ Approximate Light Non-Aqueous-Phase Liquid (LNAPL) Extent

— OHW — Ordinary High Water

- - - Parcel Boundary for TOC Seattle Terminal 1, LLC Properties

SELECTED REMEDIAL ALTERNATIVE

▨ Capping With Pavement Or Buildings Upland Area Of Concern (AOC)

🟧 Excavation to Cleanup Level (CUL)

🟩 Excavation to Remediation Level (REL)

🟨 In-Situ Stabilization / Solidification

● In-Situ Groundwater Treatment (See Note 1)

■ ■ ■ ■ Interceptor Trench

NOTES

1. In-Situ groundwater treatment includes enhanced reductive dechlorination of the TCE and vinyl chloride groundwater plume using a trademark colloidal biomatrix and sulfidated micro zero-valent iron mixture (PlumeStop and S-MicroZVI) to create a passive treatment zone of chemical reduction and bioremediation in the Shallow WBZ and the addition of an enriched natural microbial consortium (BDI Plus) to stimulate rapid dechlorination of TCE.

2. Parcel boundaries obtained from King County GIS Center, 2011. Lot lines are approximate. Not for legal use.

3. The surface elevation at CAA-6a varies from 35' NAVD88 to 22' NAVD88. Elevations are provided to ensure final depths are achieved. The excavation will be approximately 15' ft bgs at the northern extent and 5' bgs at the southern extent.

4. The surface elevation in CAA-6b varies slightly, an elevation is provided to ensure that the excavation depth is reached throughout the excavation. The excavation will be about 3 ft bgs.

ABBREVIATIONS

AOC = Area of Concern
BDI = Bio-Dechlor INOCULUM
CAA = Cleanup Action Area
CUL = Cleanup Level
CY = Cubic Yards
Ft BGS = Feet Below Ground Surface
ISS = In-Situ Solidification and Stabilization
LNAPL = Light Non-Aqueous-Phase Liquid
REL = Remediation Level
TCE = Trichloroethene
WBZ = Water-Bearing Zone
OHW = Ordinary High Water Mark

File: D:_Projects\Crete\Time Oil Seattle\Time Oil_EDR Figs-Crete.dwg Date: 4/28/2021 Author: Cabryn

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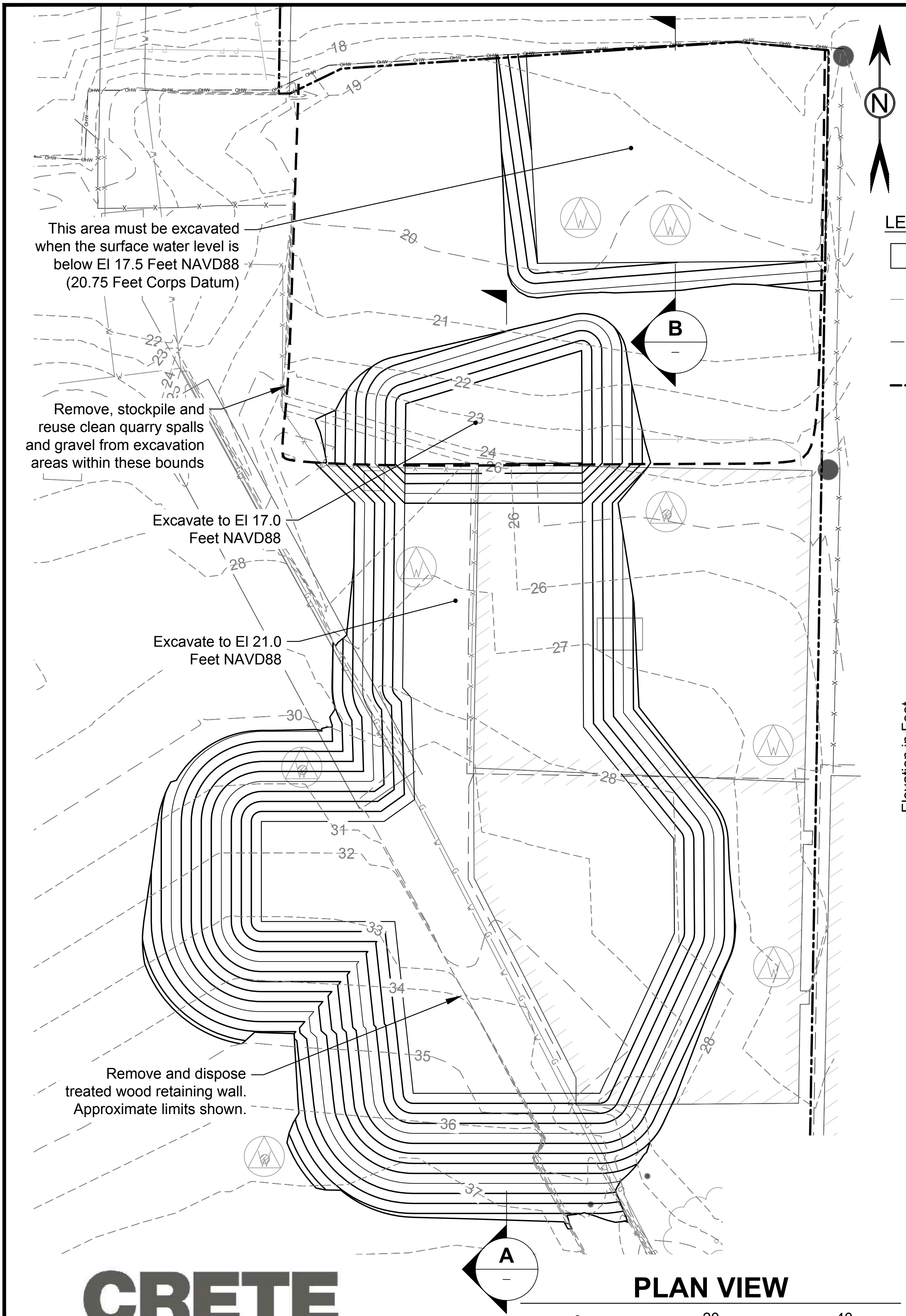
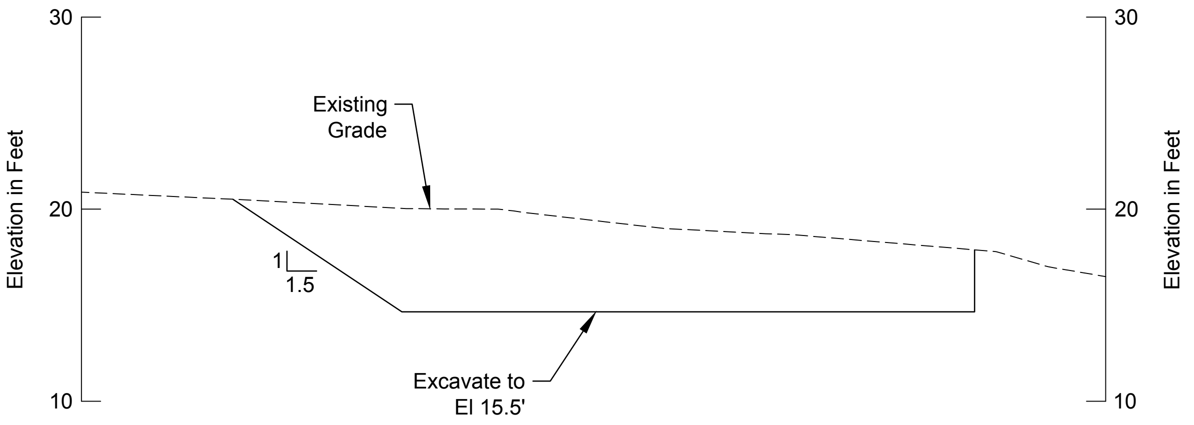
Figure 5
Property Cleanup Summary



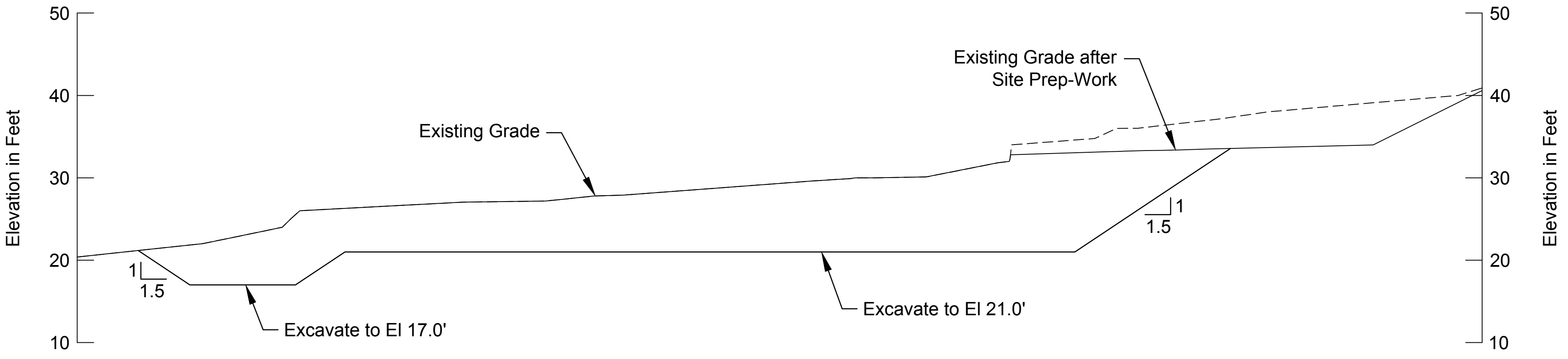
PLAN VIEW

LEGEND

▭	Excavation / Treatment Area
- - 30 - -	Existing Surface Contour
— OHW — OHW —	Ordinary High Water
— · · — · · —	Parcel Boundary for TOC Seattle Terminal 1, LLC Properties
Ⓦ	Existing Monitoring Well



B EXCAVATION SECTION



A EXCAVATION SECTION

NOTES

1. Elevations listed in NAVD88.
2. The surface elevation at CAA-6a varies from 35' NAVD88 to 22' NAVD88. Elevations are provided to ensure final depths are achieved. The excavation will be approximately 15' ft bgs at the northern extent and 5' bgs at the southern extent.
3. Soil removal along CAA-6b will be completed in small section along the shoreline portion and will be immediately backfield to stabilize the bank.

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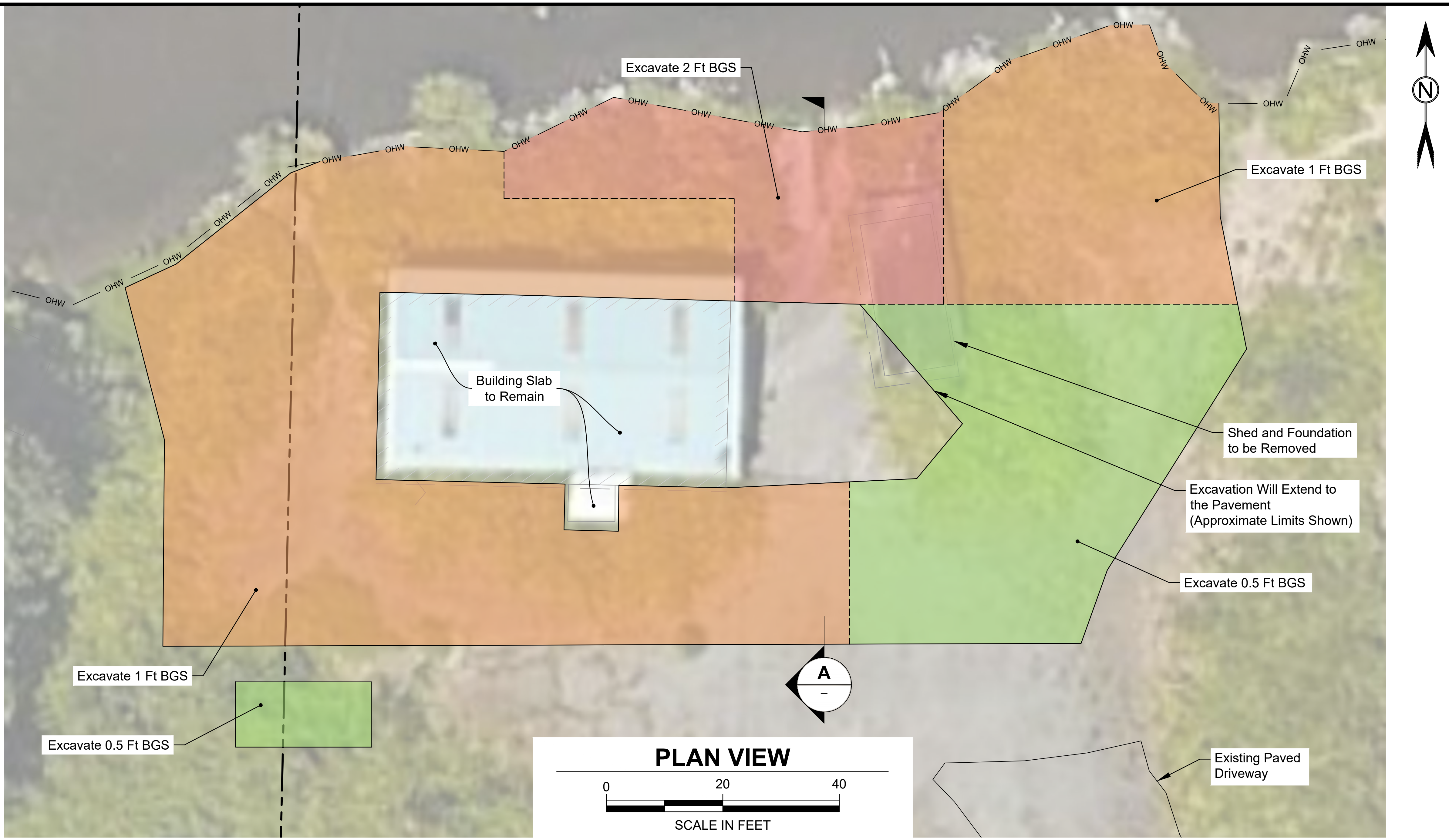
Seattle, Washington

Figure 6
Cleanup Action Area CAA-6
Excavation Plan

File: E:_Business\Crete\20001.01\2021.05.28\Time Oil - working cad files\Time Oil_EDR Figs\Time Oil_EDR Figs-Crete.dwg Date: 4/28/2021 Author: Greene, Chris



PLAN VIEW

LEGEND

▭ Excavation / Treatment Area

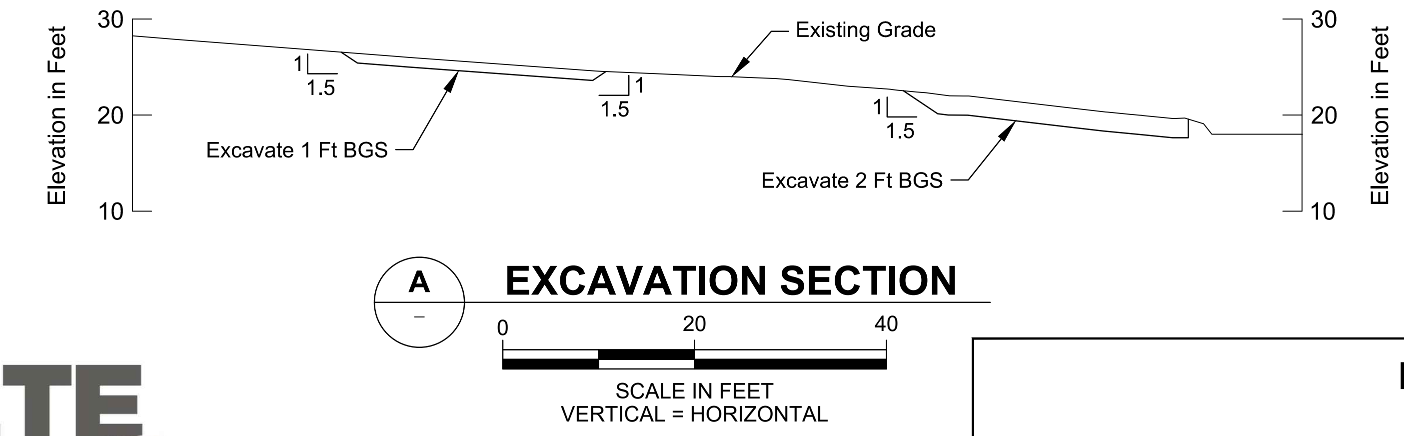
🟩 0.5-Foot Excavation

🟧 1-Foot Excavation

🟥 2-Foot Excavation

— OHW — Ordinary High Water

— — — Parcel Boundary for
TOC Seattle Terminal 1, LLC Properties



EXCAVATION SECTION

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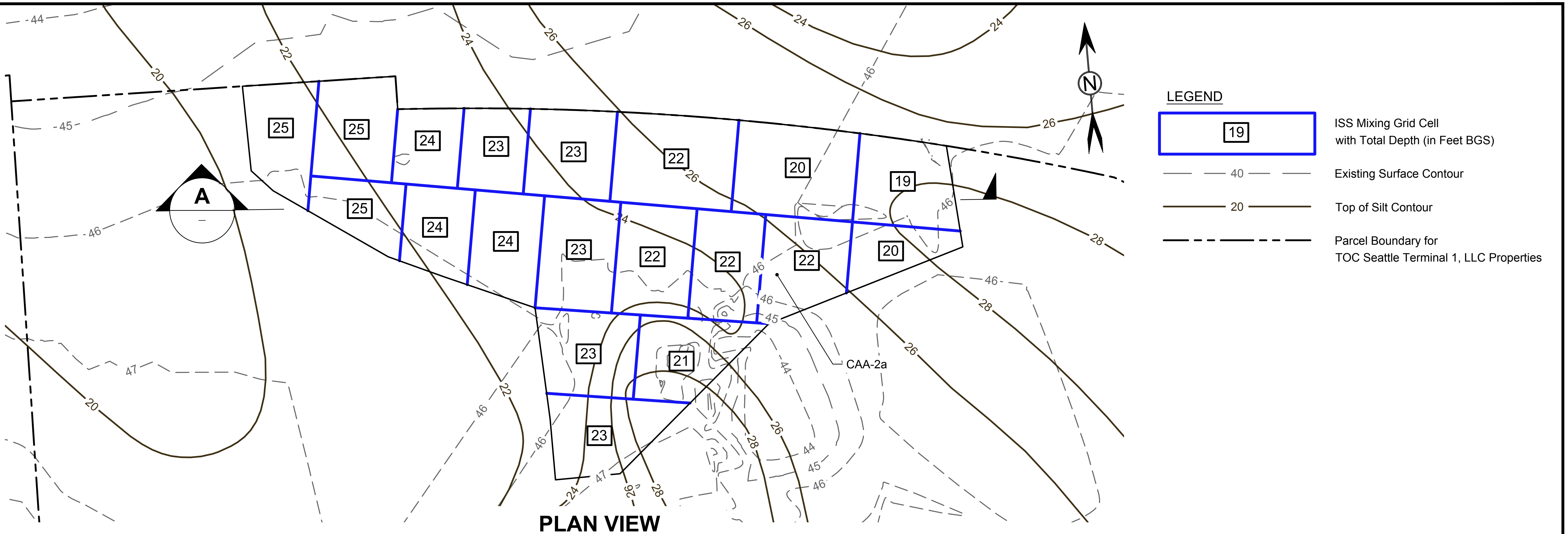
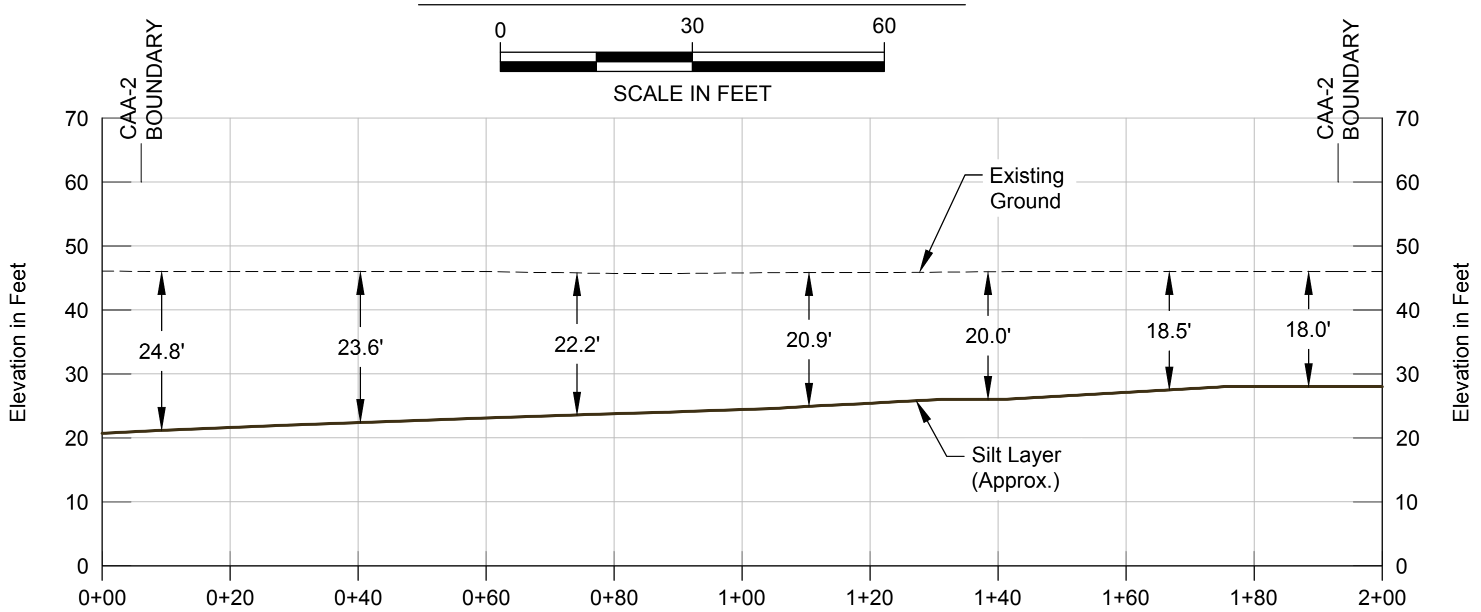
Time Oil Bulk Terminal
Seattle, Washington

Figure 7
Cleanup Action Area CAA-7
Excavation Plan

File: D:_Projects\Crete\Time Oil Seattle\Time Oil_EDR Figs-Crete.dwg Date: 4/28/2021 Author: Cabryn

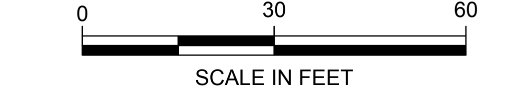


PLAN VIEW



A

SECTION



VERTICAL = HORIZONTAL

NOTES

For all ISS mixing cells, mixing will occur to 1 foot below the lowest elevation of the contact with the silt layer in each cell to key the ISS mixture into the silt.

File: E:_Business\Crete\20001.01\2021.05.28\Time Oil - working cad files\Time Oil_EDR Figs\Time Oil_EDR Trench ISS.dwg Date: 4/28/2021 Author: Greene, Chris

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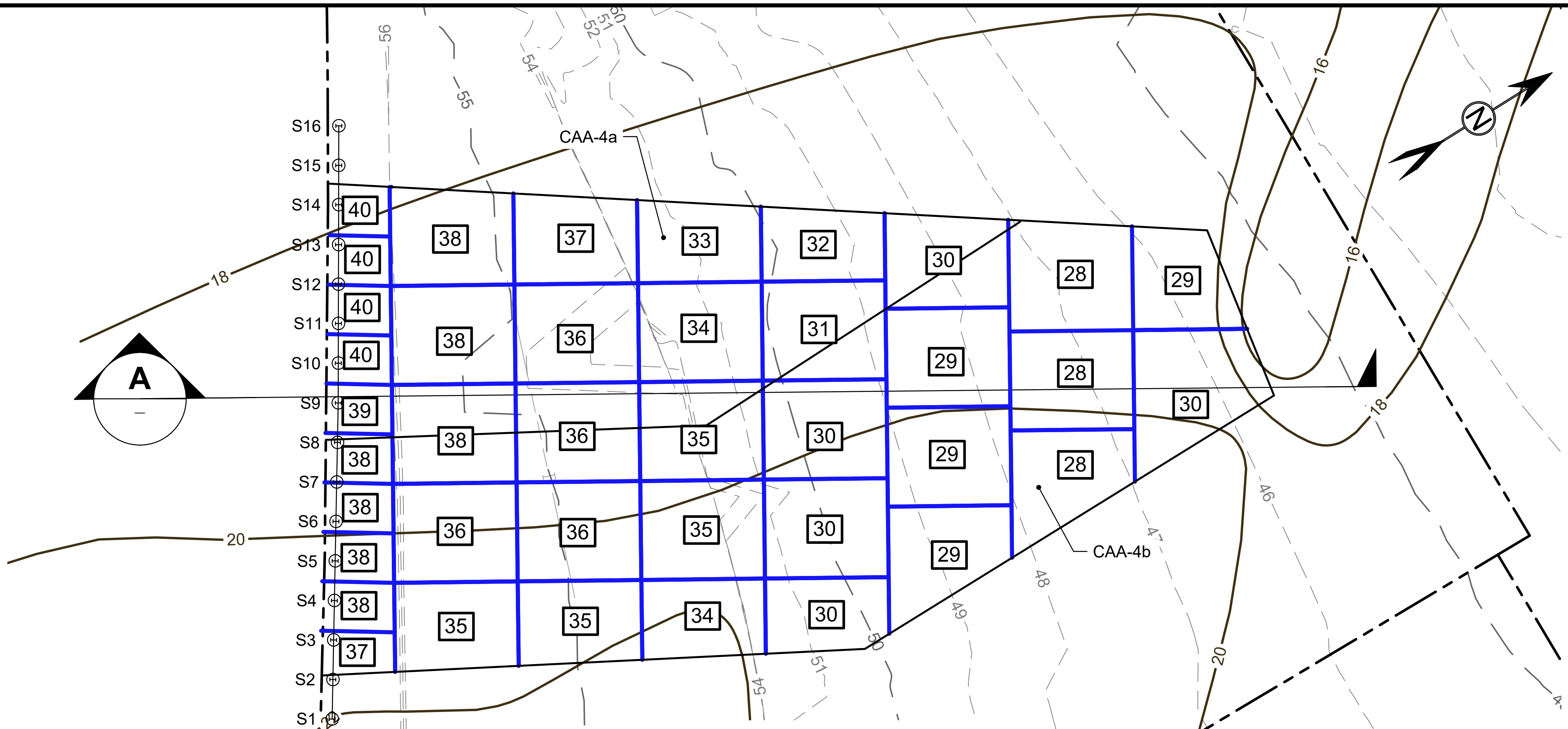
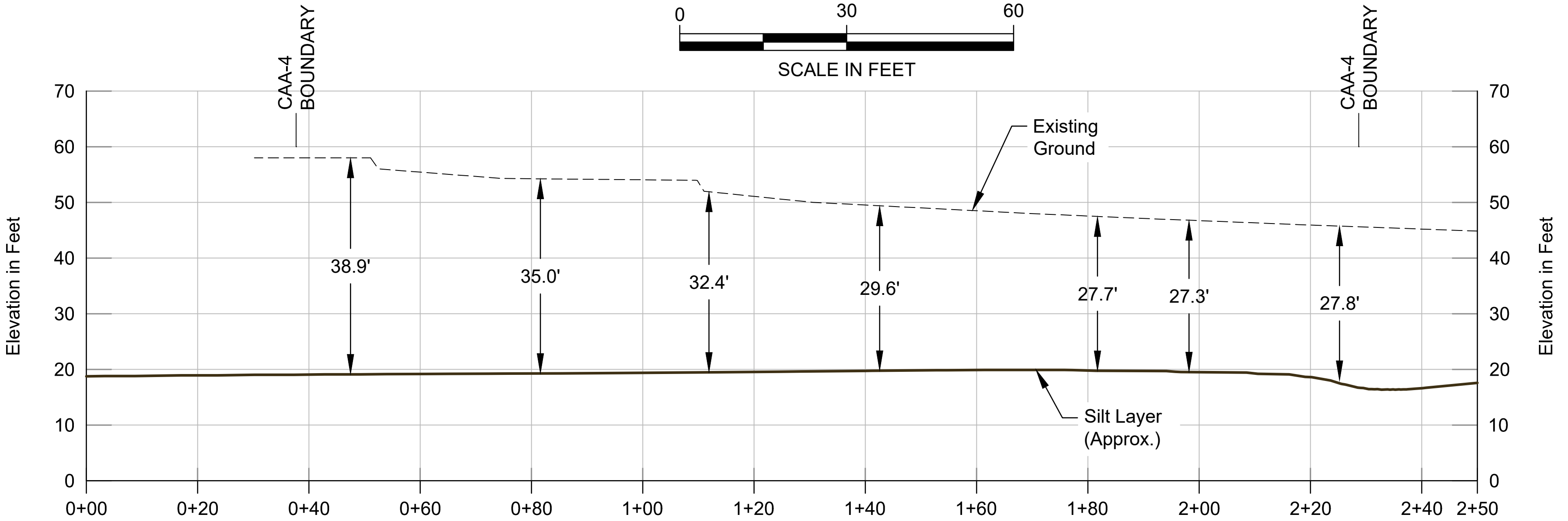
Time Oil Bulk Terminal
Seattle, Washington

Figure 8a
In-Situ Solidification and Stabilization Overview
CAA-2a



PLAN VIEW

0 30 60
SCALE IN FEET



A SECTION

0 30 60
SCALE IN FEET
VERTICAL = HORIZONTAL

LEGEND

19	ISS Mixing Grid Cell with Total Depth (in Feet BGS)
— — 20 — —	Existing Surface Contour
—— 20 ——	Top of Silt Contour
— · — · —	Parcel Boundary for TOC Seattle Terminal 1, LLC Properties

NOTES

1. ISS mixing will include removing the top 15 feet of soil to allow for swell management. This soil will be treated by ISS and moved to the swell management area. Shoring will be installed prior to ISS work at CAA-4.
2. For all ISS mixing cells, mixing will occur to the 1 foot below the lowest elevation of the contact with the silt layer in each cell to key the ISS mixture into the silt.

File: D:_Projects\Crete\Time Oil Seattle\Time Oil_EDR Trench ISS.dwg Date: 4/28/2021 Author: Cabryn

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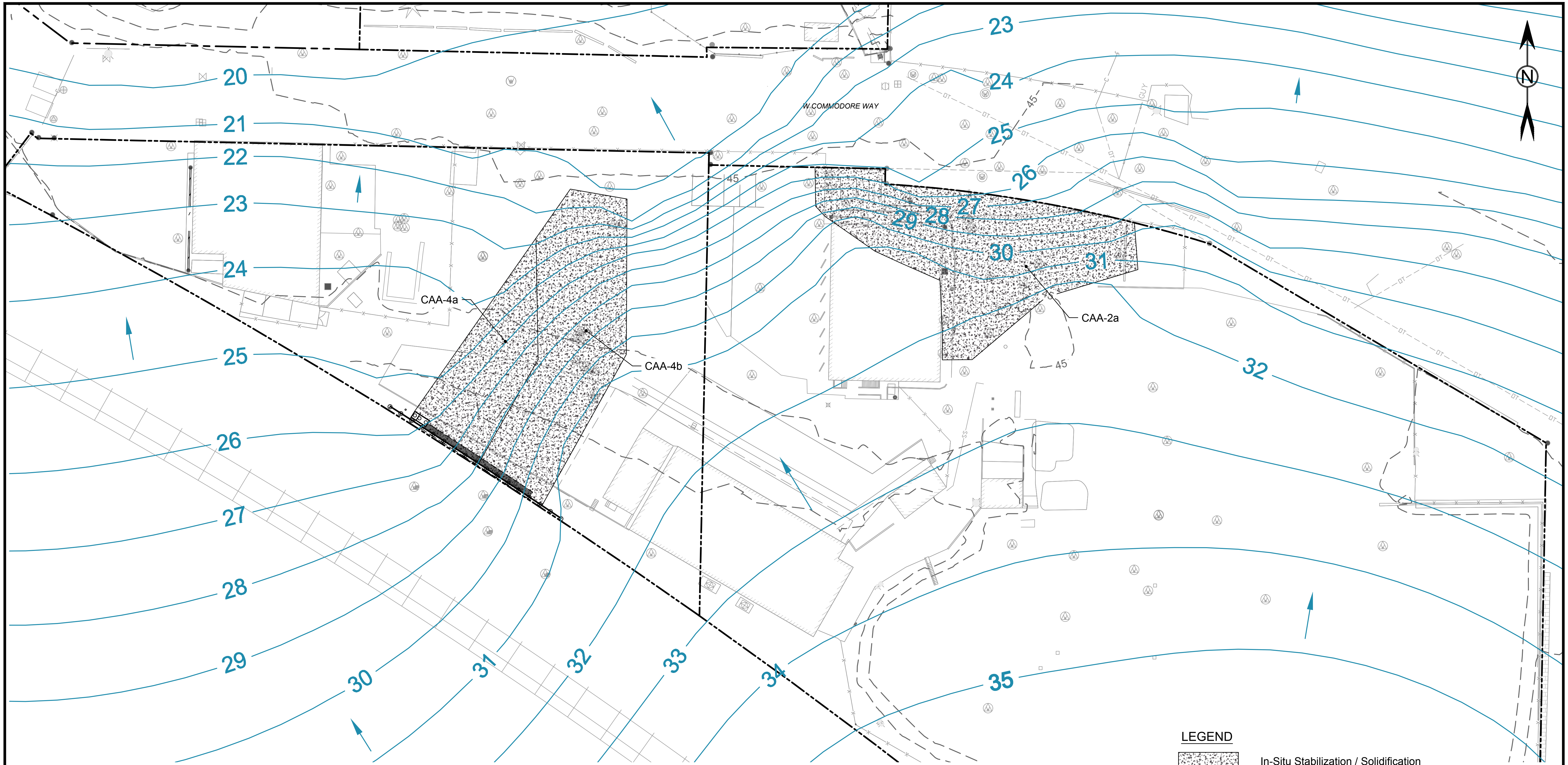
Time Oil Bulk Terminal
Seattle, Washington

Figure 8b
In-Situ Solidification and Stabilization Overview
CAA-4



LEGEND

▨ In-Situ Stabilization / Solidification

— 20 — Groundwater Contour

← Groundwater Flow Direction

-·-·- Parcel Boundary for TOC Seattle Terminal 1, LLC Properties

Existing Monitoring Well

PLAN VIEW

0 60 120

SCALE IN FEET

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CONSULTING, INC.

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Time Oil Bulk Terminal
Seattle, Washington

Figure 9
Model Estimated Post-ISS Shallow WBZ
Groundwater Flow

File: E:_Business!\Crete!\20001.01\2021.05.28\Time Oil - working cad files\Time Oil_EDR Figs\Time Oil_EDR Trench ISS.dwg Date: 4/28/2021 Author: Greene, Chris

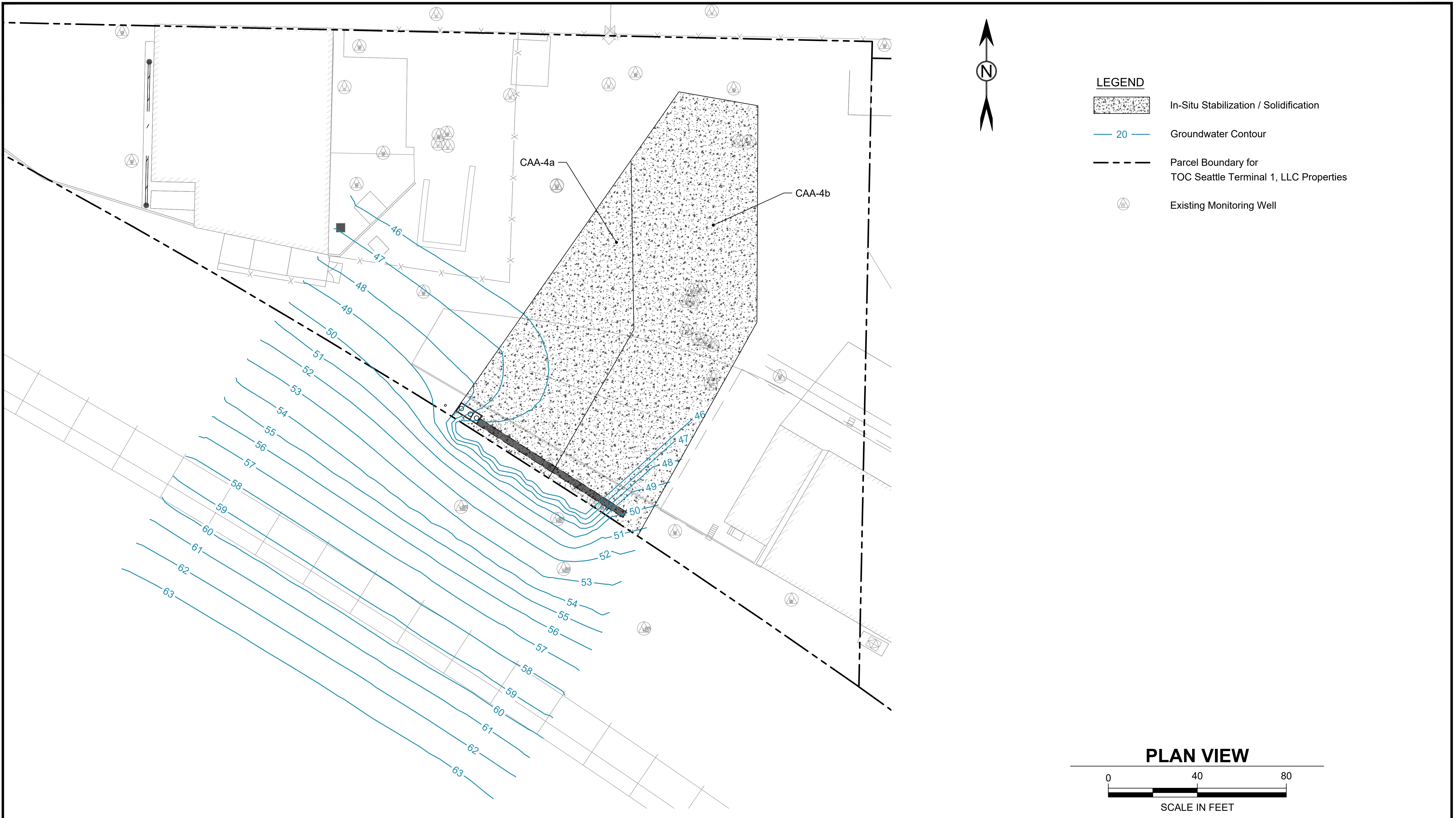

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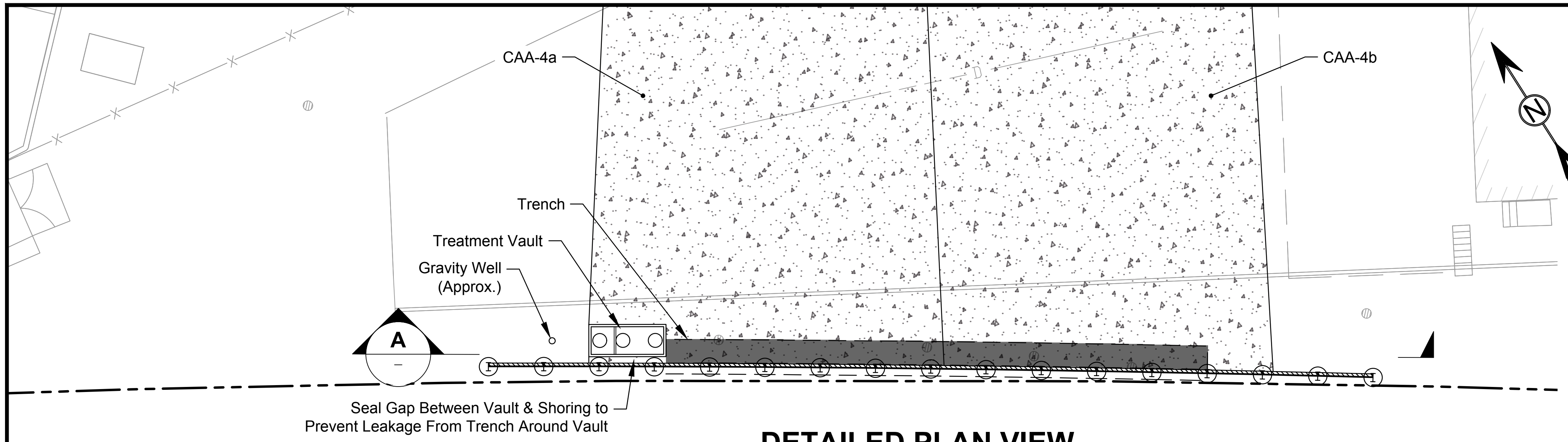
Figure 10
Model Estimated Trench
Perched WBZ Capture Zone

File: D:_Projects\Crete\Time Oil Seattle\Time Oil_EDR Trench ISS.dwg Date: 4/28/2021 Author: Cabryn



DETAILED PLAN VIEW

0 20 40
SCALE IN FEET

LEGEND

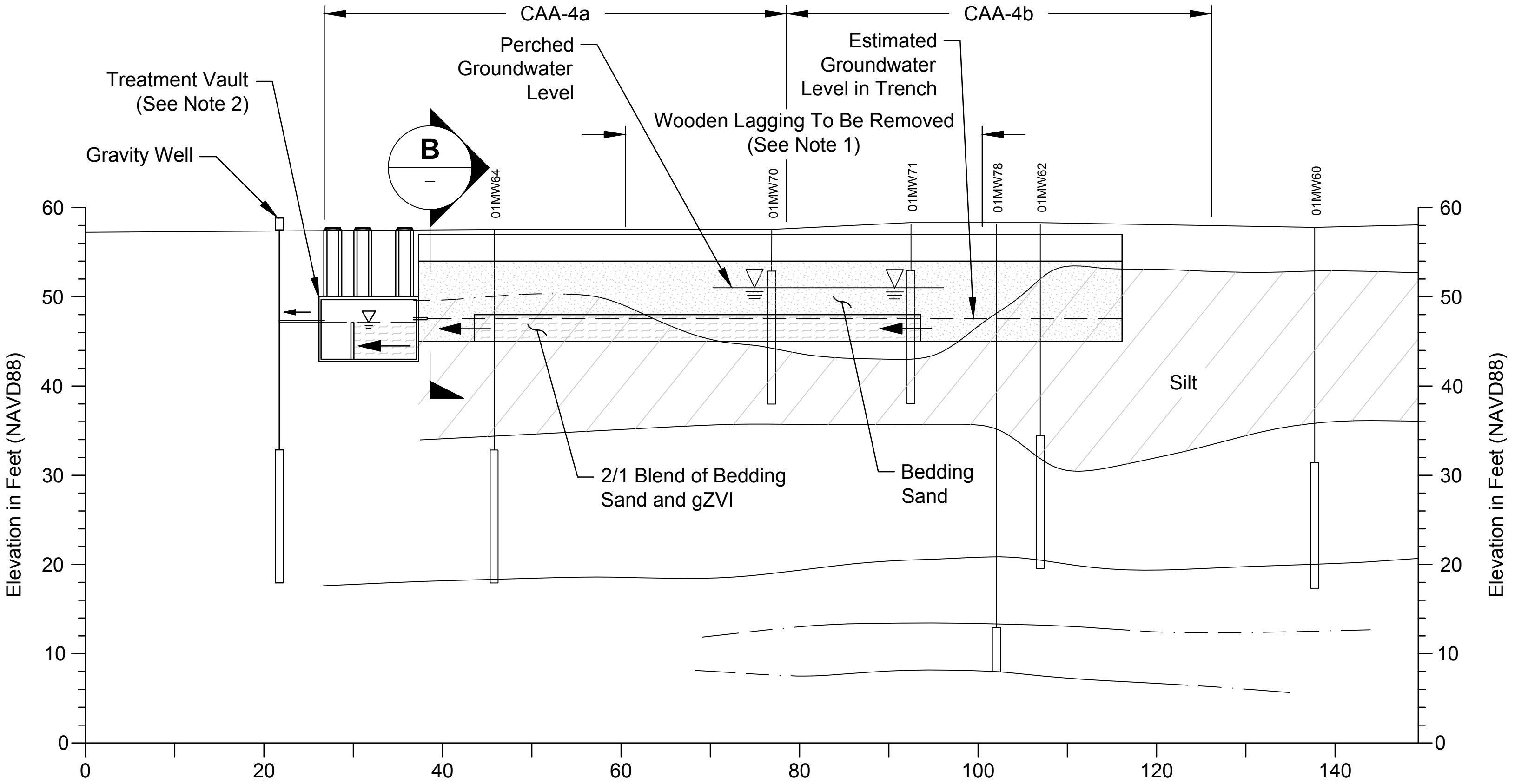
▨ In-Situ Stabilization / Solidification

— — — Parcel Boundary for
TOC Seattle Terminal 1, LLC Properties

NOTES

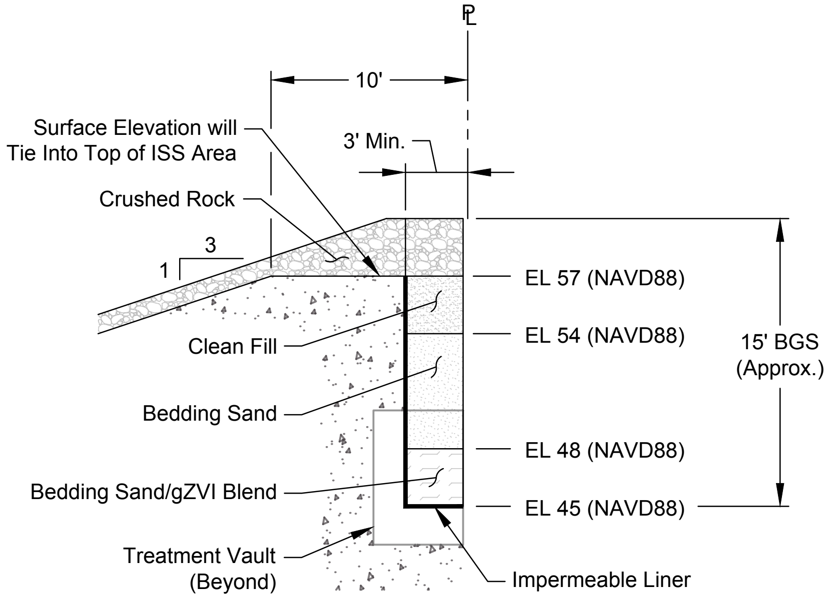
1. Shoring will be installed along this property boundary to complete the ISS work prior to the installation of the trench and treatment vault. During trench installation a portion of the wooden lagging between the solider piles will be removed from elevation 45 to 54. The remaining lagging will have gaps between all boards that allow groundwater flow.

2. Treatment vault shall be Oldcastle Precast Model 5106 GA 1,500 gallon vault with access manholes, or similar. The separator portion of the vault will be filled with about 1,025 gallons of gZVI. The gZVI will be an 8 to 50 mesh product that is suitable for this application and will be certified clean by the manufacturer.



A TRENCH PROFILE

0 20 40
SCALE IN FEET
VERTICAL = HORIZONTAL



B TRENCH SECTION

0 10 20
SCALE IN FEET

File: E:_Business\Crete\20001.01\2021.05.28\Time Oil - working cad files\Time Oil_EDR Figs\Time Oil_EDR Trench ISS.dwg Date: 4/28/2021 Author: Greene, Chris

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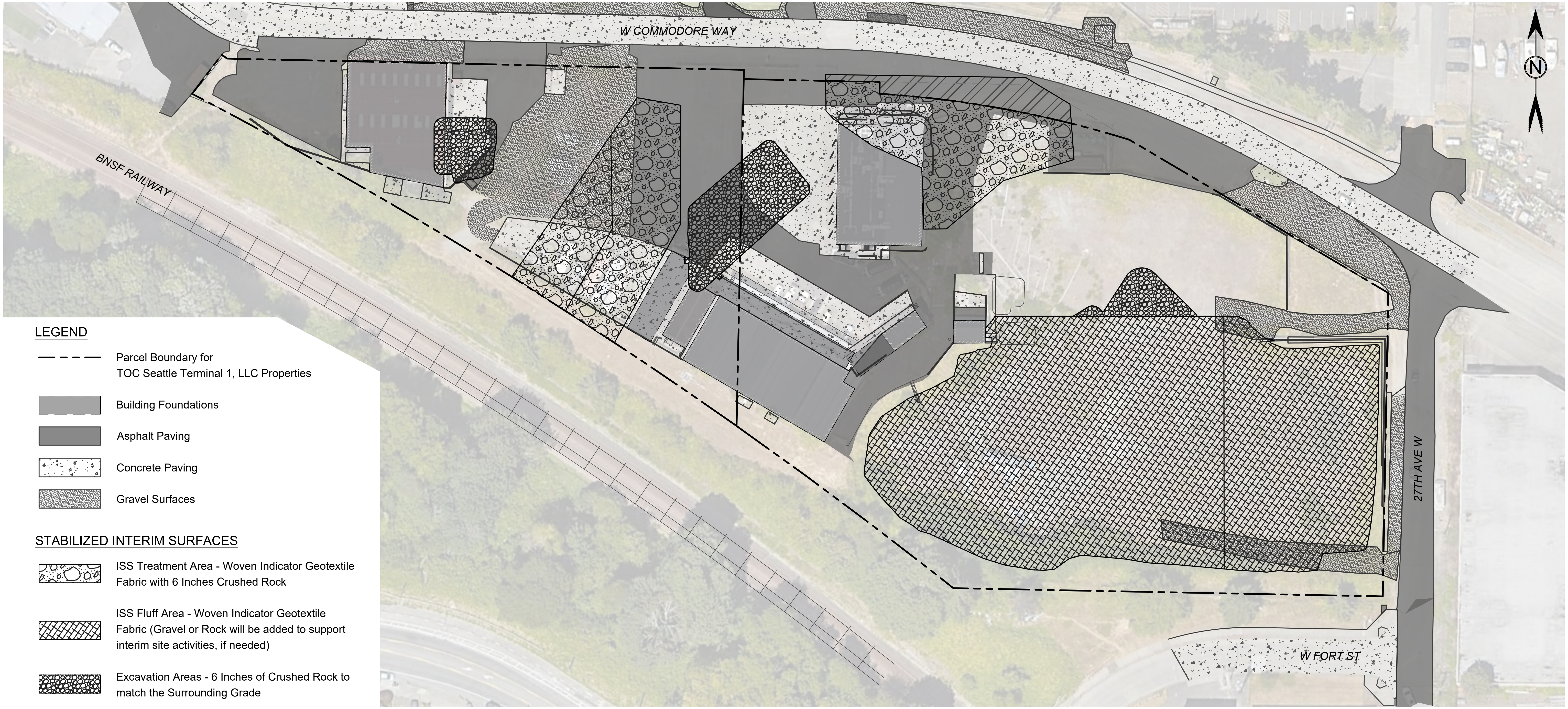
Seattle, Washington

Figure 11
Interceptor Trench Design



LEGEND

- - - Parcel Boundary for TOC Seattle Terminal 1, LLC Properties

▒ Building Foundations

▇ Asphalt Paving

░ Concrete Paving

▒ Gravel Surfaces

STABILIZED INTERIM SURFACES

▨ ISS Treatment Area - Woven Indicator Geotextile Fabric with 6 Inches Crushed Rock

▩ ISS Fluff Area - Woven Indicator Geotextile Fabric (Gravel or Rock will be added to support interim site activities, if needed)

▦ Excavation Areas - 6 Inches of Crushed Rock to match the Surrounding Grade

▧ ROW - Restored to Pre-Construction Conditions

NOTES

1. Existing asphalt, concrete, and gravel areas will remain during the interim period between site clean and development.
2. Building foundations that are outside of the cleanup action areas will remain in place.
3. Perimeter fencing along roadways will be maintained following the cleanup action.

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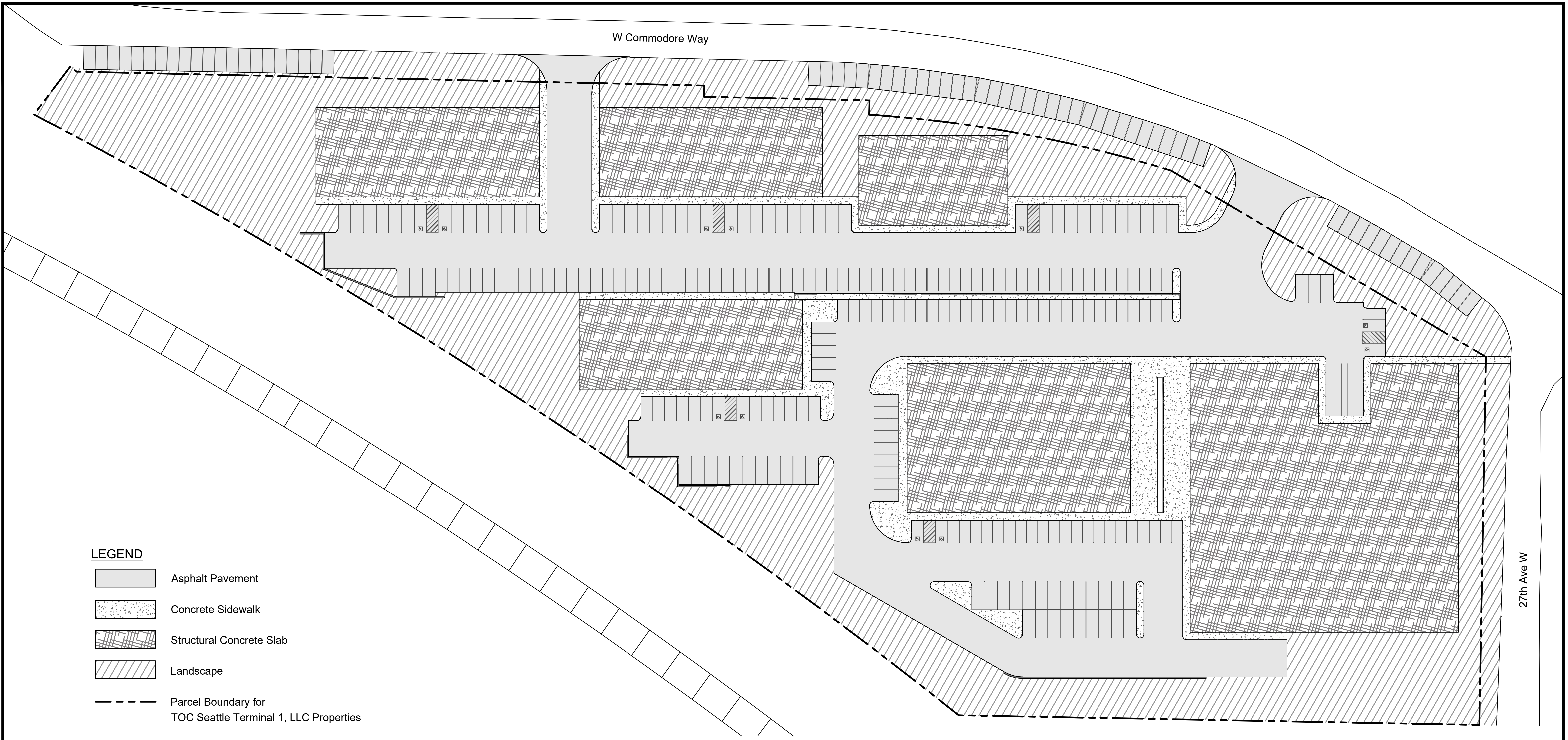
Seattle, Washington

Figure 12
Upland AOC Cleanup Action Areas
Interim Stabilization

File: D:_Projects\Crete\Time Oil Seattle\Time Oil_EDR Figs-Crete.dwg Date: 4/28/2021 Author: Cabryn



Source: Figure adapted from "Overall Masterplan", Sheet MP-01, prepared by Jackson|Main Architecture, dated November 2020.

NOT TO SCALE

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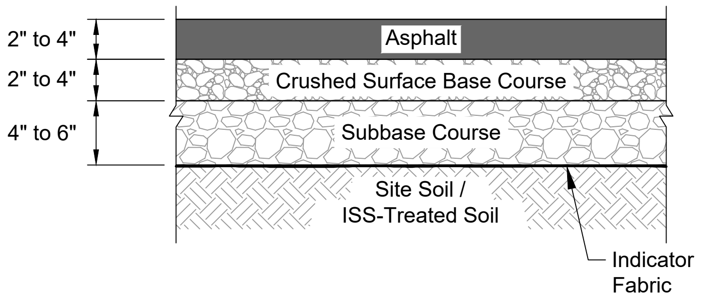
Engineering Design Report
Time Oil Bulk Terminal
Seattle, Washington

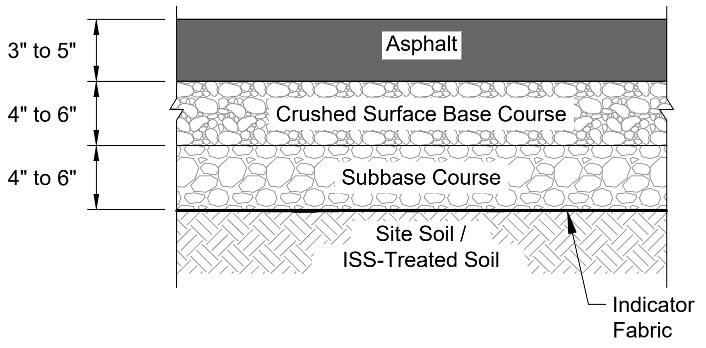
Figure 13
Conceptual Site Development
and Cap Locations

File: D:_Projects\Crete\Time Oil Seattle\Time Oil_EDR Concept Site.dwg Date: 4/28/2021 Author: Cabryn



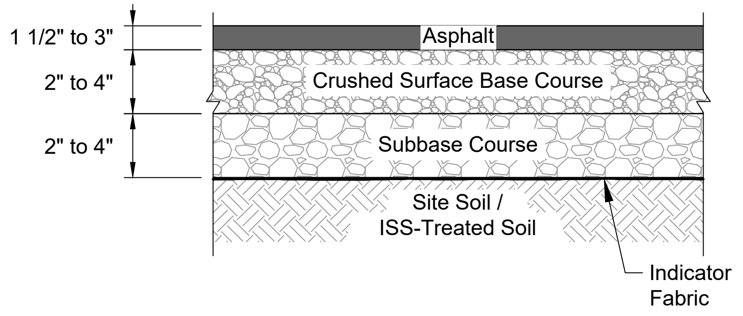
PAVEMENT SECTION

Light Duty



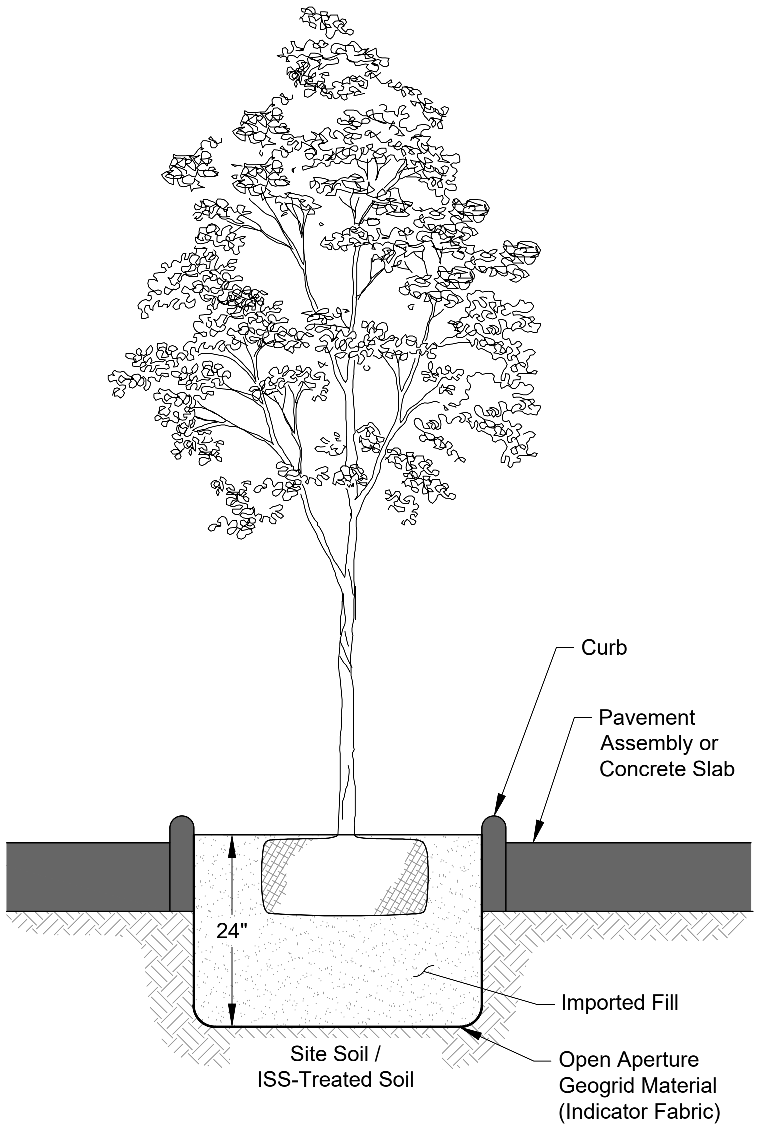
PAVEMENT SECTION

Heavy Duty



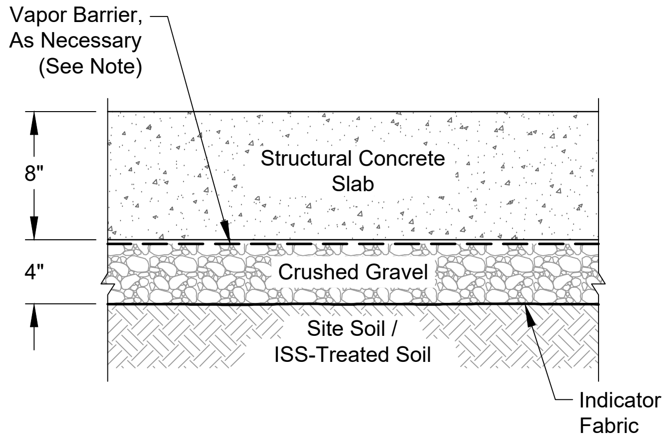
PAVEMENT SECTION

Pedestrian Access



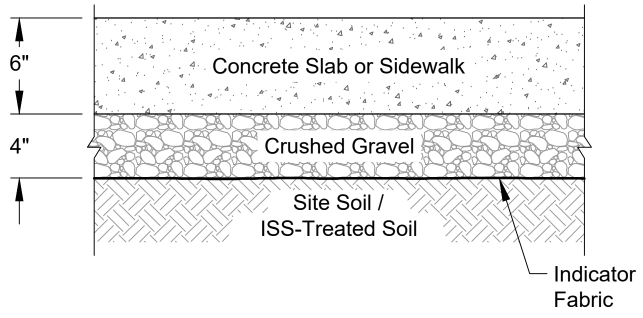
PLANTER SECTION

Tree



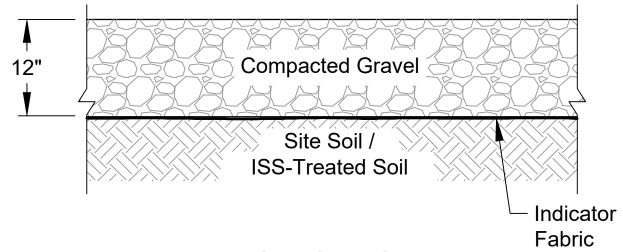
SLAB CAP SECTION

Structural Concrete



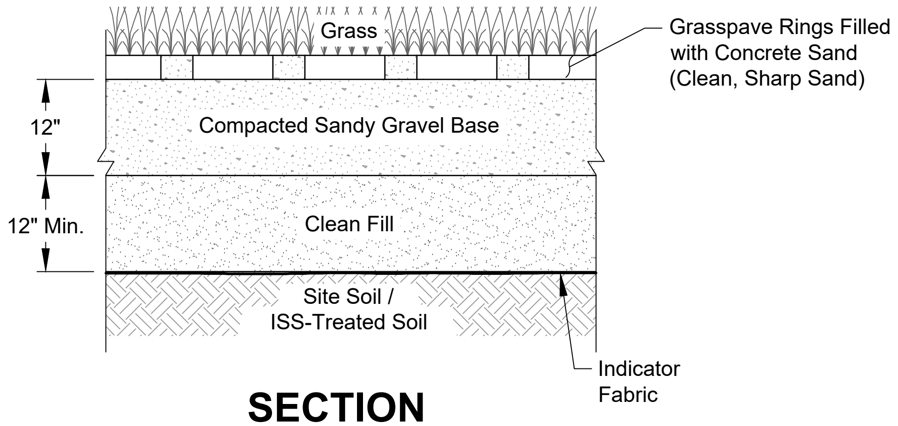
SLAB CAP SECTION

Concrete Slab or Sidewalk



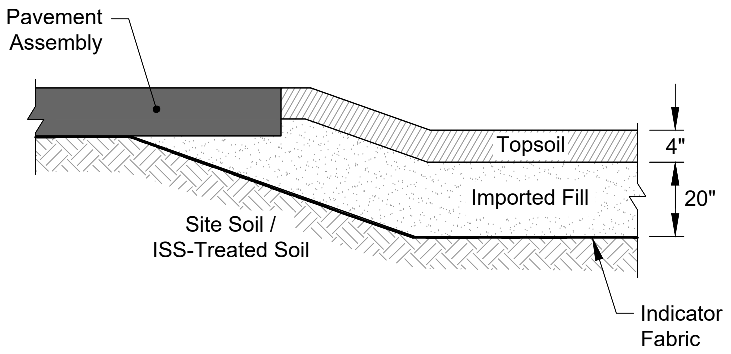
SECTION

Gravel Cap



SECTION

Grasspave



SECTION

Landscape

NOTES

1. All asphalt, concrete, base course, and gravel thicknesses may be modified based on the final redevelopment plans. The thicknesses provided are typical for these types of applications.
2. The need for vapor intrusion protective measures will be evaluated during the development design.

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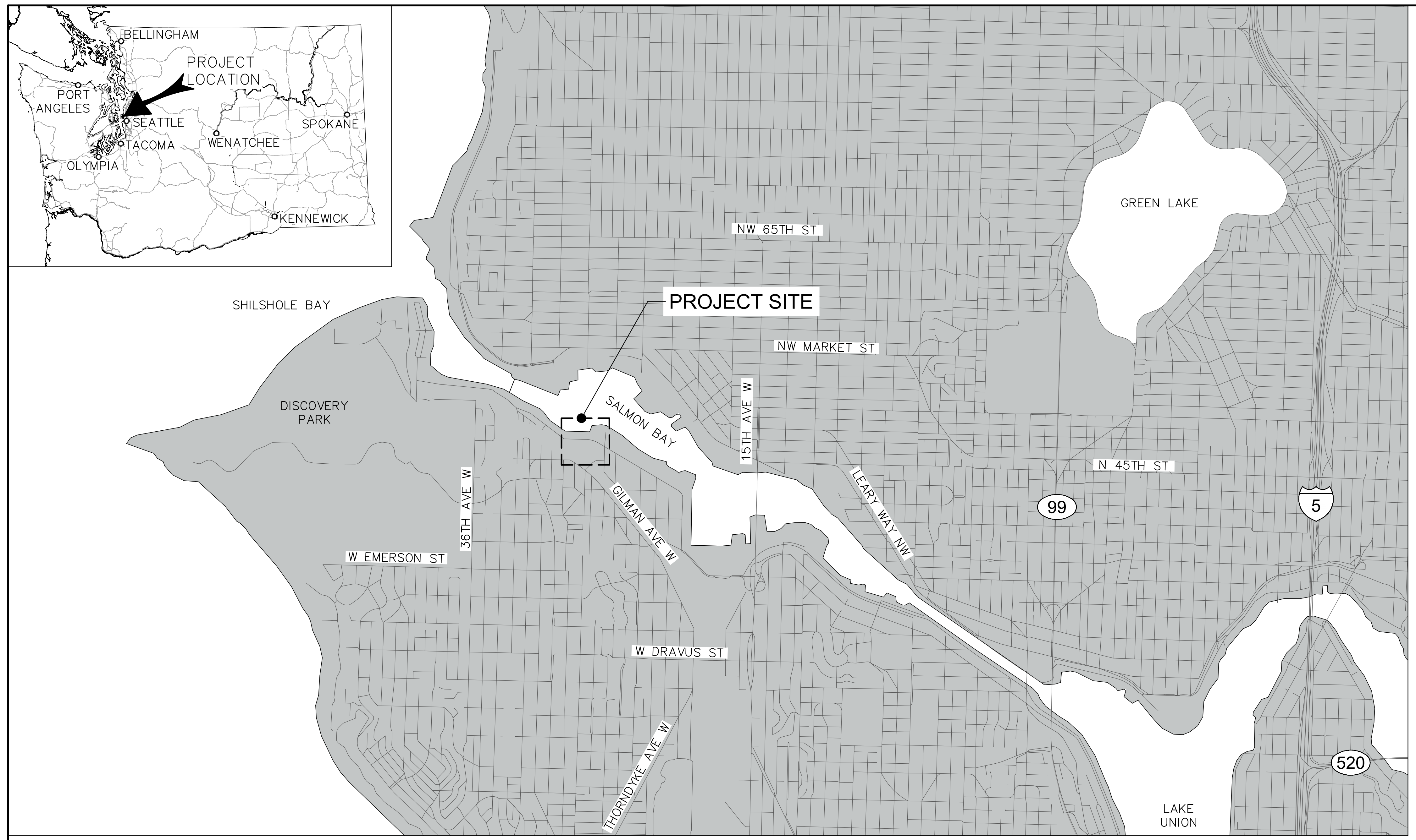
Figure 14
Typical Final Cap Details

File: D:_Projects\Crete\Time Oil Seattle\Time Oil_EDR Cap Details.dwg Date: 4/28/2021 Author: Cabryn

Appendix A Cleanup Design Drawings

Time Oil Bulk Terminal Cleanup Action



VICINITY MAP

Not to Scale

LEGAL DESCRIPTION

PARCEL A:
THE EASTERLY 78.025 FEET OF LOT 5 AND ALL OF LOTS 6, 7, 8 AND 9, BLOCK 7, SEATTLE TIDELANDS, IN KING COUNTY, WASHINGTON, AS SHOWN ON THE OFFICIAL MAPS ON FILE IN THE OFFICE OF THE COMMISSIONER OF PUBLIC LANDS AT OLYMPIA, WASHINGTON.

PARCEL B:
THE EAST 111.04 FEET OF THAT PORTION OF GOVERNMENT LOT 5 OF SECTION 11, TOWNSHIP 25 NORTH, RANGE 3 EAST, WILLAMETTE MERIDIAN, IN KING COUNTY, WASHINGTON, LYING NORTH OF WEST COMMODORE WAY;

TOGETHER WITH THAT PORTION OF GOVERNMENT LOT 5 OF SECTION 11, TOWNSHIP 25 NORTH RANGE 3 EAST, WILLAMETTE MERIDIAN, IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

BEGINNING ON THE NORTHERLY LINE OF COMMODORE WAY AS NOW ESTABLISHED, AT A POINT WHICH IS 111.004 FEET WEST OF THE EAST LINE OF SAID GOVERNMENT LOT;
THENCE WEST ALONG SAID NORTH LINE OF COMMODORE WAY 219.00 FEET;
THENCE NORTH PARALLEL WITH THE EAST LINE OF SAID GOVERNMENT LOT TO THE SOUTHERLY LINE OF BLOCK 7, SEATTLE TIDELANDS;
THENCE EASTERLY ALONG THE SOUTHERLY LINE OF SAID BLOCK TO A POINT WHICH IS 111.004 FEET WEST OF THE EAST LINE OF SAID GOVERNMENT LOT;
THENCE SOUTH TO THE POINT OF BEGINNING;

EXCEPT ANY PORTION THEREOF LYING WITHIN THE SEATTLE TIDELANDS.

PARCEL C:
THAT PORTION OF THE EAST 111.04 FEET GOVERNMENT LOT 5, SECTION 11, TOWNSHIP 25 NORTH, RANGE 3 EAST, WILLAMETTE MERIDIAN, IN KING COUNTY, WASHINGTON, LYING SOUTH OF COMMODORE WAY AND NORTH OF A LINE PARALLEL TO AND 180.51 FEET SOUTH OF SAID SOUTH LINE OF COMMODORE WAY, MEASURED ALONG THE EAST LINE OF SAID GOVERNMENT LOT 5;

EXCEPT THAT PORTION THEREOF, IF ANY, LYING WEST OF THE EAST LINE OF BLOCK 5, LAWTON PARK, ACCORDING TO THE PLAT THEREOF, RECORDED IN VOLUME 12 OF PLATS, PAGE 56, IN KING COUNTY, WASHINGTON.

PARCEL D:
THAT PORTION OF GOVERNMENT LOT 6, SECTION 11, TOWNSHIP 25 NORTH, RANGE 3 EAST, WILLAMETTE MERIDIAN, IN KING COUNTY, WASHINGTON, LYING NORTH OF FORT STREET (FORMERLY GOVERNMENT WAY), WEST OF 27TH AVENUE WEST, AND SOUTH OF COMMODORE WAY;

EXCEPT THE FOLLOWING PORTION:

BEGINNING AT THE SOUTHWEST CORNER OF SAID TRACT;
THENCE NORTH ALONG THE WEST LINE OF SAID LOT 6 A DISTANCE OF 50.40 FEET;
THENCE SOUTHEASTERLY A DISTANCE OF 84.5 FEET TO THE NORTH LINE OF FORT STREET
(FORMERLY GOVERNMENT WAY);
THENCE WEST TO THE POINT OF BEGINNING.

PARCEL E:
THAT PORTION OF THE EAST 111.04 FEET OF GOVERNMENT LOT 5, SECTION 11, TOWNSHIP 25 NORTH, RANGE 3 EAST, WILLAMETTE MERIDIAN, IN KING COUNTY, WASHINGTON, LYING NORTHEASTERLY OF THAT PORTION OF THE EAST 111.04 FEET OF SAID GOVERNMENT LOT 5 CONVEYED TO THE GREAT NORTHERN RAILWAY COMPANY BY DEED RECORDED IN VOLUME 726 OF DEEDS, AT PAGE 372, UNDER RECORDING NUMBER 652106, RECORDS OF KING COUNTY, WASHINGTON, AND SOUTHERLY OF A LINE PARALLEL TO AND 180.51 FEET SOUTHERLY OF THE SOUTHERLY MARGIN OF COMMODORE WAY MEASURED ALONG THE EAST LINE OF SAID GOVERNMENT LOT 5;

EXCEPT THAT PORTION THEREOF, IF ANY, LYING WEST OF THE EAST LINE OF BLOCK 5, LAWTON PARK, ACCORDING TO THE PLAT THEREOF, RECORDED IN VOLUME 12 OF PLATS, PAGE 56, IN KING COUNTY, WASHINGTON.

PARCEL F:
THAT PORTION OF BLOCKS 3, 4 AND 5, LAWTON PARK, ACCORDING TO THE PLAT THEREOF, RECORDED IN VOLUME 12 OF PLATS, PAGE 56, IN KING COUNTY, WASHINGTON, AND OF VACATED STREETS AND ALLEYS ADJOINING, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE SOUTHERLY MARGIN OF WEST COMMODORE WAY DISTANT SOUTH 54°01'35" EAST 190 FEET FROM THE NORTHWESTERLY LINE OF LOT 1, BLOCK 6, OF SAID PLAT OF LAWTON PARK;
THENCE SOUTH 35°58'25" WEST, PARALLEL WITH SAID NORTHWESTERLY LINE TO THE NORTHEASTERLY MARGIN OF THE GREAT NORTHERN RAILWAY RIGHT OF WAY;
THENCE SOUTHEASTERLY ALONG SAID MARGIN 500 FEET, MORE OR LESS, TO THE EAST LINE OF SAID BLOCK 5;
THENCE NORTH 00°00'50" WEST 300 FEET, MORE OR LESS, TO THE NORTHEAST CORNER OF SAID BLOCK 5, SAID POINT BEING ON THE SOUTH MARGIN OF WEST COMMODORE WAY; THENCE WESTERLY ALONG SAID SOUTH MARGIN 400 FEET, MORE OR LESS, TO THE POINT OF BEGINNING.

PARCEL G:
THAT PORTION OF GOVERNMENT LOT 5, SECTION 11, TOWNSHIP 25 NORTH, RANGE 3 EAST, WILLAMETTE MERIDIAN, IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

BEGINNING ON THE NORTH LINE OF COMMODORE WAY AS ESTABLISHED AT A POINT WHICH IS 330.004 FEET WEST OF THE EAST LINE OF SAID GOVERNMENT LOT;
THENCE WEST AND NORTHWESTERLY ALONG SAID WAY LINE TO A POINT ON A LINE WHICH IS PARALLEL WITH AND 550 FEET WEST OF THE EAST LINE OF SAID GOVERNMENT LOT; THENCE NORTH ALONG SAID PARALLEL LINE TO THE SOUTHERLY LINE OF BLOCK 7, SEATTLE TIDE LANDS;
THENCE EASTERLY ALONG SAID BLOCK 7 TO A POINT WHICH IS 330.004 FEET WEST OF THE EAST LINE OF SAID GOVERNMENT LOT;
THENCE SOUTH TO THE BEGINNING.

PARCEL H (SUBJECT TO CHANGE; SEE EXCEPTION 20 IN SCHEDULE B HEREIN):
THAT PORTION OF WASHINGTON STATE HARBOR AREA LYING NORTH OF BLOCK 7, MAP OF SEATTLE TIDE LANDS, SECTION 11, TOWNSHIP 25 NORTH, RANGE 3 EAST, W.M., DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF SAID SECTION 11;
THENCE SOUTH 89°08'27" EAST 1323.59 FEET TO EAST LINE OF GOVERNMENT LOT 5;
THENCE ALONG SAID EAST LINE NORTH 0°49'52" EAST 930.22 FEET TO ITS INTERSECTION WITH THE NORTH LINE OF BLOCK 7, SEATTLE TIDE LANDS, ALSO KNOWN AS THE STATE HARBOR LINE;
THENCE NORTH 88°05'33" WEST 78.02 FEET TO THE TRUE POINT OF BEGINNING;
THENCE NORTH 1°54'27" EAST 25.00 FEET;
THENCE NORTH 75°32'30" WEST 366.00 FEET;
THENCE SOUTH 14°27'30" WEST 53.00 FEET;
THENCE SOUTH 75°32'30" EAST 210.00 FEET;
THENCE SOUTH 1°54'27" WEST 7.16 FEET TO THE SAID HARBOR LINE;
THENCE SOUTH 88°05'33" EAST 163.79 FEET TO THE TRUE POINT OF BEGINNING AND THE END OF THIS DESCRIPTION.

PROJECT TEAM

OWNER
TOC Seattle Terminal 1, LLC
2753 West 31st Street
Chicago, IL 60608
Contact: Mike Ciserella
773-722-9200 x501

WASHINGTON DEPARTMENT OF ECOLOGY PROJECT
Cleanup Project Manager,
Toxics Cleanup Program
3190 160th Ave SE
Bellevue, WA 98008
Contact: Mark Adams
425-649-7107
mada461@ecy.wa.gov

REMEDIATION CONSULTANT
CRETE Consulting, Inc., PC
108 S. Washington St, Suite 300
Seattle, WA 98104
Contact: Jamie Stevens
206-799-2744

REMEDIATION CONTRACTOR
(TBD)

CIVIL DESIGNER
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Contact: Jenifer Clapman
206-926-0549

SHORING DESIGNER
CT Engineering
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SURVEYOR
Axis Survey & Mapping
15241 NE 90th St, Suite 100
Redmond, WA 98052
Contact: Mitch Evans
425-823-5700 x301

GEOTECHNICAL ENGINEER
PanGEO, Inc.
3213 Eastlake Ave East, Suite B
Seattle, WA 98102
Contact: W. Paul Grant
206-262-0370

PROJECT SUMMARY

TOC Seattle Terminal 1, LLC purchased these parcels on November 25, 2020 and plans to clean up and develop these parcels associated with the former Time Oil Bulk Terminal facility. To address these historical contaminants TOC Seattle Terminal 1, LLC and the Washington Department of Ecology have entered into a Prospective Purchaser Consent Decree which directs TOC Seattle Terminal 1, LLC to implement the cleanup of the parcels in accordance with the Washington Department of Ecology's cleanup laws and regulations. Cleanup work completed that is required and is being performed under a Washington Department of Ecology Prospective Purchaser Consent Decree is exempt from the procedural requirements of State and local permits for on-site actions (RCW 70.105D.090(1)). The cleanup must comply with the substantive requirements of the applicable permits; therefore, engagement is needed with State and local jurisdictional authorities to obtain the substantive requirements. The main elements to the cleanup actions include the removal of soil above state cleanup levels through excavation and off-site disposal, and in situ solidification and stabilization. The cleanup action also includes elements to address groundwater contamination not covered by these permit documents.

Owner:
TOC Seattle Terminal 1, LLC

Washington Department of Ecology:
Cleanup Oversight through a Prospective
Purchaser Consent Decree No. 20-2-15215-3 SEA,
effective November 25, 2020
Ecology Project Manager: Mark Adams 425-649-7107

Project Design Team:
CRETE Consulting, Inc., PC
Primary Contact: Jamie Stevens 206-799-2744

SHEET INDEX

SHEET NO.	DWG NO.	SHEET TITLE
1	G-1	COVER SHEET, SHEET INDEX AND VICINITY MAP
2	G-2	SITE MAP
3	G-3	GENERAL NOTES (1 OF 4)
4	G-4	GENERAL NOTES (2 OF 4)
5	G-5	GENERAL NOTES (3 OF 4)
6	G-6	GENERAL NOTES (4 OF 4)
7	G-7	SITE SURVEY (1 OF 3)
8	G-8	SITE SURVEY (2 OF 3)
9	G-9	SITE SURVEY (3 OF 3)
10	G-10	SITE ACCESS, HAUL ROUTES, AND STAGING AREAS
11	G-11	DEMO AND TESC PLAN (1 OF 2)
12	G-12	DEMO AND TESC PLAN (2 OF 2)
13	G-13	TESC NOTES AND DETAILS
14	G-14	TESC DETAILS
15	C-1	REMEDIATION AREAS
16	C-2	CAA-1 EXCAVATION AREA PLAN AND PROFILE
17	C-3	CAA-2B EXCAVATION PLAN PLAN AND PROFILE
18	C-4	CAA-3 AND CAA-5 EXCAVATION AREA PLAN AND PROFILE
19	C-5	CAA-6 EXCAVATION AREAS PLAN AND PROFILE
20	C-6	CAA-7 EXCAVATION AREAS PLAN AND PROFILE
21	C-7	CAA-2A INSITU SOLIDIFICATION AREA
22	C-8	CAA-4A INSITU SOLIDIFICATION AREA
23	C-9	ISS SWELL MANAGEMENT AREA
24	C-10	INTERCEPTOR TRENCH DESIGN
25	C-11	UPLAND AOC CLEANUP ACTION AREAS INTERIM STABILIZATION
26	C-12	TYPICAL FINAL CAP DETAILS

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UTILITY NOTIFICATION CENTER
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Rev	Date	Description	By

Client

CRETE
CONSULTING, INC.
108 S. Washington Street, Suite 300
Seattle, Washington 98104
(206) 491-7554
www.creteconsulting.com

GRANT HAINSWORTH
33192
6/28/2021

Scale As Noted

SCALE WARNING
Drawing is not to scale, if scale bar doesn't measure one inch

Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

Cover Sheet,
Sheet Index and Vicinity Map

Drawing No.
G-1

Sheet 1 **of** 26

File: E:_Business\!Crete\!20001.01\2021.05.28\Time Oil - working cad files\Time Oil Bulk Terminal_Drawings\G1-G3 thru G6.dwg Plot Date:
May 26, 2021 Plotted by: Greene, Chris

EXISTING SITE PLAN

Rev	Date	Description	By

Client

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GRANT HAINSWORTH
33192
6/28/2021

Scale As Noted

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Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

Site Map

Drawing No.
G-2

Sheet 2 of 26

GENERAL NOTES

1. THIS WORK IS BEING COMPLETED TO SATISFY A PROSPECTIVE PURCHASER CONSENT DECREE (PPCD) BETWEEN THE DEPARTMENT OF ECOLOGY AND TOC SEATTLE TERMINAL 1, LLC.

2. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN DURING THE LIFE OF THE CONTRACT, ENVIRONMENTAL PROTECTIVE MEASURES IN ACCORDANCE WITH THESE PLANS. THE MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, EROSION CONTROL, VEHICLE DECONTAMINATION, AND SPILL RESPONSE.

3. IT IS POSSIBLE THAT DISTURBANCE OF HISTORICAL NATIVE AMERICAN MATERIALS MAY OCCUR AS A RESULT OF EXCAVATION OPERATIONS. THE EXCAVATION CREW SHALL ATTEND A 1-HOUR ONSITE ORIENTATION HELD BY THE SITE ARCHAEOLOGIST (RETAINED BY TOC SEATTLE TERMINAL 1, LLC) WHERE PERSONNEL SHALL BE MADE AWARE OF THE POTENTIAL TO DISCOVER CULTURAL RESOURCES WITHIN THE REMOVAL AREAS. THE CONTRACTOR SHALL BE MADE AWARE OF THEIR RESPONSIBILITIES DURING MONITORING BY THE SITE ARCHAEOLOGIST AND THEIR OBLIGATIONS IN THE CASE OF AN INADVERTENT DISCOVERY. IF ANY ARCHAEOLOGICAL RESOURCES ARE DISCOVERED DURING REMOVAL, THE CONTRACTOR SHALL CEASE EXCAVATION AND NOTIFY THE ENGINEER. CONTRACTOR SHALL ALLOW ACCESS TO WORK AREAS AS REQUESTED BY THE ENGINEER TO ALLOW INSPECTION FOR CULTURAL RESOURCES.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING, MAINTAINING, MONITORING, AND SUPPLEMENTING SILT CONTROL MEASURES, STORMWATER RUNOFF CONTROL MEASURES, AND ADDITIONAL BEST MANAGEMENT PRACTICES (BMPS) FOR THE IMPLEMENTATION AND MAINTENANCE OF A COMPREHENSIVE EROSION CONTROL PLAN. THE CONTRACTOR SHALL MEET CITY OF SEATTLE REQUIREMENTS AND THE SUBSTANTIVE REQUIREMENTS OF THE CONSTRUCTION STORMWATER GENERAL PERMIT (CSWGP) UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM AND STATE WASTE DISCHARGE PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY FOR SITE CONSTRUCTION WORK (INCLUDING APPLICABLE CONSTRUCTION WATER).

5. GRADING MUST BE STABILIZED BY OCTOBER 31ST, AND NO EXCAVATION OR FILL PLACEMENT CAN BE PERFORMED BETWEEN OCTOBER 31ST AND APRIL 1ST UNLESS AN EXTENSION IS GIVEN BY THE ENGINEER.

PERMITS/NOTICE OF INTENTS

1. THE CONTRACTOR SHALL OBTAIN CONSTRUCTION PERMITS AND APPROVALS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   A. CITY OF SEATTLE FIRE HYDRANT OR WATER SERVICE CONNECTION PERMIT

2. OWNER WILL OBTAIN THE FOLLOWING PERMITS OR SUBSTANTIVE REQUIREMENT DETERMINATIONS AND CONTRACTOR SHALL COMPLY WITH THESE REQUIREMENTS:
   A. KING COUNTY INDUSTRIAL WASTEWATER PERMIT FOR DISCHARGE OF TREATED SITE WATER TO THE SANITARY SEWER.
   B. CITY OF SEATTLE GRADING, SHORING, AND RIGHT-OF-WAY WORK APPROVALS.
   C. ECOLOGY CONSTRUCTION STORM WATER NPDES PERMIT THAT WILL BE TRANSFERRED TO CONTRACTOR PRIOR TO MOBILIZATION.
   D. ECOLOGY ENGINEERING DESIGN REPORT APPROVAL.

PRE CONSTRUCTION SUBMITTALS

1. THE CONTRACTOR SHALL SUBMIT A TECHNICAL EXECUTION PLAN (PLAN) THAT DOCUMENTS THE PROPOSED APPROACHES, EQUIPMENT, MEANS, AND METHODS OF ACCOMPLISHING THE EXCAVATION AND DISPOSAL OF SOIL AND ASSOCIATED SUBSURFACE DEBRIS AS WELL AS APPROACHES, EQUIPMENT, MEANS AND METHODS TO COMPLETE THE SOIL MIXING AND THE CONSTRUCTION OF THE INFILTRATION TRENCH. THE PLAN SHALL INCLUDE THE SEQUENCING APPROACH TO COMPLETE THE WORK BASED ON THE SCHEDULE. THE PLAN SHALL ADDRESS THE SAFE HANDLING OF CONTAMINATED MATERIALS AND MAINTAINING CLOSE TOLERANCES ON THE EXCAVATION LIMITS SHOWN ON THE DRAWINGS. AT A MINIMUM THE PLAN SHALL INCLUDE THE FOLLOWING ATTACHMENTS:
   A. TRAFFIC CONTROL PLAN
   B. EXCAVATION PLAN
   C. UTILITY PROTECTION PLAN
   D. ISS DESIGN
   E. DEWATERING SYSTEM PLAN WHICH SHALL DETAIL THE MEANS AND METHODS FOR ACHIEVING DEWATERED EXCAVATIONS THAT ENCOUNTER THE GROUNDWATER TABLE. THE METHODS FOR DEWATERING SHALL BE AT THE CONTRACTOR'S DISCRETION AND MAY BE A SYSTEM COMPRISED OF SEVERAL DIFFERENT COMPONENTS INCLUDING, BUT NOT LIMITED TO TRENCHES AND PUMPS, SHEET PILING, WELLS, AND WELL POINTS. WHILE THE CONTRACTOR WILL BE GIVEN THE DISCRETION IN ASSEMBLING, OPERATING AND MAINTAINING THE SYSTEM, PERFORMANCE OF THE SYSTEM SHALL BE MONITORED BY THE ENGINEER. THE CONTRACTOR SHALL MAKE ADJUSTMENTS TO THE DEWATERING SYSTEM TO ENSURE THAT OPEN EXCAVATION AREAS ARE HYDROSTATICALLY CONTROLLED AT ALL TIMES. THE ENGINEER WILL HAVE FINAL DETERMINATION AS TO ACCEPTABILITY OF THE DEWATERING SYSTEM PERFORMANCE. THE CONTRACTOR SHALL ALSO CONTROL SURFACE RUNOFF SO AS TO PREVENT ENTRY OR COLLECTION OF WATER IN EXCAVATIONS.
   F. CONSTRUCTION WATER MANAGEMENT PLAN (CWMP) - SHALL PROVIDE SUFFICIENT DETAIL TO ENSURE THAT THERE SHALL BE NO DISCHARGE OF WATER THAT DOES NOT COMPLY WITH ECOLOGY REQUIREMENTS AT ANY TIME AND UNDER ANY CIRCUMSTANCE. THE CWMP SHALL INCLUDE DETAILS ON ONSITE COLLECTION, TREATMENT, AND DISCHARGE OF WATER AND/OR COLLECTION, TRUCKING, AND OFFSITE TREATMENT OF WATER COLLECTED DURING FIELD ACTIVITIES. WATER INCLUDES SITE STORMWATER STOCKPILE DRAINAGE, DECONTAMINATION FLUIDS, AND GROUNDWATER COLLECTED DURING DEWATERING.
   G. CONSTRUCTION SEQUENCE & SCHEDULE.
   H. TEMPORARY EROSION & SEDIMENTATION CONTROL MEASURES.
   I. CONSTRUCTION WATER MANAGEMENT APPROACH.
   J. SPECIFIC EQUIPMENT & MEANS AND METHODS TO COMPLETE THE SCOPE OF WORK.
   K. SHORING APPROACH.
   L. CONSTRUCTION QUALITY CONTROL PLAN.
   M. SURVEY APPROACH.

2. THE CONTRACTOR SHALL SUBMIT, FOR THE ENGINEER'S REVIEW AND COMMENT, A SITE-SPECIFIC CONSTRUCTION HEALTH AND SAFETY PLAN. THE ENGINEER'S REVIEW OF, OR COMMENT ON, THE SITE-SPECIFIC CONSTRUCTION HEALTH AND SAFETY PLAN SHALL NOT, IN ANY WAY, RELIEVE THE CONTRACTOR OF ANY RESPONSIBILITY OR LIABILITY FOR THE PLAN. DELAY IN SUBMITTING A WRITTEN SITE- SPECIFIC CONSTRUCTION HEALTH AND SAFETY PLAN SHALL NOT CONSTITUTE GROUNDS FOR A CONTRACT SCHEDULE EXTENSION OR DELAY CLAIM.

3. THE CONTRACTOR SHALL IMPLEMENT THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) DEVELOPED FOR THE PROJECT IN ACCORDANCE WITH REQUIREMENTS OF THE CURRENT CSWGP THAT BECAME EFFECTIVE IN JANUARY 1, 2021 (NOTE THIS EXPIRES DECEMBER 31, 2025, CONTRACTOR SHALL USE THE MOST RECENT VERSION WHICH EXTENDS INTO THE CONSTRUCTION WORK WINDOW). THE SWPPP SHALL INCLUDE A CONSTRUCTION STORMWATER AND EROSION CONTROL PLAN (CSECP), SPILL PLAN (SP). THE CONTRACTOR IS RESPONSIBLE FOR THE IMPLEMENTATION OF THE SWPPP AND THE TESC MEASURES INCLUDING MONITORING, SAMPLING, TESTING, AND REPORTING REQUIRED BY THE CSWGP.
   A. IF REQUESTED BY ECOLOGY, THE CONTRACTOR SHALL SUBMIT TO ECOLOGY PRODUCT CATALOG CUTS FOR FILTER FABRIC FENCE AND FILTER BAG INSERTS TO BE USED FOR THE WORK.
   B. CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING MONTHLY DISCHARGE REPORTS IN ACCORDANCE WITH THE CSWGP. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FINES OR PENALTIES AS A CONSEQUENCE OF FAILURE TO SUBMIT MONTHLY REPORTS IN A TIMELY FASHION.

SCHEDULE

1. WEEKLY PROGRESS MEETINGS SHALL INCLUDE THE CONTRACTOR, ENGINEER, CONSULTANTS AND OTHERS AFFECTED BY DECISIONS MADE. THE ENGINEER WILL ARRANGE FOR THE TIME AND LOCATION OF THE MEETINGS. CONTRACTOR SHALL SCHEDULE, COORDINATE, LEAD AND ATTEND WEEKLY PROGRESS MEETINGS. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING COPIES OF THE CURRENT THREE WEEK LOOK AHEAD SCHEDULE TO ALL PARTICIPANTS AT EACH MEETING. THE CONTRACTOR SHALL RECORD MEETING MINUTES AND DISTRIBUTE COPIES WITHIN FIVE WORKING DAYS TO THE MEETING TO PARTICIPANTS AND TO OTHERS AFFECTED BY THE DECISIONS MADE.

2. WEEKLY PROGRESS MEETING SHALL INCLUDE THE FOLLOWING STANDARD AGENDA:
   A. REVIEW MINUTES OF PREVIOUS MEETING
   B. HEALTH AND SAFETY ISSUES
   C. REVIEW OF WORK PROGRESS
   D. FIELD OBSERVATION, PROBLEMS, AND DECISIONS
   E. IDENTIFICATION OF PROBLEMS THAT IMPEDE PLANNED PROGRESS
   F. REVIEW OF PROGRESS SCHEDULE (3 WEEKS LOOK AHEAD, 1 WEEK BACK)
   G. CORRECTIVE MEASURES TO ACHIEVE SCHEDULE MILESTONES
   H. PLANNED PROGRESS DURING SUCCEEDING WORK PERIOD
   I. COORDINATION OF PROJECTED WORK PROGRESS
   J. QUALITY AND WORK STANDARDS
   K. EFFECT OF PROPOSED CHANGES ON PROGRESS SCHEDULE AND COORDINATION
   L. DEMONSTRATION THAT THE PROJECT RECORDS ARE UP-TO-DATE
   M. OTHER BUSINESS RELATED TO THE WORK.

3. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE WORK SCHEDULE SO THAT ALL WORK CAN BE COMPLETED IN A SINGLE SEASON. CONTRACTOR SHALL PROVIDE EQUIPMENT, MATERIALS AND LABOR AS NECESSARY TO MAINTAIN THE PROJECT SCHEDULE AND SHALL, AT NO ADDITIONAL COST, PROVIDE ADDITIONAL EQUIPMENT, MATERIALS AND LABOR TO ACCELERATE THE WORK AS REQUIRED TO REMAIN ON SCHEDULE.

4. CONTRACTOR SHALL SUBMIT WEEKLY SCHEDULE UPDATES THAT SHOW A DETAILED 3-WEEK LOOK-AHEAD SCHEDULE, AND AN OVERALL SCHEDULE THAT DEMONSTRATES COMPLETION BY THE DATES PRESCRIBED HEREIN. THIS WEEKLY SCHEDULE SUBMITTAL SHALL CLEARLY SHOW THE COMPLETION DATES AND DETAIL METHODS THAT WILL BE EMPLOYED TO ACCELERATE THE WORK AS NECESSARY TO ACHIEVE THE COMPLETION DATES.

5. THE FOLLOWING WORK RESTRICTIONS APPLY TO THIS WORK:
   A. PROJECT COMPLETION DATE IS XXXX, 20XX. ALL SITE WORK SHALL BE COMPLETED BY THIS DATE.

HEALTH AND SAFETY NOTES

1. THE CONTRACTOR SHALL COMPLY WITH THE FEDERAL OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 (OSHA), INCLUDING ALL REVISIONS AND AMENDMENTS THERETO; THE PROVISIONS OF THE WASHINGTON DEPARTMENT OF LABOR AND INDUSTRIES, SAFETY AND HEALTH.

2. THE CONTRACTOR SHALL CONSIDER THAT HAZARDOUS AND/OR REGULATED MATERIAL CAN BE ENCOUNTERED IN THE SUBSURFACE AT ANY LOCATION ON THE PROJECT. THE CONTRACTOR SHALL PLAN WORK ZONE DESTINATION AND WORK HEALTH AND SAFETY AROUND THIS ASSUMPTION.

3. FORTY-HOUR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE (HAZWOPER) TRAINING, WITH CURRENT ANNUAL 8-HOUR REFRESHER, SHALL BE REQUIRED FOR ALL ONSITE WORKERS AND OTHER WORKERS WITH POTENTIAL FOR HANDLING OR EXPOSURE TO SITE SOIL OR GROUNDWATER, WITH THE EXCEPTION OF TRUCK DRIVERS AND SURVEYORS (UNLESS THEIR ACTIVITIES REQUIRE POTENTIAL EXPOSURE TO CONTAMINATED MATERIALS). TRUCK DRIVERS SHALL RECEIVE ORIENTATION ON THE SITE SPECIFIC CONSTRUCTION HEALTH AND SAFETY PLAN; NO OTHER HEALTH AND SAFETY TRAINING SHALL BE REQUIRED, PROVIDED THAT ALL OUT-OF-CAB ACTIVITIES ARE RESTRICTED TO COVERING OF LOADS, NECESSARY VEHICLE INSPECTIONS, AND SIGNING OF MANIFESTS.

SURVEYING NOTES

1. THE CONTRACTOR SHALL ESTABLISH SUCH ADDITIONAL LINES, GRADES AND CONTROLS AS ARE NEEDED FOR CONSTRUCTION.

2. ALL WORK PERFORMED SHALL BE IN CONFORMANCE WITH THE LINES, GRADES AND DIMENSIONS INDICATED ON THE DRAWINGS. IF A DISCREPANCY IS NOTED BETWEEN THE DRAWINGS, THE SAME SHALL IMMEDIATELY BE BROUGHT TO THE ENGINEER'S ATTENTION. WHERE TOLERANCES ARE STATED, THE WORK PERFORMED SHALL BE WITHIN THOSE TOLERANCES. THE ENGINEER WILL DETERMINE IF THE WORK CONFORMS TO SUCH LINES, GRADES AND DIMENSIONS AND HIS DETERMINATION SHALL BE FINAL.

3. THE CONTRACTOR ASSUMES FULL RESPONSIBILITY FOR DETAILED DIMENSIONS AND ELEVATIONS MEASURED FROM PRIMARY CONTROL POINTS.

4. CONTRACTOR SHALL SUBMIT SURVEYS TO THE ENGINEER WITHIN 24 HOURS OF COMPLETING INDEPENDENT SURVEYS. INCLUDE AUTOCAD ELECTRONIC FILE, PLAN VIEW DRAWINGS WITH 1-FT CONTOUR INTERVALS AND SPOT ELEVATIONS DEPICTING HIGH AND LOW POINTS PLOTTED AT 1 INCH=50 FEET. THE AUTOCAD FILES SHALL INCLUDE A TRIANGULATED IRREGULAR NETWORK (TIN) BASED DTM. ASCII-FORMAT PROCESSED SURVEY DATA SHALL BE PROVIDED IN X,Y,Z (EASTING, NORTHING, ELEVATION) FORMAT. EACH DATA SHALL INCLUDE A DESCRIPTIVE HEADER INCLUDING, BUT NOT LIMITED TO: SOFTWARE AND EQUIPMENT INFORMATION, CLIENT, PROJECT, HORIZONTAL AND VERTICAL DATUM, UNITS, SURVEY TYPE, ALIGNMENT, AND STATIONS SURVEYED.

5. THE CONTRACTOR SHALL MAINTAIN ON SITE A COMPLETE, ACCURATE LOG OF CONTROL OF SURVEY WORK AS IT PROGRESSES.

EXISTING UTILITIES

1. THE CONTRACTOR SHALL LOCATE EXISTING UNDERGROUND AND ABOVEGROUND UTILITIES IN THE AREA OF THE WORK. THOSE UTILITIES WHICH ARE TO REMAIN SHALL BE ADEQUATELY PROTECTED FROM DAMAGE. THE CONTRACTOR SHALL MAKE ARRANGEMENTS WITH ALL UTILITY PROVIDERS THAT WILL BE AFFECTED BY EARTHWORK ACTIVITIES AND SHALL DESIGN SITE ACTIVITIES (SHORING) TO ACCOUNT FOR THE UTILITIES.

2. THE CONTRACTOR SHALL PREPARE A UTILITY PROTECTION PLAN, DISCUSSED WITH THE TECHNICAL EXECUTION PLAN SUBMITTAL. UTILITIES TO BE PROTECTED INCLUDE MONITORING WELLS, SIDE SEWER CONNECTIONS AND A GAS LINE AND UTILITY POLE ASSOCIATED WITH THE RIGHT-OF-WAY EXCAVATION. CITY MAY PROVIDE SPECIFIC PROTECTION OR MONITORING REQUIREMENTS IN THE RIGHT-OF-WAY WORK APPROVAL.

3. WELLS AND INJECTION POINTS WILL BE DECOMMISSIONED BY OWNER PRIOR TO CONTRACTOR MOBILIZATION.

4. ALL SEWER AND STORM LINES IN THE ROW WITHIN 10 FEET (OR WITHIN 20 FEET IF SUCH LINES ARE 30 FEET OR MORE OFF SITE PROPERTY LINE) OF ANY PROPOSED SHORING ELEMENT SHALL BE VIDEOTAPED OF PRE-PROJECT CONDITION AND A COPY SENT TO SPU AT SPU_DWW_PIPE_REHAB@SEATTLE.GOV PRIOR TO PRECONSTRUCTION MEETING. SIMILAR VIDEOTAPE OF POST-PROJECT CONDITION IS ALSO REQUIRED AND SENT TO SPU AT SAME EMAIL ADDRESS.

CONSTRUCTION WATER MANAGEMENT

1. THE DEWATERING SYSTEM IS EXPECTED TO BE OPERATED INTERMITTENTLY THROUGHOUT THE PROJECT. WATER COLLECTION AND TREATMENT WILL BE REQUIRED FOR ALL SITE CONTACT STORMWATER, INCLUDING WATER COLLECTED WITHIN STOCKPILE AREAS, FROM OTHER DISTURBED AREAS WITHIN THE SITE WHERE STORMWATER CONTACTS CONTAMINATED OR POTENTIALLY CONTAMINATED SOIL.

2. WATER GENERATED FROM THE DEWATERING PROCESS WILL BE APPROPRIATELY TREATED AND DISCHARGED TO SANITARY SEWER OR AT AN OFFSITE FACILITY PERMITTED TO DISPOSE OF CONTAMINATED WATER.

3. THE MINIMUM SYSTEM REQUIREMENTS SHALL INCLUDE OIL/WATER SEPARATION, SOLIDS REMOVAL, POLISHING WITH GRANULATED ACTIVATED CARBON, AND PH AND DISSOLVED OXYGEN TREATMENT. CONTRACTOR SHALL ADD TO THE SYSTEM TO THE DEGREE THEY BELIEVE NECESSARY TO COMPLY WITH THE DISCHARGE LIMITS.

4. ALL PROJECT WATER THAT CONTACTS CONTAMINATED OR POTENTIALLY CONTAMINATED SOIL, OR THAT CONTACTS ONSITE PAVEMENT, SHALL BE TREATED ONSITE TO REMOVE ALL CONTAMINANTS OF CONCERN (COCS) BEFORE DISCHARGE TO THE CITY OF SEATTLE TREATMENT SYSTEM, OR SHALL BE TRUCKED TO AN ECOLOGY-APPROVED OFFSITE FACILITY FOR TREATMENT, OR A COMBINATION OF BOTH. THE EXCEPTION IS FOR OVER-THE-ROAD TRUCK WHEEL WASH WATER WHICH SHALL BE HANDLED SEPARATELY (OFFSITE DISPOSAL) DUE TO THE POTENTIAL FOR DIFFERENT CONTAMINANTS.

5. CONTRACTOR SHALL UTILIZE EITHER OR BOTH METHODS, WHICHEVER IS DEEMED NECESSARY TO ENSURE THAT NO DISCHARGE OF NON-COMPLIANT WATER OCCURS AT ANY TIME OR UNDER ANY CIRCUMSTANCE.

6. SUFFICIENT STORAGE SHALL BE AVAILABLE ONSITE TO PREVENT NON-COMPLIANT DISCHARGES. STORAGE CAPACITY DESIGN SHALL CONSIDER FLOW-THROUGH DISCHARGE RATES AND/OR TRUCKING CAPACITY AND TURNAROUND TIMES.

7. FOR OFFSITE DISPOSAL, TRUCK TICKETS SHALL BE PROVIDED TO THE ENGINEER WEEKLY AND WILL IDENTIFY LOCATION OF FACILITY AND VOLUME OF WATER DISCHARGED.

8. FOR ONSITE TREATMENT AND DISPOSAL, DAILY TREATMENT LOGS SHALL BE PROVIDED TO THE ENGINEER AS PART OF THE DAILY CONSTRUCTION REPORT AND SHALL INCLUDE CUMULATIVE INFLOW AND DISCHARGE VOLUMES, HOURS OF TREATMENT SYSTEM OPERATION AND DISCHARGE, MAINTENANCE ACTIVITIES, AND TEST DATA THAT DEMONSTRATE DISCHARGED WATER MEETS ALL REQUIRED CRITERIA.

9. TREATMENT SYSTEM(S) SHALL BE APPROVED FOR USE BY THE WASHINGTON STATE DEPARTMENT OF ECOLOGY BMP C250 AND THE CHEMICAL TREATMENT ASSESSMENT PROTOCOL – ECOLOGY (CTAPE).

10. THE CONSTRUCTION WATER TREATMENT SYSTEM SHALL ONLY BE OPERATED BY THE CONSTRUCTION WATER TREATMENT SYSTEM OPERATOR(S) (OPERATOR).

11. OPERATOR SHALL BE ONSITE AT ALL TIMES THE CONSTRUCTION WATER TREATMENT SYSTEM IS OPERATING AND SHALL HAVE NO OTHER DUTIES.

12. IF ONSITE TREATMENT IS USED, CONTRACTOR SHALL PERFORM A "PROOF OF TREATMENT" TO DEMONSTRATE THE EFFECTIVENESS OF THE TREATMENT SYSTEM PRIOR TO STARTING DISCHARGE

13. SAMPLING AND ANALYSIS: CONTRACTOR SHALL PERFORM SAMPLING AND ANALYSIS OF REPRESENTATIVE SAMPLES OF THE TREATED WATER AS REQUIRED TO DEMONSTRATE THAT THE EFFLUENT MEETS KING COUNTY INDUSTRIAL WASTE PROGRAM WATER QUALITY DISCHARGE LIMITS BEFORE DISCHARGE INTO THE SANITARY SEWER SYSTEM ACCORDING TO THE REQUIREMENTS OF PERMIT.

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Scale As Noted

SCALE WARNING
Drawing is not to scale, if scale bar doesn't measure one inch

Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

General Notes
(1 of 4)

Drawing No.
G-3

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File: E:_Business\!Crete\!20001.01\2021.05.28\Time Oil - working cad files\Time Oil Bulk Terminal_Drawings\G1-G3 thru G6.dwg Plot Date:
May 26, 2021 Plotted by: Greene, Chris

GENERAL NOTES continued...

EARTHWORK AND SUBGRADE PREPARATION NOTES

1. ALL EARTHWORK AND SUBGRADE PREPARATION WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE DRAWINGS.

2. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND /OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS CONCEPTUAL. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. EXISTING UTILITIES ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION ONLY WITHIN THE LIMITS OF THE PROJECT. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THE PERTINENT UTILITY LOCATIONS AND ELEVATIONS. IT IS THE CONTRACTORS RESPONSIBILITY TO FULLY UNDERSTAND AND VERIFY THE CONDITION OF ANY UTILITY SERVICE LINES, AND PROTECT THOSE LINES AT ALL TIMES DURING THE COURSE OF THIS WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGES RESULTING FROM ITS ACTIONS.

3. IF DURING CONSTRUCTION, CONDITIONS ARE ENCOUNTERED WHICH DIFFER FROM THE CONDITIONS PROVIDED ON THE DRAWINGS OR LISTED WITHIN THE SPECIFICATIONS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY.

4. THE CONTRACTOR IS RESPONSIBLE FOR ALL PROJECT SAFETY.

5. USE OF DUST CONTROL MEASURES SHALL BE IMPLEMENTED AS NECESSARY TO MINIMIZE DUST GENERATION. IF WORK ACTIVITIES GENERATE VISIBLE DUST AT THE PROJECT BOUNDARIES OR IN AREAS WHERE CLEAN BACKFILL HAS BEEN PLACED, ACTIVITIES SHALL BE MODIFIED OR STOPPED WHILE DUST CONTROL MEASURES ARE IMPLEMENTED. DUST CONTROL MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, SPRINKLING AREAS WITH WATER, CHANGING THE RATE OF EXCAVATION/BACKFILLING/HAULING ACTIVITIES, OR KEEPING DROP HEIGHTS TO A MINIMUM WHILE LOADING TRUCKS.

STOCKPILE MANAGEMENT PROCEDURES

1. STOCKPILING SHALL BE ALLOWED ONLY IN AREAS APPROVED BY THE ENGINEER. THE EDGES OF THE STOCKPILES SHALL BE LOCATED NO CLOSER THAN 20 FEET FROM THE TOP OF THE BANK ALONG SALMON BAY.

2. STOCKPILES ARE REQUIRED TO BE LINED ON THE BOTTOM OR PLACED ON PAVEMENT TO PREVENT CONTAMINATION OF THE UNDERLYING SOIL, AND COVERED WHEN NOT DIRECTLY IN USE TO MINIMIZE THE DUST PRODUCTION AND TO PROTECT AGAINST PRECIPITATION.

3. STOCKPILE BOTTOM LINERS SHALL BE POLYETHYLENE, SHALL HAVE A MINIMUM THICKNESS OF 30 MILS AND SHALL BE RESISTANT TO WEATHERING AND DEGRADATION DUE TO CONTACT WITH CONTAMINATED MATERIALS FOR THE DURATION OF THE PROJECT WORK AND SUITABLE FOR THE INTENDED USE OF THE STOCKPILE AREA. THE LINER SHALL BE FURNISHED WITH PREFABRICATED SHOP WELDED SEAMS OR SEAMS WELDED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. DIMENSIONS MAY BE MAXIMIZED TO PROVIDE THE LARGEST MANAGEABLE SHEET.

4. THE LINER SHALL BE SUPPLIED IN ROLLS. LABELS ON EACH ROLL SHALL IDENTIFY THE THICKNESS OF THE MATERIAL, THE LENGTH AND WIDTH OF THE ROLL, LOT AND ROLL NUMBERS, AND NAME OF MANUFACTURER.

5. PREPARE THE AREA TO RECEIVE THE STOCKPILE LINER IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS TO PROVIDE A SMOOTH, FIRM SUBGRADE THAT SHALL BE FREE OF PROTRUSIONS AND SUITABLE TO PROTECT THE LINER DURING USE.

6. INSTALL BOTTOM LINER TO FULLY COVER THE SMOOTH GROUND SURFACE FOR EACH STOCKPILE. FIELD SEAMING, IF NECESSARY, SHALL BE COMPLETED IN ACCORDANCE WITH THE LINER MANUFACTURER'S RECOMMENDATIONS TO PROVIDE A WATER TIGHT SEAM. SIMPLE OVERLAPPING OF SEAMS WITHOUT SEALING IS NOT ALLOWED. ANCHOR THE LINER ADEQUATELY TO PREVENT DISPLACEMENT. MONITOR AND MAINTAIN LINER INTEGRITY. IMMEDIATELY REPAIR TEARS OR PUNCTURES WHERE DAMAGED.

7. STOCKPILE BERMS (OR ECOLOGY BLOCKS) SHALL BE FIRM, NON-YIELDING AND STABLE. BOTTOM LINER SHALL COVER ENTIRE BERM AND BE PLACED SUCH THAT ALL DRAINAGE FROM THE STOCKPILE IS CONTAINED WITHIN THE STOCKPILE CELL.

8. ONCE THE LINER IS IN PLACE AND THE STOCKPILE AREA READY TO RECEIVE/ STORE MATERIAL, THE CONTRACTOR SHALL INSTALL A CUSHIONING LAYER (MINIMUM 12 INCHES THICK) TO PROTECT THE LINER IN ACCORDANCE WITH THE LINER MANUFACTURER'S RECOMMENDATIONS. THIS LAYER CAN CONSIST OF ONSITE WASTE AS LONG AS IT MEETS THE LINER MANUFACTURER'S RECOMMENDATIONS FOR LINER PROTECTION. LEAVE THIS CUSHIONING LAYER OVER THE LINER DURING OPERATIONS TO PROTECT THE LINER FROM DAMAGE BY STOCKPILING AND LOADING OPERATIONS. SHOULD THE LINER BE DAMAGED, THE CONTRACTOR SHALL IMMEDIATELY REPAIR THE DAMAGE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND NOT ALLOW CONTAMINATED MATERIAL OR RUN-OFF TO ESCAPE THE STOCKPILE. NO CONSTRUCTION EQUIPMENT SHALL BE ALLOWED TO DRIVE DIRECTLY OVER THE LINER.

9. STOCKPILE COVERS SHALL BE 6-MIL (MINIMUM THICKNESS) BLACK OR CLEAR REINFORCED POLYETHYLENE SHEETING. THE STOCKPILE COVER SHEETS SHALL BE OF SUFFICIENT LENGTH AND WIDTH TO COMPLETELY AND FULLY COVER ALL OF EACH STOCKPILE WITH NO MORE THAN TWO SHEETS.

10. STOCKPILE COVERS AND LINERS SHALL BE FREE OF HOLES OR TEARS. DEFECTIVE MATERIAL SHALL BE IMMEDIATELY REPAIRED OR REPLACED AND NOT ALLOW LEAKAGE OR ESCAPE OF MATERIAL FROM THE STOCKPILE AREA, AS DETERMINED BY THE ENGINEER.

11. INSTALL STOCKPILE COVER IN A MANNER THAT MINIMIZES WRINKLES AND PROVIDES FOR A STRAIGHT PLACEMENT. ALL SEAMS SHALL BE TAPED OR WEIGHTED DOWN FULL LENGTH AND THERE SHALL BE AT LEAST 4 FEET OF OVERLAP OF ALL SEAMS. PLACE SANDBAGS OR OTHER PREAPPROVED CLEAN WEIGHTED OBJECTS ON THE COVER AT SUFFICIENTLY CLOSE SPACING TO PREVENT UPLIFT FROM WIND. THE TOE OF SLOPES SHALL BE TIGHTLY SECURED AND COVERED BY THE SHEETING.

12. PROTECT THE COVER FROM DAMAGE. REMOVE AND REPLACE DAMAGED POLYETHYLENE SHEETING AS NEEDED OR IF DIRECTED BY THE ENGINEER.

13. FURNISH SAND BAGS OR OTHER DEVICES AS APPROVED BY THE ENGINEER OF SUFFICIENT QUANTITY AND WEIGHT AND WITH SUFFICIENTLY CLOSE SPACING TO COMPLETELY AND FULLY HOLD THE STOCKPILE COVER IN POSITION. ONLY CLEAN, UNCONTAMINATED MATERIAL SHALL BE USED TO WEIGH DOWN THE COVERING; STOCKPILE MATERIAL SHALL NOT BE USED FOR COVER WEIGHT. IN PARTICULAR, THE EDGES OF THE STOCKPILE COVER SHALL BE ADEQUATELY ANCHORED TO COMPLETELY TRAP THE MATERIAL WITHIN.

14. COORDINATE STOCKPILING AND STOCKPILE MAINTENANCE WORK WITH EXCAVATION WORK.

15. LINE BOTTOM OF STOCKPILES AS OUTLINED IN THESE PLANS. PROVIDE STORMWATER RUN-ON CONTROL, MANAGE ALL DRAINAGE FROM STOCKPILES, PREVENT RAIN, STORMWATER, AND SURFACE WATER FROM CONTACTING MATERIAL CONTAINED IN THE STOCKPILES. COVER STOCKPILES DURING LENGTHY PERIODS OF INACTIVITY WHILE ON SITE, AT THE END OF EACH WORK DAY, JUST PRIOR TO AND DURING PERIODS OF PRECIPITATION, AND AS NECESSARY TO CONTROL DUST, EROSION AND ODORS.

STOCKPILE SAMPLING

1. THE FREQUENCY OF MATERIAL SAMPLING WILL DEPEND UPON THE REQUIREMENTS OF THE WASTE DISPOSAL FACILITY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONDUCT AND COORDINATE ANY SAMPLING REQUIREMENTS MANDATED BY THE WASTE DISPOSAL FACILITY.

2. STOCKPILES LOCATED ON AREAS OVERLYING CLEAN SOILS SHALL MANDATE THAT SAMPLING OF THE UNDERLYING SOILS BE PERFORMED UPON STOCKPILE REMOVAL TO DEMONSTRATE THAT STOCKPILING DID NOT AFFECT CLEAN UNDERLYING SOILS. CONTRACTOR SHALL NOTIFY THE ENGINEER WHEN STOCKPILES HAVE BEEN COMPLETELY REMOVED AND THE ENGINEER WILL SAMPLE THE UNDERLYING SOILS. IF THE UNDERLYING SOILS ARE FOUND, THROUGH SAMPLING OR VISUAL OBSERVATIONS BY THE ENGINEER, TO BE CONTAMINATED BY THE CONTRACTOR'S STOCKPILING ACTIVITIES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMEDIATING THE CONTAMINATED SOILS TO THE ENGINEER'S SATISFACTION AT NO ADDITIONAL COST TO THE OWNER.

EXCAVATION NOTES

1. NO ADDITIONAL COMPENSATION SHALL BE MADE TO THE CONTRACTOR FOR DEALING WITH OBSTRUCTIONS. IF OBSTRUCTIONS ARE ENCOUNTERED DURING EXCAVATION, THE CONTRACTOR SHALL COMPLETE THE FOLLOWING STEPS:
   - A. NOTIFY THE ENGINEER.
   - B. IF THE EXPOSED OBSTRUCTION IS TOO LARGE TO REMOVE, EITHER CHIP OUT THE PORTION THAT EXTENDS INTO THE EXCAVATION, OR PROVIDE FOR THE REMOVAL TO BE COMPLETED AROUND THE OBSTRUCTION. THIS DETERMINATION WILL BE MADE WITH THE ENGINEER.

2. THE DRAWINGS IDENTIFY CONFIRMATION SAMPLING GRID CELLS THAT MUST BE SAMPLED BY THE ENGINEER TO DETERMINE IF CLEANUP GOALS HAVE BEEN MET. THE TECHNICAL EXECUTION PLAN SHALL BE DEVELOPED TO SEQUENCE THE WORK TO COINCIDE WITH THIS SAMPLING PROTOCOL.

3. FOR GRID CELLS THAT REQUIRE CONFIRMATION SAMPLING: UPON COMPLETION OF EXCAVATION TO THE LIMITS SHOWN ON THE DRAWINGS, THE ENGINEER WILL CONDUCT CONFIRMATION SAMPLING WITHIN THE SOIL GRID CELLS INDICATED ON THE DRAWINGS TO DETERMINE IF THE SOIL REMAINING AT THE BOTTOM AND SIDEWALLS OF EACH EXCAVATION MEETS THE REQUIRED CLEANUP GOALS.

4. NOTIFICATION:
   - A. THE CONTRACTOR SHALL NOTIFY THE ENGINEER UPON COMPLETION OF EXCAVATION AND DEMONSTRATE THAT THE EXCAVATION CONFIGURATION SHOWN ON THE DRAWINGS HAS BEEN ACHIEVED VIA SURVEY. THE NOTIFICATION SHALL NOT BE CONSIDERED "COMPLETE" WITHOUT SURVEY INFORMATION THAT DEMONSTRATES THAT THE EXCAVATION HAS BEEN COMPLETED IN ACCORDANCE WITH THE LINES AND GRADES SHOWN ON THE DRAWINGS.
   - B. FOR THE CONFIRMATION GRID CELLS THAT DO REQUIRE SAMPLING, THE ENGINEER SHALL NOTIFY THE CONTRACTOR WITHIN 3 DAYS (EXCLUDING SUNDAYS AND HOLIDAYS) OF A COMPLETE NOTIFICATION BY THE CONTRACTOR IF THE CLEANUP GOALS HAVE BEEN MET EACH GRID CELL.

5. ACTIONS THAT WILL RESULT FROM SAMPLING INCLUDE:
   - A. IF THE CLEANUP GOALS HAVE BEEN MET WITHIN A GRID CELL, IT WILL BE CONSIDERED READY TO BACKFILL BY THE ENGINEER AND SHALL BE BACKFILLED TO THE FINAL SITE GRADES BY THE CONTRACTOR AT A TIME THEY DEEM APPROPRIATE.
   - B. IF THE CLEANUP GOALS HAVE NOT BEEN MET WITHIN A GRID CELL, THE ENGINEER WILL DETERMINE WHAT ADDITIONAL DEPTH OR EXTENT OF SOIL SHALL BE REMOVED FROM THE EXCAVATION AND INFORM THE CONTRACTOR OF THE NEW REQUIRED EXCAVATION LIMITS. THE CONTRACTOR SHALL PERFORM THE ADDITIONAL REMOVAL AND PROVIDE NOTIFICATION AS DESCRIBED IN THIS SECTION. THIS PROCESS WILL CONTINUE UNTIL THE SITE CLEANUP GOALS HAVE BEEN MET.

6. THE CONTRACTOR SHALL PROVIDE A SAFE ENTRANCE INTO THE EXCAVATION FOR THE ENGINEER TO SECURE THE CONFIRMATION SAMPLES AND WORK WITH THE ENGINEER TO ACHIEVE THE SAMPLE WHICH MAY INCLUDE PROVIDING AN EXCAVATOR WITH OPERATOR THAT CAN BE USED TO REACH TO THE BOTTOM OR SIDEWALL OF THE DEEPER EXCAVATIONS TO OBTAIN A SAMPLE.

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFETY AROUND OPEN EXCAVATIONS AND SHALL BE RESPONSIBLE FOR BACKFILLING THE OPEN EXCAVATIONS WITH CLEAN BACKFILL.

BACKFILL NOTES

1. SUBMIT TEST RESULTS PRIOR TO IMPORTING ANY BACKFILL MATERIAL ON THE SITE, ONE TEST FOR EVERY SOURCE OF BACKFILL MATERIAL, AND EACH TIME THE MATERIAL SOURCE IS DEEMED TO CHANGE. EACH SAMPLE SHALL BE REPRESENTATIVE OF THE CURRENT PRODUCTION AND STOCKPILE BEING SUPPLIED TO THE SITE. TESTING SHALL IN ACCORDANCE WITH
   - A. SIEVE ANALYSES AND COMPARISON TO THE REQUIRED SPECIFICATIONS
   - B. MOISTURE DENSITY CURVE FOR GRAVEL BORROW IN ACCORDANCE WITH ASTM D-1557 MODIFIED PROCTOR
   - C. CHEMICAL TEST RESULTS FOR ALL ANALYTES LISTED HEREIN ALONG WITH A COMPARISON OF THE ANALYTICAL TEST RESULTS TO THE SPECIFIED LEVELS

2. IMPORTED BACKFILL MATERIAL SHALL BE NATURALLY OCCURRING OR NATURAL MATERIAL BLENDED TO ACHIEVE GRADATION REQUIREMENTS LISTED HEREIN. THE BACKFILL SHALL NOT CONTAIN RECYCLED MATERIAL OF ANY TYPE AND SHALL NOT BE FROM AN INDUSTRIAL OR COMMERCIAL SITE. IMPORTED GRAVEL BORROW OR OTHER CLEAN SOIL SHALL BE IN COMPLIANCE WITH ANALYTICAL TESTING SPECIFICATIONS.

3. BACKFILL SHALL BE PLACED IN 12 INCH MAXIMUM LIFT THICKNESS AND COMPACTED TO 95% ASTM D-1557 MINIMUM COMPACTION.

4. THE CONTRACTOR SHALL PLACE MATERIAL USED FOR THE CONSTRUCTION OF FILL IN ROUGHLY HORIZONTAL LAYERS UPON EARTH WHICH HAS BEEN STABILIZED OR OTHERWISE APPROVED BY THE ENGINEER FOR CONSTRUCTION. THE BACKFILL SHALL BE COMPACTED WITH MODERN, EFFICIENT COMPACTING UNITS SATISFACTORY TO THE ENGINEER.

5. FIELD TESTS TO DETERMINE IN-PLACE COMPLIANCE WITH REQUIRED DENSITIES AS SPECIFIED, SHALL BE PERFORMED IN ACCORDANCE WITH ASTM D1557, D2167, OR D6938.

6. THE EXCAVATED AREA WITHIN THE W. COMMODORE WAY ROW SHALL ALSO BE BACKFILLED WITH CLEAN IMPORTED FILL AND RESTORED WITH A PAVEMENT SECTION MEETING CITY OF SEATTLE REQUIREMENTS.

7. FOR BACKFILL:
   - A. SATURATED EXCAVATIONS (ALL AREAS) - QUARRY SPALLS UP TO WATER LEVEL
   - B. DRY EXCAVATIONS OR ABOVE WATER LEVEL (ALL AREAS) - GRAVEL BORROW
   - C. SURFACE LAYER ALL AREAS EXCEPT CAA-2 AND CAA-4 - 2 FEET BALLAST ROCK
   - D. ISS TREATMENT AREAS (CAA-2 AND CAA-4) - GEOTEXTILE AND 6 INCHES BALLAST ROCK
   - E. SURFACE - ROW CAA-2b - PAVEMENT WITH SUBGRADE PER WSDOT
   - F. ISS SWELL AREA - COMPACTED ISS MATERIAL AND GEOTEXTILE SECURED IN PLACE (NO BALLAST ROCK).

MATERIAL SPECIFICATIONS

1. BALLAST ROCK - WSDOT SPECIFICATION 9-03.9(1).
2. WOVEN GEOTEXTILE SHALL BE US 2600 OR APPROVED EQUIVALENT.
   - A. QUARRY SPALLS
     - A.A. QUARRY SPALLS SHALL MEET THE REQUIREMENTS OF WSDOT SPECIFICATION SECTION 9-13.6.
   - B. GRAVEL BORROW
     - B.A. AGGREGATE FOR GRAVEL BORROW SHALL CONSIST OF GRANULAR MATERIAL, EITHER NATURALLY OCCURRING OR BLENDED, AND SHALL MEET THE FOLLOWING REQUIREMENTS FOR GRADATION:

SIEVE SIZE (INCHES)	PERCENT PASSING
4	99 – 100
2	70 – 100
NO. 4	50 – 80
NO. 40	30 MAX.
NO. 200	7.0 MAX.*
SAND EQUIVALENT	50 MIN.

NOTES: ALL PERCENTAGES ARE BY WEIGHT.
* FOR BACKFILL IN WET CONDITIONS THE FINES CONTENT (MATERIAL PASSING NO. 200) SHALL BE LIMITED TO 5.0%

   - C. BALLAST ROCK
     - C.A. BALLAST ROCK SHALL MEET THE REQUIREMENTS OF WSDOT SPECIFICATION SECTION 9-03.9(1)
   - D. WOVEN GEOTEXTILE
     - D.A. WOVEN GEOTEXTILE SHALL BE US 2600 OR APPROVED EQUIVALENT

2. CHEMICAL TESTING IS REQUIRED FOR ANALYSIS FROM EVERY SOURCE PROPOSED. TESTING SHALL BE OF THE 1-INCH MINUS COMPONENT OF THE GRAVEL BORROW MATERIAL ANTICIPATED PRIOR TO IMPORT. IF THE IMPORT SOURCE CHANGES NEW TESTING WILL BE REQUIRED. ONLY BACKFILL WITH A 1-INCH MINUS (FINES) COMPONENT IS REQUIRED TO BE TESTED. CHEMICAL ACCEPTANCE CRITERIA: CONTRACTOR SHALL PROVIDE DOCUMENTATION OF THE CHEMICAL COMPOSITION TO DEMONSTRATE THAT THE PROPOSED BACKFILL IS FREE FROM ENVIRONMENTAL CONTAMINATION. BACKFILL ANALYTES, REPORTING LIMITS, METHODS, AND CRITERIA ARE:

Analyte	Unit	Analytical Method	Reporting Limit	Criteria
PCB Aroclors	μg/kg dw	EPA 8082	4	ND
Semi-volatile organic compounds (SVOCs)	μg/kg dw	EPA 8270	20^{A}	ND
Arsenic	mg/kg dw	EPA 6010	5	7.3
Cadmium			0.2	0.77
Chromium			0.5	48
Copper			0.2	36
Lead			2	21
Silver			0.1	ND
Zinc			1	85
Mercury	mg/kg dw	EPA 7471	0.02	0.07
Diesel range hydrocarbons	mg/kg dw	NWTPH-Dx	5	ND
Lube oil range hydrocarbons			10	
cPAH TEQ	mg/kg dw	EPA 8270	0.007	ND

NOTES:
ND = NOT DETECTED AT REPORTING LIMIT; TEQ = TOXICITY EQUIVALENT.

[A]: MOST SVOCS, SUCH AS PAHS, HAVE REPORTING LIMITS OF 20 UG/KG DW. SOME SVOCS HAVE HIGHER REPORTING LIMITS: 2,4-DIETHYLPHENOL – 35, 4-METHYLPHENOL – 35, BENZOIC ACID – 400, BIS(2-ETHYLHEXYL)PHTHALATE - 30, HEXACHLOROBUTADIENE – 90, DIETHYLPHTHALATE – 50, PENTACHLOROPHENOL – 200.

3. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION OF THE CHEMICAL COMPOSITION OF ALL IMPORT SOIL TO DEMONSTRATE THAT THE PROPOSED IMPORT MATERIAL MEETS THE CHEMICAL CRITERIA. IMPORT TESTING SHALL BE EVALUATED EITHER USING PRE-EXISTING, VERIFIABLE DATA FROM AN IMPORT SOURCE THAT WAS DEVELOPED WITHIN 180 DAYS OF THE SUBMITTAL AND IS FROM THE SAME MATERIAL SOURCE, OR BY COLLECTING SAMPLES SPECIFICALLY FOR THIS PROJECT. SAMPLES SHALL BE COLLECTED BY AN ENVIRONMENTAL PROFESSIONAL AND ALL LABORATORY TESTING SHALL BE COMPLETED BY LABS ACCREDITED BY ECOLOGY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL IMPORT MATERIAL SAMPLING, TESTING AND REPORTING.

4. ALL TESTING TO DEMONSTRATE COMPLIANCE WITH SPECIFICATIONS SHALL BE SUBMITTED AND APPROVED BY THE ENGINEER PRIOR TO PURCHASE OF THE MATERIAL. TESTING SHALL BE SUBMITTED NO LATER THAN FIVE WORKING DAYS PRIOR TO THE PLANNED DELIVERY OF MATERIALS TO THE SITE. A MINIMUM OF ONE ANALYTICAL SAMPLE SHALL BE COLLECTED FROM EACH SOURCE AND EACH MATERIAL IMPORTED.

5. THE CONTRACTOR SHALL NOT OBTAIN IMPORT MATERIAL(S) FROM INDUSTRIAL OR COMMERCIAL SITES. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION OF THE SOURCE AREA LAND USE AND OPERATION HISTORY WHEN PROVIDING TESTING RESULTS, TO SUPPORT THE ENGINEER'S DETERMINATION OF MATERIAL SUITABILITY.

6. THE CONTRACTOR SHALL CONDUCT ONE PHYSICAL SAMPLE FOR EACH IMPORT SOURCE PER EACH MATERIAL DELIVERED TO THE SITE FOR PLACEMENT.

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General Notes
(2 of 4)

Drawing No.
G-4

Sheet 4 of 25

File: E:_Business\!Crete\!20001.01\2021.05.28\Time Oil - working cad files\Time Oil Bulk Terminal_Drawings\G1-G3 thru G6.dwg Plot Date:
May 26, 2021 Plotted by: Greene, Chris

GENERAL NOTES continued...

7. IF THE IMPORT SOURCE CHANGES DURING CONSTRUCTION, NEW TESTING SHALL BE SUBMITTED FOLLOWING THE SCHEDULE AND REQUIREMENTS LISTED IN THIS SPECIFICATION. THE OWNER MAY REQUIRE ADDITIONAL TESTS IF THERE IS AN OBSERVABLE VARIANCE IN THE PROVIDED MATERIAL, SUCH TESTS SHALL BE PERFORMED AT NO ADDITIONAL COST TO THE OWNER. EACH SAMPLE SHALL BE REPRESENTATIVE OF THE CURRENT PRODUCTION AND STOCKPILE BEING SUPPLIED TO THE SITE AND TESTING SHALL BE DONE BY A ECOLOGY ACCREDITED LABORATORY.

8. THE CONTRACTOR SHALL MONITOR IMPORT MATERIALS TO MAINTAIN CONSISTENT GRADATION AND CHEMICAL REQUIREMENTS AS SPECIFIED.

DEWATERING

1. LOCATE DEWATERING FACILITIES WHERE THEY SHALL NOT INTERFERE WITH UTILITIES AND CONSTRUCTION WORK TO BE PERFORMED BY OTHERS INCLUDING ANY FOLLOW ON CONTRACTORS. OBTAIN APPROVAL FOR FACILITY LOCATIONS FROM THE ENGINEER.

2. THE CONTRACTOR SHALL MONITOR GROUNDWATER LEVELS IN AND AROUND THE EXCAVATIONS TO ENSURE GROUNDWATER LEVELS AND HYDROSTATIC PRESSURES ARE REDUCED AS REQUIRED PRIOR TO EXCAVATION, SUCH THAT GROUNDWATER SHALL NOT PREVENT PROPER COMPLETION OF ALL WORK PERFORMED UNDER THIS CONTRACT. THE CONTRACTOR MAY USE EXISTING MONITORING WELLS.

3. ACCEPTANCE BY THE ENGINEER SHALL NOT IN ANY WAY RELIEVE THE CONTRACTOR FROM THE RESPONSIBILITY FOR ERRORS THEREIN OR FROM THE RESPONSIBILITY FOR COMPLETE AND ADEQUATE DESIGN, MATERIALS, INSTALLATION METHODS, OPERATION METHODS, OR ADEQUATE MAINTENANCE OF THE SYSTEM.

4. THE CONTRACTOR SHALL EMPLOY MATERIALS, EQUIPMENT, AND CONSTRUCTION METHODS COMMONLY USED AND PROVEN AS SUITABLE FOR THE DURATION OF CONSTRUCTION DEWATERING AND ANY SURFACE WATER CONTROL SYSTEMS.

5. THE CONTRACTOR SHALL VERIFY AND INDEPENDENTLY INTERPRET THE AVAILABLE SUBSURFACE INFORMATION PRESENTED IN THE CONTRACT DOCUMENTS AND ASSOCIATED TECHNICAL EXHIBITS AND SUPPLEMENT THE EXISTING DATA NECESSARY IN ORDER TO COMPLETE THE DESIGN AND CONSTRUCTION.

6. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE ADEQUACY OF THE DESIGNED DEWATERING SYSTEM TO PERFORM THE DESIRED FUNCTION.

SCREENING, HANDLING, AND DISPOSAL OF CONTAMINATED SOIL AND WATER

1. ALL SOIL REMOVED FROM EXCAVATION REMOVAL AREAS WILL BE DISPOSED OF AS SUBTITLE D SOIL IN AN ECOLOGY APPROVED LANDFILL. ALL SAMPLING REQUIRED BY THE LANDFILL SHALL BE COMPLETED PRIOR TO SHIPMENT OF SOILS.

2. ALL WATER THAT COMES INTO CONTACT WITH DISTURBED SOILS SHALL BE CAPTURED AND DISPOSED OF OFF SITE AT AN APPROVED DISPOSAL FACILITY OR TREATED AT THE ON-SITE WATER TREATMENT PLANT PRIOR TO DISCHARGE. THE ON-SITE WATER TREATMENT PLANT WILL COMPLY WITH ALL KING COUNTY INDUSTRIAL WASTEWATER TREATMENT REQUIREMENTS.

3. IF ANY WATER IS COLLECTED THROUGH DEWATERING ACTIVITIES IT SHALL BE TREATED AS CONTACT STORMWATER, DESCRIBED ABOVE.

4. GROUNDWATER DEWATERING TO COMBINED SEWERS MUST BE METERED PRIOR TO DISCHARGE. CONTACT THE SPU SUBMETER PROGRAM OFFICE AT (206) 684-5089 TO DETERMINE THE REQUIRED METER TYPE, INSTALLATION LOCATION AND BILLING INFORMATION AND TO SCHEDULE AN INSPECTION AFTER INSTALLATION.

INSITU SOLIDIFICATION NOTES

SUBMITTALS

1. THE CONTRACTOR SHALL SUBMIT THE FOLLOWING INFORMATION IN THE TECHNICAL EXECUTION PLAN FOR THE ISS DESIGN PLAN:
   A. DESCRIPTION AND SPECIFICATIONS OF ISS SYSTEM, EQUIPMENT, AND PROCESSES.
   B. ISS LAYOUT DRAWING SHOWING THE CONFIGURATION AND LAYOUT OF THE ISS SYSTEM.
   C. SITE MAPS SHOWING THE PROPOSED LAYOUT AND PATTERN OF THE INDIVIDUAL ISS MIXING CELLS.
   D. PROPOSED APPROACH FOR MIXING CAA-4 IN TWO LIFTS, RELOCATION OF THE UPPER LIFT MIXED SOIL TO ISS SWELL MANAGEMENT AREA, AND BACKFILLING WITH LOWER LIFT ISS SWELL IN CONJUNCTION WITH PLACEMENT OF THE INTERCEPTOR TRENCH.
   E. METHODS FOR DETERMINING AND VERIFYING THE COORDINATES, ELEVATIONS, AND DEPTHS OF THE ISS MIXING CELLS.
   F. METHODS FOR CONTROLLING NOISE LEVELS GENERATED FROM THE ISS EQUIPMENT.
   G. PROPOSED METHODS TO PREPARE GROUT MIXTURES AND TO PROPORTION REAGENTS TO VERIFY PROPER PORTIONS.
   H. TOTAL ESTIMATED QUANTITY OF WATER AND SOLIDIFICATION REAGENTS REQUIRED FOR THE WORK BASED ON THESE DRAWINGS, AVAILABLE SOIL BORING INFORMATION, CONTRACTOR'S TREATABILITY STUDY, AND THE CONTRACTOR'S LAYOUT PLAN FOR THE ISS MIXING CELLS.
   I. SOLIDIFICATION PROCEDURES AND SEQUENCING, INCLUDING COORDINATION WITH SHORING INSTALLATION AND INTERCEPTOR TRENCH PLACEMENT.
   J. ASSOCIATED DEWATERING PROCEDURES.
   K. ESTIMATED PRODUCTION RATE FOR SOLIDIFICATION IN TERMS OF NUMBER OF MIXING CELLS PER DAY.
   L. METHODS FOR HANDLING GENERATED SWELL.
   M. ESTIMATED SCHEDULE FOR COMPLETION.
   N. ANY PROPOSED DEVIATIONS FROM THE DRAWINGS.
   O. SPILL CONTROL MEASURES.
   P. WASH OUT AND GROUT DISPOSAL FACILITIES AND PRACTICES.
   Q. EROSION CONTROL.
   R. SAMPLING METHODS, PERSONNEL, AND EQUIPMENT.
   S. RESUMES FOR KEY PERSONNEL ASSIGNED TO CONDUCT THE WORK, INCLUDING PROJECT SUPERINTENDED, EQUIPMENT OPERATIONS, GROUT PLANT OPERATORS, SUPERVISORY ENGINEERING STAFF AND OTHER TECHNICAL STAFF.
   T. DISCUSSION OF BACKUP EQUIPMENT REQUIRED AND/OR AVAILABLE FOR THIS PROJECT.

2. CONTRACTOR SHALL PROVIDE DAILY SUBMITTALS DURING THE WORK SUMMARIZING THE FOLLOWING INFORMATION AT A MINIMUM:
   A. NUMBER OF MIXING CELLS SOLIDIFIED
   B. MIX DESIGN CALCULATIONS
   C. SOLIDIFICATION EQUIPMENT USED
   D. ANY UNFORESEEN SITE CONDITIONS OR EQUIPMENT PROBLEMS THAT AFFECTED SOLIDIFICATION EFFORTS
   E. ANY MODIFICATIONS OR DEVIATIONS FROM THE SPECIFICATIONS, DRAWINGS OR THE TECHNICAL EXECUTION PLAN
   F. IDENTIFICATION OF PORTIONS OF MIXING CELLS NOT COMPLETED DUE TO REFUSAL

3. CONTRACTOR SHALL PROVIDE WEEKLY SUBMITTALS SUMMARIZING THE FOLLOWING INFORMATION AT A MINIMUM:
   A. TOTAL QUANTITY OF SOLID SOLIDIFIED FOR THE WEEK IN CUBIC YARDS AND NUMBER OF MIXING CELLS
   B. QUANTITIES OF REAGENTS USED DURING THE WEEK
   C. QUANTITIES OF REAGENTS DELIVERED TO THE SITE DURING THE WEEK WITH BACKUP IN FORM OF WEIGHT RECIPES, BILLS OF LADING, FLOW METER RECORDS, OR EQUIVALENT
   D. PERCENT COMPLETE FOR ALL SOLIDIFICATION
   E. SOLIDIFICATION PROGRESS SCHEDULE AND ANY MODIFICATIONS TO THE PROJECT SCHEDULE BASED ON THE WEEKLY PRODUCTION
   F. SWELL DISPOSAL/HANDLING METHODS AND QUANTITIES MANAGED FOR THE WEEK
   G. WASHOUT AND GROUT DISPOSAL AND HANDLING METHODS AND QUANTITIES MANAGED FOR THE WEEK

GROUT MIX DESIGN

1. CONTRACTOR SHALL PROVIDE THE PROPOSED MIX DESIGN, BASED ON THE ADDITIONAL MIX DESIGN STUDY PERFORMED, TO BE USED FOR PRODUCTION TO MEET THE PERFORMANCE REQUIREMENTS OF THE PROJECT.

2. CONTRACTOR SHALL PROVIDE PORTLAND CEMENT AND GROUND GRANULATED BLAST FURNACE SLAG (GGBFS) AS APPROVED BY THE ENGINEER IN ACCORDANCE WITH THE APPROVED PRODUCTION MIX DESIGN IN SUFFICIENT QUANTITIES TO MAINTAIN THE REQUIRED PRODUCTION RATE.

3. CONTRACTOR SHALL COMPLETE A FORM ACCEPTABLE TO THE ENGINEER TO CALCULATE THE MINIMUM REAGENT PORTIONS AS FOLLOWS:
   A. CALCULATE THE VOLUME OF SOIL BEING TREATED IN THE EACH CELL BASED ON THE TOTAL DEPTH AND SQUARE FOOTAGE OF THE CELL.
   B. CALCULATE THE WEIGHT OF SOIL BEING TREATED IN THE MIXING CELL BASED ON THE PREVIOUSLY CALCULATED VOLUME, USING AN APPROPRIATE UNIT DENSITY FOR THE SOIL BEING SOLIDIFIED.
   C. WATER AND REAGENT ADDITION SHALL BE IN ACCORDANCE WITH THE RATIOS DEFINED IN THE ENGINEER-APPROVED PRODUCTION MIX DESIGN. CONTRACTOR SHALL KEEP THE WATER RATIO AT A MINIMUM TO OBTAIN A WORKABLE GROUT AND MINIMIZE SWELL.
   D. CONTRACTOR SHALL NOT MODIFY THE GROUT MIX PROPORTIONS OF THE APPROVED PRODUCTION MIX DESIGN WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER.
   E. CONTRACTOR SHALL PROVIDE A FORM DETAILING THE MATERIAL USED BATCH MIXING INFORMATION AND CORRECT MIX RATIO VERIFICATION FOR EACH MIXING CELL.

PERFORMANCE REQUIREMENTS

1. MIXING CELLS SHALL BE LAID OUT IN A MANNER TO STABILIZE THE ENTIRE AREA SO THAT NO SOIL IS UNTREATED.

2. THE PRODUCTION ISS MIXING CELLS SHALL MEET THE FOLLOWING PERFORMANCE STANDARDS. PRODUCTION MIXING CELLS THAT DO NOT MEET THE PERFORMANCE TESTING REQUIREMENTS SHALL BE RE-MIXED, RE-SAMPLED, AND RE-TESTED AT THE CONTRACTOR'S SOLE EXPENSE UNTIL THE MIXING CELL MEETS THE PERFORMANCE REQUIREMENTS:
   A. HYDRAULIC CONDUCTIVITY LESS THAN 1X10-6 CM/SEC
   B. UNCONFINED COMPRESSIVE STRENGTH (28 DAYS) GREATER THAN 50 PSI
   C. ALL PERIMETER ISS MIXING CELLS SHALL ACHIEVE THE PERFORMANCE CRITERIA
   D. UP TO 10% OF INTERIOR ISS MIXING CELLS MAY FAIL THE ABOVE CRITERIA BUT EACH GRID CELL MUST HAVE A HYDRAULIC CONDUCTIVITY NO GREATER THAN 10-5 CM/S AND A UCS NO LESS THAN 30 PSI

3. CONTRACTOR SHALL COMPLETE A MINIMUM OF TWO TEST MIXING CELLS IN EACH CAA AT A LOCATION DESIGNATED BY THE ENGINEER PRIOR TO PRODUCTION MIXING CELLS TO ENSURE THAT THE PERFORMANCE STANDARDS SHALL BE ACHIEVED USING THE PRODUCTION MIX DESIGN SUBMITTED TO THE ENGINEER. CONTRACTOR SHALL OBTAIN SAMPLES OF THE TREATED SOIL MASS IN THE TEST MIXING CELLS USING THE PRODUCTION SAMPLING EQUIPMENT AND TEST THE SAMPLES TO DEMONSTRATE THAT THE PROJECT PERFORMANCE REQUIREMENTS SHALL BE ACHIEVED. THE TEST CELL(S) SHALL BE LOCATED WITHIN THE ISS FOOTPRINT AND WILL BECOME PART OF THE FINAL ISS AREA AFTER TESTING.

4. THE BOTTOM ELEVATION FOR ISS TREATMENT IS SHOWN ON THE DRAWINGS FOR EACH MIXING CELL. TO THE EXTENT THAT CONTRACTOR MODIFIES THE PROPOSED MIXING CELLS, THE BOTTOM ELEVATIONS WILL NEED TO BE APPROVED BY ENGINEER. CONTRACTOR SHALL NOT DEVIATE FROM THE ELEVATIONS BY GREATER THAN 0.5 FEET WITHOUT WRITTEN AUTHORIZATION BY THE ENGINEER.

5. IF SUBSURFACE OBSTRUCTIONS ARE ENCOUNTERED DURING ISS MIXING, CONTRACTOR SHALL IDENTIFY THE OBSTRUCTION, INFORM THE ENGINEER, AND DEVELOP A COURSE OF ACTION TO SAFELY AND EFFECTIVELY REMOVE THE OBSTRUCTION. DEPENDING ON THE NATURE OF THE OBSTRUCTION, THE MATERIALS SHALL BE SEPARATED AND MANAGED AS APPROVED BY ENGINEER. MATERIAL MAY BE PLACED IN THE ISS SWELL MANAGEMENT AREA OR LOADED INTO DESIGNATED WASTE CONTAINERS FOR CONTAINMENT AND TRANSPORT OF THAT CLASS OF WASTE TO AN OFF-SITE DISPOSAL FACILITY. OBSTRUCTIONS WHICH CANNOT BE PENETRATED OR REMOVED MAY BE LEFT IN PLACE WITH THE ISS EXCAVATOR PATTERN ADJUSTED TO ALLOW MIXING WHICH CAN BE COMPLETED AROUND THE OBSTRUCTION OR WITH GROUTING AROUND THE OBSTRUCTION.

6. CONTRACTOR SHALL ENSURE THAT THE GROUT IS DISTRIBUTED EVENLY THROUGH THE MIXING CELL AND THAT THE GROUT AND SOIL AT EACH MIXING CELL IS A HOMOGENEOUS MIXTURE TO MEET THE PERFORMANCE REQUIREMENTS.

7. CONTRACTOR SHALL INSPECT AND PREPARE A TEST SAMPLE OF TREATED SOIL. SAMPLES WILL BE VISUALLY INSPECTED TO VERIFY THAT A HOMOGENEOUS MIXTURE HAS BEEN CREATED, BASED ON THE FOLLOWING CRITERIA:
   A. NO VISIBLE NON AQUEOUS PHASE LIQUID (NAPL)
   B. GROUT AND SOIL ARE THOROUGHLY MIXED IN THE MIXING CELL
   C. CONSISTENT COLOR FOR SAMPLES COLLECTED FROM DIFFERENT DEPTH INTERVALS AND LOCATIONS IN THE MIXING CELL
   D. THERE ARE NO UNMIXED SOIL CLUMPS GREATER THAN 6 INCHES

8. SAMPLES COLLECTED BY CONTRACTOR SHALL BE TESTED FOR UNCONFINED COMPRESSIVE STRENGTH AND HYDRAULIC CONDUCTIVITY TO DEMONSTRATE THAT THE SAMPLES MEET THE PERFORMANCE REQUIREMENTS.

9. CONTRACTOR SHALL CONDUCT THE WORK IN A MANNER TO MINIMIZE THE AMOUNT OF SWELL PRODUCED BY THE SOLIDIFICATION PROCESSES.

SOLIDIFICATION WATER

1. WATER SHALL BE OBTAINED FROM THE CITY OF SEATTLE VIA A FIRE HYDRANT OR WATER SERVICE CONNECTION, ON OR NEAR THE SITE. THE WATER SERVICE SHALL BE EQUIPPED WITH A BACKFLOW PREVENTER. CONTRACTOR SHALL OBTAIN ALL PERMITS AND ARRANGE FOR TEMPORARY HOOK UP OF WATER SERVICE AND PAY ALL FEES FOR CITY WATER USAGE. CONTRACTOR MAY USE OTHER INCIDENTAL SOURCES OF WATER (E.G. STORMWATER) FOR SOLIDIFICATION WITH APPROVAL FROM THE ENGINEER.

2. CONTRACTOR SHALL PROVIDE A MEANS OF MEASURING WATER FOR BATCH MIXING. THE MEASURING DEVICE SHALL MEASURE TOTALIZED AND INSTANTANEOUS FLOWS. MEASURING DEVICES SHALL BE CALIBRATED TO WITHIN +/- 2% TO ACCURATELY MEASURE THE WATER FOR EACH BATCH. CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR THE CALIBRATION. MEASURING DEVICES SHALL BE RECALIBRATED PER THE MANUFACTURES RECOMMENDATIONS AND MONTHLY DURING THE WORK.

3. CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL PIPES AND HOSES USED TO CONNECT THE GROUT MIXING PLANT TO THE CITY OF SEATTLE WATER SUPPLY SYSTEM.

4. IF WATER FOR ISS IS STORED ON THE SITE, STORAGE CONTAINERS SHALL BE FREE OF ANY WASTE MATERIALS, DEBRIS, AND OTHER ITEMS THAT MAY BE DELETERIOUS TO THE EXECUTION OF THE SOLIDIFICATION PROCESSES.

REAGENTS

1. CONTRACTOR SHALL PROVIDE PORTLAND CEMENT AND GGBFS APPROVED BY THE ENGINEER IN ACCORDANCE WITH THE APPROVED PRODUCTION MIX DESIGN.

2. UNLESS THE LIMIT AND DEPTHS SHOWN ON THE DRAWINGS ARE INCREASED AS DETERMINED BY THE ENGINEER, THE CONTRACTOR SHALL PURCHASE ANY ADDITIONAL REGENTS AT NO EXPENSE TO THE OWNER DUE TO WASTE OR OVER APPLICATION.

3. REAGENT REQUIREMENTS (MODIFICATIONS MAY BE MADE IN ACCORDANCE WITH THE APPROVED PRODUCTION MIX DESIGN SUBMITTED BY THE CONTRACTOR)
   A. PORTLAND CEMENT - TYPE I PORTLAND CEMENT MEETING THE REQUIREMENTS OF ASTM C150
   B. GGBFS - GRADE 100 MEETING THE REQUIREMENTS OF ASTM C989.

GROUT PREPARATION

1. CONTRACTOR SHALL PROVIDE ALL EQUIPMENT, MATERIALS, AND PERSONNEL NEEDED TO PROPERLY PREPARE THE GROUT IN ACCORDANCE WITH THE ENGINEER-APPROVED PRODUCTION MIX DESIGN AND THESE SPECIFICATIONS.

2. CONTRACTOR SHALL COMPLETE A FORM TO CALCULATE THE NEEDED QUANTITIES OF WATER AND REAGENTS FOR EACH MIXING CELL:
   A. AMOUNT OF EACH REAGENT ADDED
   B. GROUT DENSITY
   C. ISS MIXING CELL NUMBER

3. CONTRACTOR SHALL ADD THE CALCULATED QUANTITIES OF WATER AND REAGENTS TO THE GROUT MIXING PLANT.

4. CONTRACTOR SHALL THOROUGHLY MIX THE WATER AND REAGENT MIXTURE UNTIL IT IS A CONSISTENT AND HOMOGENOUS MIXTURE.

5. CONTRACTOR SHALL PUMP THE GROUT MIXTURE FROM THE GROUT MIXING PLANT TO THE ISS EQUIPMENT.

6. CONTRACTOR SHALL PROVIDE THE PUMPS, HOSES, AND PIPING AS A MEANS OF DELIVERING THE MIXED GROUT FROM THE GROUT MIXING PLANT TO THE MIXING CELL AT AN ADEQUATE PRESSURE AND FLOW RATE FOR THE SOLIDIFICATION PROCESS.

7. PROCESSED GROUT HELD FOR GREATER THAN 3 HOURS PRIOR TO USING SHALL BE DISCARDED AT THE CONTRACTOR'S EXPENSE.

8. CONTRACTOR SHALL PROVIDE GROUT MIXING EQUIPMENT OF SIZE AND CAPACITY AS TO NOT LIMIT THE PRODUCTION OF THE ISS MIXING EQUIPMENT.

Rev	Date	Description	By

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6/28/2021

Scale As Noted

SCALE WARNING
Drawing is not to scale, if scale bar doesn't measure one inch

Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

General Notes
(3 of 4)

Drawing No.
G-5

Sheet 5 of 25

File: E:_Business\!Crete\!20001.01\2021.05.28\Time Oil - working cad files\Time Oil Bulk Terminal_Drawings\G1-G3 thru G6.dwg Plot Date:
May 26, 2021 Plotted by: Greene, Chris

COORDINATION OF WORK

1. CONTRACTOR SHALL COORDINATE ISS ACTIVITIES WITH SHORING EXCAVATION, DEWATERING, SAMPLING, BACKFILLING, AND OTHER WORK AS NECESSARY.
2. AS PART OF THE ISS WORK, DEMOLITION OF SURFACES AND EXCAVATION OF CLEAN OVERBURDEN SHALL BE CONDUCTED PRIOR TO BEGINNING ISS WORK.
3. DEWATERING SHALL BE CONDUCTED ONLY TO THE EXTENT NECESSARY TO COMPLETE THE WORK.
4. CONTRACTOR SHALL COLLECT SAMPLES FROM THE MIXING CELLS IN CONSULTATION WITH THE ENGINEER.
5. CONTRACTOR SHALL NOT BACKFILL ANY AREAS WITHOUT WRITTEN APPROVAL FROM THE ENGINEER.

SOLIDIFICATION

1. CONTRACTOR SHALL PROVIDE ALL PERSONNEL, EQUIPMENT, AND MATERIALS REQUIRED TO CONDUCT THE WORK IDENTIFIED IN THESE SPECIFICATIONS.
2. SOLIDIFICATION SHALL BE CONDUCTED TO THE EXTENTS, DEPTHS, AND ELEVATIONS SHOWN IN THESE DRAWINGS.
3. CONTRACTOR PERSONNEL SHALL PERFORM SURVEYING TO CONFIRM THE MIXING CELL COORDINATES AND THE GROUND SURFACE AND BOTTOM ELEVATION FOR ISS TREATMENT.
4. CONTRACTOR SHALL NOTE ANY VARIANCE FOR THE ISS DEPTH AND ADJUST GROUT MIX ACCORDINGLY.
5. REAGENT ADDITION SHALL BE AT THE PRESCRIBED PROPORTIONS IN THE APPROVED MIX DESIGN AND CALCULATED ON THE CONTRACTOR'S FORM.
6. CONTRACTOR SHALL MIX GROUT WITH IMPACTED SOIL UNTIL IT IS A HOMOGENEOUS MIXTURE OF SOIL AND GROUT FROM THE GROUND SURFACE TO THE BOTTOM ELEVATION OF ISS TREATMENT SHOWN ON THE DRAWINGS.
7. CONTRACTOR SHALL COMPLETE A FORM TO CALCULATE THE NEEDED QUANTITIES OF WATER AND REAGENTS FOR EACH MIXING CELL:
   A. AMOUNT OF EACH REAGENT ADDED
   B. GROUT DENSITY
   C. ISS MIXING CELL NUMBER
   D. MIXING CELL COORDINATES
   E. GROUND SURFACE ELEVATION
   F. BOTTOM ELEVATION FOR ISS TREATMENT PROVIDED IN THE DRAWINGS
   G. ACTUAL BOTTOM ELEVATION OF MIXING CELL
   H. START AND FINISH TIME
   I. GROUT ADDITION RATE

SWELL MANAGEMENT

1. CONTRACTOR SHALL REMOVE SWELL GENERATED DURING ISS OPERATION FROM THE IMMEDIATE WORK AREA AS REQUIRED TO ALLOW WORK TO PROCEED.
2. A SPECIFIC AREA OF THE BULK TERMINAL PARCEL HAS BEEN IDENTIFIED FOR PLACEMENT OF EXCESS ISS SWELL MATERIAL. THE CONTRACTOR SHALL MOVE EXCESS ISS SWELL MATERIAL TO THE DESIGNATED AREA WHILE THE SWELL MATERIAL IS STILL WORKABLE. CONTRACTOR SHALL COORDINATE WITH ENGINEER REGARDING THE LOCATION AND THICKNESS OF SWELL PLACEMENT BASED ON ACTUAL SWELL PRODUCTION DURING CONSTRUCTION.
3. CONTRACTOR SHALL PLACE SWELL MATERIAL AT THE NORTH END OF CAA-4 IN CONJUNCTION WITH INSTALLATION OF THE INTERCEPTOR TRENCH AND ISS SURFACE GRADING. SWELL MATERIAL ADJACENT TO THE INTERCEPTOR TRENCH SHALL BE WRAPPED WITH A WOVEN GEOTEXTILE FABRIC DURING PLACEMENT AND COMPACTION TO SEPARATE THE TREATED ISS MATERIAL FROM THE TRENCH BACKFILL.
4. ISS FLUFF SHOULD BE COMPACTED IN 6-INCH LIFTS USING A DOZER FOLLOWED BY A SMOOTH DRUM ROLLER ON THE FINAL LIFT TO CREATE A SMOOTH SURFACE. ALL FILL SUPPORTING STRUCTURES, INCLUDING BUILDINGS AND PAVEMENTS, SHOULD BE MOISTURE CONDITIONED AND COMPACTED TO A DENSE AND UNYIELDING CONDITION AS DETERMINED BY PANGEO'S FIELD REPRESENTATIVE.

PERFORMANCE MONITORING

1. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAMPLING AND PERFORMANCE TESTING REQUIRED IN THIS SECTION. CONTRACTOR SHALL ALSO PROVIDE A DUPLICATE SET OF SAMPLES TO THE ENGINEER UPON REQUEST OF THE ENGINEER FOR EVERY SAMPLE TAKEN FOR PRODUCTION TESTING.
2. PERIODICALLY THE ENGINEER WILL VISUALLY INSPECT EACH BATCH OF MIXED GROUT TO ENSURE THAT THE GROUT HAS BEEN SUFFICIENTLY MIXED. CONTRACTOR SHALL CONTINUE TO MIX GROUT UNTIL IT IS THOROUGHLY MIXED TO THE SATISFACTION OF THE ENGINEER.
3. CONTRACTOR SHALL COLLECT IN SITU BULK SAMPLES FROM NEWLY SOLIDIFIED MIXING CELLS.
   A. SAMPLING TIMING - SAMPLING OF THE MIXING CELLS SHALL OCCUR WITHIN 4 HOURS OF MIXING CELL COMPLETION WHILE THE MIXING CELL IS STILL WET.
   B. SAMPLING TOOL - CONTRACTOR SHALL PROVIDE AND USE A SUITABLE IN SITU SAMPLING TOOL TO COLLECT THE SAMPLES. THE MINIMUM SAMPLE VOLUME OF THE TOOL SHALL BE 3.0 GALLONS. THE SAMPLER SHALL CONSIST OF A WEIGHTED CHAMBER, WHICH CAN BE OPENED AND CLOSED FROM THE SURFACE TO OBTAIN MIXED SOIL AND GROUT AT DEPTH IN THE MIXING CELL. THE SAMPLER SHALL BE CAPABLE OF SAMPLING TO THE DEPTH OF THE BOTTOM ELEVATION FOR ISS TREATMENT IN ALL LOCATIONS.
   C. SAMPLING FREQUENCY - AT A MINIMUM, 1 SAMPLE WILL BE COLLECTED FROM EACH MIXING CELL PER DAY OF PRODUCTION. THE MIXING CELL WILL BE CHOSEN BY THE ENGINEER.
   D. NUMBER OF SAMPLES PER MIXING CELL - A SAMPLE FOR QUALITY CONTROL TESTING SHALL BE COLLECTED FROM EACH MIXING CELL. MIXING CELL SIZES HAVE BEEN SELECTED TO APPROXIMATE 1 DAY OR SHIFT OF PRODUCTION FOR 1 EXCAVATOR. THE SAMPLE WILL BE COLLECTED FROM THE LOCATION AND DEPTH SPECIFIED BY THE ENGINEER AT THE TIME OF SAMPLING AND WILL VARY FOR EACH MIXING CELL. CONTRACTOR SHALL FORM THE REQUIRED NUMBER OF INDIVIDUAL CYLINDERS OR MOLDS TO PERFORM THE TESTING DESCRIBED BELOW. ADDITIONAL CYLINDERS WILL BE REQUIRED TO PERFORM DUPLICATE TESTING ON 10% OF THE MIXING CELLS.
   E. TESTING OF SAMPLES - CONTRACTOR SHALL BE RESPONSIBLE FOR PERFORMING ALL OF THE QUALITY CONTROL TESTING. CONTRACTOR SHALL TEST TWO CYLINDERS FROM EACH MIXING CELL. THE FIRST CYLINDER OR MOLD SHALL BE TESTED FOR HYDRAULIC CONDUCTIVITY AND UNCONFINED COMPRESSIVE STRENGTH AT 10 DAYS. THE SECOND CYLINDER SHALL BE TESTED FOR PERMEABILITY AND UNCONFINED COMPRESSIVE STRENGTH AT 28 DAYS. IF THE RESULTS AT 28 DAYS DO NOT ACHIEVE THE PROJECT PERFORMANCE REQUIREMENTS, A THIRD CYLINDER SHALL BE TESTED FOR PERMEABILITY AND UNCONFINED COMPRESSIVE STRENGTH. ADDITIONAL TESTING OF CYLINDERS FROM THE SAME MIXING CELL MAY BE REQUIRED IF THE 28 DAY TESTS DO NOT ACHIEVE THE PROJECT PERFORMANCE REQUIREMENTS. ALL ADDITIONAL TESTING PERFORMED AT THE ENGINEERS DISCRETION ON THE MIXING CELL AFTER FAILING 28 DAY TESTS SHALL BE AT THE CONTRACTOR'S EXPENSE. ALTERNATELY, THE CONTRACTOR MAY CHOOSE TO REMIX AND RETEST THE FAILING MIXING CELL RATHER THAN PERFORM ADDITIONAL LABORATORY TESTS ON SAMPLES.
4. THE ENGINEER WILL DETERMINE WHETHER THE CONTRACTOR'S ISS OPERATIONS MEET SPECIFIED PERFORMANCE REQUIREMENTS BASED ON THE QUALITY CONTROL LABORATORY TESTING RESULTS.
5. THE ENGINEER MAY REQUIRE ADDITIONAL SAMPLING DURING THE COURSE OF THE PROJECT.

Rev	Date	Description	By

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Scale As Noted

SCALE WARNING
Drawing is not to scale, if scale bar doesn't measure one inch

Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

General Notes
(4 of 4)

Drawing No.
G-6

Sheet 6 **of** 26

DATUM/BASIS OF BEARINGS

BASIS OF BEARINGS HELD A BEARING OF N88°56'31"W FROM PUNCH IN BRASS DISK ON CONC MON IN ALUMINUM CASE AT THE INTERSECTION OF W. FORT ST. (W. GOVERNMENT WAY) AND 32ND AVE. W., AND A TACK AND WASHER AT THE INTERSECTION OF W. FORT ST. AND 27TH AVE. W.

ORIGINATING BENCHMARK:

NATIONAL GEODETIC SURVEY (NGS) BENCHMARK 944 7130 TIDAL 7 PID SY0289 A DISK SET 3.0 FEET ABOVE THE CONCRETE SIDEWALK IN THE SW GRANITE CORNERSTONE OF THE NATIONAL BUILDING LOCATED ON THE NE CORNER OF THE INTERSECTION OF THE WESTERN AVENUE AND MADISON STREET, SEATTLE, WA

VERTICAL DATUM: NAVD 88
ELEVATION: 19.26'

BM - CITY OF SEATTLE #5166 - FND 2" DOMED BRASS DISK @ INTX BACK OF CONC WALKS @ SE QUAD INTX WILLIAMS AVE W. & GILMAN AVE W. STAMPED "C OF S 5166"
ELEVATION: 90.18'

TBM - A, MAGNETIC NAIL W/CONTROL WASHER, SET IN ASPHALT S. SIDE OF W. COMMODORE WAY, 35'E. BY 35'N. OF THE NE CORNER OF BUILDING #2737
ELEV=45.12

TBM - B, MAGNETIC NAIL W/CONTROL WASHER, SET IN ASPHALT S. SIDE OF W. COMMODORE WAY, 87'W. BY 50'N. OF THE NW CORNER OF BUILDING #2737
ELEV=44.23

EQUIPMENT NOTES

PRIMARY CONTROL POINTS AND ACCESSIBLE MONUMENT POSITIONS WERE FIELD MEASURED UTILIZING GLOBAL POSITIONING SYSTEM (GPS) SURVEY TECHNIQUES USING LEICA SYSTEM 1200 EQUIPMENT. MONUMENT POSITIONS THAT WERE NOT DIRECTLY OBSERVED USING GPS SURVEY TECHNIQUES WERE TIED INTO THE CONTROL POINTS UTILIZING LEICA 1201 & 1103 TOTAL STATIONS FOR THE MEASUREMENT OF BOTH ANGLES AND DISTANCES, AS WELL AS A 3D LASER SCANNING SYSTEM, LEICA SCANSTATION 2, MODEL NUMBER HDS 4050. MEETING OR EXCEEDING STANDARDS SET BY WAC 332-130-080/090.

NOTES

THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION, ELEVATION AND SIZE OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

UTILITY LOCATIONS SHOWN HEREON ARE BASED UPON ASBUILT FIELD LOCATION OF EXISTING STRUCTURES BASED ON OBSERVABLE SURFACE EVIDENCE AND AVAILABLE UTILITY MAPS FROM CITY AND UTILITY PURVEYOR'S DRAWINGS. A UTILITY LOCATE SERVICE WAS SUB-CONSULTED. CALL 811 FOR UTILITY LOCATES BEFORE ANY DIGGING OR EXCAVATION ON SITE.

THIS SURVEY DISCLOSES FACTORS OF RECORD AND ON THE GROUND AFFECTING THE SUBJECT PROPERTY BOUNDARY, BUT IT DOES NOT PURPORT TO LEGALLY RESOLVE RELATED PROPERTY LINE DISPUTES. WHERE AMBIGUITIES ARE NOTED, AXIS RECOMMENDS THAT THE OWNER CONSULT WITH LEGAL COUNSEL TO DETERMINE HOW BEST TO INTERPRET THEIR PROPERTY RIGHTS AND ADDRESS ANY POTENTIAL PROPERTY LINE DISPUTES.

THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULT OF SURVEYS BETWEEN JANUARY 2009 TO MAY 21, 2012, AUGUST 21, 2018 AND MAY 6, 2019 AND ADDITIONALLY IN NOVEMBER, 2020 AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.

ALL DISTANCES SHOWN ARE GROUND DISTANCES UNLESS OTHERWISE NOTED.

AQUATIC LANDS AND BOUNDARIES MAY CHANGE DEPENDING ON NATURAL OR ARTIFICIAL CAUSES. OTHER THAN ENVIRONMENTAL CHANGES, THE BALLARD LOCKS DIRECTLY TO THE WEST HAS A DAILY IMPACT ON WATER LEVELS IN SALMON BAY. THE ORDINARY HIGH WATER MARK WAS LOCATED ON (5/10/2012) AND MAY OR MAY NOT REPRESENT THE ACTUAL LOCATION OF THE LIMIT TITLE.

SURVEY CONTROL POINTS

HORIZONTAL CONTROL:
AVERAGE SCALE FACTOR: 0.99997357527
AVERAGE ELEVATION FACTOR: 1.00000227123
AVERAGE COMBINED GRID FACTOR: 0.99997584644

HORIZONTAL DATUM (NAD 83/91)
OWNER: CITY OF SEATTLE
DESCRIPTION: FND PUNCH IN 3/8" BRASS PIN IN CONC MON IN CASE, DN. 0.95'
LOCATION INTERSECTION OF COMMODORE WAY AND 31ST AVE W.
N=245964.86
E=1255189.74

HORIZONTAL DATUM (NAD 83/91)
OWNER: CITY OF SEATTLE
DESCRIPTION: FND 1/8" BRASS PIN IN CONC MON IN CASE, DN. 1.25', 0.03'N. X 5.23'E. OF INTX.
LOCATION: NEAR INTX. OF COMMODORE WAY AND 29TH AVE. W.
N=245632.09
E=1255633.83

HORIZONTAL DATUM (NAD 83/91)
OWNER: CITY OF SEATTLE
DESCRIPTION: FND MON - STAMPED 'X' IN 2" BRASS DISK
"COS 3773-2502 SURVEY"
LOCATION: ±19' S. OF INTX. OF COMMODORE WAY AND 29TH AVE. W.
N=245613.83
E=1255627.57

HORIZONTAL CONTROL

HORIZONTAL DATUM (NAD 83/91)
OWNER: CITY OF SEATTLE
DESCRIPTION: FND 1/8" BRASS PIN IN CONC MON IN CASE, DN. 1.25'
LOCATION: INTERSECTION OF COMMODORE WAY AND 27TH AVE. W.
N=245450.98
E=1256594.55

HORIZONTAL DATUM (NAD 83/91)
OWNER: CITY OF SEATTLE
DESCRIPTION: FND TACK & LS WASHER IN ASPHALT AT INTX.
LOCATION: INTERSECTION OF W. FORT ST. AND 27TH AVE. W.
N=245113.77
E=1256588.59

HORIZONTAL DATUM (NAD 83/91)
OWNER: CITY OF SEATTLE
DESCRIPTION: FND PUNCH IN 3/4" BRASS DISK IN CONC MON IN ALUM CASE, DN. 1.0'
LOCATION: INTERSECTION OF W. FORT ST. AND 32ND AVE. W.
N=245146.48
E=1254817.34

REFERENCES

(R1) RECORD OF SURVEY BY TARGET SURVEYORS INC, REC NO. 9307149007

(R2) RECORD OF SURVEY BY RUSS DODGE SURVEY REC NO. 9707019001

(R3) R.O.S. BY BARGHAUSEN CONSULTING ENG. INC REC. NO. 8403219007

(R4) CITY OF SEATTLE ENGINEERING MAP SE 1/4 SEC 10 T25N R5E

(R5) RECORD OF SURVEY BY ORNI ENTERPRISES REC. NO. 9509279003

(R6) RECORD OF SURVEY BY REID MIDDLETON & ASSOC. REC NO. 7703179001

(R7) RECORD OF SURVEY BY ABA INC. REC NO. 2009070290010

(R8) CITY OF SEATTLE ENGINEERING MAP SW 1/4 SEC 11 T25N R5E

(R9A) OREGON WASHINGTON RAILROAD AND NAVIGATION COMPANY STATION MAP LANDS TRACTS AND STRUCTURES 107-25.A

(R9B) OREGON WASHINGTON RAILROAD AND NAVIGATION COMPANY STATION MAP LANDS TRACTS AND STRUCTURES 107-25.B

(R10) AQ 20-010897

(P1) PLAT OF LAWTON PARK RECORDED IN VOLUME 12 OF PLATS PAGE 56

(P2) SEATTLE TIDE LANDS MAP TF17-204

(L1) DNR WATERWAY USE AUTHORIZATION/LEASE NO. 20-A10919 REC. NO. 9711200892/20090924000249/20130607000412/20180521001023

METRO - BRICK SEWER REHABILITATION PROJECT DATED 12/17/91, WEST POINT SYSTEM DATED APR. 1976

LINE LEGEND

—▷—▷—▷—	DITCH LINE
— — —	SANITARY SEWER LINE
— — —	STORM DRAIN LINE
—— OHP ——	OVERHEAD POWER LINE
———	OVERHEAD TELECOMMUNICATIONS LINE
—— - - - ——	POWER LINE
— — —	STORM AND SANITARY SEWER LINE
———	FORCE MAIN SEWER LINE
—— —— ——	WATER LINE
—— - —— - ——	GAS LINE
—×—×—×—	CHAIN LINK FENCE LINE
▨	EXISTING RETAINING WALL

LINE LEGEND (CONT.)

\\\\\\\\	BUILDING OVERHANG
\\\\\\\\	ROOF OVERHANG/EAVE
———	PROPERTY LINES
· · · · · ·	EASEMENT
═══	CURB

HATCH LEGEND

▤	CONCRETE PAVING
▩	ASPHALT PAVING
▨	BUILDINGS
▦	GRAVEL SURFACE

SYMBOL LEGEND

⊗	SURVEY MONUMENT IN CASE
◑	SURVEY REBAR/CAP, PIPE/CAP, IRON PIPE
·	TACK/LEAD, TACK PK NAIL, SPIKE
⊕	SURVEY BENCHMARK
○	CATCH BASIN: V-CB240A
☐	CATCH BASIN: V-CB241
○	CATCH BASIN: V-CB242A
○	CLEAN-OUT: V-CO
○	MAINTENANCE HOLE: V-MH204A
○	MAINTENANCE HOLE: V-MH204B
○	MAINTENANCE HOLE: V-MH205A
<	CULVERT
▷	HOSE BIB
⊠	HVAC
⊘	INJECTION WELL
○	MONITOR WELL
○	BOLLARD
○	PILE
○	POST
⊥	SIGN
⋈	GATE VALVE
○	FIRE HYDRANT
EV	ELECTRICAL VAULT
LP	LIGHT POLE
○—○	POWER POLE WITH STREET LIGHT
●	YARD LIGHT
UP	UTILITY POLE
GP	GUY POLE
)—	GUY ANCHOR
⋈	NATURAL GAS VALVE
○	POWER METER
W	WATER MANHOLE
WM	WATER METER
✶	CONIFEROUS TREE
✿	DECIDUOUS TREE

ABBREVIATIONS

AP	ANGLE POINT
ASPH	ASPHALT
BLDG	BUILDING
BLRD	BOLLARD
BM	BENCH MARK
BRKN	BROKEN
CALC	CALCULATION
CB	CATCH BASIN
℄	CENTER LINE
CLF	CHAIN LINK FENCE
CO	CLEAN OUT
CONC	CONCRETE
COR	CORNER
COS	CITY OF SEATTLE
CULV	CULVERT
CW	CONCRETE WALK
DBL	DOUBLE
DI	DUCTILE IRON PIPE
DWY	DRIVEWAY
E	EAST
EOC	END OF CURB
EV	ELECTRICAL VAULT
FC	FACE OF CURB
FND	FOUND
G	GAS
GP	GUY POLE
GV	GATE VALVE
HYD	HYDRANT
IE	INVERT ELEVATION
MB	MAILBOX
MIC	MONUMENT IN CASE
MON	MONUMENT
MW	MONITOR WELL
N	NORTH
NAVD	NORTH AMERICAN VERTICAL DATUM
NO	NUMBER
⅊	PROPERTY LINE
PS	PIPE SEWER COMBINED
PSD	PIPE SEWER DRAIN
PSS	PIPE SEWER SANITARY
RET WALL	RETAINING WALL
RR	RAILROAD
S	SOUTH
SCL	SEATTLE CITY LIGHT
SD	SERVICE DRAIN
SW	SIDEWALK
TYP	TYPICAL
UP	UTILITY POLE
W	WEST
WCR	WALKWAY CURB RAMP
WM	WATER METER
WV	WATER VALVE

Rev	Date	Description	By

Client

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GRANT HAINSWORTH
33192
6/28/2021

Scale As Noted

SCALE WARNING
Drawing is not to scale, if scale bar doesn't measure one inch

Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

Site Survey
(1 of 3)

Drawing No.
G-7

Sheet 7 **of** 26

SITE SURVEY

0 40 80

SCALE IN FEET

NOTES

1. SITE SURVEY BY AXIS SURVEY & MAPPING, DATED 12-9-2020.
2. THE DEPTH OF THE SIDE SEWER IS LOCATED BELOW THE EXCAVATION DEPTH IN THIS AREA. THE CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH PRIOR TO EXCAVATION IN THIS AREA. THIS MAY INCLUDE POT HOLING WITHIN THE EXCAVATION FOOTPRINT IF DEPTH IS NOT KNOWN. IF VERIFICATION DETERMINES THAT THE EXCAVATION CONFLICTS WITH THE SIDE SEWER, THE SIDE SEWER SHALL BE ABANDONED AT A LOCATION DETERMINED BY THE ENGINEER.

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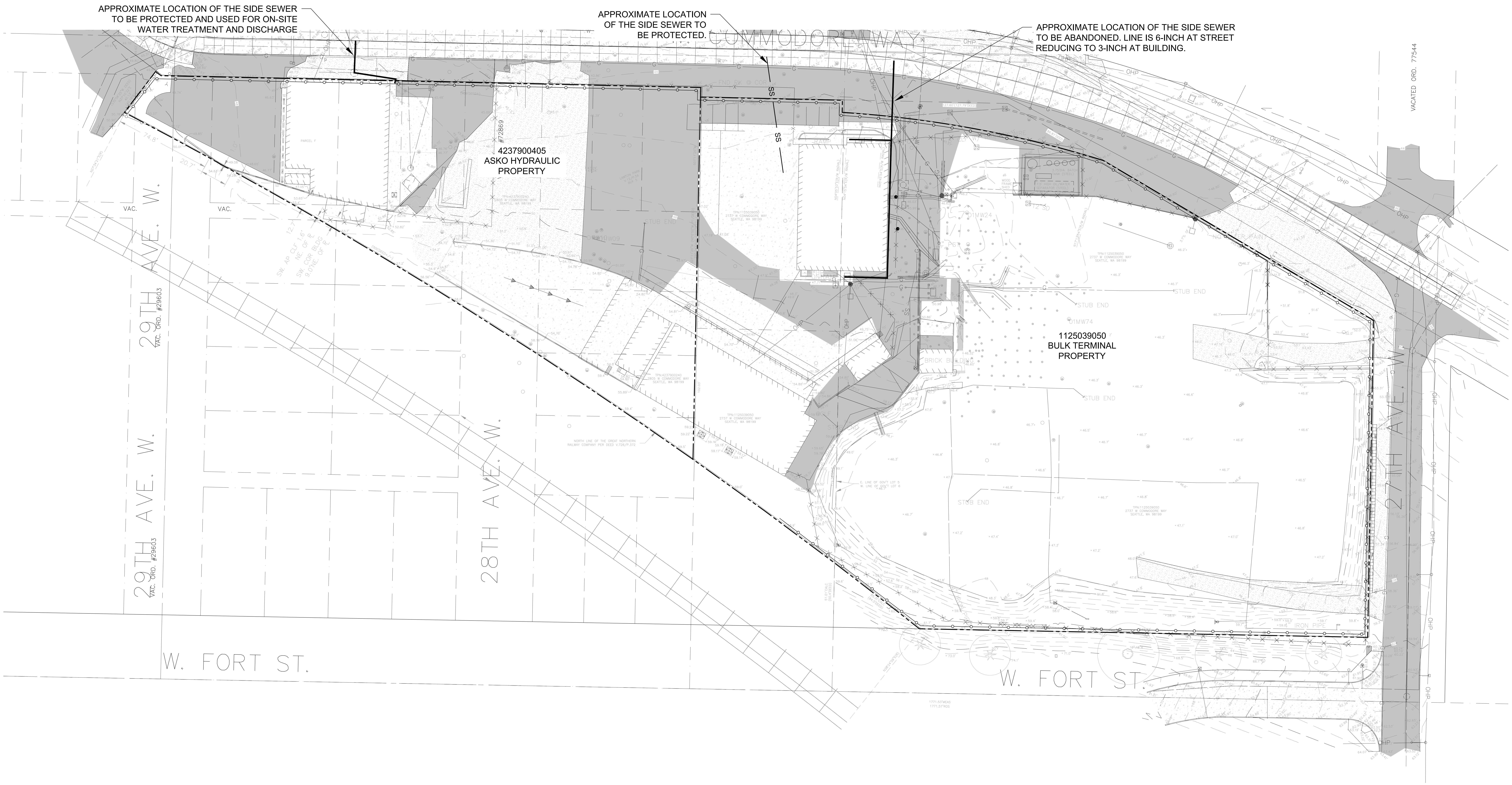
Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

Site Survey
(2 of 3)

Drawing No.
G-8

Sheet 8 **of** 26



APPROXIMATE LOCATION OF THE SIDE SEWER TO BE PROTECTED AND USED FOR ON-SITE WATER TREATMENT AND DISCHARGE

APPROXIMATE LOCATION OF THE SIDE SEWER TO BE PROTECTED.

APPROXIMATE LOCATION OF THE SIDE SEWER TO BE ABANDONED. LINE IS 6-INCH AT STREET REDUCING TO 3-INCH AT BUILDING.

SITE SURVEY

0 40 80
SCALE IN FEET

NOTES

1. SITE SURVEY BY AXIS SURVEY & MAPPING, DATED 12-9-2020.

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Site Survey
(3 of 3)

Drawing No.
G-9

Sheet 9 of 26

LEGEND

▭	PARCEL BOUNDARY FOR TOC SEATTLE TERMINAL 1, LLC PROPERTIES
▨	BUILDINGS TO BE DEMOLISHED
▭	CONTRACTOR LAYDOWN AREA
═	SITE ACCESS
─○─○─	TEMPORARY FENCING

NOTES

1. ISS BATCH PLANT AND WATER TREATMENT OPERATIONS SHALL BE LOCATED WITHIN THE ASKO/BULK TERMINAL AND MAY BE LOCATED OUTSIDE OF THE CONTRACTOR LAYDOWN AREA. THE LOCATIONS OF THE ISS BATCH PLAN AND WATER TREATMENT OPERATIONS SHALL BE APPROVED BY THE ENGINEER PRIOR TO MOBILIZATION.
2. CONTRACTOR LAYDOWN AREA AND SOIL MANAGEMENT AREA (INCLUDING OVERBURDEN AND EXCAVATED SOILS) FOR THE "EAST WATERFRONT PROPERTY" SHALL BE APPROVED BY THE ENGINEER PRIOR TO MOBILIZATION.
3. HAUL ROUTES, ACCESS AREAS, & STAGING AREAS FOR EQUIPMENT & MATERIALS WILL BE DETERMINED BY THE CONTRACTOR & WILL BE DEPENDENT ON THE SEQUENCE OF WORK.

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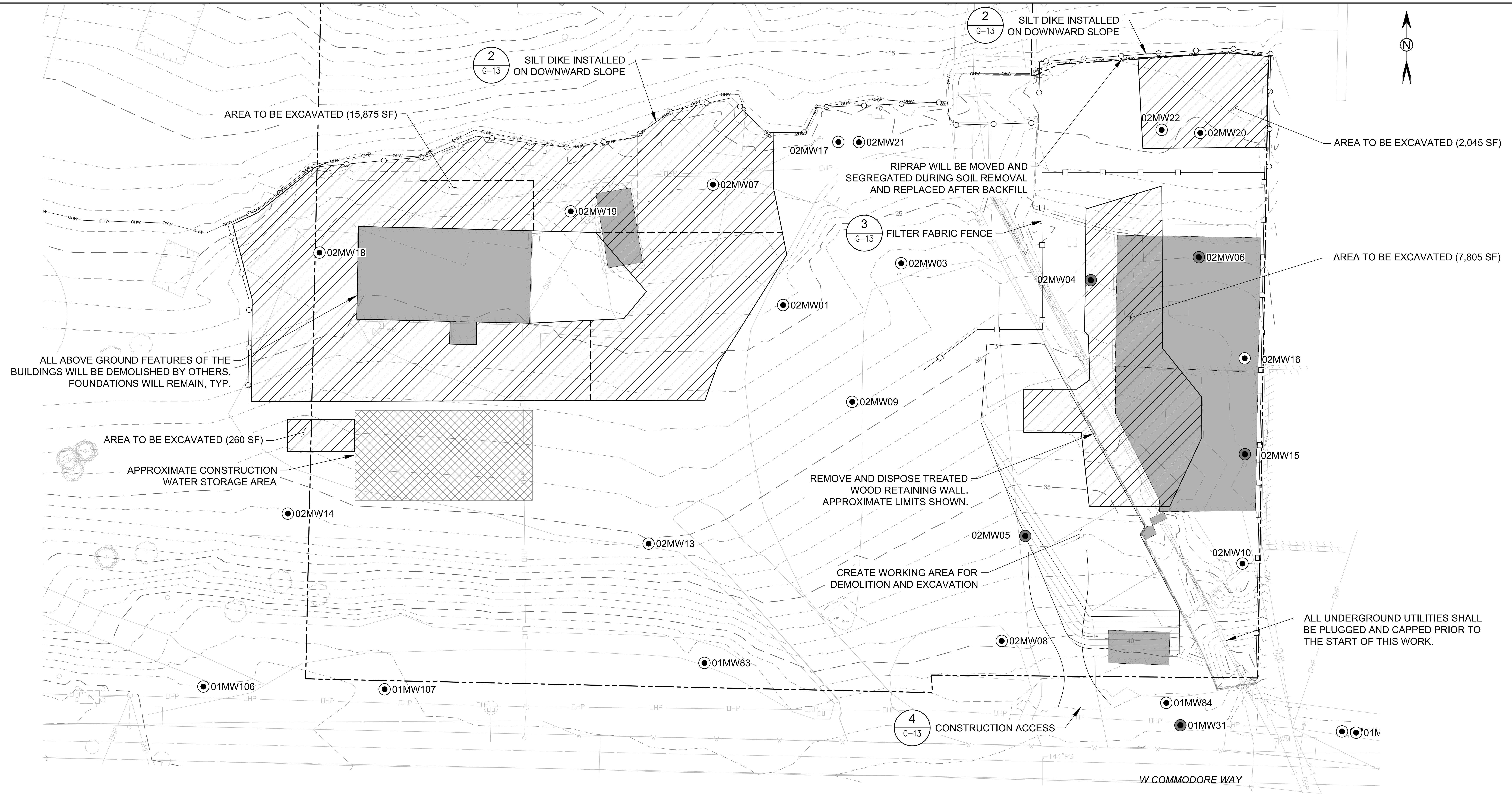
Reviewer	X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

Site Access, Haul Routes, and Staging Areas

Drawing No.
G-10

Sheet 10 of 26



0 20 40
SCALE IN FEET

LEGEND

- ▨ EXCAVATION / TREATMENT AREA
- ▩ ABOVE GROUND FEATURE TO BE DEMOLISHED (UNDER SEPARATE PERMIT)
- ▦ CONSTRUCTION WATER STORAGE AREA
- ⊙ MONITORING WELL TO BE PROTECTED
- ● MONITORING WELL DECOMMISSIONED IN MARCH 2021
- —○— TEMPORARY SILT DIKE
- —□— TEMPORARY FILTER FABRIC FENCE
- — OHW — ORDINARY HIGH WATER
- – – – PARCEL BOUNDARY FOR TOC SEATTLE TERMINAL 1, LLC PROPERTIES

NOTES

1. DEMOLITION OF UPLAND STRUCTURES IS PERMITTED UNDER SEPARATE PERMIT AND WILL OCCUR BY OTHERS PRIOR TO THE START OF THIS WORK. DEMOLITION WILL INCLUDE ALL ABOVE GRADE STRUCTURES AND ACTIVE UTILITIES ASSOCIATED WITH THE BUILDINGS. SELECTIVE DEMOLITION WILL BE REQUIRED TO REMOVE ASPHALT AND CONCRETE ABOVE WORK AREAS AND WILL BE COMPLETED BY THE REMEDIATION CONTRACTOR.
2. ALL CONTACT STORMWATER WILL BE COLLECTED DURING SITE CONSTRUCTION AND WILL BE DISCHARGED IN ACCORDANCE WITH PERMITS AND AS APPROVED BY THE ENGINEER.
3. WATER WILL BE COLLECTED FORM THE WATERFRONT PROPERTY AND DISPOSED OFF THROUGH THE WATER TREATMENT SYSTEM ON THE ASKO/BULK TERMINAL PARCELS.
4. GROUNDWATER DEWATERING TO COMBINED SEWERS MUST BE METERED PRIOR TO DISCHARGE. CONTACT THE SPU SUBMETER PROGRAM OFFICE AT (206) 684-5089 TO DETERMINE THE REQUIRED METER TYPE, INSTALLATION LOCATION AND BILLING INFORMATION AND TO SCHEDULE AN INSPECTION AFTER INSTALLATION.

File: E:_Business\!Crete\!20001.01\2021.05.28\Time Oil - working cad files\Time Oil Bulk Terminal_Drawings\C1-C3.1 THRU C3.4-C4.1-C4.2-C5.1.dwg Plot Date: May 26, 2021 Plotted by: Greene, Chris

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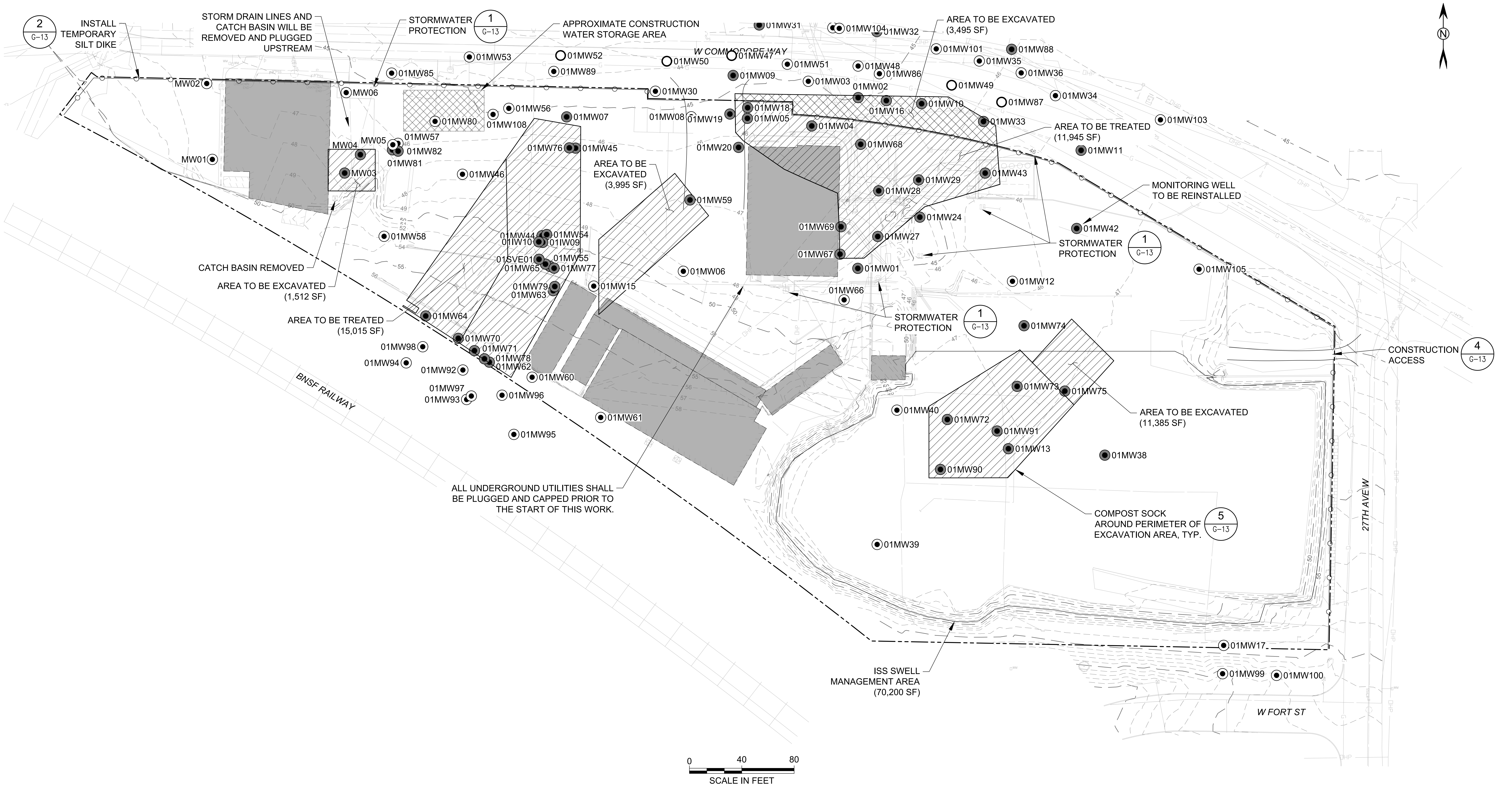
Reviewer X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

Demo and TESC Plan
(1 of 2)

Drawing No.
G-11

Sheet 11 of 26



LEGEND

- ▨ EXCAVATION / TREATMENT AREA
- ■ ABOVE GROUND FEATURE TO BE DEMOLISHED (UNDER SEPARATE PERMIT)
- ▩ CONSTRUCTION WATER STORAGE AREA
- ⦿ MONITORING WELL TO BE PROTECTED
- ● MONITORING WELL DECOMMISSIONED IN MARCH 2021
- ○ MONITORING WELL TO BE DECOMMISSIONED DURING CLEANUP ACTION
- —○— TEMPORARY SILT DIKE
- — - — PARCEL BOUNDARY FOR TOC SEATTLE TERMINAL 1, LLC PROPERTIES

NOTES

1. DEMOLITION OF UPLAND STRUCTURES IS PERMITTED UNDER SEPARATE PERMIT AND WILL OCCUR BY OTHERS PRIOR TO THE START OF THIS WORK. DEMOLITION WILL INCLUDE ALL ABOVE GRADE STRUCTURES AND ACTIVE UTILITIES ASSOCIATED WITH THE BUILDINGS. SELECTIVE DEMOLITION WILL BE REQUIRED TO REMOVE ASPHALT AND CONCRETE ABOVE WORK AREAS AND WILL BE COMPLETED BY THE REMEDIATION CONTRACTOR.
2. ALL CONTACT STORMWATER WILL BE COLLECTED DURING SITE CONSTRUCTION AND WILL BE DISCHARGED IN ACCORDANCE WITH PERMITS AND AS APPROVED BY THE ENGINEER.
3. SAND BAGS OR EQUIVALENT BMPs ARE TO BE INSTALLED ALONG THE UPGRADIENT SIDE OF THE EXCAVATION AREAS WITHIN PAVED PORTIONS OF THE SITE REMAINING TO PREVENT RUN-ON FROM ENTERING THE EXCAVATIONS.

File: E:_Business\Crete\20001.01\2021.05.28\Time Oil - working cad files\Time Oil Bulk Terminal_Drawings\G11-G12 AND C1-C11.dwg
Plot Date: May 26, 2021 Plotted by: Greene, Chris

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Drafter C. Taylor
Checker X
Reviewer X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

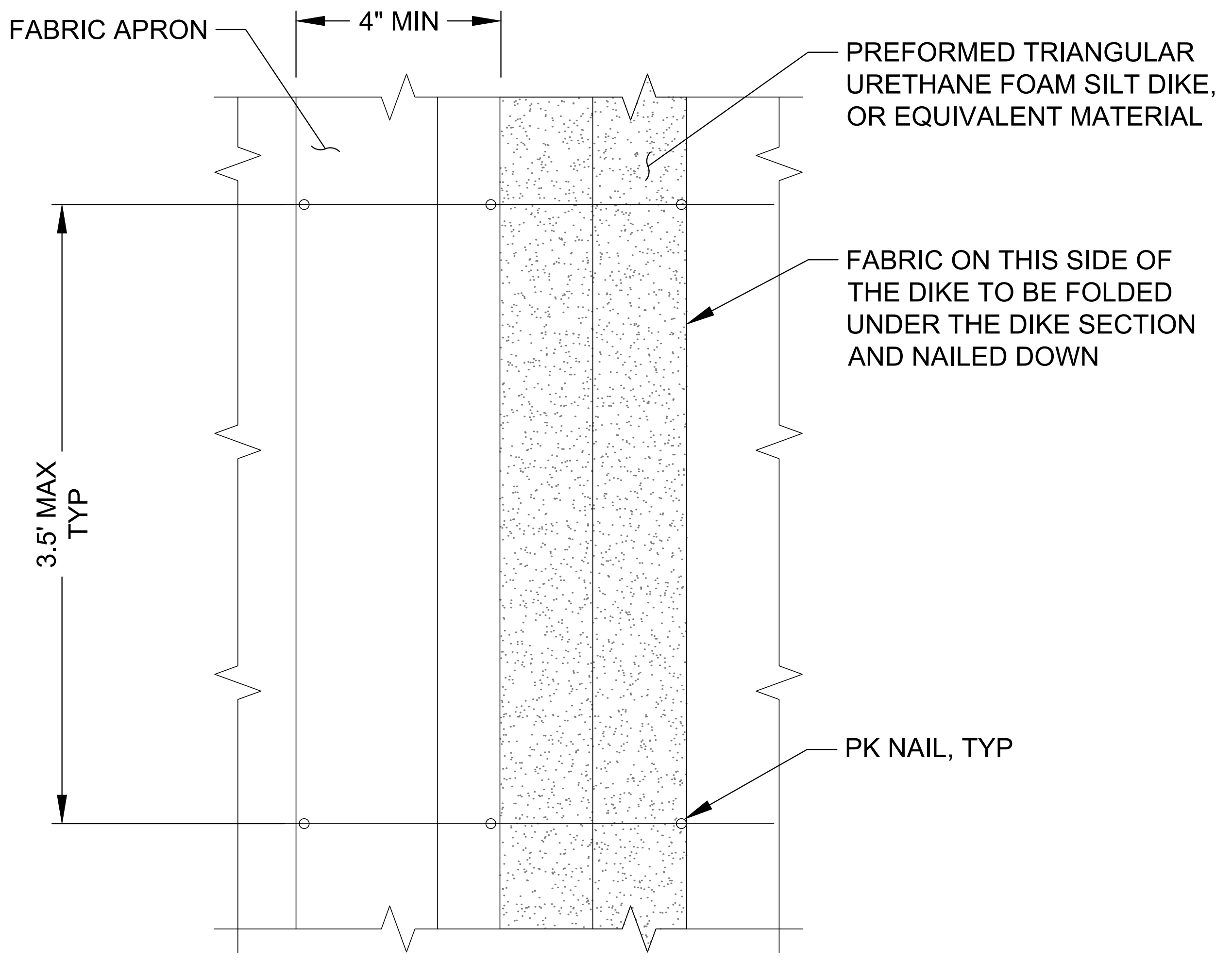
Demo and TESC Plan
(2 of 2)

Drawing No.
G-12

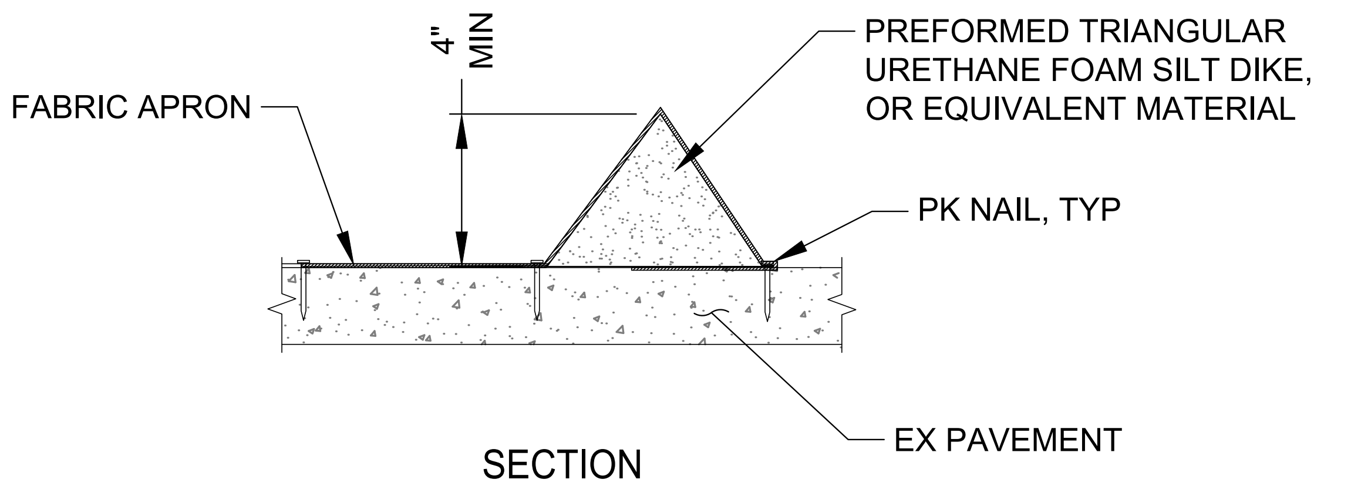
Sheet 12 **of** 26

CONSTRUCTION STORMWATER AND EROSION CONTROL PLAN (CSECP) NOTES

1. SUBMIT A CONSTRUCTION STORMWATER ANO EROSION CONTROL PLAN (CSECP), TREE, VEGETATION AND SOIL PROTECTION PLAN (TVSPP), SPILL PLAN (SP), AND TEMPORARY DISCHARGE PLAN (TDP) IN ACCORDANCE WITH 8-01.3(2).
2. THE CONCEPTUAL CSEC MEASURES SHOWN ON THIS PLAN ARE THE MINIMUM BMPS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD. THESE CSEC FACILITIES MUST BE UPGRADED (E.G. ADDITIONAL CATCH BASIN FILTERS, OR ADDITIONAL STORMWATER TREATMENT MEASURES) AS NEEDED, DUE TO WEATHER OR FIELD CONDITIONS TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE SYSTEM OR OFF-SITE AREAS.
3. THE CONTRACTOR MUST USE PROPER EROSION AND SEDIMENT CONTROL PRACTICES ON THE CONSTRUCTION SITE AND ANY ADJACENT CONSTRUCTION STAGING AREAS TO PREVENT EROSION IN AND DOWNHILL OF DISTURBED AREAS, AND TO PREVENT THE DISCHARGE OF UPLAND SEDIMENTS OR SEDIMENT- LADEN WATER INTO WETLANDS, WATER BODIES, STREETS AND LOCAL DRAINAGE SYSTEMS.
4. THE CSEC FACILITIES ON THE APPROVED PLAN WILL BE CONSTRUCTED PRIOR TO SITE DISTURBANCE TO ENSURE THAT THE TRANSPORT OF SEDIMENT TO SURFACE WATERS, DRAINAGE SYSTEMS, AND ADJACENT PROPERTIES IS MINIMIZED.
5. THE CONTRACTOR MUST USE BMPS (E.G. DIVERSION DITCHES, BERMS) AS APPLICABLE TO MINIMIZE OFF- SITE RUNOFF AND CLEAN STORMWATER FROM ENTERING THE PROJECT AREA.
6. THE CONTRACTOR MUST NOT DISCHARGE TURBID WATER GENERATED FROM CONSTRUCTION ACTIVITIES, DIRECTLY TO ANY STREAMS, STORM WATER SYSTEM INLETS, OR DRAINAGE DITCHES.
7. SOIL STOCKPILES MUST BE STABILI ZED FROM EROSION, PROTECTED WITH SEDIMENT TRAPPING MEASURES, AND, WHERE POSSIBLE, LOCATED AWAY FROM STORM DRAIN INLETS.
8. THE CONTRACTOR MUST EMPLOY DUST CONTROL MEASURES AS NEEDED TO PREVENT SURFACE AND AIR MOVEMENT OF DUST FROM EXPOSED SOIL SURFACES.
9. CATCH BASIN PROTECTION MUST BE INSTALLED IN ANY GRATED ROAD DRAINAGE STRUCTURES, EXISTING OR NEWLY INSTALLED, WHICH ARE LIKELY TO RECEIVE RUNOFF FROM THE DISTURBED AREAS DURING CONSTRUCTION. CATCH BASIN PROTECTION SHOWN ON THE CONCEPTUAL CSEC PLANS ARE APPROXIMATE LOCATIONS. THE CONTRACTOR MUST ADD CATCH BASIN PROTECTION AS NECESSARY TO ALL GRATED CATCH BASINS THAT RECEIVE STORMWATER RUNOFF WITHIN THE PROJECT AREA AND THAT MAY OR MAY NOT BE SHOWN ON THE CSEC PLANS.
10. SILT FENCES SHALL BE INSTALLED AND MAINTAINED PER CITY OF SEATTLE SPECIFICATIONS 8-01.3(10) AND 8-01.3(14).
11. THE CONTRACTOR SHALL PROTECT ALL DRAINAGE AND SEWER SYSTEM PER CITY OF SEATTLE SPECIFICATIONS 8-01.3(12) AND 8-01.3(14).
12. ALL COMPOST SOCKS, COMPOST BERMS, AND STRAW WATTLES SHALL BE CONSTRUCTED, INSTALLED AND MARINATED PER CITY OF SEATTLE SPECIFICATIONS 8-01.3(13) AND 8-01.3(14).
13. BMPS (E.G. COMPOST SOCKS) MUST BE INSTALLED TO PREVENT SEDIMENT OR SEDIMENT LADEN WATERS FROM ENTERING GRATED ROADWAY INLETS WHICH HAVE NO SUMP AND MAY BE TOO SHALLOW TO EMPLOY CATCH BASIN FILTER SOCKS. OTHER BMPS, SUCH AS STREET SWEEPING AND VACUUMING MUST ALSO BE EMPLOYED AS NEEDED TO REMOVE SEDIMENT.
14. AT NO TIME MUST MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A CATCH BASIN. ALL CATCH BASINS AND CONVEYANCE LINES MUST BE CLEANED PRIOR TO PAVING. THE CLEANING OPERATION MUST NOT FLUSH SEDIMENT LADEN WATER INTO THE DOWNSTREAM SYSTEM.
15. PER CITY OF SEATTLE STANDARD SPECIFICATION SECTION 8-01.3(2)A AND THE CITY'S STORMWATER CODE, AREAS OF EXPOSED SOIL IN EXCESS OF 4,000 SQUARE FEET THAT WILL NOT BE DISTURBED FOR TWO DAYS DURING THE PERIOD FROM OCTOBER 1 TO APRIL 30, OR SEVEN DAYS DURING THE PER IOD FROM MAY 1 TO SEPTEMBER 30, WILL BE IMMEDIATELY STABILIZED WITH APPROVED CSEC METHODS (E.G., SEEDING, MULCHING, NETTING, CLEAR PLASTIC COVERING).
16. THE CONTRACTOR'S CERTIFIED SEDIMENT AND EROSION CONTROL LEAD (CSECL) MUST REVIEW AND MODIFY THE CSEC PLANS ON AN AS NEEDED BASIS TO REFLECT THE SITE CONDITIONS AND CONSTRUCTION METHODS USED. THE CONTRACTOR'S CSECL MUST CONDUCT SITE INSPECTIONS AT LEAST ONCE EVERY CALENDAR WEEK AND WITHIN 24 HOURS OF ANY RUNOFF DISCHARGE FROM SITE. AFTER ANY 24- HOUR RUNOFF PRODUCING EVENT, THE CSECL WILL INSPECT CSEC MEASURES FOR INTEGRITY. ANY DAMAGED CSEC MEASURES WILL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND REPAIRED IMMEDIATELY.
17. CONCRETE SAWCUTTING DEBRIS AND SLURRY MUST BE CONTAINED AND MANAGED USING APPROPRIATE BMPS TO PREVENT CONTAMINATION OF SITE WATER AND MEET DISCHARGE REQUIREMENTS. FRESH CONCRETE CAN ALSO ADVERSELY AFFECT SITE WATER QUALITY. PH SAMPLING AND TESTING MUST BE IN COMPLIANCE WITH APPLICABLE DISCHARGE AUTHORIZATIONS FROM KING COUNTY DURING CONCRETE POURS AND SAWCUTTING. IF PH EXCEEDS DISCHARGE LIMITS, APPROPRIATE BMPS MUST BE APPLIED.
18. THE CONTRACTOR MUST SET ASIDE A SEPARATE AREA FOR THE WASH-OUT OF CONSTRUCTION EQUIPMENT AND TOOLS. PROCESS WATER MUST BE HAULED OFF SITE OR DISCHARGED TO SEWER IN COMPLIANCE WITH A KING COUNTY DISCHARGE AUTHORIZATION.
19. TEMPORARY TRENCH DEWATERING MUST BE DISCHARGED TO AN APPROVED LOCATION. DISCHARGES TO THE SEWER SYSTEM MUST COMPLY WITH ALL PROVISIONS OF ANY DISCHARGE AUTHORIZATIONS FROM KING COUNTY AND SPU, AS WELL AS COS SPECIFICATIONS SECTION 2- 08.3. & 8- 01.3(2)D AND E.
20. EXCAVATION SPOILS MAY BE EXTREMELY WET. CONTRACTOR MUST PREVENT MUD AND WATER FROM BEING TRACKED ALONG HAULING ROUTES BY LINING TRUCK BEDS OR BY OTHER MEANS AS NECESSARY. THE CONTRACTOR MUST ENSURE THAT SOIL, DEBRIS, OR OTHER MATERIAL TRACKED AND DEPOSITED ARE REMOVED BY SWEEPING OR BY WASHING AND PROPERLY DISPOSED PER CITY OF SEATTLE SPECIFICATIONS 8-01.3(16).
21. THE CONTRACTOR IS RESPONSIBLE FOR THE SEQUENCING AND STAGING OF ALL DEMOLITION AND CSEC ACTIVITIES AT APPROPRIATE TIMES.
22. PROTECT TREES & VEGETATION PER STANDARD SPECIFICATIONS 1 -07. 16 (2) & 8-01.3(2)B. CONTACT SDOT URBAN FORESTRY (684-8621 OR 684-5041) FOR FIELD REVIEW OF TREE, VEGETATION, AND SOIL PROTECTION PLAN PRIOR TO CONSTRUCTION.
23. THE CONTRACTOR MUST ENSURE THAT SOIL, DEBRIS, OR OTHER MATERIAL TRACKED AND DEPOSITED ARE REMOVED BY SWEEPING OR BY WASHING AND PROPERLY DISPOSED PER CITY OF SEATTLE SPECIFICATIONS 8-01.3(16).
24. CONTRACTOR SHALL LOCATE EXISTING CATCH BASINS AND RELATED STORMWATER DRAINAGE FEATURES THAT MAY BE IMPACTED BY CONSTRUCTION ACTIVITIES DURING THE PROJECT. PROTECTION OF THESE CATCH BASINS AND RELATED STORMWATER DRAINAGE FEATURES SHALL BE COORDINATED WITH THE WORK BY THE CONTRACTOR.



PLAN VIEW

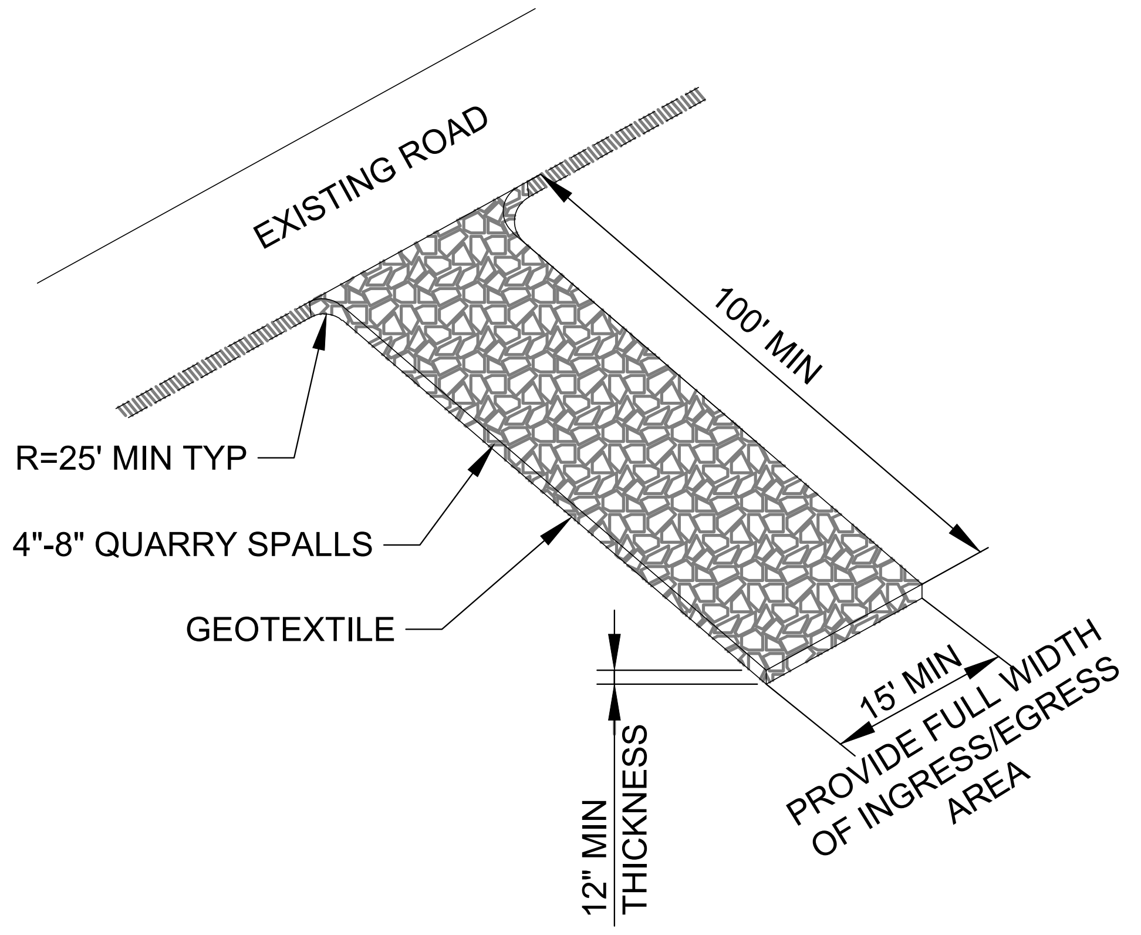


SECTION

NOTES

1. PK NAILS SHALL BE PLACED WHERE THE UNITS OVERLAP AND IN THE CENTER OF A 7-FOOT UNIT AS SHOWN ON THE DIKE PLAN.
2. ALTERNATE APPROVED HOLD DOWN DEVICE MAY BE SUBSTITUTED FOR PK NAILS (WIRE STAPLES, ETC).

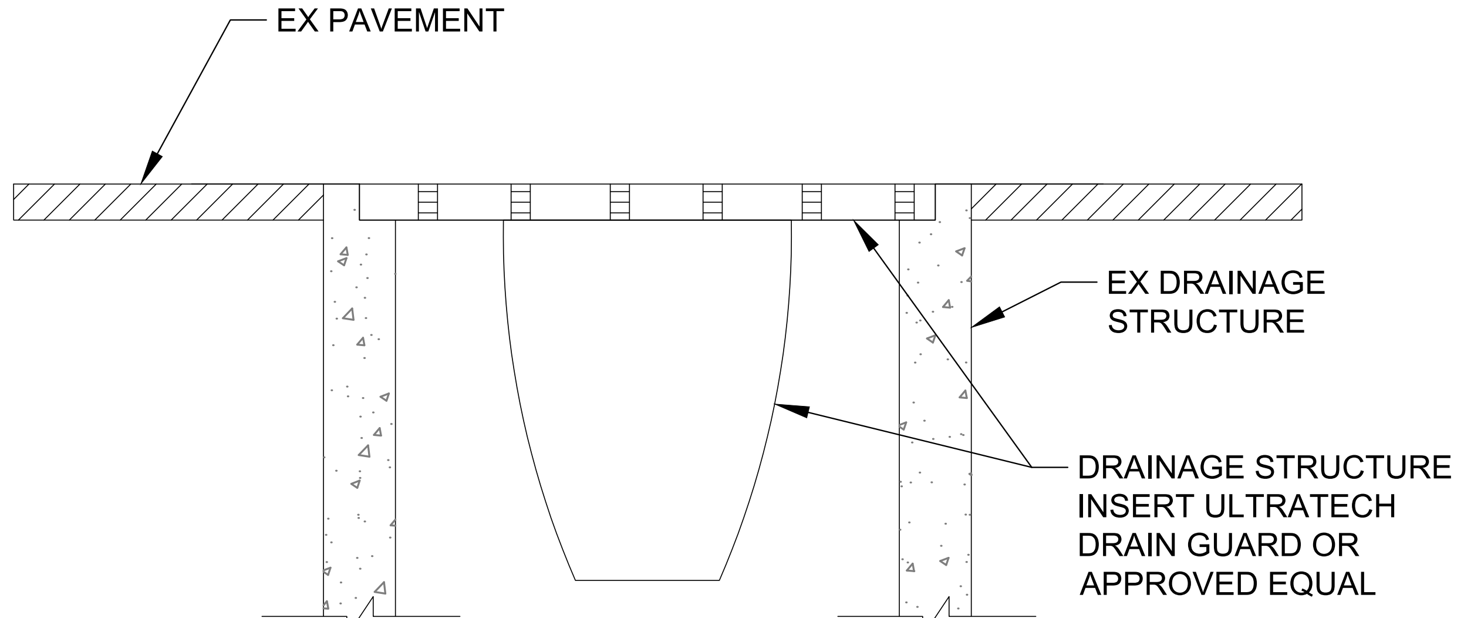
2
–
TEMPORARY TRIANGULAR SILT DIKE - DETAIL
SCALE: NTS



NOTES

1. ALL MATERIALS SPILLED, DROPPED, WASHED OR TRACKED FROM VEHICLES ONTO ROADWAYS MUST BE REMOVED IMMEDIATELY.
2. VEHICLE TIRES SHALL BE INSPECTED TO ENSURE THEY ARE FREE OF MUD BEFORE ENTERING PUBLIC ROADWAYS.
3. PROVIDE FLAGGING FOR CONSTRUCTION VEHICLES ENTERING AND LEAVING SITE AND ENTERING PUBLIC ROADWAYS.
4. CONTRACTOR SHALL MAINTAIN AND AUGMENT EXISTING STABILIZED CONSTRUCTION ENTRANCES AS NEEDED TO CONTROL SEDIMENT.

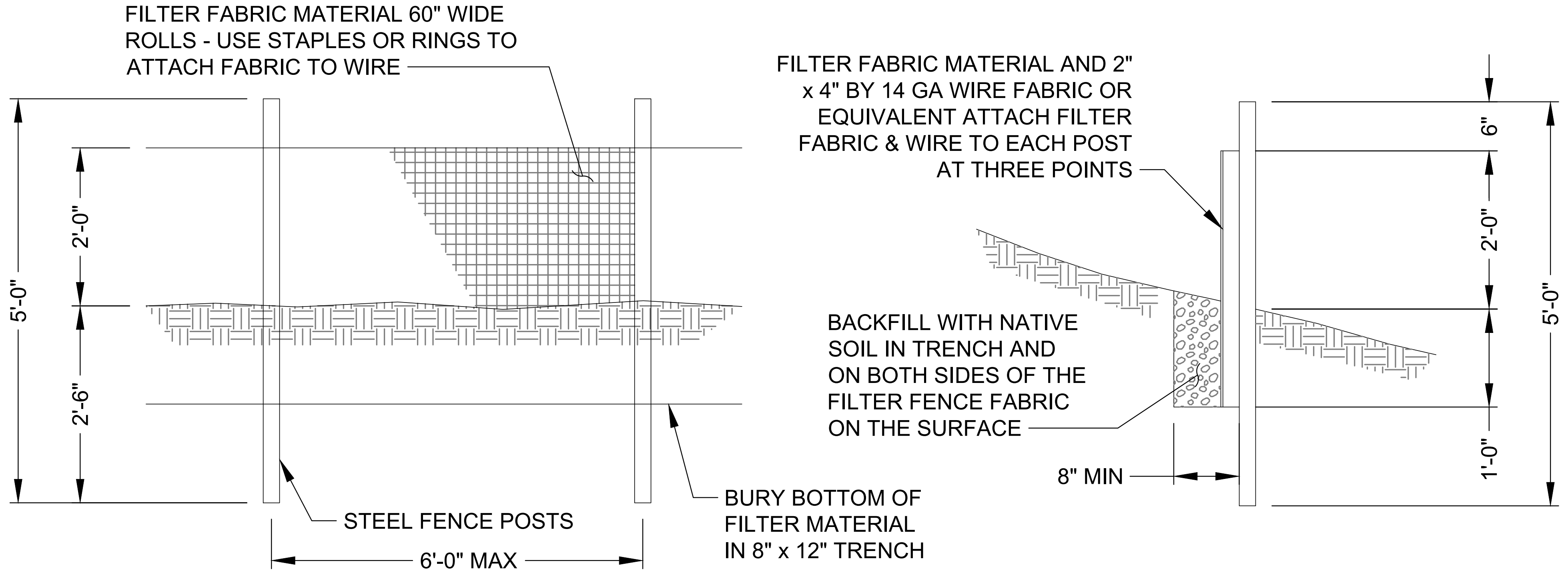
4
–
STABILIZED TEMPORARY CONSTRUCTION ACCESS - DETAIL
SCALE: NTS



NOTES

1. ANY ACCUMULATED SEDIMENT ON OR AROUND THE FILTER FABRIC SHALL BE REMOVED. ALL SEDIMENT SHALL BE DISPOSED OF OFF-SITE.
2. ANY SEDIMENT IN THE DRAINAGE STRUCTURE INSERT SHALL BE REMOVED WHEN SEDIMENT HAS FILLED ONE-THIRD OF THE INSERT. THE INSERT SHALL BE REPLACED MONTHLY OR AS DIRECTED BY THE ENGINEER.

1
–
TEMPORARY DRAINAGE STRUCTURE INSERT - DETAIL
SCALE: NTS



ELEVATION

SECTION

3
–
TEMPORARY FILTER FABRIC FENCE - DETAIL
SCALE: NTS

Rev	Date	Description	By

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www.creteconsulting.com

GRANT HAINSWORTH
33192
6/28/2021

Scale As Noted

SCALE WARNING
Drawing is not to scale, if scale bar doesn't measure one inch

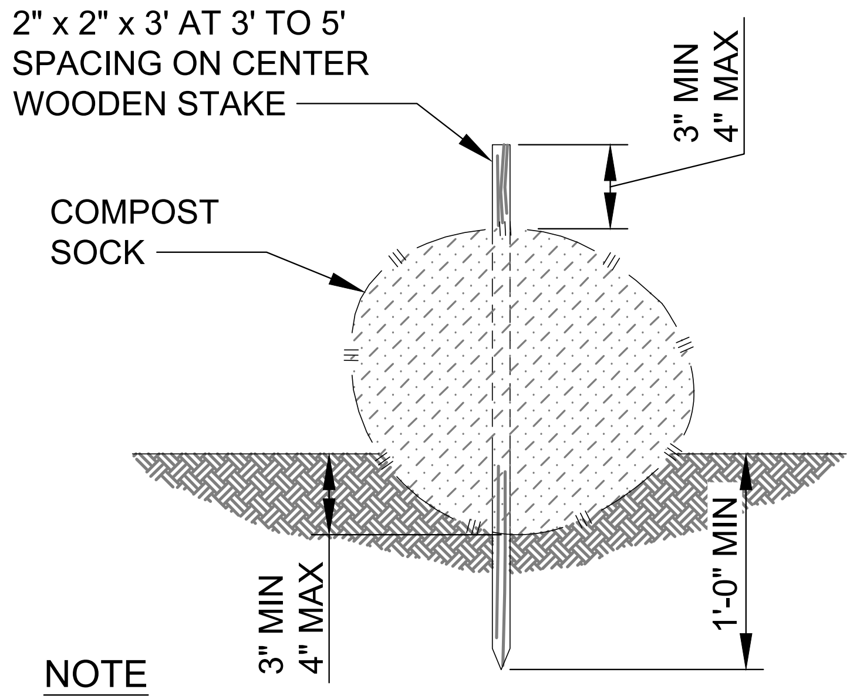
Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

TESC Notes and Details

Drawing No.
G-13

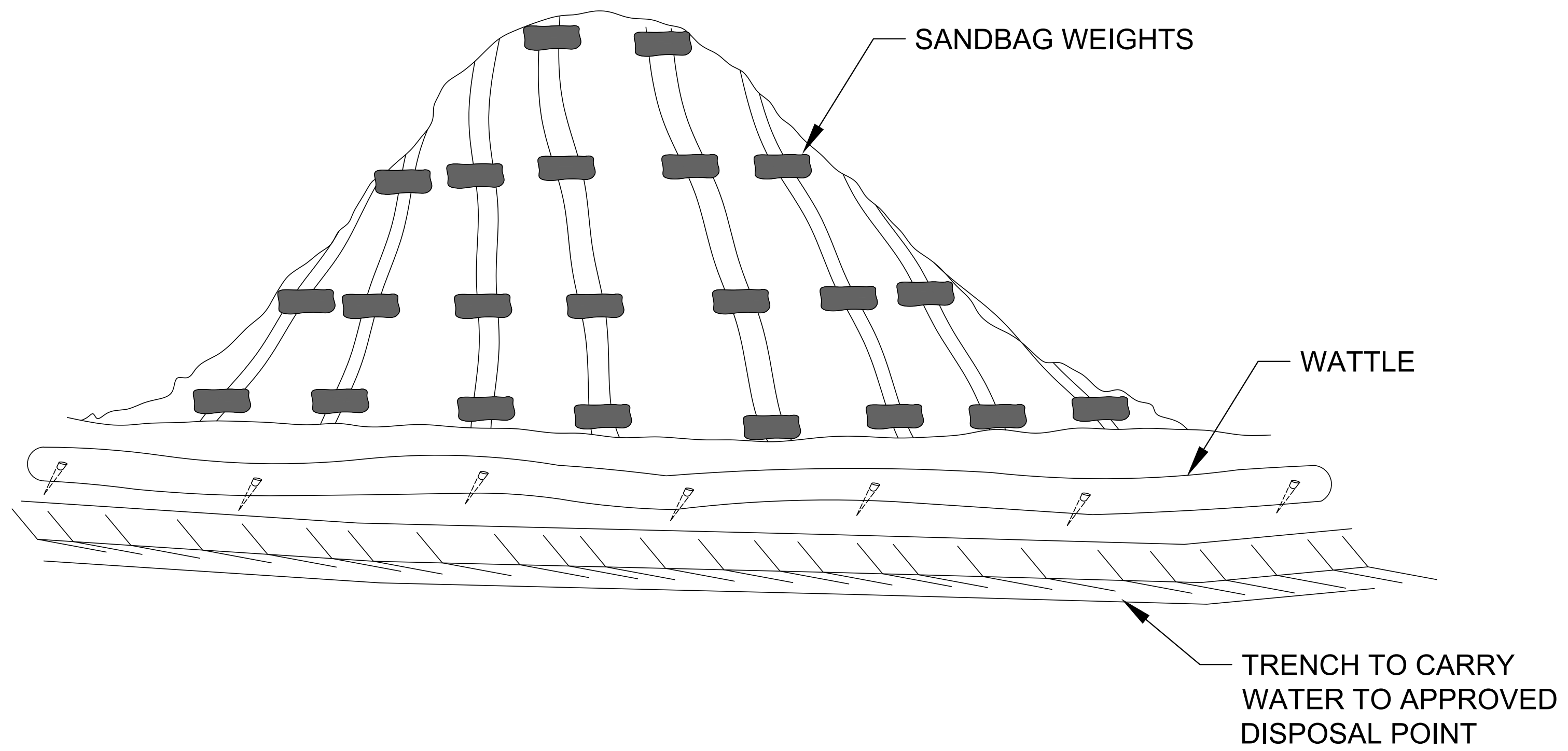
Sheet 13 of 26



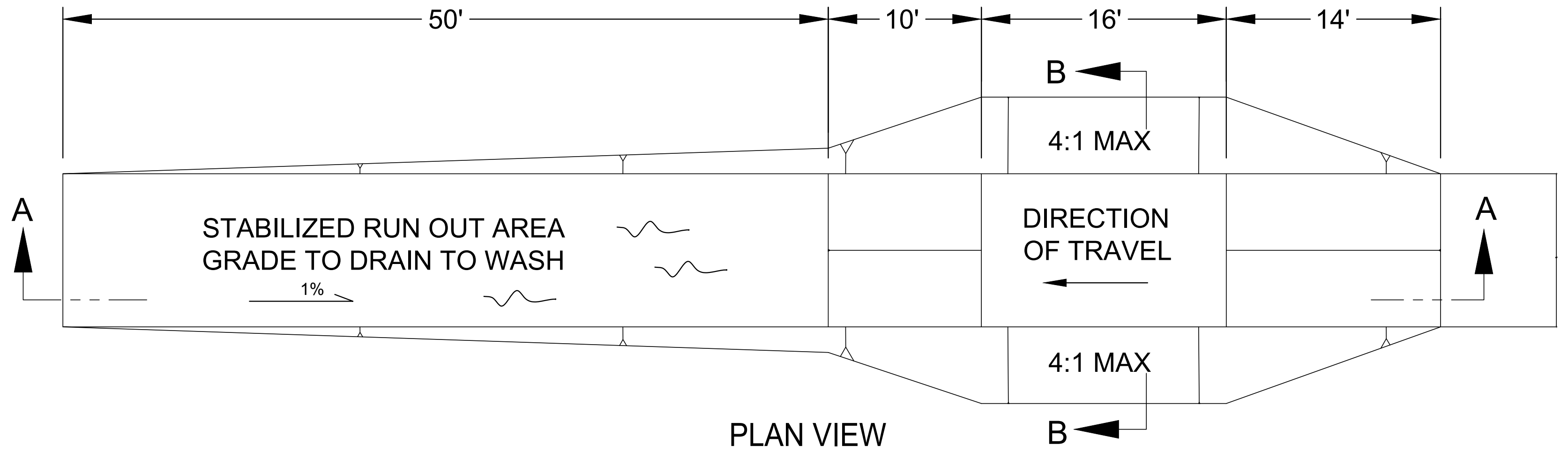
NOTE

1. COMPOST SOCK SHALL BE 100% NATURAL AND BIODEGRADABLE. MATERIAL AND INSTALLATION SHALL BE PER WSDOT STANDARD SPECIFICATIONS 8-01.3(12) AND 9-14.5(6).

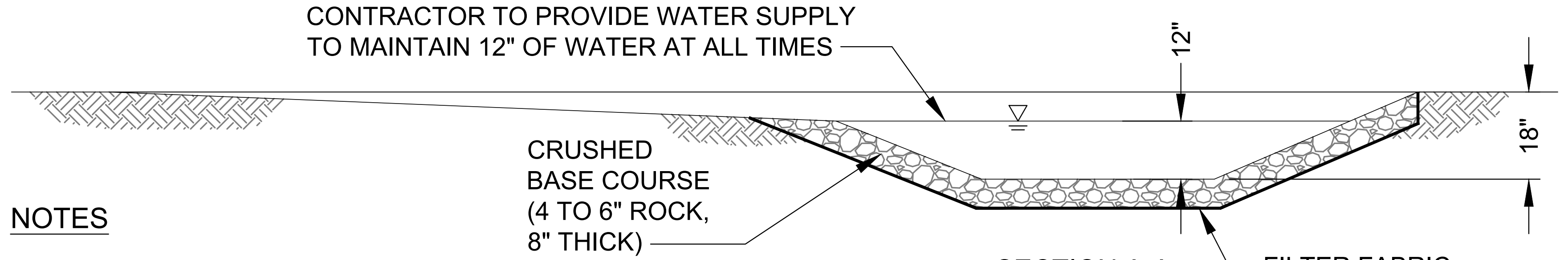
5 – COMPOST SOCK - DETAIL
SCALE: NTS



6 – STOCKPILE COVER - DETAIL
SCALE: NTS



PLAN VIEW



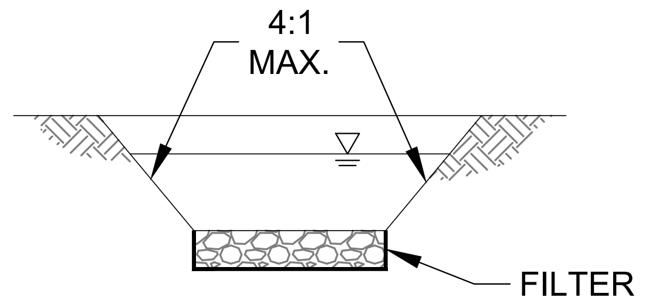
SECTION A-A

NOTES

1. CONTRACTOR TO REMOVE ACCUMULATED SEDIMENT FROM WHEEL WASH; MAY BE PIPED TO AN APPROVED SEDIMENT TRAP.

REFERENCE

1. USE GEOTEXTILE FABRIC WITH AGGREGATE FOR A TEMPORARY TIRE WASH.



SECTION B-B

7 – WHEEL WASH - DETAIL
SCALE: NTS

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33192
6/28/2021

Scale As Noted

SCALE WARNING
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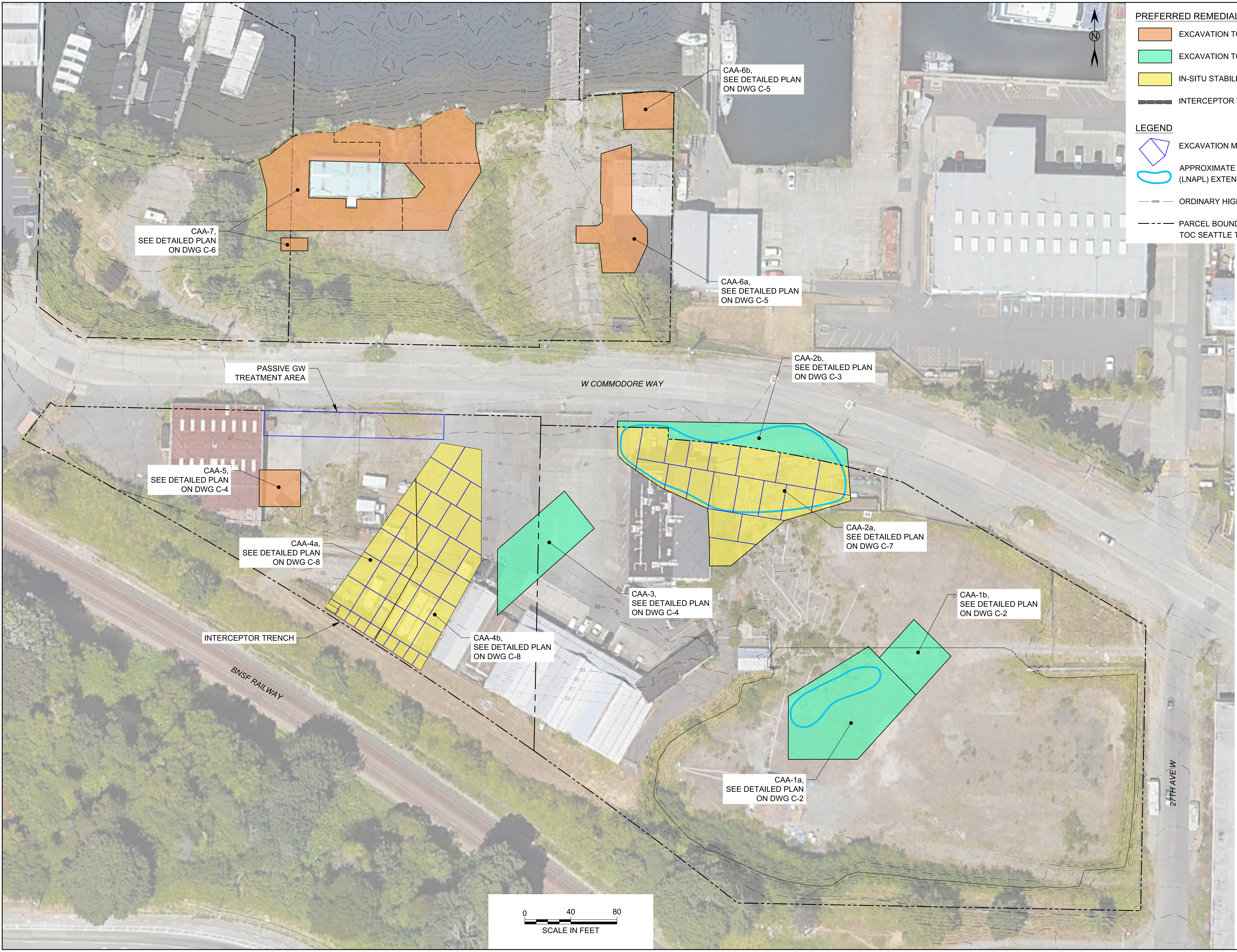
Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

TESC Details

Drawing No.
G-14

Sheet 14 of 26



PREFERRED REMEDIAL ALTERNATIVE

- 🟧 EXCAVATION TO CLEANUP LEVEL (CUL)
- 🟩 EXCAVATION TO REMEDIATION LEVEL (REL)
- 🟨 IN-SITU STABILIZATION / SOLIDIFICATION
- ▬ INTERCEPTOR TRENCH

LEGEND

- ◇ EXCAVATION MIXING GRID CELLS
- ◯ APPROXIMATE LIGHT NON-AQUEOUS-PHASE LIQUID (LNAPL) EXTENT
- — OHW — ORDINARY HIGH WATER
- — · — PARCEL BOUNDARY FOR TOC SEATTLE TERMINAL 1, LLC PROPERTIES

Rev	Date	Description	By

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33192
6/28/2021

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SCALE WARNING
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Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

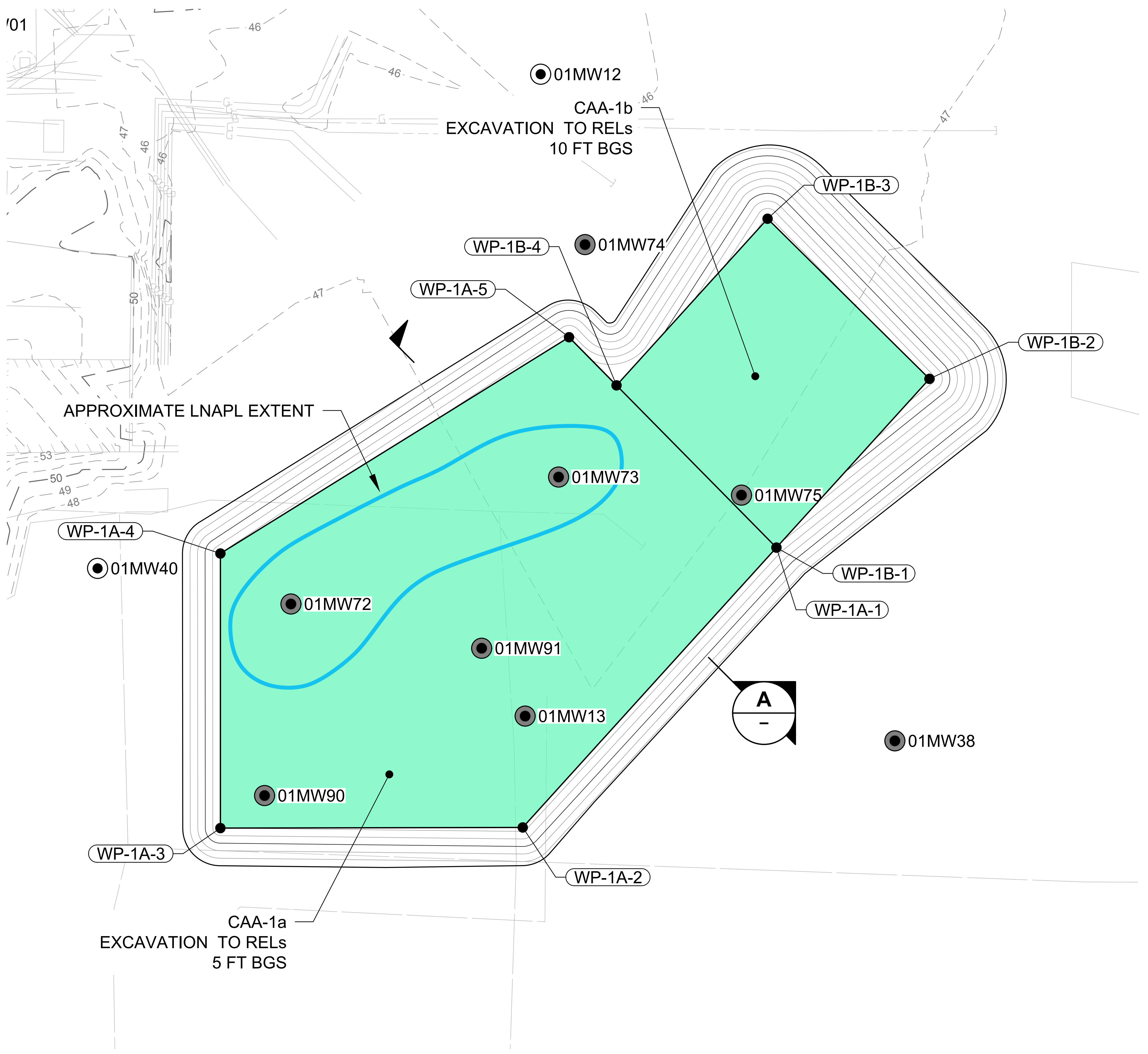
Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

Remediation Areas

Drawing No.
C-1

Sheet 15 of 26

File: E:_Business\Crete\20001.01\2021.05.28\Time Oil - working cad files\Time Oil Bulk Terminal_Drawings\C1-C3.1 THRU C3.4-C4.1-C4.2-C5.1.dwg Plot Date: May 26, 2021 Plotted by: Greene, Chris



DETAILED PLAN VIEW

CAA-1 EXCAVATION AREAS

0 20 40
SCALE IN FEET

CAA-1a

WORKING POINTS		
POINT ID	NORTHING	EASTING
WP-1A-1	245351.26	1256363.61
WP-1A-2	245295.50	1256313.09
WP-1A-3	245295.38	1256252.89
WP-1A-4	245350.08	1256252.89
WP-1A-5	245393.18	1256322.31

CAA-1b

WORKING POINTS		
POINT ID	NORTHING	EASTING
WP-1B-1	245351.26	1256363.61
WP-1B-2	245384.89	1256394.08
WP-1B-3	245416.79	1256361.85
WP-1B-4	245383.59	1256331.77

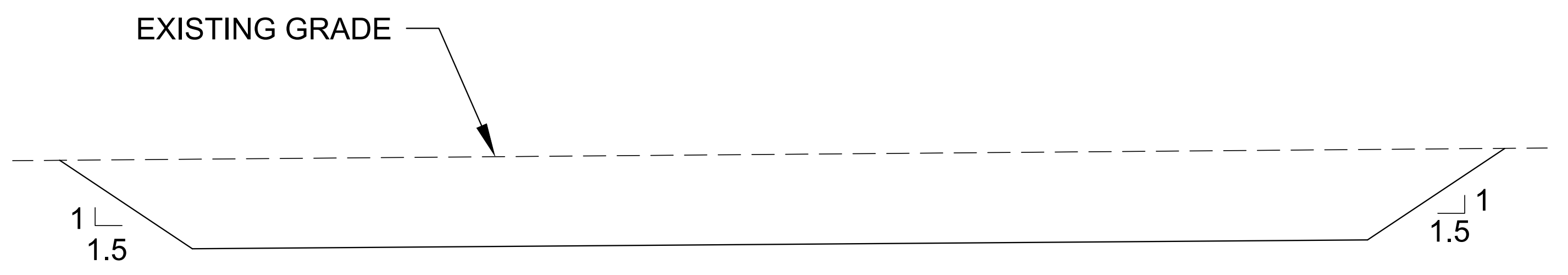
N

LEGEND

🟩	EXCAVATION TO REMEDIATION LEVEL (REL)
◯	APPROXIMATE LIGHT NON-AQUEOUS-PHASE LIQUID (LNAPL) EXTENT
⊙	MONITORING WELL TO BE PROTECTED
●	MONITORING WELL DECOMMISSIONED IN MARCH 2021

NOTES

1. EXCAVATED AREAS WILL BE BACKFILLED AND COMPACTED WITH CLEAN IMPORT MATERIAL TO EXISTING GRADE +/- 1 FOOT. FINAL SURFACES WILL BE STABILIZED TO PREVENT EROSION.



A – SECTION

SCALE: 1"=10'

0 10 20
SCALE IN FEET

NOTES

1. FINAL SOIL EXCAVATION DEPTHS WILL VARY BASED ON FIELD CONDITIONS, CROSS SECTIONS SHOW ANTICIPATED DEPTH AND VARIABILITY (TYP).

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33192
6/28/2021

Scale As Noted

SCALE WARNING
Drawing is not to scale, if scale bar doesn't measure one inch

Designer	M. Byers
Drafter	C. Taylor
Checker	X
Reviewer	X

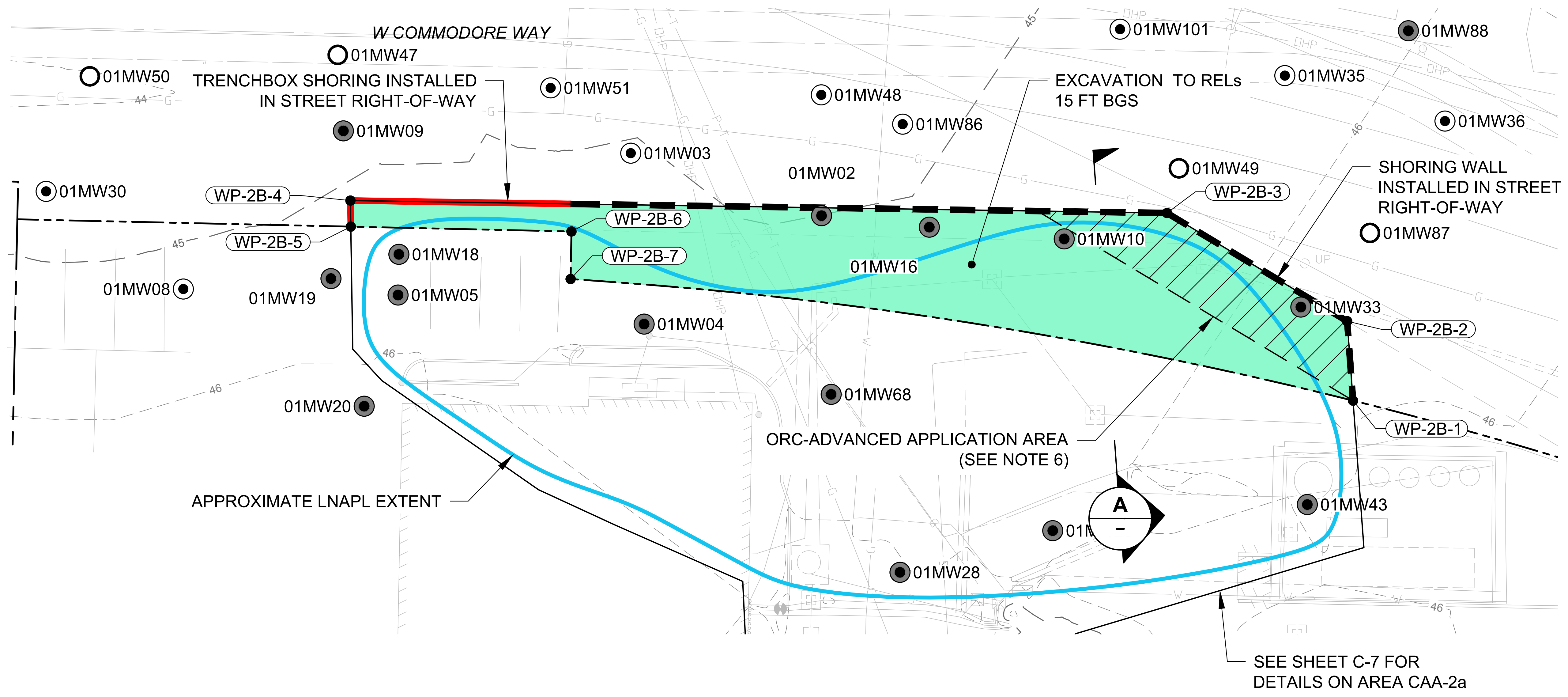
Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

CAA-1 Excavation Area
Plan and Profile

Drawing No.
C-2

Sheet 16 of 26

File: E:_Business\Crete\20001.01\2021.05.28\Time Oil - working cad files\Time Oil Bulk Terminal_Drawings\C1-C3.1 THRU C3.4-C4.1-C4.2-C5.1.dwg Plot Date: May 26, 2021 Plotted by: Greene, Chris



DETAILED PLAN VIEW

CAA-2B EXCAVATION AREA

0 20 40

SCALE IN FEET

CAA-2b

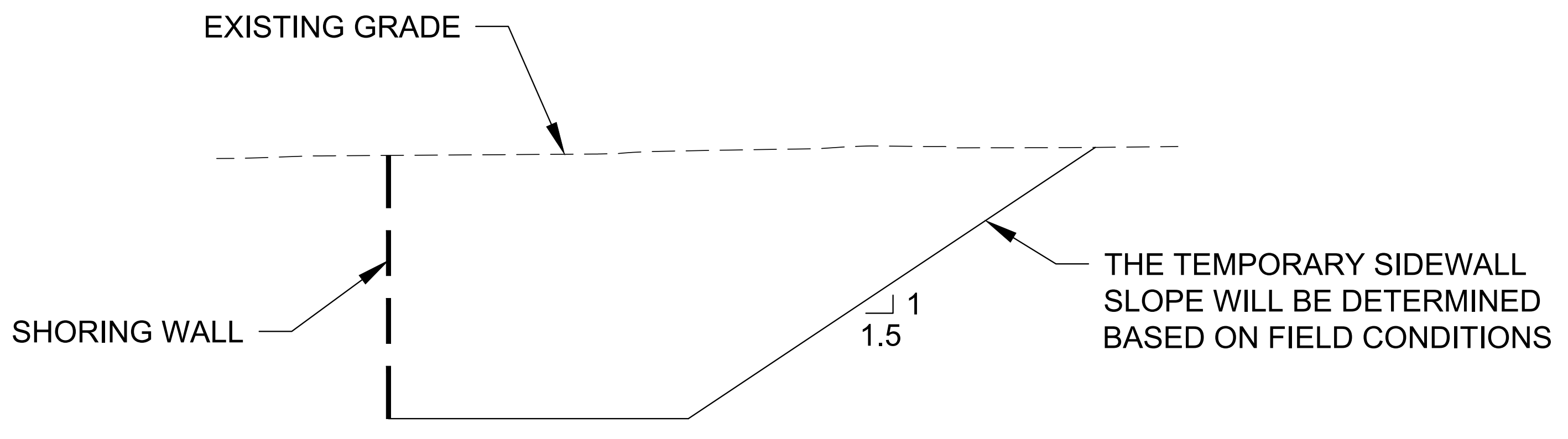
WORKING POINTS		
POINT ID	NORTHING	EASTING
WP-2B-1	245548.98	1256304.98
WP-2B-2	245564.83	1256303.81
WP-2B-3	245586.42	1256267.84
WP-2B-4	245588.91	1256104.74
WP-2B-5	245583.71	1256104.82
WP-2B-6	245582.74	1256148.89
WP-2B-7	245573.24	1256148.72

LEGEND

🟩	EXCAVATION TO REMEDIATION LEVEL (REL)
⬭	APPROXIMATE LIGHT NON-AQUEOUS-PHASE LIQUID (LNAPL) EXTENT
▬ ▬ ▬	SHORING WALL (SEE SHORING DRAWINGS SS1.0 THRU SS4.0 FOR DETAILS)
🟥	TRENCH BOX SHORING
⊙	MONITORING WELL TO BE PROTECTED
●	MONITORING WELL DECOMMISSIONED IN MARCH 2021
○	MONITORING WELL TO BE DECOMMISSIONED DURING CLEANUP ACTION
— - - —	PARCEL BOUNDARY FOR TOC SEATTLE TERMINAL 1, LLC PROPERTIES

NOTES

1. EXCAVATED AREAS WILL BE BACKFILLED AND COMPACTED WITH CLEAN IMPORT MATERIAL TO EXISTING GRADE +/- 1 FOOT. FINAL SURFACES IN THE CITY OF SEATTLE ROW WILL BE RETURNED TO EXISTING CONDITIONS BASED ON CITY OF SEATTLE REQUIREMENTS.
2. UTILITIES WILL BE PROTECTED DURING CONSTRUCTION ACTIVITIES.
3. GAS LINE SHALL BE LOCATED PER THE SHORING DETAILS.
4. ALL SEWER AND STORM LINES IN THE ROW WITHIN 10 FEET (OR WITHIN 20 FEET IF SUCH LINES ARE 30 FEET OR MORE OFF SITE PROPERTY LINE) OF ANY PROPOSED SHORING ELEMENT SHALL BE VIDEOTAPED OF PRE-PROJECT CONDITION AND A COPY SENT TO SPU AT SPU_DWW_PIPE_REHAB@SEATTLE.GOV PRIOR TO PRE-CONSTRUCTION MEETING. SIMILAR VIDEOTAPE OF POST-PROJECT CONDITION IS ALSO REQUIRED AND SENT TO SPU AT SAME EMAIL ADDRESS. ADD A NOTE IN THE PLANS TO THIS EFFECT.
5. THE CITY ROW SHALL BE RESTORED TO PRE EXISTING CONDITIONS BASED ON THE CITY OF SEATTLE REQUIREMENTS (SECTION 9.3.3.2.1 OR SECTION 9.3.3.2.4 OF CITY OF SEATTLE'S ROW OPENING & RESTORATION RULES).
6. APPROXIMATE EXTENT OF ORC-ADVANCE PELLETS APPLICATION AREA IS SHOWN ON THESE DRAWINGS. THE CONTRACTOR SHALL BROADCAST THE PELLETS (EITHER AS A POWDER OR SLURRY) TO ACHIEVE UNIFORM APPLICATION ALONG THE TREATMENT AREA. APPLICATION METHODS SHALL BE CONSISTENT WITH REGENESIS INSTALLATION INSTRUCTIONS. THE LAGGING THAT OVERLAPS WITH THIS TREATMENT AREA SHALL BE REMOVED TO ALLOW FOR INCREASED GROUNDWATER FLOW THROUGH THIS AREA OF THE SHORING.



A – SECTION

SCALE: 1"=10'

0 10 20

SCALE IN FEET

NOTES

1. FINAL SOIL EXCAVATION DEPTHS WILL VARY BASED ON FIELD CONDITIONS, CROSS SECTIONS SHOW ANTICIPATED DEPTH AND VARIABILITY (TYP).

Rev	Date	Description	By

Client

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GRANT HAINSWORTH
33192
Grant Hainsworth
6/28/2021

Scale As Noted

SCALE WARNING
Drawing is not to scale, if scale bar doesn't measure one inch

Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

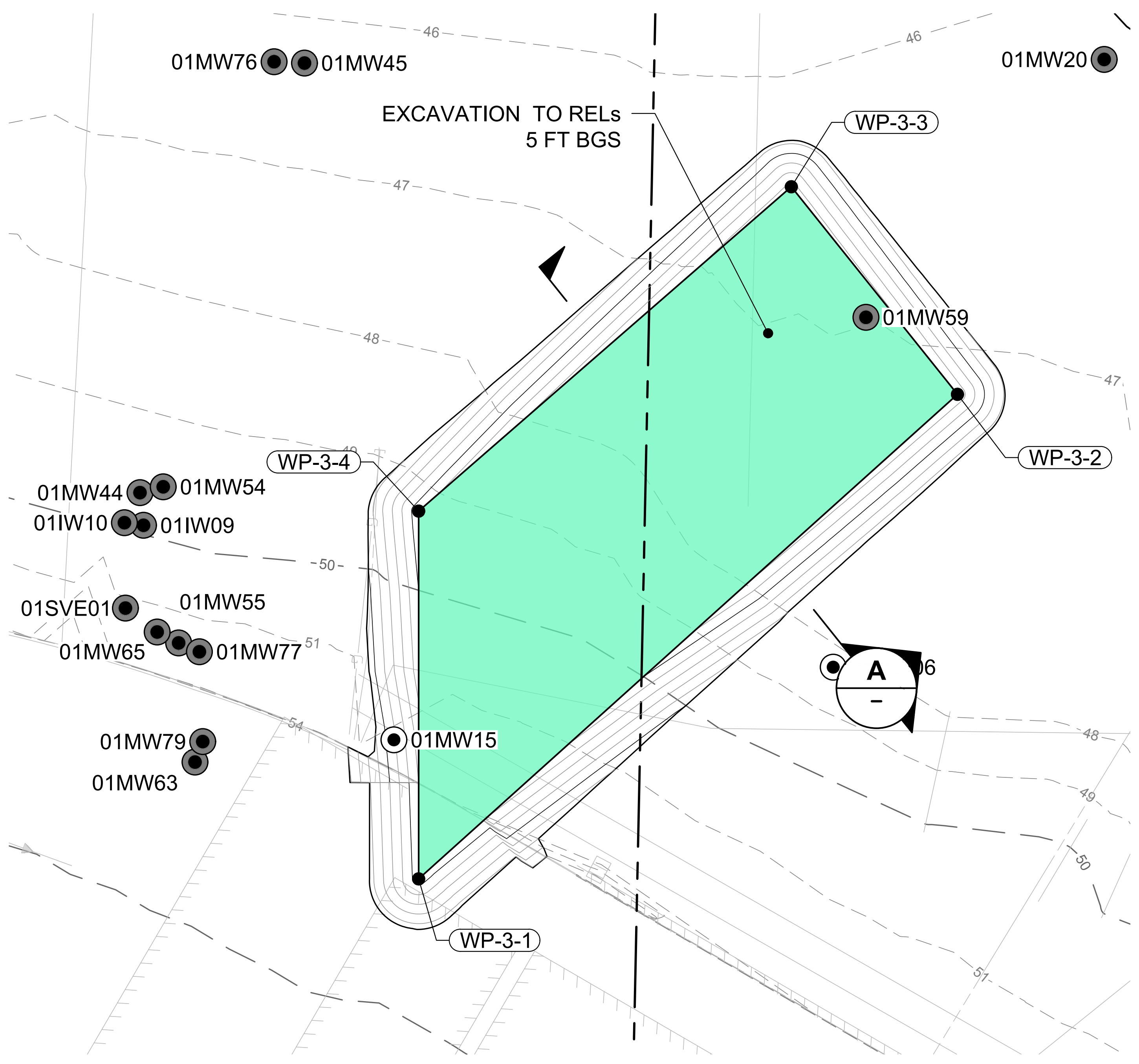
Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

CAA-2b Excavation Plan
Plan and Profile

Drawing No.
C-3

Sheet 17 **of** 26

File: E:_Business\Crete\20001.01\2021.05.28\Time Oil - working cad files\Time Oil Bulk Terminal_Drawings\C1-C3.1 THRU C3.4-C4.1-C4.2-C5.1.dwg Plot Date: May 26, 2021 Plotted by: Greene, Chris

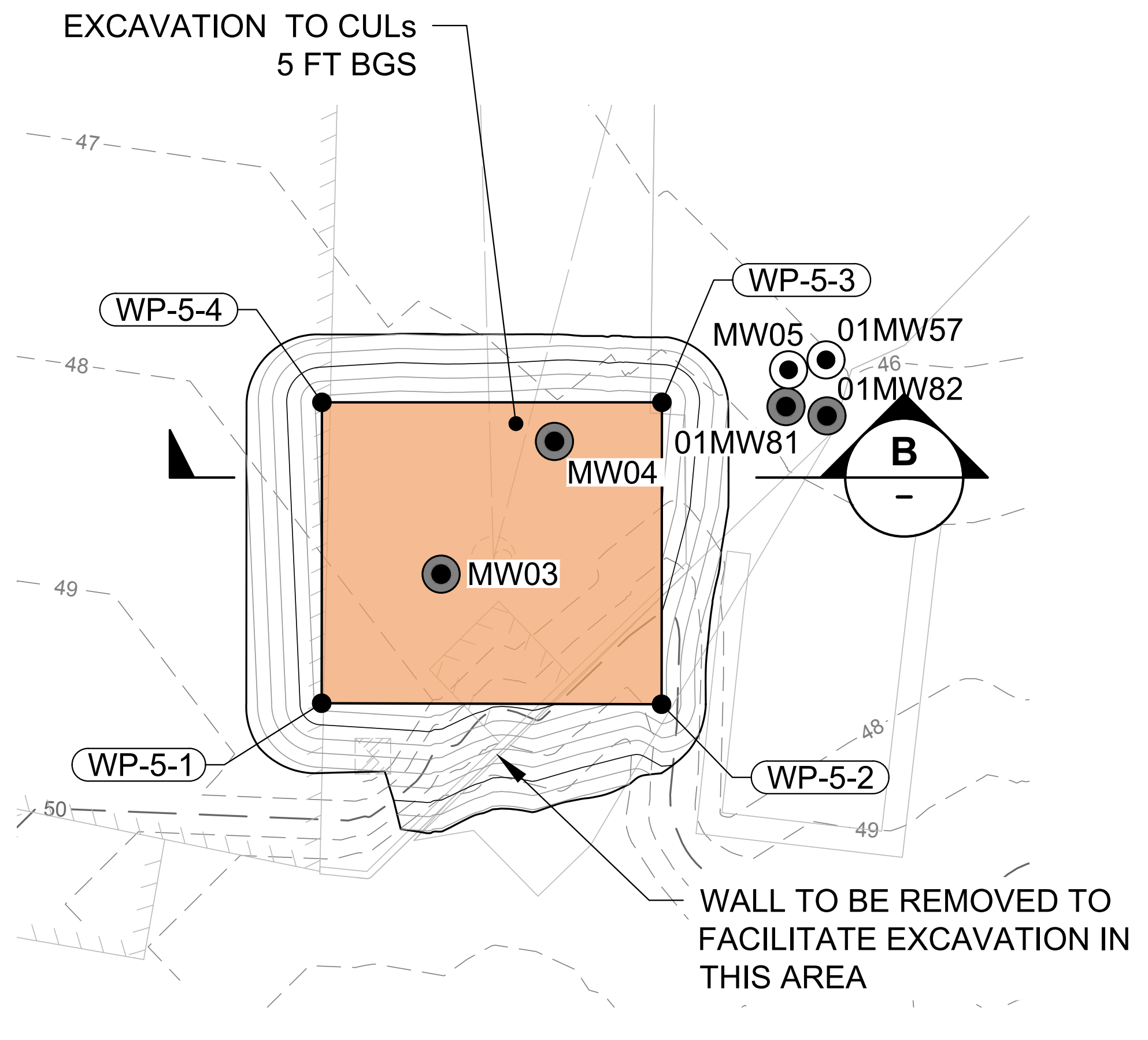


EXCAVATION TO RELs
5 FT BGS

DETAILED PLAN VIEW

CAA-3 EXCAVATION AREA

0 20 40
SCALE IN FEET



EXCAVATION TO CULs
5 FT BGS

WALL TO BE REMOVED TO
FACILITATE EXCAVATION IN
THIS AREA

DETAILED PLAN VIEW

CAA-5 EXCAVATION AREA

0 20 40
SCALE IN FEET

CAA-3

WORKING POINTS		
POINT ID	NORTHING	EASTING
WP-3-1	245420.23	1256000.75
WP-3-2	245495.70	1256084.65
WP-3-3	245528.03	1256058.78
WP-3-4	245477.52	1256000.75

CAA-5

WORKING POINTS		
POINT ID	NORTHING	EASTING
WP-5-1	245514.61	1255794.03
WP-5-2	245514.51	1255829.99
WP-5-3	245546.44	1255830.03
WP-5-4	245546.44	1255794.06

N

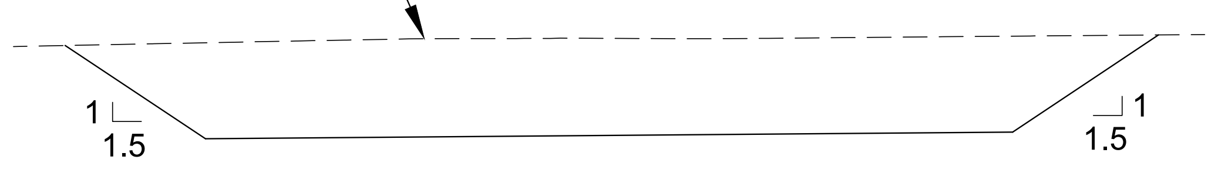
LEGEND

🟧	EXCAVATION TO CLEANUP LEVEL (CUL)
🟩	EXCAVATION TO REMEDIATION LEVEL (REL)
⊙	MONITORING WELL TO BE PROTECTED
◉	MONITORING WELL DECOMMISSIONED IN MARCH 2021
— — —	PARCEL BOUNDARY FOR TOC SEATTLE TERMINAL 1, LLC PROPERTIES

NOTES

1. EXCAVATED AREAS WILL BE BACKFILLED AND COMPACTED WITH CLEAN IMPORT MATERIAL TO EXISTING GRADE +/- 1 FOOT. FINAL SURFACES WILL BE STABILIZED TO PREVENT EROSION.

EXISTING GRADE

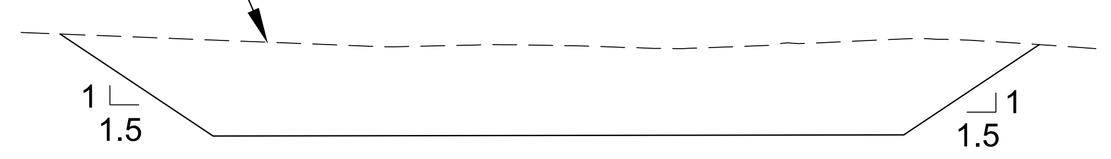


A
–
SECTION

SCALE: 1"=10'

0 10 20
SCALE IN FEET

EXISTING GRADE



B
–
SECTION

SCALE: 1"=10'

0 10 20
SCALE IN FEET

NOTES

1. FINAL SOIL EXCAVATION DEPTHS WILL VARY BASED ON FIELD CONDITIONS, CROSS SECTIONS SHOW ANTICIPATED DEPTH AND VARIABILITY (TYP).

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Rev	Date	Description	By

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GRANT HAINSWORTH
33192
6/28/2021

Scale As Noted

SCALE WARNING
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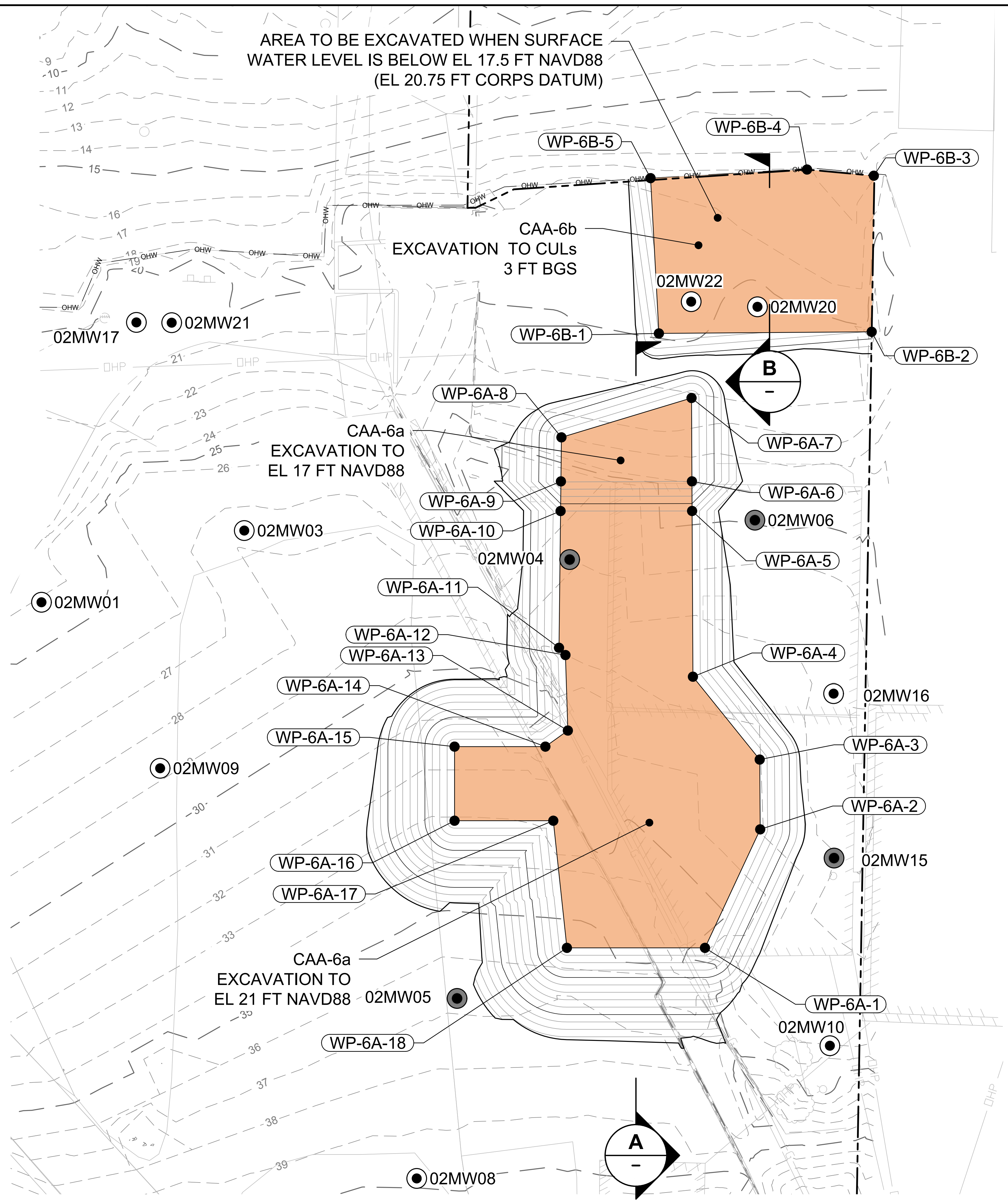
Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

**Time Oil Bulk Terminal
Remediation Design
Seattle, Washington**

CAA-3 and CAA-5 Excavation Area Plan and Profile

Drawing No.
C-4

Sheet 18 of 26



DETAILED PLAN VIEW

CAA-6 AND CAA-7 EXCAVATION AREAS

0 20 40
SCALE IN FEET

CAA-6a

WORKING POINTS		
POINT ID	NORTHING	EASTING
WP-6A-1	245717.33	1256119.57
WP-6A-2	245741.32	1256130.76
WP-6A-3	245755.46	1256130.66
WP-6A-4	245772.23	1256117.13
WP-6A-5	245805.78	1256116.97
WP-6A-6	245811.78	1256116.94
WP-6A-7	245828.66	1256116.85
WP-6A-8	245820.69	1256090.50
WP-6A-9	245811.77	1256090.40
WP-6A-10	245805.77	1256090.33
WP-6A-11	245778.08	1256090.01
WP-6A-12	245776.62	1256091.31
WP-6A-13	245761.33	1256091.80
WP-6A-14	245758.08	1256087.25
WP-6A-15	245758.07	1256068.85
WP-6A-16	245743.07	1256068.85
WP-6A-17	245743.07	1256088.85
WP-6A-18	245717.33	1256091.61

CAA-6b

WORKING POINTS		
POINT ID	NORTHING	EASTING
WP-6B-1	245841.72	1256110.24
WP-6B-2	245842.06	1256153.34
WP-6B-3	245873.66	1256153.78
WP-6B-4	245874.91	1256140.25
WP-6B-5	245873.16	1256108.55

LEGEND

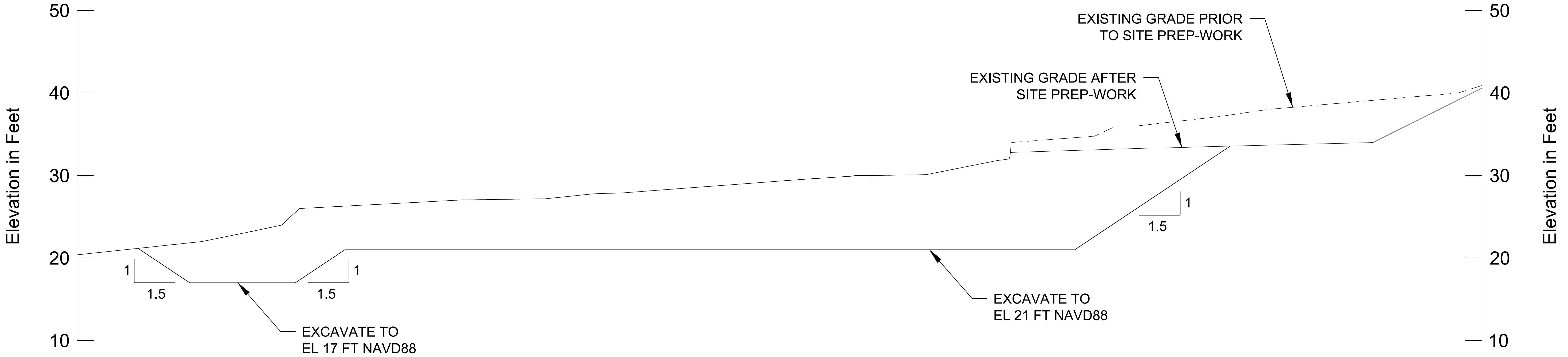
🟧	EXCAVATION TO CLEANUP LEVEL (CUL)
⦿	MONITORING WELL TO BE PROTECTED
●	MONITORING WELL DECOMMISSIONED IN MARCH 2021
— OHW —	ORDINARY HIGH WATER
— - - —	PARCEL BOUNDARY FOR TOC SEATTLE TERMINAL 1, LLC PROPERTIES

NOTES

1. EXCAVATED AREAS WILL BE BACKFILLED AND COMPACTED WITH CLEAN IMPORT MATERIAL TO EXISTING GRADE +/- 1 FOOT. FINAL SURFACES WILL BE STABILIZED TO PREVENT EROSION.

SITE RESTORATION

1. ALL EXPOSED EARTH SURFACES SHALL BE LANDSCAPED WITH SUITABLE VEGETATION TO PREVENT EROSION FOR THE PERMANENT CONDITION.

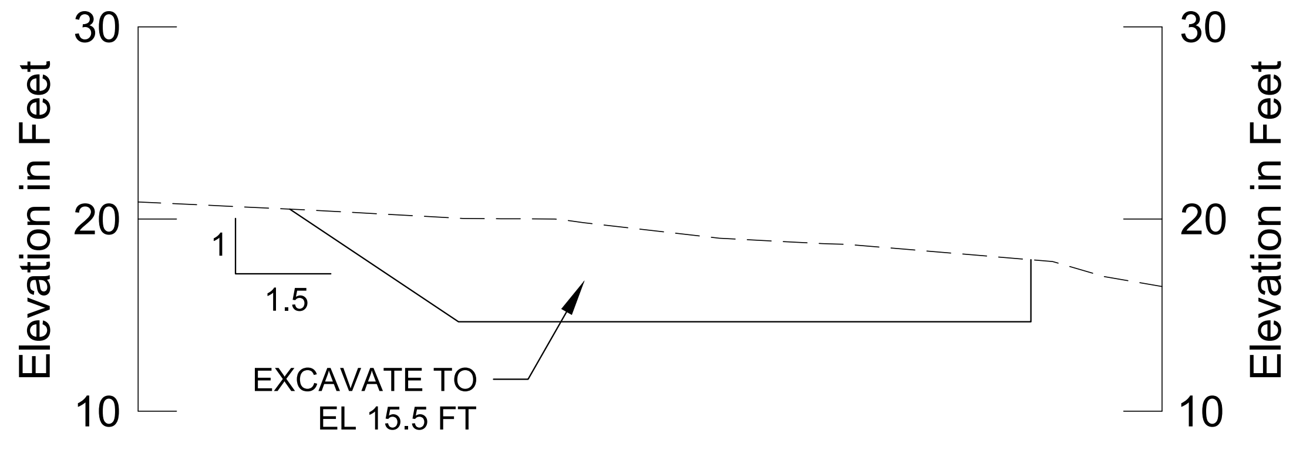


A SECTION

0 10 20
SCALE IN FEET

NOTES

1. FINAL SOIL EXCAVATION DEPTHS WILL VARY BASED ON FIELD CONDITIONS, CROSS SECTIONS SHOW ANTICIPATED DEPTH AND VARIABILITY (TYP).



B SECTION

0 10 20
SCALE IN FEET

Rev	Date	Description	By

Client

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GRANT HAINSWORTH
33192
6/28/2021

Scale As Noted

SCALE WARNING
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Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

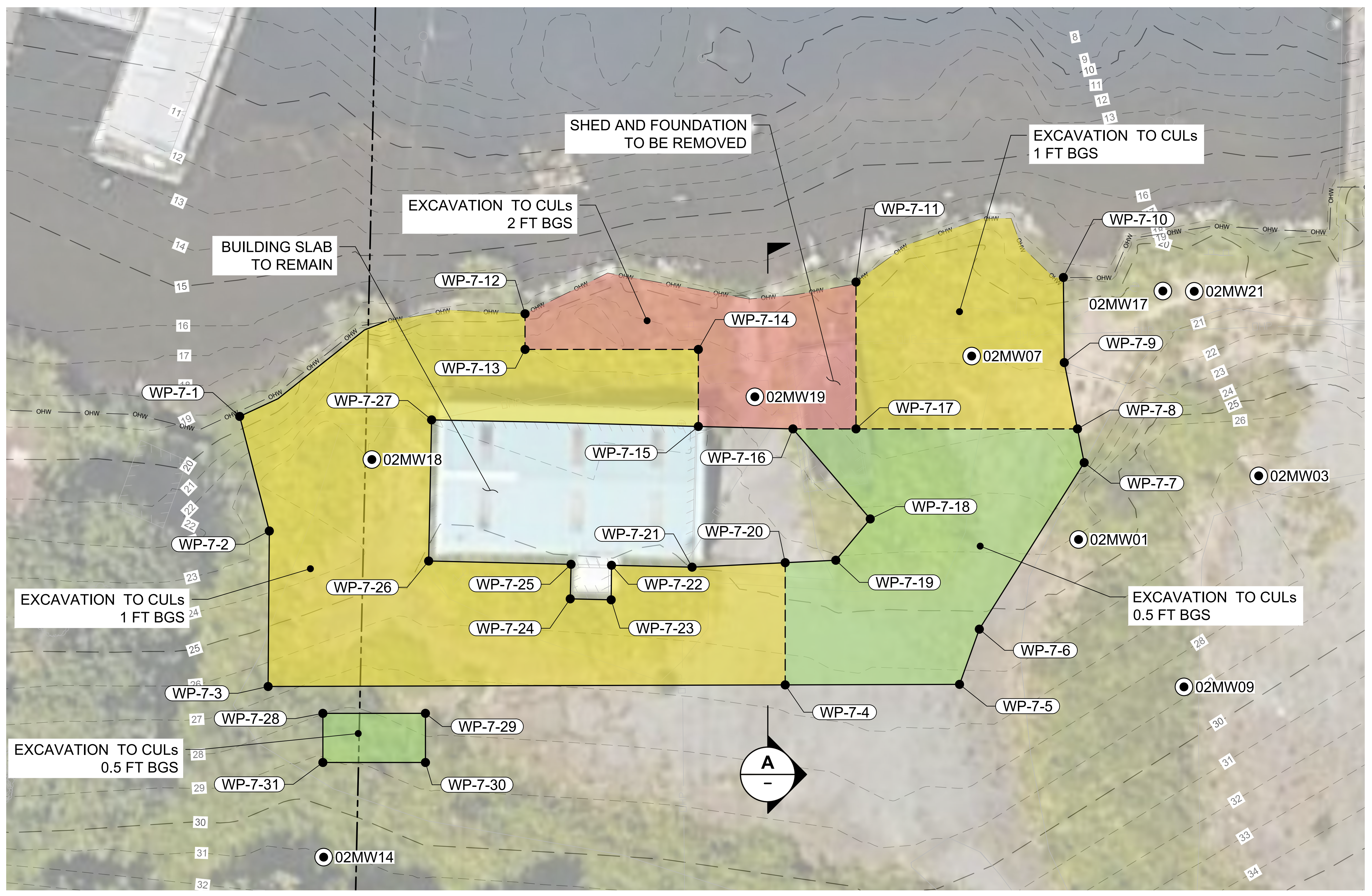
Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

CAA-6 Excavation Areas
Plan and Profile

Drawing No.
C-5

Sheet 19 of 26

File: E:_Business\Crete\20001.01\2021.05.28\Time Oil - working cad files\Time Oil Bulk Terminal_Drawings\C1-C3.1 THRU C3.4-C4.1-C4.2-C5.1.dwg Plot Date: May 26, 2021 Plotted by: Greene, Chris



DETAILED PLAN VIEW

CAA-6 AND CAA-7 EXCAVATION AREAS

0 20 40
SCALE IN FEET

CAA-7

WORKING POINTS		
POINT ID	NORTHING	EASTING
WP-7-1	245815.36	1255793.92
WP-7-2	245789.24	1255800.67
WP-7-3	245753.78	1255800.40
WP-7-4	245754.15	1255918.30
WP-7-5	245754.27	1255958.06
WP-7-6	245766.85	1255962.56
WP-7-7	245804.83	1255986.47
WP-7-8	245812.52	1255984.94
WP-7-9	245827.64	1255981.93
WP-7-10	245847.05	1255981.73
WP-7-11	245846.00	1255934.44
WP-7-12	245838.77	1255858.98
WP-7-13	245830.64	1255858.98
WP-7-14	245830.64	1255898.50
WP-7-15	245813.08	1255898.50
WP-7-16	245812.52	1255920.07
WP-7-17	245812.52	1255934.44
WP-7-18	245791.99	1255937.69
WP-7-19	245782.57	1255929.84
WP-7-20	245782.02	1255918.30

LEGEND

▭ EXCAVATION TO CLEANUP LEVEL (CUL)
🟩 0.5-FOOT EXCAVATION
🟨 1-FOOT EXCAVATION
🟥 2-FOOT EXCAVATION

⊙ MONITORING WELL TO BE PROTECTED

● MONITORING WELL DECOMMISSIONED IN MARCH 2021

— OHW — ORDINARY HIGH WATER

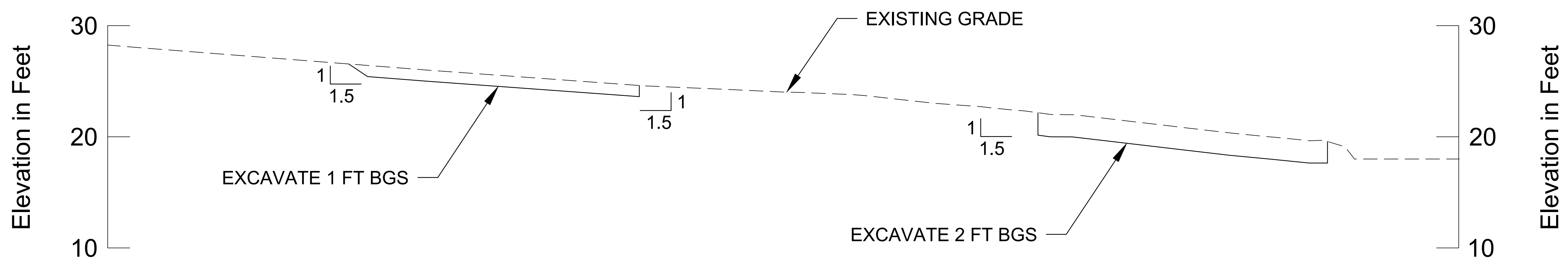
— - — PARCEL BOUNDARY FOR TOC SEATTLE TERMINAL 1, LLC PROPERTIES

NOTES

1. EXCAVATED AREAS WILL BE BACKFILLED AND COMPACTED WITH CLEAN IMPORT MATERIAL TO EXISTING GRADE +/- 1 FOOT. FINAL SURFACES WILL BE STABILIZED TO PREVENT EROSION.
2. LARGE PIECES OF CONCRETE & DEBRIS ARE INTERBEDDED WITHIN THE SHORELINE BANK. THE CONTRACTOR SHALL CONDUCT EXCAVATION ACTIVITIES IN THIS AREA IN A WAY THAT DOES NOT DISTURB THE SHORELINE BANK.

SITE RESTORATION

1. ALL EXPOSED EARTH SURFACES SHALL BE LANDSCAPED WITH SUITABLE VEGETATION TO PREVENT EROSION FOR THE PERMANENT CONDITION.



A – SECTION

0 10 20
SCALE IN FEET

NOTES

1. FINAL SOIL EXCAVATION DEPTHS WILL VARY BASED ON FIELD CONDITIONS, CROSS SECTIONS SHOW ANTICIPATED DEPTH AND VARIABILITY (TYP).

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GRANT HAINSWORTH
33192
6/28/2021

Scale As Noted

SCALE WARNING
Drawing is not to scale, if scale bar doesn't measure one inch

Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

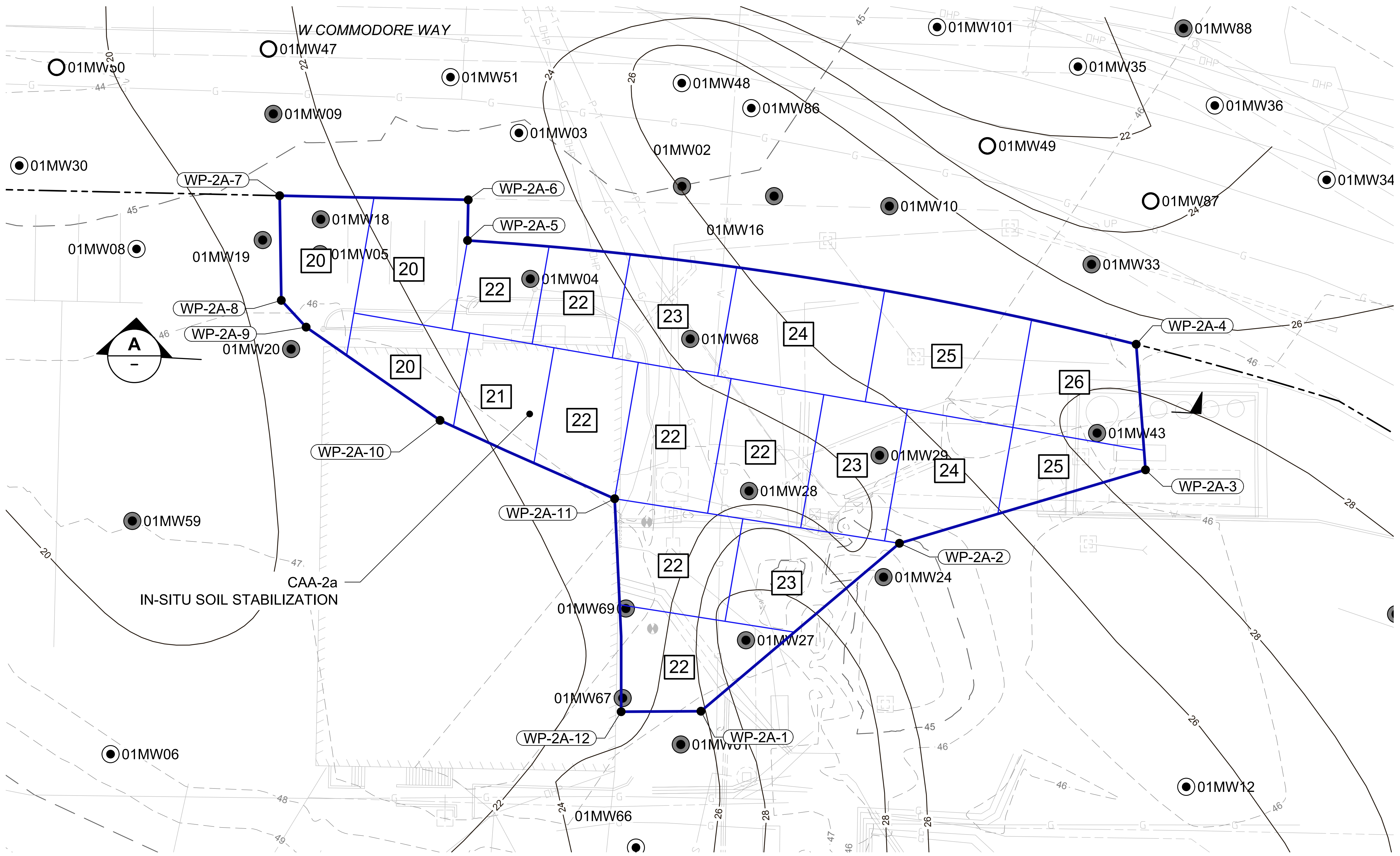
Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

CAA-7 Excavation Areas Plan and Profile

Drawing No.
C-6

Sheet 20 of 26

File: E:_Business\!Crete\!20001.01\2021.05.28\Time Oil - working cad files\Time Oil Bulk Terminal_Drawings\C1-C3.1 THRU C3.4-C4.1-C4.2-C5.1.dwg Plot Date: May 26, 2021 Plotted by: Greene, Chris



DETAILED PLAN VIEW

CAA-2A IN-SITU SOLIDIFICATION AREA

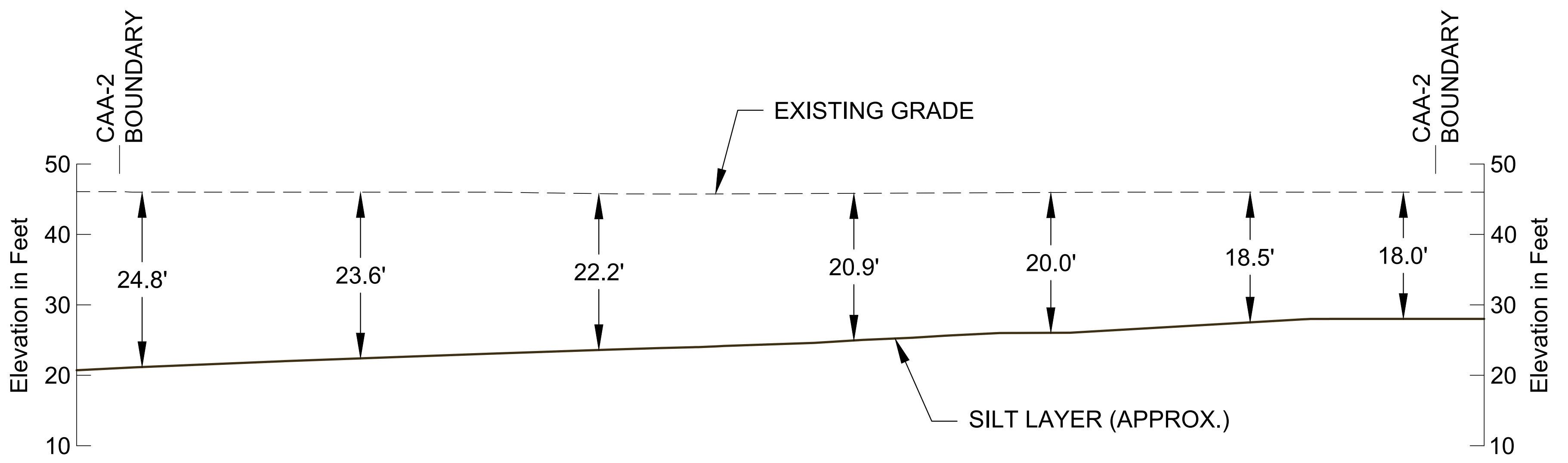
0 20 40
SCALE IN FEET

CAA-2a

WORKING POINTS		
POINT ID	NORTHING	EASTING
WP-2A-1	245463.24	1256203.26
WP-2A-2	245502.48	1256249.65
WP-2A-3	245519.64	1256307.14
WP-2A-4	245548.98	1256304.98
WP-2A-5	245573.24	1256148.72
WP-2A-6	245582.74	1256148.89
WP-2A-7	245583.71	1256104.82
WP-2A-8	245559.25	1256105.20
WP-2A-9	245552.99	1256111.00
WP-2A-10	245531.21	1256142.30
WP-2A-11	245512.90	1256183.10
WP-2A-12	245463.12	1256184.62

LEGEND

▭	IN-SITU STABILIZATION / SOLIDIFICATION
24	EXCAVATION MIXING GRID CELL WITH MIXING BOTTOM ELEVATION (IN FEET, NAVD88)
- - 20 - -	EXISTING SURFACE CONTOUR
— 20 —	TOP OF SILT CONTOUR
⊙	MONITORING WELL TO BE PROTECTED
●	MONITORING WELL DECOMMISSIONED IN MARCH 2021
○	MONITORING WELL TO BE DECOMMISSIONED DURING CLEANUP ACTION
- — - —	PARCEL BOUNDARY FOR TOC SEATTLE TERMINAL 1, LLC PROPERTIES



A SECTION

0 20 40
SCALE IN FEET

NOTES

1. ALL ISS TREATMENT AREAS SHALL BE COVERED WITH A WOVEN GEOTEXTILE FABRIC AND 6 INCHES OF CRUSHED ROCK OR BALLAST ROCK TO RESTORE THE AREA TO PRE-EXISTING CONDITIONS.
2. THE FINAL DEPTH OF THE IN-SITU SOIL STABILIZATION AREA MAY CHANGE BASED ON FIELD CONDITIONS.

N

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GRANT HAINSWORTH
33192
6/28/2021

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Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

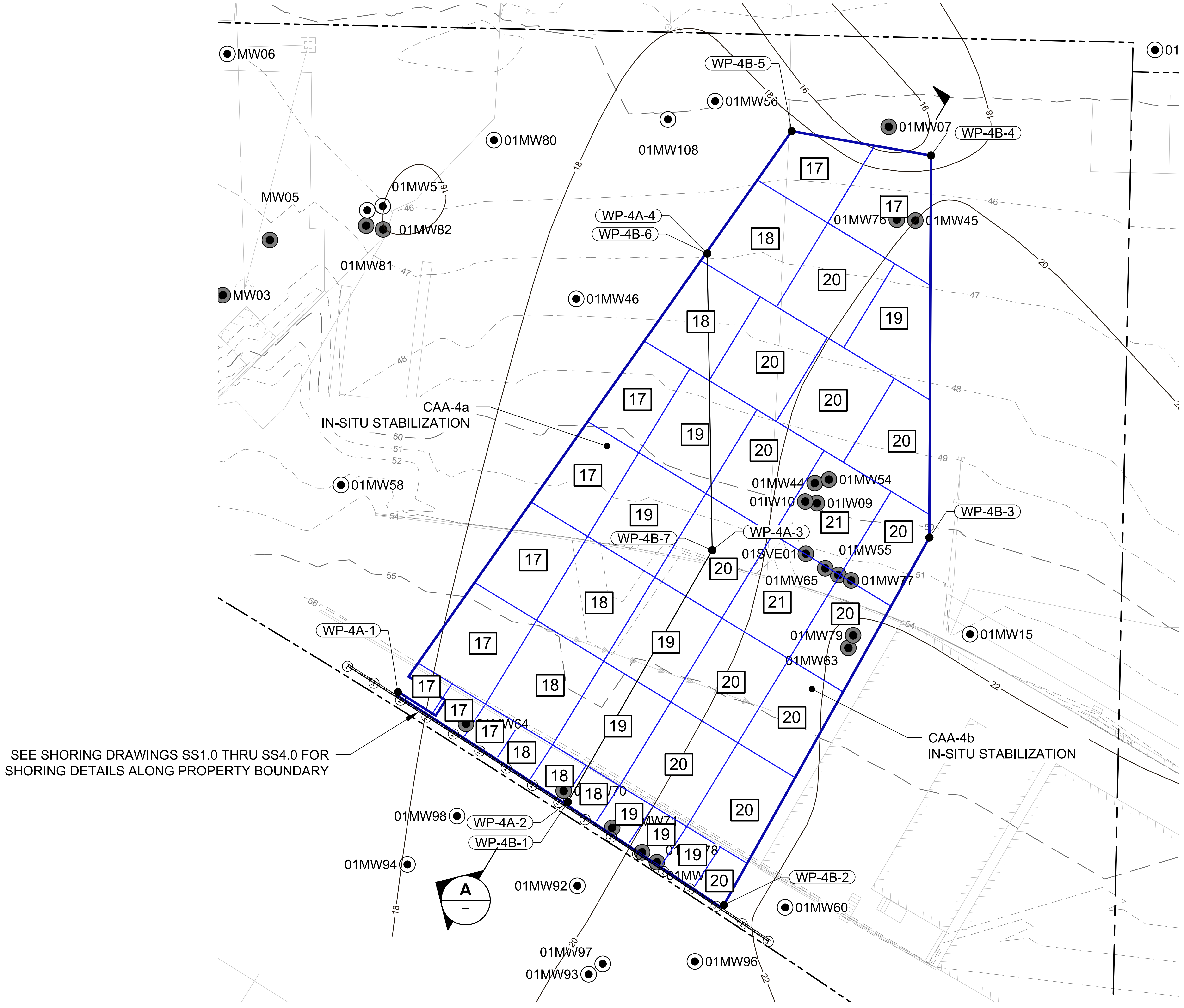
Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

CAA-2a Insitu Solidification Area

Drawing No.
C-7

Sheet 21 of 26

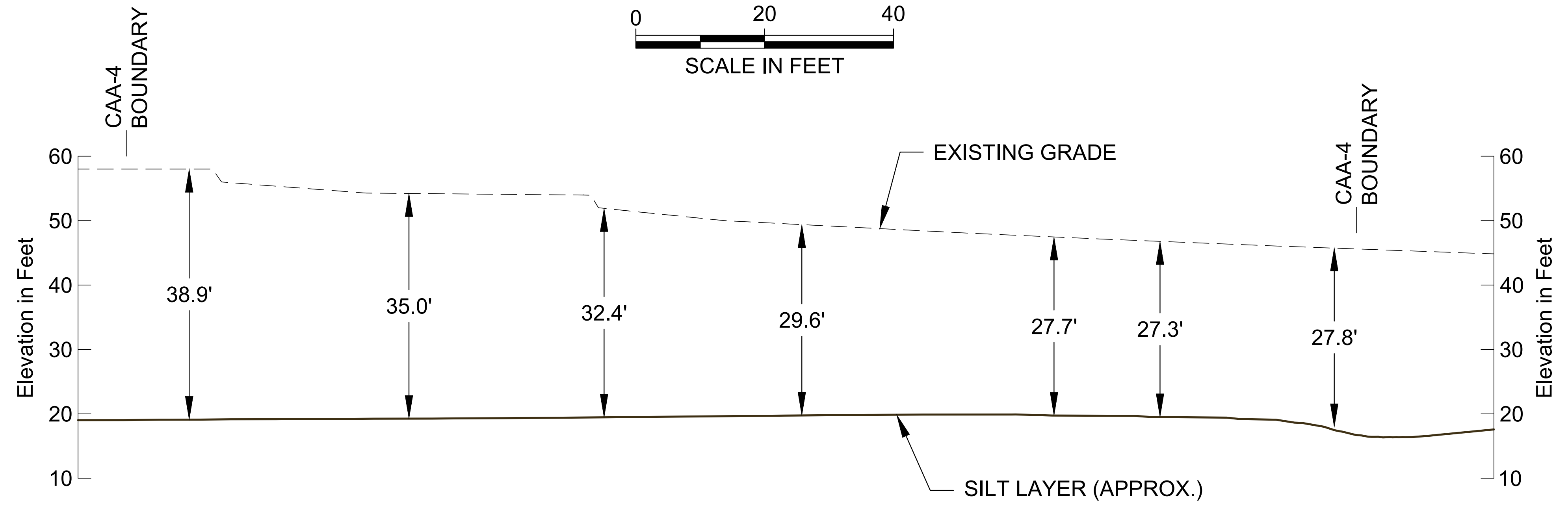
File: E:_Business\Crete\20001.01\2021.05.28\Time Oil - working cad files\Time Oil Bulk Terminal_Drawings\C1-C3.1 THRU C3.4-C4.1-C4.2-C5.1.dwg Plot Date: May 26, 2021 Plotted by: Greene, Chris



DETAILED PLAN VIEW

CAA-4A IN-SITU SOLIDIFICATION AREA

0 20 40
SCALE IN FEET



A SECTION

0 20 40
SCALE IN FEET

CAA-4a

WORKING POINTS		
POINT ID	NORTHING	EASTING
WP-4A-1	245427.11	1255851.25
WP-4A-2	245399.16	1255894.51
WP-4A-3	245463.29	1255931.25
WP-4A-4	245538.88	1255929.98

CAA-4b

WORKING POINTS		
POINT ID	NORTHING	EASTING
WP-4B-1	245399.16	1255894.51
WP-4B-2	245372.93	1255934.23
WP-4B-3	245466.55	1255986.55
WP-4B-4	245563.84	1255986.96
WP-4B-5	245570.05	1255951.48
WP-4B-6	245538.88	1255929.98
WP-4B-7	245463.29	1255931.25

LEGEND

▭	IN-SITU STABILIZATION / SOLIDIFICATION
24	EXCAVATION MIXING GRID CELL WITH MIXING BOTTOM ELEVATION (IN FEET, NAVD88)
- 20 -	EXISTING SURFACE CONTOUR
— 20 —	TOP OF SILT CONTOUR
⊙	MONITORING WELL TO BE PROTECTED
●	MONITORING WELL DECOMMISSIONED IN MARCH 2021
- - -	PARCEL BOUNDARY FOR TOC SEATTLE TERMINAL 1, LLC PROPERTIES

NOTES

1. ALL ISS TREATMENT AREAS SHALL BE COVERED WITH A WOVEN GEOTEXTILE FABRIC AND 6 INCHES OF CRUSHED ROCK OR BALLAST ROCK TO RESTORE THE AREA TO PRE-EXISTING CONDITIONS.
2. THE FINAL DEPTH OF THE IN-SITU SOIL STABILIZATION AREA MAY CHANGE BASED ON FIELD CONDITIONS.

N

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GRANT HAINSWORTH
33192
6/28/2021

Scale As Noted

SCALE WARNING
Drawing is not to scale, if scale bar doesn't measure one inch

Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

CAA-4a Insitu Solidification Area

Drawing No.
C-8

Sheet 22 of 26

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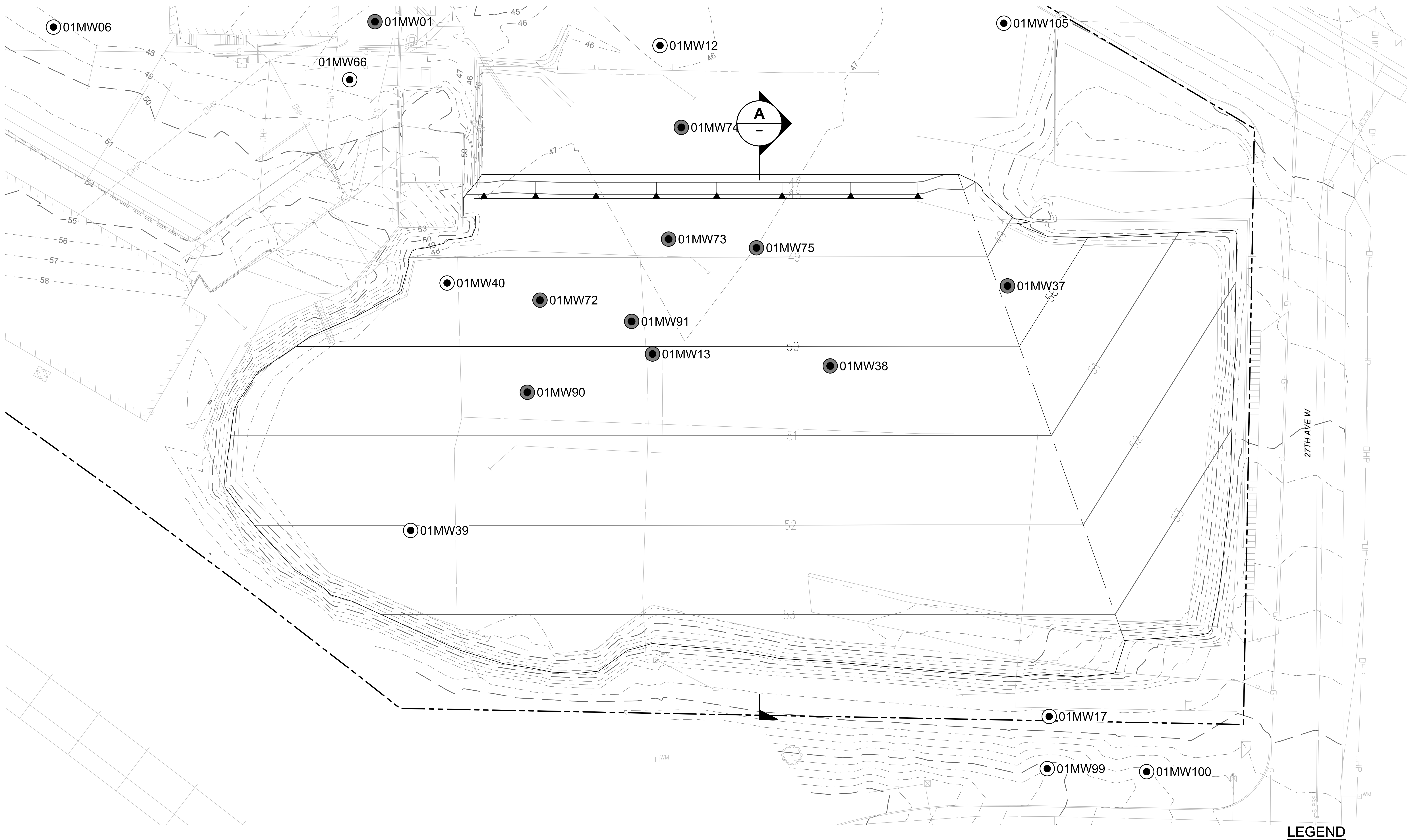


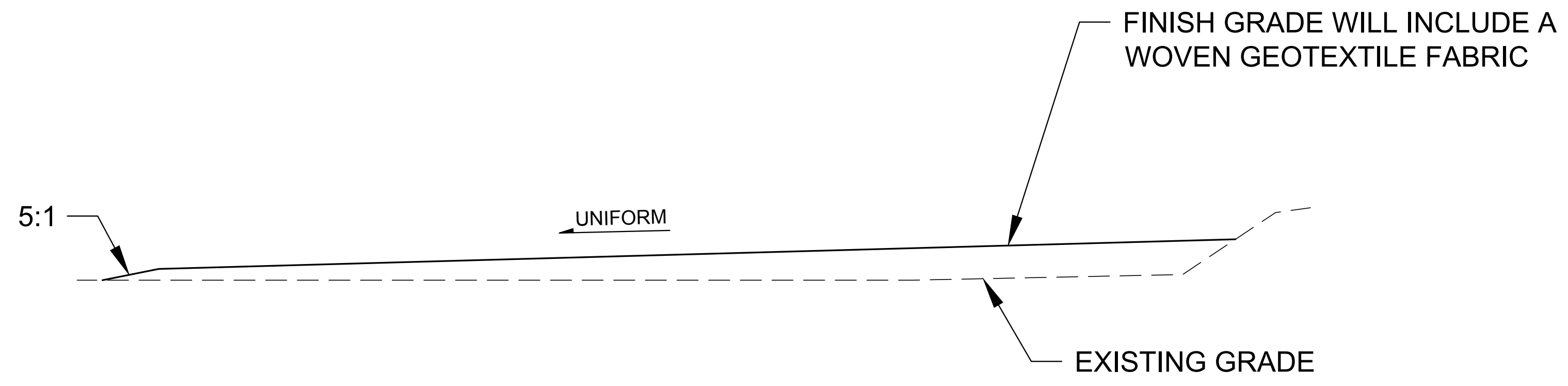
DETAILED PLAN VIEW

ISS SWELL MANAGEMENT AREA

0 30 60
SCALE IN FEET

LEGEND

50	PROPOSED FINISH GRADE CONTOUR
⦿	MONITORING WELL TO BE PROTECTED
●	MONITORING WELL DECOMMISSIONED IN MARCH 2021
— - —	PARCEL BOUNDARY FOR TOC SEATTLE TERMINAL 1, LLC PROPERTIES



A SECTION

SCALE: 1"=30'

0 30 60
SCALE IN FEET

NOTES

1. THE SURFACE IS SLOPED TO FACILITATE STORMWATER RUN OFF. THIS WILL BE SWELL MANAGEMENT SOIL WITH A GEOTEXTILE ANCHORED ON THE SURFACE TO STABILIZE THE AREA.
2. ISS SWELL IS SLOPED FOR DRAINAGE.

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Drafter C. Taylor
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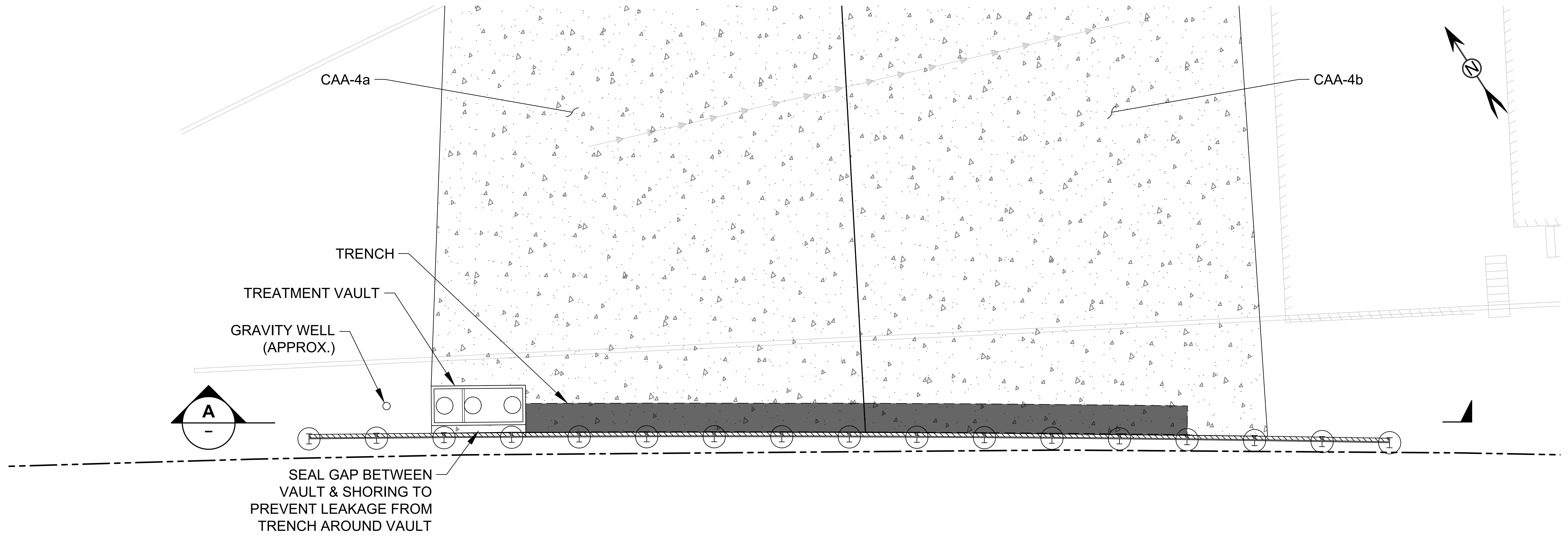
Reviewer X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

ISS Swell Management Area

Drawing No.
C-9

Sheet 23 of 26



DETAILED PLAN VIEW

INFILTRATION TRENCH

0 20 40
SCALE IN FEET

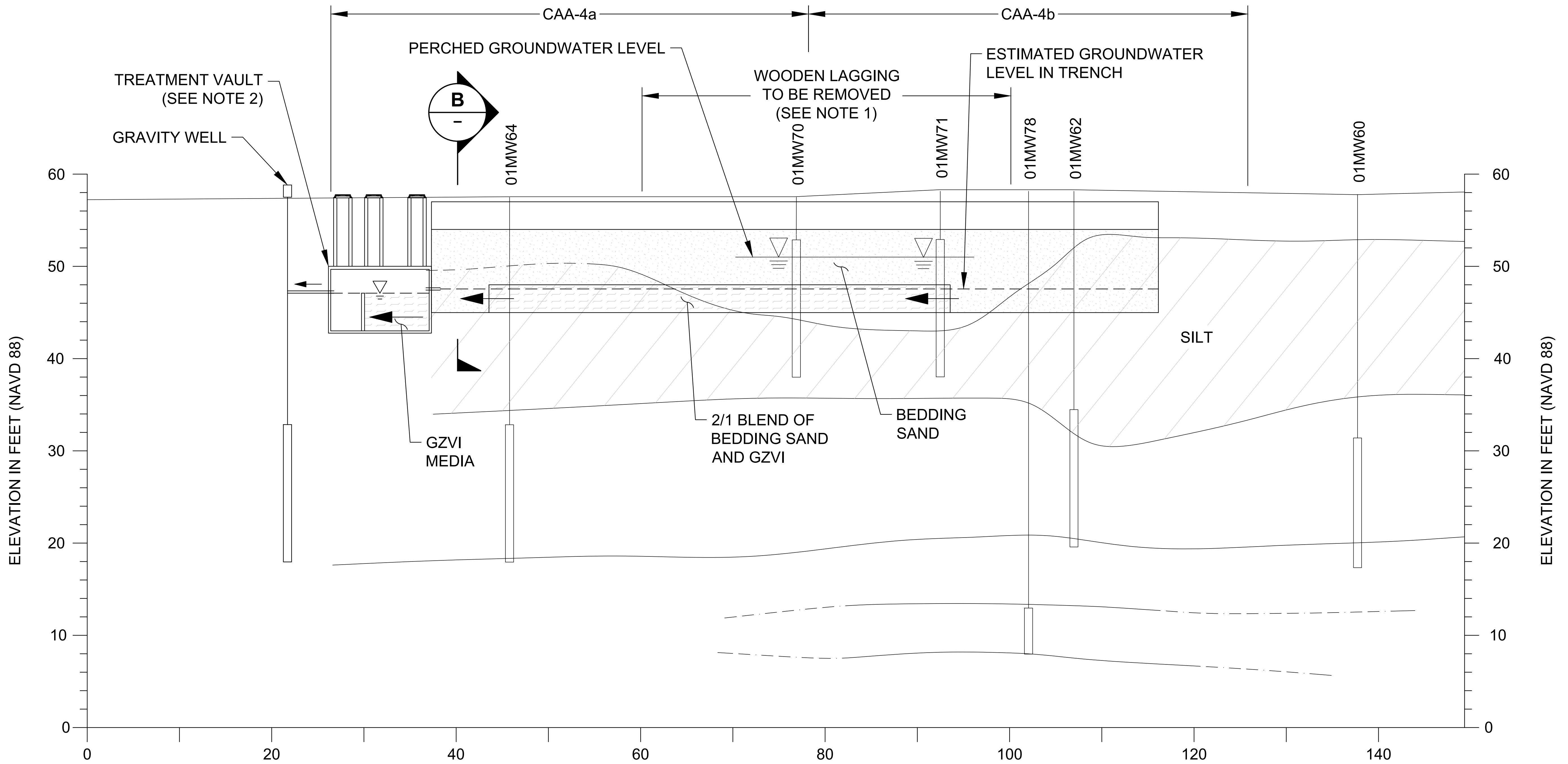
LEGEND

▨ IN-SITU STABILIZATION / SOLIDIFICATION

– – – – PARCEL BOUNDARY FOR TOC SEATTLE TERMINAL 1, LLC PROPERTIES

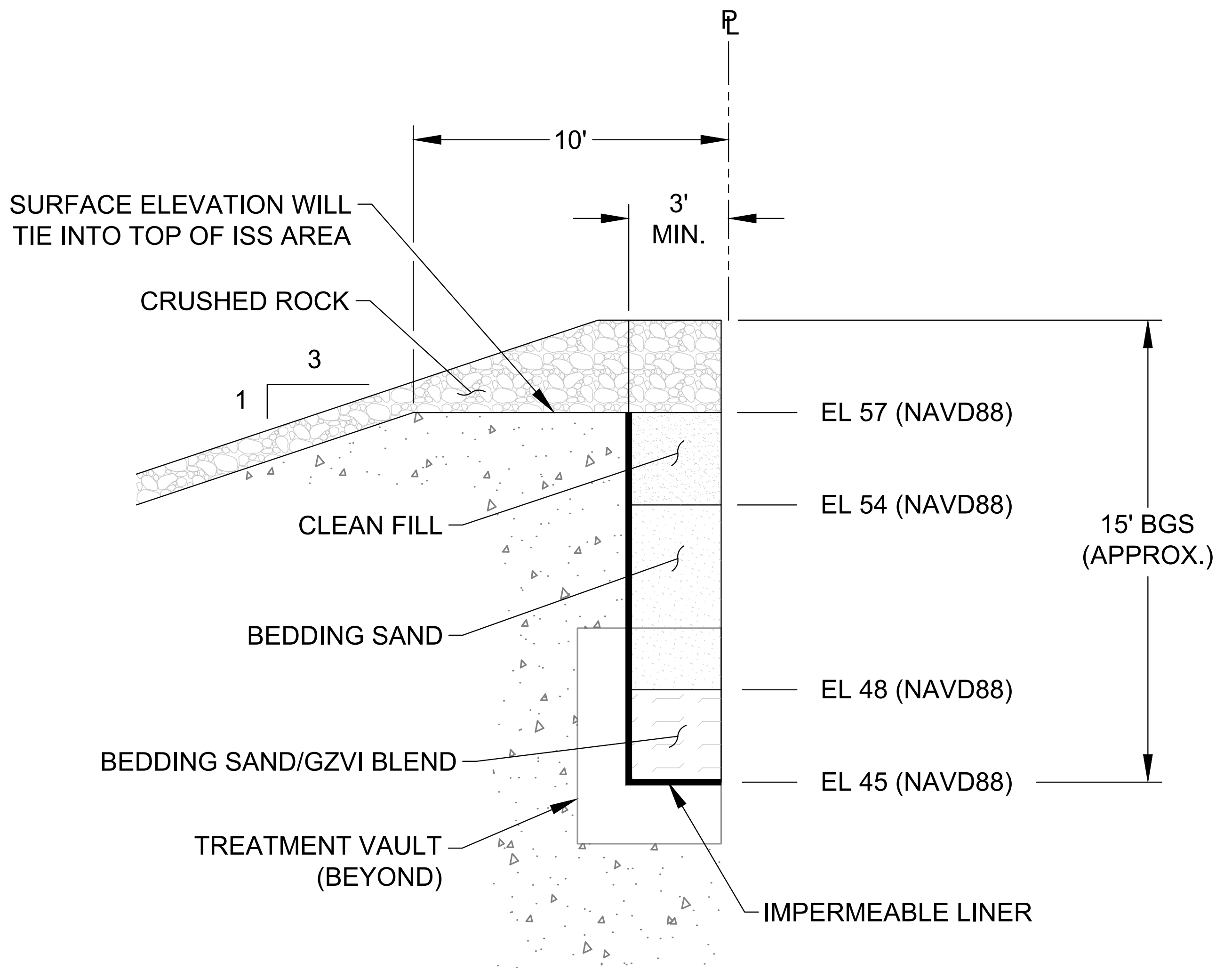
NOTES

1. SHORING WILL BE INSTALLED ALONG THIS PROPERTY BOUNDARY TO COMPLETE THE ISS WORK PRIOR TO THE INSTALLATION OF THE TRENCH AND TREATMENT VAULT. DURING TRENCH INSTALLATION A PORTION OF THE WOODEN LAGGING BETWEEN THE SOLIDER PILES WILL BE REMOVED FROM ELEVATION 45 TO 54. THE REMAINING LAGGING WILL HAVE GAPS BETWEEN ALL BOARDS THAT ALLOW GROUNDWATER FLOW.
2. TREATMENT VAULT SHALL BE OLDCASTLE PRECAST MODEL 5106 GA 1,500 GALLON VAULT WITH ACCESS MANHOLES, OR SIMILAR. THE SEPARATOR PORTION OF THE VAULT WILL BE FILLED WITH ABOUT 1,025 GALLONS OF GZVI. THE GZVI WILL BE AN 8 TO 50 MESH PRODUCT THAT IS SUITABLE FOR THIS APPLICATION AND WILL BE CERTIFIED CLEAN BY THE MANUFACTURER.
3. THE GRAVITY WELL SHALL BE A 6-INCH DIAMETER PVC WELL, SCREENED FROM 20 TO 35 FEET NAVD88, FLUSH MOUNT, 0.01 INCH SLOT SIZE WELL SCREEN & A 10/20 SAND FILTER PACK. WELL SHALL BE CONSTRUCTED PER THE MINIMUM REQUIREMENTS OF WAC 173-160. PIPING SHALL CONNECT TO THE EFFLUENT FLOW OF THE VAULT AT A 1% SLOPE. THE WELL WILL BE FIELD PACED BUT SHALL BE A MINIMUM OF 5 FEET AWAY FROM THE VAULT.



A TRENCH PROFILE

0 10 20
SCALE IN FEET
HORIZONTAL = VERTICAL



B TRENCH SECTION

0 5 10
SCALE IN FEET

File: E:_Business!\Crete\20001.01\2021.05.28\Time Oil - working cad files\Time Oil Bulk Terminal_Drawings\G11-G12 AND C1-C11.dwg
Plot Date: May 26, 2021 Plotted by: Greene, Chris

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GRANT HAINSWORTH
33192
6/28/2021

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Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

Interceptor Trench Design

Drawing No.
C-10

Sheet 24 of 26

LEGEND

- ☐ EXCAVATION / TREATMENT AREA
- ▨ BUILDING FOUNDATIONS
- ■ ASPHALT PAVING
- ▨ CONCRETE PAVING
- ▨ GRAVEL SURFACES
- – - – PARCEL BOUNDARY FOR TOC SEATTLE TERMINAL 1, LLC PROPERTIES

STABILIZED INTERIM SURFACES

- ▨ ISS AREAS - WOVEN INDICATOR GEOTEXTILE FABRIC WITH 6 INCHES CRUSHED ROCK
- ▨ ISS SWELL AREA - WOVEN INDICATOR GEOTEXTILE FABRIC (GRAVEL OR ROCK WILL BE ADDED TO SUPPORT INTERIM SITE ACTIVITIES, IF NEEDED)
- ▨ EXCAVATION AREAS - 6 INCHES OF CRUSHED ROCK TO THE SURROUNDING GRADE
- ▨ ROW - RESTORED TO PRE-CONSTRUCTION CONDITIONS

NOTES

1. EXISTING ASPHALT, CONCRETE, AND GRAVEL AREAS WILL REMAIN DURING THE INTERIM PERIOD BETWEEN SITE CLEANUP AND DEVELOPMENT.
2. BUILDING FOUNDATIONS THAT ARE OUTSIDE OF THE CLEANUP ACTION AREAS WILL REMAIN IN PLACE.
3. PERIMETER FENCING ALONG ROADWAYS WILL BE MAINTAINED FOLLOWING THE CLEANUP ACTION.

File: E:_Business\!Crete\!20001.01\2021.05.28\Time Oil - working cad files\Time Oil Bulk Terminal_Drawings\C1-C3.1 THRU C3.4-C4.1-C4.2-C5.1.dwg Plot Date: May 26, 2021 Plotted by: Greene, Chris

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6/28/2021

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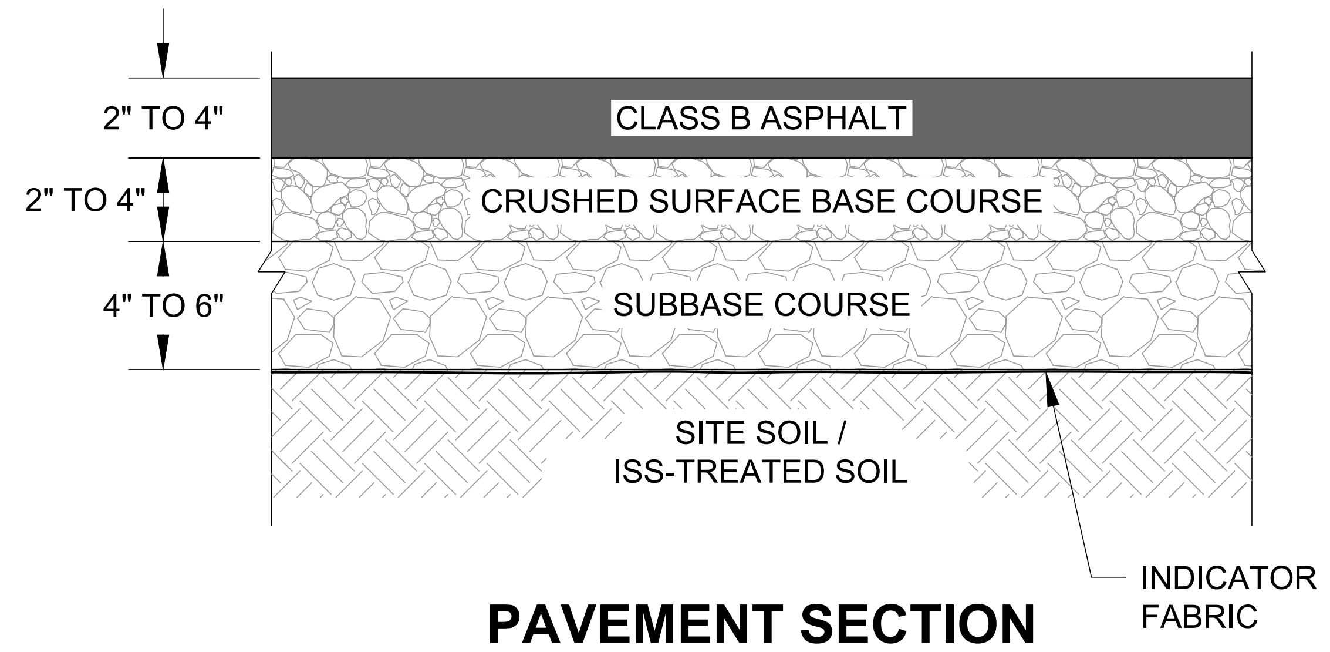
Drafter C. Taylor
Checker X
Reviewer X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

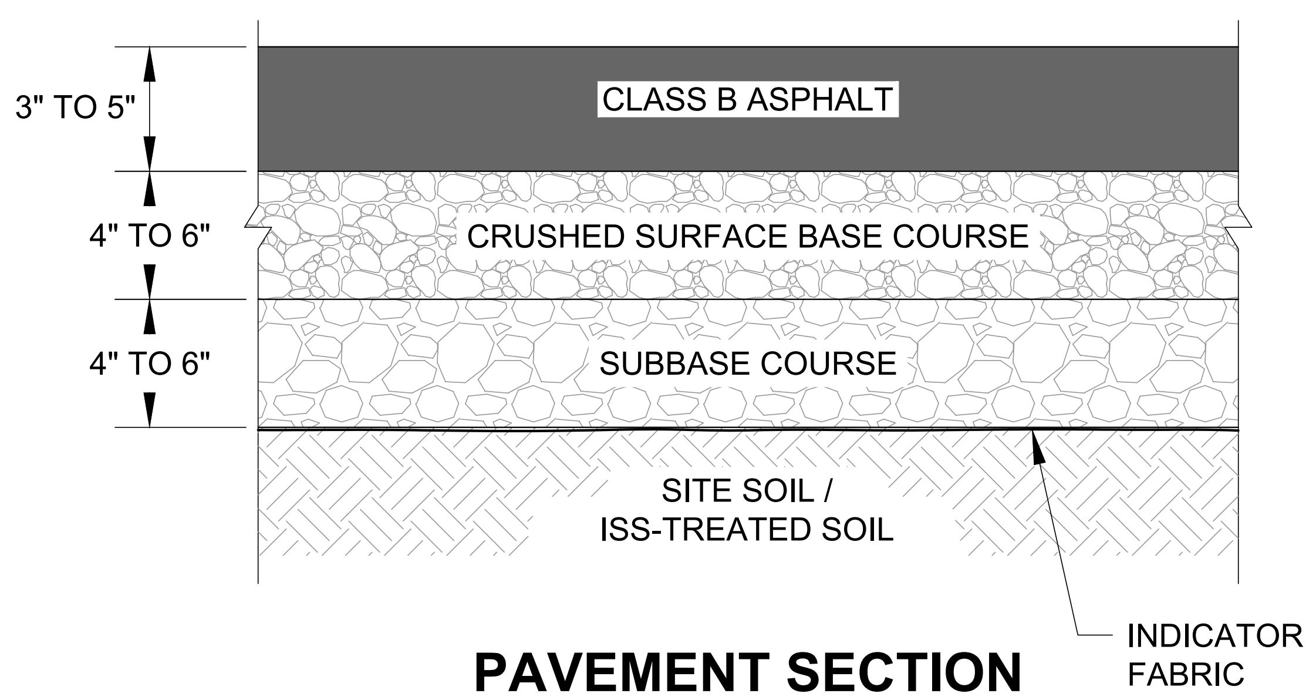
Upland AOC Cleanup Action Areas
Interim Stabilization

Drawing No.
C-11

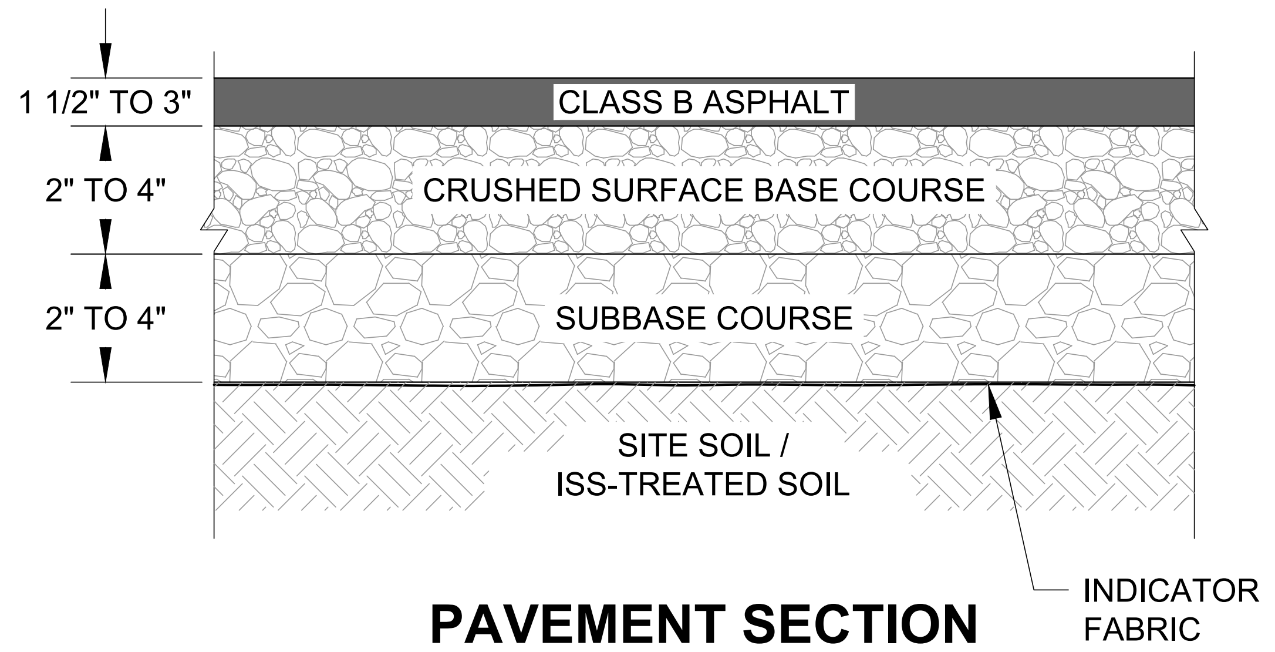
Sheet 25 of 26



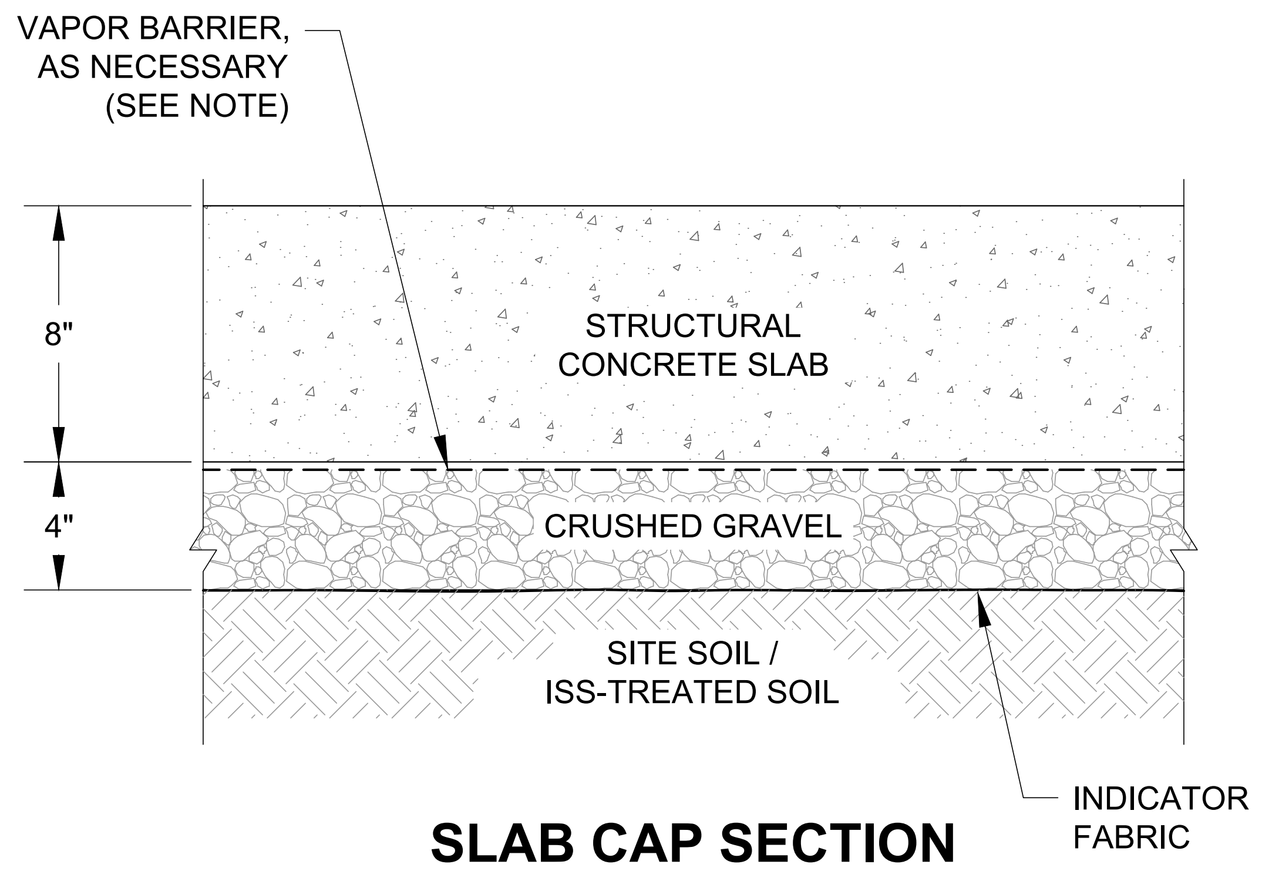
PAVEMENT SECTION
LIGHT DUTY



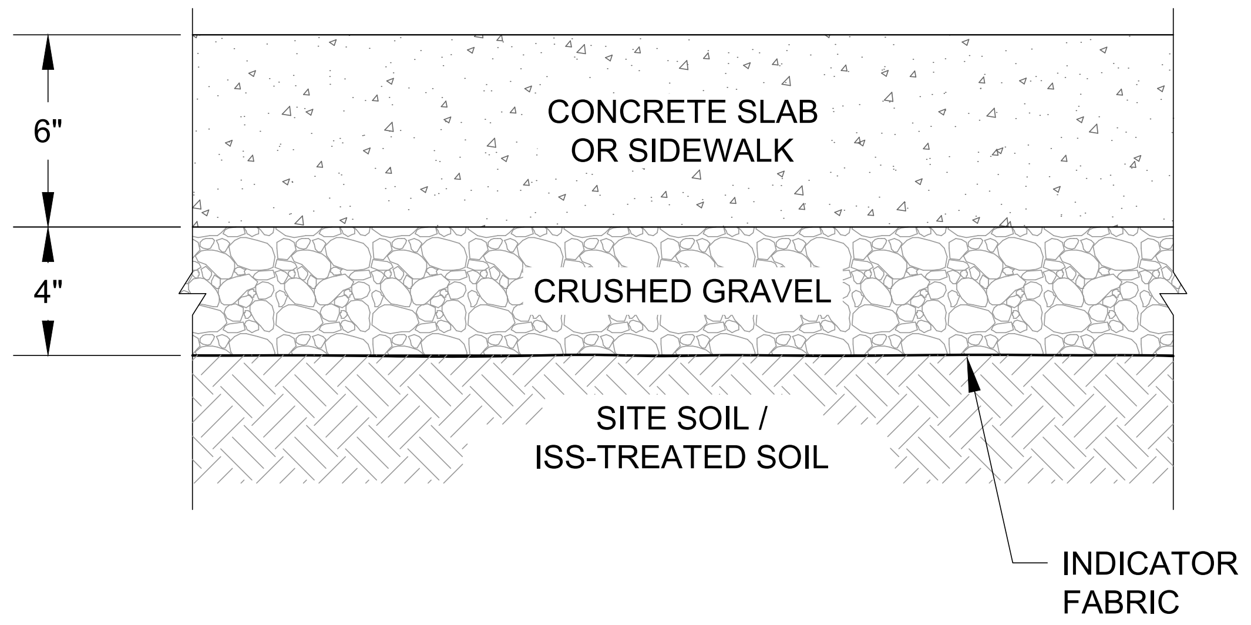
PAVEMENT SECTION
HEAVY DUTY



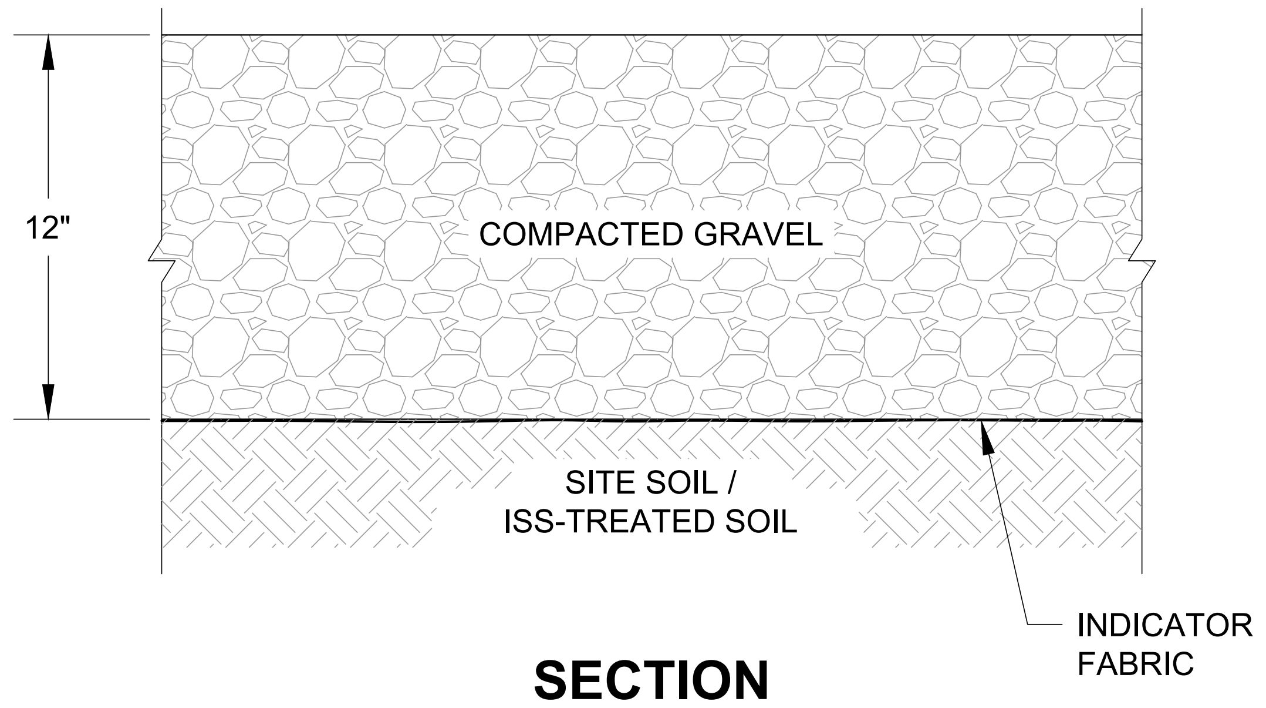
PAVEMENT SECTION
PEDESTRIAN ACCESS



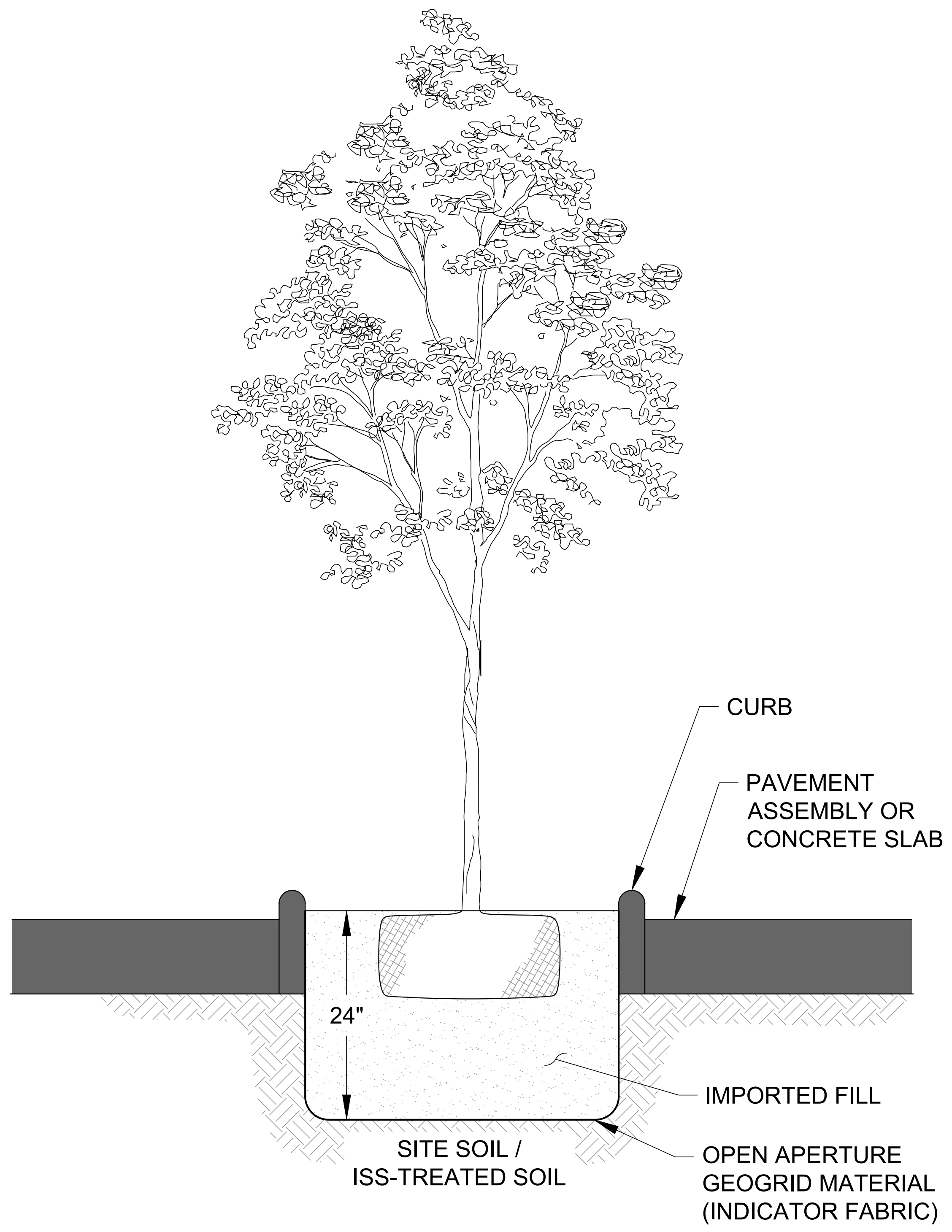
SLAB CAP SECTION
STRUCTURAL CONCRETE



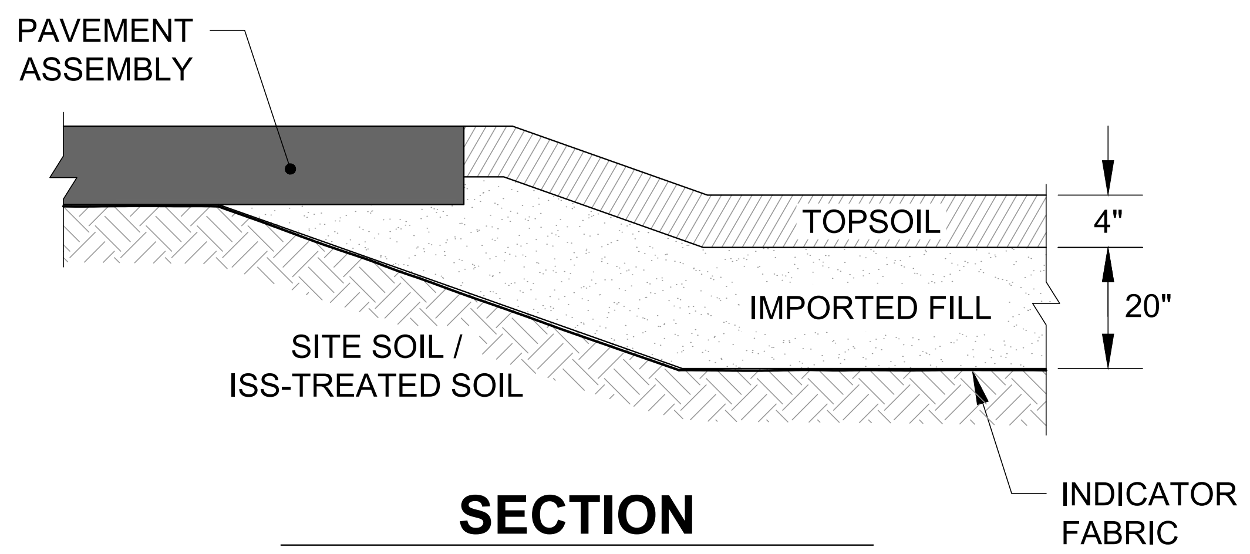
SLAB CAP SECTION
STRUCTURAL CONCRETE AND
CONCRETE SIDEWALK



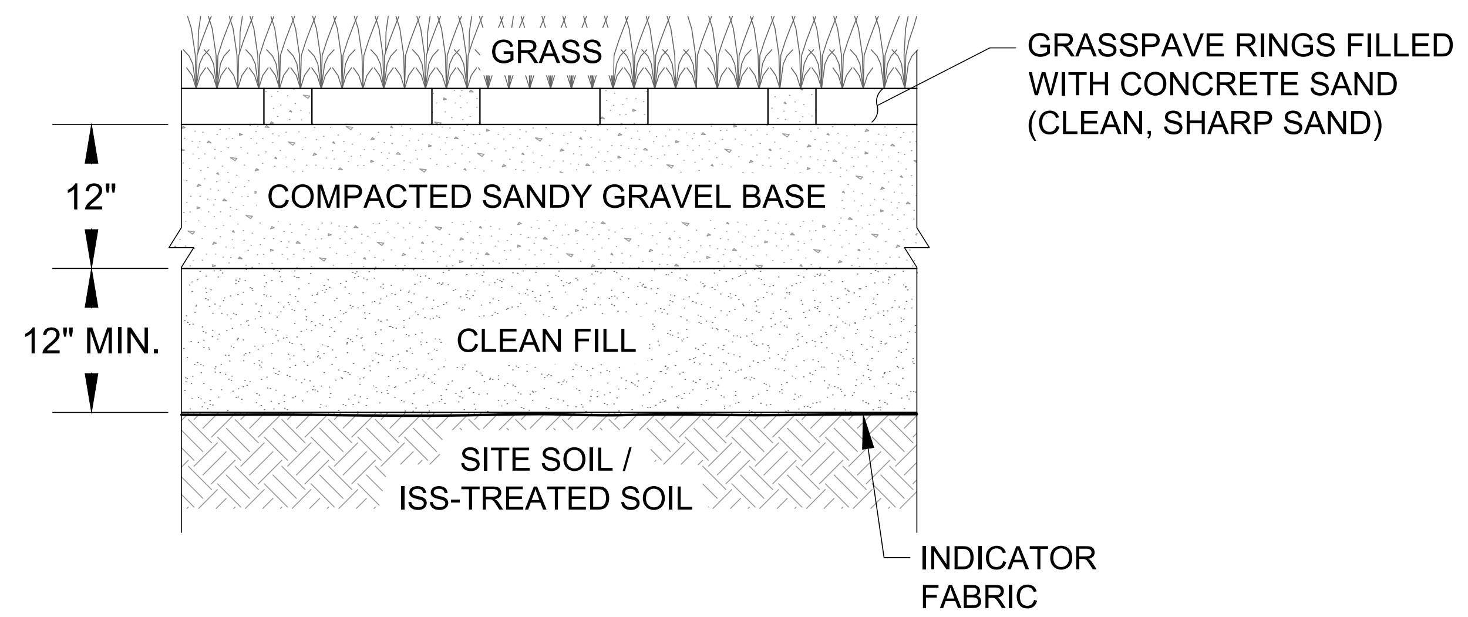
SECTION
GRAVEL CAP



PLANTER SECTION
TREE



SECTION
LANDSCAPE



SECTION
GRASSPAVE

NOTES

1. ALL ASPHALT, CONCRETE, BASE COURSE, AND GRAVEL THICKNESSES MAY BE MODIFIED BASED ON THE FINAL REDEVELOPMENT PLANS. THE THICKNESSES PROVIDED ARE TYPICAL FOR THESE TYPES OF APPLICATIONS.
2. THE NEED FOR VAPOR INTRUSION PROTECTIVE MEASURES WILL BE EVALUATED DURING THE DEVELOPMENT DESIGN.

NOT TO SCALE

Rev	Date	Description	By

Client

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GRANT HAINSWORTH
33192
6/28/2021

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Designer M. Byers
Drafter C. Taylor
Checker X
Reviewer X

Time Oil Bulk Terminal
Remediation Design
Seattle, Washington

Typical Final Cap Details

Drawing No.
C-12

Sheet 26 of 26

ABBREVIATIONS

&	AND
@	AT
'	FEET (FOOT)
"	INCH (INCHES)
#	POUND(S), NUMBER
=	EQUAL(S)
A.B.	ANCHOR BOLT
ABV.	ABOVE
ADD.	ADDITIONAL
ADJ.	ADJACENT
ALUM.	ALUMINUM
ALT.	ALTERNATE
APPROX.	APPROXIMATE(LY)
ARCH.	ARCHITECT(URAL)
ASSY.	ASSEMBLY
B. (BTM.)	BOTTOM
BEL.	BELOW
BEN	BOUNDARY EDGE NAILING
B.F.	BRACED FRAME
BLDG.	BUILDING
BLK.(G.)	BLOCK (ING)
BLW.	BELOW
BM.	BEAM
BMU	BRICK MASONRY UNIT
BN	BOUNDARY NAILING
BNDRY.	BOUNDARY
B.O.	BOTTOM OF
B.O.E.	BOTTOM OF EXCAVATION
B.O.F.	BOTTOM OF FOOTING
BRDG.	BRIDGE, BRIDGING
BRG.	BEARING
BTWN.	BETWEEN
C	CAMBER
CAMB.	CAMBER(ED)
CANT.	CANTILEVER(ED)
CF	CUBIC FOOT
C.I.P.	CAST IN PLACE
C.J.	CONSTRUCTION JOINT
CL	CENTER LINE
CLG.	CEILING
CLR.	CLEAR
COL.	COLUMN
CONC.	CONCRETE
CONN.	CONNECTION
CONST.	CONSTRUCTION
CONT.	CONTINUOUS
CTSK.	COUNTERSINK
CTR.	CENTER(ED)
CY	CUBIC YARD
CMU	CONCRETE MASONRY UNIT
d	PENNY (NAILS)
DB	DROPPED BEAM
DBA	DEFORMED BAR ANCHORS
DBL.	DOUBLE
DCW	DEMAND CRITICAL WELD
DEPT.	DEPARTMENT
DET.	DETAIL
DF	DOUGLAS FIR
DIA. / Ø	DIAMETER
DIAG.	DIAGONAL
DIAPH.	DIAPHRAGM
DIM.	DIMENSION
DN.	DOWN
D.O.	DITTO (REPEAT)
DP.	DEEP
D.S.	DRAG STRUT
DWG.	DRAWING(S)
DWL.	DOWELS(S)
(E)	EXISTING
EA.	EACH
E.E.	EACH END
E.F.	EACH FACE
E.J.	EXPANSION JOINT
EL.	ELEVATION
ELEV.	ELEVATOR
EMBD.	EMBED(MENT)
EN	EDGE NAIL
ENG.	ENGINEER
EQ.	EQUAL
EQPT.	EQUIPMENT
E.W.	EACH WAY
EXP.	EXPANSION
EXST.	EXISTING
EXT.	EXTERIOR

ABBREVIATIONS

FAB.	FABRICATION
FB	FLUSH BEAM
FDN.	FOUNDATION
F.F.	FINISH FLOOR
FIN.	FINISH(ED)
FLG.	FLANGE
FLR.	FLOOR
FN	FIELD (FACE) NAIL
F.O.	FINISHED OPENING
F.O.C.	FACE OF CONCRETE
F.O.M.	FACE OF MASONRY
F.O.S.	FACE OF STUD
F.O.W.	FACE OF WALL
FRM.	FRAME (FRAMING)
F.S.	FAR SIDE
FT.	FEET (FOOT)
FRTW	FIRE RETARDANT TREATED WOOD
FTG.	FOOTING
GA.	GAUGE
GALV.	GALVANIZE(D)
GB.	GRADE BEAM
GLB	GLUE LAMINATED BEAM
GRD.	GRADE
GWB	GYPSUM WALLBOARD
GYP.	GYPCRETE
HD	HOLDOWN
H.D.G.	HOT DIPPED GALVANIZED
HGR.	HANGER
HORIZ.	HORIZONTAL
HR	HEADER
H.S.B.	HIGH STRENGTH BOLT
HT.	HEIGHT
I.D.	INSIDE DIAMETER
I.E.	INVERT ELEVATION
I.F.	INSIDE FACE
IN.	INCH(ES)
INFO.	INFORMATION
INT.	INTERIOR
JST.	JOIST
JT.	JOINT
K	KIPS (1000 LB.)
LAT.	LATERAL
LB.	POUND(S)
L.B.	LAG BOLTS(S)
LG.	LONG(ITUDINAL)
LGTH.	LENGTH
LGMF.	LIGHT GAUGE METAL FRAMING
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LSH	LONG SLOTTED HOLE(S)
L.W.	LIGHT WEIGHT
MAT.	MATERIAL
MAX.	MAXIMUM
M.B.	MACHINE BOLT
MBM	METAL BUILDING MANUFACTURER
MECH.	MECHANICAL
M.E.J.	MASONRY EXPANSION JOINT
MEZZ.	MEZZANINE
MFR.	MANUFACTURER
MIN.	MINIMUM
MISC.	MISCELLANEOUS
MTL.	METAL
N.L.B.	NON-LOAD BEARING
NO.	NUMBER
N.S.	NEAR SIDE
N.T.S.	NOT TO SCALE
N.W.C.	NORMAL WEIGHT CONCRETE
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
O.F.	OUTSIDE FACE
O.H.	OPPOSITE HAND
OPNG.	OPENING
OPP.	OPPOSITE
ORNT.	ORIENTATION
OSB	ORIENTED STRAND BOARD
O.W.J.	OPEN WEB JOIST

ABBREVIATIONS

PAR.	PARALLEL
P/C	PRECAST
PEN	PANEL EDGE NAIL
PERP.	PERPENDICULAR
PL.	PLATE
PL	PROPERTY LINE
PLMBG.	PLUMBING
PLYWD.	PLYWOOD
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
P.T.	PRESERVATIVE TREATED
PT	POST TENSION(ED)
QTY.	QUANTITY
R. (RAD.)	RADIUS
RE: (REF.)	REFERENCE
REINF.	REINFORCEMENT
REQ.	REQUIRED
R.F.	RIGID FRAME
R.O.	ROUGH OPENING
R.S.	ROUGH SAWN
SCH.	SCHEDULE
SCHED.	SCHEDULE
SCL	STRUCTURAL COMPOSITE WOOD
SHT.	SHEET
SIM.	SIMILAR
S.J.	SHRINKAGE CONTROL JOINT
SKW.	SKEW(ED)
S.O.G.	SLAB ON GRADE
SPC.	SPACE(S) (ING)
SPEC.	SPECIFICATION(S)
SQ.	SQUARE
STD.	STANDARD
STGR.	STAGGER
STIFF.	STIFFENER(S)
STIR.	STIRRUP(S)
STL.	STEEL
STRUC.	STRUCTURAL
STRUCT.	STRUCTURAL
SUSP.	SUSPENDED(TION)
SYMM.	SYMMETRICAL
T.	TOP
T.&B.	TOP AND BOTTOM
TEMP.	TEMPORARY
T.&G.	TONGUE AND GROOVE
THK.	THICK(NESS)
THRD.	THREADED
TN	TOE NAIL
T.O.S.	TOP OF (STEEL) (SHEATHING) (SLAB)
T.O.W.	TOP OF WALL
TRANSV.	TRANSVERSE
TYP.	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
U/S	UNDERSIDE
V.	VERTICAL
VERT.	VERTICAL
VIF	VERIFY IN FIELD
W.	WIDE (WIDTH)
W/	WITH
W/O	WITHOUT
WD.	WOOD
W.H.S.	WELDED HEADED STUDS
W.P.	WORK POINT
W.S.	WELDED STUD
WT.	WEIGHT
W.W.F.	WELDED WIRE FABRIC
X-STG	EXTRA STRONG
XX-STG	DOUBLE EXTRA STRONG
YD	YARD

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Utility Conflict Note

CAUTION:

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00100- CODE REQUIREMENTS

ALL DESIGN AND CONSTRUCTION SHALL CONFORM TO THE 2015 INTERNATIONAL BUILDING CODE, AS AMENDED BY THE CITY OF SEATTLE.

00101- EASEMENTS

ALL EASEMENTS, IF REQUIRED, SHALL BE THE RESPONSIBILITY OF THE OWNER.

00200- DESIGN LOADS AND CONSIDERATIONS

DESIGN LOADS FOR THE SHORING SYSTEM ARE AS SPECIFIED IN PANGEO INC REPORT NO. 20-361 DATED NOVEMBER 20, 2020.

THE SHORING SYSTEM IS TEMPORARY. THE STEEL SOLDIER PILES AND THE LAGGING ARE THE TEMPORARY RETAINING SYSTEM.

SEE DETAILS ON SS4 FOR SPECIFIC DESIGN LOADING DIAGRAMS.

00300- UTILITIES AND ADJACENT PROPERTIES

STABILITY AND EROSION PROTECTION OF EXISTING & CUT SLOPES, AND THE COORDINATION OF THE EXCAVATION, SHORING AND OTHER WORK WITH ALL UTILITIES AND ADJACENT PROPERTIES IS THE RESPONSIBILTY OF THE CONTRACTOR PRIOR TO DRILLING AND EXCAVATION.

LOCATE AND DISCONNECT ANY UNDERGROUND POWER, COMMUNICATION, GAS AND WATER LINES PRIOR TO DRILLING & EXCAVATION. CONTRACTOR SHALL VERIFY OVERHEAD CLEARANCES PRIOR TO MOBILIZATION AND CONSTRUCTION.

THE CONTRACTOR SHALL VERIFY THE EXACT ELEVATION, LOCATION AND SIZE OF ALL UNDERGROUND UTILITIES OR STRUCTURES PRIOR TO SHORING INSTALLATION.

00301- DRAINAGE CONTROL

THE CONTRACTOR SHALL TAKE MEASURES TO CONTROL ALL SURFACE WATER RUNOFF FLOW AND FLOWS FROM EXISTING SUBSURFACE DRAINAGE FEARTURES INCLUDING PERCHED WATER. IN NO CASE SHALL THE CONTRACTOR ALLOW THE WALL SYSTEM TO BE EXPOSED TO HYDROSTATIC PRESSURES OR ALLOW SURFACE WATER TO FLOW INTO THE EXCAVATION.

00400- BASELINE SURVEY AND MONITORING

EXISTING STRUCTURES OR IMPROVEMENTS TO BE SAVED THAT ARE NEAR THE CONSTRUCTION ZONE SHOULD HAVE BASELINE PHYSICAL LOCATION DATA ESTABLISHED PRIOR TO BEGINNING WORK. AS A MINIMUM, OPTICAL SURVEY POINTS (POINTS KNOWN, OR PK'S) SHOULD BE ESTABLISHED AT THE CORNERS AND MIDPOINT OF THE STRUCTURE. THE SELECTION OF MONITORING POINTS SHOULD BE MADE WITH CONCURRENCE OF THE GEOTECHNICAL ENGINEER.

THE MONITORING PROGRAM SHOULD INCLUDE MEASUREMENT OF CHANGES IN BOTH THE HORIZONTAL AND VERTICAL DIRECTIONS. THE MONITORING SHOULD BE PERFORMED AT LEAST WEEKLY WHILE ACTIVE WALL CONSTRUCTION IS UNDERWAY. THE MONITORING SHOULD BE BY A LICENSED SURVEYOR, AND THE RESULTS BE PROMPTLY SUBMITTED TO THE GEOTECHNICAL ENGINEER FOR REVIEW. THE RESULTS OF THE MONITORING WILL ALLOW THE DESIGN TEAM TO CONFIRM DESIGN PARAMETERS, AND FOR THE CONTRACTOR TO MAKE ADJUSTMENTS TO MEANS AND METHODS OF CONSTRUCTION, IF NECESSARY.

00401- MONITORING AND QUALITY CONTROL

THE OWNER SHALL PROVIDE MONITORING AND QUALITY CONTROL OF ALL SHORING WALLS INCLUDING SOLDIER PILE WALLS, BERMS, AND ADJACENT GROUND SURFACES AND BUILDINGS OF STRUCTURES AS FOLLOWS:

THE GEOTECHNICAL ENGINEER OF RECORD SHALL PROVIDE FULL TIME OBSERVATION MONITORING OF THE EXCAVATION, SOLDIER PILE INSTALLATION. INSTALLATION INCLUDES DRILLING OF PILES AND PLACEMENT OF LEAN MIX AND STRUCTURAL GROUT. A COMPLETE AND ACCURATE RECORD SHALL BE KEPT OF ALL PILE AND DEPTHS, QUANTITIES OF LEAN MIX AND STRUCTURAL GROUT PER PILE AND ANY UNUSUAL CONDITIONS ENCOUNTERED.

A QUALIFIED TESTING AGENCY SHALL PERFORM WELDING INSPECTIONS AND STRUCTURAL GROUT SAMPLING AND TESTING.

PRECONSTRUCTION BASELINE SURVEY:
A LICENSED SURVEYOR HIRED BY THE OWNER, SHALL ESTABLISH BASELINE READINGS OF BENCHMARKS AND MONITORING POINTS ON THE GROUND SURFACE AND SETTLEMENT-SENSITIVE STRUCTURES BEHIND THE SHORING WALL ALIGNMENT PRIOR TO EXCAVATION AND INSTALLATION OF THE SHORING SYSTEM. STATIONARY BENCHMARKS SHALL BE SET AT LEAST 40 FEET AWAY FROM THE MONITORING POINTS. MONITORING POINTS ESTABLISHED ALONG THE CURBLINE AND CENTERLINE OF ADJACENT ROADWAYS NEED TO BE MONITORED WHEN TOTAL WALL MOVEMENTS REACH 0.5 INCH OR AT SDOT REQUEST. THE MINIMUM MONITORING POINT SPACING ALONG THE TOP OF ALL SOIL NAIL WALLS SHALL BE 20 FEET AND AT THE TOP OF EVERY OTHER SOLDIER PILE. THE SURVEY SHALL HAVE AN ACCURACY OF 0.01 FEET. A VISUAL AND PHOTGRAPHIC SURVEY SHALL BE MADE OF ADJACENT BUILDINGS PRIOR TO CONSTRUCTION.

REPORTS:
SURVEY MONITORING RESULTS SHALL BE TRANSMITTED TO THE GEOTECHNICAL ENGINEER AND GENERAL CONTRACTOR WITHIN 24 HOURS OF EACH SURVEY. THE GEOTECHNICAL ENGINEER SHALL REVIEW SURVEY DATA AND PROVIDE AN EVALUATION OF WALL PERFORMANCE AND A GRAPHICAL REPRESENTATION OF WALL MOVEMENT VERSUS TIME ALONG WITH THE SURVEY DATA TO GENERAL CONTRACTOR, SHORING INSTALLER, SHORING ENGINEER, DPD AND ON AT LEAST A WEEKLY BASIS.

CONSTRUCTION MONITORING:
THE GENERAL CONTRACTORS SHALL OBSERVE THE CONDITIONS ABOVE THE SHORING ON A DAILY BASIS FOR SIGNS OF GROUND OR BUILDING MOVEMENTS. THE GEOTECHNICAL, SHORING ENGINEER SHALL BE IMMEDIATELY AND DIRECTLY NOTIFIED IF SIGNS OF MOVEMENT SUCH AS: NEW CRACKS IN STRUCTURES, INCREASED SIZE OF OLD CRACKS OR SEPARATION OF JOINTS IN STRUCTURES, FOUNDATIONS, STREETS OR PAVED AND UNPAVED SURFACES ARE OBSERVED.

THE SURVEYOR AND GENERAL CONTRACTOR SHALL NOTIFY THE GEOTECHNICAL ENGINEER SHORING ENGINEER, DPD IMMEDIATELY AND DIRECTLY IF MORE THAN 0.5 INCH OF DISPLACEMENT OCCURS. AT THAT TIME THE GEOTECHNICAL ENGINEER AND SHORING ENGINEER SHALL PREPARE A REMEDIAL PLAN. REMEDIAL MEASURES SHALL BE IMPLEMENTED TO PREVENT DEFLECTIONS FROM EXCEEDING 1.0 INCH.

DRILLING AND EXCAVATION OPERATIONS SHALL BE IMMMEDIATELY SUSPENDED IF GROUND SUBSIDENCE IS OBSERVED, OR IF ADJACENT STRUCTURES ARE DAMAGED AS A RESULT OF THE DRILLING OR EXCAVATION OPERATION.

SHORING INSTALLATION AND EXCAVATION IN AREAS ADJACENT TO BUILDINGS:
THE SURVEYOR AND GENERAL CONTRACTOR SHALL NOTIFY THE GEOTECHNICAL ENGINEER, SHORING ENGINEER AND DPD IMMEDIATELY AND DIRECTLY IF THE 0.5 INCH DAMAGE THRESHOLD IS APPROACHED. SHORING INSTALLATION AND EXCAVATION SHALL NOT CONTINUE UNTIL REMEDIAL ACTION IS TAKEN TO ENSURE THAT 0.5 INCH IS NOT EXCEEDED.

00600- MATERIALS

LEAN MIX CONCRETE 1 1/2 SACK MIX

STRUCTURAL STEEL	WF SECTIONS	ASTM A992 Fy = 50 KSI
	CHANNELS	ASTM A36 Fy = 36 KSI
	STEEL ANGLES	ASTM A36 Fy = 36 KSI
	PLATE MATERIAL	ASTM A36 Fy = 36 KSI
	STRUCTURAL PIPE	ASTM A53 Fy = 35 KSI GRADE B
	STRUCTURAL BOLTS	ASTM A 325-N
	WELDED HEADED STUDS (WHS)	ASTM A -108
	WELDING ELECTRODES	E70-XX WITH CHARPY V-NOTCH TOUGHNESS OF AT LEAST 20 FT-LBS AT 0 DEGREES F.

TIMBER LAGGING P.T. HF NO. 2 4X12

TIMBER LAGGING SHALL BE PRESERVATIVE TREATED WITH WATER BORNE PRESERVATIVES IN ACCORDANCE WITH AWPA U1 (A OR F) TO A MINIMUM RETENTION OF 0.4 LBS/CU. FT. (0.21 LBS/CU. FT. FOR CA-B) ANY SAWN ENDS OF SUCH TREATED LAGGING SHALL BE FIELD TREATED WITH TWO BRUSHED COATS OF THE SAME PRESERVATIVE. A 1" DIAMETER HOLE SHALL BE DRILLED IN THE CENTER OF ALL LAGGING BOARDS AT 24" ON CENTER TO PERMIT SEEPAGE. EACH LAGGING LIFT SHALL BE 4 FOOT HIGH MAXIMUM. NO EXCAVATION FOR THE IMMEDIATE LOWER LIFT IS ALLOWED UNTIL VOIDS BEHIND THE LAGGING OF THE PRECEDING LIFT ARE FILLED WITH APPROVED MATERIALS. ALL VOIDS BEHIND LAGGING SHALL BE BACKFILLED PRIOR TO PROJECT MAIN STRUCTURE CONSTRUCTION.

DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH THE 14TH EDITION OF THE AISC "STEEL CONSTRUCTION MANUAL AND THE SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS", AISC 360-10.

00601- CORROSION PROTECTION

THE PILES FOR THIS PROJECT ARE TEMPORARY AND DO NOT REQUIRE CORROSION PROTECTION.

00602- WELDING

WELDING SHALL CONFORM TO AWS D1-04 "STRUCTURAL WELDING CODE." WELDING ELECTRODES SHALL BE E70XX. ALL WELDING SHALL BE PERFORMED BY WABO AND AWS CERTIFIED WELDERS. ALL COMPLETE PENETRATION WELDS (CP) SHALL BE ULTRASONIC TESTED. ALL SINGLE PASS FILLET WELDS SHALL BE VISUALLY INSPECTED. MINIMUM WELD SIZE IS 1/4" CONTINUOUS FILLET.

00603- SUBMITTALS

SUBMITTALS FOR THE FOLLOWING ITEMS SHALL BE SUBMITTED FOR REVIEW AND APPROVAL PRIOR TO FABRICATION AND INSTALLATION;

1. CONSTRUCTION SEQUENCE NARRATIVE & DESCRIPTION INCLUDING EQUIPMENT LIST AND KEY PERSONNEL.
2. LEAN CONCRETE MIX & STRUCTURAL CONCRETE MIX DESIGN
3. CERTIFIED STEEL MILL REPORTS
4. STRUCTURAL STEEL AND EMBEDDED ITEMS

00604- EXCAVATION

THE DISPOSAL SITE FOR EXCAVATION SPOILS, INCLUDING FACILITY NAME AND ADDRESS SHALL BE PROVIDED TO THE BUILDING DEPARTMENT SITE DEVELOPMENT INSPECTOR AT THE PRECONSTRUCTION MEETING.

ANY VOIDS BETWEEN THE FACE OF THE EXCAVATION AND THE LAGGING SHALL BE FILLED IMMEDIATELY WITH AN PERMEABLE, FREE DRAINING MATERIAL APPROVED BY THE GEOTECHNICAL ENGINEER. THIS SHALL INCLUDE LEAN CONCRETE GROUT BEHIND THE UPPER TWO-THIRDS OF THE CUT FACE OF THE SHORING SYSTEM IF APPROVED BY THE GEOTECHNICAL ENGINEER. NO EXCAVATION FOR A LOWER LIFT SHALL PROCEED UNTIL THE INSTALLATION OF THE LIFT ABOVE IS COMPLETED, INCLUDING BACKFILLING BEHIND THE LAGGING.

THE CONTRACTOR SHALL LIMIT THE OPEN FACE OF THE EXCAVATION TO 4 FEET VERTICAL, UNLESS OTHERWISE APPROVED BY THE GEOTECHNICAL ENGINEER. THE CONTRACTOR SHALL EXCAVATE THE WALL FACE AND INSTALL THE TIMBER LAGGING IN SUCH A MANNER AS TO MAINTAIN A SAFE WORK AREA AND AVOID EXCESSIVE SLOUGHING, CAVING OR OVERBREAK. THE CONTRACTOR SHALL RESPONSIBLE FOR THE MEANS AND METHODS USED FOR TEMPORARY FACE STABILITY AND MEANS TO CONTROL EXCESSIVE OVERBREAK, AS APPROVED BY THE GEOTECHNICAL ENGINEER. EXCAVATION SHALL PROCEED TO A BOTTOM OF EXCAVATION (BOE) DEPTH NO GREATER THAN SHOWN ON THE PLANS.

REMOVE LEAN MIX FROM THE PILE TO ALLOW PLACEMENT OF WOOD LAGGING. CARE BY THE EXCAVATOR SHALL BE TAKEN TO PREVENT EXCESSIVE POUNDING OR SHAKING OF THE SHORING WALL.

GROUNDWATER:
THE GEOTECHNICAL REPORT INDICATES THAT THE GROUNDWATER TABLEN IS UNLIKELY TO BE ENCOUNTERED ABOVE THE BOTTOM OF EXCAVATION ELEVATION - LOCAL PERCHED GROUNDWATER MAY BE ENCOUNTERED. REFER TO THE GEOTECHNICAL REPORT.

00605 - SLOPE PROTECTION

THE CONTRACTOR SHALL PROTECT CUT SLOPES WITH PLASTIC IF CONSTRUCTION OCCURS DURING WET WEATHER. PLASTIC SHEETING SHALL BE OVERLAPPED AT LEAST 12 INCHES. SURFACE DRAINAGE AROUND THE EXCAVATION SHALL BE CONTROLLED BY THE CONTRACTOR TO PREVENT WATER FROM FLOWING INTO THE EXCAVATION. CUT SLOPES SHALL BE EXCAVATED TO INTERSECT THE BACKSIDE OF THE DRILLED HOLE.

CLEAR PLASTIC SHALL HAVE A MINIMUM THICKNESS OF 6 MIL AND SHALL MEET THE REQUIREMENTS OF WSDOT / APWA SECTION 9-14.5.

CONTRACTOR SHALL MONITOR SLOPES FOR ANY SIGNS OF DISTRESS AND TAKE CORRECTIVE ACTIONS AS REQUIRED BY THE GEOTECHNICAL ENGINEER.

00700- SOLDIER PILES

SOLDIER PILES ARE TO BE INSTALLED IN 24 INCH DIAMETER HOLES U.N.O AND BACKFILLED WITH LEAN MIX CONCRETE, TYPICAL U.N.O. REFER TO SHORING ELEVATIONS. ALL HOLES SHALL BE DRILLED IN AN ACCEPTABLE MANNER WITHOUT LOSS OF GROUND AND WITHOUT ENDANGERING PREVIOUSLY INSTALLED PILES TO THE GEOTECHNICAL ENGINEERS SATISFACTION

TEMPORARY CASING OR OTHER APPROVED METHODS SHALL BE USED AS REQUIRED FOR PILE INSTALLATION TO MINIMIZE GROUND LOSS SHOULD CAVING SOIL CONDITIONS BE ENCOUNTERED. WHEN CASING HOLES ARE REQUIRED, THE CASING SHALL BE OF SUFFICIENT STRENGTH AND RIGIDITY TO WITHSTAND ALL INSTALLATION AND REMOVAL STRESSES, TO PREVENT DISTORTION CAUSED BY PLACING ADJACENT PILES AND TO PREVENT COLLAPSE DUE TO SOIL OR HYDROSTATIC PRESSURE.

ALTERNATE PILE PLACEMENT AT LEAST 24 HOURS TO ALLOW CONCRETE TO HARDEN PRIOR TO DRILLING ADHACENT PILES.

INSTALLATION TOLERANCES SHALL BE AS FOLLOWS;

PLAN DIRECTION	3 INCHES PARALLEL TO WALL 1 INCH PERPENDICULAR TO WALL
VERTICAL DIRECTION	1 1/2% OF TOTAL LENGTH, 3" MAXIMUM IN ELEVATION

SHOULD GROUNDWATER BE ENCOUNTERED DURING DRILLING FOR SOLDIER PILES, THE CONTRACTOR SHALL BE PREPARED TO USE TEMPORARY CASING OR OTHER METHODS TO KEEP THE SIDEWALLS OF THE HOLE OPEN WITHOUT SIGNIFICANT RAVELING OR CAVING.

GEOTECHNICAL ENGINEER SHALL BE PRESENT DURING DRILLING OPERATION TO VERIFY THAT THE CONTRACTORS DRILLING METHOD AND PROCEDURES ARE APPROPRIATE FOR THE GROUND CONDITONS.

09990 ADDITIONAL CITY COMMENTS

GRADING SEASON	NOTE THAT NO GRADING SHALL BE PERFORMED BETWEEM OCTOBER 31st, AND APRIL 1st.

Structural Drawing List (Shoring)

SHEET	DESCRIPTION	Issued	Rev	Rev Date
SS1.0	Structural Notes	06/21/21	1	03/11/2021
SS2.0	Excavation Plan	06/21/21	1	03/11/2021
SS2.1	Excavation Plan	06/21/21		
SS3.0	Elevations and Details	06/21/21		
SS3.1	Elevations and Details	06/21/21	1	03/11/2021
SS4.0	Details	06/21/21		

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06/21/21

No.	REVISION	DATE
	PERMIT SUBMITTAL	01/15/2021
1	SDOT & SDCI CORRECTIONS	03/11/2021

JOB #: 20209
ENG: YEZ
CAD: JMA
SCALE:
KEY ISSUE DATES:

Structural Notes

Shoring Plan
W. Commodore Way & 27th Ave W.
Seattle WA

SS1.0

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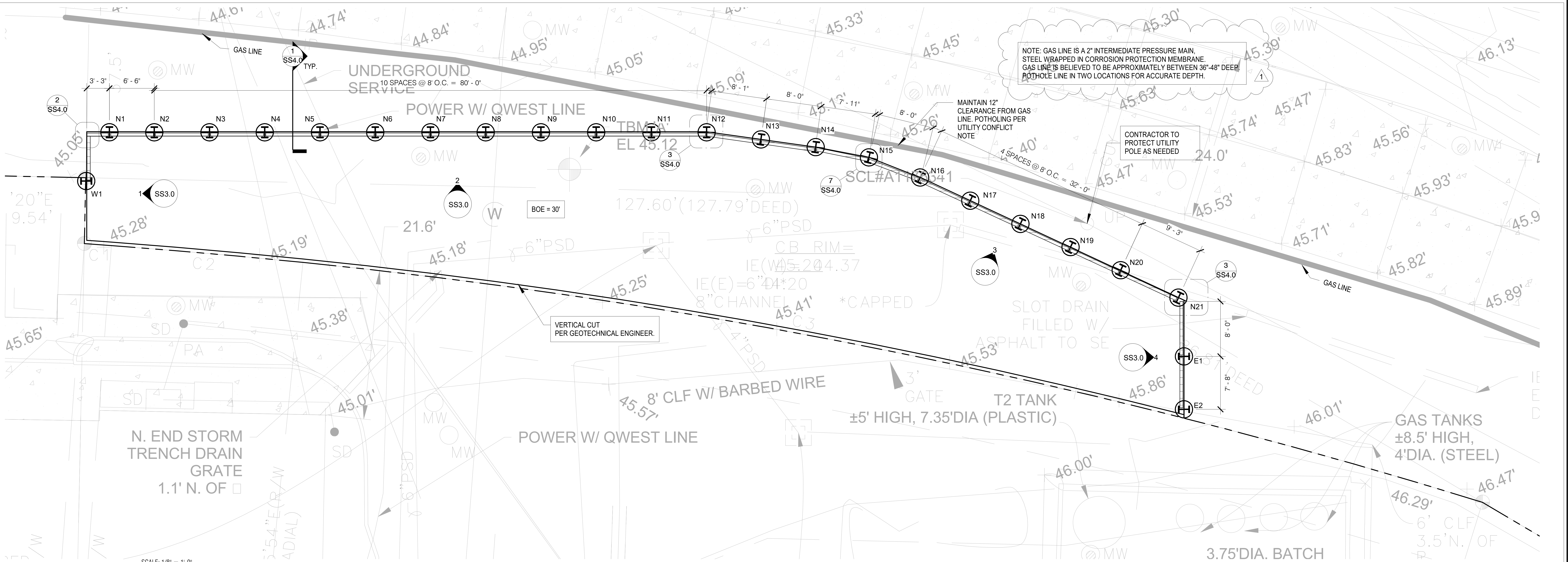

SCALE: 1/8" = 1'-0"

1 L1 Shoring - East Side

Shoring Notes

1. VERIFY ALL DIMENSIONS WITH ARCHITECT PRIOR TO CONSTRUCTION. RE: ARCHITECT FOR GRID TO FACE OF SHORING. SEE WALL ELEVATIONS FOR SHORING LAYOUT TO GRIDS.
2. A PRECONSTRUCTION MEETING WITH THE CITY DOT (IN ADDITION TO THOSE REQUIRED BY THE BUILDING DEPARTMENT) SHALL BE REQUIRED PRIOR TO START OF CONSTRUCTION. THE OWNER, GENERAL CONTRACTOR, EXCAVATION AND SHORING SUBCONTRACTORS, GEOTECHNICAL ENGINEER, SURVEYOR AND SHORING DESIGNER SHALL BE IN ATTENDANCE. GENERAL CONTRACTOR SHALL COORDINATE MEETING TIME WITH ATTENDEES AND CITY DOT.
3. ALL EXISTING UTILITIES, I.E., OVERHEAD POWER, COMMUNICATION LINES, ETC., AS WELL AS ALL UNDERGROUND UTILITIES SHALL BE FIELD LOCATED AND PROTECTED THROUGHOUT CONSTRUCTION.
4. ALL EXISTING STORM, SEWER, GAS, ETC., LINES CROSSING INTO THE EXCAVATION SHALL BE FIELD LOCATED AND REROUTED OR CAPPED PRIOR TO INSTALLATION OF THE SHORING. POTHOLE TO VERIFY LOCATION OF UNDER SIDEWALK POWER AND PHONE.
5. ALL SHORING ELEMENTS IN THE ROW SHALL BE REMOVED TO A DEPTH OF AT LEAST 4 FEET BELOW FINISHED GRADE IN THE ROW ONCE THEY ARE NO LONGER NEEDED FOR CONSTRUCTION.
6. CONTRACTOR SHALL NOT STOCK PILE MATERIALS AND/OR EQUIPMENT ALONG THE TOP OF SHORING WALL THAT EXCEEDS 250 PSF U.N.O.. ALL LOADS SHALL BE REVIEWED BY THE GEOTECHNICAL ENGINEER AND SHORING DESIGNER PRIOR TO PLACEMENT. RE: CONSTRUCTION LOADING SECTION SHEET SS4.0.

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1

GRAPHIC SCALE

-8' 0' 4' 8' 16'

(1/8" : 1'-0")

Utility Conflict Note

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CRAIG F. ROBERTS
46480
06/21/21

No.	REVISION	DATE
	PERMIT SUBMITTAL	01/15/2021
1	SDOT & SDCI CORRECTIONS	03/11/2021

JOB #: 20209
ENG: YEZ
CAD: JMA
SCALE: As indicated
KEY ISSUE DATES:

Excavation Plan

Shoring Plan
W. Commodore Way & 27th Ave W.
Seattle WA

SS2.0

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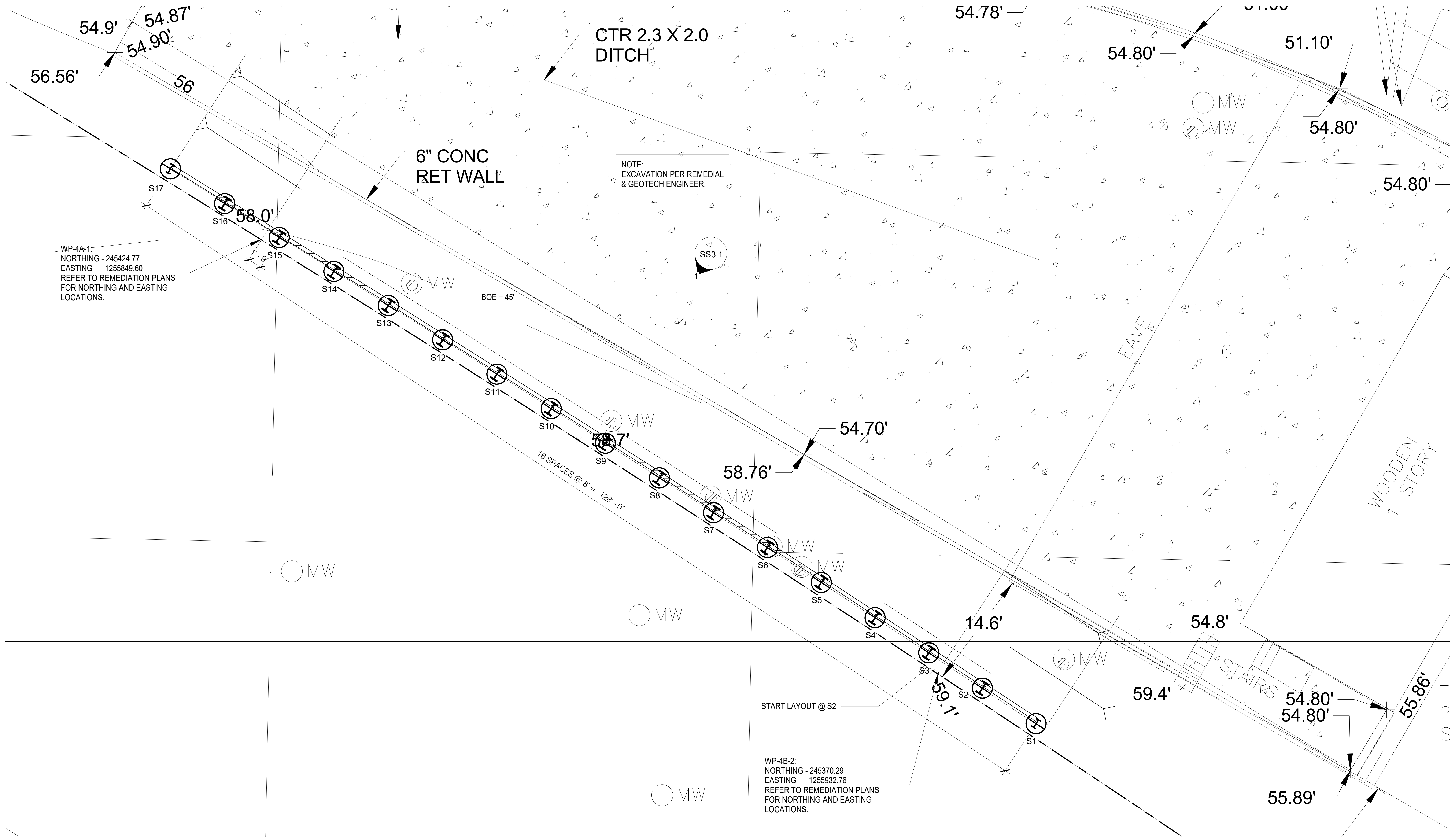

SCALE: 1/8" = 1'-0"

1 L1 Shoring - West Side

Shoring Notes

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N

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06/21/21

No.	REVISION	DATE
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JOB #: 20209
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Excavation Plan
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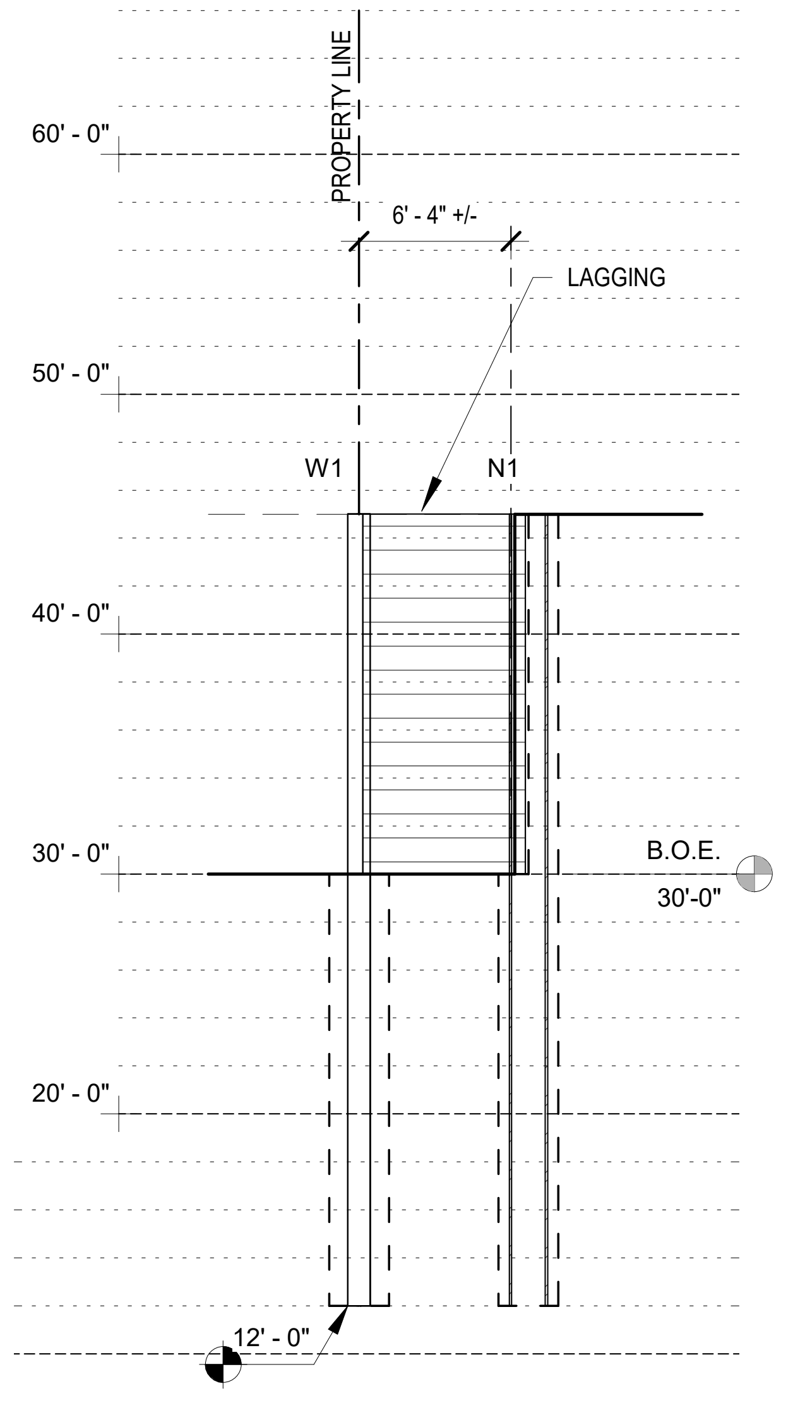
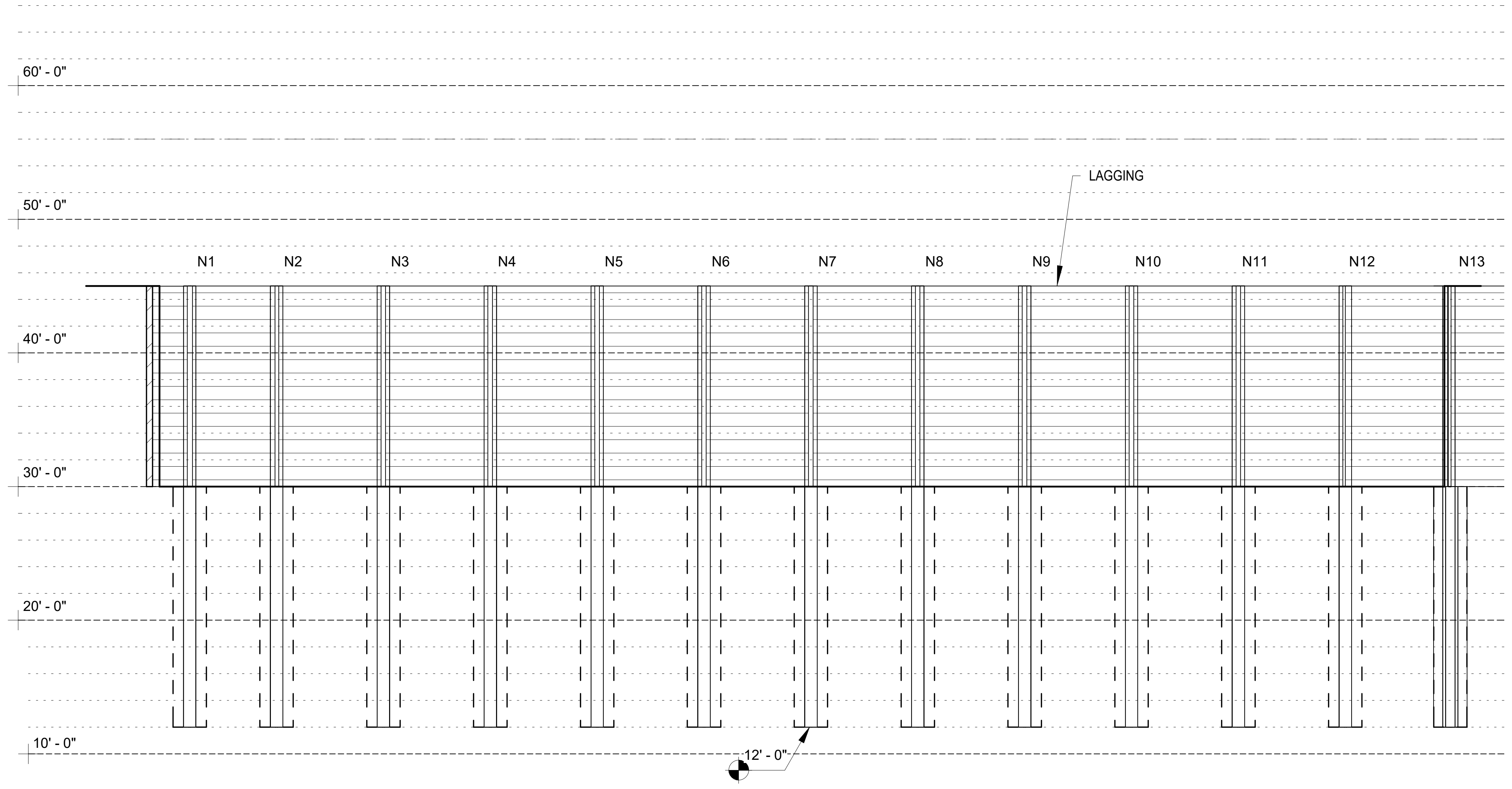
W. Commodore Way & 27th Ave W.
Seattle WA

SS2.1



SCALE: 1/8" = 1'-0"

1 West



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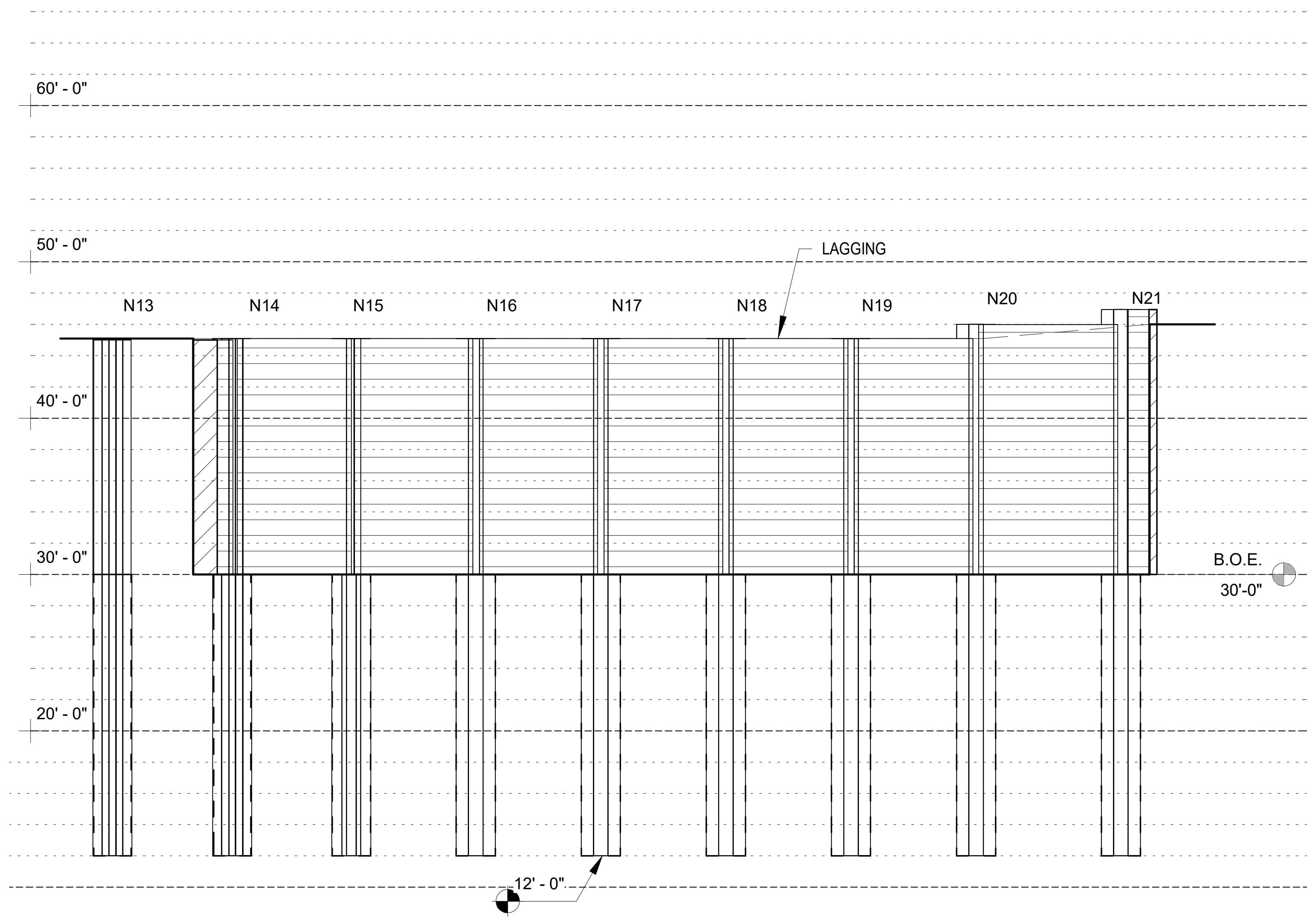

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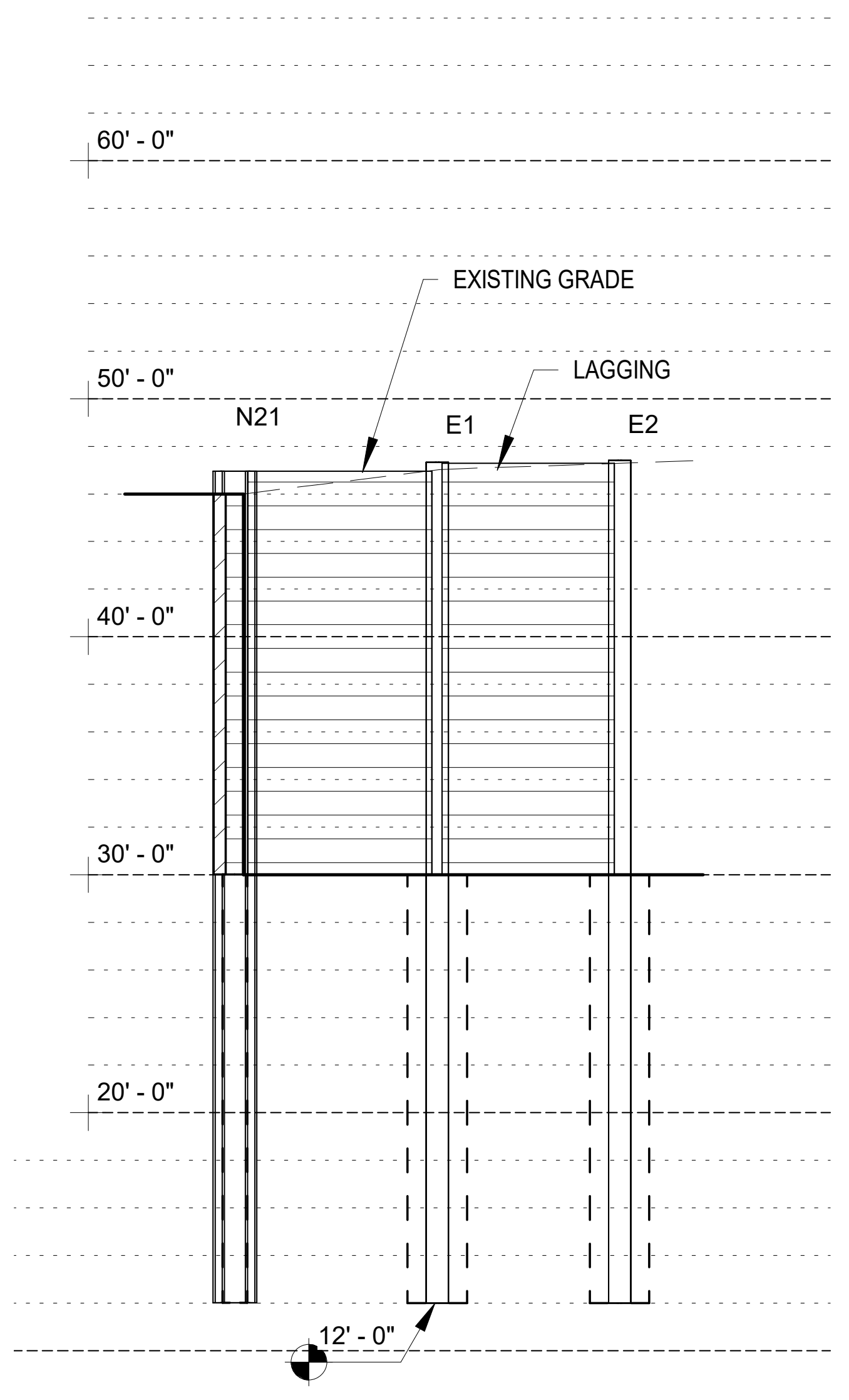

SCALE: 1/8" = 1'-0"

4 East

Structural Shoring Schedule (Cantilever)

PILE NO	PILE SIZE	HOLE DIA.	PILE LENGTH INFORMATION		
			UPSTAND HEIGHT	EMBED DEPTH	LENGTH
E1	W18X130	30"	17' - 4"	18' - 0"	35' - 4"
E2	W18X130	30"	17' - 5"	18' - 0"	35' - 5"
N1	W18X130	30"	15' - 0"	18' - 0"	33' - 0"
N2	W18X130	30"	15' - 0"	18' - 0"	33' - 0"
N3	W18X130	30"	15' - 0"	18' - 0"	33' - 0"
N4	W18X130	30"	15' - 0"	18' - 0"	33' - 0"
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N8	W18X130	30"	15' - 0"	18' - 0"	33' - 0"
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N12	W18X130	30"	15' - 0"	18' - 0"	33' - 0"
N13	W18X130	30"	15' - 0"	18' - 0"	33' - 0"
N14	W18X130	30"	15' - 1"	18' - 0"	33' - 1"
N15	W18X130	30"	15' - 1"	18' - 0"	33' - 1"
N16	W18X130	30"	15' - 1"	18' - 0"	33' - 1"
N17	W18X130	30"	15' - 1"	18' - 0"	33' - 1"
N18	W18X130	30"	15' - 1"	18' - 0"	33' - 1"
N19	W18X130	30"	15' - 1"	18' - 0"	33' - 1"
N20	W18X130	30"	16' - 0"	18' - 0"	34' - 0"
N21	W18X130	30"	16' - 11"	18' - 0"	34' - 11"
S1	W14X34	30"	10' - 0"	15' - 0"	25' - 0"
S2	W18X130	30"	15' - 0"	19' - 0"	34' - 0"
S3	W18X130	30"	15' - 0"	19' - 0"	34' - 0"
S4	W18X130	30"	15' - 0"	19' - 0"	34' - 0"
S5	W18X130	30"	15' - 0"	19' - 0"	34' - 0"
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S10	W18X130	30"	15' - 0"	19' - 0"	34' - 0"
S11	W18X130	30"	15' - 0"	19' - 0"	34' - 0"
S12	W18X130	30"	15' - 0"	19' - 0"	34' - 0"
S13	W18X130	30"	15' - 0"	19' - 0"	34' - 0"
S14	W18X130	30"	15' - 0"	19' - 0"	34' - 0"
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S17	W14X34	30"	10' - 0"	15' - 0"	25' - 0"
W1	W18X130	30"	15' - 0"	18' - 0"	33' - 0"

Utility Conflict Note

CAUTION:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION, DIMENSION, AND DEPTH OF ALL EXISTING UTILITIES WHETHER SHOWN ON THESE PLANS OR NOT BY POTHOLING THE UTILITIES AND SURVEYING THE HORIZONTAL AND VERTICAL LOCATION PRIOR TO CONSTRUCTION. THIS SHALL INCLUDE CALLING UTILITY LOCATE AT 1-800-424-5555 AND THEN POTHOLING ALL OF THE EXISTING UTILITIES AT LOCATIONS OF NEW UTILITY CROSSINGS TO PHYSICALLY VERIFY WHETHER OR NOT CONFLICTS EXIST. LOCATIONS OF SAID UTILITIES AS SHOWN ON THESE PLANS ARE BASED UPON THE UNVERIFIED PUBLIC INFORMATION AND ARE SUBJECT TO VARIATION. RESOLVE ANY PROBLEMS PRIOR TO PROCEEDING WITH CONSTRUCTION.

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CRAIG F ROBERTS
06/21/21

No.	REVISION	DATE
	PERMIT SUBMITTAL	01/15/2021

JOB #: 20209
ENG: YEZ
CAD: JMA
SCALE: 1/8" = 1'-0"
KEY ISSUE DATES:

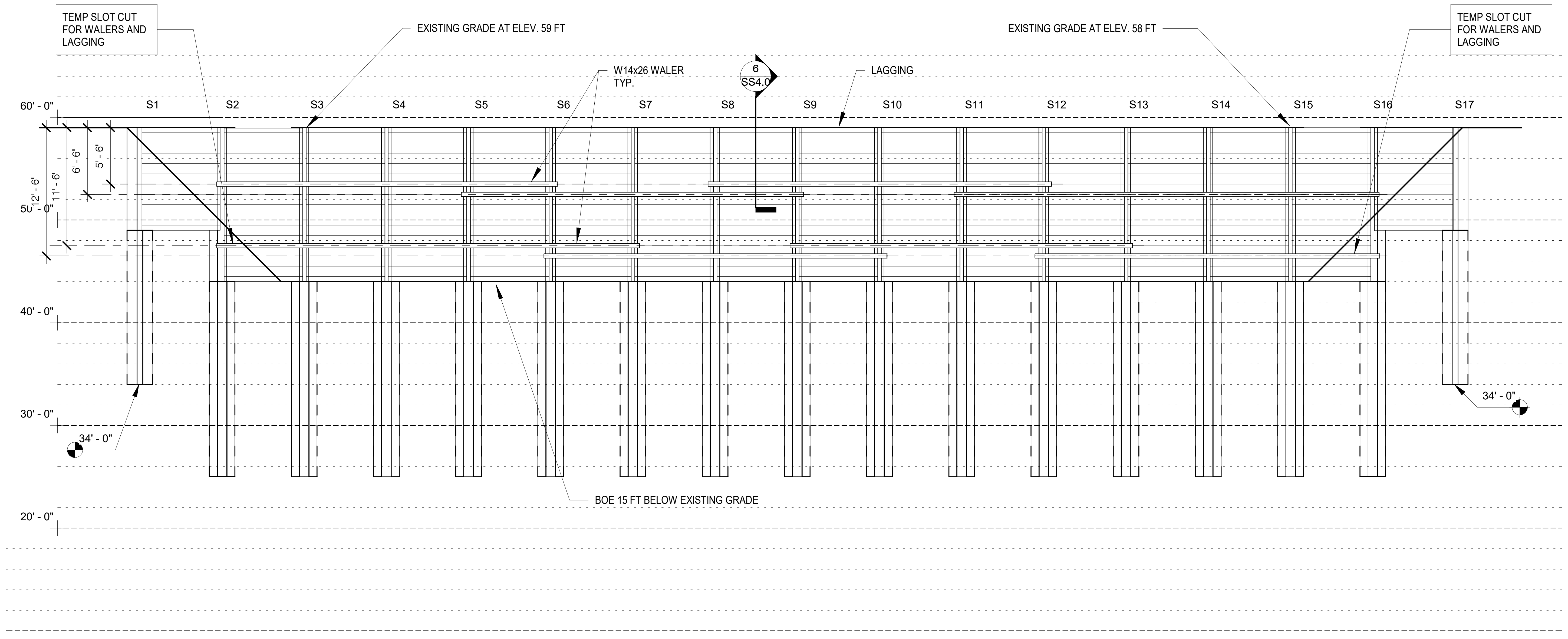
Elevations and Details

Shoring Plan
W. Commodore Way & 27th Ave W.
Seattle WA

SS3.0

NOTE:
THE WALERS ARE FOR THE PURPOSE OF PROVIDING TEMPORARY SUPPORT TO EACH OF THE PILES TO ALLOW FOR A SEQUENCE OF NARROW TRENCH EXCAVATIONS DOWN TO ELEVATION 30' FOR REMEDIATION PURPOSES. THE TRENCHES ARE TO BE LIMITED IN WIDTH TO THE 8' WIDE ZONE IN FRONT OF EACH OF THE PILES WHILE MAINTAINING THE EMBEDMENT AND PASSIVE PRESSURE RESISTANCE FOR THE TWO ADJACENT PILES. AFTER REMEDIATION IS COMPLETE FOR EACH OF THE TRENCHES, THEY ARE TO BE BACKFILLED WITH MATERIAL THAT INCLUDES CEMENT IN ORDER TO RE-ESTABLISH THE PASSIVE PRESSURE CAPABILITIES FOR THAT ZONE TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER.

1



SCALE: 1/8" = 1'-0"

1 South

Structural Shoring Schedule (Cantilever)

PILE NO	PILE SIZE	HOLE DIA.	PILE LENGTH INFORMATION		
			UPSTAND HEIGHT	EMBED DEPTH	LENGTH
E1	W18X130	30"	17' - 4"	18' - 0"	35' - 4"
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N2	W18X130	30"	15' - 0"	18' - 0"	33' - 0"
N3	W18X130	30"	15' - 0"	18' - 0"	33' - 0"
N4	W18X130	30"	15' - 0"	18' - 0"	33' - 0"
N5	W18X130	30"	15' - 0"	18' - 0"	33' - 0"
N6	W18X130	30"	15' - 0"	18' - 0"	33' - 0"
N7	W18X130	30"	15' - 0"	18' - 0"	33' - 0"
N8	W18X130	30"	15' - 0"	18' - 0"	33' - 0"
N9	W18X130	30"	15' - 0"	18' - 0"	33' - 0"
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S4	W18X130	30"	15' - 0"	19' - 0"	34' - 0"
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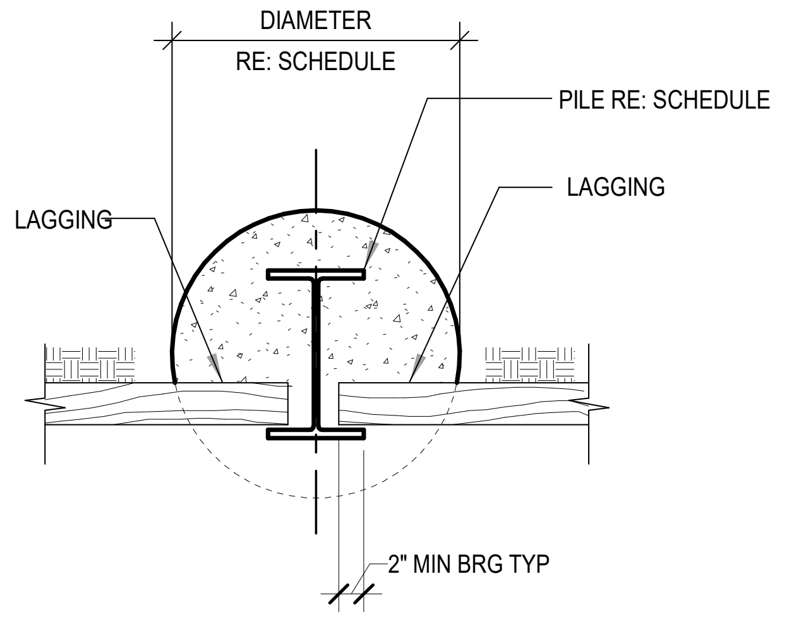
No.	REVISION	DATE
	PERMIT SUBMITTAL	01/15/2021
1	SDOT & SDCI CORRECTIONS	03/11/2021

JOB #: 20209
ENG: YEZ
CAD: JMA
SCALE: 1/8" = 1'-0"
KEY ISSUE DATES:

Elevations and Details

Shoring Plan
W. Commodore Way & 27th Ave W.
Seattle WA

SS3.1



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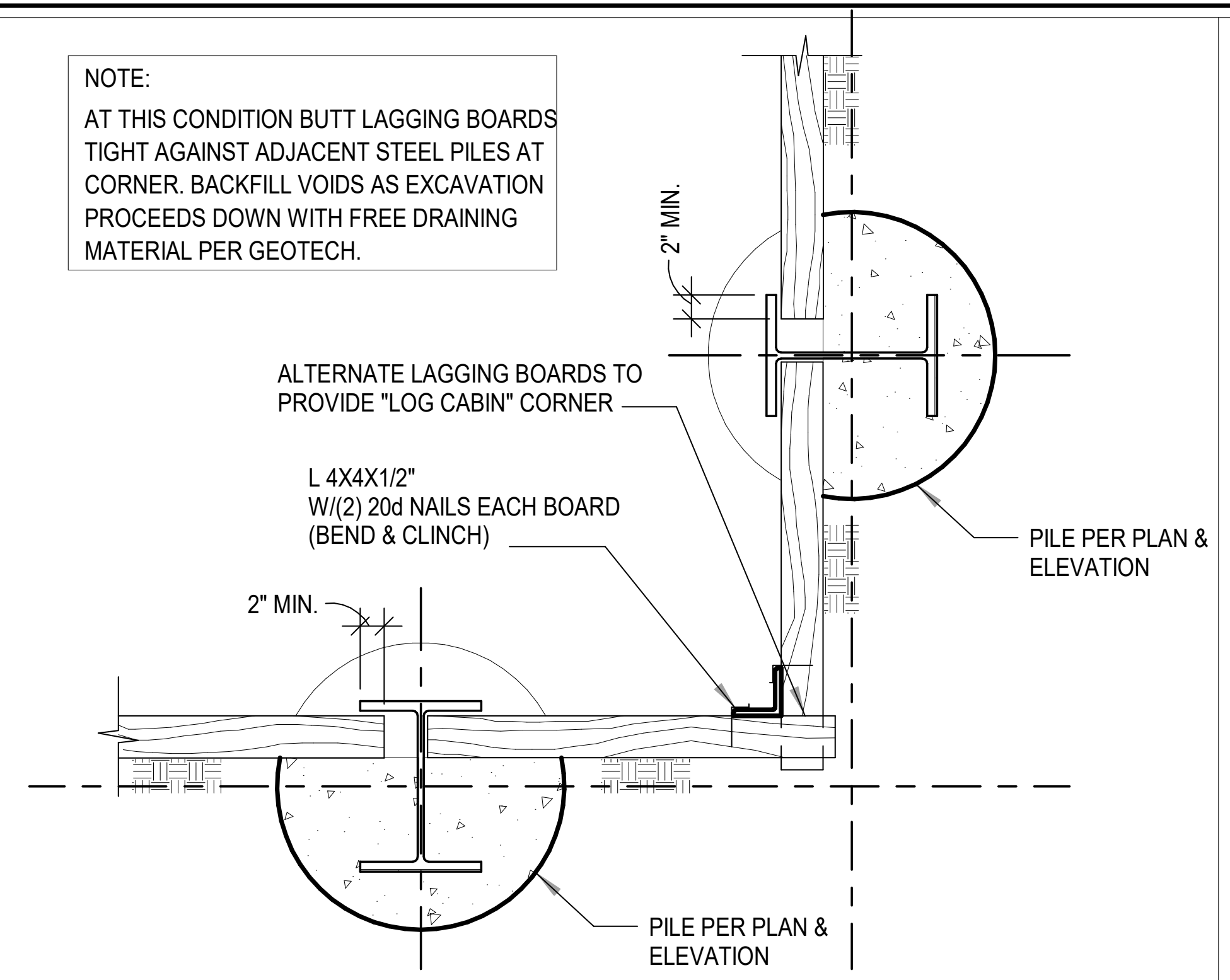

NOTE:
AT THIS CONDITION BUTT LAGGING BOARDS TIGHT AGAINST ADJACENT STEEL PILES AT CORNER. BACKFILL VOIDS AS EXCAVATION PROCEEDS DOWN WITH FREE DRAINING MATERIAL PER GEOTECH.

SCALE: 3/4" = 1'-0"

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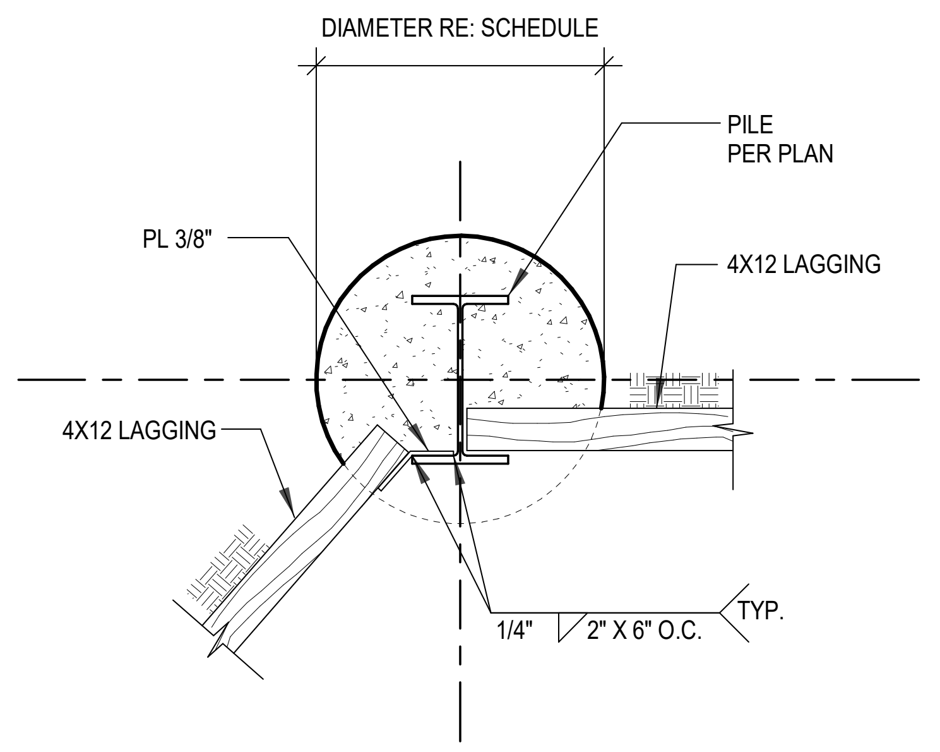
TYPICAL BUTTED CORNER DETAIL



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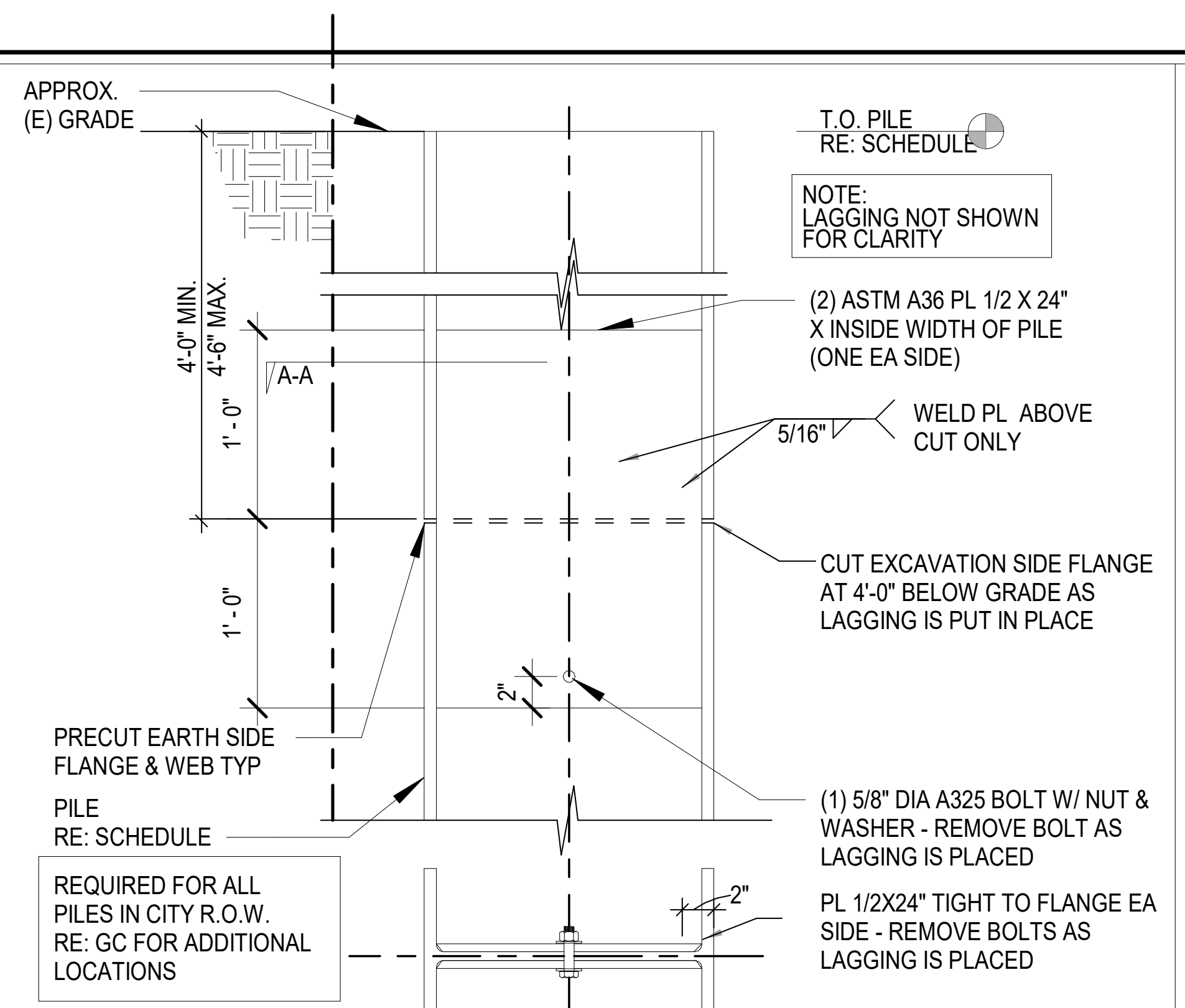
TYPICAL CORNER PILE DETAIL



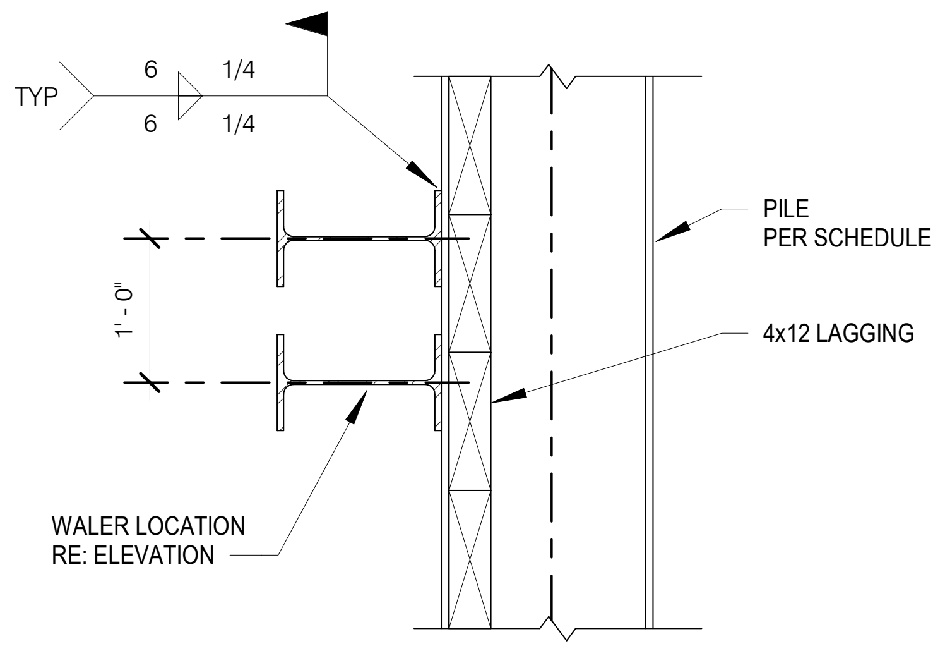
NOTE:
LAGGING NOT SHOWN FOR CLARITY

REQUIRED FOR ALL PILES IN CITY R.O.W.
RE: GC FOR ADDITIONAL LOCATIONS

SCALE: 1" = 1'-0"

4

TOP OF PILE SECTION



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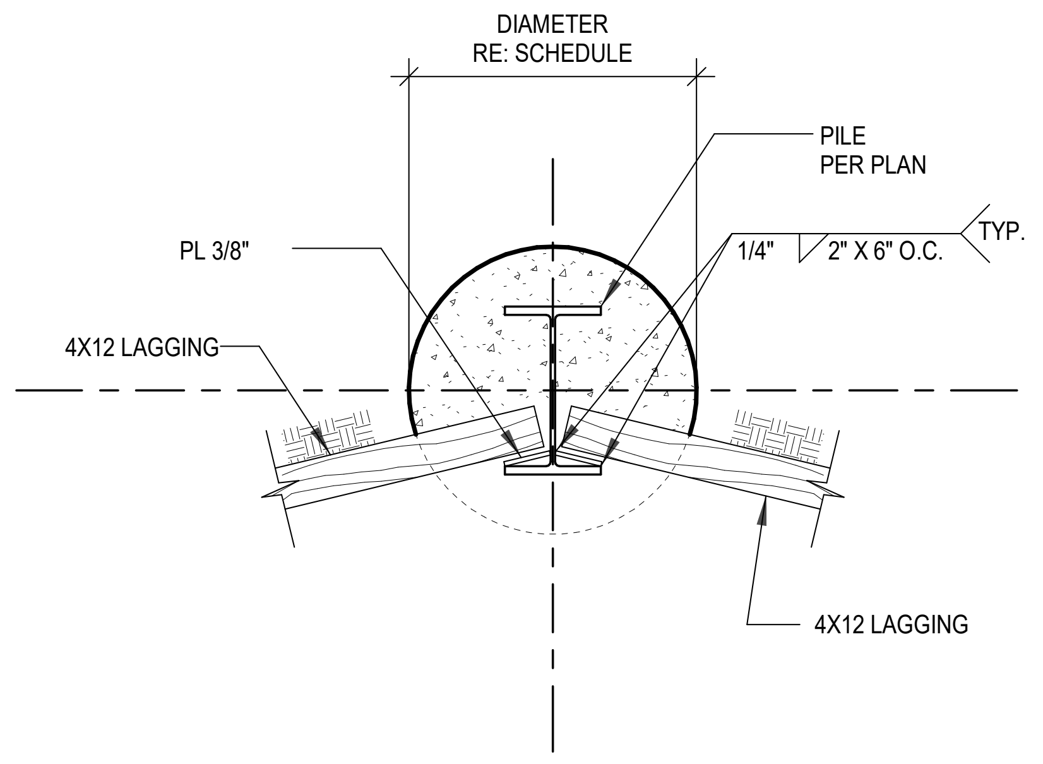
WALER CONNECTION



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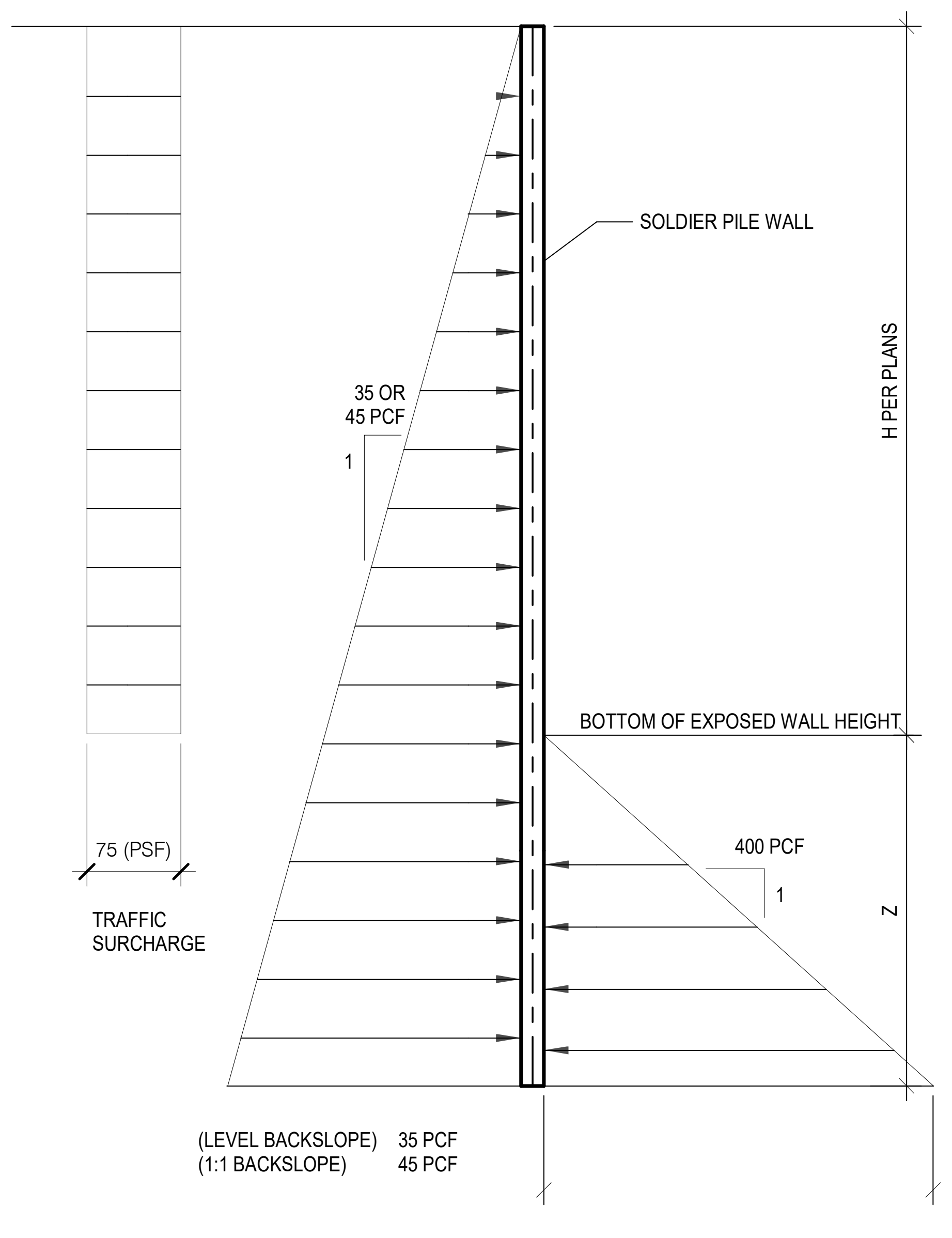
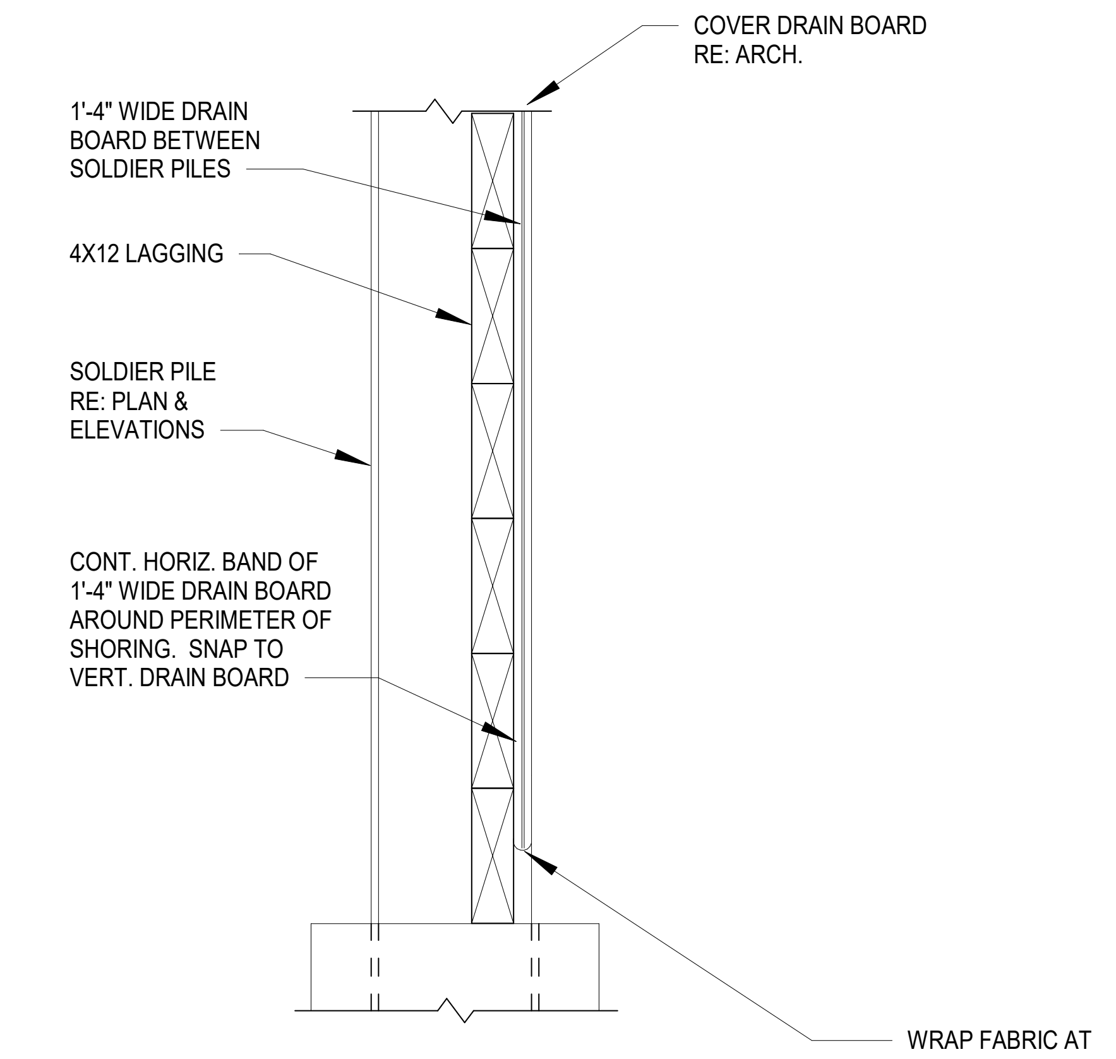
TYPICAL CORNER PILE DETAIL



SCALE: 3/4" = 1'-0"

10

WALL DESIGN PARAMETERS - SINGLE TIEBACK & CANTILEVER PILE



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TYPICAL SECTION

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No.	REVISION	DATE
	PERMIT SUBMITTAL	01/15/2021

JOB #: 20209
ENG: YEZ
CAD: JMA
SCALE: As indicated
KEY ISSUE DATES:

Details

Shoring Plan
W. Commodore Way & 27th Ave W.
Seattle WA

SS4.0

Appendix B PRDI Data Summary Report

Time Oil Bulk Terminal Site

Pre-Remedial Design Investigation Summary Report

Prepared for

TOC Seattle Terminal 1, LLC
2753 West 31st Street
Chicago, IL 60608

May 2021

FLOYD | SNIDER
strategy ▪ science ▪ engineering
Two Union Square • 601 Union Street • Suite 600
Seattle, Washington 98101 • tel: 206.292.2078

LIMITATIONS

This report has been prepared for the exclusive use of TOC Seattle Terminal 1, LLC, their authorized agents, and regulatory agencies. It has been prepared following the described methods and information available at the time of the work. No other party should use this report for any purpose other than that originally intended, unless Floyd|Snider agrees in advance to such reliance in writing. The information contained herein should not be utilized for any purpose or project except the one originally intended. Under no circumstances shall this document be altered, updated, or revised without written authorization of Floyd|Snider.

The interpretations and conclusions contained in this report are based in part on previous site characterization data collected by others and Floyd|Snider cannot assure the accuracy of this information.

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List of Acronyms and Abbreviations

Acronym/ Abbreviation	Definition
AOC	Area of Concern
ASKO	ASKO Hydraulic
bgs	Below ground surface
CAA	Cleanup action area
CAP	Cleanup Action Plan
CUL	Cleanup level
DRO	Diesel-range organics
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
FBI	Friedman & Bruya, Inc.
Fremont	Fremont Analytical, Inc.
GRO	Gasoline-range organics
IHS	Indicator hazardous substance
ISS	In situ solidification and stabilization

Acronym/ Abbreviation	Definition
mg/kg	Milligrams per kilogram
MTCA	Model Toxics Control Act
OHWM	Ordinary high-water mark
PCUL	Preliminary cleanup level
PFM	Passive flux meter
PID	Photoionization detector
PRB	Permeable reactive barrier
PRDI	Pre-Remedial Design Investigation
Property	Time Oil Bulk Terminal Site
REL	Remediation level
RI/FS	Remedial Investigation and Feasibility Study
RIWP	Remedial Investigation Work Plan
TBT	Tributyltin
TCE	Trichloroethene
VOC	Volatile organic compound
WBZ	Water-bearing zone
Work Plan	Pre-Remedial Design Work Plan

1.0 Introduction

This Pre-Remedial Design Investigation (PRDI) Summary Report is presented as an appendix to the Engineering Design Report (EDR) for the Time Oil Bulk Terminal Site (Property) and presents the results of additional PRDI sample collection to inform the design of certain portions of the cleanup action for the EDR. The sample collection was performed in accordance with the Pre-Remedial Design Work Plan (Work Plan; Floyd|Snider 2020a) approved by the Washington State Department of Ecology (Ecology) in email correspondence on October 20, 2020, and the sampling protocols presented in the Sampling and Analysis Plan and Quality Assurance Project Plan provided in the Supplemental Upland Remedial Investigation Work Plan (RIWP; Floyd|Snider 2019).

The additional sample collection was completed to fill data gaps necessary to finalize engineering design for the remedial action in selected cleanup action areas (CAAs) in the Upland and Shoreline Areas of Concern (AOCs), including the following:

- CAA-4: Additional soil testing was completed to verify the design parameters of the interceptor trench and permeable reactive barrier (PRB) wall and hydrogeological parameters of the Perched Water-Bearing Zone (WBZ).
- CAA-5: Additional soil and groundwater testing was completed to verify the design parameters of the PlumeStop injections.

  CAA-7: Additional soil sampling and analysis were completed to delineate the vertical and lateral extent of arsenic concentrations greater than its cleanup level (CUL) in shallow soils; to evaluate the presence of other metals potentially associated with arsenic and sandblast grit in shallow soils; and to investigate the potential presence of tributyltin (TBT), an organometallic paint additive, to determine whether TBT is present at concentrations that warrant cleanup.

The CAAs associated with the areas of PRDI data collection are shown on Figure 1. The PRDI data presented in this appendix were used to support the design for these elements, as presented in the EDR.

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2.0 Upland AOC Pre-Design Data Collection and Results

The Upland AOC encompasses CAA-4 and CAA-5 on the ASKO Hydraulic (ASKO) parcel. Data were collected in these CAAs to refine the design of the interceptor trench and PRB wall and of the PlumeStop injections, respectively. PRDI sample locations in the Upland AOC are shown on Figure 2.

2.1 CAA-4 PRE-DESIGN DATA COLLECTION

Additional data were collected by Crete Consulting, Inc., on October 7, 2020, to assess the soil characteristics in the Perched WBZ and refine the groundwater model. These data and the results of the groundwater modeling were used to estimate the flow of groundwater collected by the interceptor trench and routed through the PRB wall. Supporting documents for the CAA-4 investigation are provided in Attachment 1.

2.1.1 Soil Sample Collection and Analysis

Soil samples were collected from one soil boring on the southern portion of the ASKO parcel in the Upland AOC (ISS-ASKO) as described in the Work Plan. The soil data collection was targeted within the zone for construction of the interceptor trench and PRB wall (approximately 5 to 15 feet below ground surface [bgs]) to provide information about soil composition. Continuous soil samples were collected using hollow stem augers with split spoons to a depth of 15 feet bgs. The silt layer underlying the Perched WBZ was observed at approximately 11 feet bgs and may have been fully penetrated at 14.5 feet bgs.

Soil samples were collected by Holocene Drilling, a Washington State licensed driller. Oversight of the soil boring and sample collection was performed by Crete Consulting, Inc. Soils were logged, photographed, and screened for evidence of contamination including staining, sheen, odor, and elevated headspace volatiles concentrations measured using a photoionization detector (PID). A soil boring field log for ISS-ASKO is presented in Attachment 1.

Four soil samples were collected for grain size analysis (ASTM D-422) at approximately 1.5-foot increments from the top of the saturated zone of the Perched WBZ (4.5 feet bgs) to slightly above the contact with the underlying silt layer (10.5 feet bgs). In addition, two representative samples were collected and submitted for analysis of total organic carbon by USEPA Method 9060. All samples were submitted to Friedman & Bruya, Inc. (FBI) and subsequently transferred to Fremont Analytical, Inc. (Fremont), in Seattle, Washington, for analysis. The borehole was backfilled with bentonite following sample collection. Laboratory analytical data for the ISS-ASKO boring are presented in Attachment 1.

2.1.2 Groundwater Elevation Measurement

Depth to water was measured in Perched WBZ wells in the vicinity of CAA-4 concurrently with the soil sample collection. The elevations of groundwater in the Perched WBZ were used to refine the understanding of the groundwater flow direction and horizontal gradients. The PRB design incorporating these measurements is presented in detail in the EDR and field measurements are included in Attachment 1.

2.2 CAA-5 PRE-DESIGN DATA COLLECTION AND RESULTS

PRDI was performed by Floyd|Snider and Regenesis (the manufacturer of PlumeStop) to verify the final design parameters of the PlumeStop in situ treatment barrier. These tests included measurement of the contaminant mass flux, groundwater and soil mass characterization, soil grain size, and water injection rate testing. CAA-5 pre-design locations are shown on Figure 2. Supporting documents for the CAA-5 investigation are provided in Attachment 2.

2.2.1 Passive Flux Meter Installation and Sample Collection and Results

Passive flux meters (PFMs) were installed in two Shallow WBZ monitoring wells on November 12, 2020, to measure the vertical profile of contaminant flux through the groundwater table. PFMs consisting of a 5-foot-long permeable mesh liner filled with a mixture of sorbent material were placed into target wells MW06 and 01MW46 (refer to Figure 2). Well 01MW46 was selected as an alternate location to 01MW80, which was specified in the Work Plan, for PFM sampling at Regenesis's direction because clean water injections were completed adjacent to 01MW80 on the same day and the addition of potable water to the Shallow WBZ could bias the results of contaminant flux analysis.

The PFMs were lowered to the bottom of the well screen to sample the approximate 5-foot-thick saturated zone at each location; the PFMs were from 23 to 28 feet bgs at MW06 (where groundwater was encountered at 22.4 feet bgs) and from 22.5 to 27.5 feet bgs at 01MW46 (where groundwater was encountered at 24.6 feet bgs).

The PFMs remained in the wells for 18 days (within the recommended 2 to 3 weeks) and were retrieved on November 30, 2020, to collect groundwater samples, in accordance with the manufacturer's PFM Protocol Manual provided in the Work Plan. Once retrieved, the media within the PFMs were sampled for contaminant flux analysis. Each 5-foot-long PFM was split into three equal depth intervals for analysis, and composite samples of the media spanning each depth interval were submitted to EnviroFlux, LLC, for analysis of Darcy flux and contaminant mass flux.

Darcy velocities measured in PFM samples ranged from 2.2 to 8.4 centimeters per day. Corresponding contaminant flux results for trichloroethene (TCE) ranged from 1.0 to 51.7 milligrams per square meter per day, with the maximum and minimum contaminant fluxes observed at the top and bottom of the saturated zone, respectively, at MW06. These values are within the ideal ranges for treatability with PlumeStop. Tables of the laboratory analytical data for PFM samples provided by EnviroFlux are presented in Attachment 2.

2.2.2 Groundwater Sample Collection and Results

Groundwater samples were collected from monitoring wells MW06, 01MW46, and 01MW80 using low-flow methodology on November 12, 2020, to analyze groundwater characteristics that can impact the effectiveness of the PlumeStop and microscale zero-valent iron materials to adsorb and break down chlorinated volatile organic compounds. The groundwater samples were collected prior to conducting the clean water injection test described in Section 2.2.4.

Water quality parameters including temperature, pH, oxidation-reduction potential, dissolved oxygen, conductivity and turbidity were recorded at approximately 5-minute intervals. Samples were collected once water quality parameters were stabilized in accordance with the criteria in the RIWP. Field indications such as odors or sheen were not observed in any of the samples.

To supplement existing groundwater total petroleum hydrocarbons and volatile organic compound (VOC) data collected as part of the RI and to inform PlumeStop design, groundwater samples were analyzed by FBI and Fremont for:

- VOCs by USEPA Method 8260
- Total calcium and magnesium
- Hardness
- Alkalinity
- Biochemical oxygen demand
- Total organic carbon
- Dissolved organic carbon
- Sulfate and nitrate

The primary detected VOC in groundwater was TCE, consistent with prior groundwater sampling results, with lesser detected concentrations of dichloroethene, vinyl chloride, and benzene. Results of metals and geochemical parameters were within the expected ranges assumed during the feasibility study. Laboratory reports for groundwater samples are provided in Attachment 2.

2.2.3 Soil Sample Collection and Grain Size Analysis

Soil samples were collected from three soil borings along the PlumeStop barrier installation (PDSB01 through PDSB03; refer to Figure 2). The soil data collection was targeted within the zone for PlumeStop injection above the base of the Shallow WBZ (approximately 20 to 30 feet bgs) to provide information about constituents in soil that can be adsorbed to the PlumeStop matrix or affect the PlumeStop's physical characteristics.

Soil borings were completed on November 12, 2020, by Holocene Drilling and overseen by Regenesis. Borings were advanced to 30 feet bgs and monitored for the occurrence of saturated soil defining the top of the Shallow WBZ and the silt layer defining the base of the Shallow WBZ, as well as for field indications of contamination. Soils encountered were consistent with lithology described in the Supplemental Upland Remedial Investigation and Feasibility Study (RI/FS; Floyd|Snider 2020b), and field indications of contamination such as odor, sheen, or elevated headspace concentrations of VOCs measured using a PID were not encountered at these soil boring locations.

The Shallow WBZ was encountered as follows:

- PDSB-01: saturated soil (top of Shallow WBZ) at 21 feet bgs, low-permeability silt layer (base of Shallow WBZ) at 28.5 feet bgs
- PDSB-02: saturated soil at 20 feet bgs, low-permeability silt layer at 27.5 feet bgs
- PDSB-03: saturated soil at 25 feet bgs, low-permeability silt layer at 26 feet bgs

Starting at 15 feet bgs, about 5 feet above the target PlumeStop zone, Regenesis collected samples for grain size approximation in 1-foot increments to the bottom of the top of the silt layer that defines the base of the Shallow WBZ. Samples for grain sizes approximation to determine the fraction of clays, silts, fine sands, coarse sands, and gravels present in each interval were submitted to Regenesis's laboratory for visual analysis in accordance with the Work Plan.

Visual grain size analysis found that soil in the Shallow WBZ is composed primarily of medium to fine sand, with fractions of fine-grained material (silt and clay) ranging from approximately 12% to 45%. The proportion of silt and clay in the saturated zone was generally less at PDSB-01 than at PDSB-02 and PDSB-03. At all locations, the base of the Shallow WBZ was defined by a layer of primarily silt with clay fractions ranging from 7% to 20% and 0% to 15% fine sand. Grain size logs for the soil borings are presented in Attachment 2.

Representative samples from the top 1-foot interval of the water table and the 1-foot interval above the silt layer were collected with assistance from Floyd|Snider field staff for analysis of chemical constituents in soil with the potential to impact the PlumeStop application. Soil samples were analyzed by FBI and Fremont for the following:

- Gasoline-range organics (GRO)
- Diesel-range organics (DRO) and oil-range organics
- Total organic carbon
- VOCs
- Total calcium

GRO, DRO, and VOCs were generally not detected in soil except for one detection of GRO at the top of the saturated zone at PDSB-02 and one detection of TCE at the top of the saturated zone at PDSB-01. These results were consistent with the Supplemental Upland RI/FS (Floyd|Snider 2020b), which found that contamination at the northern boundary of CAA-5 is primarily in the dissolved phase. Results of geochemical parameters were within the expected ranges assumed during the feasibility study. Laboratory reports for the soil samples are provided in Attachment 2.

2.2.4 Injection Testing

Injection testing was conducted to measure pressures and flows of the aquifer while being injected upon to determine the target injection rates and volumes that can be supported by the soils in the proposed PlumeStop injection area.

Injection was completed using direct-push methodology by Regenesis and Holocene Drilling on November 12, 2020. Injection testing was completed at location DVT-1 approximately 4 feet from well 01MW80 (the well closest to the pre-design soil borings; refer to Figure 2) at Regenesis's direction. Injections were attempted using two methodologies. First, an injection point with a 2-foot retractable screen was advanced to the base of the Shallow WBZ and injection of potable water was attempted while continuously raising the screen in a bottom-up fashion. The retractable screen methodology was found to cause clogging of the screen, and the test was repeated using pressure-activated probe points advanced in both bottom-up and top-down fashion. The bottom-up pressure-activated probe test was also unsuccessful; however, a successful test using top-down injection (designated DVT-1C) was completed from 20 to 26 feet bgs. A total of 250 gallons of water, or approximately 40 gallons per foot, was injected at rates of 2.1 to 5.3 gallons per minute. A field injection log noting the total volumes, injection pressures, and flow rates is provided in Attachment 2.

Prior to injection and while injection was proceeding, key water quality parameters including conductivity and dissolved oxygen were monitored at 01MW80 and compared to measurements of the same parameters in the potable water supply used for injection. Water quality parameters did not change relative to the baseline measurements at 01MW80 during injection testing.

2.2.5 PlumeStop Design

The data collected as part of the PRDI as described in the previous sections were provided to Regenesis for the design of the PlumeStop in situ groundwater treatment zone. The layout of the PlumeStop injection is presented on Figure 3. As shown on Figure 3, the predicted groundwater flow direction in the treatment zone of the Shallow WBZ after in situ solidification and stabilization (ISS) is to the north, northeast, and northwest as groundwater moves downgradient of the ISS monolith (refer to Appendix E of the EDR for a detailed summary of ISS groundwater modeling). The target zone for PlumeStop injection, as shown on Figure 3, is the saturated soil of the Shallow WBZ from approximately 21 to 28 feet bgs. Injections will be performed in two offset rows along the length of the treatment zone to allow overlap in the radius of injection at each point. The target treatment zone will span the width of the inferred TCE plume in Shallow WBZ groundwater in the downgradient direction(s) from the ISS monolith (refer to Figure 3), with the expectation that TCE breakdown products will attenuate significantly after removal of the dissolved TCE source.

The design of the PlumeStop groundwater treatment is consistent with the preliminary assumptions presented in the Supplemental Upland RI/FS and Cleanup Action Plan (CAP; Ecology 2020). The size of the treatment zone and required quantity of reagent are consistent with the prior design assumptions. Minor adjustments were made in the engineering design to account for slightly greater proportions of fine grained material in the saturated zone, with slightly closer spacing of injection points and greater pressure injection with lesser quantities of product injected at each point. The PlumeStop design recommendation, including injection volumes and injection point spacing, provided by Regenesis is presented in Attachment 2. During injection, observations of soil and field water quality parameters will be collected to verify injection in accordance with the PlumeStop design recommendation presented in Attachment 2.

3.0 Shoreline AOC Pre-Design Data Collection and Results

Additional characterization of arsenic in shallow soils was completed by Floyd|Snider within and surrounding CAA-7 on the East Waterfront parcel of the Shoreline AOC between November 13, 2020, and March 22, 2021, to delineate the lateral and vertical extents of shallow soil excavation for arsenic. Characterization of other metals in soil within CAA-7 was also completed at Ecology's request to determine whether other metals are correlated with the presence of arsenic. Characterization for TBT was also completed in surrounding areas to determine whether TBT is present at concentrations warranting cleanup.

In the Supplemental Upland RI/FS (Floyd|Snider 2020b), arsenic was identified as an indicator hazardous substance (IHS) and CAA-7 was designated as a cleanup area to remediate arsenic in surface soil collocated with arsenic-contaminated groundwater. The presumed source of metals in surface soils on the property identified in the Supplemental Upland RI/FS was sandblast grit associated with sandblasting and maintenance by former tenant Icicle Seafoods; therefore, other metals were presumed to be collocated with arsenic.[1] Evaluation of cadmium, copper, lead, mercury, silver, and zinc was completed at Ecology's request to determine whether these other metals are present when arsenic is present and, when arsenic is present at concentrations less than the CUL established in the CAP, whether other metals are present at concentrations that could pose potential risk to human health or the environment.

The CAP additionally identified TBT, which was historically used in marine paints, as a potential contaminant that may be of concern for erosion into to Salmon Bay and identified a target remediation level (REL) for TBT. Limited characterization of TBT within and surrounding CAA-7 was completed in May 2020 (not timely enough to be included in the CAP) and was summarized in the Work Plan. TBT was not detected in surface soils at concentrations exceeding the targeted REL during this focused event; however, further characterization of the surrounding areas was completed as part of the PRDI to more fully assess the presence of TBT.

3.1 METALS AND TBT SOIL SAMPLE COLLECTION

PRDI soil sampling was completed in an initial study area defined in the Work Plan, which included the potentially erodible soils in the upper 2 feet in unpaved areas where Icicle Seafoods previously operated. Soil samples were collected and archived at the laboratory to allow a phased approach to laboratory analysis, with collection of sidewall and base samples within CAA-7 and composite samples in the surrounding areas. Additional step-out and step-down samples were collected and analyzed as needed to fully delineate soil impacts in the area surrounding CAA-7. PRDI soil sample locations in the Shoreline AOC are shown on Figure 4. Supporting documents for the Shoreline AOC investigation, including CAA-7 and the surrounding areas, are provided in Attachment 3.

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[1] Arsenic was the only metal that was detected in groundwater at concentrations greater than the preliminary CULs.

3.1.1 CAA-7 Delineation and Confirmation Samples

Collection of initial CAA-7 sidewall and base samples was completed on November 13, 2020, using hand sampling methodology. A total of 10 sidewall samples (CAA7-SW01 through CAA7-SW10; refer to Figure 4) were collected from 0.25 to 0.75 feet bgs at approximately every 20 feet of sidewall as proposed in the Work Plan. Four excavation base samples (CAA7-B01 through CAA7-B04) were collected from 1 to 1.25 feet bgs and 2 to 2.25 feet bgs at each location (the deeper samples were archived). The base samples were collected at the locations proposed in the Work Plan with the exception of the easternmost sample (CAA7-B04), which was relocated approximately 7.5 feet to the northeast due to repeated shallow refusal within the top 1 foot.

All sidewall samples and the upper base samples from CAA-7 were initially analyzed for arsenic, and follow-up analysis of the lower base sample at CAA7-B04 was also completed. Soil sample results for arsenic are discussed in detail in Section 3.2.1. In accordance with the Work Plan, four samples representing a range of arsenic concentrations were also selected for analysis of the other metals as described in Section 3.2.2.

3.1.2 Additional Arsenic and TBT Characterization

Initial sample collection for arsenic and TBT in the potentially erodible areas surrounding CAA-7 was completed on November 13, 2020. The sampling areas were mowed to remove thick brush including blackberries prior to sample collection. Samples were collected using hand sampling methodology after removing any recent surfacing material such as fresh gravel or vegetation in accordance with the Work Plan. A total of seven composite samples (COMP-1 through COMP-7) composed of four discrete samples each representing an approximate 400 square-foot area were collected as shown on Figure 4. Samples of composited material from the surface soil interval from 0 to 0.5 feet bgs in each composite area were collected for immediate analysis. Composite samples of the underlying 0.5 to 1 foot bgs interval in each composite area were collected and archived and the 0 to 0.5 and 0.5 to 1 foot bgs depth intervals at each discrete sample location were also collected and archived for potential follow-up analysis.

Composite samples were collected as proposed in the Work Plan, with minor adjustments to the locations or sample intervals including the following:

- One discrete sample location, originally designated as part of the COMP-1 composite, encountered refusal on pavement. This sample was located in the approximate vicinity of a former shed. The material overlying the pavement and in the remainder of the 400 square-foot sample grid area consisted of gravel with only trace fine-grained constituents. Therefore, a discrete sample was not collected at this location. The sample compositing schemes for the subsequent locations to the south (COMP-2, COMP-3, and COMP-6) were adjusted in order to create a 4-point composite for each area (refer to Figure 4 for final composite area and sample configuration).
- Refusal on compacted gravel was encountered at 0.4 feet bgs at location COMP-4b southeast of the former ASKO warehouse, and refusal on pavement was encountered between 0.4 and 0.5 feet bgs along the southwest side of the ASKO warehouse at

COMP-5a and COMP-7d (refer to Figure 5 for areas of pavement encountered during sampling). At these locations, lower samples were not able to be collected, and the resultant archived 0.5 to 1 foot bgs composite samples in these composite areas were 3-point composites.

The seven surface composite samples were analyzed for arsenic and TBT. Follow-up arsenic analysis was completed for multiple discrete samples and selected deeper samples were also analyzed for vertical delineation. Soil arsenic results are discussed in detail in Section 3.2.1, and TBT results are discussed in detail in Section 3.2.3.

3.1.2.1 Supplemental Arsenic Characterization

After receipt of results from the initial round of sampling, additional step-out samples to delineate arsenic in shallow soil were collected on November 30 and December 10, 2020. Step-out samples were collected at approximately 10-foot lateral intervals in accordance with the Work Plan to delineate arsenic along the eastern boundary on the initial study area (locations COMP-1e and COMP-2e) and the western boundary (locations COMP-7e through COMP-7j).

Surface soil samples were collected from the 0 to 0.5 feet bgs interval at all step-out locations except in the area to the southwest of the former ASKO warehouse. Pavement below the shallow soil in this vicinity was found to extend westward as shown on Figure 5, and refusal was encountered at 0.4 and 0.1 foot bgs at COMP-7e and COMP-7h, respectively. A deeper sample was also collected from 0.5 to 1 foot bgs at step-out location COMP-7i, and a step-down sample was collected from 1 to 2 feet bgs at location COMP-7b. Soil arsenic results for these step-out and step-down samples are discussed in detail in Section 3.2.1.

Following discussion of the initial arsenic data with Ecology, additional step-out and step-down samples were collected to further delineate the extents of arsenic in soil on February 22, 2021, and March 22, 2021. Step-out surface soil samples were collected from 0 to 0.5 foot bgs at 10-foot lateral intervals along the eastern and western boundaries of the initial study area (i.e., locations CAA7-SW11 through CAA7-SW14 and CAA7-SW18 through CAA7-SW26) and underlying samples from 0.5 to 1 foot bgs were collected at a subset of the step-out locations along the western portion of the study area. Additionally, samples were collected from 1 to 1.5 feet bgs to further define the depth of contamination at several locations in the western and northeastern portion of the initial study area (i.e., locations CAA7-B05 through CAA7-B10) and along the northern shoreline (CAA7-SW15 through CAA7-SW17). The shoreline locations CAA7-SW16 and CAA7-SW17 were re-occupied during the March 2021 sampling effort and designated as CAA7-B11 and CAA7-B12, respectively, and deeper samples were collected from 2 to 2.25 feet bgs. Soil arsenic results for these step-out and step-down samples are discussed in detail in Section 3.2.1.

During shallow soil sampling, surface soils generally consisted of topsoil or gravel underlain by sand with silt and gravel. Abundant earthworms and rootlets were observed throughout the soil in the study area. Below the surface soils, a firm gray silty sand with rounded gravel and orange mottling interpreted to be native soil was encountered and at depths ranging from 0.5 to 2 feet bgs. In the area of the Salmon Bay shoreline adjacent to the concrete bank armoring, a seam of angular and coarse black sand with a vitreous appearance interpreted to be sandblast grit was encountered at approximately 0.5 to 0.75 feet bgs at location CAA7-B12. This grit was encountered in sandy material intermixed with smaller pieces of broken concrete interpreted to be fill. Suspected sandblast grit was not observed elsewhere in the study area.

3.2 SUMMARY OF SOIL ANALYTICAL RESULTS

The analytical results for arsenic, other metals, and TBT are presented in the following sections. These sample results were compared to criteria for cleanup established in the CAP and other criteria for soil quality established in the Supplemental Upland RI/FS, Work Plan, and Model Toxics Control Act (MTCA) regulation. Laboratory reports are provided in Attachment 3.

3.2.1 Arsenic Results

Arsenic was detected in all samples analyzed, at concentrations ranging from 3.7 to 1,680[2] milligrams per kilogram (mg/kg). The greatest concentrations of arsenic were detected in surface soils from approximately 0 to 0.5 or 0 to 1 foot bgs, with significantly lesser concentrations detected in deeper intervals. Arsenic in shallow soil was found to be concentrated in the areas of Icicle Seafoods's former waterfront operations to the north, east, and west of the former ASKO warehouse building and along the paved areas to the east and west of the warehouse building. This distribution is consistent with storage of sandblast grit piles containing arsenic (and other metals) adjacent to waterfront operational areas, and limited distribution of sandblast grit to surrounding surface soils by handling, wind action, and equipment tracking. Arsenic concentrations were least to the south of the former ASKO warehouse, farthest from the former waterfront operations where surface soils were likely shielded from wind by the building and historical aerial photos indicate that the primary land use was parking of employee vehicles.

Arsenic results were compared to the Property CUL of 7.3 mg/kg established in the CAP, which is based on natural background concentrations of arsenic (In accordance with WAC 173-340-705(6), the CUL for arsenic was adjusted upward to this natural background value, which is considered a surrogate for protection of the groundwater leaching pathway and ecological receptors). Results were also compared to regulatory criteria to provide additional context regarding the magnitude of arsenic concentrations greater than the Property CUL. These additional regulatory criteria include the MTCA Method A CUL for unrestricted land use of 20 mg/kg and the MTCA Method C CUL of 88 mg/kg, which is based on protection of human health from carcinogenic effects of arsenic via direct contact for a commercial/industrial property consistent with current and future use.

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[2] An arsenic concentration of 1,680 mg/kg was reported by the laboratory for this sample. Consistent with established data presentation rules for the Property, the result has been rounded to two significant figures (i.e., 1,700 mg/kg) for presentation in data tables and figures. Refer to Attachment 3 for laboratory reports.

Arsenic results in soil are presented in Table 1 and shown relative to the above criteria on Figure 5. Available groundwater results and soil results for arsenic originally presented in the Supplemental Upland RI/FS are also shown on Figure 5.

In the initial samples analyzed, arsenic exceedances of the CUL of 7.3 mg/kg were encountered in all of the CAA-7 excavation area sidewall samples except westernmost sample SW10 and all of the surface soil composites except COMP-6 located farthest to the south and up-slope from the shoreline of Salmon Bay. The excavation base samples collected from 1 to 1.25 feet bgs were all less than the CUL except at easternmost sample location CAA7-B04, which is in an area with significantly elevated arsenic concentrations.

Follow-up analysis of archived discrete samples comprising the surface soil composites and selected deeper discrete samples from 0.5 to 1 foot bgs showed that arsenic is present primarily in surface soil at concentrations greater than the CUL above approximately 0.5 feet bgs. Arsenic concentrations exceeding the CUL are present in the areas surrounding the former ASKO warehouse, extending to the approximate boundary of the former Icicle Seafoods operations to the east and onto the West Waterfront parcel to the west. Arsenic concentrations were generally less than the CUL to the south and southeast of the warehouse except along the driveway (i.e., locations COMP-2a, COMP-3b, and COMP-4b, as shown on Figure 5) where the primary mechanism of soil contamination is presumed to be vehicle or equipment tracking.

Shallow soil hot spots with arsenic concentrations greater than the MTCA Method C CUL of 88 mg/kg were encountered along the waterfront within the former Icicle Seafoods operational area. In the eastern portion of CAA-7, east-northeast of the former ASKO warehouse (i.e., locations CAA7-B04 and CAA7-SW03 through CAA7-SW07, as shown on Figure 5), arsenic concentrations ranging from 150 to 1,680 mg/kg were detected in surface soil above 2 feet bgs. Along the waterfront to the west of the warehouse and extending south along the west wall of the building (i.e., locations COMP-7a through COMP-7h and COMP 7j, as shown on Figure 5), arsenic concentrations ranging from 32 to 620 mg/kg were detected in surface soil above 1 foot bgs. Both of these hot spots are generally correlated with sandblast grit pile locations and concrete structures along the shoreline, consistent with former waterfront operations. Additional localized hot spots with arsenic greater than the MTCA Method C CUL of 88 mg/kg are located at COMP-2c and COMP-4b, which are along the driveway close to the transition from pavement to compact gravel. The distribution of elevated shallow arsenic was also found to extend at lesser concentrations to localized areas in the southwestern portion of the study area, where an arsenic concentration of 37 mg/kg was detected in surface soil at location CAA7-SW22. This small and highly localized hot spot is also presumed to result from windborne deposition west of the former ASKO building or vehicle tracking at the edge of the former parking area.

Arsenic contamination in soil is limited to within the top 0.5 to 1 foot throughout the former Icicle Seafoods operation area and extends slightly deeper to 2 feet bgs in the hot spot area along the northern portion of CAA-7, where it is bounded by results less than the CUL from 2 to 2.25 feet at CAA7-B04, CAA7-B11, and CAA7-B12.

The results of the PRDI arsenic analysis indicate that an expansion of the CAA-7 footprint from what is depicted in the CAP is necessary to address shallow arsenic contaminated soil. The proposed revision to CAA-7 excavation boundary is discussed in Section 3.3.

3.2.2 Other Metals Results

After receipt of initial arsenic analytical results, four samples from CAA-7 were selected for follow-up analysis for other metals as specified in the Work Plan. Because there were no samples where arsenic was not detected, the sample selection criteria were adjusted slightly from the Work Plan to better evaluate the range of arsenic conditions encountered, including the least detected concentration (3.7 mg/kg at CAA7-B01), a concentration close to the CUL (7.2 mg/kg at CAA7-SW10), a concentration consistent with an elevated arsenic concentration of approximately 30 mg/kg (35 mg/kg at CAA7-SW01), and the greatest detected concentration (1,680 mg/kg at CAA7-SW04).

These four selected samples were analyzed for cadmium, copper, lead, mercury, silver, and zinc in accordance with the Work Plan to evaluate the correlation of these metals with arsenic and to verify that cleanup of arsenic as the IHS would clean up the other collocated metals. Soil results for these other metals, with the corresponding arsenic results, are presented in Table 2. Results for all of the other metals analyzed were found to be well-correlated with arsenic, with greater arsenic concentrations predicting greater concentrations of other metals.

The detected concentrations of other metals relative to arsenic are shown on Figure 6.[3]

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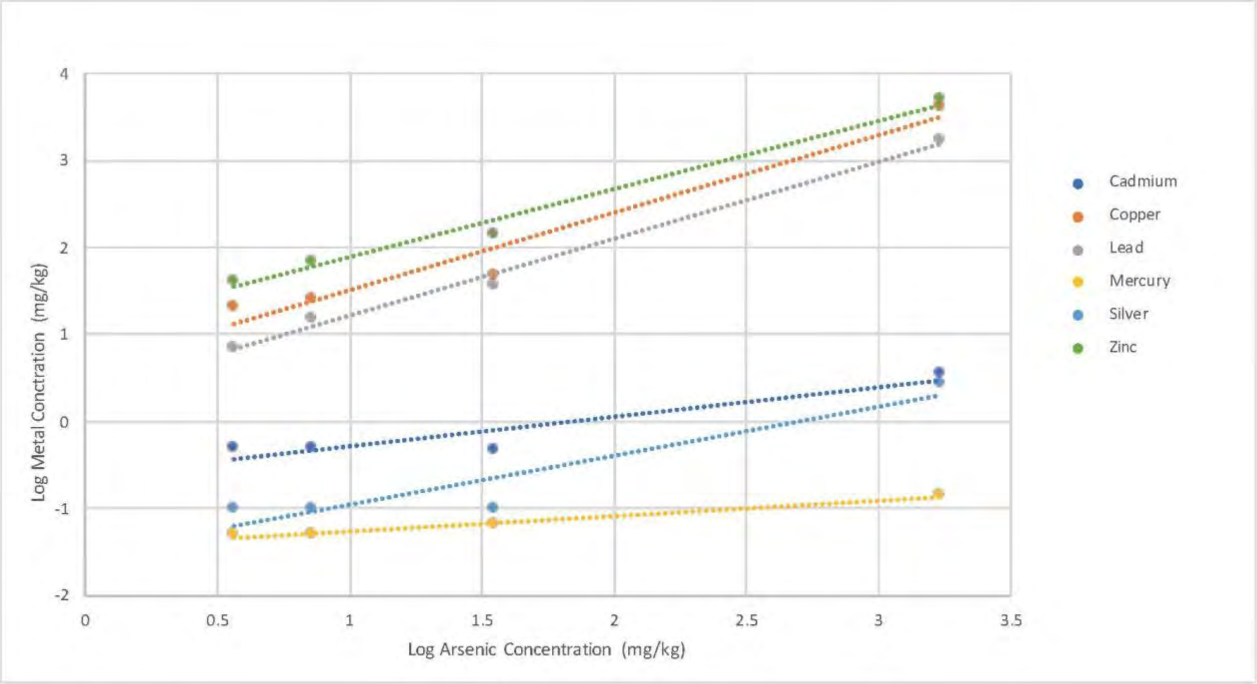
[3] Results are shown on a log-log scale plot in order to display results for multiple metals with varying magnitudes of concentrations on the same diagram.

Figure 6
Other Metals Correlation with Arsenic



The comparison criteria used for evaluation of other metals results are the preliminary CULs (PCULs) for metals established in the Supplemental Upland RI/FS and other applicable MTCA criteria[4] including the following:

- The cadmium PCUL of 0.77 mg/kg, which is based on natural background concentrations
- The copper MTCA Method B CUL of 140 mg/kg, which is based on protection of groundwater via leaching
- The lead PCUL of 24 mg/kg, which is based on natural background concentrations
- The mercury PCUL of 0.070 mg/kg, which is based on natural background concentrations
- The silver PCUL of 0.10 mg/kg, which is based on the laboratory practical quantitation limit using standard analytical methods
- The zinc MTCA Method B CUL of 300 mg/kg, which is based on protection of groundwater via leaching

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[4] PCULs were not established for copper or zinc in the RI/FS because these metals were not identified of chemicals of interest. The MTCA Method B criteria for copper and zinc to protect groundwater via leaching, which is identified as a complete pathway in the RI/FS, have been included in this analysis.

In all four samples analyzed, greater concentrations of other metals were positively correlated with greater arsenic concentrations. As presented in Table 2, in each sample analyzed, the exceedance factor of the arsenic CUL was greater than the exceedance factors of the PCULs for the other metals. Furthermore, at arsenic concentrations approximately equal to the PCUL, concentrations of other metals were significantly less than the PCULs (i.e., approximately 60% or less than PCUL concentrations), demonstrating that the CUL for arsenic is the most sensitive criterion for cleanup of metals contamination. Therefore, arsenic is the appropriate IHS for design of the cleanup action, and cleanup to address arsenic will also address other metals in shallow soil.

3.2.3 TBT Results

TBT was analyzed in the 0 to 0.5 feet bgs composite samples COMP-1 through COMP-7 in order to supplement the prior TBT data collected in CAA-7 that were presented in the Work Plan.

TBT concentrations ranged from nondetect at a reporting limit of 0.0038 mg/kg to detections between the method detection limit and the reporting limited estimated at 0.00066 mg/kg to 0.0020 mg/kg. The seven composite samples were all less than the trigger defined in the Work Plan for analyses of discrete samples (greater than one-fourth of the target REL of 0.047 mg/kg for TBT, or 0.012 mg/kg); therefore, additional TBT follow-up analyses were not warranted. Soil results for TBT are presented in Table 3.

The criteria used for evaluation of TBT results in soil include the following:

- The target REL of 0.047 mg/kg established in the CAP
- The MTCA Method B CUL of 24 mg/kg, which is based on protection of human health via direct contact

All of the soil results for TBT were less than the target REL and confirm that TBT is not a constituent of concern for the Property. Therefore, in accordance with the CAP, cleanup is not necessary for TBT.

3.3 UPDATED DELINEATION OF THE CAA-7 EXCAVATION

The results of the PRDI show that the lateral extents and depth of CAA-7 that were presented in the CAP do not encompass the full extent of arsenic-contaminated soil exceeding the CUL; therefore, the excavation extent has been revised as part of remedial design. As established in the Supplemental Upland RI/FS, and further demonstrated in this PRDI Summary Report, arsenic is an appropriate IHS for determining areas of metals impacts present as a result of former Icicle Seafoods operations that have the potential to pose potential risk to human health or the environment. The revised CAA-7 excavation will remove the lateral and vertical extent of arsenic in soil exceeding the CUL.

3.3.1 Revised CAA-7 Excavation Boundary

The area of shallow soil with arsenic concentrations greater than the CUL of 7.3 mg/kg is shown on Figure 7 and defines the revised extent of the CAA-7 excavation. Based on the available data, soil within the revised CAA-7 boundary would be excavated to a depth of 0.5 or 1 foot bgs consistent with the CAP, with an additional targeted hot spot excavation to 2 feet bgs in the vicinity of CAA7-B04 that extends approximately 75 feet to the west along the shoreline (refer to Figure 7). Excavation will be completed in the former operational areas surrounding the former ASKO warehouse and in the southwest corner of the former parking area. The total excavation area encompasses 13,025 square feet and 485 cubic yards of soil.

As shown on Figure 7, the excavation will include areas of vegetated and gravel ground surface, removal of subsurface paving encountered during field investigation, and soil removal beneath the vacant storage shed, which was constructed after the start of Icicle Seafoods operations at the Property. The excavation excludes the soil beneath surface improvements that predate Icicle Seafoods operations that would have prevented arsenic in sandblast grit from reaching the soil surface, including the former ASKO warehouse and the adjoining warehouse concrete pad.[5] The warehouse and the shed will be demolished prior to excavation. The warehouse slab and adjoining concrete pad will remain in place to limit the amount of exposed soils during excavation.

Soil will be removed to the target depths shown on Figure 7. In the area of the warehouse slab and concrete pad, excavation will remove all soil up to the edges of the concrete. Along the shoreline, excavation will remove the entirety of the bank to the water’s edge of Salmon Bay above the ordinary high-water level.

3.3.2 CAA-7 Excavation Confirmation Samples

The final lateral and vertical extents of the excavation have been confirmed predominately by the PRDI sample collection described in previous sections. Surface (0 to 0.5 feet bgs) soil samples collected along the eastern, southern, and western/southwestern boundaries of CAA-7 excavation areas at a frequency of approximately 1 sample for every 40 or fewer feet define the lateral limits of the excavation. The lateral extent of excavation will be defined to the north by the shoreline of Salmon Bay above the ordinary high-water mark (OHWM), which is the demarcation between the uplands and the Salmon Bay sediments per the PPCD. The OHWM is, therefore, the maximum practical extent of excavation, and confirmation samples will not be collected from the northern extent of the excavation because the entirety of the upland soil will be removed (base samples along the shoreline confirm the necessary depth of excavation to meet cleanup objectives). Where the excavation is defined by improvements that pre-dated Icicle Seafoods operations, the lateral extent of excavation will extend to the edges of these improvements (i.e., edge of concrete) and, therefore, additional samples will not be collected from the lateral extents that border these improvements. Existing base and sidewall samples will

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[5] The former ASKO warehouse, east-adjacent paved ASKO warehouse pad, and the paved access driveway pre-date the start of Icicle Seafoods operations at the Property, as shown on Figures 4, 5, and 7.

be supplemented with additional proposed base samples in areas where deeper samples could not be collected due to obstruction and to fill spatial data gaps as shown on Figure 7, to achieve a base sample frequency of approximately one sample per 460 square feet of excavation.

Confirmation samples will demonstrate that the soil cleanup achieves compliance with the cleanup standard in accordance with MTCA (WAC 173-340-740(7)) as described in the Construction Compliance Monitoring Plan presented in the EDR. Refer to Appendix G (and Figure G-7) of the EDR for more specific detail regarding confirmation sample collection and refer to Section 6.2.3.1 of the EDR for additional detail regarding verification of compliance with the cleanup standards.

4.0 References

Floyd|Snider. 2019. *Time Oil Bulk Terminal PPA Supplemental Upland Remedial Investigation Work Plan.* Prepared for Cantera Development Group, LLC. March.

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Washington State Department of Ecology (Ecology). 2020. *Cleanup Action Plan, Time Oil Bulk Terminal, Seattle, WA.* 28 September.

Time Oil Bulk Terminal Site

Pre-Remedial Design
Investigation Summary Report

Tables

Table 1
Summary of Arsenic Results in Soil, Shoreline Area of Concern

				Analyte	**Arsenic (mg/kg)**
				CUL	**7.3**
Sample Type	**Location**	**Sample ID**	**Sample Date**	**Depth (feet bgs)**	
Initial Cleanup Action Area 7 Excavation Base	CAA7-B01	CAA7-B01-1.0-1.25	11/13/20	1.0–1.25	3.7
	CAA7-B02	CAA7-B02-1.0-1.25	11/13/20	1.0–1.25	5.7
	CAA7-B03	CAA7-B03-1.0-1.25	11/13/20	1.0–1.25	6.7
	CAA7-B04	CAA7-B04-1.0-1.25	11/13/20	1.0–1.25	**550**
		CAA7-B4-2.0-2.25	11/13/20	2.0–2.25	6.0
Aditional Cleanup Action Area 7 Excavation Base	CAA7-B05	CAA7-B05-1.0-1.5	2/22/21	1.0–1.5	**9.2**
	CAA7-B06	CAA7-B06-1.0-1.5	2/22/21	1.0–1.5	**7.9**
	CAA7-B07	CAA7-B07-1.0-1.5	2/22/21	1.0–1.5	5.8
	CAA7-B08	CAA7-B08-1.0-1.5	2/22/21	1.0–1.5	4.9
	CAA7-B11	CAA7-B11-2.0-2.25	3/22/21	2.0–2.25	6.5
	CAA7-B12	CAA7-B12-2.0-2.25	3/22/21	2.0–2.25	5.8
Initial Cleanup Action Area 7 Excavation Sidewall	CAA7-SW01	CAA7-SW01-0.25-0.75	11/13/20	0.25–0.75	**35**
	CAA7-SW02	CAA7-SW02-0.25-0.75	11/13/20	0.25–0.75	**15**
	CAA7-SW03	CAA7-SW03-0.25-0.75	11/13/20	0.25–0.75	**150**
	CAA7-SW04	CAA7-SW04-0.25-0.75	11/13/20	0.25–0.75	**1700**
	CAA7-SW05	CAA7-SW05-0.25-0.75	11/13/20	0.25–0.75	**150**
	CAA7-SW06	CAA7-SW06-0.25-0.75	11/13/20	0.25–0.75	**230**
	CAA7-SW07	CAA7-SW07-0.25-0.75	11/13/20	0.25–0.75	**550**
	CAA7-SW08	CAA7-SW08-0.25-0.75	11/13/20	0.25–0.75	6.8
	CAA7-SW09	CAA7-SW09-0.25-0.75	11/13/20	0.25–0.75	**9.5**
	CAA7-SW10	CAA7-SW10-0.25-0.75	11/13/20	0.25–0.75	7.2
Composite Shallow Soil	COMP-1	COMP-1-0.0-0.5	11/13/20	0.0–0.5	**27**
Discrete Shallow Soil	COMP-1a	COMP-1a-0.0-0.5	11/13/20	0.0–0.5	**10**
	COMP-1b	COMP-1b-0.0-0.5	11/13/20	0.0–0.5	**14**
		COMP-1b-0.5-1.0	11/13/20	0.5–1.0	**12**
	COMP-1c	COMP-1c-0.0-0.5	11/13/20	0.0–0.5	**18**
		COMP-1c-0.5-1.0	11/13/20	0.5–1.0	6.4
	COMP-1d	COMP-1d-0.0-0.5	11/13/20	0.0–0.5	**22**
		COMP-1d-0.5-1.0	11/13/20	0.5–1.0	**7.5**
	COMP-1e	COMP-1e-0.0-0.5	11/30/20	0.0–0.5	**24**
Composite Shallow Soil	COMP-2	COMP-2-0.0-0.5	11/13/20	0.0–0.5	**40**
Discrete Shallow Soil	COMP-2a	COMP-2a-0.0-0.5	11/13/20	0.0–0.5	**16**
		COMP-2a-0.5-1.0	11/13/20	0.5–1.0	3.5
	COMP-2b	COMP-2b-0.0-0.5	11/13/20	0.0–0.5	**38**
		COMP-2b-0.5-1.0	11/13/20	0.5–1.0	2.1
	COMP-2c	COMP-2c-0.0-0.5	11/13/20	0.0–0.5	**150**
		COMP-2c-0.5-1.0	11/13/20	0.5–1.0	4.2
	COMP-2d	COMP-2d-0.0-0.5	11/13/20	0.0–0.5	4.4
	COMP-2e	COMP-2e-0.0-0.5	11/30/20	0.0–0.5	**9.5**

Table 1
Summary of Arsenic Results in Soil, Shoreline Area of Concern

				Analyte	Arsenic (mg/kg)
				CUL	7.3
Sample Type	**Location**	**Sample ID**	**Sample Date**	**Depth (feet bgs)**	
Composite Shallow Soil	COMP-3	COMP-3-0.0-0.5	11/13/20	0.0–0.5	**9.2**
Discrete Shallow Soil	COMP-3a	COMP-3a-0.0-0.5	11/13/20	0.0–0.5	**16**
		COMP-3a-0.5-1.0	11/13/20	0.5–1.0	4.6
	COMP-3b	COMP-3b-0.0-0.5	11/13/20	0.0–0.5	**18**
		COMP-3b-0.5-1.0	11/13/20	0.5–1.0	3.4
	COMP-3c	COMP-3c-0.0-0.5	11/13/20	0.0–0.5	4.7
	COMP-3d	COMP-3d-0.0-0.5	11/13/20	0.0–0.5	3.8
Composite Shallow Soil	COMP-4	COMP-4-0.0-0.5	11/13/20	0.0–0.5	**28**
Discrete Shallow Soil	COMP-4a	COMP-4a-0.0-0.5	11/13/20	0.0–0.5	**20**
		COMP-4a-0.5-1.0	11/13/20	0.5–1.0	**7.4**
	COMP-4b	COMP-4b-0.0-0.4	11/13/20	0.0–0.4	**130**
	COMP-4c	COMP-4c-0.0-0.5	11/13/20	0.0–0.5	4.7
	COMP-4d	COMP-4d-0.0-0.5	11/13/20	0.0–0.5	4.0
Composite Shallow Soil	COMP-5	COMP-5-0.0-0.5	11/13/20	0.0–0.5	**20**
Discrete Shallow Soil	COMP-5a	COMP-5a-0.0-0.5	11/13/20	0.0–0.5	**47**
	COMP-5b	COMP-5b-0.0-0.5	11/13/20	0.0–0.5	**12**
		COMP-5b-0.5-1.0	11/13/20	0.5–1.0	**8.7**
	COMP-5c	COMP-5c-0.0-0.5	11/13/20	0.0–0.5	4.1
	COMP-5d	COMP-5d-0.0-0.5	11/13/20	0.0–0.5	5.7
Composite Shallow Soil	COMP-6	COMP-6-0.0-0.5	11/13/20	0.0–0.5	4.7
Discrete Shallow Soil	COMP-6a	COMP-6a-0.0-0.5	11/13/20	0.0–0.5	5.8
	COMP-6d	COMP-6d-0.0-0.5	11/13/20	0.0–0.5	1.1
Composite Shallow Soil	COMP-7	COMP-7-0.0-0.5	11/13/20	0.0–0.5	**300**
Discrete Shallow Soil	COMP-7a	COMP-7a-0.0-0.5	11/13/20	0.0–0.5	**150**
		COMP-7a-0.5-1.0	11/13/20	0.5–1.0	**36**
	COMP-7b	COMP-7b-0.0-0.5	11/13/20	0.0–0.5	**620**
		COMP-7b-0.5-1.0	11/13/20	0.5–1.0	**88**
		COMP-7b-1.0-2.0	11/30/20	1.0–2.0	**8.1**
	COMP-7c	COMP-7c-0.0-0.5	11/13/20	0.0–0.5	**38**
		COMP-7c-0.5-1.0	11/13/20	0.5–1.0	**8.1**
	COMP-7d	COMP-7d-0.0-0.4	11/13/20	0.0–0.4	**110**
	COMP-7e	COMP-7e-0.0-0.4	11/30/20	0.0–0.4	**170**
	COMP-7f	COMP-7f-0.0-0.5	11/30/20	0.0–0.5	**39**
	COMP-7g	COMP-7g-0.0-0.5	11/30/20	0.0–0.5	**230**
	COMP-7h	COMP-7h-0.0-0.1	12/10/20	0.0–0.1	**91**
	COMP-7i	COMP-7i-0.0-0.5	12/10/20	0.0–0.5	**12**
		COMP-7i-0.5-1.0	12/10/20	0.5–1.0	**11**
	COMP-7j	COMP-7j-0.0-0.5	12/10/20	0.0–0.5	**32**

Table 1
Summary of Arsenic Results in Soil, Shoreline Area of Concern

				Analyte	Arsenic (mg/kg)
				CUL	7.3
Sample Type	**Location**	**Sample ID**	**Sample Date**	**Depth (feet bgs)**	
Discrete Shallow Soil	CAA7-SW11	CAA7-SW11-0.0-0.5	2/22/21	0.0–0.5	3.6
		CAA7-SW11-0.5-1.0	2/22/21	0.5–1.0	4.9
	CAA7-SW12	CAA7-SW12-0.0-0.5	2/22/21	0.0–0.5	4.0
		CAA7-SW12-0.5-1.0	2/22/21	0.5–1.0	4.0
	CAA7-SW13	CAA7-SW13-0.0-0.5	2/22/21	0.0–0.5	2.2
		CAA7-SW13-0.5-1.0	2/22/21	0.5–1.0	2.0
	CAA7-SW14	CAA7-SW14-0.0-0.5	2/22/21	0.0–0.5	**28**
		CAA7-SW14-0.5-1.0	2/22/21	0.5–1.0	6.0
	CAA7-SW15	CAA7-SW15-1.0-1.5	2/22/21	1.0–1.5	**7.8**
	CAA7-SW16	CAA7-SW16-1.0-1.5	2/22/21	1.0–1.5	**30**
	CAA7-SW17	CAA7-SW17-1.0-1.5	2/22/21	1.0–1.5	**18**
	CAA7-SW18	CAA7-SW18-0.0-0.5	2/22/21	0.0–0.5	5.4
	CAA7-SW19	CAA7-SW19-0.0-0.5	2/22/21	0.0–0.5	**19**
	CAA7-SW20	CAA7-SW20-0.0-0.5	2/22/21	0.0–0.5	5.0
	CAA7-SW21	CAA7-SW21-0.0-0.5	2/22/21	0.0–0.5	4.4
	CAA7-SW22	CAA7-SW22-0.0-0.5	2/22/21	0.0–0.5	**37**
	CAA7-SW23	CAA7-SW23-0.0-0.5	3/22/21	0.0–0.5	**11**
	CAA7-SW24	CAA7-SW24-0.0-0.5	3/22/21	0.0–0.5	**13**
	CAA7-SW25	CAA7-SW25-0.0-0.5	3/22/21	0.0–0.5	6.4
	CAA7-SW26	CAA7-SW26-0.0-0.5	3/22/21	0.0–0.5	**14**

Notes:

	Criteria and results have been rounded to two significant digits.
RED/BOLD	Indicates a concentration that exceeds the CUL.

Abbreviations:

bgs	Below ground surface
CUL	Cleanup level
mg/kg	Milligrams per kilogram

Table 2
Summary of Metals Results in Soil, Shoreline Area of Concern

Location					CAA7-B01		CAA7-SW01		CAA7-SW04		CAA7-SW10	
Sample ID					CAA7-B01-1.0-1.25		CAA7-SW01-0.25-0.75		CAA7-SW04-0.25-0.75		CAA7-SW10-0.25-0.75	
Sample Date					11/13/2020		11/13/2020		11/13/2020		11/13/2020	
Depth (feet bgs)					1.0–1.25		0.25–0.75		0.25–0.75		0.25–0.75	
Analyte	**Unit**	**MTCA Method B (1)**	**PCUL**	**CUL**	**Result**	**EF**	**Result**	**EF**	**Result**	**EF**	**Result**	**EF**
Arsenic	mg/kg	NA	--	7.3	3.7	0.51	**35**	**4.8**	**1,700**	**230**	7.2	0.99
Cadmium	mg/kg	NA	0.77	--	0.50 U	*0.65*	0.46	0.60	**3.6**	**4.7**	0.50 U	*0.65*
Copper	mg/kg	140	--	--	21	*0.15*	48	0.34	**4,100**	**29**	25	0.18
Lead	mg/kg	NA	24	--	7.0	0.29	**36**	**1.5**	**2,500**	**100**	15	0.63
Mercury	mg/kg	NA	0.070	--	0.050 U	*0.71*	0.064	0.91	**0.14**	**2.0**	0.050 U	*0.71*
Silver	mg/kg	NA	0.10	--	0.10 U	*1.0*	0.10 U	*1.0*	4.0 U	*40*	0.10 U	*1.0*
Zinc	mg/kg	300	--	--	40	0.13	140	0.47	**4,900**	**16**	69	0.23

Notes:

	Criteria and results have been rounded to two significant digits.
--	Not established.
RED/BOLD	Indicates a concentration that exceeds the applicable CUL or PCUL.
italic	Exceedance factor calculated for the practical quantitation limit of a non-detect result; the true exceedance factor is less than the calculated value.
1	The criterion is the MTCA B cleanup level for protection of groundwater via leaching.

Abbreviations:

bgs	Below ground surface
CUL	Cleanup level
EF	Exceedance factor
mg/kg	Milligrams per kilogram
NA	The criterion is not applicable because it is superceded by a PCUL or CUL.
PCUL	Preliminary cleanup level

Qualifier:

U	Analyte was not detected at the given reporting limit.

Table 3
Summary of Tributyltin Results in Soil, Shoreline Area of Concern

		Analyte	Tributyltin (mg/kg)
		Target REL	0.047
		MTCA Method B CUL	24
Location	Sample Date	Depth Range (feet bgs)	
COMP-1	11/13/2020	0.0–0.5	0.0020 JQ
COMP-2	11/13/2020	0.0–0.5	0.00066 JQ
COMP-3	11/13/2020	0.0–0.5	0.0038 U
COMP-4	11/13/2020	0.0–0.5	0.0038 UJ
COMP-5	11/13/2020	0.0–0.5	0.0011 JQ
COMP-6	11/13/2020	0.0–0.5	0.0038 U
COMP-7	11/13/2020	0.0–0.5	0.0012 JQ

Note:

Criteria and results have been rounded to two significant digits.

Abbreviations:

bgs	Below ground surface
CUL	Cleanup level
mg/kg	Milligrams per kilogram
MTCA	Model Toxics Control Act
REL	Remediation level

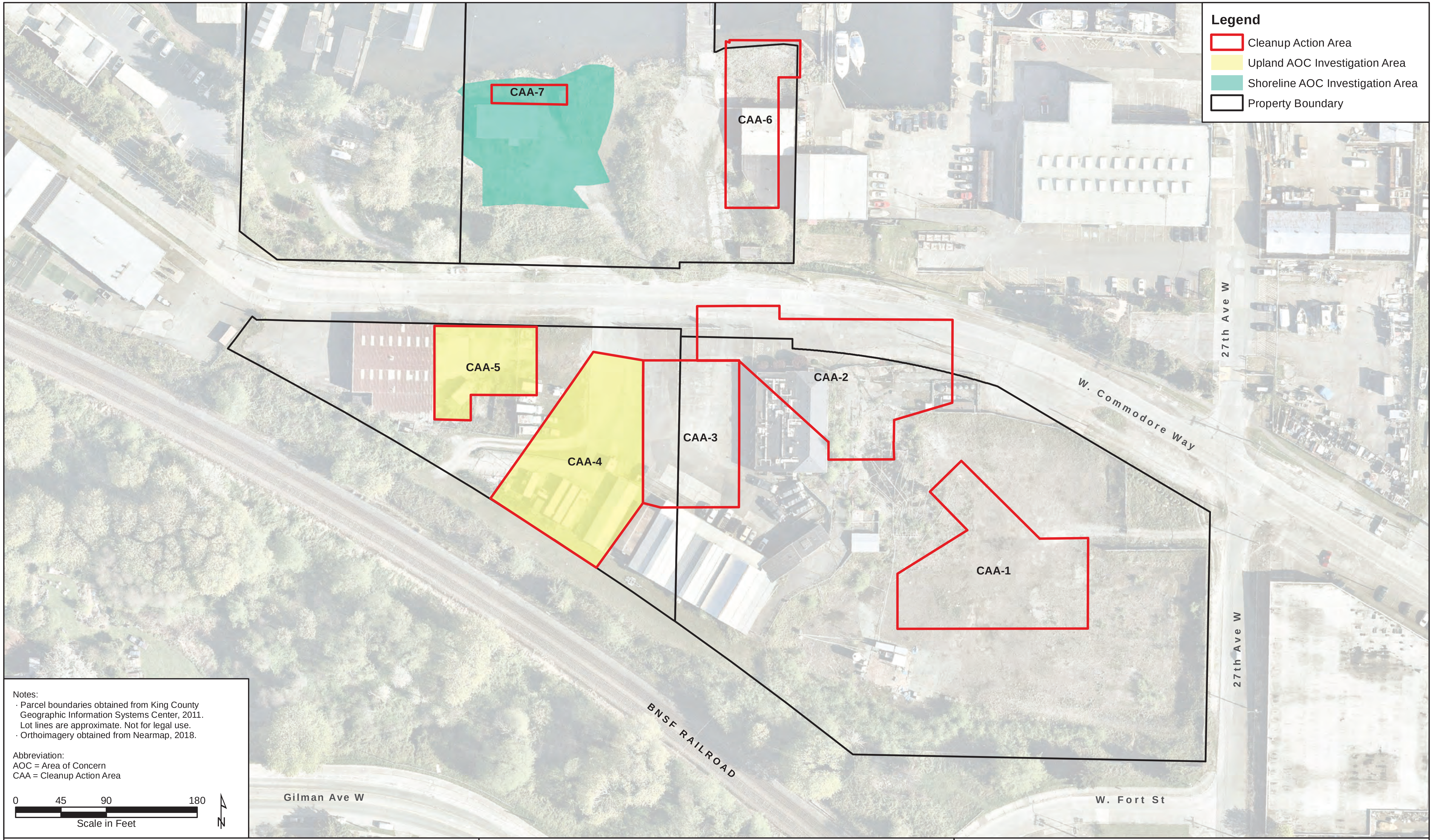
Qualifiers:

JQ	Analyte was detected between the method detection limit and reporting limit and is considered to be an estimate.
U	Analyte was not detected at the given reporting limit.
UJ	Analyte was not detected at the given reporting limit, which is considered to be an estimate.

Time Oil Bulk Terminal Site

Pre-Remedial Design Investigation Summary Report

Figures



Notes:
- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

Abbreviation:
AOC = Area of Concern
CAA = Cleanup Action Area

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Figure 1
Pre-Remedial Design Investigation Areas

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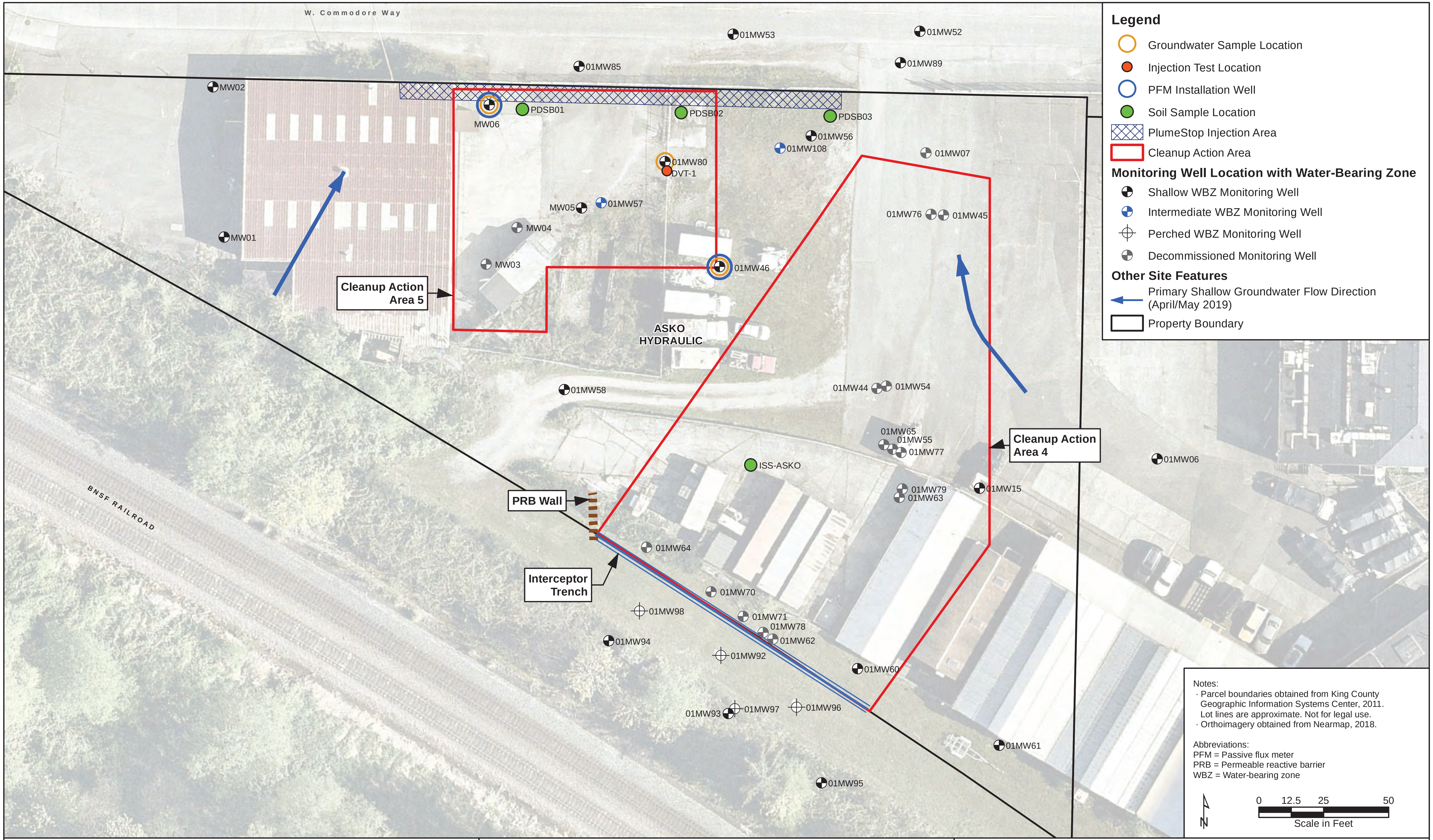

Notes:
- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

Abbreviations:
PFM = Passive flux meter
PRB = Permeable reactive barrier
WBZ = Water-bearing zone

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Figure 2
Upland Area of Concern Investigation Locations

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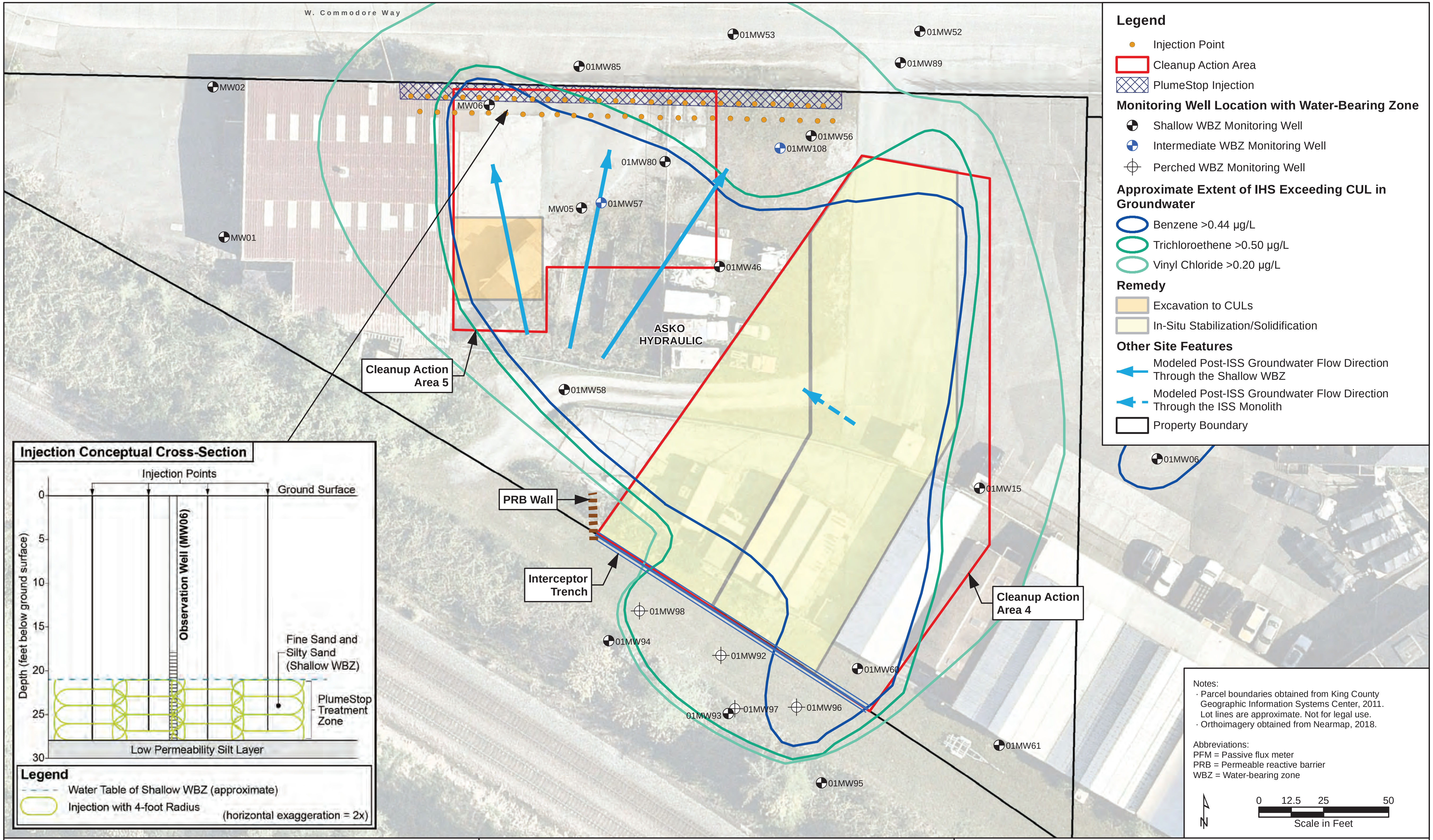

Notes:
- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

Abbreviations:
PFM = Passive flux meter
PRB = Permeable reactive barrier
WBZ = Water-bearing zone

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Figure 3
Upland Area of Concern PlumeStop Injection Layout

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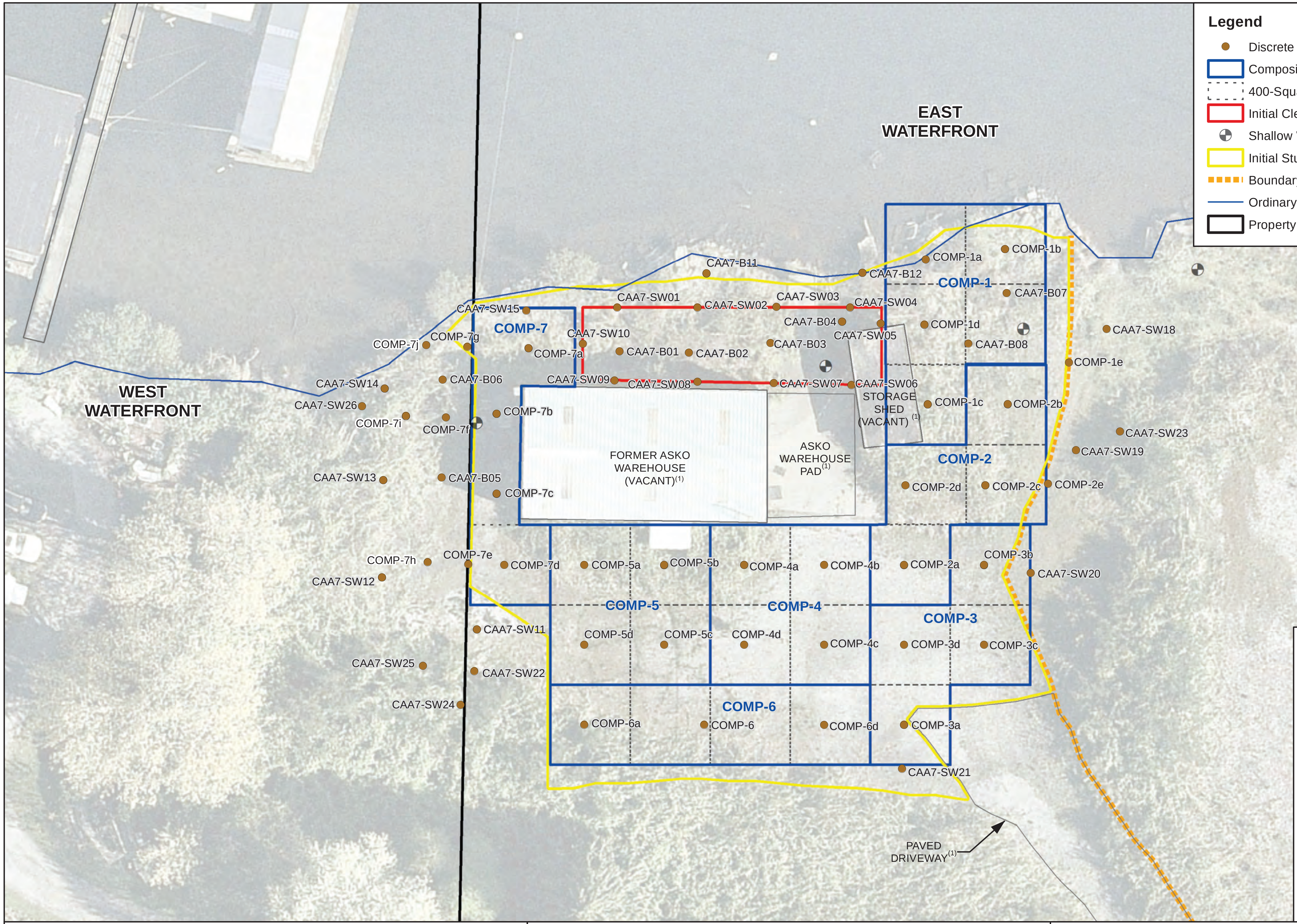

Notes:

1. Available records indicate the former ASKO warehouse, ASKO warehouse pad, and paved driveway were constructed prior to the start of Icicle Seafoods operations at the property and the vacant storage shed was constructed after Icicle Seafoods ceased operations.

- Ground surface coverings are approximated based on historical aerial photographs and current observed Property conditions.
- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

Abbreviations:
ASKO = Asko Hydraulic
CAA = Cleanup Action Area
TOC = Time Oil Company
WBZ = Water-bearing zone

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Figure 4
Shoreline Area of Concern Investigation Locations

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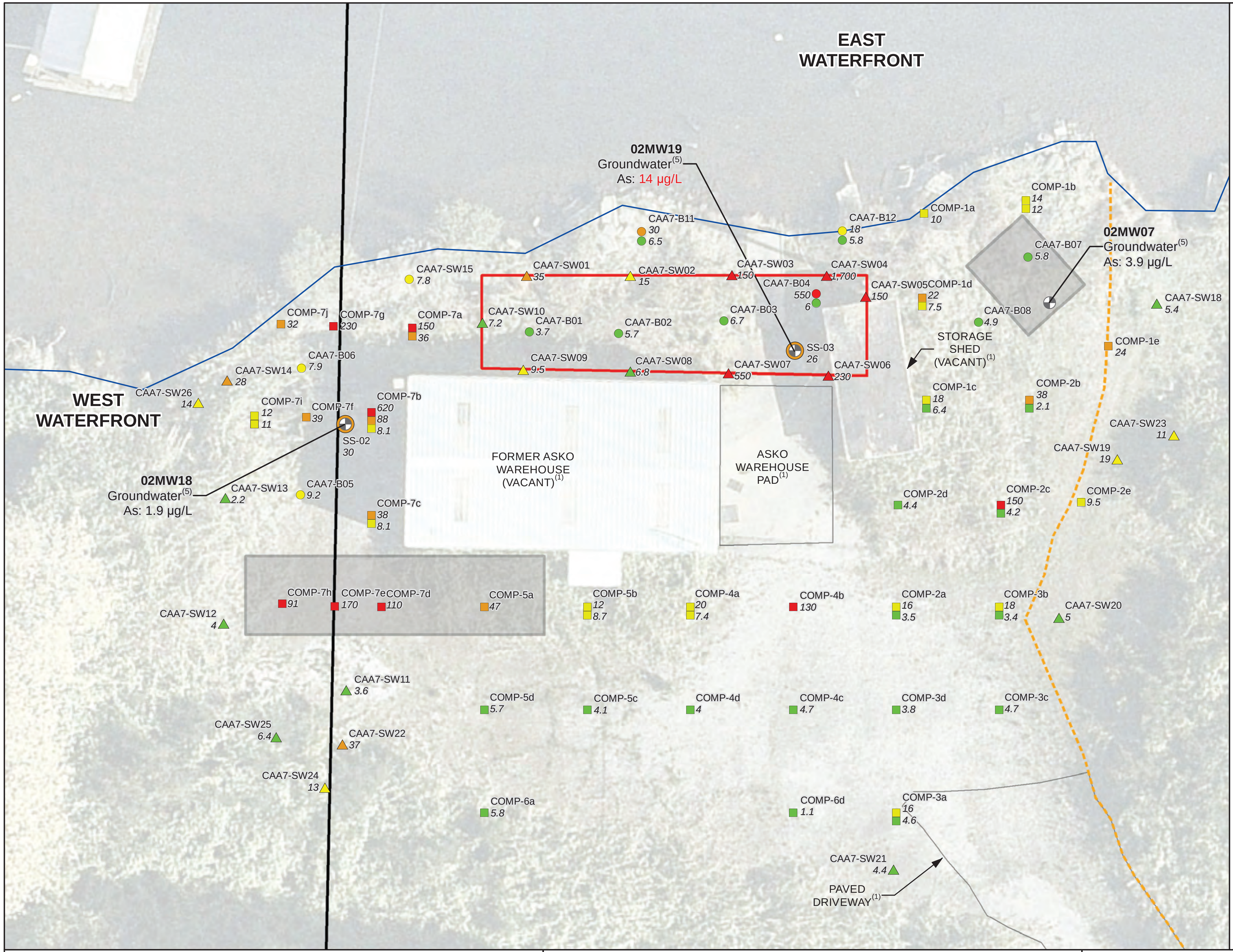

Legend

- ◉ Shallow WBZ Monitoring Well
- ▨ Field Observation of Pavement Below Shallow Soil
- 🟥 Initial Cleanup Action Area 7
- - - - Boundary Between TOC and Icicle Seafoods Operations
- — Ordinary High Water Line
- ☐ Property Boundary

Arsenic Result[(2)]

- 🟩 ≤7.3 mg/kg
- 🟨 >7.3 mg/kg and ≤20 mg/kg
- 🟧 >20 mg/kg and ≤88 mg/kg
- 🟥 >88 mg/kg

Sample Type

△ Initial Cleanup Action Area 7 Excavation Sidewall Sample 0.25–0.75 feet bgs

◉ Monitoring Well Boring Shallow Surface Soil Sample 0–0.5 feet bgs(4)

Excavation Base Sample
- ○ 1–1.25 and 1–1.5 feet bgs
- ○ 2–2.25 feet bgs

Shallow Soil Discrete Sample
- ☐ 0–0.5 feet bgs(3)
- ☐ 0.5–1 feet bgs
- ☐ 1–2 feet bgs

Label Key

Notes:
1. Available records indicate the former ASKO warehouse, ASKO warehouse pad, and paved driveway were constructed prior to the start of Icicle Seafoods operations at the property and the vacant storage shed was constructed after Icicle Seafoods ceased operations.
2. Soil arsenic results were compared to the following criteria: the CUL of 7.3 mg/kg established in the CAP; the MTCA Method A Unrestricted CUL of 20 mg/kg; and the MTCA Method C direct contact CUL of 88 mg/kg.
3. Some discrete soil surface samples (COMP-4b, COMP-7d, COMP-7e, COMP-7h) did not encompass the entire 0–0.5-foot interval due to subsurface obstruction.
4. The soil sample at 02MW19 was collected from 0.25 to 0.75 feet bgs.
5. Groundwater results were compared to the CUL of 5 µg/L established in the CAP. Results exceeding the CUL are shown in RED.

- · Ground surface coverings are approximated based on historical aerial photographs and current observed Property conditions.
- · Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- · Orthoimagery obtained from Nearmap, 2018.

Abbreviations:

As = Arsenic	mg/kg = Milligrams per kilogram
ASKO = Asko Hydraulic	MTCA = Model Toxics Control Act
bgs = Below ground surface	REL = Remediation level
CAP = Cleanup Action Plan	TOC = Time Oil Company
CUL = Cleanup level	WBZ = Water-bearing zone
µg/L = Micrograms per liter	

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Figure 5
Arsenic Results in Soil and Groundwater, Shoreline Area of Concern

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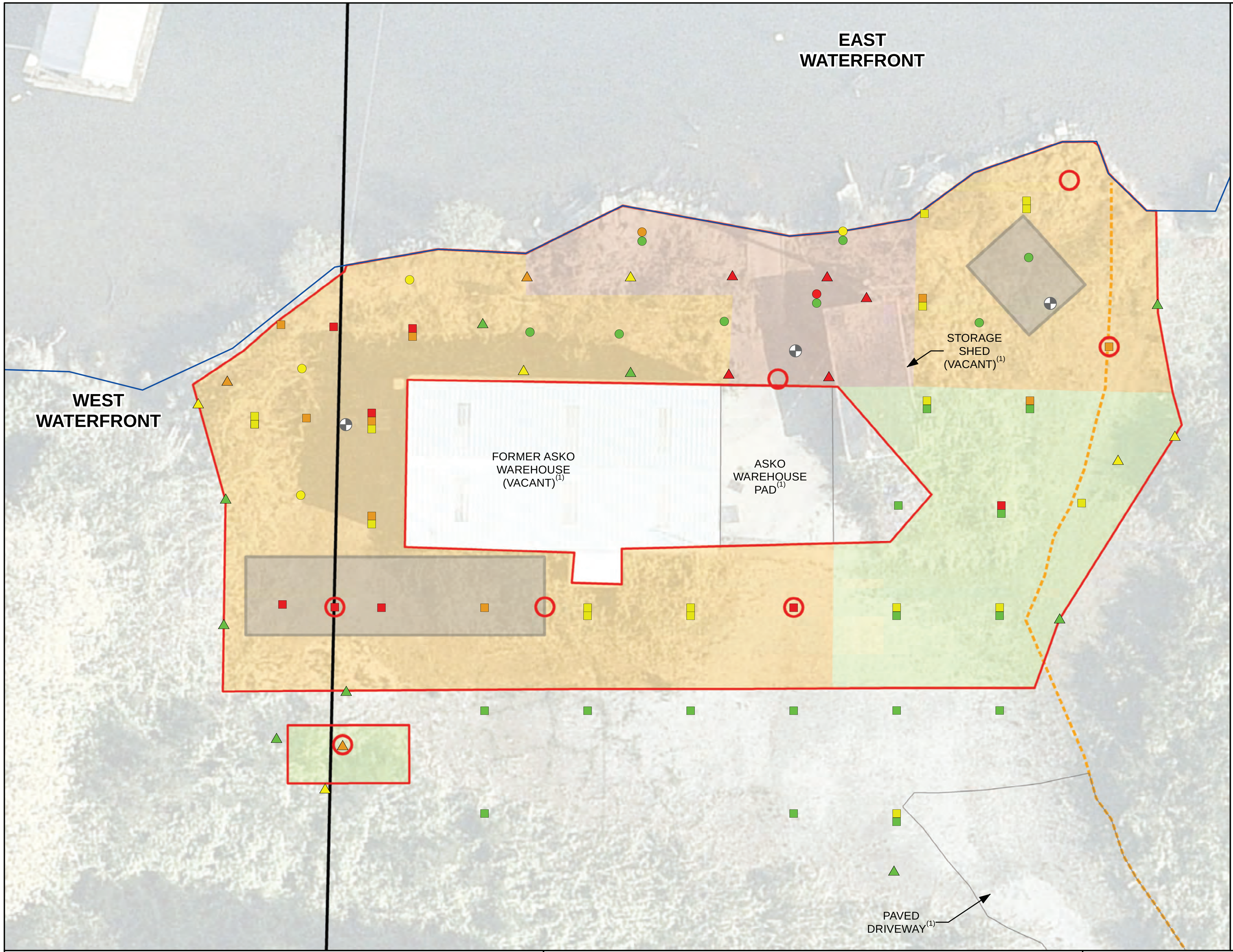


Legend

- Shallow WBZ Monitoring Well
- ▨ Field Observation of Pavement Below Shallow Soil
- ☐ Proposed Revised Cleanup Action Area 7[2]
- 🟩 0.5-foot Excavation Area
- 🟨 1-foot Excavation Area
- 🟥 2-foot Excavation Area
- ○ Proposed Excavation Base Confirmation Sample
- Boundary Between TOC and Icicle Seafoods Operations
- Ordinary High Water Mark
- ☐ Property Boundary

Arsenic Result[3]

- 🟩 ≤7.3 mg/kg
- 🟨 >7.3 mg/kg and ≤20 mg/kg
- 🟧 >20 mg/kg and ≤88 mg/kg
- 🟥 >88 mg/kg

Sample Type

- △ Initial Cleanup Action Area 7 Excavation Sidewall Sample 0.25–0.75 feet bgs

Excavation Base Sample
- ● 1–1.25 and 1–1.5 feet bgs
- ● 2–2.25 feet bgs

Shallow Soil Discrete Sample
- ■ 0–0.5 feet bgs[3]
- ■ 0.5–1 feet bgs
- ■ 1–2 feet bgs

Notes:
1. Available records indicate the former ASKO warehouse, ASKO warehouse pad, and paved driveway were constructed prior to the start of Icicle Seafoods operations at the property and the vacant storage shed was constructed after Icicle Seafoods ceased operations.
2. The Cleanup Action Area 7 excavation will extend to the edges of the paved pads and structures that pre-date Icicle Seafoods operations. Other pavement will be removed during excavation. Confirmation samples will not be collected along the sidewalls of the excavation defined by the paved pads and structures that predated Icicle Seafoods operations.
3. Soil arsenic results were compared to the following criteria: the CUL of 7.3 mg/kg established in the CAP; the MTCA Method A Unrestricted CUL of 20 mg/kg; and the MTCA Method C direct contact CUL of 88 mg/kg.
4. Some discrete soil surface samples (COMP-4b, COMP-7d, COMP-7e, COMP-7h) did not encompass the entire 0–0.5-foot interval due to subsurface obstruction.
4. Monitoring wells within Cleanup Action Area 7 will be protected during excavation.
- · Ground surface coverings are approximated based on historical aerial photographs and current observed Property conditions.
- · Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- · Orthoimagery obtained from Nearmap, 2018.

Abbreviations:
As = Arsenic
ASKO = Asko Hydraulic
bgs = Below ground surface
CAP = Cleanup Action Plan
CUL = Cleanup level
mg/kg = Milligrams per kilogram
MTCA = Model Toxics Control Act
TOC = Time Oil Company
WBZ = Water-bearing zone

N
0 10 20 40
Scale in Feet

FLOYD | SNIDER
strategy • science • engineering

Pre-Remedial Design Investigation Summary Report
Time Oil Bulk Terminal
Seattle, Washington

Figure 7
Cleanup Action Area 7 Excavation Plan

I:\GIS\Projects\Cantera-TOC\MXD\Eng Design\PRDI Summary\Figure 7 CAA 7 Excavation Plan.mxd
5/17/2021

Time Oil Bulk Terminal Site

Pre-Remedial Design Investigation Summary Report

Attachment 1

Cleanup Action Area 4 Investigation Supporting Documentation

CRETE CONSULTING, INC.

Crete Consulting, Inc.
108 South Washington
Suite 300
Seattle, WA 98104

Boring Log

Page 1 of 1

LOCATION/BORING ID: **ISS-ASKO**

PROJECT INFORMATION

PROJECT: **TOC, In Situ Solidification**
SITE NAME: **TOC Seattle Terminal 1**
2737 W. Commodore Way
SITE LOCATION: **Seattle, WA**
JOB NUMBER:
PROJECT MANAGER: **M. Byers, P.E.**
LOGGED BY: **R. Jones**
DATE(S) DRILLED: **10/7/2020**
START TIME: **09:35** END TIME: **11:00**
REMARKS: **ASKO, CAA-4.**

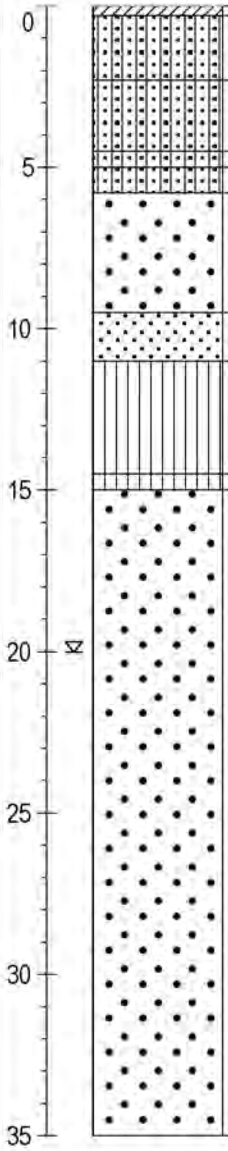
DRILLING INFORMATION

DRILLING COMPANY: **Holocene Drilling**
DRILLING METHOD: **4.25-Inch ID Hollow Stem Auger**
BORING DEPTH: **35 ft bgs**
BORING DIAMETER: **8-inch**
SOIL SCREENING: **MiniRAE PID**
PLUGGING METHOD: **Bentonite chips**

GROUND ELEV: **NM**
ELEV. METHOD: **NM**
COOR. METHOD: **Lat./Long.**

LATITUDE (°N)	LONGITUDE (°W)
47.662189	**122.393821**

▽ INITIAL WATER LEVEL: **20 ft bgs**



USCS	SOIL DESCRIPTION
SM	CONCRETE at surface; no rebar. CLAYEY GRAVEL, wet; tan to gray, black wet staining.
	SILTY SAND, minor to some GRAVEL, moist, brown to gray.
SM	SILTY SAND, fine to medium-grained, moist, reddish brown.
	SILTY SAND, trace GRAVEL, fine to medium grained, moist.
SM	SILT and SAND, very fine to medium-grained, firm, slightly moist to moist, light tan.
SP	SAND, trace to minor SILT, medium-grained, moist, reddish brown to reddish orange. At 9 to 9.5 ft bgs: GRAVEL
SW	SAND, moist, reddish orange.
ML	SILT, hard, dry to slightly moist, tan/brown to gray.
	SANDY SILT, friable, slightly moist, oxidized minerals, red to tan/brown.
SP	SAND, fine to medium-grained, minor to some SILT, moist, gray to dark gray, no appreciable odors. At 20 ft bgs: Wet.

SAMPLE ID	SPT #s	PID (ppm)	COMMENTS
	3/5/6	1.9	
	4/6/9	1.8	
	2/3/3	2.3	
ISS-ASKO 4.5-5.8'	2/3/6	2.2	
ISS-ASKO 5.8-7.5'	3/6/9	1.9	
ISS-ASKO 7.5-9'	6/13/18	2.3	
ISS-ASKO 9-10.5'	3/15/23	2.6	Split spoons cores to 0 to 15 ft bgs
ISS-ASKO 11-11.7'	11/13/15	3.2	
ISS-ASKO 11.7-12.5' ISS-ASKO 12.5-13.5'	3/5/6	2.4	
	6/14/28	3.8	
ISS-ASKO 1-35 ft	N/A	N/A	Mixed auger cuttings 15 to 35 ft bgs

These logs should not be used separately from original report

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

November 6, 2020

Jamie Stevens, Project Manager
Crete Consulting
108 S. Washington St., Suite 300
Seattle, WA 98104

Dear Ms Stevens:

Included are the results from the testing of material submitted on October 7, 2020 from the TOC Seattle Terminal, F&BI 010129 project. There is 1 page included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
CTC1106R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on October 7, 2020 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal, F&BI 010129 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Crete Consulting
010129 -01	ISS-ASKO 4.5-5.8'
010129 -02	ISS-ASKO 5.8-7.5'
010129 -03	ISS-ASKO 7.5-9'
010129 -04	ISS-ASKO 9-10.5'
010129 -05	ISS-ASKO 11-11.7'
010129 -06	ISS-ASKO 11.7-12.5'
010129 -07	ISS-ASKO 12.5-13.5'

Samples ISS-ASKO 4.5-5.8', ISS-ASKO 5.8-7.5', ISS-ASKO 7.5-9', and ISS-ASKO 9-10.5' were sent to Fremont Analytical for grain size analysis. In addition, samples ISS-ASKO 7.5-9' and ISS-ASKO 9-10.5' were sent to Fremont for total organic carbon analysis. The report is enclosed.

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

Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 010129
Work Order Number: 2010106

November 10, 2020

Attention Michael Erdahl:

Fremont Analytical, Inc. received 4 sample(s) on 10/8/2020 for the analyses presented in the following report.

Grain Size by ASTM D422
Total Organic Carbon by EPA 9060

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

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

Date: *11/10/2020*

CLIENT: Friedman & Bruya
Project: 010129
Work Order: 2010106

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2010106-001	ISS-ASKO-4.5-5.8'	10/07/2020 11:00 AM	10/08/2020 9:37 AM
2010106-002	ISS-ASKO-4.8-7.5'	10/07/2020 11:05 AM	10/08/2020 9:37 AM
2010106-003	ISS-ASKO-7.5-9'	10/07/2020 11:10 AM	10/08/2020 9:37 AM
2010106-004	ISS-ASKO-9-10.5'	10/07/2020 11:15 AM	10/08/2020 9:37 AM

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

Case Narrative

WO#: **2010106**
Date: **11/10/2020**

CLIENT: Friedman & Bruya
Project: 010129

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

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

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

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

Note: The grainsize data indicate a discontinuity between the sieve analyses and hydrometer analyses in the size range below 100 microns. It is not uncommon to observe a discontinuity in this range due to differences in analytical procedure and the effects of irregular soil particle shape.

11/10/2020: Revision 1 includes a correction to the "Percent Retained" table of the grain size data.

Qualifiers & Acronyms

WO#: **2010106**
Date Reported: **11/10/2020**

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

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

Analytical Report

Work Order: **2010106**
Date Reported: **11/10/2020**

CLIENT: Friedman & Bruya
Project: 010129

Lab ID: 2010106-003
Client Sample ID: **ISS-ASKO-7.5-9'**
Collection Date: 10/7/2020 11:10:00 AM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Organic Carbon by EPA 9060				Batch ID: 30009		Analyst: SS
Total Organic Carbon	ND	0.0750		%-dry	1	10/14/2020 12:34:00 PM

Lab ID: 2010106-004
Client Sample ID: **ISS-ASKO-9-10.5'**
Collection Date: 10/7/2020 11:15:00 AM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Organic Carbon by EPA 9060				Batch ID: 30009		Analyst: SS
Total Organic Carbon	ND	0.0750		%-dry	1	10/14/2020 2:24:00 PM

Grain Size by ASTM D422

Project: 010129
Client: Friedman & Bruya
Lab Project #: 2010106

Percent Retained in Each Size Fraction

UOM = Percent

Grain Size Classification	***Gravel***							***Coarse Sand***	***Medium Sand***		***Fine Sand***			***Silt and Finer***
Sieves Size	**3"**	**2"**	**1 1/2"**	**1"**	**3/4"**	**3/8"**	**#4 (4750µ)**	**#10 (2000µ)**	**#20 (850µ)**	**#40 (425µ)**	**#60 (250µ)**	**#140 (106µ)**	**#200 (75µ)**	
Particle Size (Microns)	**>76200**	**76200-50800**	**50800-38100**	**38100-25400**	**25400-19000**	**19050-9525**	**9525-4750**	**4750-2000**	**2000-850**	**850-425**	**425-250**	**250-106**	**106-75**	**<75**
Sample ID														
ISS-ASKO-4.5-5.8'	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.424%	7.79%	6.03%	5.36%	5.38%	10.4%	8.22%	56.4%
ISS-ASKO-4.8-7.5'	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.28%	4.18%	4.54%	11.6%	39.1%	6.25%	31.0%
ISS-ASKO-7.5-9'	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.535%	0.811%	0.00%	0.846%	13.8%	50.2%	9.33%	24.5%
ISS-ASKO-9-10.5'	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9.23%	0.00%	1.63%	16.8%	22.2%	3.29%	46.8%

Grain Size by ASTM D422

Project: 010129
Client: Friedman & Bruya
Lab Project #: 2010106

Percent Finer (Passing) than the Indicated Size

UOM = Percent

Grain Size Classification	*Gravel*						*Coarse Sand*	*Medium Sand*		*Fine Sand*			*Silt and Finer*
Sieve Size	**3"**	**2"**	**1 1/2"**	**1"**	**3/4"**	**3/8"**	**#4**	**#10**	**#20**	**#40**	**#60**	**#140**	**#200**
Particle Size (Microns)	**76200**	**50800**	**38100**	**25400**	**19050**	**9525**	**4750**	**2000**	**850**	**425**	**250**	**106**	**75**
Sample ID													
ISS-ASKO-4.5-5.8'	100%	100%	100%	100%	100%	100%	100%	91.8%	85.9%	80.5%	75.1%	64.7%	56.5%
ISS-ASKO-4.8-7.5'	100%	100%	100%	100%	100%	100%	100%	96.7%	92.7%	88.2%	76.6%	37.4%	31.2%
ISS-ASKO-7.5-9'	100%	100%	100%	100%	100%	100%	99.5%	98.7%	98.7%	97.8%	84.0%	33.8%	24.5%
ISS-ASKO-9-10.5'	100%	100%	100%	100%	100%	100%	100%	90.8%	90.8%	89.1%	72.3%	50.1%	46.8%

Grainsize by ASTM D422 - Hydrometer

Project: 010129
Client: Friedman & Bruya
Lab Project #: 2010106

	Specific Gravity Determination				Hygroscopic Moisture Determination		
Sample	**Initial Mass of Volumetric Flask + Water**	**Mass of Soil in empty flask**	**Flask with Soil filled to 500mL DI**	**Specific Gravity**	**Air Dried Weight (g)**	**Oven Dried Weight (g)**	**Hygroscopic Moisture Correction Factor**
ISS-ASKO-4.5-5.8'	380	11.5	387	2.62	11.5	11.2	0.973
ISS-ASKO-4.8-7.5'	380	11.1	387	2.56	10.7	10.5	0.984
ISS-ASKO-7.5-9'	380	11.0	387	2.90	11.2	11.1	0.989
ISS-ASKO-9-10.5'	380	11.1	387	2.74	10.7	10.6	0.988

Blank Hydrometer Reading: 5

Sample 1: ISS-ASKO-4.5-5.8'
Corrected Soil Weight through #10: 53.2
Air-dried aliquot through #10 used for hydrometer: 50.2

Time (minutes)	2	5	15	30	60	250	1440
Temperature,°C	19.7	19.9	20.4	20.4	21.3	21.9	20.7
Hydrometer Reading	33	30	27	23	20	16.25	13.5
Percent finer than	53.1%	47.4%	41.7%	34.2%	28.5%	21.3%	16.1%
Diameter of particle (microns)	32.8	21.2	12.3	8.95	6.37	3.20	1.38

Sample 2: ISS-ASKO-4.8-7.5'
Corrected Soil Weight through #10: 51.0
Air-dried aliquot through #10 used for hydrometer: 50.14

Time (minutes)	2	5	15	30	60	250	1440
Temperature,°C	20.7	20.7	20.8	21.2	21.3	22.0	20.9
Hydrometer Reading	25.6	24	22.5	21.8	20.5	20	18
Percent Finer than	41.2%	38.0%	35.0%	33.5%	31.0%	30.0%	26.0%
Diameter of particle (microns)	34.8	22.2	13.0	9.12	6.47	3.13	1.35

Grainsize by ASTM D422 - Hydrometer

Project: 010129
Client: Friedman & Bruya
Lab Project #: 2010106

	Specific Gravity Determination	**Hygroscopic Moisture Determination**

Sample 3: **ISS-ASKO-7.5-9'**

Corrected Soil Weight through #10: 50.3

Air-dried aliquot through #10 used for hydrometer: 50.1

Time (minutes)	2	5	15	30	60	250	1440
Temperature,°C	21.0	21.0	21.2	21.2	21.4	21.3	20.1
Hydrometer Reading	11.0	10.0	9.50	9.25	7.75	6.50	6.00
Percent Finer than	11.3%	9.45%	8.50%	8.03%	5.20%	2.83%	1.89%
Diameter of particle (microns)	37.3	23.8	13.6	9.62	6.89	3.39	1.43

Sample 4: **ISS-ASKO-9-10.5'**

Corrected Soil Weight through #10: 54.6

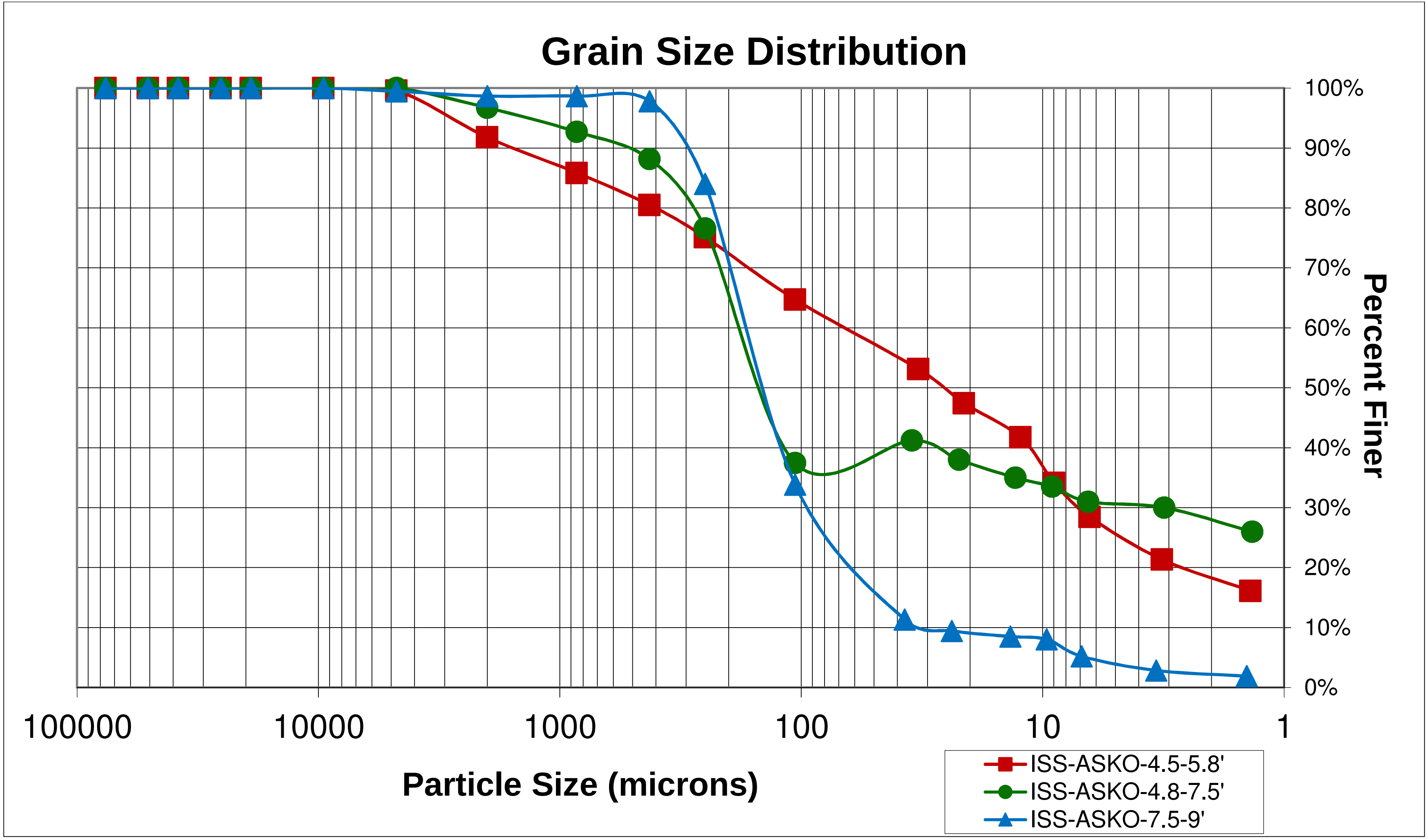
Air-dried aliquot through #10 used for hydrometer: 50.2

Time (minutes)	2	5	15	30	60	250	1440
Temperature,°C	21.1	21.1	21.2	21.3	21.4	21.3	20.1
Hydrometer Reading	28.5	28.0	26.5	24.5	23.000	18.0	13.3
Percent Finer than	42.6%	41.7%	39.0%	35.3%	32.6%	23.6%	14.9%
Diameter of particle (microns)	32.1	20.3	11.9	8.54	6.06	3.06	1.33

3600 Fremont Ave. N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178
Email: info@fremontanalytical.com

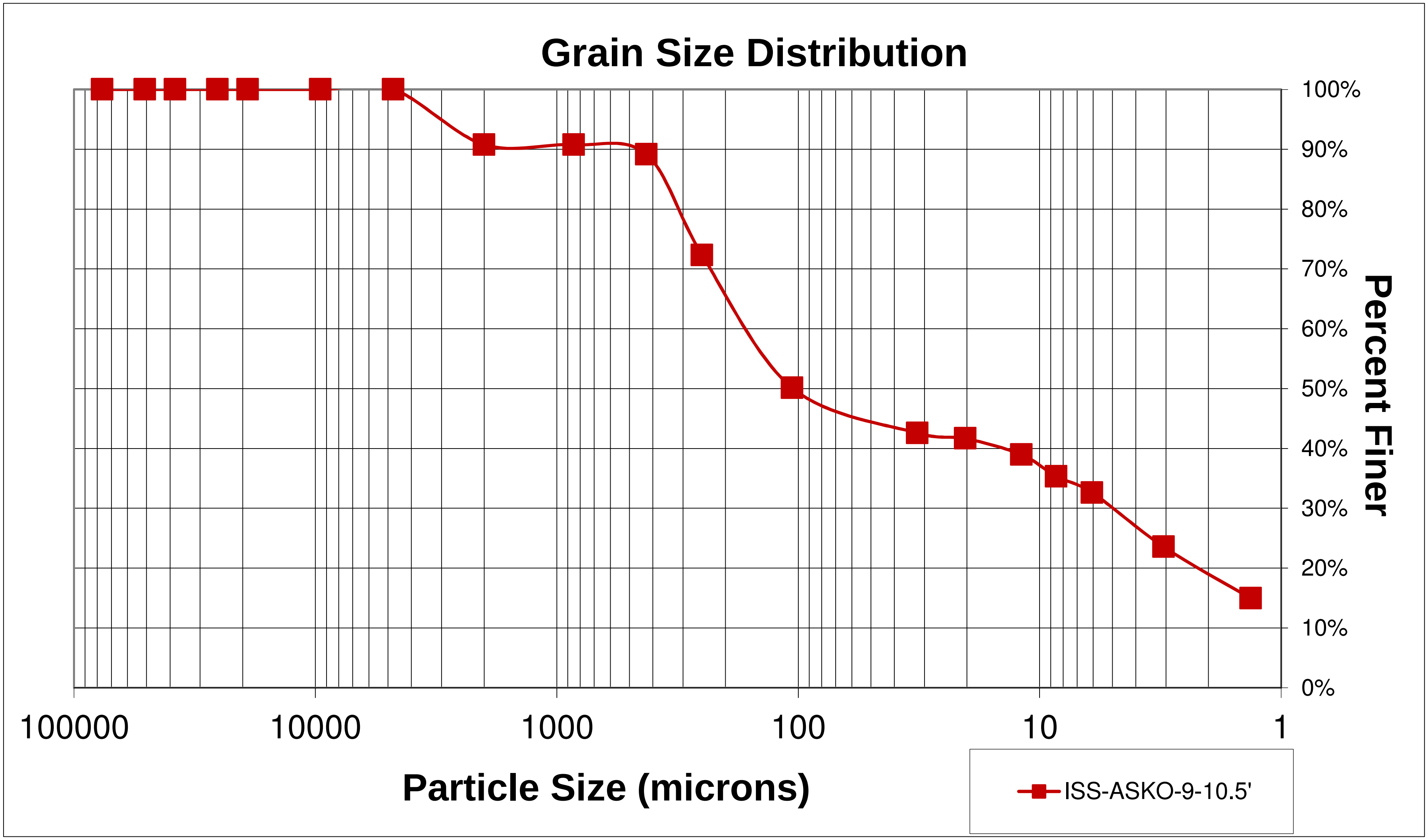
Grain Size by ASTM D422

Project: 010129
Client: Friedman & Bruya
Lab Project #: 2010106



Grain Size by ASTM D422

Project: 010129
Client: Friedman & Bruya
Lab Project #: 2010106



Work Order: 2010106
CLIENT: Friedman & Bruya
Project: 010129

QC SUMMARY REPORT

Total Organic Carbon by EPA 9060

Sample ID: **MB-30009** SampType: **MBLK** Units: **%-dry** Prep Date: **10/14/2020** RunNo: **62564**
Client ID: **MBLKS** Batch ID: **30009** Analysis Date: **10/14/2020** SeqNo: **1255535**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	ND	0.0750									

Sample ID: **LCS-30009** SampType: **LCS** Units: **%-dry** Prep Date: **10/14/2020** RunNo: **62564**
Client ID: **LCSS** Batch ID: **30009** Analysis Date: **10/14/2020** SeqNo: **1255536**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	1.01	0.0750	1.000	0	101	80	120				

Sample ID: **2010106-003ADUP** SampType: **DUP** Units: **%-dry** Prep Date: **10/14/2020** RunNo: **62564**
Client ID: **ISS-ASKO-7.5-9'** Batch ID: **30009** Analysis Date: **10/14/2020** SeqNo: **1255538**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	ND	0.0750						0		20	

Sample ID: **2010106-003AMS** SampType: **MS** Units: **%-dry** Prep Date: **10/14/2020** RunNo: **62564**
Client ID: **ISS-ASKO-7.5-9'** Batch ID: **30009** Analysis Date: **10/14/2020** SeqNo: **1255539**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	1.12	0.0750	1.000	0.05200	107	75	125				

Sample ID: **2010106-003AMSD** SampType: **MSD** Units: **%-dry** Prep Date: **10/14/2020** RunNo: **62564**
Client ID: **ISS-ASKO-7.5-9'** Batch ID: **30009** Analysis Date: **10/14/2020** SeqNo: **1255540**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	1.13	0.0750	1.000	0.05200	108	75	125	1.121	0.622	20	

Fremont Analytical

Sample Log-In Check List

Client Name: **FB**
Work Order Number: **2010106**
Logged by: **Carissa True**
Date Received: **10/8/2020 9:37:00 AM**

Chain of Custody

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

Log In

3. Coolers are present? Yes ☑ No ☐ NA ☐

4. Shipping container/cooler in good condition? Yes ☑ No ☐
5. Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact) Yes ☐ No ☐ Not Present ☑

6. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐

7. Were all items received at a temperature of >2°C to 6°C * Yes ☑ No ☐ NA ☐

8. Sample(s) in proper container(s)? Yes ☑ No ☐
9. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
10. Are samples properly preserved? Yes ☑ No ☐
11. Was preservative added to bottles? Yes ☑ No ☐ NA ☐
MEOH
12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☑
13. Did all samples containers arrive in good condition(unbroken)? Yes ☑ No ☐
14. Does paperwork match bottle labels? Yes ☑ No ☐

15. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
16. Is it clear what analyses were requested? Yes ☑ No ☐
17. Were all holding times able to be met? Yes ☐ No ☑

Special Handling (if applicable)

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

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

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample 1	2.0

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2010106

Page # 1 of 1

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER Fremont

PROJECT NAME/NO.	PO #
010129	A-422

REMARKS

Please Email Results

TURNAROUND TIME

☒ Standard TAT
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL

☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

						ANALYSES REQUESTED										
Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	Dioxins/Furans	EPH	VPH	Grain Size w/ Hydrometer	TOC						Notes
ISS-ASKO 4.5-5.8'		10/7/20	1100	Soil	~~2~~ 1				x							
ISS-ASKO 5.8-7.5'		|	1105	|	~~2~~ 1				x							
ISS-ASKO 7.5-9'		|	1110	|	~~2~~ 1				x	x						
ISS-ASKO 9-10.5'		|	1115	|	~~2~~ 1				x	x						
					MG											
					10/8/20											

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:	Michael Erdahl	Friedman & Bruya	10/8/20	0800
Received by:	Carter Johnson	FAI	10/8/20	0937
Relinquished by:				
Received by:				

010129

SAMPLE CHAIN OF CUSTODY

ME 10-07-20

Page # 1 of 1 BI4

Report To Jamie Stevens / Kim Hempel
Company Pioneer Engineering & Environmental Services
Address 2753 West 31st Street
City, State, ZIP Chicago, Illinois 60608
Phone 773.435.3725 Email

SAMPLERS (*signature*) Rusty Jones R. Jones

PROJECT NAME	PO #
TOC Seattle Terminal	

REMARKS	INVOICE TO
Project specific RLs? - Yes / No	

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Grain Size	TOC			Notes
ISS-ASKO 4.5-5.8'	01 A-B	10.07.2020	1100	SOIL	2								X				
ISS-ASKO 5.8-7.5'	02		1105		2								X				
ISS-ASKO 7.5-9'	03		1110		~~1~~ ②								X	X			
ISS-ASKO 9-10.5'	04		1115		~~1~~ ②								X	Y			
ISS-ASKO 11-11.7'	05		1120		2												HOLD
ISS-ASKO 11.7-12.5'	06		1125		1												HOLD
ISS-ASKO 12.5-13.5'	07	↓	1130	↓	1												HOLD

Samples received at 5 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: R. Jones	Rusty Jones	Crete Consulting	10.07.2020	1443
Received by:	Ann Webber Bruya	F&B	10/7/20	1443
Relinquished by:				
Received by:				

Gauging data for wells, including perched aquifer wells along south property line:

Time	Well ID	DTW (ft BTOC)	TD (ft BTOC)	NOTES
1235	01MW70	12.10	20.30	
1236	01MW78	37.15	46.40	← Tagged top of installed pump
1238	01MW71	11.39	20.11	
1248	01MW79	9.55	20.XX	
1255	MW03	10.68/10.70	13.62	Gaged twice

BY R. Jones DATE 10/7/2021 Sheet No ____ of ____

PROJECT TOC, ISS Bulk Soil Collection PROJECT NUMBER ________

CRETE
CONSULTING, INC.

Time Oil Bulk Terminal Site

Pre-Remedial Design Investigation Summary Report

Attachment 2
Cleanup Action Area 5
Investigation Supporting Documentation

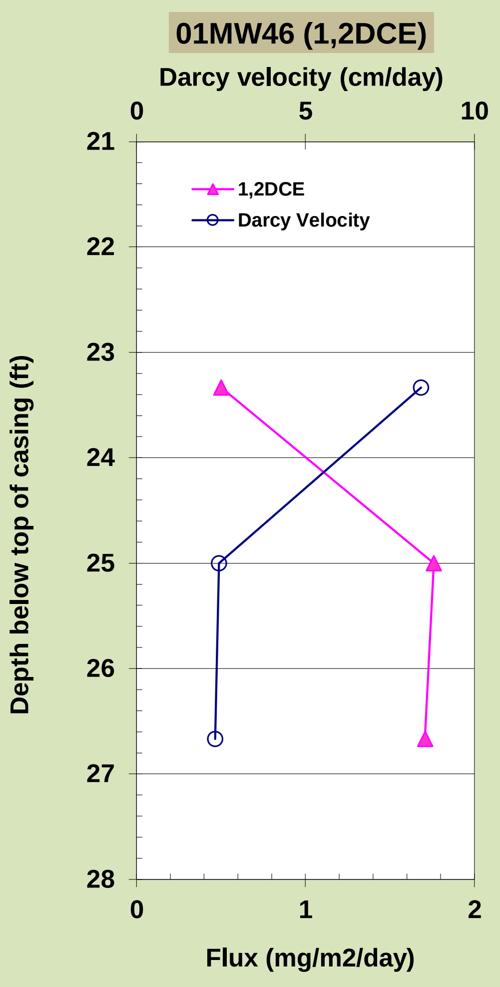
Floyd/Snider	
Project name:	Contera-TOC
Project Manager	Lynn Grochala/Kim Hempel
Installation Date	11/12/2020
Sampling Date	11/30/2020
Reporting Date	12/15/2020

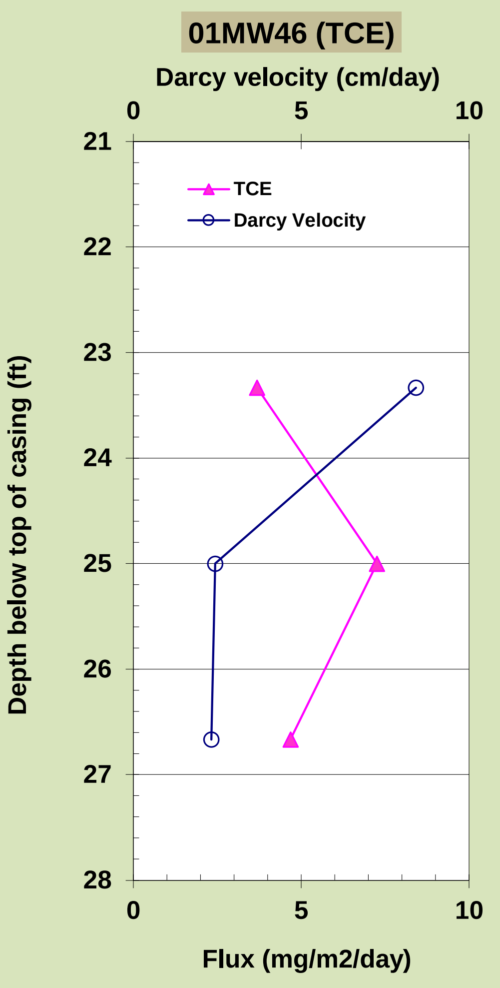
Table1. Summary of flux values for each well

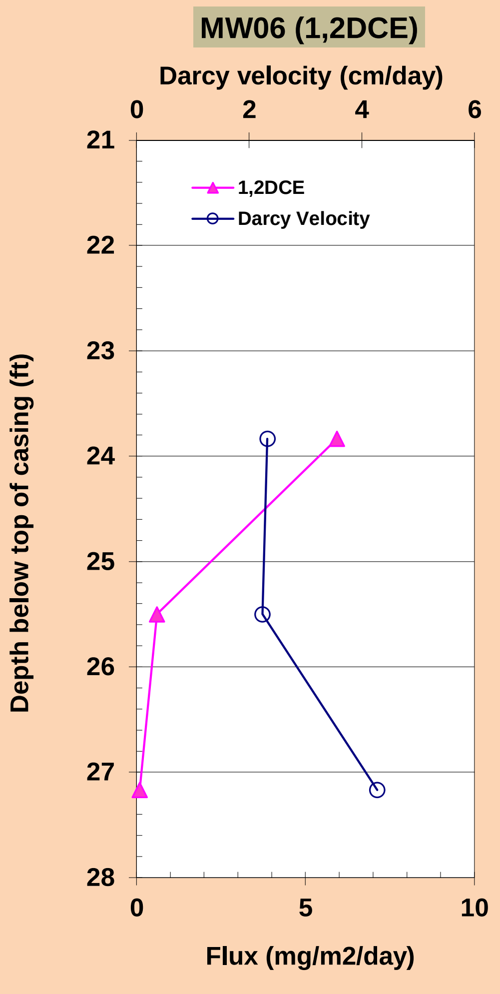
Well_ID	Sample_ID	Depth below top of well casing (ft)	Darcy Velocity (cm/day)	VC (mg/m^2/day)	cis-1,2DCE (mg/m^2/day)	TCE (mg/m^2/day)
01MW46	01MW46-22'6"-24'2"	23.3	8.4	0.0	0.5	3.7
	01MW46-24'2"-25'10"	25.0	2.4	0.0	1.8	7.3
	01MW46-25'10"-27'6"	26.7	2.3	3.4	1.7	4.7
MW06	MW06-23-24'8"	23.8	2.3	4.0	5.9	51.7
	MW06-24'8"-26'4"	25.5	2.2	0.0	0.6	8.7
	MW06-26'4"-28"	27.2	4.3	0.0	0.1	1.0

Table2. Summary of flux average contaminant concentration

Well_ID	Sample_ID	Depth below top of well casing (ft)	Darcy Velocity (cm/day)	VC (ug/L)	cis-1,2DCE (ug/L)	TCE (ug/L)
01MW46	01MW46-22'6"-24'2"	23.3	8.4	0	6	44
	01MW46-24'2"-25'10"	25.0	2.4	0	72	297
	01MW46-25'10"-27'6"	26.7	2.3	147	74	202
MW06	MW06-23-24'8"	23.8	2.3	171	255	2224
	MW06-24'8"-26'4"	25.5	2.2	0	27	389
	MW06-26'4"-28"	27.2	4.3	0	2	23







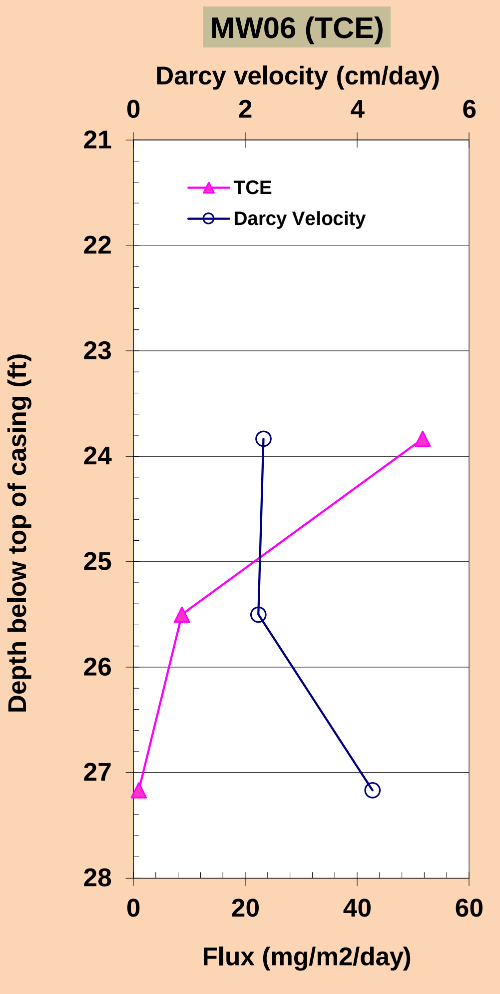


Table 3. Mass discharge per unit width for aquifer of each well

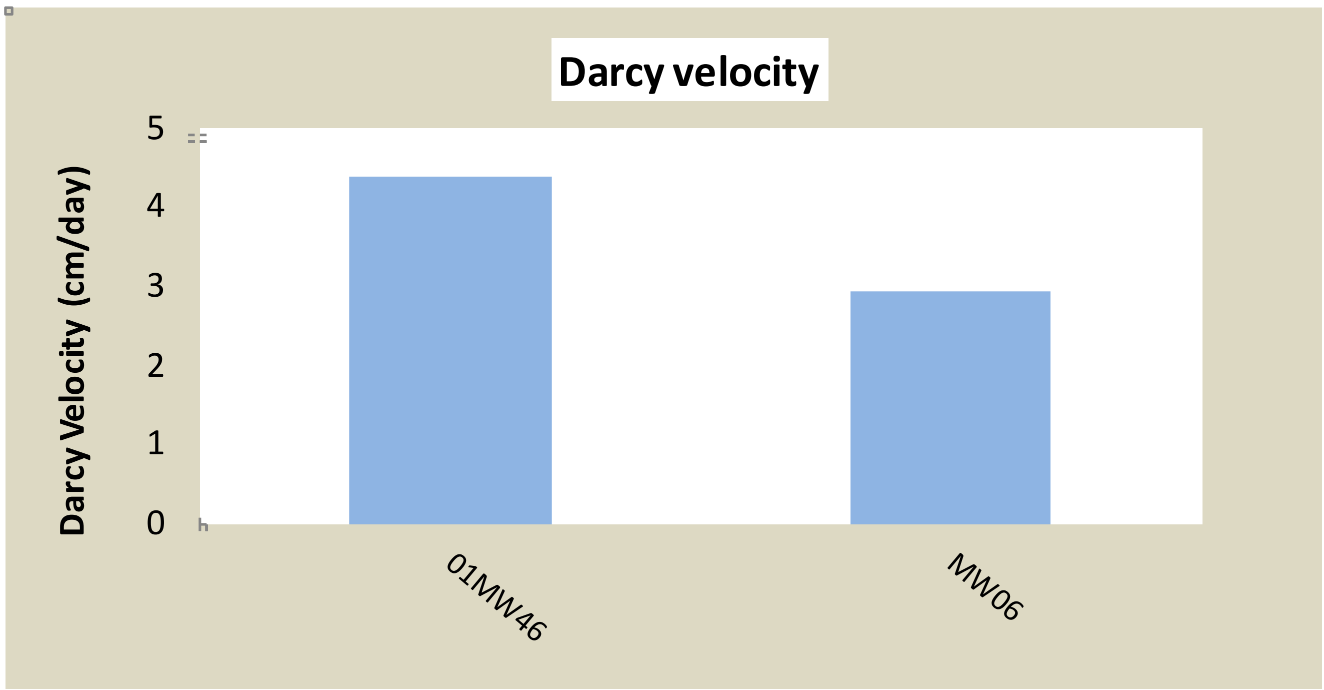
Well	Darcy Velocity (cm/day)	VC (mg/m/day)	cis-1,2DCE (mg/m/day)	TCE (mg/m/day)
01MW46	4.4	1.7	2.0	7.9
MW06	2.9	2.0	3.4	31.2

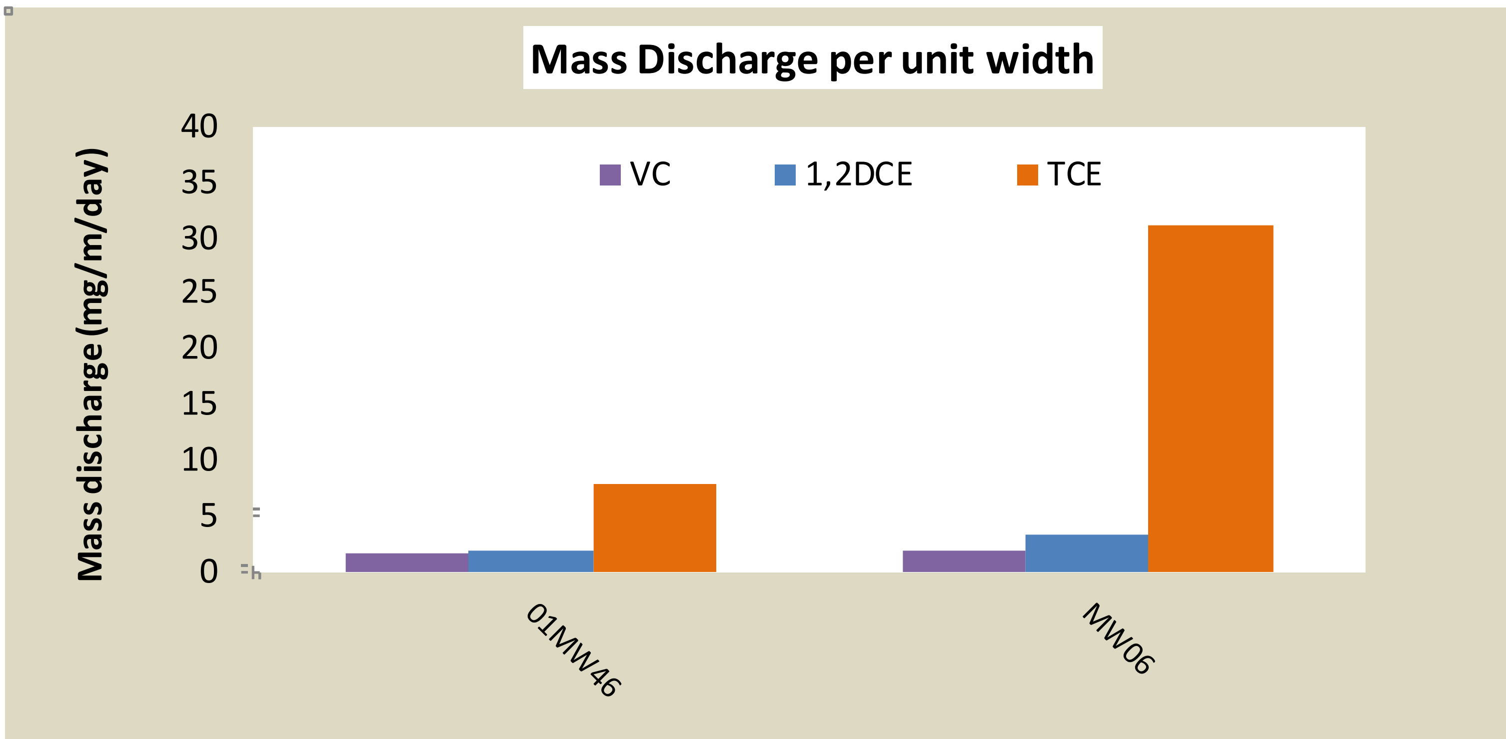
Table 4. Well average values of mass flux based on PFMs

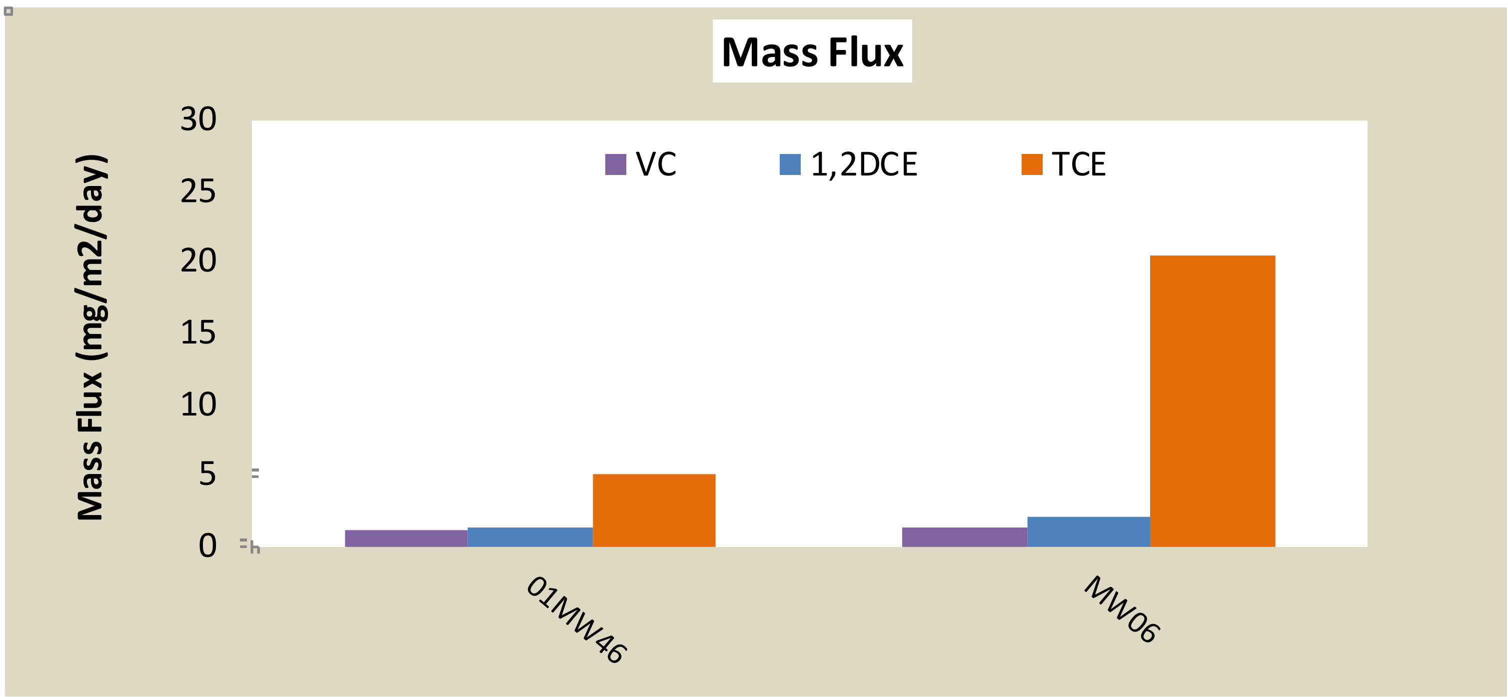
Well	Darcy Velocity (cm/day)	VC (mg/m^2/day)	cis-1,2DCE (mg/m^2/day)	TCE (mg/m^2/day)
01MW46	4.4	1.1	1.3	5.2
MW06	2.9	1.3	2.2	20.46

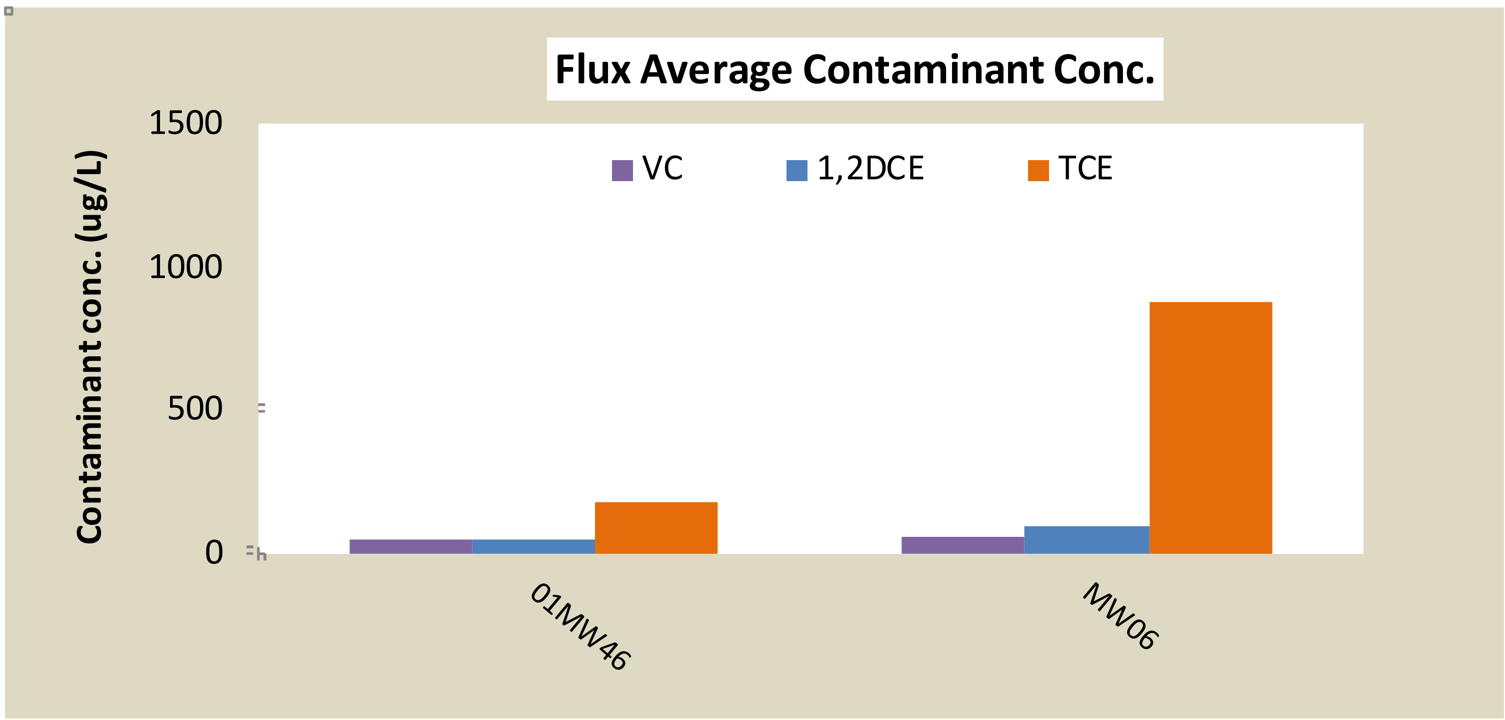
Table 5. Flux average contaminant concentration on PFMs

Well	Darcy Velocity (cm/day)	VC (ug/L)	cis-1,2DCE (ug/L)	TCE (ug/L)
01MW46	4.4	49	51	181
MW06	2.9	57	95	879




Mass Discharge per unit width
Mass discharge (mg/m/day)
40
35
30
25
20
15
10
5
0
VC
1,2DCE
TCE
01MW46
MW06


Mass Flux
Mass Flux (mg/m2/day)
30
25
20
15
10
5
0
VC
1,2DCE
TCE
01MW46
MW06


Flux Average Contaminant Conc.
Contaminant conc. (ug/L)
1500
1000
500
0
VC
1,2DCE
TCE
01MW46
MW06

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

3012 16th Avenue West
Seattle, WA 98119-2029
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fbi@isomedia.com
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November 24, 2020

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on November 12, 2020 from the Cantera TOC, F&BI 011245 project. There are 35 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kristin Anderson
FDS1124R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on November 12, 2020 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera TOC, F&BI 011245 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
011245 -01	PDSB03-21-22FT
011245 -02	PDSB03-25-26FT
011245 -03	PDSB02-20-21FT
011245 -04	PDSB02-26.5-27.5FT
011245 -05	PDSB01-23-24FT
011245 -06	PDSB01-27.5-28.5FT
011245 -07	01MW80-111220
011245 -08	MW06-111220
011245 -09	01MW46-111220
011245 -10	trip blanks

Samples PDSB03-21-22FT, PDSB03-25-26FT, PDSB02-20-21FT, PDSB02-26.5-27.5FT, PDSB01-23-24FT, and PDSB01-27.5-28.5FT were sent to Fremont Analytical for total organic carbon and calcium analysis. In addition, samples 01MW80-111220, MW06-111220, and 01MW46-111220 were sent to Fremont Analytical for alkalinity, BOD, TOC, DOC, sulfate, and nitrate analyses. The report is enclosed.

The 8260D calibration standard failed the acceptance criteria for acetone. The data were flagged accordingly.

All other quality control requirements were acceptable.

Date of Report: 11/24/20
Date Received: 11/12/20
Project: Cantera TOC, F&BI 011245
Date Extracted: 11/16/20
Date Analyzed: 11/17/20

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

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

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
PDSB03-21-22FT 011245-01	<5	90
PDSB03-25-26FT 011245-02	<5	87
PDSB02-20-21FT 011245-03	20	90
PDSB02-26.5-27.5FT 011245-04	<5	83
PDSB01-23-24FT 011245-05	<5	91
PDSB01-27.5-28.5FT 011245-06	<5	88
Method Blank 00-2420 MB	<5	88

Date of Report: 11/24/20
Date Received: 11/12/20
Project: Cantera TOC, F&BI 011245
Date Extracted: 11/17/20
Date Analyzed: 11/17/20

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
01MW80-111220 011245-07	680	86
MW06-111220 011245-08	260	87
01MW46-111220 011245-09	520	85
Method Blank 00-2421 MB	<100	86

Date of Report: 11/24/20
Date Received: 11/12/20
Project: Cantera TOC, F&BI 011245
Date Extracted: 11/17/20
Date Analyzed: 11/17/20

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES USING METHOD 8021B

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Surrogate (% Recovery) Limit (52-124)
trip blanks 011245-10	<1	<1	<1	<3	79
Method Blank 00-2421 MB	<1	<1	<1	<3	86

Date of Report: 11/24/20
Date Received: 11/12/20
Project: Cantera TOC, F&BI 011245
Date Extracted: 11/13/20
Date Analyzed: 11/13/20

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

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

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 53-144)
PDSB03-21-22FT 011245-01	<50	<250	52
PDSB03-25-26FT 011245-02	<50	<250	84
PDSB02-20-21FT 011245-03	<50	<250	78
PDSB02-26.5-27.5FT 011245-04	<50	<250	88
PDSB01-23-24FT 011245-05	<50	<250	84
PDSB01-27.5-28.5FT 011245-06	<50	<250	81
Method Blank 00-2510 MB	<50	<250	79

Date of Report: 11/24/20
Date Received: 11/12/20
Project: Cantera TOC, F&BI 011245
Date Extracted: 11/13/20
Date Analyzed: 11/13/20

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

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
01MW80-111220 011245-07	270	<250	114
MW06-111220 011245-08	150	<250	109
01MW46-111220 011245-09	180	<250	108
Method Blank 00-2506 MB	<50	<250	106

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	01MW80-111220	Client:	Floyd-Snider
Date Received:	11/12/20	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/17/20	Lab ID:	011245-07 x10
Date Analyzed:	11/18/20	Data File:	011245-07 x10.069
Matrix:	Water	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP

Analyte:	Concentration mg/L (ppm)
Calcium	52.8
Magnesium	66.1
Hardness (as CaCO3)	404

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	MW06-111220	Client:	Floyd-Snider
Date Received:	11/12/20	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/17/20	Lab ID:	011245-08 x10
Date Analyzed:	11/18/20	Data File:	011245-08 x10.072
Matrix:	Water	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP

Analyte:	Concentration mg/L (ppm)
Calcium	73.1
Magnesium	38.4
Hardness (as CaCO3)	341

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	01MW46-111220	Client:	Floyd-Snider
Date Received:	11/12/20	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/17/20	Lab ID:	011245-09 x10
Date Analyzed:	11/18/20	Data File:	011245-09 x10.073
Matrix:	Water	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP

Analyte:	Concentration mg/L (ppm)
Calcium	66.6
Magnesium	49.9
Hardness (as CaCO3)	372

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	NA	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/17/20	Lab ID:	I0-717 mb
Date Analyzed:	11/18/20	Data File:	I0-717 mb.066
Matrix:	Water	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP

Analyte:	Concentration mg/L (ppm)
Calcium	<0.05
Magnesium	<0.05
Hardness (as CaCO3)	<0.35

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	PDSB03-21-22FT	Client:	Floyd-Snider
Date Received:	11/12/20	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/16/20	Lab ID:	011245-01
Date Analyzed:	11/16/20	Data File:	111613.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	145
Toluene-d8	100	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<5 ca	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Hexane	<0.25	o-Xylene	<0.05
Methylene chloride	<0.5	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.05	Bromoform	<0.05
1,1-Dichloroethane	<0.05	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.05	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<0.5	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.05	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.05	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.03	sec-Butylbenzene	<0.05
Trichloroethene	<0.02	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.05	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.05
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	PDSB03-25-26FT	Client:	Floyd-Snider
Date Received:	11/12/20	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/16/20	Lab ID:	011245-02
Date Analyzed:	11/16/20	Data File:	111614.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	145
Toluene-d8	98	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<5 ca	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Hexane	<0.25	o-Xylene	<0.05
Methylene chloride	<0.5	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.05	Bromoform	<0.05
1,1-Dichloroethane	<0.05	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.05	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<0.5	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.05	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.05	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.03	sec-Butylbenzene	<0.05
Trichloroethene	<0.02	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.05	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.05
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	PDSB02-20-21FT	Client:	Floyd-Snider
Date Received:	11/12/20	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/16/20	Lab ID:	011245-03
Date Analyzed:	11/16/20	Data File:	111615.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	145
Toluene-d8	100	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<5 ca	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Hexane	<0.25	o-Xylene	<0.05
Methylene chloride	<0.5	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.05	Bromoform	<0.05
1,1-Dichloroethane	<0.05	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.05	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<0.5	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.05	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.05	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.03	sec-Butylbenzene	<0.05
Trichloroethene	<0.02	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.05	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.05
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID: PDSB02-26.5-27.5FT
Date Received: 11/12/20
Date Extracted: 11/16/20
Date Analyzed: 11/16/20
Matrix: Soil
Units: mg/kg (ppm) Dry Weight

Client: Floyd-Snider
Project: Cantera TOC, F&BI 011245
Lab ID: 011245-04
Data File: 111616.D
Instrument: GCMS4
Operator: JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	145
Toluene-d8	98	55	145
4-Bromofluorobenzene	99	65	139

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<5 ca	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Hexane	<0.25	o-Xylene	<0.05
Methylene chloride	<0.5	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.05	Bromoform	<0.05
1,1-Dichloroethane	<0.05	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	0.082	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<0.5	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.05	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.05	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.03	sec-Butylbenzene	<0.05
Trichloroethene	<0.02	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.05	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.05
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	PDSB01-23-24FT	Client:	Floyd-Snider
Date Received:	11/12/20	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/16/20	Lab ID:	011245-05
Date Analyzed:	11/16/20	Data File:	111617.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	62	145
Toluene-d8	99	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<5 ca	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Hexane	<0.25	o-Xylene	<0.05
Methylene chloride	<0.5	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.05	Bromoform	<0.05
1,1-Dichloroethane	<0.05	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.05	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<0.5	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.05	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.05	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.03	sec-Butylbenzene	<0.05
Trichloroethene	0.87	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.05	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.05
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	PDSB01-27.5-28.5FT	Client:	Floyd-Snider
Date Received:	11/12/20	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/16/20	Lab ID:	011245-06
Date Analyzed:	11/16/20	Data File:	111618.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	62	145
Toluene-d8	100	55	145
4-Bromofluorobenzene	102	65	139

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<5 ca	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Hexane	<0.25	o-Xylene	<0.05
Methylene chloride	<0.5	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.05	Bromoform	<0.05
1,1-Dichloroethane	<0.05	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.05	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<0.5	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.05	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.05	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.03	sec-Butylbenzene	<0.05
Trichloroethene	<0.02	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.05	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.05
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/16/20	Lab ID:	00-2687 mb
Date Analyzed:	11/16/20	Data File:	111609.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	62	145
Toluene-d8	101	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<5 ca	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Hexane	<0.25	o-Xylene	<0.05
Methylene chloride	<0.5	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.05	Bromoform	<0.05
1,1-Dichloroethane	<0.05	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.05	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<0.5	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.05	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.05	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.03	sec-Butylbenzene	<0.05
Trichloroethene	<0.02	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.05	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.05
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	01MW80-111220	Client:	Floyd-Snider
Date Received:	11/12/20	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/13/20	Lab ID:	011245-07
Date Analyzed:	11/17/20	Data File:	111638.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	57	121
Toluene-d8	102	63	127
4-Bromofluorobenzene	100	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	9.2	Dibromochloromethane	<1
Bromomethane	<5	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50 ca	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	3.6	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	210 ve	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	1.2	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	14	sec-Butylbenzene	<1
Trichloroethene	1,000 ve	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	01MW80-111220	Client:	Floyd-Snider
Date Received:	11/12/20	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/13/20	Lab ID:	011245-07 1/10
Date Analyzed:	11/17/20	Data File:	111635.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	102	63	127
4-Bromofluorobenzene	103	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<10	1,3-Dichloropropane	<10
Chloromethane	<100	Tetrachloroethene	<10
Vinyl chloride	9.7	Dibromochloromethane	<10
Bromomethane	<50	1,2-Dibromoethane (EDB)	<10
Chloroethane	<10	Chlorobenzene	<10
Trichlorofluoromethane	<10	Ethylbenzene	<10
Acetone	<500 ca	1,1,1,2-Tetrachloroethane	<10
1,1-Dichloroethene	<10	m,p-Xylene	<20
Hexane	<50	o-Xylene	<10
Methylene chloride	<50	Styrene	<10
Methyl t-butyl ether (MTBE)	<10	Isopropylbenzene	<10
trans-1,2-Dichloroethene	<10	Bromoform	<50
1,1-Dichloroethane	<10	n-Propylbenzene	<10
2,2-Dichloropropane	<10	Bromobenzene	<10
cis-1,2-Dichloroethene	230	1,3,5-Trimethylbenzene	<10
Chloroform	<10	1,1,2,2-Tetrachloroethane	<10
2-Butanone (MEK)	<200	1,2,3-Trichloropropane	<10
1,2-Dichloroethane (EDC)	<10	2-Chlorotoluene	<10
1,1,1-Trichloroethane	<10	4-Chlorotoluene	<10
1,1-Dichloropropene	<10	tert-Butylbenzene	<10
Carbon tetrachloride	<10	1,2,4-Trimethylbenzene	<10
Benzene	14	sec-Butylbenzene	<10
Trichloroethene	990	p-Isopropyltoluene	<10
1,2-Dichloropropane	<10	1,3-Dichlorobenzene	<10
Bromodichloromethane	<10	1,4-Dichlorobenzene	<10
Dibromomethane	<10	1,2-Dichlorobenzene	<10
4-Methyl-2-pentanone	<100	1,2-Dibromo-3-chloropropane	<100
cis-1,3-Dichloropropene	<10	1,2,4-Trichlorobenzene	<10
Toluene	<10	Hexachlorobutadiene	<10
trans-1,3-Dichloropropene	<10	Naphthalene	<10
1,1,2-Trichloroethane	<10	1,2,3-Trichlorobenzene	<10
2-Hexanone	<100		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW06-111220	Client:	Floyd-Snider
Date Received:	11/12/20	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/13/20	Lab ID:	011245-08
Date Analyzed:	11/17/20	Data File:	111639.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	100	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	2.1	Dibromochloromethane	<1
Bromomethane	<5	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50 ca	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	1.0	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	21	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	1.7	sec-Butylbenzene	<1
Trichloroethene	300 ve	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW06-111220	Client:	Floyd-Snider
Date Received:	11/12/20	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/13/20	Lab ID:	011245-08 1/10
Date Analyzed:	11/17/20	Data File:	111636.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<10	1,3-Dichloropropane	<10
Chloromethane	<100	Tetrachloroethene	<10
Vinyl chloride	2.0	Dibromochloromethane	<10
Bromomethane	<50	1,2-Dibromoethane (EDB)	<10
Chloroethane	<10	Chlorobenzene	<10
Trichlorofluoromethane	<10	Ethylbenzene	<10
Acetone	<500 ca	1,1,1,2-Tetrachloroethane	<10
1,1-Dichloroethene	<10	m,p-Xylene	<20
Hexane	<50	o-Xylene	<10
Methylene chloride	<50	Styrene	<10
Methyl t-butyl ether (MTBE)	<10	Isopropylbenzene	<10
trans-1,2-Dichloroethene	<10	Bromoform	<50
1,1-Dichloroethane	<10	n-Propylbenzene	<10
2,2-Dichloropropane	<10	Bromobenzene	<10
cis-1,2-Dichloroethene	23	1,3,5-Trimethylbenzene	<10
Chloroform	<10	1,1,2,2-Tetrachloroethane	<10
2-Butanone (MEK)	<200	1,2,3-Trichloropropane	<10
1,2-Dichloroethane (EDC)	<10	2-Chlorotoluene	<10
1,1,1-Trichloroethane	<10	4-Chlorotoluene	<10
1,1-Dichloropropene	<10	tert-Butylbenzene	<10
Carbon tetrachloride	<10	1,2,4-Trimethylbenzene	<10
Benzene	<3.5	sec-Butylbenzene	<10
Trichloroethene	320	p-Isopropyltoluene	<10
1,2-Dichloropropane	<10	1,3-Dichlorobenzene	<10
Bromodichloromethane	<10	1,4-Dichlorobenzene	<10
Dibromomethane	<10	1,2-Dichlorobenzene	<10
4-Methyl-2-pentanone	<100	1,2-Dibromo-3-chloropropane	<100
cis-1,3-Dichloropropene	<10	1,2,4-Trichlorobenzene	<10
Toluene	<10	Hexachlorobutadiene	<10
trans-1,3-Dichloropropene	<10	Naphthalene	<10
1,1,2-Trichloroethane	<10	1,2,3-Trichlorobenzene	<10
2-Hexanone	<100		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	01MW46-111220	Client:	Floyd-Snider
Date Received:	11/12/20	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/13/20	Lab ID:	011245-09
Date Analyzed:	11/17/20	Data File:	111640.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	107	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	9.4	Dibromochloromethane	<1
Bromomethane	<5	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50 ca	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	2.5	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	170 ve	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	2.2	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	9.8	sec-Butylbenzene	<1
Trichloroethene	690 ve	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	01MW46-111220	Client:	Floyd-Snider
Date Received:	11/12/20	Project:	Cantera TOC, F&BI 011245
Date Extracted:	11/13/20	Lab ID:	011245-09 1/10
Date Analyzed:	11/17/20	Data File:	111637.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	57	121
Toluene-d8	102	63	127
4-Bromofluorobenzene	102	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<10	1,3-Dichloropropane	<10
Chloromethane	<100	Tetrachloroethene	<10
Vinyl chloride	10	Dibromochloromethane	<10
Bromomethane	<50	1,2-Dibromoethane (EDB)	<10
Chloroethane	<10	Chlorobenzene	<10
Trichlorofluoromethane	<10	Ethylbenzene	<10
Acetone	<500 ca	1,1,1,2-Tetrachloroethane	<10
1,1-Dichloroethene	<10	m,p-Xylene	<20
Hexane	<50	o-Xylene	<10
Methylene chloride	<50	Styrene	<10
Methyl t-butyl ether (MTBE)	<10	Isopropylbenzene	<10
trans-1,2-Dichloroethene	<10	Bromoform	<50
1,1-Dichloroethane	<10	n-Propylbenzene	<10
2,2-Dichloropropane	<10	Bromobenzene	<10
cis-1,2-Dichloroethene	180	1,3,5-Trimethylbenzene	<10
Chloroform	<10	1,1,2,2-Tetrachloroethane	<10
2-Butanone (MEK)	<200	1,2,3-Trichloropropane	<10
1,2-Dichloroethane (EDC)	<10	2-Chlorotoluene	<10
1,1,1-Trichloroethane	<10	4-Chlorotoluene	<10
1,1-Dichloropropene	<10	tert-Butylbenzene	<10
Carbon tetrachloride	<10	1,2,4-Trimethylbenzene	<10
Benzene	9.6	sec-Butylbenzene	<10
Trichloroethene	610	p-Isopropyltoluene	<10
1,2-Dichloropropane	<10	1,3-Dichlorobenzene	<10
Bromodichloromethane	<10	1,4-Dichlorobenzene	<10
Dibromomethane	<10	1,2-Dichlorobenzene	<10
4-Methyl-2-pentanone	<100	1,2-Dibromo-3-chloropropane	<100
cis-1,3-Dichloropropene	<10	1,2,4-Trichlorobenzene	<10
Toluene	<10	Hexachlorobutadiene	<10
trans-1,3-Dichloropropene	<10	Naphthalene	<10
1,1,2-Trichloroethane	<10	1,2,3-Trichlorobenzene	<10
2-Hexanone	<100		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID: Method Blank
Date Received: Not Applicable
Date Extracted: 11/13/20
Date Analyzed: 11/13/20
Matrix: Water
Units: ug/L (ppb)

Client: Floyd-Snider
Project: Cantera TOC, F&BI 011245
Lab ID: 00-2680 mb
Data File: 111316.D
Instrument: GCMS4
Operator: JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	109	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	96	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<5	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50 ca	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Date of Report: 11/24/20
Date Received: 11/12/20
Project: Cantera TOC, F&BI 011245

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 011265-02 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	90	71-131

Date of Report: 11/24/20
Date Received: 11/12/20
Project: Cantera TOC, F&BI 011245

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 011245-07 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	680	650	4

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	94	69-134

Date of Report: 11/24/20
Date Received: 11/12/20
Project: Cantera TOC, F&BI 011245

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES USING EPA METHOD 8021B

Laboratory Code: 011245-07 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	15	15	0
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	100	65-118
Toluene	ug/L (ppb)	50	92	72-122
Ethylbenzene	ug/L (ppb)	50	92	73-126
Xylenes	ug/L (ppb)	150	91	74-118

Date of Report: 11/24/20
Date Received: 11/12/20
Project: Cantera TOC, F&BI 011245

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

Laboratory Code: 011244-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	104	112	64-133	7

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	98	58-147

Date of Report: 11/24/20
Date Received: 11/12/20
Project: Cantera TOC, F&BI 011245

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

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	112	100	63-142	11

Date of Report: 11/24/20
Date Received: 11/12/20
Project: Cantera TOC, F&BI 011245

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8 AND SM 2340B

Laboratory Code: 011245-07 x10 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Calcium	mg/L (ppm)	1.0	52.8	16 b	45 b	70-130	95 b
Magnesium	mg/L (ppm)	1.0	66.1	45 b	0 b	70-130	200 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Calcium	mg/L (ppm)	1.0	98	85-115
Magnesium	mg/L (ppm)	1.0	102	85-115

Date of Report: 11/24/20
Date Received: 11/12/20
Project: Cantera TOC, F&BI 011245

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 011245-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	1	<0.5	55	52	10-142	6
Chloromethane	mg/kg (ppm)	1	<0.5	72	66	10-126	9
Vinyl chloride	mg/kg (ppm)	1	<0.05	76	69	10-138	10
Bromomethane	mg/kg (ppm)	1	<0.5	94	80	10-163	16
Chloroethane	mg/kg (ppm)	1	<0.5	89	78	10-176	13
Trichlorofluoromethane	mg/kg (ppm)	1	<0.5	88	83	10-176	6
Acetone	mg/kg (ppm)	5	<5	106	88	10-163	19
1,1-Dichloroethene	mg/kg (ppm)	1	<0.05	105	90	10-160	15
Hexane	mg/kg (ppm)	1	<0.25	68	75	10-137	10
Methylene chloride	mg/kg (ppm)	1	<0.5	91	96	10-156	5
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	1	<0.05	90	92	21-145	2
trans-1,2-Dichloroethene	mg/kg (ppm)	1	<0.05	98	97	14-137	1
1,1-Dichloroethane	mg/kg (ppm)	1	<0.05	93	97	19-140	4
2,2-Dichloropropane	mg/kg (ppm)	1	<0.05	88	84	10-158	5
cis-1,2-Dichloroethene	mg/kg (ppm)	1	<0.05	99	97	25-135	2
Chloroform	mg/kg (ppm)	1	<0.05	95	94	21-145	1
2-Butanone (MEK)	mg/kg (ppm)	5	<0.5	93	93	19-147	0
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1	<0.05	91	88	12-160	3
1,1,1-Trichloroethane	mg/kg (ppm)	1	<0.05	88	87	10-156	1
1,1-Dichloropropene	mg/kg (ppm)	1	<0.05	95	93	17-140	2
Carbon tetrachloride	mg/kg (ppm)	1	<0.05	84	84	9-164	0
Benzene	mg/kg (ppm)	1	<0.03	98	95	29-129	3
Trichloroethene	mg/kg (ppm)	1	<0.02	100	83	21-139	19
1,2-Dichloropropane	mg/kg (ppm)	1	<0.05	101	83	30-135	20
Bromodichloromethane	mg/kg (ppm)	1	<0.05	98	82	23-155	18
Dibromomethane	mg/kg (ppm)	1	<0.05	99	83	23-145	18
4-Methyl-2-pentanone	mg/kg (ppm)	5	<0.5	109	91	24-155	18
cis-1,3-Dichloropropene	mg/kg (ppm)	1	<0.05	99	85	28-144	15
Toluene	mg/kg (ppm)	1	<0.05	101	93	35-130	8
trans-1,3-Dichloropropene	mg/kg (ppm)	1	<0.05	97	88	26-149	10
1,1,2-Trichloroethane	mg/kg (ppm)	1	<0.05	107	95	10-205	12
2-Hexanone	mg/kg (ppm)	5	<0.5	99	88	15-166	12
1,3-Dichloropropane	mg/kg (ppm)	1	<0.05	102	93	31-137	9
Tetrachloroethene	mg/kg (ppm)	1	<0.025	102	95	20-133	7
Dibromochloromethane	mg/kg (ppm)	1	<0.05	102	93	28-150	9
1,2-Dibromoethane (EDB)	mg/kg (ppm)	1	<0.05	108	98	28-142	10
Chlorobenzene	mg/kg (ppm)	1	<0.05	105	96	32-129	9
Ethylbenzene	mg/kg (ppm)	1	<0.05	103	94	32-137	9
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	1	<0.05	100	91	31-143	9
m,p-Xylene	mg/kg (ppm)	2	<0.1	103	94	34-136	9
o-Xylene	mg/kg (ppm)	1	<0.05	103	94	33-134	9
Styrene	mg/kg (ppm)	1	<0.05	108	99	35-137	9
Isopropylbenzene	mg/kg (ppm)	1	<0.05	101	94	31-142	7
Bromoform	mg/kg (ppm)	1	<0.05	104	92	21-156	12
n-Propylbenzene	mg/kg (ppm)	1	<0.05	101	91	23-146	10
Bromobenzene	mg/kg (ppm)	1	<0.05	105	94	34-130	11
1,3,5-Trimethylbenzene	mg/kg (ppm)	1	<0.05	99	90	18-149	10
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	1	<0.05	104	95	28-140	9
1,2,3-Trichloropropane	mg/kg (ppm)	1	<0.05	101	93	25-144	8
2-Chlorotoluene	mg/kg (ppm)	1	<0.05	101	90	31-134	12
4-Chlorotoluene	mg/kg (ppm)	1	<0.05	102	92	31-136	10
tert-Butylbenzene	mg/kg (ppm)	1	<0.05	99	90	30-137	10
1,2,4-Trimethylbenzene	mg/kg (ppm)	1	<0.05	99	92	10-182	7
sec-Butylbenzene	mg/kg (ppm)	1	<0.05	98	89	23-145	10
p-Isopropyltoluene	mg/kg (ppm)	1	<0.05	99	89	21-149	11
1,3-Dichlorobenzene	mg/kg (ppm)	1	<0.05	105	96	30-131	9
1,4-Dichlorobenzene	mg/kg (ppm)	1	<0.05	106	96	29-129	10
1,2-Dichlorobenzene	mg/kg (ppm)	1	<0.05	102	91	31-132	11
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	1	<0.5	87	81	11-161	7
1,2,4-Trichlorobenzene	mg/kg (ppm)	1	<0.25	94	85	22-142	10
Hexachlorobutadiene	mg/kg (ppm)	1	<0.25	94	84	10-142	11
Naphthalene	mg/kg (ppm)	1	<0.05	96	87	14-157	10
1,2,3-Trichlorobenzene	mg/kg (ppm)	1	<0.25	93	85	20-144	9

Date of Report: 11/24/20
Date Received: 11/12/20
Project: Cantera TOC, F&BI 011245

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Dichlorodifluoromethane	mg/kg (ppm)	1	65	10-146
Chloromethane	mg/kg (ppm)	1	83	27-133
Vinyl chloride	mg/kg (ppm)	1	95	22-139
Bromomethane	mg/kg (ppm)	1	112	38-114
Chloroethane	mg/kg (ppm)	1	96	9-163
Trichlorofluoromethane	mg/kg (ppm)	1	107	10-196
Acetone	mg/kg (ppm)	5	105	52-141
1,1-Dichloroethene	mg/kg (ppm)	1	118	47-128
Hexane	mg/kg (ppm)	1	77	43-142
Methylene chloride	mg/kg (ppm)	1	91	42-132
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	1	94	60-123
trans-1,2-Dichloroethene	mg/kg (ppm)	1	95	67-129
1,1-Dichloroethane	mg/kg (ppm)	1	93	68-115
2,2-Dichloropropane	mg/kg (ppm)	1	97	52-170
cis-1,2-Dichloroethene	mg/kg (ppm)	1	99	72-127
Chloroform	mg/kg (ppm)	1	94	66-120
2-Butanone (MEK)	mg/kg (ppm)	5	99	72-127
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1	88	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	1	94	62-131
1,1-Dichloropropene	mg/kg (ppm)	1	92	69-128
Carbon tetrachloride	mg/kg (ppm)	1	95	60-139
Benzene	mg/kg (ppm)	1	95	68-114
Trichloroethene	mg/kg (ppm)	1	99	64-117
1,2-Dichloropropane	mg/kg (ppm)	1	94	72-127
Bromodichloromethane	mg/kg (ppm)	1	98	72-130
Dibromomethane	mg/kg (ppm)	1	96	70-120
4-Methyl-2-pentanone	mg/kg (ppm)	5	106	45-145
cis-1,3-Dichloropropene	mg/kg (ppm)	1	98	75-136
Toluene	mg/kg (ppm)	1	92	66-126
trans-1,3-Dichloropropene	mg/kg (ppm)	1	89	72-132
1,1,2-Trichloroethane	mg/kg (ppm)	1	93	75-113
2-Hexanone	mg/kg (ppm)	5	99	33-152
1,3-Dichloropropane	mg/kg (ppm)	1	89	72-130
Tetrachloroethene	mg/kg (ppm)	1	93	72-114
Dibromochloromethane	mg/kg (ppm)	1	96	74-125
1,2-Dibromoethane (EDB)	mg/kg (ppm)	1	96	74-132
Chlorobenzene	mg/kg (ppm)	1	94	76-111
Ethylbenzene	mg/kg (ppm)	1	92	64-123
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	1	99	69-135
m,p-Xylene	mg/kg (ppm)	2	94	78-122
o-Xylene	mg/kg (ppm)	1	94	77-124
Styrene	mg/kg (ppm)	1	97	74-126
Isopropylbenzene	mg/kg (ppm)	1	94	76-127
Bromoform	mg/kg (ppm)	1	99	56-132
n-Propylbenzene	mg/kg (ppm)	1	85	74-124
Bromobenzene	mg/kg (ppm)	1	90	72-122
1,3,5-Trimethylbenzene	mg/kg (ppm)	1	87	76-126
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	1	90	56-143
1,2,3-Trichloropropane	mg/kg (ppm)	1	88	61-137
2-Chlorotoluene	mg/kg (ppm)	1	87	74-121
4-Chlorotoluene	mg/kg (ppm)	1	87	75-122
tert-Butylbenzene	mg/kg (ppm)	1	89	73-130
1,2,4-Trimethylbenzene	mg/kg (ppm)	1	88	76-125
sec-Butylbenzene	mg/kg (ppm)	1	85	71-130
p-Isopropyltoluene	mg/kg (ppm)	1	87	70-132
1,3-Dichlorobenzene	mg/kg (ppm)	1	90	75-121
1,4-Dichlorobenzene	mg/kg (ppm)	1	90	74-117
1,2-Dichlorobenzene	mg/kg (ppm)	1	90	76-121
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	1	86	58-138
1,2,4-Trichlorobenzene	mg/kg (ppm)	1	86	64-135
Hexachlorobutadiene	mg/kg (ppm)	1	82	50-153
Naphthalene	mg/kg (ppm)	1	91	63-140
1,2,3-Trichlorobenzene	mg/kg (ppm)	1	88	63-138

Date of Report: 11/24/20
Date Received: 11/12/20
Project: Cantera TOC, F&BI 011245

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 011198-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Dichlorodifluoromethane	ug/L (ppb)	10	<1	127	10-172
Chloromethane	ug/L (ppb)	10	<10	114	25-166
Vinyl chloride	ug/L (ppb)	10	<0.2	117	36-166
Bromomethane	ug/L (ppb)	10	<5	136	47-169
Chloroethane	ug/L (ppb)	10	<1	117	46-160
Trichlorofluoromethane	ug/L (ppb)	10	<1	126	44-165
Acetone	ug/L (ppb)	50	<50	54	10-182
1,1-Dichloroethene	ug/L (ppb)	10	<1	119	60-136
Hexane	ug/L (ppb)	10	<5	91	52-150
Methylene chloride	ug/L (ppb)	10	<5	111	67-132
Methyl t-butyl ether (MTBE)	ug/L (ppb)	10	<1	95	74-127
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	101	72-129
1,1-Dichloroethane	ug/L (ppb)	10	<1	94	70-128
2,2-Dichloropropane	ug/L (ppb)	10	<1	95	36-154
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	100	71-127
Chloroform	ug/L (ppb)	10	<1	96	65-132
2-Butanone (MEK)	ug/L (ppb)	50	<20	64	10-129
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<1	87	48-149
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	94	60-146
1,1-Dichloropropene	ug/L (ppb)	10	<1	95	69-133
Carbon tetrachloride	ug/L (ppb)	10	<1	95	56-152
Benzene	ug/L (ppb)	10	<0.35	96	76-125
Trichloroethene	ug/L (ppb)	10	<1	96	66-135
1,2-Dichloropropane	ug/L (ppb)	10	<1	94	78-125
Bromodichloromethane	ug/L (ppb)	10	<1	94	61-150
Dibromomethane	ug/L (ppb)	10	<1	94	66-141
4-Methyl-2-pentanone	ug/L (ppb)	50	<10	103	10-185
cis-1,3-Dichloropropene	ug/L (ppb)	10	<1	97	72-132
Toluene	ug/L (ppb)	10	<1	95	76-122
trans-1,3-Dichloropropene	ug/L (ppb)	10	<1	92	76-130
1,1,2-Trichloroethane	ug/L (ppb)	10	<1	98	68-131
2-Hexanone	ug/L (ppb)	50	<10	86	10-185
1,3-Dichloropropane	ug/L (ppb)	10	<1	93	71-128
Tetrachloroethene	ug/L (ppb)	10	<1	98	10-226
Dibromochloromethane	ug/L (ppb)	10	<1	97	70-139
1,2-Dibromoethane (EDB)	ug/L (ppb)	10	<1	97	69-134
Chlorobenzene	ug/L (ppb)	10	<1	97	77-122
Ethylbenzene	ug/L (ppb)	10	<1	96	69-135
1,1,1,2-Tetrachloroethane	ug/L (ppb)	10	<1	99	73-137
m,p-Xylene	ug/L (ppb)	20	<2	98	69-135
o-Xylene	ug/L (ppb)	10	<1	97	60-140
Styrene	ug/L (ppb)	10	<1	101	71-133
Isopropylbenzene	ug/L (ppb)	10	<1	96	65-142
Bromoform	ug/L (ppb)	10	<5	101	65-142
n-Propylbenzene	ug/L (ppb)	10	<1	93	58-144
Bromobenzene	ug/L (ppb)	10	<1	96	75-124
1,3,5-Trimethylbenzene	ug/L (ppb)	10	<1	94	66-137
1,1,2,2-Tetrachloroethane	ug/L (ppb)	10	<1	97	51-154
1,2,3-Trichloropropane	ug/L (ppb)	10	<1	93	53-150
2-Chlorotoluene	ug/L (ppb)	10	<1	92	66-127
4-Chlorotoluene	ug/L (ppb)	10	<1	92	65-130
tert-Butylbenzene	ug/L (ppb)	10	<1	94	65-137
1,2,4-Trimethylbenzene	ug/L (ppb)	10	<1	93	59-146
sec-Butylbenzene	ug/L (ppb)	10	<1	93	64-140
p-Isopropyltoluene	ug/L (ppb)	10	<1	95	65-141
1,3-Dichlorobenzene	ug/L (ppb)	10	<1	97	72-123
1,4-Dichlorobenzene	ug/L (ppb)	10	<1	96	69-126
1,2-Dichlorobenzene	ug/L (ppb)	10	<1	96	69-128
1,2-Dibromo-3-chloropropane	ug/L (ppb)	10	<10	88	32-164
1,2,4-Trichlorobenzene	ug/L (ppb)	10	<1	94	66-136
Hexachlorobutadiene	ug/L (ppb)	10	<1	96	60-143
Naphthalene	ug/L (ppb)	10	<1	93	44-164
1,2,3-Trichlorobenzene	ug/L (ppb)	10	<1	92	69-148

Date of Report: 11/24/20
Date Received: 11/12/20
Project: Cantera TOC, F&BI 011245

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	ug/L (ppb)	10	106	92	25-158	14
Chloromethane	ug/L (ppb)	10	105	95	45-156	10
Vinyl chloride	ug/L (ppb)	10	109	96	50-154	13
Bromomethane	ug/L (ppb)	10	126	111	55-143	13
Chloroethane	ug/L (ppb)	10	115	99	58-146	15
Trichlorofluoromethane	ug/L (ppb)	10	120	106	50-150	12
Acetone	ug/L (ppb)	50	57	51	22-155	11
1,1-Dichloroethene	ug/L (ppb)	10	115	101	67-136	13
Hexane	ug/L (ppb)	10	75	70	57-137	7
Methylene chloride	ug/L (ppb)	10	102	85	39-148	18
Methyl t-butyl ether (MTBE)	ug/L (ppb)	10	108	98	64-147	10
trans-1,2-Dichloroethene	ug/L (ppb)	10	110	102	68-128	8
1,1-Dichloroethane	ug/L (ppb)	10	94	100	74-135	6
2,2-Dichloropropane	ug/L (ppb)	10	62	65	55-143	5
cis-1,2-Dichloroethene	ug/L (ppb)	10	98	101	74-136	3
Chloroform	ug/L (ppb)	10	92	99	74-134	7
2-Butanone (MEK)	ug/L (ppb)	50	66	75	37-150	13
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	84	98	66-129	15
1,1,1-Trichloroethane	ug/L (ppb)	10	93	98	74-142	5
1,1-Dichloropropene	ug/L (ppb)	10	91	97	77-129	6
Carbon tetrachloride	ug/L (ppb)	10	92	97	75-158	5
Benzene	ug/L (ppb)	10	96	98	69-134	2
Trichloroethene	ug/L (ppb)	10	94	96	67-133	2
1,2-Dichloropropane	ug/L (ppb)	10	95	96	71-134	1
Bromodichloromethane	ug/L (ppb)	10	95	98	76-132	3
Dibromomethane	ug/L (ppb)	10	94	96	68-132	2
4-Methyl-2-pentanone	ug/L (ppb)	50	103	106	65-138	3
cis-1,3-Dichloropropene	ug/L (ppb)	10	88	91	74-140	3
Toluene	ug/L (ppb)	10	94	107	72-122	13
trans-1,3-Dichloropropene	ug/L (ppb)	10	84	99	80-136	16
1,1,2-Trichloroethane	ug/L (ppb)	10	99	107	75-124	8
2-Hexanone	ug/L (ppb)	50	85	89	60-136	5
1,3-Dichloropropane	ug/L (ppb)	10	93	103	76-126	10
Tetrachloroethene	ug/L (ppb)	10	91	103	76-121	12
Dibromochloromethane	ug/L (ppb)	10	97	96	84-133	1
1,2-Dibromoethane (EDB)	ug/L (ppb)	10	99	101	82-115	2
Chlorobenzene	ug/L (ppb)	10	96	98	83-114	2
Ethylbenzene	ug/L (ppb)	10	93	94	77-124	1
1,1,1,2-Tetrachloroethane	ug/L (ppb)	10	99	102	84-127	3
m,p-Xylene	ug/L (ppb)	20	94	95	81-112	1
o-Xylene	ug/L (ppb)	10	98	98	81-121	0
Styrene	ug/L (ppb)	10	100	101	84-119	1
Isopropylbenzene	ug/L (ppb)	10	95	96	80-117	1
Bromoform	ug/L (ppb)	10	101	100	74-136	1
n-Propylbenzene	ug/L (ppb)	10	88	92	74-126	4
Bromobenzene	ug/L (ppb)	10	96	99	80-121	3
1,3,5-Trimethylbenzene	ug/L (ppb)	10	91	95	78-123	4
1,1,2,2-Tetrachloroethane	ug/L (ppb)	10	97	104	66-126	7
1,2,3-Trichloropropane	ug/L (ppb)	10	94	99	67-124	5
2-Chlorotoluene	ug/L (ppb)	10	90	95	77-127	5
4-Chlorotoluene	ug/L (ppb)	10	88	93	78-128	6
tert-Butylbenzene	ug/L (ppb)	10	93	95	80-123	2
1,2,4-Trimethylbenzene	ug/L (ppb)	10	90	95	79-122	5
sec-Butylbenzene	ug/L (ppb)	10	88	93	80-116	6
p-Isopropyltoluene	ug/L (ppb)	10	88	92	81-123	4
1,3-Dichlorobenzene	ug/L (ppb)	10	94	97	83-113	3
1,4-Dichlorobenzene	ug/L (ppb)	10	92	99	81-112	7
1,2-Dichlorobenzene	ug/L (ppb)	10	94	98	84-112	4
1,2-Dibromo-3-chloropropane	ug/L (ppb)	10	89	92	57-141	3
1,2,4-Trichlorobenzene	ug/L (ppb)	10	88	91	72-130	3
Hexachlorobutadiene	ug/L (ppb)	10	78	84	53-141	7
Naphthalene	ug/L (ppb)	10	93	99	64-133	6
1,2,3-Trichlorobenzene	ug/L (ppb)	10	89	94	65-136	5

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 011245
Work Order Number: 2011243

November 23, 2020

Attention Michael Erdahl:

Fremont Analytical, Inc. received 9 sample(s) on 11/13/2020 for the analyses presented in the following report.

Biochemical Oxygen Demand by SM 5210B
Dissolved Organic Carbon by SM 5310C
Ion Chromatography by EPA Method 300.0
Sample Moisture (Percent Moisture)
Total Alkalinity by SM 2320B
Total Metals by EPA Method 6020B
Total Organic Carbon by EPA 9060
Total Organic Carbon by SM 5310C

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

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

Original

Brianna Barnes
Project Manager

Date: *11/23/2020*

CLIENT: Friedman & Bruya
Project: 011245
Work Order: 2011243

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2011243-001	PDSB03-21-22 ft	11/12/2020 9:50 AM	11/13/2020 9:04 AM
2011243-002	PDSB03-25-26 ft	11/12/2020 10:00 AM	11/13/2020 9:04 AM
2011243-003	PDSB02-20-21 ft	11/12/2020 10:50 AM	11/13/2020 9:04 AM
2011243-004	PDSB02-26.5-27.5 ft	11/12/2020 11:00 AM	11/13/2020 9:04 AM
2011243-005	PDSB01-23-24 ft	11/12/2020 12:05 PM	11/13/2020 9:04 AM
2011243-006	PDSB01-27.5-28.5 ft	11/12/2020 12:15 PM	11/13/2020 9:04 AM
2011243-007	01MW80-111220	11/12/2020 10:10 AM	11/13/2020 9:04 AM
2011243-008	MW06-111220	11/12/2020 11:40 AM	11/13/2020 9:04 AM
2011243-009	01MW46-111220	11/12/2020 12:55 PM	11/13/2020 9:04 AM

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

Case Narrative

WO#: **2011243**
Date: **11/23/2020**

CLIENT: Friedman & Bruya
Project: 011245

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

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

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

III. ANALYSES AND EXCEPTIONS:

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

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

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

Analytical Report

Work Order: **2011243**
Date Reported: **11/23/2020**

CLIENT: Friedman & Bruya
Project: 011245

Lab ID: 2011243-001 **Collection Date:** 11/12/2020 9:50:00 AM
Client Sample ID: **PDSB03-21-22 ft** **Matrix:** Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 6020B				Batch ID: 30418		Analyst: CO
Calcium	4,510	276	D	mg/Kg-dry	10	11/17/2020 2:58:16 PM
Sample Moisture (Percent Moisture)				Batch ID: R63449		Analyst: LB
Percent Moisture	16.3	0.500		wt%	1	11/17/2020 10:28:46 AM
Total Organic Carbon by EPA 9060				Batch ID: 30491		Analyst: SS
Total Organic Carbon	0.0760	0.0750		%-dry	1	11/20/2020 11:55:00 AM

Lab ID: 2011243-002 **Collection Date:** 11/12/2020 10:00:00 AM
Client Sample ID: **PDSB03-25-26 ft** **Matrix:** Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 6020B				Batch ID: 30418		Analyst: CO
Calcium	4,350	274	D	mg/Kg-dry	10	11/17/2020 3:03:49 PM
Sample Moisture (Percent Moisture)				Batch ID: R63449		Analyst: LB
Percent Moisture	14.5	0.500		wt%	1	11/17/2020 10:28:46 AM
Total Organic Carbon by EPA 9060				Batch ID: 30491		Analyst: SS
Total Organic Carbon	0.119	0.0750		%-dry	1	11/20/2020 12:55:00 PM

Lab ID: 2011243-003 **Collection Date:** 11/12/2020 10:50:00 AM
Client Sample ID: **PDSB02-20-21 ft** **Matrix:** Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 6020B				Batch ID: 30418		Analyst: CO
Calcium	5,210	258	D	mg/Kg-dry	10	11/17/2020 3:09:23 PM
Sample Moisture (Percent Moisture)				Batch ID: R63449		Analyst: LB
Percent Moisture	18.7	0.500		wt%	1	11/17/2020 10:28:46 AM
Total Organic Carbon by EPA 9060				Batch ID: 30491		Analyst: SS
Total Organic Carbon	0.285	0.0750		%-dry	1	11/20/2020 1:11:00 PM

Lab ID: 2011243-004 **Collection Date:** 11/12/2020 11:00:00 AM
Client Sample ID: **PDSB02-26.5-27.5 ft** **Matrix:** Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 6020B				Batch ID: 30418		Analyst: CO
Calcium	3,670	296	D	mg/Kg-dry	10	11/17/2020 3:14:56 PM
Sample Moisture (Percent Moisture)				Batch ID: R63449		Analyst: LB
Percent Moisture	15.5	0.500		wt%	1	11/17/2020 10:28:46 AM
Total Organic Carbon by EPA 9060				Batch ID: 30491		Analyst: SS
Total Organic Carbon	0.0770	0.0750		%-dry	1	11/20/2020 1:24:00 PM

Lab ID: 2011243-005
Collection Date: 11/12/2020 12:05:00 PM
Client Sample ID: **PDSB01-23-24 ft**
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 6020B				Batch ID: 30418		Analyst: CO
Calcium	3,970	295	D	mg/Kg-dry	10	11/17/2020 3:20:30 PM
Sample Moisture (Percent Moisture)				Batch ID: R63449		Analyst: LB
Percent Moisture	16.1	0.500		wt%	1	11/17/2020 10:28:46 AM
Total Organic Carbon by EPA 9060				Batch ID: 30491		Analyst: SS
Total Organic Carbon	0.0850	0.0750		%-dry	1	11/20/2020 2:53:00 PM

Lab ID: 2011243-006
Collection Date: 11/12/2020 12:15:00 PM
Client Sample ID: **PDSB01-27.5-28.5 ft**
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 6020B				Batch ID: 30418		Analyst: CO
Calcium	4,030	290	D	mg/Kg-dry	10	11/17/2020 3:26:03 PM
Sample Moisture (Percent Moisture)				Batch ID: R63449		Analyst: LB
Percent Moisture	15.2	0.500		wt%	1	11/17/2020 10:28:46 AM
Total Organic Carbon by EPA 9060				Batch ID: 30491		Analyst: SS
Total Organic Carbon	ND	0.0750		%-dry	1	11/20/2020 3:07:00 PM

Analytical Report

Work Order: **2011243**
Date Reported: **11/23/2020**

CLIENT: Friedman & Bruya
Project: 011245

Lab ID: 2011243-007
Collection Date: 11/12/2020 10:10:00 AM
Client Sample ID: **01MW80-111220**
Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Biochemical Oxygen Demand by SM 5210B				Batch ID: R63542		Analyst: SS
Biochemical Oxygen Demand	ND	2.00	*	mg/L	1	11/13/2020 7:00:00 PM

NOTES:
All dilutions resulted in insufficient oxygen depletion. Result calculated using the largest amount of sample (smallest dilution). True value equal to or less than posted result.
* - Flagged value is not within established control limits.

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ion Chromatography by EPA Method 300.0				Batch ID: 30416		Analyst: TN
Nitrate (as N)	ND	0.200	DH	mg/L	2	11/16/2020 11:45:00 AM
Nitrate (as N)	ND	1.00	D	mg/L	10	11/13/2020 8:02:00 PM
Sulfate	61.2	3.00	D	mg/L	10	11/13/2020 8:02:00 PM
Dissolved Organic Carbon by SM 5310C				Batch ID: R63480		Analyst: SS
Organic Carbon, Dissolved	3.78	0.500		mg/L-dry	1	11/17/2020 5:47:00 PM
Total Organic Carbon by SM 5310C				Batch ID: R63479		Analyst: SS
Total Organic Carbon	3.83	0.500		mg/L-dry	1	11/17/2020 1:27:00 PM
Total Alkalinity by SM 2320B				Batch ID: R63575		Analyst: WF
Alkalinity, Total (As CaCO3)	368	2.50		mg/L	1	11/20/2020 2:52:14 PM

Analytical Report

Work Order: **2011243**
Date Reported: **11/23/2020**

CLIENT: Friedman & Bruya
Project: 011245

Lab ID: 2011243-008
Collection Date: 11/12/2020 11:40:00 AM
Client Sample ID: **MW06-111220**
Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Biochemical Oxygen Demand by SM 5210B				Batch ID: R63542		Analyst: SS
Biochemical Oxygen Demand	ND	2.00	*	mg/L	1	11/13/2020 7:00:00 PM

NOTES:
All dilutions resulted in insufficient oxygen depletion. Result calculated using the largest amount of sample (smallest dilution). True value equal to or less than posted result.
* - Flagged value is not within established control limits.

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ion Chromatography by EPA Method 300.0				Batch ID: 30416		Analyst: TN
Nitrate (as N)	ND	0.100	H	mg/L	1	11/16/2020 12:08:00 PM
Nitrate (as N)	ND	1.00	D	mg/L	10	11/13/2020 8:25:00 PM
Sulfate	46.3	3.00	D	mg/L	10	11/13/2020 8:25:00 PM
Dissolved Organic Carbon by SM 5310C				Batch ID: R63480		Analyst: SS
Organic Carbon, Dissolved	3.72	0.500		mg/L-dry	1	11/17/2020 6:08:00 PM
Total Organic Carbon by SM 5310C				Batch ID: R63479		Analyst: SS
Total Organic Carbon	3.78	0.500		mg/L-dry	1	11/17/2020 2:52:00 PM
Total Alkalinity by SM 2320B				Batch ID: R63575		Analyst: WF
Alkalinity, Total (As CaCO3)	309	2.50		mg/L	1	11/20/2020 2:52:14 PM

Analytical Report

Work Order: **2011243**
Date Reported: **11/23/2020**

CLIENT: Friedman & Bruya
Project: 011245

Lab ID: 2011243-009
Client Sample ID: **01MW46-111220**
Collection Date: 11/12/2020 12:55:00 PM
Matrix: Water

Biochemical Oxygen Demand by SM 5210B

Batch ID: R63542 Analyst: SS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Biochemical Oxygen Demand	ND	2.00	*	mg/L	1	11/13/2020 7:00:00 PM

NOTES:
All dilutions resulted in insufficient oxygen depletion. Result calculated using the largest amount of sample (smallest dilution). True value equal to or less than posted result.
* - Flagged value is not within established control limits.

Ion Chromatography by EPA Method 300.0

Batch ID: 30416 Analyst: TN

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Nitrate (as N)	0.106	0.100	H	mg/L	1	11/16/2020 12:31:00 PM
Nitrate (as N)	ND	1.00	D	mg/L	10	11/13/2020 8:48:00 PM
Sulfate	43.4	3.00	D	mg/L	10	11/13/2020 8:48:00 PM

Dissolved Organic Carbon by SM 5310C

Batch ID: R63480 Analyst: SS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Organic Carbon, Dissolved	4.42	0.500		mg/L-dry	1	11/17/2020 6:29:00 PM

Total Organic Carbon by SM 5310C

Batch ID: R63479 Analyst: SS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Organic Carbon	4.54	0.500		mg/L-dry	1	11/17/2020 3:13:00 PM

Total Alkalinity by SM 2320B

Batch ID: R63575 Analyst: WF

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Alkalinity, Total (As CaCO3)	348	2.50		mg/L	1	11/20/2020 2:52:14 PM

Work Order: 2011243
CLIENT: Friedman & Bruya
Project: 011245

QC SUMMARY REPORT

Biochemical Oxygen Demand by SM 5210B

Sample ID: **MB-63542** SampType: **MBLK** Units: **mg/L** Prep Date: **11/13/2020** RunNo: **63542**
Client ID: **MBLKW** Batch ID: **R63542** Analysis Date: **11/13/2020** SeqNo: **1275440**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Biochemical Oxygen Demand	ND	2.00									*

NOTES:
* - Flagged value is not within established control limits.

Sample ID: **LCS-63542** SampType: **LCS** Units: **mg/L** Prep Date: **11/13/2020** RunNo: **63542**
Client ID: **LCSW** Batch ID: **R63542** Analysis Date: **11/13/2020** SeqNo: **1275441**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Biochemical Oxygen Demand	129	2.00	198.0	0	65.0	84.6	115.4				S

NOTES:
S - Outlying spike recovery observed (low bias). Samples will be qualified with a *.

Sample ID: **2011254-001BDUP** SampType: **DUP** Units: **mg/L** Prep Date: **11/13/2020** RunNo: **63542**
Client ID: **BATCH** Batch ID: **R63542** Analysis Date: **11/13/2020** SeqNo: **1275443**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Biochemical Oxygen Demand	3.55	2.00						3.158	11.6	20	*

NOTES:
* - Flagged value is not within established control limits.

Work Order: 2011243
CLIENT: Friedman & Bruya
Project: 011245

QC SUMMARY REPORT

Total Alkalinity by SM 2320B

Sample ID: **MB-R63575** SampType: **MBLK** Units: **mg/L** Prep Date: **11/20/2020** RunNo: **63575**
Client ID: **MBLKW** Batch ID: **R63575** Analysis Date: **11/20/2020** SeqNo: **1276166**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	ND	2.50									

Sample ID: **LCS-R63575** SampType: **LCS** Units: **mg/L** Prep Date: **11/20/2020** RunNo: **63575**
Client ID: **LCSW** Batch ID: **R63575** Analysis Date: **11/20/2020** SeqNo: **1276167**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	102	2.50	100.0	0	102	99.6	108				

Sample ID: **2011243-007ADUP** SampType: **DUP** Units: **mg/L** Prep Date: **11/20/2020** RunNo: **63575**
Client ID: **01MW80-111220** Batch ID: **R63575** Analysis Date: **11/20/2020** SeqNo: **1276169**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	372	2.50						367.5	1.32	20	

Work Order: 2011243
CLIENT: Friedman & Bruya
Project: 011245

QC SUMMARY REPORT

Dissolved Organic Carbon by SM 5310C

Sample ID: **MB-R63480** SampType: **MBLK** Units: **mg/L** Prep Date: **11/17/2020** RunNo: **63480**
Client ID: **MBLKW** Batch ID: **R63480** Analysis Date: **11/17/2020** SeqNo: **1274246**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	ND	0.500									

Sample ID: **LCS-R63480** SampType: **LCS** Units: **mg/L** Prep Date: **11/17/2020** RunNo: **63480**
Client ID: **LCSW** Batch ID: **R63480** Analysis Date: **11/17/2020** SeqNo: **1274247**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	5.00	0.500	5.000	0	100	94.4	109				

Sample ID: **2011243-009DDUP** SampType: **DUP** Units: **mg/L-dry** Prep Date: **11/17/2020** RunNo: **63480**
Client ID: **01MW46-111220** Batch ID: **R63480** Analysis Date: **11/17/2020** SeqNo: **1274251**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	4.48	0.500						4.422	1.30	20	

Sample ID: **2011243-009DMS** SampType: **MS** Units: **mg/L-dry** Prep Date: **11/17/2020** RunNo: **63480**
Client ID: **01MW46-111220** Batch ID: **R63480** Analysis Date: **11/17/2020** SeqNo: **1274252**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	9.24	0.500	5.000	4.422	96.4	80.9	124				

Sample ID: **2011243-009DMSD** SampType: **MSD** Units: **mg/L-dry** Prep Date: **11/17/2020** RunNo: **63480**
Client ID: **01MW46-111220** Batch ID: **R63480** Analysis Date: **11/17/2020** SeqNo: **1274253**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	9.20	0.500	5.000	4.422	95.6	80.9	124	9.244	0.477	30	

Work Order: 2011243
CLIENT: Friedman & Bruya
Project: 011245

QC SUMMARY REPORT

Ion Chromatography by EPA Method 300.0

Sample ID: **MB-30416** SampType: **MBLK** Units: **mg/L** Prep Date: **11/13/2020** RunNo: **63413**
Client ID: **MBLKW** Batch ID: **30416** Analysis Date: **11/13/2020** SeqNo: **1272624**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate (as N)	ND	0.100									
Sulfate	ND	0.300									

Sample ID: **LCS-30416** SampType: **LCS** Units: **mg/L** Prep Date: **11/13/2020** RunNo: **63413**
Client ID: **LCSW** Batch ID: **30416** Analysis Date: **11/13/2020** SeqNo: **1272625**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate (as N)	0.704	0.100	0.7500	0	93.9	90	110				
Sulfate	3.81	0.300	3.750	0	102	90	110				

Sample ID: **2011254-001BDUP** SampType: **DUP** Units: **mg/L** Prep Date: **11/13/2020** RunNo: **63413**
Client ID: **BATCH** Batch ID: **30416** Analysis Date: **11/13/2020** SeqNo: **1272631**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate (as N)	ND	1.00						0		20	D
Sulfate	12.2	3.00						12.21	0.164	20	D

Sample ID: **2011254-001BMS** SampType: **MS** Units: **mg/L** Prep Date: **11/13/2020** RunNo: **63413**
Client ID: **BATCH** Batch ID: **30416** Analysis Date: **11/13/2020** SeqNo: **1272632**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate (as N)	7.13	1.00	7.500	0	95.1	80	120				D
Sulfate	53.0	3.00	37.50	12.21	109	80	120				D

Work Order: 2011243
CLIENT: Friedman & Bruya
Project: 011245

QC SUMMARY REPORT

Ion Chromatography by EPA Method 300.0

Sample ID: **2011254-001BMSD** SampType: **MSD** Units: **mg/L** Prep Date: **11/13/2020** RunNo: **63413**
Client ID: **BATCH** Batch ID: **30416** Analysis Date: **11/13/2020** SeqNo: **1272633**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate (as N)	7.19	1.00	7.500	0	95.9	80	120	7.130	0.838	20	D
Sulfate	53.4	3.00	37.50	12.21	110	80	120	53.01	0.770	20	D

Work Order: 2011243
CLIENT: Friedman & Bruya
Project: 011245

QC SUMMARY REPORT

Total Organic Carbon by EPA 9060

Sample ID: **MB-30491** SampType: **MBLK** Units: **%-dry** Prep Date: **11/20/2020** RunNo: **63576**
Client ID: **MBLKS** Batch ID: **30491** Analysis Date: **11/20/2020** SeqNo: **1276213**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	ND	0.0750									

Sample ID: **LCS-30491** SampType: **LCS** Units: **%-dry** Prep Date: **11/20/2020** RunNo: **63576**
Client ID: **LCSS** Batch ID: **30491** Analysis Date: **11/20/2020** SeqNo: **1276214**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	1.03	0.0750	1.000	0	103	80	120				

Sample ID: **2011243-001ADUP** SampType: **DUP** Units: **%-dry** Prep Date: **11/20/2020** RunNo: **63576**
Client ID: **PDSB03-21-22 ft** Batch ID: **30491** Analysis Date: **11/20/2020** SeqNo: **1276216**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	ND	0.0750						0.07600	32.1	20	

Sample ID: **2011243-001AMS** SampType: **MS** Units: **%-dry** Prep Date: **11/20/2020** RunNo: **63576**
Client ID: **PDSB03-21-22 ft** Batch ID: **30491** Analysis Date: **11/20/2020** SeqNo: **1276217**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	1.08	0.0750	1.000	0.07600	101	75	125				

Sample ID: **2011243-001AMSD** SampType: **MSD** Units: **%-dry** Prep Date: **11/20/2020** RunNo: **63576**
Client ID: **PDSB03-21-22 ft** Batch ID: **30491** Analysis Date: **11/20/2020** SeqNo: **1276218**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	1.10	0.0750	1.000	0.07600	102	75	125	1.083	1.28	20	

Work Order: 2011243
CLIENT: Friedman & Bruya
Project: 011245

QC SUMMARY REPORT

Total Organic Carbon by SM 5310C

Sample ID: **MB-R63479** SampType: **MBLK** Units: **mg/L** Prep Date: **11/17/2020** RunNo: **63479**
Client ID: **MBLKW** Batch ID: **R63479** Analysis Date: **11/17/2020** SeqNo: **1274195**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	ND	0.500									

Sample ID: **LCS-R63479** SampType: **LCS** Units: **mg/L** Prep Date: **11/17/2020** RunNo: **63479**
Client ID: **LCSW** Batch ID: **R63479** Analysis Date: **11/17/2020** SeqNo: **1274196**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	4.92	0.500	5.000	0	98.5	90	118				

Sample ID: **2011243-007CDUP** SampType: **DUP** Units: **mg/L-dry** Prep Date: **11/17/2020** RunNo: **63479**
Client ID: **01MW80-111220** Batch ID: **R63479** Analysis Date: **11/17/2020** SeqNo: **1274198**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	3.80	0.500						3.831	0.812	20	

Sample ID: **2011243-007CMS** SampType: **MS** Units: **mg/L-dry** Prep Date: **11/17/2020** RunNo: **63479**
Client ID: **01MW80-111220** Batch ID: **R63479** Analysis Date: **11/17/2020** SeqNo: **1274199**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	8.55	0.500	5.000	3.831	94.4	80.9	124				

Sample ID: **2011243-007CMSD** SampType: **MSD** Units: **mg/L-dry** Prep Date: **11/17/2020** RunNo: **63479**
Client ID: **01MW80-111220** Batch ID: **R63479** Analysis Date: **11/17/2020** SeqNo: **1274200**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	8.42	0.500	5.000	3.831	91.7	80.9	124	8.553	1.59	30	

Work Order: 2011243
CLIENT: Friedman & Bruya
Project: 011245

QC SUMMARY REPORT

Total Metals by EPA Method 6020B

Sample ID: **MB-30418** SampType: **MBLK** Units: **mg/Kg** Prep Date: **11/16/2020** RunNo: **63437**
Client ID: **MBLKS** Batch ID: **30418** Analysis Date: **11/17/2020** SeqNo: **1273933**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	ND	22.2									

Sample ID: **LCS-30418** SampType: **LCS** Units: **mg/Kg** Prep Date: **11/16/2020** RunNo: **63437**
Client ID: **LCSS** Batch ID: **30418** Analysis Date: **11/17/2020** SeqNo: **1273934**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	393	22.4	373.1	0	105	80	120				

Sample ID: **2011269-002AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/16/2020** RunNo: **63437**
Client ID: **BATCH** Batch ID: **30418** Analysis Date: **11/17/2020** SeqNo: **1273937**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	13,000	30.8	513.6	11,640	270	75	125				ES

NOTES:
S - Analyte concentration was too high for accurate spike recovery(ies).
E - Estimated value. The amount exceeds the linear working range of the instrument.

Sample ID: **2011269-002APDS** SampType: **PDS** Units: **mg/Kg-dry** Prep Date: **11/16/2020** RunNo: **63437**
Client ID: **BATCH** Batch ID: **30418** Analysis Date: **11/17/2020** SeqNo: **1273939**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	12,800	33.1	552	11,600	203	75	125				ES

NOTES:
S - Analyte concentration was too high for accurate spike recovery(ies).
E - Estimated value. The amount exceeds the linear working range of the instrument.

Work Order: 2011243
CLIENT: Friedman & Bruya
Project: 011245

QC SUMMARY REPORT

Total Metals by EPA Method 6020B

Sample ID: **2011269-002AMSD**	SampType: **MSD**	Units: **mg/Kg-dry**	Prep Date: **11/16/2020**	RunNo: **63437**
Client ID: **BATCH**	Batch ID: **30418**		Analysis Date: **11/17/2020**	SeqNo: **1273992**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	12,900	30.6	509.7	11,640	243	75	125	13,030	1.16	20	ES

NOTES:

S - Analyte concentration was too high for accurate spike recovery(ies).

E - Estimated value. The amount exceeds the linear working range of the instrument.

Sample Log-In Check List

Client Name: **FB** Work Order Number: **2011243**
Logged by: **Clare Griggs** Date Received: **11/13/2020 9:04:00 AM**

Chain of Custody

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

Log In

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

Special Handling (if applicable)

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

Person Notified: Eric Young Date: 11/13/2020
By Whom: Clare Griggs Via: ☐ eMail ☑ Phone ☐ Fax ☐ In Person
Regarding: Confirming volume received.
Client Instructions: 250mL polys with Zn Acetate & NaOH should be placed on hold.

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample	2.4

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

201243

Page # ______ of ______

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER Fremont

PROJECT NAME/NO. 01245

PO # A-459

REMARKS

Please Email Results

TURNAROUND TIME

☑ Standard TAT
☐ RUSH ______
Rush charges authorized by:

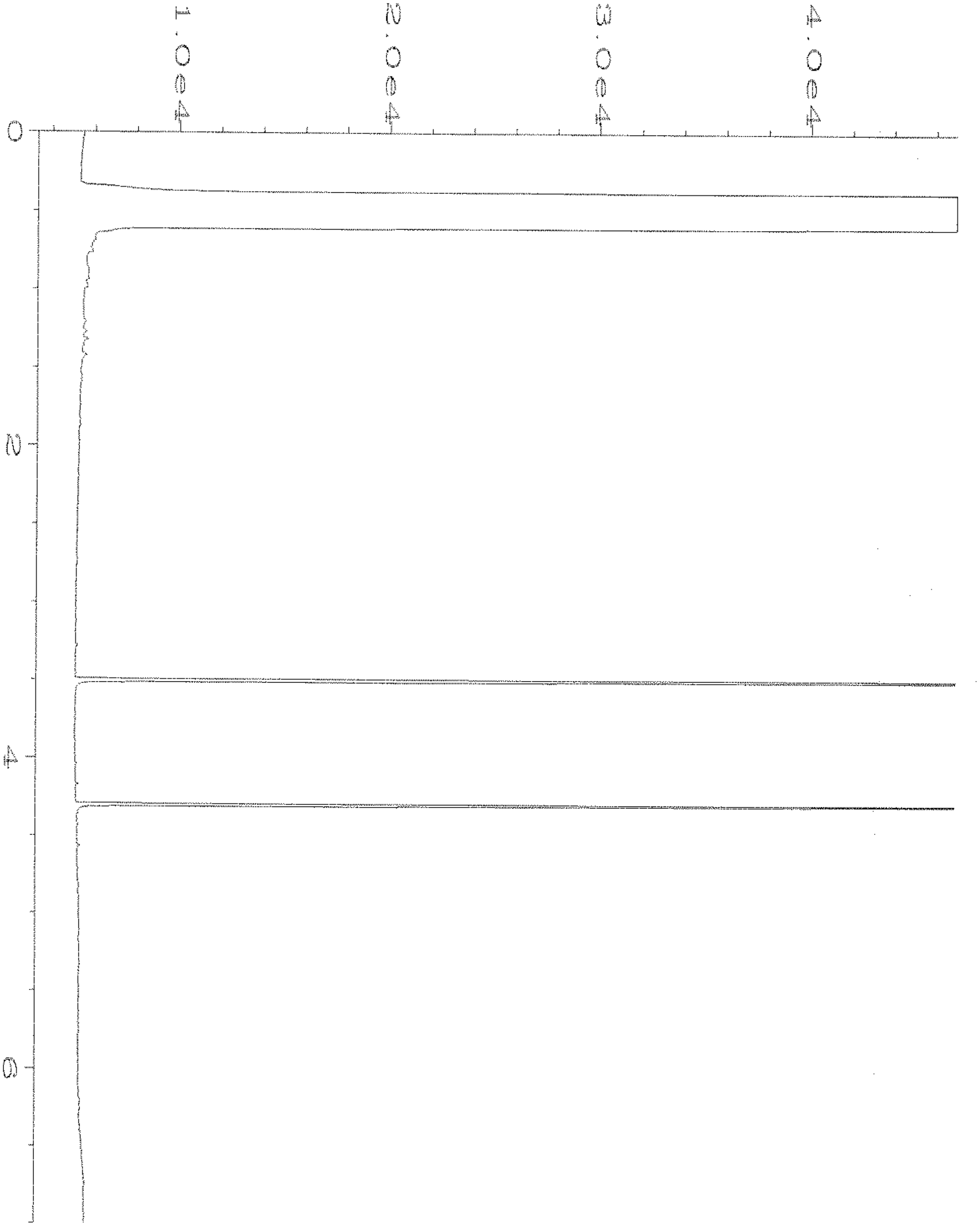
SAMPLE DISPOSAL

☑ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	Dioxins/Furans	EPH	VPH	TOC	Alkalinity	BOD	TOC/DOC	SULFATE	NITRATE	Calcium	Notes
PDSB03-21-22Ft		11/12/20	0950	S	1				✓						✓	
PDSB03.25-26Ft			1000	S	1				✓						✓	
PDSB02-20-21Ft			1050	S	1				✓						✓	
PDSB02-26.5-27.5Ft			1100	S	1				✓						✓	
PDSB01-23-24Ft			1205	S	1				✓						✓	
PDSB01-27.5-28.5FT			1215	S	1				✓						✓	
01MW80-111220			1010	W	4 ~~5 3~~					✓	✓	✓	✓	✓		
MW06-11220			1140	W	4 ~~5 3~~					✓	✓	✓	✓	✓		
01MW46-11220			1255	W	4 ~~5 3~~					✓	✓	✓	✓	✓		
					EP 11/13											

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:	~~Michael Erdahl~~ ERIC Young	Friedman & Bruya	11/13/20	900
Received by:	Carter Johnson	FAI	11/13/20	0904
Relinquished by:				
Received by:				



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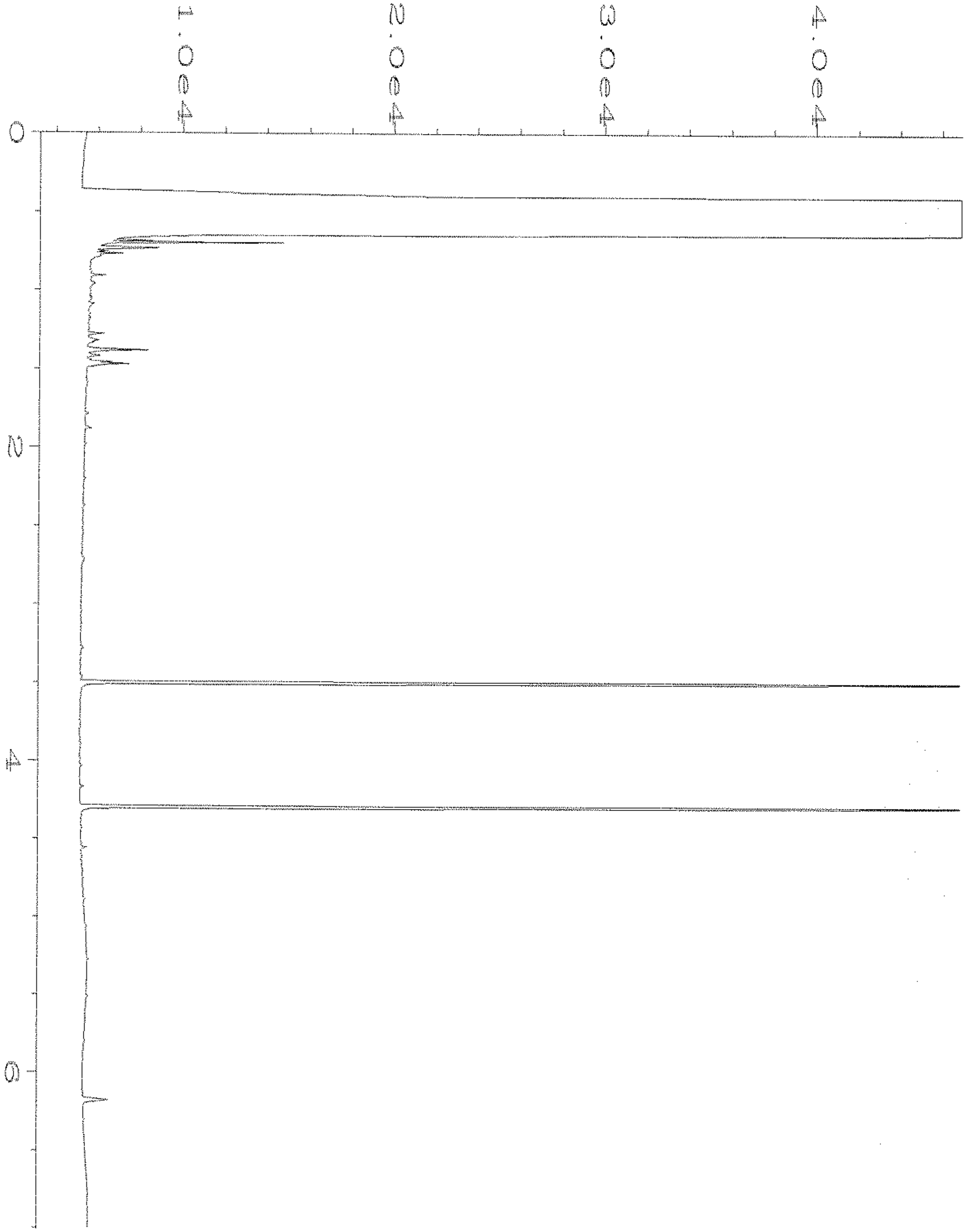
Operator : TL
Instrument : GC6
Sample Name : 011245-01
Run Time Bar Code:
Acquired on : 13 Nov 20 02:31 PM
Report Created on: 16 Nov 20 08:13 AM

Page Number : 1
Vial Number : 16
Injection Number : 1
Sequence Line : 5
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



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Operator : TL
Instrument : GC6
Sample Name : 011245-02
Run Time Bar Code:
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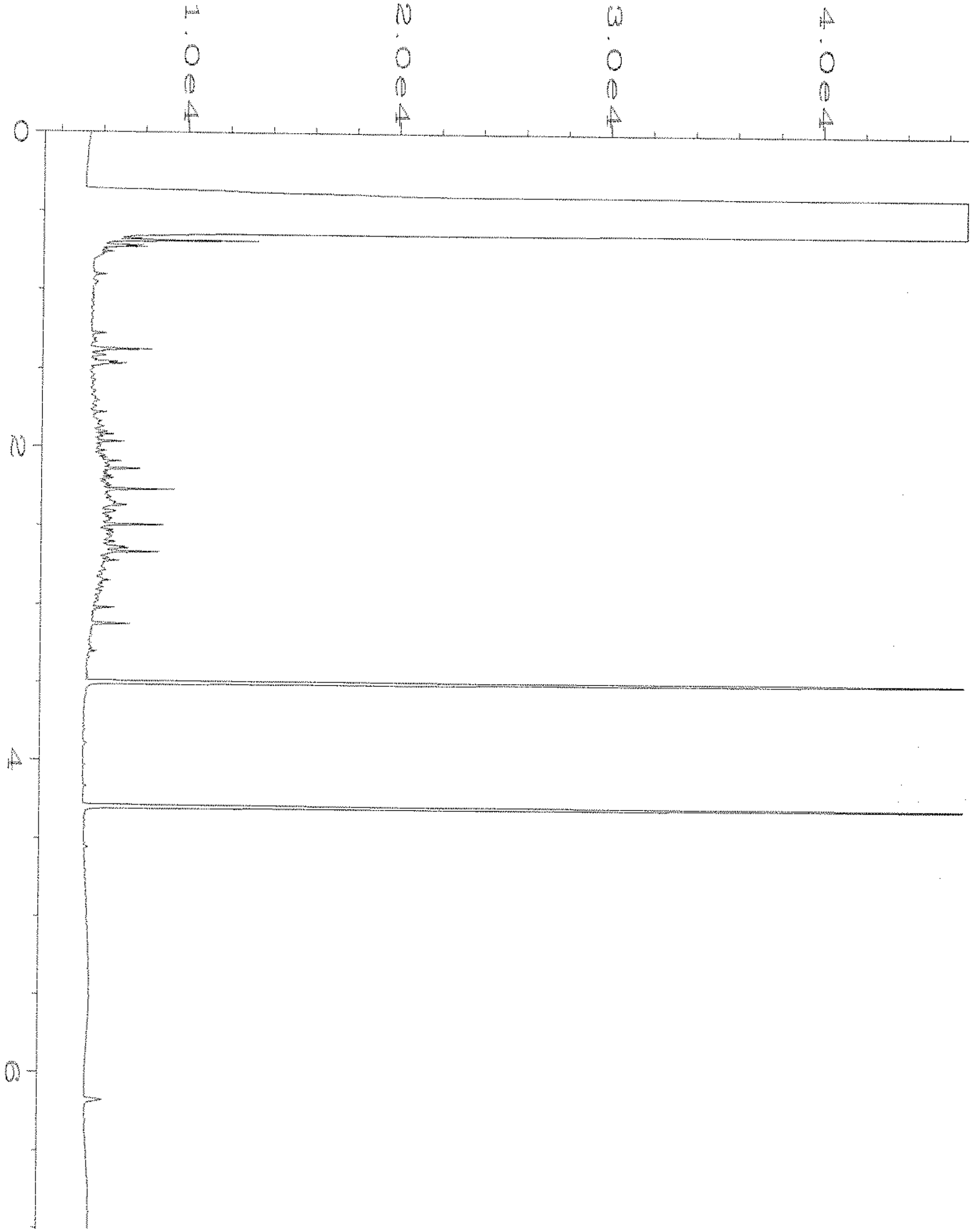
Report Created on: 16 Nov 20 08:14 AM

Page Number : 1
Vial Number : 17
Injection Number : 1
Sequence Line : 5
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name : C:\HPCHEM\6\DATA\11-13-20\018F0501.D
Operator : TL
Instrument : GC6
Sample Name : 011245-03
Run Time Bar Code:
Acquired on : 13 Nov 20 02:50 PM
Report Created on: 16 Nov 20 08:14 AM

Page Number : 1
Vial Number : 18
Injection Number : 1
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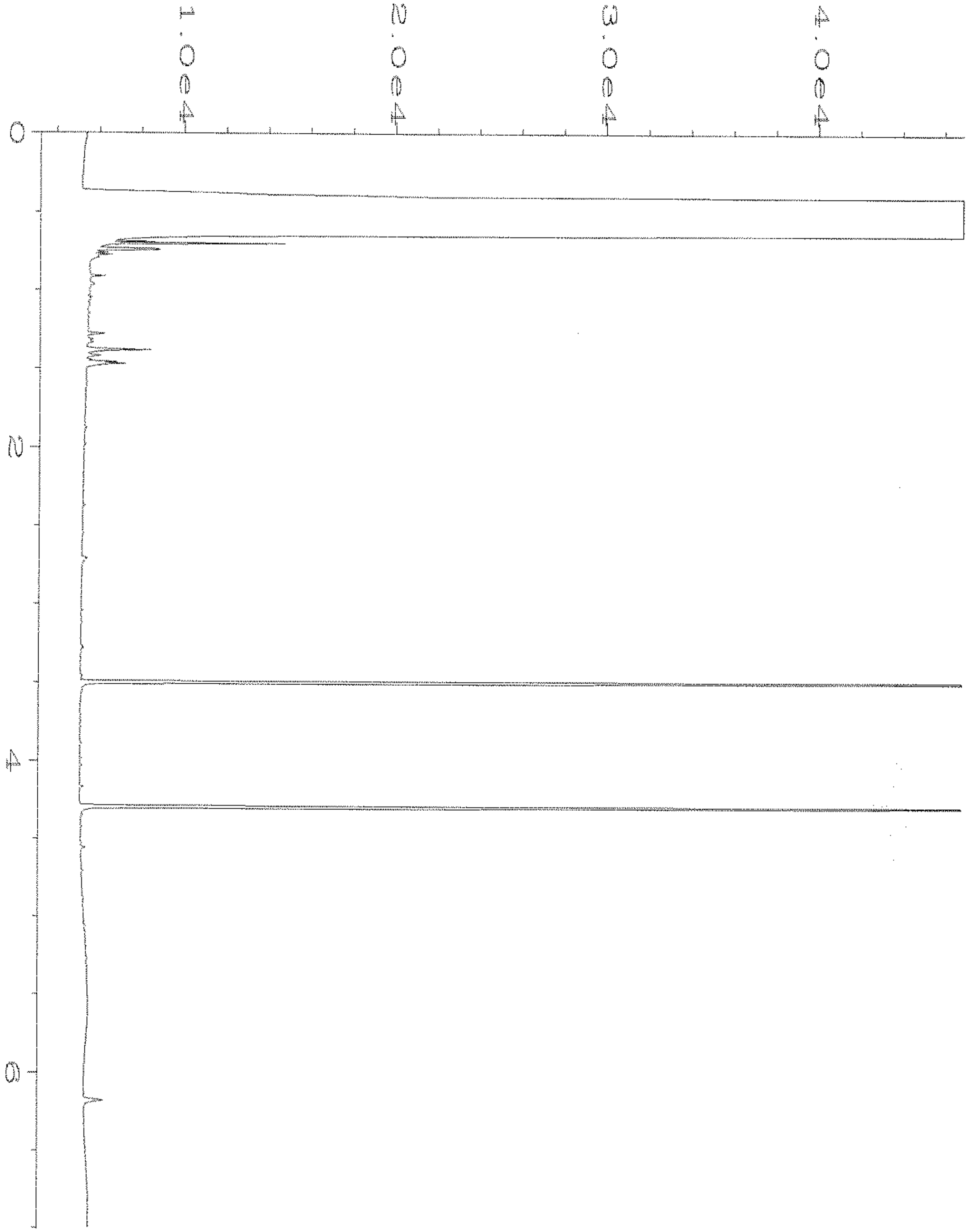
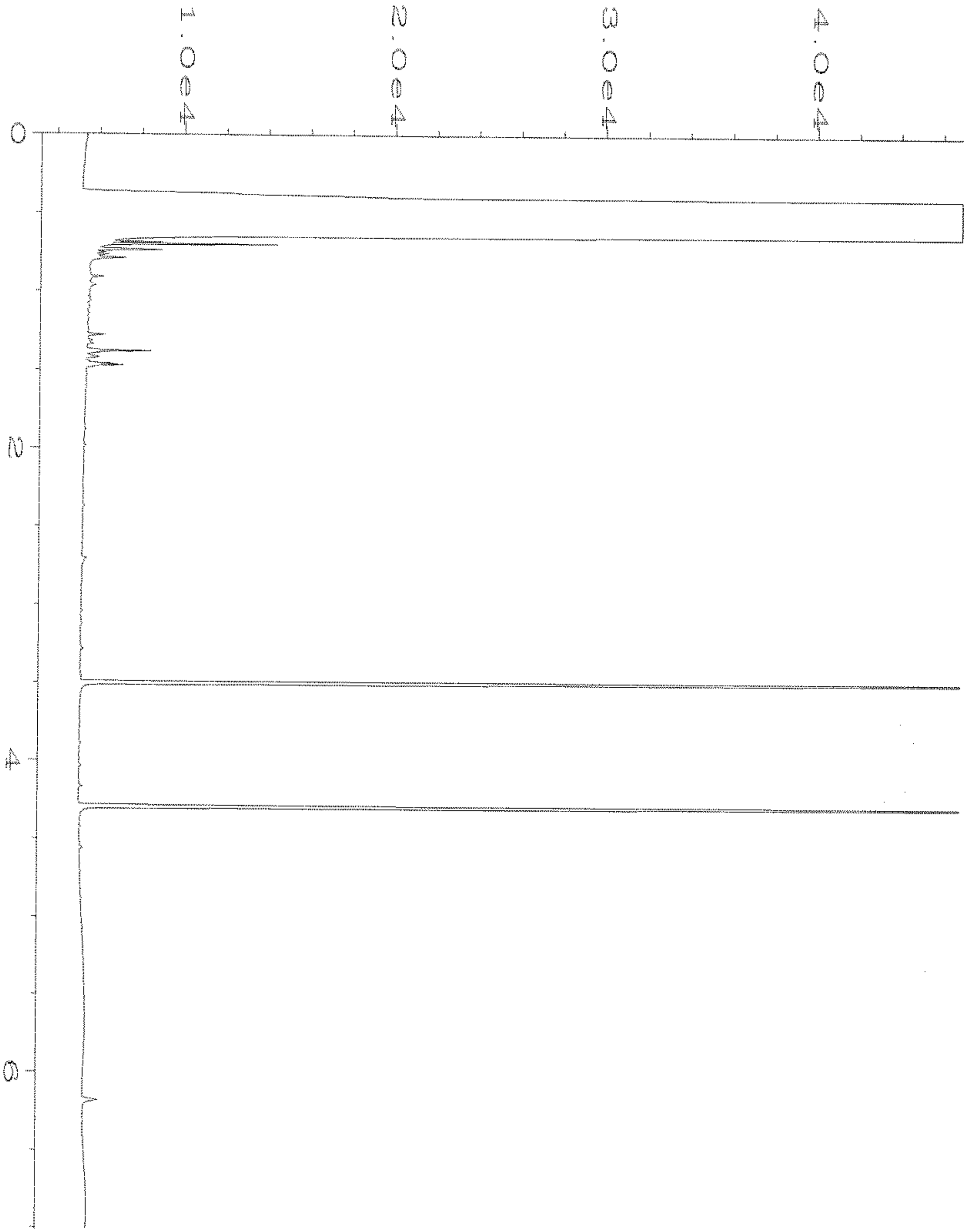
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name : C:\HPCHEM\6\DATA\11-13-20\019F0501.D
Operator : TL
Instrument : GC6
Sample Name : 011245-04
Run Time Bar Code:
Acquired on : 13 Nov 20 03:01 PM
Report Created on: 16 Nov 20 08:14 AM

Page Number : 1
Vial Number : 19
Injection Number : 1
Sequence Line : 5
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



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Operator          : TL                                     Page Number      : 1
Instrument        : GC6                                    Vial Number      : 20
Sample Name       : 011245-05                              Injection Number : 1
Run Time Bar Code:                                         Sequence Line    : 5
Acquired on       : 13 Nov 20   03:12 PM                   Instrument Method: DX.MTH
Report Created on: 16 Nov 20   08:14 AM                    Analysis Method  : DEFAULT.MTH
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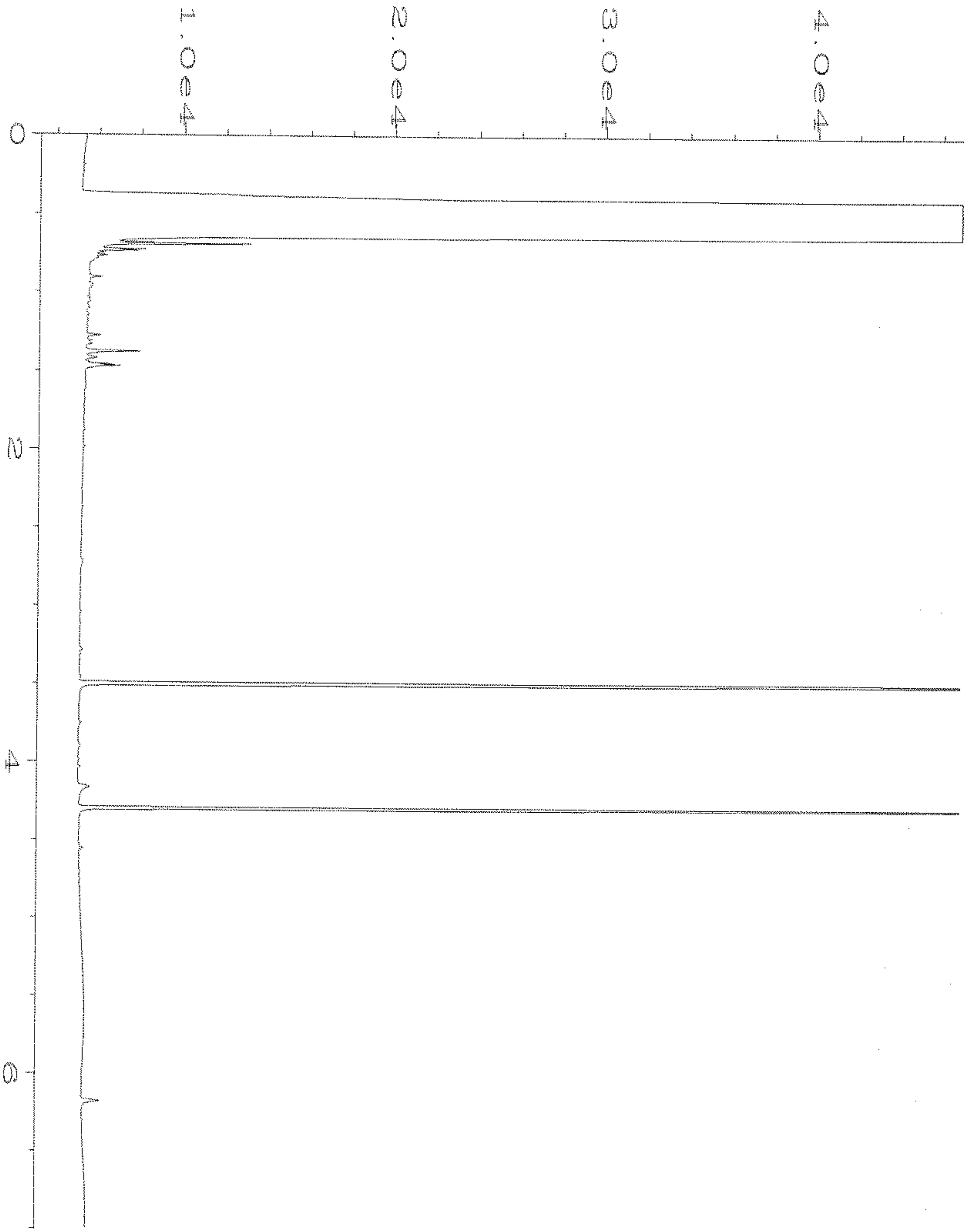

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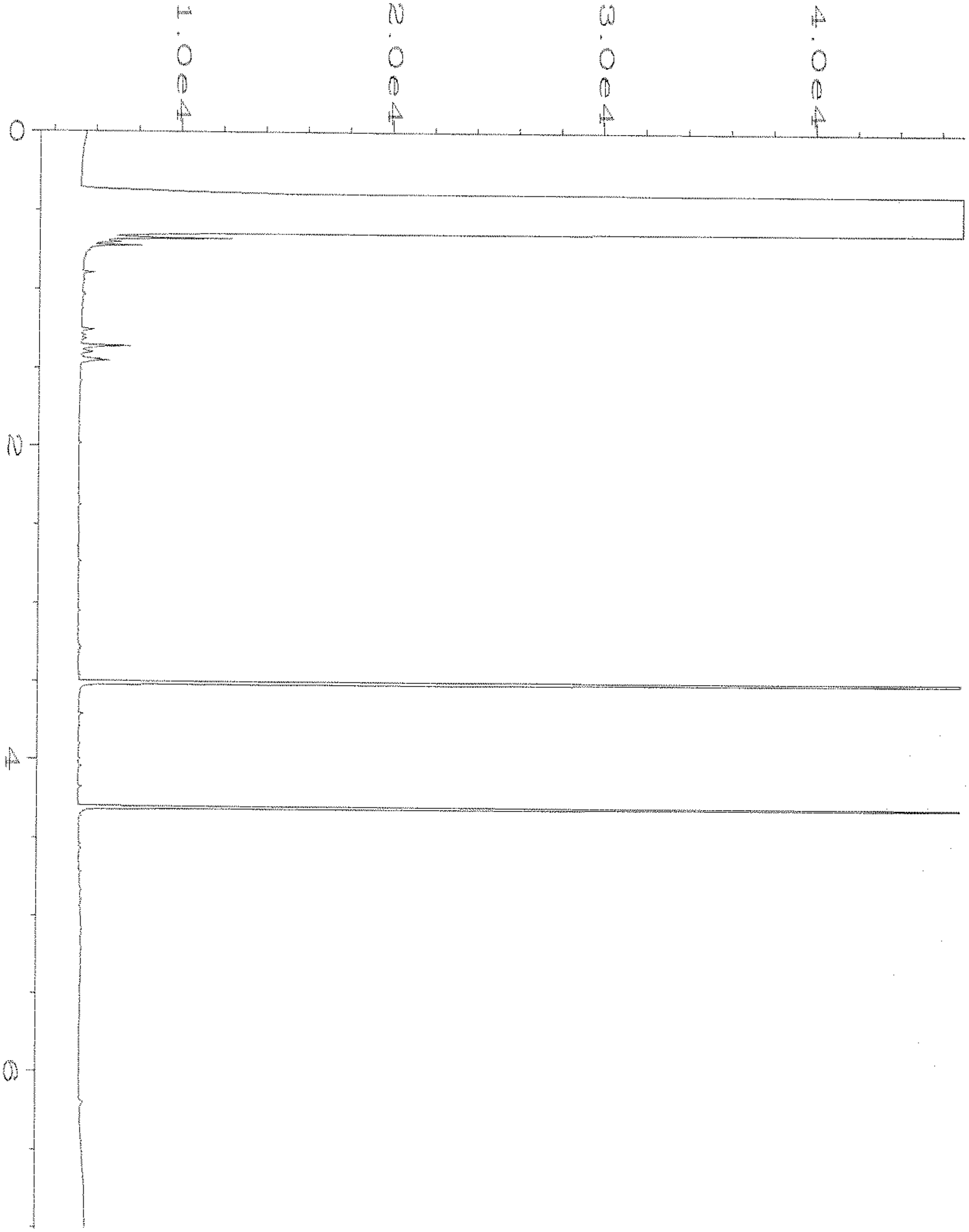
Operator          : TL                              Page Number       : 1
Instrument        : GC6                             Vial Number       : 21
Sample Name       : 011245-06                       Injection Number  : 1
Run Time Bar Code:                                  Sequence Line     : 5
Acquired on       : 13 Nov 20   03:24 PM            Instrument Method: DX.MTH
Report Created on: 16 Nov 20   08:14 AM             Analysis Method   : DEFAULT.MTH
```



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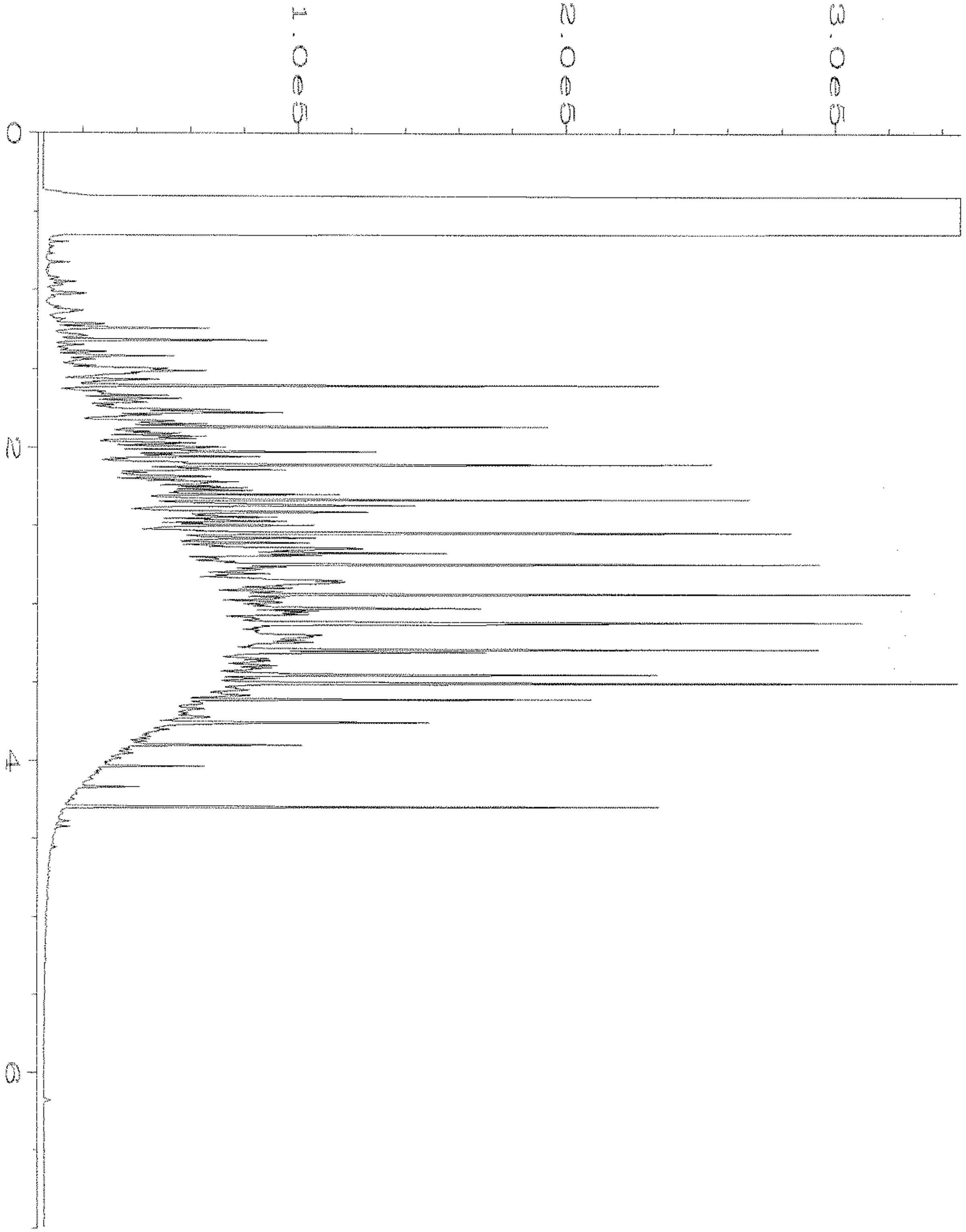
Operator          : TL                          Page Number        : 1
Instrument        : GC6                         Vial Number        : 6
Sample Name       : 00-2510 mb                  Injection Number : 1
Run Time Bar Code:                              Sequence Line      : 3
Acquired on       : 13 Nov 20   08:03 AM        Instrument Method: DX.MTH
Report Created on: 16 Nov 20   08:14 AM         Analysis Method    : DEFAULT.MTH
```



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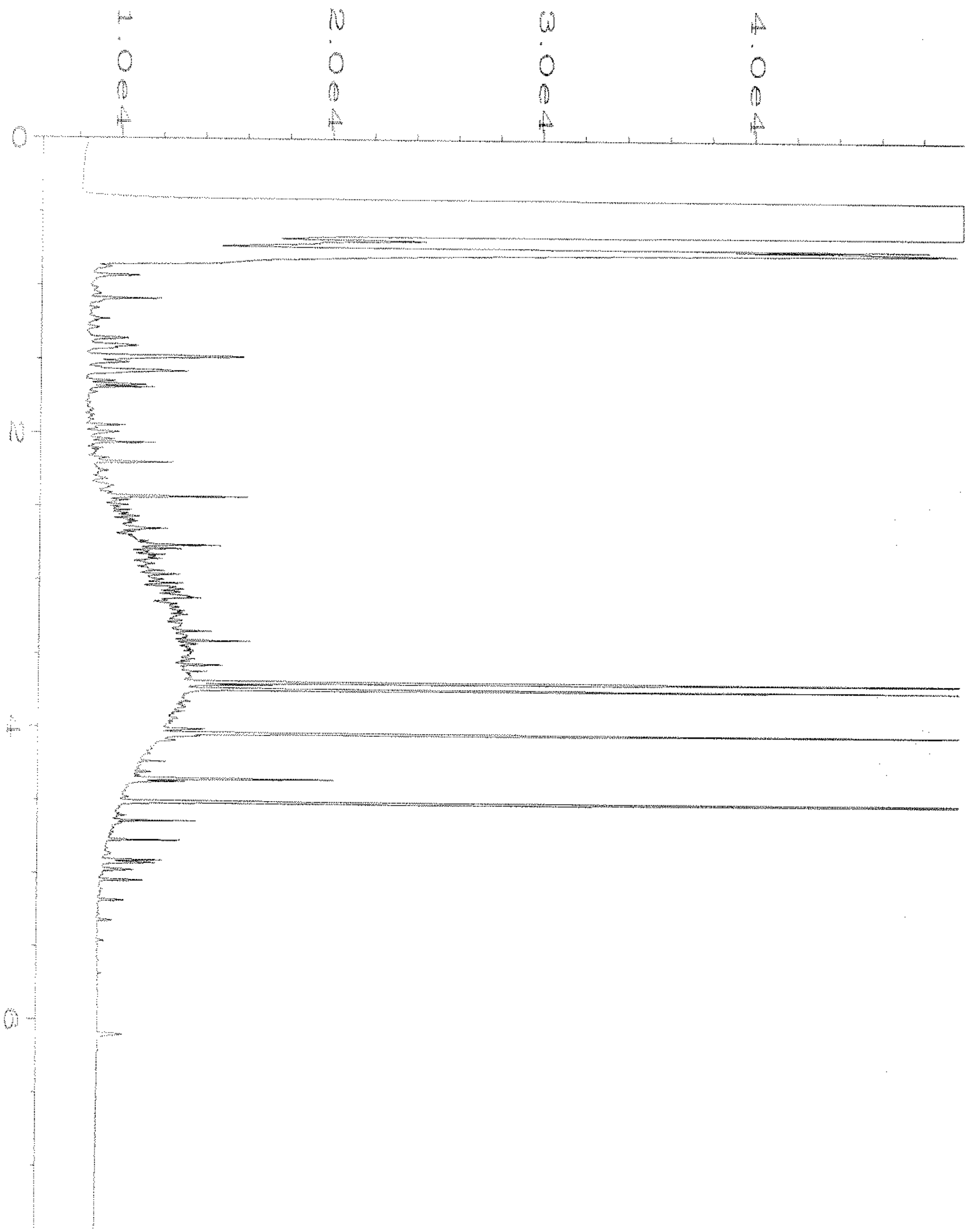
Operator   : TL
Instrument   : GC6
Sample Name   : 1000 Dx 61-146C
Run Time Bar Code:
Acquired on   : 13 Nov 20 02:10 PM
Report Created on: 16 Nov 20 08:14 AM

Page Number   : 1
Vial Number   : 5
Injection Number : 1
Sequence Line   : 4
Instrument Method: DX.MTH
Analysis Method   : DEFAULT.MTH



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Operator          : TL                                   Page Number       : 1
Instrument        : GC1                                  Vial Number       : 32
Sample Name       : 011245-07                            Injection Number : 1
Run Time Bar Code:                                       Sequence Line     : 13
Acquired on       : 13 Nov 20   05:32 PM                 Instrument Method: DX.MTH
Report Created on: 16 Nov 20   08:54 AM                  Analysis Method   : DEFAULT.MTH
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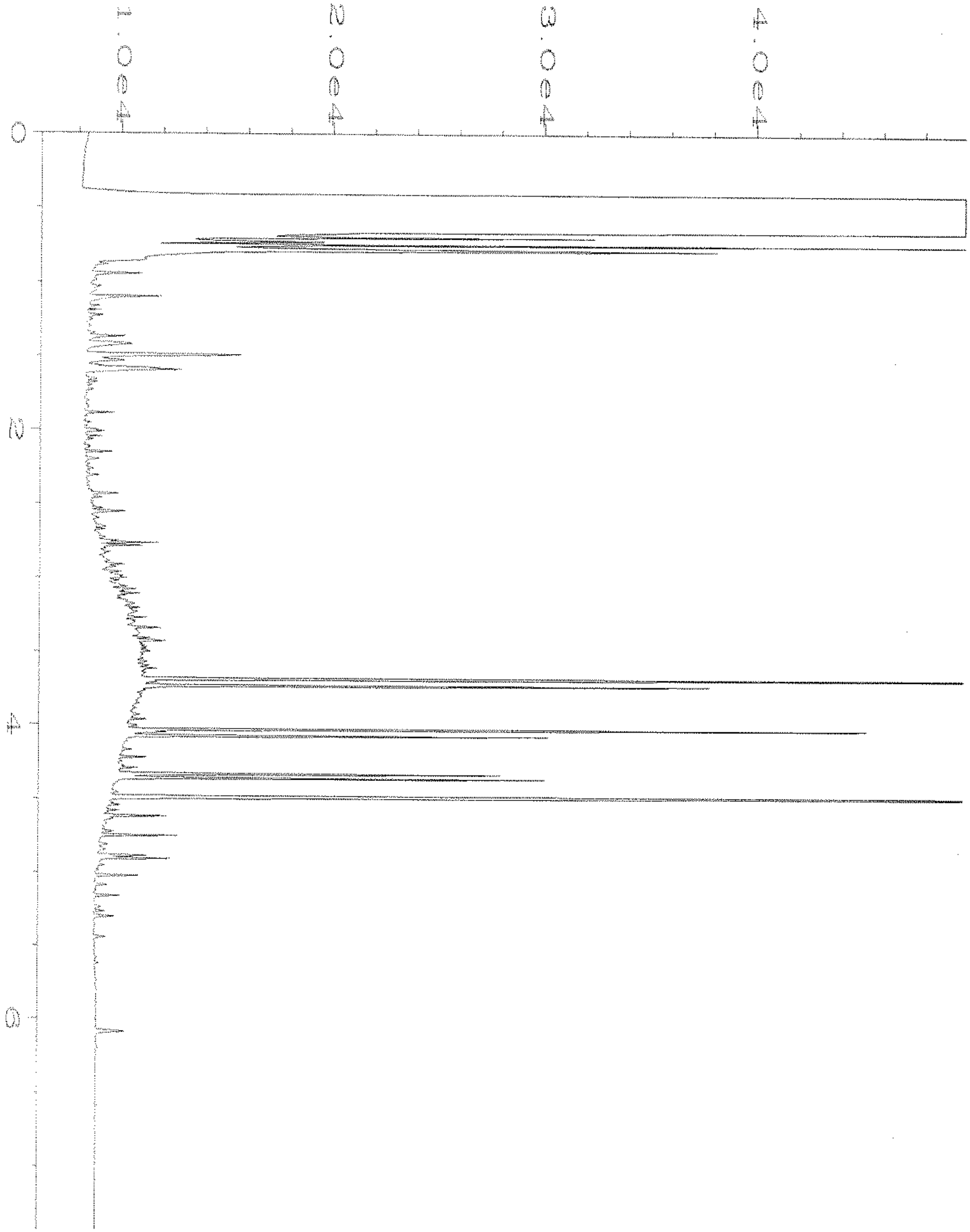
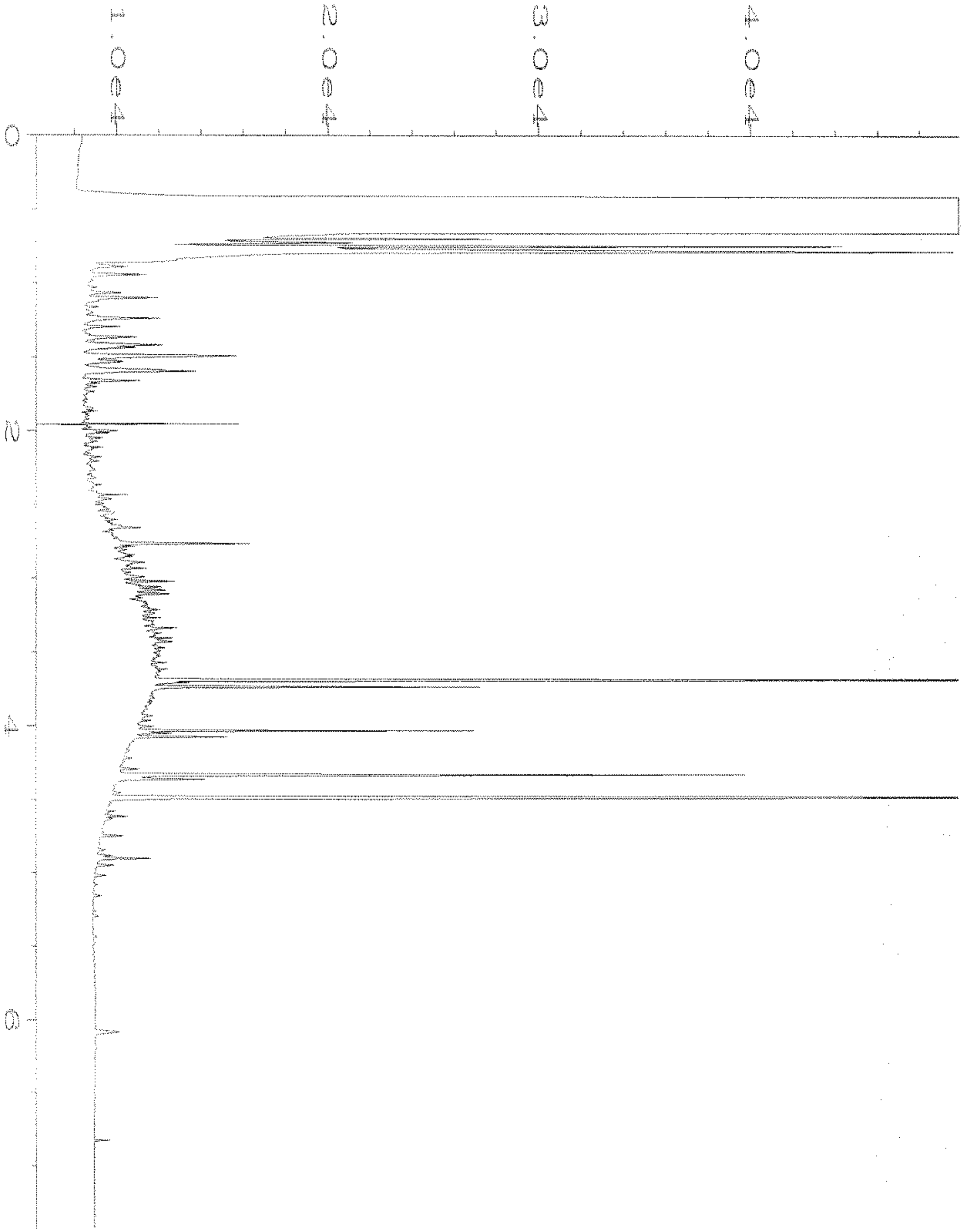


Data File Name : C:\HPCHEM\1\DATA\11-13-20\033F1301.D
Operator : TL
Instrument : GC1
Sample Name : 011245-08
Run Time Bar Code:
Acquired on : 13 Nov 20 05:41 PM
Report Created on: 16 Nov 20 08:54 AM

Page Number : 1
Vial Number : 33
Injection Number : 1
Sequence Line : 13
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



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Instrument        : GC1                             Vial Number       : 34
Sample Name       : 011245-09                       Injection Number  : 1
Run Time Bar Code:                                  Sequence Line     : 13
Acquired on       : 13 Nov 20   05:53 PM            Instrument Method: DX.MTH
Report Created on: 16 Nov 20   08:54 AM             Analysis Method   : DEFAULT.MTH
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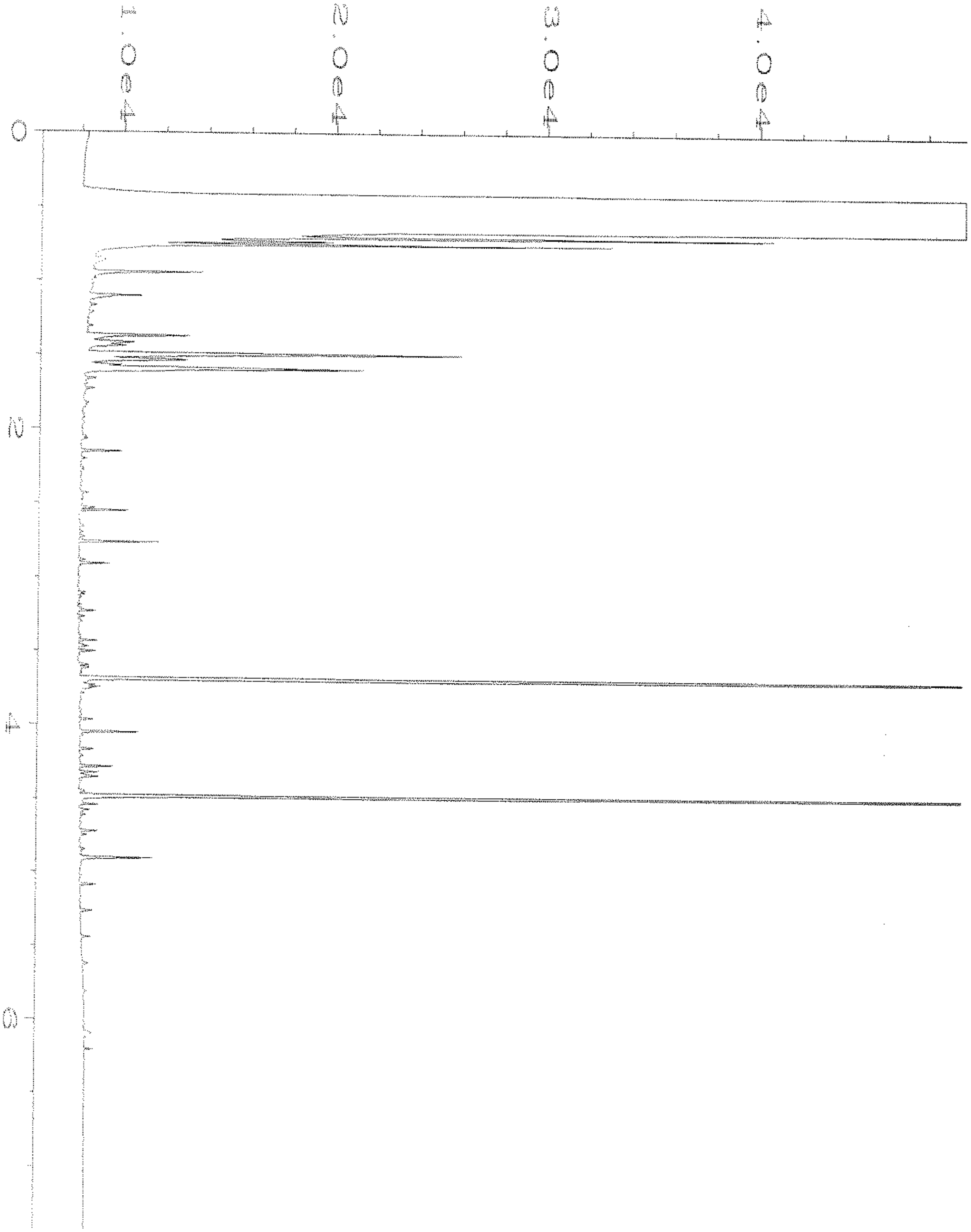

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Operator          : TL                           Page Number      : 1
Instrument        : GC1                          Vial Number      : 24
Sample Name       : 00-2506 mb                   Injection Number : 1
Run Time Bar Code:                               Sequence Line    : 11
Acquired on       : 13 Nov 20   03:18 PM         Instrument Method: DX.MTH
Report Created on: 16 Nov 20   08:54 AM          Analysis Method  : DEFAULT.MTH
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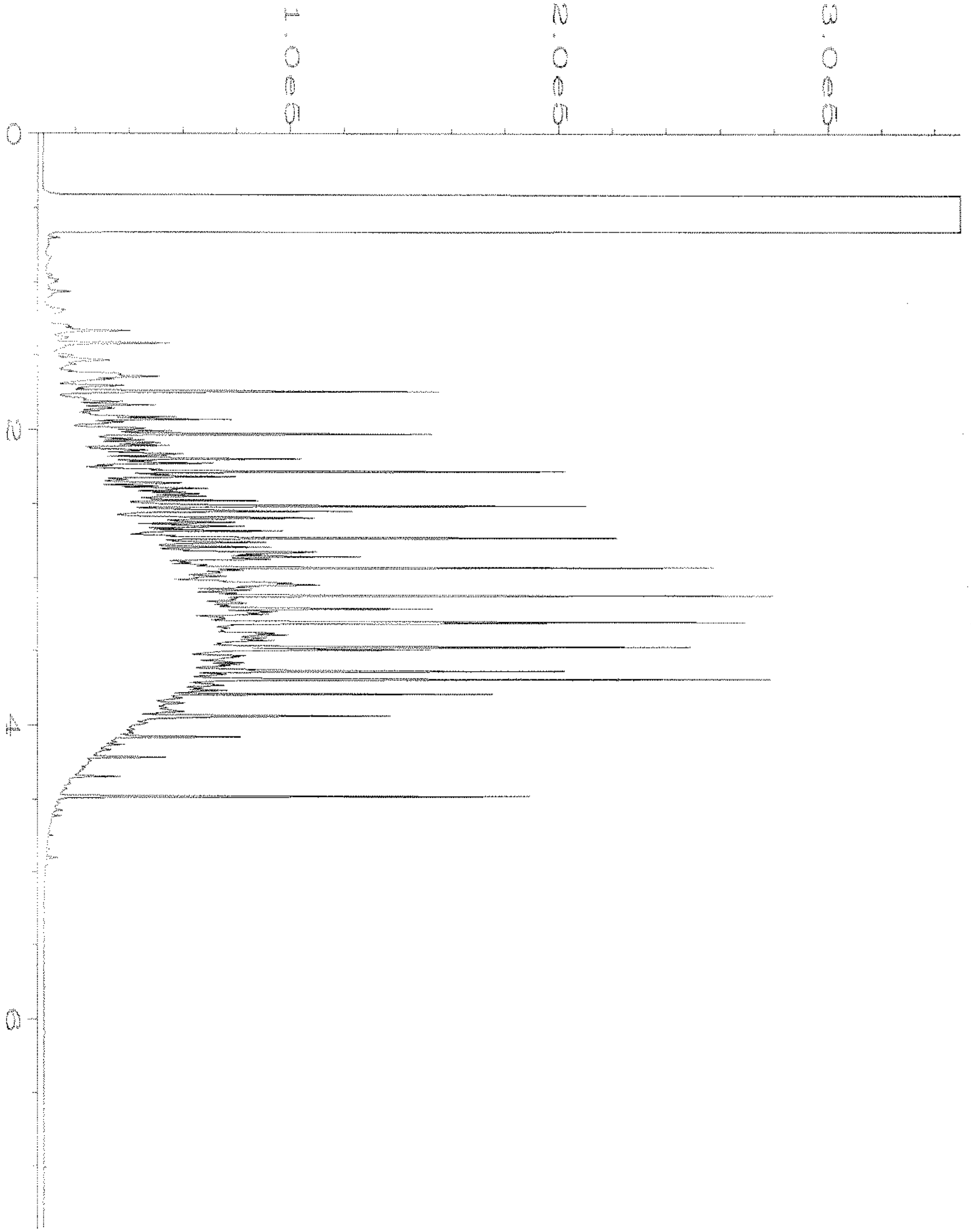

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Operator          : TL                                 Page Number     : 1
Instrument        : GC1                                Vial Number     : 5
Sample Name       : 1000 Dx 61-146C                    Injection Number : 1
Run Time Bar Code:                                     Sequence Line   : 10
Acquired on       : 13 Nov 20   02:18 PM               Instrument Method: DX.MTH
Report Created on: 16 Nov 20   08:54 AM               Analysis Method  : DEFAULT.MTH
```

011245

SAMPLE CHAIN OF CUSTODY ME 11-12-20

BI4/EO3/UW2/ VS1

Page # 1 of 1

Report To Lynn Grochala

Company Floyd Snider

Address 601 Union St, Ste 600

City, State, ZIP Seattle, WA 98101

Phone 206-292-2078 Email lynn.grochala@floydsnider.com

SAMPLERS (*signature*)

PROJECT NAME Cartera TOC

PO #

REMARKS

INVOICE TO

Project specific RLs? [✓ Yes] No

TURNAROUND TIME

☒ Standard turnaround

☐ RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

☐ Archive samples

☐ Other

Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	TOC (EPA 9060)	Metals (EPA 6010)	Hardness (SM 2340B)	Alkalinity (SM 2320B)	BOD (SM 5210B)	TOC/DOC (SM 5310B)	Sulfate (SM 4500)	Nitrate (EPA 353.2)	Notes
PDSB03-21-22FT	01 A-F	11/12/20	0950	soil	6	X	X			X			X	X							soil metals: Ca
PDSB03-25-26FT	02		1000		6	X	X			X			X	X							water metals: Ca + Mg
PDSB02-20-21 FT	03		1050		6	X	X			X			X	X							
PDSB02-26.5-27.5FT	04		1100		6	X	X			X			X	X							
PDSB01-23-24 FT	05		1205		6	X	X			X			X	X							
PDSB01-27.5-28.5FT	06		1215		6	X	X			X			X	X							
01MW80-111220	07 A-M		1010	water	13	X	X			X				X	X	X	X	X	X	X	
MW06-111220	08		1140		13	X	X			X				X	X	X	X	X	X	X	
01MW46-111220	09		1255		13	X	X			X				X	X	X	X	X	X	X	
trip blanks	10 A-B	—	—		2			X													

AP

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	Floyd Snider	11/12/20	1735
Received by:				
Relinquished by:	JOE MOHAMMED	F&BI	11/12/20	1735
Received by:				

Samples received at 3 °C

Soil Settling Tube/Grain Size Analysis

REGENESIS

				Percent Distribution					
	Interval			Clays	Silts	Fine Sand	Medium Sand	Coarse Sand	Gravel
PDSB01	15	to	17	0.5	9.5	15	75		
	17	to	19	0.5	9.5	10	80		
	19	to	21	0.5	9.5	10	80		
	21	to	23	0.1	19.9	10	70		
	23	to	25	0.1	11.9	10	78		
	25	to	27	0.1	14.9	15	70		
	27	to	29	5	10	5	80		
	29	to	30	10	75	15			

				Percent Distribution					
	Interval			Clays	Silts	Fine Sand	Medium Sand	Coarse Sand	Gravel
PDSB02	15	to	17		85	10	5		
	17	to	19	0.5	44.5	30	25		
	19	to	21	3	42	20	35		
	21	to	23	10	23	17	50		
	23	to	25	10	20	20	50		
	25	to	27	2	23	15	60		
	27	to	30	7	80	13			

				Percent Distribution					
	Interval			Clays	Silts	Fine Sand	Medium Sand	Coarse Sand	Gravel
PDSB03	15	to	17	0.5	14.5	25	60		
	17	to	19	0.5	14.5	20	65		
	19	to	21	0.5	19.5	15	65		
	21	to	23	10	27	13	50		
	23	to	25	10	25	10	55		
	25	to	27	12	35	13	40		
	27	to	30	20	80				

TOC - Seattle Oil Site
Injection Field Log
DVT; November 2020
Table 1

Injection Point	Date	Time	Injection Depth (ft. bgs)	Injection Pressure (psi)	Flow Rate (gpm)	Volume of Flush Water			Gallons Per Location	Comments	Injection Tooling
						Beginning Flow Meter (gal.)	Ending Flow Meter (gal.)	Gallons Per Interval			
DVT-1A	11/12/2020	12:45	30-28	60	0.0	0.0	0.0	0.0	0	Bottom-Up	2-Foot Screen
	11/12/2020	12:47	30-28	100	0.0	0.0	0.0	0.0			
	11/12/2020	12:50	30-28	150	0.0	0.0	0.0	0.0			
	11/12/2020	13:30	28-26	60	0.0	0.0	0.0	0.0			
	11/12/2020	13:32	28-26	100	0.0	0.0	0.0	0.0			
	11/12/2020	13:38	26-24	100	0.0	0.0	0.0	0.0			
	11/12/2020	13:40	26-24	150	0.0	0.0	0.0	0.0			
	11/12/2020	13:43	24-22	100	0.0	0.0	0.0	0.0			
	11/12/2020	13:45	24-22	150	0.0	0.0	0.0	0.0			
	11/12/2020	13:47	22-20	150	0.0	0.0	0.0	0.0		Tooling clogged.	
DVT-1B	11/12/2020	14:15	30-29	150	0.0	0.0	0.0	0.0	0	Bottom-Up	Pressure Activated Probe
	11/12/2020	14:20	29-28	170	0.0	0.0	0.0	0.0			
	11/12/2020	14:25	28-27	170	0.0	0.0	0.0	0.0			
	11/12/2020	14:30	27-26	170	0.0	0.0	0.0	0.0			
	11/12/2020	14:35	26-25	170	0.0	0.0	0.0	0.0			
	11/12/2020	14:40	25-24	170	0.0	0.0	0.0	0.0			
	11/12/2020	14:41	24-23	170	0.0	0.0	0.0	0.0			
	11/12/2020	14:42	23-22	170	0.0	0.0	0.0	0.0			
	11/12/2020	14:43	22-21	170	0.0	0.0	0.0	0.0			
	11/12/2020	14:44	21-20	170	0.0	0.0	0.0	0.0		Tooling clogged.	
DVT-1C	11/12/2020	15:00	20-21	150	2.4	0.0	45.0	45.0	250	Top-Down	Pressure Activated Probe
	11/12/2020	15:30	21-22	100	2.3	45.0	90.0	45.0			
	11/12/2020	15:50	22-23	150	2.1	90.0	135.0	45.0			
	11/12/2020	16:20	23-24	160	4.0	135.0	180.0	45.0			
	11/12/2020	16:35	24-25	130	4.8	180.0	225.0	45.0			
	11/12/2020	16:40	25-26	50	5.3	225.0	250.0	25.0			
									Total Gallons		
									250		

REGENESIS
REMEDIATION SERVICES
Technology-Based Solutions for the Environment

January 27, 2021

To: TOC Seattle Terminal 1, LLC | ATTN: Kim Hempel
khempel@pioneerees.com | Kristin.Anderson@floydsnider.com

Project #: ChL66181

Subject: Proposal for Application of PlumeStop™, Bio-Dechlor Inoculum® and S-MicroZVI® - Time Oil Bulk Terminal Site in Seattle, WA.

REGENESIS Remediation Services (RRS) appreciates the opportunity to provide TOC Seattle Terminal 1, LLC (TOC) with this proposal for in situ remedial treatment application at the former Time Oil Bulk Terminal Site located at 2737 W. Commodore Way Seattle, Washington (the Site). In this proposal we discuss our remedial approach, summarize our design, and present our implementation scope of work including cost estimates.

RRS has successfully completed hundreds of similar remediation applications across the country and has the product knowledge and implementation expertise to actively manage this field application. RRS will provide custom built injection equipment and a team of experienced personnel who specialize in applying REGENESIS' remedial technologies. Our team will ensure a high probability of success, while minimizing risks with our institutional in-house knowledge. Our best-in-class remediation design team and application services ensures proper placement, distribution, and performance of the remedial technologies being applied. With the information provided by TOC and gained during the on-site DVT event, RRS is estimating it will take a total of seven (7) days on-site to safely complete the remediation application.

If you have any questions regarding the application details provided within this proposal, please contact Isaac Gregg at 720.955.5142 (Igregg@regenesis.com); for design questions please contact Andrew Punsoni at 503.504.1399 (Apunsoni@regenesis.com).

Sincerely,

Isaac Gregg
Proposal Manager

Andrew Punsoni
Northwest District Technical Manager

Remedial Approach

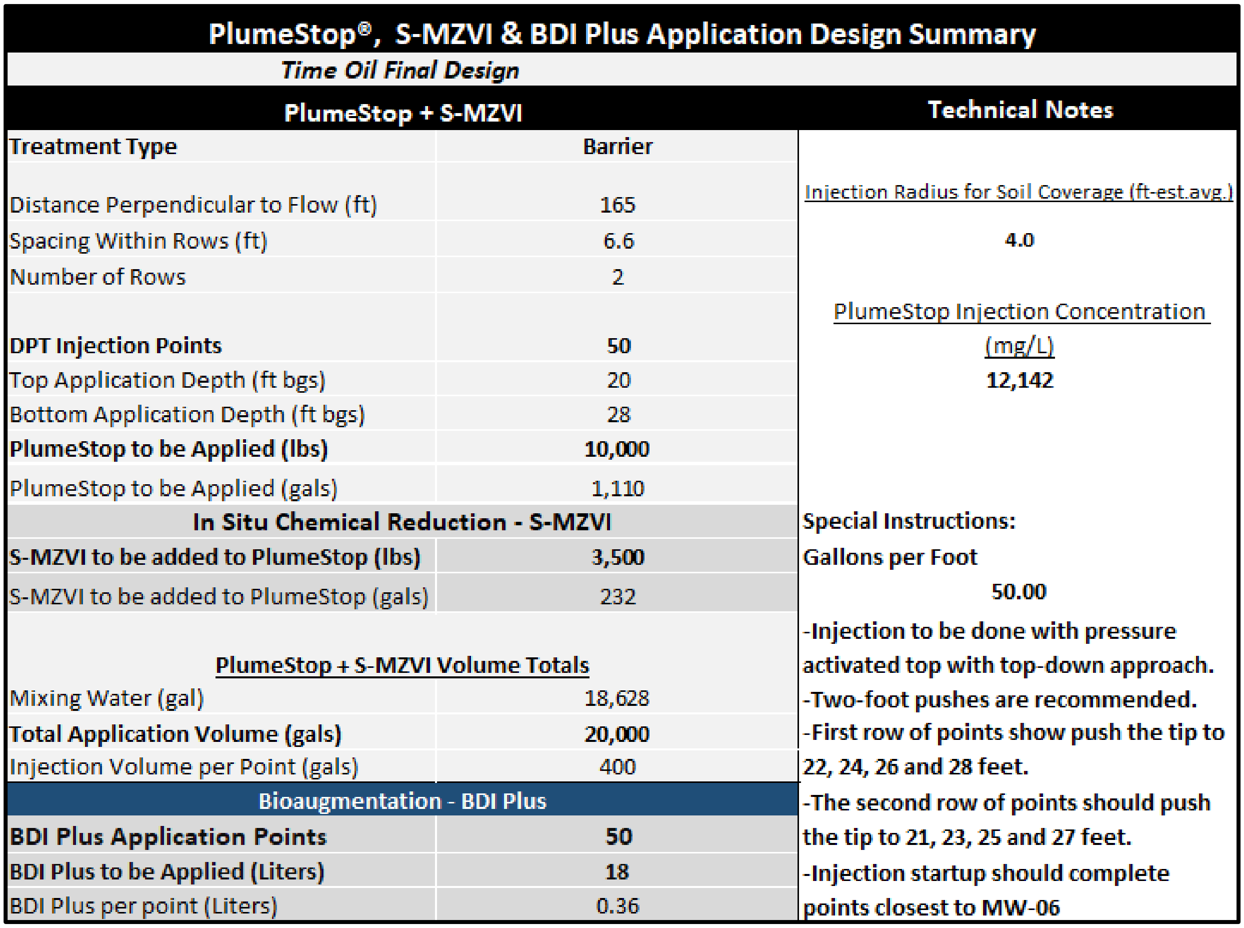
Injection Methods

RRS will apply all materials in situ using direct-push technology (DPT) drilling techniques with appropriate injection tooling (discrete lateral pressure activated injection tool) as the delivery method. TOC will provide a qualified DPT drilling contractor.

Summary of Relevant Design Information

A tabulated summary of pertinent design assumptions and is provided in **Table 1**. Product technical description sheets have been provided in **Appendix B**.

Table 1: Remedial Design Summary



PlumeStop®, S-MZVI & BDI Plus Application Design Summary		
Time Oil Final Design		
PlumeStop + S-MZVI		**Technical Notes**
Treatment Type	**Barrier**	
Distance Perpendicular to Flow (ft)	165	Injection Radius for Soil Coverage (ft-est.avg.)
Spacing Within Rows (ft)	6.6	**4.0**
Number of Rows	2	
		PlumeStop Injection Concentration (mg/L)
DPT Injection Points	**50**	**12,142**
Top Application Depth (ft bgs)	20	
Bottom Application Depth (ft bgs)	28	
PlumeStop to be Applied (lbs)	**10,000**	
PlumeStop to be Applied (gals)	1,110	
In Situ Chemical Reduction - S-MZVI		**Special Instructions:**
S-MZVI to be added to PlumeStop (lbs)	**3,500**	**Gallons per Foot**
S-MZVI to be added to PlumeStop (gals)	232	**50.00**
		-Injection to be done with pressure
PlumeStop + S-MZVI Volume Totals		**activated top with top-down approach.**
Mixing Water (gal)	18,628	**-Two-foot pushes are recommended.**
Total Application Volume (gals)	**20,000**	**-First row of points show push the tip to**
Injection Volume per Point (gals)	400	**22, 24, 26 and 28 feet.**
Bioaugmentation - BDI Plus		**-The second row of points should push**
BDI Plus Application Points	**50**	**the tip to 21, 23, 25 and 27 feet.**
BDI Plus to be Applied (Liters)	**18**	**-Injection startup should complete**
BDI Plus per point (Liters)	0.36	**points closest to MW-06**

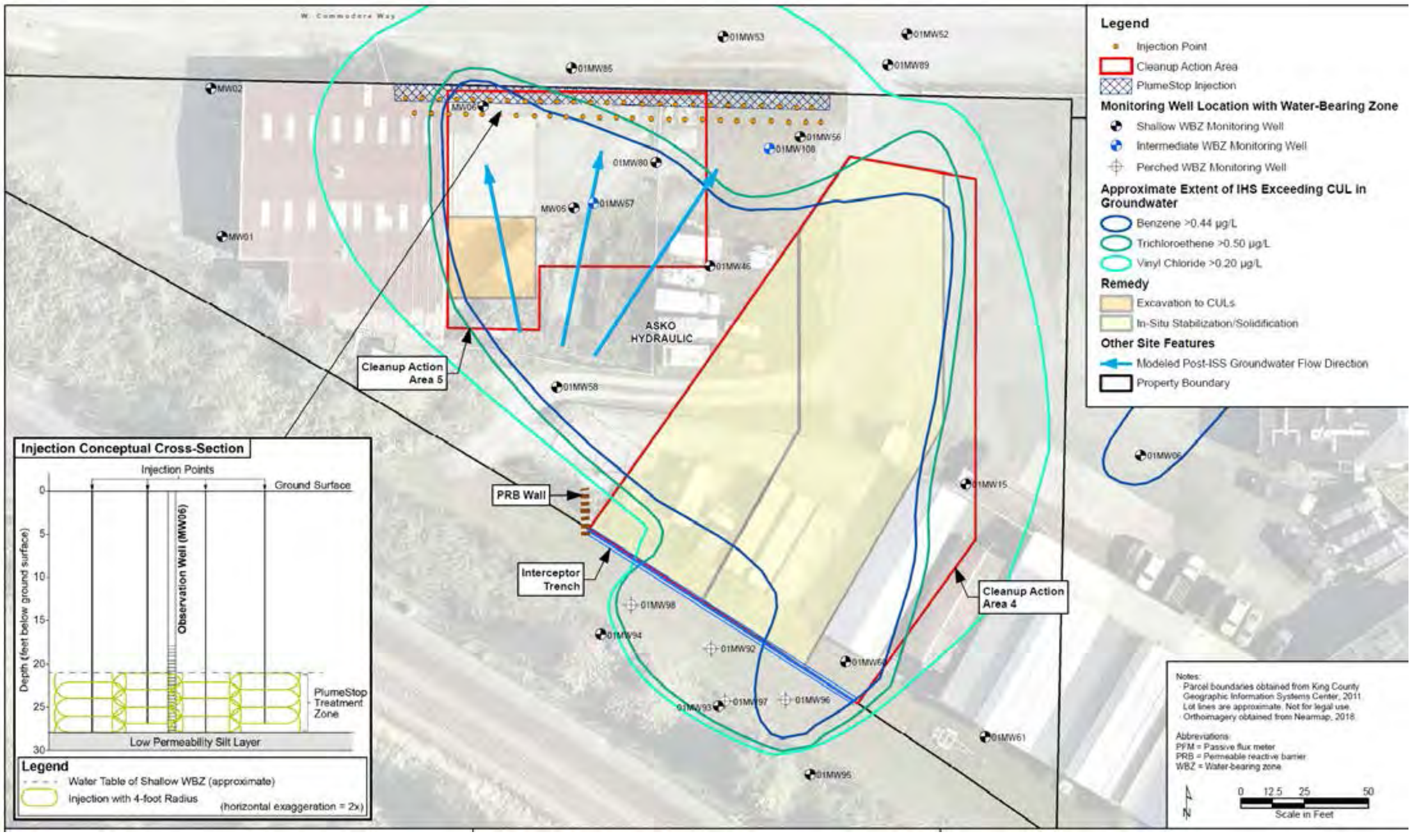
Work Plan Summary

RRS has a national team of experts with decades of experience in the remediation industry and trained/certified field personnel with in-depth product and application knowledge. Our custom-built injection systems are specifically designed to properly apply REGENESIS products to ensure your investment in our remediation technologies achieves its full potential. Below is a summary of the work plan process, assigned responsibilities and on-site equipment that is intended to be used.

RRS will work under the direction of TOC to implement the field work associated with the application of the selected remediation technologies. Responsibilities for the implementation of this scope of work will be shared between RRS and TOC. Responsibilities for each are outlined in this section and further under the Assumptions/Qualification section.

The application of the remediation technologies will be performed via DPT injection points within the proposed PlumeStop Barrier (**Figure 1**). A secure storage/staging area for the product containers will need to be identified by TOC prior to the start of the full-scale injection activities. TOC will provide a forklift to maneuver product containers for the duration of this application.

Figure 1: Proposed PlumeStop Barrier Injection Area



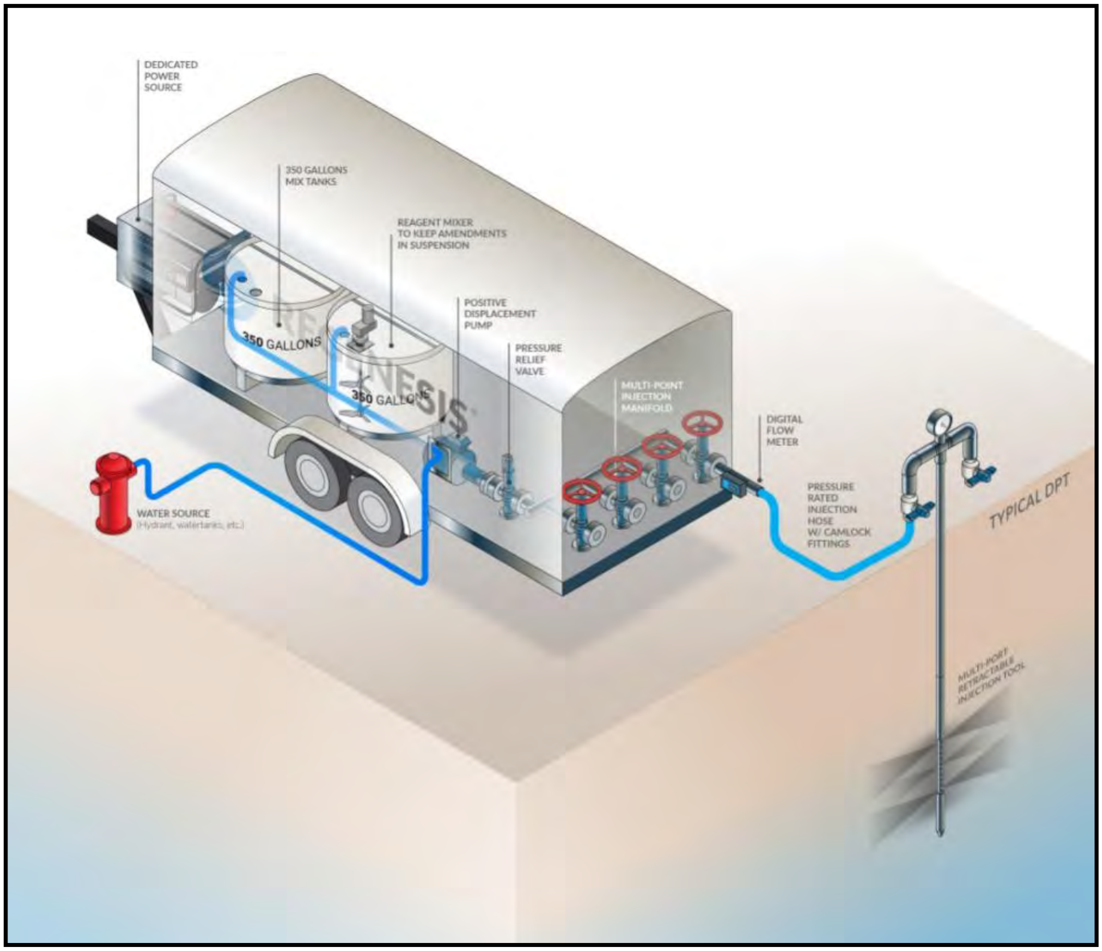
Notes:
- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

Abbreviations:
PFM = Passive flux meter
PRB = Permeable reactive barrier
WBZ = Water-bearing zone

RRS Responsibilities

- **RRS** will provide and ship the specified quantities of the remediation reagents (PlumeStop, BDI and S-MZVI) to the site address provided by TOC. RRS shipping estimates assume all products will be shipped to the site at the same time. RRS will coordinate with TOC prior to any shipment of product. Alternative shipping locations or phases could lead to an increase in fright costs.
- **RRS** will mobilize a 40-hour HAZWOPER certified crew experienced in the proper application of REGENESIS remediation technologies.
- **RRS** will supply the necessary injection tooling (DPT contractor to supply minimum of 120 linear feet of 1.5" diameter Geoprobe rods).
- **RRS** will perform site reconnaissance and pre-application activities that include H&S orientation, sensitive receptor identification and protection, treatment area layout, point location placement assistance, and equipment staging.
- **RRS** will provide site safety equipment including cones and caution tape to delineate the work area (efforts will be made to limit the impact on business operations at the site).
- **RRS** will supply and operate a custom-built injection system (**Figure 2**) equipped with:
    - Self-sufficient, dedicated power
    - Onboard mixing tanks
    - Positive displacement pump (or similar) for injecting into the TTZ
    - Injection manifold with pressure rated hosing capable of injecting into multiple points simultaneously
    - Pressure and flow gauges to monitor injection data for individual points
    - Custom injection caps equipped with safety controls for the DPT injection tool string
    - Site safety equipment and spill response kit (including wet vac)
- **RRS** will perform real-time reagent distribution diagnostics during injection activities to allow for field modifications, as needed, to ensure optimal results.
- **RRS** will work directly with our design team to fill any data gaps identified during the injection application to more effectively maintain the project objectives and goals.

Figure 2: Injection System Diagram



At the beginning of each day a safety tailgate meeting will be conducted and an overview of the procedures, responsibilities and goals for the day will be discussed. Injection rods equipped with an appropriate injection tool will be advanced to the bottom of the TTZ and injection will be performed in a bottom up method. The remediation technologies will be mixed with water in batches at the designated solution percentage and kept in constant suspension throughout the injection application. The mixing process ensures a homogenous solution is prepared prior to injection into the subsurface and throughout the application event. The batches will continuously be made throughout the entirety of the project until the full volume has been achieved with the appropriate amount of remedial solution being applied for each injection point and per vertical foot as best as possible.

Pressures, flow rates and total volume will be monitored and digitally documented for each injection interval. Multiple injection points may be injected into simultaneously (up to 4) to increase efficiencies on-site. The injection points and surrounding areas will be monitored for any signs of surfacing and a spill response kit will be on standby.

During the application, real-time information will be collected by the Floyd Snider Field Staff. Regenesis will analyze and help verify design assumptions and subsurface reagent distribution. Data collected and analyzed may consist of groundwater quality parameters (i.e., pH, conductivity, DO, ORP, etc.), depth to water measurements, visual indicators through groundwater or soil samples, and in-field injection concentration test kits. No samples from the injection verification will be submitted for lab analysis. This information is typically collected during the application when within 10 feet of an appropriately screened monitoring well. All in-field data will be used for the sole purpose of reagent placement validation. Based on the information collected, the project team may choose to modify the remediation design to further optimize the injection application. This includes modification to injection concentrations, volume per vertical foot, injection intervals, etc.

Once the injection event is completed, RRS will demobilize all equipment and personnel off-site. A detailed injection summary report which includes injection point data (interval depths, injection pressure/flow rates, reagent volume, time elapsed and if surfacing occurred), field observations and any other noteworthy information will be generated and made available to TOC.

TOC Responsibilities

- **TOC** will coordinate project schedule and reagent order with REGENESIS to ensure adequate mobilization time.
- **TOC** will coordinate site access with property owner to coincide with project schedule and identify a secure product staging area.
- **TOC** will contract a qualified DPT drilling rig and operator equipped with at least 120 linear feet of 1.5” diameter Geoprobe rod and proper abandonment materials per King County regulations.
- **TOC** Will call in public utility locates, should private underground utilities be within the treatment area, **TOC** will contract with a private utility locating service to mark utilities prior to RRS mobilization. RRS can provide costs if requested.
- **TOC** will provide a water source (e.g. hydrant, water truck) capable of producing at least 30 GPM for the duration of the project within 300 ft. of the project staging area, at no cost to RRS. **TOC** will coordinate and provide a backflow preventer for on-site hydrants utilization if needed. RRS can provide costs if requested.
- **TOC** will procure any necessary permits needed to complete the project including right of way, UIC and municipal.
- **TOC** is responsible for all soil, air and groundwater sampling and analysis.
- **TOC** is responsible for transportation and disposal of any contaminated waste generated on-site during injection activities, though we do not anticipate generating any such waste during injection activities.
- All empty product containers will be the responsibility of **TOC** for proper disposal/recycling. General refuse will be collected and disposed of in a **TOC** provided refuse container on-site.
- **TOC** will provide a depth to water meter and field water quality meter similar to a YSI 556 with a down-hole sensor capable of reaching the water table and well screen interval while on-site for injection activities.
- **TOC** will provide access to a restroom during on-site hours. RRS can provide costs if requested.

Once an executed agreement has been established and a work schedule has been agreed upon, RRS will begin to implement the assigned responsibilities and work with TOC accordingly.

Safety Program

REGENESIS is committed to providing a safe and healthy working environment for all employees, clients and contractors on-site. Prior to mobilization RRS will develop a site-specific Health and Safety Plan (HASP) and designate an on-site safety officer. All personnel on-site are required to participate in daily safety tailgate meetings with the goal of proactively identifying potential hazards and mitigating risks to the full extent possible. In addition to the hours of rigorous safety training courses all personnel are required to complete, REGENESIS also incorporates a behavior-based safety program by utilizing our DoneSafe® mobile application (app) interface on every site. This app encourages our personnel to actively search for potential on-site risks and document mitigation actions taken. The effectiveness of our safety program can be seen in our industry leading EMR ratings listed in **Table 2**.

Table 2: REGENESIS EMR Rating 2017-2020

Year	Total Hours	EMR
2020	162,037	0.64
2019	169,964	0.66
2018	144,600	0.70
2017	140,706	0.70

Health and Safety Plan

RRS safety tailgate meetings and HASP will include the following:

- Site map with entrance and exit points and best possible muster points depending on conditions.
- List of personnel and contact information for employees on-site and supporting the project.
- Rout to the nearest hospital or medical facility along with contact information.
- Job Hazard Analysis (JHA) detailing each job task on-site with its potential hazards and best practices to avoid those hazards.
- Description and hazards of the contaminates of concern (COC) with appropriate Personal Protection Equipment (PPE) requirements.
- List and description of REGENESIS chemicals on-site including a Safety Data Sheet (SDS) for each chemical.
- Personnel will be equipped with face coverings and follow all local Covid-19 regulation.
- Checklist of site safety equipment including fire extinguishers, eyewash station, first aid kit, spill prevention kit and any site-specific equipment needed.
- Daily Tailgate safety meeting sheet with identified hazards and risks associated with the site and job tasks for that day, along with shared learning observations from the previous day.

Project Cost Estimate

Below is the cost estimate for RRS to provide the remediation technologies (PlumeStop, BDI and S-MZVI) and execute the application design provided in this proposal. Please also see the assumptions and qualifications section.

Time Oil Application				
Description	**Quantity**	**Unit**	**Price per Unit**	**Subtotal**
RRS Application Services (10 Days)	1	Lump Sum	$44,440.00	$44,440.00
Remediation Technologies **PlumeStop/S-MZVI/BDI** (Including Tax & Freight)	1	Lump Sum	$117,640.00	$117,440.00
Total				**$162,080.00**

The cost provided above is inclusive of all product, estimated product freight, product mixing, injection services as outlined within this proposal, tax and materials to complete the work. We will submit invoice(s) when product ships and upon project completion, or end of calendar month, for RRS services. Payment terms are Net 30 days upon invoice submittal unless indicated otherwise in a master service agreement (MSA).

***Please note that this pricing is contingent upon completion of this scope of work without delays or work stoppages once mobilization occurs. RRS has allotted seven (7) on-site working days (10-hr days, Monday through Saturday) to apply the remediation technologies. RRS believes the scope of work provided above can be completed in this timeframe, however, if the project is delayed due to circumstances beyond our control, RRS will utilize a daily rate of $3,500.00 plus applicable tax to the invoice price. Should the project be completed ahead of schedule, a portion of the daily rate may be credited to the final invoice after review. RRS reserves the right to modify the design and associated cost if additional information gathered warrants modification.**

Assumption/Qualifications

In generating this proposal, REGENESIS relied upon professional judgment and site-specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site. The attached design summary tables specify the assumptions used in preparation for this technical design. We request that these modeling input assumptions be verified by your firm prior to application of PlumeStop. Other assumptions and qualifications related to this proposal are as follows:

- The above cost outlined will be valid for 60 days from date or proposal. If beyond 60 days, REGENESIS reserves the right to update cost.
- If applicable, sales tax charges for product, freight, and services are considered estimated at the time of proposal submittal. The appropriate sales tax category (i.e., product, freight, and services) and actual sales tax rate is finalized at the time of invoice and may change from date of proposal submittal.
- RRS personnel will take delivery of the Product, and **TOC** will arrange for secure storage. If additional deliveries are requested, changes to the price will be incorporated as necessary. If material needs to be stored off-site, **TOC** personnel will coordinate the delivery of the material to the site.
- RRS will have access to the site for equipment operation and secure storage of materials and equipment. Access to each work area location will be clear and free of obstructions. RRS assumes the injection trailer will be staged within 80 ft. of the furthest injection point location.
- Pricing and work schedule assume union labor and prevailing wages (Davis-Bacon) are not required.
- **TOC** will provide access to a restroom during on-site hours.
- **TOC** is responsible for securing any permits prior to mobilizing to the site.
- **TOC** is responsible for all soil, air and groundwater sampling and analysis.
- **TOC** is responsible for transportation and disposal of any contaminated waste generated on-site during injection activities, though we do not anticipate generating any such waste during injection activities.
- All private, on-site underground utilities and any known subsurface features (e.g., piping, storage tanks, septic systems, etc.) will be clearly marked/cleared by **TOC** prior to RRS mobilization to the site. RRS is not responsible for damage to any unmarked utilities or subsurface features. If as- built drawings are available for any on-site subsurface features, RRS request the right to review these drawing with **TOC** to confirm clearance for the advancement of DPT injection points.
- For safety reasons, access to the treatment area will be limited to RRS and **TOC** personnel. RRS will provide delineators and cones to section off working areas.
- The remediation design and injection procedures contain the necessary precautions to minimize the likelihood of surfacing of the treatment chemistry. RRS will monitor treatment chemistry application flow rates and pressures as well as observe for signs of reagent surfacing around active injection areas. If surfacing is detected, RRS will stop or slow down injection activities at that location to stop additional surfacing and remove/vacuum up recoverable surfaced fluid. RRS is not be responsible for treatment chemistry infiltration into undesired locations beyond our visible control.

- RRS personnel can have access to site for work up to 12 hours per day Sunday-Saturday, though, in generating the costs, a 9.5-hour, Monday through Saturday workday schedule was assumed. Additional charges will be applied for Saturday and/or Sunday work schedules.
- RRS assumes that there will be complete site access, with no areas being blocked by persons, vehicles or buildings. The injection flow rates and schedule are based on having full site access.
- RRS assumes that direct-push style drill rig can access all injection point locations and drive injection tooling to the required depth. If site conditions limit the use of the provided direct-push rig for any injection point and other drilling methods are required to complete the task, additional charges will apply.
- All injection points will be closed/backfilled according to county regulations by the DPT contractor.
- Site conditions can change over time and should be monitored post injection. REGENESIS is not responsible for changing site conditions after completing the scope of work and demobilizing from the site. This includes but is not limited to changes related to borehole abandonment (i.e., swelling of backfill material), surface restoration, well conditions, and on-site utilities.
- In generating this estimate, REGENESIS relied upon professional judgment and site-specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.

Acknowledgment

Please sign below to acknowledge acceptance of proposal **ChL66181** for the **Time Oil Bulk Terminal Site** and authorize REGENESIS to proceed with a final contract and work authorization:

TOC Seattle Terminal 1, LLC

Authorized Signature Date

Name (print) P.O. or Project Number

Signature above confirms signee has reviewed the proposal and agrees with all outlined responsibilities and assumptions/qualifications. Please also see our terms and conditions located in **Appendix A**. Below is a list of next steps toward implementation of this project. Please note these steps may take 4-6 weeks to complete depending upon the complexity of the project and previous experience with your company. REGENESIS Remediation Services will contact you soon to begin the implementation process.

Steps to Project Implementation

- Sign acceptance of proposal
- Finalize contract documents incorporating this proposal or formal REGENESIS Subcontract Agreement
- Confirm account credit status
- Complete remediation services logistics evaluation
- Confirm delivery address and date
- Schedule application

Appendix A

REGENESIS
1011 Calle Sombra
San Clemente, CA 92673-6244
Tel: 949.366.8000 • Fax: 949.366.8090

Terms and Conditions
Products and Services

1. PAYMENT TERMS. Net 30 Days. Accounts outstanding after 30 days will be assessed 1.5% monthly interest. Volume discount pricing will be rescinded on all accounts outstanding over 90 days. An early payment discount of 1.5% Net 10 is available for cash or check payments only. We accept Master Card, Visa and American Express.

2. RETURN POLICY. A 15% re-stocking fee will be charged for all returned goods. All requests to return product must be pre-approved by seller. Returned product must be in original condition and no product will be accepted for return after a period of 90 days.

3 FORCE MAJEURE. Seller shall not be liable for delays in delivery or services or failure to manufacture or deliver due to causes beyond its reasonable control, including but not limited to acts of God, acts of buyer, acts of military or civil authorities, fires, strikes, flood, epidemic, war, riot, delays in transportation or car shortages, or inability to obtain necessary labor, materials, components or services through seller's usual and regular sources at usual and regular prices. In any such event Seller may, without notice to buyer, at any time and from time to time, postpone the delivery or service dates under this contract or make partial delivery or performance or cancel all or any portion of this and any other contract with buyer without further liability to buyer. Cancellation of any part of this order shall not affect Seller's right to payment for any product delivered or service performed hereunder.

4. LIMITED WARRANTY. Seller warrants the product(s) sold and services provided as specified on face of invoice, solely to buyer. Seller makes no other warranty of any kind respecting the product and services, and expressly DISCLAIMS ALL OTHER WARRANTIES OF WHATEVER KIND RESPECTING THE PRODUCT AND SERVICES, INCLUDING ALL WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE AND NON-INFRINGEMENT.

5. DISCLAIMER. Where warranties to a person other than buyer may not be disclaimed under law, seller extends to such a person the same warranty seller makes to buyer as set forth herein, subject to all disclaimers, exclusions and limitations of warranties, all limitations of liability and all other provisions set forth in the Terms and Conditions herein. Buyer agrees to transmit a copy of the Terms and Conditions set forth herein to any and all persons to whom buyer sells, or otherwise furnishes the products and/or services provided buyer by seller and buyer agrees to indemnify seller for any liability, loss, costs and attorneys' fees which seller may incur by reason, in whole or in part, of failure by buyer to transmit the Terms and Conditions as provided herein.

6. LIMITATION OF SELLER'S LIABILITY AND LIMITATION OF BUYER'S REMEDY. Seller's liability on any claim of any kind, including negligence, for any loss or damage arising out of, connected with, or resulting from the manufacture, sale, delivery, resale, repair or use of any goods or performance of any services covered by or furnished hereunder, shall in no case exceed the lesser of (1) the cost of repairing or replacing goods and repeating the services failing to conform to the forgoing warranty or the price of the goods and/or services or part thereof which gives rise to the claim. IN NO EVENT SHALL SELLER BE LIABLE FOR SPECIAL INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING LOST PROFITS, OR FOR DAMAGES IN THE NATURE OF PENALTIES.

7. INDEMNIFICATION. Buyer agrees to defend and indemnify seller of and from any and all claims or liabilities asserted against seller in connection with the manufacture, sale, delivery, resale or repair or use of any goods, and performance of any services, covered by or furnished hereunder arising in whole or in part out of or by reason of the failure of buyer, its agents, servants, employees or customers to follow instructions, warnings or recommendations furnished by seller in connection with such goods and services, by reason of the failure of buyer, its agents, servants, employees or customers to comply with all federal, state and local laws applicable to such goods and services, or the use thereof, including the Occupational Safety and Health Act of 1970, or by reason of the negligence or misconduct of buyer, its agents, servants, employees or customers.

8. EXPENSES OF ENFORCEMENT. In the event seller undertakes any action to collect amounts due from buyer, or otherwise enforce its rights hereunder, Buyer agrees to pay and reimburse Seller for all such expenses, including, without limitation, all attorneys and collection fees.

9. TAXES. Liability for all taxes and import or export duties, imposed by any city, state, federal or other governmental authority, shall be assumed and paid by buyer. Buyer further agrees to defend and indemnify seller against any and all liabilities for such taxes or duties and legal fees or costs incurred by seller in connection therewith.

10. ASSISTANCE AND ADVICE. Upon request, seller in its discretion will furnish as an accommodation to buyer such technical advice or assistance as is available in reference to the goods and services. Seller assumes no obligation or liability for the advice or assistance given or results obtained, all such advice or assistance being given and accepted at buyer's risk.

11. SITE SAFETY. Buyer shall provide a safe working environment at the site of services and shall comply with all applicable provisions of federal, state, provincial and municipal safety laws, building codes, and safety regulations to prevent accidents or injuries to persons on, about or adjacent to the site.

12. INDEPENDENT CONTRACTOR. Seller and Buyer are independent contractors and nothing shall be construed to place them in the relationship of partners, principal and agent, employer/employee or joint ventures. Neither party will have the power or right to bind or obligate the other party except as may be expressly agreed and delegated by other party, nor will it hold itself out as having such authority.

13. REIMBURSEMENT. Seller shall provide the products and services in reliance upon the data and professional judgments provided by or on behalf of buyer. The fees and charges associated with the products and services thus may not conform to billing guidelines, constraints or other limits on fees. Seller does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the “Government”). In any circumstance where seller may serve as a supplier or subcontractor to an entity which seeks reimbursement from the Government for all or part of the services performed or products provided by seller, it is the sole responsibility of the buyer or other entity seeking reimbursement to ensure the products and services and associated charges are in compliance with and acceptable to the Government prior to submission. When serving as a supplier or subcontractor to an entity which seeks reimbursement from the Government, seller does not knowingly present or cause to be presented any claim for payment to the Government.

14. APPLICABLE LAW/JURISDICTION AND VENUE. The rights and duties of the parties shall be governed by, construed, and enforced in accordance with the laws of the State of California (excluding its conflict of laws rules which would refer to and apply the substantive laws of another jurisdiction). Any suit or proceeding hereunder shall be brought exclusively in state or federal courts located in Orange County, California. Each party consents to the personal jurisdiction of said state and federal courts and waives any objection that such courts are an inconvenient forum.

15. ENTIRE AGREEMENT. This agreement constitutes the entire contract between buyer and seller relating to the goods or services identified herein. No modifications hereof shall be binding upon the seller unless in writing and signed by seller's duly authorized representative, and no modification shall be effected by seller's acknowledgment or acceptance of buyer's purchase order forms containing different provisions. Trade usage shall neither be applicable nor relevant to this agreement, nor be used in any manner whatsoever to explain, qualify or supplement any of the provisions hereof. No waiver by either party of default shall be deemed a waiver of any subsequent default.

Remedial Design Assumptions and Qualifications

Cost Estimate Disclaimer: The cost listed assumes conditions set forth within the proposed scope of work and assumptions and qualifications. Changes to either could impact the final cost of the project. This may include final shipping arrangements, sales tax or application related tasks such as product storage and handling, access to water, etc. If items listed need to be modified, please contact Regenesis for further evaluation.

Shipping Estimates: Shipping estimates are valid for 30 days. All shipping charges are estimates and actual freight charges are calculated at the time of invoice. Additional freight charges may be assessed for any accessorial requested at the time of delivery. The estimate included within assumes standard shipping.

Standard delivery is between 8am -5pm Monday –Friday. *accessorial – can include, but not limited to lift gate and pallet jack at delivery, inside delivery, time definite deliveries, and delivery appointments.

Please communicate any requirements for delivery with the customer service department at the time the order is placed.

Return Policy: To initiate a return please contact your local sales manager for an RMA. A 15% re-stocking fee will be charged for all returned goods. Return freight must be prepaid. All requests to return product must be in original condition and no product will be accepted for return after 90 days from date of delivery.

Professional Judgement: In generating this estimate, REGENESIS relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.

REGENESIS developed this Scope of Work in reliance upon the data and professional judgments provided by those whom completed the earlier environmental site assessment(s), and in reliance upon REGENESIS' prior experience on similar project sites. The fees and charges associated with the Scope of Work were generated through REGENESIS' proprietary formulas and thus may not conform to billing guidelines, constraints or other limits on fees. REGENESIS does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the "Government"). In any circumstance where REGENESIS may serve as a supplier or subcontractor to an entity which seeks reimbursement from the Government for all or part of the services performed or products provided by REGENESIS, *it is the sole responsibility of the entity seeking reimbursement to ensure the Scope of Work and associated charges are in compliance with and acceptable to the Government prior to submission*. When serving as a supplier or subcontractor to an entity which seeks reimbursement from Government, REGENESIS does not knowingly present or cause to be presented any claim for payment to the government.

Appendix B

S-MicroZVI Specification Sheet

S-MicroZVI Technical Description

S-MicroZVI™ is an *In Situ* Chemical Reduction (ISCR) reagent that promotes the destruction of many organic pollutants and is most commonly used with chlorinated hydrocarbons. It is engineered to provide an optimal source of micro-scale zero valent iron (ZVI) that is both easy to use and delivers enhanced reactivity with the target contaminants via multiple pathways. S-MicroZVI can destroy many chlorinated contaminants through a direct chemical reaction (**see Figure 1**). S-MicroZVI will also stimulate anaerobic biological degradation by rapidly creating a reducing environment that is favorable for reductive dechlorination.

S-MicroZVI is Best in Class For

- ☑ Longevity
- ☑ Kinetics
- ☑ Transport

Sulfidated ZVI

S-MicroZVI is composed of colloidal, sulfidated zero-valent iron particles suspended in glycerol using proprietary environmentally acceptable dispersants. The passivation technique of sulfidation, completed using proprietary processing methods, provides unparalleled reactivity with chlorinated hydrocarbons like PCE and TCE and increases its stability and longevity by minimizing undesirable side reactions. In addition to superior reactivity, S-MicroZVI is designed for easy handling that is unmatched by any ZVI product on the market. Shipped as a liquid suspension, S-MicroZVI requires no powder feeders, no thickening with guar, and pneumatic or hydraulic fracturing is not mandatory. When diluted with water prior to application, the resulting suspension is easy to inject using either direct push or permanent injection wells.

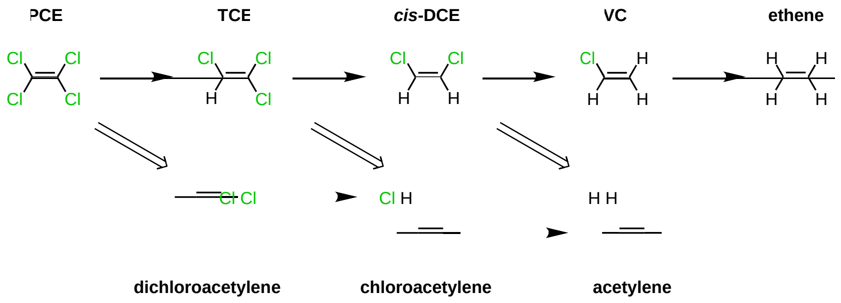


Figure 1: *Chlorinated ethene degradation pathways and products. The top pathway with single line arrows represent the reductive dechlorination (hydrogenolysis) pathway. The lower pathway with downward facing double line arrows represent the beta-elimination pathway.*

To see a list of treatable contaminants, view the S-MicroZVI treatable contaminants guide.

S-MicroZVI™
Sulfidated Zero-Valent Iron

S-MicroZVI Specification Sheet

Chemical Composition

Iron, powders CAS 7439-89-6
Iron (II) sulfide CAS 1317-37-9
Glycerol CAS 56-81-8

Properties

Physical State: Liquid
Form: Viscous metallic suspension
Color: Dark gray
Odor: Slight
pH: Typically 7-9 as applied
Density: 15 lb/gal

Storage and Handling Guidelines

Storage:

- Use within four weeks of delivery
- Store in original containers
- Store at temperatures below 95F°
- Store away from incompatible materials

Handling:

- Never mix with oxidants or acids
- Wear appropriate personal protective equipment
- Do not taste or swallow
- Observe good industrial hygiene practices

Applications

S-MicroZVI is diluted with water on site and easily applied into the subsurface through low-pressure injections. S-MicroZVI can also be mixed with products like 3-D Microemulsion® or PlumeStop® prior to injection.

Health and Safety

The material is relatively safe to handle; however, avoid contact with eyes, skin and clothing. OSHA Level D personal protection equipment including: vinyl or rubber gloves and eye protection are recommended when handling this product. Please review the Safety Data Sheet for additional storage, and handling requirements here: S-MicroZVI SDS.

REGENESIS®

www.regenesis.com

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BDI PLUS® Technical Description

Species of Dehalococcoides sp. (DHC)

Bio-Dechlor INOCULUM Plus (BDI PLUS®) is an enriched natural consortium containing species of Dehalococcoides sp. (DHC). BDI PLUS has been shown to simulate the rapid and complete dechlorination of chlorinated solvents such as tetrachloroethene (PCE), trichloroethene (TCE), dichloroethene (DCE) and vinyl chloride (VC) to non-toxic end products, ethene, carbon dioxide and water.

The culture also contains microbes capable of dehalogenating halomethanes (e.g., carbon tetrachloride and chloroform) and haloethanes (e.g., 1,1,1-TCA and 1,1-DCA) as well as mixtures of these contaminants.

For a list of treatable contaminants with the use of BDI PLUS, view the Range of Treatable Contaminants Guide

Chemical Composition

- Non-hazardous, naturally-occurring, non-altered anaerobic microbes and enzymes in a water-based medium.

Properties

- Appearance – Murky, yellow to grey water
- Odor – Musty
- pH 6.0 to 8.0
- Density – Approximately 1.0 grams per cubic centimeter (0.9 to 1.1 g/cc)
- Solubility – Soluble in Water
- Vapor Pressure – None
- Non-hazardous

Storage and Handling Guidelines

Storage
Store in original tightly closed container
Store away from incompatible materials
Recommended storage containers: plastic lined steel, plastic, glass, aluminum, stainless steel, or reinforced fiberglass
Store in a cool, dry area at 4-5°C (39 - 41°F)
Material may be stored for up to 3 weeks at 2-4°C without aeration

Handling
Avoid prolonged exposure
Observe good industrial hygiene practices
Wear appropriate personal protective equipment

BIO-DECHLOR
INOCULUM

BDI PLUS® Technical Description

Applications

- BDI PLUS is delivered to the site in liquid form and is designed to be injected directly into the saturated zone requiring treatment.
- Most often diluted with de-oxygenated water prior to injection into either hydraulic push injection points or properly constructed injection wells.
- The typical dilution rate of the injected culture is 10 gallons of deoxygenated water to 1 liter of standard BDI PLUS culture.

Application instructions for this product are contained here BDI PLUS Application Instructions.

Health and Safety

Material is non-hazardous and relatively safe to handle; however avoid contact with eyes and prolonged contact with skin. OSHA Level D personal protection equipment including: vinyl or rubber gloves and safety goggles or a splash shield are recommended when handling this product. An eyewash station is recommended. Please review the Material Safety Data Sheet for additional storage, usage, and handling requirements here: BDI PLUS SDS.

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PlumeStop® Liquid Activated Carbon™ Technical Description

PlumeStop Liquid Activated Carbon is an innovative groundwater remediation technology designed to rapidly remove and permanently degrade groundwater contaminants. PlumeStop is composed of very fine particles of activated carbon (1-2µm) suspended in water through the use of unique organic polymer dispersion chemistry. Once in the subsurface, the material behaves as a colloidal biomatrix, binding to the aquifer matrix, rapidly removing contaminants from groundwater, and promoting permanent contaminant biodegradation.

This unique remediation technology accomplishes treatment with the use of highly dispersible, fast-acting, sorption-based technology, capturing and concentrating dissolved-phase contaminants within its matrix-like structure. Once contaminants are sorbed onto the regenerative matrix, biodegradation processes achieve complete remediation.

Distribution of PlumeStop in water

To see a list of treatable contaminants with the use of PlumeStop, view the Range of Treatable Contaminants Guide.

Chemical Composition

- Water - CAS# 7732-18-5
- Colloidal Activated Carbon ≤2.5 - CAS# µm 7440-44-0
- Proprietary Additives

Properties

- Physical state: Liquid
- Form: Aqueous suspension
- Color: Black
- Odor: Odorless
- pH: 8 - 10

Storage and Handling Guidelines

Storage
Store in original tightly closed container
Store away from incompatible materials
Protect from freezing

Handling
Avoid contact with skin and eyes
Avoid prolonged exposure
Observe good industrial hygiene practices
Wash thoroughly after handling
Wear appropriate personal protective equipment

PLUME STOP®
Liquid Activated Carbon

PlumeStop® Liquid Activated Carbon™ Technical Description

Applications

PlumeStop is easily applied into the subsurface through gravity-feed or low-pressure injection.

Health and Safety

Wash hands after handling. Dispose of waste and residues in accordance with local authority requirements. Please review the Material Safety Data Sheet for additional storage, usage, and handling requirements here: PlumeStop SDS.

REGENESIS
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Time Oil Bulk Terminal Site

Pre-Remedial Design Investigation Summary Report

Attachment 3
Shoreline Area of Concern Investigation Supporting Documentation

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
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December 2, 2020

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on November 13, 2020 from the Cantera - TOC, F&BI 011267 project. There are 81 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kristin Anderson
FDS1202R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on November 13, 2020 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera - TOC, F&BI 011267 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
011267 -01	Comp1-A-0-0.5
011267 -02	Comp1-A-0.5-1
011267 -03	Comp1-B-0-0.5
011267 -04	Comp1-B-0.5-1
011267 -05	Comp1-D-0-0.5
011267 -06	Comp1-D-0.5-1
011267 -07	Comp1-C-0-0.5
011267 -08	Comp1-C-0.5-1
011267 -09	Comp-1-0-0.5
011267 -10	Comp-1-0.5-1
011267 -11	Comp2-A-0-0.5
011267 -12	Comp2-A-0.5-1
011267 -13	Comp2-B-0-0.5
011267 -14	Comp2-B-0.5-1
011267 -15	Comp2-C-0-0.5
011267 -16	Comp2-C-0.5-1
011267 -17	Comp2-D-0-0.5
011267 -18	Comp2-D-0.5-1
011267 -19	Comp-2-0-0.5
011267 -20	Comp-2-0.5-1
011267 -21	Comp3-A-0-0.5
011267 -22	Comp3-A-0.5-1
011267 -23	Comp3-B-0-0.5
011267 -24	Comp3-B-0.5-1
011267 -25	Comp3-C-0-0.5
011267 -26	Comp3-C-0.5-1
011267 -27	Comp3-D-0-0.5
011267 -28	Comp3-D-0.5-1
011267 -29	Comp-3-0-0.5
011267 -30	Comp-3-0.5-1
011267 -31	Comp4-A-0-0.5
011267 -32	Comp4-A-0.5-1
011267 -33	Comp4-B-0-0.4
011267 -34	Comp4-C-0-0.5
011267 -35	Comp4-C-0.5-1

CASE NARRATIVE (CONTINUED)

Laboratory ID	Floyd-Snider
011267 -36	Comp4-D-0-0.5
011267 -37	Comp4-D-0.5-1
011267 -38	Comp-4-0-0.5
011267 -39	Comp-4-0.5-1
011267 -40	Comp5-A-0-0.5
011267 -41	Comp5-B-0-0.5
011267 -42	Comp5-B-0.5-1
011267 -43	Comp5-C-0-0.5
011267 -44	Comp5-C-0.5-1
011267 -45	Comp5-D-0-0.5
011267 -46	Comp5-D-0.5-1
011267 -47	Comp-5-0-0.5
011267 -48	Comp-5-0.5-1
011267 -49	Comp6-A-0-0.5
011267 -50	Comp6-A-0.5-1
011267 -51	Comp6-B-0-0.5
011267 -52	Comp6-B-0.5-1
011267 -53	Comp6-C-0-0.5
011267 -54	Comp6-C-0.5-1
011267 -55	Comp6-C-0.5-1-D
011267 -56	Comp6-D-0-0.4
011267 -57	Comp6-D-0-0.4-D
011267 -58	Comp-6-0-0.5
011267 -59	Comp-6-0.5-1
011267 -60	Comp-6-0.5-1-D
011267 -61	Comp7-A-0-0.5
011267 -62	Comp7-A-0.5-1
011267 -63	Comp7-B-0-0.5
011267 -64	Comp7-B-0.5-1
011267 -65	Comp7-C-0-0.5
011267 -66	Comp7-C-0.5-1
011267 -67	Comp7-D-0-0.4
011267 -68	Comp-7-0-0.5
011267 -69	Comp-7-0.5-1
011267 -70	SW1-0.25-0.75

CASE NARRATIVE (CONTINUED)

Laboratory ID	Floyd-Snider
011267 -71	SW2-0.25-0.75
011267 -72	SW3-0.25-0.75
011267 -73	SW4-0.25-0.75
011267 -74	SW5-0.25-0.75
011267 -75	SW6-0.25-0.75
011267 -76	SW7-0.25-0.75
011267 -77	SW8-0.25-0.75
011267 -78	SW9-0.25-0.75
011267 -79	SW10-0.25-0.75
011267 -80	B1-1.0-1.25
011267 -81	B1-2.0-2.25
011267 -82	B2-1.0-1.25
011267 -83	B2-2.0-2.25
011267 -84	B3-1.0-1.25
011267 -85	B3-2.0-2.25
011267 -86	B3-2.0-2.25-D
011267 -87	B4-1.0-1.25
011267 -88	B4-2.0-2.25

Samples Comp-1-0-0.5, Comp-2-0-0.5, Comp-3-0-0.5, Comp-4-0-0.5, Comp-5-0-0.5, Comp-6-0-0.5, Comp-7-0-0.5 were sent to ARI for tributyltin analysis. The results generated by ARI will be issued in a separate report.

The 1631E matrix spike and matrix spike duplicate failed the relative percent difference for mercury. The laboratory control sample passed the acceptance criteria, therefore the results were due to matrix effect.

All other quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp1-A-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-01
Date Analyzed:	11/19/20	Data File:	011267-01.131
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	10.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp1-B-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-03
Date Analyzed:	11/19/20	Data File:	011267-03.138
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	13.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp1-D-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-05
Date Analyzed:	11/19/20	Data File:	011267-05.139
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	22.4

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp1-D-0.5-1	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/24/20	Lab ID:	011267-06
Date Analyzed:	11/24/20	Data File:	011267-06.132
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	7.52

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp1-C-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-07
Date Analyzed:	11/19/20	Data File:	011267-07.140
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	18.1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp-1-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-09
Date Analyzed:	11/16/20	Data File:	011267-09.053
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	27.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp2-A-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-11
Date Analyzed:	11/19/20	Data File:	011267-11.141
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	15.8

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp2-B-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-13
Date Analyzed:	11/19/20	Data File:	011267-13.142
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	38.0

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp2-C-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-15
Date Analyzed:	11/19/20	Data File:	011267-15.143
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	153

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp2-C-0.5-1	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/24/20	Lab ID:	011267-16
Date Analyzed:	11/24/20	Data File:	011267-16.133
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.16

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp2-D-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-17
Date Analyzed:	11/19/20	Data File:	011267-17.144
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.38

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp-2-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-19
Date Analyzed:	11/16/20	Data File:	011267-19.104
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	39.8

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp3-A-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-21
Date Analyzed:	11/19/20	Data File:	011267-21.145
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	16.0

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp3-B-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-23
Date Analyzed:	11/19/20	Data File:	011267-23.148
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	17.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp3-C-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-25
Date Analyzed:	11/19/20	Data File:	011267-25.149
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.66

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp3-D-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-27
Date Analyzed:	11/19/20	Data File:	011267-27.150
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.75

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp-3-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-29
Date Analyzed:	11/16/20	Data File:	011267-29.105
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	9.16

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp4-A-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-31
Date Analyzed:	11/19/20	Data File:	011267-31.151
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	20.1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp4-A-0.5-1	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/24/20	Lab ID:	011267-32
Date Analyzed:	11/24/20	Data File:	011267-32.134
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	7.42

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp4-B-0-0.4	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-33
Date Analyzed:	11/19/20	Data File:	011267-33.152
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	133

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp4-C-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-34
Date Analyzed:	11/19/20	Data File:	011267-34.153
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.74

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp4-D-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-36
Date Analyzed:	11/19/20	Data File:	011267-36.154
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.99

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp-4-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-38
Date Analyzed:	11/16/20	Data File:	011267-38.106
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	27.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp5-A-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-40
Date Analyzed:	11/19/20	Data File:	011267-40.155
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	46.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp5-B-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-41
Date Analyzed:	11/19/20	Data File:	011267-41.156
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	12.4

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp5-C-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-43
Date Analyzed:	11/19/20	Data File:	011267-43.157
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.13

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp5-D-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-45
Date Analyzed:	11/19/20	Data File:	011267-45.160
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	5.69

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp-5-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-47
Date Analyzed:	11/16/20	Data File:	011267-47.109
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	20.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp-6-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-58
Date Analyzed:	11/16/20	Data File:	011267-58.110
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.74

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp7-A-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-61
Date Analyzed:	11/19/20	Data File:	011267-61.161
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	145

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp7-A-0.5-1	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/24/20	Lab ID:	011267-62
Date Analyzed:	11/24/20	Data File:	011267-62.135
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	36.4

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp7-B-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-63 x10
Date Analyzed:	11/20/20	Data File:	011267-63 x10.046
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	624

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp7-B-0.5-1	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/24/20	Lab ID:	011267-64
Date Analyzed:	11/24/20	Data File:	011267-64.136
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	87.9

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp7-C-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-65
Date Analyzed:	11/19/20	Data File:	011267-65.165
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	38.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp7-D-0-0.4	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-67
Date Analyzed:	11/19/20	Data File:	011267-67.166
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	106

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp-7-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-68 x5
Date Analyzed:	11/16/20	Data File:	011267-68 x5.130
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	302

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW1-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-70
Date Analyzed:	11/16/20	Data File:	011267-70.111
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	35.0

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW2-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-71
Date Analyzed:	11/16/20	Data File:	011267-71.112
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	15.4

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW3-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-72 x5
Date Analyzed:	11/16/20	Data File:	011267-72 x5.133
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	149

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW4-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-73 x10
Date Analyzed:	11/16/20	Data File:	011267-73 x10.134
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	1,680

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW5-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-74
Date Analyzed:	11/16/20	Data File:	011267-74.113
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	150

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW6-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-75
Date Analyzed:	11/16/20	Data File:	011267-75.114
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	234

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW7-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-76 x10
Date Analyzed:	11/17/20	Data File:	011267-76 x10.169
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	548

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW8-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-77
Date Analyzed:	11/16/20	Data File:	011267-77.116
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	6.76

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW9-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-78
Date Analyzed:	11/16/20	Data File:	011267-78.117
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	9.54

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW10-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-79
Date Analyzed:	11/16/20	Data File:	011267-79.118
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	7.24

Analysis For Total Metals By EPA Method 6020B

Client ID:	B1-1.0-1.25	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-80
Date Analyzed:	11/16/20	Data File:	011267-80.121
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.65

Analysis For Total Metals By EPA Method 6020B

Client ID:	B2-1.0-1.25	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-82
Date Analyzed:	11/16/20	Data File:	011267-82.122
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	5.70

Analysis For Total Metals By EPA Method 6020B

Client ID:	B3-1.0-1.25	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-84
Date Analyzed:	11/16/20	Data File:	011267-84.123
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	6.73

Analysis For Total Metals By EPA Method 6020B

Client ID:	B4-1.0-1.25	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-87 x5
Date Analyzed:	11/16/20	Data File:	011267-87 x5.127
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	547

Analysis For Total Metals By EPA Method 6020B

Client ID:	B4-2.0-2.25	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	011267-88
Date Analyzed:	11/19/20	Data File:	011267-88.167
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	6.01

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	I0-707 mb
Date Analyzed:	11/16/20	Data File:	I0-707 mb.037
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	I0-708 mb
Date Analyzed:	11/16/20	Data File:	I0-708 mb.039
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	I0-724 mb
Date Analyzed:	11/19/20	Data File:	I0-724 mb.129
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/19/20	Lab ID:	I0-725 mb
Date Analyzed:	11/19/20	Data File:	I0-725 mb.136
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/24/20	Lab ID:	I0-732 mb
Date Analyzed:	11/24/20	Data File:	I0-732 mb.120
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW1-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-70
Date Analyzed:	11/16/20	Data File:	011267-70.111
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Cadmium	0.458
Copper	47.6
Lead	36.1
Silver	<0.2 ca
Zinc	138

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW1-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-70 x0.5
Date Analyzed:	11/19/20	Data File:	011267-70 x0.5.087
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Silver	<0.1

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW4-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-73
Date Analyzed:	11/16/20	Data File:	011267-73.067
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Cadmium	1.22 J
Copper	2,520 J ve
Lead	1,410 ve
Silver	0.870 J
Zinc	3,130 J ve

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW4-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-73 x10
Date Analyzed:	11/16/20	Data File:	011267-73 x10.134
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Cadmium	3.63
Copper	4,060
Zinc	4,930

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW4-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-73 x20
Date Analyzed:	11/23/20	Data File:	011267-73 x20.122
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Lead	2,470
Silver	<4

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW10-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-79
Date Analyzed:	11/16/20	Data File:	011267-79.118
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Cadmium	<0.5
Copper	24.8
Lead	15.3
Silver	<0.2 ca
Zinc	69.2

Analysis For Total Metals By EPA Method 6020B

Client ID:	SW10-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-79 x0.5
Date Analyzed:	11/19/20	Data File:	011267-79 x0.5.093
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Silver	<0.1

Analysis For Total Metals By EPA Method 6020B

Client ID:	B1-1.0-1.25	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-80
Date Analyzed:	11/16/20	Data File:	011267-80.121
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Cadmium	<0.5
Copper	20.7
Lead	7.00
Silver	<0.2 ca
Zinc	40.4

Analysis For Total Metals By EPA Method 6020B

Client ID:	B1-1.0-1.25	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	011267-80 x0.5
Date Analyzed:	11/19/20	Data File:	011267-80 x0.5.096
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Silver	<0.1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/16/20	Lab ID:	I0-707 mb x0.5
Date Analyzed:	11/19/20	Data File:	I0-707 mb x0.5.086
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Cadmium	<0.25
Copper	<2.5
Lead	<0.5
Silver	<0.1
Zinc	<2.5

Date of Report: 12/02/20
Date Received: 11/13/20
Project: Cantera - TOC, F&BI 011267
Date Extracted: 11/16/20
Date Analyzed: 11/23/20

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

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

Sample ID Laboratory ID	Total Mercury
SW1-0.25-0.75 011267-70	0.064
SW4-0.25-0.75 011267-73	0.14
SW10-0.25-0.75 011267-79	<0.05
B1-1.0-1.25 011267-80	<0.05
Method Blank i0-707 MB	<0.05

Analysis for TCLP Metals By EPA Method 6020B and 1311

Client ID:	SW4-0.25-0.75	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/24/20	Lab ID:	011267-73
Date Analyzed:	11/25/20	Data File:	011267-73.059
Matrix:	Soil/Solid	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP

Analyte:	Concentration mg/L (ppm)	TCLP Limit
Arsenic	<1	5.0
Lead	1.13	5.0

Analysis for TCLP Metals By EPA Method 6020B and 1311

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	NA	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	11/24/20	Lab ID:	I0-734 mb
Date Analyzed:	11/25/20	Data File:	I0-734 mb.045
Matrix:	Soil/Solid	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP

Analyte:	Concentration mg/L (ppm)	TCLP Limit
Arsenic	<1	5.0
Lead	<1	5.0

Date of Report: 12/02/20
Date Received: 11/13/20
Project: Cantera - TOC, F&BI 011267

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

Laboratory Code: 011267-09 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	20.8	128 b	206 b	75-125	47 b
Cadmium	mg/kg (ppm)	10	<5	97	93	75-125	4
Copper	mg/kg (ppm)	50	73.0	95 b	131 b	75-125	32 b
Lead	mg/kg (ppm)	50	94.9	127 b	119 b	75-125	7 b
Silver	mg/kg (ppm)	10	<5	87	88	75-125	1
Zinc	mg/kg (ppm)	50	313	100 b	327 b	75-125	106 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	96	80-120
Cadmium	mg/kg (ppm)	10	98	80-120
Copper	mg/kg (ppm)	50	104	80-120
Lead	mg/kg (ppm)	50	99	80-120
Silver	mg/kg (ppm)	10	98	80-120
Zinc	mg/kg (ppm)	50	105	80-120

Date of Report: 12/02/20
Date Received: 11/13/20
Project: Cantera - TOC, F&BI 011267

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

Laboratory Code: 011267-09 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	20.8	128 b	206 b	75-125	47 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	96	80-120

Date of Report: 12/02/20
Date Received: 11/13/20
Project: Cantera - TOC, F&BI 011267

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

Laboratory Code: 011267-87 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	465	374 b	0 b	75-125	200 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	100	80-120

Date of Report: 12/02/20
Date Received: 11/13/20
Project: Cantera - TOC, F&BI 011267

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

Laboratory Code: 011267-01 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	8.35	78 b	129 b	75-125	49 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	92	80-120

Date of Report: 12/02/20
Date Received: 11/13/20
Project: Cantera - TOC, F&BI 011267

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

Laboratory Code: 011267-61 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	135	0 b	0 b	75-125	0 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	86	80-120

Date of Report: 12/02/20
Date Received: 11/13/20
Project: Cantera - TOC, F&BI 011267

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

Laboratory Code: 011259-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	4.77	115 b	294 b	75-125	88 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	90	80-120

Date of Report: 12/02/20
Date Received: 11/13/20
Project: Cantera - TOC, F&BI 011267

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 011267-09 1/20 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	0.125	<1	79	99	71-125	22 vo

Laboratory Code: Laboratory Control Sample 1/20

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	93	68-125

Date of Report: 12/02/20
Date Received: 11/13/20
Project: Cantera - TOC, F&BI 011267

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL/SOLID SAMPLES FOR TCLP METALS USING EPA METHODS 6020B AND 1311

Laboratory Code: 011380-05 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/L (ppm)	1.0	<1	100	98	75-125	2
Lead	mg/L (ppm)	1.0	<1	87	85	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/L (ppm)	1.0	98	80-120
Lead	mg/L (ppm)	1.0	87	80-120

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

P14

SAMPLE CHAIN OF CUSTODY ME 11-13-20

Page # 1 of 9

MH/13
Report To ~~Kristin Anderson~~ Lynn. Grochala ~~011267~~ 011267
Company Floyd|Snider
Address 601 Union Street Suite 600
City, State, ZIP Seattle, WA 98101
Phone 206-292-2078 Email ~~Kristin.Anderson@floydsnider.com~~ lynn.grochala@floydsnider

SAMPLERS (signature)

PROJECT NAME	PO #
CANTERA-TOC	CANTERA-TOC

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
☐ Standard turnaround
☑ RUSH As only 2 day
Rush charges authorized by:

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

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	◆ -24 hr TAT per KA 11/24/20 Notes ME ■ -std TAT per KA 11/24/20 ME
COMP1-A-0-0.5	01	11/13/20	9:45	Soil	1								✓			X	Hold volume
COMP1-A-0.5-1	02		9:46		1											X	for additional
COMP1-B-0-0.5	03		9:55		1								✓			X	metal analysis
COMP1-B-0.5-1	04		9:56		1											X	
~~COMP1-C-0-0.5~~ e	0g												~~✓~~			X	✓-per KA
~~COMP1-C-0.5-1~~ e																X	11/18
COMP1-D-0-0.5	05		10:05		1								✓			X	
COMP1-D-0.5-1	06		10:06		1								■			X	3-day TAT
COMP1-C-0-0.5	07		10:25		1								✓			X	
COMP1-C-0.5-1	08		10:26		1											X	

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Isaac Lessig	FBI	11/13/20	1721
Relinquished by:				
Received by:		Samples received at 3 °C		

UI4

SAMPLE CHAIN OF CUSTODY MB 11-13-20 [redacted]

011267 [redacted]

Page # 2 of 9

Report To See pg 1
Company Floyd|Snider
Address
City, State, ZIP
Phone Email

SAMPLERS (*signature*)

PROJECT NAME	PO #
CANTERA-TOC	CANTERA-TOC
REMARKS Project specific RLs? - Yes / No	INVOICE TO

TURNAROUND TIME
☐ Standard turnaround
☑ RUSH As only 2 day
Rush charges authorized by:

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-1-0-0.5	09	11/13/20	10:30	soil	1								X	X			
COMP-1-0.5-1	10		10:31		1											X	
COMP2-A-0-0.5	11		1110		1								✓			X	
COMP2-A-0.5-1	12		1111		1											X	
COMP2-B-0-0.5	13		1035		1								✓			X	
COMP2-B-0.5-1	14		1036		1											X	
COMP2-C-0-0.5	15		1045		1								✓			X	
COMP2-C-0.5-1	16		1046		1								◆			X	
COMP2-D-0-0.5	17		1050		1								✓			X	
COMP2-D-0.5-1	18		1051		1											X	

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Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1724
Received by:	Isaac Lessig	FBI	11/13/20	1724
Relinquished by:				
Received by:		Samples received at 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

DI4

Page # 3 of 9

Report To See page 1

Company Floyd|Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME CANTERA-TOC

PO # CANTERA-TOC

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
☐ Standard turnaround
☐ RUSH See page 1
Rush charges authorized by:

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-2-0-0.5	19	11/13/20	1115	Soil	1								X	X			
COMP-2-0.5-1	20	↓	1116	↓	1											X	
COMP3-A-0-0.5	21		1140		1								✓			X	
COMP3-A-0.5-1	22		1141		1											X	
COMP3-B-0-0.5	23		1125		1								✓			X	
COMP3-B-0.5-1	24		1126		1											X	
COMP3-C-0-0.5	25		1130		1								✓			X	
COMP3-C-0.5-1	26		1131		1											X	
COMP3-D-0-0.5	27		1135		1								✓			X	
COMP3-D-0.5-1	28		1136		1											X	

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3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Andersen	FS	11/13/20	1721
Received by:	Isaac Lessig	FBI	11/13/20	17:21
Relinquished by:				
Received by:		Samples received at 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

BF4

Page # 4 of 9

Report To See pg 1

Company Floyd|Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (signature)

PROJECT NAME CANTERA-TOC

PO # CANTERA-TOC

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

TURNAROUND TIME
☐ Standard turnaround
☑ RUSH As only 2 day
Rush charges authorized by:

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

						ANALYSES REQUESTED												
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-3-0-0.5	29	11/13/20	1145	soil	1								X	X			
COMP-3-0.5-1	30	↓	1146	↓	1											X	
COMP4-A-0-0.5	31		1230		1								✓			X	
COMP4-A-0.5-1	32		1231		1								[redacted]			X	
COMP4-B-0-0.4	33		1236		1								✓			X	
COMP4-C-0-0.5	34		1240		1								✓			X	
COMP4-C-0.5-1	35		1241		1											X	
COMP4-D-0-0.5	36		1235		1								✓			X	
COMP4-D-0.5-1	37		1236		1											X	
COMP-4-0-0.5	38	↓	1240	↓	1								X	X			

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3012 16th Avenue West
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Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Lucas Lessig	FBI	11/13/20	17:21
Relinquished by:				
Received by:		Samples received at 3 °C		

BI4

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

Page # 5 of 9

Report To See pg 1
Company Floyd | Snider
Address
City, State, ZIP
Phone Email

SAMPLERS (*signature*)

PROJECT NAME CANTERA-TOC
PO # CANTER-TOC

REMARKS
Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
☐ Standard turnaround
☑ RUSH As only 2day
Rush charges authorized by:

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-4-0.5-1	39	11/13/20	1241	soil	1											X	
COMPS-A-0-0.5	40		1300		1								✓			X	
COMPS-~~B~~-0-0.5	41		1305		1								✓			X	
COMPS-B-0.5-1	42		1306		1											X	
COMPS-C-0-0.5	43		1310		1								✓			X	
COMPS-C-0.5-1	44		1311		1											X	
COMPS-D-0-0.5	45		1315		1								✓			X	
COMPS-D-0.5-1	46		1316		1											X	
COMP-5-0-0.5	47		1320		1								X	X			
COMP-5-0.5-1	48	↓	1321	↓	1											X	

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3012 16th Avenue West
Seattle, WA 98119-2029
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	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Kristin Anderson	FS	11/13/20	1721
Received by:		Isaac Lessig	FBI	11/13/20	17:21
Relinquished by:					
Received by:			Samples received at 3 °C		

011267

SAMPLE CHAIN OF COUSTODY ME 11-13-20

BI4

Page # 10 of 9

Report To See pg 1

Company Floyd|Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME	PO #
CANTERA-TOC	CANTERA-TOC

REMARKS	INVOICE TO
Project specific RLs? - Yes / No	

TURNAROUND TIME

☐ Standard turnaround

☑ RUSH Asbly 2day

Rush charges authorized by:

SAMPLE DISPOSAL

☑ Archive samples

☐ Other

Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP6-A-0-0.5	49		1330		1											X	
COMP6-A-0.5-1	50		1331		1											X	
COMP6-B-0-0.5	51		1340		1											X	
COMP6-B-0.5-1	52		1341		1											X	
COMP6-C-0-0.5	53		1345		1											X	
COMP6-C-0.5-1	54		1346		1											X	
COMP6-C-0.5-1-D	55		1348		1											X	
COMP6-D-0-0.4	56		1350		1											X	
COMP6-D-0-0.4-D	57		1352		1											X	
COMP-6-0-0.5	58		1355										X	X			

Friedman & Bruya, Inc.

3012 16th Avenue West

Seattle, WA 98119-2029

Ph. (206) 285-8282

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Kristin Anderson	FS	11/13/20	1721
Received by:		Isaac Lessig	FBI	11/13/20	17:21
Relinquished by:					
Received by:			Samples received at 3 °C		

SAMPLE CHAIN OF CUSTODY ME 11-13-20

BI4

Page # 7 of 9

011267

Report To See page 1

Company Floyd|Snider

Address

~~City, State, ZIP~~

Phone Email

SAMPLERS (*signature*)

PROJECT NAME	PO #
CANTERA-TOC	CANTERA-TOC

REMARKS	INVOICE TO
Project specific RLs? - Yes / No	

TURNAROUND TIME
☐ Standard turnaround
☑ RUSH As early 2day
Rush charges authorized by:

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-6-0.5-1	59	11/13/20	1357	Soil	1											X	
COMP-6-0.5-1-D	60		1358		1											X	
COMP7-A-0-0.5	61		1405		1								✓			X	
COMP7-A-0.5-1	62		1406		1								◆			X	
COMP7-B-0-0.5	63		1410		1								✓			X	
COMP7-B-0.5-1	64		1411		1								◆			X	
COMP7-C-0-0.5	65		1415		1								✓			X	
COMP7-C-0.5-1	66		1416		1											X	
COMP7-D-0-0.4	67		1420		1								✓			X	
COMP-7-0-0.5	68		1425		1								X	X			

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Isaac Lessig	FBI	11/13/20	17:21
Relinquished by:				
Received by:		Samples received at 3 °C		

014

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

Page # 8 of 9

Report To See pg 1

Company Floyd|Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME	PO #
CANTERA-TOC	CANTERA-TOC
REMARKS Project specific RLs? - Yes / No	INVOICE TO

TURNAROUND TIME
☐ Standard turnaround
☑ RUSH As only 2day
Rush charges authorized by:

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

						ANALYSES REQUESTED												
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	Cu, Cd, Pb, Ag, Zn	1631 Hg	Archive	TCLP As+Pb	Notes
COMP-7-0.5-1	69	11/13/20	1426	Soil	1											X		
SW1-0.25-0.75	70	↓	1430	↓	1								X	✓	✓			
SW2-0.25-0.75	71		1432		1								X					
SW3-0.25-0.75	72		1448		1								X					
SW4-0.25-0.75	73		1450		1								X	✓	✓		■	
SW5-0.25-0.75	74		1458		1								X					
SW6-0.25-0.75	75		1500		1								X					
SW7-0.25-0.75	76		1502		1								X					
SW8-0.25-0.75	77		1504		1								X					
SW9-0.25-0.75	78		1515		1								X					

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Kirsten Anderson	FS	11/13/20	1921
Received by:		Isaac Lessig	FBI	11/13/20	17:21
Relinquished by:					
Received by:			Samples received at 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

D14

Page # 9 of 9

Report To Kristin Anderson
Company Floyd|Snider
Address 601 Union Street Suite 600
City, State, ZIP Seattle, WA 98101
Phone 206-292-298 Email Kristin.Anderson@floydsnider.com

SAMPLERS (signature)

PROJECT NAME CANTERA - TOC

PO #

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

TURNAROUND TIME
☐ Standard turnaround
☑ RUSH As only 2 day
Rush charges authorized by:

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	Cu, Cd, Pb, Ag, Zn	1631 Hg	Archive	Notes
SW10-0.25-0.75	79	11/13/20	1517	soil	1								X	✓	✓		
B1-1.0-1.25	80		1535		1								X	✓	✓		
B1-2.0-2.25	81		1536		1											X	
B2-1.0-1.25	82		1545		1								X				
B2-2.0-2.25	83		1547		1											X	
B3-1.0-1.25	84		1550		1								X				
B3-2.0-2.25	85		1552		1											X	
B3-2.0-2.25-D	86		1554		1											X	
B4-1.0-1.25	87		1610		1								X				
B4-2.0-2.25	88		1612		1								✓			X	

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Kristin Anderson	FS	11/13/20	1721
Received by:		Isaac Lessig	FBI	11/13/20	1721
Relinquished by:					
Received by:			~~Samples received at~~		3 °C

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

January 14, 2021

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the additional results from the testing of material submitted on November 13, 2020 from the Cantera - TOC, F&BI 011267 project. There are 8 pages included in this report.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kristin Anderson
FDS0114R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on November 13, 2020 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera - TOC, F&BI 011267 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
011267 -01	Comp1-A-0-0.5
011267 -02	Comp1-A-0.5-1
011267 -03	Comp1-B-0-0.5
011267 -04	Comp1-B-0.5-1
011267 -05	Comp1-D-0-0.5
011267 -06	Comp1-D-0.5-1
011267 -07	Comp1-C-0-0.5
011267 -08	Comp1-C-0.5-1
011267 -09	Comp-1-0-0.5
011267 -10	Comp-1-0.5-1
011267 -11	Comp2-A-0-0.5
011267 -12	Comp2-A-0.5-1
011267 -13	Comp2-B-0-0.5
011267 -14	Comp2-B-0.5-1
011267 -15	Comp2-C-0-0.5
011267 -16	Comp2-C-0.5-1
011267 -17	Comp2-D-0-0.5
011267 -18	Comp2-D-0.5-1
011267 -19	Comp-2-0-0.5
011267 -20	Comp-2-0.5-1
011267 -21	Comp3-A-0-0.5
011267 -22	Comp3-A-0.5-1
011267 -23	Comp3-B-0-0.5
011267 -24	Comp3-B-0.5-1
011267 -25	Comp3-C-0-0.5
011267 -26	Comp3-C-0.5-1
011267 -27	Comp3-D-0-0.5
011267 -28	Comp3-D-0.5-1
011267 -29	Comp-3-0-0.5
011267 -30	Comp-3-0.5-1
011267 -31	Comp4-A-0-0.5
011267 -32	Comp4-A-0.5-1
011267 -33	Comp4-B-0-0.4
011267 -34	Comp4-C-0-0.5
011267 -35	Comp4-C-0.5-1

CASE NARRATIVE (continued)

Laboratory ID	Floyd-Snider
011267 -36	Comp4-D-0-0.5
011267 -37	Comp4-D-0.5-1
011267 -38	Comp-4-0-0.5
011267 -39	Comp-4-0.5-1
011267 -40	Comp5-A-0-0.5
011267 -41	Comp5-B-0-0.5
011267 -42	Comp5-B-0.5-1
011267 -43	Comp5-C-0-0.5
011267 -44	Comp5-C-0.5-1
011267 -45	Comp5-D-0-0.5
011267 -46	Comp5-D-0.5-1
011267 -47	Comp-5-0-0.5
011267 -48	Comp-5-0.5-1
011267 -49	Comp6-A-0-0.5
011267 -50	Comp6-A-0.5-1
011267 -51	Comp6-B-0-0.5
011267 -52	Comp6-B-0.5-1
011267 -53	Comp6-C-0-0.5
011267 -54	Comp6-C-0.5-1
011267 -55	Comp6-C-0.5-1-D
011267 -56	Comp6-D-0-0.4
011267 -57	Comp6-D-0-0.4-D
011267 -58	Comp-6-0-0.5
011267 -59	Comp-6-0.5-1
011267 -60	Comp-6-0.5-1-D
011267 -61	Comp7-A-0-0.5
011267 -62	Comp7-A-0.5-1
011267 -63	Comp7-B-0-0.5
011267 -64	Comp7-B-0.5-1
011267 -65	Comp7-C-0-0.5
011267 -66	Comp7-C-0.5-1
011267 -67	Comp7-D-0-0.4
011267 -68	Comp-7-0-0.5
011267 -69	Comp-7-0.5-1
011267 -70	SW1-0.25-0.75
011267 -71	SW2-0.25-0.75
011267 -72	SW3-0.25-0.75
011267 -73	SW4-0.25-0.75
011267 -74	SW5-0.25-0.75

CASE NARRATIVE (continued)

Laboratory ID	Floyd-Snider
011267 -75	SW6-0.25-0.75
011267 -76	SW7-0.25-0.75
011267 -77	SW8-0.25-0.75
011267 -78	SW9-0.25-0.75
011267 -79	SW10-0.25-0.75
011267 -80	B1-1.0-1.25
011267 -81	B1-2.0-2.25
011267 -82	B2-1.0-1.25
011267 -83	B2-2.0-2.25
011267 -84	B3-1.0-1.25
011267 -85	B3-2.0-2.25
011267 -86	B3-2.0-2.25-D
011267 -87	B4-1.0-1.25
011267 -88	B4-2.0-2.25

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp2-B-0.5-1	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	01/12/21	Lab ID:	011267-14
Date Analyzed:	01/12/21	Data File:	011267-14.118
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.07

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp7-C-0.5-1	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	01/12/21	Lab ID:	011267-66
Date Analyzed:	01/12/21	Data File:	011267-66.119
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	8.06

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	01/12/21	Lab ID:	I1-15 mb2
Date Analyzed:	01/12/21	Data File:	I1-15 mb2.039
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1

Date of Report: 01/14/21
Date Received: 11/13/20
Project: Cantera - TOC, F&BI 011267

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

Laboratory Code: 101101-01 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	5.15	144 b	82 b	75-125	55 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	95	80-120

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

P14

SAMPLE CHAIN OF CUSTODY ME 11-13-20

Page # 1 of 9

Report To Lynn Grochala MK/13 Kristin Anderson ~~001767~~ 011267

Company Floyd|Snider

Address 601 Union Street Suite 600

City, State, ZIP Seattle, WA 98101

Phone 206-292-2078 Email Kristin.Anderson@floydsnider.com lynn.grochala@floydsnider

SAMPLERS (*signature*)

PROJECT NAME CANTERA-TOC

PO # CANTERA-TOC

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

TURNAROUND TIME
☐ Standard turnaround
☑ RUSH As only 2 day
Rush charges authorized by:

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

						ANALYSES REQUESTED												
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	◆ -24 hr TAT per KA 11/24/20 ML Notes ■ -std TAT per KA 11/24/20 ME
COMP1-A-0-0.5	01	11/13/20	9:45	Soil	1								✓			X	Hold volume
COMP1-A-0.5-1	02		9:46		1											X	for additional
COMP1-B-0-0.5	03		9:55		1								✓			X	metal analysis
COMP1-B-0.5-1	04		9:56		1											X	
~~COMP1-C-0-0.5~~	0g												~~✓~~			X	✓-per KA
~~COMP1-C-0.5-1~~																X	11/18
COMP1-D-0-0.5	05		10:05		1								✓			X	
COMP1-D-0.5-1	06		10:06		1								■			X	3-day TAT
COMP1-C-0-0.5	07		10:25		1								✓			X	● -Std TAT
COMP1-C-0.5-1	08		10:26		1											X	per KA 1/12/21

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Isaac Lessing	FBI	11/13/20	1721
Relinquished by:				
Received by:		Samples received at 3 °C		

SAMPLE CHAIN OF CUSTODY ME 11-13-20

011267

Report To See pg 1

Company Floyd|Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME CANTERA-TOC

PO # CANTERA-TOC

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

Page # 2 of 9

UI4

TURNAROUND TIME
☐ Standard turnaround
☒ RUSH As only 2 day
Rush charges authorized by:

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-1-0-0.5	09	11/13/20	10:30	soil	1								X	X			
COMP-1-0.5-1	10		10:31		1											X	
COMP2-A-0-0.5	11		1110		1								✓			X	
COMP2-A-0.5-1	12		1111		1											X	
COMP2-B-0-0.5	13		1035		1								✓			X	
COMP2-B-0.5-1	14		1036		1								●			X	
COMP2-C-0-0.5	15		1045		1								✓			X	
COMP2-C-0.5-1	16		1046		1								●			X	
COMP2-D-0-0.5	17		1050		1								✓			X	
COMP2-D-0.5-1	18		1051		1											X	

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Seattle, WA 98119-2029
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SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Isaac Lessig	FBI	11/13/20	17:21
Relinquished by:				
Received by:		Samples received	at 3 °C	

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

DI4

Report To See page 1

Company Floyd | Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME CANTERA-TOC

PO # CANTERA-TOC

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

Page # 3 of 9

TURNAROUND TIME

☐ Standard turnaround

☐ RUSH See page 1

Rush charges authorized by:

SAMPLE DISPOSAL

☒ Archive samples

☐ Other

Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
						ANALYSES REQUESTED											
COMP-2-0-0.5	19	11/13/20	1115	Soil	1								X	X			
COMP-2-0.5-1	20		1116		1											X	
COMP3-A-0-0.5	21		1140		1								✓			X	
COMP3-A-0.5-1	22		1141		1											X	
COMP3-B-0-0.5	23		1125		1								✓			X	
COMP3-B-0.5-1	24		1126		1											X	
COMP3-C-0-0.5	25		1130		1								✓			X	
COMP3-C-0.5-1	26		1131		1											X	
COMP3-D-0-0.5	27		1135		1								✓			X	
COMP3-D-0.5-1	28	↓	1136	↓	1											X	

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3012 16th Avenue West
Seattle, WA 98119-2029
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	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Kristen Andersen	FS	11/13/20	1724
Received by:		Isaac Lessig	FBI	11/13/20	19:21
Relinquished by:					
Received by:			Samples received at 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

BF4

Page # 4 of 9

Report To See pg 1
Company Floyd|Snider
Address
City, State, ZIP
Phone Email

SAMPLERS (*signature*)

PROJECT NAME CANTERA-TOC
PO # CANTERA-TOC

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
☐ Standard turnaround
☒ RUSH As only 2 day
Rush charges authorized by:

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-3-0-0.5	29	11/13/20	1145	soil	1								X	X			
COMP-3-0.5-1	30		1146		1											X	
COMP4-A-0-0.5	31		1230		1								✓			X	
COMP4-A-0.5-1	32		1231		1								■			X	
COMP4-B-0-0.5	33		1236		1								✓			X	
COMP4-C-0-0.5	34		1240		1								✓			X	
COMP4-C-0.5-1	35		1241		1											X	
COMP4-D-0-0.5	36		1235		1								✓			X	
COMP4-D-0.5-1	37		1236		1											X	
COMP-4-0-0.5	38	↓	1240	↓	1								X	X			

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3012 16th Avenue West
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SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Andersen	FS	11/13/20	1721
Received by:	Isaac Lessig	FBI	11/13/20	17:21
Relinquished by:				
Received by:		Samples received at 3 °C		

011267

B14

SAMPLE CHAIN OF CUSTODY ME 11-13-20

Page # 5 of 9

Report To See pg 1

Company Floyd | Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME CANTERA-TOC

PO # CANTERA-TOC

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
☐ Standard turnaround
☑ RUSH As only 3day
Rush charges authorized by:

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

						ANALYSES REQUESTED										
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-4-0.5-1	39	11/13/20	1241	soil	1											X	
COMPS-A-0-0.5	40		1300		1								✓			X	
COMPS-B-0-0.5	41		1305		1								✓			X	
COMPS-B-0.5-1	42		1306		1											X	
COMPS-C-0-0.5	43		1310		1								✓			X	
COMPS-C-0.5-1	44		1311		1											X	
COMPS-D-0-0.5	45		1315		1								✓			X	
COMPS-D-0.5-1	46		1316		1											X	
COMP-5-0-0.5	47		1320		1								X	X			
COMP-5-0.5-1	48		1321		1											X	

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	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Kristin Anderson	FS	11/13/20	1721
Received by:		Isaac Lessig	FBI	11/13/20	17:21
Relinquished by:					
Received by:			Samples received at 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

BI4

Page # 6 of 9

Report To See pg 1

Company Floyd|Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (signature)

PROJECT NAME	PO #
CANTERA-TOC	CANTERA-TOC

REMARKS	INVOICE TO
Project specific RLs? - Yes / No	

TURNAROUND TIME

☐ Standard turnaround

☑ RUSH As only 2day

Rush charges authorized by:

SAMPLE DISPOSAL

☑ Archive samples

☐ Other

Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
						ANALYSES REQUESTED											
COMP6-A-0-0.5	49		1330		1											X	
COMP6-A-0.5-1	50		1331		1											X	
COMP6-B-0-0.5	51		1340		1											X	
COMP6-B-0.5-1	52		1341		1											X	
COMP6-C-0-0.5	53		1345		1											X	
COMP6-C-0.5-1	54		1346		1											X	
COMP6-C-0.5-1-D	55		1348		1											X	
COMP6-D-0-0.4	56		1350		1											X	
COMP6-D-0-0.4-D	57		1352		1											X	
COMP-6-0-0.5	58		1355										X	X			

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3012 16th Avenue West
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Ph. (206) 285-8282

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Kristin Anderson	FS	11/13/20	1721
Received by:		Isaac Lessig	FBI	11/13/20	17:21
Relinquished by:					
Received by:			Samples received at 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

BI4

Page # 7 of 9

Report To See page 1

Company Floyd|Snider

Address

~~City, State, ZIP~~

Phone Email

SAMPLERS (*signature*)

PROJECT NAME	PO #
CANTERA-TOC	CANTERA-TOC

REMARKS	INVOICE TO
Project specific RLs? - Yes / No	

TURNAROUND TIME

☐ Standard turnaround
☑ RUSH As only 2day
Rush charges authorized by:

SAMPLE DISPOSAL

☑ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
						ANALYSES REQUESTED											
COMP-6-0.5-1	59	11/13/20	1357	Soil	1											X	
COMP-6-0.5-1-D	60		1358		1											X	
COMP7-A-0-0.5	61		1405		1								✓			X	
COMP7-A-0.5-1	62		1406		1								◆			X	
COMP7-B-0-0.5	63		1410		1								✓			X	
COMP7-B-0.5-1	64		1411		1								◆			X	
COMP7-C-0-0.5	65		1415		1								✓			X	
COMP7-C-0.5-1	66		1416		1								●			X	
COMP7-D-0-0.4	67		1420		1								✓			X	
COMP-7-0-0.5	68		1425		1								X	X			

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Isaac Lassig	FBI	11/13/20	1721
Relinquished by:				
Received by:		Samples received at 3 °C		

011267

SAMPLE CHAIN OF COUSTODY ME 11-13-20

014

Report To See pg 1

Company Floyd|Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME CANTERA-TOC

PO # CANTERA-TOC

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

Page # 8 of 9

TURNAROUND TIME

☐ Standard turnaround

☑ RUSH As only 2day

Rush charges authorized by:

SAMPLE DISPOSAL

☑ Archive samples

☐ Other

Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	Cu Cd Pb Ag, Zn	1631 Hg	Archive	TCLP As Notes
COMP-7-0.5-1	69	11/13/20	1426	Soil	1											X	
SW1-0.25-0.75	70		1430		1								X	✓	✓		
SW2-0.25-0.75	71		1432		1								X				
SW3-0.25-0.75	72		1448		1								X				
SW4-0.25-0.75	73		1450		1								X	✓	✓		■
SW5-0.25-0.75	74		1458		1								X				
SW6-0.25-0.75	75		1500		1								X				
SW7-0.25-0.75	76		1502		1								X				
SW8-0.25-0.75	77		1504		1								X				
SW9-0.25-0.75	78	↓	1515	↓	1								X				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1921
Received by:	Isaac Lessig	FBI	11/13/20	17:24
Relinquished by:				
Received by:		Samples received at 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

014

Report To Kristin Anderson

Company Floyd|Snider

Address 601 Union Street Suite 600

City, State, ZIP Seattle, WA 98101

Phone 206-292-298 Email Kristin.Anderson@floydsnider.com

SAMPLERS (*signature*)

PROJECT NAME CANTERA - TOC

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

Page # 9 of 9

TURNAROUND TIME
☐ Standard turnaround
☑ RUSH As only 2 day
Rush charges authorized by:

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	Cr, Cd, Pb, Ag, Zn	1631 Hg	Archive	Notes
SW10-0.25-0.75	79	11/13/20	1517	soil	1								X	✓	✓		
B1-1.0-1.25	80		1535		1								X	✓	✓		
B1-2.0-2.25	81		1536		1											X	
B2-~~1~~1.0-1.25	82		1545		1								X				
B2-2.0-2.25	83		1547		1											X	
B3-~~1.0~~-1.25	84		1550		1								X				
B3-2.0-2.25	85		1552		1											X	
B3-2.0-2.25-D	86		1554		1											X	
B4-1.0-1.25	87		1610		1								X				
B4-2.0-2.25	88		1612		1								✓			X	

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Isaac Lessig	FBI	11/13/20	1721
Relinquished by:				
Received by:		~~Samples received at~~		3 °C

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

February 2, 2021

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the additional results from the testing of material submitted on November 13, 2020 from the Cantera - TOC, F&BI 011267 project. There are 13 pages included in this report.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kristin Anderson
FDS0202R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on November 13, 2020 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera - TOC, F&BI 011267 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
011267 -01	Comp1-A-0-0.5
011267 -02	Comp1-A-0.5-1
011267 -03	Comp1-B-0-0.5
011267 -04	Comp1-B-0.5-1
011267 -05	Comp1-D-0-0.5
011267 -06	Comp1-D-0.5-1
011267 -07	Comp1-C-0-0.5
011267 -08	Comp1-C-0.5-1
011267 -09	Comp-1-0-0.5
011267 -10	Comp-1-0.5-1
011267 -11	Comp2-A-0-0.5
011267 -12	Comp2-A-0.5-1
011267 -13	Comp2-B-0-0.5
011267 -14	Comp2-B-0.5-1
011267 -15	Comp2-C-0-0.5
011267 -16	Comp2-C-0.5-1
011267 -17	Comp2-D-0-0.5
011267 -18	Comp2-D-0.5-1
011267 -19	Comp-2-0-0.5
011267 -20	Comp-2-0.5-1
011267 -21	Comp3-A-0-0.5
011267 -22	Comp3-A-0.5-1
011267 -23	Comp3-B-0-0.5
011267 -24	Comp3-B-0.5-1
011267 -25	Comp3-C-0-0.5
011267 -26	Comp3-C-0.5-1
011267 -27	Comp3-D-0-0.5
011267 -28	Comp3-D-0.5-1
011267 -29	Comp-3-0-0.5
011267 -30	Comp-3-0.5-1
011267 -31	Comp4-A-0-0.5
011267 -32	Comp4-A-0.5-1
011267 -33	Comp4-B-0-0.4
011267 -34	Comp4-C-0-0.5
011267 -35	Comp4-C-0.5-1

CASE NARRATIVE (continued)

011267 -36	Comp4-D-0-0.5
011267 -37	Comp4-D-0.5-1
011267 -38	Comp-4-0-0.5
011267 -39	Comp-4-0.5-1
011267 -40	Comp5-A-0-0.5
011267 -41	Comp5-B-0-0.5
011267 -42	Comp5-B-0.5-1
011267 -43	Comp5-C-0-0.5
011267 -44	Comp5-C-0.5-1
011267 -45	Comp5-D-0-0.5
011267 -46	Comp5-D-0.5-1
011267 -47	Comp-5-0-0.5
011267 -48	Comp-5-0.5-1
011267 -49	Comp6-A-0-0.5
011267 -50	Comp6-A-0.5-1
011267 -51	Comp6-B-0-0.5
011267 -52	Comp6-B-0.5-1
011267 -53	Comp6-C-0-0.5
011267 -54	Comp6-C-0.5-1
011267 -55	Comp6-C-0.5-1-D
011267 -56	Comp6-D-0-0.4
011267 -57	Comp6-D-0-0.4-D
011267 -58	Comp-6-0-0.5
011267 -59	Comp-6-0.5-1
011267 -60	Comp-6-0.5-1-D
011267 -61	Comp7-A-0-0.5
011267 -62	Comp7-A-0.5-1
011267 -63	Comp7-B-0-0.5
011267 -64	Comp7-B-0.5-1
011267 -65	Comp7-C-0-0.5
011267 -66	Comp7-C-0.5-1
011267 -67	Comp7-D-0-0.4
011267 -68	Comp-7-0-0.5
011267 -69	Comp-7-0.5-1
011267 -70	SW1-0.25-0.75
011267 -71	SW2-0.25-0.75
011267 -72	SW3-0.25-0.75
011267 -73	SW4-0.25-0.75
011267 -74	SW5-0.25-0.75
011267 -75	SW6-0.25-0.75

CASE NARRATIVE (continued)

011267 -76	SW7-0.25-0.75
011267 -77	SW8-0.25-0.75
011267 -78	SW9-0.25-0.75
011267 -79	SW10-0.25-0.75
011267 -80	B1-1.0-1.25
011267 -81	B1-2.0-2.25
011267 -82	B2-1.0-1.25
011267 -83	B2-2.0-2.25
011267 -84	B3-1.0-1.25
011267 -85	B3-2.0-2.25
011267 -86	B3-2.0-2.25-D
011267 -87	B4-1.0-1.25
011267 -88	B4-2.0-2.25

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp1-B-0.5-1	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	01/28/21	Lab ID:	011267-04
Date Analyzed:	01/28/21	Data File:	011267-04.053
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	11.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp1-C-0.5-1	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	01/28/21	Lab ID:	011267-08
Date Analyzed:	01/28/21	Data File:	011267-08.054
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	6.41

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp2-A-0.5-1	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	01/28/21	Lab ID:	011267-12
Date Analyzed:	01/28/21	Data File:	011267-12.057
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.54

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp3-A-0.5-1	Client:	Floyd-Snider
Date Received:	11/13/21	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	01/28/21	Lab ID:	011267-22
Date Analyzed:	01/28/21	Data File:	011267-22.060
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.59

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp3-B-0.5-1	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	01/28/21	Lab ID:	011267-24
Date Analyzed:	01/28/21	Data File:	011267-24.061
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.43

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp5-B-0.5-1	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	01/28/21	Lab ID:	011267-42
Date Analyzed:	01/28/21	Data File:	011267-42.062
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	8.68

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp6-D-0-0.4	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	01/28/21	Lab ID:	011267-56
Date Analyzed:	01/28/21	Data File:	011267-56.063
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	1.07

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	01/28/21	Lab ID:	I1-53 mb
Date Analyzed:	01/28/21	Data File:	I1-53 mb.051
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1

Date of Report: 02/02/20
Date Received: 11/13/21
Project: Cantera - TOC, F&BI 011267

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

Laboratory Code: 011267-12 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	<5	93	96	75-125	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	89	80-120

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MKps

SAMPLE CHAIN OF CUSTODY ME 11-13-20

P14

Lynn Grochala ~~011267~~
Report To: Kristin Anderson 011267
Company: Floyd|Snider
Address: 601 Union Street Suite 600
City, State, ZIP: Seattle, WA 98101
Phone: 206-292-2078 Email: Kristin.Anderson@floydsnider.com lynn.grochala@floydsnider

SAMPLERS (*signature*): Coli Gz

PROJECT NAME: CANTERA-TOC
PO #: CANTERA-TOC

REMARKS:

Project specific RLs? - Yes / No

INVOICE TO:

Page # 1 of 9

TURNAROUND TIME
☐ Standard turnaround
☑ RUSH As only 2 day
Rush charges authorized by:

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

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	◆ -24 hr TAT per KA 11/24/20 Notes ME ■ -Std TAT per KA 1/14/21 MS
COMP1-A-0-0.5	01	11/13/20	9:45	Soil	1								✓			X	Hold volume
COMP1-A-0.5-1	02		9:46		1											X	for additional
COMP1-B-0-0.5	03		9:55		1								✓			X	metal analysis
COMP1-B-0.5-1	04		9:56		1								ⓧ			X	⊛ per KA 1/27/21 ME
~~COMP1-C-0-0.5~~	CG												~~✓~~			X	✓-per KA
~~COMP1-C-0.5-1~~																X	11/18
COMP1-D-0-0.5	05		10:05		1								✓			X	
COMP1-D-0.5-1	06		10:06		1								■			X	3-day TAT
COMP1-C-0-0.5	07		10:25		1								✓			X	● -Std TAT
COMP1-C-0.5-1	08		10:26		1								ⓧ			X	per KA 1/12/21

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3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Isaac Lessig	FBI	11/13/20	1721
Relinquished by:				
Received by:		Samples received at 3 °C		

014

011287

SAMPLE CHAIN OF CUSTODY ME 11-13-20

Page # 2 of 9

Report To Se pg 1
Company Floyd|Snider
Address
City, State, ZIP
Phone Email

SAMPLERS (*signature*)	
PROJECT NAME CANTERA - TOC	PO # CANTERA - TOC
REMARKS Project specific RLs? - Yes / No	INVOICE TO

TURNAROUND TIME
☐ Standard turnaround
☒ RUSH As only 2 day
Rush charges authorized by:

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-1-0-0.5	09	11/13/20	10:30	soil	1								X	X			
COMP-1-0.5-1	10		10:31		1											X	
COMP2-A-0-0.5	11		1110		1								✓			X	
COMP2-A-0.5-1	12		1111		1								⊗			X	
COMP2-B-0-0.5	13		1035		1								✓			X	
COMP2-B-0.5-1	14		1036		1								●			X	
COMP2-C-0-0.5	15		1045		1								✓			X	
COMP2-C-0.5-1	16		1046		1								◆			X	
COMP2-D-0-0.5	17		1050		1								✓			X	
COMP2-D-0.5-1	18		1051		1											X	

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SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Isaac Lessig	FBI	11/13/20	17:21
Relinquished by:				
Received by:		Samples received at 2 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

DI4

Page # 3 of 9

Report To See page 1

Company Floyd|Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME CANTERA-TOC

PO # CANTERA-TOC

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME

☐ Standard turnaround

☐ RUSH See page 1

Rush charges authorized by:

SAMPLE DISPOSAL

☒ Archive samples

☐ Other

Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-2-0-0.5	19	11/13/20	1115	Soil	1								X	X			
COMP-2-0.5-1	20		1116		1											X	
COMP3-A-0-0.5	21		1140		1								✓			X	
COMP3-A-0.5-1	22		1141		1								ⓧ			X	
COMP3-B-0-0.5	23		1125		1								✓			X	
COMP3-B-0.5-1	24		1126		1								ⓧ			X	
COMP3-C-0-0.5	25		1130		1								✓			X	
COMP3-C-0.5-1	26		1131		1											X	
COMP3-D-0-0.5	27		1135		1								✓			X	
COMP3-D-0.5-1	28	↓	1136	↓	1											X	

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3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristen Andersen	FS	11/13/20	1724
Received by:	Izaine Lessig	FBI	11/13/20	19:24
Relinquished by:				
Received by:		~~Samples received at~~ 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

BF4

Report To See pg 1

Company Floyd|Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME	PO #
CANTERA-TOC	CANTERA-TOC
REMARKS Project specific RLs? - Yes / No	INVOICE TO

Page # 4 of 9

TURNAROUND TIME

☐ Standard turnaround

☒ RUSH 8 only 2 day

Rush charges authorized by:

SAMPLE DISPOSAL

☒ Archive samples

☐ Other

Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-3-0-0.5	29	11/13/20	1145	soil	1								X	X			
COMP-3-0.5-1	30		1146		1											X	
COMP4-A-0-0.5	31		1230		1								✓			X	
COMP4-A-0.5-1	32		1231		1								[illegible]			X	
COMP4-B-0-0.5	33		1236		1								✓			X	
COMP4-C-0-0.5	34		1240		1								✓			X	
COMP4-C-0.5-1	35		1241		1											X	
COMP4-D-0-0.5	36		1235		1								✓			X	
COMP4-D-0.5-1	37		1236		1											X	
COMP-4-0-0.5	38	↓	1240	↓	1								X	X			

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SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Andersen	FS	11/13/20	1921
Received by:	Isaac Lessig	FBI	11/13/20	19:21
Relinquished by:				
Received by:		Samples received at 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

B14

Page # 6 of 9

Report To See pg 1

Company Floyd|Snider

Address

~~City, State, ZIP~~

Phone Email

SAMPLERS (*signature*)

PROJECT NAME	PO #
CANTERA-TOC	CANTER-TOC

REMARKS	INVOICE TO
Project specific RLs? - Yes / No	

TURNAROUND TIME
☐ Standard turnaround
☑ RUSH As only 3 day
Rush charges authorized by:

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-4-0.5-1	39	11/13/20	1241	soil	1											X	
COMPS-A-0-0.5	40		1300		1								✓			X	
COMPS-B-0-0.5	41		1305		1								✓			X	
COMPS-B-0.5-1	42		1306		1								Ⓧ			X	
COMPS-C-0-0.5	43		1310		1								✓			X	
COMPS-C-0.5-1	44		1311		1											X	
COMPS-D-0-0.5	45		1315		1								✓			X	
COMPS-D-0.5-1	46		1316		1											X	
COMP-5-0-0.5	47		1320		1								X	X			
COMP-5-0.5-1	48	↓	1321	↓	1											X	

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	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Kristin Anderson	FS	11/13/20	17:24
Received by:		Isaac Lessig	FBI	11/13/20	17:24
Relinquished by:					
Received by:			Samples received at 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

B19

Page # 6 of 9

Report To See pg 1
Company Floyd|Snider
Address
City, State, ZIP
Phone Email

SAMPLERS (signature)

PROJECT NAME	PO #
CANTERA-TOC	CANTERA-TOC
REMARKS	INVOICE TO
Project specific RLs? - Yes / No	

TURNAROUND TIME
☐ Standard turnaround
☒ RUSH Weekly 2day
Rush charges authorized by:

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	Tbt		Archive	Notes
COMP6-A-0-0.5	49		1330		1											X	
COMP6-A-0.5-1	50		1331		1											X	
COMP6-B-0-0.5	51		1340		1											X	
COMP6-B-0.5-1	52		1341		1											X	
COMP6-C-0-0.5	53		1345		1											X	
COMP6-C-0.5-1	54		1346		1											X	
COMP6-C-0.5-1-D	55		1348		1											X	
COMP6-D-0-0.4	56		1350		1								ⓧ			X	
COMP6-D-0-0.4-D	57		1352		1											X	
COMP-6-0-0.5	58		1355										X	X			

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Seattle, WA 98119-2029
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	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Kristin Anderson	FS	11/13/20	1721
Received by:		Isaac Lessig	FBI	11/13/20	1721
Relinquished by:					
Received by:			Samples received at 3 °C		

911267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

BI4

Report To See page 1

Company Floyd|Snider

Address

~~City, State, ZIP~~

Phone Email

SAMPLERS (*signature*)

PROJECT NAME	PO #
CANTERA-TOC	CANTERA-TOC

REMARKS	INVOICE TO
Project specific RLs? - Yes / No	

Page # 7 of 9

TURNAROUND TIME

☐ Standard turnaround

☑ RUSH As early 2day

Rush charges authorized by:

SAMPLE DISPOSAL

☑ Archive samples

☐ Other

Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-6-0.5-1	59	11/13/20	1357	Soil	1											X	
COMP-6-0.5-1-D	60		1358		1											X	
COMP7-A-0-0.5	66		1405		1								✓			X	
COMP7-A-0.5-1	62		1406		1								◆			X	
COMP7-B-0-0.5	63		1410		1								✓			X	
COMP7-B-0.5-1	64		1411		1								◆			X	
COMP7-C-0-0.5	65		1415		1								✓			X	
COMP7-C-0.5-1	66		1416		1								●			X	
COMP7-D-0-0.4	67		1420		1								✓			X	
COMP-7-0-0.5	68	↓	1425	↓	1								X	X			

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Isaac Lessig	FBI	11/13/20	1721
Relinquished by:				
Received by:		Samples received at 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

014

Report To See pg 1

Company Floyd|Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME CANTERA-TOC

PO # CANTERA-TOC

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

Page # 8 of 9

TURNAROUND TIME

☐ Standard turnaround

☒ RUSH As only 2 day

Rush charges authorized by:

SAMPLE DISPOSAL

☒ Archive samples

☐ Other

Default: Dispose after 30 days

						ANALYSES REQUESTED												
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	Cu Cd Pb Ag, Zn	1631 Hg	Archive	TCLP As Pb	Notes
COMP-7-0.5-1	69	11/13/20	1426	Soil	1											X		
SW1-0.25-0.75	70		1430		1								X	✓	✓			
SW2-0.25-0.75	71		1432		1								X					
SW3-0.25-0.75	72		1448		1								X					
SW4-0.25-0.75	73		1450		1								X	✓	✓		[redacted]	
SW5-0.25-0.75	74		1458		1								X					
SW6-0.25-0.75	75		1500		1								X					
SW7-0.25-0.75	76		1502		1								X					
SW8-0.25-0.75	77		1504		1								X					
SW9-0.25-0.75	78		1515		1								X					

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kirsten Anderson	FS	11/13/20	1921
Received by:	Isaac Lesser	FBI	11/13/20	17:21
Relinquished by:				
Received by:		~~Samples received at~~ 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

014

Report To Kristin Anderson
Company Floyd|Snider
Address 601 Union Street Suite 600
City, State, ZIP Seattle, WA 98101
Phone 206-292-298 Email Kristin.Anderson@floydsnider.com

SAMPLERS (*signature*)

PROJECT NAME CANTERA-TOC

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

Page # 9 of 9

TURNAROUND TIME
○ Standard turnaround
☑ RUSH As only 2 day
Rush charges authorized by:

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	Cu, Cd, Pb, Ag, Zn	1631 Hg	Archive	Notes
SW10-0.25-0.75	79	11/13/20	1517	soil	1								X	✓	✓		
B1-1.0-1.25	80		1535		1								X	✓	✓		
B1-2.0-2.25	81		1536		1											X	
B2-~~1~~1.0-1.25	82		1545		1								X				
B2-2.0-2.25	83		1547		1											X	
B3-1.0-1.25	84		1550		1								X				
B3-2.0-2.25	85		1552		1											X	
B3-2.0-2.25-D	86		1554		1											X	
B4-1.0-1.25	87		1610		1								X				
B4-2.0-2.25	88		1612		1								✓			X	

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Isaac Lessig	FBI	11/13/20	1721
Relinquished by:				
Received by:		~~Samples received at~~		3 °C

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

March 16, 2021

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the additional results from the testing of material submitted on November 13, 2020 from the Cantera - TOC, F&BI 011267 project. There are 7 pages included in this report.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kristin Anderson
FDS0316R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on November 13, 2020 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera - TOC, F&BI 011267 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
011267 -01	Comp1-A-0-0.5
011267 -02	Comp1-A-0.5-1
011267 -03	Comp1-B-0-0.5
011267 -04	Comp1-B-0.5-1
011267 -05	Comp1-D-0-0.5
011267 -06	Comp1-D-0.5-1
011267 -07	Comp1-C-0-0.5
011267 -08	Comp1-C-0.5-1
011267 -09	Comp-1-0-0.5
011267 -10	Comp-1-0.5-1
011267 -11	Comp2-A-0-0.5
011267 -12	Comp2-A-0.5-1
011267 -13	Comp2-B-0-0.5
011267 -14	Comp2-B-0.5-1
011267 -15	Comp2-C-0-0.5
011267 -16	Comp2-C-0.5-1
011267 -17	Comp2-D-0-0.5
011267 -18	Comp2-D-0.5-1
011267 -19	Comp-2-0-0.5
011267 -20	Comp-2-0.5-1
011267 -21	Comp3-A-0-0.5
011267 -22	Comp3-A-0.5-1
011267 -23	Comp3-B-0-0.5
011267 -24	Comp3-B-0.5-1
011267 -25	Comp3-C-0-0.5
011267 -26	Comp3-C-0.5-1
011267 -27	Comp3-D-0-0.5
011267 -28	Comp3-D-0.5-1
011267 -29	Comp-3-0-0.5
011267 -30	Comp-3-0.5-1
011267 -31	Comp4-A-0-0.5
011267 -32	Comp4-A-0.5-1
011267 -33	Comp4-B-0-0.4
011267 -34	Comp4-C-0-0.5
011267 -35	Comp4-C-0.5-1

CASE NARRATIVE (Continued)

Laboratory ID	Floyd-Snider
011267 -36	Comp4-D-0-0.5
011267 -37	Comp4-D-0.5-1
011267 -38	Comp-4-0-0.5
011267 -39	Comp-4-0.5-1
011267 -40	Comp5-A-0-0.5
011267 -41	Comp5-B-0-0.5
011267 -42	Comp5-B-0.5-1
011267 -43	Comp5-C-0-0.5
011267 -44	Comp5-C-0.5-1
011267 -45	Comp5-D-0-0.5
011267 -46	Comp5-D-0.5-1
011267 -47	Comp-5-0-0.5
011267 -48	Comp-5-0.5-1
011267 -49	Comp6-A-0-0.5
011267 -50	Comp6-A-0.5-1
011267 -51	Comp6-B-0-0.5
011267 -52	Comp6-B-0.5-1
011267 -53	Comp6-C-0-0.5
011267 -54	Comp6-C-0.5-1
011267 -55	Comp6-C-0.5-1-D
011267 -56	Comp6-D-0-0.4
011267 -57	Comp6-D-0-0.4-D
011267 -58	Comp-6-0-0.5
011267 -59	Comp-6-0.5-1
011267 -60	Comp-6-0.5-1-D
011267 -61	Comp7-A-0-0.5
011267 -62	Comp7-A-0.5-1
011267 -63	Comp7-B-0-0.5
011267 -64	Comp7-B-0.5-1
011267 -65	Comp7-C-0-0.5
011267 -66	Comp7-C-0.5-1
011267 -67	Comp7-D-0-0.4
011267 -68	Comp-7-0-0.5
011267 -69	Comp-7-0.5-1
011267 -70	SW1-0.25-0.75

CASE NARRATIVE (Continued)

Laboratory ID	Floyd-Snider
011267 -71	SW2-0.25-0.75
011267 -72	SW3-0.25-0.75
011267 -73	SW4-0.25-0.75
011267 -74	SW5-0.25-0.75
011267 -75	SW6-0.25-0.75
011267 -76	SW7-0.25-0.75
011267 -77	SW8-0.25-0.75
011267 -78	SW9-0.25-0.75
011267 -79	SW10-0.25-0.75
011267 -80	B1-1.0-1.25
011267 -81	B1-2.0-2.25
011267 -82	B2-1.0-1.25
011267 -83	B2-2.0-2.25
011267 -84	B3-1.0-1.25
011267 -85	B3-2.0-2.25
011267 -86	B3-2.0-2.25-D
011267 -87	B4-1.0-1.25
011267 -88	B4-2.0-2.25

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020B

Client ID:	Comp6-A-0-0.5	Client:	Floyd-Snider
Date Received:	11/13/20	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	03/12/21	Lab ID:	011267-49
Date Analyzed:	03/12/21	Data File:	011267-49.058
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	5.77

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera - TOC, F&BI 011267
Date Extracted:	03/12/21	Lab ID:	I1-162 mb
Date Analyzed:	03/12/21	Data File:	I1-162 mb.035
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1

Date of Report: 03/16/21
Date Received: 11/13/20
Project: Cantera - TOC, F&BI 011267

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

Laboratory Code: 103188-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	7.49	116 b	127 b	75-125	9 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	96	80-120

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

P14

SAMPLE CHAIN OF CUSTODY ME 11-13-20

Report To ~~Kristin Anderson~~ Lynn Grochala MK/HS ~~001267~~ 011267

Company Floyd|Snider

Address 601 Union Street Suite 600

City, State, ZIP Seattle, WA 98101

Phone 206-292-2078 Email ~~Kristin.Anderson@floydsnider.com~~ lynn.grochala@floydsnider.com

SAMPLERS (signature) Colin Jgy

PROJECT NAME	PO #
CANTERA-TOC	CANTERA-TOC

REMARKS	INVOICE TO
Project specific RLs? - Yes / No	

Page # 1 of 9

TURNAROUND TIME
☐ Standard turnaround
☑ RUSH As only 2 day
Rush charges authorized by:

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	◆ - 24 hr TAT per KA 1/24/21 ML Notes ■ - Std TAT per KA 1/11/21 ME
COMP1-A-0-0.5	01	11/13/20	9:45	Soil	1								✓			X	Hold volume
COMP1-A-0.5-1	02		9:46		1											X	for additional
COMP1-B-0-0.5	03		9:55		1								✓			X	metal analysis
COMP1-B-0.5-1	04		9:56		1								⊗			X	⊛ per KA 1/27/21 mc
~~COMP1-C-0-0.5~~ e	CG												~~✓~~			X	✓- per KA
~~COMP1-C-0.5-1~~ e																X	11/18
COMP1-D-0-0.5	05		10:05		1								✓			X	
COMP1-D-0.5-1	06		10:06		1								■			X	3-day TAT
COMP1-C-0-0.5	07		10:25		1								✓			X	● - Std TAT
COMP1-C-0.5-1	08	↓	10:26	↓	1								⊗			X	per KA 1/12/21

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Isaac Lessig	FBI	11/13/20	1721
Relinquished by:				
Received by:		Samples received at 3 °C		

VT4

SAMPLE CHAIN OF CUSTODY ME 11-13-20

011267

Report To See pg 1

Company Floyd|Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME CANTERA-TOC

PO # CANTERA-TOC

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

Page # 2 of 9

TURNAROUND TIME
☐ Standard turnaround
☒ RUSH As only 3 day
Rush charges authorized by:

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-1-0-0.5	09	11/13/20	10:30	soil	1								X	X			
COMP-1-0.5-1	10		10:31		1											X	
COMP2-A-0-0.5	11		1110		1								✓			X	
COMP2-A-0.5-1	12		1111		1								ⓧ			X	
COMP2-B-0-0.5	13		1035		1								✓			X	
COMP2-B-0.5-1	14		1036		1								●			X	
COMP2-C-0-0.5	15		1045		1								✓			X	
COMP2-C-0.5-1	16		1046		1								◆			X	
COMP2-D-0-0.5	17		1050		1								✓			X	
COMP2-D-0.5-1	18		1051		1											X	

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Isaac Lessig	FBI	11/13/20	1721
Relinquished by:				
Received by:		Samples received at 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

DI4

Report To See page 1

Company Floyd | Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*) Ali Jzz

PROJECT NAME CANTERA-TOC

PO # CANTERA-TOC

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

Page # 3 of 9

TURNAROUND TIME

○ Standard turnaround

☐ RUSH See page 1

Rush charges authorized by:

SAMPLE DISPOSAL

☒ Archive samples

☐ Other

Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-2-0-0.5	19	11/13/20	1115	Soil	1								X	X			
COMP-2-0.5-1	20		1116		1											X	
COMP3-A-0-0.5	21		1140		1								✓			X	
COMP3-A-0.5-1	22		1141		1								ⓧ			X	
COMP3-B-0-0.5	23		1125		1								✓			X	
COMP3-B-0.5-1	24		1126		1								ⓧ			X	
COMP3-C-0-0.5	25		1130		1								✓			X	
COMP3-C-0.5-1	26		1131		1											X	
COMP3-D-0-0.5	27		1135		1								✓			X	
COMP3-D-0.5-1	28	↓	1136	↓	1											X	

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Izaiac Lessig	FBI	11/13/20	17:21
Relinquished by:				
Received by:		Samples received at 2 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

BF4

Report To See pg 1

Company Floyd|Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (signature)

PROJECT NAME CANTERA-TOC

PO # CANTERA-TOC

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

Page # 4 of 9

TURNAROUND TIME
☐ Standard turnaround
☒ RUSH 2 day only 2 day
Rush charges authorized by:

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-3-0-0.5	29	11/13/20	1145	soil	1								X	X			
COMP-3-0.5-1	30		1146		1											X	
COMP4-A-0-0.5	31		1230		1								✓			X	
COMP4-A-0.5-1	32		1231		1								■			X	
COMP4-B-0-0.5	33		1236		1								✓			X	
COMP4-C-0-0.5	34		1240		1								✓			X	
COMP4-C-0.5-1	35		1241		1											X	
COMP4-D-0-0.5	36		1235		1								✓			X	
COMP4-D-0.5-1	37		1236		1											X	
COMP-4-0-0.5	38		1240		1								X	X			

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1924
Received by:	Jenna Lessing	FBI	11/13/20	19:21
Relinquished by:				
Received by:		Samples received at 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

BI4

Report To See pg 1

Company Floyd | Snider

Address

~~City, State, ZIP~~

Phone Email

SAMPLERS (signature)

PROJECT NAME CANTERA-TOC

PO # CANTERA-TOC

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

Page # 6 of 9

TURNAROUND TIME

☐ Standard turnaround

☑ RUSH As only 3 day

Rush charges authorized by:

SAMPLE DISPOSAL

☑ Archive samples

☐ Other

Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-4-0.5-1	39	11/13/20	1241	soil	1											X	
COMPS-A-0-0.5	40		1300		1								✓			X	
COMPS-B-0-0.5	41		1305		1								✓			X	
COMPS-B-0.5-1	42		1306		1								ⓧ			X	
COMPS-C-0-0.5	43		1310		1								✓			X	
COMPS-C-0.5-1	44		1311		1											X	
COMPS-D-0-0.5	45		1315		1								✓			X	
COMPS-D-0.5-1	46		1316		1											X	
COMP-5-0-0.5	47		1320		1								X	X			
COMP-5-0.5-1	48	↓	1321	↓	1											X	

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Kristin Adison	FS	11/13/20	17:21
Received by:		Isaac Lessing	FBI	11/13/20	17:21
Relinquished by:					
Received by:			Samples received at 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

BI4

Page # 10 of 9

Report To See pg 1

Company Floyd|Snider

Address

City, State, ZIP

Phone Email

SAMPLERS (signature)

PROJECT NAME CANTERA-TOC

PO# CANTERA-TOC

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

TURNAROUND TIME

☐ Standard turnaround

☑ RUSH Mostly 2day

Rush charges authorized by:

SAMPLE DISPOSAL

☑ Archive samples

☐ Other

Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP6-A-0-0.5	49		1330		1								■			X	■ -per KA
COMP6-A-0.5-1	50		1331		1											X	3/11/21 ME
COMP6-B-0-0.5	51		1340		1											X	
COMP6-B-0.5-1	52		1341		1											X	
COMP6-C-0-0.5	53		1345		1											X	
COMP6-C-0.5-1	54		1346		1											X	
COMP6-C-0.5-1-D	55		1348		1											X	
COMP6-D-0-0.4	56		1350		1								Ⓧ			X	
COMP6-D-0-0.4-D	57		1352		1											X	
COMP-6-0-0.5	58		1355										X	X			

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Isaac Lessig	FBI	11/13/20	1721
Relinquished by:				
Received by:		Samples received at 2 °C		

012267

SAMPLE CHAIN OF CUSTODY ~~ME~~ 11-13-20

Page # 7 of 9

Report To See page 1

Company Floyd|Snider

Address

~~City, State, ZIP~~

Phone Email

SAMPLERS (signature)

PROJECT NAME: CANTERA-TOC

PO #: CANTERA-TOC

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

TURNAROUND TIME
☐ Standard turnaround
☑ RUSH As only 2day
Rush charges authorized by:

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	TBT		Archive	Notes
COMP-6-0.5-1	59	11/13/20	1357	Soil	1											X	
COMP-6-0.5-1-D	60		1358		1											X	
COMP7-A-0-0.5	61		1405		1								✓			X	
COMP7-A-0.5-1	62		1406		1								◆			X	
COMP7-B-0-0.5	63		1410		1								✓			X	
COMP7-B-0.5-1	64		1411		1								◆			X	
COMP7-C-0-0.5	65		1415		1								✓			X	
COMP7-C-0.5-1	66		1416		1								●			X	
COMP7-D-0-0.4	67		1420		1								✓			X	
COMP-7-0-0.5	68	↓	1425	↓	1								X	X			

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Isaac Lessig	FBI	11/13/20	1721
Relinquished by:				
Received by:		Samples received at 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

014

Report To See pg 1
Company Floyd|Snider
Address
City, State, ZIP
Phone Email

SAMPLERS (*signature*)	
PROJECT NAME CANTERA-TOC	PO # CANTERA-TOC
REMARKS Project specific RLs? - Yes / No	INVOICE TO

Page # 8 of 9

TURNAROUND TIME
☐ Standard turnaround
☒ RUSH As only 2 day
Rush charges authorized by:

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

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	Cu, Cd, Pb, Ag, Zn	1631 Hg	Archive	TCLP As Pb	Notes
COMP-7-0.5-1	69	11/13/20	1426	Soil	1											X		
SW1-0.25-0.75	70		1430		1								X	✓	✓			
SW2-0.25-0.75	71		1432		1								X					
SW3-0.25-0.75	72		1448		1								X					
SW4-0.25-0.75	73		1450		1								X	✓	✓			
SW5-0.25-0.75	74		1458		1								X					
SW6-0.25-0.75	75		1500		1								X					
SW7-0.25-0.75	76		1502		1								X					
SW8-0.25-0.75	77		1504		1								X					
SW9-0.25-0.75	78		1515		1								X					

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kirstin Anderson	FS	11/13/20	1921
Received by:	Isaac Leroc	FBI	11/13/20	17:21
Relinquished by:				
Received by:		Samples received at 3 °C		

011267

SAMPLE CHAIN OF CUSTODY ME 11-13-20

014

Report To Kristin Anderson
Company Floyd|Snider
Address 601 Union Street Suite 600
City, State, ZIP Seattle, WA 98101
Phone 206-292-29 Email Kristin.Anderson@floydsnider.com

SAMPLERS (signature)

PROJECT NAME CANTERA-TDC

PO #

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

Page # 9 of 9

TURNAROUND TIME
☐ Standard turnaround
☑ RUSH As only 2 day
Rush charges authorized by:

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic	Cu,Cd,Pb,Ag,Zn	1631 Hg	Archive	Notes
SW10-0.25-0.75	79	11/13/20	1517	soil	1								X	✓	✓		
B1-1.0-1.25	80		1535		1								X	✓	✓		
B1-2.0-2.25	81		1536		1											X	
B2-1.0-1.25	82		1545		1								X				
B2-2.0-2.25	83		1547		1											X	
B3-1.0-1.25	84		1550		1								X				
B3-2.0-2.25	85		1552		1											X	
B3-2.0-2.25-D	86		1554		1											X	
B4-1.0-1.25	87		1610		1								X				
B4-2.0-2.25	88		1612		1								✓			X	

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	FS	11/13/20	1721
Received by:	Isaac Lessig	FBI	11/13/20	1721
Relinquished by:				
Received by:		Samples received at	3 °C	

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

December 4, 2020

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on November 30, 2020 from the Cantera-TOC, F&BI 011484 project. There are 9 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kristin Anderson
FDS1204R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on November 30, 2020 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera-TOC, F&BI 011484 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
011484 -01	COMP-1-E-0-0.5
011484 -02	COMP-2-E-0-0.5
011484 -03	COMP-7-E-0-0.5
011484 -04	COMP-7-G-0-0.5
011484 -05	COMP-7-F-0-0.5
011484 -06	COMP-7-B-1-2

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	COMP-1-E-0-0.5	Client:	Floyd-Snider
Date Received:	11/30/20	Project:	Cantera-TOC, F&BI 011484
Date Extracted:	12/01/20	Lab ID:	011484-01
Date Analyzed:	12/01/20	Data File:	011484-01.127
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	24.1

Analysis For Total Metals By EPA Method 6020B

Client ID:	COMP-2-E-0-0.5	Client:	Floyd-Snider
Date Received:	11/30/20	Project:	Cantera-TOC, F&BI 011484
Date Extracted:	12/01/20	Lab ID:	011484-02
Date Analyzed:	12/01/20	Data File:	011484-02.128
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	9.51

Analysis For Total Metals By EPA Method 6020B

Client ID:	COMP-7-E-0-0.5	Client:	Floyd-Snider
Date Received:	11/30/20	Project:	Cantera-TOC, F&BI 011484
Date Extracted:	12/01/20	Lab ID:	011484-03 x5
Date Analyzed:	12/02/20	Data File:	011484-03 x5.045
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	169

Analysis For Total Metals By EPA Method 6020B

Client ID:	COMP-7-G-0-0.5	Client:	Floyd-Snider
Date Received:	11/30/20	Project:	Cantera-TOC, F&BI 011484
Date Extracted:	12/01/20	Lab ID:	011484-04 x5
Date Analyzed:	12/03/20	Data File:	011484-04 x5.035
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	227

Analysis For Total Metals By EPA Method 6020B

Client ID:	COMP-7-B-1-2	Client:	Floyd-Snider
Date Received:	11/30/20	Project:	Cantera-TOC, F&BI 011484
Date Extracted:	12/01/20	Lab ID:	011484-06 x5
Date Analyzed:	12/03/20	Data File:	011484-06 x5.036
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	8.14

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 011484
Date Extracted:	12/01/20	Lab ID:	I0-742 mb
Date Analyzed:	12/01/20	Data File:	I0-742 mb.097
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1

Date of Report: 12/04/20
Date Received: 11/30/20
Project: Cantera-TOC, F&BI 011484

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

Laboratory Code: 011439-03 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	<5	93	90	75-125	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	99	80-120

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

011484

Chain of Custody Record & Laboratory Analysis Request

ME 11-30-20

BI3

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

ARI Assigned Number:

Turn-around Requested: 72-hr

Page: 1 of 1

ARI Client Company: Floyd Snider

Phone:

Date: 11/30/20

Ice Present?

Client Contact: Lynn Grochala

No. of Coolers:

Cooler Temps:

Client Project Name: Cantwe - TOC

Client Project #: " "

Samplers: L Waehter, K Anderson

Sample ID	Date	Time	Matrix	No. Containers	AS	HOLD							Lab ID	Notes/Comments
COMP-1-E-0-0.5	11/30/20	1130	Soil	1	X								01	
COMP-2-E-0-0.5		1135		1	X								02	
COMP-7-E-0-0.5		1155		1	X								03	
COMP-7-G-0-0.5		1215		1	X								04	
COMP-7-F-0-0.5		1200		1		X							05	
COMP-7-B-1-2		1225		1	X								06	

Comments/Special Instructions

Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature) Layni Waehter	(Signature)	(Signature)	(Signature)
Printed Name: Layni Waenter	Printed Name: Nhan Pham	Printed Name	Printed Name:
Company: Floyd|Snider	Company: FcBI	Company	Company:
Date & Time: 11/30/20 13:01	Date & Time: 11-30-20 1301	Date & Time	Date & Time:

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

Samples received at 4 °C

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

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

December 8, 2020

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the additional results from the testing of material submitted on November 30, 2020 from the Cantera-TOC, F&BI 011484 project. There are 5 pages included in this report.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kristin Anderson
FDS1208R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on November 30, 2020 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera-TOC, F&BI 011484 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
011484 -01	COMP-1-E-0-0.5
011484 -02	COMP-2-E-0-0.5
011484 -03	COMP-7-E-0-0.5
011484 -04	COMP-7-G-0-0.5
011484 -05	COMP-7-F-0-0.5
011484 -06	COMP-7-B-1-2

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020B

Client ID:	COMP-7-F-0-0.5	Client:	Floyd-Snider
Date Received:	11/30/20	Project:	Cantera-TOC, F&BI 011484
Date Extracted:	12/04/20	Lab ID:	011484-05
Date Analyzed:	12/04/20	Data File:	011484-05.121
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	38.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 011484
Date Extracted:	12/04/20	Lab ID:	I0-752 mb
Date Analyzed:	12/04/20	Data File:	I0-752 mb.107
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1

Date of Report: 12/08/20
Date Received: 11/30/20
Project: Cantera-TOC, F&BI 011484

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

Laboratory Code: 012053-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	1.01	93	92	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	94	80-120

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

011484.

ME 11-30-20

BI3

Chain of Custody Record & Laboratory Analysis Request

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

ARI Assigned Number:

Turn-around Requested: 72-hr

Page: 1 of 1 [redacted]

ARI Client Company: Floyd Snider

Phone:

Date: 11/30/20

Ice Present?

Client Contact: Lynn Grochala

No. of Coolers:

Cooler Temps:

Client Project Name: Canfor – TOC

Client Project #: " "

Samplers: L Waehter, K Anderson

Sample ID	Date	Time	Matrix	No. Containers	AS	HOLD						Lab ID	Notes/Comments
COMP-1-E-0-0.5	11/30/20	1130	soil	1	X							01	
COMP-2-E-0-0.5	↓	1135	↓	1	X							02	
COMP-7-E-0-0.5		1155		1	X							03	
COMP-7-6-0-0.5		1215		1	X							04	
COMP-7-F-0-0.5		1200		1	ⓧ	~~X~~						05	ⓧ Run per KA on 24hr TAT - EWB 12/4
COMP-7-B-1-2		1225		1	X							06	

Comments/Special Instructions

Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature) Layni Waehter	(Signature)	(Signature)	(Signature)
Printed Name: Layni Waenter	Printed Name: Nhan Pham	Printed Name:	Printed Name:
Company: Floyd Snider	Company: Fe BI	Company:	Company:
Date & Time: 11/30/20 13:01	Date & Time: 11-30-20 1301	Date & Time:	Date & Time:

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

Samples received at 4 °C

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

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

December 14, 2020

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on December 10, 2020 from the Cantera-TOC, F&BI 012173 project. There are 8 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kristin Anderson
FDS1214R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 10, 2020 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera-TOC, F&BI 012173 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
012173 -01	COMP-7-H-0-0.1
012173 -02	COMP-7-I-0-0.5
012173 -03	COMP-7-I-0.5-1
012173 -04	COMP-7-J-0-0.5

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020B

Client ID:	COMP-7-H-0-0.1	Client:	Floyd-Snider
Date Received:	12/10/20	Project:	Cantera-TOC, F&BI 012173
Date Extracted:	12/11/20	Lab ID:	012173-01
Date Analyzed:	12/11/20	Data File:	012173-01.036
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	90.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	COMP-7-I-0-0.5	Client:	Floyd-Snider
Date Received:	12/10/20	Project:	Cantera-TOC, F&BI 012173
Date Extracted:	12/11/20	Lab ID:	012173-02
Date Analyzed:	12/11/20	Data File:	012173-02.037
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	11.9

Analysis For Total Metals By EPA Method 6020B

Client ID:	COMP-7-I-0.5-1	Client:	Floyd-Snider
Date Received:	12/10/20	Project:	Cantera-TOC, F&BI 012173
Date Extracted:	12/11/20	Lab ID:	012173-03
Date Analyzed:	12/11/20	Data File:	012173-03.038
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	10.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	COMP-7-J-0-0.5	Client:	Floyd-Snider
Date Received:	12/10/20	Project:	Cantera-TOC, F&BI 012173
Date Extracted:	12/11/20	Lab ID:	012173-04
Date Analyzed:	12/11/20	Data File:	012173-04.039
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	32.1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 012173
Date Extracted:	12/11/20	Lab ID:	I0-766 mb2
Date Analyzed:	12/11/20	Data File:	I0-766 mb2.035
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1

Date of Report: 12/14/20
Date Received: 12/10/20
Project: Cantera-TOC, F&BI 012173

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

Laboratory Code: 012066-01 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	6.18	106	92	75-125	14

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	88	80-120

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

012173
[redacted]

SAMPLE CHAIN OF CUSTODY

ME 12/10/20
[redacted]

Page # 1 of 1 AB1, BT1

Report To Lynn Grachala
Company Floyd|Snider
Address 601 S Union St 8
City, State, ZIP Seattle, WA 98101
Phone 206-292-2078 Email lynn.grachala@floydsnider.com

SAMPLERS (*signature*) Layni Wiuenter & Tyler Scott

PROJECT NAME Cantara-TOC

PO #

REMARKS Project Standard

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
☐ Standard turnaround
☒ RUSH 24 hr TAT
Rush charges authorized by:

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	As					Notes
[illegible]																		
[illegible]																		
COMP-7-H-0-0.1	01	12/10/20	12:26	Soil	1								X					
COMP-7-I-0-0.5	02	↓	12:30	↓	↓								X					
COMP-7-I-0.5-1	03	↓	12:45	↓	↓								X					
COMP-7-J-0-0.5	04	↓	12:50	↓	↓								X					

Samples received at 5 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Tyler Scott	Tyler Scott	Floyd/Snider	12.10.20	13:42
Received by:	Nhan Phan	FeBT	12/10/20	1342
Relinquished by:				
Received by:				

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

March 1, 2021

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on February 22, 2021 from the Cantera-TOC, F&BI 102333 project. There are 24 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0301R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on February 22, 2020 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera-TOC, F&BI 102333 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
102333 -01	CAA7-S22-0-0.5
102333 -02	CAA7-S12-0-0.5
102333 -03	CAA7-S12-0.5-1
102333 -04	CAA7-S13-0-0.5
102333 -05	CAA7-S13-0.5-1
102333 -06	CAA7-S14-0-0.5
102333 -07	CAA7-S14-0.5-1
102333 -08	CAA7-S15-1-1.5
102333 -09	CAA7-S16-1-1.5
102333 -10	CAA7-S17-1-1.5
102333 -11	CAA7-S18-0-0.5
102333 -12	CAA7-S19-0-0.5
102333 -13	CAA7-S20-0-0.5
102333 -14	CAA7-S21-0-0.5
102333 -15	CAA7-B5-1-1.5
102333 -16	CAA7-B6-1-1.5
102333 -17	CAA7-B7-1-1.5
102333 -18	CAA7-B8-1-1.5
102333 -19	CAA7-S11-0-0.5
102333 -20	CAA7-S11-0.5-1

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S22-0-0.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-01
Date Analyzed:	02/25/21	Data File:	102333-01.172
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	36.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S12-0-0.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-02
Date Analyzed:	02/25/21	Data File:	102333-02.175
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.99

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S12-0.5-1	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-03
Date Analyzed:	02/25/21	Data File:	102333-03.176
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.01

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S13-0-0.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-04
Date Analyzed:	02/25/21	Data File:	102333-04.187
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.24

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S13-0.5-1	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-05
Date Analyzed:	02/25/21	Data File:	102333-05.188
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.04

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S14-0-0.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-06
Date Analyzed:	02/25/21	Data File:	102333-06.198
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	28.0

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S14-0.5-1	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-07
Date Analyzed:	02/25/21	Data File:	102333-07.199
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	6.02

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S15-1-1.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-08
Date Analyzed:	02/25/21	Data File:	102333-08.200
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	7.82

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S16-1-1.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-09
Date Analyzed:	02/25/21	Data File:	102333-09.201
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	30.2

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S17-1-1.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-10
Date Analyzed:	02/25/21	Data File:	102333-10.210
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	18.4

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S18-0-0.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-11
Date Analyzed:	02/25/21	Data File:	102333-11.211
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	5.40

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S19-0-0.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-12
Date Analyzed:	02/25/21	Data File:	102333-12.212
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	18.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S20-0-0.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-13
Date Analyzed:	02/25/21	Data File:	102333-13.213
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	5.01

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S21-0-0.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-14
Date Analyzed:	02/25/21	Data File:	102333-14.214
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.42

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-B5-1-1.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-15
Date Analyzed:	02/26/21	Data File:	102333-15.221
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	9.24

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-B6-1-1.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-16
Date Analyzed:	02/26/21	Data File:	102333-16.222
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	7.90

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-B7-1-1.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-17
Date Analyzed:	02/26/21	Data File:	102333-17.223
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	5.83

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-B8-1-1.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-18
Date Analyzed:	02/26/21	Data File:	102333-18.224
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.85

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S11-0-0.5	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-19
Date Analyzed:	02/26/21	Data File:	102333-19.225
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.63

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-S11-0.5-1	Client:	Floyd-Snider
Date Received:	02/22/21	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	102333-20
Date Analyzed:	02/26/21	Data File:	102333-20.226
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.93

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 102333
Date Extracted:	02/23/21	Lab ID:	I1-133 mb
Date Analyzed:	02/23/21	Data File:	I1-133 mb.077
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1

Date of Report: 03/01/21
Date Received: 02/22/21
Project: Cantera-TOC, F&BI 102333

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

Laboratory Code: 102333-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	32.1	0 b	112 b	75-125	200 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	107	80-120

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

102333

SAMPLE CHAIN OF CUSTODY

ME 02/22/21

BI4

Page # 1 of 3

Report To Lynn Grochala

Company Floyd|Snider

Address 601 S Union St

City, State, ZIP Edmond WA 98026

Phone ~~253 29[illegible] [illegible]~~ 206-292-2078 Email

SAMPLERS (*signature*) L. Wachter + T. Scott

PROJECT NAME Cantera-Toc

PO #

REMARKS Use previous

Project specific RLs? - Yes / No

INVOICE TO

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

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
[✓ Default] Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Tot Arsenic				Notes
CAA7-S11-0-0.5	01	2/22	10:00	Soil	1								X				
~~CAA7-S11-0.5-1~~			~~10:05~~														
CAA7-S12-0-0.5	02		10:15										X				
CAA7-S12-0.5-1	03		10:20										X				
CAA7-S13-0-0.5	04		10:25										X				
CAA7-S13-0.5-1	05		10:35										X				
~~CAA7-S14-0.0-1~~			~~10:50~~														
CAA7-S14-0-0.5	06		10:50										X				
CAA7-S14-0.5-1	07		10:55										X				
CAA7-S15-1-1.5	08	↓	11:35	↓	↓								X				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Tyler Scott	Tyler Scott	FS	2/22/21	16:04
Received by: Hong	HONG NGUYEN	FBI	✓	✓
Relinquished by:				
Received by:		Samples received at 4 °C		

102333

SAMPLE CHAIN OF CUSTODY

ME 02/22/21

BIY

Page # 2 of 3

Report To

Company FIS

Address 601 union St

City, State, ZIP Seattle WA 98001

Phone 206-292-2078 Email

SAMPLERS (*signature*) L.wachter + T. Scott

PROJECT NAME Cantera -TOC

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Tot Arsenic				Notes
CAA7-S16-1-1.5	09	2/22	12:20	Soil	1								X				
CAA7 -S17-1-1.5	10	↓	12:30	↓	↓								X				
CAA7 -S18-0-0.5	11	↓	12:45	↓	↓								X				
CAA7-S19 -0-0.5	12	↓	12:55	↓	↓								X				
CAA7-S20-0-0.5	13	↓	13:10	↓	↓								X				
CAA7-S21-0-6.5	14	↓	13:15	↓	↓								X				
CAA7-B5-1-1.5	15	↓	13:30	↓	↓								X				
CAA7-B6-1-1.5	16	↓	13:35	↓	↓								X				
CAA7-B7-1-1.5	17	↓	14:00	↓	↓								X				
CAA7-B8-1-1.5	18	↓	14:30	↓	↓								X				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Tyler Scott	Tyler Scott	FS	2.22.21	16:04
Received by: Hong	HONG NGUYEN	FBI	✓	✓
Relinquished by:				
Received by:		Samples received at 4 °C		

102333

SAMPLE CHAIN OF CUSTODY ME 02/22/21

BI4

Page # 3 of 3

Report To

Company

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*) LW+TS

PROJECT NAME Cantera-TOC

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic				Notes
CAA7-S11-0-0.5	19	2/22	1515	Soil	1								X				
CAA7-S11-0.5-1	20	↓	15:20	↓	1								X				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Tyler Scott	Tyler Scott	FS	2.22.21	16:04
Received by: Hong	HONG NGUYEN	FBI	✓	✓
Relinquished by:				
Received by:			Samples received at 4 °C	

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

March 26, 2021

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on March 22, 2021 from the Cantera-TOC, F&BI 103414 project. There are 10 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0326R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on March 22, 2021 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera-TOC, F&BI 103414 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
103414 -01	CAA7-B12-2.0-2.25
103414 -02	CAA7-B11-2.0-2.25
103414 -03	CAA7-SW23-0.0-0.5
103414 -04	CAA7-SW24-0.0-0.5
103414 -05	CAA7-SW25-0.0-0.5
103414 -06	CAA7-SW26-0.0-0.5

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-B12-2.0-2.25	Client:	Floyd-Snider
Date Received:	03/22/21	Project:	Cantera-TOC, F&BI 103414
Date Extracted:	03/23/21	Lab ID:	103414-01
Date Analyzed:	03/24/21	Data File:	103414-01.059
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	5.80

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-B11-2.0-2.25	Client:	Floyd-Snider
Date Received:	03/22/21	Project:	Cantera-TOC, F&BI 103414
Date Extracted:	03/23/21	Lab ID:	103414-02
Date Analyzed:	03/24/21	Data File:	103414-02.060
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	6.54

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-SW23-0.0-0.5	Client:	Floyd-Snider
Date Received:	03/22/21	Project:	Cantera-TOC, F&BI 103414
Date Extracted:	03/23/21	Lab ID:	103414-03
Date Analyzed:	03/24/21	Data File:	103414-03.061
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	10.8

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-SW24-0.0-0.5	Client:	Floyd-Snider
Date Received:	03/22/21	Project:	Cantera-TOC, F&BI 103414
Date Extracted:	03/23/21	Lab ID:	103414-04
Date Analyzed:	03/24/21	Data File:	103414-04.093
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	13.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-SW25-0.0-0.5	Client:	Floyd-Snider
Date Received:	03/22/21	Project:	Cantera-TOC, F&BI 103414
Date Extracted:	03/23/21	Lab ID:	103414-05
Date Analyzed:	03/24/21	Data File:	103414-05.094
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	6.39

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-SW26-0.0-0.5	Client:	Floyd-Snider
Date Received:	03/22/21	Project:	Cantera-TOC, F&BI 103414
Date Extracted:	03/23/21	Lab ID:	103414-06
Date Analyzed:	03/24/21	Data File:	103414-06.095
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	13.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 103414
Date Extracted:	03/23/21	Lab ID:	I1-182 mb2
Date Analyzed:	03/23/21	Data File:	I1-182 mb2.107
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1

Date of Report: 03/26/21
Date Received: 03/22/21
Project: Cantera-TOC, F&BI 103414

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

Laboratory Code: 103386-01 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	11.3	111	116	75-125	4

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	109	80-120

Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

103414

SAMPLE CHAIN OF CUSTODY

03-22-21

BI2 Page # 1 of 1

Report To Lynn Grochala

Company Floyd Snider

Address 601 Union St Ste 600

City, State, ZIP Seattle, WA 98101

Phone 206-292-2078 Email lynn.grochala@floydsnider.com

SAMPLERS (*signature*)

PROJECT NAME Cantera — TOC

PO #

REMARKS

Project specific RLs? - Yes [✓ No]

INVOICE TO

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

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

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic				Notes
CAA7-B12-2.0-2.25	01	3-22-21	1500	Soil	1								X				
CAA7-B11-2.0-2.25	02	↓	1545	↓	↓								X				
CAA7-SW23-0.0-0.5	03	↓	1610	↓	↓								X				
CAA7-SW24-0.0-0.5	04	↓	1625	↓	↓								X				
CAA7-SW25-0.0-0.5	05	↓	1640	↓	↓								X				
CAA7-SW26-0.0-0.5	06	↓	1705	↓	↓								X				

Samples received at 2 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Kristin Anderson	FS	3/22/21	1737
Received by:		JOE MOHAMMED	FBI	3/22/21	1737
Relinquished by:					
Received by:					

Analytical Resources, Incorporated
Analytical Chemists and Consultants

18 December 2020

Kristin Anderson
Floyd - Snider
601 Union Street Two Union Square, Suite 600
Seattle, WA 98101-2341

RE: Cantera - TOC

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
20K0398	N/A

Amanda Volgardsen
Digitally signed by Amanda Volgardsen
Date: 2020.12.18 09:58:20 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006-012

20K0398

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER ARI

PROJECT NAME/NO.	PO #
011267	A-477

REMARKS
Please Email Results
F/S Deliverables
Samples for Kristin Anderson.

Page # 1 of 1

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

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

						ANALYSES REQUESTED										
Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	Dioxins/Furans	EPH	VPH	TBT							Notes
COMP-1-0-0.5		11/13/20	1030	Soil	1				X							
COMP-2-0-0.5		11/13/20	1115	Soil	1				X							
COMP-3-0-0.5		11/13/20	~~1445~~ 1145	Soil	1				X							
COMP-4-0-0.5		11/13/20	~~1145~~ 1240	Soil	1				X							
COMP-5-0-0.5		11/13/20	1320	Soil	1				X							
COMP-6-0-0.5		11/13/20	1355	Soil	1				X							
COMP-7-0-0.5		11/13/20	1425	Soil	1				X							

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:	~~Michael Erdahl~~ Eric Young	Friedman & Bruya	11/24/20	1450
Received by:	Kenny Dang	ARI	11/24/20	1612
Relinquished by:				
Received by:				

Analytical Resources, Incorporated
Analytical Chemists and Consultants

ORGANICS PREPARATION BENCH SHEET

Batch: BIL0050

Prepared using: EPA 3546 (Microwave)

8270E-SIM Butyl Tins in Solid (Version:TBT Only)

Matrix: Solid **Date Prepared:** 12/02/20 **Balance ID:** B 1392984002 **Set Up By:** CTD 12/2/20

Analysis: 8270E-SIM Butyl Tins

Lab Number & Container	% Solids	Initial (g) Target Dry: 5 (Wet) Actual	Actual Wet Wt (g)	Final Effective Vol (mL)	Vol (mL) to Lab	Extraction Comments
20K0398-01 A	76.0	(6.58)	6.60	0.5 ____	0.5 ____	
20K0398-02 A	91.5	(5.46)	5.55	0.5 ____	0.5 ____	
20K0398-03 A	88.2	(5.67)	5.74	0.5 ____	0.5 ____	
20K0398-04 A	89.5	(5.59)	5.64	0.5 ____	0.5 ____	
20K0398-05 A	85.6	(5.84)	5.87	0.5 ____	0.5 ____	
20K0398-06 A	87.1	(5.74)	5.81	0.5 ____	0.5 ____	
20K0398-07 A	88.2	(5.67)	5.69	0.5 ____	0.5 ____	

Batch QC

Lab Number	% Solids	Initial (g) Target Dry: 5 (Wet) Actual	Actual Wet Wt (g)	Final Effective Vol (mL)	Vol (mL) to Lab	Extraction Comments
BIL0050-BLK1	100.0	(5.00)	5.00	0.5 ____	0.5 ____	
BIL0050-BS1	100.0	(5.00)	5.00	0.5 ____	0.5 ____	
BIL0050-BSD1	100.0	(5.00)	5.00	0.5 ____	0.5 ____	
BIL0050-MRL1	100.0	(5.00)	5.00	0.5 ____	0.5 ____	

Client ID verified By ____ Date 12/02/20

Preparation Reviewed By ____ Date 12/11/20

Extraction Date and Time 12/02/20 12:05

Printed: 12/2/2020 8:53:22AM

3064F

Analytical Resources, Incorporated
Analytical Chemists and Consultants

ORGANICS PREPARATION BENCH SHEET

Batch: BIL0050

Prepared using: EPA 3546 (Microwave)

8270E-SIM Butyl Tins in Solid (Version:TBT Only)

Prep Steps

Microwave
1 2 3
CT/DR 12/02/20
Analyst/Date

TurboVap Hexane Exchange (15 mL)
1 2 3 [✓ 4] 5
SH 12/2/20
Analyst/Date

HexMgBr Addition Vortex 45min + Sit Overnight
[✓ 0] [✓ 1] 2 3
SH 12/2/20
Analyst/Date

(REQ) Hydrolisys (4mL) Vortex
1 2 3
Cas 12/11/20
Analyst/Date

(REQ) SPE (1mL)
Cas 12/11/20
Analyst/Date

TurboVap Post SPE
1 [✓ 2] 3 4 5
Cas 12/11/20
Analyst/Date

Vialing
Cas 12/11/20
Analyst/Date

Reagents Used

Station/Reagent	**Standard ID**
Microwave Analyst: DR/CT Date: 12/02/20	
Anhydrous Sodium Sulfate	I010747
0.10% Tropolone in Methylene Chloride	I009773
Neutral Glass Wool	I010379
Hexane	I009769
Vialing/HexMgBr Addition Analyst: SH Date: 12/2/20	
(Turbovap exchange): Hexane:	I009769
HexylMagnesiumBromide	H011730
Hydrolysis/Silica/Final Vialing Analyst: Cas Date: 12/11/20	
1:1 HCL/DI H2O	I006865
Anhydrous Sodium Sulfate	I011225
Silica Gel (SPE) Dart (EPH)	I006350
(Final Vialing):Hexane	I009769

Surrogates & Spike Standards Used

Type	Vial ID / Standard ID	Vol uL	Analyst	Witness
Surrogate 2.5µg/mL	**L** I008488 Exp: 12/10/2020	100µL	DR	
Spike 2.5µg/mL	**8** H012047 Exp: 12/12/2020 BS1,BSD1 ONLY	100µL	DR	
QLS Spike 0.5µg/mL	**QLS 3** I000317 Exp: 12/12/2020 MRL only	40µL	DR	

(V) indicates a virtual standard combining two or more physical standards. In these cases the Standard ID refers to the virtual standard, not the parent standards.

If a Standard ID is missing, but should be present, check the standard definition in Element LIMS to be sure Standard Info 6 has the correct letter or number designator matching the vial designator inthe Standard ID column. If it is correct, check the batch and bench sheet in Element LIMS to be sure the correct standards are selected for surrogate(s) and spike(s).

Printed: 12/2/2020 8:53:22AM

3064F

Analytical Resources, Incorporated
Analytical Chemists and Consultants

ORGANICS PREPARATION BENCH SHEET

Batch: BIL0050

Prepared using: EPA 3546 (Microwave)

8270E-SIM Butyl Tins in Solid (Version:TBT Only)

Prep Instructions	
SPECIAL INSTRUCTIONS: NOTE: TBT Extractions must be completed within 48 hours! 1. Blanks = Solvent Only (NO Sulfate). 2. Weigh samples into 100mL beakers-dry with Sodium Sulfate. 3. Pre-Rinse microwave vessel with 0.10% Tropolone in DCM. 4. Transfer soil to microwave vessel. 5. Add 0.10% Tropolone in DCM to vessel until solvent is 1" above soil layer after homogenization). 6. Add surr/spike. 7. Microwave on appropriate power setting determined by # of samples. 8. After microwave-Re-homogenize while hot then let cool 15 min. in cold water bath. Re-homogenize while cool. 9. Decant into 0.10% troplone rinsed turbo tube with small Funnel containing glass wool and 1" sodium sulfate. 10. Add (2) 10mL Hexane rinses to vessel and transfer to turbo tube. 11. TurboVap to 2mL and add 15mL Hexane (X1)-mix well. 12. TurboVap to 3mL-Transfer with Hexane to 40mL VOA vial. 13. Derivitize=1 pipet HexMgBr (Mix by hand) then Vortex. Let sit 45min (vortex every 10 min) Then let sit overnite. 14. Hydrolisys: Add (2) pipets of 1:1 HCL. Vortex for 30 sec. Draw off/discard HCL (bottom layer). Add 1 pipet of 1:1 HCL and 5mL DI H2O. Vortex for 30 sec. Draw off/discard H20 (bottom layer). Add 5mL DI H2O. Vortex for 30 sec. Draw off/discard H2O (bottom layer). 15. Add sodium sulfate and Let sit 15min. 16. Transfer to culture tube and TurboVap to 1mL. 17. SPE Clean with EPH darts 18. TurboVap 19. Vial in hexane. 20. NOTE: DERIVITIZATIONS MUST BE DONE IN THE HOOD TO PROTECT FROM POTENTIAL CHEMICAL REACTIONS, ODORS AND FUMES. A. Need Total Solids Y / [✓ N] B. Archive/Freeze [✓ Y] / N	

Printed: 12/2/2020 8:53:22AM

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Analytical Chemists and Consultants

Organic Extractions Laboratory Analyst Notes

Extraction Parameter: TBT
Extraction Batch BIL0050

Total Solids Batch: BIK0840
Work Order(s): 20K0398

Screens: Soil/Sediment/Solid/Other:	**Analyst/Date**
☒ No Anomalies (standard soil/wet sediment/sand/gravel)= 01 -	12/01/20
☐ Standing Water Decanted (Not shared)=	
☐ Standing Water Homogenized (Shared samples)=	
☐ Clay/Clumps (Difficult to homogenize)=	
☒ Rocks (%+size)? ~~1/4"~~ 5.0% =03, 04, 05, 06, 07.	12/01/20
☒ Organics (Leaves/sticks/grass)= 5.0% =02	12/01/20
☐ Oily, obvious fuel/sulfur odors=	
☐ Received in 32oz jar(s)=Homogenized in Pyrex dish=	
☒ Previously Frozen = all, pulled 12/1/20	CR 12/2/20
☒ Other (Details)= missed notes on % moisture, did % solids PSEP w/ low volume, #'s line up within 1~5%.	CR 12/2/20
Aqueous:	
☐ No Anomalies	
☐ Turbid/Color=	
☐ Particulates(%)=(Note: >5%=Notify Supervisor/Lead)	
☐ Emulsions (%)=	
☐ Oily, obvious fuel/sulfur odors=	
☐ Other (Details)=	
☐ Received in 1.0L Bottle(s)=No Bottle Rinse=	
☐ Other Notes/Comments= (Note problems, concerns, corrective actions).	
Thick emulsion on 398-4 during hydrolysis.	AS 12/17/20
☒ Share Samples Y / [✓ N]	12/01/20
☒ Multiple Jars Y / [✓ N]	12/01/20
☐ Sample Pre-Screens indicate analyte activity=	
☐ Sample weights/volumes reduced based on Pre-Screen=	

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Revision 15
07/01/19

```
Batch: BIL0050
Batch Comment: **NONE**
        Project: Cantera - TOC
        Project Comments: <E> LCSD Required </E>
                Work Order:20K0398
                Work Order Comments: <E> LCSD Required </E>
                        Sample: 20K0398-01
                        Sample Comments: **NONE**
                        Sample: 20K0398-02
                        Sample Comments: **NONE**
                        Sample: 20K0398-03
                        Sample Comments: **NONE**
                        Sample: 20K0398-04
                        Sample Comments: **NONE**
                        Sample: 20K0398-05
                        Sample Comments: **NONE**
                        Sample: 20K0398-06
                        Sample Comments: **NONE**
                        Sample: 20K0398-07
                        Sample Comments: **NONE**
```

Floyd - Snider	Project: Cantera - TOC	
601 Union Street Two Union Square, Suite 600	Project Number: 011267	**Reported:**
Seattle WA, 98101-2341	Project Manager: Kristin Anderson	18-Dec-2020 09:56

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
COMP-1-0-0.5	20K0398-01	Solid	13-Nov-2020 10:30	24-Nov-2020 16:12
COMP-2-0-0.5	20K0398-02	Solid	13-Nov-2020 11:15	24-Nov-2020 16:12
COMP-3-0-0.5	20K0398-03	Solid	13-Nov-2020 11:45	24-Nov-2020 16:12
COMP-4-0-0.5	20K0398-04	Solid	13-Nov-2020 12:40	24-Nov-2020 16:12
COMP-5-0-0.5	20K0398-05	Solid	13-Nov-2020 13:20	24-Nov-2020 16:12
COMP-6-0-0.5	20K0398-06	Solid	13-Nov-2020 13:55	24-Nov-2020 16:12
COMP-7-0-0.5	20K0398-07	Solid	13-Nov-2020 14:25	24-Nov-2020 16:12

Floyd - Snider	Project: Cantera - TOC	
601 Union Street Two Union Square, Suite 600	Project Number: 011267	**Reported:**
Seattle WA, 98101-2341	Project Manager: Kristin Anderson	18-Dec-2020 09:56

Work Order Case Narrative

Sample receipt

Samples as listed on the preceding page were received 24-Nov-2020 16:12 under ARI work order 20K0398. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Butyl Tin(s) - EPA Method SW8270E-SIM

The samples were frozen in order to maintain holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits, with the exception of sample COMP-4-0-0.5 which has low surrogate percent recoveries. The sample was non-detect. No corrective action was taken.

The method blank was clean at the reporting limits.

The blank spike/blank spike duplicate (BS/LCS/BSD/LCSD) percent recoveries and RPD were within control limits.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Floyd Snider

Project Name: 011267

COC No(s): [✓ NA]

Delivered by: Fed-Ex UPS Courier [✓ Hand Delivered] Other:

Assigned ARI Job No: 20K0398

Tracking No: [✓ NA]

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES [✓ NO]

Were custody papers included with the cooler? [✓ YES] NO

Were custody papers properly filled out (ink, signed, etc.) [✓ YES] NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1612 4.8 ____ ____ ____ ____ ____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO S206

Cooler Accepted by: KP Date: 11/24/20 Time: 1612

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES [✓ NO]

What kind of packing material was used? ... Bubble Wrap [✓ Wet Ice] Gel Packs Baggies Foam Block Paper Other: card board box

Was sufficient ice used (if appropriate)? NA [✓ YES] NO

How were bottles sealed in plastic bags? Individually Grouped [✓ Not]

Did all bottles arrive in good condition (unbroken)? [✓ YES] NO

Were all bottle labels complete and legible? [✓ YES] NO

Did the number of containers listed on COC match with the number of containers received? [✓ YES] NO

Did all bottle labels and tags agree with custody papers? [✓ YES] NO

Were all bottles used correct for the requested analyses? [✓ YES] NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... [✓ NA] YES NO

Were all VOC vials free of air bubbles? [✓ NA] YES NO

Was sufficient amount of sample sent in each bottle? [✓ YES] NO

Date VOC Trip Blank was made at ARI [✓ NA] ____

Were the sample(s) split by ARI? [✓ NA] YES Date/Time: ____ Equipment: ____ Split by: ____

Samples Logged by: JS Date: 11/24/2020 Time: 1615 Labels checked by: JS

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Floyd - Snider	Project: Cantera - TOC	
601 Union Street Two Union Square, Suite 600	Project Number: 011267	**Reported:**
Seattle WA, 98101-2341	Project Manager: Kristin Anderson	18-Dec-2020 09:56

COMP-1-0-0.5

20K0398-01 (Solid)

Butyl Tins

Method: EPA 8270E-SIM
Sampled: 11/13/2020 10:30
Instrument: NT8 Analyst: JZ
Analyzed: 12/16/2020 15:28

Sample Preparation:
Preparation Method: EPA 3546 (Microwave)
Extract ID: 20K0398-01 A 01
Preparation Batch: BIL0050
Sample Size: 6.6 g (wet)
Dry Weight:5.02 g
Prepared: 12/02/2020
Final Volume: 0.5 mL
% Solids: 76.00

Sample Cleanup:
Cleanup Method: Silica Gel
Extract ID: 20K0398-01 A 01
Cleanup Batch: CIL0137
Initial Volume: 0.5 mL
Cleaned: 11-Dec-2020
Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.449	3.85	2.01	ug/kg	J
Surrogate: Tripentyltin				*30-160 %*	*82.9*	*%*	
Surrogate: Tripropyltin				*30-160 %*	*61.0*	*%*	

Floyd - Snider	Project: Cantera - TOC	
601 Union Street Two Union Square, Suite 600	Project Number: 011267	**Reported:**
Seattle WA, 98101-2341	Project Manager: Kristin Anderson	18-Dec-2020 09:56

COMP-2-0-0.5

20K0398-02 (Solid)

Butyl Tins

Method: EPA 8270E-SIM — Sampled: 11/13/2020 11:15

Instrument: NT8 Analyst: JZ — Analyzed: 12/16/2020 15:44

Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0398-02 A 01
	Preparation Batch: BIL0050	Sample Size: 5.55 g (wet)	Dry Weight:5.08 g
	Prepared: 12/02/2020	Final Volume: 0.5 mL	% Solids: 91.52
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0398-02 A 01
	Cleanup Batch: CIL0137	Initial Volume: 0.5 mL	
	Cleaned: 11-Dec-2020	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.443	3.80	0.661	ug/kg	J
Surrogate: Tripentyltin				*30-160 %*	*83.2*	*%*	
Surrogate: Tripropyltin				*30-160 %*	*60.2*	*%*	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Floyd - Snider
601 Union Street Two Union Square, Suite 600
Seattle WA, 98101-2341

Project: Cantera - TOC
Project Number: 011267
Project Manager: Kristin Anderson

Reported:
18-Dec-2020 09:56

COMP-3-0-0.5

20K0398-03 (Solid)

Butyl Tins

Method: EPA 8270E-SIM
Instrument: NT8 Analyst: JZ

Sampled: 11/13/2020 11:45
Analyzed: 12/16/2020 16:00

Sample Preparation:
Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BIL0050
Prepared: 12/02/2020
Sample Size: 5.74 g (wet)
Final Volume: 0.5 mL
Extract ID: 20K0398-03 A 01
Dry Weight:5.06 g
% Solids: 88.16

Sample Cleanup:
Cleanup Method: Silica Gel
Cleanup Batch: CIL0137
Cleaned: 11-Dec-2020
Initial Volume: 0.5 mL
Final Volume: 0.5 mL
Extract ID: 20K0398-03 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.445	3.81	ND	ug/kg	U
Surrogate: Tripentyltin				*30-160 %*	*84.0*	*%*	
Surrogate: Tripropyltin				*30-160 %*	*59.2*	*%*	

Analytical Report

Floyd - Snider	Project: Cantera - TOC	
601 Union Street Two Union Square, Suite 600	Project Number: 011267	**Reported:**
Seattle WA, 98101-2341	Project Manager: Kristin Anderson	18-Dec-2020 09:56

COMP-4-0-0.5

20K0398-04 (Solid)

Butyl Tins

Method: EPA 8270E-SIM — Sampled: 11/13/2020 12:40

Instrument: NT8 Analyst: JZ — Analyzed: 12/16/2020 16:17

Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0398-04 A 01
	Preparation Batch: BIL0050	Sample Size: 5.64 g (wet)	Dry Weight:5.05 g
	Prepared: 12/02/2020	Final Volume: 0.5 mL	% Solids: 89.47
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0398-04 A 01
	Cleanup Batch: CIL0137	Initial Volume: 0.5 mL	
	Cleaned: 11-Dec-2020	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.446	3.82	ND	ug/kg	U
Surrogate: Tripentyltin				*30-160 %*	*16.3*	*%*	*
Surrogate: Tripropyltin				*30-160 %*	*12.2*	*%*	

Floyd - Snider	Project: Cantera - TOC	
601 Union Street Two Union Square, Suite 600	Project Number: 011267	**Reported:**
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COMP-5-0-0.5

20K0398-05 (Solid)

Butyl Tins

Method: EPA 8270E-SIM — Sampled: 11/13/2020 13:20
Instrument: NT8 Analyst: JZ — Analyzed: 12/16/2020 16:34

Sample Preparation: Preparation Method: EPA 3546 (Microwave) — Extract ID: 20K0398-05 A 01
Preparation Batch: BIL0050 — Sample Size: 5.87 g (wet) — Dry Weight:5.02 g
Prepared: 12/02/2020 — Final Volume: 0.5 mL — % Solids: 85.58

Sample Cleanup: Cleanup Method: Silica Gel — Extract ID: 20K0398-05 A 01
Cleanup Batch: CIL0137 — Initial Volume: 0.5 mL
Cleaned: 11-Dec-2020 — Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.448	3.84	1.08	ug/kg	J
Surrogate: Tripentyltin				*30-160 %*	*87.4*	*%*	
Surrogate: Tripropyltin				*30-160 %*	*64.0*	*%*	

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Project: Cantera - TOC
Project Number: 011267
Project Manager: Kristin Anderson

Reported:
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COMP-6-0-0.5

20K0398-06 (Solid)

Butyl Tins

Method: EPA 8270E-SIM
Instrument: NT8 Analyst: JZ

Sampled: 11/13/2020 13:55
Analyzed: 12/16/2020 16:50

Sample Preparation:
Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BIL0050
Prepared: 12/02/2020
Sample Size: 5.81 g (wet)
Final Volume: 0.5 mL
Extract ID: 20K0398-06 A 01
Dry Weight:5.06 g
% Solids: 87.11

Sample Cleanup:
Cleanup Method: Silica Gel
Cleanup Batch: CIL0137
Cleaned: 11-Dec-2020
Initial Volume: 0.5 mL
Final Volume: 0.5 mL
Extract ID: 20K0398-06 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.445	3.81	ND	ug/kg	U
Surrogate: Tripentyltin				*30-160 %*	*73.0*	*%*	
Surrogate: Tripropyltin				*30-160 %*	*44.6*	*%*	

Floyd - Snider	Project: Cantera - TOC	
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COMP-7-0-0.5

20K0398-07 (Solid)

Butyl Tins

Method: EPA 8270E-SIM — Sampled: 11/13/2020 14:25

Instrument: NT8 Analyst: JZ — Analyzed: 12/16/2020 17:07

Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0398-07 A 01
	Preparation Batch: BIL0050	Sample Size: 5.69 g (wet)	Dry Weight:5.02 g
	Prepared: 12/02/2020	Final Volume: 0.5 mL	% Solids: 88.18
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0398-07 A 01
	Cleanup Batch: CIL0137	Initial Volume: 0.5 mL	
	Cleaned: 11-Dec-2020	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.448	3.85	1.17	ug/kg	J
Surrogate: Tripentyltin				*30-160 %*	*88.9*	*%*	
Surrogate: Tripropyltin				*30-160 %*	*62.1*	*%*	

Floyd - Snider	Project: Cantera - TOC	
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Butyl Tins - Quality Control

Batch BIL0050 - EPA 3546 (Microwave)

Instrument: NT8 Analyst: JZ

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIL0050-BLK1)				Prepared: 02-Dec-2020 Analyzed: 16-Dec-2020 14:21							
Tributyltin Ion	ND	0.450	3.86	ug/kg							U
Surrogate: Tripentyltin	51.7			ug/kg	*45.2*		*114*	*30-160*			
Surrogate: Tripropyltin	37.6			ug/kg	*43.7*		*86.1*	*30-160*			
LCS (BIL0050-BS1)				Prepared: 02-Dec-2020 Analyzed: 16-Dec-2020 14:38							
Tributyltin Ion	43.6	0.450	3.86	ug/kg	44.6		97.9	30-160			
Surrogate: Tripentyltin	52.2			ug/kg	*45.2*		*116*	*30-160*			
Surrogate: Tripropyltin	36.6			ug/kg	*43.7*		*83.6*	*30-160*			
LCS Dup (BIL0050-BSD1)				Prepared: 02-Dec-2020 Analyzed: 16-Dec-2020 14:54							
Tributyltin Ion	43.0	0.450	3.86	ug/kg	44.6		96.6	30-160	1.36	30	
Surrogate: Tripentyltin	51.3			ug/kg	*45.2*		*114*	*30-160*			
Surrogate: Tripropyltin	36.1			ug/kg	*43.7*		*82.4*	*30-160*			

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601 Union Street Two Union Square, Suite 600
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Project: Cantera - TOC
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Reported:
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Certified Analyses included in this Report

Analyte	Certifications
EPA 8270E-SIM in Solid	
Tributyltin Ion	WADOE,DoD-ELAP
Tributyltin Ion	DoD-ELAP
Tributyltin Ion	WADOE,DoD-ELAP
Tributyltin Ion	WADOE,DoD-ELAP
Dibutyltin Ion	WADOE,DoD-ELAP
Dibutyltin Ion	DoD-ELAP
Dibutyltin Ion	WADOE,DoD-ELAP
Dibutyltin Ion	WADOE,DoD-ELAP
Butyltin Ion	WADOE
Butyltin Ion	
Butyltin Ion	WADOE
Butyltin Ion	WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021

Floyd - Snider	Project: Cantera - TOC	
601 Union Street Two Union Square, Suite 600	Project Number: 011267	**Reported:**
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Notes and Definitions

*	Flagged value is not within established control limits.
J	Estimated concentration value detected below the reporting limit.
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.