

Memorandum

To: Connie Groven, Washington State Department of Ecology
Copies: Jesse Waknitz, Port of Port Angeles
From: Pamela Osterhout and Allison Geiselbrecht, Floyd|Snider
Date: April 5, 2021
Project No: K Ply
Re: **K Ply Remediation Site Long-Term Soil Monitoring Plan**

This memorandum summarizes the long-term soil monitoring program to be implemented at the K Ply Site (Site). The Site was formerly a plywood mill and is located at 439 W. Marine Drive in Port Angeles, Washington (Figure 1). The Site is being remediated in accordance with Agreed Order (AO) No. DE 11302 between the Washington State Department of Ecology (Ecology) and the Port of Port Angeles (Port), effective May 2015.

In 2015 and 2016, 53,765 tons of contaminated soil was removed from the K Ply Site and backfilled with a combination of crushed concrete, quarry spalls, and clean common borrow fill material in accordance with the requirements of the Cleanup Action Plan (CAP; Ecology 2015). The CAP, finalized by Ecology in 2015, describes long-term soil monitoring as a component of the selected remedial action for the Site. This monitoring is to be conducted once every 5 years following completion of active remediation to confirm monitored natural attenuation (MNA) of soil is occurring in areas of residually contaminated soil outside of the excavation areas. Additional details on the long-term soil monitoring program are included in the Engineering Design Report (EDR; Floyd|Snider 2015) and the Soil Management Plan (SMP; Floyd|Snider 2016). This memorandum combines the objectives and methods of the long-term soil monitoring program from the CAP, EDR, and SMP in a single location for ease of reference.

The CAP states that sampling of soil will be performed once every 5 years to confirm that MNA in areas of residually contaminated soils is effective and that the objective of this sampling will be to define the current limits of soil greater than cleanup levels (CULs) and average concentrations of contaminants of concern (COCs) within these areas, which is expected to diminish over time (Ecology 2015). The CAP identifies an expected 30-year time frame for all Site soil to achieve CULs via MNA. Remedial actions at the Site were completed in 2016, and the first long-term soil monitoring event is planned for spring 2021.

SOIL SAMPLING APPROACH

The results of the first soil monitoring event, to occur in 2021, will establish baseline COC concentrations at established monitoring locations within the areas of residual contamination where the CAP identifies MNA as the selected remedial action.

Soil samples will be collected from 29 locations, one cited in each cell of a 40-foot by 40-foot grid, extending laterally from the limits of the excavation in areas where residual contamination was established during the Remedial Investigation (RI) and Feasibility Study (FS), using an extension of the same sampling grid established for excavation confirmational sampling. Soil will be collected by direct-push probe, and samples will be analyzed for diesel-range organics (DRO); oil-range organics (ORO); gasoline-range organics (GRO); and benzene, toluene, ethylbenzene, and xylenes (BTEX) as described in the EDR (Floyd|Snider 2015). The proposed long-term soil monitoring grid locations are shown on Figure 2. Exact boring locations will be adjusted in the field based on conditions including utility location, surface completions, and access. A handheld global positioning device with sub-meter accuracy will be used during drilling to record monitoring locations.

The sample data quality objectives will be consistent with the sample data quality objectives presented in the RI/FS Work Plan Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP; Floyd|Snider 2013). These include laboratory quality assurance (QA) objectives; sample handling and custody documentation; data reduction, validation, and reporting; and corrective actions.

Laboratory data QA criteria for the required soil analyses to be performed during the long-term monitoring are summarized in Table 1. The analytical methods, preservation, bottle type, and required holding times for these analyses are presented in Table 2. The required quantitation limits for sample analyses are presented in Table 3.

FIELD PROCEDURES

The following sections describe the specific protocols that will be used to collect soil samples for long-term monitoring, which are consistent with the Ecology-approved SAP/QAPP included as Appendix G in the EDR (Floyd|Snider 2015), with clarification on target drilling depths based on data presented in Table L.1 and Figure L.1 in the SMP (included as Attachment 1). An updated page for project roles and responsibilities is provided in Attachment 2.

Long-term soil monitoring samples will be collected via direct push drilling methods. Each boring will be advanced to at least the depth of previously observed residual contamination based on the closest in situ data point on Figure 2 and Table L.1 in the SMP (Attachment 1). If field indications are present in the soil core at this depth, drilling will continue until field indications of contamination are no longer present. Consistent with the EDR, soil samples will be collected from the depth interval with the strongest field indications of contamination (i.e., sheen, odor, elevated photoionization detector [PID] readings, or presence of non-aqueous phase liquid [NAPL]). If

multiple distinct intervals of contamination are identified, a soil sample will be collected from each interval, and the sample with the greatest indications of contamination will be analyzed. Other samples will be archived by the laboratory for potential analyses. If field indications of contamination are not observed, a soil sample will be collected from within the 8 to 12 feet below ground surface (bgs) smear zone where contamination was consistently encountered during previous site investigations.

Soil Screening

For soil borings advanced in the area of the Concrete Pad Excavation Area, where GRO, DRO, and BTEX contamination are present, field screening for potential contamination will include qualitative monitoring for gasoline odors, sheen testing, and measuring volatile organic compound concentrations by PID either at a freshly exposed soil of the core or in the headspace of a sealed container with a small amount of soil placed inside. The presence of gasoline odors, rainbow sheens, or elevated PID readings (i.e., readings that are 10 parts per million by volume greater than background) will indicate potentially contaminated soil.

For soil borings advanced in the area of the Bulkhead Excavation Area, where GRO, BTEX, and ORO contamination are present, field screening will include the criteria above, along with qualitative observations of ORO including the presence of hydraulic oil odor or NAPL. Indications of NAPL include visually oily soil, oily spots or residue when blotting the soil with a clean paper towel, and an oil film that develops when soils are sheen tested.

Sample Nomenclature, Handling, and Analysis

The sample number format for long-term soil monitoring samples will be based on the grid system, consisting of 40-foot rows oriented generally north-south and east-west as shown on Figure 2. Samples will be named according to the year of collection, their grid location, and depth or depth interval, separated by dashes. For example, the long-term soil monitoring sample collected in 2021 at grid location H12 from 11 to 12 feet bgs would be named "2021-H12-11-12."

The specific sample collection date will be known from the sample bottle and chain-of-custody form. Sample labels will include the time of collection and initials of sampler on the bottle label.

The samples will be delivered to the laboratory following completion of the field event to ensure that analytical holding times specified in Table 2 are met.

Soil samples will be analyzed for the following COCs and laboratory methods:

- DRO and ORO by NWTPH-Dx
- GRO by NWTPH-Gx
- BTEX by USEPA Method 8021B

Equipment Decontamination

Field sampling equipment, such as stainless-steel bowls and spoons, will be cleaned between each use according to the following procedure:

1. Potable water will be sprayed over equipment to dislodge and remove any particles.
2. Surfaces of equipment contacting sample material will be scrubbed with brushes using an Alconox solution.
3. Scrubbed equipment will be rinsed and scrubbed again with clean water.
4. Equipment will undergo a final spray rinse of deionized or distilled water.

Additionally, the sample processing table will be cleaned to eliminate potential for cross-contamination between boring locations. The sample processing area will be set up to allow for separation of clean sampling gear and bottles from the soil core processing area, and temporary pop-up tents to provide cover from precipitation will be available for use if needed.

Investigation-Derived Waste Management

Waste soils and investigation-derived waste liquids, such as decontamination fluids, will be containerized on-site in 55-gallon drums and properly labeled. Profiling and disposal of long-term soil monitoring waste soils and contaminated waste waters will be coordinated by the Port.

CULTURAL RESOURCES CONSIDERATIONS

The Site is located near Tumwater Creek and is in close proximity to one of the three documented Klallam villages in the harbor area. The project area is approximately 1 mile from the Tse-whit-zen village site and another documented Klallam village site at the mouth of Ennis Creek. Cultural resource protocols for monitoring during all ground-disturbing activities throughout remediation will be implemented in compliance with federal, state, and local laws and regulations and in accordance with the AO. In addition, the Port, the City of Port Angeles, and the Lower Elwha Klallam Tribe (LEKT) have an agreement that all ground-disturbing activities in the area between the bluff to the south and the shoreline behind which the K Ply mill is located require monitoring of site work by an archaeologist.

An archaeologist will be present to monitor all subsurface soil-disturbing activities, consistent with the Archaeological Monitoring and Inadvertent Discovery Plan (MIDP) for the K Ply Site (included as Attachment 3). The archaeologist will follow the procedures for archaeological monitoring of soil sampling consistent with Section 4.3 of the MIDP. All field observations will be recorded in a field notebook or field form, and photographs will be taken of each soil core and the general work area. A cultural resources monitoring report will be included in the annual report.

HEALTH AND SAFETY

This work will comply with the health and safety standards prescribed by the Occupational Safety and Health Act, the Washington Department of Labor and Industries' Division of Occupational Safety and Health, and the project-specific Health and Safety Plan included in Appendix I of the EDR (Floyd|Snider 2015) and included in this memorandum as Attachment 4.

SCHEDULE AND REPORTING

The first post-remediation long-term soil monitoring will take place in spring 2021. Results will be reported in the annual report submitted to Ecology in December 2021.

REFERENCES

Floyd|Snider. 2013. *K Ply Site Remedial Investigation/Feasibility Study Work Plan*. Prepared for Port of Port Angeles. September.

_____. 2015a. *K Ply Site Engineering Design Report*. Prepared for Port of Port Angeles. August.

_____. 2015b. *K Ply Site Remedial Investigation/Feasibility Study*. Prepared for Port of Port Angeles. May.

_____. 2016. *K Ply Site Soil Management Plan for the Construction Completion Report*. Prepared for Port of Port Angeles. December.

Washington State Department of Ecology (Ecology). 2015. *K Ply Site Cleanup Action Plan*. Draft. 23 March.

LIST OF ATTACHMENTS

Table 1	Data Quality Assurance Criteria
Table 2	Analytical Requirements, Methods, Preservation, Bottle Type, and Holding Times
Table 3	Analytical Methods, Detection Limits, and Reporting Limits
Figure 1	Vicinity Map
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Tables

**Table 1
Data Quality Assurance Criteria**

Parameter	Reference	Precision (Relative Percent Difference)	Accuracy (Percent Difference from Standard)	Completeness (Percentage of Data Validated)
Soil				
DRO	NWTPH-Dx	± 20%	± 50%	95%
ORO				
GRO	NWTPH-Gx	± 20%	± 50%	95%
BTEX Compounds				
Benzene	USEPA Method 8021B or 8260C	± 20%	± 50%	95%
Toluene				
Ethylbenzene				
Xylenes				

Abbreviations:

- BTEX Benzene, toluene, ethylbenzene, and xylenes
- DRO Diesel-range organics
- GRO Gasoline-range organics
- ORO Oil-range organics
- USEPA U.S. Environmental Protection Agency

Table 2
Analytical Requirements, Methods, Preservation, Bottle Type, and Holding Times

Parameter	Reference	Bottle Type	Preservative	Holding Time
Soil				
DRO	NWTPH-Dx	(1) 4-oz WMG	None, cool to ≤6 °C	14 days to extract, then 40 days to analyze
ORO				
GRO	NWTPH-Gx	(3) tared glass VOA vials with PTFE septum	Methanol and cool to ≤6 °C, or none and cool to ≤6 °C	14 days to analyze with MeOH preservation or if none, 2 days at ≤6 °C, 14 days at ≤-7 °C
BTEX Compounds	USEPA Method 8021B or 8260C			
Benzene				
Toluene				
Ethylbenzene				
Xylenes				

Abbreviations:

- BTEX Benzene, toluene, ethylbenzene, and xylenes
- °C Degrees Celsius
- DRO Diesel-range organics
- GRO Gasoline-range organics
- MeOH Methanol
- ORO Oil-range organics
- oz Ounces
- PTFE Polytetrafluoroethylene (Teflon)
- VOA Volatile organic analysis
- WMG Wide-mouth glass jar

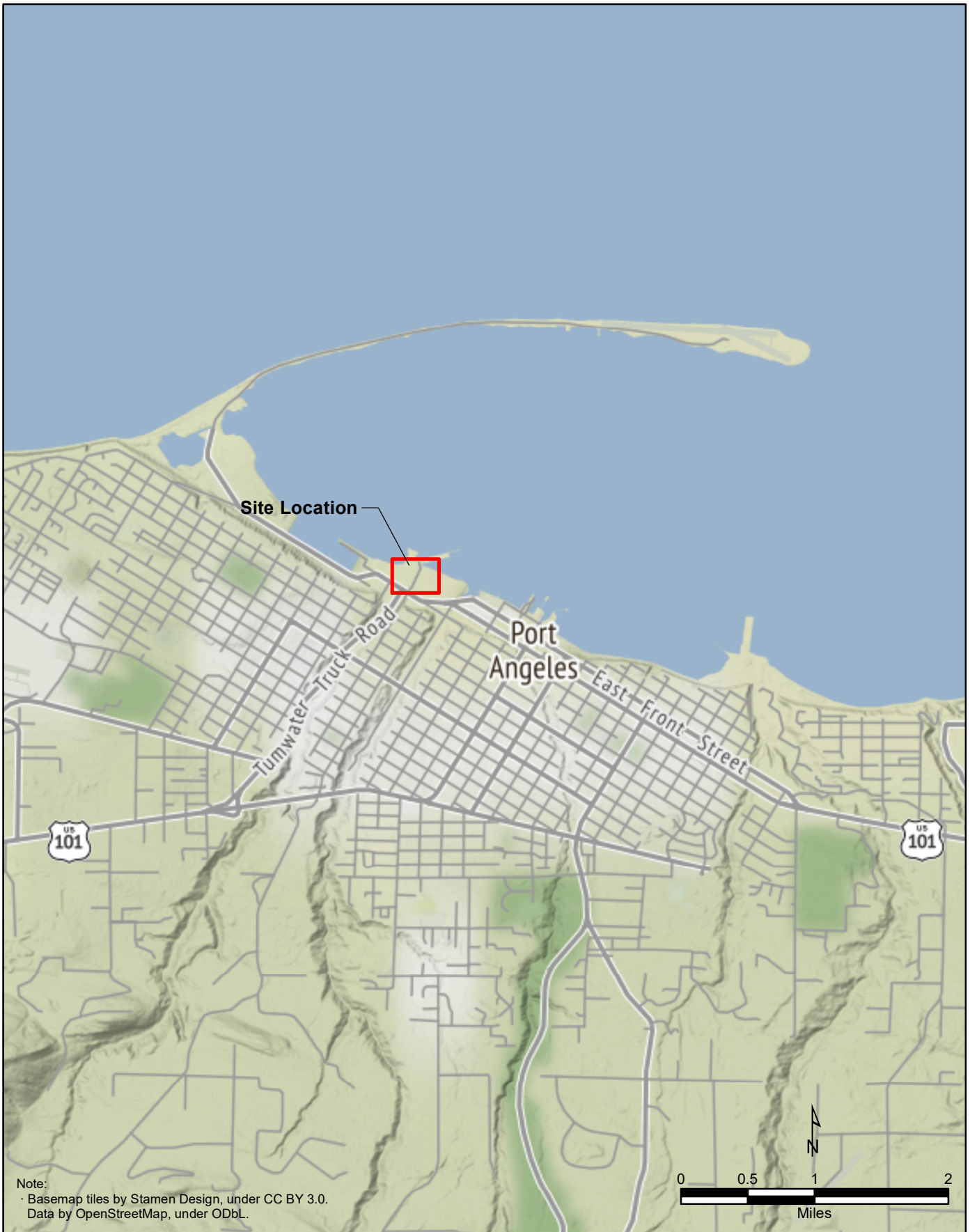
Table 3
Analytical Methods, Detection Limits, and Reporting Limits

Parameter	Reference	Units	Detection Limit	Reporting Limit/PQL	Cleanup Level
Soil					
DRO	NWTPH-Dx	mg/kg	25	25-50	2,000
ORO			50	250	2,000
GRO	NWTPH-Gx		0.3	2	30
BTEX Compounds					
Benzene	USEPA Method 8021B	µg/kg	6	20	300
Toluene	USEPA Method 8021B		2	20	7,000
Ethylbenzene	USEPA Method 8021B		2	20	6,000
Xylenes	USEPA Method 8021B		6	60	9,000

Abbreviations:

- BTEX Benzene, toluene, ethylbenzene, and xylenes
- DRO Diesel-range organics
- GRO Gasoline-range organics
- µg/kg Micrograms per kilogram
- mg/kg Milligrams per kilogram
- ORO Oil-range organics
- PQL Practical quantitation limit

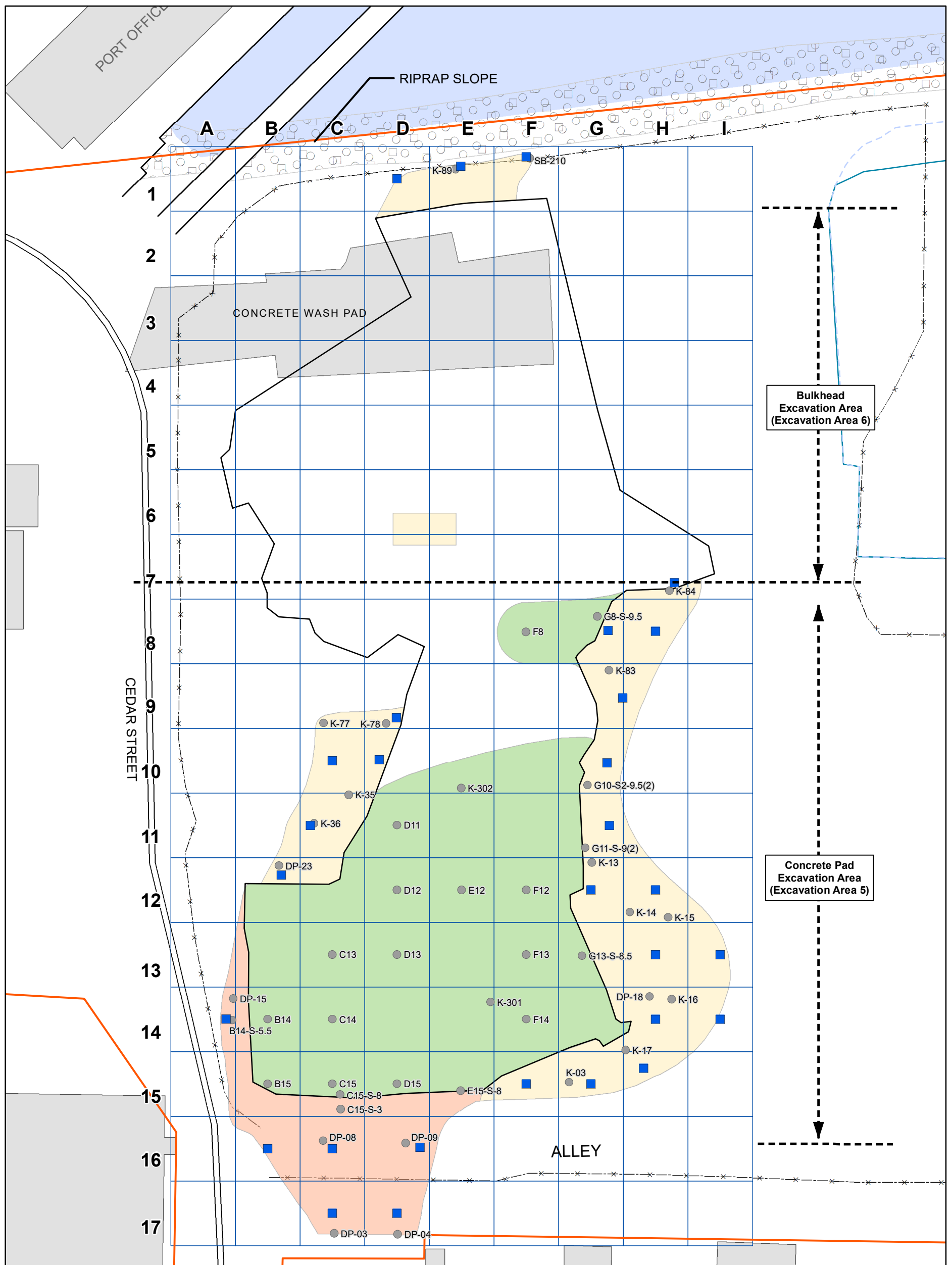
Figures



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**Long-Term Soil
 Monitoring Plan
 K Ply Site
 Port Angeles, Washington**

**Figure 1
 Vicinity Map**



Legend

- Long-Term Soil Monitoring Sample Location
- In-situ Soil Sample Location Exceeds MTCA Method A Cleanup Level
- Residual Contamination Depths**
- Shallow: <4 ft bgs
- Medium: 4–8 ft bgs
- Deep: >8 ft bgs
- 1940 Approximate Extent of Former Log Pond
- 1985 Approximate Extent of Former Log Pond
- Excavation Toe of Slope
- Fence
- Existing Structure
- Intertidal Area
- K Ply Site Boundary

Notes:

- All depths are approximate.
- Refer to Remedial Investigation/Feasibility Study (Floyd|Snider 2015b) and Appendix D of the Engineering Design Report (Floyd|Snider 2015a) 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
- MTCA = Model Toxics Control Act

0 30 60 120
Scale in Feet

Attachment 1
Soil Management Plan

K Ply Site

Soil Management Plan for the Construction Completion Report



Prepared for

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December 2016

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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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Figure L.1 Residual Contamination in Soil

List of Acronyms and Abbreviations

Acronym/ Abbreviation	Definition
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
bgs	Below ground surface
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 environment. 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 than 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 Reevaluation 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:

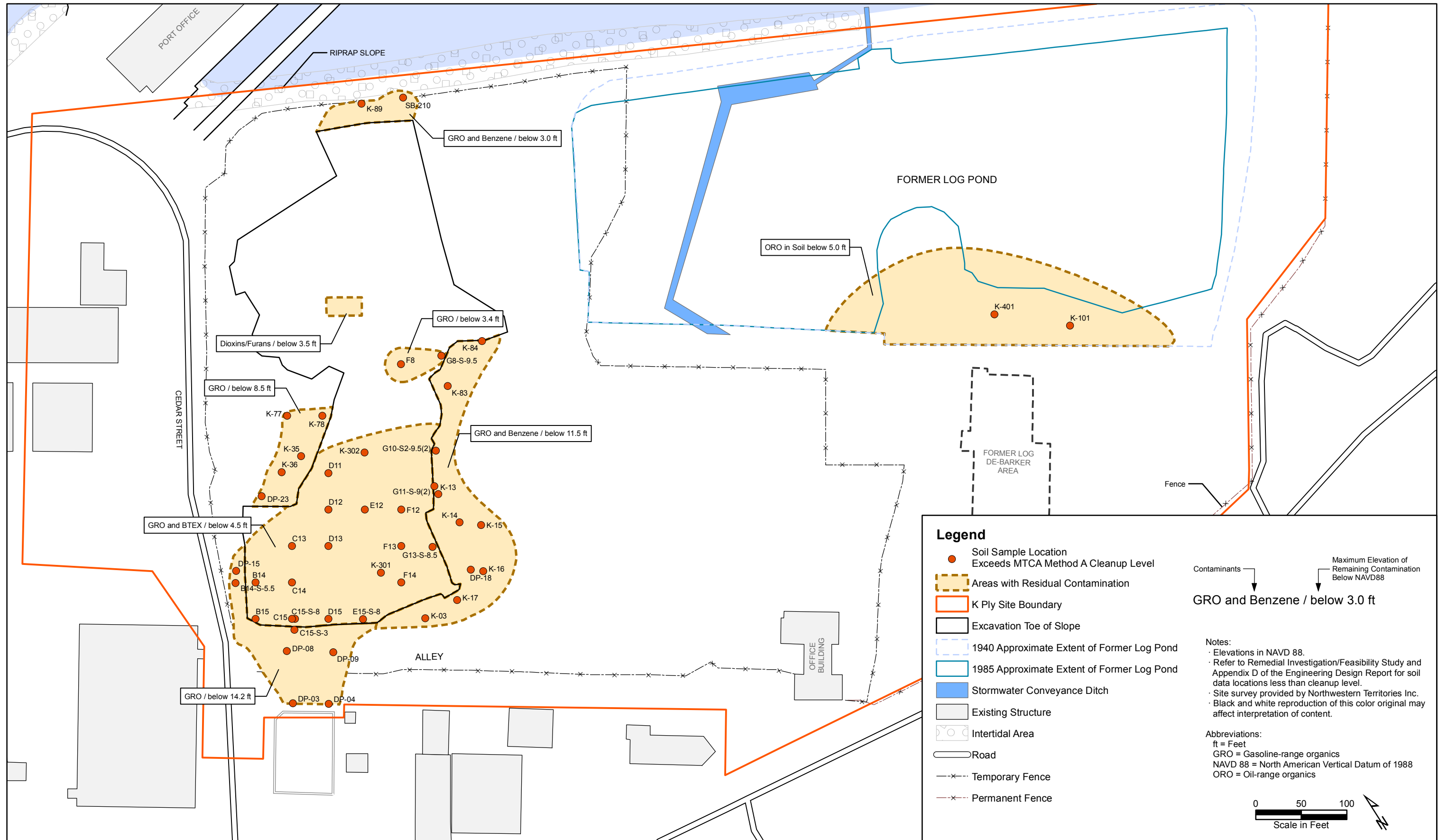
J Analyte was detected, concentrations is considered an estimate.

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



Attachment 2
Updated Project Roles and Responsibilities

Attachment 2 Project Organization and Responsibility

Updated March 2021

The various QA field, laboratory, and management responsibilities of key project personnel are defined below.

MANAGEMENT RESPONSIBILITIES

Jesse Waknitz—Port of Port Angeles

Jesse Waknitz is the Port of Port Angeles' (Port's) primary point of contact. He will perform the following:

- Authorize and coordinate access for field activities.
- Assist with field activities.
- Review and approve all reports (deliverables) before their submission to Washington State Department of Ecology (Ecology).
- Manage the disposal of any investigation-derived waste.

Kristin Anderson, LHG—Floyd | Snider Project Manager

Kristin Anderson, Project Manager, will have overall responsibility for project implementation. As Project Manager she will be responsible for maintaining QA on this project and ensuring that the post-remediation compliance monitoring objectives are met. The Project Manager will perform the following:

- Approve the SAP/QAPP.
- Monitor project activity and quality.
- Provide overview of field activities to the Port and Ecology.
- Provide technical representation of project activities at meetings.

QUALITY ASSURANCE RESPONSIBILITIES

Chell Black—Floyd | Snider Data Manager

The Data Manager will be responsible for the data validation of all sample results from the analytical laboratories and entering the data into a database. Additional responsibilities include the following:

- Review of laboratory reports.
- Loading analytical data to Ecology's Environmental Information Management (EIM) database.

- Advising on data corrective action procedures.
- QA/QC on analytical data reports.
- Database management and queries.

LABORATORY RESPONSIBILITIES

An Ecology-accredited laboratory will perform all analytical services in support of the cleanup action activities.

Laboratory Project Manager

The Laboratory Project Manager will be responsible for the following:

- Coordinating laboratory analyses with Floyd|Snider.
- Reviewing and approving final analytical reports.
- Scheduling sample analyses.
- Overseeing data review.

FIELD RESPONSIBILITIES

Pamela Osterhout, LG—Floyd|Snider Field Supervisor and Sampling Lead

The Field Supervisor and Sampling Lead will be responsible for managing day-to-day work activities and leading and coordinating sampling activities in the field. The Field Supervisor will report directly to the Floyd|Snider Project Manager. Specific responsibilities include the following:

- Tracking project activities and schedule.
- Coordinating and managing work activity.
- Managing collection of samples.
- Coordinating and managing field sampling staff including drillers.
- Reviewing field data including field logs and field measurement data.
- Coordinating with the laboratory.

Attachment 3
Archaeological Monitoring and
Inadvertent Discovery Plan for the K Ply Site

REDACTED Archaeological Monitoring and Inadvertent Discovery
Plan for the K Ply Site Remedial Investigation,
City of Port Angeles, Washington

Prepared for:
Floyd Snider
Seattle, Washington

Submitted by:
Historical Research Associates, Inc.
Jordan Pickrell, PhD
Jennifer Gilpin, MA

Seattle, Washington
May 2015



HISTORICAL
RESEARCH
ASSOCIATES, INC.

This archaeological monitoring and inadvertent discovery plan was prepared by HRA archaeologists Jordan Pickrell, PhD, and Jennifer Gilpin, MA, who meet the Secretary of the Interior's professional qualifications standards for archaeology. This plan is intended for the exclusive use of the Client and its representatives. It contains the procedures to follow for archaeological monitoring during ground disturbing activities, as well as procedures to follow regarding inadvertent discovery of cultural resources and human remains. It should not be considered to constitute project clearance with regard to the treatment of cultural resources or permission to proceed with the project described in lieu of review by the appropriate reviewing or permitting agency. This plan should be submitted to the appropriate state and local review agencies for their comments prior to the commencement of the project.

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1. Introduction

Floyd|Snider is assisting the Port of Port Angeles (Port) with investigation and cleanup of environmental contamination at the K Ply Site (Project) under Agreed Order No. DE 9546 (Agreed Order [1]) with the Washington State Department of Ecology (DOE). The K Ply Site is located along the Port Angeles Harbor shoreline at 439 Marine Drive, Port Angeles, Washington. It is situated in the west half of Section 3, Township 30 North, Range 6 West, Willamette Meridian (Port Angeles, Washington Quadrangle; Figure 1-1).

1.1 Project Description

The current phase of the Project consists of excavation of all vadose zone gasoline-contaminated soil that exceeds applicable cleanup levels (CUL) and a large portion of the underlying smear zone soil that is a source of groundwater contamination. Excavation will also occur in the areas where light non-aqueous phase liquid (LNAPL) containing soil exists. Soil within other designated cleanup areas will also be excavated and either disposed of or relocated on site. In addition to the excavations, soil sampling will be conducted in the Log Pond Fill Area in order to delineate the boundary of the contamination in this portion of the project area. The total excavation volume is expected to be approximately 34,900 cubic yards (CY). Additionally, the Project includes replacement of select monitoring wells that were abandoned prior to project construction.

1.2 Regulatory Context

Due to the involvement of the DOE, the project will comply with State of Washington regulations regarding the consideration of cultural resources, including those outlined in the State Environmental Policy Act (SEPA), and Regulatory Code of Washington (RCW) Chapter 27.53 (Archaeological Sites and Resources) and Chapter 27.44 (Indian Graves and Records).

In addition, the Port, the City of Port Angeles (City), and the Lower Elwha Klallam Tribe (LEKT) have a Settlement Agreement that all ground disturbing activities along the City's waterfront (between the bluff to the south and the shoreline) be monitored, with oversight by the City and/or LEKT representatives.

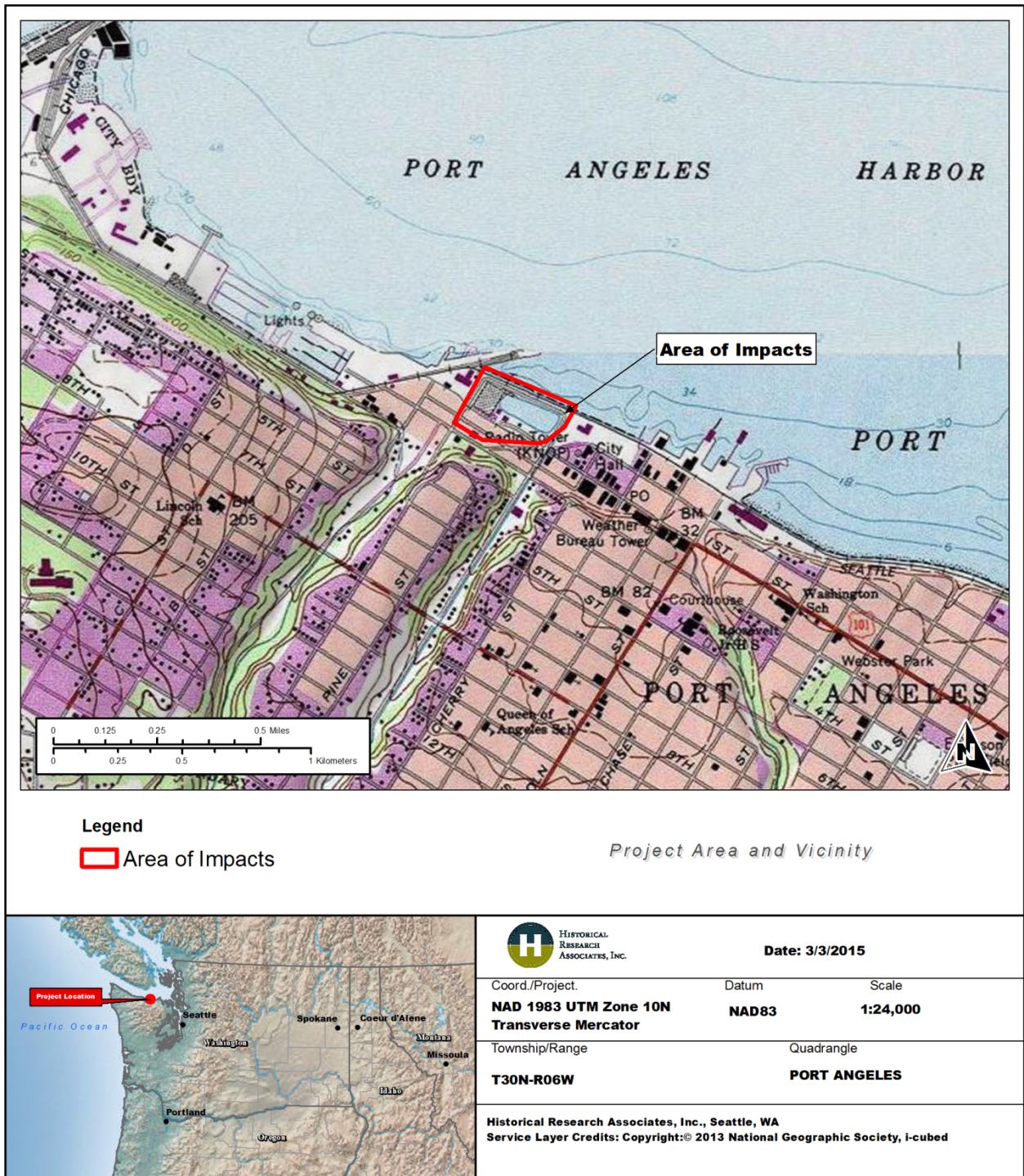


Figure 1-1. Project area and vicinity.

1.3 Area of Impacts

The Area of Impacts (AI) is defined as the portions of the project area wherein ground-disturbing activities could impact human remains or archaeological deposits that are eligible or potentially eligible for listing in national, state, or local registers. The Project AI includes locations of proposed environmental sampling and remedial excavation. This area measures approximately 21.5 acres (Figure 1-2).



Figure 1-2. Project Area of Impacts location Map.

2. Background Research

The reader is asked to refer to the previous archaeological monitoring reports (Meoli 2008; Raff-Tierney and Gilpin 2014; Tingwall and Rust 2009) for detailed archival and background research associated with the Project. The following sections provide a summary of the environmental and cultural contexts for the AI, for reference by the monitoring archaeologist during environmental sampling and remediation activities.

2.1 Environmental Context

The AI is located adjacent to Port Angeles Harbor on flat land at 15 feet (ft) above mean sea level, flanked on either side by Tumwater and Valley Creeks (Tingwall and Rust 2009). Fill deposits dredged from the harbor, and possibly derived from the 1914 sluicing project (see Martin 1983:106, 109–119), overlie native beach deposits and measure 8 to 16 ft thick. Native beach deposits developed and deposited during the Holocene are about 30 ft thick and overlie approximately 300-ft-thick glacial deposits and bedrock. Bedrock in the vicinity of the AI is from the Twin River Formation, which consists of olive to greenish gray claystone, mudstone, and siltstone and dates to the late Eocene to early Miocene (Floyd | Snider 2013).

Examination of the United States Surveyor General's (USSG) 1879 General Land Office (GLO) map (Figure 2-1) and the historic-period maps prepared by the Wengler Surveying & Mapping Co. (2007) show that the historic-period shoreline was located within the southern portion of the AI. As archaeologist Dr. Gary Wessen points out, a sea level curve taken by Gowan (2007) indicates that the sea level had risen to “within a few meters of the modern level by ca. 5,000 years B.P.,” meaning that during the Late Pleistocene and early Holocene, the harbor shoreline was somewhat farther north, and that the AI would have largely been a terrestrial environment. These deposits, if extant (and not eroded away), would likely be deeply buried (Wessen 2010:5).

The protected harbor provided by Ediz Hook provided an ecosystem bountiful in flora and fauna available to the region's inhabitants. Larger land mammals, including Roosevelt elk, black-tailed deer, black bear, and wolf, were historically available in the vicinity of the AI, as were marine mammals such as orcas and harbor seals. Smaller mammals, including waterfowl, raccoon, rabbit, and squirrel, would also have utilized the vicinity of the AI. Salmon were present in the larger creeks along the coastline, and they were certainly readily available to inhabitants of the AI vicinity. Marine invertebrates available along the coastline, within or close to the AI, included butter and horse

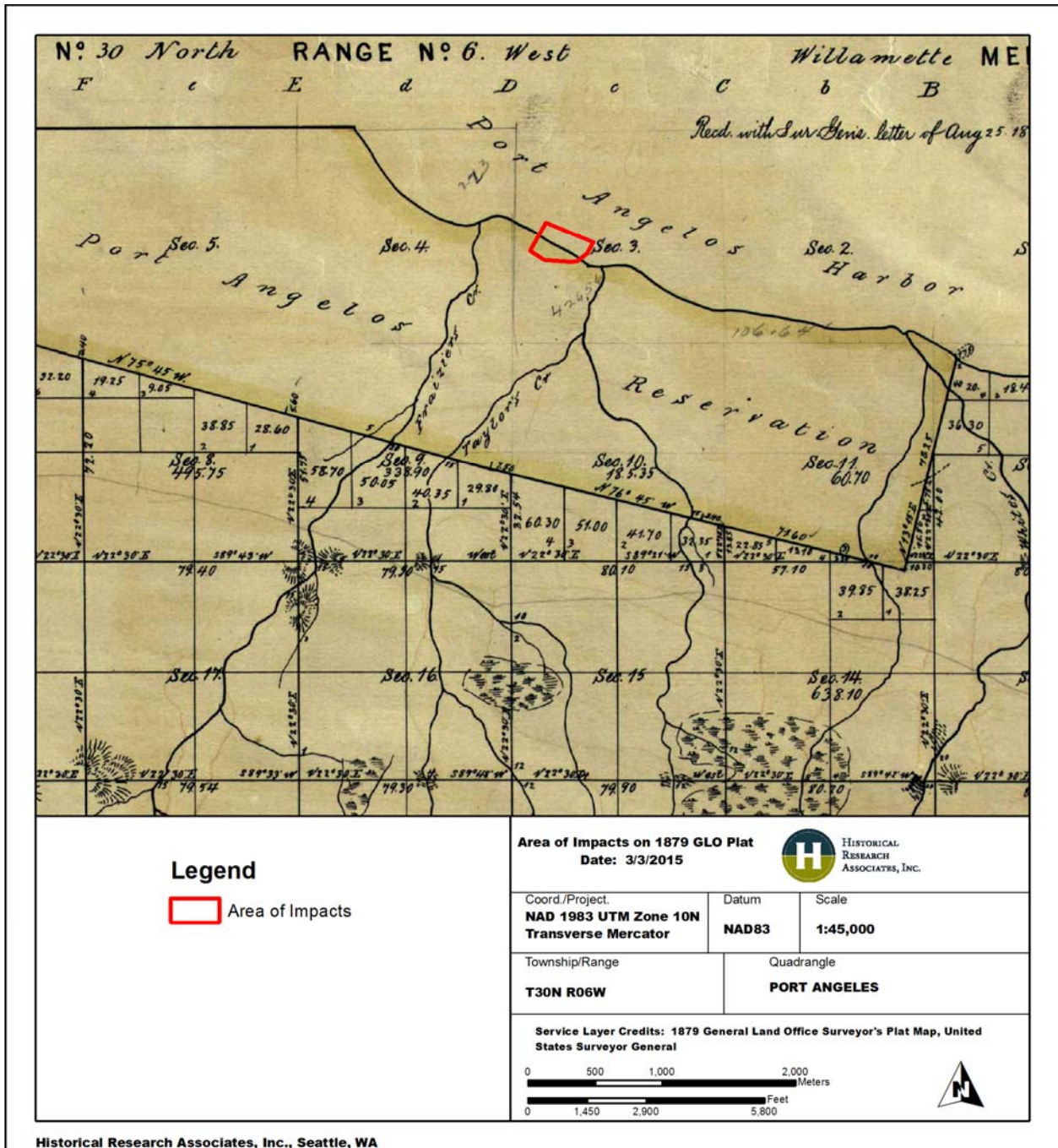


Figure 2-1. GLO plat from 1879, showing the location of the AI on the historic shoreline of Port Angeles Harbor (USSG 1879).

clams, sea and bay mussels, scallop, native oysters, cockles, limpets, barnacles, and sea urchins (Schalk 1988; Suttles 1990).

2.2 Cultural Context

Human occupation of the Port Angeles area began soon after the last glacial retreat, approximately 11,500 years ago. Ediz Hook formed between 9,000 and 5,000 years ago, creating a protected harbor with broad beaches and lagoons. Such ecosystems nurtured a local abundance of plant and animal life which would have encouraged human occupation in the vicinity of the AI (Tingwall and Rust 2009:3). The overall climatic regime did not settle into a modern pattern until circa 5,000 years ago, coinciding with the establishment of more permanent settled village occupations (Kovanen and Easterbrook 2001).

High acid content in soils in the Puget Sound region tends to decompose bone, shell, wood and textiles, while allowing for the preservation of lithic artifacts (Nelson 1990:481). Due to preservation and macro-level changes to the topography, prehistoric archaeological remains in the AI are most likely to be related to the Late Pacific period and Ethnohistoric period (after 1775 A.D.) (Ames and Maschner 1999). In 2011, former City archaeologist Derek Beery recorded a precontact isolated find (Smithsonian Number 45CA689), close to the AI. It is a small andesitic flake tool, identified as such by its resharpening scars and slightly crushed platform. It was observed in redeposited midden sediments (Beery 2011).

The area is the traditional home of the Klallam people, who relied on the project area vicinity for hunting, fishing, and gathering (Eells 1889; Gunther 1927). The AI is near three Klallam villages that have been reported in historic and ethnographic documents. The *Tse-whit-zen* village was located west near the Ediz Hook lagoon, and *I'e'nis* village was located east of the AI near Ennis Creek. A third, unnamed village was historically noted as being located close to the AI (Tingwall and Rust 2009:4). This village was depicted on the 1853 Coast and Geodetic Survey map of Port Angeles Harbor; although no evidence of the village has been found, oral histories provided by LEKT elders support the idea of its existence (Beery 2010a:35–36).

Port Angeles Harbor was first sighted by Europeans in 1791 and named by Don Francisco de Eliza. Anglo-American settlement of the area began in the 1860s. Within 20 years, lumber mills and railroads were expanding in the area. Port Angeles soon became one of the largest suppliers of lumber products on the West Coast (Tingwall and Rust 2009:2–4)

The Chicago, Milwaukee, St. Paul & Pacific Railroad (later known as the Milwaukee Road) was constructed by 1916, on the north side of the AI (Beery 2010b). At this time, much of the AI was still intertidal shoreline. A rail spur from the main line was extended into the AI, to the south side of what would eventually be the K Ply Mill. Wood products from the mill were loaded and transported

to Port Townsend. Timbers associated with the railroad trestle, and the eventual bulkhead, were largely creosote treated (Floyd | Snider 2013:2-3).

The AI was first partially filled in 1926 with sediment dredged from Port Angeles Harbor. The current, northern bulkhead wall was built at this time, following the line of the Milwaukee Road trestle, and a second bulkhead was built further inland, on the south side of the future mill building (Floyd | Snider 2013:2-1). The M. R. Alleman mill, a small lumber mill about which little is known, was constructed just behind this second bulkhead and south of what would eventually be the K-Ply mill building. Sometime before 1941, this mill closed and the entire area south of the outer bulkhead except the log pond was filled (Floyd | Snider 2013:2-3).

In 1941, the Peninsula Plywood Corporation constructed the Pen Ply Mill at this site. Plywood constructed at the mill was utilized for the war effort in World War II and during the post-war boom. The mill operated under various owners, including ITT Rayonier, Klukwan, Inc. (who renamed the mill “K Ply”), and Peninsula Plywood Company, until it was closed permanently in 2011 (Floyd | Snider 2013:2-3–2-4; Martin 1983:140; Tingwall and Rust 2009:4–5). Operations through these years included log storage, hog fuel burning, and log debarking and peeling. Log storage occurred in the yard and log pond, which was excavated in 1941 and periodically filled from 1946 until it was completely filled in 1997 (Floyd | Snider 2013:2-3, 2-6).

The Milwaukee Road has been recorded in segments throughout Clallam County as archaeological site 45CA458 (Beery 2010b; Ferland 2010; Speulda et al. 1994). The closest recorded railroad segment to the AI is located approximately 0.2 mi to the east. The road (and former railroad grade) has not been formally evaluated for listing in the National Register of Historic Places (NRHP). The road, originally conceived as a logging railroad in the early 1900s by Michael Earles, was extended to Port Angeles with the help of investors. The right-of-way for the railroad through Port Angeles was secured by 1914 and it was constructed by 1916 under the name Seattle, Port Angeles, and Western Railroad Company. In December 1918/January 1919, the project was transferred to the Chicago, Milwaukee, St. Paul & Pacific Railroad. During World War I, the railroad was utilized as part of the Spruce Railroad, intended to ship the strong, light wood for use in aircraft. During the 1920s and 1930s, the railroad was utilized by commercial logging companies, although the line was also used for passenger service in these decades (under the name Seattle, Port Angeles, and Lake Crescent Railway). The railroad was sold to the Seattle and North Coast Railroad in 1980, and it was abandoned by 1985 (Beery 2010b; Ferland 2010; Secrest 1997; Wiersema n.d.).

3. Potential for Encountering Archaeological Resources

Historical Research Associates, Inc. (HRA), used a combination of background archival research and the results of previous archaeological monitoring to form predictions regarding the presence of cultural resources within the AI. The Washington Department of Archaeology and Historic Preservation (DAHP) predictive model map for the AI, examined during archival research, shows that the AI is located on land considered to have a very high potential for archaeological resources. While monitoring ground disturbing activities within the AI in 2013, HRA observed two historic-period archaeological features: 1940s-era fuel pipes; and a 100-ft segment of railroad spur.

The fuel pipes are associated with the Peninsula Fuel Company, which began operations in the late 1930s under the General Petroleum Corporation (Floyd | Snider 2013). Pen Ply began development of a plywood lumber mill within the AI in 1941. After Klukwan, Inc., acquired the business in 1989, the mill became known as the K Ply building. In 2012, DAHP issued a determination of non-significance for the K-Ply complex while the mill was still standing (Kaehler 2012). The standing structure was torn down in advance of the current phase of the Project (Floyd | Snider 2013). HRA anticipates that under Washington State law, the K Ply mill complex will be recorded and evaluated, and its eligibility for listing in the NRHP determined by DAHP, as the proposed remediation work will remove most if not all of the remaining structural features.

HRA also observed 100-ft segment of railroad associated with a previously recorded archaeological site, the Chicago, Milwaukee, St. Paul & Pacific Railroad (45CA458). Features recorded within the AI in 2013 include a railroad spur, two cart bases on the railroad tracks, and mid-twentieth century smoking related artifacts on and close to the rail grade (Raff-Tierney and Gilpin 2014). HRA expects that remediation activities within the AI will expose additional features associated with archaeological site 45CA458, including additional grade, rails, and a bulkhead. At this time, the site's eligibility for the NRHP has not been evaluated. HRA anticipates that the railroad spur will be evaluated for NRHP eligibility prior to the current monitoring phase of the Project because the proposed remediation work will remove most, if not all, of the associated features within the AI.

HRA expects to encounter and exposures of historic-period features related to finds noted during previous monitoring: wooden piles; portions of known bulkheads; additional fuel and utility lines; and concrete foundations and structural remains (Raff-Tierney and Gilpin 2014). HRA anticipates that additional isolated historic-period archaeological materials will be observed in the historic-period fill. These materials—which will likely include fragments of brick, glass, metal (i.e., cans,

machinery, and/or assorted tools), and slag—may have been intentionally deposited during the filling episodes, or were already present in the graded and/or dredged fill soils and redeposited during later fill episodes. Any historic-period archaeological features or artifacts found *in situ* will be treated as inadvertent discoveries (See Section 4.3).

The AI is located near Tumwater Creek and is in close proximity to one of the three documented Klallam villages in the Port Angeles Harbor area: the unnamed village at Tumwater Creek. Nearby precontact archaeological sites, including the *Tse-Whit-Zen* village site (45CA523), which as of June, 2014, is listed on the NRHP, have been recorded in areas that have seen large amounts of historic-period and modern development (Hartmann 2003; Raff-Tierney and Gilpin 2014). This belies the notion that the historic-period development has obliterated potentially significant pre-contact archaeological materials around the shoreline of Port Angeles Harbor.

Within the closer vicinity of the AI, former City of Port Angeles archaeologist Derek Beery recorded an andesitic flake tool within redeposited shell midden (Beery 2011). It is feasible that shell midden deposits—either intact or redeposited (i.e., dredged)—are located within the AI. Such deposits could be located beneath or within fill layers and may contain faunal materials and bone or stone tools. Additional precontact through historic-period archaeological materials may include the remnants of fish weirs, fishing or collecting implements (i.e., bone spears, basketry). Such archaeological resources will be treated as inadvertent discoveries (See Section 4.3).

4. Procedures for Archaeological Monitoring and Inadvertent Discovery Plan (IDP)

4.1 Qualifications and Certificates

The Port or their representative will arrange for a Professional Archaeologist who meets the Secretary of the Interior's (SOI) qualifications (36 CFR Part 61; required by the State of Washington in RCW 27.53.030.8) to provide oversight for all cultural resources related activities for the Project. This oversight will include communication with environmental staff at Floyd|Snider and/or the Port Representative regarding upcoming remediation activities and archaeological monitoring. Per the Settlement Agreement, an archaeological monitor will be present for all of the Project's ground disturbing activities.

For archaeological monitoring activities, if a Professional Archaeologist meeting the SOI qualifications is not available then an experienced archaeologist (e.g., one who has worked in a variety of archaeological field situations) will be allowed to do so given that a "Supervisory Plan for Archaeological Monitoring" has been filed with DAHP by the consultant prior to their work at the site. An example of this form is located in Appendix A. Appendix B contains a Project Contacts list that includes the names of the supervising archaeologists at HRA, namely Jennifer Gilpin, MA; Brent Hicks, MA, RPA; and Lynn Compas, MA, RPA. This contacts list will be updated as needed during the course of the project.

Per project requirements, any Professional or monitoring archaeologists on site will be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER) at the 40-hour level. The archaeological consultant will prepare a project-specific Health and Safety Plan (HASP), prior to archaeological monitoring, for use by the monitoring archaeologist and Professional archaeologist.

4.2 Monitoring Procedures

The following sections outline the procedures for archaeological monitoring at the AI, organized primarily by activity (environmental sampling or boring versus broader-scale remedial excavation) and by anticipated materials.

For all monitoring activities within the APE:

1. Prior to the commencement of construction activities, the monitoring archaeologist will brief Floyd | Snider staff, the Port Representative, and the contracted construction operators (e.g., drillers, excavator operators) about potential cultural resource issues. This will include an explanation of the purpose of the work, how it will be conducted, and types of cultural resources that crew members may encounter during the Project.
2. Prior to archaeological monitoring, the Port will invite interested Native American Tribes to observe the monitoring, provided that all safety requirements are met, including 24- or 40-hour HAZWOPER training.
3. The monitoring archaeologist will record the work as follows: daily activities will be recorded on a Daily Record Form (Appendix C) and in a field notebook. Overview photographs of the AI, monitored locations, example work activities, and any cultural materials will be taken as feasible. The monitoring archaeologist will record this information in a photograph log. In addition, the monitoring archaeologist will prepare sketches/drawings of particular areas, artifacts, features, and (as feasible) soil profiles. The locations of archaeological monitoring will be noted on a field map for the project.
4. The Daily Record form will be submitted nightly, when feasible, to the professional archaeologist so that it is available for review by consulting parties. The Daily Record Forms will also be used to compile a brief Weekly Status Report that will be submitted in electronic form to the consulting parties.
5. The monitoring archaeologist will follow instructions provided in the project specific HASP, but also from the onsite representative in matters pertaining to safety and all environmental exploration and remedial actions.
6. For safety reasons, the monitoring archaeologist will not enter any excavations deeper than 5 ft to inspect a possible find until the excavation has been shored by the contractor, per OSHA standards at 29 CFR 1926.652 (www.osha-slc.gov/).
7. If during soil/sediment excavations the monitoring archaeologist or any member of the remediation project crew believes that they have encountered archaeological materials, the monitoring archaeologist or crew member will direct the Port Representative to stop work—at least temporarily—at that location to protect potential additional resources.
8. The Port Representative, in communication with the monitoring archaeologist, will establish a buffer zone appropriate in size to the location and nature of the cultural material to protect the location and the monitoring archaeologist during this inspection.

9. The Port Representative will inform the geotechnical/construction contractor(s) about the archaeologist's monitoring work and make provisions, within its agreement with the contractor(s), for work stoppage, relocation of activity, and for temporary shoring of the trench, when applicable, for inspection of possible finds.
10. If an archaeological monitor is *not* present, the Port Representative will temporarily halt the work in that location and contact the professional archaeologist and will describe the find to ascertain the necessary next steps. The Port Representative will establish a buffer zone of at least 50 ft around the find to protect the location during this time.
11. As listed in Section 3, precontact and ethnohistoric archaeological deposits may include, but are not limited to:
 - a. Intact and redeposited shell midden sediments;
 - b. Clusters of fire-modified rock (FMR), charcoal, or other evidence of fire-related activities; and
 - c. Faunal remains in association with stone chips or tools.
12. Historic-period archaeological materials may include:
 - a. Features such as utility lines, piles and bulkheads, footings, and foundations,
 - b. Additional intact and disturbed railroad grade; and
 - c. Isolated artifacts within the fill or in intertidal sediments.
13. According to DAHP guidelines, archaeological resources are defined as follows:

Isolate: One distinct artifact or a few fragments of the same artifact that are too far away (typically more than 30 m) from other cultural materials (over 50 years old) to be considered part of a site. If diagnostic, the find should be recorded on an Isolate Form and photographs taken.

Intact Artifact Deposit or Feature: Two or more distinct artifacts or one feature (immovable object such as a concrete foundation) within a 50 meter (m) area. Such deposits would be considered an archaeological site and depending on size and nature, take longer than an isolated find to record on an Archaeological Site Inventory Form. Additionally, steps in Section 4.5 below should be implemented.

Disturbed Artifact Deposits: Artifacts identified in disturbed soils (such as historic fill) should be documented in monitoring notes and photographed. Depending on the volume of artifacts and the level of disturbance, the site may or may not need to be recorded on a Site

Form. Limited investigation around the artifacts may be necessary to determine if additional materials are present and the site boundaries extend, following the protocol steps below as necessary.

Other: Abandoned/remnant utilities and materials less than 50 years old are not considered significant. These items should be documented in monitoring notes, but would not be recorded on Isolate or Site Forms. No further action is necessary.

14. The monitoring archaeologist will identify whether any observed cultural materials should be classified an isolate, an intact archaeological deposit, disturbed artifact deposits, or other materials, and to allow for discussion between the Port Representative, DAHP, DOE, and the on-call professional archaeologist.
15. If monitoring reveals human remains, the procedures listed in **Section 5** will be followed.
16. When monitoring work has been completed, the professional archaeologist will prepare a report discussing the methods and results of the work. The draft report will be provided to Floyd|Snider and/or the Port Representative. After a short review period, Floyd|Snider and/or the Port Representative will direct the professional archaeologist to make revisions that take into account review comments. The professional archaeologist will provide a final copy to Floyd|Snider and/or the Port Representative for distribution to the Port, DOE, affected Tribes, and DAHP. The professional archaeologist will incorporate revisions from these agencies after the review period.

4.3 Procedures for Archaeological Monitoring of Soil Sampling and Replacement Ground Well Installation

1. During drilling of borings for soil/sediment samples and replacement of monitoring wells, the archaeological monitor will examine soils/sediments if it is determined that it is safe to do so, including those from borings and in soil cuttings.
2. Excavation at each testing location will not continue until the archaeological monitor has had an opportunity to inspect the soils/sediments.
3. The monitoring archaeologist will work with the Port Representative to obtain accurate soil/sediment descriptions for use in the monitoring report.
4. The Port Representative will authorize the archaeologist to stop the boring periodically, as needed, for a closer examination of exposed soils.
5. It is not anticipated that the archaeologist will halt work activities at a boring location if archaeological materials are observed in the soil/sediment sample cores (unless there is

suspicion that those materials contain human remains; see Section 5). The archaeologist will instead treat the boring as methodologically equivalent to a Phase I archaeological shovel probe and may need to continue examination of soils/sediments to accurately characterize the observed materials.

- a. For example, if there is suspicion that the artifacts may be disturbed or in a fill layer, the archaeologist or archaeological monitor may request that drilling and sampling continue to assess the nature of soils/sediments below the observed materials. A description of the cultural materials, their sedimentary context, and depth will help the archaeologist to compare deposits across the wider site, if additional materials are observed, and to ascertain the depositional context.
6. If drilling is allowed to continue, the monitoring archaeologist will take notes on the find along with overview photographs to enable the Professional Archaeologist to form a basic description of the characteristics and location of the cultural materials for further investigation during future phases of construction work, to allow for minimal delays in work activities.
7. Following the observation of cultural resources (*not* including human remains) in an environmental core, the professional archaeologist will contact the consulting parties within 24 hours. This communication is assumed to take the form of a brief email, describing the characteristics of the find and outlining a proposed plan of action in the instance that additional nearby cores contain similar materials.

4.4 Procedures for Archaeological Monitoring of Remedial Excavations

1. During remedial excavations, the archaeological monitor will examine exposed soils/sediments as feasible and safe, including those in the excavation trenches and in back-dirt piles. It is anticipated that the monitoring archaeologist will be able to differentiate between historic-period fill and native sediments more easily than in the environmental bores, given the broader exposures provided.
2. The archaeologist will watch for precontact or historic-period artifacts or layers/lenses of organic material or shell, and organically enriched midden soils that might indicate past human use. The archaeologist will also watch for features associated with previously evaluated sites (the railroad spur and the K-Ply mill), and anticipated historic-period features (e.g. wooden pile and bulkhead features, the pre-1941 lumber mill).

3. It is anticipated that archaeological site 45CA458 will be evaluated prior to the current phase of the Project. As features associated with 45CA458 are observed, the recommendations outlined in the site's treatment plan or NRHP evaluation memorandum will be followed. Such recommendations may include additional documentation of the site, at minimum.
4. It is anticipated that the historic-period Pen Ply/K Ply mill complex will be evaluated prior to the current phase of the Project. As additional features associated with the complex are observed, the recommendations outlined in the site's treatment plan or NRHP evaluation memorandum will be followed. Such recommendations may include additional documentation of the site, at minimum.
5. If cultural materials *not associated* with either the Pen Ply/K Ply mill complex or archaeological site 45CA458 are observed, procedures for the inadvertent discovery of archaeological materials will be followed (refer to Section 4.5). Such cultural resources include all precontact cultural resources (whether redeposited or *in situ*) as well as any unevaluated historic-period resources (including but not limited to features associated with the bulkheads and the pre-1941 lumber mill).

4.5 Inadvertent Discovery of Archaeological Materials

1. If during ground disturbing activities during project remediation, the archaeological monitor or any member of the remediation project crew believes that they have encountered precontact (including, but not limited to, intact deposits of midden; clusters of FMR, charcoal, or other evidence of fire-related activities; stone chips or tools; and faunal remains in association with stone chips or tools) or historic-period archaeological materials *different from the materials associated with the K-Ply mill or archaeological site 45CA458*, the archaeologist or crew member will direct the Port Representative to stop work—at least temporarily—at that location to protect potential additional resources.
2. If there is suspicion that the artifacts may be disturbed or in a fill layer, the monitoring archaeologist may request that mechanical excavation continue to assess the extent of the deposit and the nature of soils/sediments below the observed materials. The monitoring archaeologist will coordinate with the Port Representative to direct the contractor in such circumstances. If excavation is allowed to continue, the monitoring archaeologist will take notes on the find along with overview photographs to enable the professional archaeologist to form a basic description of the characteristics and location of the cultural materials for further investigation during future phases of construction work, to allow for minimal delays.
3. If the monitoring archaeologist believes that the find is a prehistoric or historic-period archaeological resource requiring further evaluation, the Port Representative will take

appropriate steps to protect the discovery site by installing a physical barrier (i.e., exclusionary fencing) and prohibiting all machinery, other vehicles, and unauthorized individuals from crossing the barrier.

4. Within 12 hours of the initial discovery, and once the site has been preliminarily characterized, the professional archaeologist will inform the Port Representative, who will contact the Port. The Port will in turn contact DOE, who will contact DAHP and the cultural resources representatives for the affected Tribes (see Appendix B, Contact List). Under RCW 27.53, all prehistoric archaeological sites are protected regardless of significance or eligibility for national, state, and/or local historic registers. A determination of eligibility for listing in the NRHP by DAHP must be obtained for archaeological sites. It is presumed that archaeological sites are eligible for listing in the NRHP until and unless DAHP makes a determination that they are not.
5. The Professional archaeologist will perform an NRHP evaluation of the resource, as feasible, within the initial week after discovery (and ideally within 36 hours). Evaluation activities will include mapping, photography, subsurface testing, sample collection, and/or other activities, as determined appropriate by DAHP in coordination with the other consulting parties (e.g., the Port, DOE, and Tribal representatives).
6. Once the NRHP evaluation has been performed, DOE, as the lead agency, will contact the appropriate parties (the Port, DAHP, and Tribes), as soon as practical (i.e., within 24 hours), to seek consultation regarding the National Register-eligibility of the discovery. If DAHP determines that the discovery is an eligible resource, they will consult with appropriate parties on an appropriate form of treatment. Treatment measures may include mapping, photography, limited probing, and sample collection, or other activities.
7. The Port will arrange for the implementation of the treatment measures agreed upon by the consulting parties. If treatment measures determined by the consulting parties include sample collection, the archaeological resources will be examined by the archaeologist and possibly analyzed by specialists, as needed and appropriate.
8. When evaluation of the archaeological site has been completed, the professional archaeologist will prepare a memorandum discussing the methods and results of the evaluation. The draft memorandum will be provided to Floyd|Snider and/or the Port Representative. After a review period, Floyd|Snider and/or the Port Representative will direct the archaeologist to make revisions that take into account review comments. The professional archaeologist will provide a final draft copy to Floyd|Snider and/or the Port Representative for distribution to the consulting parties. After a review period, the

professional archaeologist will make revisions that take into account any review comments by consulting agencies.

5. Inadvertent Discovery of Human Remains

Any human remains that are discovered during project-related excavation will be treated with dignity and respect.

In the event that human remains are discovered, the following procedures are to be followed to ensure compliance with RCW 68.50 *Human Remains*, RCW 68.60: *Abandoned and Historic Cemeteries and Historic Graves*, and RCW 27.44: *Indian Graves and Records*.

If ground disturbing activities encounter human skeletal remains during activities associated with the Project, then all activity **must** cease that may cause further disturbance to those remains and the area of the find must be secured and protected from further disturbance. The following steps should be taken:

1. Per RCW 68.50.645, 27.44.055, and 68.60.055 (1) Any person who discovers skeletal human remains must notify the county coroner and local law enforcement in the most expeditious manner possible (Appendix B). Any person knowing of the existence of human remains and not having good reason to believe that the coroner and local law enforcement has notice thereof and who fails to give notice thereof is guilty of a misdemeanor.
 1. However, to establish if a bone is human, Dr. Guy Tasa is available to review pictures of a bone. His information is in the contact list in Appendix B. The Port representative will immediately notify DOE who will then contact Dr. Tasa, or give permission for the professional archaeologist to contact Dr. Tasa.
 - a. If Dr. Tasa establishes that the bone **is not human**, then there is no need to contact the coroner and procedures outlined in Section 4.5 for the discovery of archaeological materials should be followed.
 - b. If Dr. Tasa establishes that the bone **is human**, the Port representative will contact the coroner and local law enforcement discovery.
 2. If the bone is human, the remains should not be touched, moved, or further disturbed. The coroner will assume jurisdiction and determine if the remains are forensic or not.

3. If the bones are not forensic, the coroner will report that to DAHP, who will then take jurisdiction over the human remains and report the remains to any appropriate cemeteries and to affected tribes.
4. The state physical anthropologist will make a determination of whether the remains are Native American or not and will report that finding to any appropriate cemeteries, to affected tribes, and to other appropriate consulting parties.
5. DOE will then conduct all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains.

6. References

Ames, K. M., and H. D. G. Maschner

1999 *Peoples of the Northwest Coast, Their Archaeology and Prehistory*. Thames and Hudson Ltd., London, England.

Beery, Derek S.

2010a *Combined Sewer Overflow Project: Cultural Resources Assessment for CSO Phase I Project, City of Port Angeles, Clallam County, Washington*. Prepared by the City of Port Angeles. On file at the Department of Archaeology and Historic Preservation, Olympia, Washington.

2010b *State of Washington Archaeological Site Inventory Form, Chicago, Milwaukee, St. Paul & Pacific Railroad, 45CA458*. On file at the Department of Archaeology and Historic Preservation, Olympia, Washington.

2011 *State of Washington Archaeological Isolate Form, 45CA689*. On file at the Department of Archaeology and Historic Preservation, Olympia, Washington.

Eells, Myron

1889 The Twana, Chemakum, and Klallam Indians of Washington Territory. In *Smithsonian Institution Annual Report for 1887*, pp. 605–681. Washington, D.C.

Ferland, Sara

2010 *State of Washington Archaeological Site Inventory Form, Chicago, Milwaukee, St. Paul & Pacific Railroad, 45CA458*. On file at the Department of Archaeology and Historic Preservation, Olympia, Washington.

Floyd | Snider

2013 *K-Ply Mill Remedial Investigation/ Feasibility Study Work Plan*. Floyd | Snider, Seattle, Washington. Submitted to Port of Port Angeles, Port Angeles, Washington.

Gowan, Evan James

2007 *Glacio-Isostatic Adjustment Modeling of Improved Relative Sea-Level Observations in Southwestern British Columbia, Canada*. Master's thesis, School of Earth and Ocean Sciences, University of Victoria, British Columbia, Canada.

Gunther, Erna

1927 Klallam Ethnography. *University of Washington Publications in Anthropology* 1(5):171–314.

Hartmann, Glenn

2003 *USSDI/NPS NRHP Registration Form Tse-whit-zen Village, 45CA523*. On file at the Department of Archaeology and Historic Preservation, Olympia, Washington.

Kaehler, Gretchen

2012 Letter to Mr. Jeffrey Robb RE: Former Pen Ply Mill Demolition and Recycling Project Determination of Non-Significance. On file at Floyd | Snider, Seattle, Washington.

- Kovanen, D. J., and D. J. Easterbrook
 2001 Late Pleistocene, Post-Vashon, Alpine Glaciation of the Nooksack Drainage, North Cascades, Washington. *Geological Society of America*. Bulletin 113:274–288.
- Martin, Paul J.
 1983 *Port Angeles, Washington: A History*. Volume I. Peninsula Publishing Inc., Port Angeles, Washington.
- Meoli, Lisa
 2008 *Marine Trades Area – Cultural Resource Monitoring Project Number: SJZ-MTA Task 6*. Floyd|Snider, Seattle, Washington. Submitted to City of Port Angeles, Port Angeles, Washington.
- Nelson, Charles M.
 1990 Prehistory of the Puget Sound Region. In *Northwest Coast*, edited by Wayne Suttles, pp. 481–484. Handbook of North American Indians, Vol. 7, William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.
- Raff-Tierney, Angus, and Jennifer Gilpin
 2014 *Archaeological Monitoring Report for the K Ply Site Remedial Investigation, City of Port Angeles, Washington*. Historical Research Associates, Inc., Seattle, Washington. Submitted to Floyd|Snider. On file at the Department of Archaeology and Historic Preservation, Olympia, Washington.
- Schalk, Randall
 1988 *The Evolution and Diversification of Native Land Use Systems on the Olympic Peninsula*. Prepared for the National Park Service, Northwest Regional Office, Seattle, Washington. On file at the Department of Archaeology and Historic Preservation, Olympia, Washington.
- Secrest, Ken
 1997 Biography of Olympic Peninsula Railroads. Electronic document, <http://www.trainweb.org/snch&ts/pages/biography.html>, accessed October 29, 2013.
- Speulda, L, K. Haertel, and D. Ericks
 1994 *Olympic National Park Archaeological Site Form, 45CA458*. On file at the Department of Archaeology and Historic Preservation, Olympia, Washington.
- Suttles, Wayne
 1990 Central Coast Salish. In *Northwest Coast*, edited by Wayne Suttles, pp. 453–475. Handbook of North American Indians, Vol. 7, William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.
- Tingwall, Doug, and Thomas C. Rust
 2009 *Results of Cultural Resources Monitoring, MTA/K-Ply Cedar Street Benzene Investigation, Clallam County, Washington*. Landau Associates, Edmonds, Washington. Submitted to City of Port Angeles, Port Angeles, Washington.
- United States Surveyor General (USSG)
 1879 General Land Office Map, Township 30 North, Range 6 East, Willamette Meridian. On file at the Washington State Department of Natural Resources, Olympia, Washington, also available as electronic resource, <http://www.glorerecords.blm.gov>, accessed March 3, 2015.

Wengler Surveying & Mapping Company

2007 *Maps Showing the Location of the Shoreline Between 1864 and 2007, Port Angeles Harbor, Clallam County, Washington.* Prepared for the City of Port Angeles, Washington.

Wessen, Gary

2010 *A Report of Archaeological Monitoring of Construction Activities at the East Boat Haven Sheet Pile Retaining Wall Repair Project Area, Port Angeles, Clallam County, Washington.* Wessen & Associates, Inc. Prepared for the Port of Port Angeles, Washington. On file at the Department of Archaeology and Historic Preservation, Olympia, Washington.

Wiersema, Ken

n.d. The History and Design of the Dungeness Railroad Bridge. Electronic document, <http://www.dungenessrivercenter.org/BridgeHistory.html>, accessed October 29, 2013.

Appendix A. Example Supervisory Plan

Supervisory Plan for Archaeological Monitoring

Project: **K Ply Remediation Project**

Location: **Port Angeles, Clallam County, Washington**

Monitoring Plan: Attachment A (not included herein)

Name of Archaeological Monitor: TBD

Monitor's Resume Attachment B (not included herein)

Summary of Monitor's Qualifications:

- At least 5 years of archaeological field experience: Yes No
- Experience in archaeological excavation: Yes No
- Experience with historical and prehistoric archaeological artifacts and deposits that could be found at the monitoring location: Yes No
- Experience in archaeological monitoring: Yes No
(or an HRA onsite supervisor will be present during first monitoring project)

Professional Archaeologist(s) who will serve as Monitoring Supervisor(s):

Name, Degree	Position
Jennifer Gilpin, MA	HRA Project Archaeologist
Lynn Compas, MA	HRA Senior Archaeologist

Supervisory Requirements:

- Monitor will have a cell phone and a digital camera.
- Supervisor will visit the project site at the beginning of the work, if the monitor has not worked at the location previously. Supervisor will visit the project site periodically if the monitoring work continues longer than two full-time weeks. Supervisor will visit the project site if a find is made that needs immediate attention.
- Monitor will record daily notes on HRA's standard monitoring form (Attachment C). Monitor will take at least one photograph daily to record the work progress.
- Monitor will telephone Monitoring Supervisor daily to describe construction work, monitoring methods, and findings, and to discuss any questions.
- Monitor will send electronic photographs of any finds of artifacts or deposits to supervisor for discussion of treatment measures and decisions. The Supervisor will be available to visit site on short notice to view finds that are questionable and/or need immediate attention.
- Monitor will submit written notes weekly for Supervisor's review.
- Supervisor will review written notes at daily monitoring forms at least weekly and during site visits.

Appendix B. Project Contacts List

Project Contacts List

Floyd | Snider

Tucker Stevens – Project Manager
Email: Tucker.Stevens@floydsnider.com

Lisa Meoli
Email: Lisa.Meoli@floydsnider.com

601 Union Street, Suite 600
Seattle, Washington 98101

Telephone: (206) 292-2078

Department of Ecology (DOE)

Connie Groven, Site Project Manager
300 Desmond Drive
Lacey, WA 98516
Telephone: (360) 407-6254

Port of Port Angeles

Jesse Waknitz, Environmental Specialist
338 West First Street
Port Angeles, WA 98362
Telephone: (360) 417-3452

City of Port Angeles

Nathan West, Community Development Director
City of Port Angeles
321 E. 5th Street
Port Angeles, WA 98362
(360) 417-4750

Archaeological Consultant (Current)

Historical Research Associates, Inc. (HRA)
Jennifer Gilpin, MA (Project Archaeologist)
Email: jgilpin@hrassoc.com
Cell Phone: (206) 305-4552

Brent Hicks, MA, RPA
Email: bhicks@hrassoc.com

Lynn Compas, MA, RPA

Email: lcompas@hrassoc.com

Telephone: (206) 343-0226

City of Port Angeles Police Department

Terry Gallagher, Chief of Police

321 E 5th St.

Port Angeles, Washington 98362

Telephone: (360) 452-4545

Clallam County Coroner

Mark Nichols, Coroner

Clallam County Coroner's Office

223 East Fourth Street, Suite 11

Port Angeles, WA 98362

Telephone: (360) 417-2297

Fax: (360) 417-2469

Email: dkelly@co.clallam.wa.us

Native American Tribes

Lower Elwha Klallam Tribe

William White, Tribal Archaeologist

Telephone: (360) 452-8471 ext. 7424

Cell Phone: (360) 460-1617

Fax: (360)452-3428

Frances Charles, Tribal Chair

Telephone: (360) 452-8471 ext. 7411

Cell Phone: (360) 460-2808

Fax: (360)452-3428

Washington State Department of Archaeology and Historic Preservation (DAHP)

State Archaeologist

Gretchen Kaehler, Assistant State Archaeologist, Local Governments

PO Box 48343

Olympia, WA 98501

Telephone: (360) 586-3088 (office)

Cell Phone: (360) 628-2755

Email: Gretchen.Kaehler@dahp.wa.gov

State Physical Anthropologist

Dr. Guy Tasa

PO Box 48343
Olympia, WA 98501
Telephone: (360) 586-3534 (office)
Email: Guy.tasa@dahp.wa.gov

Appendix C. Monitoring Form

Project Name and Number			
Name			
Date	Total Hours on Site	Hours Travel	
Safety Meeting <input type="checkbox"/> Yes <input type="checkbox"/> No	Issues		
Weather Conditions			
Site Location			
Site Setting- Ground visibility, materials visible on surface, etc.			
Nature of Construction Activity- Skidding, grubbing, scraping, excavating, demolition, etc.?			
Equipment working in vicinity of Site(s) Types and number of machines			
Workers Present Names and Companies			
Visitors/Other Monitors Names and Companies			
Arch Monitoring Activities Describe in full if equipment was stopped or asked to move			
Notes on Discussions with others- HRA, other contractors, Tribes			
Halt? <input type="checkbox"/> Temporary <input type="checkbox"/> Extended	Reason?	Client/Agency Contacted? <input type="checkbox"/> Yes <input type="checkbox"/> No	Contact Name Time of Call? <input type="checkbox"/> am
Instructions- Halt activities, continue to monitor, etc.			
Camera Number	Photo Numbers		
Camera Number	Photo Numbers		

Attachment 4
Health and Safety Plan

K Ply Site

Engineering Design Report

Appendix I

Health and Safety Plan

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List of Acronyms and Abbreviations

Acronym/ Abbreviation	Definition
DRO	Diesel-range organics
EZ/CRZ	Exclusion zone/contamination reduction zone
GRO	Gasoline-range organics
HASP	Health and Safety Plan
HSO/SS	Health and Safety Officer/Site Supervisor
mg/kg	Milligrams per kilogram
ORO	Oil-range organics
PID	Photoionization Detector
PM	Project Manager
PPE	Personal protective equipment
ppmv	Parts per million by volume
RI	Remedial Investigation
Site	K Ply Site
SSO	Site Safety Officer
SZ	Support Zone
VOC	Volatile organic compound
WAC	Washington Administrative Code

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1.0 Plan Objectives and Applicability

This Health and Safety Plan (HASP) has been written to comply with the standards prescribed by the Occupational Safety and Health Act (OSHA) and the Washington Industrial Safety and Health Act (WISHA).

The purpose of this HASP is to establish protection standards and mandatory safe practices and procedures for all personnel involved with investigation activities including soil confirmation sample collection during soil excavation at the K Ply Site (Site). This HASP assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may occur during field work activities. This plan consists of site descriptions, a summary of work activities, an identification and evaluation of chemical and physical hazards, monitoring procedures, personnel responsibilities, a description of site zones, decontamination and disposal practices, emergency procedures, and administrative requirements.

The provisions and procedures outlined by this HASP apply to all Floyd|Snider personnel on-site. Contractors, subcontractors, other oversight personnel, and all other persons involved with the field work activities described herein are required to develop and comply with their own HASPs. Subcontractors reporting directly to Floyd|Snider may also submit equipment-specific safety protocols, as needed, to supplement this HASP. All Floyd|Snider staff conducting field activities are required to read this HASP and indicate that they understand its contents by signing the Health and Safety Officer/Site Supervisors' (HSO/SS') copy of this plan.

It should be noted that this HASP is based on information that was available as of the date indicated in the left footer of this document. It is possible that additional hazards that are not specifically addressed by this HASP may exist at the work site, or may be created as a result of on-site activities. It is the firm belief of Floyd|Snider that active participation in health and safety procedures and acute awareness of on-site conditions by all workers is crucial to the health and safety of everyone involved. Should project personnel identify a site condition that is not addressed by this HASP and have any questions or concerns about site conditions, they should immediately notify the HSO/SS and an addendum will be provided to this HASP.

The HSO/SS has field responsibility for ensuring that the provisions outlined herein adequately protect worker health and safety and that the procedures outlined by this HASP are properly implemented. In this capacity, the HSO/SS will conduct regular site inspections to ensure that this HASP remains current with potentially changing site conditions. The HSO/SS has the authority to make health and safety decisions that may not be specifically outlined in this HASP, should site conditions warrant such actions. In the event that the HSO/SS leaves the Site while work is in progress, an alternate Site Safety Officer (SSO) will be designated. Personnel responsibilities are further described in Section 4.0.

This HASP has been reviewed by the Project Manager (PM) and the HSO/SS prior to commencement of work activities. All Floyd|Snider personnel shall review the plan and be familiar with on-site health and safety procedures. A copy of the HASP will be on-site at all times.

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2.0 Background

2.1 SITE BACKGROUND

The Site is located at 439 W. Marine Drive in Port Angeles, Washington and is the site of a former plywood mill. The majority of the mill buildings were demolished in 2012 and 2013, and the Site is currently unoccupied.

A remedial investigation (RI) completed at the Site in 2013-2014 delineated gasoline-range organics (GRO), diesel-range organics (DRO) and oil-range organics (ORO) in site soil and groundwater. The RI also identified minor areas of pentachlorophenol and dioxin/furan contamination in soils.

A Cleanup Action Plan to address the remaining soil contamination at the Site was approved by the Washington State Department of Ecology in 2015. This plan includes excavation of contaminated soil, in situ treatment of residual contamination, and site restoration.

2.2 SCOPE OF WORK

This HASP focuses on field activities associated with the excavation of soils contaminated with chemicals at concentrations considered to be a risk to worker safety, including GRO and associated volatiles, and DRO and ORO. Field activities include collection of excavation bottom pre-characterization soil samples using direct push borings, well decommissioning, excavation oversight, collection of confirmation samples from the excavation sidewalls, well installation, and groundwater monitoring.

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3.0 Emergency Contacts and Information

3.1 DIAL 911

In the event of an emergency, dial 911 to reach fire, police, and first aid.

3.2 HOSPITAL AND POISON CONTROL

<p>Nearest Hospital Location and Telephone: Refer to Figure I.1 below for map and directions to the hospital.</p>	<p>Olympic Medical Center 939 Caroline Street Port Angeles, WA (360) 417-7000</p>
<p>Washington Poison Control Center:</p>	<p>(800) 222-1222</p>

Figure I.1
Hospital Directions



1. Head **southeast** on **MARINE DR/W MARINE DR** going toward **W 2ND ST** - go **0.2** mi
2. Bear Right on **W 1ST ST** - go **0.3** mi
3. Continue on **E 1ST ST** - go **0.8** mi
4. Turn Left on **N RACE ST** - go **0.2** mi
5. Turn Right on **CAROLINE ST/E CAROLINE ST** - go **< 0.1** mi
6. Arrive at **939 CAROLINE ST, PORT ANGELES**

3.4 EMERGENCY CONTACTS

After contacting emergency response crews as necessary, contact the Floyd|Snider PM, or a Principal to report the emergency. The Floyd|Snider PM may then contact the Site owner, or direct the field staff to do so.

Floyd|Snider Emergency Contacts:

Contact	Office Phone Number	Cell Phone Number
Kate Snider, Principal	(206) 292-2078	(206) 375-0762
Allison Geiselbrecht, PM		(206) 722-2460
Pamela Osterhout, HSO/SS		(206) 387-9440

Other Emergency Contacts:

Contact	Company	Cell Phone Number
Jesse Waknitz	Port of Port Angeles	(360) 460-1364
Contractor Safety Officer	TBD	TBD

*Contacts Updated in March 2021

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4.0 Primary Responsibilities and Requirements

4.1 PROJECT MANAGER

The PM will have overall responsibility for the completion of the project, including the implementation and review of this HASP. The PM will review health and safety issues as needed and as consulted, and will have authority to allocate resources and personnel to safely accomplish the field work.

The PM will direct all Floyd|Snider personnel involved in field work at the Site. If the project scope changes, the PM will notify the HSO/SS so that the appropriate addendum will be included in the HASP. The PM will ensure that all Floyd|Snider personnel on-site have received the required training, are familiar with the HASP, and understand the procedures to follow should an accident and/or incident occur on-site.

4.2 HEALTH AND SAFETY OFFICER AND SITE SUPERVISOR

The HSO/SS will approve this HASP and any amendments thereof, and will ultimately be responsible for full implementation of all elements of the HASP.

The HSO/SS will advise the PM and project personnel on all potential health and safety issues of the field investigation activities to be conducted at the Site. The HSO/SS will specify required exposure monitoring to assess site health and safety conditions, modify the Site HASP based on field assessment of health and safety accidents and/or incidents, and recommend corrective action if needed. The HSO/SS will report all accidents and/or incidents to the PM. If the HSO/SS observes unsafe working conditions by Floyd|Snider personnel or any contractor personnel, the HSO/SS will suspend all work until the hazard has been addressed.

4.3 SITE SAFETY OFFICER

The SSO may be a person dedicated to the task of assisting the HSO/SS during field work activities. The SSO will ensure that all personnel have appropriate personal protective equipment (PPE) on-site and PPE is properly used. The SSO will assist the HSO/SS in field observation of Floyd|Snider personnel safety. If a health or safety hazard is observed, the SSO shall suspend all work activity. The SSO will conduct on-site safety meetings daily before work commences and complete the Daily Tailgate Safety Meeting and Debrief Form (provided as Attachment I.1) after the completion of field work. All health and safety equipment will be calibrated daily and records kept in the daily field logbook. The SSO may perform exposure monitoring if needed and will ensure that equipment is properly maintained.

4.4 FLOYD|SNIDER PROJECT PERSONNEL

All Floyd|Snider project personnel involved in field work activities will take precautions to prevent accidents and/or incidents from occurring to themselves and others in the work areas. Employees will report all accidents and/or incidents or other unsafe working conditions to the HSO/SS or SSO immediately. Employees will inform the HSO/SS or SSO of any physical conditions that could impact their ability to perform field work.

4.5 TRAINING REQUIREMENTS

All Floyd|Snider project personnel must comply with applicable regulations specified in the Washington Administrative Code (WAC) Chapter 296-843, Hazardous Waste Operations, administered by the Washington State Department of Labor and Industries. Project personnel will be 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) trained and maintain their training with an annual 8-hour refresher. Personnel with limited tasks and minimal exposure potential will be required to have 24-hour training and a site hazard briefing and be escorted by a trained employee. Personnel with defined tasks that do not include potential contact with disturbed site soils or waste, groundwater, or exposures to visible dust (e.g., surveying) are not required to have any level of hazardous waste training beyond a site emergency briefing and hazard orientation by the HSO/SS. Floyd|Snider project personnel will fulfill the medical surveillance program requirements.

At least one person on-site during field work will have current cardiopulmonary resuscitation (CPR)/First Aid certification. All field personnel will have a minimum of 3 days of hazardous materials field experience under the direction of a skilled supervisor.

Additional site-specific training that covers on-site hazards, PPE requirements, use and limitations, decontamination procedures, and emergency response information as outlined in this HASP will be given by the HSO/SS before on-site work activities begin.

5.0 Hazard Evaluation and Risk Analysis

In general, there are three broad hazard categories that may be encountered during site work: chemical exposure hazards, fire/explosion hazards, and physical hazards. Sections 5.1 through 5.3 discuss the specific hazards that fall within each of these broad categories. Section 5.4 summarizes the hazard analysis for each specific task.

5.1 CHEMICAL EXPOSURE HAZARDS

This section describes potential chemical hazards associated with soil excavation and sampling. Based on previous site data, the chemicals of concern at the Site are petroleum hydrocarbons, including benzene and GRO, DRO, and ORO. Human health hazards for these compounds are presented below:

Chemical	Greatest Detected Concentration in Site Soil	Routes of Exposure	Potential Toxic Effects
Benzene	120 mg/kg	Inhalation, absorption, ingestion, contact	Eye/skin/respiratory system irritation, nausea, headache, dizziness, lack of coordination, headache, drowsiness
Gasoline-range organics	14,000 mg/kg ¹	Inhalation, absorption, ingestion, contact	Eye/skin/respiratory system irritation, nausea, headache, dizziness, lack of coordination, blurred vision, convulsions,
Diesel-range organics	24,000 mg/kg	Inhalation, absorption, ingestion, contact	Eye and respiratory system irritation, dizziness, headache, nausea
Oil-range organics	32,000 mg/kg ¹	Inhalation, absorption, ingestion, contact	Eye and respiratory system irritation

Note:

- 1 Greatest concentration observed in site soils; GRO and ORO also present as non-aqueous phase liquid in some site monitoring wells.

Abbreviation:

mg/kg Milligrams per kilogram

This information covers potential toxic effects that might occur if relatively significant acute and/or chronic exposure were to happen. This information does not mean that such effects will occur from the planned site activities. Potential routes of exposure include inhalation, dermal contact, and ingestion. The primary exposure route of concern during site work is ingestion or inhalation of contaminated soil or soil vapor.

Ingestion of volatile organic compounds (VOC)-contaminated soil is highly preventable with the use of appropriate PPE as described in Section 7.1 and pollution prevention and decontamination procedures described in Section 9.0. In order to limit the potential for inhalation of VOCs during site work, ambient air will be monitored with a photoionization detector (PID) during excavation, as described in Section 6.0. Additionally, the contractor will be required to apply odor and VOC suppressant foam to control migration of noxious odors (refer to Attachment I.2 for odor suppressant foam Material Safety Data Sheet). Section 7.2 describes engineering controls that may be enacted to limit the inhalation of VOCs.

5.2 FIRE AND EXPLOSION HAZARDS

Flammable and combustible liquid hazards may occur from fuels and lubricants brought to the property for excavation equipment. When on-site storage is necessary, such material will be stored in containers approved by the Washington State Department of Transportation in a location not exposed to strike hazards and provided with secondary containment. A minimum 2-A:20-B fire extinguisher will be located within 25 feet of the storage location and where refueling occurs. Any subcontractors bringing flammable and combustible liquid hazards to the Site are responsible for providing appropriate material for containment and spill response, and should address these containment and cleanup measures in their respective HASPs. Transferring of flammable liquids (e.g., gasoline) will occur only after making positive metal-to-metal connection between the containers, which may be achieved by using a bonding strap. Storage of ignition and combustible materials will be kept away from fueling operations.

Although there are VOCs present as contamination in site soils, these compounds are typically present in moist to wet soils. Though GRO is not present at concentrations that pose significant fire or explosion hazards, there is a limited risk of flammability in areas where GRO is present as non-aqueous phase liquid. As a precautionary and good housekeeping measure, smoking and open flames will not be permitted inside the excavation area.

5.3 PHYSICAL HAZARDS

When working in or around any hazardous or potentially hazardous substances or situations, including an open excavation and vehicle traffic, all site personnel should plan all activities before starting any task. A tailgate safety meeting, in which personnel identify health and safety hazards involved with the work planned and consult with the HSO/SS as to how the task can be performed in the safest manner, and if personnel have any reasons for concern or uncertainty, shall be conducted prior to the start of work.

All field personnel will adhere to general safety rules including wearing appropriate PPE—hard hats, steel-toed boots, high-visibility vests, safety glasses, gloves, and hearing protection, as appropriate. Eating, drinking, and/or use of tobacco or cosmetics will be restricted in all work areas. Personnel will prevent splashing of liquids containing chemicals and minimize dust emissions.

The following table summarizes a variety of physical hazards that may be encountered on the Site during work activities. For convenience, these hazards have been categorized into several general groupings with recommended preventative measures.

Hazard	Cause	Prevention
Head strike	Falling and/or sharp objects, bumping hazards.	Hard hats will be worn by all personnel at all times when overhead hazards exist, such as during drilling activities.
Fall hazards	Falling into open excavation or other pits on-site.	Existing concrete-lined pits from historical operations will be excluded from the active construction area by fencing. Excavated areas that are not undergoing active work and are not properly sloped for entry by field personnel will be marked by high-visibility tape or temporary fencing and will be backfilled as soon as practical. All personnel will pay attention to fall hazards when walking through the Site.
Foot/ankle twist, crush, slip/trip/fall	Sharp objects, dropped objects, uneven and/or slippery surfaces.	Steel-toed boots must be worn at all times on-site while heavy equipment is present. Pay attention to footing on uneven or wet terrain and do not run. Keep work areas organized and free from unmarked trip hazards. Use caution when entering the excavation area.
Hand cuts, splinters, and chemical contact	Hands or fingers pinched or crushed, chemical hazards. Cut or splinters from handling sharp/rough objects and tools.	Nitrile safety gloves will be worn to protect the hands from dust and chemicals. Leather or cotton outer gloves will be used when handling sharp-edged rough materials or equipment. Refer to preventive measures for mechanical hazards below.
Eye damage from flying materials, or splash hazards	Sharp objects, poor lighting, exposure due to flying debris or splashes.	Safety glasses will be worn at all times on-site. If a pressure washer is used to decontaminate heavy equipment, a face shield will be worn over safety glasses or goggles. Care will be taken during decontamination procedures and groundwater sampling to avoid splashing or dropping equipment into decontamination water.

Hazard	Cause	Prevention
Electrical hazards	Underground utilities, overhead utilities. Electrical cord hazards, such as well development pumps.	No buried electrical lines are present in the excavation areas. Make sure that no damage to extension cords occurs. If an extension cord is used, make sure it is the proper size for the load that is being served and rated SJOW or STOW (an “-A” extension is acceptable for either) and inspected prior to use for defects. The plug connection on each end should be of good integrity. Insulation must be intact and extend to the plugs at either end of the cord. All portable power tools will be inspected for defects before use and must either be a double-insulated design or grounded with a ground-fault circuit interrupter.
Mechanical hazards	Heavy equipment such as drill rigs, excavator, service trucks, etc. Conducting work in road right of ways (on the road shoulder).	Ensure the use of competent operators, backup alarms, regular maintenance, daily mechanical checks, and proper guards. Subcontractors will supply their own HASP. All project personnel will make eye contact with operator and obtain a clear “OK” before approaching or working within swing radius of heavy equipment, staying clear of swing radius.
Traffic hazards	Vehicle traffic and hazards when working near active operations.	When working in or near the right-of-way, orange cones and/or flagging will be placed around the work area. Safety vests will be worn at all times while conducting work off-site. Multiple field staff will work together (buddy system) and spot traffic for each other. Avoid working with your back to traffic whenever possible.
Noise/ damage to hearing	Loud machinery	Wear earplugs or protective ear covers when a conversational level of speech is difficult to hear at a distance of 3 feet; when in doubt, a sound level meter may be used on-site to document noise exposure.

Hazard	Cause	Prevention
Strains from improper lifting	Injury due to improper lifting techniques, over-reaching/ overextending, lifting overly heavy objects.	Use proper lifting techniques and mechanical devices where appropriate. The proper lifting procedure first involves testing the weight of the load by tipping it. If in doubt, ask for help. Do not attempt to lift a heavy load alone. Take a good stance and plant your feet firmly with legs apart, one foot farther back than the other. Turn the forward foot and point it in the direction of the eventual movement. Make sure you stand on a level area with no slick spots or loose gravel. Use as much of your hands as possible, not just your fingers. Keep your back straight, almost vertical. Bend at the hips, holding load close to your body. Keep the weight of your body over your feet for good balance. Use large leg muscles to lift. Push up with one foot positioned in the rear as you start to lift. Avoid quick, jerky movements and twisting motions. Never try to lift more than you are accustomed to lifting.
Cold stress	Cold temperatures and related exposure.	Workers will ensure appropriate clothing, stay dry, and take breaks in a heated environment when working in cold temperatures. Further detail on cold stress is provided in Section 5.3.1.
Accidents due to inadequate lighting	Improper illumination.	Work will proceed during daylight hours only, or under sufficient artificial light.

5.3.1 Cold Stress

Field work is expected to be completed in early spring and exposure to cold temperatures may be possible. Exposure to moderate levels of cold can cause the body’s internal temperature to drop to a dangerously low level, causing hypothermia. Symptoms of hypothermia include slow, slurred speech, mental confusion, forgetfulness, memory lapses, lack of coordination, and drowsiness.

To prevent hypothermia, site personnel will stay dry and avoid exposure. Site personnel will have access to a warm, dry area, such as a vehicle, to take breaks from the cold weather and warm up. Site personnel will be encouraged to wear sufficient clothing in layers such that outer clothing is wind- and waterproof and inner layers retain warmth (wool or polypropylene), if applicable. Site personnel will keep hands and feet well protected at all times. The signs and symptoms and treatment for hypothermia are summarized below.

Signs and Symptoms

- Mild hypothermia (body temperature of 98–90 °F)
 - Shivering
 - Lack of coordination, stumbling, fumbling hands
 - Slurred speech
 - Memory loss
 - Pale, cold skin
- Moderate hypothermia (body temperature of 90–86 °F)
 - Shivering stops
 - Unable to walk or stand
 - Confused and irrational
- Severe hypothermia (body temperature of 86–78 °F)
 - Severe muscle stiffness
 - Very sleepy or unconscious
 - Ice cold skin
 - Death

Treatment of Hypothermia—Proper Treatment Depends on the Severity of the Hypothermia

- Mild hypothermia
 - Move to warm area.
 - Stay active.
 - Remove wet clothes and replace with dry clothes or blankets and cover the head.
 - Drink warm (not hot) sugary drinks.
- Moderate hypothermia
 - All of the above, plus:
 - Call 911 for an ambulance.
 - Cover all extremities completely.
 - Place very warm objects such as hot packs or water bottles on the victim's head, neck, chest, and groin.
- Severe hypothermia
 - Call 911 for an ambulance.
 - Treat the victim very gently.
 - Do not attempt to re-warm—the victim should receive treatment in a hospital.

Frostbite

Frostbite occurs when the skin actually freezes and loses water. In severe cases, amputation of the frostbitten area may be required. While frostbite usually occurs when the temperatures are 30 °F or lower, wind chill factors can allow frostbite to occur in above-freezing temperatures. Frostbite typically affects the extremities, particularly the feet and hands. Frostbite symptoms include a cold, tingling, stinging, or aching feeling in the frostbitten area followed by numbness and skin discoloration from red to purple, then white or very pale skin. Should any of these symptoms be observed, wrap the area in soft cloth, do not rub the affected area, and seek medical assistance. Call 911 if the condition is severe.

Protective Clothing

Wearing the right clothing is the most important way to avoid cold stress. The type of fabric also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, on the other hand, retains its insulation even when wet. The following are recommendations for working in cold environments:

- *Wear at least three layers* of clothing.
 - An outer layer to break the wind and allow some ventilation (like Gortex or nylon).
 - A middle layer of down or wool to absorb sweat and provide insulation even when wet.
 - An inner layer of cotton or synthetic weave to allow ventilation.
- Wear a hat—up to 40 percent of body heat can be lost when the head is left exposed.
- Wear insulated boots or other footwear.
- Keep a change of dry clothing available in case work clothes become wet.
- Do not wear tight clothing—loose clothing allows better ventilation.

Work Practices

- **Drinking**—Drink plenty of liquids, avoiding caffeine and alcohol. It is easy to become dehydrated in cold weather.
- **Work Schedule**—If possible, heavy work should be scheduled during the warmer parts of the day. Take breaks out of the cold in heated vehicles.
- **Buddy System**—Try to work in pairs to keep an eye on each other and watch for signs of cold stress.

5.3.2 Heat Stress

To avoid heat-related illness, current regulations in WAC 296-62-095 through 296-62-09560 will be followed during all outdoor work activities. These regulations apply to any outdoor work environment from May 1 through September 30, annually, when workers are exposed to temperatures greater than 89 °F when wearing breathable clothing, greater than 77 °F when

wearing double-layered woven clothing (such as jackets or coveralls), or greater than 52 °F when wearing non-breathing clothing such as chemical resistant suits or Tyvek. The planned work at the Site is expected to be completed prior to the beginning of the time period during which outdoor work is regulated to control heat-related illness.

5.3.3 Biohazards

Bees and other insects may be encountered during the field work tasks. Persons with allergies to bees will make the HSO/SS aware of their allergies and will avoid areas where bees are identified. Controls such as repellents, hoods, nettings, masks, or other personal protection may be used. Report any insect bites or stings to the HSO/SS and seek first aid, if necessary. Site personnel will maintain a safe distance from any urban wildlife encountered, including stray dogs, raccoons, and rodents, to preclude a bite from a sick or injured animal. Personnel will be gloved and will use tools to lift covers from catch basins and monitoring wells.

5.4 HAZARD ANALYSIS BY TASK

The following section identifies potential hazards associated with each task listed in Section 2.2 of this HASP. Tasks have been grouped according to the types of potential hazard associated with them.

Task	Potential Hazard
Soil Boing Installation and Well Decommissioning	Exposure to loud noise; overhead hazards; head, foot, ankle, hand, and eye hazards; electrical and mechanical hazards; lifting hazards; soil vapor and/or dust inhalation hazards; potential dermal or eye exposure to site contaminants in groundwater and soil; traffic hazards; and heat or cold exposure hazards.
Excavation Oversight	Exposure to loud noise; overhead hazards; head, foot, ankle, hand, and eye hazards; electrical and mechanical hazards; lifting hazards; soil vapor and/or dust inhalation hazards; potential dermal or eye exposure to site contaminants in groundwater and soil; fall hazards; traffic hazards; and heat or cold exposure hazards.
Soil Sampling, Field Screening, and Confirmation Soil Sample Collection	Chemical hazards include potential dermal or eye exposure to site contaminants in soil. Physical hazards include slip, trip, or fall hazards; heat and cold exposure hazards; and biological hazards.

6.0 Site Monitoring

This section describes site monitoring techniques and equipment that are to be used during site field activities. The HSO/SS, or a designated alternate, is responsible for site control and monitoring activities.

Soil samples will be screened with a PID to monitor the presence of VOCs. Visual monitoring for dust will be conducted by the HSO/SS to ensure that inhalation of contaminated soil particles does not occur; however, the contaminated Site soils are generally moist to wet and are not expected to generate substantial dust. If visible dust is leaving the work area during contaminated soil excavation, immediate action will be taken to suppress the dust. Water may be used to suppress any dust clouds generated during work activities. The HSO/SS will visually inspect the work site at least daily to identify any new potential hazards. If new potential hazards are identified, immediate measures will be taken to eliminate or reduce the risks associated with these hazards.

Project personnel are expected to perform field work in Level D PPE (i.e., no respiratory protection equipment required with routine air monitoring). A PID will also be used to monitor vapor concentrations in breathing air of total VOCs in parts per million volume (ppmv) throughout excavation activities and a wind sock will be used to assess the prevailing wind direction. VOC concentrations measured during air monitoring will be recorded in a field notebook. The PID will sample the breathing space above the excavation and monitor continuously, and the following institutional controls may be enacted based on the measured VOC concentrations. The action levels for air monitoring for VOCs are as follows:

Monitoring Equipment	VOC Concentration	Action
PID	Less than 0.1 ppmv; less than 0.5 ppmv (ACGIH 8-hour TWA for benzene) for no longer than 15 minutes	Continue operations in Level D PPE. Work upwind of excavation area when possible.
	Greater than 0.1 and less than 0.5 ppmv; intermittent	Leave work area and allow vapor to dissipate; use engineering controls if necessary. Monitor VOC concentration every 5 minutes; resume work once concentrations are less than 0.1 ppmv for 15 minutes.
	Greater than 2.5 ppmv (ACGIH STEL)	Stop operations and evacuate area. Do not resume work until engineering controls able to maintain VOC concentrations less than 0.1 ppmv in breathing space are in place.

Abbreviations:

- ACGIH American Conference of Governmental Hygienists
- STEL Short term exposure limit
- TWA Time-weighted average

Engineering controls that may be undertaken to reduce the risk of airborne VOCs in the work area are discussed in Section 7.2.

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7.0 Hazard Reduction

7.1 PERSONAL PROTECTIVE EQUIPMENT

All work will proceed in Level D PPE, which shall include hard hat, steel-toed boots, hearing protection, eye protection, gloves, and sturdy outer work clothing. Rubber or other waterproof boots must be worn inside the excavation area, as footwear must be thoroughly decontaminated in a boot wash before exiting the excavation area.

All personnel have been trained in the proper use of PPE. The level of protection may be upgraded by the HSO/SS if warranted by conditions present in the work area. As an alternative, work may be temporarily suspended in order to implement appropriate engineering controls. The HSO/SS will periodically inspect equipment such as gloves and hard hats for defects.

For all work involving potential exposure to soil or groundwater, workers will wear nitrile gloves and Level D PPE.

High visibility vests will be worn when working around heavy equipment, and off-site on road shoulders.

7.2 ENGINEERING CONTROLS

The SSO will evaluate the need for engineering controls to reduce exposures to airborne contaminants. Engineering controls should include using a wind sock or other monitoring device to determine the direction of prevailing wind and setting up a work area upwind of the airborne contaminant source. Alternative engineered controls include the use of enhanced ventilation at a work site (e.g., the use of electric fans) to reduce contaminant concentration by dilution, if there is not sufficient circulation of ambient air. If fans are used, they will be directed away from pedestrian pathways and building entrances.

Site perimeter monitoring of the populated areas to the south and west will be conducted daily when wind conditions may cause vapor from the work area to blow off-site, to ensure that airborne contaminants do not affect people in the surrounding area. If noticeable odors or PID readings greater than background concentrations are observed during perimeter monitoring, the contractor will be responsible for applying an odor and VOC suppressant foam to control off-site migration of soil vapor. Shielding may be used in some instances to protect workers from contaminants. Exposures can also be reduced by keeping contaminated soils covered when possible and backfilling the excavation as soon as possible.

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8.0 Site Control and Communication

8.1 SITE CONTROL

Work area controls and decontamination areas will be provided to limit the potential for chemical exposure associated with site activities, and transfer of contaminated media from one area of the Site to another. The support zone (SZ) for the Site includes all areas outside the work area and decontamination areas. An exclusion zone/contamination reduction zone (EZ/CRZ) and SZ will be set up for work being conducted within the limits of the Site. Only authorized personnel shall be permitted access to the EZ/CRZ. Staff will decontaminate all equipment and gear, including work boots, as necessary prior to exiting the CRZ.

The Site is unoccupied and will be fully fenced to prevent members of the public from entering the work area.

8.2 COMMUNICATION

All site work will occur in teams and the primary means of communication on-site and with off-site contacts will be via cell phones. An agreed-upon system of alerting via air horns and/or vehicle horns may be used around heavy equipment to signal an emergency if shouting is ineffective.

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9.0 Decontamination and Waste Disposal

9.1 CONTAMINATION PREVENTION

To avoid personal contact with contaminants, personnel will adhere to the following guidelines:

- Do not walk through areas of known contamination.
- Do not directly handle or touch contaminated materials.
- Make sure all PPE is intact and in good working condition prior to donning.
- Take particular care to protect any skin injuries.
- Stay upwind of airborne contaminants.
- Do not carry cigarettes, gum, or similar items into contaminated areas.

To avoid spreading equipment and sample contamination, personnel will do the following:

- Take care to limit contact with heavy equipment and vehicles.
- If contaminated tools are to be placed on non-contaminated equipment/vehicles for transport to a decontamination area, use plastic to keep the non-contaminated equipment clean.
- Bag sample containers prior to emplacement of sample material.

9.2 DECONTAMINATION

A majority of field activities and sampling are expected to be conducted using Level D PPE. Decontamination procedures for both PPE and field equipment will be strictly followed to prevent off-site spread of contaminated soil or water. The HSO/SS will assess the effectiveness of decontamination procedures by visual inspection. Hands must be thoroughly washed before leaving the Site to eat, drink, or use tobacco.

Equipment and vehicle decontamination generally consists of sweeping (if dry) and/or pressure washing with detergent solution followed by a potable water rinse, requiring construction of a temporary decontamination station. Equipment decontamination will be designed and implemented by the contractor, and the HSO/SS will monitor equipment decontamination to ensure that contaminated media do not leave the Site.

9.3 WASTE DISPOSAL

Floyd|Snider and its subcontractors will employ safe and prudent waste collection and housekeeping practices to minimize the spread of contamination beyond the work zone and the amount of investigation-derived wastes. The Floyd|Snider HSO/SS will work with site personnel to ensure the proper collection, packaging, and identification of waste materials so that waste materials will be properly disposed of.

Waste soils left over from sample processing and decontamination waste water will be disposed of in accordance with the established procedures for the removal and hauling of excavated site soil.

10.0 Emergency Response and Contingency Plan

This section defines the emergency action plan for the Site. It will be rehearsed with all Floyd|Snider field personnel and subcontractors directly overseen by Floyd|Snider, and reviewed whenever the plan is modified or the HSO/SS believes that field personnel are unclear about the appropriate emergency actions.

A muster point of refuge (that is clear of adjacent hazards and not located downwind of site investigation activities) will be identified by the HSO/SS and communicated to the field team each day. In an emergency, all field personnel and visitors will evacuate to the muster point for roll call. It is important that each person on-site understand their role in an emergency, and that they remain calm and act efficiently to ensure everyone's safety.

After each emergency is resolved, the entire project team will meet and debrief on the incident—the purpose is not to fix blame, but to improve the planning and response to future emergencies. The debriefing will review the sequence of events, what was done well, and what can be improved. The debriefing will be documented in a written format and communicated to the PM. Modifications to the emergency plan will be approved by the PM.

Reasonably foreseeable emergency situations include medical emergencies, accidental release of hazardous materials (such as gasoline or diesel) or hazardous waste, and general emergencies such as vehicle accident, fire, thunderstorm, and earthquake. Expected actions for each potential incident are outlined below.

10.1 MEDICAL EMERGENCIES

General emergency procedures that are applicable to almost every activity are presented below.

In the event of a medical emergency, the following procedures should be used:

- Stop any imminent hazard if you can safely do so.
- Remove ill, injured, or exposed person(s) from immediate danger if moving them will clearly not cause them harm and no hazards exist to the rescuers.
- Evacuate other on-site personnel to a safe place in an upwind or cross-wind direction until it is safe for work to resume.

In the event of a chemical exposure, use the following procedures:

- **Skin Contact.** Flush the area with copious quantities of cold water for at least 15 minutes. Do not let contamination spread to other personnel. Seek medical attention. If injuries are severe, summon an ambulance as described below.
- **Eye Contact.** Wash/rinse affected area for at least 15 minutes. An emergency eye wash system will be present on-site. Seek medical attention.

- **Inhalation.** Remove the person from further exposure. Summon an ambulance and contact the hospital as described below, and be prepared to provide respiratory support if the person has difficulty breathing.
- **Ingestion.** Dilute the material with large quantities of water. Summon an ambulance and contact the hospital or poison control center immediately for further instructions.
- If serious injury or a life-threatening condition exists, call **911** for paramedics, fire department, and police. Clearly describe the location, injury, and conditions to the dispatcher. Designate a person to go to the site entrance and direct emergency equipment to the injured person(s). Provide the responders with a copy of this HASP to alert them to chemicals of potential concern.
- Trained personnel may provide cardiopulmonary resuscitation/First Aid if it is necessary and safe to do so. Remove contaminated clothing and PPE only if this can be done without endangering the injured person.
- Call the PM and HSO/SS.
- Immediately implement steps to prevent recurrence of the accident.

Refer to Section 3.2 for a map showing the nearest hospital location (Figure I.1) as well as a hospital phone number and address.

10.2 ACCIDENTAL RELEASE OF CONTAMINATED MATERIALS OR WASTES

The procedures for handling and notification of spills are provided in the Spill Prevention, Control, and Countermeasures Plan (refer to Appendix C of the Engineering Design Report). In the event of a spill, the SSO will evacuate all on-site personnel to a safe place in an upwind direction until the HSO/SS determines that it is safe for work to resume. The SSO will also contact the PM and confirm a response.

10.3 GENERAL EMERGENCIES

In the case of fire, explosion, earthquake, or imminent hazards, work shall be halted and all on-site personnel will be immediately evacuated to a safe place. The local police/fire department shall be notified, by calling 911, if the emergency poses a continuing hazard.

In the event of a thunderstorm, outdoor work will be discontinued until the threat of lightning has abated. During the incipient phase of a fire, the available fire extinguisher(s) may be used by persons trained in putting out fires, if it is safe for them to do so. Contact the fire department as soon as feasible.

10.4 EMERGENCY COMMUNICATIONS

In the case of an emergency, an air horn will be used as needed to signal the emergency. One long (5-second) blast will be given as the emergency/stop work signal. If the air horn is not working, a vehicle horn and/or overhead waving of arms will be used to signal the emergency. In any emergency, all personnel will evacuate to the designated refuge area and await further instruction.

10.5 EMERGENCY EQUIPMENT

The following minimum emergency equipment will be readily available on-site and functional at all times:

- First Aid Kit—contents approved by the HSO/SS, including two blood borne pathogen barriers and an emergency eye wash station
- Spill kit
- Portable fire extinguisher (2-A:10 B/C min)
- A copy of the current HASP

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11.0 Administrative

11.1 MEDICAL SURVEILLANCE

Floyd|Snider personnel involved with field activities must be covered under Floyd|Snider's medical surveillance program that includes biennial physical examinations. These medical monitoring programs must be in compliance with all applicable worker health and safety regulations.

11.2 RECORDKEEPING

The HSO/SS, or a designated alternate, will be responsible for keeping documentation of site activities including: attendance lists of personnel present at site health and safety meetings, accident reports, and signatures of all personnel who have read this HASP.

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12.0 Approvals

Project Manager

Date

Project Health & Safety Officer

Date

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K Ply Site

Engineering Design Report

Appendix I Health and Safety Plan

Attachment I.1 Daily Tailgate Safety Meeting and Debrief Form

DAILY TAILGATE SAFETY MEETING AND DEBRIEF FORM

Instructions

To be completed by supervisor prior to beginning of work each day, when changes in work procedures occur, or when additional hazards are present. Please maintain a copy of this form with the site-specific HASP for the record.

PROJECT NAME AND ADDRESS:

WORK COMPLETED/TOOLS USED:

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TOPICS/HAZARDS DISCUSSED:

Chemicals of concern:
Slip, trip, fall:
Heat or cold stress:
Required PPE:
Other Potential Hazards:
• Environmental:
• Physical:
• Biological:
• Other :

INFORMAL TRAINING CONDUCTED (Name, topics):

NAMES OF EMPLOYEES:

ADDITIONAL HAZARDS IDENTIFIED AT END OF WORK DAY:

Near Misses/Incidents? If so proceed to Page 2 Near Miss and Incident Reporting Form

Supervisors Signature/Date: _____

NEAR MISS AND INCIDENT REPORTING FORM

INCIDENTS:

INJURIES:

NEAR MISSES:

CORRECTIVE ACTIONS:

Supervisors Signature/Date:

K Ply Site

Engineering Design Report

Appendix I Health and Safety Plan

Attachment I.2 Odor Suppressant Foam Material Safety Data Sheet



SAFETY DATA SHEET

LONG DURATION FOAM AC-645

Section 1. Identification

GHS product identifier : LONG DURATION FOAM AC-645
Chemical name : Proprietary Surfactant.
Other means of identification : Aqueous anionic surfactant mixture.
Product type : Liquid.

Relevant identified uses of the substance or mixture and uses advised against

Product use : Aqueous Surfactant. Spray application for VOC and Odor control.
Area of application : Industrial applications.

Supplier/Manufacturer : Rusmar, Inc.
216 Garfield Avenue
West Chester, PA 19380
Phone: 610-436-4314
Fax: 610-436-8436

e-mail address of person responsible for this SDS : info@rusmarinc.com
Website: www.rusmarinc.com

Emergency telephone number (with hours of operation) : 888 488 8044 or 212 682 1200
CHEMTREC 800 424 9300

Section 2. Hazards identification

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

Classification of the substance or mixture : Not classified.

GHS label elements

Signal word : No signal word.
Hazard statements : No known significant effects or critical hazards.

Precautionary statements

Prevention : Not applicable.
Response : Not applicable.
Storage : Not applicable.
Disposal : Not applicable.

Hazards not otherwise classified : None known.

Date of issue/Date of revision : 05/28/2015 **Date of previous issue** : No previous validation **Version** : 1 1/11

Section 3. Composition/information on ingredients

Substance/mixture : Substance
Chemical name : Proprietary Surfactant.
Other means of identification : Aqueous anionic surfactant mixture.

CAS number/other identifiers

CAS number : Not available.
Product code : Not available.

Ingredient name	Other names	%	CAS number
Proprietary Surfactant.	-	100	-

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

Ingestion : Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.
Inhalation : No known significant effects or critical hazards.
Skin contact : No known significant effects or critical hazards.
Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Section 4. First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
sulfur oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Section 6. Accidental release measures

- Large spill** : Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8).
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None.

- Appropriate engineering controls** : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Section 8. Exposure controls/personal protection

- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

- Physical state** : Liquid. [Clear viscous liquid.]
- Color** : Translucent. White.
- Odor** : Odorless.
- Odor threshold** : Not available.
- pH** : Not available.
- Melting point** : Not available.
- Boiling point** : 99°C (210.2°F)
- Flash point** : Not applicable.
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not applicable.
- Lower and upper explosive (flammable) limits** : Not available.
- Vapor pressure** : 3.3 kPa (25 mm Hg) [room temperature]
- Vapor density** : Not available.
- Relative density** : 1.01 to 1.06
- Solubility** : Easily soluble in the following materials: cold water and hot water.
- Solubility in water** : Easily soluble.
- Partition coefficient: n-octanol/water** : Not available.
- Auto-ignition temperature** : Not available.
- Decomposition temperature** : Not available.
- SADT** : Not available.
- Viscosity** : Not available.

Section 10. Stability and reactivity

- Reactivity** : No specific test data related to reactivity available for this product or its ingredients.
- Chemical stability** : The product is stable.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.
Under normal conditions of storage and use, hazardous polymerization will not occur.
- Conditions to avoid** : Keep away from heat.
- Incompatible materials** : No specific data.
- Hazardous decomposition products** : Low levels of sulfur oxides on exposure to high temperatures (concentrate).

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Conclusion/Summary : Not expected.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Section 11. Toxicological information

Potential acute health effects

Eye contact	: No known significant effects or critical hazards.
Inhalation	: No known significant effects or critical hazards.
Skin contact	: No known significant effects or critical hazards.
Ingestion	: No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	: No specific data.
Inhalation	: No specific data.
Skin contact	: No specific data.
Ingestion	: No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects	: Not available.
Potential delayed effects	: Not available.

Long term exposure

Potential immediate effects	: Not available.
Potential delayed effects	: Not available.

Potential chronic health effects

Not available.

General	: No known significant effects or critical hazards.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Section 12. Ecological information

Bioaccumulative potential

Not available.

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.
Additional information	-	-	-

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **United States inventory (TSCA 8b):** Not determined.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Not applicable.

Composition/information on ingredients

No products were found.

SARA 313

Not applicable.

State regulations

Massachusetts : This material is not listed.

New York : This material is not listed.

New Jersey : This material is not listed.

Pennsylvania : This material is not listed.

California Prop. 65

None of the components are listed.

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Inform Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

Health	0
Flammability	0
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
Not classified.	

History

Date of issue/Date of revision	: 05/28/2015
Date of previous issue	: No previous validation
Version	: 1
Prepared by	: IHS
Key to abbreviations	: ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) UN = United Nations

Section 16. Other information

References : HCS (U.S.A.)- Hazard Communication Standard
International transport regulations

✔ Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.