Landau Associates
Environmental and Geotechnical Services

# TRANSMITTAL

To: Washington State Department of Ecology
3190 160th Ave. SE
Bellevue, WA 98008-5452

Date: March 20, 2000

Attn: Ms. Judith Aitken

Project No.: 53057.20

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**RE: Plans for Addressing Arsenic Contamination**
**Riverside Business Park (former Weyerhaeuser East Site)**
**Everett, Washington**

| Copies | Description |
|---|---|
| 1 | Technical Memorandum re: Plans for Addressing Arsenic Contamination, Riverside Business Park, Everett, Washington (3/20/00) |

Message:

Judy:

The attached technical memorandum is being provided at the request of the Port of Everett. It describes the actions that the Port intends to implement to address arsenic-affected soil and groundwater at the former Weyerhaeuser East Site during initial site development for the Riverside Buisiness Park. If possible, we would like to get your concurrence with the planned approach this week so the actions can be incorporated into the construction plans and specifications that will be going out for bid next week. I will call you later in the week to see if you have any questions or concerns.

We will also be sending you a review copy of the construction plans and specifications for the initial development activities within a week. This document will contain the general environmental specifications needed to comply with the consent decree requirements for the former Weyerhaeuser East Site.

LANDAU ASSOCIATES, INC.

By:
Lawrence D. Beard, P.E.
Principal

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Enclosure

cc: Bob McChesney, Port of Everett
Bob Galteland, Reid Middleton

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Environmental and Geotechnical Services

# TECHNICAL MEMORANDUM

TO: Bob Galteland, P.E., Reid Middleton
Bob McChesney, Port of Everett

FROM: Lawrence D. Beard, P.E.

DATE March 20, 2000

**RE: PLANS FOR ADDRESSING ARSENIC CONTAMINATION**
**RIVERSIDE BUSINESS PARK**
**EVERETT, WASHINGTON**

This technical memorandum was prepared at the request of the Port of Everett (Port) to specifically address the recommended handling of arsenic-affected soil and groundwater during site development of the Riverside Business Park at the former Weyerhaeuser Company East Site in Everett, Washington. Because the East Site was cleaned up under a consent decree between Weyerhaeuser Company and the Washington State Department of Ecology (Ecology), any subsequent activities must be reviewed by Ecology to ensure the planned actions do not compromise the integrity of the cleanup action. Construction procedures for addressing the broader range of identified constituents of concern for the site are being incorporated into the plans and specifications for the first phase of site development. These plans and specifications will need to be submitted to Ecology for review prior to the start of construction this spring.

Arsenic was not specifically identified as a constituent of concern for the site because soil concentrations detected during site investigation activities were generally below applicable soil cleanup levels, and it was concluded that the elevated arsenic concentrations in site groundwater are associated with an offsite source (the former ASARCO smelter). However, a February 1999 investigation conducted by ASARCO, to better define the extent of groundwater and soil contamination in the lowlands area resulting from the former smelter activities, identified arsenic concentrations in site soil that exceed the applicable Washington Model Toxics Control Act (MTCA) cleanup level. Because the arsenic-affected soil is in an area that will be disturbed during the initial phase of site development, cleanup of the soil is being addressed at this time. Additionally, arsenic concentrations in groundwater are significantly elevated in certain areas that could require dewatering during the installation of some development features, so procedures for handling (or limiting the need for handling) arsenic-affected groundwater are also addressed in this memorandum.

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## BACKGROUND

Weyerhaeuser Company owned the former Everett East Site in northeast Everett, Washington, prior to its purchase by the Port. Remediation of contaminated soil at the former East Site was conducted by Weyerhaeuser in accordance with a Consent Decree between Ecology and the Weyerhaeuser Company (Ecology 1997). Remediation activities for the contaminants of concern (total petroleum hydrocarbons, polychlorinated biphenyls, carcinogenic polycyclic aromatic hydrocarbons, and pentachlorophenol) were performed in 1996 and 1997, as described in the *Soil Remediation Completion Report* (DOF 1997). Arsenic was not addressed during the remedial action at the former East Site because the applicable soil cleanup level for arsenic was only exceeded at a single location (TP-30) during investigation of the former East Site.

Following Ecology's approval of the East Site soil remediation, the site was transferred to the Port according to the terms of a purchase/sale agreement between the Port and Weyerhaeuser. The Port has prepared plans for developing the former East Site into a light industrial/business park (Riverside Business Park). Proposed construction activities at the site in 2000 include raising the existing grade, utilities installation, road construction, and construction of two stormwater ponds. The existing grade will be raised approximately 1 to 3 ft throughout the site. Utilities installation and road construction work will occur near the west property boundary. Although the road will be constructed above the existing grade, most utilities will be installed up to about 3 ft below existing grade and pump stations will be constructed up to about 10 ft below existing grade. The two stormwater ponds will be located at the north end of the site and excavated to a depth of about 6 ft below existing grade. This memorandum identifies measures that should be taken, and areas where these measures should be taken, to address arsenic-affected soil and groundwater during construction activities.

## CLEANUP LEVEL COMPARISON

The Weyerhaeuser East Site was cleaned up to industrial cleanup levels based on its historic site use and planned future site use. The Weyerhaeuser/Ecology consent decree and the Port/Weyerhaeuser purchase/sale agreement include restrictive covenants that prevent future site uses that are inconsistent with the level of protection provided by MTCA industrial soil cleanup levels.

The future Riverside Business Park is considered an industrial site because it is currently zoned for heavy industry and future use of the property is expected to be appropriate for this zoning. Site contamination has been addressed by soil remediation activities (DOF 1997) and arsenic is the only anticipated constituent of concern with respect to planned construction activities that was not specifically addressed by the East Site cleanup action. Therefore, for the purpose of identifying areas with elevated

soil arsenic concentrations to be addressed during site development for the Riverside Business Park, arsenic concentrations were compared to the MTCA Method A industrial soil cleanup level (200 mg/kg).

Groundwater arsenic concentrations are of concern because groundwater may be extracted by dewatering processes during construction activities and must be handled appropriately. The East Site does not have a National Pollutant Discharge Elimination System (NPDES) permit with arsenic limits; therefore, there are no existing site-specific discharge criteria to which groundwater arsenic concentrations can be compared. Groundwater arsenic data are presented in this memorandum for informational purposes to identify the range of arsenic concentrations that may be present in groundwater collected during dewatering processes (if needed). The planned procedures for managing groundwater extracted during dewatering is addressed in a subsequent section of this memorandum.

## SITE ARSENIC DISTRIBUTION

Site arsenic distribution was evaluated based on available data in Landau Associates files associated with the previous investigations for the former East Site, the ASARCO smelter, and the Mill E site.

### Soil Data

A number of environmental investigations have been conducted at the former East Site and the Mill E site by Weyerhaeuser and ASARCO. Soil arsenic data were collected from several reports, which are identified as references below, and used to identify the distribution of arsenic in soil at and near the planned Riverside Business Park. Maximum concentrations of arsenic detected in the soil are presented on Figure 1. Arsenic concentrations in most soil samples were well below the MTCA Method A industrial cleanup level of 200 mg/kg. However, some arsenic concentrations exceeding 200 mg/kg have been detected.

The primary area where arsenic concentrations approach or exceed 200 mg/kg is at the north end of the site, near the existing bridge and roadway embankment. Arsenic concentrations exceeding 200 mg/kg extend from approximately 100 ft south of the elevated roadway to approximately 350 ft north of the elevated roadway on the west end of the embankment. Although soil arsenic concentrations exceeding the MTCA Method A industrial cleanup level are present primarily near the west side of the roadway embankment, arsenic was also detected at a concentration of 198 mg/kg near the toe of the elevated roadway embankment on the east side of the site. The shaded areas on Figure 1 provide an estimate of the areal extent over which MTCA Method A industrial soil cleanup levels are exceeded, based on available data.

The maximum detected soil concentration of arsenic, 954 mg/kg from test pit TP-30, was identified approximately 300 ft west of Mill E toward the south end of the planned Riverside Business Park. The elevated arsenic concentration was detected in a sample collected at a depth of 2 ft below ground surface (BGS) and no other arsenic concentrations exceeding 200 mg/kg were observed at this location or in this area. As a result, this detection is considered an isolated occurrence that does not require cleanup.

Metals leachability data are not available for the former East Site; however, the toxicity characteristic leaching procedure (TCLP) was performed for arsenic on eight samples from the former Mill E site, which is adjacent to the former East Site. TCLP results for these samples (which had soil concentrations ranging from 15.7 to 459 mg/kg) ranged from nondetect to 0.7 mg/L. The maximum TCLP result was nearly one order of magnitude less than the regulatory level of 5 mg/L for designation as a dangerous waste. TCLP analyses have also been conducted on several samples collected from the ASARCO Everett Smelter site, which is the likely source of elevated arsenic concentrations at the former East Site. TCLP concentrations at the Everett Smelter site ranged from less than 0.1 mg/L to greater than 4,000 mg/L. A linear regression analysis for total arsenic and TCLP arsenic concentrations in soil at the Everett Smelter site indicates that soil arsenic concentrations greater than 3,700 mg/kg are likely to correspond to a TCLP arsenic concentration greater than 5 mg/L, which is the TCLP dangerous waste criterion for arsenic. The maximum soil arsenic concentration observed at the former East Site is almost four times less than 3,700 mg/kg. Therefore, it is expected that soil samples from the former East Site would not be classified as a dangerous waste (once excavated) based on toxicity characteristics observed at the Everett Smelter site.

Some TCLP results for lead exceeded the dangerous waste TCLP criterion of 5 mg/L in some samples collected from the Everett Smelter site. However, most TCLP analyses indicated that soil would not be classified as dangerous waste based on lead toxicity. It appears that soil lead concentrations of approximately 10,000 mg/kg roughly correspond to TCLP lead concentrations of 5 mg/L. The maximum detected soil lead concentration in samples collected from the former East Site is approximately 5,600 mg/kg; therefore, it is not expected that soil at the former East Site would be classified as dangerous waste based on lead TCLP data.

**Groundwater Data**

Groundwater samples are collected at the former East Site as required by the Consent Decree (Ecology 1997). Arsenic contamination is not addressed by the Consent Decree and, as a result, arsenic analyses are not consistently performed on groundwater samples collected for East Site compliance monitoring. However, arsenic was analyzed for site compliance monitoring samples collected in June

1998, in site samples collected during characterization of the former East Site and Mill E site, and in site geoprobe samples collected by ASARCO. Shallow aquifer groundwater arsenic data from these sampling events are presented on Figure 2. The deeper aquifer is also affected by arsenic, but deep aquifer data are not presented because activities during site development are not anticipated to affect, or be affected by, the deep aquifer.

Arsenic groundwater concentrations in the shallow aquifer are generally less than 20 µg/L, except for an area in the northern portion of the site and an area in the vicinity of the former Mill E site, as shown on Figure 2. It is important to recognize that many of the groundwater samples exhibiting elevated arsenic concentrations were collected by geoprobe, which, even after filtering, may be biased high due to particulates.

## RECOMMENDED ARSENIC-AFFECTED SOIL HANDLING AND CLEANUP

We understand that the majority of the site surface following construction of the proposed Riverside Business Park will be covered with low-permeability material (i.e., pavement or buildings). We recommend leaving soil with elevated arsenic concentrations in place in areas that will be covered by a low-permeability surface. In areas where soil will not be covered by a low-permeability surface, and where soil arsenic concentrations exceed the MTCA Method A industrial soil cleanup level of 200 mg/kg (estimated from available existing data), we recommend excavating the contaminated soil to the 200 mg/kg cleanup level. Any excavated soil with elevated arsenic concentrations can be used as fill in areas where the surface will be covered by low-permeability material and placement should be limited to areas where existing soil arsenic concentrations exceed or approach 200 mg/kg. The intent of these recommended soil handling techniques is to contain all known soil with elevated arsenic levels within areas that will be covered by a low-permeability surface to limit direct contact with, and surface water infiltration through, the contaminated soil.

There are no presently identified areas containing arsenic concentrations exceeding the MTCA Method A industrial soil cleanup level that will not be covered with a low-permeability surface, although we understand the final landscaping plan for the arsenic-affected area north of the existing bridge and roadway embankment has not been developed. Soil in this area contains concentrations exceeding 200 mg/kg at depths up to 3.5 ft below the existing ground surface. Therefore, we recommend that any landscape areas identified in the area in the future be excavated from the existing ground surface to 4 ft below existing ground surface, and be used as fill to raise the existing grades (as needed) within the arsenic-affected area that will be covered with a low-permeability surface.

Soil arsenic concentrations have not been characterized at the proposed location of a second stormwater pond at the north corner of the East Site. However, nearby data suggests that arsenic

concentrations may be elevated, but are likely below the MTCA Method A industrial soil cleanup level. Due to the limited amount of data available for this area, we recommend that soil excavated during construction of the north pond from the existing surface to 4 ft below existing ground surface be used as fill to raise the existing grade north of the elevated roadway embankment in an area that will be covered with a low-permeability surface.

It is assumed that all excavated soil in the arsenic-affected soil area will be appropriate for use as structural fill in planned pavement or building areas. In the event that soil excavated in the arsenic-affected area is not suitable for use as structural fill, it should be stockpiled and tested for arsenic and TCLP arsenic and lead to evaluate disposal requirements. If the excavated soil is below MTCA method A industrial soil cleanup levels it can be placed in planned site landscape areas. If the excavated soil is above MTCA method A industrial soil cleanup levels, but below TCLP dangerous waste criteria, it should be disposed of at a solid waste disposal facility. If the excavated soil exceeds TCLP dangerous waste criteria for arsenic or lead, it should be disposed of at a hazardous waste disposal facility.

The maximum detected soil arsenic concentration of 954 mg/kg in the south end of the former East Site appears to be localized and is in an area that will likely be covered with a low permeability surface. No construction activities during the first phase of site development are expected to result in direct contact with soil in this area; therefore, it is not an area of concern for upcoming construction and no cleanup activities are planned for this area.

## MANAGEMENT OF ARSENIC-AFFECTED GROUNDWATER

Dewatering may be required during some construction activities, such as pump station and stormwater pond construction. Although no existing NPDES permit regulates stormwater discharge from the East Site to the Snohomish River, it would likely be necessary to obtain a temporary NPDES permit for discharge of groundwater collected during dewatering to the existing stormwater system or a temporary waste discharge permit would likely be needed if the water was to be discharged to the sanitary sewer. A wide range of groundwater arsenic concentrations exist at the former East Site that may preclude discharge to the existing stormwater or sanitary system without pretreatment, including elevated concentrations in the areas shown on Figure 2.

Excavation procedures should be considered by the contractor for implementation at the site to reduce the need for construction dewatering, due to the potentially high cost of groundwater pretreatment. Such excavation procedures could include the use of sheet pile excavation shoring for pump station excavations to reduce groundwater discharge to excavations or staging excavations to coincide with periods of seasonally low groundwater elevations. The construction contractor needs to manage any extracted groundwater generated during site development consistent with all local, state, and federal laws,

including all permitting, treatment, and disposal activities. The contractor needs to either obtain a temporary NPDES discharge permit or waste discharge permit (as applicable) and abide by all associated pretreatment and monitoring requirements, or temporarily store all extracted groundwater onsite in holding tanks for transport, treatment, and disposal in conformance with applicable laws and regulations.

In addition to managing arsenic-affected groundwater during construction, engineering controls should be taken to prevent arsenic-affected groundwater from impacting stormwater. Shallow groundwater elevations are likely to exceed surface water elevations in site storm water detention ponds at the north end of the site during the wet season. The two stormwater ponds planned for the north end of the site should be lined with a flexible membrane liner (FML) manufactured from high density polyethylene (HDPE) or a similar low permeability material.

* * * * * *

This memorandum has been prepared for the exclusive use of Reid Middleton and the Port of Everett for specific application to the first phase of the Riverside Business Park development project. The reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

Please call us if you have any questions regarding the contents of this memorandum.

Attachments: Figure 1: East Site Arsenic Distribution – Soil
Figure 2: East Site Arsenic Distribution – Shallow Groundwater

## REFERENCES


ASARCO. 1998. *Draft Supplemental Remedial Investigation, Additional Characterization and Monitoring Work Plan for the Lowland Area, Everett Smelter Site, Everett, Washington.* July.

ASARCO. 1999. *Letter from Thomas Aldrich, ASARCO, to Bob McChesney, Port of Everett, Re: Validated Data – Lowland Supplemental Investigation, Everett Smelter Site.* June 10.

DOF. 1997. *Soil Remediation Completion Report for Weyerhaeuser Everett East Site.* June.

Ecology. 1997. *Cleanup Action Plan, Appendix C to Consent Decree No. 972027738 between the Washington State Department of Ecology and Weyerhaeuser Company.* April.

Ecology. 1998. *Cleanup Action Plan, Appendix C to Consent Decree No. 982087186 between the Washington State Department of Ecology and Weyerhaeuser Company.* November.

EMCON. 1992. *Work Plan for Remedial Investigation/Feasibility Study of Former Mill E/Koppers Facility.* November.

EMCON. 1993. *Former Mill E/Koppers Facility Supplemental Remedial Investigation Work Plan.* September.

EMCON. 1994. *Draft Remedial Investigation Report for Former Mill E/Koppers Facility, Everett, Washington.* September.

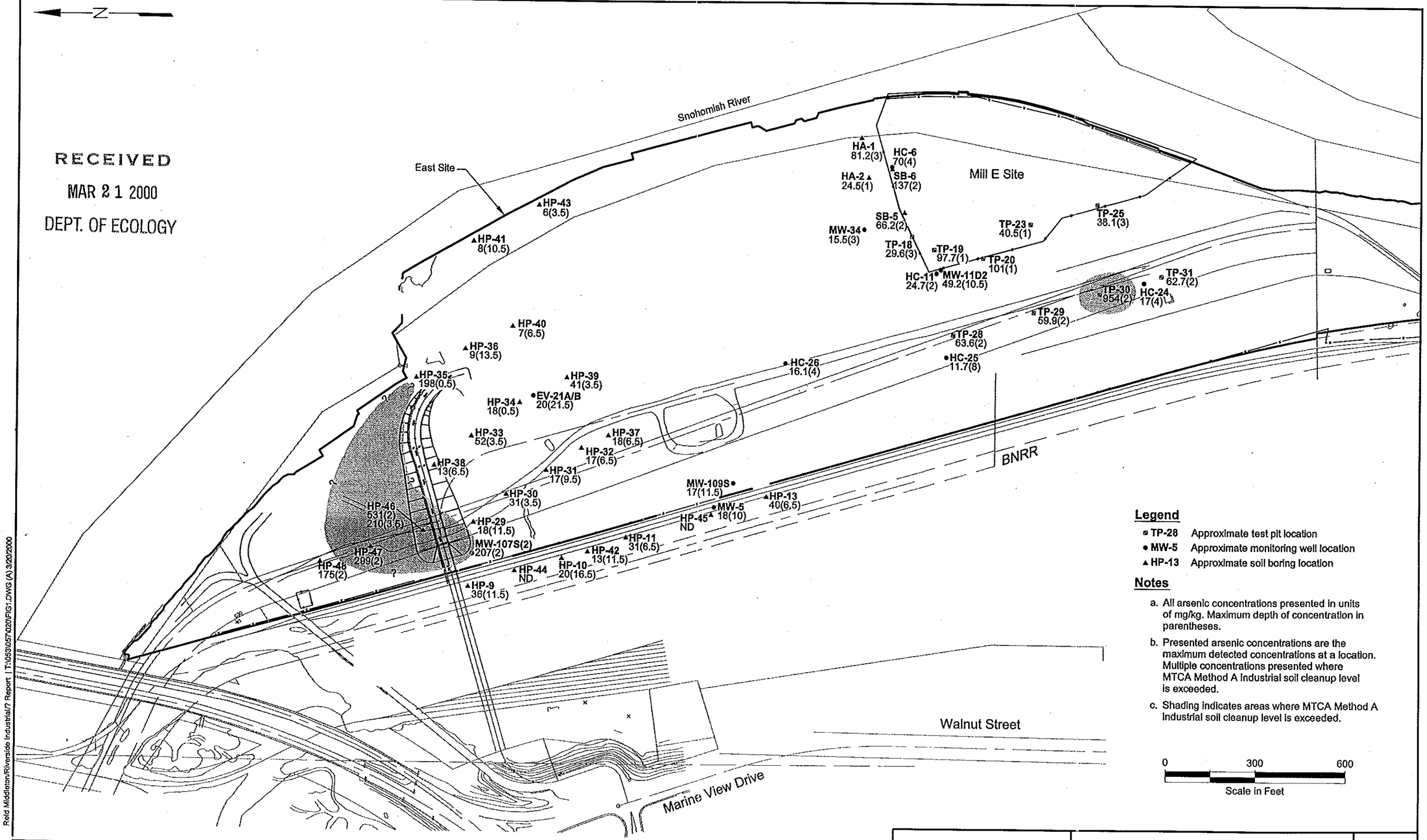
EMCON. 1999. *Round 8 (First Quarter 1999)/Annual Groundwater Compliance Monitoring Report, Weyerhaeuser Everett East Site – Parcel 1.* June 4.

Hart Crowser. 1989. *Final Report Environmental Assessment and Site Characterization Work Plan, Weyerhaeuser Old Machine Shop, Everett Mill E Site, Everett, Washington.* May 16.

Hart Crowser. 1989. *Site Characterization Report, Weyerhaeuser Old Machine Shop, Everett Mill E Site, Everett, Washington.* October 27.

Hart Crowser. 1991. *Phase Ic Site Characterization Report, Weyerhaeuser-Everett Mill E Site, Everett, Washington.* March 26.

Hydrometrics. 1999. *Memorandum from Steve Thompson, Hydrometrics, to Larry Beard, Landau Associates, Re: Port of Everett Data.* July 19.




**Legend**

- ▫ TP-28 Approximate test pit location
- • MW-5 Approximate monitoring well location
- ▲ HP-13 Approximate soil boring location

**Notes**

a. All arsenic concentrations presented in units of mg/kg. Maximum depth of concentration in parentheses.

b. Presented arsenic concentrations are the maximum detected concentrations at a location. Multiple concentrations presented where MTCA Method A Industrial soil cleanup level is exceeded.

c. Shading indicates areas where MTCA Method A Industrial soil cleanup level is exceeded.

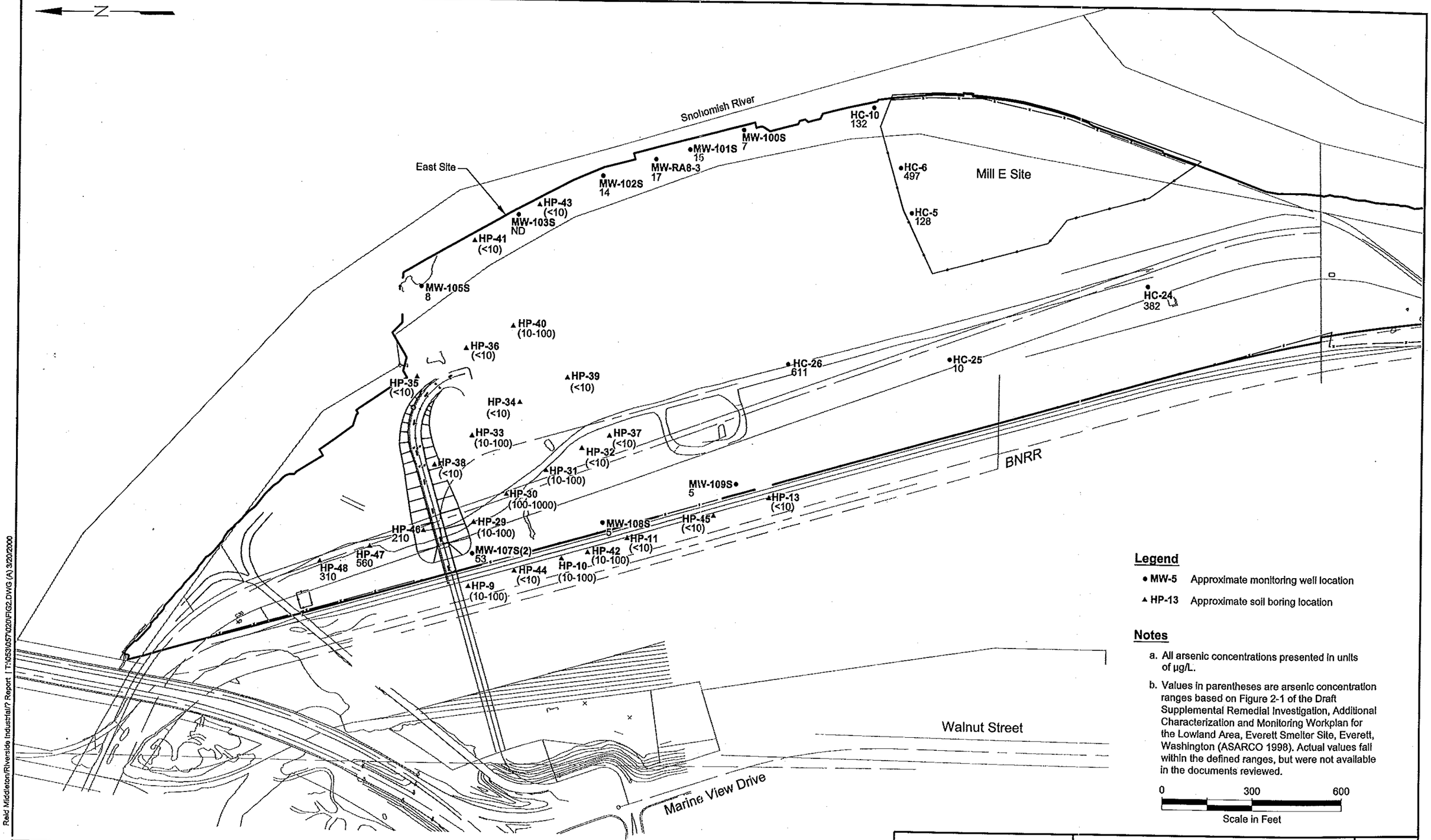
0 300 600
Scale in Feet

Reid Middleton/Riverside Industrial/7 Report | T:\053\057\0020\FIG1.DWG (A) 3/20/2000

Landau Associates

*Base Map Source: Clark M. Leeman Land Surveying, 1998*

| Riverside Business Park | **East Site Arsenic Distribution - Soil** | Figure 1 |
|---|---|---|




**Legend**

- • MW-5 Approximate monitoring well location
- ▲ HP-13 Approximate soil boring location

**Notes**

a. All arsenic concentrations presented in units of µg/L.

b. Values in parentheses are arsenic concentration ranges based on Figure 2-1 of the Draft Supplemental Remedial Investigation, Additional Characterization and Monitoring Workplan for the Lowland Area, Everett Smelter Site, Everett, Washington (ASARCO 1998). Actual values fall within the defined ranges, but were not available in the documents reviewed.

0 300 600

Scale in Feet

Reid Middleton/Riverside Industrial/? Report | T:\0531\057\020\FIG2.DWG (A) 3/20/2000

Landau Associates

*Base Map Source: Clark M. Leeman Land Surveying, 1998*

Riverside Business Park

**East Site Arsenic Distribution Shallow Groundwater**

Figure 2