

**ORIGINAL**

May 22, 2008

8-61M-112201

Ms. Paula J. Miranda  
Port of St. Helens - Business Development Manager  
P.O. Box 598  
St. Helens, Oregon 97051

Dear Ms. Miranda:

**Re: Request for No Further Action Determination  
Former Pope & Talbot Wood Treating Site - Area 2  
St. Helens, Oregon**



## INTRODUCTION

AMEC Earth & Environmental, Inc. (AMEC), on behalf of the Port of St. Helens (PSH), has prepared this letter to present rationale for requesting a "No Further Action" (NFA) determination for a portion of the former Pope & Talbot, Inc. (P&T) wood treating property (Site), referred to herein as Area 2, located in St. Helens, Oregon. The former P&T wood treating Site is owned by the PSH and has been the subject of a Remedial Investigation/Feasibility Study (RI/FS) since the issuance of the 1995 Order on Consent (WMCSR-NWR-95-05) by the Oregon Department of Environmental Quality (DEQ).

Based on the results of the 1998 RI completed by GeoEngineers, Inc. (GeoEngineers) and reported in the RI Report dated April 7, 2000 (RI Report), the Site has been divided into two areas to distinguish the area with relatively greater creosote-related contamination (Area 1) from the area that is minimally impacted by historical wood treatment operations (Area 2). Area 1 includes the former wood treatment plant facilities and extends to the southwestern property boundary (approximately 17 acres). Area 2 (approximately 32 acres) is the eastern portion of the Site that historically has been less developed and is the subject of this NFA request. In addition to historical Site use, division of the Site reflects geologic and hydrologic conditions influencing contaminant migration beneath the Site. PSH is interested in redeveloping Area 2 while remedial actions are ongoing in Area 1.

## BACKGROUND

### Site Location and Description

The former P&T wood treating Site is located in the southern portion of St. Helens, Oregon at 1550 Railroad Avenue in Sections 9 and 10, Township 4 North, Range 1 West of the Willamette Meridian. The 49-acre Site is bounded on the south and west by surface water bodies, on the north by railroad tracks and on the northeast by industrial development (Boise Cascade Pulp and Paper Mill). The surface water bodies include Scappoose Bay and Multnomah Channel to the south and southeast, and Milton Creek to the west. Industrial development is present approximately 500 feet west of the Site (Armstrong World Industries), across Milton Creek and

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Sauvie Island located to the southeast across Scappoose Bay and Multnomah Channel. Undeveloped land is located immediately west and northwest across the elevated grade of the railroad tracks. Limited residential development is present northwest of the Site along Railroad Avenue. The location of the Site relative to these surrounding features is shown in Figure 1.

The upland portion of the Site is relatively flat with a gentle downward slope toward the shoreline of Scappoose Bay/Multnomah Channel. There is approximately 4,500 linear feet of shoreline contiguous with Milton Creek and Scappoose Bay/Multnomah Channel that exhibits relatively steep to vertical banks generally covered with blackberries and Scotch Broom. Following demolition of the P&T wood treatment facility, the PSH placed several feet of dredge sand fill across the entire Site, raising its upland surface grade to approximately 15 to 25 feet above mean sea level. Coarse gravel has been placed over portions of the Site for road construction and the PSH periodically clears the upland area of vegetation. The placement of fill has resulted in the wood treating chemical contaminated soil being limited to what are now subsurface native soils. Figure 2 illustrates surface topography and the general current layout of the Site.

Subsurface soil beneath the Site consists of dredged sand fill (thickness ranges between 3 and 18 feet) over native silt (thickness ranges between 2 and 21 feet) over basalt bedrock (encountered between 6 and 35 feet below ground surface [bgs]). In general, depths to shallow groundwater beneath the Site vary from about 6 to 13 feet, depending on the season. The water table generally replicates the surface topography of the Site, with maximum groundwater elevations in the central portion of the Site and groundwater flow (discharge) toward the nearest surface water body at an inferred gradient ranging between 0.01 and 0.03 (foot per foot). The approximate locations of RI monitoring wells and inferred shallow groundwater elevations from a January 2008 water level monitoring event are shown in Figure 3.

Groundwater is present within both the dredge sand and the native silt. RI monitoring wells were constructed to evaluate groundwater conditions separately within the upper dredge sand fill and the lower native silt. Hydraulic conductivity within the sand fill ( $10^{-2}$  to  $10^{-3}$  centimeters/second [cm/sec]) is approximately 1 to 2 orders of magnitude greater than the native silt based on slug testing in the monitoring wells. Additionally, hydraulic conductivity within the native silt ( $10^{-3}$  to  $10^{-5}$  cm/sec) is generally 1 to 2 orders of magnitude greater than the underlying basalt, in the limited instances in which the basalt was permeable ( $10^{-5}$  to 0 cm/sec) based on in-situ borehole permeability testing performed within the upper 20 feet of bedrock. Groundwater seeps have been observed within localized areas of the Site shoreline with Milton Creek and Scappoose Bay in Area 1 only. The approximate locations of groundwater seeps are shown in Figure 4.

Relative groundwater elevations in paired monitoring wells located away from surface waters (interior upland areas) typically exhibit a downward vertical hydraulic gradient from sand fill to the underlying native silt. Groundwater elevations in paired monitoring wells located immediately adjacent to the shoreline of Scappoose Bay/Multnomah Channel typically exhibit a slight upward vertical gradient from the native silt to the overlying sand fill. A measure of vertical hydraulic gradients between the alluvium soils and underlying basalt was not determined as part of the RI as no groundwater monitoring wells are completed entirely in the basalt bedrock.



## Site History

The Site was established as a wood treating facility in 1912 and wood treating operations continued until 1960 under the ownership and operation of P&T. The primary wood-treating compound used was creosote. Pentachlorophenol (PCP) and chromated copper arsenate (CCA) were apparently used in limited quantities in 1953/1954. PSH purchased the property in 1963 and since then the western portion of the Site (Area 1) has either been vacant or leased for the following industrial uses 1) log peeling and wood pole storage facility (1974 - 1991); 2) storage yard for a marine construction/dredge company (1993 - 1998); 3) a private wood-working business (1998 - 2002); and 4) log reclamation and small-scale sawing operations (2002 - present).

During P&T's ownership, Area 2 contained a small sawmill, powerhouse, wood burner, rail spurs, and a portion of the elevated wooden platforms used to transfer raw and finished wood product between ships and railcars. An 8-inch-diameter creosote pipeline originated at the Site's eastern shoreline and traversed west to a large creosote aboveground storage tank (AST) located in Area 1. Within Area 2, the majority of the creosote pipeline (approximately 1,000 linear feet) was constructed aboveground. From 1915 to the mid-1930s, an oil AST appears to have operated on the eastern shoreline of Area 2. Since the demolition of the P&T facilities in 1960, Area 2 has remained vacant and was only used to store untreated peeled wooden poles between 1974 and 1991. The locations of former facilities are shown in GeoEngineers Figures 3 through 6 of the RI Report (copies are provided in Attachment A).

## NATURE AND EXTENT OF CONTAMINATION

The current understanding of the nature and extent of soil, groundwater, and surface water contamination for the Site is based on the results of the RI and as presented in the RI Report. The approximate locations of RI explorations and sampling locations are shown in Figure 5. The nature and extent of sediment contamination offshore from the Site is based primarily on sediment sampling and analysis performed for the ecological risk assessment (ERA) in 2003 through 2005 and as presented in the ERA Summary Report prepared by Bridgewater Group, Inc. and Kennedy/Jenks Consultants, Inc. Previous environmental investigations and risk assessments were performed and prepared for the Site as a whole. The following summary of contaminant conditions is focused on Area 2 of the Site.

### Chemicals of Interest

The results of the RI indicate that detected concentrations of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) in upland soil and groundwater are the result of releases from the historical wood processing and treating activities that occurred primarily within Area 1 of the Site. The results of the RI indicate that upland soil and groundwater within Area 2 is generally unaffected by historical Site activities, except for a limited portion of the former creosote pipeline and wood waste burner associated with the sawmill.

Since creosote was the primary wood treatment product used, polycyclic aromatic hydrocarbons (PAHs) make up the majority of SVOCs detected in Area 1 and to a limited extent Area 2. Given some limited use of metal-based wood treating chemicals, select metals are also chemicals of interest (COI). Select VOCs are also a COI given the possible use of petroleum hydrocarbons as a creosote solvent. PCP was reportedly used for a very limited period



(months) at the Site. As a result, PCP and dioxins are considered minor COIs. Polychlorinated biphenyls (PCBs) were apparently present in road oil placed on the Site surface after the wood treating plant ceased operations and the dredge sand fill had been placed on the Site. Thus, PCBs are COIs in the surface soil. A summary of the RI chemical analytical data for the upland Area 2 soil and groundwater samples, as well as the surface water and sediment samples collected along the Area 2 shoreline are provided in Appendix C of the RI Report. Additional sediment sample chemical analytical data was collected along the Area 2 shoreline as part of the ERA completed in 2005 (Bridgewater Group, 2006).

## Soil

Field evidence of creosote and/or petroleum hydrocarbon contamination was not observed on soil samples obtained from explorations completed in Area 2, with the exception of two localized areas in the southwestern and central upland portions of Area 2. Approximately ½-acre of creosote-impacted soil is present along the alignment for the former creosote pipeline in the vicinity of RI explorations GB-3 and GP-7. Localized areas of oil-impacted soil were encountered in the vicinity of the former wood waste burner associated with the 1919 sawmill (RI explorations GB-7 and MW-13A/MW-13B). With the exception of GB-3, impacted soil within Area 2 is confined to the fill materials or the upper portion of the native silt at depths ranging between 3 and 6 feet (GeoEngineers, 2000). In boring GB-3, impacted soil was encountered at a depth of 8 feet (top of the native silt unit) and extended to 18 feet bgs (soil/basalt contact).

Concentrations of contaminants detected in Area 2 soil were compared to risk-based screening levels (RBSLs) as part of the 2006 human health risk assessment (HHRA) described below. In general, site-specific Risk-Based Concentrations (RBCs) calculated in accordance with the DEQ risk-based decision making (RBDM) guidance (DEQ, 2003) were used as the RBSLs when available. If an RBC was not available for a given chemical then the U.S. Environmental Protection Agency (EPA) Region 9 Preliminary Remediation Goals (PRGs) for industrial workers were used. The 2006 risk-based screening indicate that detected concentrations of COIs in Area 2 soil are below applicable RBSLs. Table 1 presents a comparison of maximum detected concentrations of contaminants of potential concern (COPCs) in Area 2 soil samples to the RBSLs.

On April 2, 2007, following completion of the HHRA, DEQ started using screening values developed by EPA Region 6 for constituents where RBCs are not available. Therefore, AMEC included the Region 6 PRGs in screening evaluation summarized by Table 1. Select high-molecular weight PAHs (carcinogenic), arsenic, lead and PCBs (Aroclor 1260) were the only contaminants detected in Area 2 soil at concentrations greater than EPA Region 6 PRGs for industrial workers. Except for PCBs, none of these contaminants were detected within the upper 3 feet of Area 2 soil. Detected concentrations of arsenic and lead in Area 2 soil were determined to be consistent with natural regional background levels (Appendix D of the RI Report).

Gravel roadbeds within Area 2 were sampled for the presence of PCBs at nine separate locations. The PCB compound Aroclor 1260 was detected in 2 of the 9 roadbed samples (SS-7 and SS-8) at concentrations less than the PCB cleanup level of 7.5 mg/kg established by DEQ's PCB generic remedy for industrial sites (DEQ, 1997). The sample with the highest detected



concentration of PCBs in Area 2 (SS-8 at 4.6 mg/kg) was also analyzed for leachable PCBs by EPA Methods 1311 and 8080M. Leachable PCBs in sample SS-8 were not detected. Total PCBs were not detected in the remaining Area 2 roadbed samples. The locations of Area 2 gravel roadbed samples are shown in Figure 32 of the RI Report (a copy is provided in Attachment A). All of the Area 2 soil data is less than DEQ's "highly concentrated" hot spot levels for industrial sites (DEQ, 1998b).

As noted in the Level II ERA report and described below, the Site has been highly disturbed and is a "nongame", industrial zoned property. The ground surface present during use of the Site for wood treating operations (1912 to 1960) was subsequently covered with 5 to 10 feet of dredge sand fill in the early 1970s. PCBs are the only suspected hazardous substances released to the current ground surface as the result of oiling gravel roads for dust control in limited areas in 1982. Area 2 roadbed sampling for PCBs were compared to the screening level values (SLVs) developed by DEQ for a Level II ERA. This screening process is presented in Table 3-2 of the Level II ERA report, as well as in Table 1 of this letter. Based on the appropriate SLV comparison and given that PCBs are present only across limited portions of the Site, PCBs were not identified as contaminants of potential ecological concern (CEPCs) for surface soil exposure to terrestrial receptors (Bridgewater, 2003). A complete summary of the ERA is provided below.

### **Groundwater**

Relatively low-levels of VOCs, SVOCs, and metals have been detected in groundwater samples collected from the Area 2 monitoring wells. Detected concentrations of VOCs were generally found to be associated with laboratory contamination. In general, low-molecular weight PAHs (non-carcinogenic) were detected at relatively low concentrations in Area 2 monitoring wells located near and/or downgradient of the former creosote pipeline and sawmill. One or more high-molecular weight PAHs (carcinogenic) and PCP were detected only one time in several Area 2 monitoring wells during the nine low-flow sampling events and the detected concentrations were relatively low (generally between the method detection limit and method reporting limit). Detected concentrations of COIs in the Site's groundwater monitoring wells have been relatively consistent over the 10 years of monitoring. Detected concentrations of select VOCs including benzene, toluene, ethylbenzene, and total xylenes (BTEX) and total PAHs in the Site's monitoring wells during the January 2008 monitoring event are presented in Figures 6 and 7, respectively.

Concentrations of contaminants detected in Area 2 groundwater were compared to RBSLs as part of the 2006 HHRA described below. In general, site-specific RBCs were used as the RBSLs when available. If an RBC was not available for a given chemical then the EPA Region 9 PRGs for industrial workers were used. The 2006 risk-based screening indicate that detected concentrations of COIs in Area 2 groundwater are below applicable RBSLs. Table 2 of the HHRA Report presents a comparison of maximum detected concentrations of COIs in Site groundwater samples to the RBSLs (Kennedy/Jenks Consultants, 2006). Also, all the of the Area 2 groundwater data is less than DEQ's "highly concentrated" hot spot levels for industrial sites (DEQ, 1998b).



Following completion of the HHRA, DEQ started using screening values developed by EPA Region 6 for constituents where RBCs are not available. Arsenic and lead were the only contaminants detected in Area 2 groundwater samples at concentrations greater than EPA Region 6 PRGs protective of tap water. However, a comparison of dissolved arsenic and lead concentrations in groundwater samples obtained from non-contaminated areas to contaminated areas of the Site (Area 1) suggests that dissolved concentrations are within background levels and not the result of releases from wood treating activities.

Detected concentrations of COIs in groundwater samples collected from Area 2 monitoring wells located closest to the Scappoose Bay/Multnomah Channel shoreline (MW-12A, MW-12B, MW-14 and MW-18) were compared to National Recommended Water Quality Criteria published by EPA, referred to as the Ambient Water Quality Criteria (AWQC). The AWQC are based on scientific information regarding concentrations of specific chemicals or levels of parameters in surface water that protect aquatic life and/or human health. Select high-molecular weight PAHs, PCP, lead, and zinc were detected in these Area 2 shoreline wells on one or more occasions above the acute and/or chronic AWQC. The risk evaluation based on comparison of groundwater concentrations with relevant AWQC assumes that aquatic organisms in surface water have long-term exposure to chemicals at the concentrations observed in groundwater. This exposure assumption significantly overestimates actual exposures at the former P&T waterfront property. If groundwater containing low concentrations of the COIs were to enter Scappoose Bay/Multnomah Channel, dilution with surface water would significantly reduce the concentrations of CEPCs.

As mentioned above, high-molecular weight PAHs and PCP were detected in these shoreline-monitoring wells during only 1 of the 9 sampling events, and are likely attributed to the occasional entrainment of solid particulates in these groundwater samples. Since groundwater seeps were not observed during the RI along the Area 2 shoreline, transition zone water was not characterized as part of the RI. The approximate locations of visible groundwater seeps within Area 1 and characterized during the RI are shown in Figure 4. The conceptual site model (CSM) presented in the RI Report and summarized below indicates that Area 2 shoreline surface water and sediment have not been impacted as a result of soil contaminants migrating through the groundwater to Scappoose Bay/Multnomah Channel.

## **DENSE NONAQUEOUS PHASE LIQUID**

A visible creosote-petroleum product, described as a dense nonaqueous phase liquid (DNAPL), was not observed in subsurface soil samples nor in groundwater monitoring wells located within Area 2. As determined by the RI, a bedrock ridge impedes the migration of DNAPL detected in within Area 1 from reaching Area 2. Also, detected concentrations of COIs in Area 2 groundwater samples are orders of magnitude below their effective solubility limits. The estimated areal extent of DNAPL within Area 1 is shown in Figure 8.

## **Surface Water**

Surface water quality data collected during the RI indicate that the potential for adverse impacts to surface water from Area 2 groundwater discharge at the Site is low. Detected concentrations of VOCs and SVOCs in surface water samples collected from Scappoose Bay/Multnomah Channel adjacent to Area 2 of the Site were less than EPA AWQC for protection of human



health and aquatic life. In August 1996, PAHs and benzene were detected at concentrations greater than the AWQC in one or more Phase I RI surface water samples obtained upstream of Area 2 as part of Phase I RI activities. However, none of these compounds were detected in surface water samples obtained immediately adjacent to the Site's Area 2 shoreline during the Phase 2 RI activities. The approximate locations of RI surface water samples are shown in Figure 5.

### **Sediment**

Shallow sediment conditions (upper 10 centimeters) along the Area 2 shoreline at the Site were explored by obtaining a series of discrete and composite sediment samples along six transects and two background locations. The approximate locations of RI and ERA sediment samples are shown in Figure 9. Results of the sediment investigations adjacent to Area 2 indicate that COIs were detected within anthropogenic background levels measured in Scappoose Bay (GeoEngineers, 2000 and Bridgewater Group & Kennedy/Jenks Consultants, 2005).

### **CONCEPTUAL SITE MODEL AND LOCALITY OF FACILITY**

The RI noted that upland surface soil contaminants were limited to PCBs within Area 2. Shoreline sediment and groundwater seep contaminants are limited to Area 1 and are predominately PAHs. These contaminants are present in the Site soil and groundwater primarily in Area 1 due to releases from the historical wood treating activities including spills and drippage. PAHs are present in the sediment offshore from Area 1 of the Site due likely to historical process water discharges and shallow groundwater seepage. The primary current potential contaminant migration pathway is potential migration of contaminated groundwater from Area 1 to the Site shoreline and adjacent waterways via seeps. Discharge of contaminants to adjacent surface water or sediments does not appear to be occurring in Area 2. Also, the general direction of shallow groundwater flow beneath the Site and the presence of a basalt ridge between the former wood treating process area and Area 2 preclude contaminant transport from Area 1 to Area 2.

Overland migration of upland surface soil containing PCBs is not anticipated based on observations at the Site during heavy rainfall events. There are no drainage ditches visible within Area 2, particularly in the vicinity of SS-7 and SS-8, and stormwater runoff has been observed to pond in the vicinity of monitoring wells MW13A/MW-13B. The surface topography of the Site is illustrated in Figure 2.

Based on the results of the RI, the locality of facility (LOF) is defined by the Site's property boundary to the north and east, and Milton Creek and Scappoose Bay to the south and west. Also, RI findings indicate that the LOF is limited to the shallow water-bearing zone above the basalt bedrock.

### **REVIEW OF BENEFICIAL WATER USE DETERMINATION AND SITE ZONING**

As part of evaluating Site data collected since the completion of the RI Report, a review of the Beneficial Water Use Determination (BWUD), included as an Appendix E to the RI Report, was completed. The review included a cursory review of groundwater and surface water usage within one-mile of the LOF since the completion of the BWUD and review of the Site zoning.



## **BWUD**

A review of Oregon Water Resources Department (OWRD) records was performed on April 29, 2008. Two additional State Registered Water Supply Wells have been installed within one mile of the Site since completion of the 2000 BWUD. Both new wells appear to be for domestic purposes at residential or commercial properties. The first well is located on the west side of the intersection of Railroad Avenue and Old Portland Road, approximately ½ mile northwest of the Site. The well was drilled to a depth of 80 feet on March 1, 2001, and appears to provide commercial domestic service. The well log indicates that the water bearing zone extends from 55-75 feet bgs and the estimated yield is 9 gallons per minute (gpm). The second well is located at 58365 Old Portland Road, approximately ½ mile west of the Site. The well was drilled to a depth of 280 feet bgs on August 27, 2003, and appears to provide residential domestic service. The well log indicates that the water bearing zone extends from 260-265 feet bgs and the estimated yield is 20 gpm. Both new wells are located upgradient of the Site; therefore, they are not expected to be impacted with COIs from the Site.

In addition to the two well locations, review of the OWRD records indicate two additional surface water rights permits have been issued for diversion points within one mile of the Site since completion of the original BWUD. The Oregon Department of Fish and Wildlife (ODFW) have obtained permits for two small dams to be built on Sauvie Island for restoration of Cunningham Slough in Deep Lake and Millionaire Lake. The diversion points are upstream of the Site and beyond the LOF.

## **Site Zoning**

A zoning map was downloaded from the City of St. Helens web site (<http://www.ci.st-helens.or.us/>) on April 29, 2008. The map revision date is noted as October 22, 2007. The zoning of the Site has remained unchanged from Heavy Industrial (HI). In summary, the current and reasonably anticipated future land use is industrial.

## **SUMMARY OF RISK ASSESSMENTS**

### **Human Health Risk Assessment**

As part of the RI/FS process for the Site, a baseline HHRA was completed by Bridgewater Group and Kennedy/Jenks Consultants and reported to the DEQ in the *HHRA, Pope & Talbot, Port St. Helens Site* dated November 28, 2006 (HHRA Report).

The HHRA included a data quality review of available analytical data collected prior to and after the completion of the RI. Available Site data through 2004 were used in the selection of COPC for the four media types evaluated at the Site. COPCs were determined by screening Site COIs against the appropriate RBSLs outlined in Section 3.2.2 of the HHRA Report. A summary of COPCs by media type is provided in Table 5 of the HHRA Report.

The evaluation also included an exposure analysis to identify potential exposure pathways to individuals who may come in contact with the previously identified COPCs originating from the Site based on the CSM. The evaluation concluded that based on likely land and water uses within Areas 1 and 2 of the Site and vicinity, people may be exposed to Site-related contaminants by onsite industrial workers, onsite excavation workers, and recreational



trespassers scenarios. Furthermore, the HHRA included an evaluation of exposure point concentrations (EPCs) for COPCS in soil, sediment, and groundwater. Results of this evaluation are included in Tables 6 through 8 of the HHRA Report.

The HHRA Report concluded that for Areas 1 and 2 combined, target risk levels were not exceeded for the exposure scenarios for the onsite industrial worker and recreational trespasser at the shoreline and not exceeded for the excavation worker exposed to soil during trenching activities.

Unacceptable risks and hazards to excavation workers in the southern portion of the Site (i.e., area of DNAPL within Area 1) from dermal contact with groundwater containing PAHs did exceed DEQ's target risk levels. The locations of Area 1 groundwater samples exceeding the excavation worker protection are shown in Figure 10.

The calculation of EPCs for COPCs in Area 2 groundwater was beyond the scope of this letter report. However, detected concentrations of PAHs in Area 2 groundwater are two to four orders of magnitude lower than the RBSLs calculated for groundwater in an excavation (i.e.,  $RBC_{we}$ ). Therefore the maximum individual cancer risk, the total cancer risk, and the total noncancer hazard index to excavation workers through dermal contact with Area 2 groundwater containing PAHs should be considered acceptable by DEQ criteria for both the reasonable maximum exposure and central tendency exposure scenarios.

### **Ecological Risk Assessment**

In addition to the HHRA, a Level II ERA was conducted for Areas 1 and 2 of the Site. Results of this assessment were reported in the *Level II ERA, Former Pop & Talbot Wood Treating Site* dated October 17, 2003.

As previously discussed this Site has been worked and reworked by industrial and filling practices during its history. This has resulted in no sensitive environments or natural habitats on the Site; however there are sensitive environments in an area near the Site resulting in considerations for potential ecological receptors being potentially exposed to Site COIs.

Site surveys were conducted for Areas 1 and 2 of the Site during multiple periods during the RI. A summary of plant species observed for Area 2 is included in Table 2-2 of the Level II ERA. In general weeds and grasses dominant in Area 2 including Reed Canarygrass (*Phalaris arundinacea*) and Oregon Ash (*Fraxinus latifolia*). Wildlife observed on Area 2 during Site surveys included Mourning Dove (*Zenaidura macroura*) and Blacktail Deer (*Odocoileus hemionus columbianus*). Based on the results of the Site surveys, candidate ERA endpoints were identified for consideration. These endpoints are summarized on Table 3-1 of the Level II ERA.

Identification of CPEC for the Site followed DEQ guidance (DEQ, 1998 and 2001). This included evaluating COIs for detection frequency, comparison of COIs to DEQ SLVs, and screening against concentration-risk screening criteria or bioaccumulation criteria. A summary of CPECs for surface soil, surface water, groundwater seeps, and sediment are presented on Table 3-11 of the Level II ERA.



The conclusions of the ERA indicate a potential unacceptable ecological risk to ecological receptors in: the Milton Creek Area 1 shore and near shore community from PAHs and possibly arsenic in sediment; the Scappoose Bay Area 1 shore and near shore community from PAHs in surface water; dioxins, furans, metals, and PAHs in groundwater seeps; and PAHs and possibly arsenic in sediment; and piscivorous birds from consumption of arsenic and benzo(a)pyrene-contaminated prey (Bridgewater, et.al, 2003). As noted in the ERA, no contaminants of potential ecological concern are present in surface soil; therefore, no further ecological risk assessment activities for surface soil receptors are warranted.

Based on the above ecological pathways, the following Level III ERA tasks were completed in 2005 for off-shore issues potentially pertaining to Area 2: 1) assess the potential ecological risk to Scappoose Bay shoreline community from benzo(a)anthracene in surface water, PAHs in sediment and groundwater seeps, and arsenic in sediment; and 2) assess the potential ecological risk to piscivorous birds and mammals from consumption of arsenic and benzo(a)pyrene-contaminated prey. The results of additional sediment sampling conducted adjacent to the Site determined that PAHs and arsenic were within regional background levels and/or below SLVs. Potential unacceptable risk was identified for ecological receptors contacting the groundwater seeps present near Area 1 monitoring well pair MW-3A/3B. The complete ERA is present in a November 29, 2006, *ERA Summary Report* prepared by Bridgewater Group.

#### **Review of Additional Site Groundwater Data**

Since completion of the RI Report and risk assessments, three additional groundwater monitoring events have been conducted at the Site. Annual groundwater monitoring events conducted in December 2005 and 2006 and January 2008 are reported in the February 21, 2006, February 9, 2007, and February 22, 2008 memorandums prepared by Bridgewater Group. As part of this request for an NFA determination, the results from the additional groundwater monitoring were evaluated using the appropriate RBSLs outlined in Section 3.2.2 of the HHRA Report. Site-specific RBCs from the DEQ RBDM guidance (DEQ, 2003) were used as the RBSLs; however, when an RBC was unavailable, the EPA Region 9 PRGs were used. Following completion of the HHRA, DEQ adopted the use of EPA Region 6 PRGs from that of the Region 9. Evaluation of RBSLs for the newly collected groundwater data incorporated the use of the Region 6 PRGs as appropriate.

As part of the evaluation the analytical results from the additional groundwater monitoring events for wells located within Area 2 were compared to the maximum concentrations reported in Table 2 of the HHRA Report. Groundwater results from these events resulted in no additional COPCs from those included in the HHRA Report. Further review of the Site COIs by the EPA Region 6 PRGs resulted in no changes to the COPCs listed in the HHRA Report for Area 2 as presented in Table 2.



## CONCLUSIONS

Creosote has been identified as the primary wood treating contaminant in soil and groundwater samples collected in the vicinity of the former P&T treatment facilities (primarily Area 1). Creosote is mainly comprised of PAHs. Consequently, the presence and quantity of PAHs (or lack of) in subsurface soil, groundwater, sediment and surface water samples collected from the Site and locality were generally used to define the LOF.

The results of the RI indicate that upland soil and groundwater within Area 2 is generally unaffected by historical Site activities, except for a limited portion of the former creosote pipeline and wood waste burner associated with the sawmill. Since dredge sand and other fill materials were placed onsite after operation of the former wood treating facilities ceased, contamination related to creosote primarily exists within the native silt, beneath 5 to 10 feet of non-impacted fill. The baseline HHRA and ERA performed at the Site determined that the localized contamination encountered within Area 2 did not pose an unacceptable risk to human and ecological receptors. The results of these risk assessments provide the basis for an NFA determination for Area 2 of Site. As a result, remedial actions designed specifically to address soil and groundwater impacts in Area 2 are not warranted.

The CSM used in the risk assessments included industrial land use and no beneficial uses of groundwater beneath the Site, except for discharge to surface water. Therefore, the NFA determination is contingent on putting the appropriate administrative and legal controls in place (institutional controls) to restrict future land and groundwater uses at the Site. In addition, current engineering control practices designed to reduce the number of ecological receptors (e.g., clearing of vegetation) and recreational trespassers (perimeter fencing) should be maintained prior to, during, and following the redevelopment of Area 2. Erosion control best management practices (BMPs) should be implemented for all Area 2 earthwork conducted within 100 feet of the Scappoose Bay/Multnomah Channel shoreline.

## LIMITATIONS

We have prepared this report for use by the PSH. Within the limitations of scope, schedule, and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this letter report was prepared. No warranty or other conditions, expressed or implied, should be understood.

## REFERENCES

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## CLOSING

If you have any further questions or require additional information, please contact the undersigned at (503) 639-3400 or through the email addresses provided below.

Sincerely,

**AMEC Earth & Environmental, Inc.**



Christy Johnson, RG

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Project Manager

## Attachments:

### Tables:

- Table 1 Area 2 Soil Chemicals of Potential Concern
- Table 2 Summary of Chemical Analytical Data, 2008 - 2008 Groundwater Samples

### Figures:

- Figure 1 Site Vicinity Plan
- Figure 2 Site Layout and Topography
- Figure 3 Groundwater Elevations and Inferred Contours - January 2008
- Figure 4 Groundwater Seep Locations
- Figure 5 RI Explorations and Sampling Locations
- Figure 6 BTEX Concentrations in Groundwater - January 2008
- Figure 7 Total PAH Concentrations in Groundwater - January 2008
- Figure 8 Estimated Areal Extent of DNAPL
- Figure 9 Sediment Sample Locations
- Figure 10 Excavation Worker Groundwater Protective Level Exceedences and Seep Water Hot Spots

### Attachment A:

- Figure 3 Historical Site Plan - 1919 (GeoEngineers)
- Figure 4 Historical Site Plan - 1938 (GeoEngineers)
- Figure 5 Historical Site Plan - 1959 (GeoEngineers)
- Figure 6 Historical Site Plan - 1974 (GeoEngineers)
- Figure 10 Locations of Phase 1 and 2 Remedial Investigation Activities
- Figure 32 Locations of PCBs Detected in Near-Surface Soil (GeoEngineers)

CJ/jm

c: Deborah Bailey, DEQ, Portland, Oregon



**TABLES**



**TABLE 2**  
**Summary of Chemical Analytical Data, 2005-2008 Groundwater Samples**  
**Review of COPCs in Groundwater**  
**Former Pope Talbot Wood Treating Site**  
**St. Helens, Oregon**

Chemical	Original Site Area with Maximum Concentration	Original Maximum Concentration	New Max?	Area 2 Groundwater Concentrations (Maximum Values in µg/l), 2005 - 2008	PRG Region 9 <sup>a</sup>	PRG Region 6 <sup>b</sup>	Above PRG 05' - 06'?	Original COPC	New COPC?
Benzene	1	150	N	0.15U - MW-12B & MW-14 (12/14/05)	5	0.35	N	N	N
Ethylbenzene	1	600J	N	0.11U - MW-12B & MW-14 (05, 06 & 08)	700	1,300	N	N	N
Toulene	1	160	N	0.16U - MW-12B & MW-14 (12/14/05)	1,000	2,300	N	N	N
Total Xylenes	1	1,700	N	0.26U - MW-12B & MW-14 (12/14/05)	10,000	200	N	N	N
Acenaphthene	1	59,000	N	<b>0.721 - MW-14 (12/14/05)</b>	370	370	N	Y	N
Acenaphthylene	1	900J	N	0.048U - MW-14 (12/14/05)	24,775 <sup>c</sup>	24,775 <sup>c</sup>	N	N	N
Anthracene	1	13,000	N	0.0481U - MW-14 (12/14/05)	1,800	1,800	N	N	N
Benzo(a)anthracene	1	6,800	N	0.0481U - MW-14 (12/14/05)	0.029	0.029	N	Y	N
Benzo(a)pyrene	1	2,000J	N	0.0481U - MW-14 (12/14/05)	0.0092	0.0029	N	Y	N
Benzo(b)fluoranthene	1	3,000J	N	0.0481U - MW-14 (12/14/05)	0.092	0.029	N	Y	N
Benzo(g,h,i)perylene	1	0.28	N	0.0481U - MW-14 (12/14/05)	5,804 <sup>c</sup>	5,804 <sup>c</sup>	N	N	N
Benzo(k)fluoranthene	1	2,000J	N	0.0481U - MW-14 (12/14/05)	0.92	0.29	N	Y	N
Chrysene	1	6200	N	0.0481U - MW-14 (12/14/05)	9.2	2.9	N	Y	N
Dibenzo(a,h)anthracene	1	0.11J	N	0.0962U - MW-14 (12/14/05)	0.0092	0.0029	N	N	N
Fluoranthene	1	49,000	N	0.0481U - MW-14 (12/14/05)	1,500	1,500	N	Y	N
Fluorene	1	55,000	N	0.0481U - MW-14 (12/14/05)	240	240	N	Y	N
Indeno(1,2,3-cd)pyrene	1	4J	N	0.0481U - MW-14 (12/14/05)	0.092	0.029	N	Y	N
2-Methylnaphthalene	1	72,000	N	-	680 <sup>c</sup>	680 <sup>c</sup>	N	Y	N
Naphthalene	1	310,000	N	0.0481U - MW-14 (12/14/05)	6.2	6.2	N	Y	N
Phenanthrene	1	100,000	N	0.0481U - MW-14 (12/14/05)	5,804 <sup>c</sup>	5,804 <sup>c</sup>	N	Y	N
Pyrene	1	34,000	N	<b>0.0665J - MW-14 (12/14/05)</b>	180	180	N	Y	N
Arsenic	1	38	N	-	0.045	0.045	N	Y	N
Cadmium	1	0.25	N	-	18	18	N	N	N
Chromium	2	6	N	-	55,000	55,000	N	N	N
Copper	2	25	N	<b>9.2 - MW-12B (12/13/06)</b>	1,460	1,400	N	N	N
Lead	2	106	N	-	15	15	N	Y	N
Zinc	2	528	N	<b>422 - MW-12B (12/13/06)</b>	10,950	620	N	N	N

**Notes:**

<sup>a</sup> EPA Region 9 preliminary remediation goal for tap water (EPA 2004b).

<sup>b</sup> EPA Region 6 Human Health Medium-Specific Screening Levels (EPA 2008). The PRG shown is protective of residential water.

<sup>c</sup> DEQ risk-based concentration (RBC) for occupational vapor intrusion into buildings or groundwater in excavation, whichever is lower (DEQ) 2003.

COPC = chemical of potential concern.

µg/l = micrograms per liter.

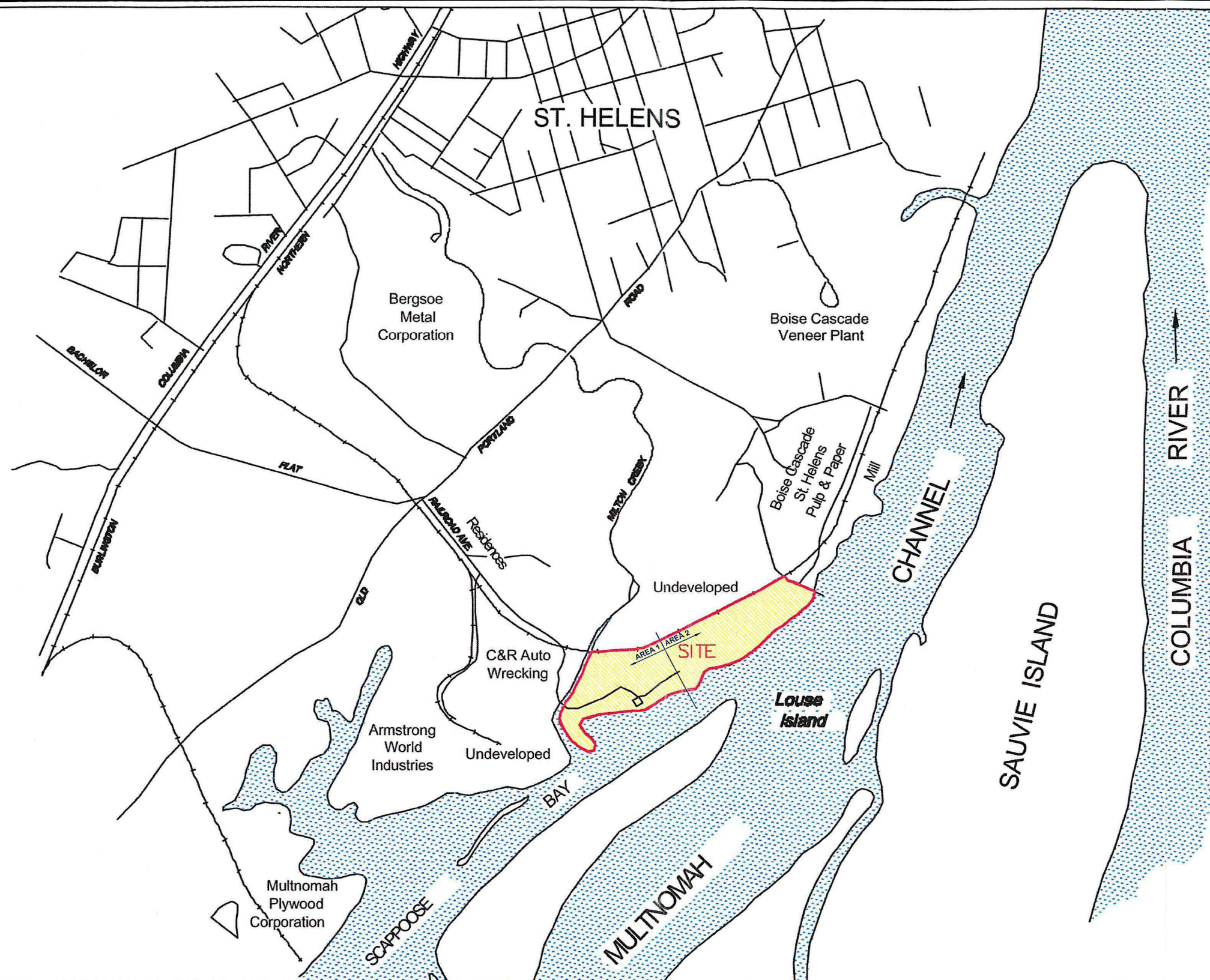
0.0481U = Not detected at or above the laboratory method reporting limit (0.0481 µg/l).

**Bold** - Max detections 2005-2008.



**FIGURES**





DRAWING IS NOT TO SCALE

NOTE: DRAWING FROM FIGURE 1-2 FROM "LEVEL II ECOLOGICAL RISK ASSESSMENT, FORMER POPE AND TALBOT WOOD TREATMENT SITE, PORT OF ST. HELENS, ST. HELENS, OREGON," DATED 10/17/2003, BY BRIDGEWATER GROUP/HARTCROWSER.

CLIENT:

PORT OF ST. HELENS

AMEC Earth & Environmental

7376 S.W. Durham Road  
Portland, OR. U.S.A. 97224



DWN BY: DMF/PM

CHK'D BY: KH

DATUM: -

PROJECTION: -

SCALE: NOT TO SCALE

PROJECT

FORMER POPE AND TALBOT WOOD TREATMENT SITE

TITLE

SITE VICINITY PLAN

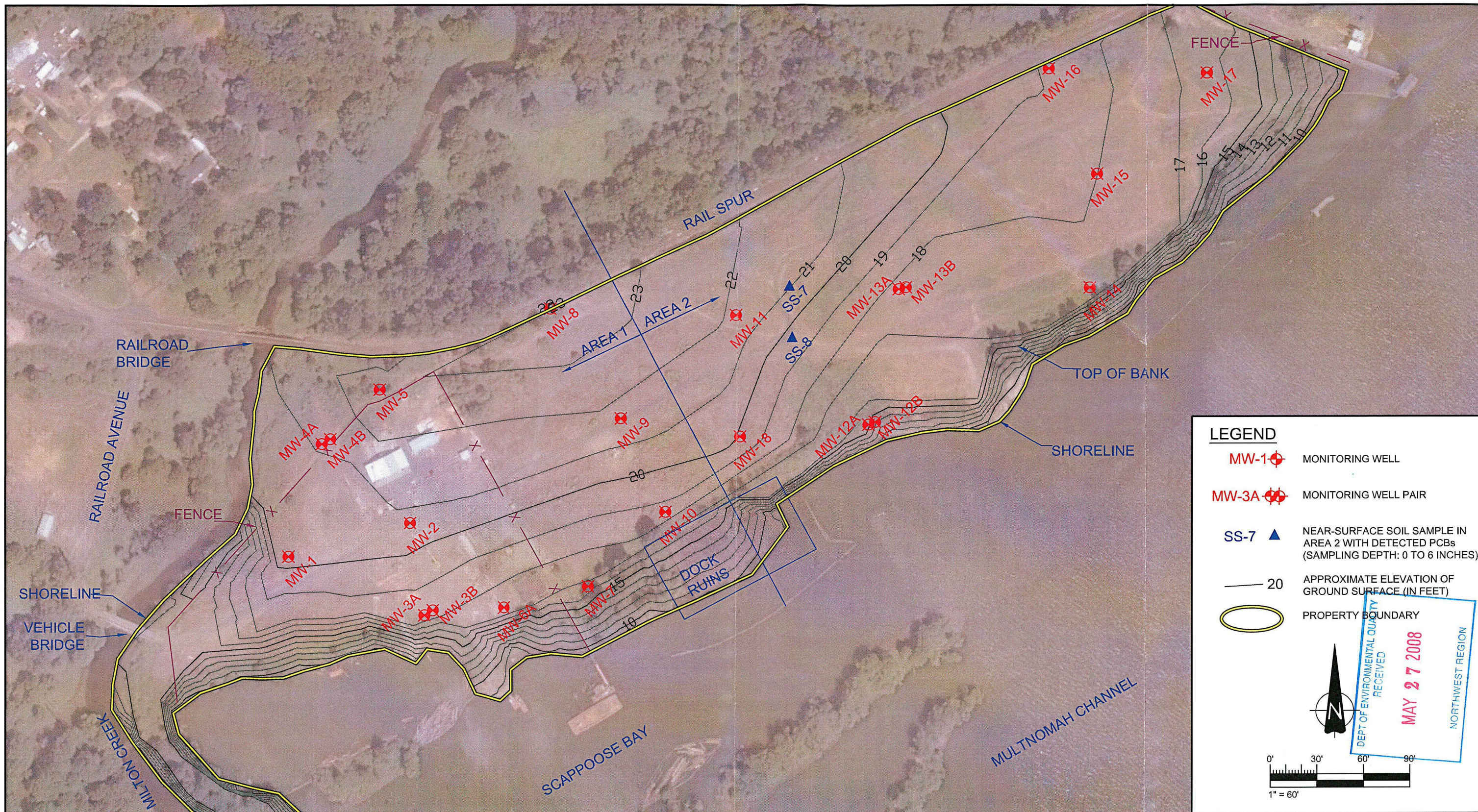
DATE: MAY 2008

PROJECT NO: 8-61M-11220-1

REV. NO.: 1

FIGURE No. 1





NOTES:  
 1. One foot topographic contours from surveyed monitoring well elevations and the United States Geological Survey National Elevation Dataset 10 Meter 7.5x7.5 minute quadrangles dated 2000-Present for shoreline definition.  
 2. Aerial photography from Google Pro 2007.

CLIENT LOGO

CLIENT:  
 PORT OF ST. HELENS

AMEC Earth & Environmental  
 7376 S.W. Durham Road  
 Portland, OR, U.S.A. 97224



DWN BY: RK/PM  
 CHK'D BY: KH  
 DATUM: NAVD88  
 PROJECTION: NAD83 UTM 10N  
 SCALE: 1" = 60'

PROJECT  
 FORMER POPE AND TALBOT WOOD TREATING SITE

TITLE  
 SITE LAYOUT AND TOPOGRAPHY

DATE:  
 MAY 2008

PROJECT NO:  
 8-61M-11220-1

REV. NO.:  
 2

FIGURE No.  
 2





NOTE: DRAWING FROM FIGURE 3 FROM "JANUARY 2008 GROUNDWATER MONITORING RESULTS FORMER POPE & TALBOT/PORT OF ST. HELENS WOOD TREATING SITE, ST. HELENS, OREGON," DATED 02/22/2008, BY BRIDGEWATER GROUP. BASE PHOTOGRAPH JUNE 2000.

Approximate Scale  
200 Feet

CLIENT:  
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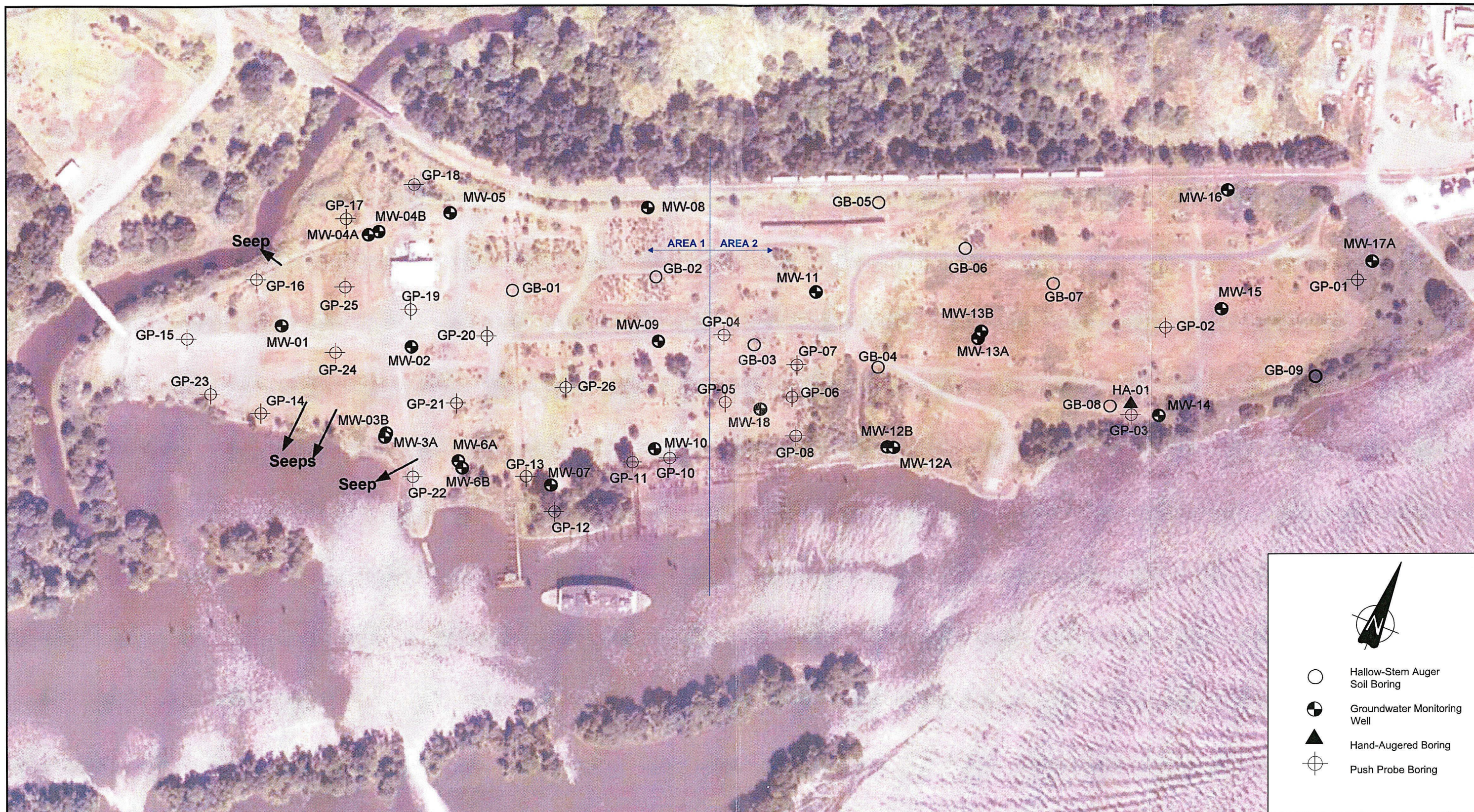
DWN BY: DMF/PM  
CHK'D BY: KH  
DATUM: NGVD  
PROJECTION:  
SCALE: 1" = 200'

PROJECT  
**FORMER POPE AND TALBOT WOOD TREATMENT SITE**

TITLE  
**GROUNDWATER ELEVATIONS AND INFERRED CONTOURS - JANUARY 2008**

DATE: MAY 2008  
PROJECT NO: 8-61M-11220-1  
REV. NO.: 1  
FIGURE No. 3





NOTE: DRAWING FROM FIGURE 2-6 FROM "FEASIBILITY STUDY REPORT, FORMER POPE & TALBOT WOOD TREATING SITE, PORT OF ST. HELENS, ST. HELENS, OREGON," DATED 05/01/2007, BY BRIDGEWATER GROUP/AMEC EARTH AND ENVIRONMENTAL. BASE PHOTOGRAPH JUNE 2000.

Approximate Scale  
200 Feet

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DWN BY: DMF/PM

CHK'D BY: KH

DATUM: NGVD

PROJECTION: -

SCALE: 1 = 200'

PROJECT

FORMER POPE AND TALBOT WOOD TREATMENT SITE

TITLE

GROUNDWATER SEEP LOCATIONS

DATE:

MAY 2008

PROJECT NO.:

8-61M-11220-1

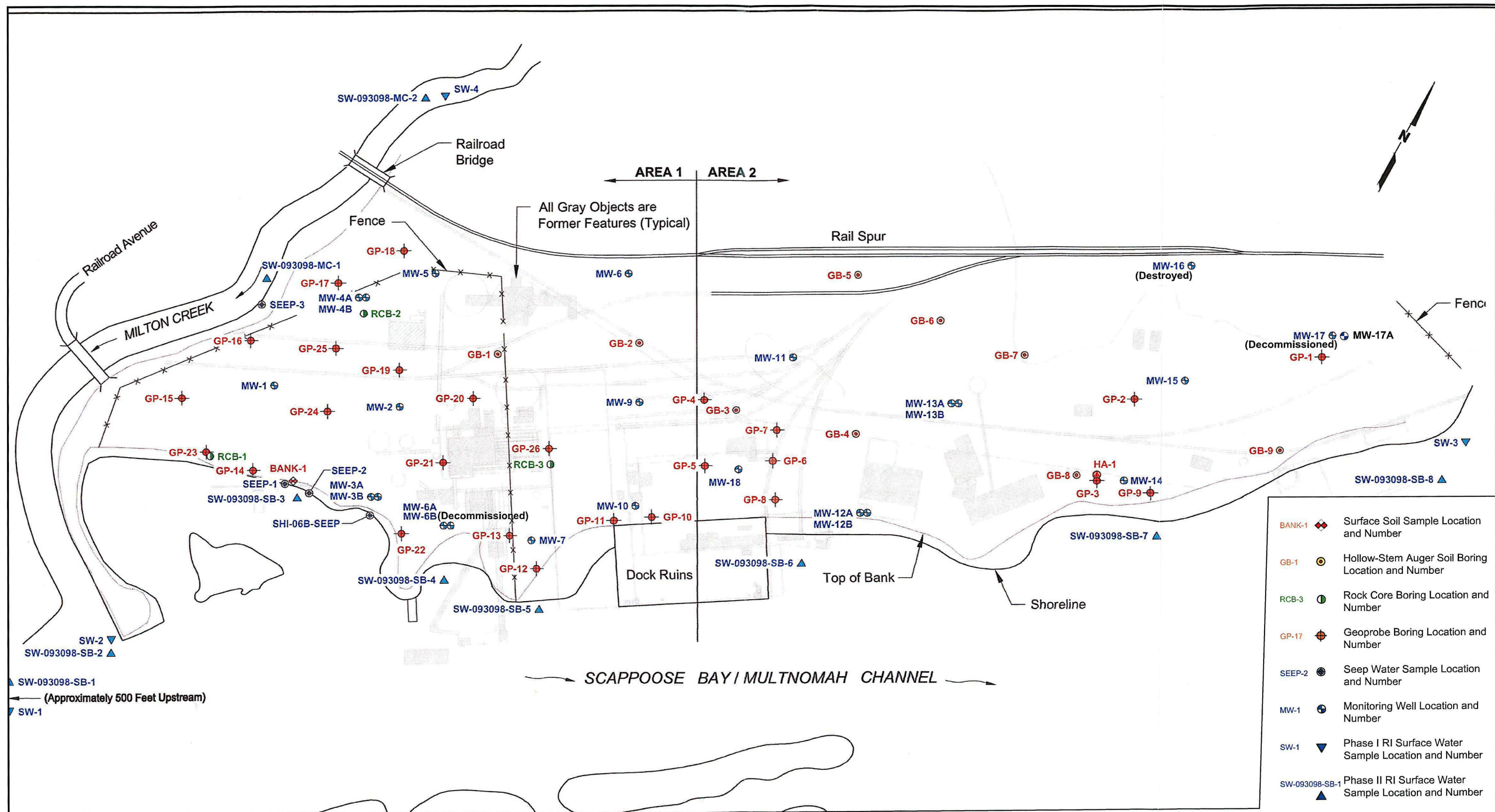
REV. NO.:

1

FIGURE No.

4





NOTE: DRAWING FROM FIGURE 1-3 FROM "ECOLOGICAL RISK ASSESSMENT AND SEDIMENT SAMPLING AND ANALYSIS WORK PLAN, FORMER POPE & TALBOT WOOD TREATING SITE, PORT OF ST. HELENS, ST. HELENS, OREGON," DATED 10/17/2003, BY BRIDGEWATER GROUP/HART CROWSER. ORIGINAL DRAWING FROM FIGURES 10, 28, AND 29 FROM THE REMDIAL INVESTIGATION REPORT DATED APRIL 7, 2000, GEOENGINEERS INC.

Approximate Scale  
200 Feet

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DWN BY: DMF/PM

CHK'D BY: KH

DATUM: -

PROJECTION: -

SCALE: 1 = 200'

PROJECT

FORMER POPE AND TALBOT WOOD TREATMENT SITE

TITLE

RI EXPLORATIONS AND SAMPLING LOCATIONS

DATE:

MAY 2008

PROJECT NO:

8-61M-11220-1

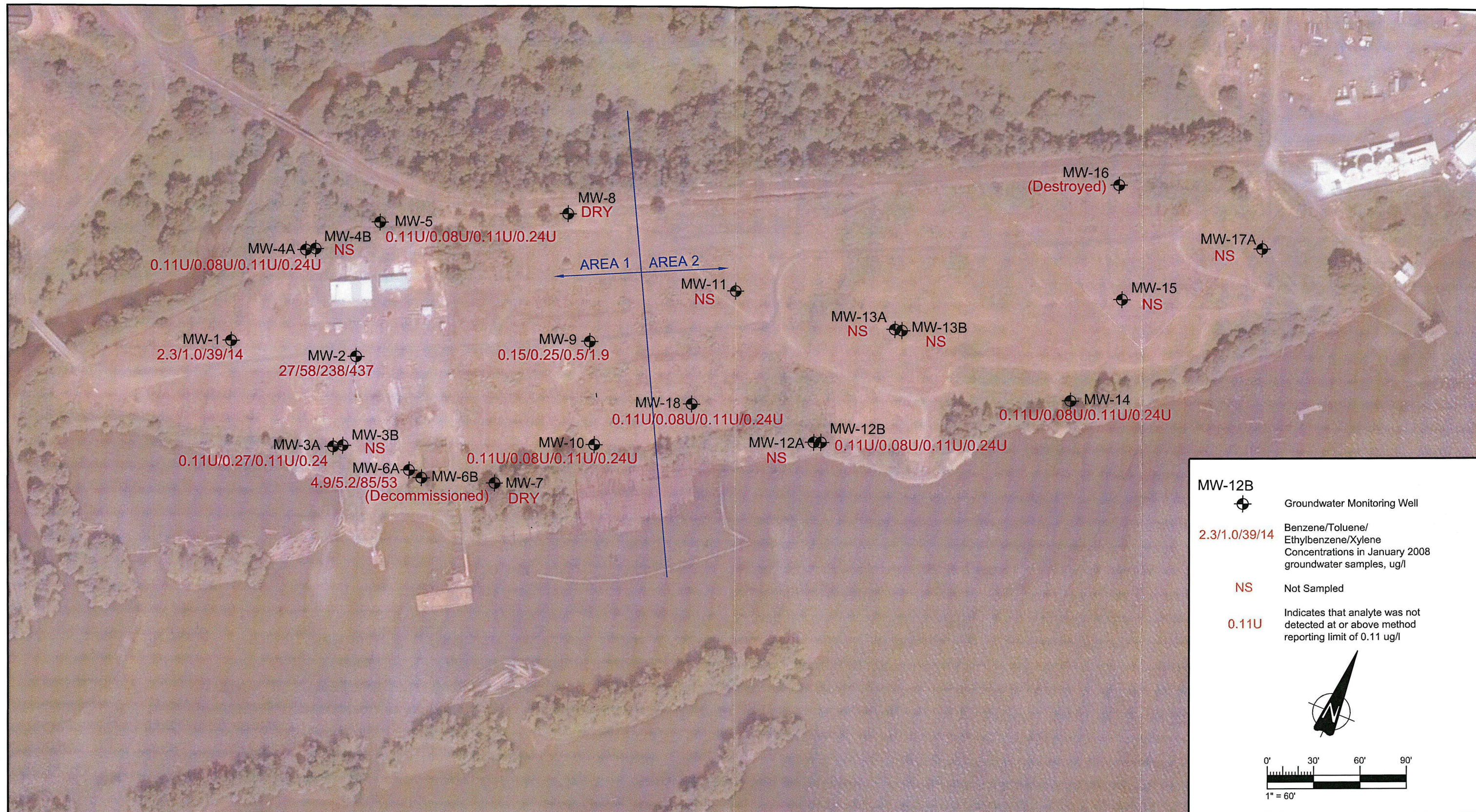
REV. NO.:

1

FIGURE NO.

5





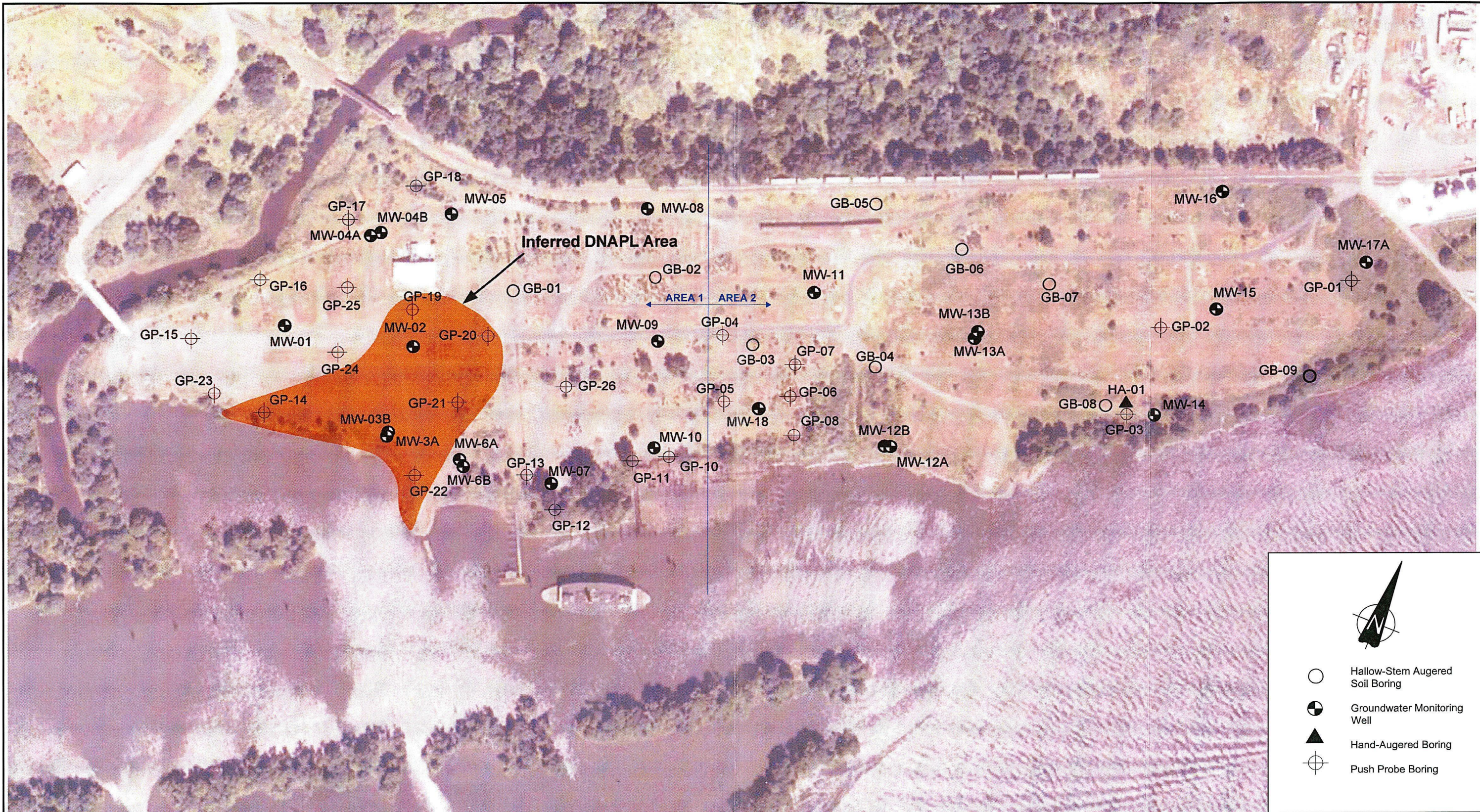
NOTE: DRAWING BASED FROM FIGURE 1-2 FROM DRAFT OUTLINE "FEASIBILITY STUDY REPORT, FORMER POPE & TALBOT WOOD TREATING SITE, PORT OF ST. HELENS, ST. HELENS, OREGON," DATED 05/01/2007, BY BRIDGEWATER GROUP/AMEC EARTH AND ENVIRONMENTAL. AERIAL PHOTO FROM GOOGLE PRO 2007.	CLIENT LOGO	CLIENT: PORT OF ST. HELENS		DWN BY: PM	PROJECT: FORMER POPE AND TALBOT WOOD TREATING SITE	DATE: MAY 2008
		AMEC Earth & Environmental 7376 S.W. Durham Road Portland, OR, U.S.A. 97224		CHK'D BY: KH		PROJECT NO.: 8-61M-11220-1
				DATUM: NAVD88	TITLE: BTEX CONCENTRATION IN GROUNDWATER JANUARY 2008	REV. NO.: 1
				PROJECTION: NAD83 UTM 10N SCALE: 1" = 60'		FIGURE No. 6





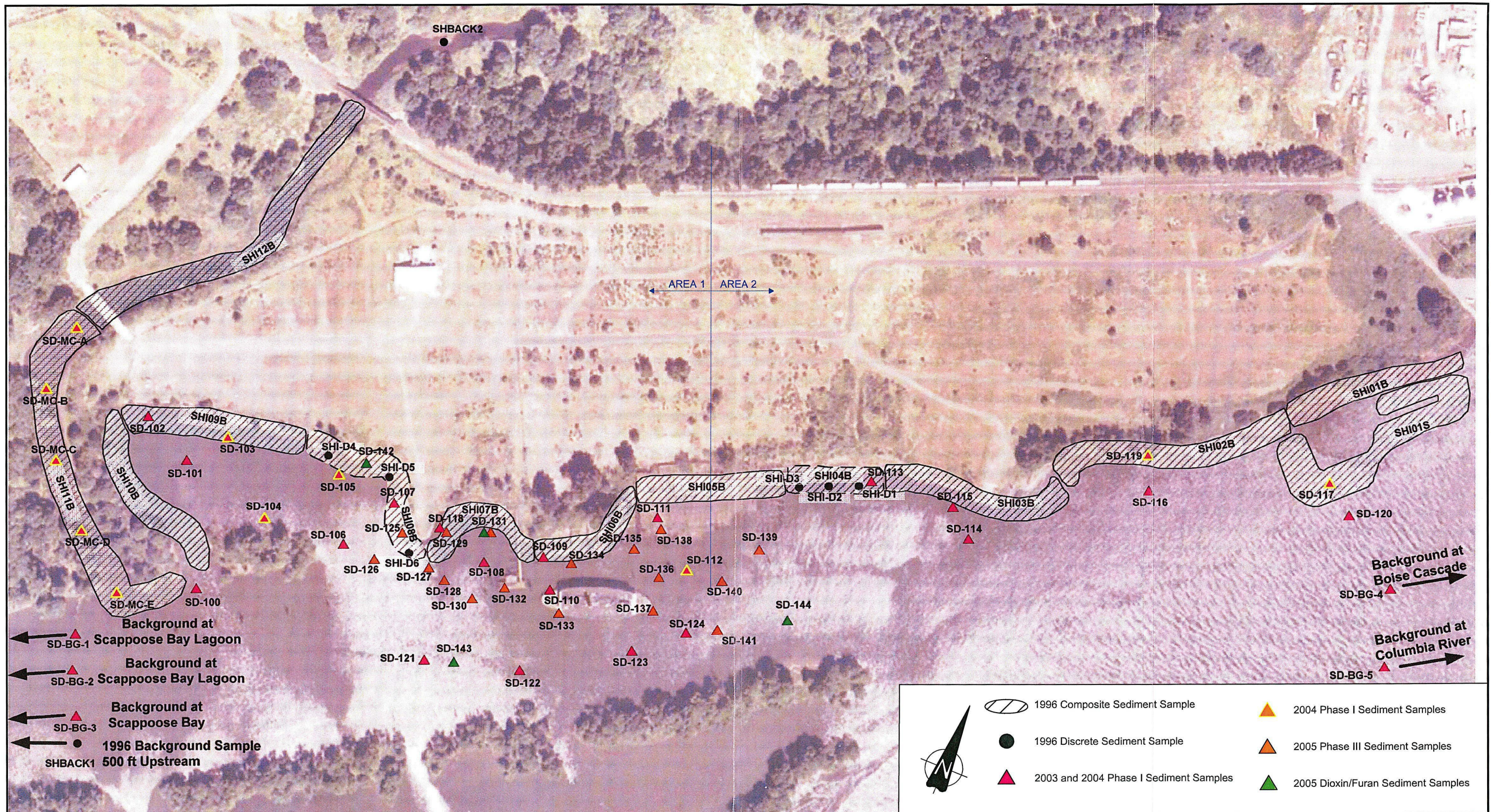
<p>NOTE: DRAWING BASED FROM FIGURE 1-2 FROM DRAFT OUTLINE "FEASIBILITY STUDY REPORT, FORMER POPE &amp; TALBOT WOOD TREATING SITE, PORT OF ST. HELENS, ST. HELENS, OREGON," DATED 05/01/2007, BY BRIDGEWATER GROUP/AMEC EARTH AND ENVIRONMENTAL. AERIAL PHOTO FROM GOOGLE PRO 2007.</p>	<p>CLIENT LOGO</p>	<p>CLIENT:</p> <p>PORT OF ST. HELENS</p> <p>AMEC Earth &amp; Environmental 7376 S.W. Durham Road Portland, OR. U.S.A. 97224</p> <p><b>amec</b></p>	<p>DWN BY: PM</p> <p>CHK'D BY: KH</p> <p>DATUM: NAVD88</p> <p>PROJECTION: NAD83 UTM 10N</p> <p>SCALE: 1" = 60'</p>	<p>PROJECT</p> <p>FORMER POPE AND TALBOT WOOD TREATING SITE</p> <p>TITLE</p> <p>TOTAL PAH CONCENTRATION IN GROUNDWATER JANUARY 2008</p>	<p>DATE: MAY 2008</p> <p>PROJECT NO: 8-61M-11220-1</p> <p>REV. NO.: 1</p> <p>FIGURE No. 7</p>
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<p>NOTE: DRAWING FROM FIGURE 2-9 FROM DRAFT OUTLINE "FEASIBILITY STUDY REPORT, FORMER POPE &amp; TALBOT WOOD TREATING SITE, PORT OF ST. HELENS, ST. HELENS, OREGON," DATED 05/01/2007, BY BRIDGEWATER GROUP/AMEC EARTH AND ENVIRONMENTAL. BASE PHOTOGRAPH JUNE 2000.</p>	<p>Approximate Scale 200 Feet</p>	<p>CLIENT: <b>PORT OF ST. HELENS</b></p>	<p>DWN BY: DMF/PM CHK'D BY: KH DATUM: - PROJECTION: - SCALE: APPROXIMATE</p>	<p>PROJECT <b>FORMER POPE AND TALBOT WOOD TREATMENT SITE</b></p>	<p>DATE: MAY 2008 PROJECT NO: 8-61M-11220-1 REV. NO.: -</p>
		<p><b>AMEC Earth &amp; Environmental</b> 7376 S.W. Durham Road Portland, OR. U.S.A. 97224</p>		<p>TITLE <b>ESTIMATED AREAL EXTENT OF DNAPL</b></p>	<p>FIGURE No. <b>8</b></p>





NOTE: DRAWING FROM FIGURE 2-3 FROM DRAFT OUTLINE "FEASIBILITY STUDY REPORT, FORMER POPE & TALBOT WOOD TREATING SITE, PORT OF ST. HELENS, ST. HELENS, OREGON," DATED 05/01/2007, BY BRIDGEWATER GROUP/AMEC EARTH AND ENVIRONMENTAL. BASE PHOTOGRAPH JUNE 2000.

Approximate Scale  
200 Feet

CLIENT:

PORT OF ST. HELENS

AMEC Earth & Environmental  
7376 S.W. Durham Road  
Portland, OR. U.S.A. 97224



DWN BY: DMF/PM  
CHK'D BY: KH  
DATUM: -  
PROJECTION: -  
SCALE: 1 = 200'

PROJECT

FORMER POPE AND TALBOT WOOD TREATMENT SITE

TITLE

SEDIMENT SAMPLE LOCATIONS

DATE: MAY 2008  
PROJECT NO: 8-61M-11220-1  
REV. NO.: 1  
FIGURE No. 9






NOTE: DRAWING FROM FIGURE 2-10 FROM DRAFT OUTLINE "FEASIBILITY STUDY REPORT, FORMER POPE & TALBOT WOOD TREATING SITE, PORT OF ST. HELENS, ST. HELENS, OREGON," DATED 05/01/2007, BY BRIDGEWATER GROUP/AMEC EARTH AND ENVIRONMENTAL. BASE PHOTOGRAPH JUNE 2000.	<div>Approximate Scale 200 Feet</div> <div></div>	CLIENT:  PORT OF ST. HELENS		DWN BY: DMF/PM	PROJECT	DATE: MAY 2008
				CHK'D BY: KH	FORMER POPE AND TALBOT WOOD TREATMENT SITE	PROJECT NO: 8-61M-11220-1
				DATUM: -	TITLE EXCAVATION WORKER GROUNDWATER PROTECTIVE LEVEL EXCEEDENCES AND SEEP WATER HOT SPOTS	REV. NO.: 1
				PROJECTION: -		FIGURE No. 10
				SCALE: 1 = 200'		
AMEC Earth & Environmental 7376 S.W. Durham Road Portland, OR, U.S.A. 97224						



TABLE 1  
Area 2 Soil Chemicals of Potential Concern  
Comparison Against RBSLs and SLVs  
Former Pope Talbot Wood Treating Site, 1550 Railroad Avenue, St. Helens, OR

Chemicals of Potential Concern in Soil <sup>1</sup>	Maximum Constituent Concentration Detected in Soil (units are in milligrams per kilogram [mg/kg]) [sample ID - sample depth]	Human Health-Based Screening Criteria						Ecological Screening Criteria		
		Site-Specific Risk-Based Concentrations <sup>2</sup>				EPA Region 6 PRGs <sup>3</sup>		Level II ERA SLVs <sup>4</sup>		
		Occupational Vapor Intrusion Into Buildings (RME)	Occupational Volatilization to Outdoor Air (RME)	Excavation Worker Soil Ingestion, Dermal Contact and Inhalation (RME)	Generic Remedy For PCBs - Industrial Land Use	Industrial Indoor Worker	Industrial Outdoor Worker	Plants	Birds	Mammals
		(mg/kg)						(mg/kg)		
Volatile Organic Compounds										
Methylene Chloride	0.6 [GP-7-5.5]	19.7	820	75,000	NA	2.1	2.2	NA	NA	NA
Semivolatile Organic Compounds										
Acenaphthene	18 [GP-7-5.5]	2,550,000	700,000	1,100,000	NA	38,000	33,000	NA	NA	NA
Benzo(a)anthracene	6.6 [GP-7-5.5]	461,000	130,000	1,900	NA	7.8	2.3	NA	NA	NA
Benzo(a)pyrene	0.428 [B13@13-15]	340,000	93,000	190	NA	0.78	0.23	NA	NA	NA
Benzo(b)fluoranthene	1.8 [GP-7-5.5]	106,000	29,000	1,900	NA	7.8	2.3	NA	NA	NA
Beno(k)fluoranthene	2.4 [GP-7-5.5]	92,300,000	25,000,000	19,000	NA	78	23	NA	NA	NA
Chrysene	9.7 [GP-7-5.5]	3,670,000	1,000,000	190,000	NA	780	230	NA	NA	NA
Fluoranthene	20 [GP-7-5.5]	487,000,000	130,000,000	790,000	NA	82,000	24,000	NA	NA	NA
Fluorene	26 [GP-7-5.5]	13,500,000	3,700,000	970,000	NA	33,000	26,000	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.55 [GP-7-5.5]	18,500,000	5,100,000	1,900	NA	7.8	2.3	NA	NA	NA
2-methylnaphthalene	24 [GP-7-5.5]	51,000	14,000	53,000	NA	NE	NE	NA	NA	NA
Naphthalene	0.57 [GB-4-5]	3,440	940	21,000	NA	190	210	NA	NA	NA
Phenanthrene	68 [GP-7-5.5]	75,400,000	21,000,000	570,000	NA	NE	NE	NA	NA	NA
Pyrene	19 [GP-7-5.5]	571,000,000	160,000,000	600,000	NA	54,000	32,000	NA	NA	NA
Pentachlorophenol	0.006 [GP-7-5.5]	162,000	44,000	9,100	NA	48	10	NA	NA	NA
Metals										
Arsenic	10 [GB-4-5]	NA	NA	1,200	NA	0.39 <sup>5</sup>	3.8 <sup>5</sup>	NA	NA	NA
Lead	511 [GB-4-5]	NA	NA	750	NA	80	80	NA	NA	NA
Polychlorinated Biphenyls (PCBs)										
Aroclor 1260	4.6 [SS-08]	NA	NA	NA	7.5	2.9	0.083	40 <sup>6</sup>	2.2 <sup>7</sup>	4 <sup>6</sup>

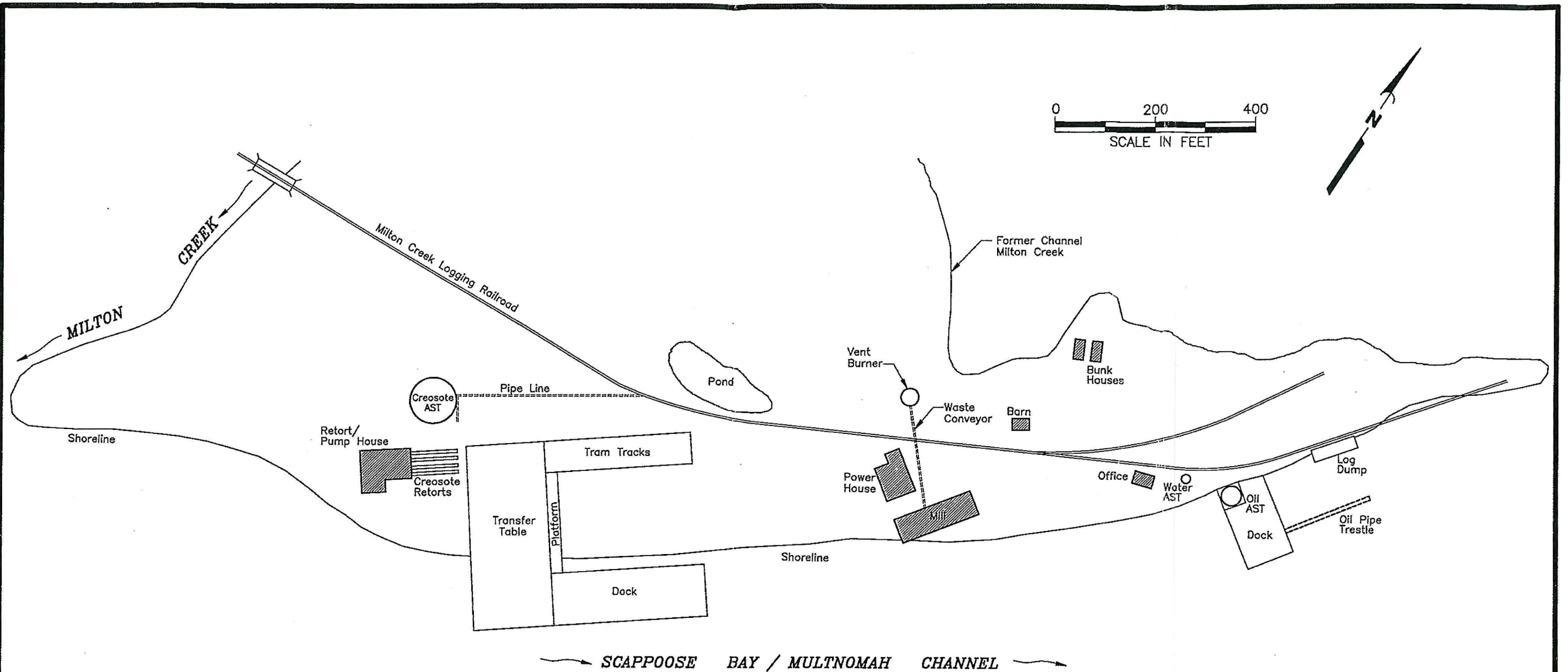
Notes:

- 1 = Chemicals of potential concern in soil as determined by the November 26, 2006 Human Health Risk Assessment (Kennedy/Jenks Consultants).  
Soil chemical data between depths of 0.5 and 6 feet (i.e., uppermost level of shallow groundwater at the time of soil sampling) were screened against appropriate DEQ and EPA risk-based screening levels.
- 2 = Site-specific RBCs for soil were calculated in the November 26, 2006 Human Health Risk Assessment (HHRA) report in accordance with DEQ guidance. RBCs were calculated for both Reasonable Maximum Exposure (RME) and Central Tendency (CT) scenarios. Only the RME values are listed in this table.
- 3 = EPA Region 6 provides preliminary remediation goals (PRGs) as screening values for site investigations. They are conservative risk-based concentrations that are provided to assist with the Area 2 screening evaluation, and are not intended to replace the site-specific RBSLs used to form the conclusions of the HHRA.
- 4 = Level II Screening Level Values (SLVs) developed by DEQ in 2001 for Ecological Risk Assessment. SLVs are presented for plants, invertebrates, and wildlife exposed to soil.
- 5 = Arsenic (cancer endpoint) PRGs used.
- 6 = Screening criteria is based on total PCBs.
- 7 = The average for Aroclor 1242 and Aroclor 1254 was used as an approximate Screening Level Value as stipulated in the October 17, 2003 Level II Ecological Risk Assessment (Bridgewater Group and Hart Crowser).
- RBC = Risk-based concentration.  
ERA = Ecological Risk Assessment.  
PCBs = Polychlorinated biphenyls.  
NA = Not applicable.  
NE = Not established.



**ATTACHMENT A**





EXPLANATION:

AST ABOVE GROUND STORAGE TANK

Reference: Generic CAD file P04CD003.GCD entitled "Site Map Circa 1919," dated 01/11/94, by Harding Lawson Associates, and drawing entitled "Columbia County Lumber Company in the Thos. H. Smith D.L.C.," dated September 1919, by L.J. Van Orshoren, County Surveyor. Pope and Talbot files map entitled "Map Showing Railroad Extension, To The City Of St. Helens, Columbia County," dated November 1919.

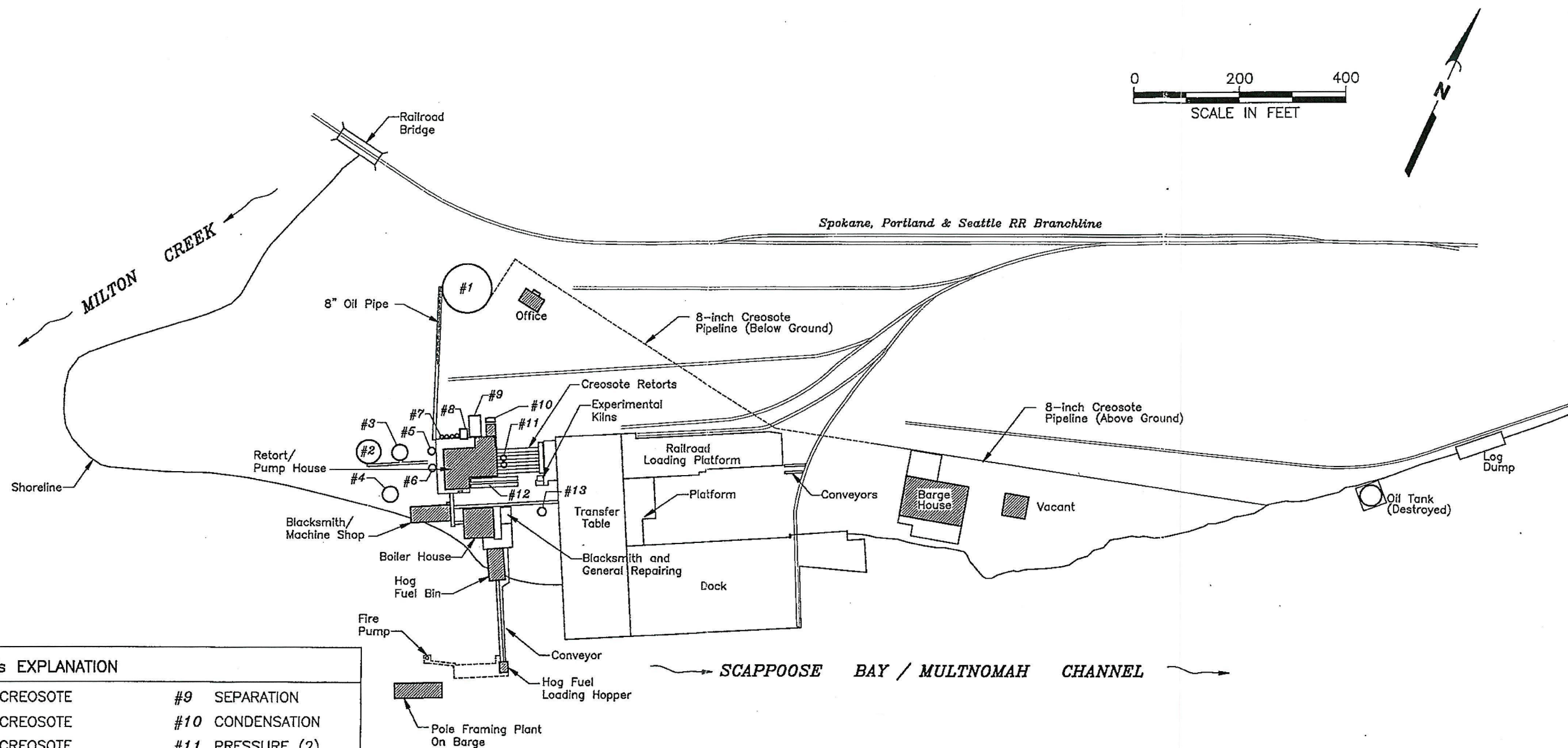
Note: The locations of all features shown are approximate.

Geo  Engineers

HISTORICAL SITE PLAN - 1919

FIGURE 3





0 200 400  
SCALE IN FEET



#### ASTs EXPLANATION

#1 CREOSOTE	#9 SEPARATION
#2 CREOSOTE	#10 CONDENSATION
#3 CREOSOTE	#11 PRESSURE (2)
#4 FUEL OIL	#12 AIR RECEIVING AND SETTLING WATER
#5 WATER	#13 CRANE FUEL OIL
#6 FUEL OIL #2	
#7 SETTLING (4)	
#8 SUMP	

#### EXPLANATION:

AST ABOVE GROUND STORAGE TANK

Reference: Generic CAD file 1933.GCD entitled "Pope & Talbot Inc., Creosote Plant, St. Helens, Oregon," dated 05/11/93, by Pope & Talbot Inc, and drawing entitled "Pope and Talbot Inc., Creosoting Plant, St. Helens, Oregon," dated 1938, by Pope and Talbot Inc.  
Pope & Talbot files map entitled "Chas. R. McCormick Lbr. Co.," dated 1935, by JE Eilertson County Surveyor.  
1938 aerial HLA report site diagram, HLA report, figure B-31.

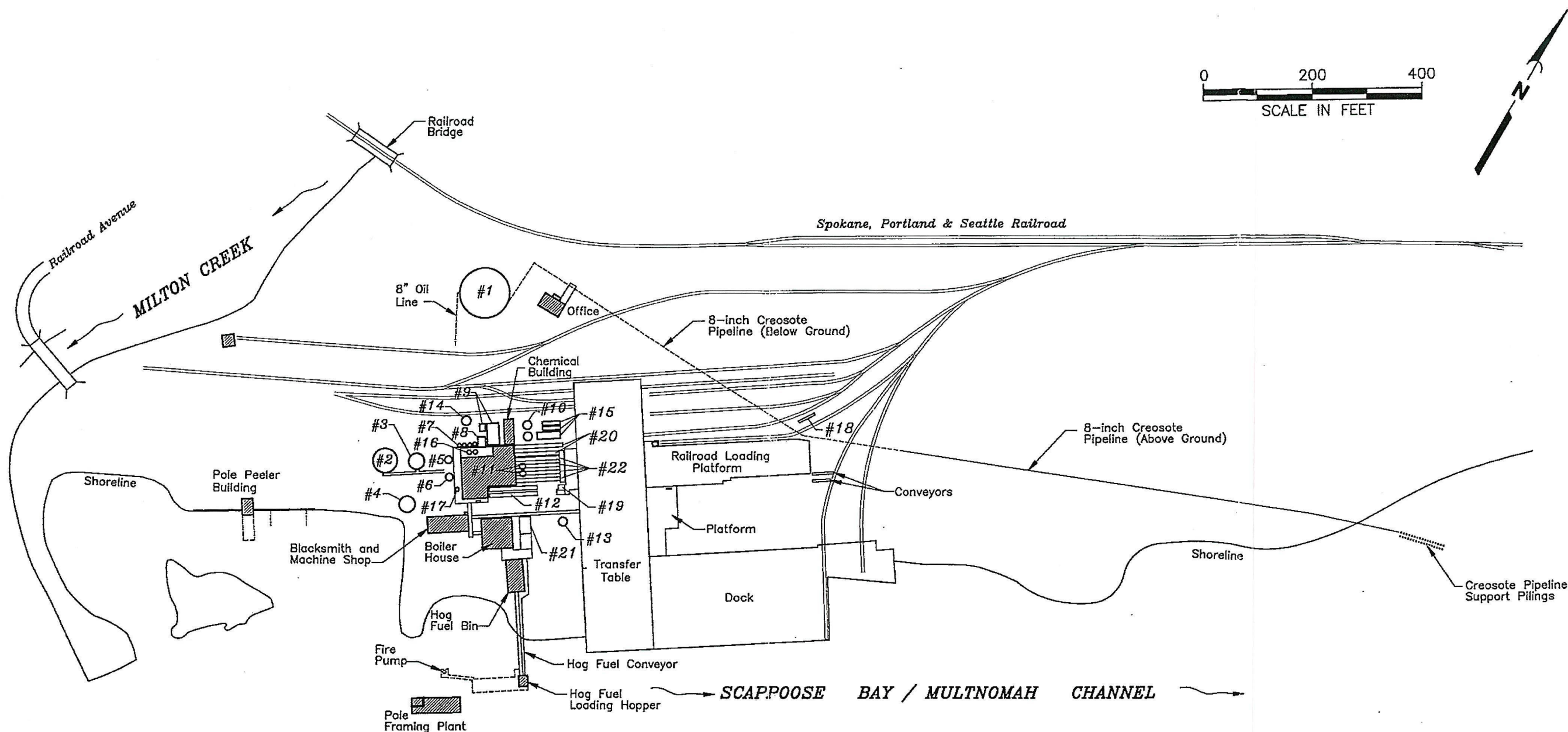
Note: The locations of all features shown are approximate.

Geo  Engineers

HISTORICAL SITE PLAN - 1938

FIGURE 4





#### ASTs/FACILITY EXPLANATION

#1 CREOSOTE	#10 WOLMAN WORKING (2)	#19 EXPERIMENTAL KILNS
#2 CREOSOTE	#11 PRESSURE (2)	#20 WOLMAN AND WOLMAN/PENTA RETORTS
#3 CREOSOTE	#12 AIR RECEIVING AND SETTLING WATER	#21 BLACKSMITH AND GENERAL REPAIRING
#4 FUEL OIL	#13 CRANE FUEL OIL	#22 CREOSOTE RETORTS (4)
#5 LIGHT FUEL OIL	#14 OIL STORAGE (PENTA)	
#6 LIGHT FUEL OIL	#15 UNLABELLED HORIZONTAL ASTs (3)	
#7 SETTLING (4)	#16 MEASURING (2)	
#8 SUMP	#17 WATER	
#9 SEPARATING (2)	#18 OIL (CIRCA 1941)	

#### EXPLANATION:

AST ABOVE GROUND STORAGE TANK

Note: The locations of all features shown are approximate.

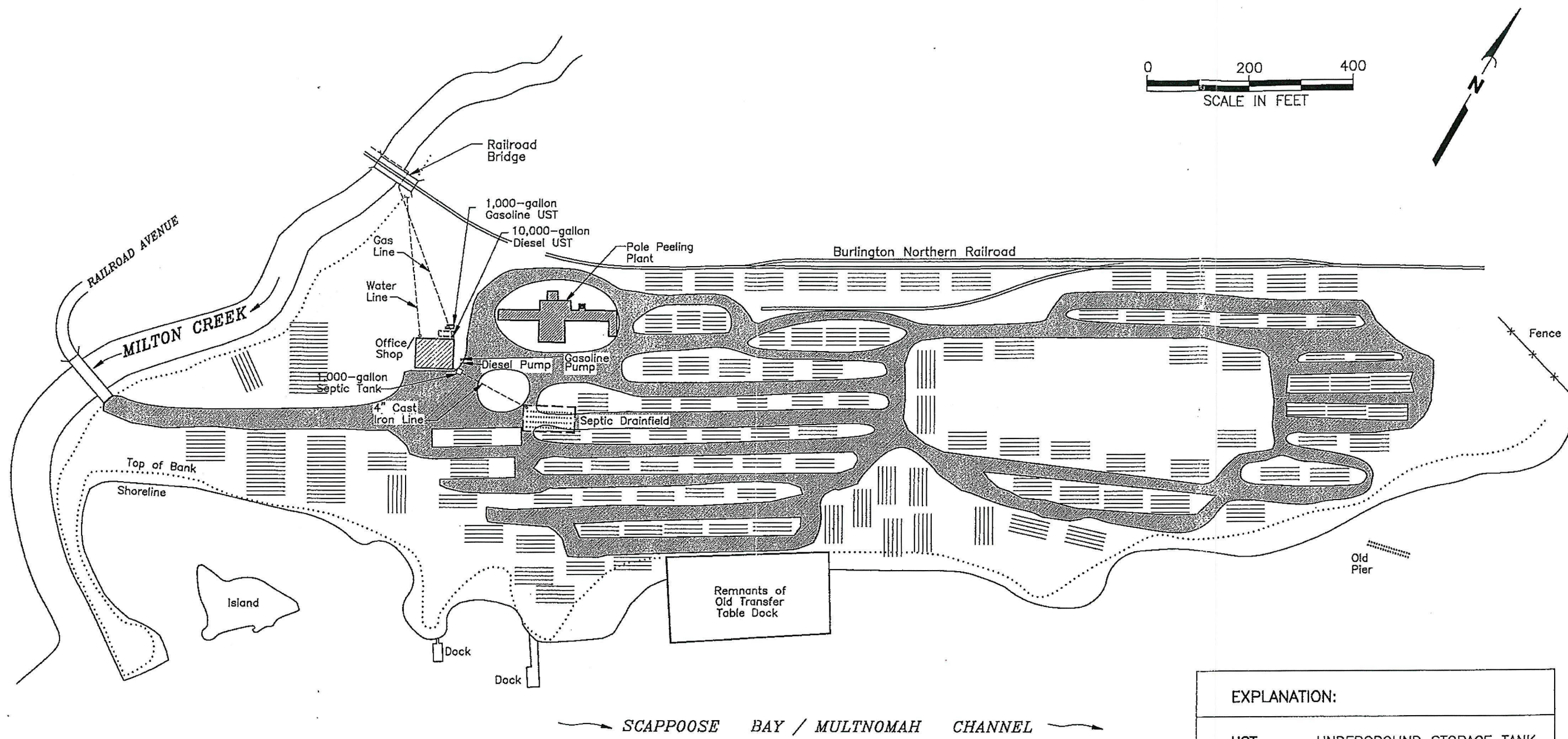
Reference: HLA report diagram B-28 entitled "Map of Pope & Talbot Inc., Creosote Plant, St. Helens, Oregon," dated May 1941, by General Appraisal Company.

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HISTORICAL SITE PLAN - 1959

FIGURE 5



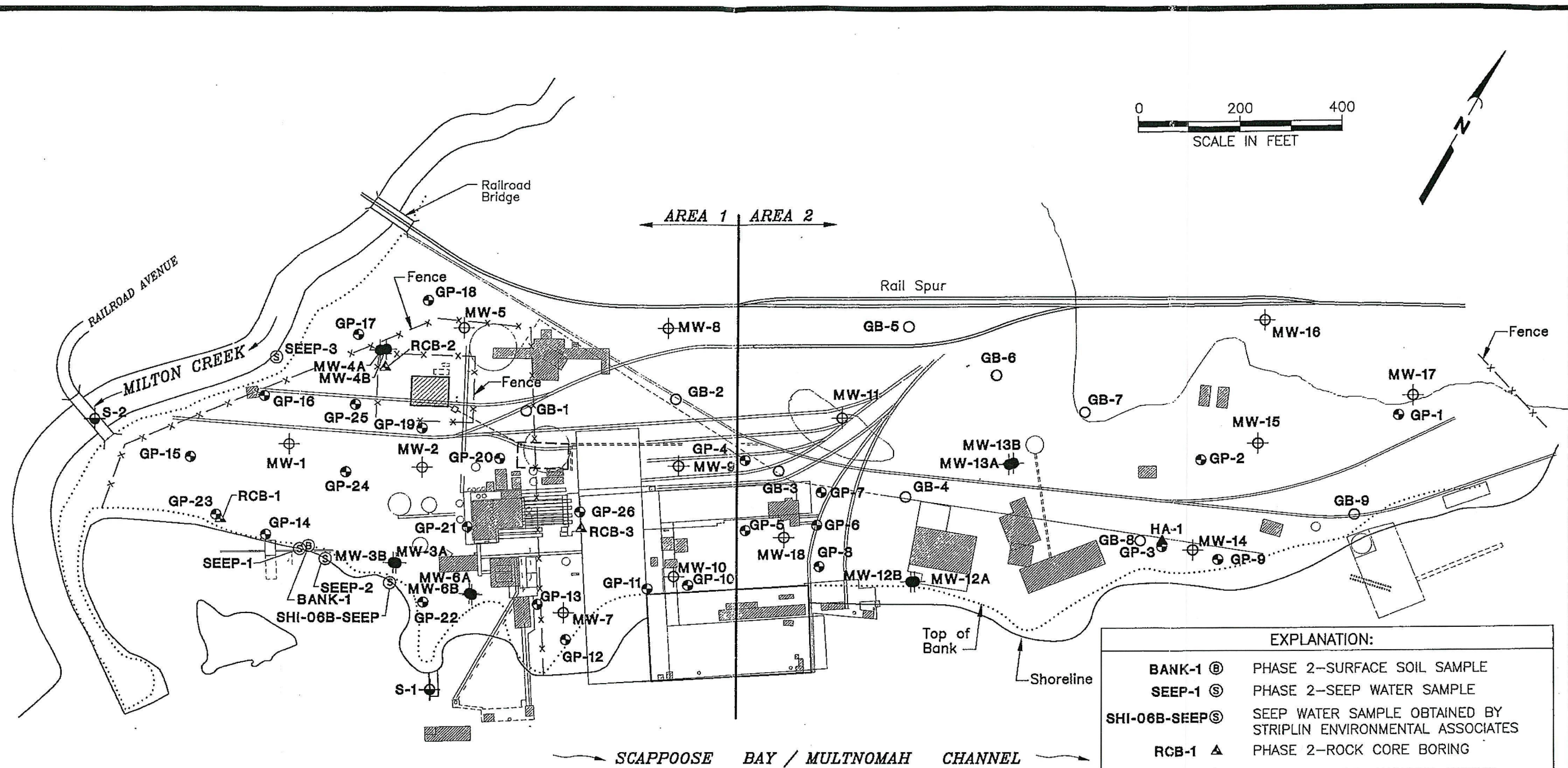


EXPLANATION:	
UST	UNDERGROUND STORAGE TANK
	APPROXIMATE LOCATION OF SITE ROADWAY
	LOG STORAGE PILES

Reference: AutoCAD file GRID.DWG entitled "Field Orientation Grid, Base Map, Port of St. Helens, Creosote Plant Site," dated 02/17/93, by McMenamin Engineering Consultants.  
 Pope & Talbot file drawing entitled "Fuel Tank Layout," dated 11/14/75, by Niedermeyer Wartin Co.  
 Port of St. Helens files drawing entitled "Northwest Natural Gas Company," dated 01/03/75.

Note: The locations of all features shown are approximate.





**Notes:**

1. The locations of all features shown are approximate.
2. Historical site features are described in Figures 3 through 6.

Reference: AutoCAD file GRID.DWG entitled "Field Orientation Grid, Base Map, Port of St. Helens, Creosote Plant Site," dated 02/17/93, by McMenamin Engineering Consultants.

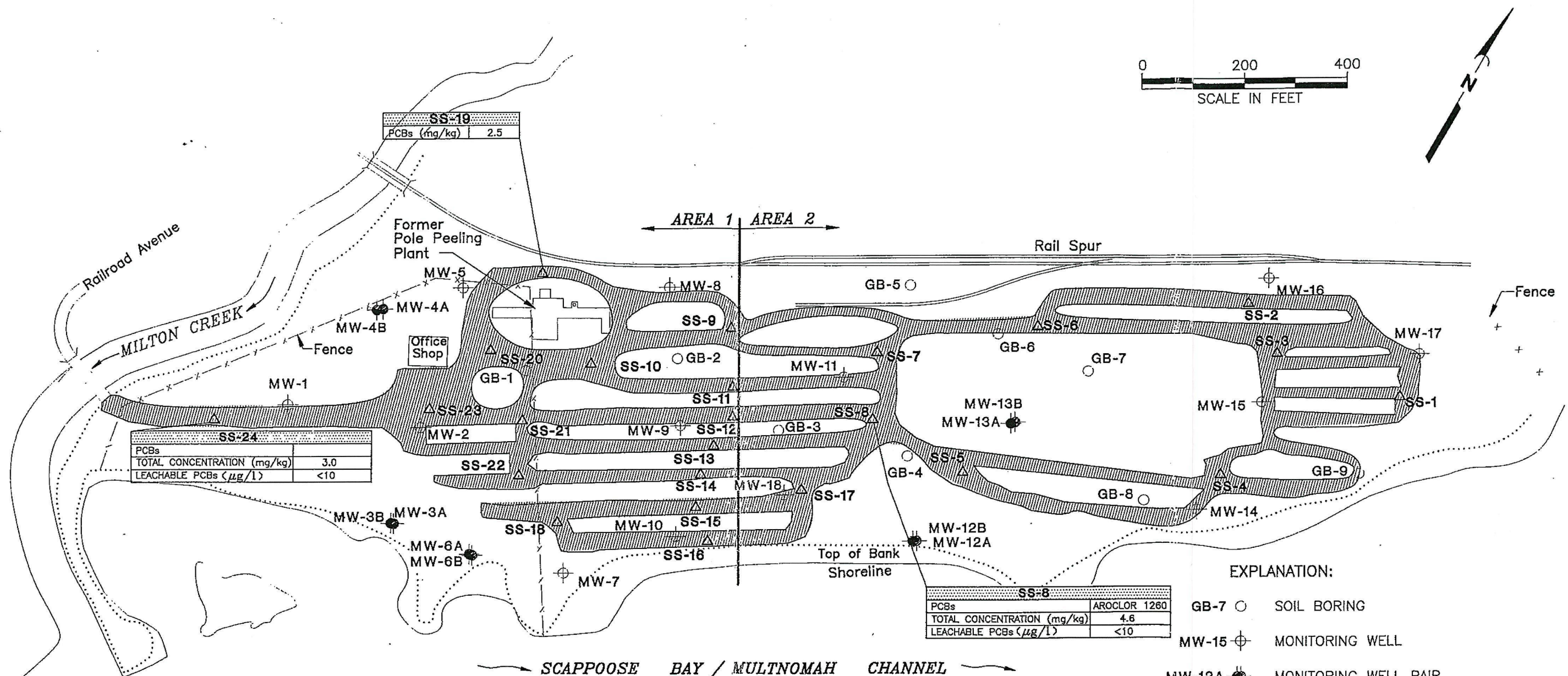
EXPLANATION:	
BANK-1 @	PHASE 2—SURFACE SOIL SAMPLE
SEEP-1 S	PHASE 2—SEEP WATER SAMPLE
SHI-06B-SEEP S	SEEP WATER SAMPLE OBTAINED BY STRIPLIN ENVIRONMENTAL ASSOCIATES
RCB-1 A	PHASE 2—ROCK CORE BORING
HA-1 A	PHASE 2—HAND-AUGERED BORING <sup>TM</sup>
GP-1 G	PHASE 2—GEOPROBE BORING
GB-7 O	PHASE 2—SOIL BORING USING HOLLOW-STEM AUGER
MW-15 +	MONITORING WELL
MW-12A ●	MONITORING WELL PAIR
S-1 +	SURFACE WATER LEVEL MEASUREMENT STATION

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**LOCATIONS OF PHASE 1 AND 2  
REMEDIAL INVESTIGATION ACTIVITIES**

**FIGURE 10**





**Notes:**

1. Each soil sample represents a discrete sampling location along the former roadways at the site. The sample locations were determined by examining aerial photographs, surface soil conditions and measuring from known reference points.
2. The numeric protective level for PCBs in soil at an industrial site is 7.5 mg/kg (PCB Generic Remedies). EPA Region 9 Preliminary Remediation Goal (PRG) for PCBs in soil for industrial land use is 1.3 mg/kg.
3. Only detected PCB concentrations greater than Region 9 PRGs are displayed.
4. Samples with the highest detected concentrations of total PCBs were submitted for the Toxicity Characteristic Leaching Procedure (TCLP) to evaluate potential leaching of PCBs at the site. Leachable PCBs were not detected.
5. Concentrations presented in (mg/kg) represent total PCB concentrations. Concentrations presented in (µg/l) represent leachable PCB concentrations.

Reference: AutoCAD file GRID.DWG entitled "Field Orientation Grid, Base Map, Port of St. Helens, Creosote Plant Site," dated 02/17/93, by McMenamin Engineering Consultants.

**EXPLANATION:**

- GB-7 ○ SOIL BORING
- MW-15 ⊕ MONITORING WELL
- MW-12A ⊕ MONITORING WELL PAIR
- SS-1 △ NEAR-SURFACE SOIL SAMPLE (SAMPLING DEPTH: 0 TO 6 INCHES)
- APPROXIMATE LOCATION OF SITE ROADWAY BASED ON 1982 AERIAL PHOTOGRAPH
- PCBs POLYCHLORINATED BIPHENYLS
- (mg/kg) MILLIGRAMS PER KILOGRAM
- (µg/l) MICROGRAMS PER LITER

Note: The locations of all features shown are approximate.

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**LOCATIONS OF PCBs DETECTED  
IN NEAR-SURFACE SOIL**

**FIGURE 32**