K Ply Site

Construction Completion Report

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Prepared for

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List of Acronyms and Abbreviations

Acronym/ Abbreviation	Definition
AO	Agreed Order
bgs	Below ground surface
BMP	Best management practice
BTEX	Benzene, toluene, ethylbenzene, and xylenes
CAP	Cleanup Action Plan
CESCL	Certified Erosion and Sediment Control Lead
COC	Contaminant of concern
CPOC	Conditional point of compliance
CQA	Construction quality assurance
CUL	Cleanup level
CY	Cubic yards
DRO	Diesel-range organics
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
ERRG	Engineering Remediation Resources Group
GRO	Gasoline-range organics
HCID	Hydrocarbon identification
HRA	Historical Research Associates, Inc.
K Ply	K Ply, Inc.
LNAPL	Light non-aqueous phase liquid
µg/L	Micrograms per liter

Acronym/ Abbreviation	Definition
mg/kg	Milligrams per kilogram
MTCA	Model Toxics Control Act
NAPL	Non-aqueous phase liquid
NPDES	National Pollutant Discharge Elimination System
ORC	Oxygen-releasing compound
ORO	Oil-range organics
PCP	Pentachlorophenol
PID	Photoionization detector
Port	Port of Port Angeles
PVC	Polyvinyl chloride
RI/FS	Remedial Investigation/Feasibility Study
RL	Remediation level
RPD	Relative percent differences
SEPA	State Environmental Policy Act
Site	K Ply Site
SWPPP	Stormwater Pollution Prevention Plan
TESC	Temporary erosion and sediment control
TPH	Total petroleum hydrocarbon
USEPA	U.S. Environmental Protection Agency
WAC	Washington Administrative Code

1.0 Introduction

This report documents completion of cleanup construction activities at the K Ply Site (Site) located at 439 Marine Drive in Port Angeles, Washington (Figure 1.1). The Site is being cleaned up under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D of the Revised Code of Washington, administered by the Washington State Department of Ecology (Ecology) under the MTCA Cleanup Regulation, Washington Administrative Code (WAC) 173-340, and under Agreed Order (AO) No. DE 11302 between Ecology and the Port of Port Angeles (Port), effective May 2015. The AO requires that the Port implement the Cleanup Action Plan (CAP) for the Site (Ecology 2015) and that the construction activities be documented in a Construction Completion Report.

1.1 REGULATORY BACKGROUND AND ENVIRONMENTAL INVESTIGATION

Environmental contamination under the former mill building was first documented in the late 1980s with partial cleanup actions undertaken by ITT Rayonier, one of the prior mill owners. The presence of the mill building, however, overlying nearly all of the known soil and groundwater contamination, hindered efforts at both investigation and cleanup. The mill was demolished by the Port in 2013, which allowed for a more comprehensive Remedial Investigation/Feasibility Study (RI/FS) and cleanup to be completed. The RI/FS was completed in 2014 and documented a broad area of both gasoline- and hydraulic oil-contaminated soil and groundwater under the former mill. The selected remedy, as documented in the CAP, included excavation followed by bioremediation of contaminated soil and groundwater. This remedial action removed the majority of soil contamination and greatly reduced the source mass of contamination that was causing contaminants in groundwater to discharge to Port Angeles Harbor at concentrations greater than applicable standards.

1.2 CONSTRUCTION ROLES AND RESPONSIBILITIES

The construction activities were conducted by the following parties:

- **Port of Port Angeles.** The Port was the project owner and contracting party. The Port also filled the role of the Certified Erosion and Sediment Control Lead (CESCL) for compliance with the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit. Mr. Chris Hartman was the Port engineer with overall responsibility for the project and Mr. Jesse Waknitz held the role of the CESCL and was responsible for compliance with all permits obtained for the project.
- **Floyd|Snider.** Floyd|Snider was the Port's environmental consultant that provided remedial construction management, performed compliance and performance sampling, and documented the construction activities. Mr. Tucker Stevens was the project resident engineer responsible for contract compliance and design changes. Mr. Ken Preston was responsible for construction oversight and work inspections. Ms. Jenny Pracht was responsible for all environmental sampling activities. Mr. Tom Colligan was the project manager. The sub-consultants on the project included: Historical Research Associates, Inc.

(HRA) who performed the archeological monitoring; Hart Crowser who performed geotechnical oversight, testing, and consultation services regarding backfill and compaction; and Northwest Territories Inc. who performed surveying.

- **Engineering/Remediation Resources Group.** Engineering/Remediation Resources Group (ERRG) was the selected contractor for the project and was responsible for all remedial construction site work. This included implementation of the temporary erosion and sediment control (TESC), shoring, excavation, off-site disposal of soil, backfilling, installation of the infiltration galleries, and other construction activities required to implement the selected remedial action. Mr. Brad Coury was the Construction Manager and Mr. Gabe Smith was the site superintendent. Key subcontractors used by ERRG included: Northwestern Territories Inc., who provided surveying services; Axis Crane LLC., who installed the temporary shoring; R Transport, who transported the contaminated soil to the transfer station; and Rain for Rent, who supplied the waste water treatment system.
- **Washington State Department of Ecology.** Ecology provided project grant funding, construction oversight, and approval of deviations from construction activities. Ms. Connie Groven was the Ecology site manager.

1.3 DOCUMENT ORGANIZATION

This Construction Completion Report is organized as follows:

- **Section 2.0—Site Description and Summary of Environmental Conditions:** Provides a brief overview of the Site and pre-remediation conditions.
- **Section 3.0—Engineering Design:** Provides a description of the engineering approach to the cleanup.
- **Section 4.0—Work Conducted:** Provides a summary of the remedial construction activities.
- **Section 5.0—Construction Quality Assurance and Control:** Describes the measures that were put in place to assure that the goals and objectives of the project were met.
- **Section 6.0—Institutional Controls/Soil Management Plan:** Describes how future Site development will handle residual soil contamination.
- **Section 7.0—Monitoring Well Installation:** Describes the network of wells that will used to monitor post-remedial construction groundwater conditions.
- **Section 8.0—Summary and Opinion:** Provides a summary of the document and an engineer's opinion regarding the success and completion of the project based on the objectives of the CAP.
- **Section 9.0—References:** Lists all references used in the development of this Construction Completion Report.

The Appendices are organized as follows:

- **Appendix A—Construction Plans and Specifications:** Includes the engineering plans and specifications for Site cleanup, as well as the For Construction Set and design revisions.
- **Appendix B—Analytical Data Reports:** Provides results for the analyses for soil, non-aqueous phase liquid (NAPL) product, and water that were tested and removed from the Site during construction activities.
    - **Soil & Product:** The chemical analytical results for soil and NAPL sampling in Excavation Areas 5 and 6.
    - **Water:** The chemical analytical results from outfall samples and wastewater discharge samples.
- **Appendix C—Health and Safety Monitoring Data:** Includes results from the air quality monitoring to assess health and safety of workers during construction.
- **Appendix D—Photographs:**
    - **Attachment D.1—Excavation Progress:** Ground and aerial photographs of the weekly excavation progress.
    - **Attachment D.2—General Construction:** General construction photographs of findings, activities, and progress of the project.
- **Appendix E—Archeological Monitoring Report:** Documents archaeological oversight, findings, conclusions, and recommendations.
- **Appendix F—Wastewater Discharge Monitoring Reports:** Provides the Discharge Monitoring Reports provided to the City of Port Angeles.
- **Appendix G—Weekly Reports by Floyd|Snider and Weekly Meeting Agendas & Minutes:** Documents weekly field activities and weekly progress meetings.
- **Appendix H—Daily Reports by Engineering Remediation Resources Group:** Describes daily field activities.
- **Appendix I—Import Backfill Sampling Results:** Provides chemical analytical reports of imported select fill.
- **Appendix J—Surveys:** Includes initial, final excavation, and final fill survey data for the project.
- **Appendix K—Geotechnical Reports:** Includes geotechnical oversight field reports prepared by HartCrowser.
- **Appendix L—Soil Management Plan:** Describes how the residually contaminated soil at the Site will be managed during construction activities.
- **Appendix M—Soil Disposal Documentation:** Includes truck tickets for disposal of contaminated soil off Site.

- **Appendix N—Monitoring and Compliance Well Logs:** Includes the well logs for all of the compliance wells installed post-construction.
- **Appendix O—Permits:** Includes copies of permits obtained for the project, including the Industrial Wastewater Discharge authorization, the NPDES Construction General Permit, NPDES inspection letter, and an Olympic Region Clean Air Agency compliance letter.

2.0 Site Description and Summary of Environmental Conditions

2.1 SITE DESCRIPTION

The Site is located on level ground directly west of downtown Port Angeles. It is bounded by West Marine Drive to the south, Port Angeles Harbor to the north, the Valley Creek Estuary to the east, and S. Cedar Street to the west. To the north of the Site are approximately 4.7 acres of aquatic land (tidelands and filled tidelands) owned by Washington State Department of Natural Resources.

The Site is zoned as "Industrial Heavy" by the City of Port Angeles and is approximately 18.6 acres in size and entirely owned by the Port. The primary historical operation at the Site was plywood manufacture. Site-wide operations included log storage, log rafting (in the harbor), hog fuel burning, log debarking, log peeling, pressing and gluing, steam drying, site maintenance, and other miscellaneous operations. Environmental contamination consisting of hydraulic oil and gasoline contamination was first documented in the late 1980s and partial cleanup actions were undertaken by ITT Rayonier, one of the former plywood mill owners, to address hydraulic oil contamination due to leaks from plywood presses. The source of the gasoline was determined to be related to a former pipeline (Pipeline 8) that passed under the mill building to an adjacent bulk fuel facility (former Peninsula Fuels).

The presence of the mill building overlying nearly all of the known soil and groundwater contamination hindered prior investigation and cleanup efforts. The mill was demolished by the Port as part of an Interim Cleanup Action in 2013 to allow for a more comprehensive RI/FS and to support a more thorough cleanup at the Site. An in-depth description of site background, prior operations, and the nature and extent of contamination is provided in the RI/FS report (Floyd|Snider 2015a). Figures 2.1, 2.2, and 2.3 display the pre-construction extent of soil and groundwater contamination under the former mill building.

2.2 CONTAMINANTS OF CONCERN AND LOCATIONS

The primary contaminants of concern (COCs) detected at the Site are petroleum hydrocarbons, mainly gasoline and hydraulic oil, found in both soil and groundwater. Historical contaminant detections of gasoline and hydraulic oil at concentrations greater than cleanup levels (CULs) were generally limited to the footprint of the former K Ply, Inc. (K Ply) mill building with some benzene migration in groundwater west of the former mill footprint into S. Cedar Street. Petroleum hydrocarbons were also detected at the base of the former log pond, located in the eastern half of the Site which was, until recently, used for log debarking and log storage operations. There was also some localized and shallow areas of dioxins/furans and pentachlorophenol (PCP) soil contamination.

2.2.1 Soil Cleanup and Remediation Levels

The CAP established soil CULs and remediation levels (RLs) for the cleanup action. These CULs, presented in Table 2.1, are sourced directly from the CAP. Refer to the CAP for a more thorough description of these CULs.

Table 2.1
Soil Cleanup Levels

Contaminant of Concern	Cleanup Level[1] (mg/kg)	Concrete Pad Excavation Area Smear Zone Remediation Level[2] (mg/kg)
Diesel-Range Organics (DRO)	2,000	-
Gasoline-Range Organics (GRO)	30	3,000
Oil-Range Organics (ORO)	2,000	-
Benzene	0.30	10
Toluene	7.0	-
Ethylbenzene	6.0	-
Xylenes	9.0	-
PCP	330	-
Dioxins/Furans	0.00059	-

Notes:
- A RL is not defined for the indicated COC.
1 The CULs are applicable to the entire Site.
2 RLs were used in the Concrete Pad Excavation Area (Excavation Area 5) only and were only applicable to soils at or below the water table.

Abbreviation:
mg/kg Milligrams per kilogram

2.2.2 Groundwater Cleanup Levels

Contaminated groundwater at the Site is considered non-potable due to its proximity to marine waters. CULs are based on protection of surface water. Final groundwater CULs are presented in Table 2.2.

Table 2.2
Groundwater Cleanup Levels

Contaminant of Concern	Cleanup Level (µg/L)
ORO	500
DRO	500
GRO	800
Benzene	51

Abbreviation:
µg/L Micrograms per liter

2.2.3 Groundwater Point of Compliance

Given that there is no potable use of site groundwater and the highest beneficial use of groundwater at the Site is discharge to surface water, a groundwater conditional point of compliance (CPOC) has been approved of by Ecology in the CAP. The CPOC for groundwater for the Site is along the bulkhead at the closest monitoring location to the point of discharge to surface water.

3.0 Engineering Design

With the exception of the items described in Section 5.8, the cleanup was performed in accordance with the engineering concepts and design criteria detailed in the Engineering Design Report (EDR; Floyd|Snider 2015b). The EDR was the basis for developing the detailed plans and specifications (refer to Appendix A) for the remedial construction phase of this project and provides details on the implementation of post-construction activities including groundwater treatment and monitoring.

3.1 GOAL OF CLEANUP

The primary goal of the remedial action was to remove contaminant mass in soil. This action would in turn remove the source of contamination to groundwater such that the groundwater concentrations of the COCs would be reduced to levels less than the CULs in a reasonable restoration timeframe. Additionally, removal of gasoline-impacted soil would reduce the potential for vapor intrusion inside any future buildings constructed on the Site. The cleanup activities completed to accomplish these goals are described in the following sections.

3.2 SOIL CLEANUP AREAS

The CAP identified six distinct cleanup areas at the Site with soil or groundwater contamination. These included two primary cleanup areas and four minor cleanup areas (refer to Figure 3.1). The remedial design involved developing the exact size/slope of the excavation areas and other remedial activities to address these cleanup areas. Ultimately six excavation areas were developed as part of design areas and were numbered (refer to Figure 3.2).

The two primary cleanup areas included the following:

- **The Gasoline Area (Excavation Areas 5 and 6).** This area extended continuously from the northern to southern boundary of the Site. Gasoline was present in soil and groundwater at concentrations greater than Site CULs throughout this area. Remediation consisted of excavation of both vadose and smear zone soils followed by application of bio-amendments during backfilling.
- **The Hydraulic Oil Area (Excavation Area 6).** This area is located in the vicinity of the former hydraulic presses. Hydraulic oil was present as a light non-aqueous phase liquid (LNAPL) pooled on the groundwater surface and also present in soil and groundwater downgradient of the LNAPL zone. Remediation consisted of excavation of both vadose and smear zone soils followed by application of bio-amendments during backfilling. A portion of the soil in the Hydraulic Oil Area was comingled with contamination from the Gasoline Area.

The minor cleanup areas included the Stack Area, the Hog Fuel Storage Area, the PCP Area, and the Log Pond Fill Area, and consisted of the following:

- **The Stack Area (Excavation Area 1).** This area is near the former mill stack where dioxins were detected in two surface soil samples following demolition of the stack. The dioxin/furan concentrations in this area prior to the project were less than the industrial CUL; however, this soil posed a risk of being spread by wind or other mechanisms to neighboring properties. Remediation of this area consisted of scraping the upper foot of surface soils and then placing this soil as backfill.
- **The Hog Fuel Storage Area (Excavation Areas 2 and 3).** This areas is where shallow DRO and GRO soil contamination was observed near the former hog fuel pile. Remediation consisted of excavation and backfilling.
- **The PCP Area (Excavation Area 4).** The PCP Area is a small area of surface soil lying beneath the former mill floor where PCP was detected in surface soil due to past panel oiling operations. This area underwent a remedial action by Rayonier ITT in the 1990s, and while the CULs were meet for PCP, elevated levels of total petroleum hydrocarbons (TPH) still remained in this area, likely originating from application of plywood form oil. Remediation consisted of excavation and backfilling.
- **The Log Pond Fill Area.** This area is located in the eastern part of the Site. It is the only one of the six cleanup areas of the site where no cleanup was performed. This is because the soil contamination in former log pond sediments is localized in extent, only found in deeper soil at approximately 12 feet below grade, and was not found to be impacting groundwater quality. Institutional controls will be applied to this area to manage the risk of this soil over the long term.

3.3 GROUNDWATER CLEANUP

Groundwater at the Site was designed to be treated via application of bio-amendments in two forms, discussed in the following sections.

3.3.1 S. Cedar Street Plume Bio-Injections

The RI defined a plume of GRO and benzene in groundwater emanating from the Gasoline Area and extending under S. Cedar Street toward the Port's Terminal 1. This area of dissolved-phase groundwater contamination was designed to be treated with an oxygen-releasing compound (ORC) that would be injected during the construction phase of the project throughout an approximately 1-acre area (refer to Figure 3.3). The treated area roughly corresponded to benzene concentrations in the plume greater than 500 µg/L.

3.3.2 Groundwater Infiltration Galleries

Infiltration galleries were installed in the Concrete Pad and Bulkhead Areas (Excavation Areas 5 and 6) prior to backfilling. These infiltration galleries were designed to allow for future application of an ORC or bacteriological nutrients if groundwater monitoring indicates that the groundwater CULs are not being attained at the CPOC.

4.0 Work Conducted

4.1 PERMITS

This remedial action was conducted under an AO with Ecology and, therefore, was exempt from certain procedural and permitting requirements of select Washington laws and regulations and all local permits (WAC 173-340-710(9)(b)). However, implementation of the cleanup action complied with the substantive requirements of any otherwise applicable permits. The following paragraphs describe the permits obtained or, if the permit was exempt, how the substantive requirements of that permit was met.

- The Port prepared a State Environmental Policy Act (SEPA) checklist as part of the CAP that underwent the public review process. Ecology was the lead agency for the SEPA review and provided a determination of non-significance for the project.
- The remedial construction required a NPDES Stormwater Construction Permit, administered by Ecology, to control discharge of pollutants from construction activities. Given that the Port maintained the NPDES Stormwater Construction Permit that was obtained for the prior mill demolition in 2013, remediation activities were conducted under this existing permit. An updated Stormwater Pollution Prevention Plan (SWPPP) and TESC Plan were prepared that identified how stormwater would be managed during construction. The SWPPP and TESC drawing were made part of the overall construction documentation. Both the Water Quality and Toxics divisions of Ecology were consulted in the development of the revised SWPPP and TESC Plan. Ecology Inspectors for the Water Quality division made one site visit during the project (refer to Appendix O). The Port conducted weekly site walks to inspect best management practices (BMPs) and ensure compliance with the permit.
- Local permitting requirements for remedial construction fell within the City of Port Angeles jurisdiction. The applicable requirements for the work were discussed by the Port and the City of Port Angeles, and it was determined that the planned work was exempt from land use permit requirements. However, the cleanup action complied with the applicable substantive requirements under the City of Port Angeles' Shoreline Management Act Program and Chapter 15.28 Clearing, Grading, Filling and Drainage Regulations of the municipal code.
- The Port obtained an Industrial Wastewater Discharge Permit from the City of Port Angeles so that treated TESC and dewatering water could be discharged to the sanitary sewer. An Engineering Report that describes water quality and the water treatment system that was used was prepared as part of the permit application (refer to Appendix O).

4.2 CONSTRUCTION ACTIVITY CHRONOLOGY

Construction activities took place over the course of two seasons because adverse fall weather conditions prevented the completion of backfilling. The first season lasted for 16 weeks from August 3, 2015 to November 20, 2015. The second season of work lasted 4 weeks from April 18 to May 13, 2016. A summary of the progress made during each week of construction is summarized in Table 4.1. Representative photographs documenting each week of construction progress are presented in Appendix D. Generally, construction activities completed during the first season included installation of all TESC measures, installation and removal of shoring, surface scraping and removal, excavation of Excavation Areas 1 through 6, transport and disposal of all contaminated soil, removal of residual LNAPL, treatment of dewatering water, application of the bio-amendment, backfilling of Excavation Areas 2 and 3, and limited backfilling of Excavation Areas 5 and 6. Construction activities completed during the second season included completion of all backfilling and installation of the infiltration galleries. The following sections provide greater detail on these activities.

4.2.1 Site Preparation

The first construction activity conducted at the Site was site preparation. These activities were conducted to stabilize the surface conditions, install TESC BMPs, and to consolidate the surface dioxin contamination. The following paragraphs describe the specific preparation activities that were conducted at the Site:

- **Monitoring and Extraction Well Decommissioning and Removal.** Several wells were decommissioned or removed as part of the project because they were located within or immediately adjacent to excavation areas. There were also monitoring wells that were located outside of the excavation areas but interfered with construction traffic so they were decommissioned as well. All wells were decommissioning by a licensed driller, Holocene Drilling of Puyallup, Washington.
- **Stormwater Control.** The excavation areas and most of the Site was unpaved prior to the start of construction and the topography generally sloped inward. This physical characteristic aided the Contractor in the control of stormwater because stormwater either infiltrated or puddled at low areas within the Site. Limited amounts of stormwater that had not come in contact with contaminated soil were channelized to a stormwater conveyance ditch located in the north-central area of the Site. The stormwater conveyance ditch allows for settling and biofiltration of stormwater prior to discharge to the harbor. This discharge point is regulated under the Port's current NPDES Stormwater Construction General Permit and was the stormwater sampling point for the project. This ditch and outfall point was maintained as part of the project. There were no instances where uncontrolled stormwater left the Site.

- **Demolition and Crushing of Concrete Structures.** Several concrete structures in the work areas were demolished several weeks prior to the start of remedial construction by a local Port Angeles contractor. These structures included the loading dock concrete pad, the dryer concrete pad, the Bamford/8-foot lathe building, and other miscellaneous concrete structures left standing after demolition. There were also a number of piles of concrete rubble that were crushed. Approximately 6,200 cubic yards (CY) of concrete was demolished, crushed to fragments 6 inches or less in size (6-inch minus), and stockpiled on-site prior to the start of remedial construction. This crushed concrete was later used as the backfill at elevations below the water table.

  Prior to demolition and crushing, the concrete was tested for Resource Conservation and Recovery Act (RCRA) 8 metals to ensure that the concrete was suitable for backfill. No metals issues were identified. Concrete that was stained with petroleum was pressure washed prior to being crushed.

- **Site Clearing and Grubbing.** A limited amount of site clearing and grubbing was conducted to remove unsuitable surface material and debris in accordance with the Geotechnical Report recommendations (refer to Appendix B of the EDR). All debris and unsuitable clear and grub materials were transported off-site for disposal at a Subtitle D solid waste landfill.

- **Staging and Stockpile Areas.** Current asphalt surfaces were maintained for the majority of the project, and were used for staging and stockpiling purposes. The pile of crushed concrete generated for use as backfill was re-located by ERRG farther to the east at the start of construction to allow more room for contractor staging areas. The existing office building was used as the construction office for the Contractor and engineering team.

4.2.2 Utility Protection, Abandonment, or Removal

4.2.2.1 Active Utilities

Two active storm sewer lines and overhead power lines were located in the construction zone. The storm sewer lines that required protection included a lateral line that runs in the alley immediately south of the concrete pad and the lateral lines that are directed toward the Site from the trunk line in S. Cedar Street. These pipes were not located within the excavation areas, but the catch basins were protected with catch basin inserts to ensure construction-generated soil did not enter the storm system. The power lines were flagged to make them more visible to heavy equipment.

4.2.2.2 Historical Utilities

Historical utilities removed as part of the project included a former water line, a former rail line, and former Pipeline 8. The background and history of these utilities was described in previous reports.

During RI/FS field work, gasoline-contaminated water was found in the two 4-inch-diameter steel pipes that comprise Pipeline 8. The water in these pipes was pumped out and disposed of prior to the pipes being removed from the ground. Prior to being removed, the pipes were exposed along their length by trenching. The pipes were inerted and cut at the location where the pipes extended under the alley toward the Peninsula Fuels property. The trenched sections of pipe were then removed by lifting out sections with the excavator. The section of Pipeline 8 (both 4-inch-diameter pipes) that passed under the concrete pad was found to have a number of corrosion holes along its length. These holes were the likely release points for gasoline contamination to the surrounding soils (refer to Appendix D, Attachment D.2). With the exception of the section of pipe that remains underneath the alley, all of Pipeline 8 has been removed from the Site.

4.2.3 Temporary Shoring

Temporary shoring was installed along the bulkhead to prevent collapse of the bulkhead while excavating the contaminated soil at the north end of Excavation Area 6. The shoring consisted of 40-foot-long cantilevered sheetpile segments driven in by a vibratory hammer on a crane.

4.2.4 Temporary Erosion and Sediment Control

Erosion and sediment control BMPs were installed and maintained for the duration of the project. These were installed to prevent off-site migration of contamination via dust, trackout, or stormwater and for general environmental control. The following BMPs were used:

- Applied water to dry soils as necessary to suppress airborne dust. Because the Site is a large, unpaved and exposed area, this BMP became an important control from the beginning of the project. The Contractor applied water as a dust control measure multiple times per day. In addition to using water, the Contractor established on-site haul routes. The frequent use of these roads compacted the surface in these areas and reduced dust.
- Installed a silt fence around the perimeter of the Site with the exception of the perimeter areas that were paved. This BMP prevented contaminated soils from migrating off-site.
- Maintained excavation equipment in good working order.
- Cleaned up any contaminated material resulting from spilled hydraulic oils.
- Established specific truck haul routes between the Site and the disposal locations for off-site transport of contaminated soil.
- Vacuum swept paved areas of the Site and entrances/exits.
- Stockpiled contaminated soil for load-out within the excavation zone.
- Allowed wet soils to drain prior to be loaded for transport.
- Covered truck loads during transport.

In addition to these BMPs, a Spill Protection, Containment, and Countermeasures Plan was prepared to detail how to prevent spills of petroleum products or hazardous materials from occurring or provide efficient and timely cleanup response to spills. There was a single instance of a spill on October 29, 2015, when approximately 2.5 gallons of hydraulic oil spilled to a puddle located between the select fill stockpile and the office building (southeast side of the Site). The Port and Ecology were notified of the spill. The spill was cleaned up through limited use of absorbent pads and then vacuuming the puddle and hydraulic oil up with a vacuum truck.

4.3 EXCAVATION OF CONTAMINATED SOILS

The excavation process began by first surveying in with grade stakes the lateral limits and sidewall bench cut depths of the each excavation area. At this same time, the Contractor excavated and stockpiled the approximate 4 feet of clean structural fill that had been located below the concrete pad as part of its original construction. Removal of this material was important so that the grade in this area matched the plans and the current grading on the rest of the Site.

Initial excavation included the contaminated soil in Excavation Areas 2 and 3 and the excavation around and removal of Pipeline 8. A total of 215 CY of contaminated soil was removed and these areas were immediately backfilled. Field screening and soil sampling conducted at the ground surface on top of and adjacent to Pipeline 8 at the southern portion of Excavation Area 5 identified contaminated soil. It was determined that this soil would have to be excavated as contaminated.

The Contractor then established a contaminated soil stockpile area. The Contractor chose to use the southern part of Excavation Area 5 as an appropriate place to stockpile contaminated soils for load out for the duration of the project. This was a change from the design plans, which had located the stockpile on pavement outside the excavation areas and near the office building. Stockpiling in the southern part of Excavation Area 5 was acceptable because contaminated soil extended to the surface in this area. Adding contaminated soil on top of this soil did not further contaminate the subsurface.

The large-scale excavation started with the north half of Excavation Area 5. Excavation Area 4 was entirely encompassed by Excavation Area 5, and Excavation Area 4 was excavated concurrently with this area. Once the north half of Excavation Area 5 was completed, excavation proceeded in Excavation Area 6. Following completion of excavation of Excavation Area 6, the contaminated soil in the southern portion of Excavation Area 5 were excavated. A total of 54,979 CY of soil was excavated as part of the project. This total includes both clean overburden soil and underlying contaminated soil from Excavation Areas 1 through 6 and the concrete pad fill soil that was excavated. Table 4.2 summarizes the excavation volumes. Figure 4.1 shows the as-built extent of the excavation.

Table 4.2
Excavation Area Soil Volumes[1]

Location	Contaminated Soil Excavated (CY)	Contaminated Soil Disposed (Tons)	Notes
Excavation Area 1	137	Not measured	Volume based on survey volume.
Excavation Areas 2 and 3	*215*	Not measured	Volume based on field observations and design calculation.
Excavation Area 4	*310*	Not measured	Volume based on design calculation.
Excavation Areas 5 and 6	*30,625*	Not measured	Volume based on design calculation and field observations.
Concrete Pad Fill Excavation	6,122	Not measured	Volume of fill that was under the concrete pad and had to be moved prior to excavation of Excavation Area 5. Volume measured by survey.
Total Contaminated Soil	Not measured	53,763	Weight based on truck tickets.
Total Soil Excavated—Concrete pad fill, contaminated, and non-contaminated	54,979	Not measured	Volume measured by survey.

Note:
Italics Indicates an approximate volume.

For each excavation area, the first soils that were removed were typically the clean overburden soil. These soils were excavated with a large excavator, loaded to the "clean" articulated dump truck, and hauled to a stockpile. The thickness of overburden varied across the Site. Field screening using a photoionization detector (PID) was performed continually during excavation to assess if the overburden soil was "likely clean" or "likely contaminated." If the overburden soil being excavated was "likely clean," it was consolidated into 500-CY stockpiles and each stockpile was tested to ensure it met site CULs. Once the stockpile was confirmed clean, it was moved to a central clean stockpile area located adjacent to Excavation Areas 5 and 6 and eventually used as "common borrow" backfill. If the overburden soil being excavated displayed indications of contamination, such as elevated PID response and strong odor, it was sent to the contaminated soil stockpile, generally without further testing. In an effort to validate the field screening methods, in situ analytical samples were occasionally collected for soil that was designated at

"likely contaminated." The concentrations in these samples aided the engineering team in making field screening decisions.

When the design elevation of the clean overburden soil was reached, the soil below that depth was considered uniformly contaminated (based on extensive RI testing) and was excavated out and hauled to the contaminated soil stockpile. Generally this soil was subject to lesser amounts of field screening and analytical testing. Excavation of contaminated soil was conducted with a large excavator, loaded to the "dirty" articulated dump truck, and hauled to the contaminated soil stockpile. Excavation continued in the contaminated soil/smear zone until the design base elevation was reached as defined in the plans and specifications. This base elevation typically corresponded to approximately 2 feet below the average water table elevation at the Site. In Excavation Area 5, the excavation to the base elevation occurred in a series of narrow strips that were as wide as the excavator arm could reach. Crushed concrete, which was used as base fill, was used to dam ponded groundwater from entering into the strip being excavated and to create walkways for survey purposes (refer to Appendix D, Attachment D.1). In Excavation Area 6, the Contractor adjusted methods. All soil lying above the smear zone was first removed, followed by full excavation of the LNAPL or water-saturated smear zone soils. Backfilling with base fill generally occurred immediately following completion of excavation of these sub-areas, which provided a stable working surface for the excavator. Dewatering was also used to draw down the water table prior to excavation for portions of Excavation Area 6. In five 40-foot by 40-foot cells within Excavation Area 6, the hydraulic oil contamination extended deeper than the typical 2-foot depth below the water table. These areas were excavated to a depth of 1 to 2 additional feet deeper than surrounding final excavation elevations to achieve the specified design elevations. Final excavation survey data are provided in Appendix J.

4.4 WATER TREATMENT SYSTEM AND DEWATERING/LIGHT NON-AQUEOUS PHASE LIQUID

In order to effectively excavate soil at elevations below the water table and to allow for proper backfilling, dewatering was used when working in Excavation Areas 5 and 6. In Excavation Area 5, dewatering of the excavation was conducted immediately prior to backfilling so that fill was placed in a dry excavation. In Excavation Area 6, dewatering was used both to facilitate excavation of contaminated soils and to provide a dry excavation for the placement of fill. As discussed in Section 4.3, dewatering was especially critical to allow successful excavation of the five 40-foot by 40-foot grid cells that required deeper excavation for contamination removal requirements (as much as 3 to 4 feet below the typically water table elevation). In Excavation Area 6, dewatering occurred by first digging a perimeter trench to funnel water to a central sump. A trash pump placed in the sump then pumped the water to the treatment system

A water treatment system was assembled and operated by Rain for Rent. Incoming water up to 100 gallons per minute was first treated with a chitosan contactor as it was pumped into an 18,000-gallon under-weir/over-weir tank to remove floating and settleable solids. After the over-weir tank, water was pumped through another chitosan contactor and then into an 18,000-gallon settling tank. From that tank, the water was pumped into a coalescing plate oil/water separator and then into two 1,000-pound carbon vessels prior to discharge into the

sanitary sewer under an Industrial Wastewater Discharge Permit. A total of 549,842 gallons of water was pumped and treated to the sanitary sewer. Discharge Monitoring Reports were submitted to the City of Port Angeles that documented analytical results and volume discharged (Appendix F).

4.5 DISPOSAL OF WASTES

Several different types of waste streams were generated by the project. Each waste material type and its disposal or re-use location is documented in Table 4.3.

Table 4.3
Disposition of Waste Materials

Waste or Material	Disposition
Crushed Concrete	Re-used on-site as base fill within and above the water table.
Wood Piling/Decayed Wood	Disposed of off-site at Waste Management with other surface debris.
Scrap Steel	Recycled off-site at a scrap metal recycler.
Clean Overburden Soil	Re-used on-site as common borrow backfill following receipt of acceptable stockpile sampling results.
Solid Waste and Surface Debris	Approximately 613 CY of surface waste and debris was disposed of off-site at the Columbia Ridge Landfill, a licensed Subtitle D solid waste landfill.
Dioxin-Contaminated Soil	Used on-site as backfill in Excavation Area 6 at depths 1 foot higher than the top of base fill and 1.5 feet below the top of the common borrow fill. This will be at a depth deeper than 5 feet once the Site is brought up to final grade and developed.
Petroleum-Contaminated Soil	Approximately 54,979 tons of contaminated soil was disposed of off-site. 45,937 tons was disposed of at the Columbia Ridge Landfill and 7,846 tons was disposed of at the Wasco Landfill. Both landfills are licensed Subtitle D solid waste landfills.
LNAPL as Free Liquid	Hauled off-site as liquid for treatment and disposal at PRS Group, Inc., in Tacoma, Washington.

4.6 BACKFILLING, BIOAMENDMENTS, AND GRADING

Backfilling activities were conducted in general accordance with the design plans and specifications. Backfilling consisted of four main components: base fill, bio-amendment, common borrow fill, and select fill. Backfilling procedures were consistent for all of the excavation areas.

The base fill was placed first at elevations below and at the water table. This backfill was generally placed soon after or immediately after excavation was complete for a given area. The base fill consisted of crushed concrete from the on-site demolished structures (9,878 tons) and the demolished Elwha Dam (19,579 tons). The base fill was placed to a minimum elevation of 1 foot above the water table. Generally, this meant that between 3 and 4 feet of crushed concrete base fill was placed in the excavation. Following placement of the base fill, the bio-amendment was applied to the excavation areas that extended below the groundwater table. The bio-amendment used was Tersus brand ORC (TersOx^{TM}), a calcium peroxide granular material. The bio-amendment was dispersed by hand or with the excavator bucket and then mixed into the crushed concrete backfill by turning the base fill with the excavator bucket. A total of 19,720 pounds of TersOx^{TM} was placed in Excavation Areas 2, 5, and 6.

Common borrow fill, which consisted of clean, reusable on-site overburden soil, was placed and compacted over the crushed concrete to approximately 5 to 6 feet below the future grade. The first several lifts of the common borrow were compacted to a firm non-yielding condition. The top foot of common borrow fill was compacted to 90 percent of the maximum dry density.

Select fill was placed at the surface of the backfill section. This material had lower fines content than compared to the common borrow fill material and was intended to provide a solid surface from which a future paving section could be build. The select backfill was imported and compacted to 95 percent dry density using a heavy vibratory roller, with the exceptions discussed in Appendix K. As discussed in Section 5.0, major compaction issues were encountered with the common borrow fill during the first season of work because of heavy fall rains. Ultimately backfilling operations were suspended for the winter to wait for dryer weather. Backfilling was completed in the spring of 2016. Figure 4.2 shows the final as-built construction surface. The final planned 2 to 3 feet of the excavation was not backfilled, pending the plans and requirements for an as of yet undetermined Port tenant that will eventually occupy this space and backfill it to their requirements. Final backfill survey data are provided in Appendix J.

4.7 ARCHAEOLOGICAL MONITORING

Archaeological monitoring work was completed in compliance with State of Washington regulations regarding the consideration of cultural resources, including those outlined in the SEPA, and Revised Code of Washington § 27.53 and 27.44. In addition, the Port, the City of Port Angeles, and the Lower Elwha Klallam Tribe (LEKT) have an agreement that all ground-disturbing activities along the City of Port Angeles' waterfront be monitored. Archaeological monitoring at the Site was conducted by professional archaeologists employed by HRA in accordance with the Archaeological Monitoring and Inadvertent Discovery Plan (Appendix H of the EDR).

Archaeological oversight was continuous when excavating but was not required when backfilling. Historic-period debris was noted to be scattered across the surface and within the disturbed overburden layer, throughout the project area. The historic-period debris primarily consisted of construction rubble and wood piles from demolished buildings, and abandoned utilities. Two cow bones (one complete, one saw-cut) were identified during excavation in Excavation Area 6. No archaeological discoveries of significance were encountered. A full report of the archaeological monitoring conducted is included in Appendix E.

4.8 BIO-INJECTIONS

Bio-injections were performed to treat the S. Cedar Street plume of benzene. A Geoprobe rig drove a temporary injection point to a depth of 15 feet, after which the rod was retracted to expose the injection point to the aquifer. The hollow interior of the push rod was connected to the injection point and filled with a slurry mixture of ORC, which was pumped into the aquifer. The slurry mixture was formed by mixing one 25-pound bag of ORC powder with 5 gallons of water according the manufacturer's (REGENESIS) instructions. Each injection row was oriented transverse to the plume axis and the rows were 50 feet apart. The spacing between injection points along each row was approximately 10 feet except when having to avoid utility or fencing obstructions. The as-built layout for the completed injection points is shown in Figure 3.3.

A total of 65 injections were completed following the excavation of contaminated soil from November 11 to 17, 2015. This was a deviation from the originally planned 86 injection points. Twenty-one of the planned injection point locations were made inaccessible due to the push-out of the Area 6 excavation extent along its western edge. This push-out made the planned injection points impossible for the drill rig to access, as the rig could not enter Excavation Area 6. Initial results from post-excavation Geoprobe screening samples collected in March 2016 suggest significant improvements in groundwater quality in the areas that were injected along S. Cedar Street (see Section 7).

4.9 INFILTRATION GALLERIES

Five parallel infiltration galleries were placed at a depth of approximately 1 foot above the water table. The infiltration galleries were installed at locations approximately 100 to 200 feet apart in the excavation area (refer to Figure 4.2) in order to provide a distribution network for additional bio-amendments throughout the contaminated groundwater area should that be necessary. The infiltration galleries are constructed of 2-inch-diameter perforated polyvinyl chloride (PVC) piping (refer to Appendix D, Attachment D.2). A second 6-inch-diameter perforated PVC pipe was installed next to the 2-inch-diameter pipe to allow for larger/faster addition of amendments as well as potential future use for stormwater infiltration (following groundwater cleanup). The pipes are wrapped in a filter fabric to prevent soil clogging and are embedded in pea gravel place atop the crushed concrete base fill. Generally, the pipes are gently sloped (0.5 percent) from each end to a low central point to ensure that the bioremediation amendment that is injected reaches the entire length of the gallery (refer to Figure 4.2). There are vertical PVC risers set on either side of the infiltration gallery that will be used to inject the bioremediation amendment. The

pipes are capped and surrounded by Ecology blocks. In the future, when the grade at the Site is finished, the infiltration gallery risers will be cut down and set in protective vaults at grade.

4.10 COMPLETION OF BACKFILL AND DEMOBILIZATION

As previously mentioned, inclement weather in November 2015 forced a delay in the final backfilling and compaction of Excavation Areas 5 and 6. ERRG re-mobilized to the Site in late April of 2016 and aerated stockpiled soils for drying, placed the dioxin-contaminated soil that had been stockpiled from Excavation Area 1 in the northern part of Area 6 (refer to Figure 4.2), reworked and dried some excessively wet areas of common borrow, and then placed additional common borrow and select fill. Some of this additional borrow was derived on-site by cutting down the surface grade between the western edge of excavation and the property boundary. Approximately 3 to 4 feet of surface soil was excavated in this area such that the entire western half of the Site, extending to the property boundary, is now at a common grade with Excavation Areas 5 and 6. The select fill above the common borrow was then placed within the entire excavation area. The select fill was roller compacted to 95 percent dry density. In total, 34,716 bank CY of backfill were placed (this includes base fill, common borrow fill, and select fill as measured by survey). Refer to Appendix K, the Geotechnical Report, for more information on the backfilling and compaction.

ERRG completed work and demobilized from the Site the week of May 9, 2016. Figure 4.2 shows the current topography of the Site following demobilization by ERRG.

5.0 Construction Quality Assurance and Control

The following paragraphs detail how construction quality assurance (CQA) was achieved throughout all phases of the project.

5.1 CONSTRUCTION QUALITY ASSURANCE PROTOCOLS

CQA was addressed by implementation of the following protocols:

- **Documentation and Reporting.** Both ERRG and Floyd|Snider provided running documentation of the work performed; ERRG on a daily basis and Floyd|Snider on a weekly basis. The weekly and daily progress reports are included in Appendix G and H, respectively.
- **Submittal Management.** The Contractor was required to submit certain pre- and post-construction documentation for review and approval by the Floyd|Snider Project Engineer. These submittals included project schedules, a health and safety plan, construction plan, shoring plan, product information, spill prevention plan, and post-construction as-built drawings.
- **Progress Meetings.** Weekly progress meetings were held throughout the construction phase of the project. Attendees to these meetings included representatives from ERRG, the Port, Floyd|Snider, and Ecology. An agenda was prepared for each meeting and minutes were kept. Copies of the agendas and minutes of each progress meeting are in Appendix G.
- **Construction Oversight and Inspections.** Personnel from Floyd|Snider provided oversight during the construction activities to ensure compliance with the contract documents and the design. In addition to providing oversight, Floyd|Snider was responsible for reviewing and approving Contractor invoices to verify that the work was correctly billed to the Port.
- **Design Modifications.** Any modifications to the design drawings or specifications had to be submitted in writing by ERRG and approved by the Project Engineer and the Port. However, there were few design modifications of significance (refer to Section 5.8).

5.2 PROGRESS SOIL SAMPLING

Soil samples were obtained regularly during excavation for several purposes. These include confirming certain areas of the Site as being contaminated prior to excavation; verifying the field screening observations using the PID; and confirming certain aspects of the site conceptual model (e.g., verifying high levels of soil contamination under Pipeline 8 after its removal or assessing comingling of gasoline and hydraulic oil in Excavation Area 6).

The locations of all progress samples taken are shown on Figure 5.1. Analytical results for progress samples collected from contaminated areas that were subsequently excavated are

presented in Table 5.1. This table presents analytical results and rational for why each sample was collected.

Three representative samples of LNAPL that pooled during excavation of Excavation Area 6 were collected and analyzed for hydrocarbon fingerprinting to assess the degree of comingling of gasoline and hydraulic fluid. In addition, a full scan of the LNAPL for a variety of contaminants was required for profiling the LNAPL for disposal purposes when cleaning out the wastewater treatment system. The fingerprinting/waste characterization report for the LNAPL samples is contained within the analytical laboratory reports in Appendix B. Results demonstrate the comingling of gasoline and hydraulic oil in the sample labeled "NAPL-1," which was the most downgradient of all the NAPL samples collected and was approximately 40 feet south of the bulkhead. Results of the LNAPL waste characterization sampling did not indicate the presence of unrelated contaminants such as PCBs, metals, or chlorinated solvents.

5.3 CONFIRMATIONAL SAMPLING

Confirmation samples consisted of two types: sidewall confirmation and stockpile confirmation. Both types of samples are discussed separately below.

5.3.1 Sidewall Confirmational Sampling

In accordance with the requirements of the EDR, confirmation samples of the sidewalls of the excavation were taken at regular 40-foot intervals along the entire perimeter of Excavation Areas 5 and 6 to confirm that the lateral limits of the final excavation area met either the CULs (applicable to Excavation Area 6 and the vadose zone soils of Area 5) or RLs (applied to only the smear zone soils of Excavation Area 5). The sample that was collected was from the sidewall depth displaying the greatest field indications of contamination, which in nearly all cases was from the smear zone soils at depths typically between 8 and 11 feet bgs. For the much smaller Excavation Areas 2 and 3, one representative sample was collected from a sidewall after all field indications of contamination were excavated out. Confirmational sampling of the base of each excavation area was not done as the target elevations for excavation were established pre-construction by continuous depth sampling in each grid area, as documented in the EDR.

If initial sidewall sampling indicated that the applicable cleanup or RLs were not met, then additional excavation occurred to extend the limits of the excavation. Samples with results that initially exceeded the cleanup or RLs, or "failed samples," are included with the progress sample results shown on Table 5.1. Final confirmation samples that document post-construction contaminant levels are listed on Table 5.2 and locations of samples are shown in Figure 5.2. In some grids, more than one confirmation sample was collected in order to better document post-construction conditions.

The final confirmation samples with the greatest residual concentrations were from Excavation Area 5, as excavation was only necessary to achieve RLs in smear zone soils (CULs applied to vadose zone soils). The greatest levels of residual gasoline contamination in any Area 5 smear zone sidewall sample was 2,000 mg/kg, much less than the 3,000 mg/kg RL. Residual benzene

concentrations were all under 1 mg/kg, much less than the RL of 10 mg/kg. It is important to note that the soil cleanup levels for toluene, ethylbenzene, and xylene were exceeded in two final confirmation samples from the smear zone along the eastern edge of Area 5 that also had the greatest levels of residual gasoline (i.e., G8-S-9.5 and G11-S-9). It was decided not to excavate farther in these areas due to the fact that toluene, ethylbenzene, and xylenes are not groundwater COCs, so additional excavation would not result in additional protection of groundwater quality.

Additionally, in the southwest corner of Excavation Area 5, close to where Pipeline 8 ran, three final confirmation samples from the vadose zone (B14-S-5.5, C15-S-3, and E15-S-8) contained GRO or benzene, toluene, ethylbenzene, and total xylenes (BTEX) compounds at concentrations greater than their respective CULs. It was not possible to extend the excavation farther at these locations as the excavation boundary was already at its limit with S. Cedar Street and the adjacent alley.

In Excavation Area 6, where the CULs applied, every final confirmation sample was non-detect for the constituents analyzed for.[1]

5.3.2 Excavation Areas 5 and 6 Stockpile Confirmational Sampling

Overburden in Excavation Areas 5 and 6 that was free of field screening indications of contamination was temporarily stockpiled into 500-CY piles and each pile was tested to ensure that the stockpile would be suitable for re-use as backfill. The samples that were collected from the stockpiles were typically analyzed by the hydrocarbon identification (HCID) screening test on a 24-hour turnaround basis. This was to allow the temporary stockpile to be moved out of the excavation area to the larger stockpile lying outside the excavation that was used to store all overburden until it could be used for backfill. A total of 76 temporary stockpiles were created and tested. Five of those stockpiles had analytical results that caused the stockpile to be classified as contaminated. These stockpiles were transported to the contaminated soil stockpile for loadout as contaminated. Table 5.3 contains a summary of the results for stockpiles that were confirmed to be suitable for re-use as backfill and the grid location(s) from which these overburden stockpiles originated. Results for stockpiles that were sampled for potential re-use but rejected due to the presence of contamination are presented with excavated soil data in Table 5.1.

5.4 DATA MANAGEMENT AND VALIDATION

A U.S. Environmental Protection Agency (USEPA) Level 2A data quality review was performed on TPH and BTEX resulting from laboratory analyses for all the samples collected during the project (refer to Appendix B). Samples analyzed for HCID did not undergo a compliance screening review because HCID screening tests do not have data quality compliance requirements. The analytical

[1] Excavation Area 6 confirmation samples were all analyzed for GRO and BTEX but only analyzed for DRO in selected areas of the hydraulic oil release.

data that were validated were done in accordance with the USEPA *National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA 2014).

A total of 195 soil samples were submitted in 36 sample delivery groups (SDGs) to Friedman & Bruya, Inc. of Seattle, Washington, for chemical analysis of TPH by NWTPH-Dx/Gx and BTEX by USEPA 8021B. For all SDGs, the analytical holding times were met and the method blanks had no detections. Surrogate, matrix spike, matrix spike duplicate, laboratory control sample recoveries, and matrix spike/matrix spike duplicate relative percent differences (RPD) all met USEPA guidelines.

For SDGs FB508138, FB510012, and FB510376, the laboratory noted that several samples were received with incorrect preservation or in a container not approved for methods NWTPH-Gx and USEPA 8021B, and that the values reported should be considered estimates. All detected results from these methods for samples collected under Pipeline 8 (Pipe 8-60 Base, Pipe 8-60 +1, Pipe 8-60 +2, and Pipe 8-60 +3) as well as other miscellaneous samples (SP-15, C13-contam-6-8, E13-contam-3-4, G6-contam-9-10, C15-contam-9-10, C14-contam-6-7, and F14-contam-8-9) have been flagged "J" and non-detect results have been flagged "UJ" to indicate they are considered estimates. None of these samples flagged "J" were final confirmational sidewall samples.

For SDG FB508138, the sample/sample duplicate RPD for gasoline in sample Pipe 8-60 +3 was outside the laboratory control limits. The laboratory noted that the analyte was detected at level less than five times that of the reporting limit and the RPD results may not provide reliable information regarding the variability of the analyte. As this result has already been flagged "J" due to preservation or container issues, it is with professional judgment that no additional qualifiers are required based on this RPD information.

Based on the data quality review, data were determined to be of acceptable quality for use as reported by the laboratory unless specifically qualified above.

5.5 IMPORT MATERIAL QUALITY CONTROL

All backfill materials imported to the Site underwent quality control testing to insure that they met the geotechnical and environmental/chemical specifications prior to being accepted for use by the Project Engineer. This included sampling of the Elwha Dam crushed concrete (base fill) and imported select fill from local quarries. Imported quarry spalls were evaluated to ensure they met geotechnical requirements but no chemical sampling was conducted. Analytical results for imported materials are included in Appendix I. These reports document that the concentrations of contaminants in the imported materials were less than the acceptable criteria for metals, TPH, and BTEX. Also contained within Appendix I is a tracking sheet documenting the source of the material and the tonnage delivered to the Site from each source.

5.6 HEALTH AND SAFETY COMPLIANCE

No reportable injuries occurred during the execution of the work. Compliance with the health and safety plan was addressed by holding morning safety briefings, wearing the correct personnel protective equipment, use of backup beepers on heavy equipment, and other routine safety protocols for construction activities. For respiratory protection, air monitoring using the PID was done continuously during excavation and if the action level was exceeded, then moving upwind, applying odor suppression foam, or using air purifying respirators was initiated. To assess if workers were being exposed to BTEX, personal air monitoring was conducted on an ERRG laborer and equipment operator during 4 hours of work on September 15, 2015. The samples were collected by a third party contracted to ERRG and the samples were collected from the breathing zone of those workers. No BTEX or other volatile organic compounds were detected in the samples. The analytical report documenting these results is included in Appendix C.

5.7 MATERIAL HANDLING AND DISPOSAL QUANTITIES

Two facilities were utilized for disposal of contaminated soil. The majority of the contaminated soil was trucked to the North Mason Fiber Recycling transfer station in Belfair, Washington. The material trucked to the North Mason Fiber facility was transported by rail for permanent disposal as daily cover at the Columbia Ridge Landfill in Arlington, Oregon. A smaller volume of contaminated soil was trucked directly to the Wasco County Landfill near The Dalles, Oregon. The use of Wasco County Landfill was necessary for only a limited time period due to the daily production quantity and volume of soil that North Mason Fiber Facility could receive each day. Truck tickets for soil disposal are included in Appendix M.

Figure 5.3 is a chart that shows the weekly tonnage as well as the cumulative tonnage of disposal of contaminated soil. In total, 53,763 tons of contaminated soil was disposed.

5.8 DEVIATIONS FROM DESIGN

Several deviations from the design presented in the EDR and/or Construction Plans and Specifications occurred over the course of the project. Each deviation of note is discussed in the following sections.

5.8.1 Less Clean Overburden than Anticipated

There was significantly less clean overburden soil in the vadose zone than anticipated, in both Excavation Area 5 as well as Excavation Area 6. In Excavation Area 5, the gasoline-contaminated soil was found very close to ground surface in the Pipeline 8 release area as expected. However, this near surface contamination extended downgradient further than expected. The EDR anticipated that the northern half of Excavation Area 5 would have no vadose contamination (i.e., absent in the upper 8 feet of soil) and the southern half of Excavation Area 5 would have only 4 feet of vadose zone contamination. In reality, an additional 1 to 4 feet of vadose zone contamination was found in Excavation Area 5. This zone of vadose contamination became

progressively deeper and thinner toward the north. This resulted in an additional approximately 2,600 CY of contaminated soil removed from this excavation area.

In Excavation Area 6, the surface soils surrounding the historical hydraulic presses were found to be contaminated with hydraulic oil at ground surface in a much larger area than anticipated. This resulted in an additional approximately 1,750 CY of contaminated soil removed from this excavation area.

The result of both of these conditions resulted in approximately 4,350 CY more contaminated soil that was segregated out of the clean overburden than anticipated

5.8.2 Soil Heavier Than Anticipated

The weight of the soil that was exported as contaminated soil was much heavier than anticipated because it was much siltier and wetter than expected. The EDR assumed a dry silty sand soil weight of 1.3 tons per CY, when in fact, the actual overall weight was 1.6 to 1.8 tons per CY, an increase of at least 25 percent. This heavier soil weight did not change the size of the excavation area, but instead caused a need for more trucks than anticipated, as each truck was loaded to its weight capacity, not volume capacity. The heavier weight of the soil also increased the project cost because the contract pay item was based on a per ton basis.

5.8.3 Expansion of the Excavation Area 5 and 6 Excavation Perimeter

The final excavation perimeter was reasonably close to the design perimeter with the exception of the area around the former hydraulic oil presses in the southwestern portion of Excavation Area 6. The sidewalls in this area were pushed out an additional 30 to 40 feet farther to the southwest in this area in order to fully excavate soil with chemical concentrations greater than CULs. A few other areas along the perimeter also had to be pushed out as a result of failed confirmation samples, but these push outs were limited in extent and, at most, resulted in a lateral expansion of 10 to 15 feet. In total, the excess soil resulting from expansion of the excavation perimeter is estimated to have been an additional 3,300 CY.

5.8.4 Using Surrounding Area for Common Borrow Fill

Given that more contaminated soil was exported from the Site than anticipated, there was a need for additional common borrow fill. In order to save costs and to obtain the additional common borrow fill needed for backfilling, it was decided to use for this purpose the geotechnically suitable clean soils outside the perimeter of Excavation Areas 5 and 6. This was done by cutting down as much as the top 4 feet of the surrounding clean soils for use as common borrow fill within the excavation area. The eastern margin of the Site was found to have very little suitable material, which was not utilized. This decision was made in consultation with Ecology. Once this excavation was completed and the soil was compacted in the excavation areas, 2 feet of select fill was placed over the entire area (including the area outside the original remedial excavation) and compacted to 95 percent dry density. This had the effect of straightening the boundaries of the excavation and properly compacting the perimeter subgrade. Finally, the upper 2 feet of

backfill was never placed because it was decided that the final 2 feet would be better off backfilled as part of redevelopment. Therefore, as mentioned earlier, the current surface of the western half of the Site is approximately 2 to 4 feet lower than surrounding grade (i.e., 2 feet lower than the elevation of S. Cedar Street).

5.8.5 Adding the Quarry Spalls to Remove the Sheetpile

The construction delay in November 2015 meant that Excavation Area 6 would not be backfilled to an elevation that would support the bulkhead wall without the sheetpile wall or support a crane to remove the sheetpile. In order to remove the sheetpile, which otherwise would not be removed for another 6 months at a high rental cost, quarry spalls were imported to build a platform and wall at the north end of Excavation Area 6 and along the bulkhead. A crane could then be mobilized and used to remove the sheetpile. Approximately 2,100 tons of quarry spalls were used for this purpose (refer to photographs in Appendix D, Attachment D.1). In the spring of 2016, the quarry spall platform was reconstructed to be a 2H:1V wall to support the bulkhead. The remainder of the quarry spalls were removed from the excavation and stockpiled on the east side of the Site for future use by the Port.

5.8.6 Bio-Injections That Were Not Done

Twenty-one of the originally planned 86 bio-injection points in S. Cedar Street were not completed because these injection points lay primarily in the part of Excavation Area 6 where the perimeter was significantly expanded out. Therefore, the contaminated soil in this area was removed from the smear zone as part of construction, lessening the need for bio-injection. In addition, the soft and wet soil conditions at the base of the excavation prevented the Geoprobe rig from accessing this area when it was mobilized to the Site in November to perform the other bio-injections.

5.8.7 Sheetpile Location Adjustment

The planned location of the shoring alignment had to be relocated to the south by approximately 10 to 15 feet because the location of the bulkhead and road along the bulkhead in the field did not match the location of the bulkhead and road along the bulkhead on the design plans. The intent of the design had been to locate the shoring at the south edge of the road on the bulkhead and this change was considered minor. The change was made in consultation with Ecology.

6.0 Institutional Controls/Soil Management Plan

Soil in certain locations within the Site has COC concentrations greater than Site CULs. This soil is primarily gasoline-contaminated and mostly located in and around Excavation Area 5. In addition, certain areas at the base of the former log pond is contaminated with heavy oils. All of the known areas of residually contaminated soil and their depths of occurrence are shown on Figure 6.1.

Per the CAP, institutional controls will be required in areas where post-excavation soil or groundwater concentrations exceed applicable MTCA Method A or B CULs (e.g., for petroleum-related contaminants) and in areas where MTCA Method C is the applicable CUL (e.g., backfilled dioxin-containing soil). Institutional controls at the Site will include the following:

- An Environmental Covenant indicating that industrial CULs were applied at the Site and that the future uses of the property need to be consistent with industrial uses and CULs.
- Prohibition on withdrawal of groundwater except for monitoring purposes.
- Implementation of an Ecology-approved soil management plan specifying soil management procedures for future excavation and health and safety requirements for subsurface work in areas where contamination concentrations greater than CULs remain. These procedures will be applicable to any future site redevelopment or maintenance that involves removal or disturbance of subsurface material. The soil management plan is included as Appendix L to this report.
- Additional testing and analysis to evaluate the actual risk of vapor intrusion into potential future buildings constructed at the Site where contamination in either soil or groundwater remains at concentrations greater than CULs and what, if any, remedial measures may be necessary due to the contamination (such as a vapor barrier).

7.0 Monitoring Well Installation

Figure 7.1 shows the post-excavation groundwater monitoring network. To construct this network, 12 new performance monitoring wells (PP-36, PP-35, PP-33, PP-32, PP-31, PP-30, PP-29, PP-28, PP-27, PP-15R, PP-14R, and PP-13R) were installed in late July 2016 to re-establish the site performance well network (performance wells are used to judge effectiveness of the cleanup). In addition, two new compliance monitoring wells (PP-18R and PP-34) were installed near the bulkhead along the CPOC to supplement three existing site compliance monitoring wells (PP-17, PP-19, and PP-20). In addition, 7 existing wells were decommissioned (PP-25, PP-24, PP-9, PZ-11, PZ-10, PZ-02, and PZ-01) as they were outside of the groundwater contamination areas and were not needed for continued performance or compliance monitoring of the Site. PZ-07 and PZ-05 were planned to be decommissioned, but were not located during the well installation event, so it is assumed they were abandoned or buried during construction. Appendix N contains the well logs for each of these new wells.

The final groundwater performance monitoring well locations were modified slightly from what was proposed in the EDR based on the results of the March 2015 Geoprobe groundwater investigation conducted in S. Cedar Street (refer to Figure 7.1). This investigation found that the S. Cedar Street plume was significantly reduced in size from its presumed extents in the EDR. The following modifications were made to the performance monitoring well locations:

1. PP-32 was moved approximately 25 feet west in order to characterize groundwater conditions downgradient of PZ-12, which appears to be close to the current downgradient edge of the S. Cedar Street plume. Samples collected near the original PP-32 location did not have detectable benzene or GRO.
2. PP-33 was moved from its location at the southwestern edge of the historically understood extents of the S. Cedar Street plume because benzene and GRO were not detected in any samples collected from this area. The well was moved to the south to be near the former location of PZ-11 in the vicinity of a sample collected from the western boundary of the Site, where benzene exceeding the CUL was detected.
3. PP-35 was moved approximately 100 feet northwest to assess groundwater downgradient of PZ-10, which detected GRO and benzene at concentrations greater than the CUL during the March 2015 sampling event.

All wells will be monitored quarterly for a minimum of 2 years for GRO, DRO, and BTEX. The long-term groundwater monitoring plan is presented in further detail in the Sampling and Analysis Plan (Appendix G of EDR). Results of each monitoring event will be reported to Ecology quarterly.

8.0 Summary and Opinion

In summary, the constructed remedial action at the Site accomplished the cleanup goals of the project by excavating and disposing of off-site 53,765 tons of contaminated soil, including the highly contaminated soils in the Gasoline and Hydraulic Oil Areas. The applicable CULs or RLs for soil were met in all six excavation areas per the requirements of the CAP with the exception of Excavation Area 5 where, at three locations, the presence of S. Cedar Street and the alley prevented further excavation, and also at two locations along the eastern edge of the excavation area where soil contained exceedances of the CUL for toluene, ethylbenzene, and/or xylene.

After the contaminated soils were removed, a bio-amendment was mixed in the base fill placed below the water table to treat residual groundwater contamination. Bio-amendment was also injected into the dissolved phase contaminated groundwater plume downgradient of the excavated areas and in S. Cedar Street to accelerate the restoration of site groundwater. Five infiltration galleries were installed to allow further treatment of any residually contaminated groundwater if necessary.

Soil contamination greater than CULs (but less than RLs) still remains in certain parts of Excavation Area 5(the Gasoline Area). However, per the remedial design, this soil is located well away from the bulkhead soils and so less of a threat to the waters of Port Angeles Harbor. These remaining contaminated soils will be monitored every 5 years as described in the CAP to ensure the concentrations are declining over time (due to natural attenuation processes) and are not a threat to groundwater quality. The only other area of the Site that has contamination at concentrations greater than CULs is in one part of the former log pond where DRO exists at concentrations greater than CULs in soil at approximately 12 feet bgs. This soil will be subject to institutional controls to ensure it does not pose a risk to human health and the environment in the future.

It is the Project Engineer's opinion that the cleanup was performed in accordance with applicable requirements under MTCA and met the objectives of the CAP.

9.0 References

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Tables

Table 4.1
Chronology of K Ply Construction Events

Week	Dates	Major Accomplishments
1	08/03/2015–08/07/2015	Contractor mobilization. Stormwater Temporary erosion and sediment controls (TESCs) and best management practices (BMPs) implemented. Surveyor demarcated excavation areas. Excavation began under concrete pad with archaeological monitoring. Pipeline 8 exposed. Begin ambient air quality monitoring with photoionization detector during excavation of anticipated contaminated soil. Sampling of structural fill under pad to confirm suitable for reuse.
2	08/10/2015–08/14/2015	Haul roads and wheel wash constructed, additional stormwater BMPs implemented. Pipeline 8 removed. Visual inspection of pipe revealed several holes. Sheetpile installed along bulkhead. Excavation, backfill, and compaction of Excavation Area (EA) 3. Excavation of EA 2 and confirmation sample collection. Begin hauling of contaminated soil. Continued archaeological monitoring and ambient air quality monitoring. Begin post-excavation surveying.
3	08/17/2015–08/21/2015	Excavation of north part of EA 5 and confirmation sample collection, clean overburden range of 4 to 8 feet bgs. Segregation of overburden, sampling to confirm clean stockpiles suitable for reuse. EA 4 excavation completed. Begin backfilling base fill layers of EAs 4 and 5 using crushed concrete from former mill buildings. EA 2 backfilled, compacted, and graded. Continued hauling of contaminated soil, archaeological monitoring, ambient air quality monitoring, and post-excavation surveying.
4	08/24/2015–08/28/2015	Washington State Department of Ecology (Ecology) National Pollutant Discharge Elimination System (NPDES) inspection, TESC improvements implemented by ERRG. Excavation, confirmation sample collection, and base backfill in north EA 5. Odor complaints led to use of foam application to contaminated soil stockpile. Site visit by Olympic Air Quality Agency to investigate complaints. Water treatment system arrived and installed. Site prep for weekend rain. Continued hauling of contaminated soil, archaeological monitoring, ambient air quality monitoring and post-excavation surveying.
5	08/31/2015–09/04/2015	Excavation, confirmation sampling, and minor dewatering in north EA 5. Segregation of overburden, sampling to confirm clean stockpiles suitable for reuse. Additional haul road constructed. Additional water treatment equipment delivered. Odor still an issue. Continued hauling of contaminated soil, archaeological monitoring, and post-excavation surveying.
6	09/07/2015–09/11/2015	Water treatment system setup. Excavation of EA 6 began; excavated surface soils segregated for disposal and sampled to confirm contaminated; clean overburden segregated for reuse from west side of EA 6. EA 6 to be excavated entirely to water table, dewatered, and then continued to be excavated to final depth. Northern portion of EA 5 backfilled, dewatered, and applied with bioamendment. Continued hauling of contaminated soil, archaeological monitoring, and ambient air quality monitoring.
7	09/14/2015–09/18/2015	Continued excavation of EA 6 and confirmation sample collection. Found contaminated soil at surface near location of the lathe. Segregation of overburden, sampling to confirm clean stockpiles suitable for reuse. First 1-foot lift of common borrow fill placed and compacted in EA 5 under geotechnical oversight. Personal air monitoring conducted for some laborers and operators. Continued hauling of contaminated soil, archaeological monitoring, ambient air quality monitoring, and post-excavation surveying.
8	09/21/2015–09/25/2015	Continued excavation of EA 6 and confirmation sample collection, with more surface contamination found than expected. Test pits dug throughout EA 6 to determine full extent of surface contamination. Excavated surface soils segregated for disposal. Ecology NPDES inspection occurred, no changes requested. Begin importing additional base course crushed concrete from Elwha Dam. Continued hauling of contaminated soil, archaeological monitoring, and ambient air quality monitoring.
9	09/28/2015–10/02/2015	Smell of gasoline increased as excavation of EA 6 progressed to the east. Sprayed stockpile with odor-suppressing foam. Excavation of EA 6 to the water table; confirmation sample collection complete. Excavation of southern and western portions of EA 5. Excavation in deeper grid cells up to 4 feet below water table at eastern edge of EA 6 began with sidecasting the soil to drain. Dewatering trenches installed to allow deeper excavation. Non-aqueous phase liquid (NAPL) samples collected for hydrocarbon fingerprinting. Continued hauling of contaminated soil, archaeological monitoring, ambient air quality monitoring, and post-excavation surveying. Continued import of base course concrete, begin import of select fill.
10	10/05/2015–10/09/2015	Continued excavation of EA 6 and confirmation sampling, backfilling with crushed concrete, and import of base concrete and select fill. Dewatering began at EA 6 at 100 gallons per minute throughout the week; re-started dewatering water treatment. By end of week, half of EA 6 excavated to final grade and backfilled to just above the water table. More base fill necessary in soft soils than anticipated. Continued hauling of contaminated soil, archaeological monitoring, ambient air quality monitoring, and post-excavation surveying. Site prep for weekend rain.
11	10/12/2016–10/16/2015	Complete excavation to base of EA 6 and backfilled to just above the water table with crushed concrete base fill. Bioamendment applied to EA 6. Continued import of base concrete and select fill. Continued hauling of contaminated soil, but end active full time archaeological monitoring. Collection of treated dewatering water sample. City of Port Angeles inspection of water treatment system.
12	10/19/2015–10/23/2015	Sidewall at southwest corner of EA 6 excavated farther due to confirmation samples exceeding cleanup levels. Excavation began in south side of EA 5 in same manner as EA 6, encountered 4 to 5 feet of overburden as anticipated, sampled to confirm clean stockpiles suitable for reuse. Collected confirmation samples in EA 5. First lift of common borrow fill placed in EA 6. Continued import of base concrete and select fill. Continued off-site disposal of contaminated soil.
13	10/26/2015–10/30/2015	Continued backfilling of EA 6 and excavation of contaminated and confirmation sampling of south end of EA 5. No more clean overburden to remove. Rain caused issues with compaction of backfill, so backfill temporarily suspended. Site visit by geotechnical engineer to evaluate soft spot along sheetpile wall and site visit by Ecology. Continued import of base concrete and select fill. Continued off-site disposal of contaminated soil.
14	11/02/2015–11/06/2015	Finished excavating and backfilling south portion of EA 5. Bioamendment applied in southern portion of EA 5. Water treatment system dismantled. Thin lift of concrete placed in EA 6. Discussion of finishing backfill in next dry season. Finished off-site disposal of contaminated soil.
15	11/09/2015–11/13/2015	Continued backfilling of south EA 5 before stop work. ERRG prepped and sealed site for winter shutdown. Drilling for bioamendment injections in Cedar Street began. Final confirmation sample collection.

Table 4.1
Chronology of K Ply Construction Events

Week	Dates	Major Accomplishments
16	11/16/2015–11/20/2015	Drilling for bioamendment injections in S. Cedar Street finished. Additional demobilization and site preparation for winter season.
NA	11/23/2015–04/22/2016	Weather Delay
17	04/25/2016–04/30/2016	Contractor re-mobilization. Dioxin contaminated material placed in floor of north EA 6 in thin lift. Re-arrange stockpiles to aerate. Began installation of infiltration galleries. Soft spots in EA 5 and 6 compacted and ready for further fill.
18	05/02/2016–05/06/2016	Continued and finished installation of the infiltration galleries. Continued backfill and compaction of EAs 5 and 6 under oversight by geotech. Had to rip some areas of EA 5 to dry it out before re-compacting it. Began perimeter excavation to excavate down the perimeter and use that as fill in EAs 5 and 6.
19	05/09/2016–05/13/2016	Finished backfilling and compaction, placed infiltration gallery plugs and ecology block protection, generated punch list, completed punch list items, demobed from the site.
20	07/26/2016–07/29/2016	Long-term monitoring network wells installed. Eight wells decommissioned.

Table 5.1
Excavated Soil Sample Results

Grid Cell	Excavation Area	Sample Depth (approximate)	Sample ID	Sample Date	HCID			TPH			BTEX				Sample Description
					Gasoline (mg/kg)	Diesel (mg/kg)	Heavy Oil (mg/kg)	Gasoline-Range Organics (mg/kg)	Diesel-Range Organics (mg/kg)	Oil-Range Organics (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes, Total (mg/kg)	
Stockpile Samples															
D9, D10	EA 5	6–8 feet bgs	SP-15	08/18/2015	**30 J**	50 U	250 J	**1,400 J**	--	--	**2.0 UJ**	**9.0 J**	**14 J**	**46 J**	Failed stockpile from EA 5.
B7, C7, C8	EA 5	0–4 feet bgs	SP-35	09/08/2015	30 U	50 U	**21,000 J**	--	--	--	--	--	--	--	Failed stockpile from EA 6.
B5, B6	EA 6	0–4 feet bgs	SP-61	09/21/2015	30 U	50 U	**7,600 J**	--	--	--	--	--	--	--	Failed stockpile from EA 6.
B5, B6	EA 6	0–4 feet bgs	SP-64	09/22/2015	30 U	50 U	**4,200 J**	--	--	--	--	--	--	--	Failed stockpile from EA 6.
G6, G7	EA 6	5–7 feet bgs	SP-66D	09/29/2015	**30 J**	50 U	250 U	--	--	--	--	--	--	--	Failed stockpile from EA 6.
NA	NA	NA	Contam-1	09/18/2015	**30 J**	430 J	340 J	--	--	--	--	--	--	--	Daily contaminated confirmation sample. Taken directly from the off-site disposal stockpile.
NA	NA	NA	Contam-2	09/18/2015	**30 J**	50 U	50 U	--	--	--	--	--	--	--	Daily contaminated confirmation sample. Taken directly from the off-site disposal stockpile.
NA	NA	NA	Contam-3	09/18/2015	**30 J**	50 U	580 J	--	--	--	--	--	--	--	Daily contaminated confirmation sample. Taken directly from the off-site disposal stockpile.
Progress Samples															
B14	EA 5	0–4 feet bgs	B14-contam-0-4 (2)	10/16/2015	**30 J**	50 U	250 U	--	--	--	--	--	--	--	Failed contaminated confirmation sample.
B14	EA 5	0–4 feet bgs	B14-contam-0-4	10/16/2015	**30 J**	50 J	250 U	--	--	--	--	--	--	--	Failed contaminated confirmation sample.
C8	EA 5	NA	C8-Bench	09/08/2015	--	--	--	6.9	**8,600 JM**	**100,000**	0.020 U	0.14	0.020 U	0.060 U	Failed sample confirming the need to excavate the bench.
C13	EA 5	3–4 feet bgs	C13-contam-3-4	09/30/2015	**30 J**	790	250 U	--	--	--	--	--	--	--	Failed contaminated confirmation sample.
C13	EA 5	6–8 feet bgs	C13-contam-6-8(2)	10/07/2015	**30 J**	1,900 J	250 U	--	--	--	--	--	--	--	Sample to confirm contaminated soil vadose zone depths in EA 5 south. This was a resample due to results that were not in sync with field observations of strong odor and high PID readings.
C14	EA 5	1 foot above location of pipeline	Pipe 8-60 +1	08/07/2015	--	--	--	**1,900 J**	--	--	**0.65 J**	**7.8** J	**16 J**	**97 J**	Failed sample taken along Pipeline 8.
C14	EA 5	2 feet above location of pipeline	Pipe 8-60 +2	08/07/2015	--	--	--	23 J	--	--	0.06 J	0.071 J	0.27 J	1.5 J	Sample taken along Pipeline 8. Soil disposed of off-site due to strong odor and high PID readings.
C14	EA 5	3 feet above location of pipeline	Pipe 8-60 +3	08/07/2015	--	--	--	23 J	--	--	0.04 J	0.029 J	0.11 J	0.57 J	Sample taken along Pipeline 8. Soil disposed of off-site due to strong odor and high PID readings.
C14	EA 5	6–7 feet bgs	C14-contam-6-7	10/23/2015	**30 J**	740 J	250 U	**41**	--		0.020 U	0.038	0.040	0.19	Failed contaminated confirmation sample.
C14	EA 5	At pipeline	Pipe 8-60 Base	08/07/2015	--	--	--	23 J	--	--	**15 J**	**69 J**	**60 J**	**330 J**	Failed sample taken along Pipeline 8.
C15	EA 5	9–10 feet bgs	C15-contam-9-10	10/23/2015	**30 J**	1,400 J	250 U	**640**	--		**1.4**	2.7	**11**	4.7	Failed contaminated confirmation sample.
E13	EA 5	3–4 feet bgs	E13-contam-3-4(2)	10/07/2015	**30 J**	**8,000 J**	250 U	--	--	--	--	--	--	--	Sample to confirm contaminated soil vadose zone depths in EA 5 south. This was a resample due to results that were not in sync with field observations of strong odor and high PID readings.
E13	EA 5	6–8 feet bgs	E13-contam-6-8	10/01/2015	**30 J**	**14,000**	250 U	--	--	--	--	--	--	--	Failed contaminated confirmation sample.
F8	EA 5	5.5–8 feet bgs	F8-contam-5.5-8	09/28/2015	**30 J**	50 U	250 U	--	--	--	--	--	--	--	Failed contaminated confirmation sample.

Table 5.1
Excavated Soil Sample Results

Grid Cell	Excavation Area	Sample Depth (approximate)	Sample ID	Sample Date	HCID			TPH			BTEX				Sample Description
					Gasoline (mg/kg)	Diesel (mg/kg)	Heavy Oil (mg/kg)	Gasoline-Range Organics (mg/kg)	Diesel-Range Organics (mg/kg)	Oil-Range Organics (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes, Total (mg/kg)	
Progress Samples (continued)															
F11	EA 5	6–6.5 feet bgs	F11-potential	09/01/2015	--	--	--	**3,200**	--	--	**4.1**	**25**	**36**	**130**	Sample collected to confirm contaminated.
F14	EA 5	8–9 feet bgs	F14-contam-8-9	10/23/2015	**30 J**	880 G	250 U	**3,000**	--	--	**7.5**	**26**	**27**	**150**	Failed contaminated confirmation sample.
G7	EA 5	7–8 feet bgs	G7-contam-7-8	09/29/2015	**30 J**	1,500 J	250 U	--	--	--	--	--	--	--	Failed contaminated confirmation sample.
G7	EA 5	NA	G7-Bench	10/01/2015	**30 J**	460 J	250 U	--	--	--	--	--	--	--	Failed sample confirming the need to excavate the bench.
C5	EA 6	8 feet bgs	C5-8	09/22/2015	30 U	50 U	**15,000 J**	--	--	--	--	--	--	--	Failed contaminated confirmation sample.
C6	EA 6	Bottom 4 feet of excavation	C6-contam-bottom4	10/14/2015	30 U	50 U	**11,000 J**	--	--	--	--	--	--	--	Failed contaminated confirmation sample. Sample taken from sidecast stockpile.
D4	EA 6	Bottom 2 feet of excavation	D4-contam-bottom2	10/12/2015	30 U	50 U	250 U	--	--	--	--	--	--	--	Sample to determine comingling between gasoline and hydraulic oil.
D5	EA 6	Bottom 2 feet of excavation	D5-contam-bottom2	10/12/2015	30 U	50 U	330 J	--	--	--	--	--	--	--	Sample to determine comingling between gasoline and hydraulic oil.
D6	EA 6	0–4 feet bgs	D6-Surface	09/22/2015	30 U	50 U	**7,500 J**	--	--	--	--	--	--	--	Failed test pit location from the ground surface interval.
D6	EA 6	Bottom of excavation	NAPL-3	09/30/2015	--	--	--	--	**110,000**	**890,000**	--	--	--	--	Sample of LNAPL product observed at base of excavation.
D7	EA 6	Bottom 4 feet of excavation	D7-contam-bottom4	10/13/2015	**30 J**	50 U	250 J	--	--	--	--	--	--	--	Failed contaminated confirmation sample. Sample taken from sidecast stockpile.
E1	EA 6	Bottom 2 feet of excavation	E1-contam-bottom2	10/05/2015	**30 J**	50 U	250 U	--	--	--	--	--	--	--	Daily contaminated confirmation sample from bottom 2 feet of excavation. Sample taken from the excavator bucket.
E4	EA 6	Bottom 2 feet of excavation	E4-contam-bottom2	10/08/2015	**30 J**	50 U	760 J	--	--	--	--	--	--	--	Failed contaminated confirmation sample. Sample taken from sidecast stockpile.
E5	EA 6	Bottom 2 feet of excavation	E5-contam-bottom2	10/08/2015	**30 J**	50 U	770 J	--	--	--	--	--	--	--	Failed contaminated confirmation sample. Sample taken from sidecast stockpile.
E6	EA 6	4–5 feet bgs	E6-contam-bottom4-5	09/28/2015	30 U	50 U	250 U	--	--	--	--	--	--	--	From eastern portion of EA 6. Sample collected from 1-foot test pit. Soil disposed of off-site due to strong gasoline odor and high PID readings.
E6	EA 6	Bottom 3 feet of excavation	E6-contam-bottom3	10/09/2015	**30 J**	50 U	860 J	--	--	--	--	--	--	--	Failed contaminated confirmation sample. Sample taken from sidecast stockpile.
E7	EA 6	0–4 feet bgs	E7E-Surface	09/23/2015	30 U	50 U	**3,300 J**	--	--	--	--	--	--	--	Failed test pit location from the ground surface interval.
E7	EA 6	0–4 feet bgs	E7W-Surface	09/23/2015	30 U	50 U	**3,700 J**	--	--	--	--	--	--	--	Failed test pit location from the ground surface interval.
E7	EA 6	Bottom 2 feet of excavation	E7-contam-bottom2(2)	10/07/2015	**30 J**	50 U	870 J	--	--	--	--	--	--	--	Failed contaminated confirmation sample. Sample taken from sidecast stockpile.
F1	EA 6	1 foot above water table	Base-1	10/01/2015	30 U	50 U	250 U	23	--	--	--	--	--	--	Sample taken from 1 foot above the water table. Soil disposed of off-site due to rainbow sheen and strong odor during excavation.

Table 5.1
Excavated Soil Sample Results

Grid Cell	Excavation Area	Sample Depth (approximate)	Sample ID	Sample Date	HCID			TPH			BTEX				Sample Description
					Gasoline (mg/kg)	Diesel (mg/kg)	Heavy Oil (mg/kg)	Gasoline-Range Organics (mg/kg)	Diesel-Range Organics (mg/kg)	Oil-Range Organics (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes, Total (mg/kg)	
Progress Samples (continued)															
F2	EA 6	1 foot above water table	Base-2	10/01/2015	30 U	50 U	250 U	23	--	--	--	--	--	--	Sample taken from 1 foot above the water table. Soil disposed of off-site due to rainbow sheen and strong odor during excavation.
F2	EA 6	1 foot above water table	Base-3	10/01/2015	30 U	50 U	250 U	23	--	--	--	--	--	--	Sample taken from 1 foot above the water table. Soil disposed of off-site due to rainbow sheen and strong odor during excavation.
F6	EA 6	Bottom 4 feet of excavation	F6-contam-bottom4	10/06/2015	**30 J**	50 U	250 U	--	--	--	--	--	--	--	Daily contaminated confirmation sample from bottom 4 feet of excavation. Sample taken from the excavator bucket.
F7	EA 6	5.5–6 feet bgs	F7-contam-5.5-6	09/29/2015	30 U	50 U	250 U	--	--	--	--	--	--	--	From western portion of Grid Cell F7. Sample collected from 1-foot test pit. Soil disposed of off-site due to strong gasoline odor and high PID readings.
F8	EA 6	NA	F8-Bench	08/27/2015				8.4	--	--	0.02 U	0.15	0.025	0.35	Excavation bench sample, excavated due to underlying contamination.
G3	EA 6	1 foot above water table	Base-4	10/01/2015	30 U	50 U	250 U	23	--	--	--	--	--	--	Sample taken from 1 foot above the water table. Soil disposed of off-site due to rainbow sheen and strong odor during excavation.
G5	EA 6	0–4 feet bgs	G5W-Surface	09/23/2015	30 U	50 U	**4,200 J**	--	--	--	--	--	--	--	Failed test pit location from the ground surface interval.
G5	EA 6	7.5–8 feet bgs	G5-2	09/22/2015	30 U	50 U	250 U	--	--	--	--	--	--	--	Contaminated confirmation sample. Disposed of off-site due to odor and high PID reading.
G5	EA 6	Bottom 2 feet of excavation	G5-contam-Bottom2	10/02/2015	30 U	50 U	250 U	--	--	--	--	--	--	--	Daily contaminated confirmation sample. Sample take from sidecast stockpile that had been sitting overnight to drain. Soil disposed of off-site due to rainbow sheen on soil, high PID reading, and strong gasoline odor.
G6	EA 6	Bottom 2 feet of excavation	G6-contam-Bottom2	10/02/2015	30 U	50 U	250 U	--	--	--	--	--	--	--	Daily contaminated confirmation sample. Sample take from sidecast stockpile that had been sitting overnight to drain. Soil disposed of off-site due to rainbow sheen on soil, high PID reading, and strong gasoline odor.
H7	EA 6	10–12 feet bgs	H7-contam-10-12	10/01/2015	**30 J**	50 U	250 U	--	--	--	--	--	--	--	Failed contaminated confirmation sample.
Failed Sidewall Samples															
C8	EA 5	0–4 feet bgs	C8-0-4	10/19/2015	--	--	--	--	**4,400 JM**	**62,000**	--	--	--	--	Failed sidewall sample.
C8	EA 5	4–8 feet bgs	C8-4-8	10/19/2015	--	--	--	--	**3,300 JM**	**33,000**	--	--	--	--	Failed sidewall sample.
C8	EA 5	5–6 feet bgs	C8-S-5-6	10/20/2015	--	--	--	--	820 JM	**8,400**	--	--	--	--	Failed sidewall sample.
C8	EA 5	8 feet bgs	C8-S-8	09/14/2015	--	--	--	3.7	**22,000 JM**	**160,000**	0.020 U	0.020 U	0.020 U	0.060 U	Failed sidewall sample.
C8	EA 5	9–10 feet bgs	C8-S-9-10	10/20/2015	--	--	--	--	880 JM	**5,900**	--	--	--	--	Failed sidewall sample.

Table 5.1
Excavated Soil Sample Results

Grid Cell	Excavation Area	Sample Depth (approximate)	Sample ID	Sample Date	HCID			TPH			BTEX				Sample Description
					Gasoline (mg/kg)	Diesel (mg/kg)	Heavy Oil (mg/kg)	Gasoline-Range Organics (mg/kg)	Diesel-Range Organics (mg/kg)	Oil-Range Organics (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes, Total (mg/kg)	
Failed Sidewall Samples (continued)															
D12	EA 5	9.5 feet bgs	D12-S-9.5	08/20/2015	--	--	--	**6,400**	--	--	**6.5**	**48**	**77**	**440**	Failed sidewall sample.
F8	EA 5	8 feet bgs	F8-S-8	08/27/2015	--	--	--	**1,100**	--	--	**0.68**	**4**	**14**	**90**	Failed sidewall sample.
F8	EA 5	8 feet bgs	F8-S-8 (2)	09/03/2015	--	--	--	**5,500**	--	--	**8.6**	**24**	**79**	**350**	Failed sidewall sample.
G10	EA 5	9.5 feet bgs	G10-S2-9.5	09/01/2015	--	--	--	**1,800**	--	--	**2.3**	**9**	**37**	**13**	Failed sidewall sample.
G11	EA 5	9 feet bgs	G11-S-9	09/01/2015	--	--	--	**3,600**	--	--	**5.6**	**16**	**43**	**51**	Failed sidewall sample.
G14	EA 5	9 feet bgs	G14-S-9	10/23/2015	--	--	--	**3,600**	--	--	**4.6**	**13**	**50**	**25**	Failed sidewall sample.
B5	EA 6	6 feet bgs	B5-S-6	10/01/2015	--	--	--	2.0 U	50 U	--	0.020 U	0.020 U	0.020 U	0.060 U	Excavated due to underlying failed sidewall sample at 9 feet bgs.
B5	EA 6	9 feet bgs	B5-S-9	09/14/2015	--	--	--	2.0 U	**2,700 JM**	**27,000**	0.020 U	0.020 U	0.020 U	0.060 U	Failed sidewall sample.
B5	EA 6	9 feet bgs	B5-S-9(2)	10/01/2015	--	--	--	--	1,800 JM	**15,000**	--	--	--	--	Failed sidewall sample.
B7	EA 6	10.5 feet bgs	B7-S-10.5	09/14/2015	--	--	--	3.1	**2,100 JM**	**18,000**	0.020 U	0.026	0.020 U	0.060 U	Failed sidewall sample.
Site Remediation Level (EA 5 Smear Zone Soil)					3,000	2,000	2,000	3,000	2,000	2,000	10	7.0	6.0	9.0	
Site Cleanup Level (EA 6 Smear Zone Soil, All Vadose Zone Soil)					30	2,000	2,000	30	2,000	2,000	0.3	7.0	6.0	9.0	

Notes:

Bold Indicates a concentration that exceeds the applicable cleanup level or remediation level at the K Ply Site.

-- Sample was not analyzed for the given analyte.

Abbreviations:

bgs Below ground surface
BTEX Benzene, toluene, ethylbenzene, and xylenes
EA Excavation Area
HCID Hydrocarbon identification
LNAPL Light non-aqueous phase liquid
mg/kg milligrams per kilogram
NA Not applicable
NAPL Non-aqueous phase liquid
PID Photoionization detector
TPH Total petroleum hydrocarbons

Qualifiers:

J Analyte was detected, concentration is considered an estimate.
JM Analyte was detected, chromatographic pattern is a poor match to standard used for quantitation, concentration is considered 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 an estimate.

Table 5.2
Final/Confirmational Sidewall Soil Sample Results

Grid Cell	Excavation Area	Depth (feet bgs)	Sample ID	Sample Date	TPH			BTEX			
					Gasoline-Range Organics (mg/kg)	Diesel-Range Organics (mg/kg)	Oil-Range Organics (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes, Total (mg/kg)
Excavation Areas 2 and 3											
NA	EA 2	8	EA2-S-8	08/17/2015	3.6	--	--	0.020 U	0.020 U	0.11	0.060 U
NA	EA 3	3	EA3-S-3	08/14/2015	--	50 U	470	--	--	--	--
				Site Cleanup Level	30	2,000	2,000	0.30	7.0	6.000	9.0
Excavation Area 5 Vadose Zone Soil											
B13	EA 5	6	B13-S-6	10/26/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
B14	EA 5	5.5	B14-S-5.5	10/26/2015	**62**	--	--	0.054	0.27	0.93	4.1
B15	EA 5	6	B15-S1-6	10/26/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
C8	EA 5	5–6	C8-S-5-6 (2)	10/23/2015	--	50 U	250 U	--	--	--	--
C15	EA 5	3	C15-S-3	11/10/2015	**580**	--	--	0.020 U	0.48	0.42	1.5
D15	EA 5	3	D15-S-3	11/10/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
E15	EA 5	3	E15-S-3	11/10/2015	5.9	--	--	0.020 U	0.020 U	0.020 U	5.9
G9	EA 5	NA	G9-Bench	8/27/2015	2.5	--	--	0.020 U	0.020 U	0.020 U	0.060 U
G10	EA 5	NA	G10-Bench	8/27/2015	11	--	--	0.020 U	0.048	0.11	0.17
				Site Cleanup Level	30	2,000	2,000	0.30	7.0	6.0	9.0
Excavation Area 5 Smear Zone Soil											
B12	EA 5	11	B12-S-11	08/18/2015	2.0 U	--	--	0.120	0.034	0.020 U	0.060 U
B13	EA 5	8.5	B13-S-8.5	10/23/2015	7.2	--	--	0.120	0.052	0.037	0.060 U
B14	EA 5	9.5	B14-S-9.5	10/23/2015	*45*	--	--	0.020 U	0.083	0.067	0.15
B15	EA 5	6.5	B15-S2-6.5	10/26/2015	3.2	--	--	0.020 U	0.020 U	0.020 U	0.060 U
B15	EA 5	9	B15-S2-9	10/26/2015	*390*	--	--	0.048	0.41	1.4	2.2
B15	EA 5	9	B15-S1-9	10/23/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
C8	EA 5	9–10	C8-S-9-10 (2)	10/23/2015	--	50 U	250 U	--	--	--	--
C12	EA 5	10.5	C12-S-10.5	08/18/2015	2.0 U	--	--	0.100	0.020 U	0.020 U	0.060 U
C15	EA 5	8	C15-S-8	11/10/2015	*100*	--	--	0.020 U	0.069	0.098	0.26
D8	EA 5	9	D8-S-9	08/17/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
D9	EA 5	9	D9-S-9	08/17/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
D10	EA 5	9.5	D10-S-9.5	8/13/2015	3.3	--	--	0.130	0.31	0.059	0.12
D11	EA 5	9.5	D11-S-9.5	08/20/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
D12	EA 5	9.5	D12-S-9.5(2)	08/25/2015	19	--	--	0.039	0.29	0.41	2.6
D15	EA 5	8	D15-S-8	11/10/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
E15	EA 5	8	E15-S-8	11/10/2015	*1,900*	--	--	*0.97*	3.7	**12**	**45**
F14	EA 5	9	F14-S-9	10/23/2015	*510*	--	--	*0.96*	2.3	2.6	8.6
G8	EA 5	9.5	G8-S-9.5	10/01/2015	*550*	--	--	*0.51*	2.7	**8.1**	**19**
G9	EA 5	10	G9-S-10	08/27/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
G10	EA 5	8.5	G10-S1-8.5	08/27/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
G10	EA 5	9.5	G10-S2-9.5 (2)	09/03/2015	*140*	--	--	0.020 U	0.10 U	0.37	1.6
G11	EA 5	9	G11-S-9 (2)	09/03/2015	*2,000*	--	--	0.020 U	**11**	**14**	**31**
G12	EA 5	9.5	G12-S-9.5	09/01/2015	6.8	--	--	0.074	0.028	0.51	0.060 U
G13	EA 5	8.5	G13-S-8.5	10/23/2015	*89*	--	--	0.077	0.23	0.85	0.57
G14	EA 5	9	G14-S-9(2)	10/26/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
Site Remediation Level (Applicable to EA 5 Smear Zone Soil)					3,000	2,000	2,000	10	7.0	6.0	9.0

Table 5.2
Final/Confirmational Sidewall Soil Sample Results

Grid Cell	Excavation Area	Depth (feet bgs)	Sample ID	Sample Date	TPH			BTEX			
					Gasoline-Range Organics (mg/kg)	Diesel-Range Organics (mg/kg)	Oil-Range Organics (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes, Total (mg/kg)
Excavation Area 6											
A5	EA 6	10	A5-S-10	09/14/2015	2.0 U	50 U	250 U	0.020 U	0.020 U	0.020 U	0.060 U
B4	EA 6	10	B4-S-10	09/14/2015	2.0 U	50 U	250 U	0.020 U	0.020 U	0.020 U	0.060 U
B5[1]	EA 6	9	B5-S-9(3)	10/05/2015	--	--	--	--	--	--	--
B6	EA 6	9	B6-S-9.5	09/14/2015	2.0 U	200 JM	1,800	0.020 U	0.020 U	0.020 U	0.060 U
B7	EA 6	NA	B7-Bench	9/8/2015	2.0 U	50 U	250 U	0.02 U	0.02 U	0.02 U	0.06 U
B7	EA 6	6	B7-S-5-6	10/20/2015	--	50 U	250 U	--	--	--	--
B7	EA 6	9	B7-S-8-9	10/20/2015	--	50 U	250 U	--	--	--	--
C4	EA 6	9.5	C4-S-9.5	09/14/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
D2	EA 6	9	D2-S-9	09/14/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
D3	EA 6	9.5	D3-S-9.5	09/14/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
G1	EA 6	11	G1-S-11	10/01/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
G2	EA 6	10	G2-S-10	10/01/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
G3	EA 6	10	G3-S-10	10/01/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
G4	EA 6	9.5	G4-S-9.5	10/01/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
G5	EA 6	9.5	G5-S-9.5	10/01/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
G7	EA 6	9.5	G7-S-9.5	10/01/2015	12	--	--	0.020 U	0.051	0.065	0.060 U
H6	EA 6	9	H6-S-9	10/01/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
H7	EA 6	10	H7-S-10	10/01/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
I7	EA 6	9.5	I7-S-9.5	10/01/2015	2.0 U	--	--	0.020 U	0.020 U	0.020 U	0.060 U
				Site Cleanup Level	30	2,000	2,000	0.30	7.0	6.000	9.0

Notes:

-- The sample was not analyzed for the given analyte.
Bold Indicates a concentration that exceeds the applicable cleanup or remediation level at the K Ply Site.
Italic Indicates a concentration that exceeds the cleanup level, but is less than the applicable remediation level at the K Ply Site.
1 Results for final sidewall sample in Grid Cell B5 at 9 feet not included as it was run as HCID, with no detections reported.

Abbreviations:

bgs Below ground surface
BTEX Benzene, toluene, ethylbenzene, and xylenes
HCID Hydrocarbon identification
mg/kg Milligram per kilogram
NA Not applicable
TPH Total petroleum hydrocarbon

Qualifiers:

JM Analyte was detected, chromatographic pattern is a poor match to standard used for quantiation, concentration is considered an estimate.
U Analyte was not detected at the given reporting limit.

Table 5.3
Clean Overburden Soil Sample Results

Sample ID	Sample Date	HCID			Sample Description
		Gasoline (mg/kg)	Diesel (mg/kg)	Heavy Oil (mg/kg)	
SP-1	8/6/2015	30 U	50 U	250 U	Stockpiled structural fill under concrete pad.
SP-2	8/6/2015	30 U	50 U	250 U	Stockpiled structural fill under concrete pad.
SP-3	8/6/2015	30 U	50 U	250 U	Stockpiled structural fill under concrete pad.
SP-4	8/6/2015	30 U	50 U	250 U	Stockpiled structural fill under concrete pad.
SP-5	8/6/2015	30 U	50 U	250 U	Stockpiled structural fill under concrete pad.
SP-6	8/6/2015	30 U	50 U	250 U	Stockpiled structural fill under concrete pad.
SP-7	8/6/2015	30 U	50 U	250 U	Stockpiled structural fill under concrete pad.
SP-8	8/6/2015	30 U	50 U	250 U	Stockpiled structural fill under concrete pad.
SP-9	8/6/2015	30 U	50 U	250 U	Stockpiled structural fill under concrete pad.
SP-10	8/14/2015	30 U	50 U	440	Stockpiled area 5 overburden. D8/D9/D10.
SP-11	8/17/2015	30 U	120	420	Stockpiled area 2 overburden.
SP-12	8/17/2015	30 U	50 U	250 U	Stockpiled area 5 overburden. D8/D9/D10.
SP-14	8/18/2015	30 U	50 U	250 U	Stockpiled area 5 overburden. A12, B12, C12.
SP-16	8/20/2015	30 U	50 U	250 U	Stockpiled area 5 overburden from C11 and parts of D11/C12.
SP-17	8/24/2015	30 U	50 U	250 U	Stockpiled area 5 overburden. D10, D11, D12, E8, E9, E10.
SP-18	8/24/2015	30 U	50 U	920	Stockpiled area 5 overburden. D10, D11, D12, E8, E9, E10.
SP-19	8/24/2015	30 U	50 U	250 U	Stockpiled area 5 overburden. D10, D11, D12, E8, E9, E10.
SP-20	8/25/2015	30 U	50 U	340	Stockpiled area 5 overburden. E11, A1.
SP-21	8/26/2015	30 U	50 U	250 U	Stockpiled area 5 overburden G8, G9, G10.
SP-22	8/26/2015	30 U	50 U	250 U	Stockpiled area 5 overburden G8, G9, G11.
SP-23	8/26/2015	30 U	50 U	250 U	Stockpiled area 5 overburden G8, G9, G12.
SP-24	8/27/2015	30 U	50 U	510	Stockpiled area 5 overburden. F8, F9, F10.
SP-25	8/27/2015	30 U	50 U	950	Stockpiled area 5 overburden. F8, F9, F11.
SP-26	8/28/2015	30 U	50 U	250 U	Stockpiled area 5 overburden. F8, F9, F12.
SP-27	8/28/2015	30 U	50 U	250 U	Stockpiled area 5 overburden. E9.
SP-28	8/31/2015	30 U	50 U	250 U	Stockpiled area 5 overburden. G11, G12.
SP-29	8/31/2015	30 U	50 U	250 U	Stockpiled area 5 overburden. G11, G13.
SP-30	9/1/2015	30 U	50 U	250 U	Stockpiled area 5 overburden. F11, F12.
SP-31	9/1/2015	30 U	50 U	250 U	Stockpiled area 5 overburden. F11, F13.
SP-32	9/1/2015	30 U	50 U	250 U	Stockpiled area 5 overburden. F11, F14.
SP-33	9/2/2015	30 U	50 U	250 U	Stockpiled area 5 overburden. E10/11/12 east.
SP-34	9/3/2015	30 U	50 U	250 U	Stockpiled area 5 overburden. E10/11/12 east.
SP-36	9/8/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. B7, C8.
SP-37	9/14/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. Western edge of stockpiled area 6 for bench and northeastern portion of stockpiled area 6 for bench.
SP-38	9/14/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. Western edge of stockpiled area 6 for bench and northeastern portion of stockpiled area 6 for bench.
SP-39	9/14/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. Western edge of stockpiled area 6 for bench and northeastern portion of stockpiled area 6 for bench.
SP-40	9/14/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. Western edge of stockpiled area 6 for bench and northeastern portion of stockpiled area 6 for bench.
SP-41	9/14/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. Western edge of stockpiled area 6 for bench and northeastern portion of stockpiled area 6 for bench.
SP-42	9/14/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. Western edge of stockpiled area 6 for bench and northeastern portion of stockpiled area 6 for bench.
SP-43	9/14/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. Western edge of stockpiled area 6 for bench and northeastern portion of stockpiled area 6 for bench.
SP-44	9/15/2015	30 U	50 U	2000	Stockpiled area 6 overburden. D1, D2, E1, E2, F1, F2, G2, G3, G4, G5.
SP-45	9/15/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. D1, D2, E1, E2, F1, F2, G2, G3, G4, G6.
SP-46	9/15/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. D1, D2, E1, E2, F1, F2, G2, G3, G4, G7.
SP-47	9/15/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. D1, D2, E1, E2, F1, F2, G2, G3, G4, G8.
SP-48	9/15/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. D1, D2, E1, E2, F1, F2, G2, G3, G4, G9.
SP-49	9/15/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. D1, D2, E1, E2, F1, F2, G2, G3, G4, G10.
SP-50	9/15/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. D1, D2, E1, E2, F1, F2, G2, G3, G4, G11.
SP-51	9/16/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. D2, D3, D4, C4, E2, E3, E4, F2, F3, F4.
SP-52	9/16/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. D2, D3, D4, C4, E2, E3, E4, F2, F3, F5.
SP-53	9/16/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. D2, D3, D4, C4, E2, E3, E4, F2, F3, F6.
SP-54	9/16/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. D2, D3, D4, C4, E2, E3, E4, F2, F3, F7.
SP-55	9/16/2015	30 U	50 U	250 U	Stockpiled area 6 overburden, small pile with sweet odor.
SP-56	9/16/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. D2, D3, D4, C4, E2, E3, E4, F2, F3, F7.
SP-57	9/17/2015	30 U	50 U	1,200	Stockpiled area 6 overburden. B76, B5, B4, C4, D4, E4, F4, G4.
SP-58	9/17/2015	30 U	50 U	1,400	Stockpiled area 6 overburden. B76, B5, B4, C4, D4, E4, F4, G5.
SP-59	9/17/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. B76, B5, B4, C4, D4, E4, F4, G6.
SP-60	9/21/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. B5, C5, B6, C6, C7 and southeastern portion of stockpiled area 6 for bench.
SP-62	9/21/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. B5, C5, B6, C6, C7 and southeastern portion of stockpiled area 6 for bench.
SP-63	9/22/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. D5, D6, D7.
SP-65	9/23/2015	30 U	50 U	250 U	Stockpiled area 6 overburden, Top 4 feet from east side of D5.
SP-66	9/29/2015	30 U	50 U	250 U	Stockpiled area 6 potentially contaminated. From G6/G7 west, 5–7 feet.
SP-67	9/30/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. Top 8 feet G6/G7 east, H6, H7, I7.

Table 5.3
Clean Overburden Soil Sample Results

Sample ID	Sample Date	HCID			Sample Description
		Gasoline (mg/kg)	Diesel (mg/kg)	Heavy Oil (mg/kg)	
SP-68	9/30/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. Top 8 feet G6/G7 east, H6, H7, I7.
SP-69	10/1/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. Top 8 feet from H7/I7.
SP-70	10/2/2015	30 U	50 U	250 U	Stockpiled area 6 overburden. Top 8 feet from H7/I8.
SP-71	10/20/2015	30 U	50 U	1,600	Stockpiled area 6 potentially contaminated. Soil from sidewall pushback in B7, C8.
SP-72	10/20/2015	30 U	50 U	670	Stockpiled area 6 overburden from sidewall pushback in B7, C8.
SP-73	10/20/2015	30 U	50 U	250 U	Stockpiled area 5 potentially contaminated soil from F13, G13 approximately 5–8 feet.
SP-74	10/20/2015	30 U	50 U	250 U	Stockpiled area 5 overburden F13, G13 approximately 0–5 feet.
SP-75	10/23/2015	30 U	50 U	250 U	Stockpiled area 5 (east side, 0–4 feet) and stockpiled area 6 overburden (sidewall pull back).
SP-76	10/23/2015	30 U	50 U	250 U	Stockpiled area 5 potentially contaminated (east side, 4–8 feet).
E5E-Surface	09/23/2015	20 U	50 U	250 U	Test pit location in E5, 0–4 feet bgs.
E5W-Surface	09/23/2015	30 U	50 U	250 U	Test pit location in E5, 0–4 feet bgs.
E6E-Surface	09/23/2015	30 U	50 U	250 U	Test pit location in E6, 0–4 feet bgs.
E6W-Surface	09/23/2015	30 U	50 U	250 U	Test pit location in E6, 0–4 feet bgs.
F5E-Surface	09/23/2015	30 U	50 U	250 U	Test pit location in F5, 0–4 feet bgs.
F5W-Surface	09/23/2015	30 U	50 U	250 U	Test pit location in F5, 0–4 feet bgs.
F6E-Surface	09/23/2015	30 U	50 U	250 U	Test pit location in F6, 0–4 feet bgs.
F6W-Surface	09/23/2015	30 U	50 U	250 U	Test pit location in F6, 0–4 feet bgs.
F7E-Surface	09/23/2015	30 U	50 U	250 U	Test pit location in F7, 0–4 feet bgs.
F7W-Surface	09/23/2015	30 U	50 U	250 U	Test pit location in F7, 0–4 feet bgs.
G6W-Surface	09/23/2015	30 U	50 U	250 U	Test pit location in G6, 0–4 feet bgs.
G7W-Surface	09/23/2015	30 U	50 U	250 U	Test pit location in G7, 0–4 feet bgs.
	Site Cleanup Level	30	2,000	2,000	

Abbreviations:

HCID Hydrocarbon identification
mg/kg Milligram per kilogram

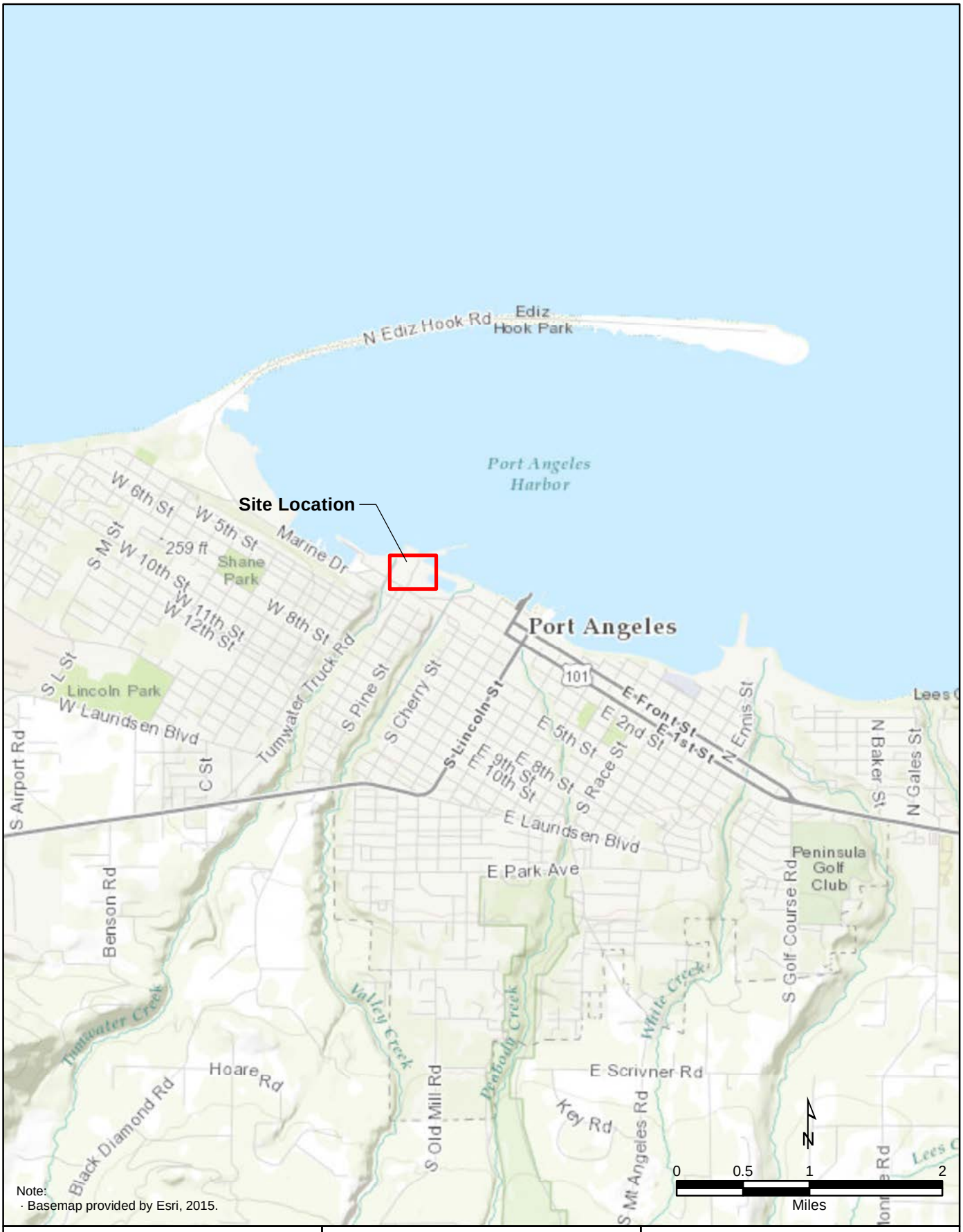
Qualifier:

U Analyte was not detected at the given reporting limit.

K Ply Site

Construction Completion Report

Figures



Note:
· Basemap provided by Esri, 2015.

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Construction Completion Report
K Ply Site
Port Angeles, Washington

Figure 1.1
Vicinity Map

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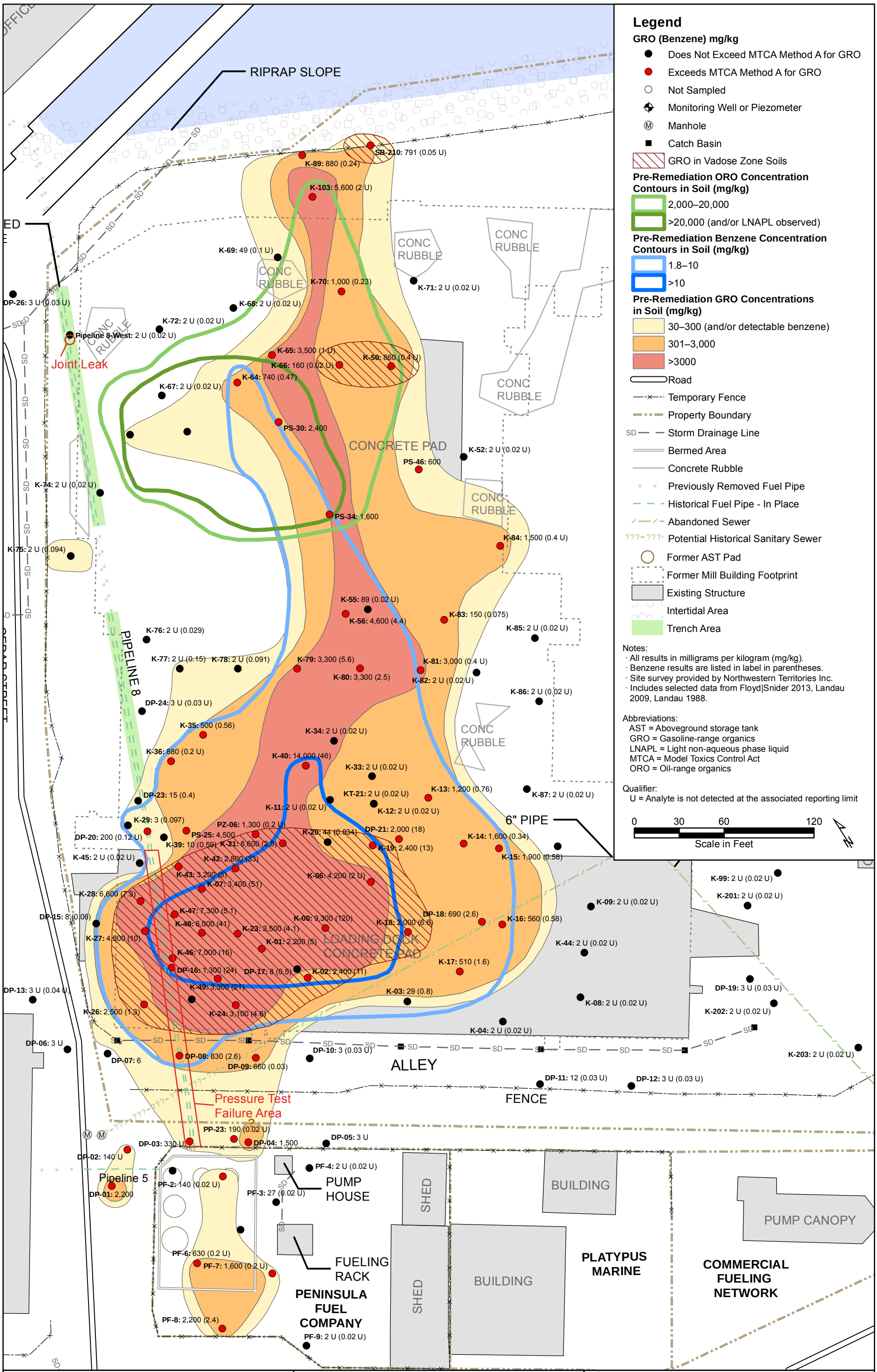
10/21/2016



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Construction Completion Report
K Ply Site
Port Angeles, Washington

Figure 2.1
Historical Extent of Soil Contamination

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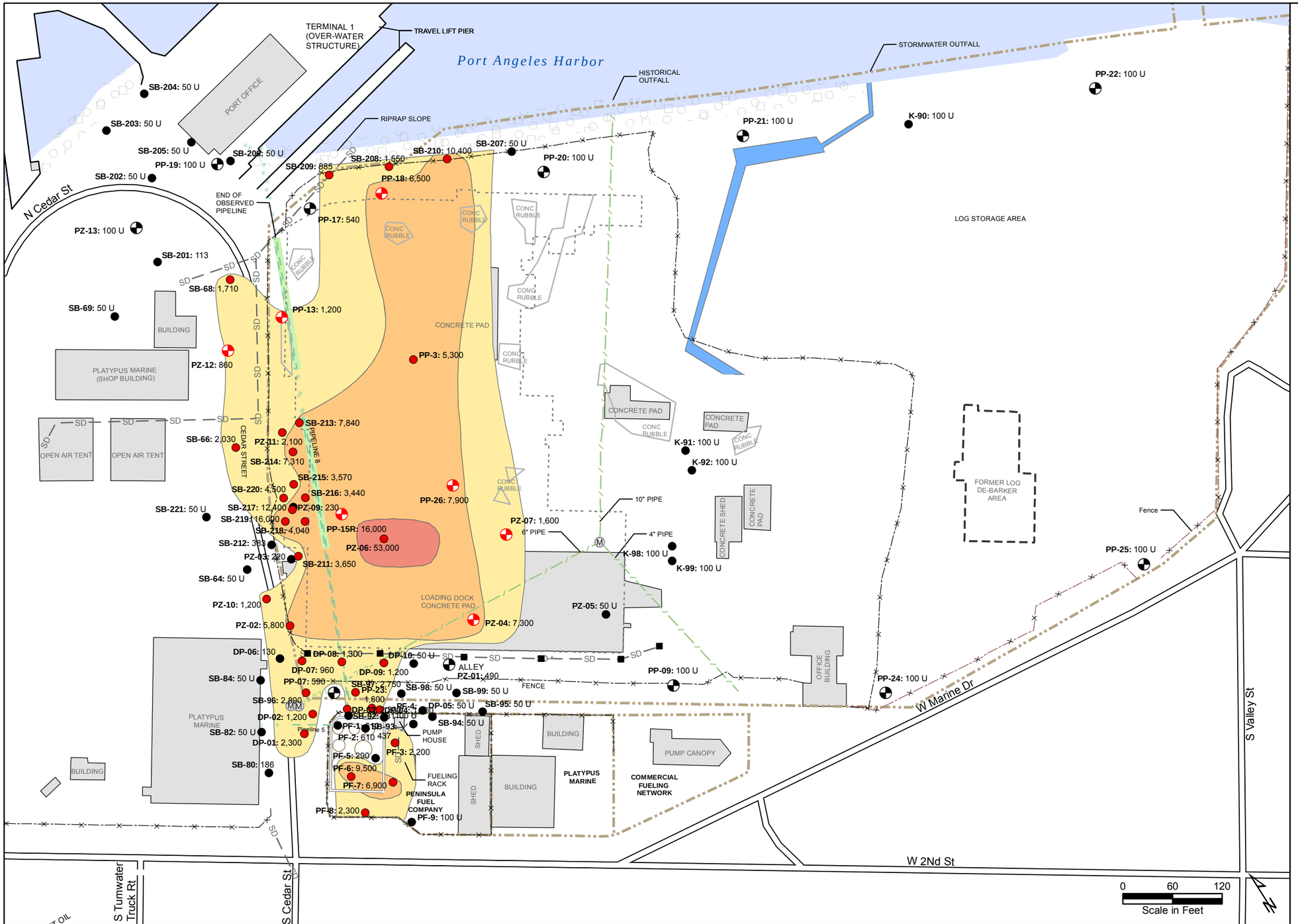
10/21/2016



Legend

Groundwater Screening Grab Sample

- PP-3: 5,300
  - Does Not Exceed MTCA Method A Cleanup Level
  - Exceeds MTCA Method A Cleanup Level

Monitoring Well or Piezometer Sample

- PP-18: 6,500
  - Does Not Exceed MTCA Method A Cleanup Level
  - Exceeds MTCA Method A Cleanup Level
- Manhole
- Catch Basin

Pre-Remediation GRO in Groundwater (µg/L)

- 800–5,000
- 5,001–50,000
- > 50,000

- Road
- Temporary Fence
- Permanent Fence
- Property Boundary
- Storm Drainage Line
- Bermed Area
- Concrete Rubble
- Previously Removed Fuel Pipe
- Historical Fuel Pipe - Abandonded In Place
- Abandoned Sewer
- Potential Historical Sanitary Sewer
- Former AST Pad
- Stormwater Conveyance Ditch
- Former Mill Building Footprint
- Existing Structure
- Intertidal Area
- Trench Area

Notes:
- Concentration results from 2014 RI/FS.
- MTCA Method A groundwater cleanup level: GRO = 800 µg/L.
- Monitoring well, Geoprobe, and piezometer RI samples collected between September 2013 and January 2014; greatest concentrations shown.
- Sample names begining with 'K-' or 'PF-' were direct-push groundwater screening RI samples.
- Boundaries of plume were drawn based on RI data and data from prior investigations including Floyd|Snider 2013, Landau 2009, and Landau 1988.
- Site survey provided by Northwestern Territories Inc.

Abbreviations:
AST = Aboveground storage tank
GRO = Gasoline-range organics
µg/L = Micrograms per liter
MTCA = Model Toxics Control Act
RI/FS = Remedial Investigation/Feasibility Study

Qualifier:
U = Analyte is not detected at the associated reporting limit.

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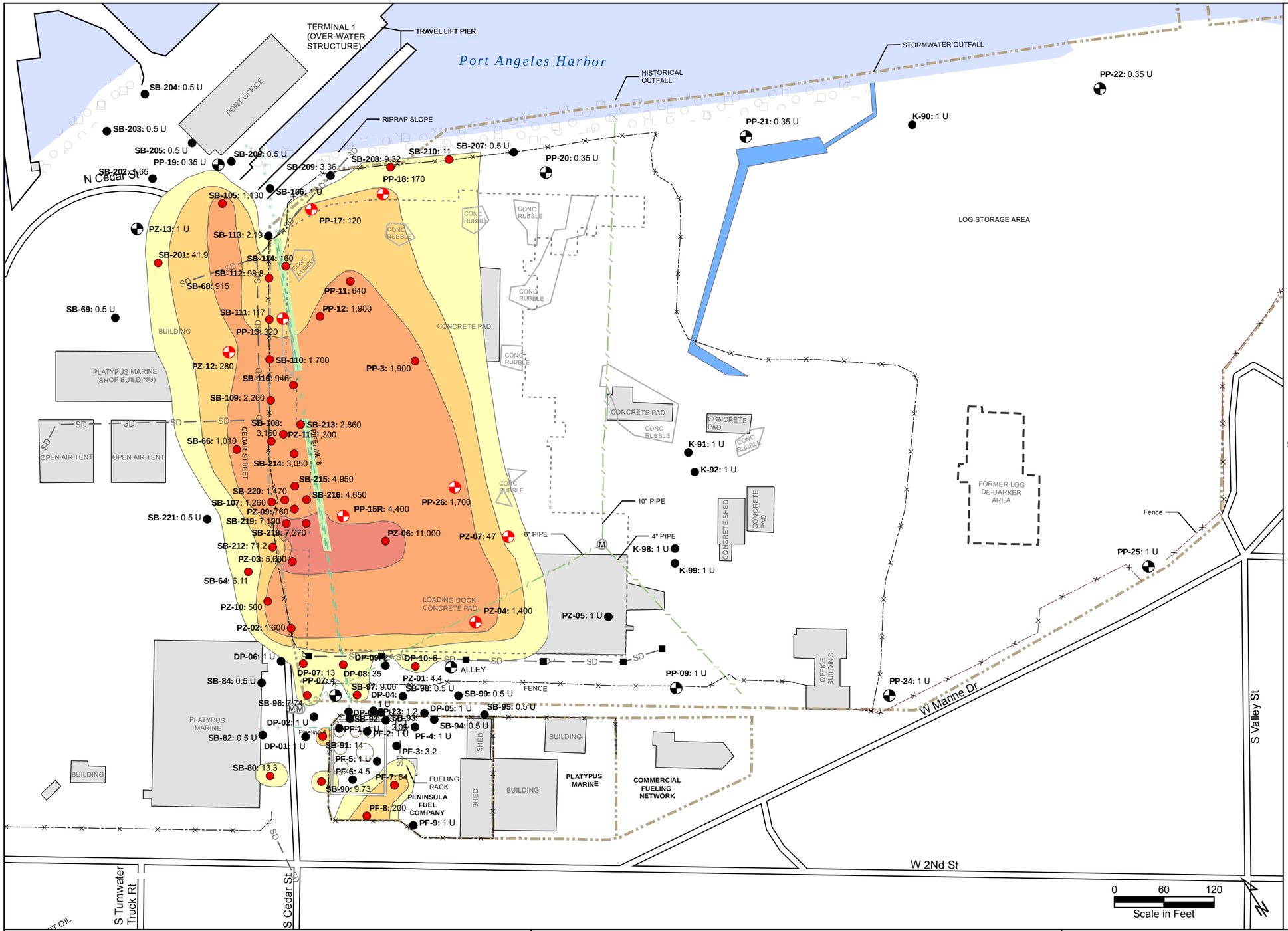
Port Angeles, Washington

Figure 2.2
Historical Extent of GRO Groundwater Contamination

I:\GIS\Projects\PPA_KPLY\MXD\ConstuctionCompletionReport\Figure 2.2 Historical Extent of GRO Groundwater Contamination.mxd
10/21/2016



Legend

Groundwater Screening Grab Sample

- PP-11: 640
  - Does Not Exceed MTCA Method A Cleanup Level
  - Exceeds MTCA Method A Cleanup Level

Monitoring Well or Piezometer Sample

- PP-26: 17,000
  - Does Not Exceed MTCA Method A Cleanup Level
  - Exceeds MTCA Method A Cleanup Level
- Manhole
- Catch Basin

Pre-Remediation Benzene in Groundwater (µg/L)

- 5–50
- 51–500
- 501–5,000
- >5,000

- Road
- Temporary Fence
- Permanent Fence
- Property Boundary
- SD — Storm Drainage Line
- Bermed Area
- Concrete Rubble
- Previously Removed Fuel Pipe
- Historical Fuel Pipe - Abandoned In Place
- Abandoned Sewer
- ???–???: Potential Historical Sanitary Sewer
- Former AST Pad
- Stormwater Conveyance Ditch
- Former Mill Building Footprint
- Existing Structure
- Intertidal Area
- Trench Area

Notes:

- Concentraion results from 2014 RI/FS.
- MTCA Method A groundwater cleanup level: benzene = 5 µg/L.
- Monitoring well, Geoprobe, and piezometer RI samples collected between September 2013 and January 2014; greatest concentrations shown.
- Sample names begining with 'K-' or 'PF-' were direct-push groundwater screening RI samples.
- Boundaries of plume were drawn based on RI data and data from prior investigations including Floyd|Snider 2013, Landau 2009, and Landau 1988.
- Site survey provided by Northwestern Territories Inc.

Abbreviations:

AST = Aboveground storage tank
µg/L = Micrograms per liter
MTCA = Model Toxics Control Act
RI/FS = Remedial Investigation/Feasibility Study

Qualifier:

U = Analyte is not detected at the associated reporting limit.

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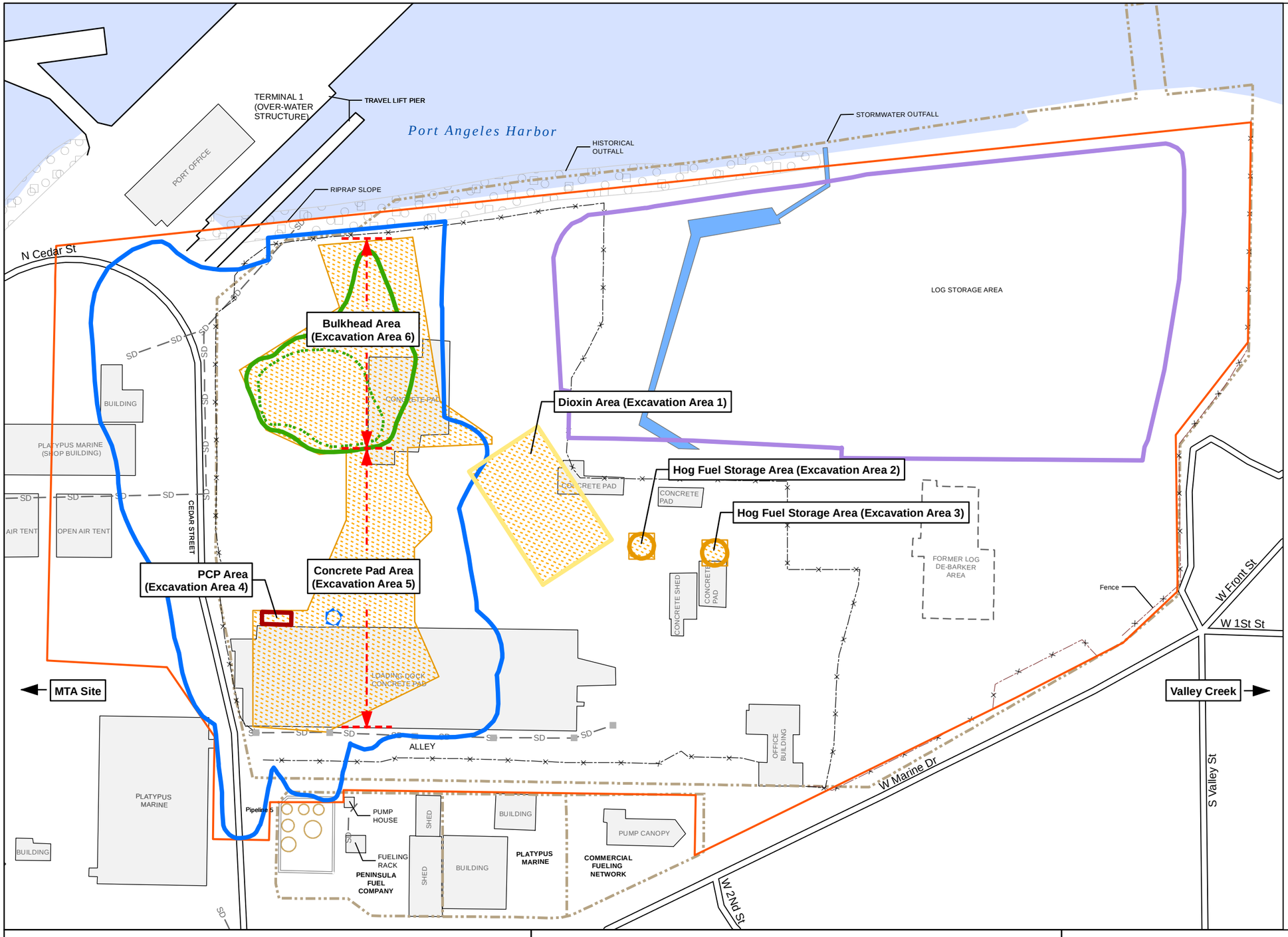
Construction Completion Report
K Ply Site
Port Angeles, Washington

Figure 2.3
Historical Extent of Benzene Groundwater Contamination

I:\GIS\Projects\PPA_KPLY\MXD\ConstuctionCompletionReport\Figure 2.3 Historical Extent of Benzene Groundwater Contamination.mxd
10/21/2016



Legend

- K Ply Site Boundary
- Excavation Area

Cleanup Areas

- Gasoline Area
- Hydraulic Oil Area
- Stack Area
- Hog Fuel Storage Area
- PCP Area
- Log Pond Fill Area
- Gasoline LNAPL Area
- Hydraulic Oil LNAPL Area
- Catch Basin
- Road
- Temporary Fence
- Permanent Fence
- Property Boundary
- SD — Storm Drainage Line
- Bermed Area
- Concrete Rubble
- Former AST Pad
- Stormwater Conveyance Ditch
- Existing Structure
- Intertidal Area

Note:
· Site survey provided by Northwestern Territories Inc.

Abbreviations:
AST = Aboveground storage tank
LNAPL = Light non-aqueous phase liquid
MTA = Marine Trades Area
PCP = Pentachlorophenol

0 120 240
Scale in Feet

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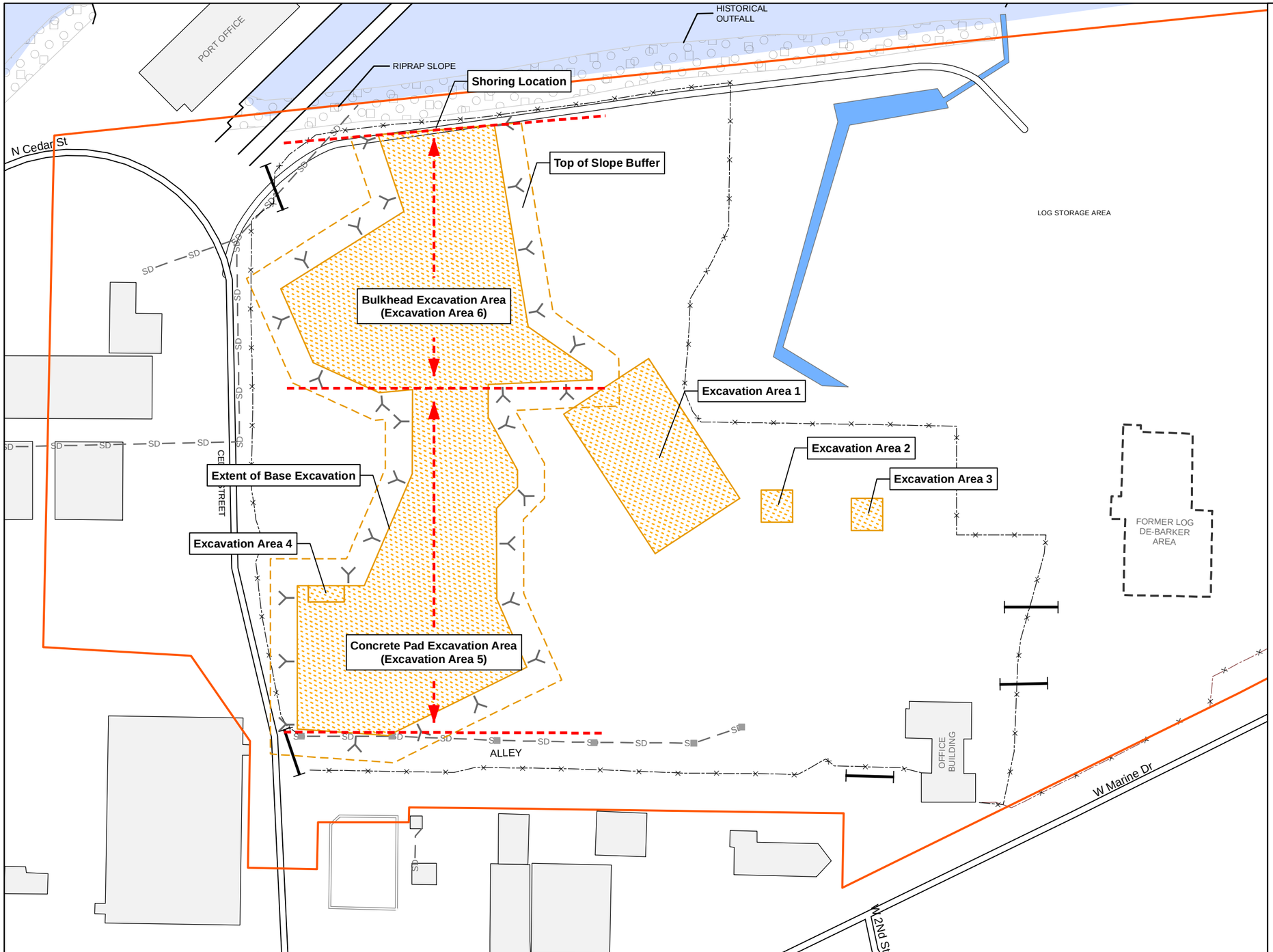
Constuction Completion Report
K Ply Site
Port Angeles, Washington

Figure 3.1
Site Boundary, Excavation Areas, and Cleanup Areas

I:\GIS\Projects\PPA_KPLY\MXD\ConstuctionCompletionReport\Figure 3.1 Site Boundary and Cleanup Areas.mxd
10/21/2016



Legend

- Base of Excavation
- Base of Excavation Top of Slope
- Catch Basin
- Road
- Site Access
- Temporary Fence
- Permanent Fence
- SD — Storm Drainage Line
- Bermed Area
- K Ply Site Boundary
- Stormwater Conveyance Ditch
- Existing Structure
- Intertidal Area

Note:
· Site survey provided by Northwestern Territories Inc.

0 50 100
Scale in Feet

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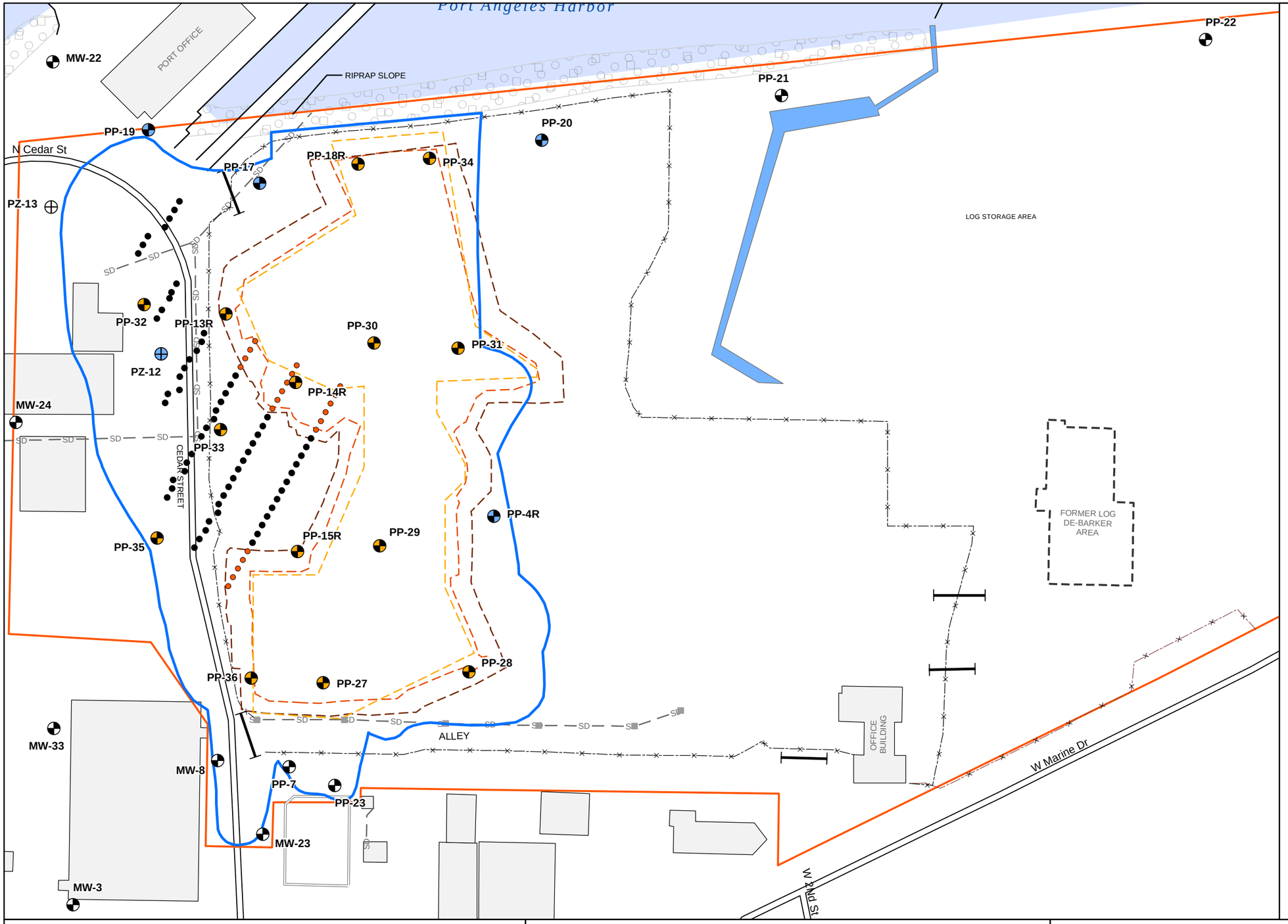
Construction Completion Report
K Ply Site
Port Angeles, Washington

Figure 3.2
Excavation Plan

I:\GIS\Projects\PPA_KPLY\MXD\ConstuctionCompletionReport\Figure 3.2 Excavation Plan.mxd
10/21/2016



Legend

- 2016 Post-Excavation Groundwater Monitoring Well
- Existing Pre-Excavation Groundwater Monitoring Well or Piezometer
- Existing Pre-Excavation Groundwater Monitoring Well or Piezometer not in Long-Term Groundwater Monitoring Network
- 2015 Oxygen-Releasing Compound Injection Points
- Not Injected in 2015 - Location Inaccesible
- Catch Basin
- Gasoline Area
- Proposed Excacation Toe of Slope
- Actual Excavation Toe of Slope
- Actual Excavation Top of Slope
- Road
- Site Access
- Temporary Fence
- Permanent Fence
- Bermed Area
- SD — Storm Drainage Line
- K Ply Site Boundary
- Stormwater Conveyance Ditch
- Former Mill Building Footprint
- Existing Structure
- Intertidal Area

Note:
· Site survey provided by Northwestern Territories Inc.

0 50 100
Scale in Feet

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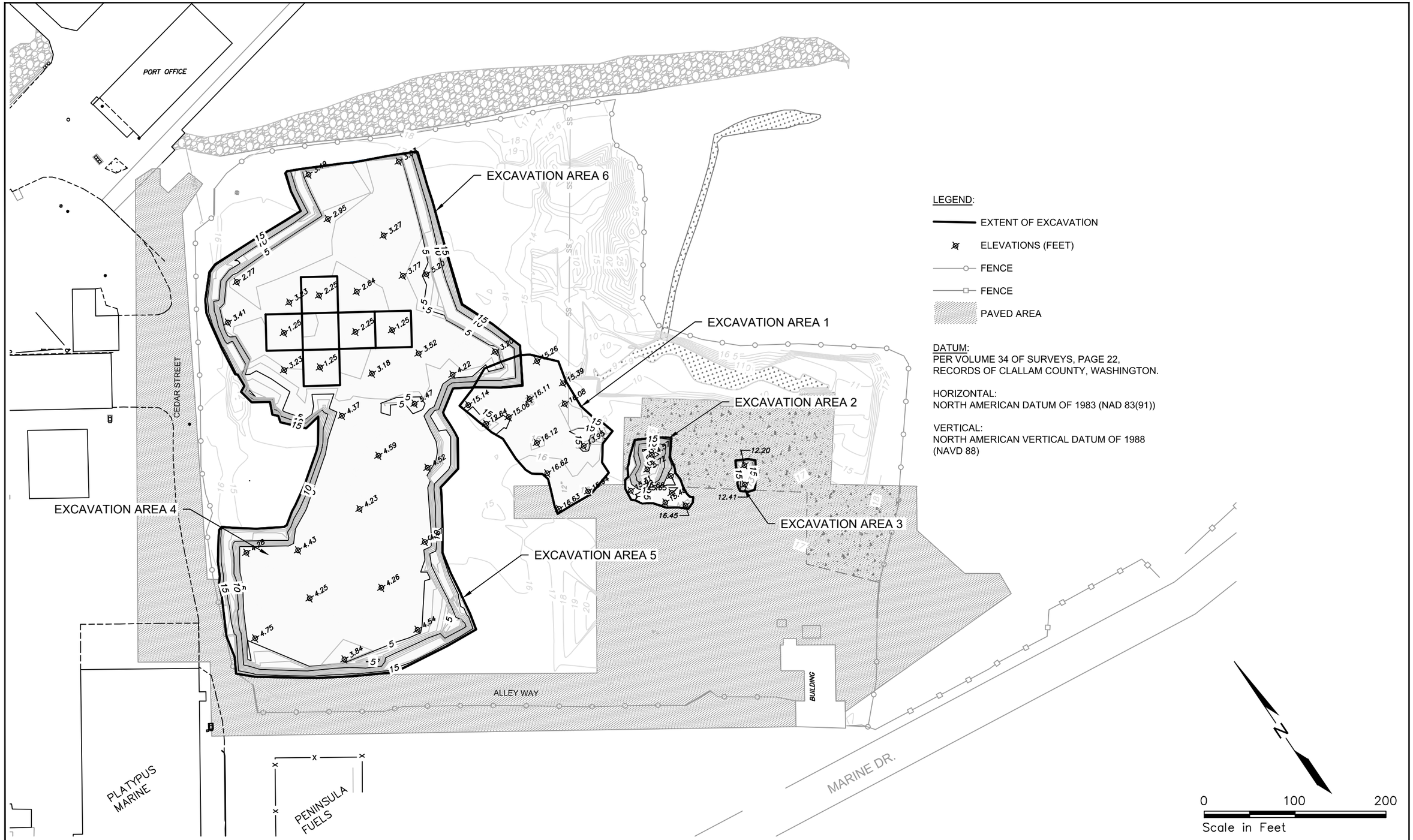
Constuction Completion Report
K Ply Site
Port Angeles, Washington

Figure 3.3
Oxygen-Releasing Compound Injection Point Layout

I:\GIS\Projects\PPA_KPLY\MXD\ConstuctionCompletionReport\Figure 3.3 Oxygen-Releasing Compound Injection Point Layout.mxd
11/28/2016



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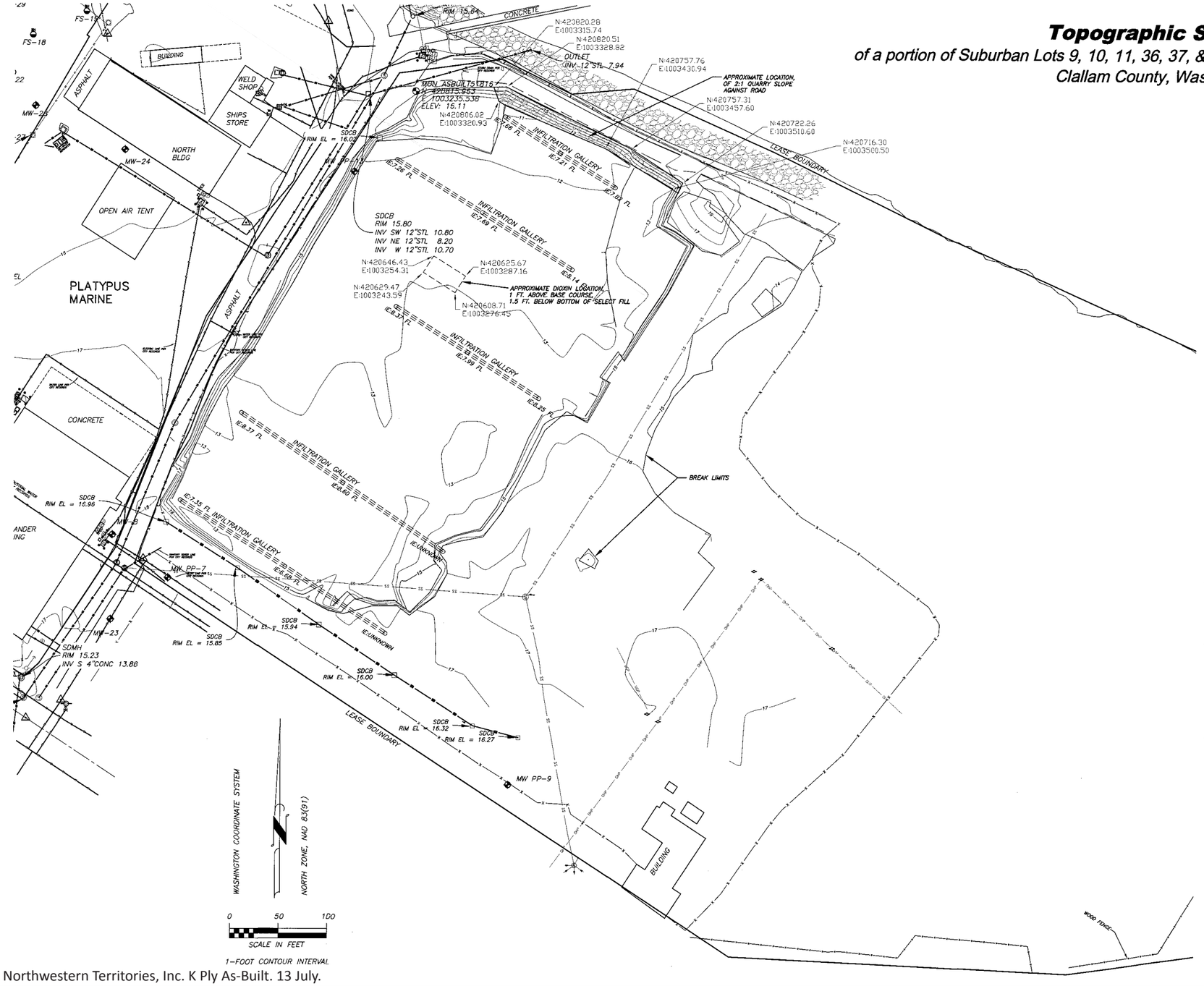
Construction Completion Report
K Ply Site
Port Angeles, Washington

Figure 4.1
Excavation Extent — As-Built

DWG NAME: G:\project\clients\Floyd and Snider\KPly2015\ASBUILT\FIGURE\KPLY_FIG_ASBUILT.dwg
DATE: 7/26/2016 7:33 PM

Topographic Survey

of a portion of Suburban Lots 9, 10, 11, 36, 37, & 38 in the Townsite of Port Angeles, Clallam County, Washington



LEGEND

- SDMH – STORM DRAIN MANHOLE
- SDCB – STORM DRAIN CATCH BASIN
- STORM DRAIN CULVERT
- ROOF DRAIN
- DRAIN
- SSMH – SANITARY SEWER MANHOLE
- CLEAN OUT
- FIRE HYDRANT
- POST INDICATOR VALVE
- FIRE DEPARTMENT CONNECTION
- WATER VALVE
- WATER SPICKET
- WATER METER
- BOLLARD
- TELEPHONE PEDESTAL
- HEAT PUMP
- OVERHEAD LIGHT
- POWER POLE
- GUY POLE
- GUY ANCHOR
- SWITCH PANEL
- TRANSFORMER
- ELECTRICAL METER
- JUNCTION PANEL
- TRAFFIC SIGNAL
- CONTROL POINT

DATUM

PER VOLUME 34 OF SURVEYS, PAGE 22, RECORDS OF CLALLAM COUNTY, WASHINGTON.

HORIZONTAL
NORTH AMERICAN DATUM OF 1983 (NAD 83(91))

VERTICAL
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)

SITE BENCHMARK
F12-4-1 – ELEVATION 14.16 FEET
2-INCH BRASS CAP STAMPED "CITY OF PORT ANGELES CONTROL POINT 06300360 P F12-4-1 1995"

NOTES

1. EXISTING UTILITIES SHOWN HEREON ARE BASED ON ABOVE GROUND OBSERVATIONS AND SHOULD BE CONSIDERED APPROXIMATE AND POSSIBLY INCOMPLETE.

2. FIELD WORK FOR THIS SURVEY WAS ACCOMPLISHED ON FEBRUARY 9, 2016.

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT I AM A PROFESSIONAL LAND SURVEYOR LICENSED TO PRACTICE IN THE STATE OF WASHINGTON AND DECLARE THAT THIS MAP CORRECTLY REPRESENTS A TOPOGRAPHIC SURVEY PERFORMED UNDER MY SUPERVISION, AND MEETS OR EXCEEDS INDUSTRY STANDARDS FOR TOPOGRAPHIC SURVEYS OF ITS CLASS; PERFORMED AT THE REQUEST OF ERRG, INC. IN FEBRUARY, 2016.

THOMAS D. ROORDA PLS 36825

THOMAS D. ROORDA STATE OF WASHINGTON 36825 REGISTERED PROFESSIONAL LAND SURVEYOR

DATE: 7/14/16

Source: 2016. Northwestern Territories, Inc. K Ply As-Built. 13 July.

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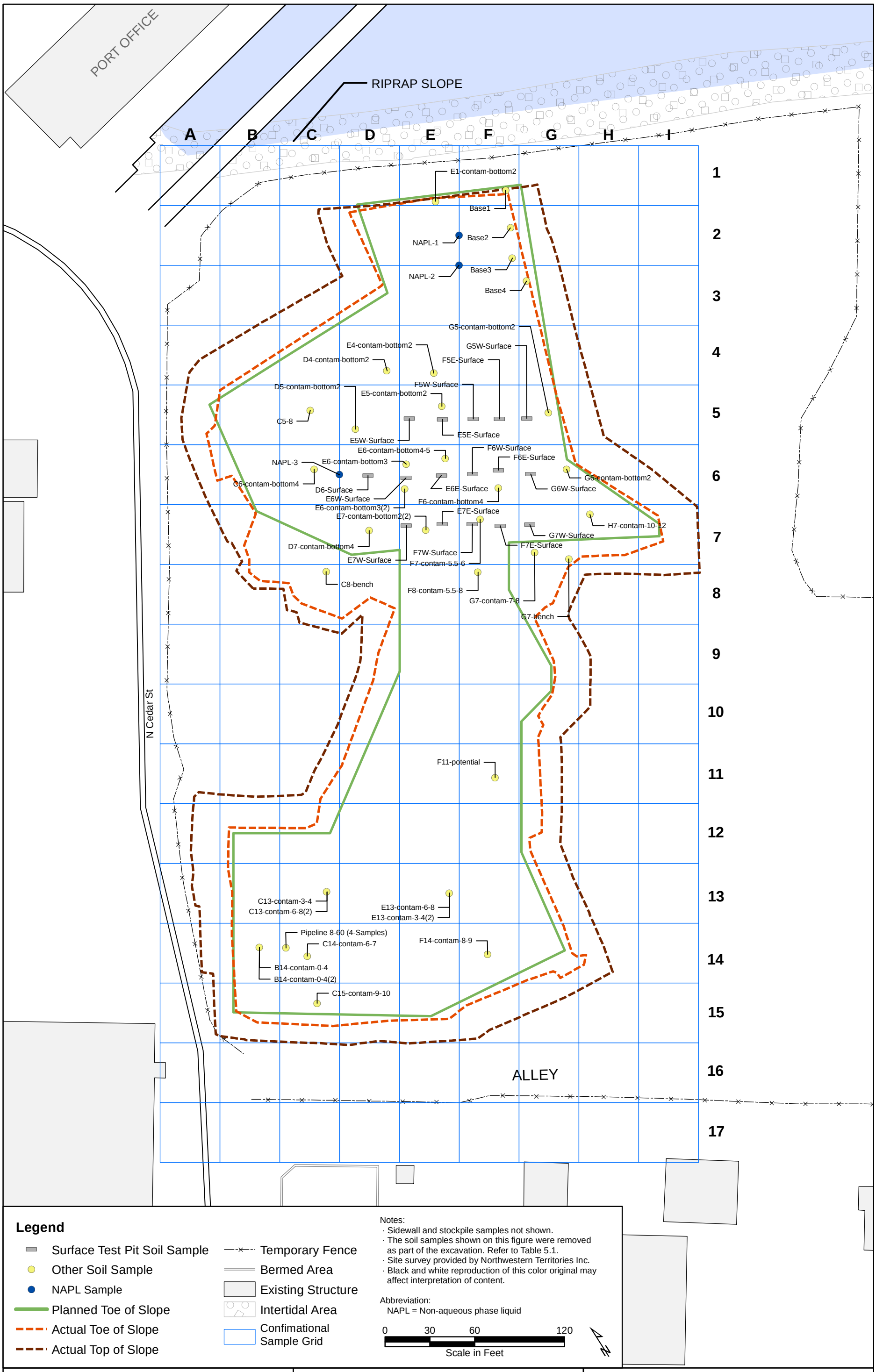
Construction Completion Report
K Ply Site
Port Angeles, Washington

Figure 4.2
Final As-Built Construction Surface



Legend

- Surface Test Pit Soil Sample
- Other Soil Sample
- NAPL Sample
- Planned Toe of Slope
- Actual Toe of Slope
- Actual Top of Slope
- Temporary Fence
- Bermed Area
- Existing Structure
- Intertidal Area
- Confimational Sample Grid

Notes:
- Sidewall and stockpile samples not shown.
- The soil samples shown on this figure were removed as part of the excavation. Refer to Table 5.1.
- Site survey provided by Northwestern Territories Inc.
- Black and white reproduction of this color original may affect interpretation of content.

Abbreviation:
NAPL = Non-aqueous phase liquid

0 30 60 120
Scale in Feet

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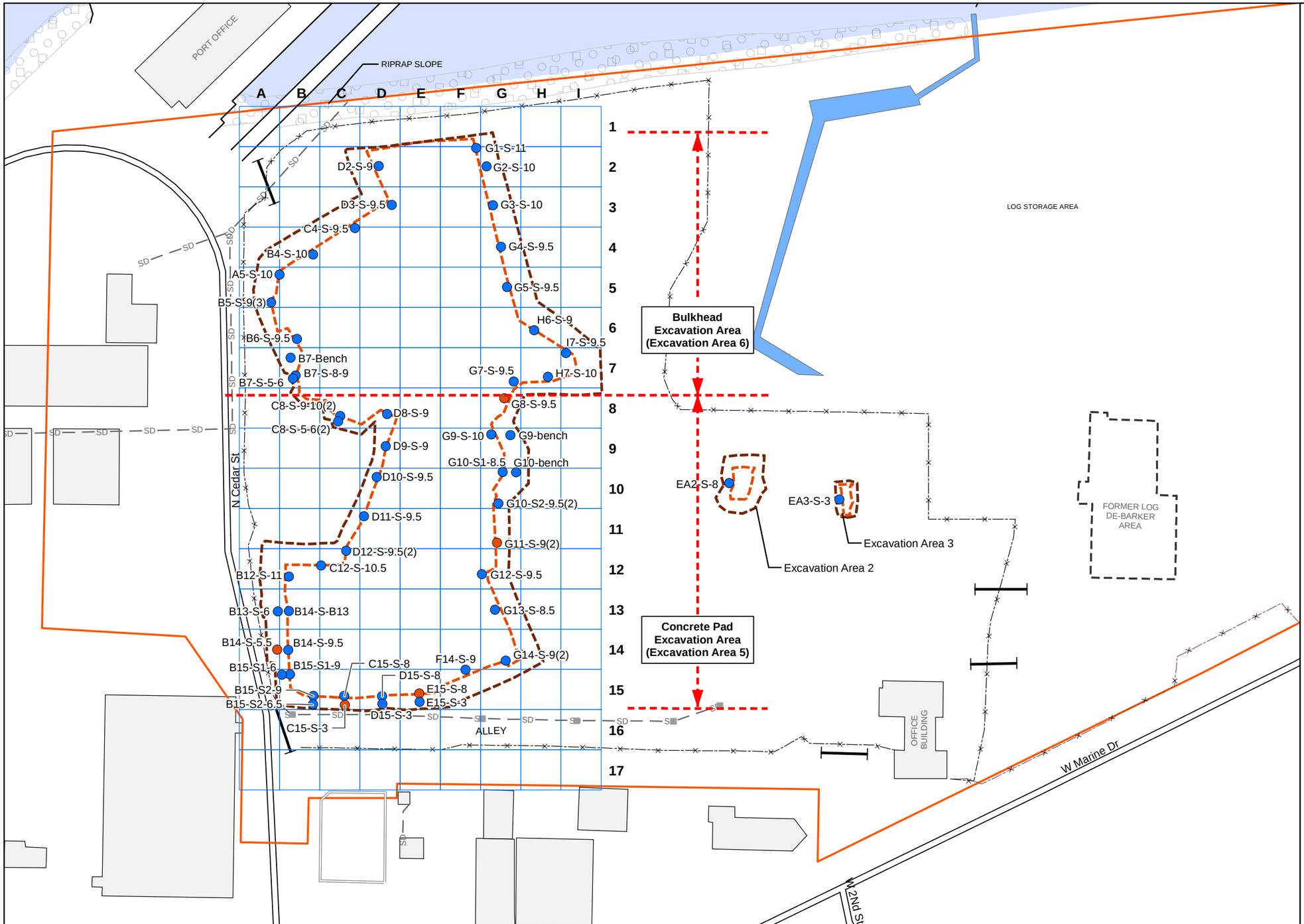
Construction Completion Report
K Ply Site
Port Angeles, Washington

Figure 5.1
Excavation Area with
Progress Sample Locations

I:\GIS\Projects\PPA_KPLY\MXD\ConstuctionCompletionReport\Figure 5.1 Excavation Area with Progress Sample Locations.mxd
10/21/2016



Legend

- Confirmation Sample Location
- Confirmation Sample with Concentration Greater than the Applicable Site Cleanup Level or Remediation Level
- Confimational Sample Grid
- Excavation Toe of Slope
- Excavation Top of Slope
- Catch Basin
- Road
- Site Access
- Temporary Fence
- Permanent Fence
- SD — Storm Drainage Line
- Bermed Area
- K Ply Site Boundary
- Stormwater Conveyance Ditch
- Existing Structure
- Intertidal Area

Notes:
- Sample locations are approximate.
- Site survey provided by Northwestern Territories Inc.
- Black and white reproduction of this color original may affect interpretation of content.

0 50 100
Scale in Feet

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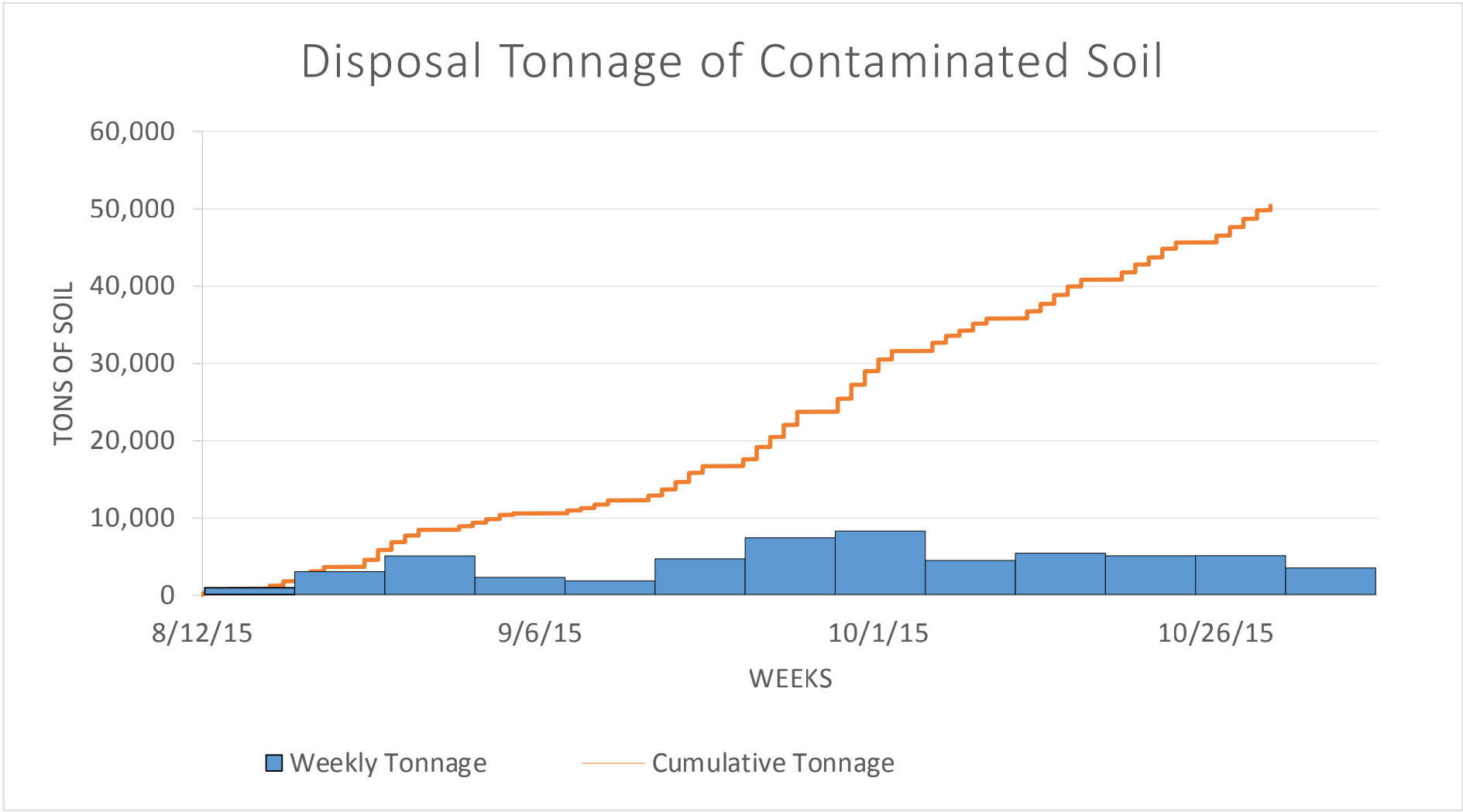
K Ply Site
Port Angeles, Washington

Figure 5.2
Confirmation Sample Locations

I:\GIS\Projects\PPA_KPLY\MXD\ConstuctionCompletionReport\Figure 5.2 Confirmation Sample Locations.mxd
10/21/2016



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Construction Completion Report
K Ply Site
Port Angeles, Washington

Figure 5.3
Exported Soil Quantity

I:\GIS\Projects\PPA_KPLY\AI\Construction Completion Report\Figure 5.3 Exported Soil Quantity.ai

07/29/2016

PORT OFFICE

RIPRAP SLOPE

K-89

SB-210

GRO and Benzene / 13' bgs (3' NAVD 88)

GRO and Benzene / 4.5' bgs (11.5' NAVD 88)

GRO / 12.6' bgs (3.4' NAVD 88)

Dioxins/Furans / 6.5' bgs (9.5' NAVD 88)[1]

GRO / 7.5' bgs (8.5' NAVD 88)

GRO and BTEX / 11.5' bgs (4.5' NAVD 88)

GRO / 1.8' bgs (14.2' NAVD 88)

CEDAR STREET

ALLEY

Bulkhead Excavation Area (Excavation Area 6)

Concrete Pad Excavation Area (Excavation Area 5)

FORMER LOG POND

ORO in Soil 11' bgs (5' NAVD 88)

K-401

K-101

FORMER LOG DE-BARKER AREA

Fence

G8-S-9.5

K-84

F8

K-83

K-77

K-78

K-35

K-36

K-302

G10-S2-9.5(2)

D11

DP-23

D12

E12

F12

G11-S-9(2)

K-13

K-14

K-15

C13

D13

F13

G13-S-8.5

K-301

F14

K-16

DP-18

DP-15

B14

C14

B14-S-5.5

K-17

B15

C15

D15

E15-S-8

K-03

C15-S-8

C15-S-3

DP-08

DP-09

DP-03

DP-04

Legend

- Soil Sample Location Exceeds MTCA Method A Cleanup Level
- K Ply Site Boundary
- Excavation Toe of Slope
- 1940 Approximate Extent of Former Log Pond
- 1985 Approximate Extent of Former Log Pond
- Stormwater Conveyance Ditch
- Existing Structure
- Intertidal Area
- Road
- Temporary Fence
- Permanent Fence

Residual Contamination Depths

- Shallow: <4' bgs
- Medium: 4'–8' bgs
- Deep: >8' bgs

0 50 100

Scale in Feet

Notes:
1. Area contains soil from Excavation1 that contained samples locations SS-1, SS-2, and SS-3.
- All depthas are approximate.
- Elevations in NAVD 88.
- Refer to Remedial Investigation/Feasibility Study and Appendix D of the Engineering Design Report for soil data locations less than cleanup level.
- Site survey provided by Northwestern Territories Inc.
- Black and white reproduction of this color original may affect interpretation of content.

Abbreviations:
bgs = Below ground surface relative to Cedar Street.
ft = Feet
GRO = Gasoline-range organics
NAVD 88 = North American Vertical Datum of 1988
ORO = Oil-range organics

Contaminants — Depth (Elevation) Contamination First Encountered

GRO and Benzene / 3.0' bgs (16' NAVD 88)

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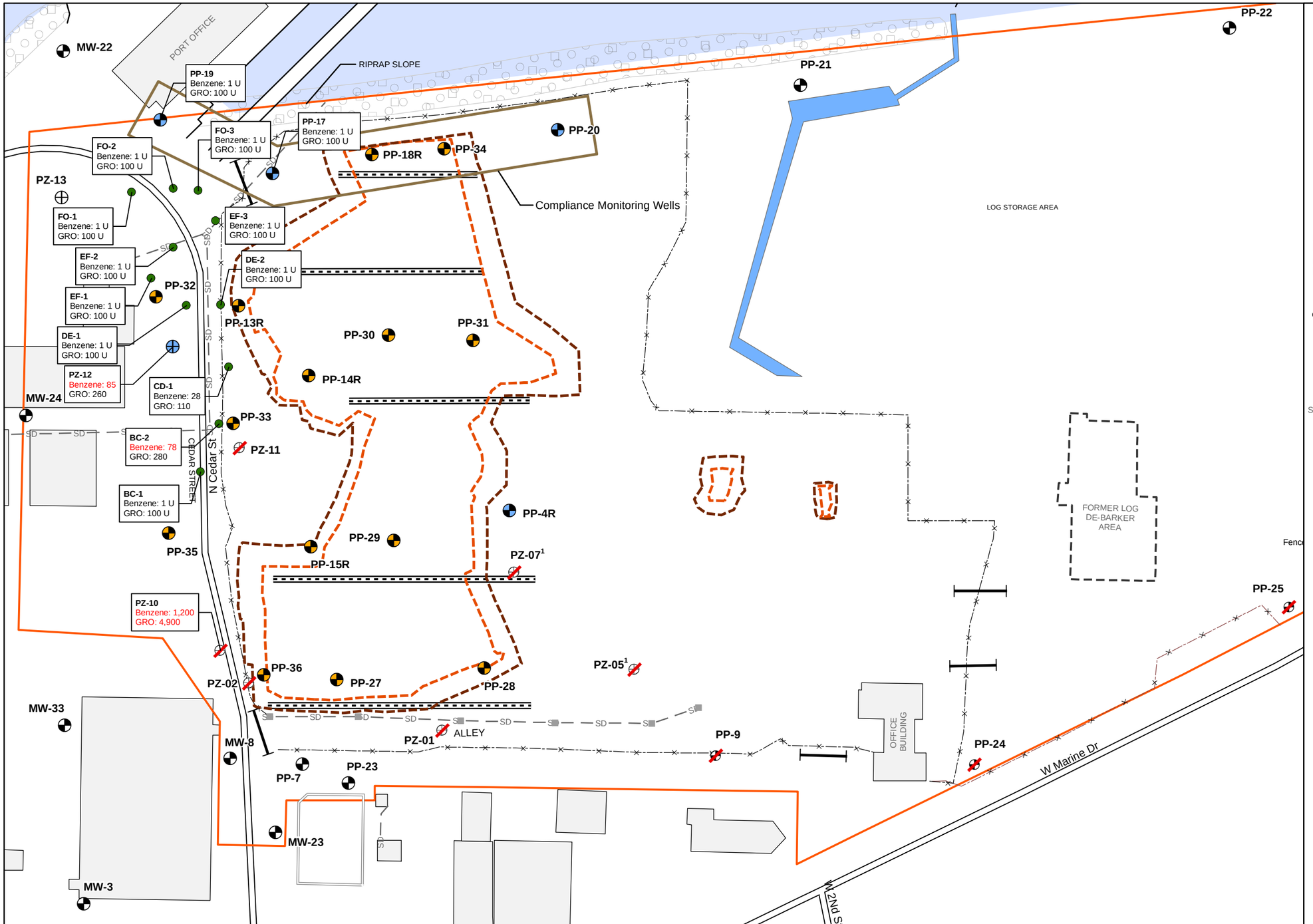
Construction Completion Report
K Ply Site
Port Angeles, Washington

Figure 6.1
Residual Soil Contamination

I:\GIS\Projects\PPA_KPLY\MXD\ConstuctionCompletionReport\Figure 6.1 Residual Soil Contamination Areas.mxd
12/7/2016



Legend

- Direct Push Groundwater Grab Sample (March 2016 Event)
- 2016 Post-Excavation Groundwater Monitoring Well
- Existing Pre-Excavation Groundwater Monitoring Well or Piezometer
- Existing Pre-Excavation Groundwater Monitoring Well or Piezometer not in Long-Term Groundwater Monitoring Network
- Decommissioned or Destoyed Monitoring Well or Piezometer
- Infiltration Gallery
- Excavation Toe of Slope
- Excavation Top of Slope
- Catch Basin
- Road
- Site Access
- Temporary Fence
- Permanent Fence
- Storm Drainage Line
- Bermed Area
- K Ply Site Boundary
- Stormwater Conveyance Ditch
- Existing Structure
- Intertidal Area

Location Name — **BC-2**
Analytes — Benzene: 78
GRO: 280
Results (µg/L) and Qualifier

Notes:
1. Well was destroyed during construction.
- Red indicates an exceedance of the site cleanup levels.
- All results shown are from the March 2016 groundwater sampling event.
- Site survey provided by Northwestern Territories Inc.

Abreviations:
GRO = Gasoline-range organics
µg/L = Micrograms per liter

Qualifier:
U = Analyte is not detected at the associated reporting limit.

0 50 100
Scale in Feet

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Construction Completion Report
K Ply Site
Port Angeles, Washington

Figure 7.1
Long-Term Groundwater Monitoring Well Network

I:\GIS\Projects\PPA_KPLY\MXD\ConstuctionCompletionReport\Figure 7.1 Long-Term Groundwater Monitoring Well Network.mxd
11/28/2016

K Ply Site

Construction Completion Report

Appendix D
Photographs

K Ply Site

Construction Completion Report

Appendix D
Photographs

Attachment D.1
Excavation Progress

Photograph 1. Excavation Area 5, week of August 3, 2015.

Photograph 2. Excavation Area 5, week of August 3, 2015.

Photograph 3. Excavation Area 5, week of August 10, 2015.

Photograph 4. Excavation Area 6, week of August 10, 2015.

Photograph 5. Excavation Area 5, week of August 17, 2015.

Photograph 6. Excavation Area 2, week of August 17, 2015.

Photograph 7. Excavation Area 5, week of August 24, 2015.

Photograph 8. Excavation Area 5, week of August 31, 2015.

Photograph 9. Excavation Area 5, week of September 7, 2015.

Photograph 10. Excavation Area 6, week of September 7, 2015.

Photograph 11. Excavation Area 5, week of September 14, 2015.

Photograph 12. Excavation Area 5, week of September 14, 2015.

Photograph 13. Excavation Area 6, week of September 14, 2015.

Photograph 14. Excavation Area 6, week of September 21, 2015.

Photograph 15. Excavation Area 5, week of September 28, 2015.

Photograph 16. Excavation Area 5, week of September 28, 2015.

Photograph 17. Excavation Area 6, week of October 5, 2015.

Photograph 18. Excavation Area 6, week of October 5, 2015.

Photograph 19. Aerial photo of site, week of October 12, 2015.

Photograph 20. Excavation Area 6, week of October 12, 2015.

Photograph 21. Excavation Area 6, week of October 12, 2015.

Photograph 22. Aerial photo of site, week of October 19, 2015.

Photograph 23. Excavation Area 6, week of October 19, 2015.

Photograph 24. Excavation Area 5, week of October 19, 2015.

Photograph 25. Excavation Area 5, week of October 26, 2015.

Photograph 26. Aerial photo of site, week of November 2, 2015.

Photograph 27. Excavation Area 6, week of November 2, 2015.

Photograph 28. Excavation Area 6, week of November 2, 2015.

Photograph 29. Excavation Area 5, week of November 2, 2015.

Photograph 30. Aerial photo of site, week of November 9, 2015.

Photograph 31. Excavation Area 6, week of November 9, 2015.

Photograph 32. Excavation Area 5, week of November 9, 2015.

Photograph 33. Excavation Area 6, week of November 3, 2015.

Photograph 34. Excavation Area 6, week of November 13, 2015.

Photograph 35. Excavation Area 6, week of November 16, 2015.

Photograph 36. Excavation Area 6, week of November 21, 2015.

Photograph 37. Excavation Area 5, week of April 25, 2016.

Photograph 38. Excavation Area 5, week of April 25, 2016.

Photograph 39. Final grade of Excavation Area 6, week of May 9, 2016.

Photograph 40. Final grade of Excavation Area 5, week of May 9, 2016.

Photograph 41. Post-construction.

K Ply Site

Construction Completion Report

Appendix D
Photographs

Attachment D.2
General Construction

Photograph 1. Covered crushed concrete stockpile.

Photograph 2. Removal of Pipeline 8.

Photograph 3. Holes and corrosion in Pipeline 8 outlined by orange paint.

Photograph. Close up of corrosion and holes in Pipeline 8.

Photograph 5. Installation of wheel wash.

Photograph 6. Loading trucks for off-site disposal of contaminated soil.

Photograph 7. BMP; watering to reduce dust during excavation.

Photograph 8. Foam applied to stockpiles to address odor complaint.

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K Ply Site

Construction Completion Report

Appendix L
Soil Management Plan

K Ply Site

Soil Management Plan for the Construction Completion Report

Prepared for

Port of Port Angeles
338 West First Street
Port Angeles, Washington 98632

December 2016

20 YEARS FLOYD | SNIDER
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LIMITATIONS

This report has been prepared for the exclusive use of ***Port of Port Angeles,*** 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.

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List of Acronyms and Abbreviations

Acronym/ Abbreviation	Definition
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
CAP	Cleanup Action Plan
CUL	Cleanup level
Ecology	Washington State Department of Ecology

Acronym/ Abbreviation	Definition
EDR	Engineering Design Report
GRO	Gasoline-range organics
mg/kg	Milligrams per kilogram
MTCA	Model Toxics Control Act
ORO	Oil-range organics
Port	Port of Port Angeles
PPE	Personal protective equipment
Site	K Ply Site
SMP	Soil Management Plan

1.0 Introduction

This Soil Management Plan (SMP) addresses the necessary considerations for future ground-disturbing activities at the K Ply Site (Site). This SMP is presented as Appendix L of the Construction Completion Report for the cleanup action but is intended to be a stand-alone document.

In 2015, the Site underwent cleanup to remove the majority of petroleum-contaminated soils. Some contaminated soil was purposely left unexcavated as it was not seen as an immediate risk to human health and the environmment. The cleanup was conducted across six separate Excavation Areas. For the contaminated soils that were not fully removed, institutional controls will be required to address any areas where residual soil and groundwater contamination remain at concentrations greater than cleanup levels (CULs) after completion of the cleanup action. Among other requirements, the site-wide institutional controls include implementation of a SMP specifying soil management procedures for future excavation and appropriate health and safety requirements for subsurface work in areas where contamination concentrations greater than CULs remain.

The subsequent sections of this SMP identify these areas of residual contamination, and provide worker safety, soil screening, and soil handling guidelines, and Washington State Department of Ecology (Ecology) notification protocols for future ground-disturbing activities in these areas.

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2.0 Areas of Residual Contamination

There are four areas where residual contamination remains in place, as described in the following sections. These areas are all shown on Figure L.1, which is based on all existing site analytical data and field observations from previous sampling events. Representative analytical data for remaining contaminated soils in these areas are presented in Table L.1.

2.1 EXCAVATION AREA 5

In Excavation Area 5, which included removal of a former gasoline pipeline and associated gasoline-contaminated soil from the southern end of the Site, most of the shallow, vadose zone soil containing gasoline-range organics (GRO) and/or benzene, toluene, ethylbenzene, and total xylenes (BTEX) exceeding the Site CULs was excavated where accessible. However, two shallow sidewall samples from grids C15 and B14 collected from the southwest corner of Excavation Area 5 at depths beginning at between 3.5 and 5 feet below ground surface (bgs) had GRO concentrations greater than the CUL of 30 milligrams per kilogram (mg/kg) but was unable to be excavated because it ran under a street or alley. This is consistent with the information presented in the Engineering Design Report (EDR), which detailed soil contamination in the southeast corner of the former mill building extending into the alley to the south or S. Cedar Street to the west that was anticipated to require long-term soil monitoring (refer to Appendix G of the EDR).

Deeper, smear zone soils (i.e., soils found near the water table) in Excavation Area 5 were excavated only to achieve a concentration of 3,000 mg/kg for GRO and 10 mg/kg for benzene. Therefore, in these areas, deeper soils exceeding the much lower CULs for both GRO and benzene remain in place.

2.2 EXCAVATION AREA 6

In Excavation Area 6, which included removal of a pool of hydraulic oil-contaminated soil near the former mill presses, all soil with GRO and hydraulic oil-range organics (ORO), and/or BTEX exceeding the CULs was excavated during the cleanup action. However, the northern extents of the excavation were limited by a sheetpile wall that was installed to prevent destabilization of the bulkhead. A small area of residual smear zone soil contamination consisting entirely of GRO remains in place under the road that parallels the bulkhead, as shown on Figure L.1.

2.3 DIOXINS/FURANS IN FILL SOIL

During demolition of the former K Ply mill prior to the cleanup action, rubble from the mill's smokestack was deposited on the ground surface to the east of the main excavation. Samples of this rubble had dioxin/furan concentrations greater than the Model Toxics Control Act (MTCA) Method A CUL for unrestricted land use, but less than the CUL for industrial land use.

Per the EDR, approximately 300 cubic yards of soil containing dioxins/furans was scraped from the ground surface and later used as backfill above the water table within Excavation Area 6 at the location and depth shown on Figure L.1.

2.4 LOG POND AREA

In the former log pond area east of the main excavation, heavy oil type contamination exceeding the CUL was detected in silty soil that appeared to represent the former log pond bottom at approximately 12 feet bgs. Due to the depth of the contamination, and a previous restrictive covenant that was placed at the time that the log pond was filled, the Cleanup Action Plan did not require excavation in this area (Ecology 2015). Additional soil borings were advanced in the former log pond to delineate the area of ORO contamination with results provided to Ecology in the March 2016 Quarterly Report (Floyd|Snider 2016). These borings confirmed that the ORO contamination was limited to the silty soil representing the former log pond bottom encountered below approximately 12 feet bgs, and found that the horizontal extents of the contamination are limited to the area north of the former log debarker. The limits of the extent of ORO concentrations greater than CULs is shown in Figure L.1.

3.0 Considerations for Future Site Work

The following sections present protocols for future ground-disturbing work at the Site.

3.1 GROUND-DISTURBING ACTIVITIES

Ground-disturbing activities at the Site include all activities that alter the ground surface including foundation drilling, grading, utility trenching, and excavation. The following sub-sections present the protocols that must be followed during these activities.

3.1.1 Ecology Notification Prior to Ground-Disturbing Activities

Prior to the start of any ground-disturbing activities with the potential to disturb areas of residual contamination, Ecology must be notified of the intended scope of work and anticipated work area. Figure L.1 displays the locations and depths on-site where it is likely that residually contaminated soil will be encountered. In general, with the exception of soil under S. Cedar Street and the alley, the residually contaminated soil lies deeper than 4 feet bgs. Therefore, if ground-disturbing activities are to occur within these areas at depths greater than 4 feet bgs, Ecology should be notified prior to the commencement of work. Ecology will require a description of the work that is planned as well as a schedule. Ground-disturbing activities that occur outside of these areas and/or at depths shallower than 4 feet do not require Ecology notification (with the exception of work within the contaminated areas of the alley or S. Cedar Street, as shown on Figure L.1).

3.1.2 Identification of Potentially Contaminated Soils

The extensive testing that was done at the Site makes it highly unlikely that new areas of soil contamination will be encountered. Regardless, workers should be made aware that potentially contaminated soils may be encountered at any location and depth site-wide and that they should notify the Port of Port Angeles (Port) if indications of contamination are observed.

Indications of potentially contaminated soils may include the presence of stained or oily soil, petroleum-like or solvent-like odors, and/or hydrocarbon sheens. In the event that potentially contaminated soil is encountered outside the known areas of residual contamination, the Port will notify Ecology and investigate the situation. If it is determined by the Port that work should be allowed to proceed, then the health and safety protocols described in Section 3.1.3 and contaminated soil handling and disposal protocols described in Section 3.1.4 must be implemented. Further reporting to be made to Ecology following the completion of soil disturbing activities in contaminated or potentially-contaminated areas is described in Section 3.1.5.

3.1.3 Health and Safety Protocols

When undertaking ground-disturbing activities with the limited potential to encounter contaminated soil, workers must wear the appropriate personal protective equipment (PPE). The minimum PPE required for handling Site soils, in addition to protective clothing appropriate to

the work being done, includes safety glasses and protective disposable (i.e., latex or nitrile) gloves. Eating and smoking are prohibited within work areas during ground-disturbing activities at the Site.

If work with high potential for worker exposure, such as excavation of a wide or deep trench for a sewer line in known areas of residual gasoline contamination, then a health and safety plan including site monitoring protocols must be prepared by the Contractor prior to the start of work in accordance with Hazardous Waste Operations and Emergency Response (HAZWOPER) worker requirements.

3.1.4 Soil Handling and Disposal

All known and potentially contaminated soils brought to the surface must be managed in accordance with applicable regulations. Contaminated soils cannot be re-used on-site as backfill.

Stockpiles of contaminated soils must be stored on impervious surfaces such as pavement or plastic sheeting, and covered with plastic sheeting when not being actively worked to control airborne dust.

Testing of the stockpiles will determine contaminant levels and the appropriate disposition options for the soil. If the stockpile test samples are greater than CULs, it must be disposed of at a permitted Subtitle D landfill. Soil that tests to have contaminant levels less then CULs may be reused as backfill within the Site, but cannot be exported from the Site.

During hauling, the following best management practices will be implemented to control off-site migration of contaminated soil:

- Loads must be covered to prevent fugitive dust.
- Truck loading will take place on the property or in a designated loading area that is either covered with sheeting or swept immediately after loading to prevent track-out.
- If wet soils are encountered, these soils must pass a paint filter test or be hauled in a truck or container fitted with a liner.

3.1.5 Record-Keeping

A record of the ground-disturbing activities including the area of disturbance and, if contaminated soil is excavated, the quantities of soil disposed and disposal facility will be maintained and provided to Ecology following completion of the work.

4.0 References

Floyd|Snider. 2016. *March 2016 Quarterly Progress Report for K Ply*. Letter from Tom Colligan and Tucker Stevens, Floyd|Snider, to Connie Groven, Washington State Department of Ecology. 13 May.

Van den Berg, Martin, Linda S. Birnbaum, Michael Denison, Mike De Vito, William Farland, Mark Feeley, Heidelore Fiedler, Helen Hakansson, Annika Hanberg, Laurie Haws, Martin Rose, Stephen Safe, Dieter Schrenk, Chiharu Tohyama, Angelika Tritscher, Jouko Tuomisto, Mats Tysklind, Nigel Walker, and Richard E. Perterson. 2006. "Review: The 2005 World Health Organization Reevalutation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds." *Toxicological Sciences* 93(2): 223-241. 7 July.

Washington State Department of Ecology (Ecology). 2015. Agreed Order No. DE 11302. 19 May.

K Ply Site

Soil Management Plan

Table

Table L.1
Residually-Contaminated Soil Analytical Data

Sample ID	Sample Date	Depth (feet bgs)[1]	Range Organics (mg/kg)	Diesel-Range Organics (mg/kg)	Oil-Range Organics (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes, Total (mg/kg)	Dioxins/ Furans TEQ[2]
Concrete Pad and Bulkhead Areas										
C15-S-3	11/10/2015	3	**580**	--	--	0.020 U	0.48	0.42	1.5	--
B14-S-5.5	10/26/2015	**5.5**	**62**	--	--	0.054	0.27	0.93	4.1	--
E15-S-8	11/10/2015	5.00	**1,900**	--	--	0.97	3.7	**12**	**45**	--
F14-S-9	10/23/2015	6.00	**510**	--	--	0.96	2.3	2.6	8.6	--
G8-S-9.5	10/01/2015	6.50	**550**	--	--	0.51	2.7	**8.1**	**19**	--
G11-S-9 (2)	09/03/2015	6.00	**2,000**	--	--	0.020 U	**11**	**14**	**31**	--
G13-S-8.5	10/23/2015	5.50	**89**	--	--	0.077	0.23	0.85	0.57	--
G10-S2-9.5 (2)	09/03/2015	6.50	**140**	--	--	0.020 U	0.10 U	0.37	1.6	--
C15-S-8	11/10/2015	8	**100**	--	--	0.020 U	0.069	0.098	0.26	--
K-14	9/11/2013	6.5–7.5	**1,600**	--	--	**0.34**	**8.6**	**14**	8.0	--
K-15	9/11/2013	6.5–7.5	**1,900**	--	--	**0.58**	**12**	**15**	**10**	--
K-16	9/23/2013	7.5–8.5	**560**	710 JM	120 U	**0.58**	3.7	2.4	5.8	--
K-17	9/23/2013	8.8–9.8	**510**	180 JM	120 U	**1.6**	4.5	**7.2**	4.4	--
K-35	9/11/2013	6–7	**500**	--	--	**0.56**	3.5	5.0	**26**	--
K-36	9/11/2013	7–8	**880**	--	--	0.20 U	4.9	**7.1**	4.8	--
K-83	10/15/2013	3.5–6	**150**	170 JM	100 U	**0.075**	0.39	1.2	5.9	--
K-84	10/15/2013	8.5–9	**1,500**	130 JM	100 U	0.4 U	**7.7**	0.4 U	6.4	--
K-89	10/16/2013	14–15	**880**	**8,100** JM	1,200 JM	**0.24**	0.95	2.3	3.8	--
K-301	4/1/2015	9–10	2.8	--	--	**0.35**	0.20 U	0.20 U	0.20 U	--
K-302	4/1/2015	10–11	**2,300**	--	--	**5.9**	**20**	**27**	**140**	--
K-302	4/1/2015	11–12	**39**	--	--	0.025	0.23	0.28	1.4	--
DP-03	1/12/2009	11–12	**330** U	--	--	0.03 U	0.9	3.2	3.5	--
DP-04	1/12/2009	11–12	**1,500**	--	--	0.03 U	5 U	5 U	7.1	--
DP-08	1/12/2009	10–11	**830**	--	--	**2.6 J**	3.6 J	5.1 J	3.9 J	--
DP-08	1/12/2009	11–12	5 U	--	--	**1.2**	0.05 U	0.07	0.2 U	--
DP-09	1/12/2009	10–11.5	**660**	--	--	0.03 U	0.8	1.8	1.7	--
DP-15	1/12/2009	12–13	8	--	--	**0.06**	0.05 U	0.4	0.2 U	--
DP-23	1/12/2009	11.5–12.5	15	--	--	**0.4**	0.2	0.8	0.8	--
SB-210	5/31/2006	6–8	**791**	**530**	--	0.05 U	0.08 U	0.08 U	2 U	--
B14[3]	8/13/2015	16.8–17.8	**110**	--	--	**1.7**	0.74	1.3	7.6	--
B15[3]	8/13/2015	16.9–17.9	9.7	--	--	**0.6**	0.02 U	0.29	0.06 U	--
C13[3]	8/13/2015	17.0–18.0	**76**	--	--	**1.4**	0.5	0.84	1.3	--
C14[3]	8/13/2015	16.9–17.9	2 U	--	--	**0.33**	0.02 U	0.05	0.06 U	--
C15[3]	8/13/2015	16.9–17.9	**45** J	--	--	0.041 J	0.02 U	0.26 J	0.14 J	--
D11	8/13/2015	10.9–11.9	**410**	--	--	**0.4**	2.3	3.9	**21**	--
D11	8/13/2015	11.9–12.9	2 U	--	--	**0.34**	0.02 U	0.02 U	0.06 U	--
D12	8/13/2015	11.3–12.3	**30**	--	--	**1.4**	0.19	0.47	1.4	--

Table L.1
Residually-Contaminated Soil Analytical Data

Sample ID	Sample Date	Depth (feet bgs)[1]	Range Organics (mg/kg)	Diesel-Range Organics (mg/kg)	Oil-Range Organics (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes, Total (mg/kg)	Dioxins/ Furans TEQ[2]
Concrete Pad and Bulkhead Areas (continued)										
D13[3]	8/13/2015	17.7–18.1	**59**	--	--	**1.8**	0.68	0.6	1.7	--
D13[3]	8/13/2015	18.1–19.1	**45**	--	--	**0.36**	0.33	0.25	1.1	--
D13[3]	8/13/2015	19.1–20.1	**34**	--	--	**0.88**	0.26	0.26	0.67	--
D14[3]	8/13/2015	16.9–17.9	**48**	--	--	0.073	0.063	0.19	0.7	--
D15[3]	8/13/2015	16.9–17.9	**1,700**	--	--	0.02 U	5.7	**18**	**28**	--
D15[3]	8/13/2015	17.9–18.9	**150**	--	--	0.28	0.41	1.7	1.2	--
E12	8/13/2015	10.9–11.9	11	--	--	**2.4**	0.047	0.046	0.06 U	--
F8	8/13/2015	10.5–11.5	**75**	--	--	0.14	0.44	1.4	1.1	--
F12	8/13/2015	11.1–12.1	7.4	--	--	**0.32**	0.043	0.23	0.12	--
F13[3]	8/13/2015	17.2–18.2	**290**	--	--	**0.69**	1	3.1	1.6	--
F14[3]	8/13/2015	17.2–18.2	**69**	--	--	**2.4**	0.33	1.6	0.78	--
Log Pond Area										
K-101	9/12/2013	13.5–15	2.0 U	250 JM	**2,800**	0.020 U	0.020 U	0.020 U	0.060 U	--
K-401-12-14	3/24/2016	12–14	--	910 JM	**7,300**	--	--	--	--	--
K-401-14-16	3/24/2016	14–16	--	1,900 JM	**16,000**	--	--	--	--	--
Bulkhead Area Backfill Soil with Dioxins/Furans										
SS-4	9/20/2013	5	--	--	--	--	--	--	--	**19.4**
SS-5	9/20/2013	5	--	--	--	--	--	--	--	**55.2**
SS-6	9/20/2013	5	--	--	--	--	--	--	--	**222**
MTCA Unrestricted Cleanup Level			30	2,000	2,000	0.030	7.0	6.0	9.0	12.8

Notes:

-- Sample was not analyzed for the given analyte.

bold Indicates a concentration that exceeds the applicable MTCA unrestricted cleanup level.

1 Sample depths are reported below the current Site ground surface, which is approximately 3 feet lower than the pre-excavation ground surface in the Concrete Pad and Bulkhead Areas.

2 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006).

3 Sample location was located on the loading dock concrete pad, which is approximately 5 feet above the surrounding ground surface.

Abbreviations:

bgs Below ground surface
mg/kg Milligrams per kilogram
MTCA Model Toxics Control Act
pg/g Picograms per gram
TEQ Toxicity equivalent

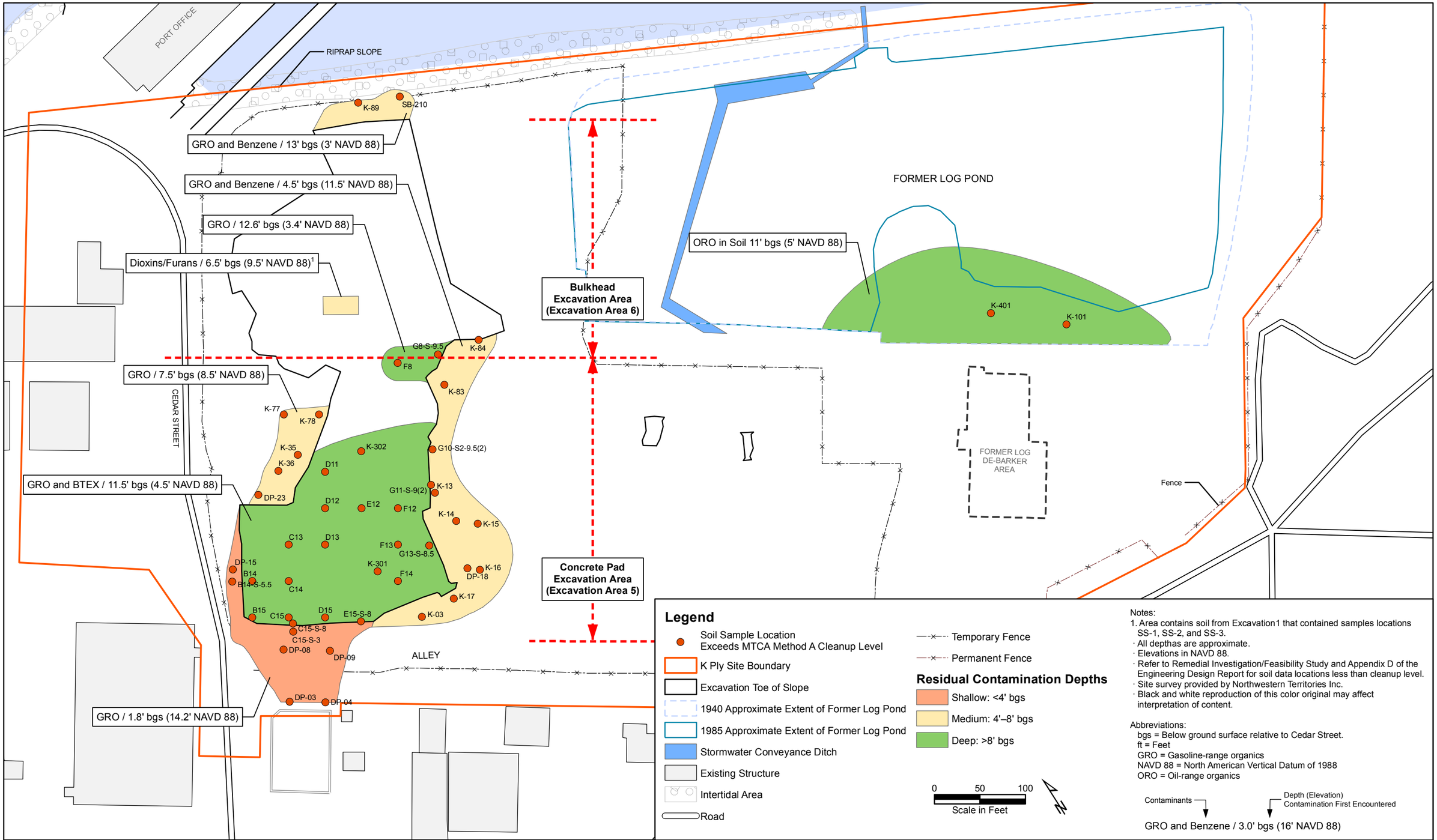
Qualifiers:

J Analyte was detected, concentrations is considered an estimate.
JM Analyte was detected, chromatographic pattern is a poor match to standard used for quantiation, concentraion is considered an estimate.
U Analyte was not detected at the given reporting limit.

K Ply Site

Soil Management Plan

Figure



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Construction Completion Report
K Ply Site
Port Angeles, Washington

Figure L.1
Residual Soil Contamination

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12/7/2016

K Ply Site

Construction Completion Report

Appendix N
Monitoring and Compliance Well Logs

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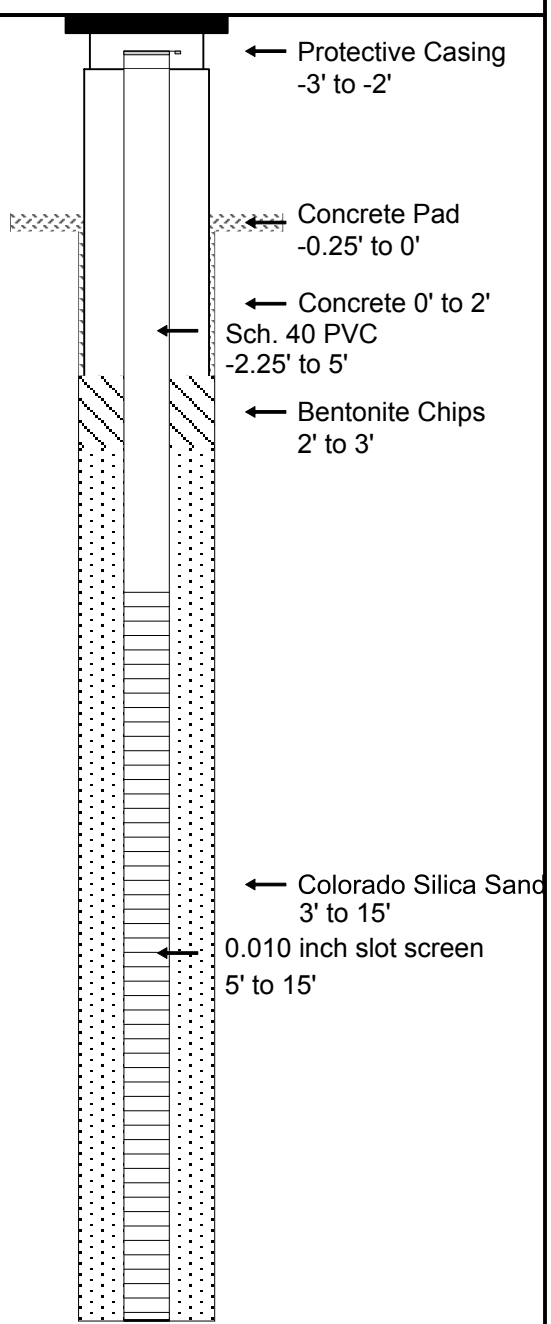
PROJECT: **K Ply**	LOCATION: **439 Marine Drive, Port Angeles, WA**	WELL ID: **PP-13R**
LOGGED BY: **Pamela Wichgers**	COORDINATE SYSTEM: **NAD83 & NAVD88**	ECOLOGY WELL ID: **BJW-302**
DRILLED BY: **Jeff Jones/Holocene**	NORTHING: **420734.569**	EASTING: **1003178.644**
DRILLING EQUIPMENT: **Geoprobe 8140 LC Limited Access Rig**	GROUND SURFACE ELEV.: **12.522**	TOC ELEVATION: **14.742**
DRILLING METHOD: **Sonic; 6-inch diameter outer rods, 4-inch diameter inner rods**	TOTAL DEPTH (ft bgs): **15**	DEPTH TO WATER (ft below TOC): **9.9**
SAMPLING METHOD: **Borings were advanced to the target depth for groundwater monitoring; soil samples were not collected for laboratory analysis**	BORING DIAMETER: **6"**	DRILL DATE: **7/27/2016**

Depth (feet)	USCS Symbol	Description
0	Fill	Backfill (sand and gravel), no odor.
10	SM	Native material: silty **SAND**.
15		Bottom of well = 15 feet bgs.

Well Construction



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
TOC = top of casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table ft bgs
- - - - = approximate depths

NOTES: Washed between inner and outer casings during drilling. Remaining soil cuttings broadcasted on site. Ground surface elevation measured from concrete pad.

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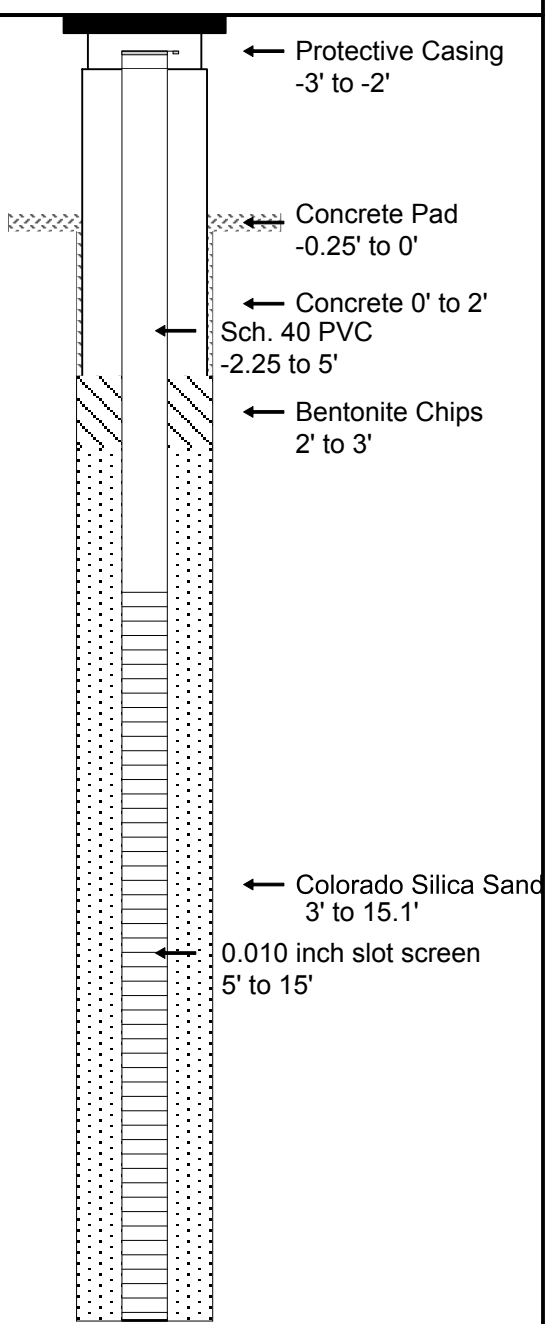
PROJECT: **K Ply**	LOCATION: **439 Marine Drive, Port Angeles, WA**	WELL ID: **PP-14R**	
LOGGED BY: **Pamela Wichgers**	COORDINATE SYSTEM: **NAD83 & NAVD88**	ECOLOGY WELL ID: **BJW-301**	
DRILLED BY: **Jeff Jones/Holocene**	NORTHING: **420633.848**	EASTING: **1003180.867**	
DRILLING EQUIPMENT: **Geoprobe 8140 LC Limited Access Rig**	GROUND SURFACE ELEV.: **13.25**	TOC ELEVATION: **15.573**	
DRILLING METHOD: **Sonic; 6-inch diameter outer rods, 4-inch diameter inner rods**	TOTAL DEPTH (ft bgs): **15**	DEPTH TO WATER (ft below TOC): **10.7**	
SAMPLING METHOD: **Borings were advanced to the target depth for groundwater monitoring; soil samples were not collected for laboratory analysis**	BORING DIAMETER: **6"**	DRILL DATE: **7/26/2016**	

Depth (feet)	USCS Symbol	Description
0		Backfill (sand and gravel), no odor.
5	Fill	
10		Native material: silty **SAND**.
12	SM	
15		Bottom of well = 15 feet bgs.



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
TOC = top of casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table ft bgs
- - - - = approximate depths

NOTES: Washed between inner and outer casings during drilling. Remaining soil cuttings broadcasted on site. Ground surface elevation measured from concrete pad.

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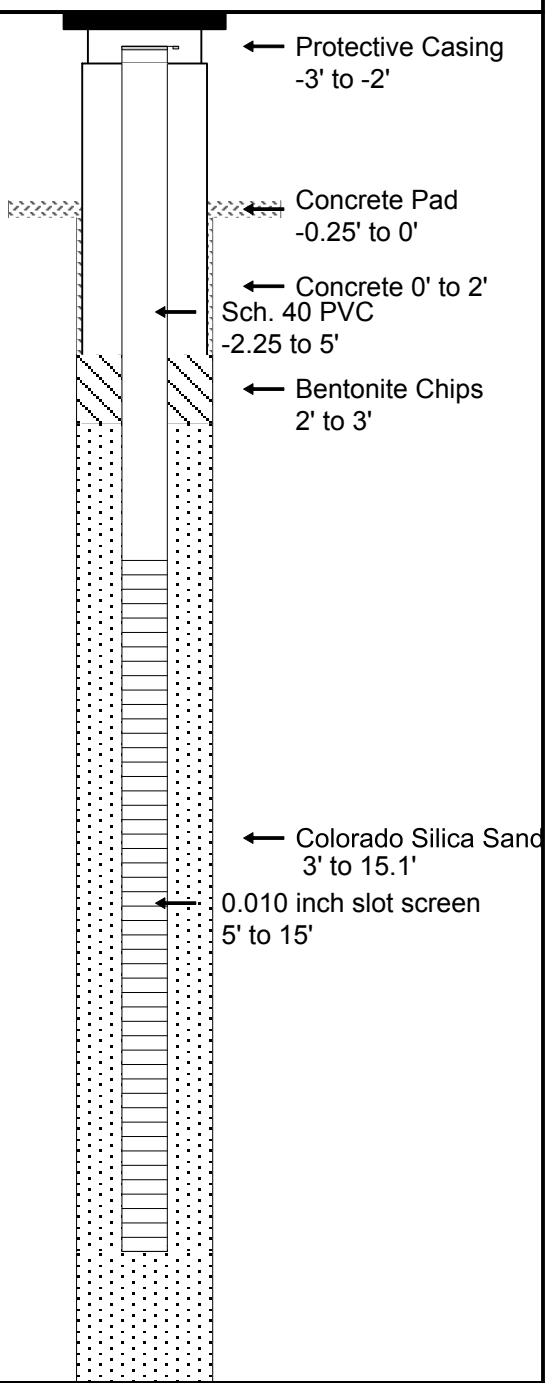
PROJECT: **K Ply**	LOCATION: **439 Marine Drive, Port Angeles, WA**	WELL ID: **PP-15R2**	
LOGGED BY: **Pamela Wichgers**	COORDINATE SYSTEM: **NAD83 & NAVD88**	ECOLOGY WELL ID: **BJW-298**	
DRILLED BY: **Jeff Jones/Holocene**	NORTHING: **420491.54**	EASTING: **1003105.215**	
DRILLING EQUIPMENT: **Geoprobe 8140 LC Limited Access Rig**	GROUND SURFACE ELEV.: **13.292**	TOC ELEVATION: **15.412**	
DRILLING METHOD: **Sonic; 6-inch diameter outer rods, 4-inch diameter inner rods**	TOTAL DEPTH (ft bgs): **17**	DEPTH TO WATER (ft below TOC): **10**	
SAMPLING METHOD: **Borings were advanced to the target depth for groundwater monitoring; soil samples were not collected for laboratory analysis**	BORING DIAMETER: **6"**	DRILL DATE: **7/26/2016**	

Depth (feet)	USCS Symbol	Description
0		Backfill (sand and gravel), no odor.
5	Fill	
10		No sample taken, presumed native material. Slight petroleum odor during wash between casings.
15		Bottom of well = 15 feet bgs.
17		Bottom of boring = 17 feet bgs.



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
TOC = top of casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table ft bgs
- - - - = approximate depths

NOTES: Washed between inner and outer casings during drilling. Soil cuttings 5'-15' segregated for disposal. Tape weight lost in hole prior to installation of PVC well. Attempted recovery resulted in pushing tape to 17 ft bgs. Ground surface elevation measured from concrete pad.

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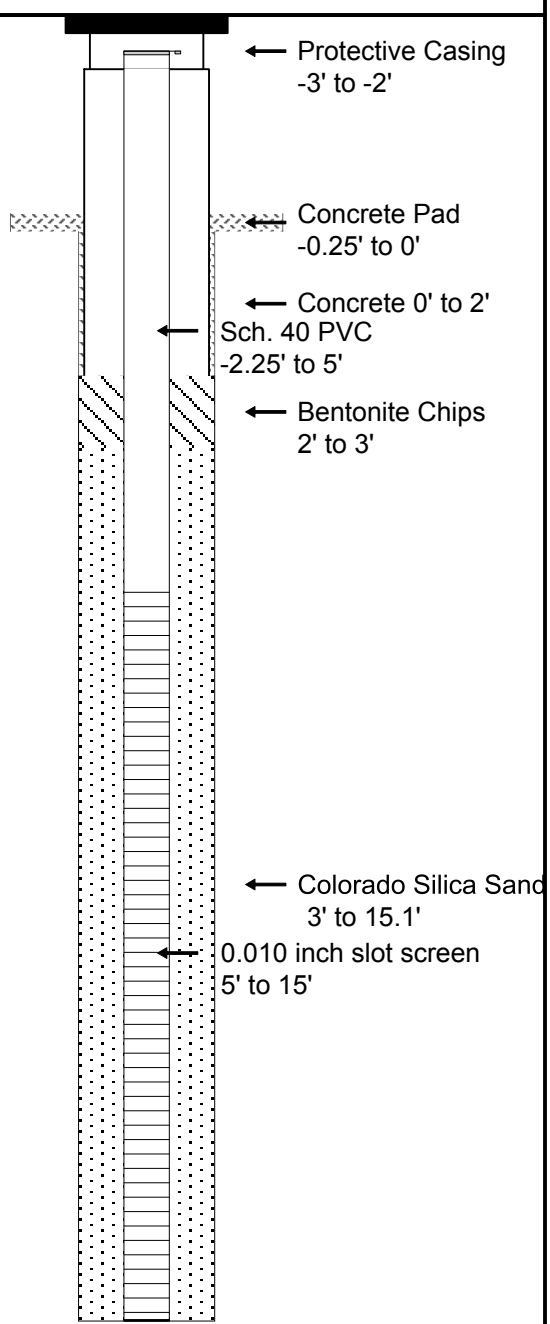
PROJECT: **K Ply**	LOCATION: **439 Marine Drive, Port Angeles, WA**	WELL ID: **PP-18R**	
LOGGED BY: **Pamela Wichgers**	COORDINATE SYSTEM: **NAD83 & NAVD88**	ECOLOGY WELL ID: **BJW-306**	
DRILLED BY: **Jeff Jones/Holocene**	NORTHING: **420786.137**	EASTING: **1003353.301**	
DRILLING EQUIPMENT: **Geoprobe 8140 LC Limited Access Rig**	GROUND SURFACE ELEV.: **11.431**	TOC ELEVATION: **13.861**	
DRILLING METHOD: **Sonic; 6-inch diameter outer rods, 4-inch diameter inner rods**	TOTAL DEPTH (ft bgs): **15**	DEPTH TO WATER (ft below TOC): **9.4**	
SAMPLING METHOD: **Borings were advanced to the target depth for groundwater monitoring; soil samples were not collected for laboratory analysis**	BORING DIAMETER: **6"**	DRILL DATE: **7/27/2016**	

Depth (feet)	USCS Symbol	Description
0		Backfill (sand and gravel), no odor.
5	"Fill"	
10		No sample taken, presumed native material.
15		Bottom of well = 15 feet bgs.

Well Construction



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
TOC = top of casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table ft bgs
- - - - = approximate depths

NOTES: Washed between inner and outer casings during drilling. Remaining soil cuttings broadcasted on site. Ground surface elevation measured from concrete pad.

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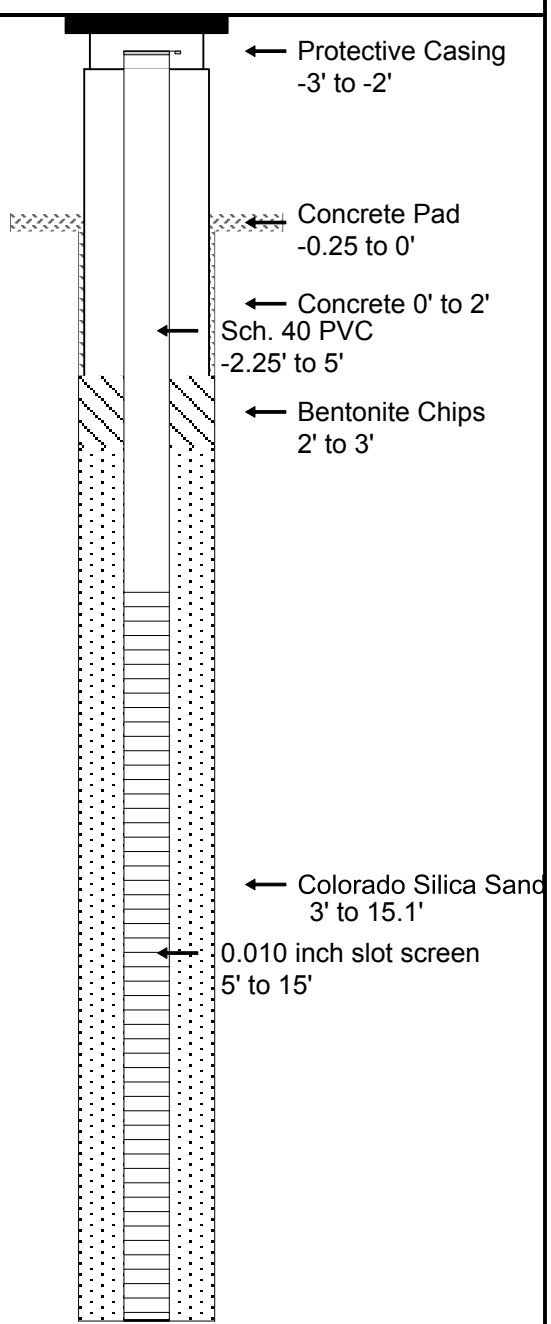
PROJECT: **K Ply**	LOCATION: **439 Marine Drive, Port Angeles, WA**	WELL ID: **PP-27**	
LOGGED BY: **Pamela Wichgers**	COORDINATE SYSTEM: **NAD83 & NAVD88**	ECOLOGY WELL ID: **BJW-296**	
DRILLED BY: **Jeff Jones/Holocene**	NORTHING: **420355.39**	EASTING: **1003082.234**	
DRILLING EQUIPMENT: **Geoprobe 8140 LC Limited Access Rig**	GROUND SURFACE ELEV.: **13.462**	TOC ELEVATION: **15.462**	
DRILLING METHOD: **Sonic; 6-inch diameter outer rods, 4-inch diameter inner rods**	TOTAL DEPTH (ft bgs): **15**	DEPTH TO WATER (ft below TOC): **10**	
SAMPLING METHOD: **Borings were advanced to the target depth for groundwater monitoring; soil samples were not collected for laboratory analysis**	BORING DIAMETER: **6"**	DRILL DATE: **7/26/2016**	

Depth (feet)	USCS Symbol	Description
0	Fill	Backfill (sand and gravel), no odor.
10		No sample taken, presumed native material: slight gasoline odor.
15		Bottom of well = 15 feet bgs.

Well Construction



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
TOC = top of casing
USCS = Unified Soil Classification System
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- - - - = approximate depths

NOTES: Washed between inner and outer casings during drilling. Remaining soil cuttings and purge water segregated for disposal. Ground surface elevation measured from concrete pad.

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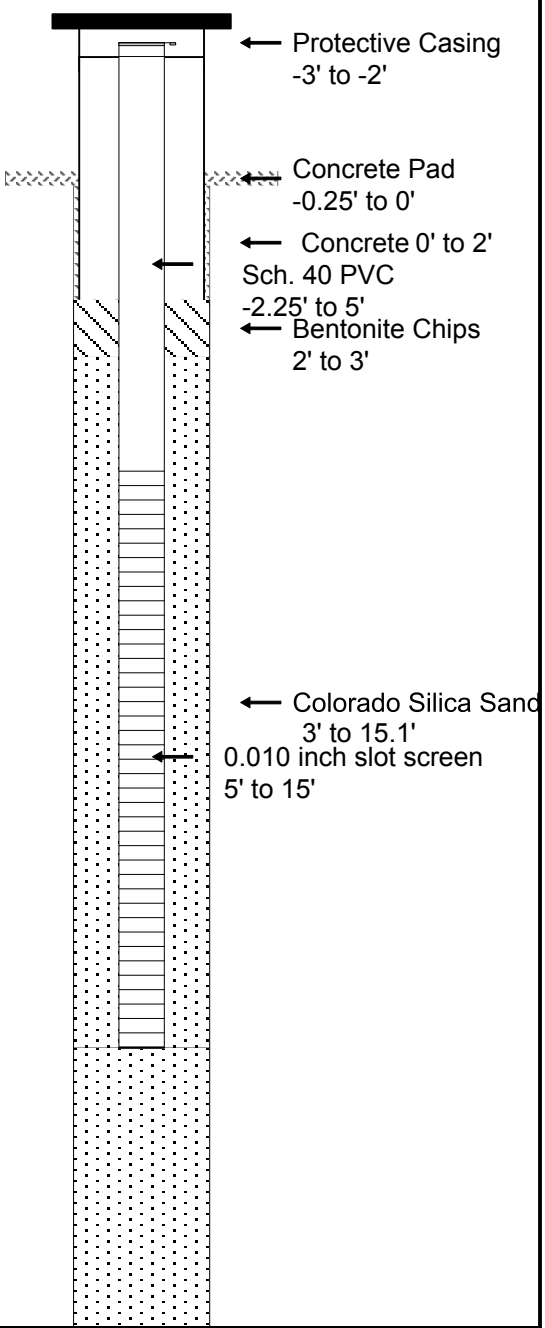
PROJECT: **K Ply**	LOCATION: **439 Marine Drive, Port Angeles, WA**	WELL ID: **PP-28**	
LOGGED BY: **Pamela Wichgers**	COORDINATE SYSTEM: **NAD83 & NAVD88**	ECOLOGY WELL ID: **BJW-295**	
DRILLED BY: **Jeff Jones/Holocene**	NORTHING: **420304.954**	EASTING: **1003172.869**	
DRILLING EQUIPMENT: **Geoprobe 8140 LC Limited Access Rig**	GROUND SURFACE ELEV.: **13.423**	TOC ELEVATION: **15.963**	
DRILLING METHOD: **Sonic; 6-inch diameter outer rods, 4-inch diameter inner rods**	TOTAL DEPTH (ft bgs): **20**	DEPTH TO WATER (ft below TOC): **11.5**	
SAMPLING METHOD: **Borings were advanced to the target depth for groundwater monitoring; soil samples were not collected for laboratory analysis**	BORING DIAMETER: **6"**	DRILL DATE: **7/26/2016**	

Depth (feet)	USCS Symbol	Description
0	Fill	Backfill (sand and gravel), no odor.
10	SW	Native material: dark gray **SAND** with silt and gravel; gasoline odor present; moist to wet.
15		Bottom of well = 15 feet bgs.
20		Bottom of boring = 20 feet bgs.



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
TOC = top of casing
USCS = Unified Soil Classification System
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NOTES: Soil cuttings and purge water segregated for disposal. Ground surface elevation measured from concrete pad.

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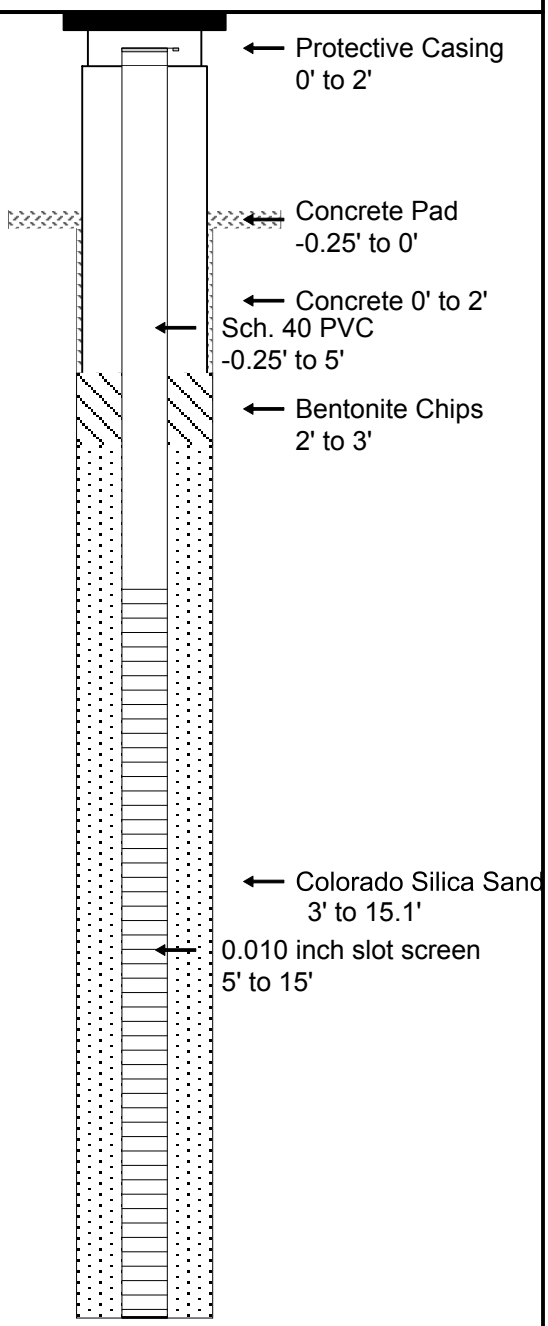
PROJECT: **K Ply**	LOCATION: **439 Marine Drive, Port Angeles, WA**	WELL ID: **PP-29**	
LOGGED BY: **Pamela Wichgers**	COORDINATE SYSTEM: **NAD83 & NAVD88**	ECOLOGY WELL ID: **BJW-299**	
DRILLED BY: **Jeff Jones/Holocene**	NORTHING: **420450.317**	EASTING: **1003175.879**	
DRILLING EQUIPMENT: **Geoprobe 8140 LC Limited Access Rig**	GROUND SURFACE ELEV.: **13.73**	TOC ELEVATION: **15.96**	
DRILLING METHOD: **Sonic; 6-inch diameter outer rods, 4-inch diameter inner rods**	TOTAL DEPTH (ft bgs): **15**	DEPTH TO WATER (ft below TOC): **10.6**	
SAMPLING METHOD: **Borings were advanced to the target depth for groundwater monitoring; soil samples were not collected for laboratory analysis**	BORING DIAMETER: **6"**	DRILL DATE: **7/26/2016**	

Depth (feet)	USCS Symbol	Description
0	Fill	Backfill (sand and gravel), no odor.
5		No sample taken, presumed native material. Slight gasoline odor during washing between 4" and 6" casings from ~5 to 15 feet bgs.
15		Bottom of well = 15 feet bgs.

Well Construction



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
TOC = top of casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table ft bgs
- - - - = approximate depths

NOTES: Washed between inner and outer casings during drilling. Soil cuttings 5'-15' segregated for disposal. Ground surface elevation measured from concrete pad.

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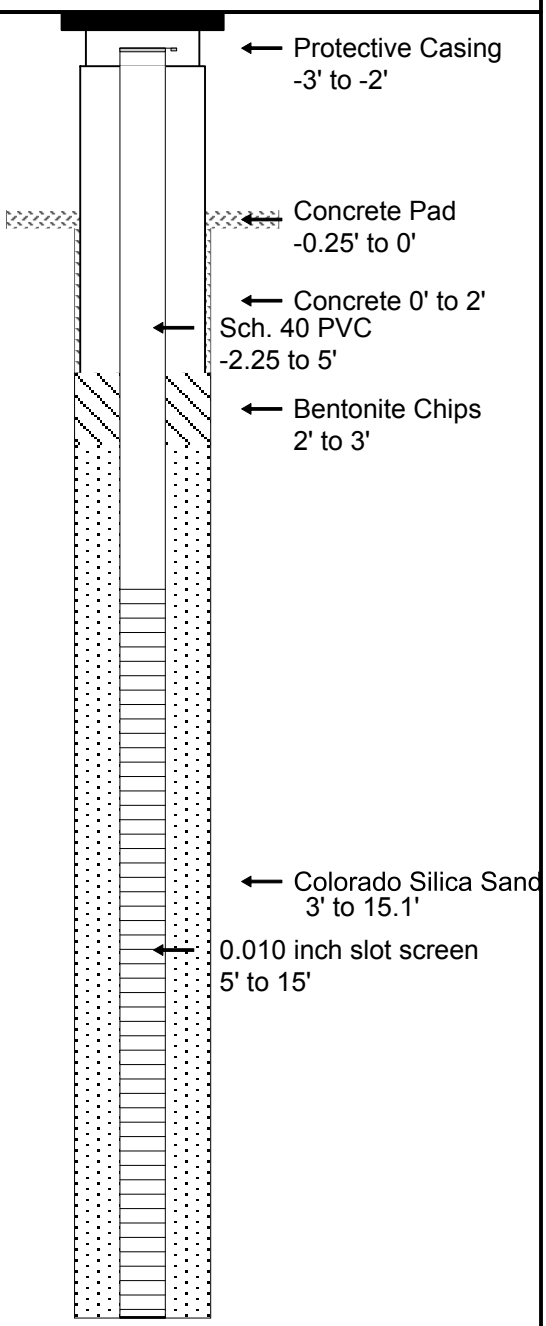
PROJECT: **K Ply**	LOCATION: **439 Marine Drive, Port Angeles, WA**	WELL ID: **PP-30**	
LOGGED BY: **Pamela Wichgers**	COORDINATE SYSTEM: **NAD83 & NAVD88**	ECOLOGY WELL ID: **BJW-303**	
DRILLED BY: **Jeff Jones/Holocene**	NORTHING: **420636.943**	EASTING: **1003283.041**	
DRILLING EQUIPMENT: **Geoprobe 8140 LC Limited Access Rig**	GROUND SURFACE ELEV.: **13.261**	TOC ELEVATION: **15.501**	
DRILLING METHOD: **Sonic; 6-inch diameter outer rods, 4-inch diameter inner rods**	TOTAL DEPTH (ft bgs): **15**	DEPTH TO WATER (ft below TOC): **10.8**	
SAMPLING METHOD: **Borings were advanced to the target depth for groundwater monitoring; soil samples were not collected for laboratory analysis**	BORING DIAMETER: **6"**	DRILL DATE: **7/27/2016**	

Depth (feet)	USCS Symbol	Description
0		Backfill (sand and gravel), no odor.
5	Fill	
10		Native material: silty **SAND**.
12	SM	
15		Bottom of well = 15 feet bgs.



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
TOC = top of casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table ft bgs
- - - - = approximate depths

NOTES: Washed between inner and outer casings during drilling. Remaining soil cuttings drummed for disposal because of dioxin/furans backfill area. Ground surface elevation measured from concrete pad.

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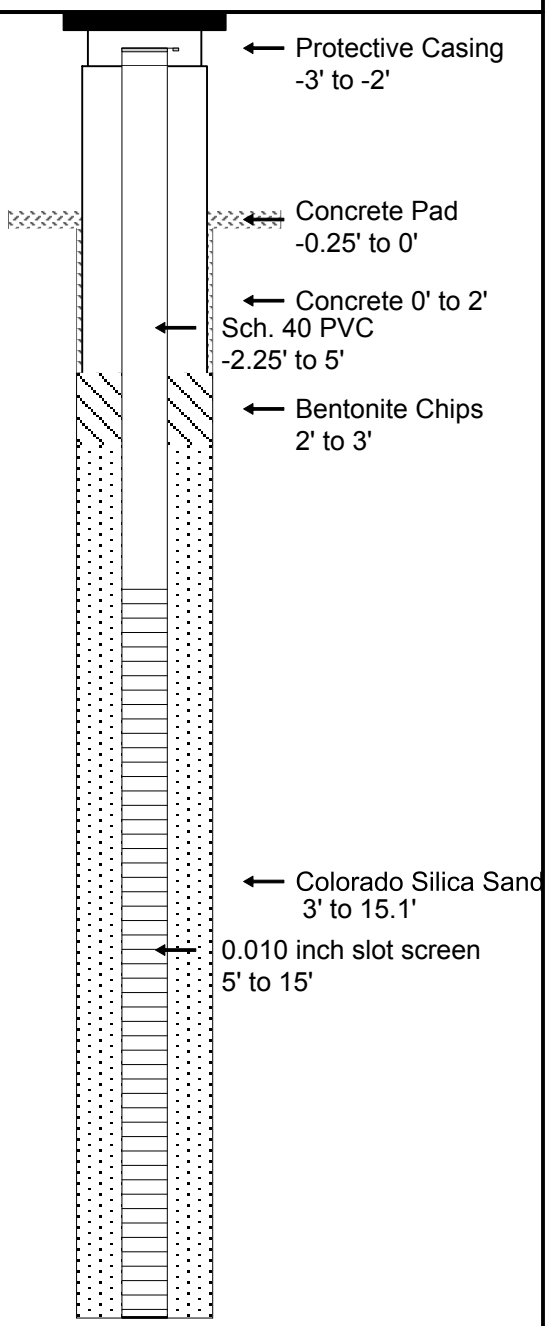
PROJECT: **K Ply**	LOCATION: **439 Marine Drive, Port Angeles, WA**	WELL ID: **PP-31**	
LOGGED BY: **Pamela Wichgers**	COORDINATE SYSTEM: **NAD83 & NAVD88**	ECOLOGY WELL ID: **BJW-304**	
DRILLED BY: **Jeff Jones/Holocene**	NORTHING: **420582.007**	EASTING: **1003379.491**	
DRILLING EQUIPMENT: **Geoprobe 8140 LC Limited Access Rig**	GROUND SURFACE ELEV.: **13.222**	TOC ELEVATION: **15.652**	
DRILLING METHOD: **Sonic; 6-inch diameter outer rods, 4-inch diameter inner rods**	TOTAL DEPTH (ft bgs): **15**	DEPTH TO WATER (ft below TOC): **10.9**	
SAMPLING METHOD: **Borings were advanced to the target depth for groundwater monitoring; soil samples were not collected for laboratory analysis**	BORING DIAMETER: **6"**	DRILL DATE: **7/27/2016**	

Depth (feet)	USCS Symbol	Description
0		Backfill (sand with gravel), no odor.
5	"Fill"	
8	▼	
10		No sample taken, presumed native material.
14		From 14-15 feet, slight odor- not gasoline.
15		Bottom of well = 15 feet bgs.

Well Construction



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
TOC = top of casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table ft bgs
- - - - = approximate depths

NOTES: Washed between inner and outer casings during drilling. Segregated 10-15' bgs soil cuttings for disposal. Ground surface elevation measured from concrete pad.

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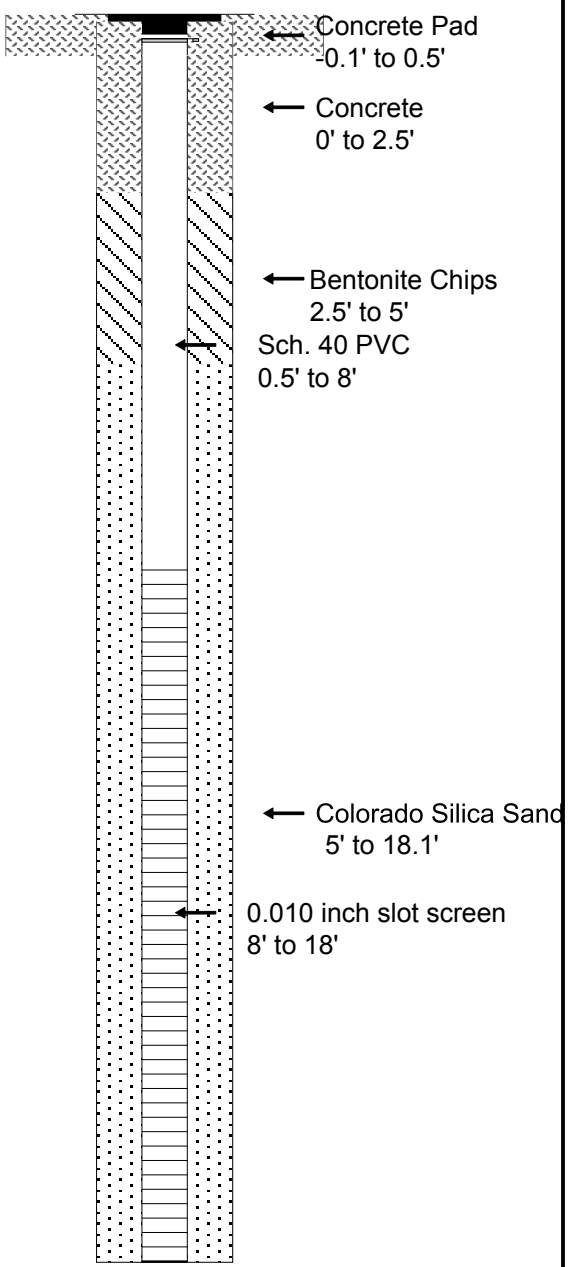
PROJECT: **K Ply**	LOCATION: **439 Marine Drive, Port Angeles, WA**	WELL ID: **PP-32**	
LOGGED BY: **Pamela Wichgers**	COORDINATE SYSTEM: **NAD83 & NAVD88**	ECOLOGY WELL ID: **BJW-308**	
DRILLED BY: **Jeff Jones/Holocene**	NORTHING: **420783.067**	EASTING: **1003108.028**	
DRILLING EQUIPMENT: **Geoprobe 8140 LC Limited Access Rig**	GROUND SURFACE ELEV.: **15.509**	TOC ELEVATION: **15.054**	
DRILLING METHOD: **Sonic; 6-inch diameter outer rods, 4-inch diameter inner rods**	TOTAL DEPTH (ft bgs): **18**	DEPTH TO WATER (ft below TOC): **11.95**	
SAMPLING METHOD: **Borings were advanced to the target depth for groundwater monitoring; soil samples were not collected for laboratory analysis**	BORING DIAMETER: **6"**	DRILL DATE: **7/27/2016**	

Depth (feet)	USCS Symbol	Description
0		**GRAVEL** ground surface.
1		Compact **SAND and GRAVEL**, no odor, dry.
2–4	GW	
5		No sample taken.
18		Bottom of well = 18 feet bgs.



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
TOC = top of casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table ft bgs
- - - - = approximate depths

NOTES: Washed between inner and outer casings during drilling. Remaining soil cuttings broadcasted on site.

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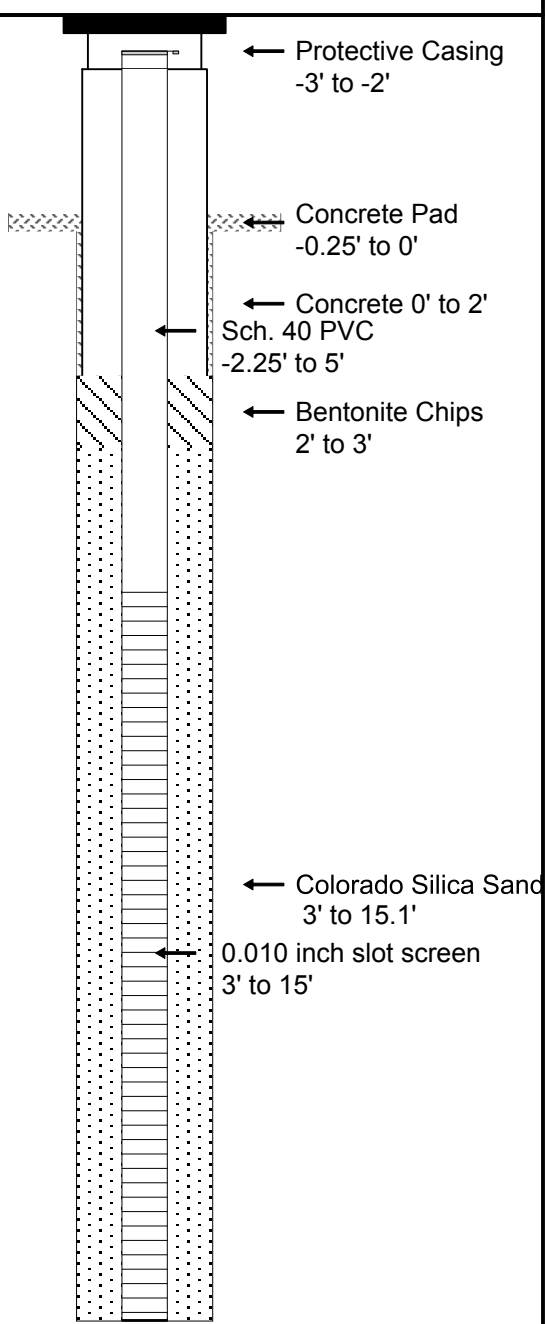
PROJECT: **K Ply**	LOCATION: **439 Marine Drive, Port Angeles, WA**	WELL ID: **PP-33**	
LOGGED BY: **Pamela Wichgers**	COORDINATE SYSTEM: **NAD83 & NAVD88**	ECOLOGY WELL ID: **BJW-300**	
DRILLED BY: **Jeff Jones/Holocene**	NORTHING: **420578.294**	EASTING: **1003101.218**	
DRILLING EQUIPMENT: **Geoprobe 8140 LC Limited Access Rig**	GROUND SURFACE ELEV.: **13.33**	TOC ELEVATION: **15.62**	
DRILLING METHOD: **Sonic; 6-inch diameter outer rods, 4-inch diameter inner rods**	TOTAL DEPTH (ft bgs): **15**	DEPTH TO WATER (ft below TOC): **10.25**	
SAMPLING METHOD: **Borings were advanced to the target depth for groundwater monitoring; soil samples were not collected for laboratory analysis**	BORING DIAMETER: **6"**	DRILL DATE: **7/26/2016**	

Depth (feet)	USCS Symbol	Description
0		Backfill (sand and gravel), no odor.
5	Fill	
10		Native material becomes becomes gray and silty with depth.
12	SW-SM	
15		Bottom of well = 15 feet bgs.



ABBREVIATIONS:
ft bgs = feet below ground surface
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TOC = top of casing
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NOTES: Washed between inner and outer casings during drilling. Remaining soil cuttings broadcasted on site. Ground surface elevation measured from concrete pad.

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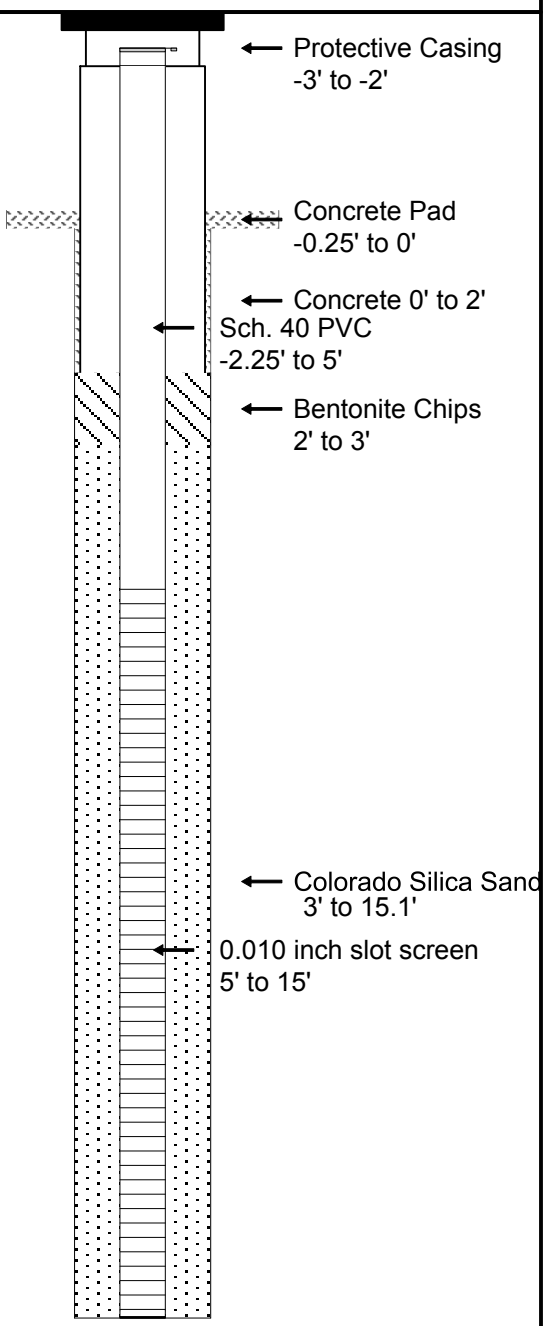
PROJECT: **K Ply**	LOCATION: **439 Marine Drive, Port Angeles, WA**	WELL ID: **PP-34**
LOGGED BY: **Pamela Wichgers**	COORDINATE SYSTEM: **NAD83 & NAVD88**	ECOLOGY WELL ID: **BJW-305**
DRILLED BY: **Jeff Jones/Holocene**	NORTHING: **420751.243**	EASTING: **1003431.486**
DRILLING EQUIPMENT: **Geoprobe 8140 LC Limited Access Rig**	GROUND SURFACE ELEV.: **11.9**	TOC ELEVATION: **14.47**
DRILLING METHOD: **Sonic; 6-inch diameter outer rods, 4-inch diameter inner rods**	TOTAL DEPTH (ft bgs): **15**	DEPTH TO WATER (ft below TOC): **9.9**
SAMPLING METHOD: **Borings were advanced to the target depth for groundwater monitoring; soil samples were not collected for laboratory analysis**	BORING DIAMETER: **6"**	DRILL DATE: **7/27/2016**

Depth (feet)	USCS Symbol	Description
0	Fill	Backfill (sand and gravel), no odor.
10	SP	Native material: dark gray, poorly graded **SAND** with few shell fragments.
13	SP-SM	Native material: grades to dark gray silty **SAND**; very slight odor.
15		Bottom of well = 15 feet bgs.



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
TOC = top of casing
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▼ = denotes groundwater table ft bgs
- - - - = approximate depths

NOTES: Washed between inner and outer casings during drilling. Remaining soil cuttings broadcasted on site. Ground surface elevation measured from concrete pad.

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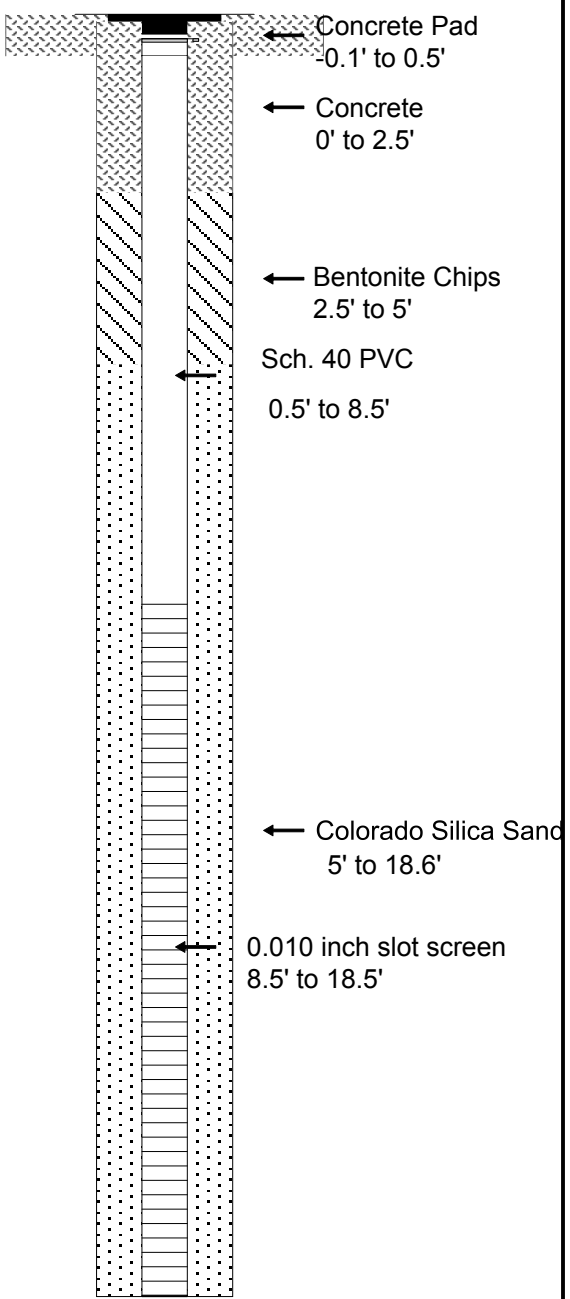
PROJECT: **K Ply**	LOCATION: **439 Marine Drive, Port Angeles, WA**	WELL ID: **PP-35**	
LOGGED BY: **Pamela Wichgers**	COORDINATE SYSTEM: **NAD83 & NAVD88**	ECOLOGY WELL ID: **BJW-307**	
DRILLED BY: **Jeff Jones/Holocene**	NORTHING: **420605.338**	EASTING: **1002987.624**	
DRILLING EQUIPMENT: **Geoprobe 8140 LC Limited Access Rig**	GROUND SURFACE ELEV.: **16.696**	TOC ELEVATION: **16.203**	
DRILLING METHOD: **Sonic; 6-inch diameter outer rods, 4-inch diameter inner rods**	TOTAL DEPTH (ft bgs): **18.5**	DEPTH TO WATER (ft below TOC): **10.75**	
SAMPLING METHOD: **Borings were advanced to the target depth for groundwater monitoring; soil samples were not collected for laboratory analysis**	BORING DIAMETER: **6"**	DRILL DATE: **7/27/2016**	

Depth (feet)	USCS Symbol	Description
0	GW	**GRAVEL** ground surface.
1	GW	Compact **SAND and GRAVEL**, no odor.
5	SP	Compact poorly graded **SAND**, no odor.
10	ML	Grades from sand to dark gray **SILT**, no odor.
15	SM	Grades from silt to silty **SAND**, no odor.
18.5		Bottom of well = 18.5 feet bgs.

Well Construction



ABBREVIATIONS:
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NOTES: Soil cuttings broadcasted on K Ply site. Sediment descriptions are approximate depths.

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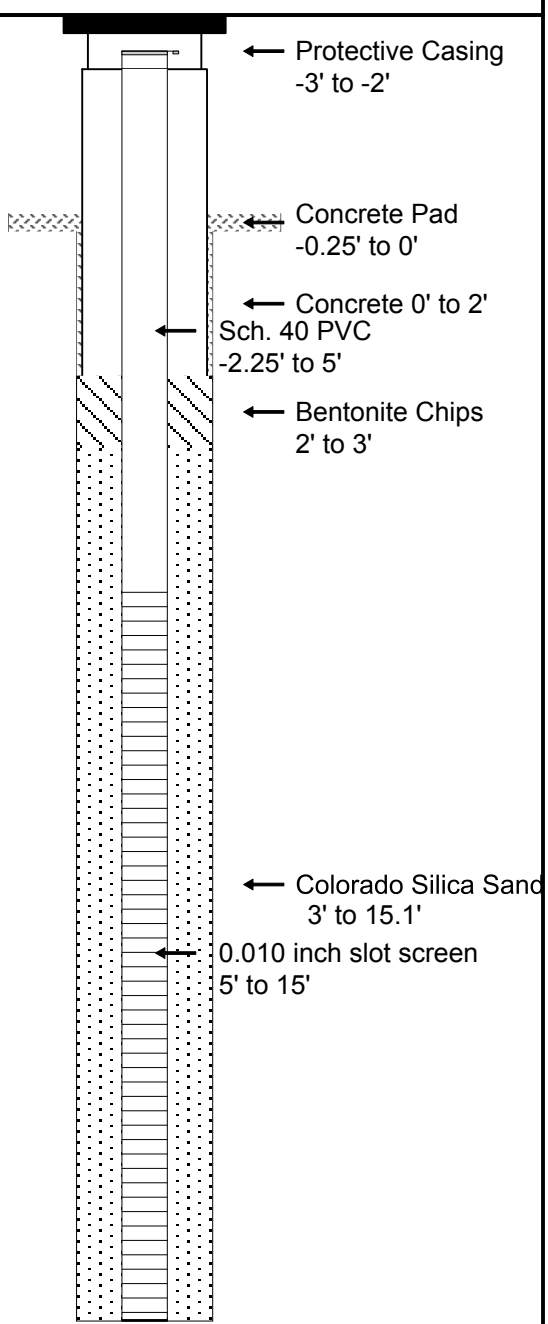
PROJECT: **K Ply**	LOCATION: **439 Marine Drive, Port Angeles, WA**	WELL ID: **PP-36**	
LOGGED BY: **Pamela Wichgers**	COORDINATE SYSTEM: **NAD83 & NAVD88**	ECOLOGY WELL ID: **BJW-297**	
DRILLED BY: **Jeff Jones/Holocene**	NORTHING: **420411.191**	EASTING: **1002997.052**	
DRILLING EQUIPMENT: **Geoprobe 8140 LC Limited Access Rig**	GROUND SURFACE ELEV.: **13.82**	TOC ELEVATION: **16.09**	
DRILLING METHOD: **Sonic; 6-inch diameter outer rods, 4-inch diameter inner rods**	TOTAL DEPTH (ft bgs): **15**	DEPTH TO WATER (ft below TOC): **10.7**	
SAMPLING METHOD: **Borings were advanced to the target depth for groundwater monitoring; soil samples were not collected for laboratory analysis**	BORING DIAMETER: **6"**	DRILL DATE: **7/26/2016**	

Depth (feet)	USCS Symbol	Description
0	Fill	Backfill (sand and gravel), no odor.
5		No sample taken, presumed native material. Slight gasoline odor during washing between 4" and 6" casings from ~5 to 15 feet bgs.
15		Bottom of well = 15 feet bgs.

Well Construction



ABBREVIATIONS:
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NOTES: Drilled ~10' east of original placement to avoid excavation slope. Washed between inner and outer casings during drilling. Cuttings broadcasted on site. Ground surface elevation measured from concrete pad.