DRAFT CLEANUP ACTION PLAN

Hambleton Bros Log Yard
Washougal, WA

May 2013
Washington State Department of Ecology
Toxics Cleanup Program
Southwest Regional Office
Lacey, WA

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1.0 INTRODUCTION

This report presents the Washington State Department of Ecology's (Ecology) proposed cleanup action for the Hambleton Bros Log Yard (Facility Site No. 4399598), located at 335 South A Street, Washougal, in Clark County, Washington (the Property) (see Figure 1). The approximate 13 acre Site, where contamination above cleanup levels (CULs) is present, lies within the approximate 25 acre Property boundary. This Cleanup Action Plan (CAP) is required as part of the Site cleanup process under the Model Toxics Control Act (MTCA), Ch. 70.105D Revised Code of Washington (RCW), implemented by Ecology. The cleanup action decision is based on the Focused Site Assessment Report (Maul Foster & Alongi, Inc. [MFA], 2012), Terrestrial Ecological Evaluation (MFA, 2013), and other historical investigation results.

This CAP outlines the following:

- The history of operations, ownership, and activities at the Site;
- The nature and extent of contamination;
- Cleanup levels (CULs) for the Site that are protective of human health and the environment;
- The selected remedial action for the Site; and
- Any compliance monitoring and institutional control requirements.

1.1 DECLARATION

Ecology has selected this remedy because it will be protective of human health and the environment. The selected remedy is consistent with the State of Washington's preference for permanent solutions to the maximum extent practicable and provides for adequate action to ensure effectiveness of the remedial action as stated in RCW 70.105D.030(1)(b).

1.2 APPLICABILITY

CULs specified in this CAP are applicable only to the Site. They were developed as a part of an overall remediation process under Ecology oversight using the authority of MTCA, and should not be considered as precedents for other sites.

1.3 ADMINISTRATIVE RECORD

The documents used to make the decisions discussed in this CAP are on file in the administrative record for the Site. Major documents are listed in the reference section. The entire administrative record for the Site is available for public review by appointment at Ecology's Southwest Regional Office, located at 300 Desmond Drive, Lacey, WA 98503-1274. The Focused Site Assessment Report (MFA, 2012) captures the most recent understanding of the Site and summarizes the results of earlier environmental investigations conducted at the Site.

1.4 CLEANUP PROCESS

Cleanup conducted under the MTCA process requires the preparation of specific documents either by the Potentially Liable Party (PLP) or by Ecology. These procedural tasks and resulting documents, along with the MTCA section that requires their completion, are listed below, with a brief description of each task.

- Remedial Investigation and Feasibility Study (RI/FS)—Washington Administrative Code (WAC) 173-340-350
  The RI/FS documents the investigations and evaluations conducted at the Site from the discovery phase to the RI/FS report. The RI collects and presents information on the nature and extent of contamination, and the risks posed by the contamination. The FS presents and evaluates site cleanup alternatives and proposes a preferred cleanup alternative. The document is prepared by the PLP, is approved by Ecology, and undergoes public comment.
- CAP—WAC 173-340-380
  The CAP sets CULs and standards for the Site and selects the cleanup actions intended to achieve the CULs. The document is prepared by Ecology and undergoes public comment.
- Engineering Design Report, Construction Plans and Specifications—WAC 173-340-400
  The report outlines details of the selected cleanup action, including any engineered systems and design components from the CAP. These may include construction plans and specifications with technical drawings. The document is prepared by the PLP and approved by Ecology. Public comment is optional.
- Operation and Maintenance Plan(s)—WAC 173-340-400
  These plans summarize the requirements for inspection and maintenance of cleanup actions, including any actions required for operation and maintenance of equipment, structures, or other remedial systems. The document is prepared by the PLP and approved by Ecology.
- Cleanup Action Report—WAC 173-340-400
  The Cleanup Action Report is completed following implementation of the cleanup action, and provides details on the cleanup activities along with documentation of adherence to or variance from the CAP. The document is prepared by the PLP and approved by Ecology.
- Compliance Monitoring Plan—WAC 173-340-410
  Compliance Monitoring Plans provide details on the completion of monitoring activities required to ensure that the cleanup action is performing as intended. It is prepared by the PLP and approved by Ecology.

2.0 SITE CONDITIONS

2.1 PROPERTY DESCRIPTION AND HISTORY

The Property is currently zoned as Highway Commercial (CH). The Property is located in sections 12 and 13 of township 1 north and range 3 east, and section 7 of township 1 north and range 3 east of the Willamette Meridian (see Figure 1). The Property is approximately 1,000 feet long (north-south) and 1,600 feet wide (east-west). The Property is bordered by State Route 14 to the north and South 2nd Street to the west, with an undeveloped vacant lot to the east. The Columbia River borders the Property to the south. Adjoining properties to the west of 2nd Street

are a commercial hotel and a vacant building slated for commercial use. Properties located north of State Route 14 are in mixed commercial, residential, and light industrial use.

The Property was occupied by a lumber mill between approximately 1948 and 2010. The lumber mill operations expanded over the years to occupy most of the Property. The Hambleton Lumber Company originally leased the land from the Port of Camas-Washougal in 1953 and eventually bought the Property in the 1970s. The company operated in a niche market, with approximately 75 percent of the mill production in large-dimension green Douglas fir, hemlock, and spruce timbers. Historically, the Property was used as a lumber mill; activities included log storage, sawmill, planer, lumber storage and shipping, and other operations ancillary to mill operations.

At one time, the Property contained an equipment mechanical shop, a chemical storage shed, a single-family residence, a mill, a debarker, and a planer building. Wood-treating activities were not conducted on the Property. The debarker burned to the ground in 2009. Because of poor economic conditions, the mill closed in 2010. All structures have been removed from the Property.

There have been no structures on the Property since demolition of the lumber mill, shop, office, chemical storage shed, and planer building (see Figure 2). Demolition of these structures was generally completed in November 2011. Concrete foundations from the demolished structures remain. The Property is surfaced with asphalt and gravel; however, areas of the Property are covered in woody debris from log storage.

2.1.1 Topography and Climate

The Property is generally flat, with a slight slope to the south, toward the Columbia River. The Columbia River is at the Property's southern boundary, at the bottom of an approximately 32-foot downward slope.

According to gauges in Washougal, rainfall averages 51 inches annually, with average summer temperatures in the mid-70s (degrees Fahrenheit) and average winter temperatures in the mid-30s (degrees Fahrenheit) (WRCC, 2013).

2.1.2 Geology and Hydrogeology

The Property is located on Quaternary alluvial deposits composed of coarse-grained outwash deposits (gravel, cobbles, boulders) from the Missoula Floods. These deposits were on boring and test pit logs at depths of up to 45 feet below ground surface (bgs) (CEC, 2009). The boring logs also indicated that local fill deposits of up to 6 feet bgs were observed throughout the Property. These fill deposits were at times intermixed with the local material. The depth to groundwater occurs between approximately 20 and 37 feet bgs, and groundwater flows toward and is assumed to discharge to the Columbia River.

3.0 ENVIRONMENTAL CONDITIONS

Site investigations and interim actions have taken place on the Property since 2002. In 2011 a Focused Site Assessment conducted to assess the nature and extent of contamination in soil, sediment, and/or groundwater identified petroleum hydrocarbons (diesel- and residual-range

organics), metals (lead and mercury), polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs; i.e., methylene chloride), and/or carcinogenic polycyclic aromatic hydrocarbons (cPAHs) as indicator hazardous substances (IHSs) on the Site. The nature and extent of contamination are summarized below; the Focused Site Assessment report (MFA, 2012) provides additional details.

3.1 SOIL

Soil concentrations were compared with MTCA Method A CULs. Detected chemicals that do not have MTCA Method A CULs were compared to MTCA Method B CULs. Also natural background concentrations where used for comparison when the background value exceeded the MTCA CULs (i.e., chromium). This evaluation indicated that most of the Property was not impacted above CULs or background concentrations except for the log pond and mill area, the aggregate recycling area, and a soil stockpile (located in the aggregate recycling area) (see Figure 3). Petroleum hydrocarbons, metals (i.e., arsenic, lead, and mercury), cPAHs, and PCBs were detected above CULs in soil samples and are considered IHSs. Figure 3 shows the sample locations and which compounds exceeded CULs or background concentrations and at what locations.

Surface soil (approximately the top 2 feet) around the log pond and mill area shows exceedances of the above-mentioned IHSs. The soil impacts in the aggregate recycling area were detected at up to 4 feet bgs; however, because the vertical extent was not delineated, it is assumed that the impacts could extend to the depth of the fill in that area (approximately 7 feet bgs).

3.2 GROUNDWATER

Petroleum hydrocarbons and arsenic were the only chemicals/metal with concentrations above the Method A CUL. Petroleum hydrocarbons exceeded the CUL in only one of seven wells, i.e., MW-7 (see Figure 4).

Total arsenic was detected in MW-7 at 5.56 micrograms per liter (µg/L), which is slightly above the CUL of 5 µg/L. The sample was also analyzed for dissolved arsenic because the sample had high turbidity. Dissolved arsenic was detected at 4.15 µg/L, below the CUL. The discrepancy between the total and dissolved arsenic concentrations appears to be due to the elevated turbidity in the sample. The arsenic concentration in MW-7 appears to be the result natural background conditions and, as such, is not considered an IHS for groundwater

3.3 SURFACE WATER

Historical samples collected in 2006 indicated that IHSs could be present in log pond surface water at concentrations above CULs. The surface water samples contained detectable metals, petroleum hydrocarbons, volatile organic compounds (VOCs), and polycyclic aromatic hydrocarbons. As remedial actions are conducted the surface water will be removed and characterized for disposal.

3.4 SEDIMENT

Historically, two sediment samples were collected in the log pond. VOCs (i.e., methylene chloride) and petroleum hydrocarbon concentrations exceeded the MTCA Method A soil CULs (see Figure 5). The sampling indicated that impacts extended approximately 4 feet below the mud line in the log pond.

Four sediment samples collected from the Columbia River (see Figure 5) were compared to Ecology 2010 Freshwater Criteria. The samples were compared primarily to the Sediment Quality Standards and the Cleanup Screening Level Standard. If no values were available, the data were compared to the Ecology 2003 Freshwater Criteria lowest and second lowest apparent effects threshold (i.e., LAET and 2LAET, respectively). No sediment detections exceeded screening levels. Note that one of the sediment samples was collected just beyond the outfall for the Property.

4.0 CLEANUP STANDARDS

MTCA requires the establishment of cleanup standards for individual sites. The two primary components of cleanup standards are CULs and points of compliance (POCs). CULs determine the concentration at which a substance does not pose unacceptable risks to human health or the environment. All materials that exceed CULs are addressed through a remedy that prevents exposure to the material. POCs represent the locations on a site where CULs must be met.

4.1 TERRESTRIAL ECOLOGICAL EVALUATION

WAC 173-340-7490 requires that sites conduct a terrestrial ecological evaluation (TEE) to determine the potential effects of soil contamination on ecological receptors. The Site does not meet any of the exclusionary criteria. The Site also does not meet criteria for a simplified TEE. Therefore, the Site was evaluated using a site-specific TEE process.

Problem formulation involves:

- Selecting chemicals of ecological concern;
- Identifying complete exposure pathways; and
- Identifying current or potential future terrestrial ecological receptors of concern.

Chemicals detected in site soils (listed in the attached table) were compared to values in MTCA Table 749-3. Since the Site is a commercial property, only risks to wildlife need to be considered. Those chemicals detected at the Site and having wildlife ecological soil criteria were carried forward.

The evaluation of exposure pathways involves determining future site uses. Since the Site is under a brownfields planning grant, the expectation of site redevelopment is high. Plans currently call for a complete build-out of the Site, covering most site soils with buildings, maintained open space, or pavement. Therefore, where some areas of the Site would not have buildings or pavement, this condition would not be met. Exposure pathways would be through direct contact and ingestion by wildlife. These wildlife receptors would likely be ground-

dwelling wildlife along the river corridor. The TEE (MFA, 2013) concluded that the remedial action proposed for human health will also be protective of ecological receptors on the Site.

4.2 Site Cleanup Levels

The Focused Site Assessment and previous investigations have documented the presence of contamination in soil and groundwater at the Site. CULs will be developed for both of these media.

The Site is impacted mainly with petroleum hydrocarbons and their constituents. The impacts appear to be limited in extent. Therefore, Method A CULs for unrestricted land use are applied to soil and groundwater as the CULs for the Site (see Table 1). These CULs are calculated using reasonable maximum human health exposure assumptions with target risk levels set at the MTCA acceptable risk level.

4.3 Point of Compliance

The MTCA Cleanup Regulation defines the POC as the point or points where CULs shall be attained. Once CULs are met at the POC, a site is no longer considered a threat to human health or the environment.

WAC 173-340-740(6) gives the POC requirements for soil. For sites where CULs are based on the protection of groundwater, the POC is established in all soil throughout the site.

The soil POC is the depth bgs at which soil CULs shall be attained. The standard POC for Method A is soil within 15 feet of the ground surface throughout the entire site. This standard POC is applied to soil on the Property. As discussed below, impacts have been detected in surface soil to approximately 4 feet bgs.

The POC for groundwater is the entire water-bearing zone at the Site (WAC 173-340-720(8)(b)). A conditional POC may be established if it is not practicable to meet the CUL throughout the Site within a reasonable restoration time frame (WAC 173-340-720(8)(c)). The conditional POC for groundwater is located in MW-7 at the top of the bank, downgradient of the log pond, along the boundary with the Columbia River.

5.0 Cleanup Action Selection

5.1 Remedial Action Objectives

The remedial action objectives describe the actions necessary to protect human health and the environment through eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration route. These objectives are developed by evaluating the characteristics of the contaminated media, the characteristics of the hazardous substances present, migration and exposure pathways, and potential receptor points.

Soil and groundwater have been contaminated as a result of past activities at the Site. People are typically exposed to contaminated soil via dermal contact, inhalation of soil particles, or incidental ingestion of soil; or to groundwater by direct contact or ingestion. Potential receptors

(i.e., those with potentially complete human health exposure pathways) include on-site commercial workers, on-site construction workers, and on-site recreationists.

The following remedial action objectives are intended to address these remaining risks:

- Prevent or minimize direct contact, inhalation, or ingestion of contaminated soil by humans or ecological receptors;
- Prevent or minimize direct contact or ingestion of contaminated groundwater by humans or ecological receptors.

5.2 CLEANUP ACTION ALTERNATIVES

Cleanup alternatives are evaluated as part of the Focused Site Assessment. The Focused Site Assessment included the evaluation of two options for soil and groundwater cleanup. The alternatives were scored and ranked using relevant criteria as described in WAC 173-340-360. Each of the considered alternatives includes one or more of the following remedial actions:

- Soil removal
- Surface water removal (from the former log pond)
- Engineered cap
- Institutional controls / restrictive covenant—including site management plan provisions

These remedial action options were combined to develop two alternatives, each intended to address all contaminated media at the Site. The following alternatives have been developed by Ecology, based on the alternatives proposed in the Focused Site Assessment prepared by MFA:

5.2.1 Alternative 1: Excavation and off-site disposal of contaminated soil and log pond sediment

This alternative is more conservative and more costly, and consists of the following elements:

- Remove (i.e., pump out) log pond liquid, characterize, and dispose of off site at a permitted disposal facility. For cost estimating purposes, the volume of liquid in the log pond is estimated to be approximately 330,000 gallons (the actual volume will vary, depending on the season and amount of precipitation occurring during the remedial action).
- Excavate impacted log pond sediment to 4 feet bgs (3,300 cubic yards), characterize, and dispose of off site at a permitted disposal facility. For cost estimating purposes and based on the sediment samples collected during the 2009 site investigation, the sediment is assumed to be nonhazardous and not special-listed waste, and disposal at a Subtitle D landfill is also assumed. Backfill log pond with clean, imported fill to existing ground surface and compact to 92 percent, based on the Modified Proctor Test (ASTM D-1557).
- Demolish concrete slab in mill area to facilitate excavation of underlying impacted soil. The slab is assumed to be reinforced and 12 inches thick. Excavate impacted soil to 2 feet bgs (930 cubic yards) and screen on site. The oversize, inert debris and rocks will be placed back in the excavation, while the material that passes through the screen will be characterized and

disposed of off site at a permitted disposal facility. For cost estimating purposes, 10 percent of the excavated material is assumed to be oversize and suitable for placement in the bottom of the remedial excavation. Based on soil samples collected, the soil is assumed to be nonhazardous and not special-listed waste, and disposal at a Subtitle D landfill is also assumed.

- Screen the impacted material stockpiled in the aggregate recycling area (approximately 500 cubic yards). The oversize, inert debris and rocks will be placed back in the excavation, while the material that passes through the screen will be characterized and disposed of off site at a permitted disposal facility. For cost estimating purposes, 10 percent of the excavated material is assumed to be oversize and suitable for placement in the bottom of the remedial excavation. Based on soil samples collected during the site investigation, the soil is assumed to be nonhazardous and not special-listed waste and may be disposed of at a Subtitle D Landfill.
- Excavate impacted soil to 7 feet bgs (4,870 cubic yards) and screen on site. The oversize, inert debris and rocks will be placed back in the excavation, while the material that passes through the screen will be characterized and disposed of off site at a permitted disposal facility. For cost estimating purposes, 10 percent of the excavated material is assumed to be oversize and suitable for placement in the bottom of the remedial excavation. Based on soil samples collected during the site investigation, the soil is assumed to be nonhazardous and not special-listed waste, and disposal at a Subtitle D landfill is also assumed.
- Employ a restrictive covenant prohibiting the use of groundwater beneath the Property as potable water.
- Groundwater monitoring at MW-7 on an 18-month schedule until groundwater CULs are achieved.

5.2.2 Alternative 2: Capping and institutional controls

This alternative is less costly than Alternative 1 and focuses on on-site soil management and capping. This alternative includes the following actions:

- Remove (i.e., pump out) log pond liquid, characterize, and dispose of off site at a permitted disposal facility. For cost estimating purposes, the volume of liquid in the log pond is estimated to be approximately 330,000 gallons (the actual volume will vary, depending on the season and the amount of precipitation occurring during the remedial action).
- Prior to consolidation of soil in the log pond, sediment samples will be collected and analyzed for methylene chloride which was historically detected above MTCA Method A CUL.
- Consolidate the impacted material stockpiled on site (500 cubic yards) in the log pond and backfill the log pond with unimpacted material stockpiled on site (2,840 cubic yards) and imported backfill (3,180 cubic yards).
- Place a soil cap over the log pond and mill area and aggregate recycling area with a minimum of 2 feet of clean, imported backfill. Soil cap would include a geotextile demarcation layer and placement of 4,340 cubic yards of clean soil.

- Implement institutional controls regarding future use of the Site through a restrictive covenant. A soil management and cap maintenance plan would be developed to outline procedures for maintaining the cap and handling impacted soils during potential future excavation. Employ a restrictive covenant prohibiting the use of groundwater beneath the Site as potable water. In addition, if methylene chloride is detected above MTCA Method A CULs then an institutional control will be required for any structure built over the log pond.
- Groundwater monitoring at MW-7 on an 18-month schedule until groundwater CULs are achieved.

5.3 REGULATORY REQUIREMENTS

The MTCA Cleanup Regulation sets forth the minimum requirements and procedures for selecting a cleanup action. A cleanup action must meet each of the minimum requirements specified in WAC 173-340-360(2), including certain threshold and other requirements. These requirements are outlined below.

5.3.1 Threshold Requirements

WAC 173-340-360(2)(a) requires that the cleanup action to:

- Protect human health and the environment;
- Comply with cleanup standards;
- Comply with applicable state and federal laws; and
- Provide for compliance monitoring.

5.3.2 Other Requirements

In addition, WAC 173-340-360(2)(b) states that the cleanup action shall:

- Use permanent solutions to the maximum extent practicable;
- Provide for a reasonable restoration time frame; and
- Consider public concerns.

WAC 173-340-360(3) describes the specific requirements and procedures for determining whether a cleanup action uses permanent solutions to the maximum extent practicable. A permanent solution is defined as one in which CULs can be met without further action being required at the Site other than the disposal of residue from the treatment of hazardous substances. To determine whether a cleanup action uses permanent solutions to the maximum extent practicable, a disproportionate cost analysis is conducted. This analysis compares the costs and benefits of the cleanup action alternatives and involves the consideration of several factors, including:

- Protectiveness;
- Permanent reduction of toxicity, mobility and volume;

- Cost;
- Long-term effectiveness;
- Short-term risk;
- Implementability; and
- Consideration of public concerns.

The comparison of benefits and costs may be quantitative, but will often be qualitative and require the use of best professional judgment.

WAC 173-340-360(4) describes the specific requirements and procedures for determining whether a cleanup action provides for a reasonable restoration time frame.

5.3.3 Groundwater Cleanup Action Requirements

At sites with contaminated groundwater, WAC 173-340-360(2)(c) requires that the cleanup action meet certain additional requirements. Permanent cleanup actions shall be completed when possible, and the regulation requires that the following two requirements be met if a nonpermanent action must be used:

1) Treatment or removal of the source of the release shall be conducted for liquid wastes, areas of high contamination, areas of highly mobile contaminants, or substances that cannot be reliably contained; and
2) Groundwater containment (such as barriers) or control (such as pumping) shall be implemented to the maximum extent practicable.

5.3.4 Cleanup Action Expectations

WAC 173-340-370 sets forth the following expectations for the development of cleanup action alternatives and the selection of cleanup actions. These expectations represent the types of cleanup actions Ecology considers likely results of the remedy selection process; however, Ecology recognizes that there may be some sites where cleanup actions conforming to these expectations are not appropriate.

- Treatment technologies will be emphasized at sites with liquid wastes and in areas with high concentrations of hazardous substances or with highly mobile and/or highly treatable contaminants;
- To minimize the need for long-term management of contaminated materials, hazardous substances will be destroyed, detoxified, and/or removed to concentrations below CULs throughout sites with small volumes of hazardous substances;
- Engineering controls, such as containment, may be necessary at sites with large volumes of materials with relatively low levels of hazardous substances and where treatment is impracticable;

- To minimize the potential for migration of hazardous substances, active measures will be taken to prevent precipitation and runoff from coming into contact with contaminated soil or waste materials;
- When hazardous substances remain on site at concentrations that exceed CULs, they will be consolidated to the maximum extent practicable to minimize the potential for direct contact and migration of hazardous substances;
- For sites adjacent to surface water, active measures will be taken to prevent/minimize releases to that water; dilution will not be the sole method for achieving compliance;
- Natural attenuation of hazardous substances may be appropriate at sites where 1) source control is conducted to the maximum extent practicable, 2) leaving contaminants on site does not pose an unacceptable risk, 3) there is evidence that natural degradation is occurring and will continue to occur, and 4) appropriate monitoring is taking place; and
- Cleanup actions will not result in a significantly greater overall threat to human health and the environment than other alternatives.

5.3.5 Applicable, Relevant, and Appropriate, and Local Requirements

WAC 173-340-710(1) requires that all cleanup actions comply with all applicable state and federal law. It further states that the term "applicable state and federal laws" shall include legally applicable requirements and those that the department determines "…are relevant and appropriate requirements." This section discusses applicable state and federal law, relevant and appropriate requirements, and local permitting requirements that were considered of primary importance in selecting cleanup requirements for the Site. If other requirements are identified at a later date, they will be applied to the cleanup actions at that time.

MTCA provides an exemption from the procedural requirements of several state laws and from any laws authorizing local government permits or approvals for remedial actions conducted under a consent decree, order, or agreed order (RCW 70.105D.090) However, the substantive requirements of a required permit must be met. The procedural requirements of the following state laws are exempted:

- Ch. 70.94 RCW, Washington Clean Air Act;
- Ch. 70.95 RCW, Solid Waste Management, Reduction, and Recycling;
- Ch. 70.105 RCW, Hazardous Waste Management;
- Ch. 77.55 RCW, Construction Projects in State Waters;
- Ch. 90.48 RCW, Water Pollution Control; and
- Ch. 90.58 RCW, Shoreline Management Act of 1971.

WAC 173-340-710(4) sets forth the criteria that Ecology evaluates when determining whether certain requirements are relevant and appropriate for a cleanup action. Local laws, which may be more stringent than specified state and federal laws, will govern where applicable.

5.4 EVALUATION OF CLEANUP ACTION ALTERNATIVES

The requirements and criteria outlined in Section 5.3 are used to conduct a comparative evaluation of the alternatives and to select a cleanup action from those alternatives.

5.4.1 Threshold Requirements

5.4.1.1 Protection of Human Health and the Environment

Both alternatives 1 and 2 reduce or eliminate risk due to contaminated soil through removal or capping and therefore would eliminate exposure pathways, protect human health and the environment.

5.4.1.2 Compliance with Cleanup Standards

Alternatives 1 and 2 would both meet cleanup standards in soil and groundwater, taking approximately the same amount of time to reach compliance.

5.4.1.3 Compliance with State and Federal Laws

The selected CULs are consistent with MTCA. In addition, local, state and federal laws related to environmental protection, health and safety, transportation, and disposal would apply to each proposed alternative. During remedial design, the selected alternative would be designed to comply with applicable, relevant, and appropriate requirements.

5.4.1.4 Provision for Compliance Monitoring

There are three types of compliance monitoring: protection, performance, and confirmational. Protection monitoring is designed to protect human health and the environment during the construction and operation and maintenance phases of the cleanup action. Performance monitoring confirms that the cleanup action has met cleanup and/or performance standards. Confirmational monitoring confirms the long-term effectiveness of the cleanup action once cleanup standards have been met or other performance standards have been attained. Both cleanup alternatives would meet this provision, as both would require varying levels of all three types of compliance monitoring.

Compliance monitoring will include cap monitoring per a forthcoming Soil Management and Cap Maintenance Plan which will be completed after the remedy is implemented. In addition, groundwater monitoring will be conducted at monitoring well MW-7 for petroleum hydrocarbons (i.e., NWTPH-Dx) on an 18 month monitoring schedule alternating low and high water events until groundwater CULs are achieved.

5.4.2 Other Requirements

5.4.2.1 Use of Permanent Solutions to the Maximum Extent Practicable

MTCA states that when selecting a cleanup alternative, preference shall be given to “permanent solutions to the maximum extent practicable.” “Permanent” is defined in WAC 173-340-200 as a

cleanup action in which the cleanup standards of WAC 173-340-700 through 760 are met without further action being required at the site being cleaned up or at any other site involved with the cleanup action, other than the approved disposal of any residue from the treatment of hazardous substances.

In order to determine the "maximum extent practicable" for each alternative, a disproportionate-cost analysis outlined in WAC 173-340-360(3)(e) is used. Costs are determined to be disproportionate to benefits if the incremental cost of a more expensive alternative over that of a lower-cost alternative exceeds the incremental degree of benefits achieved by the more expensive alternative. As outlined in WAC 173-340-360(3)(f), the evaluation criteria used were a mix of qualitative and quantitative factors, including protectiveness, permanence, cost effectiveness over the long term, management of short-term risks, technical and administrative implementability, and consideration of public concerns.

The cleanup alternatives are evaluated by the criteria below.

- Protectiveness

Protectiveness is a factor by which human health and the environment are protected by the cleanup action, including the degree to which existing risks are reduced; time required to reduce risk at the facility and attain cleanup standards; on-site and off-site risks resulting from implementing the cleanup action alternative; and improvement of the overall environmental quality. Alternatives 1 and 2 are equally protective because human and ecological exposure to all soil exceeding CULs are either removed from the Site or capped in place with clean material.

- Permanent Reduction of Toxicity, Mobility and Volume

Permanence is a factor by which the cleanup action alternative permanently reduces the toxicity, mobility, or volume of hazardous substances. It takes into account the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous substance releases and sources of releases, the degree of irreversibility of the waste-treatment process, and the characteristics and quantity of treatment residuals generated. Removal of soil would be considered the most permanent soil action because it permanently eliminates the source of releases at the Site. Alternatives that include less soil removal would be equivalently less permanent because they would rely on institutional controls, which could be violated or removed from the Site in the future. Therefore, Alternative 1 would be ranked higher for permanence than Alternative 2.

- Cleanup Costs

Costs are approximated based on specific design assumptions for each alternative. Although the costs provided by consultants are estimates based on design assumptions that might change, the relative costs can be used for this evaluation. For a detailed description of the costs involved with each alternative, please refer to the Focused Site Assessment.

Both alternatives include the costs of groundwater monitoring, laboratory services, construction oversight, monitoring well installation, and reporting. Major costs for alternatives include soil excavation; transport and disposal; and log pond liquid removal, transport and disposal. The cost

estimate for Alternative 1 (soil excavation) is $1,436,010, and for Alternative 2 (on-site capping) the cost is estimated at $439,030. The cost for Alternative 1 is more than three times the cost of Alternative 2.

- Long-Term Effectiveness

Long-term effectiveness includes the degree of certainty that the alternative will be successful; the reliability of the alternative for as long as hazardous substances are expected to remain on site at concentrations that exceed CULs; the magnitude of residual risk with the alternative in place; and the effectiveness of controls required to manage treatment residues or remaining wastes. Alternative 1 removes all contaminated soil, its long-term effectiveness is slightly higher than that of Alternative 2.

- Short-Term Risk

Short-term risks to remediation workers, the public, and the environment are assessed under this criterion. Generally, short-term risks are expected to be linearly related to the amount of material handled, treated, and/or transported and disposed of (e.g., worker injury per cubic yard excavated [equipment failure], public exposure per cubic yard-mile transported [highway accident]).

This factor addresses the risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks. Potential public exposure during transport, handling, and excavation required for both of the alternatives could lead to short-term risks. Because Alternative 2 requires less off-site transportation and handling of impacted soil and thus involves lower short-term risks, it is ranked higher than Alternative 1.

- Implementability

This factor addresses whether the alternative can be implemented and is technically possible. The availability of necessary materials, regulatory requirements, scheduling, access for construction operations and monitoring, and integration with existing and neighboring site uses must be considered. The proposed alternatives are both well proven and have been employed at many sites throughout the United States; both are readily implementable and rank equivalently.

- Consider Public Concerns

This factor includes considering concerns from individuals as well as community groups, local governments, tribes, federal and state agencies, and any other organization that may have an interest in or knowledge of the Site and that may have a preferred alternative. Public hearings to review cleanup and development alternatives will be held later in the process. Both alternatives would provide opportunity for members of the public to review and comment on plans.

5.4.2.2 Provide a Reasonable Restoration Time Frame

WAC 173-340-360(4) describes the specific requirements and procedures for determining whether a cleanup action provides for a reasonable restoration time frame, as required under

subsection (2)(b)(ii). The factors that determine whether a cleanup action provides a reasonable restoration time frame are set forth in WAC 173-340-360(4)(b) and include:

- Potential risks posed by the Site to human health and the environment;
- Practicability of achieving a shorter restoration time frame;
- Current site use and nearby resources that are or may be affected by the Site;
- Potential future use of the Site and of nearby resources that are or may be affected by the Site;
- Availability of alternative water supplies;
- Likely effectiveness and reliability of institutional controls;
- Ability to monitor and control migration of hazardous substances;
- Toxicity of hazardous substances; and
- Natural processes, documented on the Site, that reduce contaminant concentrations.

Alternatives that rely on soil removal to CULs would provide the greatest flexibility for current and future site use and the greatest reduction in risk, and would not rely on institutional controls. Alternatives that leave contaminants in soil above the CULs would rely on institutional controls, would have residual risk, and would increase the restoration time frame by leaving in place a potential ongoing source of groundwater contamination. Alternative 1 is ranked higher than Alternative 2, since Alternative 1 removes all contaminated soil, leading to restoration in a shorter time frame.

5.4.3 Groundwater Cleanup Action Requirements

Both alternatives rely on institutional controls to address the slight groundwater impacts, and therefore both alternatives score equally.

5.4.4 Cleanup Action Expectations

Specific expectations of cleanup actions are outlined in WAC 173-340-370 and are described in Section 5.3.4. Alternatives 1 and 2 address these expectations as follows:

- Each of the alternatives includes source control measures through the targeted removal of log pond liquid. Each also includes a restrictive covenant provisioning the use of groundwater beneath the Site.
- Alternative 1 would minimize the need for long-term management because contaminated soils would be removed rather than managed on site.
- Alternative 2 includes an engineered control that consolidates the impacted soils and the installation of an engineered permeable cap. Institutional controls will require the integrity of the cap be maintained to prevent contact with impacted soils.

- Both alternatives would eliminate surface water contacting and creating impacted runoff.
- Natural attenuation is appropriate as a groundwater remedy because source control will be a part of both alternatives; leaving contaminants on site will not pose an unacceptable risk, as exposure will be mitigated and petroleum-related groundwater impacts are expected to degrade naturally.

5.5 DECISION

Based on the analysis described above, Alternative 2 has been selected as the proposed remedial action for the Site. Alternative 2 meets each of the threshold requirements and uses permanent solutions to the maximum extent practicable relative to the cost of implementation. Figure 6 shows the remediation areas applicable to Alternative 2.

6.0 SELECTED REMEDIAL ACTION

The proposed cleanup action for the Site includes the removal of log pond liquid for characterization, and hauling and disposal at a permitted disposal facility. Impacted material stockpiled on site (500 cubic yards) will be consolidated in the log pond, and then the log pond will be backfilled with a combination of imported backfill and unimpacted material stockpiled on the Property. The filled log pond and mill area and the aggregate recycling area will be capped with a minimum of 2 feet of clean, imported backfill. The soil cap will include a geotextile demarcation layer.

Institutional controls regarding future use of the Site will be implemented. A soil management and cap maintenance plan will be developed to outline procedures for maintaining the cap and handling impacted soils during potential future subsurface earth work. Groundwater contamination will be addressed through the employment of a restrictive covenant prohibiting the use of groundwater beneath the Site as potable water.

6.1 INSTITUTIONAL CONTROLS

Institutional controls are measures undertaken to limit or prohibit activities that may interfere with the integrity of a cleanup action or result in exposure to hazardous substances at a site. Such measures are required to ensure both the continued protection of human health and the environment and the integrity of the cleanup action whenever hazardous substances remain at the site at concentrations exceeding applicable CULs. Institutional controls can include both physical measures and legal and administrative mechanisms. WAC 173-340-440 provides information on institutional controls and the conditions under which they may be removed.

Institutional controls will be included in the cleanup action to restrict activities that will come into contact with soil and to prevent the withdrawal and use of groundwater. A Soil Management and Cap Maintenance Plan will provide specific guidance on future use, management, and handling of soils remaining on the Site.

In addition, if methylene chloride is detected in log pond sediments then vapor mitigation or vapor assessment will be required if buildings are to be constructed over the historical log pond.

6.2 COMPLIANCE MONITORING

Groundwater monitoring will be conducted at MW-7 for petroleum hydrocarbons on an 18 month schedule until groundwater CULs are achieved. Groundwater monitoring will be discontinued upon Ecology approval.

6.3 PERIODIC REVIEW

WAC 173-340-420 states that, as long as groundwater CULs have not been achieved at sites where a cleanup action requires institutional control(s), a periodic review shall be completed no less frequently than every five years after the initiation of a cleanup action. In addition, periodic reviews are required at sites that rely on institutional controls as part of the cleanup action. Periodic reviews will be required at the Site. Periodic reviews will still be required after groundwater CULs have been achieved because soil institutional controls are a part of the remedy.

7.0 REFERENCES CITED

CEC and Erven. 2009. DRAFT Initial Independent Cleanup Report and Risk Assessment. Prepared for Hambleton Lumber Company. Prepared by Certified Environmental Consultants, Inc., Vancouver, Washington, and Evren Northwest, Inc., Portland Oregon. October 16.

MFA. 2012. Focused site assessment report. Prepared for the Port of Camas-Washougal. Maul Foster & Alongi, Inc., Vancouver, Washington. January 16.

MFA. 2013. Letter (re terrestrial ecological evaluation for the former Hambleton Lumber Mill, Washougal, Washington) to G. Barrett, Washington State Department of Ecology, from M. Novak and P. Wiescher, Maul Foster & Alongi, Inc., May 17.

WRCC. 2013. Western Regional Climate Center. http://www.wrcc.dri.edu/, April.

Table 1
Summary of Cleanup Levels
Former Hambleton Lumber Mill
Washougal, Washington

Indicator Hazardous Substances	Soil CULs (mg/kg)	Groundwater CULs (µg/L)
Metals		
Lead	250	NV
Mercury	2	NV
Polychlorinated Biphenyls		
Total PCBs	1	NV
Petroleum Hydrocarbons		
DRO	2000	500
RRO	2000	500
Carcinogenic Polycyclic Aromatic Hydrocarbons		
Benzo(a)anthracene	NV	NV
Benzo(a)pyrene	0.1	NV
Benzo(b)fluoranthene	NV	NV
Benzo(k)fluoranthene	NV	NV
Chrysene	NV	NV
Dibenzo(a,h)anthracene	NV	NV
Indeno(1,2,3-cd)pyrene	NV	NV
cPAH TEC	0.1	NV
Volatile Organic Compounds		
Methylene chloride	0.02	NV

Notes:

cPAH TEC = carcinogenic polycyclic aromatic hydrocarbon toxicity equivalent concentration.

CULs = Cleanup levels

DRO = diesel-range organics

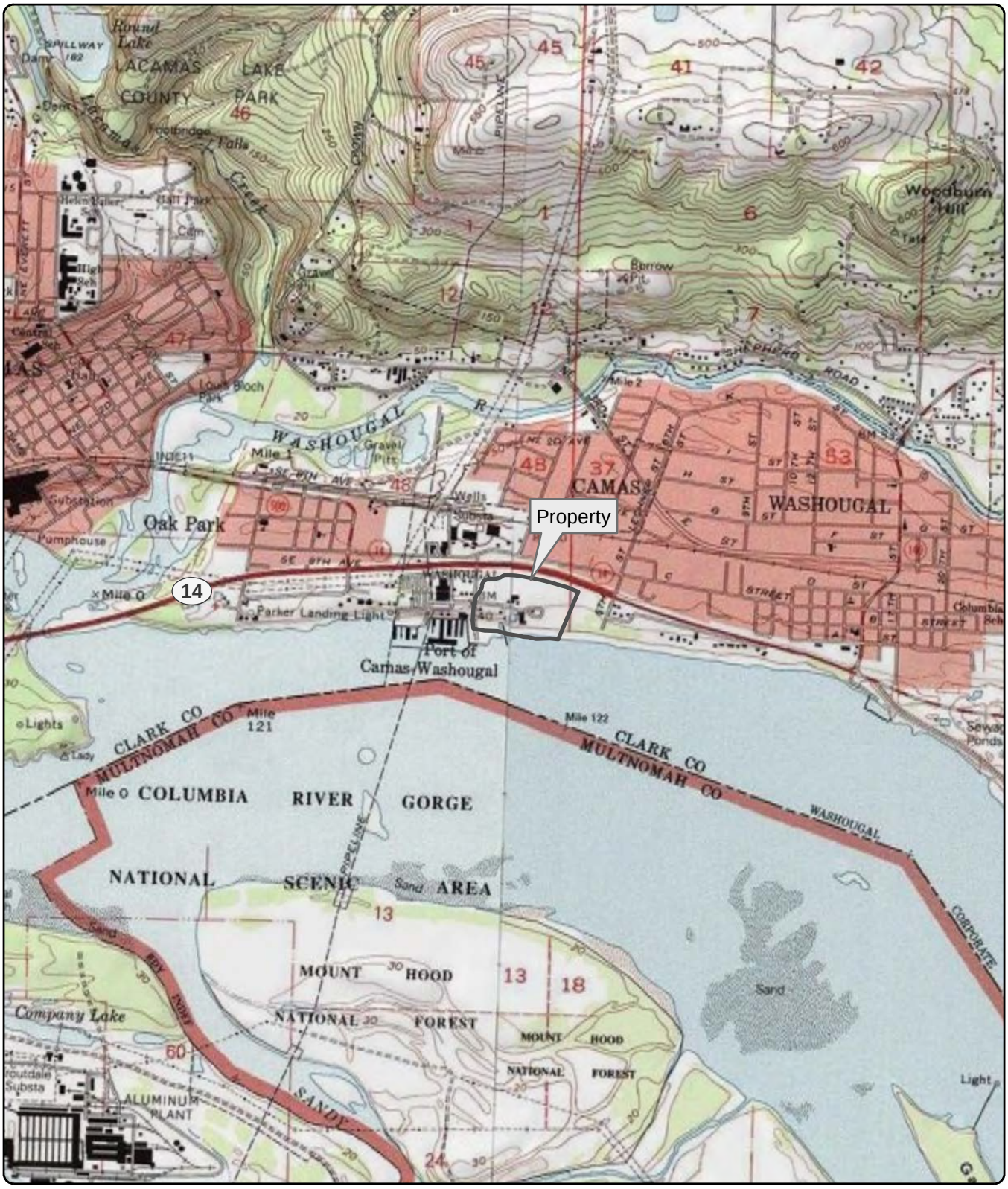
µg/L = micrograms per kilogram

mg/kg = milligrams per kilogram

NV = no value

PCBs = polychlorinated biphenyls

RRO = residual range organics



Site Address: 335 South A Street, Washougal, Washington
Source: US Geological Survey (1990) 7.5-minute topographic quadrangle: Camas & Washougal
Section 12, Township 1 N, Range 3E

Note: Property boundary is approximate and based on legal description provided by KC Development (Sept. 10, 2012).

Legend

Property Boundary

Figure 1
Property Location

Port of Camas-Washougal
Washougal, Washington

0 1,000 2,000
Feet

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Figure 2
Site Features

Port of Camas-Washougal
Washougal, Washington

Legend

- Catch Basin
- Outfall
- Potential Dry Well
- Monitoring Well
- Stockpile
- Fill
- Aggregate Recycling Area
- Former Swale
- Current and Former Site Buildings
- Site Boundary
- Property Boundary

Notes:

1. Site features were interpreted from aerial photography and gathered from Figures 2, 3, and 11 of the Initial Independent Cleanup Report and Risk Assessment by Certified Environmental Consulting, Inc. and Evren Northwest (October 16, 2009).
2. Potential fill based on site contact interview.
3. UST = Underground Storage Tank.
4. Property boundary is approximate and based on legal description provided by KC Development (Sept. 10, 2012).

0 75 150
Feet

Source: Aerial photograph obtained from ESRI, Inc. ArcGIS Online/Bing Maps.

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Produced By: rmaronn
Approved By: athughes
Print Date: 5/16/2013

Figure 3
Soil Sample Locations and Exceedances

Port of Camas-Washougal
Washougal, Washington

Legend

2011 Sample Locations
- Surface Soil Sample
- Composite Sample
- Test Pit

Historical Sample Locations
- Boring
- Surface Soil Sample
- Test Pit
- Magnetic Anomaly

Soil Exceedance and Depth (ft)
4'
TPH | Metals | PAH | PCB

- Catch Basin
- Outfall
- Potential Dry Well
- Aggregate Recycling Area
- Stockpile
- Fill
- Site Boundary
- Property Boundary

Contaminant Index
TPH = Total Petroleum Hydrocarbons
Metals = Lead and/or Mercury
PAH = Polycyclic Aromatic Hydrocarbons
VOC = Volatile Organic Compounds
PCB = Polychlorinated Biphenyls

Notes:
1. Sample locations and site features were interpreted from aerial photography and gathered from Figures 2, 3, and 11 and Tables 1 and 2 of the Initial Independent Cleanup Report and Risk Assessment by Certified Environmental Consulting NW (CEC), and Evren Northwest (October 16, 2009).
2. Potential fill based on site contact interview.
3. UST = Underground Storage Tank.
4. Sample results compared to Washington Model Toxics Control Act (MTCA) Method A Soil Cleanup Values.
5. Property boundary is approximate and based on legal description provided by KC Development (Sept. 10, 2012).

0 75 150
Feet

Source: Aerial photograph obtained from ESRI, Inc. ArcGIS Online/Bing Maps.

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Print Date: 5/16/2013
Approved By: ahughes
Produced By: jschane/maronn
Project: 0229.04.08

Figure 4
Groundwater and Surface Water Sample Locations and Exceedances

Port of Camas-Washougal
Washougal, Washington

Legend

- 2011 Monitoring Well
- Historical Monitoring Well
- Historical Surface Water Sample

Exceedances
- TPH
- Metals
- PAH

- Catch Basin
- Outfall
- Potential Dry Well
- Stockpile
- Fill Material
- Aggregate Recycling Area
- Former Site Buildings
- Site Boundary
- Property Boundary

Contaminant Index
TPH = Total Petroleum Hydrocarbons
Metals = Lead and/or Mercury
PAH = Polycyclic Aromatic Hydrocarbons

Notes:
1. Exceedances shown represent the Washington Model Toxics Control Act (MTCA) Method A Table Values.
2. Sample locations and site features were interpreted from aerial photography and gathered from Figures 2, 3, and 11 and Tables 1 and 2 of the Initial Independent Cleanup Report and Risk Assessment by Certified Environmental Consulting NW (CEC), and Evren Northwest (October 16, 2009).
3. Property boundary is approximate and based on legal description provided by KC Development (Sept. 10, 2012).

0 75 150
Feet

Source: Aerial photograph obtained from ESRI, Inc. ArcGIS Online/Bing Maps.

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Figure 5
Sediment Sample Locations and Exceedances

Port of Camas-Washougal
Washougal, Washington

Legend

- Exceedances
- TPH
- VOC
- 2011 Sediment Sample Location
- Historical Sediment Sample Location
- Catch Basin
- Outfall
- Potential Dry Well
- Stockpile
- Fill Material
- Aggregate Recycling Area
- Former Site Buildings
- Site Boundary
- Property Boundary

Contaminant Index
TPH = Total Petroleum Hydrocarbons
VOC = Volatile Organic Compounds

Notes:

1. Sample locations and site features were interpreted from aerial photography and gathered from Figures 2, 3, and 11 and Tables 1 through 13 of the Initial Independent Cleanup Report and Risk Assessment by Certified Environmental Consulting NW (CEC), and Evren Northwest (October 16, 2009).
2. Potential fill based on site contact interview.
3. UST = Underground Storage Tank.
4. Sediment sample results in Columbia River samples compared to Ecology 2010 or Freshwater Criteria Screening levels. Sediment sample results in log pond compared to Washington Model Toxics Control Act (MTCA) Method A Soil Cleanup Level values.
5. Property boundary is approximate and based on legal description provided by KC Development (Sept. 10, 2012).

0 75 150
Feet

Source: Aerial photograph obtained from ESRI, Inc. ArcGIS Online/Bing Maps.

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Project: 0229.04.08 Produced By: ikehane/maconn Approved By: ahughes Print Date: 5/16/2013

Figure 6
Remediation Boundaries

Port of Camas-Washougal
Washougal, Washington

Legend

- Site Boundary
- Property Boundary
- Stockpile to be Removed

Remediation Areas

- Impacted Log Pond Sediment and Surface Water
- Impacted Mill Area Soil
- Impacted Aggregate Recycling Area Soil

Approximate Remediation Areas
and Approximate Square Footage
Log Pond Sediment: 22,000
Log Pond Soil: 12,500
Hazardous Waste: 18,800

Notes:
1. Property boundary is approximate and based on legal description provided by KC Development (Sept. 10, 2012).

0 75 150
Feet

Source: Aerial photograph obtained from Clark County GIS

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