ENVIRONMENTAL PARTNERS INC

Remedial Action Work Plan - Marine Lumber Service South Yard

City of Seattle Right-of-Way
Northeast Corner of 5th Ave S. and S. Monroe St.
Seattle, Washington 98108

Prepared For:

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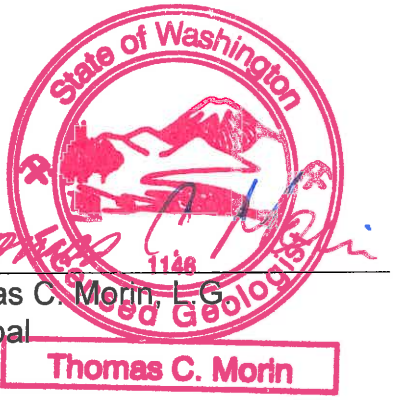

Project Number: 59401.3

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1.0 INTRODUCTION

Environmental Partners, Inc. (EPI) is pleased to submit this Remedial Action Work Plan (RAWP) for an area immediately south of the Marine Lumber Service (MLS) South Yard. The South Yard is covered under the Washington Department of Ecology Industrial Stormwater General Permit (ISGP) No. WAR011741B. Ecology issued Amended Administrative Order No. 8862 to MLS. In a subsequent Settlement Agreement, dated April 10, 2012 between Ecology and MLS, Ecology required that MLS provide the Seattle Department of Transportation (SDOT) with a RAWP by June 30, 2012 for cleanup of copper, zinc and arsenic on the north side of South Monroe Street approximately 100 feet east of 5th Avenue S. This RAWP is being provided to SDOT in fulfillment of that requirement.

MLS stored lumber treated with inorganic compounds at the South Yard. Ecology concluded those inorganic compounds impacted shallow soils immediately south of the South Yard property boundary. The RAWP documented herein is intended to serve as an Independent Cleanup that fully addresses copper, zinc, and arsenic impacts in a manner consistent with the Model Toxics Control Act (RCW 70.105D) and its implementing regulation (WAC 173-340) (collectively MTCA).

The MLS South Yard remedial action includes a cleanup action for soil located in the Seattle Department of Transportation (SDOT) Right-of-Way (ROW) at the northeast corner of South Monroe Street and 5th Avenue South, in Seattle, Washington (Figures 1 and 2) (Area of Concern). The Area of Concern is directly adjacent to the south end of the MLS South Yard (Figures 2 and 3).

In preparation of this RAWP, EPI met with representatives of the City of Seattle, Seattle Public Utilities, and Ecology at the South Yard. EPI understands that the City of Seattle will review the RAWP coincident with MLS' application for a street use permit to implement the RAWP. A street use permit is required because MLS does not control the impacted areas and can only undertake the RAWP with the consent of the landowner, the City of Seattle.

This RAWP presents the objectives, methodology, and technical approach for conducting a cleanup action to address the impacts to shallow soil within the Area of Concern. This remedial action will be conducted as an Independent Cleanup in accordance with WAC 173-340.

The objectives of this RAWP are to:

- Provide an overview of the history of the South Yard, investigative activities, and findings within the Area of Concern.
- Provide a description of the methodology and technical basis for the proposed soil remediation within the Area of Concern;
- Provide a detailed description of the individual components of the cleanup action and how they will be conducted; and
- Provide a general description of the compliance monitoring approach.

1.1 Background

The South Yard has been used by MLS for storage of both treated and untreated lumber since the 1980s, and it is entirely covered with asphalt. The treated lumber was treated with the preservative Ammoniacal Copper Zinc Arsenate (ACZA), also known by its trade name, Chemonite. The preservative was applied off-site by the Conrad Forest Products Company of North Bend, Oregon. The chemical application contains a 2:1:1 ratio of copper oxide, zinc oxide, and arsenic pentoxide, respectively. Uncovered lumber appears to have leached ACZA and, via surface water runoff, has impacted surface soils immediately south of the South Yard.

Sources for the stormwater included stormwater falling directly onto the yard and stormwater flowing onto the yard from 5th Avenue to the west and South Kenyon Street to the north. The stormwater flows southeast across the South Yard and exits the South Yard into the gravel ROW on the north side of South Monroe Street. South Monroe Street is also gravel covered.

In 2009, Seattle Public Utilities (SPU) collected soil samples at the surface, 0-3 inches below ground surface (bgs), and at 12 inches bgs within the Area of Concern. The analytical results indicated that concentrations for arsenic, copper, and zinc were above potentially applicable cleanup levels immediately south of the South Yard. Table 1 below summarizes the sample designation and analytical results for the samples collected in this area. The sample locations are indicated on Figure 3.

No treated lumber is currently stored at the South Yard and MLS has modified its Stormwater Pollution Prevention Plan (SWPPP) accordingly. The surface of the South Yard has been pressure washed and has been resealed with an asphaltic sealant. Any impacts to the Area of Concern that historically resulted from treated lumber storage on the South Yard cannot reoccur.

1.2 Work Plan Organization

The remaining sections of this Work Plan are organized as follows:

- Section 2.0 provides a description of the site conditions including COCs and applicable cleanup levels;
- Section 3.0 provides a description of the methodology and technical basis for implementation of the selected remedial alternative;
- Section 4.0 provides a detailed description of the individual components of the remedial alternative; and,
- Section 5.0 provides the limitations to this RAWP.

2.0 SITE CONDITIONS

The media of concern is the top one-foot of shallow soil. Surface conditions at the Area of Concern generally consist of 6 inches of loose gravel and interstitial silt which overlays more densely compacted gravel and soil fill. Stormwater generally infiltrates into the gravels within the Area of Concern during storm events. During high intensity storm events water can pond in the Area of Concern.

For purposes of this RAWP, the potential exposure pathways in the Area of Concern are surface water (stormwater) with potential aquatic exposure and direct contact with soils. The aquatic exposure by stormwater is addressed through compliance with the ISGP. Surface water exposures are not discussed further in this RAWP.

Potential and direct exposure within the Area of Concern will be addressed through direct excavation of impacted soil to an appropriate cleanup level and replacement of those soils with an appropriate uncontaminated fill material.

2.1 Detected Contaminants and Selected Cleanup Levels

Sampling performed by SPU indicated that the surface soils within the Area of Concern have been impacted by arsenic, copper, and zinc. For the purposes of this RAWP, the contaminants of concern (COCs) for the Area of Concern are arsenic, copper, and zinc. Table 1 below presents a summary of the sample names, the depths at which the samples were collected, the concentrations of the target analytes at locations within the Area of Concern and a comparison to potentially applicable cleanup levels for those constituents in soils. The analytical data were provided to EPI in a letter from Mr. Brian Robinson of SPU entitled: *Results from the Environmental Compliance Inspection: Corrective Actions Required*, dated April 15, 2009. Figure 3 depicts the City's sample locations within the Area of Concern.

Table 1
Summary of Maximum Detected COCs and Potentially Applicable Cleanup Standards (mg/kg)
Marine Lumber Services, Inc. – South Yard, Seattle, WA

Sample No.	Depth (inches)	Arsenic	Copper	Zinc
RCB159-0	0	**474**	**3,240**	825
RCB159-3	3	**950**	**8,370**	1,660
RCB159-12	12	**260**	2,110	594
RCB273-0	0	**214**	417	463
RCB273-3	3	**210**	232	341
RCB273-12	12	22	26	55
MTCA Method A Soil Cleanup Level for Unrestricted Land Uses	--	20	--	--
MTCA Method B(a)	--	--	3,200	24,000

Bold indicates concentration is above a MTCA Method A or Method B cleanup level.

(a) – Based on protection from direct exposure under a residential use scenario.

The selected cleanup levels for the RAWP are a combination of the MTCA Method A and B Soil Cleanup Levels. The use of these cleanup levels is highly conservative for the following reasons:

- The Area of Concern is located within a public ROW in a heavily industrialized area. Industrial Soil cleanup levels could be applied to the remedial action but the residential use cleanup levels have been selected.

- The Area of Concern is a significant distance from surface water and the Area of Concern is required to be in compliance with the ISGP.

The selected cleanup levels are:

- Arsenic – 20 mg/kg

- Copper – 3,200 mg/kg

- Zinc – 24,000 mg/kg

3.0 METHODOLOGY

The selected remedial alternative for the Area of Concern includes direct excavation of impacted soil with off-site disposal. The selection of this remedial alternative is based on the following:

- The likely depth and lateral extent of COCs is limited;
- The COCs are shallow and readily accessible to direct excavation; and
- Excavation is practicable, highly effective, and its effectiveness is quantifiable through direct sampling.

Implementation of this remedial strategy will include the following elements:

- Review and comment of this RAWP by the City of Seattle, with a copy provided to Ecology;
- Obtaining a Street Use Permit from the Seattle Department of Transportation (SDOT) for performing the work within the ROW;
- Excavation and off-site disposal of soil containing COCs at concentrations above the applicable cleanup levels, performance and confirmational sampling within the Area of Concern and analysis to demonstrate attainment of the cleanup levels within the Area of Concern;
- Site restoration; and,
- Preparation and submittal of a report and the City of Seattle upon attainment of cleanup levels at the point(s) of compliance for affected media.

The soil excavation will take place along the south end of the South Yard in the ROW of South Monroe Street at the location indicated on Figure 3. The excavation will start at the south fence of the South Yard and extend south approximately 10 feet south into the ROW. The depth of excavation is expected to be approximately 12 to 24 inches below the elevation of the northern edge of the roadway.

The limits of practicability for the removal of soil with concentrations exceeding their respective cleanup levels within the proposed excavation area are primarily defined by the South Yard fence line to the north, the MLS eastern property boundary of the South Yard to the east, South Monroe Street to the south, and the 5th Ave S. ROW to the west (Figure 3).

No excavation will be conducted within the City of Seattle Street. It may be necessary to widen the remedial excavation to the north onto the MLS property based on performance sampling and geotechnical considerations. The Area of Concern previously contained City of Seattle street trees. The root structure for those trees has damaged the MLS pavement and MLS may take the opportunity of the RAWP implementation to remove the roots and resurface the southern portion of its property.

4.0 TECHNICAL APPROACH

The following sections provide detailed descriptions of the activities that will be completed during the soil remediation at the subject property.

4.1 Permitting

The remediation project will be permitted by the City of Seattle. A Street Use Permit will be obtained for this project. The anticipated area impacted by the excavation activities within the ROW is approximately 10 feet wide by 100 feet long, or about 1,000 square feet. Prior to excavation, the area of concern will be surveyed to determine the exact location of the ROW. The excavation will be barricaded and a traffic control plan will be prepared and implemented as part of the SDOT Street Use Permit.

There are no permits required for off-site disposal of contaminated soil. However, prior to excavation, soil samples will be collected and profiled for transportation of the material to an off-site disposal facility. Transportation activities will comply with the requirements of the Washington Department of Transportation.

The work hours and hauling periods will comply with the Street Use Permit and the project will comply with requirements for street cleaning, truck cleaning, or scaling as applicable, prior to transport.

While no permits are required for worker health and safety issues, on-site activities involving the handling of contaminated soil must comply with the provisions of the Washington Industrial Safety and Health Act (WISHA) and the Code of Federal Regulations (CFR) subpart 1910.120 that governs Hazardous Waste Operations and Emergency Response (HAZWOPER). Occupational exposures by on-site workers will be monitored as a component of on-site Health and Safety monitoring. A site-specific Health and Safety Plan will be prepared and reviewed by all site workers prior to the beginning of work. Based on the information available to date, the excavated soils are not anticipated to be hazardous.

4.2 Site Preparation

Prior to any excavation, site preparation will be necessary. Site preparation activities will comply with the requirements of the SDOT Street Use Permit and will be subject to periodic inspection by City personnel. The Street Use Permit may require such items as traffic control, signage, protective fencing, limiting ingress and egress, and protection of catch basins from runoff.

The One-Call public utility locating service will be contacted at least 48 hours prior to the beginning of the excavation activities to check for subsurface public utilities. In addition, a private utility locating service will be utilized to check for private utilities.

4.3 Excavation and Soil Handling

Prior to excavation a total of four soil samples will be collected from the Area of Concern and submitted for analysis of arsenic, copper, and zinc and other specific analyses required by the selected disposal facility. Those analytical results will be used for preapproval of the excavation soils by the waste disposal facility prior to beginning excavation. All soil disposal will be in accordance with applicable regulations and with the acceptance criteria of the selected disposal facility.

Excavation will be performed primarily using a small track-mounted excavator. Other equipment may include rubber-tired backhoes, front-end loaders, vibratory rollers, or other machinery appropriate to project circumstances for excavation and backfilling. Soils will be direct-loaded into either roll-off bins or trucks and transported to the approved disposal facility. If necessary, water will be used for dust suppression. It is not anticipated that ground water will be encountered during the remedial activities.

The expected excavation area, shown in Figure 3, is rectangular in shape encompassing about 1,000 square feet. The planned excavation depth is approximately 24 inches deep. The total excavation volume is expected to be approximately 75 cubic yards. The actual limit of vertical remedial excavation will be determined through compliance sampling and those limits will be documented and presented in a report documenting the results of the remedial actions. At no point will the lateral extent of the excavation extend into the City streets.

The excavation will be barricaded and secured overnight while awaiting analytical results from the fixed base laboratory for the performance samples. Other requirements for site security that may be contained within the Right of Way or Street Use permits will also be met.

4.4 Compliance Monitoring

Compliance monitoring is intended to fulfill the requirements of Sections 410, 740, 810, and 820 of the MTCA Cleanup Regulations (WAC 173-340). The following sections present the activities that will be performed for the components of compliance monitoring during implementation of the remedial activities.

4.4.1 Protection Monitoring

Protection monitoring is intended to confirm that human health and the environment are protected during implementation of the remedial action (WAC 173-340-410(a)). Protection monitoring of human health will be performed through the implementation of a Health and Safety Plan (HASP) prepared in accordance with the requirements of the Occupational Safety and Health Administration (OSHA) and the WISHA standards for hazardous waste site operations (29 CFR 1910.120 and WAC 296-62 Part P). The HASP will pertain only to those activities relating to handling and management of contaminated soils and related hazards, and will have no relation to any other phases of the project.

The HASP will establish the general health and safety practices for EPI personnel performing the remedial action and will be provided to the on-site contractors for their information. EPI will not be responsible for the health and safety of other on-site personnel. EPI is not the general contractor for

this project and does not control the jobsite. However, EPI will be available to advise other on-site workers on the health and safety measures that EPI personnel will be using. EPI will share all of its monitoring data and will advise other workers when EPI personnel are upgrading or modifying their level of personal protective equipment (PPE). The HASP will also be provided to subcontractor personnel for informational purposes. Implementation of this level of on-site health and safety monitoring meets the requirements of WAC 173-340-410(1)(a) for the following reasons:

- Site access will be limited to authorized personnel;

- The field monitoring and mitigation measures called for in the HASP are protective of on-site worker health and safety and should therefore also be adequate to protect the health of workers potentially occupying nearby buildings;

- Conditions imposed on the remedial action contractors by applicable federal and state regulations and laws require that specific measures be taken to prevent the occurrence of discharges that may pose a threat to human health or the environment (e.g., surface water runoff, earth moving equipment dragout, wind-blown dust emissions). These same regulations also require that contingency plans be prepared and implemented in the event of an accidental discharge of contaminants (e.g., overturned haul truck). Work will be conducted in accordance with applicable OSHA and WISHA regulations. Contractors on this project will be required to develop and implement their own health and safety procedures in accordance with applicable laws and regulations; and

- Soil excavation activities associated with this project will be of a relatively short duration (i.e., 1 to 3 days) and health risks associated with long-term exposures to on-site contaminants are not a concern. Considering the protection measures and monitoring called for during soil excavation, the risk of non-workers being subjected to appreciable short-term chemical exposure will be negligible.

The HASP will also provide the standards for upgrading personal protective equipment and the air monitoring equipment to be used.

4.4.2 Performance Monitoring

Performance monitoring is used to determine whether and where the remedial action has attained the desired cleanup levels (WAC 173-340-410(1)(b)). During the cleanup action, performance monitoring will consist of collecting and analyzing soil samples from the sidewalls and bottom of the remedial excavation to demonstrate compliance with the selected cleanup levels presented in Section 2.1.

The final lateral limits of the remedial excavation will be determined solely by either a) the attainment of the selected cleanup level as demonstrated by quantitative laboratory analytical results or b) the limits of practicability such as encroachment into the City of Seattle ROW.

As stipulated in MTCA (WAC 173-340-740(7)), in determining compliance with any particular cleanup level it is necessary to demonstrate that:

(i) No single sample concentration is greater than two times the soil cleanup level;
(ii) Less than 10 percent of the sample concentrations exceed the soil cleanup level; and
(iii) The true proportion of samples that do not exceed the soil cleanup level shall not be less than 95 percent using a Type I error level of 0.05.

The COCs within the Area of Concern are not readily discernable with field screening methods. As a result, the excavation will be guided by the quantitative laboratory analyses and the limits of practicability.

Final performance soil samples will be collected from the terminal sidewalls and bottom of the excavation. At a minimum, one sidewall performance sample will be collected from each excavation sidewall or for each 20 linear feet of excavation sidewall, whichever is greater.

At a minimum, one performance sample will be collected for each 200 square feet of excavation bottom. The approximate locations of bottom samples are identified in Figure 3. If a COC is detected at concentrations above the selected cleanup level at the bottom of the excavation, the excavation will be deepened by 6 inches within a ten-by-ten foot square area around the impacted sample, and the area will be resampled. This process will be repeated until compliance with the selected cleanup levels can be demonstrated. Excavation areas more than 24 inches deeper than the surrounding excavation bottom will also have excavation sidewall samples as described above.

The approximate sample locations based on complete excavation within the Area of Concern are indicated on Figure 3. Compliance sampling locations will be clearly labeled on final report figures and sample names will contain a suffix indicating the sample depth and whether the sample was from an excavation sidewall or excavation bottom. For example, a sidewall sample collected from the southern side of the excavation at a depth of 12 inches might be named SW-SouthX-12 and a bottom sample might be named B-X-24, with “X” being an alphanumeric designation and the “12” or “24” indicating the sample depth in inches.

Performance samples will be submitted for selected analysis of the following COCs:

- Total arsenic, copper, and zinc using EPA Method 200.7/6010C

All soil samples will be collected in pre-cleaned, laboratory-supplied glass jars directly from the excavation sidewall or bottom. Soil samples will be collected with stainless steel spoons and bowls and all samples will be thoroughly homogenized prior to being placed in an 8 ounce glass jar supplied by the analytical laboratory. No composite samples will be collected for performance monitoring purposes. Any reusable sampling equipment will be decontaminated prior to use.

EPI on-site personnel will document field activities in a field notebook. This notebook will document pertinent field activities as well as the times, dates, identification numbers, and sampling locations of performance (and other) samples. This field notebook will also contain notations of pertinent observations, protection monitoring measurements, and any other observations deemed important by

the field personnel. All entries will be made in ink and each page will be dated. Photographs will be taken of unusual circumstances encountered during excavation and noted in the field notebook.

4.5 Site Restoration

After the final limits of the excavation have been reached, site restoration will begin. Placement of backfill materials will preferably be performed during dry weather to prevent the upward pumping of silty soils within the interstitial spaces of the more permeable base-layer backfill soils.

The bottom of the excavation will receive six to twelve inches of 2" to 4" quarry spalls to facilitate the infiltration of stormwater in the Area of Concern. A layer of geotextile such as Mirafi® will be placed over the quarry spalls to prevent interstitial clogging from the overlying finer grained fill soils. The remainder of the excavation will be backfilled in 6- to 12-inch loose lifts with SDOT-approved shoulder ballast aggregate meeting the 2011 edition City of Seattle Standard Specifications For Road, Bridge, and Municipal Construction standard 9-03.9(2). Soils will be compacted using a vibratory roller or vibratory plate appropriate for the project. Analytical data for copper, zinc, and arsenic of the imported aggregate backfill materials will either be provided by the materials supplier, or the material will be sampled and submitted for analysis prior to placement. The data will be reviewed prior to the placement to confirm that the imported aggregate materials meet the selected cleanup levels.

4.6 Independent Cleanup Action Report

An *Independent Cleanup Action Report* (ICAR) will be prepared upon completion of the activities described herein. The ICAR will document the activities performed during the remedial excavation, the results of the remedial activities and related sampling and analysis, and the conclusions supported by those results. The ICAR will include the following:

- A narrative description of the scope of work performed;
- A discussion of the performance monitoring results and compliance with applicable cleanup standards (levels and point of compliance);
- Tabulated summaries of field screening results and analytical data;
- A map showing the final limits of the soil excavation and soil sampling locations;
- A tabulated summary of soil disposal volumes;
- A printed copy of analytical laboratory reports;
- Copies of treatment facility tipping receipts; and
- Any other information pertinent to the implementation of the soil remediation.

5.0 LIMITATIONS

To the extent that preparation of this RAWP has required the application of best professional judgment and the application of scientific principles, certain results of this work have been based on subjective interpretation. We make no warranties express or implied, including and without limitation, warranties as to merchantability or fitness for a particular purpose. The information provided in this RAWP is not to be construed as legal advice.

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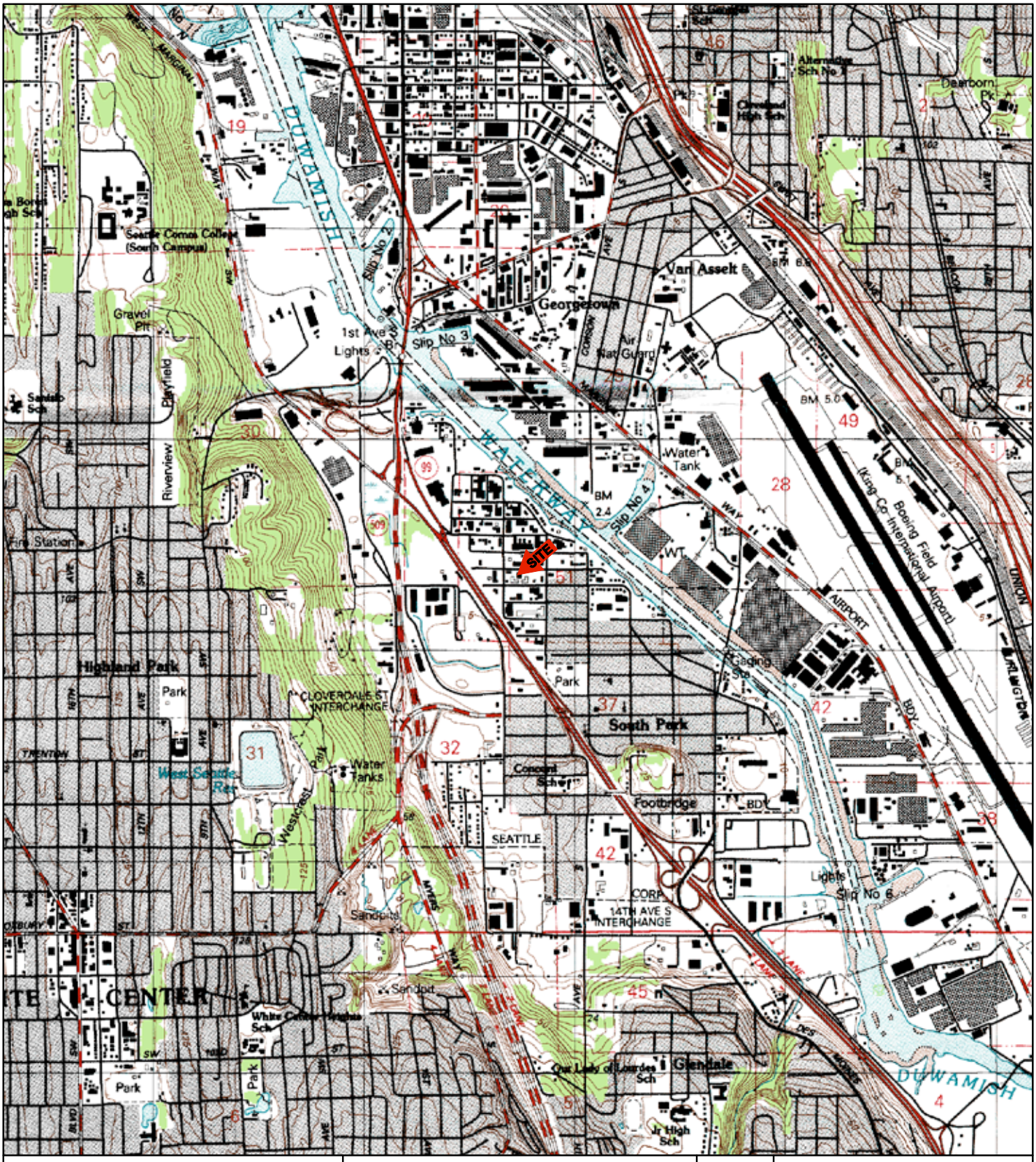
Figures



KEY:

SOURCE: USGS 7.5 MINUTE QUADRANGLE (TOPOGRAPHIC)

SEATTLE SOUTH, WASHINGTON
1977

REVISED 1983

SCALE = 1:25,000

ENVIRONMENTAL PARTNERS INC
295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

FIGURE 1

GENERAL VICINITY MAP

PROJECT	59401.1
PREPARED FOR	MARINE LUMBER SERVICE
LOCATION	525 S. CHICAGO ST. SEATTLE, WASHINGTON

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	ARM	ELC	03/05/10

KEY:

SOURCE: 2007 AERIAL PHOTGRAPH OBTAINED FROM GOOGLE EARTH.

SUBJECT PROPERTY

0 30 60 120

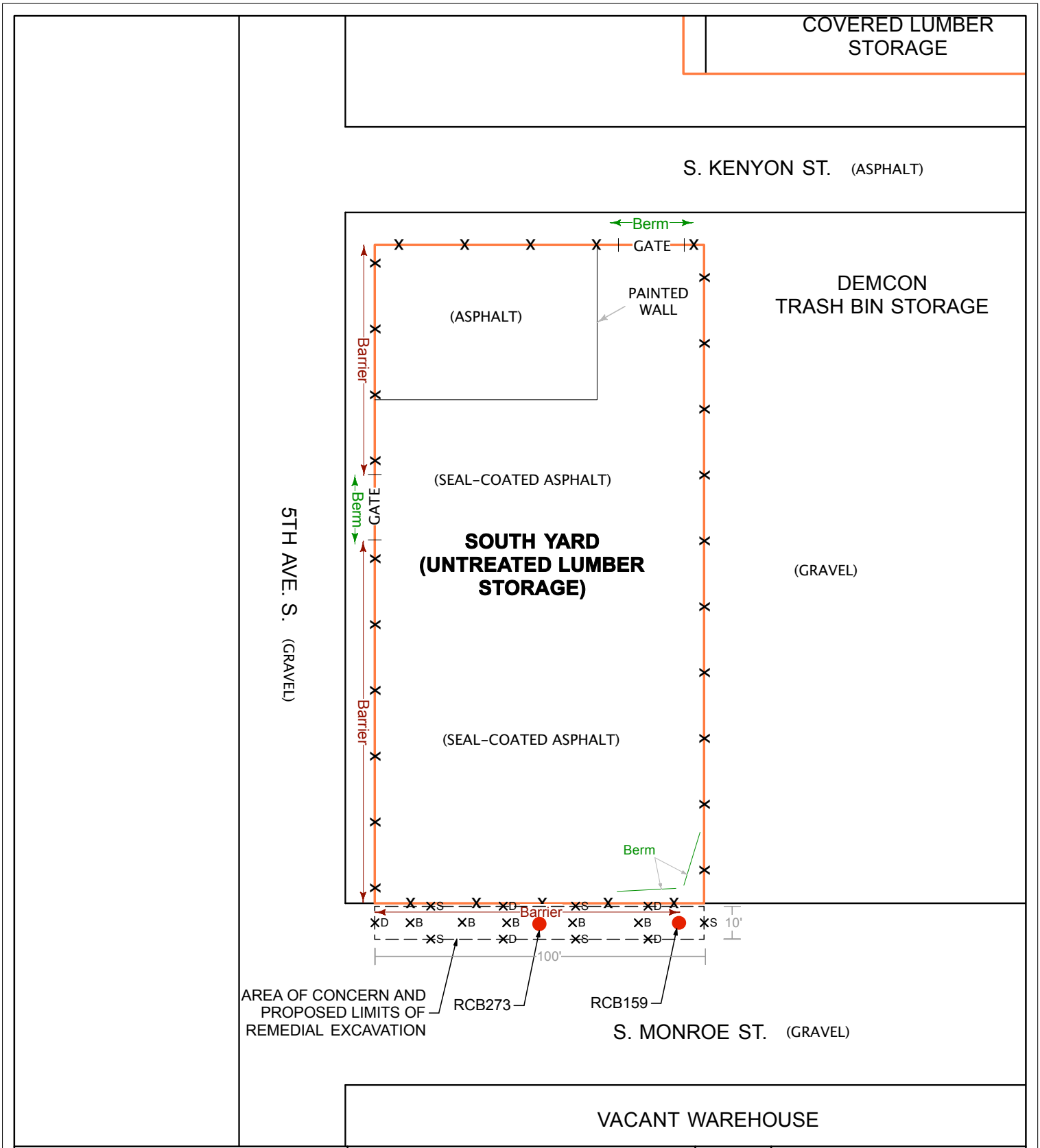
APPROXIMATE SCALE: 1" = 120'

ENVIRONMENTAL PARTNERS INC
295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

FIGURE 2

GENERAL FACILITY PLAN

PROJECT	59401.3		
PREPARED FOR	MARINE LUMBER SERVICE, INC.		
LOCATION	525 S. CHICAGO ST. SEATTLE, WASHINGTON		
SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*KLA*	*ELC*	*03/21/12*



KEY:

- SUBJECT PROPERTY
- CHAIN-LINK FENCE
- BERM
- BARRIER
- XB XS XD PROPOSED SOIL SAMPLE LOCATION
  - B = BOTTOM
  - S = SHALLOW (6" BGS)
  - D = DEEP (12" BGS)
- APPROX. LOCATION OF SPU SAMPLE

0 10 20 40

APPROXIMATE SCALE: 1" = 40'

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FIGURE 3

SITE REPRESENTATION SHOWING AREA OF CONCERN, PROPOSED LIMITS OF REMEDIAL EXCAVATION, AND PERFORMANCE SOIL SAMPLE LOCATIONS

PROJECT	004196.0
PREPARED FOR	MARINE LUMBER SERVICE, INC.
LOCATION	525 S. CHICAGO ST. SEATTLE, WASHINGTON

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	KLA	ARM	06/24/12